



F1705-190075/A

**DRAWINGS AND SPECIFICATIONS FOR:
MT.OZZARD BYPASS ROAD & COMMUNICATION TOWER FOUNDATION
CANADIAN COAST GUARD (CCG)
UCLUELET, BC**

CCG WESTERN REGION MARITIME AND CIVIL INFRASTRUCTURE
CCG PROJECT REFERENCES: N6246, N62B5

Prepared by: SC/AW
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END OF SECTION

Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises:
 - .1 Construction of a 450 m of new access road. Work include brushing and reactivation of existing road, right-of-way falling, clearing and grubbing, site prep, roadway and drainage excavations, culvert installation, road construction and grass seeding.
 - .2 Design and construction of 450m of new overhead hydro transmission line, connections to existing power line and decommissioning of redundant overhead hydro transmission line.
 - .3 Construction of concrete foundations and grounding for a 140' self-supporting steel communications tower and cable bridge at Coast Guard's communications facility at the summit of Mt.Ozzard.
 - .4 Site grading at Coast Guard's communications facility at the summit of Mt Ozzard.
 - .5 Traffic management services

1.2 PROJECT LOCATION

- .1 The Canadian Coast Guard Mt.Ozzard access road and facility at the summit is located near Ucluelet, BC on Vancouver Island. Appendix A - Site Location Photos provides details of the existing site. The approximate site coordinates are 48° 57' 35"N – 125° 29' 36"W.
 - .1 Bypass road is within a statutory Right of Way on Yuułu?if?ath Government lands.
 - .2 CCG communications facility at Mt.Ozzard Summit is within a Map Reserve registered with Department of Fisheries Oceans and is accessed via a gravel forestry-type road or by helicopter.

1.3 SUBMITTALS

- .1 Mandatory submittals and schedule for submission are detailed below and in APPENDIX B - Summary of Submittals. The following identifies general requirements only. The relevant Sections must be consulted for a complete listing of mandatory content. This summary is not an exhaustive list of all submissions required for the duration of the project, as additional submissions may be required after award. All Submissions to be in accordance with Section 01 33 00 – Submittal Procedures.
 - .1 Design Drawings
 - .1 Deadline: 28 days following contract award.
 - .2 Schedule
 - .1 Deadline: 28 days following contract award.
 - .3 Construction Plan
 - .1 Deadline: 28 days following contract award except as stated otherwise in the relevant Sections.
 - .4 As-Builts
 - .1 Deadline: 21 days following completion of site works.

1.4 WORK BY OTHERS

- .1 Co-operate with other Contractors and Canadian Coast Guard (CCG) in carrying out their respective works and carry out instructions from Departmental Representative.
- .2 Co-ordinate work with that of other Contractors and CCG Forces. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.5 WORK RESTRICTIONS

- .1 It is the responsibility of the Contractor to be familiar with the site location and identify project constraints as they relate to the scope of work. Among the various constraints includes, but not limited to, the following:
 - .1 Weather: Weather on coastal mountains can be unpredictable and subject to sudden changes. High wind, fog, and precipitation can hinder construction progress and pose safety hazards. General rainfall shutdown guidelines for worker safety by Glynnis Horel, P.Eng. for Clayoquot/Barkely area are to be followed as provided in specifications.
 - .2 Access Road Conditions: The site is accessed through public and Coast Guard owned gravel forest roads. The road conditions can be variable with pot holes, erosion, and steep, winding, and narrow lanes. The road may limit truck size and material volumes for each truck haul. Some roads may be used for active logging activities by others.
 - .3 Communications: There is limited cell coverage available on site. Other means of communication will need to be planned for such as satellite devices and radios.
 - .4 Building Access: There will be no access to the Coast Guard building at the summit of Mt Ozzard.
 - .5 Contractor to provide access on Mt.Ozzard road 24/7 for CCG and partner agencies at summit.
- .2 Contractor is responsible to maintain security of Mt.Ozzard road access. Gate is to remain closed at all times and locked daily. Contractor will be provided with access key for gate lock to permit access for duration of project.
- .3 Contractor is responsible to provide CCG site partner notifications regarding access restriction 14 calendar days in advance of planned work. Departmental Representative to review notifications prior to issuance by Contractor.

1.6 CCG RESPONSIBILITIES

- .1 The Coast Guard shall be responsible for the following:
 - .1 Providing to the Contractor a contact list of site users.
 - .2 Providing to the Contractor 1 gate key for road access.
 - .3 Providing to the Contractor road layout.
 - .4 Providing to the Contractor concrete foundation layout.
 - .5 Providing to the Contractor tower foundation threaded rod anchors, embedment plates, and anchor rod template.
- .2 The Coast Guard may undertake various monitoring functions during the Work. This includes but is not limited to:

- .1 First Nations observers: CCG may retain First Nations observers for the project. They may observe and report on construction activities to the First Nations Community on that which is required. Direct involvement on construction activities is to be limited, except where there is a cultural or archeological concern that arises at a particular site.
- .2 Environmental monitors: CCG, or its representatives, may monitor construction activities for conformance to the Environmental Protection Plan provided.
- .3 Construction monitors: CCG, or its representatives may monitor various stages of construction performance for conformance to the contract documents and for final acceptance of Works.

1.7 TRAVEL AND ACCOMODATIONS

- .1 The Contractor is responsible for all travel and accommodation related expenses incurred for the Contractor's representatives as it relates to the Work.

1.8 FEES, PERMITS, AND CERTIFICATES

- .1 Contractor to pay fees, obtain certificates and permits, and provide information to authorities having jurisdiction where required.
 - .1 Contractor to provide copies to CCG of any documentation submitted to other authorities related to the Work.
- .2 Contractor to furnish certificates and permits when requested.

1.9 CONTRACTOR USE OF PREMISES

- .1 Use of areas designated on Contract documents until Substantial Completion.
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .4 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .5 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.10 TEMPORARY FACILITIES

- .1 Sanitary Facilities
 - .1 No washroom facilities are available on construction site. Contractor to provide sanitary facilities for work force in accordance with governing regulations and ordinances.
 - .2 The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use; and shall rigorously prohibit the committing of nuisances on the site of the Work, on the lands of the CCG, or on adjacent property.
- .2 Water Supply

- .1 Temporary water supply connection is not available at the site. Contractor to arrange for temporary water supply needed for personal or construction use as required.
- .3 Temporary Power
 - .1 Temporary power supply connection is not available at the site. Contractor to arrange for temporary power supply needed for personal or construction use as required.

1.11 SPECIAL PROJECT PROCEDURES

- .1 The following agencies and utilities have facilities located near the top of Mt.Ozzard in the vicinity of the radar dome:
 - .1 Department of Fisheries and Oceans/Canadian Coast Guard
 - .2 RCMP
 - .3 Environment Canada Weather Radio
 - .4 BC Ambulance Service Telecommunications
 - .5 Arrowsmith Amateur Radio Club / Port Alberni Radio Club
 - .6 Parks Canada
 - .7 Energy, Mines, and Resources Canada
 - .8 District of Ucluelet
 - .9 Telus
 - .10 Rogers Wireless / AT&T
 - .11 Iisaak Forest Resources Ltd.
 - .12 Alliance Business Solutions
- .2 These users require periodic access to their facilities. The Contractor shall establish and maintain communications with these users for the purpose of scheduling, access, temporary road closures, locations of existing utilities, and site safety. In some cases, users may need emergency access for unscheduled corrective maintenance; in such cases, the Contractor must allow users 24/7 access as required. The Contractor shall be responsible for traffic control.

1.12 SIGNS AND NOTICES

- .1 Provide and erect project sign, within (21) calendar days of Award of Contract, in a location designated by Departmental Representative to the following:
 - .1 Construction sign 1.2m x 2.4m, of wood frame and plywood construction.
 - .2 Project sign shall be in both official languages.
 - .3 Painted with exhibited lettering as approved by Departmental Representative and produced by a professional sign painter.
 - .4 Signage to include:
 - .1 Contract;
 - .2 Contractor name, contact number, and instructions for 24/7 access; and
 - .3 Radio channel.

- .2 Provide and erect construction warning signs on mountain bike/pedestrian footpath at locations designated on drawings to the following:
 - .1 Warning sign 0.5m x 0.3m, of Coroplast or equivalent construction.
 - .2 Painted with exhibited lettering as approved by Departmental Representative and produced by a professional sign painter.
- .3 Signs and notices for safety and instruction shall be in both official languages and graphic symbols conforming to CAN/CSA-Z321.
- .4 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or when directed by Departmental Representative.
- .5 No other signs or advertisements, other than warning signs, are permitted on site.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 WORK COMPLETION DEADLINES

- .1 All work to be completed by **November 15, 2019**.
 - .1 Complete all Bypass Road and Power Line Work by **September 30, 2019**.
 - .2 Complete all Concrete Foundation and Grounding Work by **October 31, 2019**.
 - .3 Complete all Site Grading Work by **October 31, 2019**.
 - .4 Complete all Optional Work by **October 31, 2019**.

3.2 COMMUNICATIONS

- .1 Weekly Updates:
 - .1 The Contractor is to provide weekly updates to the Technical Authority while construction is in progress. The weekly updates are to include:
 - .1 Work completed that week;
 - .2 Updates to the schedule and planned activities;
 - .3 A list of any safety incidents or notes; and
 - .4 Details of crew on site.
- .2 Site Check-in/out Procedures:
 - .1 In addition to the Weekly Updates, upon arrival or departure from site each day, the Contractor is to contact Prince Rupert Coast Guard Radio on Marine VHF channel 83A (frequency 157.175 MHz) and report on number of people on site and provide any other information as requested by Coast Guard Radio.
- .3 Availability:

- .1 The Contractor is to be able to be contacted at all times while working on site. Reliable satellite or GPS services are to be employed by the Contractor to allow the Coast Guard to make contact at any time.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

- .1 Submit to Canadian Coast Guard (CCG) submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present 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 CCG. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.
- .6 Notify CCG, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Contractor's responsibility for errors and omissions in submission is not relieved by CCG's review of submittals.
- .8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by CCG's review, unless CCG gives written acceptance of specific deviations.
- .9 All submissions include:
 - .1 Date and revision number.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
- .10 Unless noted otherwise, submittals in electronic format are required.

1.2 SHOP DRAWINGS

- .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 Submit drawings stamped and signed by professional engineer registered and licensed in British Columbia, Canada.
- .3 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 co-ordinated, regardless of Section under which

adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

- .4 Allow five working days, or as otherwise stipulated in the specifications, for CCG to review of each submission.
- .5 Adjustments made on shop drawings by CCG are not intended to change contract price. If adjustments affect value of Work, state such in writing to CCG and await authorization prior to proceeding with Work.
- .6 Make changes in shop drawings as CCG may require, consistent with Contract Documents. When resubmitting, notify CCG in writing of revisions other than those requested.
- .7 Submissions to include:
 - .1 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .8 After CCG's review, distribute copies.
- .9 Submit electronic copies of shop drawings for each requirement requested in specification Sections and as CCG may reasonably request.
- .10 Submit 3 copies of product data sheets or brochures for requirements requested in specification Sections and as requested by CCG where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by CCG.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .12 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by CCG.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

- .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by CCG.
- .14 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .15 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by CCG.
- .16 Delete information not applicable to project.
- .17 Supplement standard information to provide details applicable to project.
- .18 If upon review by CCG, 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.
- .19 The review of shop drawings by CCG is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that CCG 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 requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SCHEDULE

- .1 Submit a detailed Project Schedule for planning, monitoring and reporting of project progress and to allow orderly planning, organizing, and executing of Work.
- .2 Allow five working days, or as otherwise stipulated in the specifications, for CCG to review submission.
- .3 Submission format to include a Bar Chart (GANNT).
- .4 Accepted Schedule will be used as baseline for progress and updates.
- .5 Project Milestones form targets for Project Schedule. Milestones include:
 - .1 Completion of all Bypass Road and Power Line Work
 - .2 Completion of all Concrete Foundation and Grounding Work
 - .3 Completion of all Site Grading Work
 - .4 Completion of all Optional Work
- .6 Submission to include as a minimum:
 - .1 Contract award;

- .2 Permits;
- .3 Dates of submittals;
- .4 Project Milestone completion dates; and
- .5 Detailed description of the Work Plan including:
 - .1 Mobilizations of equipment, crews, and materials;
 - .2 Site Work activities; and
 - .3 Site clean-up and demobilizations.
- .7 Update Schedule on a weekly basis reflecting activity changes and completions, activities in progress, comparing current progress to baseline, and presenting forecasts.

1.4 CONSTRUCTION PLAN

- .1 Submit a Construction Plan to be of sufficient detail to demonstrate that the challenges of the project have been considered and preparations have been made to undertake the Work in a competent and professional manner.
- .2 Allow five working days, or as otherwise stipulated in the specifications, for CCG to review of each submission.
- .3 Submission to include:
 - .1 List of Sub-Contractors, suppliers and Departmental Representative.
 - .2 Prime Contractor/co-ordination with other Contractors Plan.
 - .3 Contractor Chain of Command including Sub-Contractors and Departmental Representatives.
 - .4 Work Plan for all items including:
 - .1 Mobilization;
 - .2 Material Delivery;
 - .3 Staging Areas;
 - .4 Accommodations Plan;
 - .5 Demolition;
 - .6 Earth Movement;
 - .7 Interim Inspections; and
 - .8 Site Clean-up and Demobilizations.
 - .5 Traffic Management Plan;
 - .6 Health and Safety Plan (Section 01 35 30);
 - .7 Environmental Protection Plan (Section 01 35 43);
 - .8 Concrete Plan (Section 03 30 00);
 - .9 Grounding Plan (Section 26 05 27);
 - .10 Excavation Plan (Section 31 23 33.01).
- .4 The Construction Plan can be submitted in parts.

1.5 AS-BUILTS

- .1 Submit As-built information following completion of Work.

- .2 Allow five working days, or as otherwise stipulated in the specifications, for CCG to review each submission.
- .3 Submissions to include:
 - .1 A written construction summary report outlining Work completed or not completed.
 - .2 As-built drawings clearly marked up in red markings containing any changes or variations from the original design documents.
 - .3 Construction photographs clearly showing the completion of Work and any changes or variations from the original design documents.
 - .4 Test reports as required in the specifications.
 - .5 A 1 page signed and sealed letter from the Contractor employed respective Engineers of Record stating and providing assurance that the Work relevant to their design has been completed to their satisfaction and in accordance with their design.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Ucluelet, B.C.

Part 1 General

1.1 REFERENCES

- .1 Government of Canada:
 - .1 Canada Labour Code – Part II
 - .2 Canada Occupational Health and Safety Regulations.
- .2 Province of British Columbia:
 - .1 Occupational Health and Safety Regulation.
 - .2 Occupational Health and Safety - Part 26 Forestry Operations and Similar Activities
- .3 BC Forest Safety Council: Safety Accord Forestry Enterprise (SAFE) Certification

1.2 WORKERS COMPENSATION BOARD COVERAGE

- .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.3 BC FOREST SAFETY COUNCIL SAFE CERTIFICATION

- .1 Contactor conducting falling work associated with Bypass road construction must hold current BC Forest Safety Council SAFE Certification. Certification must be valid for duration of project.

1.4 COMPLIANCE WITH REGULATIONS

- .1 Public Works and Government Services Canada (PWGSC) may terminate the Contract without liability to PWGSC where 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 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with 01 33 00 – Submittal Procedures.
- .2 Submit the following within (21) calendar days of Award of Contract and prior to commencement of Work.
 - .1 Company Safety Manual.
 - .2 Site-specific Health and Safety Plan,
 - .3 Copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
 - .4 Copies of incident and accident reports.

- .5 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
- .6 Emergency procedures.
- .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within (7) calendar days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within (5) calendar days after receipt of comments from Departmental Representative.
- .4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .5 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .6 On-site Contingency and Emergency Response Plan: Contractor shall coordinate and comply with Departmental Representative regarding any specific emergency response procedures required by Canadian Coast Guard (CCG) at Mt.Ozzard Communications facility, and address standard operating procedures to be implemented during emergency situations.

1.6 RESPONSIBILITY

- .1 Assume responsibility as Prime Contractor for the work under this Contract.
- .2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities of the Work.
 - .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, revising, daily enforcing, and monitoring the Site Specific Health and Safety Plan.
 - .5 Be on site during execution of work

1.8 GENERAL CONDITIONS

- .1 Provide safety barricades and lights around the Contractor's Work Site (as necessary) to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
 - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
 - .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the Contractor's Work Site.
 - .3 Secure site(s) at night time as deemed necessary to protect site against entry
- .2 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect other site users.

1.9 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Multi-employer works site.
 - .2 Federal employees.
 - .3 Other contractors.
 - .4 Yuułu?il?ath Nation members.
 - .5 Public (pedestrians hiking and mountain bikers).

1.10 UTILITY CLEARANCES

- .1 The Contractor is solely responsible for all utility detection and clearances prior to starting the Work.
- .2 The Contractor will not rely solely upon Reference Drawings or other information provided for utility locations.

1.11 REGULATORY REQUIREMENTS

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

1.12 WORK PERMITS

- .1 Obtain required specialty permit(s) related to project before start of work.

1.13 FILING OF NOTICE

- .1 Contractor is to complete and submit a Notice of Project with Provincial authorities before work commences.
- .2 Provide copies of all notices to Departmental Representative.

1.14 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 safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job-specific safe work procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and 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 work.
 - .4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .5 Identify personal protective equipment (PPE) to be used by workers.
 - .6 Identify personnel and alternates responsible for site safety and health.
 - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
- .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
- .5 Departmental Representative's review of Site Specific Health and Safety Plan by Public shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

1.15 EMERGENCY PROCEDURES

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

- .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to work and as per legislated regulations.
 - .3 Local emergency resources.
 - .4 Departmental Representative.
- .2 Include the following provisions in the emergency procedures:
- .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.
 - .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
 - .6 Notify Departmental Representative.
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
- .1 Work 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 require physical assistance to be moved.

Design and mark emergency exit routes to provide quick and unimpeded exit.

1.16 HAZARDOUS PRODUCTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 33 00.
 - .2 The contractor shall ensure that the product is applied as per manufacturers recommendations.
 - .3 The contractor shall ensure that only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

1.17 ASBESTOS HAZARD

- .1 Carry out any activities involving asbestos in accordance with applicable Provincial / Federal Regulations.

- .2 Removal and handling of asbestos will be in accordance with applicable Provincial / Federal Regulations.

1.18 REMOVAL OF LEAD CONTAINING PAINTS

- .1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.
- .2 Carry out demolition and/or remediation activities involving lead-containing paints in accordance with Worksafe BC Regulations.
- .3 Dry Scraping/Sanding of any materials containing lead is strictly prohibited.
- .4 The use of Methylene Chloride based paint removal products is strictly prohibited.

1.19 SILICA

- .1 Carry out work in accordance with Worksafe BC regulations.

1.20 OVERLOADING

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

1.21 BLASTING

- .1 Blasting or other use of explosives only permitted when approved by Departmental Representative.

1.22 POWDER ACTUATED DEVICES

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

1.23 FIRE SAFETY AND HOT WORK

- .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

1.24 FIRE SAFETY REQUIREMENTS

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
- .3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the Departmental Representative is required prior to any gas or diesel tank being brought onto the work site.

1.25 UNFORSEEN HAZARDS

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

1.26 POSTING OF DOCUMENTS

- .1 Post legible versions of the following documents on site:
 - .1 Site Specific Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
 - .5 Notice of Project.
 - .6 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
 - .7 Workplace Hazardous Materials Information System (WHMIS) documents.
 - .8 Material Safety Data Sheets (MSDS).
 - .9 List of names of Joint Health and Safety Committee members, or 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 this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

1.27 MEETINGS

- .1 Schedule, administer and attend Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.28 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Canadian Environmental Protection Act (CEPA)
- .2 Canadian Environmental Assessment Act, 2012 (CEAA)

1.2 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Environmental Protection Plan as part of the Construction Plan at least (21) calendar days prior to commencing construction activities.
- .3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 Include in Environmental Protection Plan:
 - .1 Name of person responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Name and qualifications of person responsible for manifesting hazardous waste to be removed from site.
 - .3 Name and qualifications of person responsible for training site personnel.
 - .4 Drawings indicating locations of proposed temporary excavations or embankments for material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
 - .5 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas. Plan to indicate staging, refueling, and cleaning areas.
 - .6 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .7 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

- .8 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .9 Waste Water Management Plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .10 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
- .11 Equipment to be used on site identifying age and spill containment procedures.

1.4 EQUIPMENT CONDITION

- .1 Equipment mobilized to site is to be clean and free of deleterious materials and leaks.
- .2 Equipment that is not clean upon arrival to site will be rejected by Departmental Representative. Contractor to pay costs of removal and remobilizing equipment to site.
- .3 Sample equipment cleaning procedures provided in Appendices for Contractor reference.

1.5 FIRES

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

1.6 DRAINAGE

- .1 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .2 Ensure pumped water into waterways is free of suspended materials.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.7 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Only clear vegetation that interferes with construction.
- .3 Minimize stripping of topsoil and vegetation.
- .4 Restrict tree removal within limits of flagged right of way for Bypass Road.

1.8 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Provide methods, means, and facilities to prevent the contamination of soil, water, and atmosphere from the discharge of pollutants produced by construction operations.

- .3 Vehicles, machinery, and equipment shall be in good repair, equipped with emission controls as applicable and operated within regulatory requirements.
- .4 Avoid unnecessary idling of vehicles or heavy machinery.
- .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

1.9 NOTIFICATION

- .1 CCG will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform CCG of proposed corrective action and take such action for approval by CCG.
- .3 CCG will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: Leave Work area clean at end of each day.
- .2 Do not bury rubbish and waste materials on site.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .4 Waste Management: separate waste materials for recycling or reuse from materials for disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 – Concrete Work
- .2 Section 26 05 27 – Grounding
- .3 Section 31 05 16 – Aggregate Materials
- .4 Section 31 23 33.01 – Excavating, Trenching, and Backfilling
- .5 BPR-SS01 – Bypass Road Construction Supplemental Specifications

1.2 INSPECTION

- .1 Allow Canadian Coast Guard (CCG) access to Work. If part of Work is in preparation at locations other than Project Location, allow access to such Work whenever it is in progress.
- .2 The below list identifies key milestones where CCG will require an opportunity to take samples/inspect. Such inspections are to satisfy CCG's internal requirements and do not alleviate the Contractor's responsibility to review and inspect the work for conformance to design documents.
 - .1 Departmental Representative will at a minimum conduct reviews of Bypass Road construction as follows:
 - .1 Upon completion of right-of-way falling and clearing;
 - .2 Upon completion of subgrade installation;
 - .3 During culvert installation;
 - .4 Upon completion of surfacing material installation;
 - .2 Tower Foundation Base: CCG will inspect the excavation and preparation of the tower base prior to placing rebar or crushed rock. CCG will inspect backfilling and compaction.
 - .3 Reinforcing Steel Installation: CCG will inspect rebar for concrete foundations prior to placing concrete.
 - .4 Concrete Formwork: CCG may inspect formwork prior to placing concrete.
 - .5 Grounding: CCG may inspect placement of below grade grounding materials prior to backfilling.
 - .6 Electrical Trench: CCG will inspect the electrical conduit prior to backfill.
 - .7 Final Completion: CCG will conduct a final inspection upon completion.
- .3 Give a minimum of (96) hours notice for inspections of all key milestones listed above. The Contractor will be responsible for any delays in work if the required notice was not provided as specified.
- .4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

- .5 CCG will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, CCG shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

- .1 Contractor to retain and pay for services of testing company acceptable to the Departmental Representative for testing concrete materials to verify delivered concrete is in accordance with the Specifications.
- .2 Additional Independent Inspection/Testing Agencies may be engaged by CCG for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by CCG.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised at no cost to CCG. Contractor to pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.5 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by CCG as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

1.6 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.

1.7 MILL TESTS

- .1 Submit mill test certificates as required of specification Sections or as otherwise requested by CCG.

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 REFERENCE STANDARDS

- .1 Work under this section to be in compliance will all listed references. In the case of conflict or discrepancy, the more stringent shall apply:
 - .1 CSA A23.1, Concrete Materials and Methods of Concrete Construction;
 - .2 CSA A23.2, Methods of Test and Standard Practices for Concrete;
 - .3 CSA A23.3, Design of Concrete Structures;
 - .4 CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement;
 - .5 CSA S269.3 Concrete Formwork;
 - .6 National Building Code of Canada;
 - .7 ACI Specification 306 Cold Weather Concreting (if applicable).

1.2 SCOPE OF WORK

- .1 Work in this section includes the supply of all labour, material, and equipment necessary to complete the following activities:
 - .1 Construction of the tower foundation; and
 - .2 Construction of the cable bridge foundations.

1.3 PERFORMANCE REQUIREMENTS

- .1 The Work shall be designed to perform as reasonably expected for a life of 50 years.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit Concrete Plan as part of the Construction Plan at least two weeks before commencing concrete construction activities. Submission to include:
 - .1 High level summary of mix properties and admixtures to demonstrate compliance with CCG criteria and Foundation Design Drawings;
 - .2 Concrete placing plan identifying the location of the source of ready mix concrete, the transport and placement plan and any other relevant information required to demonstrate a plan for placing the concrete in the required amount of time;
 - .3 Finishing procedures;
 - .4 Curing methods and schedule;
 - .5 Clean-up procedures;
 - .6 Procedures to place and cure concrete in hot or cold temperatures where reasonably anticipated during the construction period; and
 - .7 Name of proposed inspection agency to perform concrete quality testing.
- .3 Provide test result reports for review by CCG and do not proceed without written approval when deviations from mix design or parameters are found.

1.5 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Concrete samples:
 - .1 To be obtained and tested in accordance with CSA A23.2 to verify concrete quality including: age, air content, slump, and compressive strength.
 - .2 A minimum of 3 trucks selected at random are to be sampled and tested for each day of concrete placement.
 - .3 A minimum of 4 cylinders are to be cast for each sample and are to be tested for compressive strength as follows: one at 7 days, one at 14 days, and two at 28 days.

Part 2 Products

2.1 PERFORMANCE CRITERIA

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as specified on the Design Drawings and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.2 MIXES

- .1 Concrete mix to be determined by Contractor and shall meet specifications on the Design Drawings.
- .2 The use of calcium chloride as an admixture is not permitted.

Part 3 Execution

3.1 PREPARATION

- .1 Allow for CCG to review foundation base, reinforcing steel and formwork prior to placing concrete.
- .2 Obtain CCG's written approval before placing concrete.
- .3 Place, finish, and cure concrete in accordance with the Contractor's submitted Concrete Construction Plan and in accordance with the Design Drawings.
- .4 Place concrete reinforcing:
 - .1 In accordance with the Design Drawings;
 - .2 Free from all loose scaly corrosion, dirt, oil, paint, or other coatings that may be detrimental from reinforcement;
 - .3 With no field bends or field welds except where indicated or authorized by CCG; and
 - .4 To ensure adequate cover to reinforcement is maintained during concrete pour.
- .5 During concreting operations:
 - .1 Development of cold joints is not allowed unless otherwise approved in writing by CCG.

- .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .6 Ensure reinforcement and inserts are not disturbed during concrete placement.

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2 making all adjustments necessary to account for climatic conditions anticipated during the curing period.
 - .2 Provide a lightly brushed non-skid surface on exposed concrete surfaces, unless otherwise specified in the submitted design.
 - .3 Finish concrete so as to slope gently away from the center of the slab. No water shall pond on the finished surface.
 - .4 Provide appropriate chamfers at all exposed concrete edges.
- .3 Provide samples as required for the performance of quality assurance testing.

3.3 FIELD QUALITY CONTROL

- .1 Arrange for concrete testing in accordance with Section 01 45 00 – Quality Control and submit report.
- .2 Allow for CCG to monitor any concrete pour and provide minimum 96 hours' notice prior to placement of any concrete.

3.4 CLEANING

- .1 Clean in accordance with Section 01 35 43 – Environmental Procedures.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Work under this section to be in compliance with all listed references. In the case of conflict or discrepancy, the more stringent shall apply:
 - .1 Motorola R56, Standards and Guidelines for Communication Sites.
 - .2 CSA C22.1, Canadian Electrical Code.
 - .3 CSA S37-18, Antennas, Towers, and Antenna-Supporting Structures.
 - .4 National Building Code of Canada.
 - .5 Canada Labour Code Part II.
 - .6 WorkSafeBC Occupational Health and Safety Act and Regulation.

1.2 SCOPE OF WORK

- .1 Work in this section includes the supply of all design, labour, material, and equipment necessary to provide a communications tower grounding system comprising: copper-clad steel ground rods and tinned copper ground cable complete with exothermic ground rod connections.
- .2 The grounding system is to be provided for all applicable Sections.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Grounding Plan as part of the Construction Plan at least (21) calendar days before commencing grounding construction activities. Submission to include:
 - .1 High level summary of procedures and methods to be used during construction to meet the Specifications.

1.4 QUALITY ASSURANCE

- .1 Quality assurance: in accordance with Section 01 45 00 – Quality Control.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 GENERAL

- .1 Ensure other site infrastructure and grounding systems are not disturbed by excavation and backfill activities.
- .2 Obtain CCG's written approval before installing grounding system.

- .3 In areas where topsoil is present, strip 152mm topsoil and stockpile. Upon completion of backfilling, spread topsoil evenly over affected areas.

3.2 FIELD QUALITY CONTROL

- .1 Allow for CCG to monitor any grounding construction.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM D4791 (latest edition), Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Shop Drawings, Product Data and Sample.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for aggregate materials and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Certificates for proposed granular materials to confirm compliance with the Canadian Council of Ministers of the Environment (CCME) Residential/Parkland (RL/PL) Land Usage Soil Quality Guidelines.
 - .3 Submit gradation curves of aggregate material.
 - .4 Identification of the proposed fill source(s) and identify the current and historic activities conducted at the source.

1.3 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.
- .2 Allow continual sampling by Departmental Representative during production if requested.
- .3 Provide Departmental Representative with access to source and processed material for sampling.
- .4 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.
- .3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

Part 2 Products

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.

.2 Crushed Granular Sub-base and Crushed Granular Base material: properties in accordance with the following requirements:

- .1 Crushed or screened stone, gravel or sand.
- .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
- .3 Table:

Sieve Designation	% Passing		
	Granular Sub-Base (75mm crushed gravel)	Granular Base (19mm crushed gravel)	Sand
75 mm	100	-	-
50 mm	-	-	-
37.5 mm	60-100	-	-
25 mm	-	-	-
19 mm	35-80	100	-
12.5 mm	-	75-100	100
9.5 mm	26-60	60-90	-
4.75 mm	20-40	40-70	45-100
2.36 mm	15-30-	27-55	30-90
2.00 mm	-	-	-
1.18 mm	10-20	16-42	-
0.600 mm	5-15	8-30	10-50
0.425 mm	-	-	-
0.300 mm	3-10	5-20	3-20
0.180 mm	-	-	-
0.150 mm	-	-	-
0.075 mm	0-5	2-8	0-8

.3 Unshrinkable fill: proportioned and mixed to provide:

- .1 Maximum compressive strength of 0.4 MPa at 28 days.
- .2 Maximum cement content of 25 kg/m; to CSA-A3001, Type GU.
- .3 Minimum strength of 0.07MPa at 24 h.
- .4 Concrete aggregates: to CSA-A23.1/A23.2.
- .5 Cement: Type GU.
- .6 Slump: 160 to 200 mm.

.4 Flat and elongated particles of coarse aggregate: to ASTM D4791.

- .1 Greatest dimension to exceed 5 times least dimension.

.5 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:

- .1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

- .6 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
 - .1 Crushed rock.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag and expanded shale.

2.2 SOURCE QUALITY CONTROL

- .1 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.
- .2 Advise Department Representative 2 weeks minimum in advance of proposed change of material source.
- .3 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions are acceptable for topsoil stripping.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Department Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with topsoil stripping only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

- .1 Aggregate source preparation:
 - .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as approved by Departmental Representative.
 - .2 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
 - .3 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
 - .4 Trim off and dress slopes of waste material piles and leave site in neat condition.
 - .5 Provide silt fence or other means to prevent contamination of existing watercourse or natural wetland features.
- .2 Processing:
 - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

- .2 Blend aggregates, as required, that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.
 - .1 Use methods and equipment approved in writing by Departmental Representative.
- .3 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
- .4 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.
 - .1 Use only equipment approved in writing by Departmental Representative.
- .5 Stockpiling:
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative.
 - .2 Stockpile aggregates in sufficient quantities to meet project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
 - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
 - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Department Representative within 48 hours of rejection.
 - .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Maximum 1.5 m for coarse aggregate and base course materials.
 - .2 Maximum 1.5 m for fine aggregate and sub-base materials.
 - .3 Maximum 1.5 m for other materials.
 - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
 - .9 Do not cone piles or spill material over edges of piles.
 - .10 Do not use conveying stackers.
 - .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.3 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- .5 Waste Management: separate waste materials for reuse or recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 – Concrete Work
- .2 Section 26 05 27 – Grounding
- .3 Section 31 05 16 – Aggregate Materials

1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM D698-00a¹, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN- m/m³).

1.3 SCOPE OF WORK

- .1 Work in this section includes the supply of all labour, material, and equipment necessary to complete the following activities:
 - .1 Excavating and backfilling of the tower foundation;
 - .2 Trenching and backfilling an electrical conduit at the tower site;
 - .3 Excavating, trenching, and backfilling of tower site grounding; and
 - .4 Final grading of tower site.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Excavation Plan as part of the Construction Plan at least two weeks before commencing excavation activities. Submission to include:
 - .1 Construction equipment list for major equipment to be used in this section prior to start of Work.
 - .2 Locations of stockpiles.
- .3 Submit within (14) calendar days of removal of material from site, evidence that materials were disposed of according to all applicable regulatory requirements. Submission to include copies of disposal records including transport manifests, trip tickets and disposal receipts for excavated materials disposed offsite at approved receiving facilities.
- .4 Submit within (7) calendar days of delivery of fill materials to site, copies of transport manifests, trip tickets and material origin receipts for import materials.

1.5 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.

1.6 EXISTING CONDITIONS

- .1 Refer to drawings, site photos and geotechnical assessments supplied.

- .2 Buried services:
 - .1 Before commencing work verify location of buried services on and adjacent to work area.
 - .2 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .3 Record location of maintained, re-routed and abandoned underground lines on project record drawings.
- .3 Existing buildings and surface features:
 - .1 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Granular Sub-base and Granular Base material: in accordance with Section 31 05 16 – Aggregate Materials.
- .2 All material brought to the site that does not comply with the CCME RL/PL Guidelines will be removed from the property immediately at the Contractors cost. Contractor responsible for all remediation costs associated with import of non-compliant material.

Part 3 Execution

3.1 SITE PREPARATION/PROTECTION

- .1 Unless otherwise indicated or located in an area to be occupied by new construction, protect existing compacted gravel areas from loose soils excavated from nearby areas.
 - .1 Only clear vegetation that interferes with construction.
 - .2 Minimize stripping of topsoil and vegetation.
 - .3 Obtain CCG approval prior to any tree removal.

3.2 STOCKPILING

- .1 Stockpile materials in areas approved by CCG.
 - .1 Stockpile granular materials in manner to prevent segregation.
 - .2 Protect fill materials from contamination.
 - .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.3 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Protect open excavations against flooding and damage due to surface run-off.

- .3 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved runoff areas or containment facilities and in manner not detrimental to public and private property, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.4 EXCAVATING

- .1 Advise Departmental Representative at least (7) calendar days in advance of excavation operations. Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Excavation must not interfere with bearing capacity of adjacent foundations and slabs. Contractor to notify Departmental Representative immediately where undermining of slabs of foundations occurs. Contractor responsible for devising and executing a remediation plan for filling all voids associated with undermining of slabs and foundations.
- .3 Keep excavated and stockpiled materials safe distance away from edges.
- .4 Restrict vehicle operations directly adjacent to open trenches.
- .5 Dispose of surplus and unsuitable excavated material at approved receiving facilities. Contractor must provide Departmental Representative with evidence that materials were disposed of according to all applicable regulatory requirements, including provision of all disposal records including weigh bills, disposal receipts and chain of custody documentation.
- .6 Do not obstruct flow of surface drainage or natural watercourses.
- .7 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .8 Notify Departmental Representative when bottom of excavation is reached.
- .9 Obtain Departmental Representative approval of completed excavation.
- .10 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .11 Correct unauthorized over-excavation as follows:
 - .1 Fill with granular base material to not less than 95% Modified Proctor Density.
- .12 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
 - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

3.5 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services where indicated.
- .2 Place bedding and surround material in unfrozen condition.

3.6 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Departmental Representative has inspected installations.
 - .2 Inspection, testing, approval, and recording location of underground utilities and grounding.
 - .3 Removal of concrete formwork.
 - .4 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 300 mm compacted thickness, unless noted otherwise, up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations:
 - .1 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

3.7 GRADING

- .1 Grade so that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by Departmental Representative.
 - .1 Grade to be gradual between finished spot elevations shown on drawings.

3.8 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Clean and reinstate areas affected by Work as directed by Departmental Representative.
- .3 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

Canadian Coast Guard
MT.OZZARD BYPASS ROAD & TOWER FOUNDATION

Ucluelet, B.C.

BPR-SS01
Bypass Road Construction
Supplemental Specifications
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Part 1 General**1.1 DESCRIPTION**

- .1 This section specifies requirements for development and construction of bypass road.

1.2 RELATED SECTIONS

- .1 Section 31 05 16 Aggregate Materials

1.3 REFERENCES

- .1 Definitions:
- .1 Ballast: Rock or other suitable material placed in the embankment used to improve the stability and load carrying capacity of the roadway.
 - .2 Borrow Pits: A designated area used to obtain material required to form the embankments.
 - .3 Clearing width: The boundary limits of the complete removal and disposal of all standing and fallen trees.
 - .4 Disposal Site: A designated area used to store or dispose of materials from within the clearing width that are not required or suitable for placing in the embankment.
 - .5 Ditch Block: A physical blockage of the ditch line that:
 - .1 is lower than road surface;
 - .2 is located immediately down slope of the cross drain intake; and,
 - .3 prevents large accumulations of water in the ditch by diverting it into the cross drain intake.
 - .6 Drawing(s): Includes plan profiles, cross sections, mass diagrams, traversed location lines on maps, descriptive literature, illustrations, schedules and any other similar materials provided by the Ministry.
 - .7 Embankment: A structure of soil, aggregate or rock material placed on the prepared ground surface and constructed to complete the road subgrade.
 - .8 End Hauling: The act of moving excess materials as indicated on the road design or Drawings or, where slope stability dictates, to another road section or disposal site.
 - .9 Fly Rock: Rock displaced by blasting and propelled beyond recoverable limits.
 - .10 Geosynthetics: Specially fabricated synthetic polymer materials designed with the primary functions of separation, filtration, drainage, aggregate confinement, reinforcement, distribution of load and erosion control.
 - .11 Grubbing and Stripping: The removal and disposal of all organic soils, stumps, downed, buried or non-merchantable timber, roots, logging slash and other debris from the road prism area.
 - .12 Keying: A bench, trench or structure at the approximate location of the toe of a fill slope constructed to support steep fills.
 - .13 Landing: A leveled area where timber is assembled for transport to the reloading site or conversion facility.
 - .14 L-Line: The designed roadway centre line shown on a Drawing with tangent Point of Intersection (PI), Beginning of Curve (BC), and End of Curve (EC) chainages.

Where close control of cut and fill slopes are required, the L-line is established after grubbing and stripping operations by setting grade stakes.

- .15 Other material (OM): All excavated material not identifiable as rock
- .16 Overbreak: Material beyond the proposed or specified limits of excavation which has been excavated, displaced or loosened, usually by blasting.
- .17 P-Line: The preliminary survey line established in the field and plotted on a Drawing to provide the horizontal and vertical control for the roadway centre line.
- .18 Solid Rock: A concreted mass of materials (rock, dense till, hardpan, partially cemented materials, clay or frozen material) of such density, or so firmly cemented together and are of sufficient hardness to require breaking by continuous drilling and blasting before excavation. It includes stony material occurring in masses, ledges, seams or layers and boulders individually containing a volume of 1.5m³ or more.
- .19 Reference point: An object of more or less permanent character situated outside the clearing width, which is used to relocate a station on the road centerline or other road features by linear and angular measurements.
- .20 Riparian zone: The land adjacent to the normal high water line in a stream, river, lake, or pond and extending to the portion of land that is influenced by the presence of the adjacent stream, river, lake, or pond.
- .21 Rippable Rock: Is not Solid Rock. It includes those materials that can be loosened using ripping equipment, such as rock, dense till, hardpan, partially cemented materials, clay or frozen material.
- .22 Riprap: Riprap is hard, durable, angular rock of a quality that will not disintegrate on exposure to water or the atmosphere and meets the specified gradation specifications.
- .23 Road Prism: The areas containing the roadway and cut and fill slopes.
- .24 Road Use Permit: The permit issued under the Forest Act giving the permittee the right to use the road subject to terms and conditions.
- .25 Subgrade: The traveled portion of the road prism upon which additional surfacing material is placed, if required, to provide the running surface.
- .26 Sub-Excavation: Additional excavation required below the subgrade grade elevations indicated or expected on the Drawings or other specifications. Additional material is paid in accordance with Schedule A.
- .27 Turnouts: A short auxiliary lane of sufficient width so as to provide for the safe passage of industrial vehicles.
- .28 Unsuitable Material: Any material that does not meet construction specification requirements for the designed purpose.

1.4 MOBILIZATION AND DEMOBILIZATION

- .1 Mobilization and demobilization is defined as:
 - .1 the initial transportation of workers, machinery and facilities to the work site;
 - .2 the final removal of workers, machinery and facilities from the work site; and
 - .3 all erection and dismantling activities (e.g., camp set up), until completion of the project.

1.5 ACCESS TO WORKS

- .1 The Contractor:
 - .1 is responsible for the cost of any temporary access works and any damage done to the existing roads or structures as a result of its operations;
 - .2 must ensure that the access to the works is adequate to get the required workers, machinery and facilities to the work site; and,
 - .3 must not block or impede the use of any private access without written consent of the landowner and prior approval of the Departmental Representative.

1.6 SURVEY CONTROL

- .1 The P-Line, Reference Points and clearing width boundaries have been marked in the field. Reference points and clearing boundaries must be carefully preserved. The Contractor must be satisfied before commencing any work, as to the meaning and correctness of all marks and stakes, as no claim will be entertained for any alleged inaccuracies. Should the Contractor discover or suspect any errors in the marks, the Contractor shall at once discontinue the affected work until such errors are investigated and, if necessary, rectified.
- .2 Survey control and grade staking will be provided by Departmental Representative.

1.7 SITE PREPARATION

- .1 Clearing Width
 - .1 The Contractor must not operate outside the clearing width without the prior approval of the Departmental Representative except for the purpose of removing dangerous trees or other hazards.
 - .2 The clearing width is the marked right-of way, which is approximately a 10m offset from design centerline of road for a total right-of-way width of 20m, unless otherwise directed by the Departmental Representative.
 - .3 Unless otherwise directed by the Departmental Representative, the Contractor must make a reasonable effort to ensure that all clearing boundary markings are left intact after clearing.
 - .4 Timber must not be placed outside of the clearing width.
- .2 Brushing
 - .1 Brushing to be completed for section of road noted as Reactivation area on Drawings.
 - .2 Brushing shall be to the timber line or 5 meters from the road shoulder and 8 meters on the inside of corners.
 - .3 Brushing debris to chipped onsite and deposited within right-of-way.
- .3 Grubbing and Stripping
 - .1 The Contractor must grub and strip the portion of clearing width area that will be occupied by the road prism.
 - .2 For sections of the road, grubbed and stripped materials are to be spoiled outside of the road prism downhill, or as directed by the Departmental Representative.

- .3 Other than trees and stumps with exposed roots or roots which overhang the top of cut, grubbing and stripping is not required between the tops of cuts and adjacent standing timber and the toes of fills and adjacent standing timber.
- .4 Debris Disposal
 - .1 Debris resulting from grubbing and stripping activities, hereafter referred to as “debris” in this section, must not be deposited in areas where the material is capable of damaging forest and other resources. In addition to any other remedial requirements, debris that is deposited in such areas must be immediately removed.
 - .2 Unless otherwise directed by a Departmental Representative, debris must be disposed of in the location(s) and method(s) specified on the drawings.
 - .3 Scattering
 - .1 Debris must be scattered down slope from the road shoulder and outside of the structural toe of the road prism away from standing timber. Accumulations of debris must be breached at each culvert location to facilitate drainage. Where directed by the Departmental Representative, accumulations of debris must be breached to permit the movement of livestock and wildlife, or for other operational requirements.
 - .4 Chipping
 - .1 Debris to be chipped onsite and deposited within right-of-way.
 - .5 Removal
 - .1 Debris must be transported to a disposal site(s) as specified in the Drawings, or as approved by the Departmental Representative.
 - .2 Disposal sites for debris must be prepared and benched to enable stable placement of the transported debris material. Slopes resulting from transported debris material must be stable at all times.

1.8 ROADWAY AND DRAINAGE EXCAVATION

- .1 Roadway and drainage excavation includes:
 - .1 All excavation other than that related to grubbing and stripping activities in accordance with the following table:

Material Types	Materials description	Cut Slope Angles	Fill Slope Angles
Dense Glacial Till / Cemented Sands and Gravels	Road cuts in dense to very dense GLACIAL TILL (i.e., basal till), or cemented SANDS OR SANDS and GRAVELS	½H : 1V	1½ H : 1 V
Rock	Road cuts in strong, good quality ROCK masses with no significant weaknesses	¼H : 1V	1½ H : 1V

- .2 the construction of all embankments;
 - .3 excavation of any drainage ditches;
 - .4 the import and placement of material necessary to form a stabilized subgrade in accordance with applicable project specifications; and
 - .5 transporting and disposal of all excess and unsuitable excavated material.
- .2 Embankments
- .1 Embankments must be constructed using suitable material and in such a manner as to provide a stable road prism.
 - .2 Embankments must be placed in layers, and hauling and spreading equipment operated uniformly over the full width of each layer, all to compact the materials placed in the embankment to the following:
 - .1 Each embankment layer must be leveled and smoothed before placing subsequent layers.
 - .2 Layers not to exceed 30 centimeters and compacted to 95% standard proctor density.
 - .3 All fills must be placed to attain the slope angles specified in this Schedule or in the Drawings. Fill slopes determined by the Departmental Representative for the actual soil types encountered in the field take precedence over those shown in this Schedule or on the Drawings.
 - .4 Any material utilized as part of the embankment must be competent for fill construction and of optimum quality, sorted to achieve the specified construction requirements, and placed to ensure permanent bonding of the fill material with the original side slopes. Materials that, in the opinion of the Departmental Representative, are unsuitable for the construction of embankments must be removed to disposal sites as directed. Any such unsuitable material subsequently placed in an embankment, without the approval of the Departmental Representative, must be removed to disposal sites as directed by the Departmental Representative at the Contractor's cost.
 - .5 The entire roadway, shoulders, ditches and cut and fill slopes must be neatly trimmed to produce smooth surfaces, slopes and uniform cross-sections to the lines, grades and cross-sections that are within 200 millimetres of those shown on the Drawings.
- .3 Ballasting
- .1 Ballast must be deposited and spread so that the material is well distributed and the intervening spaces are filled with smaller sizes as may be available to form a stable embankment.
 - .2 When rock ballast is overlain by other materials, the top of the ballast must be sealed with smaller rock particles and suitable soil materials, to prevent the other materials from penetrating into voids in the ballast.
 - .3 The specifications for ballast size and depth are:
 - .1 300mm minus free-draining angular rock or pit run gravel with no organics and less than 10% fines.
 - .4 Ballast materials must be placed and compacted such that the road will support a fully loaded gravel truck without leaving ruts.

.4 Ditches

- .1 Ditch construction includes inlets and outlets to culverts, ditch blocks, catch basins and ditching of all kinds to control the transport of water along and from roadways. Sideslopes of a ditch must conform to the constructed embankment slopes and cut slopes.
- .2 Ditches must be constructed in accordance with the Drawings.
- .3 Except where ditch-water converges at the culvert inlet, ditch blocks must be constructed of impermeable soils extending at least one metre (1.0m) along the ditch immediately downstream of all cross drain culvert inlets. The crest of ditch blocks must be constructed lower than the road shoulder.

.5 Widening

- .1 Curve widenings must be constructed in accordance with the Drawings.

.6 Riprap

- .1 The Contractor must protect embankments, dikes, stream banks and channels, culvert inlets and outlets, abutment wings, structural foundations and other specified locations by placing riprap of the type as shown in Table 1 below or in the Drawings at the locations and of the classes specified on the drawings
- .2 Riprap must be placed on firm, stable ground and produce a rock mass of the nominal or required thickness over the area.
- .3 Riprap material must be manipulated as necessary to provide mass stability and a regular surface with a minimum of voids.
- .4 The gradation of rock sizes in each class of riprap is provided in the table below:

Table 1 - Riprap Classes and Sizes

Class of Riprap in kilograms (kg)	Nominal Thickness of Riprap Piece in millimeters (mm)	Approximate Rock Gradation: Percentage Larger than Given Rock Mass in kilograms (kg)		
		85%	50%	15%
50	550	5.0	50	150

.7 Borrow and Gravel Pits and Quarries

- .1 In cases where the quantity of material taken from the excavation will not be sufficient to form the requisite embankment, the volume deficiency must be supplied from a borrow pit.
- .2 All borrow and gravel pit and rock quarry sites that are not inside the clearing width are shown on the Drawings and use requires pre-approved in writing by the Departmental Representative.
- .3 Borrow and gravel pits and quarries must be grubbed and stripped in accordance with applicable specifications.
- .4 Drainage ditches must be constructed to remove all accumulated water from the pit/quarry site, or the pit must be backfilled to prevent the ponding of water.
- .5 The Contractor must operate the pit or quarry in a manner that will not contaminate remaining granular material and thus limit its future use.

- .6 The Contractor is responsible for the construction and maintenance of any access roads to pits and quarries.
- .7 The Contractor must leave any such pits and quarries in a neat and stable condition to the satisfaction of the Departmental Representative.
- .8 Excavation in Solid Rock
 - .1 Materials which cannot be ripped by the following equipment shall be considered Solid Rock.
 - .1 A crawler tractor with ripper with an operating horse power of 190-259.9 FWHP; or,
 - .2 An excavator rated at an operating weight of 45,000 to 50,999 lbs; equipped with maximum 36 inch digging bucket with sharp teeth.
 - .2 The Contractor must remove all overlying materials from areas requiring rock excavation within the clearing width. The Contractor must prepare and excavate all rock to form the subgrade. Rock cuts must be excavated and mucked out fully to twenty centimetres (20 cm) below subgrade elevation.
 - .3 The Contractor is responsible for the rock excavation methods used and for any damage to the rock structure or road prism resulting from direct application of the techniques used.
 - .4 Where the excavation method is drilling and blasting, the Contractor must provide the blasting log and other relevant information regarding any blast upon request of the Departmental Representative.
 - .5 All drilling and blasting must be done in a manner that:
 - .1 retains all blasted rock within the cleared width.
 - .2 provides a stable back slope;
 - .3 does not destabilize the fill slope;
 - .4 minimizes the amount of rock loss; and
 - .5 minimizes overbreak.
 - .6 Developed rock must produce a profile of material that can be fully utilized, in accordance with the specifications. Rock that does not conform to the profile must be removed and disposed of at a suitable disposal site.
 - .7 Unless the rock can be utilized as embankment material that would otherwise have to be borrowed, all overbreak must be removed and disposed of at a suitable disposal site at the Contractor's cost.
 - .8 The Contractor must remove all dangerous, loose and overhanging rock.

1.9 CULVERTS

- .1 The types of culverts that are to be used on this project are:
 - .1 Culvert Materials
 - .1 High Density Polyethylene (HDPE) double walled drainage pipe, fittings and couplers must be manufactured from plastic in accordance with current version of CSA Standard B182 and meet current CSA standards for impact strength, pipe stiffness and flattening.
 - .2 PE pipe stiffness shall meet or exceed 210 Kilopascals (kPa).

- .3 All plastic pipe must be double walled for the entire length under the embankment fill.
- .4 The minimum length of any pipe section in a coupled culvert is 3.0 metres.
- .2 General Culvert Installations
 - .1 Culverts must be installed at locations described on drawings, or as directed by the Departmental Representative to suit actual site conditions. Culverts must be constructed concurrently with subgrade construction.
 - .2 Culvert lengths must conform to the specifications, or where not specified, must project between fifty and seventy centimetres (50 - 70 cm) beyond the face of the embankment.
 - .3 The Contractor must excavate a trench for a pipe culvert to a width of not less than twice the culvert diameter. The grade of the trench must replicate natural slope conditions unless otherwise provided in the, but for cross drains the trench must have a minimum grade of 0.5 percent to facilitate natural drainage. The culvert bed may require a camber where necessary to maintain positive drainage through the pipe. The camber will be as required by the Departmental Representative.
 - .4 Cross-drain culverts must be skewed to the perpendicular of the road centre line, by 3 degrees for each 1 percent that the road grade exceeds 3 percent, to a maximum of 45 degrees, unless otherwise directed by the Departmental Representative.
 - .5 Trenches must be backfilled evenly in lifts not exceeding twenty centimetres (20 cm) on each side of the culvert. Backfill materials must not contain any frozen material, snow, ice or organic matter.
 - .6 Backfill material having a maximum piece size of fifteen centimetres (15 cm) in diameter must be placed over all culverts for the full width of the trench to a minimum depth of thirty centimetres (30 cm) or a depth of one-half the diameter of the culvert, whichever is greater.
 - .7 Any backfill, or any portion thereof, that has suffered reduction in density after compacting due to frost action, rain or for any other reason, must be re-compacted or removed and replaced by the Contractor before any material is placed for the succeeding lift.
 - .8 Where inlet and outlet protection is required, the materials and placement must conform to the specifications.
 - .9 When water from culvert outlets is to be directed onto fill slopes, riprap or other approved protective measures must be installed to dissipate water energy.

1.10 ROAD SURFACING

- .1 Road surfacing consists of supplying, hauling and placing of aggregate base or surface course on the subgrade or base in accordance with the Drawings.
- .2 Surfacing Materials
 - .1 Aggregates that are to be used as surfacing materials must be free from organic matter or other deleterious material and must conform with the following specifications:
 - .1 Pit-run Aggregate

1.11 PROOF ROLLING

- .1 If ordered by the Departmental Representative, the Contractor shall supply and operate a loaded test vehicle of 8,200 kg axle load to test the sub-base and base for rutting and weaving.
- .2 Where proof rolling indicates areas that are defective, remove and replace according to this specification at the Contractor's expense.

1.12 GRASS SEEDING

- .1 The Contractor must supply and apply an erosion control seed mix, using application method (s) and mix designs on all exposed mineral and organic soils that are subject to surface erosion within the clearing width excluding the road surface as follows:
 - .1 Dry Seeding
 - .1 The Contractor must distribute dry seed uniformly over the surface area.
 - .2 See mix to be West Coast Forage mix.

1.13 CLEANUP

- .1 At the conclusion of the works, the Contractor must remove the Contractor's surplus products, tools, construction machinery and equipment not required for the performance of the remaining work. The Contractor must also remove waste products and debris other than that caused by the Departmental Representative, other Contractors or their employees, and leave the work site clean and suitable for occupancy or use by the Departmental Representative, unless otherwise specified.

END OF SECTION

Ucluelet, B.C.

This Supplemental Specification contains the following specifications:

- Division 26 – Electrical
- Division 33 - Utilities

DIVISION 26 – ELECTRICAL

26 05 00	Common Work Results - Electrical	1 - 9
26 05 14	Power Cables and Overhead Conductors (1001 V)	1 - 1
26 05 22	Connectors and Terminations	1 - 1

DIVISION 33 – UTILITIES

33 71 20	Electrical Pole Lines and Hardware	1 - 4
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END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 This Section describes the Common Work Results applicable to electrical disciplines.
- .2 The electrical scope of this project is a design-build for the modifications to, and construction of a privately-owned pole mounted 25kV power line.

1.2 GENERAL

- .1 The general conditions and general requirements together with all amendments and supplements contained in the General Specifications shall form an integral part of the electrical specification and will be made part of this contract.
- .2 The word "Provide" shall mean "Supply and Install" the products and services specified. "As Indicated" means that the item(s) specified are shown on the drawings.
- .3 Confirm with the civil plans and specifications the extent and nature of the work and how it will affect the electrical work. Include in the tender sum for any complications or additional work described therein.
- .4 Review existing record plans and site conditions for limitations and site constraints which would require modifications to pole height, or mounting solutions. Include in the tender sum for any complications or additional work described therein.
- .5 Comply with the requirements of the General Contract, and coordinate the installation with all other trades on site.
- .6 Confirm on-site the exact location of equipment, poles, and anchors, and all other trades.

1.3 WORK INCLUDED

- .1 This work shall include the supply and installation of all the necessary materials and apparatus for complete operating systems as indicated on the plans or mentioned in this specification, with the exception of materials or apparatus specifically mentioned to be omitted or to be supplied by owner.
- .2 Items obviously necessary or reasonably implied to complete the work, shall be included as if shown on drawings and noted in the specifications.
- .3 All materials, tools, appliances, scaffolding, apparatus and labour necessary for the execution, erection and completion of the systems described herein shall be furnished. This includes providing lighting and power for own work.
- .4 This contract shall include, but is not confined to, the following scope of work:
 - .1 Design documents
 - .2 Overhead services
 - .3 Pole installations
 - .4 Conductors, wiring and supports
 - .5 All electrically related civil works, trenching, backfilling, resurfacing
 - .6 Rock removal and associated works
 - .7 Power distribution equipment
 - .8 As-built drawings

- .5 Complete all electrical connections to equipment and accessories pertaining to this contract and leave all in operating condition to the electrical Consultant's satisfaction.

1.4 DRAWINGS AND SPECIFICATIONS

- .1 The drawings and specifications compliment each other and what is called for by one is binding as if called for by both. If there is any doubt as to meaning or true intent due to a discrepancy between the electrical drawings and specifications, and all other contract documents, obtain written ruling from Consultant prior to tender closing. **Failing this, the most expensive alternative is to be allowed for.**
- .2 The plans show the approximate location of outlets and apparatus but the right is reserved to make such changes in location as may be necessary to meet the emergencies of construction in any way. No extra will be allowed for such changes to any piece of electrical equipment unless the distance exceeds 3 metres, or if the relocation is required after initial installation is complete.
- .3 It is imperative that the contractor visit the site and completely familiarize himself as to the work to be undertaken.

1.5 CODES AND STANDARDS

- .1 All electrical work shall be carried out in accordance with the latest edition of the CEC C22.1 (Canadian Electrical Code) as amended and adopted by the Province of British Columbia and to the satisfaction of the Electrical Inspection Authority having jurisdiction, except where specified or specifically stated otherwise.
- .2 All overhead systems shall be installed in accordance with CSA C22.3 No.1 latest edition, except where specified or specifically stated otherwise.
- .3 All work shall be carried out in accordance with the National Building Code current edition (including all local amendments) to the satisfaction of local building inspector authority having jurisdiction.
- .4 Any electrical material and/or equipment supplied by any contractor or sub-contractor for installation on this project must bear evidence of CSA approval or special CSA certification acceptable to the Authority Having Jurisdiction.

1.6 CARE, OPERATION AND START-UP

- .1 Instruct Consultant and Operating Personnel in the operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.7 VOLTAGE RATINGS

- .1 Operating voltages: to CAN3-C235 latest edition.

1.8 PERMITS, FEES AND INSPECTION

- .1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay all associated fees.
- .3 Fees will cover all routine inspections by the District Electrical Inspector. Any fees for follow-up inspections found to be necessary by the District Electrical Inspectors as a result of incorrect work shall be borne by this contractor without any cost to the owner.
- .4 Notify Consultant of changes required by Electrical Inspection Department prior to making changes.
- .5 Furnish Certificates of from the authorities having jurisdiction on completion of work to Consultant.
- .6 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work. Obtain electrical permit and pay associated fees.
- .7 Consultant will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost to the Contractor.
- .8 Furnish to Consultant on completion of work Certificates of Acceptance from Electrical Inspection Department.

1.9 UTILITY WORK

- .1 Work performed on behalf of the Authority (Utility). All references to Utility include Power Supply, Communications and any other Utility that requires coordination.
 - .1 The electrical contract, including the drawings and specifications, describe the general intent of the electrical systems as they pertain to the private (non-Utility) infrastructure. The drawings and specifications describe these systems in detail and should be executed in accordance with all applicable Codes, Standards and Regulations to satisfy the Authority Having Jurisdiction.
 - .2 The electrical contract also describes the general intent of the work required by the power supply authority. This work is not governed by the same Codes, Regulations and Standards as the privately installed infrastructure. The electrical contractor is hereby responsible for the following with respect to work performed on behalf of the utility:
 - .1 For work performed by the electrical contractor on behalf of the Utility, the Electrical Contractor shall:
 - .1 Include in this contract all applicable Utility charges and costs to meet the utilities Codes, Standards, and Regulations.
 - .2 The Contractor shall refer to the Utility standard for specific details applicable to that part of the project which is executed on behalf of the Utility. The Contractor shall obtain these standards from the Utility prior to submitting tender and setting out with the work. Should the Contractor have any concerns or questions, as to which standard applies to a given project, they shall bring this matter to the attention of the Consultant and the Utility prior to submitting tender for a written ruling on the applicable

regulations. Failing this, the Electrical Contractor shall allow the most expensive alternative according to the Utility regulation.

- .3 The work on behalf of the Utility is to be executed in accordance with all Utility Codes, Standards, and Regulations without deviation. Where, due to site conditions, the Utility infrastructure cannot be installed exactly as provided in the Utility Standards, the Contractor shall bring the condition to attention of the Utility designer and Consultant for their express written permission and approval of any deviation prior to setting out with the work.
- .4 All shop-drawings depicting equipment that interfaces with the supply Utility are subject to review by the Utility and shall be submitted to the supply authority for approval prior to submission for review by the Consultant under the general electrical contract.
- .5 All work performed on behalf of the utility shall be inspected and approved by a representative from the Utility with notification to the Consultant before cover or activation. Any corrections or alteration arising from this review are the responsibility of the electrical contractor to meet the utility inspectors notice.
- .6 All work performed on behalf of the Utility, for Utility owned infrastructure under this contract is exempt from electrical permit requirements or fees. Any monies, costs or allowances are free from permit fee calculation for that part of the installation performed on behalf of the Utility.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with the Construction Waste Management Plan as established by the Construction Manager.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal: paper, plastic, polystyrene, corrugated cardboard and packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Consultant.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

1.11 EXTRA WORK

- .1 Any extra work ordered to be done shall be governed by this specification unless specific instructions or clauses are contained in the Change Order. In such cases, these instructions or clauses shall supersede those of the specification for this particular application only.

1.12 FIELD QUALITY CONTROL

- .1 All electrical work to be carried out by qualified, licensed electricians or supervised apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks. The activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.
- .2 The work of this division to be carried out by a contractor who holds a valid Master Electrical Contractor License as issued by the Province that the work is being conducted.
- .3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .4 High voltage cable 4.16kV and higher megger and hi-pot to recommended cable manufacturer's testing procedures.
- .5 Submit test results for Consultant's review.

1.13 CO-ORDINATION OF TRADES

- .1 Consult with Construction Manager and all subtrades involved to confirm the location of the equipment, and cooperate fully to ensure that no conflict arises during the installation.
- .2 Check drawings of all trades to verify space and headroom limitations for work to be installed. Coordinate work with all trades and make changes to facilitate a satisfactory installation. Make no deviations to the design intent involving extra cost to the Owner, without the Consultant's written approval.
- .3 All electrical services shall be coordinated in elevation to ensure that they are sufficiently elevated above the local grade to meet CEC requirements for overhead services.
- .4 Work out jointly all interference problems on the site and coordinate all work before fabricating, or installing any material or equipment.
- .5 Ensure that all materials and equipment fit into the allotted spaces and that all equipment can be properly serviced and replaced, if and when required. Advise the Consultant of space problems before installing any material or equipment. Demonstrate to the Consultant on completion of the work that all equipment installed can be properly, safely serviced and replaced, if and when required.

1.14 SUBSTITUTIONS

- .1 Unless otherwise noted on the plans or specifications, substitutions may be approved by the Consultant if requested by the contractor or by equipment suppliers, for items specified by the manufacturer's catalogue number.
- .2 Requests for approval of such substitutions shall be submitted at least five (5) working days prior to the tender closing date.
- .3 Complete description and data sheets of proposed substitution shall accompany the application and supplier must be prepared to submit samples for approval on short notice.
- .4 Proposed substitutions must be at least of equal quality to that of the specified item. The manufacturer's specification of the specified item shall apply for comparison if no other clause of this specification applies. The decision of the Consultant to accept or reject shall be final.

- .5 Off-the-shelf items such as standard boxes, EMT, which are specified by description only or indicated on the drawings, without any manufacturer, model, type or catalogue number, do not require approval prior to the tender closing date.
- .6 Submit list of alternates used, within one week after acceptance of tender.

1.15 PROTECTION OF EQUIPMENT

- .1 This contractor shall provide and ensure maximum protection of electrical equipment on the site. Electrical equipment, including existing electrical equipment, shall be kept clean and dry at all times and caution shall be taken to ensure no mechanical damage is done to the equipment. Equipment shall not be delivered to the site until it can be stored safely or placed in final position and the space is clean.

1.16 DAMAGES

- .1 If the finish of electrical equipment is damaged either when received or during installation, have such equipment completely refinished and restored to its original condition at no cost to the owner.
- .2 Irreparably damaged equipment shall be replaced at no cost to the owner.

1.17 SHOP DRAWINGS

- .1 Submit shop drawings, product data and samples in accordance with the contract specifications.
- .2 Shop drawings and product data shall indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.
- .3 Where applicable, include wiring, single line and schematic diagrams.
- .4 Include wiring drawings or diagrams showing interconnection with work of other sections.
- .5 Prior to manufacture of any item made specifically for this job, submit detailed drawings of the item through the Construction Manager.
- .6 Shop drawings must be received by the Consultant at a date early enough to permit reasonable study prior to approval and manufacture, or to permit alterations where necessary. Late submissions of shop drawings will be sufficient reason for a stoppage of construction pending approval, or removal and replacement of any unsatisfactory item at the contractor's expense.
- .7 Shop drawings/product data content:
 - .1 Shop drawings submitted title sheet.
 - .2 Data shall be specific and technical.
 - .3 Identify each piece of equipment.
 - .4 Information shall include all schedule data.
 - .5 Advertising literature will be rejected.
 - .6 The project and equipment designations shall be identified on each document.

- .7 The shop drawings/product data shall include:
 - .1 Dimensioned construction drawings with plans and sections showing size, arrangement and necessary clearances, with all equipment weights and mounting point loads.
 - .2 Mounting arrangements.
 - .3 Control explanation and internal wiring diagrams for packaged equipment.
 - .4 A written description of control sequences relating to the schematic diagrams.

1.18 PROTECTION OF EXPOSED LIVE EQUIPMENT

- .1 Protect exposed live equipment during construction for personnel safety.
- .2 Shield and mark live parts "LIVE 120 VOLTS", or with appropriate voltage.
- .3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of electrician.

1.19 INSPECTIONS AND TESTS

- .1 Notify the Consultant and authorities having jurisdiction at least five (5) working days in advance when the installations will be ready for inspection or testing.
- .2 Test reports, signed by all attending authorities, shall be submitted to the Consultant through the General Contractor after successful completion of an inspection or test.
- .3 Conduct all tests in a thorough and complete manner to the satisfaction of the Consultant and pay for any fees incurred to complete tests.
- .4 Furnish the Consultant with a copy of Certificate of Inspection from B.C. Electrical Safety Branch indicating that all work has been satisfactorily completed and issued prior to final connection.

1.20 CLEAN UP

- .1 Any scrap material shall be removed from the site and disposed of by the Contractor.

1.21 SURPLUS MATERIALS

- .1 All material removed from existing site and not being reused in this contract shall be the property of the owner and delivered as directed by the owner's representative. Material as it becomes surplus shall be reviewed by the owner or owner's representative and that part considered of value to the owner shall be classed as surplus material, all other becomes scrap material, and shall be disposed of by the contractor.

1.22 AS BUILT DRAWINGS

- .1 Obtain two (2) sets of white prints for the sole purpose of recording changes in installation as they occur. One (1) set is to be used in the field for day-to-day recording, and one (1) set for submittal after completion.
- .2 These plans shall be kept up-to-date as changes occur and shall be available to be inspected by the Consultant.

- .3 Arrange and pay for the incorporation of any "as-built" changes to digital PDF plans and AutoCAD plans on disks. These changes shall be of similar quality of presentation as the original plans. NOTE: All plans whether requiring as-built changes or not, shall be included in this disk.
- .4 These amended drawings shall be given to the Consultant at time of final inspections.
- .5 "As-built" drawings shall include the location and circuit numbers of junction boxes in ceiling spaces, and all conduit placed in or under poured concrete. Note normal depth of conduits below top of concrete slab.

1.23 OPERATING AND MAINTENANCE MANUALS

- .1 Submit **four sets** of operating and maintenance manuals for equipment or as requested by the general section of the contract. Include descriptive and technical data, all shop drawings, operating procedures, routine and preventative maintenance, wiring diagrams, spare parts lists, warranties, service companies, suppliers for replacement parts, test results, fire alarm certificate of verification, electrical inspection authority certificate and contract guarantee.
- .2 Submit documentation in **green colored** heavy duty three ring binders, with lettering on spine identifying: "OPERATING AND MAINTENANCE MANUAL", project title and system names.
- .3 Submit one copy for approval by Consultant prior to assembly of final sets.

1.24 WARRANTY

- .1 Within a period of one year from the date of final acceptance of work, replace or repair at own expense any defect in workmanship or material. Reused material shall be operating satisfactorily at the time of final acceptance but subsequent failures are not the responsibility of this contractor.
- .2 Warranties for equipment having more than one year guarantee shall be made out to owner, and copies shall be provided in the maintenance manuals.
- .3 Maintenance from manufacturer and contractor of all equipment shall be included for first year, including all lamps except incandescent.

Part 2 Products

2.1 MANUFACTURERS AND CSA LABELS

- .1 Visible and legible, after equipment is installed.

2.2 MATERIALS AND EQUIPMENT

- .1 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Department.
- .2 Factory assemble control panels and component assemblies.

2.3 WARNING SIGNS

- .1 As specified and to meet the requirements of the BC Electrical Inspection Authority and the Consultant.
- .2 Decal signs, minimum size 175mm x 250mm.

2.4 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

2.5 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with labels as follows:
 - .2 Labels:
 - .1 Embossed plastic labels with 6mm high letters unless specified otherwise.
 - .3 Wording on nameplates and labels to be approved by Consultant prior to manufacture.
 - .4 Allow for average of twenty-five (25) letters per nameplate and label.
 - .5 Identification to be English
 - .6 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
 - .7 All poles to be complete with identifier labels.

2.6 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1-2018.

2.7 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 This section specifies the materials and installation for power cables and overhead conductors, 1001V and greater.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C49.1 latest issue, Round Wire, Concentric Lay, Overhead Electrical Conductors.
- .2 National Electrical Manufacturer's Association (NEMA)/Insulated Cable Engineers Association (ICEA)
 - .1 NEMA WC3/ICEA S-19 latest issue, Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
 - .2 NEMA WC7/ICEA S-66-524 latest issue, Cross-Linked Polyethylene Wire and Cable for Transmission and Distribution.

Part 2 Products

2.1 PRIMARY OVERHEAD CONDUCTORS 5001 - 25000 V

- .1 Bare aluminum conductors steel reinforced: to CAN/CSA-C49.1 2008, size as indicated.

Part 3 Execution

3.1 INSTALLATION

- .1 Install primary conductors on pole lines in accordance with Section 33 71 20 - Electrical Pole Lines and Hardware.

3.2 TESTING

- .1 Perform tests using qualified personnel. Provide necessary instruments and equipment.
- .2 Check phase rotation and identify each phase conductor of each feeder.
- .3 Check each feeder for continuity, short circuits, and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.
- .4 Pre-acceptance Tests:
 - .1 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
 - .2 Check resistance to ground before energizing.
- .5 Provide Consultant with list of test results showing location at which each test was made, circuit tested, and result of each test.
- .6 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes materials and installation for connectors and terminations.

1.2 REFERENCES

- .1 CSA C22.2 No.41- Grounding and Bonding Equipment.

1.3 CERTIFICATES

- .1 Obtain inspection certificate of compliance covering high voltage stress coning from Inspection Authority and include it with maintenance manuals.

Part 2 Products

2.1 CONNECTORS AND TERMINATIONS

- .1 Copper compression connectors as required sized for conductors.
- .2 Contact aid for aluminum cables where applicable.

Part 3 Execution

3.1 INSTALLATION

- .1 Install terminations, and splices in accordance with manufacturer's instructions.
- .2 Bond and ground as required to CSA C22.2 No.41.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 This section specifies the materials and components for power poles and overhead assemblies, 1001V and greater.

1.2 SAFETY REQUIREMENTS

- .1 Worker protection:
 - .1 Workers must wear appropriate PPE when applying preservative materials, as per manufacturer's recommendations.
 - .2 Workers must not eat, drink or smoke while applying preservative material.
 - .3 Clean up spills of preservative materials immediately with absorbent material and safely discard to sanitary landfill.

1.3 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI C29.3-2015, Wet-Processed Porcelain Insulators-(Spool Type).
 - .2 ANSI C29.4-2015, Wet-Processed Porcelain Insulators-Strain Type.
 - .3 ANSI C29.5-2015, Wet-Process Porcelain Insulators, Low- and Medium-Voltage Pin Type.
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-G12-2015, Zinc-Coated Steel Wire Strand.
 - .2 CAN/CSA-C83-2017, Communication and Power Line Hardware.
 - .3 CAN/CSA-O80-2015, Wood Preservation.
 - .4 CAN/CSA-O15-2015, Wood Utility Poles and Reinforcing Stubs.
 - .5 CSA O116-1969(R2008), Power and Communication Sawn Wood Crossarms.
 - .6 CSA O124-1957(R1999), Specification for the Physical Properties of Power and Communication Wood Insulator Pins.
- .3 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
 - .1 EEMAC1B-1, 1957, Wet Process Porcelain Insulators (Strain Type).
 - .2 EEMAC2B-1, 1957, Wet Process Porcelain Insulators (Spool Type).

1.4 SHOP DRAWINGS

- .1 Submit shop drawings for the following components
 - .1 Primary Overhead Conductors (15kV).
 - .2 Insulators (pin, spool and strain type).
 - .3 Crossarm assembly drawings, to match CAN/CSA C22.3 NO.1-15-2015.
 - .4 All poles, including push poles.
 - .5 Fill materials for pole bases.
 - .6 All mounting hardware.
 - .7 Preservative materials to be used.

Part 2 Products

2.1 MATERIALS

- .1 Wood preservation: to CAN/CSA O80 Series.
- .2 Power line hardware: to CAN/CSA-C83.

2.2 POLES

- .1 Wood utility poles: to CAN/CSA-O15, wood species Douglas Fir, Class 3, preservative treated.
 - .1 15 m long poles for primary and secondary circuits.
- .2 Reinforcing stubs: to CAN/CSA-O15, wood species Douglas Fir, Class 3.
 - .1 Wood preservative: in accordance with CAN/CSA-O80-2015.
- .3 Include costs for drilling all pole install locations into rock. No additional charges will be considered for rock encountered during pole excavations.

2.3 CROSSARMS

- .1 Wood crossarms: to CSA O116, pressure or vacuum treated with wood preservative:
 - .1 For primary circuits 1 per pole, 4 pin.
 - .2 For dead end, corner, and transformer poles double arms.
 - .3 For horizontally mounted primary isolating switches double arms.
 - .4 For horizontally mounted primary load-break switches double arms.
 - .5 For each crossarm:
 - .1 Insulator pins: to CSA O124.
 - .2 Two 32 x 6 mm galvanized steel braces.
 - .3 One 9 x 38 mm galvanized steel lag screw.
 - .4 Two 9 x 114 mm galvanized steel bolts.
 - .5 Through bolts and double arm bolts as required.

2.4 INSULATORS

- .1 Primary insulators:
 - .1 Pin type: to ANSI C29.5 for low and medium voltages, nominal rating 14.4kV, for primary conductors.
- .2 Secondary insulators:
 - .1 Spool type: to ANSI C29.3 mounted on secondary racks, for secondary runs.
- .3 Guy strain insulators:
 - .1 Strain type: to ANSI C29.4, nominal rating 14.4 kV, one per guy wire.

2.5 GUYS AND ANCHORS

- .1 Guy wire: to CAN/CSA-G12, 9 mm nominal diameter, stranded, galvanized steel for dead ends and guys.
- .2 Guy clamps: three-bolt heavy duty or preform grip type.
- .3 Eye bolt: 19 mm thimble, length to suit, four hole guy straps and 16 mm machine bolt with square washer to attach guy wire to pole.

- .4 Anchor rod: 19 mm diameter x 2.7m long, galvanized steel with thimble eye.
- .5 Anchor: heavy duty expanding type, four way, expanded area 0.13 m².
- .6 Guy guard: half-round, galvanized steel 2.7 m long.
- .7 Guy guard: plastic, colored yellow, 2.7 m long.
- .8 Include costs for the drilling of all anchors into rock.

2.6 PRIMARY CONDUCTORS

- .1 In accordance with Section 26 05 14 - Power Cable and Overhead Conductors (1001 V).

2.7 WIRE CONNECTORS

- .1 In accordance with Section 26 05 22 - Connectors and Terminations.

2.8 EQUIPMENT IDENTIFICATION

- .1 Rustproof number nails with 50 mm high designated number.

Part 3 Execution

3.1 PREPARATION OF POLES

- .1 Where poles require shortening, cut piece from top only.
- .2 Roof top of poles with two cuts forming planes at 45° to meet in horizontal ridge.
- .3 Treat roof top, gains, bored holes with preservative before assembly.
- .4 Cut parallel plane crossarm gains in face of pole for single and double arming, spacing as indicated.
- .5 Bore hole in center of each gain for crossarm bolt.
- .6 Drill crossarms for pins, through bolts, double arm bolts and brace bolts. Pre-drill treated crossarms to standard spacing.
- .7 Fasten wood insulator pins to crossarms with galvanized steel nails.
- .8 Install crossarms and braces.
- .9 Install secondary racks.

3.2 INSTALLATION

- .1 Locate and dig pole holes. Make holes large enough to allow space for tamping backfill.
- .2 Set poles.
- .3 Align poles with crossarms at right angles to pole line on straight runs.
- .4 At change in direction of line, set crossarms to bisect angle formed by change.
- .5 Set poles to maintain even grade. Allow for contour of terrain and do not exceed grading of 1.5 m per pole.
- .6 Replace backfill in 150 mm layers. Tamp each layer and apply final layer to drain water away from pole.
- .7 For rock mounted poles, install cribs, sized to meet pole diameter and burial deps.
- .8 For swampy condition install timber footings.

- .9 Locate and install guy wires and anchors at dead-ends, corner poles, and start of branch feeders.
- .10 Insert anchor at least 1.8 m into ground. Backfill and tamp in 150 mm layers.
- .11 Install insulators.
- .12 Locate and construct transformer platform between 2 poles.
- .13 Install number nails on each pole.
- .14 Identify primary circuit on pole showing phasing of each conductor, every 1000 m and including origin of primary pole.

END OF SECTION