CONTENTS OF THE CONTRACT DOCUMENTS

1. Work Under this Contract

.1 THE WORK under this CONTRACT consists of construction of CCG Radar Main and radar pad for CANADIAN COAST GUARD, hereinafter called the OWNER.

2. Work Included

.1 THE WORK includes the following components:

a) Clearing and construction of a new gravel surfaced road 533 meters long.

b) Installation of two 500mm corrugated metal pipe culverts, 9 meters long.

c) Construction of a gravel surfaced CCG radar site area, 2011 square meters at the end of the new road built to road base standards.

d) Removal or burning (permitted burning) of brush and debris from road and pad clearing.

e) Hydro Seeding sides of road to tree lines.

.2 THE WORK, unless specifically stated otherwise, shall include the furnishing of all MATERIAL, PRODUCT, EQUIPMENT, LABOUR and transportation necessary to complete THE WORK. The intent is that the CONTRACTOR provides a complete job.

.3 THE WORK shall not be deemed complete until all components are placed in operation by the CONTRACTOR, and are operating satisfactorily.

.4 Any minor item of THE WORK not called for in the specifications or shown on the drawings but clearly required to meet the intent of design and normally provided for the proper operation of THE WORK shall be provided as if specifically called for in the CONTRACT DOCUMENTS.

3. Documents Required

.1 Forest Practices Code of British Columbia - Forest Road Engineering Guidebook (June (2002)

.2 Contractor to submit the construction schedule to the Departmental Representation within 14 days of contract award and provide updated progress reports if any changes occur.

.3 Maintain at the job site at least one copy of each of the following:

- Contract Drawings

- Specifications
- Addenda
- Change Orders, Field Orders, Notices
- Modifications to the Contract
- Field Test Reports
- Construction Schedule
- Occupational Health and Safety Regulations and Workers' Compensation Board Regulations;

and have readily available any referenced or specified Standards.

4. Specifications

.1 Sentence structure in parts of the specifications is abbreviated, and phrases such as "shall be," and "the Contractor shall" are deliberately omitted. Such sentences shall be read as though they are complete.

.2 The use of the word "PROVIDE" means "supply and install"; or "supply labour and materials for the installation of". It does not mean supply only.

5. Standards

.1 Wherever standards (e.g., CSA, ASTM and others), are referred to in these CONTRACT DOCUMENTS the current edition at the date of closing of TENDERS shall apply.

.2 Where there is a clear conflict between the referenced Standard and the CONTRACT DOCUMENTS, the CONTRACT DOCUMENTS shall apply.

.3 Where there is an ambiguity between a Standard and any term of these CONTRACT DOCUMENTS, the ENGINEER shall, in the first instance, give an interpretation of the intent of the CONTRACT.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Province of British Columbia

.1 Workers Compensation Act, RSBC 1996.

.2 WorkSafeBC Occupational Health and Safety Regulation.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit site-specific Health and Safety Plan: Within 28 days following contract award. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Listing of all activities specific to the project and their Health and Safety risks or hazards.

.3 Detailed descriptions of how the activities are to be carried out as well as methods for mitigating hazards and risks.

.4 Listing of personnel responsible for Health and Safety measures, and Emergency procedures.

.5 Proof of training for all employees working at heights and proof of rescue training for at least one employee working on site.

.2 Canadian Coast Guard (CCG) will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 calendar days.

.3 CCG'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.

1.3 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 CCG may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.4 RESPONSIBILITY

.1 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.

.2 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.

1.5 COMPLIANCE REQUIREMENTS

.1 Comply with Workers Compensation Act, B.C.

.2 Comply with WorkSafeBC Occupational Health and Safety Regulation.

.3 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.6 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 CCG verbally and in writing.

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, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work.

1.8 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by CCG.

.2 CCG may stop Work if non-compliance of health and safety regulations is not corrected.

1.9 WORK STOPPAGE

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

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 Environmental Protection Plan: Within 28 days following contract award and before commencing construction activities or delivery of materials to site.

.2 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.3 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.4 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, discharge of collected surface run-off, 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 FIRES

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

1.5 DRAINAGE, EROSION AND SEDIMENTATION

.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 and meets BC Water Quality Guidelines for the Protection of Aquatic Life.

.3 Do not pump water containing deleterious substances into waterways.

.4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

.5 Cover stockpiled materials to reduce or limit erosion and subsequent sediment introduction to run-off water

1.6 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as indicated.

.2 Only clear vegetation in areas required for safe construction.

.3 Minimize stripping of topsoil and vegetation. Where possible retain topsoil for revegetation post-construction

.4 Disturbed areas are to be restored to their original condition or better after construction.

.5 Restrict tree removal to areas designated by CCG.

.6 For trees that are to remain onsite, protect roots to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

1.7 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.

1.8 SPILLS OR RELEASE OF DELETERIOUS SUBSTANCES

.1 Develop and implement a plan which details spill response measures to be employed. The plan will include a list of spill response equipment that will be present on the site and will assign implementation and monitoring roles. On-site personnel will review the plan, understand their roles and responsibilities, and will be properly trained and equipped to conduct spill response activities.

.1 Identify high-risk locations where spills are probable and maintain spill kits, capable of handling the largest potential spill through the duration of the project, at these locations. Consider the location of the generator and the associated fuel tank to be a high-risk location. Include an inventory of required contents at the top of the kit. Locate PPE at the top of the spill kit to enable easy access for the spill responder(s). Keep spill kits closed with a safety seal affixed to indicate if the kit has been used or tampered with.

.2 Respond immediately to all spills in accordance with plan and applicable spill regulation(s).

.2 Immediately report all spills, regardless of severity to CCG representative. Submit within 24 hours of the spill a written report.

.3 Prevent concrete effects on watercourse, soils and geology:

.1 Mix concrete on polyethylene liner or an alternative impermeable surface to prevent contact with soils.

.2 Construct concrete forms so that they are properly sealed to prevent leakage to the surrounding soils or bedrock.

.3 Deliver concrete to the work area without spillage, or if hand-mixing, reduce spillage by using an approved mixing vessel. Wash concrete trucks, pumping equipment, and tools in a designated area with facilities to capture and treat concrete wash water. If no such facilities are available at the site, wash concrete equipment and vehicles off-site.

.4 Isolate and hold any concrete wash water or water that contacts uncured or partly cured concrete until the pH is between 6.5 and 8.0 pH units and the turbidity is less than 25 nephelometric turbidity units (NTU), measured to an accuracy of +/- 2 NTU.

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

1. General

.1 The Laws and Regulations of the Province of British Columbia shall govern.

.2 If the National Building Code of Canada applies to the WORK, the standards of the WORK shall conform to or exceed the minimum standards of the National Building Code of Canada.

.3 In the event of a dispute resolution by arbitration, the arbitration shall be governed by the British Columbia Arbitration Act.

.4 The CONTRACTOR shall ensure compliance on his part and on the part of all of his SUBCONTRACTORS with the British Columbia Workers' Compensation Act and Regulations thereunder.

Where the CONTRACTOR is required by the British Columbia Workers' Compensation Act or by the Regulations to retain professional consultants and to obtain a professional engineer's signature and seal on the design of temporary structures, concrete forming, shoring and bracing of excavations, and the methods of executing these designs, the CONTRACTOR shall retain such consultants and comply with the Act and the Regulations, all at his own expense, and there shall be no extra payment on this account.

.5 The attention of the CONTRACTOR is directed to requirements of the British Columbia Builders' Lien Act and the Regulations thereunder.

.6 Where the WORK of this CONTRACT falls under the terms of the British Columbia Public Works Act, the British Columbia Public Works Act shall apply.

.7 All other British Columbia Acts and Regulations shall apply as appropriate and the CONTRACTOR shall comply with the requirements thereof as though they had been specifically named in these specifications.

2. Burning

.1 Restrictions of federal, provincial and municipal authorities shall be complied with, and permits shall be obtained by the CONTRACTOR.

3. Regulations, Standards and Codes

.1 Codes, Standards and Regulations are specified in other sections of the specifications and the WORK shall be done in accordance with those Codes, Standards and Regulations where applicable.

.2 All permits required for the Work to be put in place and paid by the Contractor.

.3 All Work to conform to FLNRO-RD operations standards and other applicable standard practices required by the authority of jurisdiction.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

.1 This section specifies requirements for clearing the site, the designated working area and the designated storage area.

.2 The following work is included:

a) Cutting trees and brush.
b) Salvage of usable timber.
c) Preservation of trees and brush where possible.
d) Grubbing roots and stumps.
e) Burning or disposal of waste.
f) Removal of grass, weeds, concrete, fences and other deleterious material.
g) Cleanup of debris.

1.2 REGULATIONS

.1 Abide by laws and regulations of the Province, Territory and/or Municipality in which the work is located, particularly with regard to fire regulations and public safety.

.2 Observe regulations of the British Columbia Ministry of Forests.

.3 Obtain all permits to burn waste and debris from British Columbia Ministry of Forests, and abide by the stipulations of the permits.

.4 The regulations of the Occupational Health and Safety Act and Workers' Compensation Board apply to the work in this section.

1.3 AREA TO BE CLEARED

.1 Areas to be cleared are the minimum required for works shown on the drawings.

.2 Clearing shall not exceed the limits of rights-of-way, permanent easements and working easements.

PART 2 PRODUCTS

.1 Not Applicable

PART 3 EXECUTION

3.1 CLEARING

.1 Cut, remove and dispose of all timber, brush, windfall and any other fallen timber, stumps and rubbish except such trees and shrubs as may be designated for preservation by the Engineer.

.2 Preserve such designated trees and shrubs from scarring, barking or other injury during construction operations.

.3 Where grubbing is not to be done, all trees, roots and existing stumps shall be cut off flush with the original ground surface.

.4 Cut, remove and dispose of dangerous trees overhanging and off the clearing zones.

.5 Pull down, remove and dispose of any structures, fences and any physical obstructions.

3.2 SALVAGE

.1 Remove merchantable timber as defined by the British Columbia Ministry of Forests.

.2 Merchantable timber, in general, includes trees with a bottom diameter of 150 mm or greater and a top diameter of 100 mm or greater.

.3 Trim branches from merchantable timber, and cold-deck in locations approved by the ENGINEER.

.4 Dispose of branches and debris.

3.3 GRUBBING

.1 Excavate, remove and dispose of all roots, stumps, submerged logs, corduroy and similar objectional matter to a minimum depth of 0.3 m.

.2 Fill holes and level areas disturbed by grubbing.

3.4 DISPOSAL

.1 In areas shown on the plans or designated by the Engineer for clearing and grubbing, all cleared material not salvaged must be disposed of as follows:

a) Brushings are not to be spoiled over fill slopes or areas detrimental to drainage.

b) Burned or hauled away to a storage area away from CCG Radar Main and Pad.

3.5 FINISH

.1 Leave ground surface in a condition suitable for stripping of topsoil.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

.1 This section specifies requirements for grading for structures, streets, lanes, lots, easements and general site grading.

.2 The work includes:

a) Grading, in accordance with contours, cross sections, grades and elevations shown on the drawings and as staked by the Engineer.

b) Excavation of organic materials and stockpiling or placing in fill areas on site, or hauling to disposal.

c) Excavation of common excavation materials from areas on site that are to be cut, haul and place in fill areas on site or hauling to disposal.

d) Supplying and placing pit-run gravel fill.

e) Supplying and placing sand or granular fill.

f) Excavation and hauling stockpiled and excess material to disposal areas.

g) Excavation and hauling rock to disposal areas.

1.2 RELATED WORK

.1 Clearing - Section 31 11 00.

1.3 QUALITY ASSURANCE

.1 Submit to the Engineer a list of sources of materials including sand, gravel and borrow materials.

.2 Provide samples, test results, sieve analyses and reports for preliminary approval of materials.

.3 Preliminary approval of material does not constitute general acceptance. Acceptance depends upon satisfactory field test results and performance in place.

1.4 QUALITY CONTROL TESTING

.1 Moisture density curves to ASTM D698.

.2 Sieve analyses to ASTM C136.

.3 Field densities to ASTM D2167 or to ASTM D2922.

.4 Minimum quality control test frequencies specified as follows are the minimum number required. The Contractor shall perform as many tests as are necessary to ensure that the Work conforms to the requirements of the Contract regardless of the minimum number required.

.5 Provide moisture/density curves for each type of material from each source of material to be compacted to a specified density.

.6 Field densities:

a) Pit-run gravel - one for each 2000 m^2 of compacted layers.

b) Crushed gravel - one for each 2000 m^2 of compacted layers.

c) Common borrow - one for each 2000 m^2 of compacted layers.

d) Embankments (from excavated material) - one for each 4000 m^2 of compacted layers.

1.5 REGULATIONS

.1 Abide by the bylaws and regulations of the Province, Territory and/or Municipality in which the work is located and abide bylaws and regulations with regard to stream crossings, diversions or alternatives to drainage patterns and public safety.

.2 Conform with blasting requirements of the Canadian Construction Safety Code and all local, provincial and territorial codes.

.3 Obtain the approval of the Engineer and the Owner and employ a licensed explosive expert to supervise blasting.

.4 The regulations of the Occupational Health and Safety Act and Workers' Compensation Board apply to the work of this section.

1.6 BORROW AREAS

.1 Strip overburden from borrow areas and restore after use, leaving the borrow sites in a neat and uniform condition.

.2 The Contractor is responsible for all borrow pit royalties.

PART 2 PRODUCTS

2.1 ORGANIC MATERIAL

.1 Organic material is brush, branches, logs, or other organic soil underlying the topsoil, or topsoil that has not previously been stripped.

2.2 UNSUITABLE MATERIALS

.1 Unsuitable materials are materials including organic material that, in the opinion of the Engineer, are not suitable for use in subgrade of roads or in embankments or fills.

2.3 COMMON EXCAVATION MATERIALS

.1 Common excavation materials shall be materials excavated from the site, consisting of sand, clay or silty material, other than rock, organic materials or unsuitable material which can be removed and placed in fill areas, embankments or stock piles for reuse or otherwise disposed of.

2.4 COMMON BORROW MATERIALS

.1 Common borrow material can obtained from areas off site.

.2 Common borrow materials shall not be sandy or silty clay materials. Common borrow materials shall be free from topsoil, organic material, large rock or debris.

2.5 PIT-RUN GRAVEL

.1 Pit-run gravel shall be maximum size 150 mm complying with the following gradation.

Sieve Size	Percent Passing

150 mm	95 - 100
75 mm	50 - 90
25 mm	20 - 60
5 mm	5 - 35
150 micro m	0 - 5

2.6 SAND

.1 Sand shall be maximum size 9.5 mm complying with the following gradation.

Sieve Size	Percent Passing
9.5 mm	100
4.75 mm	90 - 100
150 micro m	20 maximum

2.7 CRUSHED GRAVEL

.1 Crushed gravel shall be maximum size 25 mm complying with the following gradation.

Sieve Size	Percent Passing
25 mm	100
19 mm	95 - 100
9.5 mm	60 - 80
4.75 mm	40 - 60
2.00 mm	25 - 45
425 micro m	10 - 25
75 micro m	2 - 10

2.8 ROCK

.1 Rock is either single boulders, pieces of concrete or masonry with a volume in excess of 0.25 m^3 or any material that cannot be removed by a tracked machine having a bucket capacity of 0.95 to 1.15 m^3, and which requires for its removal, drilling and blasting or breaking up with a power operated hand tool.

.2 No soft or disintegrated rock which can be removed with a hand pick; no material which can be ripped with a crawler tractor having a rated horsepower of 200 to 249; no loose or previously blasted rock or broken stone and no rock exterior to the minimum limits for measurement allowed, will be measured or allowed.

.3 Frozen material is not classified as rock.

PART 3 EXECUTION

3.1 PREPARATION OF SITE

.1 Complete site clearing and stripping before beginning grading.

.2 Maintain slopes and adequate drainage during grading.

3.2 INSPECTION OF MATERIALS ON SITE

.1 Obtain Engineer's approval prior to using material on site.

3.3 GRADING PROCEDURES

.1 Excavate to the required subgrade elevation and to cross sections shown on the drawings, or as designated by the Engineer.

.2 Excavate rock and haul to disposal areas.

.3 Excavate organic material and stockpile or place in fill areas, if approved by the Engineer.

.4 Excavate unsuitable material and haul to disposal areas.

.5 Do not mix organic materials, unsuitable materials or rock with other excavated materials.

.6 Overexcavate as required to remove organic and unsuitable material.

.7 Overexcavate to remove organic and unsuitable material such that there is a 5:1 slope between the in situ material and the material replaced with gravel.

.8 Overexcavate and end haul as specified in the Contract Drawings

3.4 EMBANKMENTS AND FILLS

.1 Uniformly grade areas to be filled before placing material.

.2 Place common excavated materials in embankments and fills, and in overexcavated areas if approved by the Engineer.

.3 Construct embankments by depositing, shaping and rolling materials in layers not exceeding 150 mm thickness.

.4 Where compaction of embankments and fill areas is required, place the material in 150 mm lifts and compact to 95% of the maximum density as determined by the Standard Proctor Compaction Test.

.5 In the event that the material is too wet to obtain the specified density, thoroughly work the material by blading, or other acceptable means, until the optimum moisture content is reached. If the material is too dry add water as necessary. Moisture content of the material being placed in fill areas and embankments shall be controlled to within 3% of the optimum condition.

.6 Schedule work to use the common excavated materials completely. Borrowing of materials will be authorized only after all suitable common excavated materials have been utilized.

.7 If common excavated materials are not available in sufficient quantity to complete the work, or if borrow materials are required, supply and place either common borrow, sand, crushed gravel or pitrun gravel as specified and compact as specified above.

3.5 FINISHING

.1 Final surfaces shall be reasonably smooth, uniform and free from lumps, loose earth, stones and debris.

.2 Grades shall be within 50 mm of design grades.

3.6 UTILITIES AND APPURTENANCES

.1 Locate, protect and mark all utilities and appurtenances, including manholes, catch basins, valves and hydrants.

.2 Adjust utility structures and appurtenances to final grades and elevations.

3.7 SUBGRADE COMPACTION

.1 Scarify, shape and compact the subgrade to a minimum of 100% of the maximum density as determined by the Standard Proctor Compaction Test.

.2 Total compacted thickness shall be 300 mm.

.3 Remove and windrow the top 300 mm of soil.

.4 Scarify, shape and compact the lower 150 mm of subgrade to a minimum of 100% of the maximum density as determined by the Standard Proctor Compaction Test.

.5 Replace the top 150 mm and compact to a minimum of 100% of the maximum density as determined by the Standard Proctor Compaction Test.

.6 Total compacted thickness shall be 300 mm.

3.8 SUBGRADE ELEVATION

.1 Final surfaces shall be within 50 mm of design grades.

.2 Provide and compact 25 mm maximum sized crushed gravel if necessary, to bring the final surface to design grade.

3.9 PROOF ROLLING

.1 If ordered by the Engineer, supply and operate a loaded test vehicle of 8200 kg axle load to test the roadway subgrade.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Rock: any solid which cannot be removed by means of heavy duty mechanical excavating equipment available to the Contractor.

.2 PPV: peak particle velocity.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Blasting Submittals: submit for approval, written proposal of operations for removal of rock by blasting to the Departmental Representative and if required to the local authorities having jurisdiction.

.1 Indicate types and quantities of explosives to be used, loading charts and drill hole patterns, type of caps, blasting techniques, blast protection measures for items such as flying rock, vibration, dust and noise control, and proposed method of carrying out work. Include details on protective measures, time of blasting and other pertinent details.

.2 Submit records to Departmental Representative at end of each shift. Maintain complete and accurate record of drilling and blasting operations.

.2 Qualification Statements:

.1 Retain licensed explosives expert to program and supervise blasting work, to interpret recommendations of pre-blasting report, and to determine precautions, preparation and operations techniques.

.2 Submit documentation verifying explosives expert's qualifications.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

Part 2 Products

2.1 MATERIALS

.1 Not used.

Part 3 Execution

3.1 ROCK REMOVAL

.1 Co-ordinate this Section with Section 01 35 29.06- Health and Safety Requirements.

.2 Remove rock to alignments, profiles, and cross sections as indicated.

.3 Do blasting operations in accordance with requirements of authority having jurisdiction and local and provincial codes.

.4 Use rock removal procedures to produce uniform and stable excavation surfaces. Minimize overbreak, and to avoid damage to adjacent structures.

.5 Remove boulders and fragments which may slide or roll into excavated areas.

3.2 PROTECTION

.1 Prevent damage to surroundings and injury to persons in accordance with applicable standards and local regulations.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

.1 This section specifies the requirements for granular sub-base and base course for roadways and parking areas.

.2 The work includes:

a) Supply of granular materials.

b) Placing and compacting sub-base.

c) Placing and compacting base course.

1.2 RELATED WORK

.1 Grading - Section 31 22 13.

1.3 MAINTENANCE OF TRAFFIC - NA

.1 Perform work in a manner that will cause the least disruption to traffic.

.2 Detouring of traffic, posting of traffic signs and provision of flagmen shall be the Contractor's responsibility.

.3 Maintain detour roads.

1.4 PERMITS

.1 Obtain all permits required for this section of the work and abide by the stipulations of the permits.

1.5 QUALITY ASSURANCE

.1 Submit to the Engineer a list of sources of materials including sand, pit-run gravel and crushed gravel.

.2 Provide samples, test results, sieve analyses and reports for preliminary approval of materials.

.3 Preliminary approval of materials does not constitute general acceptance. Acceptance depends upon satisfactory field test results and performance in place.

1.6 QUALITY CONTROL TESTING

.1 Moisture density curves to ASTM D698.

.2 Sieve analyses to ASTM C136.

.3 Field densities to ASTM D2167 or to ASTM D2922.

.4 Minimum quality control test frequencies specified as follows are the minimum number required. The Contractor shall perform as many tests as are necessary to ensure that the Work conforms to the requirements of the Contract regardless of the minimum number required.

.5 Provide moisture/density curves for each type of material from each source of material to be compacted to a specified density.

.6 Field densities:

a) Road base - one for each 2000 m^2.

PART 2 PRODUCTS

2.1 GRANULAR SUB-BASE

.1 Consists of sound, hard, durable, uniformly graded pit run or crushed gravel or sand as specified.

2.2 GRANULAR BASE

.1 Consists of sound, hard, durable particles of gravel, stone, sand and fine soil particles crushed to a uniform gradation and to the maximum size designated.

2.3 GRANULAR SUB-BASE AND GRANULAR BASE

.1 Shall not contain sod, roots, plants or other organic materials, nor shall they contain soft fragments such as shale or flaky particles in excess of fifteen (15%) percent by weight. The materials shall be well graded from course to fine within the gradation limits and shall not be subject to extreme variation between the lower and upper limits of the gradation band specified.

.2 Of the prepared materials, that portion of fine aggregate including supplementary material, if any, which passes the 425 mirco-m sieve, shall have a Liquid Limit of not more than 25 and a Plasticity Index of not more than 6.

2.4 GRADATION DESIGNATIONS

.1 When tested on Standard Laboratory screens the materials shall meet one or more of the following gradations.

Designation 1 - Sand

Sieve Size	Percent Passing
9.5 mm	100
4.75 mm	90 - 100
150 micro-m	20 max.

Designation 2 - Pit Run Gravel - Max, Size 150 mm

Sieve Size	Percent Passing
150 mm	100
75 mm	60 - 85
25 mm	30 - 60
5 mm	2 - 10

Designation 3 - Crushed Gravel

Sieve Size	Max Size 25 mm Percent Passing
50 mm	
37.5 mm	
25 mm	100
19 mm	95 - 100
9.5 mm	60 - 80
4.75 mm	40 - 60
2.00 mm	25 - 45
425 micro-m	10 - 25
75 micro-m	2 - 10

For crushed gravel, not less than 60 percent of the material retained on the 4.75 mm sieve shall be crushed particles. The ratio of the percentage passing the 75 micro-m sieve shall not exceed two-thirds and preferably not less than one-half.

PART 3 EXECUTION

3.1 SUB-GRADE

.1 The sub-grade shall be shaped to the cross-section shown on the plans prior to placing the sub-base course. The Contractor shall maintain the sub-grade to the specified compaction and section, free from ruts, waves and undulations, by whatever means are necessary.

.2 The sub-grade or sub-base course shall be in a firm dry condition before any material is placed thereon and the Engineer's consent must be obtained before placing any granular material.

3.2 PLACING OF SUB-BASE AND BASE COURSE

.1 Unless otherwise specified, the granular material shall be placed in uniform layers not exceeding 150 mm in thickness before compaction. The material shall be placed by mechanical spreaders or deposited in windrows and levelled with a suitable motor grader.

3.3 COMPACTION OF SUB-BASE AND BASE COURSE

.1 The granular sub-base and base course material shall be compacted by rolling with a pneumatic tired roller, vibratory roller or other approved type. Each layer shall be compacted at the optimum moisture content, to 100 percent of the maximum dry density as determined by the Standard Proctor Compaction Test for the material used.

.2 During compaction, water shall be added by an applicator in such quantities that the moisture content will be maintained at the optimum level as determined by the Standard Proctor test. If the moisture content exceeds the optimum moisture content, the material shall be aerated by mechanical means or work shall cease temporarily until the material has dried sufficiently to reach the optimum moisture content.

3.4 SHAPING OF SUB-BASE AND BASE COURSE

.1 A blade grader shall be used in conjunction with the compaction equipment to keep the finished surface of each layer even and uniform. The finished surfaces of the granular base course and sub-base course shall conform to the required cross-section and grades as shown on the drawings and as staked by the Engineer, within a tolerance of plus or minus 15 mm. The finished sub-base course surface shall show no depression more than 13 mm under a straight edge of 3 m long placed parallel to the road centre line. The finished base course surface shall show no depression more than 6 mm under a straight edge 3 m long placed parallel to the road centre line.

3.5 PROOF ROLLING

.1 If ordered by the Engineer, 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.

END OF SECTION

PART 1 GENERAL

1.1 Description

.1 This section specifies the requirements for surface gravel for roads and parking areas that will not be paved.

1.2 Related Work

.1 Refer to Section 31 22 13 - Grading.

1.3 Regulations

.1 Abide by the bylaws and regulations of the Province, Territory or Municipality in which the work is located.

.2 Obtain permission from the Local or Highway Authority for haul routes and abide by the regulations with respect to their maintenance.

PART 2 PRODUCTS

2.1 150 mm Maximum

Sieve Size	Percent Passing
150 mm	100
75 mm	95 - 100
25 mm	60 - 80
9 mm	40 - 60
4.75 mm	25 - 45
2 mm	10 - 25
425 micro-m	2 - 10

For crushed aggregate not less than 60 percent of the material retained on the 4.75 mm sieve shall be crushed particles. The ratio of the percentage passing the 4.75 mm sieve to the ratio passing the 425 micro-m sieve shall not exceed two-thirds and preferably not less than one half.

2.2 Minimum Quality Control Test Frequencies

.1 The following frequencies of testing are the minimum required. The Contractor shall perform as many tests as are necessary to ensure that the Work conforms to the requirements of the Contract regardless of the minimum number specified.

.2 Crushed Gravel

a) One sieve analysis for every 500 m^3 of crushed gravel.

b) One field density for every 2000 m^2 of compacted layers.

PART 3 EXECUTION

3.1 Preparation

.1 Excavate and dispose of topsoil and objectionable surface materials.

.2 Excavate and remove unsuitable materials in the subgrade and replace with approved embankment material.

3.2 Compaction

.1 The Contractor shall compact the gravel to 97% of the maximum density as determined by the Standard Proctor Compaction Test, with approved compaction equipment.

END OF SECTION

PART 1 GENERAL

.1 Hydro seeding work shall be done in accordance with section 757 of the Ministry of Transportation Standard Specifications for highway construction (See Appendix A).

.2 References to "Ministry Representative" shall mean "Engineer".

END OF SECTION

PART 1 GENERAL

1.1 Description

.1 This section specifies requirements for corrugated steel pipe for culverts, and drainage structures.

.2 The work includes supply of materials, bedding, laying and jointing.

1.2 Related Work

.1 Section 31 22 13 - Grading.

.2 Section 32 11 16 - Granular Road Base.

1.3 Reference Standards

.1 Culvert materials to CSA Specifications.

.2 Compaction and testing of bedding to ASTM Standards.

.3 Loading for highways and railways to AASHTO and AREA standard loadings.

.4 Forest Practices Code of British Columbia, Forest Road Engineering Guidebook, Second Edition, June 2002

1.4 Product Delivery, Storage and Handling

.1 Protect as recommended by the manufacturer.

1.5 Samples

.1 Prior to commencing work inform the Engineer of sources of bedding material and submit test data showing compliance to specifications.

.2 Sieve analysis to ASTM-C136.

PART 2 PRODUCTS

2.1 Corrugated Steel Pipe - General

.1 To CSA-G401.

2.2 Round Pipe - Corrugations 68 X 13 mm

.1 Helical lockseam with re-corrugated ends, Armtec Hel-Cor or equal.

.2 Wall thickness

1.3 mm
1.6 mm For Diameter 600mm to 1000mm
2.0 mm For Diameter 900mm half round flumes

.3 Finish - galvanized

2.3 Couplers

.1 Flat band dimple couplers.

a) 1 Piece - 175 mm for 100 - 300 diameter
b) 1 Piece - 350 mm for 300 - 1200 diameter
c) 1 Piece - 600 mm for 1200 - 3000 diameter.
d) Wedge lock connections for 100 to 300 diameter.
e) Bolted connection for 300 diameter and larger.

.2 Corrugated couplers for annular corrugated pipe or helical corrugated pipe with recorrugated ends.

a) 1 Piece - 175 mm for pipe to 750 diameter
b) 2 Piece - 350 mm for pipe 910 to 1500 diameter
c) 2 Piece - 600 mm for pipe 1200 to 3000 diameter

.3 Semi-corrugated for helical corrugated pipe with recorrugated ends, Armtec hugger band or approved equivalent alternative.

a) 1 Piece - 300 mm for pipe 300 mm to 1500 mm.

2.4 Fittings

.1 Helical lockseam ends to match pipe, equal to Armtec Hel-Cor.

2.5 Special Structures

.1 Fabricate as detailed.

2.6 Gravel

.1 Pit run to be maximum 150 mm complying with the following gradation:

Sieve Size	Percent Passing
150 mm	100 max.
75 mm	80 max.
25 mm	60 max.
5 mm	10 max.

.2 Crushed gravel to be maximum 25 mm complying with the following gradation:

Sieve Size	Percent Passing
25 mm	100
19 mm	95 - 100
9.5 mm	60 - 80
4.75 mm	40 - 60
2.00 mm	25 - 45
425 micro - m	10 - 25
75 micro - m	2 - 10

2.7 Sand

.1 Sand, when used for bedding, shall comply with the following gradation.

Sieve Size	Percent Passing
9.5 mm	100
4.75 mm	90 - 100
150 micro - m	20 max.

PART 3 EXECUTION

2.8 Trenching and Backfilling

.1 Do trenching and backfilling as specified on the Contract Drawings.

.2 Windrow reusable gravel and/or topsoil and keep separate from the remainder of excavated material.

.3 Excavate to a depth and width sufficient to install the pipe and bedding.

.4 Excavate so that pipe can be laid to grade as shown on the Drawings.

.5 Remove unsuitable material and surplus material from the site.

.6 Support and protect interfering services, and repair any damage at the Contractor's expense.

.7 Determine locations of existing services by contacting the Owner's of existing services.

.8 After pipe is installed, backfill the trench using Class I backfill or Class II backfill as approved by the Engineer.

.9 Class I Backfill - consists of pit run gravel or sand compacted to 95% of the maximum density as determined by the Standard Proctor Compaction Test.

.10 Class II Backfill - consists of replacing the material excavated, compacting to 95% of the maximum density as determined by the Standard Proctor Compaction Test.

.11 Restore the surface as required, replacing all road surfaces, sod or structures damaged or removed.

2.9 Bedding

.1 Place minimum thickness of 150 mm of approved granular bedding compacted to 95% maximum density as determined by the Standard Proctor Compaction Test.

.2 Shape bedding to suit pipe.

2.10 Laying Pipe

.1 Commence pipe laying at downstream end.

.2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.

2.11 Jointing

.1 Match corrugations of coupler with pipe before tightening.

.2 Tap couplers to ensure tight-fit and insert and tighten bolts.

.3 Erect by connecting plates with bolts at seams.

.4 Use drift pins to align.

.5 Place plates in sequence as recommended by the manufacturer with joints staggered.

.6 Draw bolts uptight before backfilling.

.7 Repair spots to coating as recommended by the manufacturer using 2 coats of zinc rich coating to CGSB 1.181.

2.12 Backfilling in the Pipe Zone

.1 Backfill as detailed on drawings or place material in 150 mm layers to full width on each side of culvert.

.2 Compact each layer to 95% of the maximum density as determined by the Standard Proctor Compaction Test.

.3 Place minimum of 600 mm of cover materials at 95% of maximum density, before permitting equipment over culvert.

2.13 Culvert Ends

.1 Complete culvert ends by armouring the inlet and outlets with coarse gravel material (<150mm).

.2 A sump shall be dug at the inlet end and a ditchblock below the inlet to ensure water does not pass by the culvert.

END OF SECTION

SECTION 757

REVEGETATION SEEDING

DESCRIPTION

757.01 Scope - This Section refers to those portions of the work that are unique to the supply and application of seed, fertilizer, mulch, tackifier, and other materials used for revegetating disturbed areas, and that are not designated for treatment under Section 754, Planting of Trees, Shrubs, and Ground Covers. This Section must be referenced and interpreted simultaneously with all other Sections pertinent to the works described herein.

757.02 References - Guidelines for Hydroseeding in Proximity to Hydro Lines, Canada Seed Act, and BC Weed Control Act & Regulation.

MATERIALS

757.11 Handling and Storage - All seed, mulch, fertilizers and other dry materials shall be stored in a dry, weather proof storage place and shall be protected from damage by heat, moisture, rodents or other causes until the time of seeding. Supplier labels or other identification are not to be removed or defaced.

757.12 Seed

757.12.01 Supply of Seed - All seed specified shall be supplied by the Contractor and obtained from a recognized source.

757.12.02 Seed Type and Grade - All seed supplied either as individual species, or as a seed mix, shall comply with the requirements of the Canada Seed Act and Regulations, and the grade standards for that particular crop kind. Grass and legume seed shall meet or exceed Common No.1 grade prior to mixing with other species. Seed shall be free of propagules of plant species designated as noxious weeds under the BC Weed Control Act & Regulations.

All legume seed shall be inoculated with an adapted bacterial culture to ensure nitrogen fixation.

Seed mixes used for general roadside revegetation, and for the general conditions and areas indicated, shall be as shown on the table "Standard Grass Seed Mixes For Revegetation of British Columbia Highway Roadsides", unless otherwise specified in the Special Provisions.

When specified, wildflower and shrub seed shall be supplied to the requirements of the Special Provisions.

757.12.03 Seed Analysis Report - Upon request by the Ministry Representative, the Contractor shall provide valid Certificates of Analysis for each species and seed lot used in a mix. These shall set out details of the seed as specified in the "Canadian Methods and Procedures for Testing Seed".

757.12.04 Packaging and Labelling - Seed shall be supplied in the original sealed packages, with legible labels securely attached, and providing the following information:

- Supplier's name and address
- Analysis of seed mixture – the grade, and the name and percentage by weight of individual seed species
- Percentage of Pure Live Seed (PLS) for each species
- Lot number and crop year for each species in the mix
- Net weight (mass)
- Date and location of packaging

757.13 Fertilizer - Fertilizer shall comply with the provisions of the Canada Fertilizers Act and Fertilizer Regulations. Fertilizer shall be supplied as noted on the table "Standard Grass Seed Mixes For Revegetation of British Columbia Highway Roadsides" unless otherwise specified in the Special Provisions.

757.14 Hydraulic Mulch - Hydraulic mulch shall be a wood fibre type, specifically designed for hydraulic seeding, and having demonstrated satisfactory past performance for this purpose. The product shall be dyed green for appearance and ease of monitoring application.

Mulch shall be supplied in packages bearing the manufacturer's label, clearly indicating the weight and product name.

Mulch may contain a tackifier, which shall adhere to mulch to prevent separation during shipment and to avoid chemical agglomeration during mixing in hydraulic mulching equipment.

757.15 Water - Water used for hydraulic seeding operations shall be free of impurities that would inhibit germination and growth or may be harmful to the environment. Unless otherwise noted in the Special Provisions, the Contractor shall be responsible for securing a water source for hydraulic application of materials, including obtaining use permits under the Water Act if water is to be drawn from waterbodies, and for all cost to supply.

757.16 Other Materials - Tackifiers, Bonded Fiber Matrix coverings, erosion control blankets, soil amendments and other materials shall be supplied to the specifications in the Special Provisions.

EQUIPMENT

757.21 General - Equipment used shall be capable of applying the materials listed in the Special Provisions uniformly over the designated areas.

Equipment shall not cause soil rutting or other site damage.

757.22 Hydraulic Seeding/Mulching Equipment - Equipment shall have the tank volume identified by an identification plate or sticker, which shall be affixed in plain view.

The hydraulic seeder/mulcher shall be capable of sufficient agitation to mix the materials into a homogenous slurry, and to maintain the slurry in a homogeneous state until application.

Equipment shall be adequately sized to the task, to complete work efficiently within the time frame specified, and to permit application of materials without excess water being applied, or undue time lapse between operations. Hydraulic mulchers should be capable of producing slurry viscosities containing approximately 18 to 30kg of mulch per 500 litres of water.

Extension hoses or pipes shall be provided to reach areas not accessible from the hydraulic seeder.

CONSTRUCTION

757.31 Scheduling - Work shall be scheduled to ensure a minimum duration of on-site storage of materials, minimum compaction of topsoil, and prompt mulching operations.

The work shall be co-ordinated with the schedule of other trades, and be well integrated with specific requirements such as Sediment and Drainage Management Plans, which may be provided for any given project.

757.32 Protection - Existing site equipment, roadways, landscaping, reference points, monuments, markers, utilities and structures shall be protected from damage.

757.33 Timing of Material Application - Material application shall be carried out in accordance with the milestone dates provided in the Special Provisions, and after fine grading has been completed and the prepared areas approved by the Ministry Representative.

757.34 Methods - The methods chosen for material application shall be at the Contractor's discretion, unless otherwise specified in the Special Provisions.

757.35 Rates of Application - Application of fertilizers, seed mixtures, mulch and other materials shall be at the rates specified in the Special Provisions.

757.36 Record of Application - The Contractor shall maintain a record of all pertinent application information on the form supplied by the Ministry for this purpose, or similarly provided by the Contractor. Refer to Sample Form "Daily Seeding/Application Record".

757.37 Application Method for Mechanical Drop or Broadcast Dry Seeding - Seed shall be applied in two intersecting directions, except where conditions dictate seeding in one direction only.

Seeding shall overlap adjoining ground cover by 300mm.

Refer to the Special Provisions for specific instructions for installation of wildflower, shrub and other seed as may be applicable.

757.38 Hydraulic Application of Materials

757.38.01 General - The hydraulic seeder/mulcher shall be operated in compliance with Ministry safety standards including those detailed in the publication "Guidelines for Hydroseeding in Proximity to Hydro Lines."

Materials shall not be sprayed on objects not expected to support plant growth.

The Contractor shall be responsible for any overspray or damages incurred during hydroseeding. Any overspray or damage shall be made good at no cost, to the satisfaction of the Ministry Representative.

757.38.02 Mixing - The required quantities of seed, fertilizer, mulch, tackifier and other material shall be charged into the tank accurately by weight or by an acceptable system of mass calibrated volume measurement.
The materials shall be thoroughly mixed into a homogeneous water slurry prior to application.

All seed shall be added last when mixing. Pellet inoculated seed shall be applied immediately after placement into tank, and if this is not possible, dry application methods must be used. Other seed shall not be left in the tank for unreasonable lengths of time prior to application, i.e. – exceeding one or two hours, particularly when in contact with fertilizer solution.

The Ministry Representative will determine if Seed that remains in the tank for periods longer than specified can be used. Rejected seed shall be replenished with fresh stock.

757.38.03 Application - The mulch and tackifier

components of hydraulically applied mixtures will generally be applied in stages. The initial pass of the hydraulic seeder will distribute the correct amount of seed and fertilizer for the area being done, as well as up to one third of the required mulch/tackifier. The subsequent pass(es) will complete the mulching/tacking process to the required rate.

Mulch shall be applied to form an even, uniform mat blended 150 mm into adjacent vegetated areas or previous mulch applications.

757.39 Related Work - Additional related work such as the application of erosion control blanket or other coverings, and harrowing or discing of soil following material application, shall be as specified in the Special Provisions.

757.40 Clean-up - All surplus and waste materials resulting from seeding operations shall be removed from the job site after empty product containers have been inspected by the Ministry Representative.

Hydraulic seeding and/or mulching overspray that may cause problems on areas or objects not designated for re-vegetation, shall be removed in an appropriate manner.

757.41 Conditions for Acceptance -Treated areas will be accepted by the Ministry when the following conditions have been met:

a) Treated areas are not thin with bare patches, or uneven in distribution.

b) Empty containers of materials used during the work are stored neatly on site for inspection by the Ministry Representative.

757.42 Repairs - Seeded areas that show thin application or bare spots shall be re-treated with the specified materials at the Contractor's expense and at the earliest opportunity, weather and season permitting.

MEASUREMENT

757.81 General - Revegetation Seeding will be measured by the HECTARE treated. The treated areas will be measured to the nearest tenth of a hectare [0.1 ha].

PAYMENT

757.91 General - Payment for REVEGETATION SEEDING will be at the Contract Unit Price per hectare. The Contract Unit Price shall be accepted as full compensation for the work described and all work subsidiary and incidental thereto for which separate payment is not elsewhere provided.

SHEET #_____ MINISTRY OF TRANSPORTATION AND HIGHWAYS

PROJECT #_____

DAILY SEEDING/APPLICATION RECORD

DATE	LOAD #	AREA COVERED IN HECTARES			SEED APPLIED* (IN KG.)			OTHER MATERIALS* (IN KG.)				REMARKS
		GRASS	MULCH	REPEAT	GRASS	RYE	OTHER	FERT	MULCH	TACK	MISC.	
	1											
	2											
	3											
	4											
	5											
	6											
	7											
	8											
	9											
	10											
	11											
	12											
	13											
	14											
	15											
	16											
	17											
	18											
	19											
	20											
Total of Sheet												

*Provide details of seed mixes and other materials, as required, in this space:

THIS SHEET CERTIFIED CORRECT:

FOR MINISTRY _____

FOR CONTRACTOR _____

DATE: _____

STANDARD GRASS SEED MIXES FOR REVEGETATION OF BRITISH COLUMBIA HIGHWAY ROADSIDES (BY WEIGHT)

REGION	STANDARD MIXES (by weight)		APPLICATION
South Coast	**Vancouver Island / Coast Mix**		
	Perennial Ryegrass	26%	General seeding coastal locations where mean annual precipitation is > 90 cm.
	Creeping Red Fescue	24%	
	Alsike Clover	14%	
	Hard Fescue	13%	Fertilizer: 16-32-6
	White Clover	9%	
	Timothy	8%	
	Canada Bluegrass	4%	
	Redtop	2%	
	Interior Forestland Mix		
	Intermediate Wheatgrass	32%	General seeding inland where mean annual precipitation is >50 cm.
	Alfalfa ("Rambler")	20%	
	Perennial Ryegrass	15%	Fertilizer: 16-32-6
	Annual Ryegrass	15%	
	Hard Fescue	10%	
	White Dutch Clover	5%	
	Canada Bluegrass	2%	
	Redtop	1%	
	Interior Dryland Mix		
	Crested Wheatgrass	40%	General seeding inland where mean annual precipitation is < 30 cm.
	Tall Wheatgrass	25%	
	Slender Wheatgrass	20%	Fertilizer: 16-32-6
	Hard Fescue	15%	
Thompson – Okanagan	**Interior Forestland Mix**		
	Intermediate Wheatgrass	32%	
	Alfalfa ("Rambler")	20%	General seeding inland where mean annual precipitation is >50 cm.
	Perennial Ryegrass	15%	
	Annual Ryegrass	15%	Fertilizer: 22-11-11
	Hard Fescue	10%	
	White Dutch Clover	5%	
	Canada Bluegrass	2%	
	Redtop	1%	
	Interior Dryland Mix		
	Crested Wheatgrass	40%	General seeding inland where mean annual precipitation is < 30 cm.
	Tall Wheatgrass	25%	
	Slender Wheatgrass	20%	
	Hard Fescue	15%	Fertilizer: 22-11-11
	Alkaline Tolerant Blend		
	Crested Wheatgrass	35%	General seeding in alkaline soils.
	Sherman Big Bluegrass	20%	
	Hard Fescue	20%	Fertilizer: 22-11-11
	Canada Bluegrass	15%	

REGION	STANDARD MIXES (by weight)	APPLICATION
Kootenays	**Interior Forestland Mix** Intermediate Wheatgrass 32% Alfalfa ("Rambler") 20% Perennial Ryegrass 15% Annual Ryegrass 15% Hard Fescue 10% White Dutch Clover 5% Canada Bluegrass 2% Redtop 1%	General seeding inland where mean annual precipitation is >50 cm. Fertilizer: 22-11-11
	Kootenay Dryland Tall Wheatgrass 45% Crested Wheatgrass 20% Alfalfa ("Rambler") 15% Hard Fescue 7% Sheep Fescue 5% Alsike Clover 5% Canada Bluegrass 2% Redtop 1%	General seeding inland where mean annual precipitation is < 50 cm. Fertilizer: 22-11-11
Northern (Prince George Office)	**North East General Mix** Smooth Bromegrass 40% Creeping Red Fescue 20% Timothy 15% Alfalfa 15% Alsike Clover 10%	General seeding inland where mean annual precipitation is > 50 cm. Fertilizer: 26-16-8
	North East Dryland Mix Crested Wheatgrass 35% Intermediate Wheatgrass 25% Alfalfa 15% Smooth Bromegrass 10% Creeping Red Fescue 10% Alsike Clover 5%	General seeding inland where mean annual precipitation is < 50 cm. Fertilizer: 26-16-8
Northern (Terrace Office)	**North West General Mix** Smooth Bromegrass 70.6% Alfalfa 18.0% Creeping Red Fescue 3.9% Alsike Clover 3.4% Timothy 2.9% Kentucky Bluegrass 1.1%	General seeding inland where mean annual precipitation is > 50 cm. For use in CWH and ICH biogeoclimatic zone. Fertilizer: 22-11-11
	North West Dryland Mix Intermediate Wheatgrass 47.7% Alfalfa 19.1% Crested Wheatgrass 17.9% Orchardgrass 9.1% Hard Fescue 3.0% White Clover 2.1% Kentucky Bluegrass 1.1%	General seeding inland where mean annual precipitation is < 50 cm. For use in SBS biogeoclimatic zone (East of Moricetown to West of Endako) Fertilizer: 22-11-11

REGION	STANDARD MIXES (by weight)	APPLICATION
	Northern Coastal Mix: Alfalfa 46.6% Intermediate Wheatgrass 14.0% Smooth Bromegrass 10.3% Kentucky Bluegrass 9.0% Sheep Fescue 8.2% Birdsfoot Trefoil 6.2% Timothy 5.7%	General seeding coastal locations where mean annual precipitation is > 90 cm. For use in CWH biogeoclimatic zone (QCI, Prince Rupert to Pacific) Fertilizer: 22-11-11
	Northern Mix: Hairy Vetch 57.3% Crested Wheatgrass 16.4% Alfalfa 13.1% Creeping Red Fescue 5.3% Orchardgrass 3.8% Birdsfoot Trefoil 3.1% Kentucky Bluegrass 1.1%	General seeding coastal locations where mean annual precipitation is > 90 cm. For use in ICH and BWBS biogeoclimatic zones. (ICH – Pacific to Moricetown, Kitwanga to Thomas Creek 220 km N) (BWBS – Thomas Creek to Yukon border) Fertilizer: 22-11-11
	Ditch Vegetation Seed Mixture Crested Wheatgrass 38.7% Alfalfa 30.9% Creeping Meadow Foxtail 15.8% Birdsfoot Trefoil 6.9% Reed Canarygrass 4.8% White Clover 1.6% Kentucky Bluegrass 1.2%	For use in revegetating roadside ditches following ditch maintenance operations. Fertilizer: 22-11-11
Vancouver Island	**Vancouver Island / Coast Mix** Perennial Ryegrass 26% Creeping Red Fescue 24% Alsike Clover 14% Hard Fescue 13% White Clover 9% Timothy 8% Canada Bluegrass 4% Redtop 2%	General seeding coastal locations where mean annual precipitation is > 90 cm. Fertilizer: 18-18-18

APPENDIX A

MEAN ANNUAL PRECIPITATION