PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 56 00 - Temporary Barriers and Enclosures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 31 05 10 - Corrected Maximum Dry Density for Fill.

.4 Section 31 11 00 - Clearing and Grubbing.

.5 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft^3) (600 kN-m/m^3)).

1.3 DEFINITIONS

.1 Rock Excavation: excavation of:

.1 Material from solid masses of igneous, sedimentary or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped with reasonable effort from Caterpilar D9L or equivalent to be considered integral with parent mass.

.2 Boulder or rock fragments measuring in volume one (1) cubic metre or more.

.2 Common Excavation: excavation of materials that are not Rock Excavation or Stripping.

.3 Unclassified Excavation: excavation of whatever character other than stripping encountered in the work.

.4 Stripping: excavation of organic material covering original ground.

.5 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.

.6 Waste Material: material unsuitable for embankment, embankment foundation or material surplus to requirements.

.7 Borrow Material: material obtained from areas outside right-of-way and required for construction of embankments or for other portions of work.

.8 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Adhere to regulations of authority having jurisdiction when blasting is required.
.2 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.

.2 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Divert excess materials from landfill to site approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Embankment materials require approval by Departmental Representative.

.2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.

.3 Borrow material:
.1 Obtain from borrow pit approved by Departmental Representative.

PART 3 - EXECUTION

3.1 COMPACTION EQUIPMENT

.1 Compaction equipment must equivalent of one 12 tonne vibratory packer capable of obtaining required densities in materials on project. Equipment that does not achieve specified densities must be replaced or supplemented.

.2 Operate minimum equivalent of one 12 tonne vibratory packer continuously in each embankment when placing material.

3.2 WATER DISTRIBUTORS

.1 Apply water with equipment capable of uniform distribution.

3.3 STRIPPING OF TOPSOIL

.1 Do top soil and finish grading.

.2 Commence topsoil stripping of areas as indicated as directed by Departmental Representative after brush weeds and grasses have been removed from these areas.

.3 Strip topsoil to depths as indicated as directed by Departmental Representative. Do not mix topsoil with subsoil.

.4 Stockpile in locations as indicated directed by Departmental Representative. Stockpile height not to exceed 2 m.

.5 Dispose of unused topsoil to location as indicated as directed by Departmental Representative off site.

.6 Remove clearing and grubbing debris from stripping.

.7 Spread organic stripping, on completion of excavation and embankment construction, on slopes and trim or remove from site if quantity exceeds ability to grade on site.

3.4 EXCAVATING

.1 General:
- .1 Notify Departmental Representative when waste materials are encountered and remove to depth and extent directed.
- .2 Subcut 500 mm below subgrade in cut sections unless otherwise directed. Compact top 150 mm below subcut to minimum 95% maximum dry

density, ASTM D 698 (AASHTO T99). Replace with approved embankment material and compact.

.3 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points as directed by Departmental Representative.

.4 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points in accordance with standard plans for "Cut and Fill Construction Methods at Grade Points" as indicated as directed by Departmental Representative.

.2 Drainage:

.1 Maintain profiles, crowns and cross slopes to provide good surface drainage.

.2 Provide ditches as work progresses to provide drainage.

.3 Construct interceptor ditches as indicated or as directed before excavating or placing embankment in adjacent area.

.3 Rock excavation:

.1 Shatter rock to 300 mm below subgrade elevation as indicated.

.2 Reduce overbreak and increase stability of rock faces by using smooth blasting techniques.

.3 Use smooth blast and excavate short sections in rock cuts to determine optimum spacing of holes when requested by. Departmental Representative.

.4 Charge back line holes with appropriate blasting agent in sufficient quantity to effectively shear rock along wall face between adjacent drill holes without causing further damage. Stem holes as necessary to contain blast. Do not use prilled type ammonium nitrate and fuel oil (ANFO) exposives within 4 m of final cut line.

.5 Form back wall by pre-splitting on instantaneous delay at least 10 m in advance of production blasting unless Departmental Representative determines that burden is too light or rock is so fractured that pre-splitting prevents proper production drilling or loading. Smooth wall blast just prior to or just after production blast as determined by Departmental Representative.

.6 Drill back line holes 50 mm to 75 mm in diameter parallel to each other along slope face. Maximum spacing 750 mm. Drill second line of holes parallel to back line holes. Spacing 1.5 times spacing of back line holes and same distance away.

.7 Maximum deviation from slope face and parallelism 150 mm. Do not drill smooth blast holes more than 500 mm below ditch grade. Holes maximum 6 m long for first lift and maximum 8 m long for subsequent lifts. Reduce length of holes to achieve specified deviation, as required.

.8 Scale rock backslopes to achieve smooth, stable face, free of loose rock and overhangs to design backslope.

.9 Control blasting to minimize flying particles.

.4 Borrow Excavation:

.1 Completely use in embankments, suitable materials removed from right-of-way excavations before taking material from borrow areas.

.2 Obtain embankment materials, in excess of what is available from cut areas, from designated borrow areas.

.1 Departmental Representative to designate extent of borrow areas and allowable depth of excavation.

.2 Remove waste and stripping material from borrow pits to designated locations.

.3 Slope edges of borrow areas to minimum 2:1 3:1 4.1 and provide drainage as directed.

.4 Trim and leave borrow pits in condition to permit accurate measurement of material removed.

3.5 EMBANKMENTS

.1 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces. Method used to be subject to prior approval of Departmental Representative.

.2 Break up or scarify existing road surface prior to placing embankment material.

.3 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized.

.4 Maintain crowned surface during construction to ensure ready run-off of surface water.

.5 Drain low areas before placing materials.

.1 Place and compact to full width in layers not exceeding 200 mm loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.

.6 Where material consists of rock:

.1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 1 m.

.2 Distribute rock material to fill voids with smaller fragments to form compact mass.

.3 Fill surface voids at subgrade level with rock spalls or selected material to form earth-tight surface.

.4 Do not place boulders and rock fragments with dimensions exceeding 150 mm within 300 mm of pavement subgrade elevation.

.7 Deductions from excavation will be made for overbuild of embankments.

3.6 SUBGRADE COMPACTION

.1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.

.2 Compact each layer to minimum 95% maximum dry density, ASTM D 698 (AASHTO T99) except top 150 mm of subgrade. Compact top 150 mm to 100% maximum dry density.

.3 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

3.7 FINISHING

.1 Shape entire roadbed to within 25 50 mm of design elevations.

.2 Finish slopes, ditch bottoms and borrow pits true to lines, grades and drawings where applicable. Scale slope by removing loose fragments, for cut slopes in bedrock steeper than 1:1.

.3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.

.4 Hand finish slopes that cannot be finished satisfactorily by machine.

.5 Round top of backslope 1.5 m both sides of top of slope.

.6 Run tractor tracks over slopes exceeding 3 m in height to leave tracks parallel to centreline of highway.

.7 Trim between constructed slopes and edge of clearing to provide drainage and free of humps, sags and ruts.

3.8 PROTECTION

.1 Maintain finished surfaces in condition conforming to this section until acceptance by Departmental Representative.

END