

1.0 GENERAL

1.1 DETAIL DRAWINGS

- .1 The following detail drawing is appended hereto and forms part of this section to illustrate the location and types of excavations and fill zones within the canal cross section.

<u>Number</u>	<u>Title</u>
	[Typical Canal Cross Section]

1.2 DEFINITIONS

- .1 “Common Excavation” is the excavation of on-Site soil materials required by the Contract Documents, excluding Topsoil and Subsoil Stripping, Unsuitable Organic Soils Excavation, Wet Excavation, Borrow Area Excavation, Structure Excavation, Rock Excavation, and [Stockpile Excavation of Minister Supplied Materials].
- .2 “Topsoil and Subsoil Stripping” is the excavation of Topsoil and Subsoil defined in Section 02234 – Topsoil and Subsoil Stripping.
- .3 “Unsuitable Organic Soils Excavation” is the excavation of Unsuitable Organic Soils defined in Section 02234 – Topsoil and Subsoil Stripping.
- .4 “Wet Excavation” is the excavation of on-Site soil materials from the inside side slopes [and bed] of the existing canal [located below the existing canal full supply level] as specified in the Contract Documents. It includes Wet Excavation - Type 1 and Wet Excavation - Type 2. Type 1 consists of Wet Excavation materials that are used or disposed of locally in fills (if the material is suitable), or in Waste Fill zones against the outside slope of the new canal banks and in nearby waste disposal areas (if the material is unsuitable). Type 2 consists of Wet Excavation materials that are used or disposed of in fills (if the material is suitable), or in waste disposal areas (if the material is unsuitable) located beyond 50 m.
- .5 “Borrow Area Excavation” is the excavation of soil materials in the specified borrow areas required by the Contract Documents, excluding Topsoil and Subsoil Stripping.
- .6 “Structure Excavation” is the excavation of on-Site soil materials including trenching required by the Contract Documents to demolish and remove an existing structure or to construct a new structure.
- .7 “Rock Excavation” is the excavation of on-Site rock materials required by the Contract Documents that, in an unfrozen state, cannot be ripped into individual detached masses smaller than 1.5 m³ in size with a single tooth ripper mounted on a Caterpillar D8 or equivalent Group 10 Crawler Tractor as outlined in the Alberta Roadbuilders and Heavy Construction Association Equipment Rental Rates Guide, or boulders larger than 1.5 m³ in size.
- .8 “Stockpile Excavation of Minister Supplied Materials” is the excavation from stockpiles of materials, supplied by the Minister, for use in areas specified in the Contract Documents.

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- .9 “Authorized Structure Over-Excavation” is excavation beyond the Structure Excavation lines, grades, slopes and elevations specified in the Contract Documents to remove unsuitable, unfrozen bearing soils when requested by the Minister.
- .10 The Minister will classify the above excavations. Co-operate with the Minister and conduct the excavation operations in a manner that will permit classifying by the Minister.
- .11 “Overhaul” is the hauling of on-Site excavated material derived from Common Excavation and Wet Excavation - Type 2 beyond the specified Freehaul Distance. It does not include any hauling of Topsoil, Subsoil, Wet Excavation - Type 1 [and Minister Supplied Materials specified in Section 02330 – Earthwork Materials].
- .12 “Borrow Overhaul” is the hauling of on-Site excavated material derived from Borrow Area Excavation beyond the specified Freehaul Distance. It does not include any hauling of Topsoil, Subsoil, [and Minister Supplied Materials specified in Section 02330 – Earthwork Materials].
- .13 “Haul Distance” is the calculated shortest distance, between stations along the design centreline of the canal, between the centre of volume of the material in-place before excavation and the centre of volume of this material at its final point of deposition.
- .14 “Borrow Haul Distance” is the calculated shortest distance, perpendicular to and between stations along the design centreline of the canal, between the centre of volume of the material in-place before Borrow Area Excavation and the centre of volume of this material at its final point of deposition.
- .15 “Freehaul Distance” for Common Excavation, Wet Excavation - Type 2, and Borrow Area Excavation is 500 m, and for Wet Excavation - Type 1 is 50 m.

1.3 SUBMITTALS

- .1 Provide the following submittals.
- .2 A Borrow Area Excavation Plan for each borrow area at least 10 days prior to commencing Borrow Area Excavation. Indicate the following on the plan:
 - .1 A schedule of the proposed excavation sequence, volumes, and corresponding material utilization locations.
 - .2 The proposed borrow area access/egress locations and ramp configurations.
 - .3 The proposed depths of excavation and side slopes.
 - .4 The anticipated temporary stockpiling requirements.
 - .5 The proposed material working and conditioning procedures in the borrow area, if applicable.
 - .6 The proposed care of water measures providing for drainage of the borrow area and control of sediment transport.
 - .7 The proposed measures to separate materials from the borrow area that are suitable for use as different types of fill material.

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- .8 The proposed measures to provide ongoing safety and stability in the borrow area.
- .9 The proposed measures to protect suitable fill materials within the borrow area from becoming frozen.
- .10 The proposed restoration and final grading of the borrow area.
- .3 The revised plan, if changes to the Borrow Area Excavation Plan are proposed, at least 5 days prior to changing Borrow Area Excavation operations.

2.0 PRODUCTS NOT USED

3.0 EXECUTION

3.1 EXCAVATION AND OVERHAUL - GENERAL

- .1 Sequence, schedule and perform excavation and fill placement operations to make the best use of all excavated material, protect and prevent suitable materials from becoming unsuitable, and minimize the volume of Borrow Area Excavation.
- .2 Locate and protect utility lines, survey reference points, instrumentation, fencing, and other facilities.
- .3 Remove and dispose of all snow, surface ice, and excess water prior to starting the excavation.
- .4 Do not perform Overhaul and Borrow Overhaul without prior authorization of the Minister.
- .5 The Minister will calculate the Haul Distance and the Borrow Haul Distance.

3.2 EXCAVATION LINES

- .1 Excavate to the lines, grades, slopes and elevations specified in the Contract Documents, unless established otherwise by the Minister.
- .2 The Minister will identify unsuitable bearing soils when encountered at the specified foundation level. Carry the excavation deeper to remove unsuitable bearing soils and replace excavated soil with materials as directed by the Minister.
- .3 The Minister will determine if suitable bearing conditions are found above the lines, grades, slopes, and elevations specified in the Contract Documents. Adjust excavation lines as directed by the Minister to accommodate the raised foundation.
- .4 Excavate frozen materials from surfaces against which fill materials, structures or pipes will be placed as specified in the Contract Documents. Excavate frozen materials located beyond the excavation lines, grades, slopes, and elevations specified in the Contract Documents, and replace with fill materials as directed by the Minister at no cost to the Minister.

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- .5 Fill unauthorized over-excavation to the lines, grades, slopes, and elevations specified in the Contract Documents using materials as directed by the Minister at no cost to the Minister.

3.3 PROTECTION

- .1 Protect excavations throughout the Work by temporary shoring, bracing, or other suitable methods, if required, to provide safe working conditions and to prevent caveins and loose soil from falling into the excavations.
- .2 Remove boulders, loose rock, soil blocks, and other fragments that may slide or roll into excavated areas, which, in the opinion of the Minister or the Contractor, are unsafe or appear to endanger persons, work, or property.
- .3 Minimize the depth of frost penetration into the underlying materials in required excavation and borrow areas by sequencing stripping to minimize the exposed areas, and by keeping equipment traffic to a minimum.
- .4 In cold weather, protect excavated surfaces against which fill materials will be placed from freezing by sequencing stripping to minimize the exposed area, by using a temporary layer of soil or insulating materials, or other means authorized by the Minister. Remove protection only when the Contractor is ready to place fill and authorization is provided by the Minister.
- .5 In cold weather, protect excavated foundation surfaces against which structures or pipes will be placed from freezing. Use a temporary layer of soil, insulating materials, heating and hoarding, or other means authorized by the Minister. Remove protection only when the Contractor is ready to install the structure or to place fill and authorization is provided by the Minister.
- .6 In cold weather, protect borrow area materials from freezing by sequencing stripping operations to minimize the exposed areas and by placing a temporary layer of soil on exposed areas. Remove protection only when the Contractor is ready to place materials excavated from borrow areas and authorization is provided by the Minister.
- .7 In cold weather, perform excavating, loading, hauling, dumping, spreading and compacting in a continuous operation to avoid freezing of the materials before the specified compaction has been achieved.

3.4 COMMON EXCAVATION

- .1 Provide Common Excavations at the locations, and to the lines, grades, slopes, and elevations specified in the Contract Documents.
- .2 Load, haul, and dump Common Excavation materials at the appropriate fill placement zones, waste disposal areas, [Waste Fill zones] or other locations as directed by the Minister.
- .3 Do not place any Common Excavation materials in waste disposal areas [or Waste Fill zones] that can be worked to meet the specified requirements for [Impervious Fill Zone 1A and Random Fill Zone 2A].
- .4 Sequence and schedule the Common Excavation and fill placement operations so as to maximize the quantity of [Impervious Fill Zone 1A and Random Fill Zone 2A] that is incorporated within the fill zones.

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- .5 If required, temporarily stockpile materials derived from Common Excavations that are suitable for use as [Impervious Fill Zone 1A and Random Fill Zone 2A]. Rehandle if required, and incorporate these materials in appropriate fill zones prior to obtaining similar materials from borrow areas.

3.5 WET EXCAVATION

- .1 Provide Wet Excavation at the locations, and to the lines, grades, slopes, and elevations specified in the Contract Documents.
- .2 Temporarily stockpile and subsequently incorporate suitable materials from Wet Excavation - Type 1 in [adjacent Random Fill Zone 2A fills], and unsuitable materials in [waste disposal areas] [Waste Fill zones on the outside of the new canal banks] that are located within the specified Freehaul Distance.
- .3 Load, haul, and incorporate suitable materials from Wet Excavation - Type 2 in [Random Fill Zone 2A fills], and unsuitable materials in waste disposal areas.

3.6 BORROW AREA EXCAVATION

- .1 Conduct the Borrow Area Excavation in accordance with the Borrow Area Excavation Plan to provide [Impervious Fill Zone 1A and Random Fill Zone 2A].
- .2 Excavate materials in a manner that provides for positive drainage, and avoids ponding of water from rainfall and snowmelt, run-off, or seepage in the borrow area. When excavation operations are suspended, trim excavation surfaces to a smooth, even condition at a minimum 1% drainage gradient.
- .3 Perform Borrow Area Excavation to obtain [Impervious Fill Zone 1A and Random Fill Zone 2A] with a minimal volume of excavation. This may require excavating in selected areas such that suitable materials are not contaminated and made unsuitable, or, conditioning, mixing, and blending materials to avoid depletion of a strata of material.
- .4 Maintain excavation side slopes in the borrow area in a safe and neat condition at all times. Do not excavate side slopes steeper than [2H:1V].
- .5 Load, haul, and dump borrow area materials at the appropriate fill placement locations in accordance with the authorized Borrow Area Excavation Plan.
- .6 Temporarily stockpile unsuitable fill materials.
- .7 Regrade finished side slopes within the borrow area to [3H:1V].

3.7 STRUCTURE EXCAVATION

- .1 Where the demolition of existing structures are specified in the Contract Documents, provide Structure Excavations of sufficient size and depth to permit the complete removal of the structure, and the subsequent backfill with materials specified in the Contract Documents.

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- .2 For new structures, provide Structure Excavations at the locations, and to the lines, grades, slopes, and elevations specified in the Contract Documents, as established by the Minister, or as required by the Contractor to permit subsequent construction and backfill with fill materials specified in the Contract Documents
- .3 The Minister will identify unsuitable bearing soils when encountered at the earth foundation level. When requested by the Minister, perform Authorized Structure Over-Excavation to remove unsuitable, unfrozen bearing soils and replace with Authorized Fill Materials. Authorized Structure Over-Excavation and Authorized Fill Materials will be valued in accordance with Section 00725 – General Conditions, clause 8.3 - Valuation of Changes in the Work.
- .4 If required, temporarily stockpile materials derived from Structure Excavations that are suitable for use as [Impervious Fill Zone 1A and Random Fill Zone 2A]. Rehandle if required, and incorporate these materials in appropriate fill zones prior to obtaining similar materials from borrow areas.

3.8 ROCK EXCAVATION

- .1 Use methods and techniques that produce excavated surfaces with a minimum of overhang, fracturing, and overbreak.
- .2 Use mechanical techniques, such as tractors with rippers or pneumatic or hydraulic breakers, to excavate rock to the lines, grades, slopes, and elevations specified in the Contract Documents. Rock Excavation will be valued in accordance with Section 00725 – General Conditions, clause 8.3 - Valuation of Changes in the Work.
- .3 Blasting is not permitted.
- .4 Remove shattered layers and any loose or disturbed material to provide a sound foundation for structures and pipes.
- .5 Load, haul, and dump Rock Excavation materials at the specified waste disposal areas and bury under a minimum cover of 1 000 mm of mineral soil.

3.9 STOCKPILE EXCAVATION OF MINISTER SUPPLIED MATERIALS

- .1 Sequence and schedule Stockpile Excavation of Minister Supplied [Impervious Fill Zone 1A] so that these materials are completely incorporated into appropriate fill zones prior to obtaining similar materials from borrow areas.
- .2 Sequence and schedule Stockpile Excavation of Minister Supplied [Gravel Armour Zone 5C] so that these materials are completely incorporated into the Work [prior to utilizing Contractor supplied [Gravel Armour Zone 5C]].
- .3 []

3.10 UNSUITABLE ORGANIC SOILS EXCAVATION

- .1 Excavate Unsuitable Organic Soils from the locations, and to the lines, grades, slopes and elevations specified in the Contract Documents, or as established by the Minister.

- .2 Load, haul, and dump excavated Unsuitable Organic Soils at the specified waste disposal areas and bury under a minimum cover of 1 000 mm of mineral soil.

3.11 EXCAVATION TOLERANCES

- .1 Provide finished excavation surfaces that are smooth, regular, and uniform.
- .2 For finished excavation surfaces, excluding the top of canal banks, invert of ditches, [bed of the canal between [] and []], a deviation measured normal to the excavated surface, of +/- 100 mm will be permitted between the finished excavated surface and the lines, grades, slopes, and elevations specified in the Contract Documents or as established by the Minister.
- .3 For the top of canal banks, a deviation measured normal to the excavated surface, of 0 mm to +100 mm will be permitted between the finished excavated surface and the lines, grades, slopes, and elevations specified in the Contract Documents or as established by the Minister.
- .4 For the invert of ditches, a deviation measured normal to the excavated surface, of +/- 50 mm will be permitted between the finished excavated surface and the lines, grades, slopes, and elevations specified in the Contract Documents or as established by the Minister.
- .5 For the [bed of the canal between [] and []], a deviation measured normal to the excavated surface, of - 150 mm to 0 mm will be permitted between the finished excavated surface and the lines, grades, slopes. and elevations specified in the Contract Documents or as established by the Minister.
- .6 Limit the maximum rate of change in deviation from the specified grade of any surface to a ratio of height to length of 1:50. The height and length of the gradual irregularity will be measured normal and parallel, respectively, to the specified grade.

END OF SECTION