Specification For Foundation Excavation - 2250

Section	Topic
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1 GENERAL

1.1 Description

1.1.1 The work shall consist of the removal of all materials, of whatever nature, necessary for the construction of foundations and substructures in accordance with the plans or as directed by the Ministry. It shall include the furnishing of all necessary equipment, the construction of all cofferdams and the dewatering which may be necessary for the execution of the work. It shall also include the subsequent removal of cofferdams, cribs and access roads, and the placement of all necessary backfill as hereinafter specified. It shall also include the disposal of excavated waste material in an environmentally acceptable manner and location so as not to affect the hydraulic capacity of the stream channel, not be unsightly, and not decrease the stability of the roadway embankment or valley walls.

1.1.2 All clearing and grubbing necessary within the area defined by lines connecting the extremities of the substructure units shall, unless otherwise specified in the Contract, be considered part of the excavation.

1.1.3 All substructures, where practical shall be constructed in open excavation utilizing, where necessary, shoring, bracing, or cofferdams, in accordance with approved methods. When footings can be placed in the dry, forms may be omitted with the approval of the Ministry and the entire excavation filled with concrete required shall be placed at the expense of the Contractor.

2 MATERIALS

2.1 General

2.1.1 The embankment materials shall be either stockpiled for reuse or disposed of at a suitable location away from the bridge site as approved by the Engineer.

3 CONSTRUCTION

3.1 Preservation of Channel

3.1.1 The Contractor shall organize their operations to minimize disturbances of the natural stream bed. Any excavation or dredging shall be backfilled to the original ground surface or riverbed with material satisfactory to the Ministry. Materials used for the construction of dikes or cofferdams shall be removed at times in such a manner to satisfy criteria in the Special Provisions. Material excavated from the stream bed shall not be deposited within the stream area.

3.2 Depth of Footing

3.2.1 The elevation of the bottom of footings, as shown on the plans, shall be considered as approximate only and the Ministry may order, in writing, such changes in dimensions or elevation of footings as may be necessary to secure a satisfactory foundation.

3.3 Preparation of Foundation for Footings

3.3.1 Footing on Piles

3.3.1.1 When footings are supported by piles, all excavation shall be completed before the piles are installed, unless approved otherwise by the Ministry. All material forced up between the piles shall be removed to the correct elevation, at no additional cost, before placing concrete for the footing.

3.3.1.2 If the soil at the level of the bottom of the footing is composed of soft material, the Contractor shall provide a concrete seal on which to place the concrete for the footing. All material in this seal shall be below the elevation of bottom of footing. The cost of any additional excavation and the cost of supplying and placing

the concrete seal shall be included in the price for PIER EXCAVATION or EXCAVATION.

3.3.2 Spread Footing

3.3.2.1 Where a spread pier footing is to bear on material other than rock, all material disturbed or softened during excavation shall be removed. A concrete seal shall be used to protect the bearing material from further disturbance and from seepage or precipitation. The concrete seal shall be placed immediately upon removal of the material to the specified elevation.

3.3.2.2 The concrete seal shall have a minimum thickness of 10 cm unless specified otherwise on the plans, and shall be placed below the elevation of bottom of footing. All necessary excavation, the supply of all materials and the mixing, handling, and placing of the concrete for the seal shall be included in the price for PIER EXCAVATION or EXCAVATION.

3.4 Cofferdams

3.4.1 General

3.4.1.1 Cofferdams for foundation construction shall be carried to adequate depths and heights, and be safely designed and constructed, and be made as watertight as is necessary for the proper performance of the work being performed inside them. When footings are formed, the interior dimensions of cofferdams shall provide sufficient clearance for the construction of forms and their inspection, and shall permit pumping outside the forms.

3.4.2 Protection of Concrete

3.4.2.1 Cofferdams shall be constructed to protect green concrete against damage from a sudden rise in stage of the stream and to prevent damage to the foundation by erosion. No wood or bracing shall be left in cofferdams in such a way as to extend into the concrete, without written permission from the Ministry.

3.4.3 Drawings Required

3.4.3.1 Cofferdams shall be designed by a Registered Professional Engineer in the Province of Saskatchewan and the cofferdam

plans bearing the Professional Engineer's stamp shall be submitted to the Ministry at least four weeks prior to the start of construction of the cofferdam. These plans shall also contain information as to the design loads and the de-watering and excavation sequence. The submission of the cofferdam details to the Ministry shall in no way relieve the Contractor of the full responsibility for the success or failure of the cofferdam.

3.4.4 Removal

3.4.4.1 Unless otherwise provided, cofferdams, including all sheeting and bracing, shall be removed after the completion of the substructure, care being taken not to disturb or otherwise damage the finished concrete or foundation material.

3.4.5 Pumping

3.4.5.1 Pumping from the interior of any foundation enclosure shall be done in such manner as to preclude the possibility of the movement of water through any fresh concrete. No pumping shall be permitted during the placing of concrete or for a period of at least 24 hours thereafter, unless it is done from a suitable sump separated from the concrete work.

3.4.6 Inspection

3.4.6.1 The Contractor shall notify the Ministry after each excavation is completed. No concrete shall be placed until the Ministry has approved the depth of the excavation and the character of the foundation material.

3.5 Backfill

3.5.1 All materials used for backfill shall be of a quality acceptable to the Ministry and shall be free from large or frozen lumps, wood, or other foreign material.

3.5.2 All excavated spaces not occupied by abutments, piers, rip-rap or other permanent work shall be backfilled to the surface of the surrounding ground and shall be thoroughly compacted. The space around footings shall be backfilled within 24 hours of the removal of the forms.

3.5.3 The fill behind abutments and wing walls of all bridge structures shall be deposited in horizontal layers not to exceed 15 cm in loose thickness and

shall be thoroughly compacted. The backfill in front of such units shall be placed first to prevent the possibility of forward movement. The slope bounding the excavation for abutments and wing walls shall be destroyed by stepping or roughening to prevent wedge action. Jetting of the fill behind abutments and wing walls shall not be permitted.

3.5.4 With the exception of footings, no backfill shall be placed against any concrete abutment or wing wall until test cylinders show the strength to be at least 80 percent of the strength used in design.

3.5.5 With placed around pier shafts shall be deposited on both sides to approximately the same elevation at the same time.

3.6 **Lateral Drains**

3.6.1 Provision shall be made for thorough drainage from behind wing and abutment walls by constructing lateral drains extending from the abutments to the edge of the embankment. The lateral drains are to be constructed as shown on the plans.

3.6.2 Cost for placing and compacting the granular material for the lateral drains shall be included in the payment for GRANULAR BACKFILL AT BRIDGES (Specification 6610).

3.7 **Clarification of Foundation Excavation**

3.7.1 Foundation excavation shall be classified as either "EXCAVATION" or "PIER EXCAVATION" on the bid form, and include all excavation associated with the bridge foundation.

4 MEASUREMENT

4.1 Foundation excavation to be paid for on a lump sum basis shall be the total excavation required for pier foundations, excavated in conformity with the lines, grades, and dimensions shown on the plans or designated by the Engineer, and regardless of the original ground surface. The lower limit of this excavation shall be the bottom of the footing, or the bottom of the concrete seal or of the granular backfill when concrete seals or granular backfill are required.

5 PAYMENT

5.1 Payment for EXCAVATION shall be at the contract lump sum prices.

5.2 Payment for PIER EXCAVATION shall be at the contract lump sum price.

5.3 The contract prices shall be full compensation for all labour, material, equipment, and other items required to complete the excavation. Contract prices shall also include the cost of clearing, grubbing, removing cofferdams and any waste material, and shall include the cost of backfilling in a compacted condition.

5.4 When it is necessary, in the opinion of the Ministry, to lower the pier foundations below the elevations shown on the plans, payment for the excavation below this elevation shall be paid for at a negotiated price or as extra work.