

Master Specification

Part ST-SP-C1

Earthworks for Structures

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ST-SP-C1 Earthworks for Structures

1 General

- a) This Master Specification Part specifies the requirements for earthworks construction associated with major structures such as bridges and major drainage works (spans exceeding 4.2 m or multi cell culverts), including:
 - i) the documentation requirements, as set out in section 2;
 - ii) the site preparation and excavation requirements, as set out in section 3;
 - iii) the cofferdams and dewatering systems requirements, as set out in section 4;
 - iv) the foundation preparation concrete requirements, as set out in section 5;
 - v) the backfill requirements, as set out in section 6;
 - vi) the Hold Point requirements, as set out in section 7; and
 - vii) the payment requirements, as set out in section 8.
- b) This Master Specification Part does not apply to the construction of road earthworks which must instead comply with RD-EW-C1 “Earthworks”.
- c) Where the Works are associated with an existing structure, the Contractor acknowledges and agrees that any drawings of that structure provided by the Principal may not necessarily depict all work carried out on that structure during its lifetime.

2 Documentation

2.1 Construction Documentation

In addition to the requirements of PC-CN3 “Construction Management”, the Construction Documentation must:

- a) address the following:
 - i) dewatering of the site where excavation takes place below the water table / surface; and
 - ii) construction of Temporary Works, including details of proposed temporary retaining structures;
- b) include the following documents, procedures and instructions for earthworks construction associated with major structures such as bridges and major drainage works (spans exceeding 4.2 m or multi cell culverts):
 - i) details of compaction plant with evidence that the induced earth pressures on the structure and existing structures and pipes, are consistent with the design assumptions; and
 - ii) for excavation adjacent to existing structures, dilapidation surveys of the existing structure in accordance with PC-SI3 “Condition Surveys”, and all associated monitoring procedures, in accordance with section 3e); and
- c) include all dilapidation survey results and associated monitoring procedures as required by section 4b).

3 Site preparation and excavation

In relation to site preparation and excavation requirements for earthworks construction associated with major structures:

- a) refer to PC-ENV2 “Environmental Protection Requirements” for vegetation removal and other environmental management requirements;
- b) the Contractor must:
 - i) restrict the area of site preparation / excavation to the minimum practicable for construction of the Works and Temporary Works;
 - ii) strip any topsoil present to a minimum depth of 100 mm, stockpile the topsoil and respread it on completed batter slopes;
 - iii) remove all vegetation, loose material, rubbish and existing structures (i.e. fences, bridges, retaining walls, concrete slabs, service pits, tree stumps and kerbing) within the “footprint” of the structure and associated earthworks; and
 - iv) fill any over excavation with Grade 10 concrete;
- c) a **Hold Point** will apply after completion of excavation. The excavation must not be covered up until the Hold Point has been released;
- d) any surplus excavated material which cannot be reused in the Works must be removed from the Site and disposed of by the Contractor; and
- e) for excavation adjacent to existing structures, the Contractor must undertake dilapidation surveys in accordance with PC-SI3 “Condition Surveys” and all associated monitoring to ensure that the excavation does not impact the existing structure, which must be detailed in the Construction Documentation.

4 Cofferdams and dewatering systems

In relation to cofferdams and dewatering systems requirements for earthworks construction associated with major structures:

- a) where the Works or Temporary Works are to be undertaken below the water table / level, the Contractor must:
 - i) supply and install all cofferdams / dewatering systems necessary for the execution of the work, and in accordance with the Design Documentation;
 - ii) ensure that the structures / systems are as watertight as practicable so as to prevent damage to the foundation material or concrete in footings by erosion or percolation;
 - iii) ensure that there is sufficient clearance to the footing to enable inspection of footing concrete after forms are removed;
 - iv) ensure that any dewatering is carried out in such a manner as to preclude the possibility of movement of water through fresh concrete; and
 - v) entirely remove the cofferdams / dewatering systems at the completion of the works in a manner which avoids damage to the substructure; and
- b) the Contractor must undertake dilapidation surveys in accordance with PC-SI3 “Condition Surveys” and all associated monitoring to ensure that the dewatering system does not reduce the local groundwater table to a level where damage can occur to nearby infrastructure or assets, which must be detailed in the Construction Documentation; and
- c) dewatering must not reduce the local groundwater table to a level where damage can occur to nearby structures.

5 Foundation preparation concrete

In relation to foundation preparation concrete requirements for earthworks construction associated with major structures, a layer of Grade 10 mass concrete must be placed over the whole of the foundation area.

6 Backfill

6.1 Extent

All spaces excavated for earthworks construction associated with major structures, and not occupied by the permanent Works, must be backfilled to the extent shown on the Design Drawings.

6.2 Material

Material used for backfill for earthworks construction associated with major structures must:

- a) be free draining in locations where it is necessary to prevent the build-up of hydrostatic pressures;
- b) be resistant to scour and erosion when used on batters; and
- c) develop sufficient strength to ensure it is stable and does not undergo post construction settlement.

6.3 Placing

- a) Prior to placing backfill for earthworks construction associated with major structures, a **Hold Point** will apply. Backfill must not be placed until this Hold Point has been released.
- b) The Contractor must:
 - i) remove any silt, rubbish and foreign material from the excavation;
 - ii) place the backfill in horizontal layers not exceeding 150 mm thickness (loose);
 - iii) where backfill is to be placed on both sides of wing walls, retaining walls, or culverts, bring the backfill up level with a maximum height differential of 300 mm, or as nominated on the Design Drawings;
 - iv) not place the backfill against concrete which is less than 48 hours old;
 - v) not place the backfill against flexural structural elements, such as wing walls or retaining walls, until all cast in place concrete has reached the 28-day characteristic compressive strength and is at least 14 days old; and
 - vi) ensure no damage occurs to structural elements during placement of backfill.
- c) The compaction requirements and frequency of testing must be as specified in RD-EW-C1 "Earthworks".

7 Hold Points

Table ST-SC-C1 7-1 details the review period or notification period, and type (documentation or construction quality) for each Hold Point referred to in this Master Specification Part.

Table ST-SC-C1 7-1 Hold Points

Section reference	Hold Point	Documentation or construction quality	Review period or notification period
3c)	After completion of excavation	Construction quality	1 hour notification
6.3a)	Prior to placing backfill	Construction quality	24 hours notification

8 Payment

- a) The application of the requirements in this section 8 is limited to projects where the Contractor is entitled to additional payment for rock excavation under the terms of the Contract Documents (refer to RD-EW-C1 "Earthworks").

- b) Payment under the “Provisional Sum” or “Provisional Quantity” will only be made where material is encountered which cannot be excavated at 30 m³ (loose) per hour by a Class 85 excavator.
 - c) If rates are included, the rate is m³ (solid) and it is deemed to be an “extra over” cost.
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