

AMENDMENT TO OPSS 902, NOVEMBER 2019

Special Provision No. DBSP0902

OPSS 902, November 2019, is deleted in its entirety and replaced with the following:

CONSTRUCTION SPECIFICATION FOR EXCAVATING AND BACKFILLING - STRUCTURES

902.01 SCOPE

This specification covers the requirements for excavating and backfilling for structures, ~~including dewatering.~~

902.02 REFERENCES

This specification refers to the following specifications, standards, or publications:

Design Build Special Provisions

DBSP 0539 Temporary Protection Systems

Ontario Provincial Standard Specifications, Construction

OPSS 206 Grading
OPSS 501 Compacting
OPSS 510 Removal
OPSS 517 Dewatering and Temporary Flow Passage Systems
OPSS 805 Temporary Erosion and Sediment Control Measures

Ontario Provincial Standard Specifications, Material

OPSS 1004 Aggregates - Miscellaneous
OPSS 1010 Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
OPSS 1205 Clay Seal
OPSS 1860 Geotextiles

902.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Bedding means granular material to be placed in areas so designated in the Contract Documents.

Channel means a natural or artificial watercourse.

Culvert means a structure that provides an opening through an embankment and to which roadway loads are distributed through fill or that is designated as a culvert in the Contract Documents.

Design Engineer means the Engineer retained by the Contractor who has sealed and signed the Issued for Construction Drawings and/or Working Drawings required to complete all or part of the work specified in the contract.

~~**Design Storm Return Period** means as defined in OPSS 517.~~

~~Dewatering System means as defined in OPSS 517.~~

Earth means all soils except those defined as rock, and excludes stone masonry, concrete and other manufactured materials.

Foundation means that portion of the ground below the structure base or footings that supports the structure or that portion of the ground supporting the pile caps.

Groundwater Control System means as defined in OPSS 517.

Rock means natural beds or massive fragments, of the hard, stable, cemented part of the earth's crust, igneous, metamorphic, or sedimentary in origin, which may or may not be weathered, and includes boulders having a volume of 1 cubic ~~m~~metre or greater.

Sediment means as defined in OPSS ~~517~~804.

Soil means all loose or moderately cohesive organic or inorganic deposits of the earth's crust such as silt, sand, gravel, or clay or any of their mixtures.

Structure means any bridge, tunnel, ~~concrete~~ culvert with total span in excess of 3 metres, retaining wall, dock, guide way, or sign support.

~~Temporary Flow Passage System means as defined in OPSS 517.~~

~~Unwatering means as defined in OPSS 517.~~

~~Watercourse means as defined in OPSS 517.~~

902.04 DESIGN AND SUBMISSION REQUIREMENTS

902.04.01 Design Requirements

902.04.01.01 Dewatering and Temporary Flow Passage Systems

~~Where~~When specified in the Contract Documents, the design requirements for dewatering ~~is required, the Contractor shall be responsible for the design of the dewatering system for the intended purpose.~~

~~A dewatering system shall be designed to control water and the flow of water into the excavation, prevent disturbance of the foundation, permit the placing of concrete in the dry, and complete the excavating and backfilling for structures work.~~

~~When the system includes temporary flow passage system, the system shall be designed, as a minimum, for a [* Designer Fill In, See Notes to Designer] year design storm return period, and groundwater discharge. A longer return period shall be used when determined appropriate for the work.~~

The dewatering ~~systems~~systems shall be according to ~~the design requirements specified in~~ OPSS 517.

902.04.02 Submission Requirements

902.04.02.01 ~~Working Drawings~~

~~Working Drawings for the dewatering system shall be according to OPSS 517.~~

902.04.02.02 ~~Preconstruction Survey~~

~~When a groundwater control system by wells or a well point system will be used Prior to commencing the work, a condition survey of property and structures that may be affected by the work shall be carried out. submitted to the Contract Administrator. The condition survey shall include the location locations and condition conditions of adjacent properties, buildings, underground structures, water wells, Utilities, utility services, and structures, within [** Designer Fill In, See Notes to Designer] metres from the groundwater control system. In addition, all water wells used such as a supply of drinking water and located within this distance shall be tested for compliance with Ontario Drinking Water Quality Standards.~~

~~Water wells within walls abutting the preconstruction survey distance can be located using the website <https://www.ontario.ca/environment-and-energy/map-well-records> or its successor site.~~

~~Copies of the condition survey and water quality test results shall be submitted to the Contract Administrator prior to the operation of the groundwater control system.~~

902.05 MATERIALS

902.05.01 Granular

Granular material to be used for backfill, bedding, and frost tapers shall be according to OPSS 1010.

The 19.0 mm clear stone to be used for wall drains shall be according to OPSS 1004.

902.05.02 Native Backfill

Native and imported material shall be approved by the design Engineer. All material shall be free from frozen lumps, cinders, ashes, refuse, vegetable or organic matter, rocks and boulders over 150 mm in any dimension, and other deleterious material.

902.05.03 Clay Seal

Clay seal shall be according to OPSS 1205.

902.05.04 Geotextile

Geotextile shall be according to OPSS ~~be~~1860 and be of the type, class, and filtration opening size (FOS) range specified in the Contract Documents.

902.06 EQUIPMENT

902.06.01 Compaction Equipment

Compaction equipment shall be according to OPSS 501.

902.07 CONSTRUCTION

902.07.01 Removals

Removals shall be according to OPSS 510.

902.07.02 Removal of Ice and Snow

All ice and snow shall be removed from all portions of the work area before any excavation and backfill operations proceed. Frozen materials shall not be incorporated into the work. Material shall not be placed over frozen ground, ice, or snow.

902.07.03 Protection Systems

Protection systems shall be according to DBSP 0539.

~~Protection systems shall be installed:~~

- ~~a) Where the stability, safety, or function of an existing structure, roadway, railway, or other facility can be impaired by an excavation or temporary slope.~~
- ~~b) To permit excavation where there is a necessity to retain the sidewalls of an excavation and to permit dewatering by restricting water flow and facilitating safe execution of the work.~~

902.07.04 Dewatering ~~Structure Excavation~~

~~902.07.04.01 General~~

~~The dewatering systems shall be constructed and operated according to the Working Drawings.~~

~~Activation and deactivation of a temporary flow passage system, if applicable, shall be according to OPSS 517.~~

~~The dewatering system shall be continuously operational to control buoyancy forces until such forces can be resisted by backfill and structure self-weight, to keep excavations stable, to avoid erosion impacts from the release of accumulated water, and to keep the work area in the condition required to complete the associated work as specified in the Contract Documents.~~

~~When a temporary flow passage system is to remain operational through a seasonal shutdown period, the Contractor shall be responsible for any maintenance or repair costs due to the system during the seasonal shutdown period.~~

~~**and Temporary** erosion and sediment control measures, including controlling the discharge of water, shall be according to OPSS 805. Measures not specified in OPSS 805 shall be according to the Working Drawings. Temporary erosion and sediment control measures and cover material to protect exposed soils, as required by the Working Drawings, shall be installed as soon as is practical.~~ **Flow Passage Systems**

~~Stranded fish shall be managed as specified in the Contract Documents.~~

~~Unwatering shall be carried out as necessary.~~

~~Water suspected of being contaminated as indicated by visual or olfactory observations shall be reported to the Contract Administrator.~~

~~Dewatering and temporary flow passage systems shall be discontinued in a manner that does not disturb any watercourse, pipeline, or flow channel. Operation of the dewatering system shall be shut down according to the procedures specified in the Working Drawings, where applicable according to OPSS 517.~~

~~902.07.04.02 Discharge of Water~~

~~The discharge of water shall be according to OPSS 517.~~

~~902.07.04.03 Monitoring~~

~~Monitoring shall be according to OPSS 517.~~

~~902.07.04.04 System Amendments~~

~~Amendments to stop any displacement, damage, soil loss or erosion due to the operation of the dewatering system shall be according to OPSS 517.~~

~~902.07.04.05 Removal~~

~~Removal of dewatering system and temporary flow passage system components shall be according to OPSS 517.~~

~~Until backfilling has been completed, all work necessary to control the flow of water into the excavation and to prevent disturbance of the founding material shall be carried out.~~

902.07.05 Excavation

902.07.05.01 General

~~Deterioration of the foundation soil or rock, surface shall be prevented. Surface water ~~from entering and eroding shall not be permitted to enter~~ the face of thea foundation excavation, ~~and~~. The build up of hydrostatic pressures that may have harmful effects upon the temporary or permanent structures shall be prevented.~~

902.07.05.02 Excavation for Foundations

Excavation for footings, working slabs, and granular pads shall be to the neat lines specified in the Contract Documents.

The bottom of the excavation on which the footing, working slab, or granular pad is to rest shall not be disturbed. In soft conditions, construction of the footing or structural slab shall commence immediately after the final removal of material to the foundation level has been completed.

In the case of concrete culverts of the open footing type, no excavation shall be made between the footings below the level of the stream bed or the top of the footings, whichever elevation is lower, unless authorized in writing by the design Engineer and a Notice to Proceed has been issued by the Contract Administrator.

The elevation of the bottom of the footing, working slab, or granular pad shall not be changed without the approval of the design Engineer and a Notice to Proceed has been issued by the Contract Administrator.

Over excavated areas beyond the excavation limits shall be restored to their original conditions at the Contractor's expense. Over excavated areas shall be backfilled with a material suitable for the particular

application and approved by the design Engineer. Concrete fill shall be used for over excavation in rock. Where material other than concrete is used, the material shall be compacted to the dry density specified in OPSS 501.

Any additional excavation, not anticipated in the original design, shall be justified by the design Engineer in writing for the Contract Administrator's review and approval. A Request to Proceed with the additional excavation is required and the additional excavation shall not start until a Notice to Proceed is issued by the Contract Administrator.

902.07.05.03 Excavation for Backfill and Frost Tapers

Excavation for backfill and frost tapers shall be to the neat lines specified in the Contract Documents.

Over excavated areas shall be restored with material approved by the design Engineer. The material shall be compacted to the dry density specified in OPSS 501.

902.07.05.04 Preservation of Channel

Where a channel cross-section is altered, it shall be restored to its original condition.

902.07.05.05 Protection of Waterbodies and Waterbody Banks

Protection of waterbodies and waterbody banks shall be as specified in the Contract Documents

902.07.06 Backfilling

902.07.06.01 General

Frozen materials shall not be incorporated into the work.

Footings shall be protected against frost action.

Other than the backfill placed to the tops of the footings, no fill shall be placed against an abutment, wing wall, retaining wall, or concrete culvert until the concrete has reached 70% of its design strength.

Backfilling around culverts, arches, rigid frames, and piers shall proceed simultaneously and evenly on both sides of the structure. The differential in surface elevation of the backfill material on each side of the structure and individual component shall not be greater than 500 mm.

All voids around abutments, piers, or other permanent work shall be backfilled to the level of the surrounding ground or to the grade specified in the Contract Documents, whichever is the lower before the general backfilling commences.

When rock fill is to be placed around a structure the structure shall be protected to prevent damage from the rock fill.

The minimum height of fill specified in the Contract Documents shall be placed before traffic or construction equipment shall pass over the culvert.

Granular material shall be placed within the lines and grades specified in the Contract Documents.

Wall drains shall have a 0.05 m³ pocket of 19 mm minimum size clear stone wrapped in geotextile placed over the opening of the wall drain at the backfilled side of the wall.

902.07.06.02 Compaction

Backfill shall be placed according to OPSS 206, except the Modified Layer Compaction Method shall not apply, and compacted according to OPSS 501.

Only hand operated vibratory type compaction equipment shall be used for compaction of fill material within the restricted zone behind all earth retaining structures.

902.07.07 Clay Seal

When specified in the Contract Documents, clay seals shall be placed to the dimensions ~~shown~~ specified in the Contract Documents.

902.07.08 _____ Inspection for ~~Dewatering~~, Excavation and Backfilling

~~A Request to Proceed shall be submitted to the Contract Administrator prior to the commencement of dewatering of the excavation for the structure and completion of the excavation for the foundation.~~

~~The next operation after the completion of the excavation for the foundation shall not proceed until a Notice to Proceed has been received from the Contract Administrator.~~

A Request to Proceed shall be submitted to the Contract Administrator upon completion of the excavation for the structure and frost tapers and prior to the commencement of backfilling of excavation.

The commencement of backfilling of excavation shall not proceed until a Notice to Proceed has been received from the Contract Administrator.

902.07.09 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

902.08 QUALITY ASSURANCE - Not Used

902.09 MEASUREMENT OF PAYMENT - Not Used

902.10 BASIS OF PAYMENT - Not Used

~~NOTES TO DESIGNER:~~

~~* _____ Fill in the design storm return period according to MTO Drainage Design Standard TW-1.~~

~~** _____ Fill in the preconstruction survey distance as recommended by the MTO foundation engineer.~~

WARRANT: In Design-Build contracts with Excavation, and Backfilling of Structures, ~~including dewatering~~.

CUSTODIAN: Tony Sangiuliano, Senior Foundation Engineer, Foundations Section, Structural Standards and Specifications Office and Felipe Mendoza, Senior Contract Innovations Analyst, Special Planning Initiatives Office.