



**CONSTRUCTION SPECIFICATION FOR  
REMOVAL**

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**TABLE OF CONTENTS**

<b>510.01</b>	<b>SCOPE</b>
<b>510.02</b>	<b>REFERENCES</b>
<b>510.03</b>	<b>DEFINITIONS</b>
<b>510.04</b>	<b>DESIGN AND SUBMISSION REQUIREMENTS</b>
<b>510.05</b>	<b>MATERIALS</b>
<b>510.06</b>	<b>EQUIPMENT - Not Used</b>
<b>510.07</b>	<b>CONSTRUCTION</b>
<b>510.08</b>	<b>QUALITY ASSURANCE - Not Used</b>
<b>510.09</b>	<b>MEASUREMENT FOR PAYMENT</b>
<b>510.10</b>	<b>BASIS OF PAYMENT</b>

**APPENDICES**

<b>510-A</b>	<b>Commentary</b>
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**510.01 SCOPE**

This specification covers the requirements for demolition, salvage, removal, and in-place abandonment, either completely or partially, of those materials and structures so designated, including the requirements for backfilling resulting excavations, trenches, holes, and pits.

**510.01.01 Specification Significance and Use**

This specification is written as a provincial-oriented specification. Provincial-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of the Ontario Ministry of Transportation.

Use of this specification or any other specification shall be according to the Contract Documents.

## **510.01.02 Appendices Significance and Use**

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

## **510.02 REFERENCES**

When the Contract Documents indicate that provincial-oriented specifications are to be used and there is a provincial-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.PROV, unless use of a municipal-oriented specification is specified in the Contract Documents. When there is not a corresponding provincial-oriented specification, the references below shall be considered to be to the OPSS listed, unless use of a municipal-oriented specification is specified in the Contract Documents.

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

### **Ontario Provincial Standard Specifications, Construction**

OPSS 301	Restoring Unpaved Roadway Surfaces
OPSS 410	Pipe Sewer Installation in Open Cut
OPSS 421	Pipe Culvert Installation in Open Cut
OPSS 422	Precast Reinforced Concrete Box Culverts and Box Sewers in Open Cut
OPSS 501	Compacting

### **Ontario Provincial Standard Specifications, Materials**

OPSS 1004	Aggregates - Miscellaneous
OPSS 1150	Hot Mix Asphalt
OPSS 1151	Superpave and Stone Mastic Asphalt Mixtures
OPSS 1301	Cementing Materials
OPSS 1302	Water
OPSS 1350	Concrete - Materials and Production

### **Ontario Ministry of Transportation Publications**

Structural Manual

### **CSA Standards**

S6-00 Canadian Highway Bridge Design Code

## **510.03 DEFINITIONS**

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

**Bridge Structure** means that portion of a bridge and associated wing and retaining walls above the bridge footing, excluding modular bridges.

**CIR** means cold in-place recycling.

**CIREAM** means cold in-place recycling with expanded asphalt.

**Concrete Appurtenances** means as defined in OPSS 410, 421, and 422.

**Culvert** means a single or multiple cell structure designed to provide an opening under a roadway, pedestrian way, railway, or side entrance for the passage of surface water, livestock, or pedestrians.

**Curb and Gutter** means any combination of curb, gutter, curb with gutter, gutter setbacks, bullnoses, gutter outlets, and spillways.

**HIR** means hot in-place recycling.

**Pipe** means any closed conduit originally designed to convey liquid or gas.

**Sundry Asphalt Pavements** means paved islands, medians, boulevards, and walkways.

## **510.04 DESIGN AND SUBMISSION REQUIREMENTS**

### **510.04.01 Design Requirements**

Caps for capping maintenance holes, catch basins, ditch inlets, and valve chambers shall be designed according to CAN/CSA S6 and the Structural Manual.

### **510.04.02 Submission Requirements**

#### **510.04.02.01 Removal of Bridge Structures**

Two weeks prior to commencement of the work, a work plan shall be submitted to the Contract Administrator outlining the equipment to be used, dust and debris control, and the sequence of removals for bridge demolition.

Where any portion of the bridge structure is to support traffic or equipment loading during demolition, the entire structure shall be evaluated for load carrying capacity according to the CAN/CSA S6 and the Structural Manual.

All submissions shall bear the seal and signature of the design Engineer and design check Engineer.

## **510.05 MATERIAL**

### **510.05.01 Mortar**

Mortar shall consist of a mixture of one part Portland cement according to OPSS 1301 and three parts mortar sand according to OPSS 1004, wetted with sufficient water to make the mixture plastic. Water shall be according to OPSS 1302.

**510.05.02 Concrete**

Concrete for concrete seals shall be according to OPSS 1350 with minimum specified 28-Day compressive strength of 30 MPa.

Concrete for filling abandoned pipes shall be according to OPSS 1350 with minimum specified 28-Day compressive strength of 15 MPa.

**510.05.03 Grout**

Grout shall consist of a mixture of one part Portland cement according to OPSS 1301 and two parts mortar sand according to OPSS 1004, wetted with sufficient water to make the mixture plastic. Water shall be according to OPSS 1302.

**510.07 CONSTRUCTION**

**510.07.01 General**

Removal, abandonment, demolition, or salvage of a particular item shall be as specified in the Contract Documents.

The work shall include all associated excavation, backfill, compaction, trimming, plugging, capping, filling, sealing, and right-of-way preparation.

If provided, existing drawings from the Owner pertaining to bridge structures, modular bridges, culverts, and noise barriers designated for removal shall be reviewed prior to commencement of any activities.

Stockpiling requirements shall be as specified in the Contract Documents.

Where work is done in waterbodies and on waterbody banks, the work shall be according to the Contract Documents.

**510.07.01.01 Excavation**

Excavation required for the removal work to be carried out shall be part of the removal operation and shall be performed in such a manner as to leave undisturbed any portions not designated for removal.

**510.07.01.02 Removal**

Removal shall be performed in such a manner and with such equipment as to leave undisturbed and undamaged any portion not designated for removal or salvage. All damaged or disturbed portions shall be corrected expeditiously and repaired to the satisfaction of the Contract Administrator. The broken edges of portions to be left in place that are visible after construction shall be squared and neatly trimmed.

**510.07.01.03 Salvage**

Any material designated for salvage shall remain the property of the Owner and shall be maintained in a reasonable condition and stockpiled in a manner acceptable to the Contract Administrator.

Salvaged materials that are surplus to the Contract requirements shall be delivered to the location specified in the Contract Documents. When designated for salvage and surplus to the Contract requirements, salvaged frames and related grates or covers shall be kept together as a unit for delivery and stockpiling.

Any material designated for salvage damaged by the Contractor's operations or lost by the Contractor at any time prior to re-use or stockpiling shall be replaced with new material.

#### **510.07.01.04 Backfilling, Compacting, and Trimming**

Where a removal or partial removal requires the filling of a resulting trench, hole, or pit, backfilling shall be to the required grade using either suitable excavated material or imported material as required or as specified in the Contract Documents, and shall include levelling and trimming of the site to match required contours and provide adequate drainage. Backfill material shall be placed in layers not exceeding 300 mm and compacted according to OPSS 501.

#### **510.07.02 Bridge Work**

##### **510.07.02.01 Removal of Bridge Structures and Bridge Footings**

The work of bridge structure removal shall include the complete removal of bridge structure components above the top of the bridge footings to the lines and grades specified in the Contract Documents.

The work of bridge footings removal shall include cutting the piles to the underside of the footing and the complete removal of the bridge footings.

##### **510.07.02.02 Removal of Modular Bridges**

The work of modular bridge removal shall include the dismantling and removal and salvage of the modular bridge components, all timber in the deck, curbs, running strips, and steel beam guide rail system attached to the bridge. The work shall include the unloading and erection of the launching nose and subsequent dismantling.

Modular bridge components that are the property of the Owner, including the dismantled launching nose, shall be loaded onto transport vehicles, supported on 100 x 100 mm timber to allow forklift access, securely fastened, and then transported to the location specified in the Contract Documents.

All components shall be delivered in good condition during normal working hours and neatly stockpiled. All small parts shall be crated to prevent loss.

The approximate weight of the modular bridge, as specified in the Contract Documents, includes the weight of the steel components of the bridge, the ramps, and the launching nose, but excludes the weight of the wooden deck, construction tools, and rollers.

Vehicles required to transport the launching nose and the modular bridge components and parts shall be provided by the Contractor and of sufficient size to fully support the modular bridge components.

##### **510.07.02.02.01 Operational Constraints**

Prior to dismantling of the modular bridge, qualification information shall be provided to the Contract Administrator to ensure that the person supervising the removal of the modular bridge is competent to successfully fulfill such duties.

The Contract Administrator shall be notified a minimum of 7 Days in advance of the date on which modular bridge removal is to commence. The Owner shall make the launching nose available to the Contractor, following such notification.

##### **510.07.02.02.02 Removal of Modular Bridge Substructures**

The work shall include the removal of modular bridge substructures, bank seats, cribs, and timber or steel bents, and any rock in the cribs.

Modular bridge substructure materials shall be removed from the right-of-way or managed as specified in the Contract Documents.

Rocks from cribs shall not be placed in any waterbody.

**510.07.03                    Drainage Work**

**510.07.03.01                General**

Any sediment or deposited material required to be removed shall not be allowed to enter any waterbody.

Frames with grates or covers and watermain appurtenances, within valve chambers that are to be removed, shall be salvaged.

**510.07.03.02                Removal of Curb and Gutter**

The work shall include the removal of asphalt, concrete, and cut stone curb and gutter. Cut stone curb shall be salvaged.

**510.07.03.03                Removal of Asphalt Curb and Gutter**

The work shall include the removal of asphalt curb and gutter.

**510.07.03.04                Removal of Concrete Curb and Gutter**

The work shall include the removal of concrete curb and gutter.

**510.07.03.05                Removal of Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers**

The work shall consist of the removal of maintenance holes, catch basins, ditch inlets, and valve chambers.

**510.07.03.06                Abandonment of Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers**

The work shall include the partial removal of maintenance holes, catch basins, ditch inlets, and valve chambers where structures and the Utility systems therein are abandoned. Such partial removal, when within the roadway, shall be to a minimum of 1.0 m below subgrade.

Prior to backfilling, the bottom of each structure designated for partial removal shall be broken to allow for the free movement of groundwater.

As an alternative to partial removal, maintenance holes, catch basins, ditch inlets, or valve chambers may be removed in their entirety.

**510.07.03.07                Capping Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers**

The work shall include the capping of maintenance holes, catch basins, ditch inlets, and valve chambers where the Utility systems therein are to remain in service. Such capping shall include the removal of all adjustment units. Where the structure exists within the roadbed, the upper portion of the structure shall be removed to a minimum of 1.0 m below subgrade and the walls of the structure shall be saw cut or similarly finished to produce a neat horizontal cut suitable for placing a concrete cap.

#### **510.07.03.08 Removal of Pipes and Culverts**

The work shall include the removal of pipes and culverts of 200 mm diameter and greater, including multiple cell timber culverts.

Concrete, clay, and plastic pipes may be removed by rupturing or collapsing the pipe with suitable equipment and leaving the debris in place in a manner as to eliminate all voids and so as not to be detrimental to the work.

When removing pipes that enter into a concrete culvert, maintenance hole, catch basin, ditch inlet, or valve chamber and the structure is to remain in service, the openings left in the structures from the pipe shall be sealed with concrete or brick suitable for outdoor use and mortar. Brick seals shall be a minimum thickness of one brick length. The contact surface of each brick shall be coated with mortar to provide a watertight seal. Concrete seals shall be the minimum thickness of the structure wall.

#### **510.07.03.09 Abandonment of Pipes and Culverts**

The work shall include the filling of all pipes and culverts when the Contract Documents specify abandonment.

Abandoned sections of pipes and culverts up to 1,200 mm in diameter shall be filled with grout or concrete.

Access points shall be provided to allow for confirmation that the pipe has been completely filled.

When abandoning pipes that enter into a concrete culvert, maintenance hole, catch basin, ditch inlet, or valve chamber and the structure is to remain in service, the openings in the structure shall be sealed according to the Removal of Pipes and Culverts clause.

#### **510.07.03.10 Removal of Pipe Subdrains**

The work shall include the removal of pipe subdrains smaller than 200 mm in diameter.

Excavate, as required, to remove existing pipe subdrains, backfill the resulting trenches with native material, and compact.

#### **510.07.03.11 Removal of Hydrants, Valves, and Watermain Appurtenances**

The work shall include the removal or abandonment of hydrants, valves, and watermain appurtenances.

When a hydrant is removed, the hydrant shall be removed with its boot intact and salvaged.

When the mainline is to remain in service after a removal, the work shall include capping at the tee at the mainline.

When a mainline valve is to be abandoned and the valve is not in a valve chamber, the valve box shall be removed.

When a water service connection is abandoned, the work shall include shutting off the service at the mainline.

#### **510.07.04 Fence and Noise Barrier Work**

##### **510.07.04.01 Removal of Fence**

The work shall include the removal of all fences, regardless of type.

The work shall consist of the dismantling and removal of the fence, including all posts, fence fabric, footings, gates, components, and fittings forming part of the fence designated for removal.

When the means of egress and ingress between the right-of-way and adjacent property is being controlled by an existing fence designated for removal, that control shall be maintained for the duration of the Contract.

When only part of an existing fence is removed, repairs to match the existing fence shall be made to the ends remaining.

**510.07.04.02                    Removal of Noise Barriers**

The work shall include the dismantling of the noise barrier including posts, panels, framing, doors, fire access openings, and the removal of concrete footings to a depth of 1.3 m.

**510.07.05                        Delineators, Traffic Barriers, and Energy Attenuator Work**

**510.07.05.01                    Removal of Delineator Posts**

The work shall include the removal of delineator and guide posts, including wooden, metal, and flexible posts, and associated hardware.

**510.07.05.02                    Removal of Guide Rail Systems**

The work shall include the removal of cable guide rail, steel beam guide rail, and box beam guide rail systems, including cables, steel beams, box beams, channels, hardware, posts, anchor blocks, and anchoring systems to the limits specified in the Contract Documents.

**510.07.05.03                    Removal of Concrete Barriers**

The work shall include the removal of cast-in-place concrete barriers; the removal and salvage of precast concrete barriers; the removal of back to back installed concrete barriers, concrete or granular fill between the back to back concrete barriers, barrier transition sections; and the removal of associated pads and hardware as specified in the Contract Documents.

**510.07.05.04                    Removal of Energy Attenuators**

The work shall include the removal of energy attenuators, including pads and anchoring devices. At specified locations, the energy attenuators shall be dismantled and salvaged as a complete system, including all hardware.

**510.07.05.05                    Removal of Ramp Closure Gates**

The work shall include removal of ramp closure gate concrete footings, gates, signs, and all associated hardware.

The gates and associated hardware shall be salvaged and delivered to the location specified in the Contract Documents.

**510.07.06                        Pavement Work**

**510.07.06.01                    General**

During pavement removal operations, care shall be taken to prevent contamination with granular and other foreign materials.

Removal shall be performed in such a manner as to leave adjacent pavement and structures remaining in place undisturbed.



When the roadway is to be opened to traffic after the daily shut down and full width pavement removal is required, the following shall apply:

- a) For two-lane highways, removal shall be done to the same station for the full pavement width prior to shutdown at the end of the day.
- b) For multi-lane highways, removal shall be done to essentially the same station for the full pavement width for a specific direction prior to shutdown at the end of the day.
- c) Prior to opening the lanes to traffic, temporary ramping shall be provided as specified in the Contract Documents.

Asphalt pavement material from removal operations that is to be used on this Contract or stockpiled for future use by the Owner shall be weighed according to the Contract Documents then processed prior to stockpiling so 100% of the resultant material passes the 26.5 mm sieve. RAP shall be stockpiled according to the requirements of OPSS 1150 or OPSS 1151, as applicable to the Contract.

Removed asphalt pavement materials that are different due to the removal equipment used or pavement type shall be stockpiled separately.

#### **510.07.06.02                      Cutting Existing Pavement**

Pavement shall be cut for neat removal to the depth specified in the Contract Documents.

Suitable mechanical sawing equipment or pavement milling equipment capable of producing a straight clean vertical face shall be used for cutting the pavement. The existing pavement type, thickness, and, if any, size of reinforcement shall be as specified in the Contract Documents.

#### **510.07.06.03                      Removal of Pavement, Treated Base, and Concrete Base**

The work shall include the full-depth removal of asphalt pavement, concrete pavement, asphalt pavement from concrete surfaces and concrete base, cement-treated base, and asphalt-treated base. All materials shall be managed as specified in the Contract Documents.

When removed material is to remain temporarily on site due to construction operations, the removed material shall be placed on an asphalt or concrete surface until final disposition.

When the operation for full-depth asphalt removal from concrete base or concrete surfaces other than structures causes thickness reductions or surface variations exceeding 10 mm, the removal operations shall be corrected expeditiously and the damaged concrete areas repaired.

As part of the work of full-depth pavement removal, where public traffic is to be maintained throughout the work without the use of a temporary bypass, temporary granular ramping shall be constructed and maintained to convey public traffic through the area. The ramping shall be at 20H:1V. Temporary ramps shall be removed to accommodate subsequent construction after traffic has been routed off the temporary ramp.

Following pavement removal, the existing roadway granular shall be restored according to OPSS 301, when such roadway is not designated for abandonment.

Prime, surface treatments, and mulch pavements greater than 50 mm in depth are considered to be asphalt pavement.

This work shall not include removal of materials for jointing done as part of a paving operation.

#### **510.07.06.04 Removal of Asphalt Pavement, Partial-Depth**

The work shall include the partial-depth removal of asphalt pavement. Such material shall be managed as specified in the Contract Documents.

The asphalt pavement shall be removed to the average depth specified in the Contract Documents.

Prior to commencing removal operations, all debris, deleterious material, and existing windrows shall be removed from the roadway surface, including material beyond the theoretical roadway width to provide positive drainage.

If the remaining asphalt pavement does not require further processing or if the remaining asphalt pavement is to be recycled using CIR or CIREAM or HIR processes, then the equipment used for partial depth removal shall be automatically controlled for grade and slope during removal. The surface remaining after removal shall have a constant and continuous crossfall matching the intended surface course crossfall. The surface remaining after removal shall have an even texture and be free of significantly different grooves and ridges in all directions.

Removed asphalt pavement material shall not remain on the roadway after completion of the day's operation. Placing of the material on grade other than a bituminous surface prior to hauling to a stockpile shall not be permitted.

After partial depth removal, the gap between the top of milled surface and the bottom of a 3 m straightedge placed anywhere in any direction on the milled surface shall not exceed 6 mm.

Prior to opening the lane to traffic after partial-depth pavement removal, adjacent granular shoulder material shall be reshaped and compacted to ensure proper drainage of the milled surface and adjoining shoulders.

Partial-depth asphalt pavement removal operations and the resulting surfaces from partial-depth asphalt removal operations shall not be permitted between November 16<sup>th</sup> and June 1<sup>st</sup>, unless approved by the Contract Administrator.

#### **510.07.06.04.01 Temporary Ramping**

As part of the work of partial-depth pavement removal, at the end of each completed portion and prior to opening to traffic, temporary transverse ramping shall be constructed at a slope not steeper than 120H:1V. The temporary transverse ramping shall be removed as part of continuing the removal of asphalt pavement, partial-depth operation from the ramping location or prior to placing pavement materials at the ramping location.

If, due to unforeseen circumstances, partial depth pavement removal cannot be completed to the same station for the full pavement width prior to shut down at the end of the day, then as part of the work of partial-depth pavement removal, temporary longitudinal ramping, when permitted, shall be constructed at a slope not steeper than 10H:1V prior to opening to traffic. The temporary longitudinal ramping shall be removed within 1 Day or as agreed to by the Contract Administrator in the event of weather or access restrictions.

Temporary longitudinal ramping shall not be permitted when either of the following conditions exist:

- a) the ramping height would be greater than 50 mm, or
- b) the pavement slope would cause water to accumulate at the edge of the ramping and extend onto an adjacent lane or shoulder that will be open to traffic.

All costs associated with temporary ramping, including ramping material, shall be deemed to be included in the item price for Removal of Asphalt Pavement, Partial Depth.

#### **510.07.06.05                      Removal of Asphalt Pavement from Concrete Surfaces on Structures**

The work shall include the removal of asphalt pavement and waterproofing from the concrete surfaces on structures. All materials shall be managed as specified in the Contract Documents.

When pavement-milling equipment is used, the weight of milling equipment shall be limited to:

- a) 43 tonnes maximum weight for post-tensioned decks and rigid frame decks,
- b) 26 tonnes maximum weight for thin slab concrete bridge deck on girders. For thin slab concrete bridge deck on girders, the equipment shall not travel laterally beyond 1.0 m from the centreline of the exterior girder.

When the method of asphalt removal results in impact damage or excessive vibration is observed, operations shall be modified to eliminate these effects.

Unless the Contract Documents specify a concrete or latex-modified concrete overlay is to be placed on the existing concrete deck, the milling operation shall be controlled such that the milling teeth do not come in contact with the concrete deck surface and bridge joints. Any remaining asphalt pavement and waterproofing not removed by rotary milling equipment shall be removed by other methods.

If the milling operation damages the surface of the concrete deck, causing surface variations or concrete thickness reductions exceeding 2 mm, the milling operation shall be corrected expeditiously and the damaged concrete areas repaired. The proposed repair method shall be submitted in writing to the Contract Administrator, prior to commencing repairs. Surface preparation, placement, and curing of the repair materials shall be according to the repair material manufacturer's instructions.

#### **510.07.06.06                      Removal of Concrete Pavement, Partial-Depth**

The concrete pavement shall be removed to the depths indicated in the Contract Documents.

The equipment used for partial-depth concrete pavement removal shall be automatically controlled for grade and slope during removal. The surface remaining after removal shall have a constant and continuous cross fall matching the intended surface cross fall. The surface remaining after removal shall have an even texture free of significantly different grooves and ridges in all directions.

The removed concrete pavement material shall not remain on the roadway after completion of the day's operation.

After partial-depth removal of existing concrete pavement, the Contractor shall reshape and compact the existing shoulder material to ensure proper drainage of the remaining surface and adjoining shoulders.

Removal operations and resulting surfaces from removal operations shall not be permitted during the winter months on highways with posted speeds of 80 km/h or higher.

#### **510.07.07                              Concrete Work**

##### **510.07.07.01                      Removal of Concrete**

The work shall include the removal of retaining walls; footings; foundations; concrete culverts, including associated wingwalls and retaining walls; concrete appurtenances; and similar concrete structures specified in the Contract Documents.

**510.07.08 Right-of-Way Work**

**510.07.08.01 Preparing Right-of-Way**

When preparing the right-of-way is specified in the Contract Documents, all objects and materials within the specified road allowance that interfere with the execution of the work and are not covered under separate removal items, shall be removed under this work. The work includes, but is not limited to the removal of trees less than 150 mm diameter, tree roots and stumps, brush and hedges, culverts, wooden and steel posts, signs, sidewalks, precast or poured driveway curbs, asphalt curbs, boulders, stone walls and retaining walls, and other surface materials that require removal in order to complete all parts of the Contract.

Any precast concrete slabs, bricks and stones, cut stone curbs, timbers, or similar landscaping elements that are removed shall remain the property of the adjacent property owner and shall be piled neatly on such adjacent property.

**510.07.08.02 Removal of Driveways, Sidewalks, and Sundry Asphalt Pavements**

When collective work to remove driveways and sidewalks needs to be done, work shall include the removal of asphalt, concrete, stone or brick driveways and sidewalks, and sundry asphalt pavements.

**510.07.08.03 Removal of Concrete Sidewalk**

The work shall include the removal of concrete sidewalk.

**510.07.08.04 Removal of Gabions**

The work shall include the removal of gabions, including rock and wire.

**510.07.09 Overhead Signs and Sign Support Structure Work**

Overhead signs and sign support structures shall be salvaged.

Sign support structure footings shall be removed to a minimum of 1.3 m below subgrade.

**510.07.10 Management of Excess Material**

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

**510.09 MEASUREMENT FOR PAYMENT**

**510.09.01 Actual Measurement**

**510.09.01.01 Removal of Bridge Footings**

Measurement of removal of bridge footings shall be the volume in cubic metres of the concrete removed.

**510.09.01.02 Removal of Curb and Gutter  
Removal of Asphalt Curb and Gutter  
Removal of Concrete Curb and Gutter**

Measurement of removal of curb and gutter shall be the length in metres horizontally along the flow lines of the curb and gutter removed, whether straight or circular, without separation into types. When the slope of the curb and gutter is 4H:1V or steeper, then the above measurement is of the slope length.

No deduction shall be made from the measured length for the spaces occupied by maintenance hole and catch basin castings. Where the removal includes runs of curb and gutter that converge to form bullnoses, each run shall be measured for payment and such measurement shall be deemed to include the concrete fillet within the bullnose.

**510.09.01.03                    Removal of Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers**

For measurement purposes, a count shall be made of the number of maintenance holes, catch basins, ditch inlets, and valve chambers removed regardless of type, depth, or size.

**510.09.01.04                    Abandonment of Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers, Partial-Depth**

For measurement purposes, a count shall be made of the number of maintenance holes, catch basins, ditch inlets, and valve chambers abandoned regardless of type or size.

**510.09.01.05                    Capping of Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers**

For measurement purposes, a count shall be made of the number of maintenance holes, catch basins, ditch inlets, and valve chambers capped regardless of type or size.

**510.09.01.06                    Removal of Pipes and Culverts**

Measurement of removal of pipes and culverts shall be the length in metres horizontally along the pipe or culvert, from one end or end section to the other end or the other end section. Where the grade of the pipe or culvert is 10% or greater, then the above measurement is of the slope length. Pipes and culverts smaller than 200 mm diameter shall be treated as part of the excavation work.

No deduction shall be made from the measured length for the spaces occupied by intermediate maintenance holes, catch basins, ditch inlets, and valve chambers.

**510.09.01.07                    Abandonment of Pipes and Culverts**

Measurement of abandonment of pipes and culverts shall be by length in metres horizontally along the pipe or culvert, from one end or end section to the other end or the other end section. Where the grade of the pipe or culvert is 10% or greater, then the above measurement is of the slope length.

**510.09.01.08                    Removal of Pipe Subdrains**

Measurement of removal of pipe subdrains shall be by length in metres horizontally along the centerline of the pipe subdrains, including outlets.

**510.09.01.09                    Removal of Hydrants  
Removal of Valves  
Removal of Watermain Appurtenances**

For measurement purposes, a count shall be made of the number of hydrants, valves, and watermain appurtenances removed.

**510.09.01.10                    Removal of Fence  
Removal of Noise Barrier**

Measurement of removal of fence and noise barrier shall be the length in metres, horizontally along each fence or noise barrier removed.

**510.09.01.11                    Removal of Delineator Posts**

For measurement purposes, a count shall be made of the number of delineator and guide posts removed.

**510.09.01.12                    Removal of Cable Guide Rail  
Removal of Concrete Barrier  
Removal of Steel Beam Guide Rail  
Removal of Steel Box Beam Barrier**

Measurement of removal of traffic barrier shall be the length in metres horizontally along each type of traffic barrier removed, excluding energy attenuators.

Where cable guide rail and steel box beam barrier are anchored to concrete anchor blocks, measurement shall be made between the end anchor points with no additional measurement made of the overlapping sections at intermediate anchorages.

**510.09.01.13                    Removal of Anchor Blocks**

For measurement purposes, a count shall be made of the number of anchor blocks removed.

**510.09.01.14                    Removal of Energy Attenuators**

For measurement purposes, a count shall be made of the number of complete energy attenuators systems removed.

**510.09.01.15                    Removal of Ramp Closure Gates**

For measurement purposes, a count shall be made of the number of ramp closure gates removed.

**510.09.01.16                    Cutting Existing Pavement**

Measurement of cutting of existing pavement shall be by length in metres along each cut.

**510.09.01.17                    Removal of Asphalt Pavement  
Removal of Asphalt Pavement from Concrete Surfaces  
Removal of Concrete Pavement  
Removal of Asphalt-Treated Base  
Removal of Cement-Treated Base  
Removal of Concrete Base**

Measurement of removal of asphalt pavement, asphalt pavement from concrete surfaces, concrete pavement, asphalt-treated base, cement-treated base, and concrete base shall be by area in square metres.

No deductions shall be made from the area for the space occupied by maintenance holes, catch basins, and valve chambers.

The full-depth removal of asphalt pavement, asphalt pavement from concrete surfaces, concrete pavement, asphalt-treated base, cement-treated base, and concrete base shall be measured for payment whether on the roadway surface or within an excavation, where such pavement or base has remained in place since its construction.

**510.09.01.18                    Removal of Asphalt Pavement, Partial-Depth  
Removal of Concrete Pavement, Partial-Depth**

Measurement of removal of partial-depth asphalt or concrete pavement shall be by area in square metres or by mass in tonnes as specified in the Contract Documents.

**510.09.01.19                    Removal of Asphalt Pavement from Concrete Surfaces on Structures**

Measurement of removal of asphalt pavement from concrete surfaces on structures shall be by area in square metres.

**510.09.01.20                    Removal of Concrete**

Measurement of removal of concrete shall be by volume in cubic metres.

When broken concrete or masonry is used as rip-rap or rock protection, deductions shall not be made from the concrete removal item.

**510.09.01.21                    Removal of Driveways, Sidewalks, and Sundry Asphalt Pavements**

Measurement of removal of driveways, sidewalks, and sundry asphalt pavements shall be by horizontal area in square metres.

**510.09.01.22                    Removal of Concrete Sidewalk**

Measurement of removal of concrete sidewalks shall be by horizontal area in square metres.

**510.09.01.23                    Removal of Gabions**

Measurement of removal of gabions shall be by volume in cubic metres.

**510.09.01.24                    Removal of Sign Support Structure  
Removal of Sign Support Structure Footings**

For measurement purposes, a count shall be made of the number of sign supports and sign support footings removed.

**510.09.02                    Plan Quantity Measurement**

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

**510.10**

**BASIS OF PAYMENT**

**510.10.01**

- Removal of Bridge Structure - Item**
- Removal of Bridge Footings - Item**
- Removal of Modular Bridge - Item**
- Removal of Modular Bridge Substructure - Item**
- Removal of Curb and Gutter - Item**
- Removal of Asphalt Curb and Gutter - Item**
- Removal of Concrete Curb and Gutter - Item**
- Removal of Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers - Item**
- Abandonment of Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers Partial-Depth - Item**
- Capping of Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers - Item**
- Removal of Pipe and Culverts - Item**
- Abandonment of Pipes and Culverts - Item**
- Removal of Pipe Subdrains - Item**
- Removal of Hydrants - Item**
- Removal of Valves - Item**
- Removal of Watermain Appurtenances - Item**
- Removal of Fence - Item**
- Removal of Noise Barriers - Item**
- Removal of Delineator Posts - Item**
- Removal of Cable Guide Rail - Item**
- Removal of Concrete Barrier - Item**
- Removal of Steel Beam Guide Rail - Item**
- Removal of Steel Box Beam Barrier - Item**
- Removal of Anchor Blocks - Item**
- Removal of Energy Attenuators - Item**
- Removal of Ramp Closure Gates - Item**
- Cutting Existing Pavement - Item**
- Removal of Asphalt Pavement - Item**
- Removal of Asphalt Pavement from Concrete Surfaces - Item**
- Removal of Concrete Pavement - Item**
- Removal of Asphalt-Treated Base - Item**
- Removal of Cement-Treated Base - Item**
- Removal of Concrete Base - Item**
- Removal of Asphalt Pavement, Partial-Depth - Item**
- Removal of Asphalt Pavement from Concrete Surfaces on Structures - Item**
- Removal of Concrete Pavement, Partial-Depth**
- Removal of Concrete - Item**
- Preparing Right-of-Way - Item**
- Removal of Driveways, Sidewalks, and Sundry Asphalt Pavements - Item**
- Removal of Concrete Sidewalk - Item**
- Removal of Gabions - Item**
- Removal of Sign Support Structure - Item**
- Removal of Sign Support Structure Footings - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

Imported backfill shall be paid for separately according to the tender item of the material specified in the Contract Documents.



Payment at the Contract price for the appropriate removal tender item shall be full compensation for all labour and Equipment for earth excavation required in the course of the removal operations.

Material designated for salvage but damaged by Contractor operations or lost by the Contractor shall be replaced with new material at no additional cost to the Owner.

If the Contractor elects to remove maintenance holes, catch basins, ditch inlets, and valve chambers in their entirety rather than as a partial removal, the removal shall be at no additional cost to the Owner.

When the Contract does not contain a separate item for the removal of pipe subdrain, the contract price for the items directly associated with the removal of pipe subdrain shall include full compensation for all labour, Equipment, and Materials required to do the work described in this specification.

Disturbed or damaged portions not designated for removal or salvage that result from the Contractor's operations shall be corrected or repaired at no additional cost to the Owner.

#### **510.10.02                      Excavation for Underpavement Objects**

When the Contract contains separate items for the removal of concrete pavement, asphalt pavement, concrete base, cement-treated base, sidewalk, and curb and gutter, such items removed because of the removal of under-pavement objects such as sewers, culverts, Utilities, and watermains, payment shall be at the Contract prices and according to the specifications for the removal of concrete pavement, asphalt pavement, concrete base, cement-treated base, sidewalk, or curb and gutter, respectively.

#### **510.10.03                      Excavation for Removal**

When excavation for removal overlaps the excavation required for other work under the Contract, the overlapping excavation for the removal shall be paid for in accordance with the specification for other work.

No deductions shall be made to the quantities of concrete base, cement-treated base, sidewalk, curb and gutter, and any other structure or portion of structure where these items removed are included within the established lines of an excavation item measured for separate payment.

**Appendix 510-A, November 2014  
FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS**

**Note:** This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

**Designer Action/Considerations**

No information provided here.

**Related Ontario Provincial Standard Drawings**

No information provided here.