



## **CONSTRUCTION SPECIFICATION FOR TEMPORARY EROSION CONTROL**

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This specification covers the requirements for temporary erosion control measures to protect disturbed earth surfaces during construction, minimize sedimentation and support the establishment of vegetation.

<b>804.02</b>	<b>REFERENCES</b>
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This specification refers to the following standards, specifications, or publications:

**Ontario Provincial Standard Specifications, Construction**

OPSS 206	Grading
OPSS 511	Rip-Rap, Rock Protection, and Granular Sheeting
OPSS 803	Vegetative Cover
OPSS 805	Temporary Sediment Control

**Ontario Provincial Standard Specifications, Material**

OPSS 1004	Aggregates - Miscellaneous
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OPSS 1801 Corrugated Steel Pipe Products  
OPSS 1840 Non-Pressure Polyethylene Plastic Pipe Products

## **804.03 DEFINITIONS**

For the purpose of this specification, the definitions in OPSS 182 and the following definitions apply:

**Diversion Ditch** means a temporary runoff control channel to intercept and convey overland flow away from areas of disturbed or erodible soil and to minimize erosion of slopes from sheet flow.

**Earth** means as defined in OPSS 206.

**Erosion** means the physical removal or detachment of sediment from an earth surface, followed by the transport of detached sediment to another location by the action of a mobile agent including rain, flowing water, wind, equipment and vehicles.

**Fibre Roll** means an assembled or commercially available flexible, tubular structure that provides erosion and/or sediment control and may provide run-off filtration and includes wattles, filter socks and filter berms.

**Permanent Cover** means the final cover treatment as specified in the Contract Documents to provide permanent erosion control on earth surfaces and may include, but not be limited to: rock protection, rip-rap, granular sheeting, established vegetative cover meeting the requirements of the Quality Assurance section of OPSS 803, gabions and retained soil systems.

**Significant Rainfall** means a rainfall event exceeding 15 mm within a 24-hour period.

**Sediment** means soil particles detached from an earth surface by erosion.

**Slope Drain** means a temporary surface water runoff control measure that directs water into a pipe or lined channel to prevent water flowing over disturbed earth surfaces on slopes and causing erosion.

**Slope Texturing** means contouring and roughening disturbed earth surfaces to increase water infiltration and retention, reduce runoff velocity, reduce sediment transport, and reduce soil erosion.

**Temporary Seeding** means the application of seed to stockpiles of erodible construction materials, excess or surplus materials, or disturbed earth surfaces to provide temporary erosion control until the materials are needed for construction, removed from the site, or until permanent cover is applied.

## **804.05 MATERIALS**

### **804.05.01 Mulch and Matrix**

#### **804.05.01.01 Mulch**

Mulch shall be either a mixture of straw mulch and organic straw mulch tackifier or hydraulic mulch.

#### **804.05.01.02 Straw Mulch**

Straw shall be supplied in bales, dry, and free of weeds and other foreign materials.

Organic straw mulch tackifiers may include wood and fibre paper mulch or guar and starch based tackifiers. Asphalt based tackifiers shall not be used.

#### **804.05.01.03                    Hydraulic Mulch**

Hydraulic mulch shall consist of shredded wood or paper fibres or both, and water or a stabilizing emulsion or both.

Stabilizing emulsions shall consist of an organic tackifier or an inorganic polymer.

Hydraulic mulch shall be capable of dispersing rapidly in water to form a homogeneous slurry.

Hydraulic mulch shall be dry, free of weeds and other foreign materials, and shall be supplied in factory sealed packages bearing the manufacturer's label indicating the product name, its mass and content.

#### **804.05.01.04                    Hydraulic Matrix**

Matrix shall be bonded fibre matrix (BFM) or fibre reinforced matrix (FRM).

##### **804.05.01.04.01                Bonded Fibre Matrix (BFM) and Fibre Reinforced Matrix (FRM)**

The BFM and FRM shall be capable of being hydraulically applied and after application be capable of adhering to the soil. In a dry state, BFM and FRM shall be comprised of greater than or equal to 70% by weight of long stranded wood fibres held together by organic or mineral bonding agents or both. The bonding agent shall not dissolve or disperse upon re-wetting.

The curing period for BFM shall be less than 24 hours. The FRM shall not have a curing period.

#### **804.05.02                        Erosion Control Blanket (ECB)**

The ECB shall be of a consistent thickness with a 100% biodegradable, even fibre distribution. The ECB shall be covered on top with a non-plastic biodegradable mesh or sewn together with biodegradable thread.

The ECB shall be supplied in a dry rolled mat protected with an outer waterproof wrap bearing the manufacturer's original label indicating product name and application instructions.

##### **804.05.02.01                    Erosion Control Blanket (ECB) Staples**

The ECB staples shall be according to manufacturer's specifications. The ECB staples shall have the strength and length to satisfy control measure installation, performance and maintenance requirements.

#### **804.05.03                        Fibre Rolls**

Fibre rolls shall be of a consistent internal thickness with even fibre distribution throughout the roll.

Fibre rolls shall be covered on the outside with an open-weave, biodegradable mesh or netting that securely contains the fibres within the rolls.

Fibre rolls shall be filled with 100% organic, biodegradable material such as shredded straw, wood fibres or compost and may contain seed according to OPSS 803.

#### **804.05.04                        Rock**

Rock for rock flow check dams shall be according to the requirements for rip-rap and gabion stone according to OPSS 1004.

#### **804.05.05 Pipe for Slope Drains**

Slope drains shall be constructed with non-perforated, corrugated steel pipe according to OPSS 1801 or polyethylene plastic pipe according to OPSS 1840. Pipe diameter shall be as specified in the Contract Documents.

#### **804.05.05.01 End Sections for Slope Drains**

End sections for the inlet and outlet of slope drains shall be according to OPSS 1801.

#### **804.05.06 Plastic Sheeting**

Plastic sheeting shall be a minimum thickness of 6 mm of polyethylene.

### **804.06 EQUIPMENT**

#### **804.06.01 Hydraulic Mulcher**

The hydraulic mulcher shall be capable of mixing the materials into homogeneous slurry and of maintaining the slurry in a homogeneous state until it is applied.

The discharge pumps and gun nozzles shall be capable of applying the materials uniformly over the specified area. A hose extension for the hydraulic mulcher shall be on site and available for use for areas outside of the range of the gun nozzle.

#### **804.06.02 Straw Mulch Blower**

Where straw mulch is applied mechanically by blower, the straw mulch blower shall be capable of separating straw from the bales without chopping it into short lengths and applying the straw mulch in a uniform, cohesive mat.

When tackifiers are used, the straw mulch blower shall be capable of applying straw mulch and tackifiers simultaneously.

The straw mulch blower shall be equipped with a minimum of two nozzles located inside the end of the blower pipe to coat the straw with the tackifier. Crimping may also be used to secure the straw mulch.

### **804.07 CONSTRUCTION**

#### **804.07.01 General**

Riparian vegetation areas to be preserved as specified in the Contract Documents shall be clearly marked in the field.

Temporary erosion control shall be applied and inspected within 24 hours prior to forecasted significant rainfall events.

Temporary erosion control materials and products shall not come in contact with the foliage of any trees, shrubs, or other vegetation, except as specified in OPSS 803 and shall not come in contact with waterbodies.

All stockpiles of erodible construction materials and excess or surplus materials within 30 m of a waterbody shall be protected from erosion within 48 hours of being built until they are required for construction or removed from the site.

Hydraulic mulch shall not inhibit growth or germination of the seed mix when applied to protect disturbed earth surfaces during the establishment of vegetative cover.

#### **804.07.02 Temporary Cover**

The measures, materials, products, and/or methods of temporary cover shall be selected and applied to be most suitable for the site conditions, operations and duration of the construction project. Temporary cover shall be applied to protect disturbed earth surfaces during construction to prevent erosion from occurring until permanent cover can be established.

Temporary cover measures, materials, products, and/or methods applied to, include but are not limited to:

- a) Materials or products including straw mulch, hydraulic mulch, fibre matrix, hydraulic matrix, wood chips, compost, plastic sheeting, temporary seeding, temporary sodding, rolled erosion control products, flow check dams and grade breaks.
- b) Methods such as but not limited to diversion of water from disturbed earth surfaces, slope texturing, staging of original vegetation or other permanent cover removal (e.g. deferring clearing and/or grubbing) and/or replacement (e.g. advancing permanent cover placement) and retaining vegetative buffers around waterbodies.

The Contract Administrator shall be notified in writing of the selected temporary cover measures, materials, products, and/or methods prior to either the removal of original permanent cover, or to a change in the selected method of temporary cover.

Temporary cover measures, materials, products, and/or methods selected shall be according to this specification and the instructions of the material or product manufacturer or supplier as applicable.

##### **804.07.02.01 Application**

The locations and application limits for temporary cover shall be clearly staked out as specified in the Contract Documents. Temporary cover shall be applied at these locations and any additional locations shall be at the discretion of the Contract Administrator.

Temporary cover is not required in areas where the permanent cover is applied immediately after existing cover removal provided there is no presence of erosion or sedimentation as confirmed by the Contract Administrator.

##### **804.07.02.02 Timing**

Temporary cover shall be applied prior to any forecasted precipitation and less than 48 hours after the removal of any portion of the existing vegetative cover or other earth cover.

Where the retention of existing vegetative cover, or other permanent cover, is the chosen temporary cover option, this existing cover will be retained until immediately prior to construction. This operation will be timed so that there will be less than 48 hours between the removal of existing cover and the placement of permanent cover.

Where grubbing is specified temporary cover shall be applied prior to any forecasted precipitation and less than 48 hours after any grubbing.

Temporary cover shall remain in place until the placement of the permanent cover, except for when work on disturbed earth surfaces is required or as specified in the Contract Documents.

#### **804.07.03 Straw Mulch**

Straw mulch shall be either applied manually by hand or mechanically by blower and secured using a tackifier or by crimping.

Straw mulch shall be applied to form a uniform, cohesive mat over 100% of the specified disturbed earth surface. The straw mulch shall be applied to a depth of greater than 25 mm and less than 50 mm as measured at the time of application.

#### **804.07.04 Hydraulic Mulch**

The hydraulic mulcher shall be calibrated to provide the coverage as specified for each of the hydraulically applied mulches.

Hydraulic mulch shall be applied at the rate of 2,000 kg of dry product per 10,000 m<sup>2</sup>. Hydraulic mulch shall be thoroughly mixed with water into a homogeneous slurry.

The hydraulic mulch slurry shall be applied to the specified disturbed earth surface by nozzle sprayer or extension hose. The mixed material shall be evenly dispersed over the entire disturbed earth surface to form a uniform, cohesive mat. The spray shall not dislodge soil or cause erosion.

#### **804.07.05 Bonded Fibre Matrix (BFM) or Fibre Reinforced Matrix (FRM)**

Hydrated BFM and FRM shall be applied to the specified disturbed earth surfaces to form a viscous material that dries to a high strength, porous, and erosion-resistant uniform, cohesive mat.

The BFM and FRM shall not be applied when rainfall is expected within 24 hours, during rainfall, or within 12 hours after rainfall.

#### **804.07.06 Erosion Control Blanket (ECB)**

The ECB shall be placed into position over the entire specified disturbed earth surface. The ECB shall be overlapped a minimum of 300 mm along parallel runs and on adjoining end runs.

The ECB shall be installed in direct contact with the ground surface to form a uniform, cohesive mat over the specified disturbed earth surface. The ECB shall be stapled to ensure direct contact with the soil over the entire area.

Overlapping and direct contact with the ground surface shall be maintained.

On slopes, the uppermost edge of the ECB shall be extended 1 m beyond the crest of the slope and anchored in a 150 mm wide by 150 mm deep trench excavation. The trench shall be backfilled with the excavated native material and compacted. When extension beyond the crest of the slope is not possible, the ECB shall be anchored at the top of the slope preventing any movement.

#### **804.07.07 Fibre Roll Grade Breaks**

Fibre roll grade breaks shall be constructed as specified in the Contract Documents.

Fibre rolls shall be installed horizontally starting from the toe of the slope and working up to the top of the slope. Any rills and gullies on the slope face shall be filled in as the fibre rolls are installed.

Fibre rolls shall be installed along the contour of the ground into trenches that have been excavated into the soil perpendicular to the slope face and width across the slope.

Fibre rolls shall be installed so that their base is in continuous contact with the underlying soil along their entire length without gaps and angled upslope at each end run in a "J" pattern. The ends of adjacent fibre roll segments shall be tightly butted up against each other and shall not be overlapped vertically or horizontally.

A metal bar shall be used to make pilot holes perpendicular to the slope face through the centre of the fibre rolls as specified in the Contract Documents. Pilot holes shall also be made at the ends of each fibre roll segment angled towards the next abutting fibre roll to hold adjacent rolls together.

Wooden stakes shall be driven into the pilot holes perpendicular to the slope face to secure the fibre rolls to the slope along their entire length. Additional stakes shall be driven into the fibre rolls along the downslope side at every grade change or if soils are very loose and uncompacted or the slope is steep.

Soil excavated from the trenches shall be placed along the upslope side of the fibre rolls and well compacted into the front of the trench to minimize possible undermining by runoff.

The soil on the upslope and downslope sides of the fibre rolls shall be seeded according to OPSS 803.

#### **804.07.08 Flow Check Dams - General**

Flow check dams are fibre roll flow check dams, sandbag flow check dams, or rock flow check dams.

When the flow check dam item is specified, any of the flow check dams or any combination of them may be used.

Flow check dams shall be constructed such that the spillway level of the downstream flow check dam is the same as the base of the upstream flow check dam when they are specified in series.

Flow check dams shall be constructed without gaps and without undermining to prevent sediment passage through, under, or around the flow check dam.

Flow check dams shall include protection placed against the downstream side at the lowest point of the flow check dam so that any overflow of the flow check dam is prevented from causing soil scour and erosion.

#### **804.07.08.01 Fibre Roll Flow Check Dams**

Fibre roll flow check dams shall be constructed as specified in the Contract Documents.

#### **804.07.08.02 Sandbag Flow Check Dams**

Sandbag flow check dams shall be constructed as specified in the Contract Documents.

#### **804.07.08.03 Rock Flow Check Dams**

Rock flow check dams shall be constructed as specified in the Contract Documents.

#### **804.07.09 Slope Drains**

Slope drains shall be constructed as specified in the Contract Documents.

When slope drains are specified in the Contract Documents, the slope drain and associated berm barrier shall be constructed on the same Day.

Slope drains shall be constructed as a single control measure consisting of a corrugated pipe, two end sections including an inlet and an outlet, and a sediment trap constructed at the outlet end of the pipe.

The pipe inlet shall be placed through a berm barrier. Placement shall allow water to enter the pipe inlet without scouring of the berm. The toe plate of the inlet end section shall be fully imbedded into the ground surface.

Pipes shall be maintained in place without gaps and without undermining so that water is conveyed from the upstream side of the berm and collected in the sediment trap.

#### **804.07.10                      Diversion Ditches**

Diversion ditches shall be constructed as specified in the Contract Documents.

When diversion ditches are specified to be lined with rolled erosion control blanket it shall be installed along their entire length.

When flow check dams are specified to be installed within diversion ditches, they shall be installed at regular intervals along the entire length of the diversion ditches according to this specification.

Where diversion ditches are specified to be lined with rip-rap or granular sheeting it shall be according to OPSS 511.

#### **804.07.11                      Monitoring and Documentation**

All temporary erosion control shall be monitored to ensure it is effective. Monitoring shall be completed for the following conditions:

- a) A minimum of every seven Days.
- b) The 24 hours prior to a forecasted significant rainfall event.
- c) Within 24 hours after significant rainfall events.

Monitoring shall include the following:

- a) Visual inspection of the condition and effectiveness of all installed temporary erosion control; and
- b) visual inspection of slopes for signs of erosion including rills, gullies, channels and dust.

Observations shall be documented and any concerns such as observed erosion, issues with construction staging, or with stockpiles of erodible construction materials and excess or surplus materials, shall be reported immediately to the Contract Administrator. Monitoring documentation shall be provided to the Contract Administrator upon request within 24 hours.

#### **804.07.12                      Maintenance**

Temporary erosion control shall be maintained and repaired or replaced as required, to function effectively until placement of the specified permanent cover.

When temporary cover is found by quality assurance check to be ineffective at any location, a different material, product or method more suitable for the site conditions shall be selected, applied and maintained within 48 hours.

#### **804.07.13                      Removal**

Temporary erosion control shall be removed prior to the placement of permanent cover as specified in the Contract Documents. Temporary erosion control that will not interfere with the placement, establishment or performance of specified permanent cover, may be left in place as permitted by the Contract Administrator.



Any temporary sediment control that is located within and around the area protected by temporary erosion control shall be left in place and removed according to OPSS 805.

#### **804.07.14 Cleanup**

When temporary erosion control materials or products are applied to the foliage of trees, shrubs, or other susceptible plant material, the material or product shall be immediately removed, and trees, shrubs, and plant material shall be washed with clean water.

#### **804.07.15 Protection of Waterbodies and Waterbody Banks**

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

#### **804.07.16 Management of Excess Material**

Management of excess material shall be as specified in the Contract Documents.

### **804.08 QUALITY ASSURANCE**

#### **804.08.01 Acceptance of Temporary Erosion Control**

Temporary erosion control shall be acceptable if they meet the requirements of this specification and as specified in the Contract Documents.

The Owner may conduct random quality assurance checks on temporary erosion control measures, materials, and/or products that have been selected, installed or removed to verify they are in accordance with the requirements of this specification and as specified in the Contract Documents.

Temporary erosion control that is identified by the Owner as deficient shall be removed and replaced or reapplied to meet the requirements of this specification and as specified in the Contract Documents. Removal and replacement or reapplication shall be carried out at no additional cost to the Owner within 48 hours of the Owner providing notice to the Contractor, unless otherwise agreed to in writing.

### **804.09 MEASUREMENT FOR PAYMENT**

#### **804.09.01 Actual Measurement**

##### **804.09.01.01 Temporary Cover**

Measurement shall be by area in square metres following the contours of the ground without any allowance for overlap.

##### **804.09.01.02 Mulch**

Measurement shall be by area in square metres following the contours of the ground without any allowance for overlap.

##### **804.09.01.03 Matrix**

Measurement shall be by area in square metres following the contours of the ground without any allowance for overlap.

**804.09.01.04                      Erosion Control Blanket**

Measurement shall be by area in square metres following the contours of the ground.

**804.09.01.05                      Fibre Roll Grade Breaks**

Measurement shall be the length of fibre rolls in linear metres from end to end following the contours of the ground.

**804.09.01.06                      Flow Check Dams  
Fibre Roll Flow Check Dams  
Sandbag Flow Check Dams  
Rock Flow Check Dams**

For measurement purposes, a count shall be made of the flow check dams constructed.

**804.09.01.07                      Slope Drains and Diversion Ditches**

For measurement purposes, a count shall be made of the number of slope drains and diversion ditches constructed or installed. Component parts shall not be counted separately for payment.

**804.09.02                          Plan Quantity Measurement**

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

**804.10                                BASIS OF PAYMENT**

**804.10.01                          Temporary Cover - Item  
Mulch - Item  
Matrix - Item  
Erosion Control Blanket - Item  
Fibre Roll Grade Breaks - Item  
Flow Check Dams - Item  
Fibre Roll Flow Check Dams - Item  
Sandbag Flow Check Dams - Item  
Rock Flow Check Dams - Item  
Slope Drains - Item  
Diversion Ditches - 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.

Progress payments for temporary erosion control shall be made as follows:

- a) 30% for initial construction.
- b) 50% for monitoring and maintenance.
- c) 20% for removal.

When removal of measures is not required, progress payments for temporary erosion control shall be made as follows:

- a) 50% for initial construction.
- b) 50% for monitoring and maintenance.

Payment for temporary erosion control at additional locations if required and approved by the Contract Administrator shall be administered as a Change in the Work.