

CONSTRUCTION NOTES – BACKFILL AT STRUCTURES

1.0 GENERAL REQUIREMENTS

- 1.1.

THESE CONSTRUCTION NOTES RELATE TO THE SUPPLY AND PLACEMENT OF BACKFILL MATERIALS AT THE STRUCTURES AT THE WINDSOR-ESSEX PARKWAY (WEP) PROJECT AS ILLUSTRATED ON THE ACCOMPANYING DRAWINGS. THE REQUIREMENTS GIVEN HEREFTER ARE THE GENERAL REQUIREMENTS. FOR DETAILED REQUIREMENTS, THE CONTRACTOR SHOULD REFER TO APPROPRIATE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) LISTED IN SECTION 1.6.
- 1.2.

THESE CONSTRUCTION NOTES ARE TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GEOTECHNICAL DESIGN DRAWINGS AND REPORT.
- 1.3.

FOR LIGHTWEIGHT FILL (LWF), REFER TO CONSTRUCTION NOTES FOR LIGHTWEIGHT FILL MATERIAL.
- 1.4.

FOR EXPANDED POLYSTYRENE (GEOFOAM, EPS) FILL, REFER TO CONSTRUCTION NOTES FOR EXPANDED POLYSTYRENE FILL.
- 1.5.

THESE REQUIREMENTS DO NOT APPLY TO THE HIGHWAY PAVEMENT CONSTRUCTION.
- 1.6.

THE CONSTRUCTION WORKS SHALL BE EXECUTED IN ACCORDANCE WITH THE GEOTECHNICAL DESIGN ILLUSTRATED ON THE ACCOMPANYING DRAWINGS, THE SUPPLIER SPECIFICATIONS AND THE REQUIREMENTS SPECIFIED IN THE FOLLOWING STANDARDS, SPECIFICATIONS AND PUBLICATIONS:
- ASTM D422

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ASTM D2216

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ASTM D2850

PARTICLE-SIZE ANALYSIS OF SOILS  
MOISTURE CONTENT OF SOILS  
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

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ASTM D2922

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ASTM D3017

DENSITY OF SOIL AND SOIL-AGGREGATE IN PLACE BY NUCLEAR METHODS  
WATER CONTENT OF SOIL AND ROCK IN PLACE BY NUCLEAR METHODS

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ASTM D5856

HYDRAULIC CONDUCTIVITY OF POROUS MATERIALS USING A RIGID WALL PERMEAMETER

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OPSS 201

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OPSS 206

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OPSS 212

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OPSS 401

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OPSS 501

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OPSS 517

CLEARING, CLOSE CUT CLEARING, GRUBBING, REMOVAL OF SURFACE AND PILED BOULDERS  
GRADING  
BORROW  
TRENCHING, BACKFILLING AND COMPACTING  
COMPACTING  
DEWATERING OF PIPELINE, UTILITY AND ASSOCIATED STRUCTURE EXCAVATION

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OPSS 518

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OPSS 805

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OPSS 902

CONTROL OF WATER FROM DEWATERING OPERATIONS  
TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES  
CONSTRUCTION SPECIFICATIONS FOR EXCAVATING AND BACKFILLING – STRUCTURES

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OPSS 1001

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OPSS 1004

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OPSS 1010

AGGREGATES – GENERAL  
AGGREGATES – MISCELLANEOUS  
AGGREGATES – BASE, SUBBASE, SELECT SUBGRADE AND BACKFILL MATERIAL

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OPSS 1860

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OPSD 208.010

GEOTEXTILE  
BENCHING OF EARTH SLOPES
- 1.7.

IF THERE IS ANY CONFLICT BETWEEN THE REQUIREMENTS GIVEN ON THIS DRAWING AND THE STANDARDS AND SPECIFICATIONS DOCUMENTS LISTED IN SECTION 1.6, THE DESIGNER SHOULD BE CONSULTED FOR CLARIFICATION AND RECOMMENDATIONS.
- 1.8.

IN THE FOLLOWING CONSTRUCTION NOTES, THE CONTRACTOR MEANS PIC AND ITS SUB-CONTRACTORS, THE SUPPLIER MEANS THE MANUFACTURER AND PROPRIETARY SUPPLIER, THE ENGINEER MEANS THE GEOTECHNICAL SITE ENGINEER, AND THE DESIGNER MEANS THE GEOTECHNICAL DESIGNER OF THE PROJECT.

2.0 SITE PREPARATION AND EXCAVATION

- 2.1

CLEARING AND GRUBBING AREA SHALL EXTEND MINIMUM 3 m BEYOND THE FOOTPRINT AREA OF THE STRUCTURE, OR AS REQUIRED BY THE ENGINEER. THE TREES AND SHRUBS REMOVED FROM THE GROUND SHALL BE TRANSPORTED TO DESIGNATED AREAS.
- 2.2

THE STRIPPING AREA SHALL EXTEND MINIMUM 1 m BEYOND THE FOOTPRINT AREA OF THE STRUCTURE, OR AS REQUIRED BY THE ENGINEER. ALL PEAT/MUSKEG, WETLAND VEGETATION AND OTHER UNSUITABLE MATERIAL SHOULD BE STRIPPED AND TRANSPORTED TO DESIGNATED AREAS.
- 2.3

CONTRACTOR IS FULLY RESPONSIBLE FOR THE DESIGN, CONSTRUCTION METHODS AND PERFORMANCE OF THE TEMPORARY SLOPES AND WORKS.
- 2.4

ALL EXCAVATION WORKS SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE GUIDELINES OUTLINED IN OCCUPATIONAL HEALTH AND SAFETY ACT (OHSA) AND ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS) 902. NATIVE DEWATERED SOILS AT THE SITE AND COMPACTED FILLS MAY BE CLASSIFIED IN GENERAL AS TYPE 3 SOILS. UNDEWATERED FILLS, NATIVE SAND AND SILTS, AND WATER BEARING BACKFILL WITHIN TRENCHES OF ACTIVE AND/OR ABANDONED UTILITIES MAY DEVELOP TYPE 4 SOIL CONDITIONS AND SHALL BE ADDRESSED ACCORDINGLY.
- 2.5

THE SOILS AT THE PROJECT SITE ARE HIGHLY SUSCEPTIBLE TO RAPID DETERIORATION WHEN EXPOSED TO ELEMENTS, WEATHERING, WATER INFLOW AND PONDING, DISTURBANCE FROM CONSTRUCTION TRAFFIC, AND THE LIKE. SUBGRADE SOILS AND BACKFILL IN PROGRESS SHALL BE APPROPRIATELY PROTECTED AT ALL TIMES AGAINST SURFACE EROSION, DESICCATION, AND FREEZE-THAW EFFECTS, REGULARLY INSPECTED AND MONITORED, AND TREATED AS REQUIRED.

2.6

TO PROTECT THE SUBGRADE INTEGRITY, THE FINAL EXCAVATION LAYER ABOVE THE DESIGN ELEVATION IN GENERAL SHOULD NOT BE LESS THAN 0.5 m AND SHOULD BE CARRIED OUT ONLY WHEN THE CONTRACTOR IS READY TO PREPARE AND COVER/PROTECT THE SUBGRADE SAME DAY THE FINAL EXCAVATION IS EXPOSED AND APPROVED.

2.7

NO CONSTRUCTION TRAFFIC SHOULD BE PERMITTED OVER THE SUBGRADE WITHOUT APPROVED PROTECTIVE COVERS.

2.8

THE SUBGRADE EXCAVATION SHALL BE CUT TO NEAT LINES AND GRADES USING BUCKETS EQUIPPED WITH SMOOTH LIPS. ONCE EXPOSED, THE SUBGRADE MUST BE IMMEDIATELY INSPECTED. UPON APPROVAL, THE SUBGRADE SURFACE SHOULD BE COVERED WITH SKIM COAT OF LEAN CONCRETE MUD MAT, GRANULAR OVER GEO-FABRIC, GRANULAR OVER SUBGRADE, ETC., AS APPROVED BY THE ENGINEER, FOR PROTECTION AGAINST DISTURBANCE AND TO PROVIDE A WORKING SURFACE.

2.9

THE TEMPORARY EXCAVATION SURFACES SHALL BE BENCHED ACCORDING TO OPSD 208.010. UNLESS THE GRANULAR BACKFILL IS FILTER GRADED WITH RESPECT TO THE NATIVE SUBGRADE MATERIAL, A GEOTEXTILE LAYER (TERRAFIX 360R OR EQUIVALENT) SHALL BE PLACED AT THE BENCHED INTERFACE BETWEEN THE EXCAVATED SURFACE AND THE GRANULAR BACKFILL TO FUNCTION AS A SEPARATOR AND PREVENT MIGRATION OF FINES.

2.10

IF PRESENCE OF GASSY SOILS IS EVIDENCED (FOR EXAMPLE, DISSOLVED GAS BUBBLES COMING OUT OF SOLUTION AND/OR SOFTENING OF THE EXCAVATION FACE), THE EXCAVATION PROGRESS SHALL BE REVIEWED WITH THE ENGINEER IN TERMS OF TIMING, STAGING AND OTHER MITIGATION MEASURES.

2.11

THE CONTRACTOR SHOULD EMPLOY APPROPRIATE GROUND IMPROVEMENT APPROACH (E.G., SUITABLE FILL LAYER, GEOGRID SHEET, ETC.) TO FACILITATE CONSTRUCTABILITY, WHERE REQUIRED, AS APPROVED BY THE ENGINEER.

2.12

THE SUBGRADE SHOULD BE SLOPED APPROPRIATELY TO ACHIEVE POSITIVE DRAINAGE OF SEEPAGE AND SURFACE WATER TO SUBDRAINS, DITCHES OR SUMPS TO AVOID PONDING BENEATH ANY FILL PLACED. NO PONDING OR FLOODING SHALL BE ALLOWED TO OCCUR IN AREAS OF FINAL EARTHWORKS (SEE SECTION 6 ON DRAINAGE – REQUIREMENTS).

3.0 REINFORCED GRANULAR MAT (RGM)

3.1

THE RGM ARE REINFORCED SOIL MATS COMPRISING SELECT COMPACTED GRANULAR FILL AND REINFORCEMENT (GEOSYNTHETICS OR METALLIC)

3.2

GRANULAR FILL FOR RGM: THE FILL MATERIAL SHALL BE GRANULAR 'A' OR GRANULAR 'B' TYPE II (OPSS 1010) PLACED AS PER NOTE 5.4 AND COMPACTED TO NOT LESS THAN 98%.

3.3

REINFORCEMENT FOR RGM: AS PER CONTRACT DOCUMENTS.

4.0 FILL MATERIALS

4.1

ALL FILL MATERIALS TO BE USED AS BACKFILL FOR STRUCTURES SHALL BE INERT MATERIAL, FREE OF ORGANIC MATERIAL AND DELETERIOUS SUBSTANCES. ALL FILL MATERIALS SHALL BE APPROVED BY THE ENGINEER AT THE BORROW SOURCE AND AT PLACEMENT LOCATION.

4.2

SILTY CLAY FILL: THE UPPER CLAY CRUST ZONE MATERIAL OBTAINED FROM REQUIRED EXCAVATIONS IN THE DEPRESSED SEGMENTS OF THE WEP OR OTHER SOURCES APPROVED BY THE ENGINEER SHALL BE USED AS PER DRAWINGS PROVIDED IT MEETS THE OPSS 902 REQUIREMENTS AND CAN BE COMPACTED TO AT LEAST 95% SPMDD. THE SUITABILITY OF THE CLAY FILL MATERIALS SHALL BE VERIFIED IN TERMS OF ITS GRADATION (E.G., SILTY CLAY TO CLAYEY SILT), PLASTICITY CHARACTERISTICS (LOW TO MEDIUM PLASTICITY INDEX) AND THE IN-SITU MOISTURE CONTENT. ALL SUITABLE METHODS TO ACHIEVE THE SPECIFIED PLACEMENT MOISTURE CONTENT SHALL BE EMPLOYED.

4.3

GRANULAR FILL FOR GENERAL BACKFILL: THE GRANULAR FILL MATERIAL SHALL BE GRANULAR 'B' TYPE I OR II, OR ALTERNATIVE GRANULAR MATERIALS APPROVED BY THE ENGINEER. THE SUITABILITY OF GRANULAR FILL MATERIALS SHALL BE DETERMINED AS PER THE OPSS 1010 STANDARD AND THE REQUIREMENTS OF THE RSS/RGM SUPPLIER.

4.4

RIPRAP: THE RIPRAP MATERIAL FOR EROSION PROTECTION OF PERMANENT SLOPES AND CHANNEL SURFACES SHALL BE R-10 (MINUS 180 mm) FOR LIGHT TO MEDIUM EROSION RISK CONDITIONS AND R-50 (MINUS 305 mm) FOR HIGH RISK CONDITIONS, AS SHOWN ON THE DESIGN DRAWINGS OR AS REQUIRED BY THE ENGINEER (OPSS 1004). GEOTEXTILE SHALL BE USED AT INTERFACE BETWEEN THE SOIL SLOPES AND RIPRAP LAYER TO PREVENT LOSS OF MATERIAL FROM THE SOIL SLOPE.

4.5

LWF AND EPS: SEE RESPECTIVE CONSTRUCTION NOTES.

4.6

ROCK FILL INSIDE CULVERT SHALL BE RIVER STONE AND SHALL MEET THE FOLLOWING REQUIREMENTS: 20% 100-200mm DIA. STONE, 50% 100mm DIA. STONE, 20% 50-100mm DIA. STONE, 10% CLEAN SAND.

4.7

ROCK FILL INSIDE CULVERT SHALL BE MIXED WITH PARENT MATERIAL AND TOPSOIL. MIXTURE RATIO TO BE 60% ROCK TO 40% SOIL.

METRIC

DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

Windsor–Essex  
Parkway Project  
RFP No. 09–54–1007

NEW CONSTRUCTION  
HWY 401  
TRAIL BRIDGE OVER HURON CHURCH LN. TB-5  
CONSTRUCTION NOTES – BACKFILL AT STRUCTURES

SHEET  
S6507

Phase 1  
IFC

5.0 FILL PLACEMENT AND COMPACTION

5.1

GENERAL:
  - THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER THEIR QC/QA INSPECTION AND TEST PLAN FOR REVIEW/COMMENT PRIOR TO THE PLACEMENT/COMPACTION OF FILL.
  - FILL SHALL NOT BE PLACED ON SURFACES HAVING STANDING WATER, OR SURFACES WHICH HAVE BEEN RUTTED AND HEAVED BY TRAFFICKING. FILL SHALL NOT BE PLACED ON FROZEN SURFACES. FROZEN FILL IS DEFINED AS MATERIALS WITH SOIL WATER IN FROZEN STATE.
  - ALL EARTHWORKS TO BE ADEQUATELY PROTECTED AGAINST EROSION, FROST AND WATER INGRESS UNTIL THE LANDSCAPING REQUIREMENTS HAVE BEEN INSTALLED (SEE SECTIONS 2.6 TO 2.8).

5.2

IF NOT SPECIFIED IN THE CONTRACT DOCUMENTS, TARGET DENSITIES WILL BE ESTABLISHED UTILIZING CONTROL STRIPS AS PRESENTED IN OPSS 501. THE MINIMUM TARGET DENSITIES SHALL BE AS PER NOTES 5.3 AND 5.4.

5.3

THE SILTY CLAY FILL SHALL BE PLACED IN MAXIMUM 200 mm THICK LOOSE LIFTS AND COMPACTED AT WOPT±2% MOISTURE CONTENT TO A MINIMUM OF 95% SPMDD UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS. THE TERMS WOPT AND SPMDD REFER TO OPTIMUM WATER CONTENT AND MAXIMUM DRY DENSITY, RESPECTIVELY, DETERMINED BY STANDARD PROCTOR TESTS.

5.4

THE GRANULAR FILL MATERIALS SHALL BE PLACED IN MAXIMUM 300 mm THICK LOOSE LIFTS AND COMPACTED AT WOPT±2% MOISTURE CONTENT TO A MINIMUM OF 95% SPMDD UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

5.5

THE COMPACTION EQUIPMENT SHALL BE APPROPRIATE FOR THE MATERIAL TO BE COMPACTED AND THE SITE CONDITIONS, AND SHOULD BE PROPOSED TO THE ENGINEER FOR APPROVAL. ADEQUATE NUMBER OF PASSES SHALL BE EMPLOYED TO ACHIEVE THE SPECIFIED PLACEMENT DENSITIES. HEAVY COMPACTION EQUIPMENT SHOULD NOT BE EMPLOYED NEAR STRUCTURAL WALLS.

5.6

COMPACTION AND PLACEMENT OF GRANULAR MATERIALS FOR RSS WALLS SHALL CONFORM TO THE MANUFACTURER'S RECOMMENDATIONS.

5.7

FILL PLACEMENT SHALL CONFORM TO THE REQUIREMENTS PRESENTED IN OPSS 501. THE CONTRACTOR SHOULD USE APPROPRIATELY SIZED EQUIPMENT TO AVOID DAMAGING ANY STRUCTURES, DEGRADING THE AGGREGATE, OR EPS BLOCKS.

6.0 DRAINAGE – DEWATERING

6.1

REFER TO OPSS 518 FOR DEWATERING REQUIREMENTS.

6.2

THE CONSTRUCTION SITE WILL BE KEPT CLEAN AND DRY, FREE OF WATER PUDDLES, MUD AND DEBRIS.

6.3

MINOR TO SIGNIFICANT SEEPAGE FROM RUNOFF INFILTRATIONS OR PERCHED WATER WITHIN UPPER GRANULAR DEPOSITS AND/OR FILL IS ANTICIPATED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TEMPORARY DEWATERING SYSTEM.

7.0 USE

7.1

THIS DRAWING PROVIDES CONSTRUCTION REQUIREMENTS FOR GEOTECHNICAL ASPECTS OF BACKFILLING AT TRAIL EMBANKMENTS AND STRUCTURES.

REVISIONS							
DESIGN	SF	CHK	NSV	CODE	CAN/CSA S6-06	LOAD	SEE T.A.F. DOC.
DRAWN	MM	CHK	DD	SITE	6-620	DATE	20-DEC-11

DRAWING NOT TO BE SCALED  
100mm ON ORIGINAL DRAWING

DOC: 285380-04-094-SEG1-6507