1 General

1.1 RELATED SECTIONS

.1 Section 31 23 33 - Excavating, Trenching and Backfilling.

.2 Section 32 11 19 - Granular Subbase.

.3 Section 32 11 23 - Granular Base Course.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM).

.1 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.3 SAMPLES

.1 Submit samples in accordance with Section 01 10 01 - General Requirements.

.2 Allow continual sampling by Departmental Representative during production.

.3 Provide Departmental Representative access to source and processed material for sampling.

.4 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

.5 Samples for quality testing will be required for each material and at the discretion of the Departmental Representative. Do not use any material in the work until it has been approved.

.6 Provide subsequent and progress samples from the processed materials when and as required by the Departmental Representative.

.7 Furnish such casual labour as is necessary to obtain and handle samples at the project or at other sources of material.

.8 Quality testing shall not relieve the Contractor of his responsibility to furnish materials in compliance with the Contract Documents.

.9 Testing of aggregates will be carried out in accordance with CSA, MTO or ASTM methods.

2 Products

2.1 MATERIALS

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.

.2 Flat and elongated particles of coarse aggregate: to ASTM D4791:

.1 Greatest dimension to exceed five times least dimension.

.3 Fine aggregates satisfying requirements of applicable section to be one or blend of the following:

.1 Natural sand.

.2 Manufactured sand.

.3 Screenings produced in crushing of quarried rock, boulders, or gravel.

.4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
.1 Crushed rock.
.2 Gravel and crushed gravel composed of naturally formed particles of stone.

2.2 SOURCE QUALITY CONTROL

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least four (4) weeks prior to commencing production.

.2 If, in opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

.3 Advise Departmental Representative four (4) weeks in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

3 Execution

3.1 PREPARATION

.1 Stripping.
.1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials.
.2 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

.2 Processing.
.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
.2 Blending of qualitatively acceptable aggregates will be permitted in order to satisfy the grading requirements specified, provided that the blending is performed in a satisfactory manner and with approved equipment so as to consistently produce a uniformly well graded and acceptable product.
.3 Wash aggregates if required to meet specifications.
.4 Blending performed to increase the percentage of crushed particles or decrease the percentage of thin and elongated particles will be permitted.

.3 Handling.
.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

.4 Stockpiling.
.1 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.2 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

.3 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.4 Do not use intermixed or contaminated materials.

.5 Stockpile materials in uniform layers of maximum thickness of 1.5 m. Complete each layer over the entire area before beginning the next layer.

.6 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.7 Do not cone piles or spill material over edges of piles.

.8 Do not use conveying stackers.

.9 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

.2 Defective Materials.

.1 Unless otherwise permitted by the Departmental Representative, remove rejected materials from the site of the work within 48 hours of such rejection.

3.3 CLEANING

.1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 31 05 17 - Aggregate Materials.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM).
- .1 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .2 ASTM D422-63 2002, Standard Test Method for Particle-Size Analysis of Soils.
- .3 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).
- .4 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.3 DEFINITIONS

.1 Subgrade: the surface of mass excavation and embankment finished to lines and elevations indicated.

.2 Surplus material: excavated material not required for re-use.

.3 Common: materials of whatever nature, which are not included under definition of solid rock or topsoil, including dense tills or hardpan which can be ripped or excavated with heavy construction equipment.

.4 Waste material: excavated material unsuitable for use in work or surplus to requirements.

.5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of work.

.6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.7 Unsuitable materials:
- .1 Weak, chemically unstable, and compressible materials.
- .2 All organic or excavated material which is not suitable for use in work and must be disposed of.
- .3 Frost susceptible materials:
  - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM C136.
  - .2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 – 100
0.02 mm	10 – 80
0.005 mm	0 – 45

  - .3 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

1.4 INSPECTION AND TESTING

.1 Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative.

.2 Testing of materials and compaction will be carried out by the testing laboratory designated by the Departmental Representative.

.3 The Owner will pay for inspection and testing.

.4 Compaction densities are percentages of standard proctor maximum dry density (SPMDD) as determined by ASTM D698.

1.5 EXISTING CONDITIONS

.1 The geotechnical report is available for review from the Departmental Representative upon request. The report is for information only without warranty.

.2 The Contractor will confirm with appropriate agencies the location of existing underground utilities within the work area.

.3 Furnish temporary support, adequate protection and maintenance of all underground and surface features encountered in the progress of the work, under the direction of the Departmental Representative.

.4 Restore upon completion of the work, features which have been disturbed.

.5 Protect trees, fences, poles and other property and surface structures unless their removal is shown on the drawings or authorized by the Departmental Representative.

.6 Wherever obstructions not shown on the drawings are encountered during progress of the work and interfere to such an extent that an alteration in the works is required, the Departmental Representative shall have the authority to change the drawings and order a deviation from the line and grade or arrange with the Departmental Representative of the structure for removal, relocation and reconstruction of the obstructions encountered during the progress of the work.

.7 Proceed with caution in excavation and preparation of trenches so that exact location of all buried pipes and services and underground structures may be determined and be responsible for repair of pipes, services and structures when broken or otherwise damaged.

.8 Whenever it is necessary to explore and excavate to determine the location of existing underground utility structures, make such examination and excavation at no additional cost to the Contract.

1.6 SUSTAINABLE DESIGN SUBMITTALS

.1 Construction Waste Management Plan.

.1 A Construction Waste Management Plan is in place to divert waste material from landfill. Wherever practical, send waste material for reuse or recycling, and generally document this for the contractor’s waste management final report.

.2 Regional Materials.

.1 Refer to Section 01 47 15 - Sustainable Requirements: Construction for “List of products required to be locally sourced”.

.2 If products within this section are indicated on the "List of products required to be locally sourced", include following information with Product Data submission:

.1 Extraction/Manufacturing location(s): Indicate location of extraction site or manufacturing plant, and indicate distance between extraction site or manufacturing plant and Project site.

2 Products

2.1 MATERIALS

.1 Type I Structural Fill.

.1 Crushed rock base/subbase shall be produced by the crushing and processing of rock to conform to the grading limits as set out in the below table, when tested in accordance with ASTM C136 and C117.

.2 Table.

Sieve Designation	% Passing
90.0 mm	100
75.0 mm	95 - 100
63.0 mm	85 - 100
50.0 mm	73 - 95
37.5 mm	58 - 87
19.0 mm	35 - 69
9.5 mm	25 - 54
4.75 mm	17 - 43
2.36 mm	12 - 35
1.18 mm	8 - 28
300 μm	4 - 16
75 μm	0 - 9

.2 Type II Clear Stone Fill.

.1 Crushed or screened gravel or rock base/subbase shall be produced by the crushing and processing of rock to conform to the grading limits as set out in the below table when tested in accordance with ASTM C136 and C117.

.2 Table.

Sieve Designation	% Passing
28 mm	100
20 mm	85 - 100
14 mm	50 - 90
10 mm	25 - 60
5 mm	0 - 10
2.5 mm	0 - 5

.3 Type III Foundation Backfill.

.1 Shall consist of Pit Run Gravel shall be produced by the screening and processing of gravel and rock to conform to the grading limits as set out in the below table, when tested in accordance with ASTM C136 and C117.

.2 Table.

Sieve Designation	% Passing
125 mm	100
100 mm	95 - 100
75 mm	82 - 100
50 mm	62 - 100
37.5 mm	52 - 100
19.0 mm	30 - 90
9.5 mm	22 - 79
4.75 mm	16 - 66
2.36 mm	12 - 55
1.18 mm	9 - 44
300 μm	4 - 25
75 μm	0 - 7

.4 Type IV Common Fill.

.1 Shall be approved native material by the Departmental Representative from on-site. Shall have a maximum dust content of 25% passing the 0.075mm sieve size and have a plasticity index not exceeding 6. Where required to fill to lines and grades as shown, Type III Fill may be substituted if imported material is required.

.5 Pipe Bedding.

.1 Shall consist of either clean sand bedding or clear stone if wet conditions are encountered. The bedding shall meet the following gradation limits when tested in accordance with ASTM C117 and C136:

.2 Table.

.1 Clear Stone Bedding.

Sieve Designation	% Passing
56 mm	100
40 mm	90 - 100
28 mm	25 - 60
20 mm	0 - 15
10 mm	0 - 5

.2 Sand Bedding.

Sieve Designation	% Passing
37.5 mm	100
25.0 mm	95 - 100
19.0 mm	90 - 100
9.5 mm	60 - 100
4.75 mm	35 - 80
2.36 mm	15 - 60
0.300 mm	0 - 30
0.075 mm	0 - 10

.6 Rip Rap.

.1 Hard, dense with relative density not less than 2.6, durable quarry stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended:

.1 Hand placed rip rap.

.1 Rip rap to conform to the gradation defined for Class R-5 to R-25 listed in Table 608-1, Random Rip Rap Grading Limits, Item 608 NBDOT Standard Specifications. Rip Rap Class designated on drawings.

.2 Rip rap to have rough surfaces and angular shape, thickness and breadth greater than or equal to one-third length of each rock.

.3 The rock, when tested by the Micro-Deval test method in accordance with MTO LS-618 shall not have a loss greater than 35%.

.4 When tested by the freeze/thaw test method in accordance with MTO LS-614 the rock material shall have a loss not greater than 15%.

3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways to requirements as outlined by authorities having jurisdiction and as directed by the Departmental Representative.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 ACTIONS AND SUBMITTALS

.1 The Contractor shall advise Departmental Representative two (2) weeks in advance of intended use of materials to allow sufficient time for sampling and testing. Submit samples of granular materials to be used in the works when requested by the Departmental Representative. Approval of a sample does not mean acceptance of the whole source. Each load of material received at the job site shall be subject to all the requirements of that material.

.2 The costs of any additional testing of backfill, as deemed necessary by the Departmental Representative, to determine the acceptability or degree of compaction shall be paid by the Contractor.

.3 Operations on earthwork shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing weather or other conditions of the field. At all times, the Contractor shall drag, blade or slope the fill to provide proper surface drainage.

.4 Materials to be compacted shall be placed in layers no thicker than can be compacted by anticipated compaction equipment, and be of the proper moisture content. Submit technical data for compaction equipment when requested by the Departmental Representative.

.5 Final grades shall be within 13 mm of the levels shown on the drawings. All areas shall be sloped to avoid puddles.

.6 It shall be the responsibility of the Contractor to repair all damage and correct all deficiencies which may result from the settlement of backfill areas.

3.3 SITE PREPARATION

.1 Remove obstructions, ice and snow from surfaces to be excavated within limits indicated.

.2 Identify required lines, levels, contours and datum.

.3 Identify known underground, above ground and aerial utilities. Stake and flag locations.

.4 Notify utility company to remove or relocate utilities.

.5 Protect above and below grade utilities which are to remain.

.6 Protect plant life, lawns, rock outcropping and other features remaining as a portion of the final landscaping.

.7 Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

3.4 STOCKPILING AND DISPOSAL

.1 All excess material suitable for backfill must be hauled to designated areas and spread to lines and grades as directed by the Departmental Representative.

.2 Stockpile fill material in areas designated by the Departmental Representative. Stockpile granular material in a manner to prevent segregation.

.3 Protect all fill materials from contamination.

.4 Excess material unsuitable for backfill shall become the property of the Contractor and shall be disposed of offsite. It will be the Contractor’s responsibility to acquire permission and all permits for the disposal site. Submit copies of all obtained permits to the Departmental Representative upon request.

.5 In case of a dispute, the Departmental Representative shall be the sole judge as to which material is unsuitable and has to be hauled away.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while work is in progress.

.2 Protect open excavations against flooding and damage due to surface run-off. All excavations and trenches shall be kept free from water. Dams, dykes and other works necessary for dewatering including duplicate pumps of sufficient capacity for the purpose shall be placed at the Contractor’s expense.

.3 The discharge of water from any dewatering operation shall be to a sediment pond and not to a storm sewer.

3.6 EXCAVATING AND TRENCHING

.1 Excavate to lines, grades, elevations and dimensions as indicated.

.2 Excavate subsoils required to accommodate building foundations, slabs-on-grade and construction operations.

.3 Trench excavate for footings.

.4 Excavation shall include the removal of all water, ice, snow and material of any nature which interferes with construction work.

.5 Excavation must not interfere with the bearing capacity of adjacent foundations.

.6 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations.

.7 All earth banks created by excavating shall be sloped at sufficient angle to prevent sliding or caving in and if they are not adequately sloped, then shoring and/or trench boxes must be used.

.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.9 Bottom of excavations in rock to be level. Remove soft till and unsuitable materials.

.10 Bear foundations or underside of all structures including pipe surrounds on the material as shown on the Drawings and neatly finish all bearing surfaces to the required levels and grades.

.11 Notify Departmental Representative when bottom of excavation is reached.

.12 Obtain Departmental Representative approval of completed excavation.

.13 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

.14 Excavation within fine sand layer to be carried out with smooth trenching bucket.

.15 Excess proof rolling of subgrade will be avoided.

.16 Where excavation carried out by the Contractor exceeds limits authorized by the Departmental Representative, the cost of such unauthorized excavation shall be borne by the Contractor as shall all necessary fill required to fill the void.

3.7 FILL TYPES AND COMPACTION

.1 Use fill types as indicated on the drawings and as specified below. Compaction densities are obtained from ASTM D698.

- .1 Type I Structural Fill.
  - .1 Used as shown on the drawings and under building foundations.
  - .2 Compact structural fill to not less than 98% of maximum dry density as determined by ASTM D698 with maximum lift thickness of 300 mm.
- .2 Type II Clear Stone.
  - .1 Used as shown on the drawings and under building slab-on-grade, and the perimeter footing drains.
  - .2 Compact clear stone placed below building slab-on-grade with minimum of 8 passes with a minimum 10 tonne steel drum roller under the observation of the Departmental Representative.
- .3 Type III Foundation Backfill.
  - .1 Used as shown on the drawings and to backfill building and structure foundations, and to raise grades to underside of subbase in roadway and parking areas.

.2 Compact engineered fill to 95% of maximum dry density as determined by ASTM D698 with maximum lift thickness of 300 mm.

.4 Type IV Common Fill.

.1 Used as shown on the drawings and to build up subgrade in landscaped areas.

.2 Compact engineered fill to 95% of maximum dry density as determined by ASTM D698.

.5 Granular Subbase.

.1 Compacted to 98% of maximum dry density as determined by ASTM D698.

.6 Granular Base.

.1 Compacted to 98% of maximum dry density as determined by ASTM D698.

.7 Pipe Bedding.

.1 Refer to applicable pipe and manhole sections of these specifications.

.2 Compact fill to 95% of maximum dry density as determined by ASTM D698.

3.8 BACKFILLING

.1 Do not proceed with backfilling of operations until Departmental Representative has inspected and approved installations.

.2 Proof-roll area with 8 tonne roller in static mode prior to placement of fill. Undercut any loose or soft areas and fill to subgrade level.

.3 Areas to be backfilled to be free from snow, ice, debris, water and frozen ground.

.4 Do not use backfill material which is frozen or contains ice, snow or debris.

.5 Place backfill material in uniform layers up to grades indicated. Compact each layer before placing succeeding layers.

.6 The in situ fill soils and topsoil are not to be used as structural backfill.

.7 Fill placed within 0.4 m of subgrade must be static rolled.

3.9 PROTECTION

.1 Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

.2 Protect bottoms of excavations and soil adjacent to and beneath foundation from freezing.

3.10 REPAIRS DURING WARRANTY PERIOD

.1 During the specified guarantee period, make good any damage to walk, roads, etc., due to settlement of backfilled areas. All such repairs shall be made at the Contractor’s expense upon notification by the Departmental Representative.

.2 Should the Contractor fail to carry out the necessary maintenance within five (5) days after receiving written instruction from the Departmental Representative, the Owner will carry out the work and deduct the cost incurred from the money owing the Contractor.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 01 10 01 - General Requirements.

.2 Section 31 23 33 - Excavation, Trenching and Backfill.

1.2 REFERENCES

.1 ASTM International.

- .1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM D4491-99a (2009), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- .3 ASTM D4595-09, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- .4 ASTM D4716-08, Standard Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
- .5 ASTM D4751-04, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB-4.2 No. 11.2-2004, Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
- .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes:
  - .1 No. 2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
  - .2 No. 3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
  - .3 No. 6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
  - .4 No. 7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
  - .5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

.3 CSA International.

- .1 CSA-G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA-G164-M92 (R1998), Hot Dip Galvanizing of Irregularly Shaped Article.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit samples in accordance with Section 01 10 01 – General Requirements.

.2 Product Data.

- .1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit copies of mill test data and certificate at least 4 weeks prior to start of Work.

.3 Submit to the Departmental Representative following samples at least four (4) weeks prior to beginning work:

.1 Minimum length of 2 m of roll width of geotextile. Minimum of 1 m seam with at least 300 mm of geotextile on both sides of seam.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Storage and Handling Requirements.

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

.3 Replace defective or damaged materials with new.

.3 Packaging Waste Management: remove for reuse.

1.5 SUSTAINABLE DESIGN SUBMITTALS

.1 Construction Waste Management Plan.

.1 A Construction Waste Management Plan is in place to divert waste material from landfill. Wherever practical, send waste material for reuse or recycling, and generally document this for the contractor’s waste management final report.

.2 Recycled Content.

.1 Refer to Section 01 47 15 - Sustainable Requirements: Construction for “List of products requiring recycled content”.

.2 If products within this section are indicated on the “List of products requiring recycled content”, only products with recycled content will be acceptable.

.3 For products not identified on list, source products with highest recycled content available when practical.

.4 Include following information with product data submission.

.1 Percentage of pre-consumer and post-consumer recycled content for each product.

.3 Regional Materials.

.1 Refer to Section 01 47 15 - Sustainable Requirements: Construction for “List of products required to be locally sourced”.

.2 If products within this section are indicated on the “List of products required to be locally sourced”, include following information with Product Data submission:

.1 Extraction/Manufacturing location(s): Indicate location of extraction site or manufacturing plant, and indicate distance between extraction site or manufacturing plant and Project site.

2 Products

2.1 MATERIAL

.1 NBDOT Type N1 non-woven synthetic fabric around Type II Clear Stone surrounding perimeter footing drain.

.2 NBDOT Type W2 woven geotextile for below Type 1 Structural Fill for footings.

.3 NBDOT Type W1 woven geotextile for sediment control fence and below driveway and parking area Granular Subbase.

.4 Composed of: minimum 85% by mass of polypropylene, polyethylene, polyamide, polyester or polyvinylidene chloride with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure.

.5 Seam strength: Sewn in accordance with manufacturer's recommendations or lapped a minimum of 600 mm.

.6 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

3 Execution

3.1 INSTALLATION

.1 Below Type 1 Structural Fill:
- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .5 Join successive strips of geotextile by sewing or overlapping.
- .6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .7 After installation, cover with overlying layer within four (4) hours of placement.
- .8 Replace damaged or deteriorated geotextile to approval of the Departmental Representative.
- .9 Place and compact soil layers in accordance with Section 31 23 33 - Excavating, Trenching and Backfilling.

.2 Surround perimeter footing drain:
- .1 Place geotextile material by wrapping around Type II fill surrounding the perimeter footing drain.
- .2 Join successive strips of geotextile by sewing or overlapping.
- .3 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .4 After installation, cover with overlying layer within four (4) hours of placement.
- .5 Replace damaged or deteriorated geotextile to approval of the Departmental Representative.
- .6 Place and compact soil layers in accordance with Section 31 23 33 - Excavating, Trenching and Backfilling.

.3 Sediment Control Fence:

.1 Sediment control fence shall be installed as indicated on the drawings and/or as specifically directed by the Departmental Representative. Prefabricated sediment control fence shall be installed as per the manufacturer's instructions.

.1 In areas of potential sheet flow runoff where construction activity may cause the drainage runoff to transport sediment(s), and the Contract Documents do not provide for sediment control fences in these areas, the Contractor shall ensure that sediment control fences are properly located for effective runoff control.

.2 The Contractor shall maintain the sediment control fence in a functional condition continuously from the time of installation until the completion of the Contract or removal.

.3 The Contractor shall inspect all sediment control fences after each rainfall and at least daily during periods of prolonged rainfall. The Contractor shall immediately repair any damage to sediment control fences or parts thereof.

.4 The Contractor shall remove retained sediment prior to it having accumulated to a level approximately but not exceeding one-half the height of the fence, and this sediment shall be disposed of at a location at least 30 m away from any watercourse, and in such a manner that the sediment will not be returned to the work area or the watercourse; or

.1 Subject to the approval of the Departmental Representative, the Contractor may install a second backup sediment control fence at his/her own expense.

.5 The Contractor shall remove all sediment control fence and the time of such removal shall be subject to the Departmental Representative's approval but in all cases shall occur prior to the completion of the Contract.

.1 Sediment control fence removed shall become the property of the Contractor and shall be disposed of outside the work site.

.2 If the Departmental Representative notifies the Contractor in writing, prior to the completion of the Contract, that all or any part of the sediment control fence is to remain in place, the Contractor shall be deemed to have completed his/her obligations for that portion of the sediment control fence under this item and the sediment control fence shall become the property of the Departmental Representative.

.6 At the time of removal, the Contractor shall excavate any remaining sediment and dispose of it at a location at least 30 m from any watercourse, and in such a manner that the sediment will not be returned to the work area or the watercourse; and dress and seed the area of the removed fence and sedimentation to the satisfaction of the Departmental Representative.

3.2 PROTECTION

.1 Vehicular traffic is not permitted directly on geotextile.

END OF SECTION