

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This Section specifies requirements to provide and maintain erosion and sedimentation control features where required, prior and during construction.

PART 2 – PRODUCTS

2.1 SEDIMENT CONTROL FENCE

- .1 Preassembled silt fence with industrial woven geotextile fabric with 20 - 30 micron effective opening size, pre-stapled to wood posts spaced as indicated.
 - .1 Acceptable product: Envirofence as manufactured by Mirafi Inc., Terrafence as manufactured by Terrafix, alternative products to be approved by the Departmental Representative.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Maintain site in a clean and safe manner in order to minimize erosion and sediment movement.

3.2 SEDIMENT CONTROL FENCE

- .1 Install sediment control where required.
- .2 Excavate 150mm x 150mm trench along length of fence as indicated. Lay fabric bottom in trench and backfill.

3.3 MAINTENANCE

- .1 Maintain sedimentation control features throughout the construction period. Repair damage to original condition.
- .2 Remove accumulated sediment from behind sediment control fence when and as directed by the Departmental Representative.
- .3 Maintain vertical alignment of sediment control fence such that it is always plumb and straight.
- .4 Remove sedimentation control features when directed by the Departmental Representative. Take care to avoid causing turbidity and excessive re-suspension of particles when removing sediment control features.

3.4 STOCKPILING

- .1 When stockpiling removed material such as topsoil or when stockpiles of granular material are being used in the Work, protect stockpiles from contamination, compaction and weather. Cover all stockpiles with tarpaulins.

3.4 STORM SEWER INLET PROTECTION

- .1 Install on all storm sewers inlet protection as indicated:
 - .1 On and adjacent to the Site.
 - .2 At the first inlet downstream of the site on all roads adjacent to the

- site.
- .3 Geotextile to be Type N1 as per NBDTI Standard Specifications, Item No. 601.
- .4 Cut or torn fabric shall be replaced.
- .5 Manufactured filter bags are an acceptable alternative to geotextile.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This Section specifies requirements for performing all operations necessary to complete site excavation and filling, to bring the site to sub-grade elevations.
- .2 The Work generally includes, but is not necessarily limited to, the following items:
 - .1 Excavation for new structures and roadway(s) including common and rock excavation and placing to grades indicated.
 - .2 Excavation of fill material unsuitable for engineered structural fill and disposal of unsuitable material offsite in areas approved by Departmental Representative at no additional cost to the Contract.
 - .3 Supply, placing, and compaction of engineered structural fill.
 - .4 Control of water by dewatering.
 - .5 Environmental protection.
 - .6 Sheet piling, shoring, bracing.
 - .7 Protection of stock-piled materials and excavation surfaces from disturbance by water and freezing.

1.2 REFERENCES

- .1 ASTM D698-07a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft - lb/ft³ (600 KN-m/m³)).
- .2 New Brunswick Department of Transportation and Infrastructure (NBDTI formerly NBDOT) Standard Specifications, latest edition.

1.3 DEFINITIONS

- .1 Unsuitable material: all organic, peat, silt, or other material, which is not suitable for use in the Work.
- .2 Subgrade: is the surface of mass excavation and embankment finished to lines and elevations indicated on Drawings.

1.4 EXISTING CONDITIONS

- .1 Geotechnical Investigation has been carried out at the Site.
- .2 Information from Geotechnical Report No. R043939.001 (6489.19-R01) dated April 2013, prepared by GEMTEC is available for viewing upon request to the Departmental Representative.
- .3 Any interpretations shall be at the Tenderer's own risk and the Departmental Representative shall not be held responsible for the content or interpretation of this document.
- .4 Known underground and surface utility lines and buried objects are indicated on the Drawings. Locations are approximate from record drawings.

1.5 PROTECTION

- .1 Prevent damage to structures, fencing, natural features, bench marks, or surface or underground utility lines which are to remain. If damaged, restore to original or better condition.
- .2 Protect stock-piles of excavated materials, excavation faces and the surface of mass excavations from disturbance by water and freezing.
- .3 Protect completed gravels and granular fill in all areas from contamination by traffic and construction operations on site. Make good any areas contaminated by use as haul roads or other activities at no additional cost to the Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Embankment material: Departmental Representative approved, off-site borrow that meet the requirements of NBDTI Standard Specification for Borrow A1, Item 121.2.2.2.
- .2 Engineered fill: Departmental Representative approved, off-site borrow that meet the requirements of NBDTI Standard Specifications for pit run gravel subbase or crushed sandstone subbase per Item No. 201.2.4.3 and 201.2.4.4, respectively.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Work from area of lowest elevation to area of highest elevation.
- .2 Once subgrade elevations are attained, do not let construction equipment or vehicles cross finished areas.
- .3 Before starting site grading operations, agree with Departmental Representative as to ground surface elevations to be cut and filled.
- .4 No standing water is to be left on site except for structures designed to retain or infiltrate water.

3.2 STRIPPING TOPSOIL

- .1 Strip topsoil to depths as directed by the Departmental Representative. Avoid mixing topsoil with subsoil.
- .2 Stockpile topsoil in locations as directed by the Departmental Representative. Stockpile height not to exceed 2.0m. Protect stockpiles from contamination and compaction. Cover with tarpaulins.

3.3 EXCAVATING

- .1 Prior to commencing cut and fill operations, agree with Departmental Representative as to ground surface elevations to be cut and filled.
- .2 Notify Departmental Representative whenever unsuitable materials are encountered and remove unsuitable materials to depth and extent directed.

- .3 Excavate in all kinds of material including rock encountered on the site and make own computations of amount and nature of excavation required.
- .4 Perform all excavation within plus or minus 75mm of the lines, grades and dimensions shown on the Drawings, or as established by the Departmental Representative. During the progress of the Work, the Departmental Representative may vary the lines, grades and dimensions of the excavations from those specified in this Section.
- .5 Take necessary precautions to preserve the material below and beyond the lines of all excavation in the soundest possible condition.
- .6 Do not stockpile excavation spoils within 2m or 1.5 times trench depth, whichever is greater, of edge trench.
- .7 Do not obstruct existing drainage ditches and natural water courses unless indicated on the drawings.
- .8 Reduce steepness of slopes wherever possible, and expose smallest practical area of land for shortest possible time.
- .9 During construction direct surface runoff to sediment control facilities installed and maintained to the requirements of the drawings and the City of Moncton.

3.4 EMBANKMENTS

- .1 Do not place material which is frozen or place material on frozen surfaces.
- .2 Maintain a sloped surface during construction to ensure ready run-off of surface water.
- .3 Place and compact embankment material to full width in uniform layers not exceeding 150 mm compacted loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
- .4 Compact material to a density of not less than 95% maximum dry density in accordance to ASTM D698.

3.5 ENGINEERED FILL

- .1 Compact engineered structural fill material to 98% maximum dry density.

3.6 FINISHING

- .1 Remove soft or other unstable material that will not compact properly and fill resulting depressions with approved material. Grade to eliminate rough spots and low areas to ensure positive drainage.
- .2 Shape and compact entire subgrade to within 25mm of design elevations but not uniformly high or low.
- .3 Do scarifying, blading, compacting or other methods of work as necessary to provide a thoroughly compacted site shaped to grades indicated or directed.
- .4 Finish side slopes to a neat condition, true to lines and grades indicated.

- .1 Remove boulders encountered and fill resulting cavities.
- .2 Hand finish slopes that cannot be finished satisfactorily by use of machine.

3.7 SURPLUS MATERIAL

- .1 Dispose of surplus approved embankment material not required for placement in fills off site in areas approved by Departmental Representative at no additional cost to the Contract. Surplus selected backfill and Engineered Structural fill is to be disposed of offsite in areas approved by Departmental Representative at no additional cost to the Contract.

3.8 UNSUITABLE MATERIAL

- .1 Dispose of unsuitable material offsite in areas approved by Departmental Representative at no additional cost to the Contract.

3.9 TESTING

- .1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by Departmental Representative.

3.10 MAINTENANCE

- .1 Maintain finished surfaces in a condition conforming to this section until acceptance.
- .2 Contractor shall notify Departmental Representative 24 hrs prior to being ready for testing.
- .3 Contractor shall facilitate and allow access to work to be inspected or tested.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This Section specifies requirements for furnishing all materials, labour, tools and equipment and performing all operations necessary to excavate all types of material encountered, placing of suitable excavated material as backfill, disposal of unsuitable and surplus material on-site at designated disposal area, and furnishing and placing structural fill, and imported backfill material as specified below, all as shown on the Drawings and as specified herein.
- .2 The Work generally includes, but is not necessarily limited to, the following items:
 - .1 Trench excavation and backfilling for pipelines and appurtenances.
 - .2 Structure excavation and backfilling for manholes, catch basins and structures.
 - .3 Supply and placing pipe bedding material where required.
 - .4 Compaction of bedding and backfill.
 - .5 Control of water by dewatering.
 - .6 Removal and disposal of surplus and/or unsuitable material.
 - .7 Sheet piling, shoring and bracing to support trench walls, sides of excavations or utilities.
 - .8 Reinstatement of existing asphalt surfaces.

1.2 REFERENCE STANDARDS

- .1 CAN/ULC S701-2011, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .2 ASTM D698-07a, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .3 New Brunswick Department of Transportation and Infrastructure (NB DOT formerly NBDOT) Standard Specifications, latest edition.

1.3 DEFINITIONS

- .1 Unsuitable Material: all organic or other excavated material, which is not suitable for use in Work.
- .2 Subgrade: the surface of mass excavation and embankment finished to lines and elevations indicated.

1.4 PROTECTION OF EXISTING FEATURES

- .1 Existing buried utilities:
 - .1 Size, depth and location of existing utilities as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Prior to commencing excavation Work, notify Departmental Representative and establish location and state of use of buried utilities. Clearly mark such locations to prevent disturbance during work.
 - .3 Confirm locations of buried utilities by careful test excavations.
 - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities encountered. It is the Contractor's responsibility to have these utilities field located.

- .5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Advise Departmental Representative of existing lines in area of excavation that require removal or relocation and cost for such work.
- .6 Record location of maintained, re-routed and abandoned underground lines.
- .2 Existing surface features:
 - .1 Conduct, with Departmental Representative condition survey of trees and other plants, lawns, service poles, wires, pavement, survey bench marks and monuments which may be affected by work.

1.5 SHORING, BRACING AND UNDERPINNING

- .1 Protect existing features in accordance with applicable local regulations.
- .2 Engage services of qualified professional engineer who is registered or licensed in province of New Brunswick, in which work is to be carried out to design and inspect shoring, bracing and underpinning required for work.
- .3 Submit design and supporting data at least two (2) weeks prior to commencing Work.

1.6 SUPPORT OF EXCAVATION

- .1 Suitably slope or properly shore sides of excavations according to site conditions, all in accordance with the New Brunswick Occupational Health and Safety Act.
- .2 The choice of any method of support shall be the responsibility of the Contractor. However, drawings and calculations for the method of support selected, designed by a qualified professional engineer licensed to practice in New Brunswick in accordance with the Provincial safety requirements, are to be submitted to the Departmental Representative for review before its use.
- .3 If it is desirable that any support, other than that which may be shown on the Drawings, be left in the excavations, then the Departmental Representative will issue instructions accordingly.
- .4 Take every precaution against slips or falls, but if any should occur, at once make good the same. If any such slip or fall affects or may affect the stability of the permanent work, execute such remedial work as necessary, including filling up of any space left by the slip or fall with approved granular material. Submit proposed remedial work to Departmental Representative for review.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Selected Backfill material: material approved from site excavation or borrow pits. Such material shall be free from stumps, trees, roots, sod, muck or other deleterious material, and shall not contain rock or boulders larger than 150mm. The material shall be free from frost, and shall not be

placed on frozen ground or in water. It must have a moisture content that will allow compaction to the specified densities.

.2 Engineered Fill: as specified in Section 31 22 13.

.3 Clear stone: crushed and screened, hard, durable stone, free from clay and organic matter, and graded as follows:

.1 Clear Stone, 25mm:

<u>Sieve Designation</u>	<u>% Passing</u>
25mm	100
19mm	15-85
12.5mm	0-53
9.5mm	0-30
4.75mm	0-4
1.18mm	0-2

.2 100mm Clear Stone:

<u>Sieve Designation</u>	<u>% Passing</u>
100mm	100
50mm	25-60
25mm	0-5

.4 Surge Rock: 150mm maximum crushed quarry-run material free from shale, clay, friable materials, roots and vegetable matter.

.5 Gravels: as specified in Section 32 11 19.

.6 Granular bedding material: 25mm clear stone or well graded gravel such as Aggregate Base as specified in Section 32 11 19.

.7 Rigid insulation: to CAN/ULC S701, Type 4, expanded polystyrene, minimum compressive strength 60 psi, thickness as indicated.

.1 Acceptable products: Styrofoam Highload 60 as manufactured by Dow Chemical or Foamular 600 as manufactured by Owens Corning.

.8 Underground warning tape:

.1 Detectable metallic tape, 50mm wide, clearly marked as follows:

.1 "CAUTION - BURIED WATER LINE", colour blue.

.2 "CAUTION - BURIED SANITARY SEWER", colour green.

.3 "CAUTION - BURIED STORM SEWER", colour green.

.9 Erosion and sediment control measures in accordance with Section 31 15 53.

PART 3 - EXECUTION

3.1 SITE PREPARATION

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

3.2 SHORING AND BRACING

.1 Construct temporary works to depths, heights and locations as approved

by Departmental Representative

- .2 During backfill operation:
 - .1 Unless otherwise as indicated or as directed by Departmental Representative, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Upon completion of substructure construction:
 - .1 Remove shoring and bracing.
 - .2 Remove excess materials from site as directed by Departmental Representative.

3.3 ASPHALT REMOVAL

- .1 Always cut asphalt with a cutting saw in order to facilitate removal and prevent lifting or damage to adjacent pavement, concrete or structures during excavation.
- .2 Under no circumstances will the cutting of pavement be allowed by the use of excavators or backhoe buckets, etc.
- .3 In full depth removal, care must be taken not to contaminate the reclaimed asphalt pavement with the underlying aggregate base material. All loose material remaining after cold milling shall be swept.
- .4 At all transverse vertical cuts milled in the existing pavement the Contractor shall immediately construct a temporary smooth taper with RAP (Recycled Asphalt Pavement) or hot-mix asphalt concrete to a minimum slope of 25:1.
- .5 Work, in such a manner that the structures are not damaged, and the area after removal matches the grade of the adjacent removal area. Any RAP that falls into structures shall be removed.

3.4 EXCAVATION - GENERAL

- .1 Excavate in all kinds of materials including rock encountered on Site and make own computations of amounts and nature of excavation required.
- .2 Select method of excavation, support and dewatering suitable for the works. Submit proposed method to Departmental Representative for review.
- .3 Protect property or structures above or below ground in accordance with the Contract.
- .4 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.
 - .1 Over-excavated 300 mm below underside of footing elevation and backfilled with engineered fill. Engineered fill should comprise 0-75 mm crushed quarried rock meeting NBDTI subbase specification, compacted to 95% of the maximum dry density as determined by the latest version of ASTM D 1557.
- .5 If the excavated surface is unsuitable, the Departmental Representative will determine what work is required to secure a proper foundation. If such

work is due solely to the nature of the ground, then Departmental Representative will measure the work, but if such work is due to any act or default of the Contractor in carrying out of the Works, resulting in disturbance of natural ground conditions, then the Contractor shall execute such work at no additional cost to the Contract.

- .6 Pile excavated material a safe distance away from sides of trench so it will not endanger personnel and the work, reduce sight distances, and obstruct roadways.
- .7 Leave existing utility controls unobstructed and accessible at all times.
- .8 Do not obstruct drainage ditches and natural watercourses.
- .9 Departmental Representative reserves the right to require surplus material to be placed for embanking, general grading or other improvement or use on site, for the general benefit of Departmental Representative.
- .10 Control grading so that the surface of the ground will be properly sloped to prevent water from running into excavated areas. Promptly remove any water, which accumulates in excavations.
- .11 Place excavated soil to be re- used as backfill in stockpiles properly graded and protected from all sources of moisture and freezing.
- .12 Reduce steepness of slopes wherever possible, and expose smallest practical area of land for shortest possible time.
- .13 Dispose of surplus materials off site at approved disposal site.
- .14 Where excavated materials are to be retained for the Owner's use, they will remain the sole property of the Owner and any use, disposal or sale thereof, not specifically approved in writing by the Departmental Representative is strictly forbidden. All RAP shall be loaded and hauled to the stockpile location on Westmorland Institution property as directed by the Departmental Representative.

3.5 DRAINING, PUMPING AND THAWING

- .1 Keep excavations and trenches free of water. Control excavations to prevent surface water running into excavated areas.
- .2 Do work in connection with dewatering and supply and maintain on the worksite pumps in a number and capacity sufficient to keep bottom of excavations dry and free from water so placing of pipe, manholes, and concrete will be done in the dry. Operate equipment for as long as necessary.
- .3 Dispose of water removed from excavations in a manner that will prevent injuries to public health or private property or to any operation of the work completed or under construction. Do not pump water containing silt or other material in suspension into streams or drainage courses or water bodies.
- .4 Ensure that sub-drains, sump holes, wells or the like required for

dewatering shall not endanger the stability of the Works. On completion of the work completely backfill and consolidate excavations.

- .5 Excavate, remove or thaw out frozen ground as necessary.

3.6 TRENCH EXCAVATION

- .1 Trenches for piping and related excavations shall be of sufficient width and depth at all points to allow pipes to be laid, joints to be formed, and appurtenant structures to be built in a workmanlike manner, and when needed, to allow for sheeting and shoring, pumping, draining, and for removing and replacing all materials unsuitable for foundations.
- .2 Excavate trenches so pipe can be laid to the alignment and depth required. Excavation length to be not more than pipe length that can be laid and backfilled in one day. Brace and drain trench so workers may work safely and efficiently.
- .3 Remove organic material and soft deposits to a depth where medium dense to dense materials are encountered as designated by the Departmental Representative.
- .4 Do not stockpile excavated materials alongside trench if the bearing soil will cause trench side failure or bottom uplift and affect pipe alignment.

3.7 UNSUITABLE MATERIAL EXCAVATION

- .1 Notify Departmental Representative when materials unsuitable for use in the work are encountered and remove to depth and extent as directed by Departmental Representative.
- .2 Dispose of unsuitable material off site at an approved disposal site.

3.8 GRANULAR BEDDING

- .1 Place granular bedding material in uniform layers not exceeding 150mm compacted thickness to depth as indicated.
- .2 Shape bed true to grade to provide continuous uniform bearing surface for pipe. Do not use blocks when bedding pipe.
- .3 Shape transverse depressions in bedding as required to suit joints.
- .4 Carry bedding material across actual trench width. Mounding bedding shall not be permitted.
- .5 Compact each layer full width of bed to at least 95% of corrected maximum dry density.
- .6 After pipe installation, place and compact bedding to haunch line of pipe. Place and compact bedding material from haunch line of pipe to top of pipe in maximum 150mm layers. Place remaining bedding material to 300mm above top of pipe before further compaction.
- .7 Compact granular bedding to ASTM D4254, 70% relative density for clear stone, 98% relative density for Aggregate Base Gravel.

3.9 BACKFILLING - GENERAL

- .1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
- .2 After pipelines, and structures have been built, backfill trenches and other excavated areas with materials shown on Drawings or as specified. Remove timber and debris from excavation before backfilling is commenced. Do not cover up or put out of view any work until it has been examined and approved by the Departmental Representative. If any work is covered without approval of the Departmental Representative it must, if requested, be uncovered for examination.
- .3 Do not backfill around or over cast-in-place concrete within 24 hours after placing.
- .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures, permit concrete to cure minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure.

3.10 BACKFILLING TRENCHES

- .1 Backfill trench from top of pipe bedding elevations indicated using materials shown on Drawings.
- .2 Place backfill in 300mm layers and compact to 98% maximum dry density.
- .3 During backfilling, keep trenches free of water at all times and controlled so as to prevent surface water running into excavated areas. Remove silty materials, which become wetted and subsequently liquid or extremely plastic.
- .4 Leave surface of backfill initially high and repair settlement of trench backfilling.

3.11 INSULATION

- .1 Place rigid insulation in trench where indicated on drawings. Do not disturb or break boards during backfilling.

3.12 MARKER TAPE

- .1 Place marker tape in trenches where indicated.

3.13 REINSTATEMENT

- .1 Upon completion of work, remove surplus materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Reinstate disturbed areas to conditions, elevation and thickness equal to or better than that which existed before excavation.
- .3 Clean and reinstate areas affected by work as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This Item consists of the excavation and placement within the Work Site, or disposal outside the Work Site, of solid rock.
- .2 Solid rock is defined as insitu bedrock, and naturally occurring boulders that are 1 m³ or larger in volume.
- .3 Pneumatic rock hammering is the preferred method of rock removal
- .4 Blasting is not permitted on the work site and will only be considered if other methods of prove onerous and inefficient as defined by a delay that is not acceptable to the Department Representative.

1.2 REFERENCES

- .1 New Brunswick Department of Transportation and Infrastructure (NB DTI formally NBDOT) Standard Specifications, latest edition.

1.3 DEFINITIONS

- .1 Solid rock is defined as insitu bedrock, and naturally occurring boulders that are 1 m³ or larger in volume and which cannot be removed by means of heavy duty mechanical excavating equipment with 1.15m³ bucket. Frozen material not classified as rock.
- .2 PPV: peak particle velocity.

1.4 EXISTING CONDITIONS

- .1 Geotechnical Investigation has been carried out at the Site.
- .2 Information from Geotechnical Report No. R043939.001 (6489.19-R01) dated April 2013, prepared by GEMTEC is available for viewing upon request to the Departmental Representative.
- .3 Any interpretations shall be at the Tenderer's own risk and the Departmental Representative shall not be held responsible for the content or interpretation of this document.
- .4 Known underground and surface utility lines and buried objects are indicated on the Drawings. Locations are approximate from record drawings.

1.5 SUBMITTALS

- .1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.5 PROTECTION

- .1 Prevent damage to structures, fencing, natural features, bench marks, or surface or underground utility lines which are to remain. If damaged, restore to original or better condition.
- .2 Protect stock-piles of excavated materials, excavation faces and the surface of mass excavations from disturbance by water and freezing.
- .3 Protect completed gravels and granular fill in all areas from contamination by traffic and construction operations on site. Make good any areas contaminated by use as haul roads or other activities at no additional cost to the Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 .Not used.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Notify the Departmental Representative when material appearing to be bedrock is first encountered
- .2 Remove rock to alignments, profiles, and cross sections as indicated
- .3 Explosive blasting is not permitted.
- .4 No standing water is to be left on site except for structures designed to retain or infiltrate water.
- .5 Use rock removal procedures to produce uniform and stable excavation surfaces. Minimize overbreak, and to avoid damage to adjacent structures.
- .6 Excavate rock to horizontal surfaces with slope not to exceed 1h:1v.
- .7 Over-excavated 300 mm below underside of footing elevation and backfilled with engineered fill. Engineered fill should comprise 0-75 mm crushed quarried rock meeting NBDTI subbase specification, compacted to 95% of the maximum dry density as determined by the latest version of ASTM D 1557..
- .8 Excavate trenches to lines and grades to minimum of 300 mm below pipe invert indicated. Provide recesses for bell and spigot pipe to ensure bearing will occur uniformly along barrel of pipe.
- .9 Cut trenches to widths as indicated.
- .11 Remove boulders and fragments which may slide or roll into excavated areas.
- .12 Correct unauthorized rock removal at no extra cost, in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.
- .13 Reuse material as common borrow only at the direction and approval of

the Departmental Representative

3.2 CLEANING

- .1 Rock Disposal:
 - .1 Do not dispose removed rock into landfill. Send material to appropriate location as approved by Departmental Representative.

END OF SECTION