

Delete Section 01 22 00 of the Standard Specifications for Municipal Services, as developed and published by the Nova Scotia Road Builders Association and the Consulting Engineers of Nova Scotia (CENS) Joint Committee on Contract Documents, in its entirety and replace with the following:

INDEX TO CLAUSES

GENERAL

EARTHWORK

1. Clearing
2. Grubbing
3. Mass Excavation and Embankment - Common
4. Mass Excavation and Embankment - Rock
5. Mass Excavation - Unsuitable Material
6. Replacement of Unsuitable Material with Type 2 Gravel or Surge Rock
7. Borrow
8. Breaking Mass Rock Without Removal
- 9.1 Scarify Existing Road Surface
- 9.2 Fine Grading of Road Surface

WATER SYSTEM

10. Pipe
11. Fire Hydrant
 - .1 Installation of Fire Hydrant
 - .2 Relocation of Fire Hydrant
 - .3 Removal of Fire Hydrant
12. Valve Chamber
13. Direct Buried Valve
14. Water Service
 - .1 Reconnect Existing Water Service ≤ 50 mm
 - .2 Reconnect Existing Water Service > 50 mm
 - .3 Replace Existing Water Service
15. Connection to Existing Main
16. Water Main Protection
 - .1 Rigid Insulation
 - .2 Pipe Sleeve (encasement pipe)
17. Temporary Water Service
18. Reserved
19. Reserved

SANITARY SEWER

- 20. Gravity Pipe
- 21. Pressure Pipe
- 22. Manholes
- 23. Services
- 24. Connections to Existing Main
- 25. Closed Circuit Television Inspection
- 26. Reserved
- 27. Reserved
- 28. Reserved
- 29. Reserved

STORM SEWER

- 30. Pipe
- 31. Manholes
- 32. Catchbasins
- 33. Catchbasin Leads
- 34. Services
- 35. Connections to Existing Main
- 36. Culverts
- 37. Closed Circuit Television Inspection
- 38. Remove Existing Structure
- 39.1 Culvert Headwall
- 39.2 Culvert Apron
- 39.3 Inlet/Outlet Grate/Structure

STREET CONSTRUCTION

- 40. Gravels
- 41. Placement Materials
- 42. Asphaltic Concrete
- 43. Curb
- 44. Sidewalk
- 45. Retaining Wall
- 46. Traffic Sign Base
- 47.1 Adjust Existing Structures to Grade
- 47.2 Replace Frames and Grates or Covers (Including Final Grade Adjustment)
- 47.3 Adjust Existing Adjustable Frames and Covers
- 48. Type 2 Gravel or Surge Rock Below Subgrade
- 49. Driveway Reinstatement

LANDSCAPING

- 50. Topsoil and Sod
- 51. Topsoil and Seed
- 52. Trees, Shrubs and Groundcover
- 53. Hydroseed
- 54. Tree Removal
- 55. Chip Trees in Place
- 56. Bark Mulch
- 57. Handrails and Fences
- 58. Tree Stump Removal
- 59. Reserved

ADDITIONAL ITEMS

- 60. Trench Excavation - Rock
- 61. Trench Excavation - Unsuitable Material
- 62. Replacement of Unsuitable Material with Type 2 Gravel or Surge Rock
- 63. Topsoil Excavation
- 64. Breaking Trench Rock Without Removal
- 65. Pavement Markings
- 66. Preblast Survey
- 67. Preblast Trenches
- 68. Trench Plugs
- 69. Reserved

ENVIRONMENTAL PROTECTION

- 70. Silt Fence
- 71. Flow Checks
- 72. Ground Cover
- 73. Environmental Mat
- 74. Soaker Bags
- 75. Diversion Ditches
- 76. Flow Diversions
- 77. Turbidity Curtain
- 78. Settlement Pond
- 79. Straw Bales

ELECTRICAL

- 80. Direct Buried Conduit
- 81. Traffic Signal Pole Concrete Base
- 82. Overhead Wiring for Detector Loops
- 83. Reinstate Traffic Signal Detector Loops / Scoot Loops
- 84. RA-5 Crosswalk Lights
- 85. Traffic Signal Installation
- 86. Reserved
- 87. Reserved
- 88. Reserved
- 89. Reserved

MISCELLANEOUS

- 90. Infrastructure Sign
- 91. Guiderails

GENERAL

1. Unit prices are full compensation for the work necessary to complete each item in the Contract and in combination for all work necessary to complete the Work as a whole.
2. For sanitary sewers and storm sewer systems include all of the following as required where individual quantities are not provided in the Tender Form: clearing and grubbing, common excavation, shoring, dewatering, bedding, backfilling, compaction, disposal of surplus common, mechanical joint restraints or thrust blocks as directed, testing, flushing, marker stakes, all incidentals and reinstatement as specified.
3. All measurement shall be along a horizontal plane unless otherwise indicated. Scale tickets for gravels and asphaltic concrete shall be provided within 48 hours, when requested by the Engineer, regardless of the unit of measurement.
4. The numbers of the items described below correspond to the numbers of the items in Section 00 41 43, subsection 4 - Schedule of Quantities and Unit Prices.
5. For water systems include all of the following as required where individual quantities are not provided in the Form of Tender: clearing and grubbing, common excavation of trench material, shoring, dewatering, bedding, pipe protection, polyethylene encasement, backfilling, compaction, joint restraints and thrust blocks, testing, flushing and disinfection, marker stakes, all incidentals and reinstatement as specified.
6. For earthwork, street construction and landscaping include all of the following as required where individual quantities are not provided in the Tender Form: clearing and grubbing, borrow, common excavation, backfilling, compaction, disposal of surplus material, pavement markings, tree removal, all incidentals and reinstatement as specified.
7. The quantities listed in the Schedule of Quantities and Prices are approximate only and are for the purpose of tendering. Payment to the Contractor will be based on actual quantities of work completed in accordance with the drawings and specifications.
8. The requirement for items indicated as Provisional will not be determined until the time of construction. Provisional items shall mean that the unit prices as tendered shall be included in the Tender Price and that the Owner reserves the right to delete or modify the quantities of these items.

EARTHWORK1. Clearing

Unit of Measurement: hectare (ha) or square metre (m²).

This item includes: cutting and disposal of all trees and brush from areas indicated.

2. Grubbing

Unit of Measurement: hectare (ha) or square metre (m²).

This item includes: removal and disposal of all stumps, roots, downed timber, embedded logs, rootmat, humus, and topsoil from areas indicated.

3. Mass Excavation and Embankment - Common

Unit of Measurement: cubic metre (m³)

Method of Measurement: average end area method between cross sections taken after grubbing or topsoil removal and to the finished surface lines and elevations indicated.

This item includes: excavation, placement and compaction to the finished surface lines and elevations indicated, and disposal of surplus or unsuitable material.

4. Mass Excavation and Embankment - Rock

Unit of Measurement: cubic metre (m³).

Method of Measurement: average end area method between cross sections taken after rock is exposed to lines and elevations indicated. Boulders one cubic metre or larger will be classified as rock. Boulders removed from the excavation shall be measured along the three maximum perpendicular axes.

This item includes: excavation, placement and compaction to lines and elevations indicated, and disposal of surplus or unsuitable material.

5. Mass Excavation - Unsuitable Material

Unit of Measurement: cubic metre (m³).

Method of Measurement: average end area method of volume of unsuitable material between cross sections taken before and after excavation.

This item includes: all excavation of unsuitable material and disposal. Written authorization of Engineer required.

6. Replacement of Unsuitable Material with Type 2 Gravel or Surge Rock

Unit of Measurement: cubic metre (m³) or tonne (t).

Method of Measurement: average end area method for volume of unsuitable material or ticket of surge material.

This item includes: placing Type 2 gravel or surge rock in locations where unsuitable material has been excavated as indicated on the plan or as directed by the Engineer. It also includes compaction of the gravel and placement of filter fabric. Written authorization of Engineer required.

7. Borrow

Unit of Measurement: cubic metre (m³) or tonne (t).

Method of Measurement: average end area method between cross sections taken before placement of borrow to lines and elevations indicated.

This item includes: supply, placement and compaction.

8. Breaking Mass Rock Without Removal

Unit of Measurement: cubic metre (m³).

Method of Measurement: average end area method between cross sections taken between surface of rock to lines and elevations indicated, and excluding the volume of mass excavation.

This item includes: breaking of rock to the size indicated, and excavation and backfilling test holes as directed by the Engineer.

9.1 Scarify Existing Road Surface

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes: scarifying the existing gravel sub-base to depth indicated to remove any material larger than 50 mm and mix gravels to an even consistency. This item also includes all necessary labour and equipment required for the fine grading and compaction of existing granular material.

9.2 Fine Grading of Road Surface

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes: necessary labour and equipment required for the fine grading of granular materials, to the lines and elevations as indicated, prior to asphaltic concrete placement.

WATER SYSTEM10. Pipe

Unit of Measurement: metre (m)

Method of Measurement: along centerline of pipe through fittings, valves and valve chambers.

This item includes: supply and install pipe complete with all fittings and thrust restraints, testing, chlorination and de-chlorination, bedding and pipe protection gravels, polyethylene encasement, common excavation, backfilling, environmental protection and reinstatement as specified.

11. Fire Hydrant.1 Installation of Fire Hydrant

Unit of Measurement: Each

This item includes: supply and install hydrant complete with lead, polyethylene encasement, anchor tee, valve, valve box, anodes, thrust blocks, bedding and pipe protection gravels, common excavation, backfilling and hydrant painting.

.2 Relocation of Fire Hydrant

Unit of Measurement: Each

This item includes: relocation of existing hydrant plus the supply and installation of lead, polyethylene encasement, anchor tee, valve, valve box, anodes, thrust blocks, bedding and pipe protection gravels, common excavation and backfilling.

.3 Removal of Fire Hydrant

Unit of Measurement: Each

This item includes: common excavation, backfill and removal of hydrant. Hydrants shall be returned to Halifax Water.

12. Valve Chamber

Unit of Measurement: Each

This item includes: supply and install chamber and components as per Halifax Water specifications including connection to new/existing water mains complete with all fittings, bedding and gravels, common excavation, backfilling, vents and drains.

13. Direct Buried Valve

Unit of Measurement: Each

This item includes: supply and install direct buried valve complete with valve box, appurtenances, polyethylene encasement, anodes, common excavation, backfilling and finish grade adjustment.

14. Water Service

.1 Reconnect Existing Water Service \leq 50 mm

Unit of Measurement: Each

This item includes: saddle as required, tapping, corporation stop, service pipe (if required), couplings (if required) and anode.

.2 Reconnect Existing Water Service $>$ 50 mm

Unit of Measurement: Each

This item includes: tee, gate valve, valve box, anodes, pipe (if required) and couplings.

.3 Replace Existing Water Service

.1 Service Fittings

Unit of Measurement: Each

This item includes: saddle as required, tapping, corporation stop, curb stop, service box and anode.

.2 Service Pipe

Unit of Measurement: metre (m)

Method of Measurement: center of main to termination point indicated.

This item includes: excavation, bedding and backfilling, supply and placement of pipe complete with all reinstatement as required.

15. Connection to Existing Main

Unit of Measurement: Each

This item includes: locating existing main and supply and installation of pipe, nipples, valves, reducers, fittings, common excavation, backfilling and reinstatement. This item also includes producing and distributing temporary shutdown notices to affected customers.

16. Water Main Protection.1 Rigid Insulation

Unit of Measurement: square metre (m²)

Method of Measurement: along center line of pipe

This item includes: supply and install 50 mm HI40 rigid insulation as directed by the Engineer.

.2 Pipe Sleeve (encasement pipe)

Unit of Measurement: Each

This item includes: supply and install DR18 pipe sleeves in minimum 6 metre lengths complete with all necessary appurtenances including, but not limited to, modular mechanical seals (such as Link-Seal or approved equivalent) at each end. Sites requiring pipe sleeve may be directed by the Engineer.

17. Temporary Water Service

Unit of Measurement: lump sum (l.s.)

This item includes: but is not limited to, the supply of all labour, material and equipment required for installing, maintaining and removing a minimum 50 mm diameter temporary main line and 19 mm service laterals complete with valves, pipe, backflow prevention device (sized to match temporary main line diameter), meter (supplied by Halifax Water), and vacuum breakers at the connection to homes, etc. All pipe must be disinfected to Halifax Water "Design and Construction Specification". Coordinate connection to homes with homeowners. Limits of temporary water service may extend outside the limits of construction. Larger temporary lines may be required to ensure that an adequate supply of water is provided to all customers. Submit a proposed plan 2 weeks prior to installation for review by Halifax Water. This item also includes installation of approved vehicle and pedestrian crossing protective measures along with producing and distributing notice to customers that will be placed on temporary water.

18. Reserved

19. Reserved

SANITARY SEWER**20. Gravity Pipe**

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe through manholes.

.1 Gravity Pipe Including Reinstatement

This item includes: excavation, bedding and backfill, supply and placement of pipe complete with all fittings and all reinstatement.

.2 Gravity Pipe Excluding Reinstatement

This item includes: excavation, bedding and backfill, supply and placement of pipe complete with all fittings. Reinstatement to be paid under street construction units on a theoretical trench basis as per detail HWSD - 1000.

21. Pressure Pipe

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe through fittings.

This item includes: excavation, bedding and backfill, supply and placement of pipe complete with all fittings, corrosion protection and all reinstatement.

22. Manholes

Unit of Measurement: Each

This item includes: excavation, bedding and backfill, supply and placement of manholes as indicated and in accordance with Standard Details HWSD - 1450, HWSD - 1470, HWSD - 1480 and HWSD - 1490. Also includes adjustment to finished grade.

23. Services

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe from centre of main to termination point indicated.

.1 Service Pipe Including Reinstatement

This item includes: excavation, bedding and backfill, supply and placement of pipe complete with all fittings and all reinstatement.

.2 Service Pipe Excluding Reinstatement

This item includes: excavation, bedding and backfill, supply and placement of pipe complete with all fittings. Reinstatement to be paid under street construction units on a theoretical trench basis as per detail HWSD - 1000.

24. Connections to Existing Main

Unit of Measurement: Each

This item includes: locating existing line or structure, supply and installation of all fittings or manhole as indicated.

25. Closed Circuit Television Inspection

Unit of Measurement: metre (m) for each inspection.

Method of Measurement: along centreline of pipe through manholes.

This item includes: television inspections, records and reports. Also includes mandril testing of all pipes prior to videoing.

26. Reserved.

27. Reserved.

28. Reserved.

29. Reserved.

STORM SEWER30. Pipe

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe through manholes.

.1 Pipe Including Reinstatement

This item includes: excavation, bedding and backfilling, supply and placement of pipe complete with all fittings and all reinstatement. This item also includes clear stone and geotextile as specified for underdrains.

.2 Pipe Excluding Reinstatement

This item includes: excavation, bedding and backfilling, supply and placement of pipe complete with all fittings. This item also includes clear stone and geotextile as specified for underdrains. Reinstatement to be paid under street construction units on a theoretical trench basis as per detail HWSD - 1000.

31. Manholes

Unit of Measurement: Each

This item includes: excavation, bedding and backfilling, supply and placement of manholes as indicated and in accordance with Standard Details HWSD - 1450, HWSD - 1470, HWSD - 1480 and HWSD - 1490. Also includes adjustment to finished grade.

32. Catchbasins

.1 Installation of New Catchbasins

Unit of Measurement: Each

Method of Measurement: number of units installed by type and size.

This item includes: excavation, bedding and backfilling, supply and placement of catchbasins as indicated and in accordance with Standard Detail HWSD - 1570. Also includes adjustment to finished grade.

.2 Replacement of Existing Catchbasins

Unit of Measurement: Each

Method of Measurement: number of units installed by type and size.

This item includes: locating existing structure, removal and disposal, excavation, bedding and backfilling, supply and placement of catchbasins as indicated and in accordance with Standard Detail HWSD - 1570. Also includes adjustment to finished grade and re-connection of existing leads.

33. Catchbasin Leads

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe from centre of catchbasin to centre of main sewer, centre of manhole, or termination point indicated.

.1 Catchbasin Leads Including Reinstatement

This item includes: excavation, bedding and backfilling, supply and placement of pipe complete with all fittings, connections and all reinstatement.

.2 Catchbasin Leads Excluding Reinstatement

This item includes: excavation, bedding and backfilling, supply and placement of pipe complete with all fittings and connections. Reinstatement to be paid under street construction units on a theoretical trench basis as per detail HWSD - 1000.

34. Services

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe from centre of main to termination point indicated.

.1 Service Pipe Including Reinstatement

This item includes: excavation, bedding and backfill, supply and placement of pipe complete with all fittings and all reinstatement.

.2 Service Pipe Excluding Reinstatement

This item includes: excavation, bedding and backfilling, supply and placement of pipe complete with all fittings. Reinstatement to be paid under street construction units on a theoretical trench basis as per detail HWSD - 1000.

35. Connections to Existing Main

Unit of Measurement: Each

This item includes: locating existing line or structure and supply and installation of all fittings, catchbasin, or manhole as indicated.

36. Culverts

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe.

This item includes: pipe, excavation and backfilling, pipe bedding and reinstatement.

37. Closed Circuit Television Inspection

Unit of Measurement: metre (m) for each inspection.

Method of Measurement: along centreline of pipe through manholes.

This item includes: television inspections, records and reports. Also includes mandril testing of all pipes prior to videoing.

38. Removal of Existing Structure

Unit of Measurement: Each or metre (m)

Method of Measurement: number of catchbasins or manholes removed or horizontal measurement of pipe.

This item includes: locating existing pipe or structure, excavation, disposal, backfilling, replacement of required volume with select material, compaction, all reinstatement, and all incidentals associated with the removal of existing catchbasin leads, catchbasins, manholes and pipes. This item also includes the capping of all remaining pipes and delivery of removed items as specified.

39.1 Culvert Headwall

Unit of Measurement: lump sum (l.s.) or cubic metre (m³)

Method of Measurement: volume of wall and footing constructed

This item includes: common excavation, granular base, supply and installation of headwall as specified, granular backfill, handrail, geosynthetic and all reinstatement.

39.2 Culvert Apron

Unit of Measurement: square metre (m²)

Method of Measurement: horizontal measurement

This item includes: excavation, supply and placement of geotextile and all materials to specified thickness.

39.3 Inlet / Outlet Grate / Structure

.1 ___ mm dia. Inlet Grate

.2 ___ mm dia. Outlet Grate

Unit of Measurement: Each

This item includes: supply and placement of grate as specified.

.3 Inlet / Outlet Structure

Unit of Measurement: lump sum (l.s.)

This item includes: all labour and materials necessary to construct and install the inlet and/or outlet structures indicated in the project drawings. This includes, but is not limited to clearing, grubbing, common excavation, bedding, backfilling, rip-rap, geotextile, formwork, concrete reinforcing, railing and grate fabrication and installation, and connection or casting of pipe to structure.

STREET
CONSTRUCTION40. Gravels

Unit of Measurement: square metre (m²) or tonne (t)

Method of Measurement: slope measure of indicated area at mean depth or scale tickets signed by Engineer.

This item includes: mass excavation and embankment - common, supply, placement and compaction of gravel as indicated.

41. Placement Materials.1 Reinstatement Tape

Unit of Measurement: linear metre (m)

Method of Measurement: slope measure

This item includes: the supply and installation of 2 mm x 50 mm reinstatement tape at asphalt joint in street cut by method as specified by supplier.

.2 Bituminous Prime

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure of surface area.

This item includes: supply and application.

.3 Glas Grid

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes: supply and placement of glass grid or equivalent, in accordance with manufacturer's recommendations. Separate payment will be made for the leveling course of asphalt if required.

42. Asphaltic Concrete

Unit of Measurement: square metre (m²) or tonne (t)

Method of Measurement: slope measure of surface area or scale tickets signed by Engineer.

- .1 Type C-HF - 40 mm thick
- .2 Type C-HF - 50 mm thick
- .3 Type Special C - 40 mm thick
- .4 Type Special C - 50 mm thick
- .5 Type B-HF - 50 mm thick
- .6 Type B-HF - 60 mm thick
- .7 Type B-HF - 75 mm thick
- .8 Type B-HF - 100 mm thick
- .9 Type D-HF - 65 mm thick

Items 1 to 9 include: mass excavation and embankment - common, cleaning, supply, placement and compaction as indicated including tack coat and temporary pavement markings.

.10 Hand patch

Unit of Measurement: square metre (m²) or tonne (t)

Method of Measurement: slope measure of surface area or scale tickets signed by Engineer.

This item includes: power sweeping (cleaning), supply, placement and compaction of asphaltic concrete as indicated including tack coat.

.11 Cut and patch

Unit of Measurement: square metre (m²) or tonne (t)

Method of Measurement: slope measure of surface area or scale tickets signed by Engineer.

This item includes: mass excavation and embankment - common, power sweeping (cleaning), supply, placement and compaction of asphaltic concrete as indicated including tack coat, saw cutting, temporary pavement markings and 150 mm Type 1 gravel as per HRM Standard Detail HRM 95 and HRM 96.

.12 Planer patch

Unit of Measurement: square metre (m²) or tonne (t)

Method of Measurement: slope measure of surface area or scale tickets signed by Engineer.

This item includes: mass excavation and embankment - common by planing, power sweeping (cleaning), supply, placement and compaction of asphaltic concrete as indicated including tack coat and temporary pavement markings.

.13 Profile Correction

Unit of Measurement: square metre (m²) or tonne (t)

Method of Measurement: slope measure of surface area or scale tickets signed by Engineer.

This item includes: supply, placement and compaction of asphaltic concrete as indicated including tack coat, temporary pavement markings and power sweeping (cleaning).

.14 Spreader (Mechanical Paver) patch

Unit of Measurement: square metre (m²) or tonnes (t)

Method of Measurement: slope measure of surface area or scale tickets signed by Engineer.

This item includes: mass excavation and embankment - common by planing, power sweeping (cleaning), supply, placement and compaction of asphaltic concrete as indicated including tack coat, temporary pavement markings, saw cutting, reinstatement tape and 150 mm Type 1 gravel as per HRM Standard Detail HRM 95 and HRM 96.

.15 Full Depth Reclamation

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure of surface area

This item includes but is not limited to: all labour, equipment and material required to undertake the work which includes excavation and pulverization of in-situ asphalt and gravels to depths indicated, supply and mixing of corrective aggregate (if necessary), grading and placement of reclaimed material. For

the complete description of work required for this item see supplementary specifications S-8 Full Depth Reclamation.

.16 In Place Stabilization

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure.

This item includes but is not limited to: all labour, equipment and materials required to undertake the work which includes injection of emulsion, mixing, grading, compaction, tack coat and temporary pavement markings. For the complete description of work required for this item see supplementary specifications S-8 Full Depth Reclamation.

.17 Asphalt Swale

Unit of Measurement: lineal metre (m)

Method of Measurement: slope measure along centreline of swale

This item includes: mass excavation and embankment - common, supply, placement and compaction of asphalt swale by mechanical spreader (when being installed in conjunction with a new lift of asphalt) as indicated.

.18 Cold Planing

Unit of Measurement: square metre (m²)

This item includes: the supply of all necessary materials, labour and equipment required for the planing / profiling of asphalt concrete to the depth specified, delivery of all milled material to HRM designated sites (East - Turner Drive, West - MacKintosh Street), power broom cleaning of all milled surfaces and all other work as specified to location designated by Engineer. Immediately after the existing asphalt is planed an asphalt ramp must be installed between the planed surface and the existing asphalt at all limits including side streets (edge facing oncoming traffic) and crosswalks. No separate payment will be made for the asphalt required for ramping.

.19 Pulverization

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes but is not limited to: all labour, equipment and material required to undertake the work which includes pulverizing, initial grading and compaction.

43. Curb

- .1 Concrete Curb and Gutter
- .2 Concrete Curb

Unit of Measurement: metre (m)

Method of Measurement: slope measure along face of curb through catchbasins.

Item 1 and 2 include: mass excavation and embankment - common, 150 mm Type 1 granular base (extended 150 mm beyond the back of the curb), grade stakes placed at the curb alignment showing top of curb elevation at 10 m intervals (HRM approval required prior to placing curb and gutter, curb and gutter (or concrete curb if specified), and supply and placement of backfill to subgrade for topsoil, sidewalk or driveway as per Standard Detail HRM 48.

- .3 Asphalt Curb

Unit of Measurement: metre (m)

Method of Measurement: slope measure along face of curb through catchbasins.

This item includes: preparing surface on which the curb is to be placed so that it is dry and free from all loose and foreign material, tack coat, placing the asphalt curb by a machine (if the length of curb exceeds 10 m in a continuous length) that is self-powered and capable of extruding and compacting the asphalt concrete to the line, grade and cross-section as shown on the drawings or as otherwise specified.

44. Sidewalk

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure.

This item includes: mass excavation and embankment - common, granular base, sidewalk, and supply and placement of backfill as indicated. This item also includes welded wire mesh as required.

45. Retaining Wall

Unit of Measurement: cubic metre (m³) or square metre (m²)

Method of Measurement: volume of wall and footing constructed or area of wall face above footing.

.1 Retaining Wall Including Reinstatement

This item includes: common excavation, granular base, supply and installation of retaining wall as per manufacturer's specifications or as specified on plan, granular backfill, geosynthetic, drains as indicated and all reinstatement.

.2 Retaining Wall Excluding Reinstatement

This item includes: common excavation, granular base, supply and installation of retaining wall as per manufacturer's specifications or as specified on plan, granular backfill, geosynthetic and drains as indicated.

46. Traffic Sign Base

.1 Urban Traffic Sign Post

Unit of Measurement: Each

This item includes: common excavation, backfill, supply and installation of concrete, reinforcing steel, iron pipe sleeve, sign post and water tight cap as per Standard Detail HRM 61.

This item does not include the supply and installation of signs.

.2 Rural Traffic Sign Post

Unit of Measurement: Each

This item includes: common excavation, backfill, supply and installation of telspar sign post and two piece breakaway anchor as per Standard Detail HRM 62.

This item does not include the supply and installation of signs.

47.1 Adjust Existing Structures to Grade.1 Shaft Adjustment (Manhole)

Unit of Measurement: Each

Method of Measurement: number of existing manholes adjusted to grade.

This item includes: excavation and backfill, removal of existing shaft section (800 mm inside diameter or less), reconstruction with precast concrete sections and cast-in-place concrete as specified, setting of frame and cover to finished grade and reinstatement to match existing.

This item also includes the placement of catchment devices in all manholes prior to work commencing on the manhole. Such catchment devices shall be constructed and installed in a manner so as not to impede the flows through the manhole and shall be removed after all work is completed.

.2 Shaft and Intermediate Section Adjustment (Manhole)

Unit of Measurement: Each

Method of Measurement: number of existing manholes adjusted to grade.

This item includes: excavation and backfill, removal of existing shafting material, eccentric cone sections and intermediate sections, supply and installation of required precast concrete sections, supply and placement of cast-in-place concrete as specified, setting of frame and cover to finished grade and reinstatement to match existing.

This item also includes the placement of catchment devices in all manholes prior to work commencing on the manhole. Such catchment devices shall be constructed and installed in a manner so as not to impede the flows through the manhole and shall be removed after all work is completed.

.3 Shaft Adjustment (Catchbasin)

Unit of Measurement: Each

Method of Measurement: number of existing catchbasins adjusted to grade

This item includes: excavation and backfill, removal of existing adjusting section on top of capping section, reconstruction with cast-in-place concrete as specified, setting of frame and grate to finished grade and reinstatement to match existing.

.4 Shaft and Intermediate Section Adjustment (Catchbasin)

Unit of Measurement: Each

Method of Measurement: number of existing manholes adjusted to grade.

This item includes: excavation and backfill, removal of existing shafting material, eccentric cone sections and intermediate sections, supply and installation of required precast concrete sections, supply and placement of cast-in-place concrete as specified, setting of frame and grate to finished grade and reinstatement to match existing.

.5 Type 1 Water Valve Adjustment

Unit of Measurement: Each

Method of Measurement: number of existing water valves adjusted to grade.

This item includes: the supply and installation of Mueller ductile iron adjustable top and cap, 127 mm inside diameter and minimum 305 mm length; excavation and adjustment of adjustable top, setting top to finished grade and reinstatement to match existing.

.6 Type 2 Water Valve Adjustment

Unit of Measurement: Each

Method of Measurement: number of existing water valves adjusted to grade.

This item includes: excavation and adjustment of upper valve box extension sleeve, setting top to finished grade and reinstatement to match existing.

.7 Type 3 Water Valve Adjustment

Unit of Measurement: Each

Method of Measurement: number of existing water valves adjusted to grade.

This item includes: the supply and installation of upper valve box and cap (and intermediate section if required); excavation and adjustment of upper valve box extension sleeve; centering over the valve operating stem, setting top to finished grade and reinstatement to match existing.

.8 Type 4 Water Valve Adjustment

Unit of Measurement: Each

Method of Measurement: number of existing water valves adjusted to grade.

This item includes: the supply and installation of both the upper, intermediate and lower valve box sections and cap, excavation, adjustment and replacement of upper valve box extension sleeve. Item also includes the centering of the new valve box sections over the valve operating nut, the setting of the top to finished grade and reinstatement to match existing.

47.2 Replace Frames and Grates or Covers (Including Final Grade Adjustment)

Unit of Measurement: Each

Method of Measurement: Number of sets of frame and grate or cover

This item includes: the supply and installation of new adjustable frame and grate or cover as specified. This also includes the removal of existing frame and grate or cover and transfer to HRWC Works Depot. Also includes adjustment to finished grade. For manholes, this item includes mass excavation and backfill, the removal of existing shaft section (800 mm inside diameter or less), reconstruction with precast concrete sections and cast-in-place concrete as specified, setting of adjustable frame and cover to finished grade and reinstatement to match existing. This item also includes mass excavation and backfill, the removal of existing adjusting section on top of capping section, reconstruction with cast-in-place concrete as specified, setting of frame and grate to finished grade and reinstatement to match existing.

47.3 Adjust Existing Adjustable Frames and Covers

Unit of Measurement: Each

Method of Measurement: Number of sets of frame and cover

This item includes: mass excavation and backfill, adjustment of adjustable frame and cover to finished grade and reinstatement to match existing.

48. Type 2 Gravel or Surge Rock Below Subgrade

Unit of Measurement: cubic metre (m³) or tonne (t)

Method of Measurement: average end area method or scale tickets signed by Engineer.

This item includes: excavation of unsuitable material below subgrade and supply, placement and compaction of gravel or surge rock.

49. Driveway Reinstatement.1 Gravel

Unit of Measurement: tonne (t)

Method of Measurement: scale tickets signed by Engineer.

This item includes: excavation, supply, placement and compaction of Type 1 gravel (150 mm minimum thickness).

.2 Asphalt

Unit of Measurement: square metre (m²)

Method of Measurement: Slope measure or scale tickets signed by Engineer.

This item includes: excavation, supply, placement and compaction of 65 mm Type D-HF asphalt. It also includes 150 mm Type 1 gravel base and reinstatement tape along cut edge of existing asphalt.

.3 Concrete

Unit of Measurement: square metre (m²)

Method of Measurement: Slope measure

This item includes: excavation, supply, placement and finishing of 150 mm thick concrete including reinforcing. Also includes 150 mm Type 1 gravel base and the supply and installation of 10M dowels into the existing driveway at 600 mm c.c.

.4 Brick Paver

Unit of Measurement: square metre (m²)

Method of Measurement: Slope measure

This item includes: excavation, supply and placement of brick pavers to reinstate existing brick work to original condition. This item also includes supply, placement and compaction of 150 mm type 1 gravel and 40 mm sand.

.5 Exposed Aggregate

Unit of Measurement: square metre (m²)

Method of Measurement: Slope measure or scale tickets signed by Engineer.

This item includes: excavation, supply, placement and finishing of 150 mm thick concrete (match existing aggregate size and colour) including reinforcing. It also includes 150 mm Type 1 gravel base and the supply and installation of 10M dowels into the existing driveway at 600 mm c.c.

LANDSCAPING50. Topsoil and Sod

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure.

This item includes: excavation, topsoil, lime and fertilizer, sod, required accessories, and maintenance.

51. Topsoil and Seed

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure.

This item includes: excavation, topsoil, lime, fertilizer, mulch, erosion control agent, seed, and maintenance.

52. Trees, Shrubs and Groundcover

Unit of Measurement: Each or square metre (m²)

Method of Measurement: Individual item or slope measure

This item includes: trees, shrubs and groundcover, planting mixture, mulch, lime and fertilizer, tree supports and accessories and maintenance as specified.

53. Hydroseed

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes: hydroseed mix, mulch, erosion control agent, water and fertilizer as specified and maintenance.

54. Tree Removal

Unit of Measurement: Each

This item includes: removal and disposal of all trees including stumps and roots (to size indicated) as indicated on plan.

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55. Chip Trees in Place
- Unit of Measurement: Each
- This item includes: removal of trees, chipping on site and distributing on site as specified by Engineer.
56. Bark Mulch
- Unit of Measurement: square metre (m²)
- Method of Measurement: slope measure
- This item includes: bark mulch in locations as directed by Engineer.
57. Handrails and Fences
- Unit of Measurement: metre (m)
- Method of Measurement: slope measure along top rail.
- This item includes: excavation and backfill, supply and placing concrete footings, installation and finishing of posts, rails, gates, fabric, fittings and accessories, and surface reinstatement as specified.
58. Tree Stump Removal
- Unit of Measurement: Each
- This item includes: mass excavation and embankment - common, cutting roots as required, removal and disposal of the tree trunk, removal and disposal of roots as directed, supply and placement of borrow as required to fill in all voids, 150 mm of topsoil and sod (if an individual pay item is not provided), lime, fertilizer, required accessories and maintenance.
59. Reserved.

ADDITIONAL
ITEMS60. Trench Excavation - Rock

Unit of Measurement: cubic metre (m³)

Method of Measurement:

Average end area method between changes in rock cross section. Dimensions used to calculate end areas shall be theoretical trench width as per detail HWSD - 1000, and depth from surface of rock as exposed on sides of trench after excavation to bottom of specified bedding for each pipe in trench.

Boulders larger than one-half cubic metre, any portion of which is within theoretical trench, will be classified as rock. Boulders removed from trench shall be measured along the three maximum perpendicular axes.

This item includes: all incidental work for rock excavation and disposal of surplus material over and above cost of common excavation which is included in price for pipe and related items. Also includes replacement of required volume with select material.

61. Trench Excavation - Unsuitable Material

Unit of Measurement: cubic metre (m³) or tonne (t)

Method of Measurement: average end area method for volume of unsuitable material less theoretical trench volume or ticket of surge material used to backfill.

This item includes: all excavation of unsuitable material beyond limits of the theoretical trench as per detail HWSD - 1000, and disposal. Written authorization of Engineer required.

62. Replacement of Unsuitable Material with Type 2 Gravel or Surge Rock

Unit of Measurement: cubic metre (m³) or tonne (t)

Method of Measurement: average end area method for volume of unsuitable material less theoretical trench volume or ticket of surge material.

This item includes: placing Type 2 gravel or surge rock in locations where unsuitable material has been excavated from the trench beyond the limits of the theoretical trench as per detail HWSD - 1000. It also includes compaction of the gravel and placement of filter fabric. Written authorization of Engineer required.

63. Topsoil Excavation

Unit of Measurement: cubic metre (m³).

Method of Measurement: average end area method between cross sections taken before and after stripping topsoil.

This item includes: stripping and stockpiling or disposal of topsoil as directed.

64. Breaking Trench Rock Without Removal

Unit of Measurement: cubic metre (m³).

Method of Measurement: average end area method between changes in rock cross section. Dimensions used to calculate end areas to be theoretical trench width as per detail HWSD - 1000, and depth from surface of rock as encountered during drilling to the lines and elevations indicated.

This item includes: breaking of rock to size indicated and excavation and backfilling test holes.

65. Pavement Markings

- .1 Lines
- .2 Stop Bars
- .3 Yield Bars

Unit of Measurement: metre (m)

Method of Measurement: slope measurement

This item includes: accurate inventory of existing pavement markings, the supply and application of paint in the colours, sizes, and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Arterials shall have the pre-markings applied immediately after the placement of each lift of asphaltic concrete and permanent markings shall be applied within 48 hours. All other streets shall have the permanent markings applied within one week after the placement of the final lift of asphaltic concrete.

.4 Crosswalks (Twin Parallel Line and Zebra)

Unit of Measurement: metre (m)

Method of Measurement: average of the slope measurement of both lines

This item includes: accurate inventory of existing pavement markings, the supply and application of paint in the colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Permanent markings shall be applied within one week after the placement of the final lift of asphaltic concrete.

.5 Hatching

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure of surface area including perimeter line.

This item includes: accurate inventory of existing pavement markings, the supply and application of paint in the colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Arterials shall have the pre-markings applied immediately after the placement of each lift of asphaltic concrete and permanent markings shall be applied within 48 hours. All other streets shall have the permanent markings applied within one week after the placement of the final lift of asphaltic concrete.

.6 Intersection Box

Unit of Measurement: square metre (m²)

Method of Measurement: plan measurement

This item includes: accurate inventory of existing pavement markings, the supply and application of paint in the colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Arterials shall have the pre-markings applied immediately after the placement of each lift of asphaltic concrete and permanent markings shall be applied within 48 hours. All other streets shall have the permanent markings applied within one week after the placement of the final lift of asphaltic concrete.

.7 Arrows

Unit of Measurement: Each

Method of Measurement: number of units installed. Where there is more than one arrow per installation (i.e., "Thru-left" symbol) this shall be counted as one unit.

This item includes: accurate inventory of existing arrows and configurations, supply and application of arrows in the colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Arterials shall have the pre-markings applied immediately after the placement of each lift of asphaltic concrete and permanent markings shall be applied within 48 hours. All other streets shall have the permanent markings applied within one week after the placement of the final lift of asphaltic concrete.

.8 Bicycle Symbols

Unit of Measurement: Each

Method of Measurement: number of units installed.

This item includes: supply and application of bicycle pavement markings in colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Permanent markings shall be applied within one week after the placement of the final lift of asphaltic concrete.

.9 Sharrow Symbols

Unit of Measurement: Each

Method of Measurement: number of units installed.

This item includes: supply and application of sharrow pavement markings in colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Permanent markings shall be applied within one week after the placement of the final lift of asphaltic concrete.

.10 Advance Yield to Pedestrian Line

Unit of Measurement: metre (m)

Method of Measurement: slope measurement

This item includes: accurate inventory of existing pavement markings, the supply and application of paint in colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Arterials shall have the pre-markings applied immediately after the placement of each lift of asphaltic concrete and permanent markings shall be applied within 48 hours. All other streets shall have the permanent markings applied within one week after the placement of the final lift of asphaltic concrete.

.11 Speed Hump Markings

Unit of Measurement: metre (m)

Method of Measurement: slope measurement

This item includes: accurate inventory of existing pavement markings, the supply and application of paint in colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Arterials shall have the pre-markings applied immediately after the placement of each lift of asphaltic concrete and permanent markings shall be applied within 48 hours. All other streets shall have the permanent markings applied within one week after the placement of the final lift of asphaltic concrete.

.12 Diamond Symbols

Unit of Measurement: Each

Method of Measurement: number of units installed

This item includes: accurate inventory of existing pavement markings, the supply and application of diamond symbols in the colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking. Arterials shall have the pre-markings applied immediately after the placement of each lift of asphaltic concrete and permanent markings shall be applied within 48 hours. All other streets shall have the permanent markings applied within one week after the placement of the final lift of asphaltic concrete.

.13 New Intersection Markings

Unit of Measurement: lump sum (l.s.)

This item includes: supply and application of paint in the colours, sizes and configuration as indicated on the plan. Arterials shall have the pre-markings applied immediately after the placement of each lift of asphaltic concrete and permanent markings shall be applied within 48 hours. All other streets shall have the permanent markings applied within one week after the placement of the final lift of asphaltic concrete.

.14 Removal of Existing Pavement Markings

Unit of Measurement: square metre (m²), Each or lump sum (l.s.)

Method of Measurement: Plan Measurement, per item or as Lump Sum

This item includes: the supply and installation of all materials required to remove the pavement markings in the configuration shown on the drawing and as specified by the Engineer.

.15 Replacement of Existing Markings

Unit of Measurement: lump sum (l.s.)

This item includes: accurate inventory of existing pavement markings and the supply and application of paint in the colours, sizes and configuration as necessary to replace the markings which existed prior to construction. Also includes layout and pre-marking.

66. Preblast Survey

Unit of Measurement: lump sum (l.s.)

This item includes: all costs associated with conducting preblast survey by insurers.

67. Preblast Trenches

Unit of Measurement: cubic metre (m³)

This item includes for all costs associated with drilling and blasting rock in trenches for future excavation operations. This item also includes all costs for services of the blasting consultant.

68. Trench Plugs

Unit of Measurement: Lump Sum (L.S.) or Each

This item includes: supply and placement of material for trench plugs as detailed in locations indicated on plan or as directed by Engineer.

69. Reserved

ENVIRONMENTAL
PROTECTION70. Silt Fence

Unit of Measurement: metre (m).

Method of Measurement: slope measure.

This item includes: supply, installation, maintenance and removal including stakes and fabric and reinstatement of area.

71. Flow Checks

Unit of Measurement: Each

This item includes: supply, installation, maintenance and removal.

72. Ground Covers

Unit of Measurement: square metre (m²).

Method of Measurement: slope measure.

.1 Straw or Hay Cover

.2 Gravel Cover

This item includes: supply, installation to thickness specified on drawings and maintenance.

.3 Rock Rip Rap Protection

This item includes: excavation, supply and placement of geotextile and rip rap as specified, and reinstatement as required.

73. Environmental Mat

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes: supply, installation and maintenance as specified.

74. Soaker Bags

Unit of Measurement: Each

This item includes: supply, installation, maintenance and removal.

75. Diversion Ditches

Unit of Measurement: metre (m).

Method of Measurement: slope measure of indicated width.

This item includes: laying out grades and lines, excavation and lining as required, maintenance, removal and reinstatement.

76. Flow Diversion

Unit of Measurement: Each

This item includes: clearing, grubbing, excavation for the supply, installation, maintenance, diversion channels and/or pumping and subsequent removal of barriers. Also includes all reinstatement and all other costs incidental to this item.

77. Turbidity Curtain

Unit of Measurement: Each

This item includes: the supply, installation, maintenance and subsequent removal of the turbidity curtain. Also includes all other costs incidental to this item.

78. Settlement Pond

Unit of Measurement: Each

This item includes: clearing, grubbing, excavation necessary for the installation, maintenance and subsequent removal of all settlement ponds required for project, reinstatement and all other costs incidental to this item. This item also includes fencing, as specified, to surround the pond.

79. Straw Bales

Unit of Measurement: Each

This item includes: supply, placement, maintenance and removal of straw bales in locations as directed by Engineer.

ELECTRICAL80. Direct Buried Conduit

Unit of Measurement: metre (m)

Method of Measurement: lineal metre (m) of direct buried conduit

This item includes: common excavation, backfilling, gravel reinstatement, bedding, compaction, jointing, electrical fluorescent tape, lumber, stub-ups (including the concrete bumper where indicated), pole terminations, conduit, junction boxes, pull pits, provision of temporary service as required, connections to existing, ground wire if required, etc. necessary to complete the work.

This item does not include reinstatement of asphalt concrete, concrete sidewalk, concrete curb and gutter and topsoil and sod, which is to be paid for under separate pay items.

81. Traffic Signal Pole Concrete Base

Unit of Measurement: Each

This item includes: common excavation, backfill, reinforcing steel, concrete, formwork, rebar, anchor bolts, internal conduit to 450 mm outside base and connections to conduit runs, etc.

82. Overhead Wiring for Detector Loops

Unit of Measurement: metre (m)

Method of Measurement: lineal metre (m) of overhead wiring between indicated locations

This item includes: the supply of messenger and traffic signal cable, and installation in accordance with Standard Details HRM 82 and HRM 83.

This item does not include the installation of the detector loops which is paid separately.

83. Reinstate Traffic Signal Detector Loops / Scoot Loops

Unit of Measurement: Each

This item includes the reinstatement of detector loops, junction boxes, and the home run to the controller as required.

84. RA-5 Crosswalk Lights

Unit of Measurement: lump sum (l.s.)

This item includes: the supply and installation of all RA-5 crosswalk lights, Novax Series II PXO controllers, poles, mast arms and any other necessary appurtenances. This item also includes the pulling of all wires, all connections, grounding, final wiring, testing, demonstration and commissioning.

85. Traffic Signal Installation

Unit of Measurement: lump sum (l.s.)

This item includes: all materials required for the installation of the traffic signals as shown on the drawings where individual quantities are not provided in the Form of Tender. This item also includes the pulling of wires, all connections, grounding, final wiring including overhead, testing, demonstration and commissioning.

86. Reserved.

87. Reserved.

88. Reserved.

89. Reserved.

MISCELLANEOUS90. Infrastructure Sign

Unit of Measurement: lump sum (l.s.)

This item includes: supply, erection, maintenance and subsequent removal of the infrastructure works sign as indicated.

91. Guiderails

Unit of Measurement: metre (m).

Method of Measurement: slope measure.

This item includes: common excavation and backfill, supply and placing posts, rail, reflectors, accessories, and surface reinstatement. Removal of guiderail also includes the removal and disposal of all posts, rails and accessories if they are not required for reinstallation and the supply of documentation regarding the disposal of creosote posts at an approved construction and demolition waste facility.

**** End 01 22 00 ****