Halifax Regional Municipality Standard Details referenced below are as found in the Municipal Design Guidelines at: https://www.halifax.ca/transportation/streets-sidewalks/municipal-design-guidelines-red-book and/or in Section 39 00 00 found at: https://www.halifax.ca/business/doing-business-halifax/procurement/terms-conditions

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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 Bid 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, traffic control, 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, Bid Form – 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 Bid Form: 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, traffic control, 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 Bid Form: clearing and grubbing, removals, borrow, common excavation, backfilling, compaction, disposal of surplus material, pavement markings, tree removal, traffic control, all incidentals and reinstatement as specified.

7. The quantities listed in the Schedule of Quantities and Unit 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 Bid Price and that the Owner reserves the right to delete or modify the quantities of these items.

EARTHWORK

1. Clearing

Unit of Measurement: hectare (ha) or square metre (m²) or lump sum (l.s.)

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) or lump sum (l.s.)

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) of cut

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) of cut

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: lump sum (l.s.) or cubic metre (m³) or tonne (t).

Method of Measurement: lump sum or average end area method between cross sections taken before placement of borrow to lines and elevations indicated. Imported material must be approved by an HRM representative.

This item includes: supply of new material, 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 Type 1 granular materials, to the lines and elevations as indicated, prior to asphaltic concrete placement.

WATER SYSTEM

10. 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, removal and disposal of existing pipe within or partially within theoretical trench, backfilling, environmental protection and reinstatement up to and including Type 2 gravels 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 including Type 2 gravel as specified, finish grade adjustments, removal of

existing hydrant when installed within the existing trench and hydrant painting. Existing hydrants shall be returned to Halifax Water in full working order.

.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, backfilling including Type 2 gravel as specified and finish grade adjustments of the valve and hydrant.

.3 Relocation of Fire Hydrant (including vertical adjustment)

Unit of Measurement: Each

This item includes: relocation of existing hydrant (including vertical adjustment) plus the supply and installation of lead, polyethylene encasement, anchor tee, valve, valve box, anodes, thrust blocks, bedding and pipe protection gravels, common excavation, backfilling including Type 2 gravel as specified and finish grade adjustments of the valve and hydrant.

.4 Removal of Fire Hydrant

Unit of Measurement: Each

This item includes: common excavation, backfilling including Type 2 gravel as specified and removal of hydrant complete with all reinstatement. Hydrants shall be returned to Halifax Water in full working order.

.5 Reconnection of Fire Hydrant

Unit of Measurement: Each

This item includes: reconnection of a fire hydrant including the supply and installation of lead, polyethylene encasement, anchor tee, valve, valve box, anodes, thrust blocks, bedding and pipe protection gravels, common excavation, backfilling including Type 2 gravel as specified and finish grade adjustments of the valve and hydrant.

.6 Raise Fire Hydrant

Unit of Measurement: Each

This item includes: vertical adjustment plus the supply and installation of lead, polyethylene encasement, anchor tee, valve, valve box, anodes, thrust blocks, bedding and pipe protection gravels, common excavation, backfilling including type 2 gravel as specified and finish grade adjustments of the valve and hydrant.

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 including Type 2 gravel as specified, 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 including Type 2 gravel as specified and finish grade adjustment.

14. Water Service

.1 Reconnect Existing Water Service

Unit of Measurement: Each

This item includes: saddle as required, tapping, corporation stop, service pipe (maximum 3 metres in length), couplings (if required) and anode for services 50 mm and less or tee, gate valve, valve box, anodes, pipe (if required) and couplings for service greater than 50 mm.

.2 Replace Existing Water Service

Unit of Measurement: Each

This item includes: excavation, removal and disposal of existing pipes within or partially within theoretical trench, bedding and backfilling, supply and placement of pipe

complete with saddle as required, tapping, corporation stop, curb stop, tee, gate valve, service box (c/w finish grade adjustment), anode and reinstatement up to and including Type 2 gravels as specified.

15. Connection to Existing Main

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

This item includes: locating existing main and supply and installation of pipe, nipples, valves, reducers, fittings, common excavation, backfilling including Type 2 gravel as specified and reinstatement. This item also includes producing and distributing temporary shutdown notices to affected customers and providing traffic control to Halifax Water Operations to facilitate shutdown.

16. Water Main Protection

.1 Rigid Insulation

Unit of Measurement: square metre (m^2)

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. See Halifax Water Supplemental Specification Section 33 11 00 Water Mains for further information.

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 and/or termination points indicated.

.1 Gravity Pipe

This item includes: excavation, removal and disposal of existing pipe within or partially within theoretical trench, bedding and backfilling, supply and placement of pipe complete with all fittings, service reconnects, environmental protection and reinstatement up to and including Type 2 gravels as specified.

.2 Spot Repair

This item includes: excavation, removal and disposal of existing pipe within or partially within theoretical trench, bedding and backfilling, supply and placement of pipe (PVC DR35 diameter to match existing) complete with approved connection fittings (Unicouplings) and reinstatement up to and including Type 2 gravels as specified.

21. Pressure Pipe

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe through fittings.

This item includes: excavation, removal and disposal of existing pipe within or partially within theoretical trench, bedding and backfilling, supply and placement of pipe complete with all fittings, corrosion protection, trace wire, test stations at 300 m intervals,

utility marker tape and reinstatement up to and including Type 2 gravels as specified.

22. Manholes

Unit of Measurement: Each

This item includes: excavation, removal and disposal of existing structure where existing structure is within or partially within excavation limits for new structure, bedding and backfilling, supply and placement of manholes as indicated and in accordance with Halifax Water Standard Details or as otherwise detailed on the drawings. Also includes adjustment to finished grade and reinstatement up to and including Type 2 gravels as specified.

23. Services

Unit of Measurement: Each

Method of Measurement: along centreline of pipe through fittings

This item includes: excavation, removal and disposal of existing pipes within or partially within theoretical trench, bedding and backfilling, supply and placement of pipe complete with all fittings, installation of prefabricated PVC in-line tee on new and existing sewer main, approved fittings at connection points and reinstatement up to and including Type 2 gravels as specified.

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. This item also includes excavation, bedding, backfilling including Type 2 gravel as specified and reinstatement.

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: CCTV inspections, deflection testing, records and reports as described in Halifax Water Supplementary Standard Specification Section 33 01 30 CCTV Inspection.

Contractor to conduct two CCTV inspections 1) post construction, as referenced above, and 2) prior to the end of warranty period of two years.

26. Removal of Existing Structures

Unit of Measurement: Each or metre (m)

Method of Measurement: number of structures removed or horizontal measurement of pipe.

This item is intended for removal of pipes/structures that are outside of the theoretical trench or excavation limits for new pipes/structures and includes: locating existing pipe or structure, excavation, disposal, replacement of required volume with select material, backfilling and reinstatement up to and including Type 2 gravels as specified. This item also includes the capping of all remaining pipes or plugging of holes in structures and delivery of removed items as specified.

27. Reserved.

28. Reserved.

29. Reserved.

STORM SEWER

30. Pipe

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe through manholes.

.1 Pipe

This item includes: excavation, removal and disposal of existing pipe within or partially within theoretical trench, bedding and backfilling, supply and placement of pipe complete with all fittings, service reconnects, environmental protection and reinstatement up to and including Type 2 gravels as specified.

.2 Spot Repair

This item includes: excavation, removal and disposal of existing pipe within or partially within theoretical trench, bedding and backfilling, supply and placement of pipe (PVC DR35 diameter to match existing) complete with approved connection fittings (Unicouplings) and includes clear stone,

geotextile as specified for underdrains, and reinstatement up to and including Type 2 gravels as specified.

.3 Perforated Pipe

This item includes: excavation, bedding and backfilling, supply and placement of pipe complete with all fittings, service reconnects, and environmental protection, and includes clear stone, geotextile as specified for underdrains, and reinstatement up to and including Type 2 gravels as specified. This item also includes connection to any existing household outfalls and connection to existing or proposed catch basins or manholes as required.

31. Manholes

Unit of Measurement: Each

This item includes: excavation, removal and disposal of existing structure where existing structure is within or partially within excavation limits for new structure, bedding and backfilling, supply and placement of manholes as indicated and in accordance with Halifax Water Standard Details or as otherwise detailed on the drawings. Also includes supply and installation of new frame and grate or cover hardware as specified, adjustment to finished grade and reinstatement up to and including Type 2 gravels as specified.

32. Installation of Catchbasins

Unit of Measurement: Each

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

This item includes: excavation, removal and disposal of existing structure where existing structure is within or partially within excavation limits for new structure, bedding and backfilling, supply and placement of catchbasins as indicated and in accordance with Halifax Water Standard Details or as otherwise detailed on the drawing. Also includes supply and installation of new frame and grate or cover hardware as specified, adjustment to finished grade and reinstatement up to and including Type 2 gravels as specified.

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.

This item includes: excavation, removal and disposal of existing pipe within or partially within theoretical trench, bedding and backfilling, supply and placement of pipe complete with all fittings, connections and reinstatement up to and including Type 2 gravels as specified.

34. Services

Unit of Measurement: Each

This item includes: excavation, removal and disposal of existing pipes within or partially within theoretical trench, bedding and backfilling, supply and placement of pipe, bends and approved fittings at connection points and reinstatement up to and including Type 2 gravels as specified.

35. Connections to Existing Main

Unit of Measurement: Each

This item includes: locating existing line or structure and supply and installation of all fittings to catchbasin, or manhole as indicated. This item also includes excavation, bedding, backfilling including Type 2 gravel as specified and reinstatement.

36. Culverts

Unit of Measurement: metre (m)

Method of Measurement: along centreline of pipe.

This item includes: pipe, excavation and backfilling including Type 2 gravel as specified, 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: CCTV inspections, deflection testing, records and reports. CCTV inspection is to be completed after all excavation for water main and sanitary and storm services are complete, and roadway is graveled and compacted for water main pressure test. Copy of CCTV inspection and report shall be provided to Halifax Water for review prior to placement of asphalt.

Contractor to conduct two CCTV inspections 1) post construction, as referenced above, and 2) prior to the end of warranty period of two years.

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 is intended for removal of pipes/structures that are outside of the theoretical trench or excavation limits for new pipes/structures and includes: locating existing pipe or structure, excavation, disposal, replacement of required volume with select material, backfilling and reinstatement up to and including Type 2 gravels as specified. This item also includes the capping of all remaining pipes or plugging of holes in structures and delivery of removed items as specified.

39.1 Culvert Headwall

Unit of Measurement: lump sum (l.s.) or cubic metre (m^3) or Each

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 (m^2)

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.

39.4 Headwall Railing

Unit of Measurement: Each

This item includes: supply and installation of headwall railings as indicated in the project drawings. This includes but is not limited to common excavation, railing and grate fabrication and installation, including footings and fixings.

39.5 Ditch Cleaning

Unit of Measurement: metre (m)

This item includes: clearing brush, grubbing, cleaning ditches as described in the tender documents or as directed by the Engineer, 150 mm topsoil, and/or hydroseeding, and/or mulching as directed or as specified on the drawings to cover all areas that are disturbed by the ditching operation, removal and disposal of all excavated material, and clean-up activities, including hand work, to clean out culvert ends and around utilities.

Payment for ditching shall be at the contract unit bid price per linear metre and shall be full compensation for all materials, equipment, plant, labour, excavation, removal and disposal of excavated material, clean-up activities, traffic control, hydroseeding and/or mulching and all incidentals necessary to complete the work as specified.

39.6 Ditching

Unit of Measurement: metre (m)

This item includes: all excavation, grading, supply and installation of materials (including rip-rap) and removal and disposal of waste material (including vegetation) required to complete construction of ditching as specified in the Drawings.

STREET CONSTRUCTION

40. 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.

40.23 Type 1 Trench Gravel – 150 mm
40.24 Type 1 Trench Gravel – 200 mm

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

Method of Measurement: Average end area method between changes in trench cross section. Dimensions used to calculate end areas shall be theoretical trench width as per detail HWSD – 1000, and trench depth as indicated.

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 Glass 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 HRM standard detail HRM 29 and manufacturer's recommendations. Separate payment will be made for the leveling course of asphalt if required.

.4 Crack Sealing

.1 Clean and Seal Operation

Unit of Measurement: linear metre (m)

Method of Measurement: slope measure

This item includes: cleaning and filling of cracks in asphalt concrete. All crack sealing works shall be limited to sealing uncut cracks with the Clean and Seal Operation as specified. The work consists of the furnishing of all materials, tools, equipment and labour required to complete the work, and all incidentals. Refer to Section S-15 for the Clean and Seal Operation. The Owner reserves the right to schedule the crack sealing locations based on priority.

.5 Geosynthetics

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure.

Payment for geosynthetics will be made separately for each type of geosynthetics supplied and installed.

This item includes: supply and installation of geosynthetics and includes all equipment, labour and incidentals necessary to complete the work. Measurement of geosynthetics will be for the net surface of the work covered by the material. No additional payment will be made for required overlapping of the material as per the manufacturer's recommendations.

Payment for geosynthetics associated with the retaining walls is included in the unit price for those items.

42. Asphaltic Concrete

.1 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 C-HF – 50 mm thick Polymer Modified
.6 Type B-HF – 50 mm thick
.7 Type B-HF – 60 mm thick
.8 Type B-HF – 75 mm thick
.9 Type B-HF – 100 mm thick
.10 Type D-HF – 40 mm thick
.11 Type D-HF – 50 mm thick
.12 Type D-HF – 65 mm thick
.13 Type D-HF – 75 mm thick
.14 Type D-HF – 50 mm thick Polymer Modified
.15 Type B-HF
.16 Type C-HF
.17 Type D-HF

This item includes: mass excavation and embankment – cleaning, supply, placement and compaction of asphaltic concrete as indicated (with polymer modified binder 58H-28 if specified in the Contract Documents), including dry sweeping milled surfaces prior to tacking, tack coat, temporary pavement markings and saw cutting as necessary. This item also includes supply, placement and compaction of asphalt concrete ramps installed at all limits including side streets and pedestrian ramps using hot mix asphalt (or approved equivalent) and a bond separator. Refer to section S-1 for further details.

.2 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 asphaltic concrete to the depth specified, delivery of all

milled material to a HRM designated site (East – Turner Drive, West – MacKintosh Street), cleaning of all milled surfaces, temporary pavement markings and all other work as designated by the Engineer. Profiler speed not to exceed 18.2 m/min (60 ft./min). This item also includes supply, placement and compaction of asphalt concrete ramps installed between the planed surface and the existing asphalt at all limits including side streets and pedestrian ramps using hot mix asphalt (or approved equivalent) and a bond separator. Refer to Section S-3 for further details.

.3 Asphaltic Concrete Miscellaneous

.1 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: cleaning, dry sweeping milled surfaces prior to tacking, tack coat, supply, placement and compaction of asphaltic concrete as indicated. Refer to section S-1 for further details.

.2 Cut and Patch

Unit of Measurement: tonne (t)

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

This item includes: mass excavation, cleaning, dry sweeping milled surfaces prior to tacking, tack coat, supply, placement and compaction of asphaltic concrete as indicated including temporary pavement markings and saw cutting as necessary. This item also includes 150 mm Type 1 gravel as per HRM Standard Details 59 and 60. Refer to section S-1 for further details.

.3 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, delivery of all milled material to a HRM

designated site (East – Turner Drive, West – MacKintosh Street), cleaning, dry sweeping milled surfaces prior to tacking, tack coat, supply, mechanical placement and compaction of asphaltic concrete as indicated including temporary pavement markings and saw cutting as necessary. Refer to sections S-1 and S-3 for further details.

.4 Profile Correction

Unit of Measurement: tonne (t)

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

This item includes: cleaning, dry sweeping milled surfaces prior to tacking, tack coat, supply, placement and compaction of asphaltic concrete as indicated including temporary pavement markings and saw cutting as necessary. Refer to section S-1 for further details.

.5 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, delivery of all milled material to a HRM designated site (East – Turner Drive, West – MacKintosh Street), cleaning, dry sweeping milled surfaces prior to tacking, tack coat, supply, placement and compaction of asphaltic concrete as indicated including temporary pavement markings, reinstatement tape, 150 mm Type 1 gravel and saw cutting as necessary as per HRM Standard Detail HRM 59 and HRM 60. Refer to section S-1 for further details.

.6 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.

.7-.10 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.

.11 Asphalt Swale

Unit of Measurement: linear metre (m)

Method of Measurement: slope measure along centreline of swale

This item includes: mass excavation and embankment, dry sweeping milled surfaces prior to tacking, tack coat, supply, placement of asphalt swale as per detail drawing HRM 30 (by mechanical spreader, or by hand when not being installed in conjunction with a new lift of asphalt), compaction of asphalt concrete as indicated, temporary pavement markings and saw cutting as necessary. Refer to section S-1 for further details.

.12 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. Maximum aggregate size of pulverized material shall be no greater than 50 mm. The contractor shall accurately take inventory of the existing roadway cross slope and reinstate as directed by the Engineer. This item also includes supply, placement and compaction of asphalt concrete ramps installed at all limits including side streets and pedestrian ramps using hot mix asphalt (or approved equivalent) and a bond separator.

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

.13 Full Depth Asphalt Removal

Unit of Measurement: square metre (m²)

This item includes: the supply of all necessary materials, labour and equipment required for the full depth asphaltic concrete removal and delivery of all milled material to the Contractor's location of choice. If asphaltic concrete is removed by planing, milled material may be delivered to a HRM designated site (East – Turner Drive, West – MacKintosh Street). This item also includes cleaning of all milled surfaces, temporary pavement markings and all other work as designated by the Engineer. This item also includes supply, placement and compaction of asphalt concrete ramps installed between the planed surface and the existing asphalt at all limits including side streets and pedestrian ramps using hot mix asphalt (or approved equivalent) and a bond separator.

.14 Micro Surfacing with Scratch Course

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure of surface area

This item includes: supply, placement of scratch and final coat and compaction of asphaltic concrete of micro surfacing as indicated including cleaning, dry sweeping surfaces prior to tacking, tack coat, temporary pavement markings and saw cutting as necessary. Refer to section S-5 for further details.

.15 Single Chip Seal

Unit of Measurement: square metre (m^2)

This item includes: all material, labour and equipment required to install a single chip seal as described in Section S-16, Chip Sealing for Streets.

.16 Double Chip Seal

Unit of Measurement: square metre (m^2)

This item includes: all material, labour and equipment required to install a double chip seal as described in Section S-16, Chip Sealing for Streets.

.17 Full Depth Concrete Pavement Removal

Unit of Measurement: square metre (m^2)

Method of Measure: slope measure

This item includes: the supply of all necessary materials, labour and equipment required for the full depth concrete pavement removal and delivery of all material to the Contractors location of choice. This item also includes steel reinforcing removal and cutting as required, cleaning of all milled surfaces, temporary pavement markings and all other work as designated by the Engineer. This item also includes supply, placement and compaction of asphalt concrete ramps installed between the planed or gravel surface and the existing asphalt at all limits including side streets and pedestrian ramps using hot mix asphalt (or approved equivalent) and a bond separator.

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 (or concrete curb if specified), supply and installation of concrete curb and gutter (as per Standard Detail HRM 53) or concrete curb, and supply and placement of backfill to subgrade for topsoil, sidewalk or driveway. This item also includes the removal and disposal of the existing curb if the face of the proposed curb is within 1 m horizontally of the face of the existing curb. Notwithstanding section 6 of 01 22 00 Measurement and Payments, this item also includes the removal and disposal of the existing curb if the face of the

proposed curb is within 1 m horizontally of the face of the existing curb.

.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, placement of tack coat prior to curb placement, placing the asphalt curb as per Standard Detail HRM 55 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. Notwithstanding section 6 of 01 22 00 Measurement and Payments, this item also includes the removal and disposal of the existing curb if the face of the proposed curb is within 1 m horizontally of the face of the existing curb.

.4 Curb Removal

Unit of Measurement: metre (m)

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

This item includes: mass excavation and embankment – common, and supply and placement of backfill to subgrade.

.5 Pre-Cast Concrete Curb – Supply and Install

Unit of Measurement: each (ea.)

This item includes: preparing surface on which the pre-cast concrete curb is to be placed so that it is dry and free from all loose and foreign material and the supply and installation of pre-cast concrete curb including galvanized rebar and steel dowel anchors as per the Drawings.

This item also includes installation of flexible delineators on proposed pre-cast concrete curb as shown in the drawings and as per manufacturer’s instructions and cutting of curb to adjust lengths.

.6 Pre-Cast Concrete Curb – Install Only

Unit of Measurement: each (ea.)

This item includes: transport of each unit from the HRM MacKintosh Depot to the job site, preparing surface on which the pre-cast concrete curb will be placed so that it is dry and free from all loose and foreign material and installation of pre-cast concrete curb including galvanized rebar and steel dowel anchors as per the Drawings. Asphalt shall be pre-drilled prior to installing dowels.

This item also includes installation of flexible delineators on proposed pre-cast concrete curb as shown in the drawings and as per manufacturer's instructions and cutting of curb to adjust lengths.

.7 Mountable Curb

Unit of Measurement: metre (m
Method of Measurement: slope measure along face of curb.

This items includes: common excavation and embankment, 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 or concrete curb if specified), and supply and placement of backfill to subgrade for topsoil, sidewalk or driveway as per Standard Detail HRM 53 and as specified on the drawings. This item also includes all curb steel reinforcing as specified.

.8 Concrete Curb and Gutter with Macro-synthetic Fibers

Unit of Measurement: metre (m)

This item includes: mass excavation and embankment – common, 150mm 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 (or concrete curb if specified), supply and installation of concrete curb and gutter (as per Standard Detail HRM 53) complete with macro-synthetic fiber reinforcement, and supply and placement of backfill to subgrade for topsoil, sidewalk or driveway. Notwithstanding section 6 of 01 22 00 Measurement and Payments, this item also includes the removal and disposal of the existing curb if the face of the

proposed curb is within 1 m horizontally of the face of the existing curb.

This item shall be applied to concrete curb and gutter for Curb Extensions / Bump-Outs and includes macro-synthetic fiber reinforcement. The macro-synthetic fiber reinforced concrete curb and gutter shall extend along the complete limits of the Curb Extensions / Bump-Outs starting at the nearest control joint, including the curb taper radii and tangent, ending at to the nearest control joint or radius endpoint, as shown on project drawings. Refer to S-11 - Part B, for further details.

.9 Granite Curb (Install Only)

Unit of Measurement: metre (m)

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

This item includes: mass excavation and embankment – common, 300 mm Type 1 granular base (extended 150 mm beyond the back and front of the concrete bed), grade stakes placed at the curb alignment showing top of curb elevation at 10 m intervals (HRM approval required prior to placing curb), cast-in-place concrete bed, and supply and placement of backfill to subgrade for sidewalk or driveway as per Standard Detail HRM 204. Notwithstanding section 6 of 01 22 00 Measurement and Payments, this item also includes the removal and disposal of the existing curb if the face of the proposed curb is within 1 m horizontally of the face of the existing curb.

44. Sidewalk

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure.

This item includes: mass excavation and embankment – common, bedding sand as required, 150 mm Type 1 granular base (extended 150 mm beyond edge of sidewalk structure), sidewalk as per Drawings, and supply and placement of backfill as indicated. This item also includes welded wire mesh when specified and jointing sand as required. Notwithstanding section 6 of 01 22 00 Measurement and Payments, this item also includes the removal and disposal of the existing sidewalk if it is within the limits of construction of the proposed sidewalk.

44.5 Asphalt Paths and Multi-Use Trails

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes: mass excavation and embankment – common, removal of existing asphalt, 150 mm Type 1 granular base (extended 150 mm beyond edge of sidewalk structure), asphalt path or multi-use trail as per tender Drawings, and supply and placement of backfill as indicated. Notwithstanding section 6 of 01 22 00 Measurement and Payments, this item also includes the removal and disposal of the existing sidewalk if it is within the limits of construction of the proposed sidewalk.

44.10 Concrete Unit Pavers

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes: mass excavation and embankment – common, bedding sand as required, 150 mm Type 1 granular base (extended 150 mm beyond edge of sidewalk structure), concrete base and drains as per details, and supply and placement of pre-cast concrete unit pavers. This item also includes welded wire mesh when specified and jointing sand as required. Notwithstanding section 6 of 01 22 00 Measurement and Payments, this item also includes the removal and disposal of the existing sidewalk if it is within the limits of construction of the proposed sidewalk.

44.12 Concrete or Asphalt Sidewalk Removal

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes: mass excavation and embankment – common, removal and disposal of existing concrete sidewalk, asphalt sidewalk, asphalt path, or multi-use trail as per tender Drawings, supply and placement of backfill as indicated, and reinstatement.

44.15 Traffic Island

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

This item includes: common excavation and embankment, 150 mm Type 1 granular base, doweling into adjacent curb, concrete traffic island placement as per Standard Detail HRM 52, and supply and placement of backfill as indicated. This item also includes welded wire mesh when specified. Notwithstanding section 6 of 01 22 00 Measurement and Payments, this item also includes the removal and disposal of the existing sidewalk if it is within the limits of construction of the proposed sidewalk.

45. Retaining Wall

Unit of Measurement: cubic metre (m^3) or square metre (m^2)

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

.1 Retaining Wall Including Reinstatement

This item includes: additional survey as required, design of the walls to suit dimensions and design criteria shown on Drawings, supply of shop drawings for review, revision and preparation of construction drawings to incorporate review comments, supply and installation of wall materials including pre-cast concrete wall components, geosynthetic, granular backfill, topsoil 300 mm thick, sod, geogrid, drains as indicated, common excavation, granular base, and associated reinstatement.

This item also includes sealed drawings and certification of finished retaining wall construction including the base gravels and subgrade, by a Professional Engineer (P.Eng.) licensed to practice in Nova Scotia.

.2 Retaining Wall Excluding Reinstatement

This item includes: additional survey as required, design of the walls to suit dimensions and design criteria shown on Drawings, supply of shop drawings for review, revision and preparation of construction drawings to incorporate review comments, supply and installation of wall materials including pre-cast concrete wall components, geosynthetic, granular backfill, geogrid, drains as indicated, common excavation, and granular base.

This item also includes sealed drawings and certification of finished retaining wall construction including the base gravels and subgrade, by a Professional Engineer (P.Eng.) licensed to practice in Nova Scotia.

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 38. This item also includes surface reinstatement to original condition or better.

This item does not include the supply and installation of signs. If applicable, this item also includes the temporary connection of the removed sign post (and sign) to the new sign post.

.2 Rural Traffic Sign Post

Unit of Measurement: Each

This item includes: common excavation, backfill, supply and installation of telespar sign post and two piece breakaway anchor as per Standard Detail HRM 39. This item also includes surface reinstatement to original condition or better.

This item does not include the supply and installation of signs. If applicable, this item also includes the temporary connection of the removed sign post (and sign) to the new sign post.

.3 Remove Sign Post and Base

Unit of Measurement: Each

This item includes: common excavation, backfill, removal and disposal of existing sign post and base, and all reinstatement as required including landscaping.

. 4 Traffic Sign Post at Curb End Unit

Unit of Measurement: Each

This items includes: supply and installation of sign post with water tight cap at pre-cast curb end units as indicated on the Drawings including all associated hardware. This item does not include the supply and installation of signs.

.5 Urban Traffic Sign Installation

Unit of Measurement: Each

This item is to be used in conjunction with line item 46.1 – Urban Traffic Sign Post.

This item includes transportation of the proposed signage from the MacKintosh Depot, the supply of all required hardware and accessories for sign installation, installation of the sign, and welding of the post, all as per standard detail HRM 129.

.6 Rural Traffic Sign Installation

Unit of Measurement: Each

This item is to be used in conjunction with line item 46.2 – Rural Traffic Sign Post.

This item includes transportation of the proposed signage from the MacKintosh Depot, the supply of all required hardware and accessories for sign installation, and installation of the sign, all as per standard detail HRM 130.

.7 Utility Pole Sign Installation

Unit of Measurement: Each

This item is to be used when installing a sign on a utility pole.

This item includes transportation of the proposed signage from the MacKintosh Depot, the supply of all required hardware and accessories for sign installation, and installation of the sign, all as per standard detail HRM 130.

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 pre-cast 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, and the removal thereof after all work is completed. This item also includes the removal and disposal of all debris accumulated during construction.

.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 pre-cast 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, and the removal thereof after all work is completed. This item also includes the removal and disposal of all debris accumulated during construction.

.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. This item also includes the removal and disposal of all debris accumulated during construction.

.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 pre-cast 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. This item also includes the removal and disposal of all debris accumulated during construction.

.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 adjustable top and cap, excavation and adjustment of adjustable top, setting top to finished grade and reinstatement to match existing. Materials and specifications as per Halifax Water Supplementary Standard Specification, Section 33 11 00.

This item also includes the removal and disposal of all debris accumulated during construction.

.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. This item also includes the removal and disposal of all debris accumulated during construction.

Materials and specifications as per Halifax Water Supplementary Standard Specification, Section 33 11 00.

.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. This item also includes the removal and disposal of all debris accumulated during construction.

Materials and specifications as per Halifax Water Supplementary Standard Specification, Section 33 11 00.

.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. This item also includes the removal and disposal of all debris accumulated during construction.

Materials and specifications as per Halifax Water Supplementary Standard Specification, Section 33 11 00.

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: excavation and backfill, removal of existing shaft section (800 mm inside diameter or less), supply and installation of new adjustable frame and grate or cover as specified,

reconstruction with pre-cast 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 manholes, and the removal thereof after all work is completed. This item also includes the removal and disposal of all debris accumulated during construction.

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: adjustment of adjustable frame and cover to finished grade and reinstatement to match existing. This item also includes the removal and disposal of all debris accumulated during construction.

47.4 Adjust Existing Adjustable Frames and Covers (Micro surfacing)

Unit of Measurement: Each

Method of Measurement: Number of sets of frame and cover

This item includes: adjustment of adjustable frame and cover to finished grade and reinstatement to match existing for micro surfacing and/or thin lifts of asphalt paving. This item also includes the removal and disposal of all debris accumulated during construction.

48. Type 2 Gravel or Surge Rock Below Subgrade

Unit of Measurement: cubic metre (m^3) or tonne (t)

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

This item includes: excavation and disposal of unsuitable material below subgrade and supply, placement and compaction of gravel or surge rock and filter fabric as directed by Engineer.

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

.1 65 mm Type D asphalt
.2 90 mm Type D asphalt
.3 40 mm Type D 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 welded wire mesh and installation of 200 mm long 10M dowels into the existing driveway at 600 mm c.c. It also includes excavation, supply, placement and compaction of 150 mm Type 1 gravel base.

.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, bedding sand and jointing material.

.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 welded wire mesh. It also includes 150 mm Type 1 gravel base, the supply and installation of 10M dowels into the existing driveway at 600 mm c.c. and sealant. Refer to Section S-9 for further details.

LANDSCAPING

50. Topsoil and Sod

.1 150 mm Topsoil and Sod

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure.

This item includes: excavation, scarification of the existing soil, supply 150 mm topsoil, lime, fertilizer, sod, required accessories, and maintenance.

.2 Topsoil

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 and disposal of unsuitable material and supply and placement of topsoil as directed.

51. Topsoil and Seed

.1 150 mm Topsoil and Seed

Unit of Measurement: square metre (m²)
Method of Measurement: slope measure.

This item includes: excavation, scarification of the existing soil, supply 150 mm topsoil, compaction, lime, fertilizer, mulch, erosion control agent, seed, and maintenance.

.2 Topsoil

Unit of Measurement: cubic metre (m^3) or tonne (t)

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

This item includes: excavation and disposal of unsuitable material and supply and placement of topsoil as directed.

52. Trees, Shrubs and Groundcover

Unit of Measurement: Each or square metre (m^2)

Method of Measurement: Individual item or slope measure

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

52.4 Planting Soil Mixture

Unit of Measurement: cubic metre (m^3) or tonne (t)

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

This item includes: excavation and disposal of unsuitable material and supply and placement of planting soil mixture as directed.

53. Hydroseed

Unit of Measurement: square metre (m^2)

Method of Measurement: slope measure

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

54. Tree Removal

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

This item includes: mass excavation and embankment – common, removal and disposal of all trees including stumps and roots (to size indicated) as indicated on plan, backfill, and all reinstatement. Tree diameter shall be measured at 1.3 m from the ground.

54.5 Tree Trimming

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

This item includes: the careful trimming of trees and brush by a certified arborist.

All tree trimming and pruning should be completed prior to April 15th or succeeding August 31st. If this is not possible a Migratory Bird Assessment is required, and the contractor must provide the HRM Engineer with 48-hour notice prior to any work being conducted.

54.6 Migratory Bird Assessment

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

If tree trimming, pruning, or removal is required within the April 15th to August 31st timeframe, the contractor shall engage a Professional Ornithologist and must conduct an assessment to determine the presence of any nesting of migratory birds within the proposed limits of work and provide documentation thereof.

This item includes all labour, fees, and materials required to conduct this assessment and to provide the required documentation.

55. Chip Trees in Place

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

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: excavation, supply 100 mm thick bark mulch and non-woven filter fabric.

57. Handrails and Fences

Unit of Measurement: metre (m) or each (ea)

Method of Measurement: slope measure along top rail.

This item includes: excavation and backfill, removal and disposal of existing fence, bollards, gates and/or footings, supply and placing concrete footings, installation and finishing of posts, rails, gates, fabric, fittings, bollards, and accessories as per the Drawings, temporary measures as required, 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. Soil Cells

.1 Soil Cells

Unit of Measurement: cubic metre (m^3)

Method of Measurement: volume (measured at perimeter of soil cells)

This item includes: mass excavation and embankment – common, supply and install of soil cells including all required materials and accessories, including but not limited to geotextile, geogrids, aggregates, subbase material, thickened sidewalk edge, specified soil mixture, drainage system, and root barrier as required, all as per the Drawings and manufacturer details and specifications. This item also includes existing pipe and conduit protection, backfill, and Type 2 gravels as specified. Refer to Section 32 94 50 Structural Soil Cells for further information.

.2 Tree Grates

Unit of Measurement: Each (Ea.)

This item includes: the supply and installation of a decorative metal tree grate as specified, including but not limited to sub-grade preparation, granular base, concrete support shelf, grate frame and anchor bolts and as shown on the Drawings and per HRM Standard Detail HRM 187.

ADDITIONAL ITEMS

60. Trench Excavation – Rock

Unit of Measurement: cubic metre (m^3) or tonne (t)

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 (m^3) 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 Trench Material with Type 2 Gravel or Surge Rock

Unit of Measurement: cubic metre (m^3) 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 (m^3).

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 (m^3).

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.

65.1 Painted Markings

.1 Painted Lines
.2 Painted Stop Bars
.3 Painted Yield 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 the colours, sizes, and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking in accordance with S-1.

.4 Painted Crosswalks

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 in accordance with S-1.

.5 Painted Zebra Crosswalk

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 in accordance with S-1.

.6 Painted Hatching-White
.7 Painted Hatching-Yellow
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 in accordance with S-1.

.8 Painted Intersection Box (Hatched)

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 in accordance with S-1.

.9 Painted Arrows

.1 Painted Arrow ¾ TAC size
.2 Painted Arrow ½ TAC size
.3 Painted Roundabout Arrow

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 in accordance with S-1.

.10 Painted Bicycle Symbol

Unit of Measurement: Each

Method of Measurement: number of units installed.

This item includes: accurate inventory of existing bike symbols and configurations, 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 in accordance with S-1.

.11 Painted 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 in accordance with S-1.

.12 Painted Speed Hump/Table Markings

Unit of Measurement: Per speed hump/table location

Method of Measurement: number of speed humps/tables installed.

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 in accordance with S-1.

.13 Painted Reserved Lane Diamond Symbol-White.

.14 Painted Shared Use Lane

Unit of Measurement: Each

This item includes: accurate inventory of existing pavement markings, the supply and application of symbols in the colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking in accordance with S-1.

.16 Painted Speed Cushion Markings

Unit of Measurement: Per speed cushion

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 in accordance with S-1.

.18 Painted Vehicle/Bike Zebra Conflict Marking, 1.8m x 0.6m Total (1.5m Green With 0.15m White Each End)

Unit of Measurement: each (ea.)

This items 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 in accordance with S-1.

.19 Painted Driveway/Bike Zebra Conflict Marking, 1.3m x 0.6m Total (1.0m Green with 0.15m White Each End)

Unit of Measurement: each (ea.)

This item includes: accurate inventory of existing pavement markings, the supply and application of paint in colours, sizes and configurations shown on the Drawings, as specified by the Engineer and as per HRM Red Book detail HRM 190 (using paint instead of thermoplastic). Also includes layout and pre-marking in accordance with S-1.

.21 Painted Trail Crosswalk 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, as specified by the Engineer and as per HRM Red Book detail HRM 93. Also includes layout and pre-marking in accordance with S-1.

.30 Painted 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.

.31 Removal of Existing Painted Markings

Unit of Measurement: square metre (m^2), 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.

.32 Replacement of Existing Painted 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 in accordance with S-1.

.34 Painted Pedestrian/Bicycle Shared Use Symbol

Unit of Measurement: each (ea.)

Method of Measurement: number of units installed.

This item includes: supply and application of pedestrian/bicycle shared use pavement markings in colours, sizes and configurations shown on the drawings and as specified by the Engineer. Also includes layout and pre-marking in accordance with S-1.

.35 Replacement of Existing Painted Markings

Unit of Measurement: metre (m)

Method of Measurement: slope measurement

This item includes: 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 in accordance with S-1.

65.2 Thermoplastic Markings

.1 Thermoplastic Lines
.2 Thermoplastic Stop Bars
.3 Thermoplastic Yield Line
.4 Thermoplastic Crosswalk
.5 Thermoplastic Zebra Crosswalk

Unit of Measurement: metre (m)

Method of Measurement: slope measure

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer’s instructions. This also includes layout, pre-

marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.6 Thermoplastic Hatching-White
.7 Thermoplastic Hatching-Yellow

Unit of Measurement: square metre (m²)

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

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.8 Thermoplastic Intersection Box (Hatched)

Unit of Measurement: square metre (m²)

Method of Measurement: plan measurement

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.9 Thermoplastic Arrows
  .1 Thermoplastic Arrow ¾ TAC size
  .2 Thermoplastic Arrow ½ TAC size
  .3 Thermoplastic Roundabout Arrow

Unit of Measurement: Each

Method of Measurement: number of units installed

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.10 Thermoplastic Bicycle Symbols

.1 Thermoplastic Bicycle Symbol 1.2m x 2.1m, White on Black Background
.2 Thermoplastic Bicycle Symbol 1.2m x 2.1m, White on Green Background
.3 Thermoplastic Bicycle Symbol 0.6m x 1.2m, White on Green Background

Unit of Measurement: Each

Method of Measurement: number of units installed

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.11 Thermoplastic Advance Yield to Pedestrian Line

Unit of Measurement: metre (m)

Method of Measurement: slope measure

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.12 Thermoplastic Speed Hump/Table Markings

Unit of Measurement: Per speed hump/table location

Method of Measurement: number of speed humps/tables installed.

This item includes: supply and application of cold plastic markings in the materials, colors, and sizes as described above, as specified on HRM Standard Drawing 96 in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid and anti-slip elements.

.13 Thermoplastic Reserved Lane Diamond Symbol, White on Black Background

Unit of Measurement: Each

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.14 Thermoplastic Reserved Lane Diamond Symbol, White on Red Background

Unit of Measurement: Each

This item includes: the supply and application of cold plastic markings in the materials, colours, sizes and configurations shown on the drawings, in accordance with the MUTCD, and as specified by the Engineer. Cold plastic pavement markings shall include a reserved lane (diamond) symbol enclosed within a red contrast panel as per as per HRM Standard Detail 134 and shall be applied in accordance with Manufacturer's instructions.

This item also includes layout and pre-marking in accordance with S-1, asphalt surface preparation, adhesion to pavement, inspection and maintenance during warranty

period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid and anti-slip elements.

PreMark ViziGrip highskid surface panels by Ennis-Flint Products (or approved equivalent) can be used contingent on the Engineers approval.

.15 Thermoplastic Shared Use Lane Symbol 1.0m x 3.1m

.1 Thermoplastic Shared Use Lane Symbol, White on Black Background
.2 Thermoplastic Shared Use Lane Symbol, White on Green Background

Unit of Measurement: Each

Method of Measurement: number of units installed

This item includes: supply and application of cold plastic markings in the materials, colors, and sizes as described above, as specified by the Engineer and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. 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. The surface of the preformed thermoplastic material shall contain factory applied anti-skid and anti-slip elements.

.16 Thermoplastic Shark Teeth 450mm x 150mm, 5 per row

Unit of Measurement: Row

Method of Measurement: number of rows installed

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.17 Thermoplastic Two Stage Left Turn Waiting Box, 2m x 3m, White on Green Background

Unit of Measurement: Each

This item includes: supply and application of cold plastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid and anti-slip elements.

.18 Thermoplastic Vehicle/Bike Zebra Conflict Marking, 1.8m x 0.6m total (1.5m green with 0.15m white ea. End)

.19 Thermoplastic Driveway/Bike Zebra Conflict Marking, 1.3m x 0.6m total (1.0m green with 0.15m white ea. End)

.20 Thermoplastic Bike/Pedestrian Zebra Conflict Marking, 2.5m long x 1.5m wide, 0.3m white, 0.3m space

Unit of Measurement: metre (m)

Method of Measurement: slope measurement

This item includes: supply and application of Ennis-Flint Durable PreMark EF Bike Lane cold plastic markings in the materials, colors, sizes, and configurations as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid and anti-slip elements.

.21 Thermoplastic Trail Crosswalk Markings

Unit of Measurement: metre (m)

Method of Measurement: slope measurement

This item includes: supply and application of cold plastic markings in the materials, colors, and sizes as described above, as specified by the Engineer and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed

thermoplastic material shall contain factory applied anti-skid and anti-slip elements.

.22 Thermoplastic Modified Two Stage Left Turn Bike Box, 1.8m x 2.6m, White on Green Background

Unit of Measurement: each (ea.)

This items includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied antiskid/anti-slip and retro-reflective elements.

.23 Thermoplastic White Single Line 300 mm wide, 3 m Spacing

Unit of Measurement: metre (m)

Method of Measurement: slope measure

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.24 Thermoplastic Left/Right Sharrow Turn Box

Unit of Measurement: each (ea.)

This items includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied antiskid/anti-slip and retro-reflective elements.

.30 Thermoplastic New Intersection Markings

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

This item includes: supply and application of preformed thermoplastic markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

.31 Removal of Existing Thermoplastic 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 thermoplastic pavement markings in the configuration shown on the drawing and as specified by the Engineer.

.32 Replacement of Existing Thermoplastic Markings

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

This item includes: accurate inventory of existing pavement markings and the supply and application of preformed thermoplastic markings in the colours, sizes and configuration as necessary to replace the markings which existed prior to construction. Also includes layout, pre-marking, asphalt surface preparation including milling (< 5 mm), adhesion to pavement, inspection and maintenance during warranty period. The surface of the preformed thermoplastic material shall contain factory applied anti-skid/anti-slip and retro-reflective elements.

65.3 MMA (Methyl Methacrylate) Markings

.1 MMA (Methyl Methacrylate) Lines
.2 MMA (Methyl Methacrylate) Stop Bars
.3 MMA (Methyl Methacrylate) Yield Line
.4 MMA (Methyl Methacrylate) Crosswalk

Unit of Measurement: metre (m)

Method of Measurement: slope measure

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.5 MMA (Methyl Methacrylate) Zebra Crosswalk

Unit of Measurement: metre (m)

Method of Measurement: slope measure

This item includes: supply and application of Ennis-Flint MMax MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.6 MMA (Methyl Methacrylate) Hatching-White
.7 MMA (Methyl Methacrylate) Hatching-Yellow

Unit of Measurement: square metre (m²)

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

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.8 MMA (Methyl Methacrylate) Intersection Box (Hatched)

Unit of Measurement: square metre (m²)

Method of Measurement: plan measurement

This item includes: supply and application of Ennis-Flint MMax MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.9 MMA (Methyl Methacrylate) Arrows
- .1 MMA (Methyl Methacrylate) Arrow ¾ TAC size
- .2 MMA (Methyl Methacrylate) Arrow ½ TAC size
- .3 MMA (Methyl Methacrylate) Roundabout Arrow

Unit of Measurement: Each

Method of Measurement: number of units installed

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.10 MMA (Methyl Methacrylate) Bicycle Symbols

- .1 MMA (Methyl Methacrylate) Bicycle Symbol 1.2m x 2.1m, White on Black Background
- .2 MMA (Methyl Methacrylate) Bicycle Symbol 1.2m x 2.1m, White on Green Background
- .3 MMA (Methyl Methacrylate) Bicycle Symbol 0.6m x 1.2m, White on Green Background

Unit of Measurement: Each

Method of Measurement: number of units installed

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as

specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.11 MMA (Methyl Methacrylate) Advance Yield to Pedestrian Line

Unit of Measurement: metre (m)

Method of Measurement: slope measure

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.12 MMA (Methyl Methacrylate) Speed Hump/Table Markings

Unit of Measurement: Per speed hump/table location

Method of Measurement: number of speed humps/tables installed.

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.13 MMA (Methyl Methacrylate) Reserved Lane Diamond Symbol, White on Black Background

.14 Thermoplastic Reserved Lane Diamond Symbol, White on Red Background

.15 Thermoplastic Shared Use Lane Symbol 1.0m x 3.1m

.1 Thermoplastic Shared Use Lane Symbol, White on Black Background

.2 Thermoplastic Shared Use Lane Symbol, White on Green Background

Unit of Measurement: Each

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.16 MMA (Methyl Methacrylate) Shark Teeth 450mm x 150mm, 5 per row

Unit of Measurement: Row

Method of Measurement: number of rows installed

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.17 MMA (Methyl Methacrylate) Two Stage Left Turn Waiting Box, 2m x 3m, White on Green Background

Unit of Measurement: Each

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.18 MMA (Methyl Methacrylate) Vehicle/Bike Zebra Conflict Marking, 1.8m x 0.6m total (1.5m green with 0.15m white ea. End)

.19 MMA (Methyl Methacrylate) Driveway/Bike Zebra Conflict Marking, 1.3m x 0.6m total (1.0m green with 0.15m white ea. End)

.20 MMA (Methyl Methacrylate) Bike/Pedestrian Zebra Conflict Marking, 2.5m long x 1.5m wide, 0.3m white, 0.3m space

Unit of Measurement: metre (m)

Method of Measurement: slope measurement

This item includes: supply and application of Ennis-Flint MMax MMA (Methyl Methacrylate) (or approved equivalent)) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.21 MMA (Methyl Methacrylate) Trail Crosswalk Markings

Unit of Measurement: metre (m)

Method of Measurement: slope measurement

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.22 MMA (Methyl Methacrylate) Modified Two Stage Left Turn Bike Box, 1.8m x 2.6m, White on Green Background

Unit of Measurement: each (ea.)

This item includes: supply and application of Ennis-Flint MMax MMA (Methyl Methacrylate) (or approved equivalent)) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.23 MMA (Methyl Methacrylate) White Single Line 300 mm wide, 3 m Spacing

Unit of Measurement: metre (m)

Method of Measurement: slope measure

This item includes: supply and application of Ennis-Flint HPS-6 98:2 MMA (Methyl Methacrylate) (or approved equivalent) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.24 MMA (Methyl Methacrylate) Left/Right Sharrow Turn Box

Unit of Measurement: each (ea.)

This item includes: supply and application of Ennis-Flint MMax MMA (Methyl Methacrylate) (or approved equivalent)) markings in the materials, colors, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.30 MMA (Methyl Methacrylate) New Intersection Markings

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

This item includes: supply and application of MMA (Methyl Methacrylate) markings in the materials, colors, specifications, and sizes as specified on the Drawings and in accordance with Manufacturer's instructions. This also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

.31 Removal of Existing MMA (Methyl Methacrylate) Markings

Unit of Measurement: square metre (m^2), 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 MMA (Methyl Methacrylate) pavement markings in the configuration shown on the drawing and as specified by the Engineer.

.32 Replacement of Existing MMA (Methyl Methacrylate) Markings

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

This item includes: accurate inventory of existing pavement markings and the supply and application of preformed MMA (Methyl Methacrylate) markings in the colours, sizes, specifications, and configuration as necessary to replace the markings which existed prior to construction. Also includes layout, pre-marking, asphalt surface preparation including sweeping, application to pavement, inspection and maintenance during warranty period.

66. Preblast Survey

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

This item includes: all costs associated with conducting a preblast survey as described in HRM Bylaw B-600 Respecting Blasting. The preblast survey shall meet all requirements as described in Section 31 20 00 Earthwork.

67. Preblast Trenches

Unit of Measurement: cubic metre (m^3)

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. Traffic Calming

1. Speed Hump

Unit of Measurement: Each

This item includes: supply and installation of asphalt speed hump as per Standard Detail HRM 31. Cross sections of each and every speed hump are to be surveyed per Standard Detail HRM 136 to verify that speed hump has

been constructed as intended and falls within required tolerance range. Contractor to provide survey information within two (2) weeks of construction to the Engineer for review. Speed hump will be acceptable only if it forms a shape relative to the design curve within the tolerance limits. Contractor shall be responsible to take steps necessary to correct any deficiencies that fall outside of required tolerance range.

.2 Speed Table

Unit of Measurement: Each

This item includes: supply and installation of asphalt speed table as per Standard Detail HRM 143. Cross sections of each and every speed table are to be surveyed per Standard Detail HRM 144 to verify that speed table has been constructed as intended and falls within required tolerance range. Contractor to provide survey information within two (2) weeks of construction to the Engineer for review. Speed table will be acceptable only if it forms a shape relative to the design curve within the tolerance limits. Contractor shall be responsible to take steps necessary to correct any deficiencies that fall outside of required tolerance range.

.3 Raised Crosswalk

Unit of Measurement: Each

This item includes: supply and installation of raised crosswalk as per the Drawings. Cross sections of every constructed raised crosswalk are to be surveyed per Standard Detail HRM 144 to verify that raised crosswalk has been constructed as intended and falls within required tolerance range. Contractor to provide survey information to the Engineer for review. Raised crosswalk will be acceptable only if it forms a shape relative to the design curve within the tolerance limits. Contractor shall be responsible to take steps necessary to correct any deficiencies that fall outside of required tolerance range.

.4 Speed Cushion

Unit of Measurement: Each

This item includes: supply and installation of asphalt speed cushion as per the Drawings. Survey points of every constructed speed cushion are to be gathered per Drawings

to verify that the speed cushion has been constructed as intended and falls within required tolerance range. Contractor to provide survey information to the Engineer for review. Speed cushion will be acceptable only if it forms a shape relative to the design shape, within a tolerance of ± 10 mm. Contractor shall be responsible to take steps necessary to correct any deficiencies that fall outside of required tolerance range.

EROSION AND SEDIMENT CONTROL

70. Erosion and Sediment Control Plan

Unit of Measurement: Lump Sum

This item includes the preparation of an erosion and sediment control plan in accordance with NSE requirements to be provided to the Engineer and submitted to Nova Scotia Environment one week following award. This plan shall be signed and stamped by a Professional Engineer licenced to practice in Nova Scotia. The contractor's representative shall be trained in erosion sediment & control practices.

71. Sediment Controls

.1 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.

.2 Turbidity Curtain

Unit of Measurement: Each

This item includes: the supply, installation, maintenance and subsequent removal of the turbidity curtain. Top of boom must be marked with Contractor's company name and contact number in indelible and waterproof paint. Also includes all other costs incidental to this item.

.3 Flow Checks

Unit of Measurement: Each

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

.4 Soaker Bags

Unit of Measurement: Each

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

.5 Straw Bales

Unit of Measurement: Each

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

72. Ground Covers

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

Method of Measurement: scale tickets signed by Engineer or slope measure of indicated area at specified mean depth or thickness specified on the drawings..

.1 Straw or Hay Cover

.2 Gravel Cover

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

.3 Rip Rap and Armour Stone Protection

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

.4 Environmental Mat

Unit of Measurement: square metre (m²)

Method of Measurement: slope measure

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

73. Flow Diversions

Flow diversions shall be sized to handle the flow resulting from at minimum a 1:2 year rainfall event.

.1 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.

.2 Flow Diversion

Unit of Measurement: Each

This item includes: clearing, grubbing, and 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.

.3 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.

ELECTRICAL

80. 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 pole riser 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 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.

81.16 Removal of Abandoned Traffic Signal Bases

Unit of Measurement: Each (ea.)

This item includes: mass excavation and embankment, common excavation, removal and disposal of abandoned concrete bases, backfill, and reinstatement as specified.

81.17 Removal of Abandoned Street Light Signal Bases

Unit of Measurement: Each (ea.)

This item includes: mass excavation and embankment, common excavation, removal and disposal of abandoned concrete bases, backfill, and reinstatement as specified. This item does not include reinstatement of concrete sidewalk, concrete curb and gutter, topsoil and sod, which shall be paid for under separate pay items.

81.18 Install RRFB Post and Base

Unit of Measurement: Each (ea.)

This item includes: common excavation, backfill, supply and installation of concrete, reinforcing steel, iron pipe sleeve, and post as per Standard Details HRM 172 and 180.

This item does not include the supply and installation of RRFB equipment.

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. Detectors

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

This item includes: the supply and installation of detectors as specified, any required junction boxes and any required home run to the controller.

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, poles, mast arms, installation of PXO controller(s) where required and any other necessary appurtenances. This item also includes the pulling of all wires, all connections, grounding, final wiring, testing, demonstration, and commissioning including CSA certification. This item also includes the removal of all traffic signal equipment not to be re-used plus delivery to the HRM MacKintosh Street depot. The Contractor shall schedule and supply the traffic control for overhead electrical inspections by the Engineer at the completion of the work.

85. Traffic Signal Installation

.1 Materials

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

This item includes the supply of all required traffic signal equipment required for a fully functional system including all traffic signal heads, pedestrian APS push buttons and cable, overhead wiring, LED countdown pedestrian digital modules, GPS Opticom, arm brackets, UPS Battery Backup as indicated, and all incidentals and associated hardware and wiring, etc. required to complete the work.

This item does not include the supply of traffic signal poles, combination signal street light poles, transformer bases, truss arms, traffic signal cable and signal controller, which will be supplied to the contractor by HRM, unless indicated otherwise on the drawings.

.2 Labour

Unit of Measurement: lump sum

This item includes: installation of all required traffic signal equipment; poles, mast arms, signals, push buttons, GPS Opticom, UPS Battery Backup as indicated, davit arms,

pulling of wires, wires, all connections, grounding, final wiring including overhead, testing, demonstration and commissioning including CSA certification not included under Item No. 85.1. Anti-seize compound to be applied to all screws in weather exposed equipment. This item also includes the installation of the controller on the concrete base and the removal of all traffic signal equipment not to be re-used plus delivery to the HRM MacKintosh Street depot. The Contractor shall schedule and supply the traffic control for overhead electrical inspections by the Engineer at the completion of the work.

86. Ornamental Street Light

Unit of Measurement: Each

This item includes: the supply and installation or relocation of the ornamental street light as shown on the drawings. This item also includes the pulling of wires, all connections, grounding, final wiring including overhead, testing, demonstration, and commissioning.

87. Area Lighting

Unit of Measurement: Each

This item includes: the supply and installation of the area lighting as shown on the drawings. This item also includes the pulling of wires, all connections, grounding, final wiring including overhead, testing, demonstration, and commissioning.

.3 Install Street Light on Utility Pole

Unit of Measurement: each (ea.)

This item includes: the supply and installation of street light fixtures, Acuity Photocell (Itron ready), and davit arms on existing utility poles as shown on the drawings. This item also includes wiring, connections, coordination and approvals with NS Power, inspection and permitting as required, testing, and commissioning.

88. Junction Box Removal

Unit of Measurement: Each

This item includes: locating, removal and disposal of existing junction boxes as indicated.

MISCELLANEOUS

90. Project Information Sign

Unit of Measurement: Each

This item includes: connection to an existing post, maintenance and subsequent removal of the Project Information sign thirty (30) days after Total Performance of the Work. Sign will be supplied by HRM.

92. Guiderails

.1 Galvanized Steel W-Beam Guiderail (Weak Post)

Unit of Measurement: Metre (m)

Method of Measurement: slope measure.

This item includes: mass excavation – common, backfill and compaction, supply and installation of galvanized steel weak-post W-beam guiderail including posts, rail, reflectors and accessories as per standard drawing HRM36, NSDPW drawings HS518 and HS519 and the Drawings. This item also includes the removal and disposal of existing guiderail and posts and supply of documentation regarding the disposal of creosote posts at an approved construction and demolition waste facility, if applicable.

.2 Galvanized Steel W-Beam Guiderail (Strong Post)

Unit of Measurement: Metre (m)

Method of Measurement: slope measure.

This item includes: mass excavation – common, backfill and compaction, supply and installation of galvanized steel strong-post W-beam guiderail including posts, rail, reflectors and accessories as per standard drawing HRM36, NSDPW drawings HS518 and HS519 and the Drawings. This item also includes the removal and disposal of existing guiderail and posts and supply of documentation regarding the disposal of creosote posts at an approved construction and demolition waste facility, if applicable.

.3 Guiderail Protection of Highway Sign Truss Structures

Unit of Measurement: Metre (m)

Method of Measurement: slope measure.

This item includes: mass excavation – common, backfill and compaction, supply and installation of galvanized steel W-beam guiderail protection of highway truss structures including posts, rail, reflectors, and accessories as per standard drawing HRM36, NSDPW drawings HS518, HS519, HS524, and the Drawings. This item also includes the removal and disposal of existing guiderail and posts and supply of documentation regarding the disposal of creosote posts at an approved construction and demolition waste facility, if applicable.

.4 Treated Wood Guiderail

Unit of Measurement: Metre (m)

Method of Measurement: slope measure.

This item includes: mass excavation – common, backfill and compaction, supply and installation of treated wood guiderail including timber posts, rail, reflectors and accessories as per the Drawings. This item also includes the removal and disposal of existing guiderail and posts and supply of documentation regarding the disposal of creosote posts at an approved construction and demolition waste facility.

.5 Galvanized Steel W-beam Guiderail (steel post)

Unit of Measurement: Metre (m)

Method of Measurement: slope measure.

This item includes: mass excavation – common, backfill and compaction, supply and installation of galvanized steel W-beam guiderail including steel posts, w-beam, reflectors, and accessories as shown on the Drawings. Steel posts to be W15x14 (metric) or W6x8.5 (imperial). This item also includes the removal and disposal of existing guiderail and posts and supply of documentation regarding the disposal of creosote posts at an approved construction and demolition waste facility.

All W-beam, spacing, reflectors, accessories, and other details as per HRM detail 36.

.6 Remove Guiderail

Unit of Measurement: Metre (m)

Method of Measurement: slope measure.

This item includes: mass excavation – common, backfill and compaction, removal and disposal of existing guiderail and posts as per the Drawings, the supply of documentation regarding the disposal of creosote posts at an approved construction and demolition waste facility, if applicable. This item also includes surface reinstatement.

.7 Bridge Approach – Guiderail with Steel Channel

Unit of Measure: Metre (m)

Method of Measurement: slope measurement

This item includes: mass excavation – common, backfill and compaction, supply and installation of galvanized steel W-beam guiderail and channel, including posts, rail, reflectors and accessories as per standard drawings HRM36, NSDPW drawings HS520, HS521 and HS522 at the terminal ends of the guiderail, and as per the Drawings. This item also includes the removal and disposal of existing guiderail and post and supply of documentation regarding the disposal of creosote posts at an approved construction and demolition waste facility, if applicable. This item shall also include the supply and installation of four (4) transition pieces required to provide a smooth connection between the approach rail to the bridge rails. New barriers to meet requirements of NSDPW Standard Specification Division 5, Section 6.

94. Tactile Indicators

.1 Tactile Walking Surface Indicator Plates

Unit of Measurement: Each (ea)

This item includes: supply and installation of Tactile Walking Surface Indicators as per standard detail HRM 131 and manufacturer’s instructions and reinstatement as per Drawings and specifications. This item also includes any TWSI wedges or incidentals as required.

.2 Directional Tiles

Unit of Measurement: square metre (m2)

Method of Measurement: slope measure of directional tile plates

This item includes: mass excavation and embankment – common, sub-grade preparation, 150 mm Type 1 granular base, 150 mm cast-in-place concrete base, supply and placement of directional tiles in accordance with the Drawings and standard detail HRM 199, bedding and polymeric jointing sand, and supply and placement of backfill as indicated.

95. Pavement Marking Drawing

.1 Scaled and Surveyed Pavement Marking Drawing

Unit of Measurement: Each

This item includes: the supply of a paper hard copy and an electronic pavement marking drawing that is to scale and from a survey for each street that is identified to require a scaled and surveyed drawing in this contract document, or on any drawing included with this contract document, or both. Each drawing shall be as specified in section 3.2, Pavement Marking Drawings, of Section S-4, Pavement Markings, of this contract document, for all locations that require a scaled and surveyed drawing.

.2 Non-scaled Pavement Marking Drawing

Unit of Measurement: Each

This item includes: the supply of a paper hard copy and an electronic pavement marking drawing not to scale for each street that is identified to require a non-scaled drawing in this contract document, or on any drawing included with this contract document, or both. Each drawing shall be as specified in section 3.2, Pavement Marking Drawings, of Section S-4, Pavement Markings, of this contract document, for all locations that require a non-scaled drawing.

.3 Pavement Marking Description

Unit of Measurement: Each

This item includes: a pavement marking description for each street that is identified to require a pavement marking description in this contract document, or on any drawing included with this contract document, or both. Each description shall be as specified in section 3.2, Pavement Marking Drawings, of Section S-4, Pavement Markings, of this contract document, for all locations that require a pavement marking description.

96. Daylighting Underground Utilities

.1 Exploratory Digging

Unit of Measurement: Each

This item includes exploratory digging by machine at the direction of the Engineer. This may be done to determine the nature of the soil, to see if there is rock present, to confirm that there is no infrastructure present, or for other reasons at the discretion of the Engineer. This item includes all labour, equipment and materials required to do the work. This work also includes disposal of excess material and reinstatement as required.

.2 Daylighting Underground Utilities

Unit of Measurement: Each

This item includes daylighting underground utilities by hand digging or hydro excavation to identify and locate underground infrastructure. This item includes all labour, equipment and materials required to do the work. This work also includes disposal of excess material and reinstatement as required.

98. Surveyed Planing Layout

Unit of Measurement: Each

This item includes: material and labor required to survey existing road centerline and edge of pavement every 15 m for complete roadway. This item also includes confirming existing road cross slopes and recording changes in cross slope when greater than 0.5% when planing. Contractor shall show markings along the road to indicate cut or fill from edge of pavement, equal to the width of

the planer used to plane the road. Confirm limits of survey planing with HRM Representative prior to construction.

99. Hydro Excavation Services

Unit of Measurement: Lump Sum (LS)

This item includes: all labour and equipment to carry out hydro excavation activities where shown on the Project Drawings, including locates for all utilities in the area, all required permits and fees, coordination with the engineer and access for HRM surveyors to confirm location of exposed pipelines, and reinstatement including backfilling of gravels and replacement of asphalt after hydro-excavation is complete. All work to be completed in accordance with all safety requirements including safe work around gas mains.

100. Traffic Control

Unit of Measurement: Lump Sum (LS)

This item includes: all costs for providing labour, material, equipment, and personnel to accommodate adequate vehicular, transit, active transportation, and pedestrian traffic control as stipulated in the HRM Traffic Control Manual Supplement (latest edition), Administrative Order No. 2018-005-ADM – Respecting Construction Site Management, Contract Specifications and drawings.

This item also includes all safety measures required to complete the work including fencing to protect the public from entering the construction site where required and maintaining existing access for vehicles and pedestrians as required.

102. Streetscaping

.1 Bike Rack

Unit of Measurement: Each (Ea.)

This item includes: all labour and materials required for the installation of a post and ring bike rack as per HRM Standard Detail HRM 167, including and concrete base as specified and as shown on the Drawings and standard detail.

This item also Includes excavation and embankment – common, sub-grade preparation, 150 mm Type 1 granular base (extended 150 mm beyond edge of concrete

structure), concrete slab, anchor bolts, and backfill as required.

Confirm post and ring bike rack location with HRM Representative prior to installation.

.2 Backless Transit Bench

Unit of Measurement: Each (Ea.)

This item includes: the supply and installation of a black metal decorative bench and footings in accordance with the HRM Municipal Design Guidelines, Part A, Section 3.3.2. The bench shall be black powder coated, solid cast aluminum ends, seats to be flat bars and H.S. steel tubes or aluminum tubes, fully welded and assembled on delivery.

The bench shall be between 430 mm and 485 mm from final grade (level ground surface). Any bench to be placed on slopes shall be shimmed to provide a level seating surface and bolted either directly to concrete or to concrete below unit pavers.

The Contractor may select from products listed below (or approved equivalent)

- Maglin MLB300B-M
- Maglin MLB300-MH
- Canaan Metal Backless Park Bench CAL-953B
- Canaan Metal Backless Park Bench CAL-=957B
- DuMor Model 446-60
- DuMor Model 446-60q01
- DuMor Model 282-60

Confirm backless bench type, location and positioning onsite with HRM Representative prior to installation.

.3 Flexible Delineator

.1 Supply and Install Flexible Delineator

Unit of Measurement: Each

This item includes: supply and installation of flexible delineators and associated hardware, preparation of the surface on which the delineators are to be placed so they are free from all loose and foreign material, and installation of flexible delineators as detailed in the drawings and as per manufacturers instruction.

.2 Install Flexible Delineator

Unit of Measurement: each (ea.)

This item includes: delivery of delineators from HRM MacKintosh Depot to the project site, preparation of the surface on which the flexible delineator is to be placed so that it is dry and free from all loose and foreign material, installation of flexible delineators as per manufacturer's instructions including the supply of all required fasteners and associated hardware, survey layout, and delivery of all unused, removed, or surplus flexible delineators to the HRM MacKintosh Depot. Delineators to be supplied by HRM.

103 Temporary Utility Pole Support

Unit of Measurement: each (ea.)

This item includes: design, supply and installation of temporary shoring and/or bracing of utility poles where clearance requirements of the utility pole owner cannot be maintained. Shoring and/or bracing shall not cause damage to utility poles. Shoring and/or bracing design shall be submitted for review and approval of the utility pole owner prior to installation. Also included is the removal of temporary shoring and/or bracing following stabilization of surrounding soil.

STRUCTURES 110 Bridge Bearing Replacement

.1 Bridge Bearing Replacement – Fixed
.2 Bridge Bearing Replacement – Free
.3 Bridge Bearing Replacement – Uni-Directional

Unit of Measure: each

This item incudes supply of all materials and labour required to complete the removal and replacement of bearings as outlined in the Drawings. This includes, but is not limited to, access, labour, shop drawings signed by an engineer licensed to practice in Nova Scotia, bridge jacking/temporary support, temporary works, concrete removal/disposal, bearing removal/disposal, supply/installation of steel plates/keeper/anchors, design/supply/installation of new bearings, supply/installation of new concrete/rebar, supply/installation grout and reinstatement. New bearings shall meet the requirements of NSDPW Standard Specification Division 5, Section 19.

111 Structure – Remove Existing

Unit of Measure: Lump Sum (LS)

This item incudes removal and disposal of all or portions of the existing structure as outlined in the Drawings. This includes all labour, access, excavation, containment, and equipment required to remove the existing structure (including concrete and rebar) without damaging concrete and rebar noted to remain.

112 Steel Bridge Barrier

Unit of Measure: Metre (m)

Method of Measurement: Linear metres of barrier incorporated into the construction as measured along the inside face of the bottom barrier rail

This item incudes supply, fabrication and installation of steel bridge barrier rails and posts including all associated hardware, anchorages, and accessories. Item includes all labour, access, equipment required for installation, temporary measures as required, and surface reinstatement as shown in the Drawings. New barriers to meet requirements of NSDPW Standard Specification Division 5 Section 11.

113 Bridge Drains

.1 Deck Drain

Unit of Measure: each

This item incudes supply, fabrication, galvanizing, and installation of deck drain (including concrete work, rebar modifications, anchorages, hardware/connections, etc.) as shown in the Drawings. Item includes all labour, access and equipment required for installation as shown in the Drawings and as approved by the Engineer. Deck drains shall meet the requirements of NSDPW Standard Specification Division 5 Section 4.

.2 Membrane Drain

Unit of Measure: each

This item incudes supply, fabrication, galvanizing, and installation of membrane drain (including concrete work, rebar modifications, anchorages, hardware/connections, etc.) as shown in the Drawings. Item includes all labour,

access and equipment required for installation as shown in the Drawings and as approved by the Engineer. Membrane drains shall meet the requirements of NSDPW Standard Specification Division 5 Section 4.

114 Waterproofing Concrete Bridge Decks

Unit of Measure: Square Metres (m²)

Method of Measurement: Area of surface of bridge deck/approach slab covered with waterproofing measured along the plane of the deck surface.

This item incudes the preparation of the surface, the supply and placing of tack coat, the supply and placing of the membrane reinforcement, waterproofing and protection boards and sealing of interface. Item includes all labour, materials, access and equipment required for installation. Bridge deck waterproofing to follow requirements of NSDPW Standard Specification Division 5, Section 9.

115 Bridge Concrete

.1 Cast-in-place Concrete

Unit of Measure: Cubic Metres (m³)

Method of Measurement: Volume of concrete incorporated into final structure.

This item includes forming and casting concrete. Item includes all materials, aggregates, cement, supplementary cementing materials, water, admixtures, rebar, grouted rebar, threadbar, steel armour angles, approach slab joint sealant, silicone joint sealant (curb/sidewalk joints), backwall joint seal, asphalt waterproofing, excavation, backfilling, compaction and other materials, tools, equipment, falsework, forms, bracing, labour, curing, surface finishing and all other items of expense required to complete the concrete work as noted in the Drawings. Supply, fabrication and installation of rebar is not considered separately and is included as incidental to the concrete quantity, including shop drawings signed by an engineer licensed to practice in Nova Scotia. Cast-in-place concrete to follow technical requirements of NSDPW Standard Specification Division 5, Section 7 and Division 5, Section 18. Penalty/Bonus adjustment and payment for cold weather concreting do not apply.

.2 Strip Footings

Unit of Measurement: metre (m)

Method of Measurement: linear measured along top of footing

This item includes surface preparation, bedding, supply and placement of high performance concrete footings complete with shop drawings, reinforcement, formwork, curing, and finishing.

.3 Precast Bridge Units

Unit of Measurement: Lump Sum (LS)

This item includes: design and submission of stamped design to the Engineer; supply and placement of pre-cast bridge units as shown on the Drawings. If applicable, this item also includes the supply and installation of a pre-cast concrete barrier.

.4 Precast Concrete Girders

Unit of Measurement: metre (m)

Method of Measurement: linear measure

This item incudes full compensation for all labour, materials, plant and services, submissions, shop drawings necessary to manufacture, deliver and erect members in the final position, as shown on the shop drawings and in accordance the Drawings. Precast concrete girders to follow technical requirements of NSDPW Standard Specification Division 5, Section 8. Also included under this item is the supply and installation of Girder Bearing Plates. Bearing plates to follow the technical requirements of NSDPW Standard Specification Division 5, Section 4.

116 Bridge Concrete Repair

.1 Partial Depth Concrete Repair – Vertical (Provisional)

Unit of Measure: Square Metres (m^2)

Method of Measurement: Area of exterior vertical surface of partial depth repair as measured on-site up to 150 mm deep.

This item includes partial depth removal (up to 150 mm deep), forming and casting partial depth repairs on vertical faces. Item includes all materials, aggregates, cement, supplementary cementing materials, water, admixtures, rebar and other materials, tools, equipment, falsework, forms, bracing, labour, curing, surface finishing and all other items of expense required to complete the concrete work. Supply, fabrication and installation of rebar is not considered separately and is included as incidental to the concrete quantity, including shop drawings signed by an engineer licensed to practice in Nova Scotia. Partial depth repair to follow technical requirements of NSDPW Standard Specification Division 5, Section 13. Positive/negative price adjustment does not apply.

For repair areas with a depth up to 150 mm, the repair area will not be adjusted. For repair areas with a depth that exceeds 150 mm, the area of concrete repair shall be increased by fifty percent (50%) for each additional 150mm of depth. The Contractor shall receive the Engineer's approval prior to commencing work on all repairs with a depth greater than 150 mm. When concrete removal exceeds 150 mm at intersecting surfaces, only one of the surfaces shall be measured for payment beyond 150 mm.

.2 Partial Depth Concrete Repair – Horizontal (Provisional)

Unit of Measure: Square Metres (m²)

Method of Measurement: Area of top surface of partial depth repair as measured onsite up to 150 mm deep.

This item includes partial depth removal (up to 150 mm deep), forming and casting partial depth repairs on horizontal faces completed from the top. Item includes all materials, aggregates, cement, supplementary cementing materials, water, admixtures, rebar and other materials, tools, equipment, falsework, forms, bracing, labour, curing, surface finishing and all other items of expense required to complete the concrete work. Supply, fabrication and installation of rebar is not considered separately and is included as incidental to the concrete quantity. Partial depth repair to follow technical requirements of NSDPW Standard Specification Division 5, Section 13. Positive/negative price adjustment does not apply.

For repair areas with a depth up to 150 mm, the repair area will not be adjusted. For repair areas with a depth that exceeds 150 mm, the area of concrete repair shall be

increased by fifty percent (50%) for each additional 150mm of depth. The Contractor shall receive the Engineer's approval prior to commencing work on all repairs with a depth greater than 150 mm. When concrete removal exceeds 150 mm at intersecting surfaces, only one of the surfaces shall be measured for payment beyond 150 mm.

.3 Full Depth Concrete Repair

Unit of Measure: Square Metres (m²)

Method of Measurement: Area of top surface of full depth repair as measured onsite

This item incudes removal and disposal of existing reinforced concrete deck (full depth) at various locations as outlined in the Drawings. This includes all labour, access, containment, and equipment required to remove the existing deck (including concrete and rebar) without damaging concrete and rebar noted to remain. Item includes all materials, aggregates, cement, supplementary cementing materials, water, admixtures, rebar and other materials, tools, equipment, falsework, forms, bracing, labour, curing, surface finishing and all other items of expense required to complete the concrete work. Supply, fabrication and installation of rebar is not considered separately and is included as incidental to the concrete quantity. Full depth repair to follow technical requirements of NSDPW Standard Specification Division 5, Section 13. Positive/negative price adjustment does not apply.

117 Piles

.1 Micro-Piles

Unit of Measure: Metres (m)

Method of Measurement: Linear metres of micro-pile incorporated into the work as measured from the bottom of rock anchor to the top of casing pipe.

This item includes supply and installation of micro-pile for the new bridge integral abutments, incorporated into the finished work to the limits as shown on the Drawings and as approved by the Engineer. This item includes all materials to complete micro-pile casing and rock anchor including protective shoe, drilling, threadbar, nuts, metal plate, spacers, cast-in-place (tremie) concrete and pile splices.

.2 Piles – Delivered

Unit of Measure: Metres (m)

Method of Measurement: Linear metres of piles delivered and as specified on the plans measured from the bottom of pile (tip) to the top of the pile (cut-off), plus one additional metre. In the event the driven length exceeds the estimated length shown on the plans, the quantity for payment may be increased if it is determined the piling delivered to site and as shown on the plans was not sufficient to complete the work.

This item includes supply, delivery and handling of the piles, steel plates or pile shoes used to reinforce the pile tip, pile cap plates, pile splices, and all equipment, tools, labour, and incidentals necessary to complete the work and as approved by the Engineer. Piles shall meet the requirements of Section 31 62 16.16 and NSDPW Standard Specification Division 5 Section 1.

.3 Piles – Driven

Unit of Measure: Metres (m)

Method of Measurement: Linear metres of piles remaining in place below the cut-off elevation shown on the plans. Measurement will be determined from the pile driving records.

This item includes all handling and storing, falsework, placing, erecting, driving, cutting, installation of splice plates, installation of pile tip reinforcing plates or pile shoes, installation of pile cap plates, and all labour, material, equipment, tools, and incidentals necessary to complete the work and as approved by the Engineer. Payment shall also include the supply, removal and reinstallation of any pile not properly installed due to an obstruction or other impediment

Also included under this item is accommodations for the dynamic pile testing by the Engineer. Piles shall meet the requirements of Section 31 62 16.16 and NSDPW Standard Specification Division 5 Section 1.

118 Fill Against Structure (FAS)

Unit of Measure: Tonne (t)

Method of Measurement: weigh scale tickets approved by the Engineer

This item incudes supply, placement, furnishing all materials, including water if and when required for compaction and shall cover the supply of all equipment, plant, labour and incidentals necessary to complete the work to the limits as shown on the Drawings and as approved by the Engineer. Work under this item shall also include the supply and installation of perforated drain assembly located within the Fill Against Structure behind each abutment, as detailed on the Drawings, which is considered incidental to this work. Fill Against Structure shall meet the requirements of NSDPW Standard Specification Division 3 Section 10.

****** END OF SECTION 01 22 00 ******