

ANNEX C – SPECIAL PROVISIONS – ROADS

SPR. 1 Ontario Provincial Standards

- 01)** All work shall conform to the noted Ontario Provincial Standard Specifications including the following modifications.

SPR. 2 Grading - (OPSS 206)

01) General

- (a)** Excavated material, which cannot be accommodated within the right-of-way, shall be removed from the right-of-way to a City owned site within the urban boundary, west of the Cataraqui River, at the Contractors own expense. Material delivered to the City owned site is to be end dumped; the haul route to the site will be provided by the City. The Contractor shall prevent both dust and mud tracking onto adjoining street. If tracking occurs, immediate remedial action is to be taken by the Contractor to correct the situation.

02) Earth Excavation

Earth excavation shall include excavation of all materials for the construction of road cut and ditches. **Earth excavation shall include the removal of all asphalt or concrete base, shale, boulders smaller than one cubic metre, all sidewalks, curbs and gutters, medians, driveways, steps, miscellaneous pipes and minor structures.**

Payment shall be by the cubic metre (m³) based on theoretical section as indicated on the Contract Drawings (average end area method). Excavation additions or deletions shall be calculated in the field and agreed to by the Contract Administrator and Contractor.

03) Rock Excavation

Rock Excavation shall include excavation of all rock for the construction of road cuts and ditches.

04) Ditches, Channels and Waterways

Ditches, channels and waterway shall be excavated to the elevation, cross-section and alignment shown on the contract drawings or as set out on site by the Contract Administrator. The bottom and sides of the excavation shall be firm undisturbed soil, free of loose, soft or organic matter. Roots, stumps or other unsuitable material shall be removed and excavation filled and compacted with approved fill material. Tolerances for Drainage Swales/ditches: Surface grade shall be smooth, true to line, level and free from depression exceeding 10mm as measured with a 3.0m straight edge in direction of drainage. The excavation shall not extend beyond the limits of the right of way or those specified on the drawing or as directed by the Contract Administrator. Any excavation beyond the limit of excavation that was not approved by the Contract Administrator shall be reinstated with approved compacted material at the Contractor's expense.

Ditches shall be excavated to a uniform depth of 100mm below finished grade and reinstated as identified on the contract drawings.

The Contractor shall take all necessary precautions to preserve and protect existing drains, surface drainage and ditches, culverts, sewers or other facilities which may be affected by their operations. The Contractor will be liable for any and all damage which results from the blockage or damage to a drain.

Payment will be based on linear meter and will be paid for on the contract unit price per linear meter for actual length constructed.

SPR. 3 Granular Materials - (OPSS 314)

- 01)** No granular material shall be placed until the sub-grade of the road has been checked and approved by the Contract Administrator.
- (a)** All granular materials must be obtained from pits or quarries approved by the Ministry of Transportation of Ontario.
 - (b)** The Contractor shall notify the Contract Administrator when he is satisfied the granular grade conforms to both compaction and grades requirements so grades and compaction can be checked prior to the placement of asphalt surface.
 - (c)** If the compaction test fails to meet minimum standard, the Contractor will be required to hire a consultant to perform additional tests until proper compaction results are obtained.
 - (d)** These items will be paid by the square metre. The depth of granular materials will be as stated in the Proposal form and on the Contract Drawings.

02) Granular "A" Driveways

- (a)** This item is used for the blending of existing gravel driveways into new road, sidewalk or curb construction. This item will be paid by the square metre. The depth of granular material will be 150 mm.

03) Granular "A" Shoulders

- (a)** The shoulders shall be placed at a minimum 2% to a maximum 6% grade as specified by the Contract Administrator.

04) Gravel Access Road

- (a)** Payment shall be by the square metre (m²) to regrade the existing granular material as indicated on the Contract Drawings.

SPR. 4 Water for Compaction and Dust Suppression - (OPSS 501 and 506)

SPR. 5 Calcium Chloride - (OPSS 506)

SPR. 6 Partial Depth Removal of Asphalt Pavement (OPSS 310)

01) General

This item covers the work of removing existing asphalt pavement to a partial depth, including sawcutting, and disposing of the surplus material.

02) Construction

The asphalt pavement shall be removed to an average depth as specified in the appropriate Proposal items. The maximum depth of removal in any specific location will be determined at the time of construction.

For two lane highways, asphalt removal shall be done to essentially the same station for the full pavement width prior to shutdown at the end of the day.

For multi lane highways, asphalt removal shall be done to essentially the same station for the full pavement width for a specific direction prior to shutdown at the end of the day.

The equipment used for partial depth removal shall be automatically controlled for grade and slope during the removal. The surface remaining after removal shall have a constant and continuous crossfall matching the intended surface course crossfall. The surface remaining after removal shall have an even texture free of grooves and/or ridges in all directions.

The equipment shall be able to remove asphalt flush with the curb and gutter, manhole and catchbasins. Care shall be taken, while removing, to minimize contamination with shoulder granular (where applicable).

The salvaged asphalt pavement material shall not remain on the roadway after completion of the day's operation and placing of the material on a grade other than a bituminous surface, prior to hauling to stockpile, shall not be permitted.

After partial depth removal of existing asphalt pavement, the Contractor shall reshape and compact the existing shoulder to ensure proper drainage of the milled surface and adjoining shoulders and to ensure the safety of the travelling public (where applicable).

03) Disposal of Surplus Asphalt Material

The salvaged asphalt material shall be collected, loaded and hauled to an area, outside of the right-of-way, which will be provided by the Contractor at their expense.

04) Measurement for Payment

The cost of the partial depth removal shall be included in the items for earth excavation.

Payment at the contract price for the above Proposal item shall be full compensation for all labour, equipment and material required to do the work.

05) Preparation of Existing Pavement

After asphalt removal and prior to placing padding, patching or pavement, all existing asphalt and concrete surfaces and previously laid courses shall be

cleaned of all loose, broken and foreign material to the satisfaction of the Contract Administrator.

This material shall be collected, loaded and hauled to areas, outside of the right-of-way, which will be provided by the Contractor at their expense. This item will be paid for by the square metre. The partial depth removal of asphalt pavement will be as stated in the Proposal form.

SPR. 7 In-Place Full Depth Reclamation of Asphalt Pavement and Underlying Granular - (OPSS 330)

- 01)** Under this item, the Contractor will supply all labour, equipment and material required to process the existing pavement in accordance with the Contract Documents.

For the unit price per square meter, the Contractor shall process the existing asphalt structure to a total depth as described on the drawings or elsewhere in this document, ensuring the asphalt material is thoroughly mixed with the underlying granular base. The processing shall be carried out so that all material passes the 26.5mm sieve and not more than 75% passes the 4.75mm sieve.

The Contractor shall complete all asphalt pavement and granular processing between the limits established by the Contract Administrator in the field which shall include all roadway intersections. The Price shall include cost of blading, shaping, additional Granular A and compacting of the processed material to a minimum 2% crossfall including uniform gradients in preparation for new asphalt pavement crossfalls through curves restored to super elevation percentages.

02) Removal and Disposal of Surplus Granular Material

The cost of the removal shall be included in the items for earth excavation.

This includes loading, transporting and disposal of surplus granular material from the operation of in place full depth reclamation of asphalt pavement and underlying granular.

SPR. 8 Hot Mix Hot Laid Asphalt Pavements - (OPSS 310)

- 01) Special Provisions Asphalt applies to this contract.**

02) OPSD 1150.04.01.01.01 Reclaimed Asphalt Pavement Properties

This section shall be deleted indicating that no RAP will be permitted for any / all mixes.

03) 1150.04.01.03 Anti Strip Additives

Clause 1150.04.01.03 shall be deleted and replaced with the following:

1150.04.01.03.01 General

Irrespective of any moisture sensitivity testing that shows that ASA is not required, ASA will be required in all Hot Mix asphalts.

The proposed ASA shall be from an approved supplier listed on MTO DSM #3.05.10.

The compatibility, effectiveness and dosage of ASA shall be verified by the PGAC supplier or manufacturer. Documentation indicating the adherence to the following items shall be provided to the Owner for review and approval a minimum of 10 Business Days prior to start of paving operation.

The following information on the anti-stripping additive shall be provided to the Owner:

- a) Documentation that the hot mix shall be produced in accordance to all requirements of the Contract.
- b) Amount of anti-strip to be used as determined in the mix design procedures.
- c) Complete information on how the anti-strip is to be used and how the anti-strip is to be incorporated into the mixture.
- d) The amount of anti-strip as a percentage of the mass of the aggregate.

The need for and the amount of anti-stripping additive required shall not be affected by any previous determination made with respect to the same or any other aggregate source.

Regardless of the Hot Mix type, the amount of liquid anti-stripping additive either specified in the contract documents or determined through mix design procedure shall be a percentage of the total asphalt cement required.

The amount of anti-stripping additive required shall be the greater of the following:

- a) Amount required to provide a minimum of 75% retained stability, as determined by LS-283
- b) Minimum of 0.8% by mass of asphalt cement

Course and fine aggregate crushed in the last 20 days shall not be incorporated into the asphalt mix unless hydrated lime, (Ca(OH)₂) is added to the mix.

For anti-strip additive, the following applies:

- a) For all mixes containing dolomitic sand stone or meta-arkose aggregates or a combination there of, the anti-stripping additive shall be hydrated lime (Ca(OH)₂) with a minimum dosage of 1% by mass of the total dry aggregate
- b) For all other combinations of aggregates, the anti-stripping additive may be hydrated lime or a chemical agent.
When hydrated lime is used as the aggregate ASA, the dosage shall be the greater of:
 - a) The amount required to provide minimum of 75% retained stability, as determined by LS-283.
 - b) One percent by mass of total dry aggregate.

When latex is used as an aggregate ASA or latex aggregate treatment is used in place of a liquid ASA, the dosage shall be the greater of:

- a) The amount required to provide minimum of 75% retained stability, as determined by LS-283.
- b) 0.0375% latex solids by mass of total dry aggregate

When an aggregate ASA, such as hydrated lime, or latex ASA as an aggregate treatment is not required as an ASA in the mix and aggregate anti-stripping additive is not used as the ASA, liquid ASA shall be used in the mix.

The amount of liquid ASA to be used in the mix shall be the greater of:

- a) The amount required to provide minimum of 75% retained stability, as determined by LS-283.
- b) 0.8% by mass of asphalt cement.

Latex Solution

When latex ASA is added to the mix, the latex solids shall be applied to aggregates as a solution of latex solids diluted in water to a concentration which will result in the required amount of latex solids being added to the aggregates by any of the following methods:

- a) Blended During Aggregate Production:

The solution of latex solids shall be mixed with wetted aggregate at the pit or quarry prior to delivery of the aggregate to the hot mix plant, by a method approved by the Owner prior to the start of any mix production. The blending process shall produce aggregates that are uniformly and homogeneously coated with the quantity of latex solids specified in the Contract Documents. The Contractor or the aggregate supplier or both shall implement and maintain a quality control system and records that demonstrate compliance with the Contract. The Owner may reject Materials if they fail to meet the quality control or blending requirements or both.

- b) At the HMA Plant

The HMA plant shall be equipped with suitable pumps or mixers to maintain a homogeneous concentration of latex solution and shall have adequate spray bars for introducing the required quantity of latex solids onto the aggregates. The coarse and fine aggregate shall be sufficiently wetted prior to the latex solution being sprayed on to the wetted aggregate to ensure uniform and complete adhesion of latex to the aggregate. The latex solution shall be homogeneously mixed with the wetted aggregate, prior to entering the dryer at the HMA Plant. Mixing shall be accomplished at a minimum with a tumbling wheel or mixing chamber capable of providing a homogeneously uniform mixing process.

Regardless of the method or mixing equipment used, the Contractor shall ensure through regular quality control sampling and inspection that the

specified quantity of latex solids is being incorporated into the mixture and that the aggregates possess a uniform and homogeneous coating of latex free of clumps and balls prior to entering the dryer at the HMA Plant.

Aggregate which was treated and stored from a previous season may be used only after the Contract Administrator agrees to a written proposal from the Contractor that verifies the effectiveness of the stored aggregate, including the sampling protocol used, and test results from those samples that indicate that the aggregates meet the moisture sensitivity requirements specified in this specification.

04) General

- (a) This item includes all labour and materials including sawcutting of joints, painting of joints and adjusting of all valves.
- (b) This item will be paid for by the square metre. The depth of asphalt will be as stated in the Proposal items and on the contract drawings.
- (c) All asphalt mixes shall be restricted to a maximum of 15% natural sand in the mix.
- (d) All asphalt mix designs for Hot Mix H.L. #3, and H.L. #4 shall contain a minimum of 5.3% asphalt cement content with performance grade of PG 58-28 and 3.5% air voids.

Asphalt mix design for Hot Mix H.L. #1 shall contain a minimum of 5.3% asphalt cement content with performance grade of PG 64-28 and 3.5% air voids.

Asphalt mix design for medium duty binder mix shall contain a minimum of 5.0% asphalt cement content with a performance grade of PG 64-28 and 3.5% voids.

Asphalt mix design for heavy duty binder mix shall contain a minimum of 5.0% asphalt cement content with a performance grade of 64-28 and 3.5% voids.

- (e) The owner reserves the right to delete the surface course of asphalt from this Contract.
- (f) Surface course of asphalt shall not be laid after October 15th of any given year without the expressed approval of the Contract Administrator.

- 05) The Contractor shall use a Load Transfer Device (LTD) on all surface lifts of asphalt. The LTD shall be of sufficient capacity to enable continuous hot mix paving with minimal interruptions.
- 06) OPSS 310.07.12.01.01 shall be modified to only permit the following combination of rollers; S2 +R2 + S1 or as approved in writing by the Contract Administrator.
- 07) **Payment Adjustment for Changes in the Ministry of Transportations Performance Graded Asphalt Cement Price Index (Special Provision No. 103S20)**

The City of Kingston will adjust the payment to the Contractor based on changes to the Ministry of Transportation's performance graded asphalt cement price index unless the Contractor opts out by notifying the City of Kingston in writing within 5 business days of receiving permission to start work. Once the Contractor has opted out of payment adjustments based on the index, the Contractor will not be permitted to opt back in. The price index will be published monthly in the Ministry of Transportation Contract Bulletin. The price index will be used to calculate the amount of the payment adjustment per tonne of new asphalt cement accepted into the Work.

The price index will be based on the price, excluding taxes, FOB the depots in the Toronto area, of asphalt cement grade PG 58-28 or equivalent. One index will be used to establish and calculate the payment adjustment for all grades.

A payment adjustment per tonne of new asphalt cement will be established for each month in which paving occurs when the price index for the month differs by more than 5% from the price index for the month prior to Proposal Opening. When the price index differential is less than 5%, there will be no payment adjustment established for that month. Payment adjustments due to changes in the price index are independent of any other payment adjustments made to the hot mix Proposal items.

The payment adjustment per tonne will apply to the quantity of new asphalt cement in the hot mix accepted into the Work during the month for which it is established. However, a payment adjustment will not apply to paving work done after the approved time for completion of the Contract has expired, including the expiration of any extensions of time that have been granted.

The payment adjustment for the month will be calculated from the following formulae:

1. when I_p is greater than $1.05 I_{TO}$, the payment adjustment per tonne of asphalt cement is $(I_p - 1.05 I_{TO})$ and the Contractor receives additional compensation of:

$$PA = (I_p - 1.05 I_{TO}) \times \text{quantity of new asphalt cement in tonnes}$$

2. when I_p is less than $.95 I_{TO}$, the payment adjustment per tonne of asphalt cement is $(.95 I_{TO} - I_p)$ and the Owner receives a rebate of:

$$PA = (.95 I_{TO} - I_p) \times \text{quantity of new asphalt cement in tonnes}$$

Where:

PA = payment adjustment for new asphalt cement, in dollars

I_{TO} = performance graded asphalt cement price index for the month prior to Proposal Opening

I_p = performance graded asphalt cement price index for the month in which paving occurs

The quantity of new asphalt cement includes all grades of asphalt cement supplied by the Contractor with and without polymer modifiers. For each month in which a payment adjustment has been established, the quantity will be calculated using the hot mix quantity accepted into the Work and its corresponding asphalt cement content as required by the job mix formula except for mixes which contain reclaimed asphalt pavement.

For mixes which contain reclaimed asphalt pavement, the quantity of new asphalt cement will be determined from the difference between the asphalt cement content required by the job mix formula and the asphalt cement content of the reclaimed asphalt pavement incorporated into the hot mix, as calculated by the Contract Administrator.

For mixes containing a liquid anti-stripping additive, the quantity of anti-stripping additive will be deducted from the quantity of new asphalt cement. No other deductions will be made for any other additives.

For progress payment purposes, payment adjustments will be made on the monthly progress payment certificate for the months in which hot mix paving occurs.

08) Sampling of Performance Grade Asphalt Cement (PGAC)

- (a) The Contractor shall provide PGAC samples for testing. All test samples shall be obtained in accordance with ASSHTO T 40 AND ASTM D 3665. Samples obtained for testing purposes shall be obtained at the hot mix plant during construction. The minimum quantity of each of the samples shall be two (2) gallon. The Contractor shall obtain, package and transport all samples to the City's designated location. Samples shall be delivered at the same time, in a condition suitable for testing, and within two (2) business days of sampling. All samples shall be labelled appropriately (date taken, grade of PGAC, source, lot number), have WHMIS labels on each container if required, be submitted with a current Material Safety Data Sheet, and any handling and storage requirements.

SPR. 9 Hot Mix Hot Laid #3 Asphalt Padding and Asphalt Patching

- 01) Special Provisions Asphalt will apply to this Project for asphalt padding and for asphalt patching.**
- 02)** All areas where existing asphalt has been removed or damaged shall be restored as per drawing TRD-1
- 03)** Each repair location shall be designated a Type "A" or Type "B" repair in accordance with the requirements spelled out on drawing TRD-1
- 04)** Asphalt shall be restored with attention to grade and ride. This will be strictly enforced. An inspector from the City's Engineering Department must be on site prior to the installation of any asphalt. Contact Mark Campbell at (613) 546-4291 ext. 3139 a minimum of forty-eight (48) hours prior to the work.

- 05) If the grade or ride, at the sole discretion of the inspector from the Engineering Department, is deemed inadequate the entire patch shall be removed and the process repeated to the satisfaction of the inspector at no additional cost.
- 06) Payment for asphalt padding shall be by the tonne placed. Payment for patching shall be paid by the square meter of either Type "A" or Type "B" as appropriate.

SPR. 10 Hot Mix Hot Laid #3 Asphalt – Driveways and Sidewalks

- 01) **Special Provisions Asphalt Does NOT apply for asphalt driveways and/or asphalt sidewalks**
- 02) These items will be paid by the square metre. These items shall include all labour and materials including saw cutting of joints, painting of joints and the adjustment of all valves.
- 03) Asphalt driveways and sidewalks will be constructed of 50mm of Hot Mix HL#3 with a 150mm granular "A" base unless otherwise specified.

SPR. 11 Hot Mix Hot Laid #3 - Driveway Ramps and Gutters

- 01) **Special Provisions Asphalt Does NOT apply for asphalt driveway ramps or gutters.**
- 02) This item will be paid by the linear metre.

SPR. 12 Surface Treatment – (OPSS 304)

- 01) Single and double surface treatment shall be paid by the square metre.
 - (a) Single surface treatment shall be applied using HF 150 P binder at a rate of 1.5 to 1.8 litres per square metre with a Class 6 aggregate at a rate of 16 to 20 kg/m².
 - (b) Double surface treatment shall be applied as follows:
 - (i) First application shall be HF 150 P binder at a rate of 1.4 to 1.6 litres per square metre with a Class 2 aggregate at a rate of 18 to 20 kg/m².
 - (ii) Second application shall be HF 150 P binder at a rate of 1.6 to 1.8 litres per square metre with a Class 6 aggregate at a rate of 16 to 18 kg/m².
 - (c) Samples of the Class 2 and 6 aggregates shall be obtained by the Contractor from the source for use in this contract in its entirety. The Owner shall be present for the sampling to verify quarry source and stockpile location during construction.
 - (d) The samples shall be handed over to the Owner for testing by an independent C.C.I.L. accredited laboratory. The cost of this testing shall be borne by the Owner. The owner shall be in receipt of satisfactory gradation test results of the granular samples prior to the Contractor commencing application of the surface treatment.

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 Princess Street to East of Portsmouth Avenue

- (e) When pulverization of the existing road surface is required, the pulverizing process shall be in accordance with OPSS 340 and shall result in a material that is well blended with sufficient distribution of the surface material and the Granular “A” road base. This may require overlapping passes or additional passes to achieve a homogeneous material with a maximum nominal particle size of 50mm.
- (f) The resulting pulverized road surface shall be fine graded and compacted by the Contractor immediately upon completion of the pulverization process.
- (g) When Granular “A” is required to be added to the surface of the road structure, the surface preparation shall be in conformance with OPSS 304.07.04 and be performed immediately prior to the application of the surface treatment.
- (h) The Contractor shall make good in a permanent manner, satisfactory to the Owner, any and all defects or deficiencies in the work, both during the construction and during the period of maintenance as aforesaid. The Contractor shall commence repairs on any work identified as defective under this clause within 48 hours of receipt of notice from the Owner. The severity of defective work shall be identified by and evaluated at the discretion of the Owner. Repair and/or replacement methods shall be in accordance with Table No. 1 below. The decision of the Owner shall be final as to the necessity for repairs or for any work to be done under this Section.

Table No. 1. Surface Treatment Deficiencies

SURFACE DEFECTS	SEVERITY	REPAIR/REPLACEMENT METHOD
Loss of cover aggregate due to insufficient bonding with emulsion	Slight	None
	Moderate	Patching and then a single surface treatment of affected area manually or by machine
	Severe	Patching and then a single surface treatment of affected area
Flushing/bleeding of emulsion to the surface	Slight	None
	Moderate	Lean single surface treatment of affected area
	Severe	Removal and replacement of the double surface treatment of affected area
Streaking due to insufficient emulsion spray application	Slight	None
	Moderate	Single surface treatment of affected area
	Severe	Compacted aggregate curtain or sand seal followed by single surface treatment of affected area
“Slight” shall mean	No more than 5% of the surface area per 100 m of road length is defective	
“Moderate” shall mean	6% - 25% of the surface area per 100 m of road length is defective	
“Severe” shall mean	More than 25% of the surface area per 100 m of road length is defective	

SPR. 13 Crack Sealing in Hot Mix Pavement - (OPSS 341)

01) Material

Hot applied rubber asphalt sealing compounds, specifically designed materials that form a resilient adhesive effective seal for cracks and joints in pavements on highways, bridges, sidewalks, etc. will fully conform with Federal Specifications SS-S-164, OPSS 1212 CAA Specifications P-605 and ASTM D-6690-01, Type IV with a modified resiliency. The sealant material must be listed on the All District MTO Designated Sources List. The City shall be provided with the following manufacturer's data at least five 5 working days prior to placement of sealant:

- (a) Application recommendations
- (b) Recommended heating time and temperature
- (c) Allowable storage time and temperature after initial heating
- (d) Allowable reheating criteria
- (e) Application temperature range

02) Crack Sealing Uncut Cracks (Clean & Go Operation, No Rout)

- (a) Crack sealing uncut cracks will include the cleaning and sealing of open cracks (longitudinal random and transverse cracks greater than 3 mm wide and less than 25 mm wide) during the spring and fall seasons.

All crack sealing works shall be limited to sealing uncut cracks Clean N go operations during the periods of spring and or fall when pavement surfaces are dry and air temperatures are above 10 °C.

In the event that cracks had been previously sealed and the old sealant has pulled away from the edge of the asphalt the Contractor will use the clean and go method to seal the crack

- (b) **Cleaning – Debris**

Immediately prior to placing new joint sealing compound all dust and debris shall be thoroughly cleaned and dried using a hot compressed air lance having a discharge air temperature of approximately 500C ± 1000C and an air velocity greater than 1,000 m/s. The cracks shall be treated with hot compressed air until the pavement in and around the cracks or groove is darkened.

03) Crack Sealing Cut Cracks (Route and Seal)

- (a) **Routing**

Cracks up to 20 mm in width shall be routed to the dimensions as specified in OPSP-508.010(attached) on the roads with require routing as indicated in the general description of work.

Cracks greater than 20 mm in width do not require routing but will be cleaned and sealed. The routing operation for cracks shall be carried out with an approved mechanical router capable of cutting out the pavement in a single pass to a width of 40-50mm and a depth of 8-10mm. The Contractor shall demonstrate that the equipment is capable of continually creating well-defined right angled routes, following meandering cracks and

keeping the crack centerline within 8 mm of the centre of the rout. All subsequent routing shall be within these tolerances.

When the Contractor cannot demonstrate to the satisfaction of the City's supervisor that a router is capable of maintaining the specified dimensions and shape of the rout, the Contractor shall then adjust or replace as many cutters in the router's cutting head as necessary until the dimensions and shape of the rout again meets the specification requirements.

(b) Cleaning of Routed Cracks

Immediately prior to pouring the hot joint sealing compound, all routed cracks shall be cleaned and dried using a hot compressed air lance that shall have a discharge air temperature of approximately 500 °C± 100°C and an air velocity greater than 1,000m/sec. The routed cracks shall be treated with hot compressed air until the pavement in the rout or crack is darkened. Not more than two (2) minutes shall elapse before the sealant is placed.

Before sealant application, all loose debris from the routing and cleaning operation shall be completely removed from the road surface. All moisture, debris and loose fractured aggregate shall be removed from the routed immediately prior to the time the sealant compound is being placed.

04) Application – Clean & Go Method and Route and Seal

The sealing operation must take place during the daylight hours and when the air temperature is 10°C or higher and the asphalt temperature is less than 50°C.

The application shall be carried out by a joint sealing Contractor, experienced in the heating and application of hot applied rubber asphalt compounds and having the properly designed equipment for controlled heating of the material. The sealing compound is not be less than 175°C and is not to reach temperatures of greater than 232°C at any stage of the melting or pouring operations. It shall be subject to continuous and positive mechanical agitation. Material heated in excess of 232°C shall be wasted at the expense of the Contractor. The joint sealing compound shall be poured as soon as possible after the pouring temperature is reached. Only as much compound as can be poured in a given day shall be melted that day.

Sealing compound shall not be placed unless the joint/crack is dry, clean and free of dust.

The joints/cracks shall be sealed as per the overfill method as outlined in OPSD 508.010 in a neat and workmanlike manner. The sealant shall be placed into the unrouted or routed crack by mechanical means (gravity/cone application is not permitted) and spread over the crack with the wand. The sealant centered over the crack shall be shaped with a squeegee or wand and 2-4mm thickness into an overband approximately 50mm wide. The sealed groove shall be dusted with sand or stone dust to prevent the sealing compound from tracking.

SPR. 14 Concrete Products - (OPSS 350, 351, 352 and 353)

01) Materials

- (a) Concrete shall conform to the following:
- | | | |
|------|-------------------|---|
| i) | Class of Concrete | 32MPa at 28 days |
| ii) | Coarse Aggregate | 19 mm nominal maximum size |
| iii) | Air Content | 6.0% to 9.0% |
| iv) | Maximum Slump | 80 mm +/- 20 mm |
| v) | Curing Compound | White Pigmented Curing Compound
OPSS1315 |
- (b) The air temperature should not be higher than 28 degrees C at the time of pouring concrete.
- (c) After concrete has been placed, it shall be protected against cold weather as outlined in OPSS 904.
- (d) Sufficient protective covering should be available to protect fresh concrete in event of rain.
- (e) It is the Contractor's responsibility to protect all concrete surfaces from damage or vandalism.
- (f) No steel trowels are to be used for the finishing of concrete. The concrete surface should not be overworked.
- (g) Power trowels shall not be used.
- (h) Concrete shall not be finished when bleed water is present.
- (i) Curing shall at a minimum of 6m to 10m behind finishing operations. Any concrete not cured in accordance with this provision will be automatically rejected.

02) Testing of Concrete

- (a) The inspector shall take air and slump tests. The Contractor shall make and store concrete test cylinder (cylinders supplied by the inspector) in accordance with Canadian Standards Association CAN3-A23-2-M77 when directed by the inspector. The cylinder shall be delivered to the approved laboratory by the Contractor within twenty-four (24) hours of casting.
- (b) When a compressive strength test is being made, three (3) cylinders shall be taken to provide one (1) cylinder for the seven-day test and two (2) cylinders for the twenty-eight day test results. The average of the two (2) twenty-eight day test results shall be considered as being representative of the concrete completed.

03) Unsatisfactory Concrete

- (a) Unsatisfactory concrete shall be any sampled concrete, which has a representative twenty-eight (28) day test less than 90% of the required strength. If this result occurs the concrete structure will be removed and replaced.
- (b) In addition, should the average of any five consecutive representative twenty-eight (28) day tests fall below the required strength, then the number of tests that must be deleted to raise the average to the required strength shall be considered as representing unsatisfactory concrete and shall be paid at a rate of 90% of the Proposal price.
- (c) In case the tests fail the Contractor may submit core samples for testing under test method C.S.A. A23.2-14C. When the cores test out at 100% of the required strength at 50 days it will be acceptable, if the cores fail to reach 100% of the required strength the concrete will be rejected or accepted according to the above noted "Unsatisfactory Concrete".

SPR. 15 Concrete Driveways

- 01) This item is used to enable the Contractor to blend existing concrete driveways into sidewalk or curb construction. The unit price will cover all labour and materials in the restoration of concrete driveways.
- 02) The driveways will be constructed of 150 mm of concrete reinforced with approved wire mesh on a foundation of 150 mm of Granular "A".

SPR. 16 Concrete Sidewalks – (OPSS 351)

- 01) Concrete sidewalks shall be placed on a foundation of 100 mm of compacted Granular "A" that will be included in the unit price for sidewalks. This item will be paid by the square metre.
- 02) All tool margins from finishing tools are to be broomed out so that none exist. This requirement will be strictly enforced.
- 03) Dummy joints shall be constructed as per OPSS 351 at a spacing of 1.5 m. All dummy joint tool margins are to be broomed out so only the 5 mm joint remains. See drawing JD-01.

Contraction joints shall be constructed as per OPSS 351 at every third dummy joint. Contraction joints shall be constructed at all driveway entrances. All dummy joint tool margins are to be broomed out so that only the 5 mm joint remains.

The contraction joint must be saw cut to a depth that is 0.25 (25%) of the sidewalk thickness. For example, a sidewalk which is 125 mm thick shall be saw cut to a depth of 38 mm.

Expansion joints shall be constructed as per OPSS 351 and shall be constructed where the sidewalk abuts a rigid object or changes direction or where thickness of sidewalk changes. See OPSD 310.010.

The joint between the curb and the sidewalk shall have expansion joint material installed where the sidewalk is adjacent to the curb.

- 04)** Driveway entrances shall be constructed as per drawing DE-01 and/or DE-02. This requirement will be strictly enforced.

SPR. 17 Concrete Steps - (OPSS 352)

- 01)** Concrete steps shall be placed on a foundation of 100 mm of compacted Granular "A" that will be included in the unit price for steps. This item will be paid by each unit poured.

SPR. 18 Concrete Curbs, Concrete Curb and Gutter, Concrete Spillways and Outlets - (OPSS 353)

- 01)** Curbs and spillways will be paid by the linear metre (m).
02) Outlets shall be paid by count (each)
03) Where applicable the additional width (ie: concrete key) is required where sidewalk is adjacent to the curb.

SPR. 19 Interlocking Concrete Pavers - (OPSS 355)

- 01)** Concrete Pavers installed in non-vehicular areas shall be placed on 25 mm of bedding sand and a base of 150 mm of compacted Granular "A".
02) Concrete Pavers installed in vehicular areas shall be placed on 25 mm of bedding sand and a base of 150 mm of Granular "A" and 150 mm of concrete. This item will be paid by the square metre.

SPR. 20 Subdrains - (OPSS 405)

- 01)** Subdrains shall be laid on a 50 mm compacted 16 mm crusher run granular bed (Class "B" bedding) and shall be backfilled with 19 mm Clear Stone Type I or Type II to the road subgrade. The bedding and backfilling shall be included in the unit price for subdrains.

SPR. 21 Removal of Catchbasins - (OPSS 510)

- 01)** Removal of catchbasins shall be a complete removal and any remaining pipe shall be filled with approved concrete mixture.

SPR. 22 Catchbasins - (OPSS 407)

- 01)** Catchbasins shall be placed on 150 mm of compacted Granular "A" foundation.

SPR. 23 Adjusting of Catchbasins and Maintenance Holes - (OPSS 408)

- 01)** The adjustment of these structures will be paid by each unit adjusted.

SPR. 24 Rebuilding of Catchbasins and Maintenance Holes - (OPSS 408)

- 01)** The rebuilding of catchbasins and manholes will be paid by each unit rebuilt.

SPR. 25 Removal of Sidewalks, Curbs, Gutters, and Curb and Gutter Combinations - (OPSS 510)

- 01)** The cost of the removal of sidewalks, curbs, gutters, and curb and gutter combinations shall be included in the items for earth excavation.

SPR. 26 Removal of Fences - All types - (OPSS 510)

01) The cost of fence removal will be paid by the linear metre.

SPR. 27 Highway Fence - (OPSS 540)

01) The walk gates shall be the size specified in the Proposal and contract drawings. The drive-in gates shall be the size specified in the Proposal and contract drawings.

SPR. 28 Chain Link Fence - (OPSS 541)

01) The height of the chain link fence shall be as specified in the Proposal and contract drawings. The walk gates shall be the size specified in the Proposal and contract drawings. The drive-in gates shall be the size specified in the Proposal and contract drawings.

SPR. 29 Removal of Pipes and Culverts - (OPSS 510)

01) The excavation remaining after the culvert or pipe removal will be filled with selected rock backfill.

SPR. 30 Catchbasin Laterals - (OPSS 410)

01) The bedding and backfill material for catchbasins laterals shall conform with OPSD 802.010, 802.013, 802.030 and 802.033 except cover material above the pipe shall be 600mm. The backfill for catchbasins lateral excavations shall consist of excavated rock that is no larger than 150mm size, placed and compacted in the excavation to remove all voids.

SPR. 31 Pipe Culvert - (OPSS 421)

01) Culverts to be a minimum of 1.6mm thickness and shall be galvanized unless otherwise specified.

02) Under this item the Contractor shall supply all labour, equipment and materials required to install the CSP culverts at the location specified by the Contract Administrator.

03) Included under this item shall be all excavation, including frost tapers in accordance with OPSD 803.030 and OPSD 803.031.

04) The bedding and cover material for pipe culverts shall be Granular 'A'. Depth of bedding material shall be 300mm and cover material shall be 600mm. The backfill material shall be native material with excavated rock not to be larger than 150mm.

05) Salvaged culverts that are found in good condition, as determined by the Contract Administrator, will be utilized on this contract or delivered to the City of Kingston Yard.

06) Payment for this item will be based on linear meter of culvert which includes excavation for frost tapers unless otherwise specified in the Contract Documents.

**SPR. 32 Topsoil (Imported), Sodding (Nursery, Unstaked) and Seeding -
(OPSS 802, 803 and 804)**

01) Topsoil (OPSS 802)

- (a)** The depth of topsoil will be 100mm. The cost of water is to be included in this item. The Contractor shall use sufficient water to guarantee the life of the sod through the warranty period.
- (b)** Top soil shall not contain less than 5% or more than 20% organic matter, by weight as determined by loss-on- ignition of oven dried samples in accordance with ATMT6. Organic material shall be decomposed and free of wood. Acidity range shall be from 6.0pH to 7.5pH and shall be capable of sustaining vigorous plant growth. It shall be free of any admixture of subsoil, clay lumps, stones and roots over 25mm diameter and any other extraneous matter.
- (c)** The top soil and sodded areas shall be free of all weeds. The Contractor shall be responsible for removing any/all weeds as required and/or as directed by the Contract Administrator until end of warranty period.
- (d) Topsoil Spreading and Finishing**

 - (i)** Sub-grade shall be approved by Contract Administrator prior to commencing topsoil placement
 - (ii)** Scarify sub-grade surface a minimum depth of 75mm to facilitate bedding
 - (iii)** Do not spread topsoil when it is frozen or wet
 - (iv)** Spread topsoil to a depth of 100mm over the approved subgrade
 - (v)** Maintain topsoil 15mm below top of curb, finished grades of pavement, etc., to allow for sodding. Maintain flush to allow for seeding or suitable depth to allow methods of seeding
 - (vi)** Manual spread topsoil around existing trees and shrubs
 - (vii)** Fine grade topsoil to eliminate rough and low areas to ensure positive surface drainage, blend smoothly with adjacent finished grade elevations and conform to specified levels and profiles.
 - (viii)** Roll topsoil surface of all areas to be sodded to produce a smooth uniform surface that is firm against deep foot prints and with fine loose texture.
 - (ix)** Finished surfaces are to be inspected by the Contract Administrator before placing any sod or seed. Approval of finished grade shall not relieve the Contractor of any remedial grading works which may be required.
 - (x)** Topsoil shall be removed from all paved surfaces at the end of each day.

(e) Testing and Inspection of Topsoil

- (i) Inspection and Testing of topsoil will be carried out by the Contractor immediately after notification of Contract Award.
- (ii) Test samples shall be an amalgamation of at least three (3) samples randomly taken from the source. Samples shall be carefully mixed, recorded, labelled and otherwise documented prior to delivery to the testing laboratory.
- (iii) Carefully communicate to the testing laboratory the intended use to which the topsoil is to be put.
- (iv) Submit two (2) copies of the test results to the City. The cost of testing shall be included in the unit price. Unless noted otherwise, the topsoil shall meet the following:

Total sand (0.05 – 2 mm)	50 – 60%
Silt	20 – 40%
Clay	6 – 10%
Chemical analysis	pH: 6.0 – 7.5
Nutrient levels	
Phosphorous	10 – 60 ppm
Potassium	80 – 250 ppm
Calcium	< 5000 ppm
Magnesium	100 – 300 ppm
Soluble salt	< 1.5 mmhos/cm
Percent organic matter	5-20%
Infiltration/Permeability/Hydraulic Conductivity	50 –75 mm/hr at 85% Proctor density

- (v) In the event test results indicate that the topsoil does not meet the above mentioned quality criteria, the City shall direct the Contractor to take the necessary remedial action. The remedial action shall include the application of fertilizer to correct the deficiencies. The Contract shall be deemed to include the cost of soil amendments based on the following minimum rates:

10-10-10 @ 11.0 kg/100 sm, or
 0-20-10 @ 6.5 kg/100 sm, or

5-20-20 @ 6.5 kg/100 sm, or

Superphosphate @ 13.5 kg/100 sm

- (vi) Make topsoil available for inspection at source by City. All topsoil shall be subject to Contract Administrators approval before use on job site, but subject to receipt and analysis of soil testing report.

(f) Sod (OPSS 804)

- (i) Nursery Sod: Certified No. 1 Grade Turf Grass Nursery Sod, as per the Ontario Sod Growers Association of Ontario
- (ii) Fertilizer: Complete synthetic, slow •release fertilizer (Scotts® Turf Builder® PRO Lawn Food 32-0-4 with 2% Iron or approved manufacturer). Contractor to submit specifications for approval. Fertilizer shall contain not less than 60% urea-formaldehyde. Standard Spec typically contains the following percentages by weight:

Nitrogen	Phosphoric Acid	Potash
10	10	10
0	20	10
5	20	20

- (i) Superphosphate must contain a minimum of 20% P₂ H₅ and have same approved prior to sodding. All fertilizer shall be clearly marked with the name of manufacturer, contents, weight and materials. Fertilizer shall be stored in a weatherproof storage place and in such a manner that it will stay dry and its effectiveness will not be impaired. Supply and apply all necessary fertilizers to correct any deficiencies indicated in the soils analysis. This shall be included in the contract price.

(g) Preparation and Placement of Sod

- (i) Sod shall not be applied under adverse field conditions such as frozen soil, excessively wet soil or soiled covered in snow, ice or standing water.
- (ii) The specified fertilizer shall be applied to and well worked into the topsoil by discing, raking, or harrowing. Fertilizer shall be applied within 48 hours before laying the sod. The fertilizer shall be applied using the application rates specified above.
- (iii) Lay sod immediately after arrival on site, but no later than within 36 hours of lifting.
- (iv) Lay sod sections in rows, joints staggered. Install sod close-knit so that no open joints are visible and no pieces are overlapping. Cut out irregular or thin sections with sharp implements.

- (v) Lay sod smooth and flush with adjoining grass areas, paving surfaces and top of curbs
- (vi) In swales and ditches, sod is to be installed perpendicular to direction of water flow.
- (vii) Water sod immediately after laying to obtain moisture penetration into top 100 mm of topsoil.
- (viii) After sod has dried sufficiently to prevent damage, roll area with roller to provide close contact between sod and soil and to remove irregularities.

(h) Maintenance of Sod and Watering

- (i) Water shall be Potable and free of materials which may be detrimental to growth There is no payment for this item.
- (ii) Maintain mowing of sodded areas for one complete growing season after Preliminary Acceptance. When Preliminary Acceptance is granted after October 15th, sodded areas must be mowed for the following years growing season.
- (iii) Water sodded areas in sufficient quantities and at frequency required to maintain soil under sod continuously moist to depth of 75 to 100 mm.
- (iv) Cut grass to 40 mm when it reaches height of 50 mm. Remove clippings which will smother grassed areas.
- (v) Maintain sodded areas weed free, utilising weed control methods conforming to all federal, provincial and municipal legislation. Be responsible for any damages caused by weed control methodology.
- (vi) Fertilize sodded areas one month after sodding with 2:1:1 ratio fertilizer. Spread evenly at rate of 0.75 kg of nitrogen/100 square meters and water in well.

(vii) Preliminary Acceptance of Sod

- a) Preliminary Acceptance for the sodding will be granted in conjunction with Preliminary Acceptance for the Work as a whole provided that:
 - b) All sod is well established and in vigorous growing condition.
 - c) Sod is free of bare. and dead spots and is without weeds.
 - d) No surface soil is visible from height of 1500 mm when grass has been cut to 40 mm height.
 - e) Sodded area has been cut at least two (2) times.

(viii) Final Acceptance of Sod

- a) Final acceptance will be provided two (2) years after Preliminary Acceptance provided that all sodded areas are

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well "knitted-in" and in a condition equal to that at Preliminary Acceptance, with allowance for normal wear and tear. Sod shall be free of all damaged areas due to de-icing chemicals. The Contractor may wish to use methods to try and minimize damage by utilizing measures such as pelletized gypsum soil conditioner. However, this does not alleviate the Contractor from having to replace areas that may still be damaged by de-icing chemicals.

(i) Seeding (OPSS 804)

- (i) The seeding shall be a salt tolerant mix in accordance with OPSS 804 Table 1.
- (ii) All test results shall be supplied to the Contract Administrator a minimum of two (2) weeks before application of the seed is to occur.

SPR. 33 Pavement Markings (OPSS 532)

- 01)** This item will include the premarking and the application of permanent pavement markings. Centrelines, lane lines, bicycle lanes, edge lines and turning lanes shall be marked using water borne traffic paint conforming to OPSS 1716 with glass beads conforming to OPSS 1750. Stop bar lines, crosswalk lines and turning arrows shall be marked using durable pavement markings conforming to OPSS 1713 or 1714 with glass beads conforming to OPSS 1750.
- 02)** This item will include the application of temporary pavement markings, lines and symbols, for the construction staging as indicated on the Contract Drawings. The unit price shall include the removal of the existing pavement markings or symbols and the supply, application and removal of the temporary markings.
- 03)** All pavement markings and arrow symbols shall conform to the Ontario Traffic Manual Books 11 Pavement, Hazard and Delineation Markings and 18 Cycling Facilities.
- 04)** Measurement for payment for Pavement Markings shall be by linear meter.
- 05)** Measurement for payment for Symbols shall be by count (each).

SPR. 34 Regulatory Signs

01) General

This item covers the supply and installation of regulatory signs (including all required hardware, posts and supports), as indicated on the Contract Drawings and in accordance with OPSS 703. Locations shown on the drawings are approximate and may require field adjustments to suit built conditions.

Signs and installation shall be in accordance with the appropriate Ontario Traffic Manual (OTM's) as noted on the Contract Drawings.

02) Measurement for Payment

Measurement for payment shall be by count (each) for sign installed.

SPR. 35 Flexible Bollard

01) General

This item covers the requirements for the supply and installation of Flexible Bollards to be used with the bicycle buffer area, as indicated on the Contract Drawings and as per OTM Book 18.

02) Installation

The Flexible Bollards are to be installed centred within the 0.5 m bicycle buffer. Spacing shall be 6 m and as indicated by the Contract Administrator to suit built conditions. Installation shall be as in accordance with the manufacturer's recommendations.

03) Material

Flexible Bollard shall be by Cyclo-Zone Flexible Bollard (by Develotech).
Bollards shall be black with yellow reflective sheeting.

04) Measurement for Payment

Measurement for payment for each of the above items shall be by count (each) for Flexible Bollard installed.

05) Basis of Payment

Payment at the contract price shall be full compensation for all labour, equipment, materials and incidentals required to supply and install the above noted item.

SPR. 36 Removal, Salvage, Relocation of Existing Signs

1. This special provision covers the requirements for the removal of signs, salvage and relocation of signs as indicated on the Contract Documents. The requirements of OPSS MUNI 510 shall apply, except as modified below.
2. All existing signs removed by the Contractor to accommodate construction should be kept operational by placement of a temporary support and shall be reinstalled in accordance with the appropriate Ontario Traffic Manual after the work operation is complete. Temporarily located existing signs shall be kept at the same height, offset and basic location from traffic as before removal.
3. Measurement for payment shall be by count (each) for removal and salvage of signs. No measurement for payment shall be made for the salvage and relocation of business signs, payment shall be by lump sum.

SPR. 37 Rip Rap with Filter Fabric (OPSS 511)

01) General

This special provision covers the requirements for the supply and placement of Rip Rap, in accordance with OPSD 810.010, with filter fabric to the limits as indicated on the Contract Drawings for pipe and culvert inlets and outlets.

Filter fabric shall be type 270R manufactured by Terrafix Geosynthetics Inc. or approved equal, in accordance with OPSS 1860.

02) Measurement for Payment

Measurement for payment will be based on the surface area in square metres (m²) of rip rap placed.

03) Basis of Payment

Payment at the unit price shall include full compensation for all labour, equipment and material to complete the work and associated maintenance for this item in accordance with the Contract Drawings.

SPR. 38 General Site Work

01) General

All costs for items required in the General Conditions and Special Provision of this contract which are not covered under other items of work are to be included in the above item.

This work should also include the following:

1. All permits and or approvals required by the Contractor for the performance of the work, aside from those applied for directly by the City.
2. All utility locates.
3. All clean-up.
4. All costs associated with inspectors from the various agencies or utility companies.
5. Insurance
6. Safety equipment.
7. Field Office and Amenities
8. Ground repairs to disturbed areas.
9. All costs for items required in the General Conditions and Special Provisions of this Contract and which are not covered under other items of work.

02) Laydown Area

- a. Available laydown area within the project limits include:
 - i. New Municipal Road right-of-way for the VIA Rail Entrance – area south of John Counter Boulevard, approximately 5,500 square metres.
- b. The Contractor shall cover the laydown area with a minimum of 200mm Granular 'A' material placed on filter fabric, non-woven geotextile (Terrafix 270R or approved alternative). Upon final demobilization, the Contractor shall remove all temporary granular and filter fabric materials from the laydown area and restored to the final surface in accordance with the Contract Drawings.
- c. Laydown area shall be enclosed with Modu-Loc fencing, or approved equivalent, fencing and privacy screening. The privacy screening shall be installed with tie-downs as per manufacturer's recommendations to ensure wind loads are adequately managed.

- d. The Contractor shall provide a granular entrance with lockable gate to access the laydown area. Keys shall be provided to the Contract Administrator and the City of Kingston.

03) Payment shall be as follows:

- i. Prorated over the duration of the contract

04) Basis for Payment

- a. Payment at the lump sum price shall include full compensation for all costs for labour, materials and equipment required to complete the work for this item in accordance with the Contract Documents. For progress payment purposes, the Contractor shall submit an itemized breakdown at the start of the project for costs associated with the work included in this Lump Sum item.

SPR. 39 Bonding

- 1) This special provision covers the requirements for all bonding associated with this Contract.
- 2) Measurement for Payment
 - a. No measurement for payment will be made for the above item, payment shall be by Lump Sum.
- 3) Basis for Payment
 - a. Upon execution of any potential negotiated Contract and receipt of proof of Bonding, full payment for Bonding shall be made with the first Payment Certificate for the contract.

SPR. 40 Erosion and Sediment Control

- 1) Refer to Special Provisions – General SPG.35 Erosion and Sediment Control
- 2) This special provision covers the requirements for temporary erosion and sediment control for the duration of the Contract.
- 3) The Contractor shall supply, maintain, remove and replace necessary erosion and sediment control as indicated on the Contract Documents and in accordance with OPSS 805.
- 4) Measurement for Payment:
 - a. Silt Fence shall be by linear meter (m)

The items shall include full compensation for all costs for labour, materials and equipment necessary to complete the work for this item as called for on the Contract Drawings including the installation, maintenance, and removal.
- 5) Basis for Payment
 - a. Payment at the unit price shall include full compensation for all costs for labour, materials and equipment necessary to complete the work for this item as called for on the Contract Documents.

The payment shall be divided as follows:

- a. 40% for installation
- b. 50% for maintenance
- c. 10% for removal

SPR. 41 Steel Beam Guide Rail and End Treatments

- 1) This special provision covers the requirements for the supply and install of steel beam guide rail, end treatments and structure connections at the locations and to the limits as indicated on the Contract Drawings.
- 2) The requirements of OPSS.MUNI 721 and 723 shall apply.
- 3) Measurement for payment:
 - a. Guide rail shall be by the linear metre (m)
 - b. Structure connections shall be by count (each)
 - c. End treatments shall be by count (each)

SPR. 42 Granular Sealing

- 1) This special provision covers the requirements for the application of granular sealing to granular shoulders and rounding in areas where guide rail is installed.
- 2) The requirements of OPSS 305 shall apply except as modified below:
- 3) Granular sealer shall be Type III.
- 4) Granular sealer shall be placed on the shoulder and rounding adjacent to guide rail installation. Area shall be 100 mm inside the edge of the paved shoulder to the outside edge of rounding, approximate width of 1.5 m.
- 5) Measurement for payment will be based on the surface area in square metres (m²) of granular sealer applied.
- 6) For the unit price, the Contractor shall include all labour, equipment, material and incidental items required to supply and apply the sealer in accordance with the Contract Drawings.

SPR. 43 Rock Fill

- 1) This special provision covers the requirements for the supply; installation and compaction of rock fill accordance with the Contract Documents.
- 2) The requirements of OPSS 102, OPSS.MUNI 206 and 209 shall apply unless noted otherwise.
- 3) Rock Supply
 - a. The supply of rock under this item shall include any required clearing, grubbing, and striping of the source; excavating and hauling of rock materials.
- 4) The Contractor will be required to provide access for the Contract Administrator and owner's Geotechnical Representative to visit the material source in order to confirm suitability of the rock fill. Confirmation of the suitability of material must be made a minimum of two (2) weeks prior to any material brought on site.

5) Rock Placement

- a. Each rock fill layer shall be compacted with equipment approved by the Contract Administrator. No vibratory or dynamic compaction equipment will be permitted on site. Compaction shall be carried out by completing a minimum number of six (6) passes. A complete pass is defined as 100% coverage of the layer surface. The maximum speed of the equipment during each pass shall be 3.2 km/hr.
- b. Rock fill shall be placed full width in successive, uniform layers. Layers shall not exceed 1.5 metres in thickness prior to compaction. Material in each layer shall be fully compacted before the succeeding layer is placed. Each layer shall be levelled in place and compacted to minimize voids and bridging of large rock fragments within the embankment. All ice and snow shall be removed prior to the placement of any fill.
- c. Rock fill exceeding 1.0 metre in size shall be well distributed up to a maximum size of 1.5 metres.
- d. Rock fill shall be placed in final position by blading. End dumping or the depositing of rock over the end of any layer by hauling equipment is not permitted, except as otherwise noted below.
- e. Voids on the top surface of the embankment prior to the placement of the pavement structure shall be minimized by chinking the top surface with rock fragments.
- f. Rock placed in wet areas under water may be placed by end dumping. Placement in layers and compaction is not required for rock fill placed under water. End dumping shall only be used to an elevation of 1.0 metres above the waterline, after which rock fill materials shall be placed and compacted using the methods specified.

6) Weigh Tickets

- a. Weigh tickets measured in metric tonne are to be provided in printed digital format (hand written receipts will not be accepted) and must indicate the following minimum information to be accepted for payment. Tickets not meeting these requirements will be returned to the Contractor without payment:
 - i. Supplier name
 - ii. Material type being supplied
 - iii. Hauler name
 - iv. Truck number
 - v. Pit location
 - vi. Truck tare weight
 - vii. Gross weight
 - viii. Net material weight

- ix. Date and time of delivery
- x. Total for the day
- xi. Running Total
- xii. Bar Code for digital scanning

7) Measurement for Payment

- a. Measurement for payment for the above item shall be by tonnes (t) based on approved weigh tickets for the supply, placement and compaction of rock fill. Payment at the contract price shall include full compensation for all labour, materials and equipment to complete the work in accordance with the Contract Documents.

8) Basis of Payment

- a. Payment at the unit price shall include full compensation for all labour, equipment, materials, and incidental items required to supply and install rock fill in accordance with the Contract Documents.

SPR. 44 Non-Woven Geotextile

1) General

This special provision covers the requirements for the supply and placement of a non-woven geotextile (Terrafix 420R or approved alternative), which is to be placed beneath the subbase of Granular 'B' Type II material within the limits of the rock embankment, approximately Sta. 10+400 to Sta. 11+200.

Filter fabric manufactured by Terrafix Geosynthetics Inc. or approved equal, in accordance with OPSS 1860.

2) Measurement for Payment

Measurement for payment will be based on the surface area in square metres (m²) placed.

3) Basis of Payment

Payment at the unit price shall include full compensation for all labour, equipment and material to complete the work and associated maintenance for this item in accordance with the Contract Drawings.

SPR. 45 Removal and Salvage of Existing Items

- 1) This special provision covers the requirements for the removal and salvage of existing soccer goal posts, play structures, bleachers and benches located within William Hackett Park, as shown on the Contract Drawings.
- 2) Salvaged items are to be stored onsite and the arrangements are to be made with the Contract Administrator for City personnel to pick up.
- 3) Measurement for Payment

- a. No measurement for payment will be made for the above item, payment shall be by Lump Sum.

SPR. 46 Temporary Retained Soil System (RSS)

- 1) This special provision covers the requirements for a Temporary Retained Soil System (RSS) – Low Performance, to be used in order to facilitate the construction staging in the area of Sta. 10+000 to Sta. 10+400.
- 2) The Contractor will be required to supply and install a Temporary RSS when the grade differential between Stage 1 and Stage 2 exceeds 300 mm.
- 3) At least two (2) weeks prior to the commencement of construction of the RSS, shop drawings shall be submitted for review. Shop drawings shall be stamped by a Professional Engineer in the Province of Ontario.
- 4) Temporary RSS shall be Wire Wall by Atlantic Industries Limited, TerraSlope by Terrafix, or approved alternative.

SPR. 47 Rock Flow Check Dam

- 1) This special provision covers the requirements for construction of rock flow check dams at locations indicated on the Contract Drawings.
- 2) The requirements of OPSS 805 shall apply except as modified below.
- 3) Rock flow check dams shall be installed as per the detail on the Contract Drawings and shall include geotextile.
- 4) Measurement for payment will be metres (m) based on length of rock flow check dam installed.
- 5) For the unit price, the Contractor shall include all labour, equipment, material and incidental items required to supply and apply the sealer in accordance with the Contract Drawings.

SPR. 48 Contract Layout and Survey

- 1) The Contractor is required to retain the services of an Ontario Land Surveyor (OLS) to undertake the layout for all works in accordance with the Contract Drawings. The Contractor shall provide documentation / certification to confirm this work has been completed.
- 2) This item shall also include a full topographic 3-dimensional “As-Built” survey provided in AutoCAD format (*.dwg) of all works shown on the Contract Drawings.
- 3) No measurement for payment shall be made for the above noted item. Payment shall be by Lump Sum and prorated over the duration of the contract.

SPR. 49 Overland Flow Route Inspection

- 1) This special provision covers the requirements for the regular inspection of flow paths at 6 locations within the John Counter Boulevard project limits.
- 2) The Contractor shall undertake monthly inspections with photographs to ensure that all flow paths are open and maintained at all times for the duration of the project. The locations for inspection are as follows:
 - a. Proposed equalization culverts (600 mm CSP x 3) under new VIA Rail entrance

- b. Existing east branch overland flow path – defined as the area between the east embankment and the CN Rail
 - c. Sta. 10+500 - Existing west embankment equalization culverts C1 (1800 mm CSP x 4)
 - d. Sta. 10+856 - Existing main branch culverts C2 (3300 mm CSP x 3)
 - e. Sta. 11+023 - Existing east branch culvert C3 (3300 mm CSP x 2)
 - f. Sta. 11+100 - Existing east branch culvert C4 (3300 mm CSP x 2)
- 3) All photographs and notes are to be provided to the Contract Administrator within two (2) weeks of the completed inspection.
- 4) No measurement for payment shall be made for the above noted item. Payment shall be by Lump Sum and prorated over the duration of the project.

SPR. 50 Tactile Walking Surface Indicators

Amendment to OPSS 351

OPSS 351, shall apply to this work except as amended and extended herein.

Scope

Subsection 351.01 of OPSS 351 is amended by the addition of the following:

This Special Provision covers the supply and installation of Tactile Walking Surface Indicator plates (TWSI's) for sidewalk, walkway and pathway ramps to warn visually impaired pedestrians that they are entering the roadway.

Design and Submission Requirements

Subsection 351.04.01 of OPSS 351 is deleted in its entirety and replaced with the following:

TWSI's shall be 610mm to 650mm in depth and extend along the bottom portion of the depressed curb that is flush with the roadway.

For curb ramps, TWSI's shall extend the full width of the curb ramp/area.

Plates shall be parallel with the curb radius (i.e. not necessarily perpendicular to the direction of pedestrian travel). This will require the use of radius TWSI plates in some instances.

Radius TWSI's are available in various radii. Careful consideration of radius design is required as the TWSI radius shall follow as close as possible the back of curb radius. When using different radius TWSI's to match the back of a single curb radius, plates with varying radii should be alternated.

Contractor shall submit shop drawings at least two weeks before TWSI installation showing the proposed plate arrangement at each TWSI location, and the width and radius achieved by the proposed plates, for review by the Contract Administrator. When requested by the Contract Administrator, Contractor shall provide written confirmation that selected TWSI product meets applicable material specifications.

Construction

Subsection 351.07.09 of OPSS 351 is deleted in its entirety and replaced with the following: All installations shall be completed in accordance with:

- Manufacturer's installation procedures; and
- The following additional requirements:
 - TWSI's shall be set back 150 to 200mm from the back of curb. Where TWSI's are installed in monolithic sidewalk, plates shall be set back 300 to 350mm from the front face of curb.
 - Unless indicated otherwise on the contract drawings, for depressed corner areas serving two crossing directions provide 300mm +/- 50mm gap between the TWSI sets.
 - All TWSI's shall have 6mm wide x 6mm deep drain grooves at corners between the TWSI and the curb. Panel joints may be adapted for use if touching.
 - TWSI sets shall be bolted together with Stainless Steel bolts and nuts.
 - Tops of TWSI's shall be aligned and level with the adjacent concrete surface and installation in wet concrete shall be effective in permanently securing the TWSI in place once dry.

Measurement for Payment

Subsection 351.09.01.02 of OPSS 351 is deleted in its entirety and replaced with the following: Measurement will be of the area of TWSI's measured in square metres.

Basis of Payment

Subsection 351.10.02 of OPSS 351 is deleted in its entirety and replaced with the following:

Payment at the Contract price for the tender item shall include full compensation for all labour, equipment and material required to do the work, including the supply, hauling, preparation, bolting, setting/placing, and finishing of the TWSI's.

No additional payment will be made for the work in connection with providing shop drawings, depressed access crossings, flared sides, curb transitions or blended transitions as the cost of such work is deemed to be included in the Contract price for the applicable item.

SPR. 51 Extruded Polystyrene Fill at Abutments

1.0 SCOPE

This specification covers the requirements for the supply and construction of the expanded polystyrene embankment fill, including foundation preparation, excavation, levelling pad, polyethylene sheeting, concrete protection pad and associated works as shown on the contract drawings.

2.0 REFERENCES

This special provision refers to the following standards, specification or publications.

National Standards of Canada

CAN/CGSB – 51.20 M87 Thermal Insulation, Polystyrene, Boards and Pipe Covering

ASTM

ASTM D6817cD6817M0-17 Standard Specification for Rigid Cellular Polystyrene
Geofoam

ASTM C177 Test Method for Steady State Heat Flux Measurements and
Thermal Transmission Properties by Means of the Heat Flow
Apparatus

ASTM D2842 Test Method for Water Absorption by Rigid Plastics

ASTM D2126 Test Method for Response of Rigid Cellular Plastics to Thermal and
Humid Aging

OPSS – Ontario Provincial Standard Specification

OPSS.PROV 212 Construction Specification for Earth Borrow

OPSS.PROV 501 Construction Specification for Compacting

OPSS.PROV 517 Construction Specification for Dewatering

OPSS 902 Construction Specification for Excavating and Backfilling -
Structures

OPSS.PROV 1010 Material Specification for Aggregates -Base, Subbase, Select
Subgrade, and Backfill Material

OPSS 1605 Material Specification for Extruded Expanded Polystyrene Pavement
Insulation

OPSS 1860 Material Specification for Geotextiles

3.0 SUBSURFACE CONDITIONS

The subsurface conditions at the site are described in the geotechnical investigation report for this Contract.

4.0 DEFINITIONS

For the purpose of this special provision, the following definitions apply:

Rigid Expanded Polystyrene (EPS): Moulded rigid blocks produced by a process of pre-expansion, aging and forming of a petroleum based raw material.

Production Lot: The quantity of rigid polystyrene blocks produced in a continuous period of manufacturing the same grade and thickness of product within the same production day.

5.0 QUALIFICATIONS

The Contractor shall have on site at the commencement of the work a representative of the supplier of the rigid expanded polystyrene to advise on recommended construction procedure.

The Contractor shall maintain liaison with the supplier throughout the construction of the embankment for advice and guidance as required. Periodic site visits by the supplier should be coordinated as required.

6.0 SUBMISSION AND DESIGN REQUIREMENTS

6.1 Shop Drawings

At least five (5) weeks before commencement of the work, the Contractor shall submit to the Contract Administrator six (6) copies of the shop drawings for CN's review and a method statement that provides full details of the materials and construction procedure. The shop drawings shall indicate the laying pattern and block dimensions on a layer by layer basis.

6.2 Delivery Storage and Handling

The Contractor shall submit the method of delivery, storage, handling and protection from damage by weather, traffic, construction staging and other causes as per the rigid expanded polystyrene manufacturer's requirements.

6.3 Product Data

The Contractor shall submit the product data of the EPS to the Contract Administrator at least five (5) weeks before commencement of the work for approval. The product data submission shall include the following as a minimum:

1. A general statement as to the type, composition, and method of production of the material.
2. The Manufacturer's name, address, phone number, identification of a contact person and description of experience and background in the manufacturing of rigid expanded polystyrene.
3. Certification of compliance of physical and mechanical properties.
4. Identification the laboratory, accredited by the Standards Council of Canada, which conducted the testing of the physical and mechanical properties of the expanded polystyrene.
5. The physical and mechanical properties of the rigid expanded polystyrene, including:
 - a. Geometry
 - b. Nominal Density
 - c. Compressive Strength
 - d. Flexural Strength
 - e. Dimensional Stability
 - f. Oxygen Index

g. Water Absorption

6. Aging and durability characteristics of the polystyrene, including the chemical, biological and ultra-violet degradation resistance of the EPS.
7. A table identifying the chemical resistance of the EPS to common inorganic acids and alkalis as either resistant, limited, or not resistant.

The Contractor shall also submit a sample of the expanded polystyrene material and protection membrane to the Contract Administrator at the time of product data submission.

6.4 Construction Plan

The Contract shall submit a construction plan to the Contract Administrator at least five (5) weeks before commencement of the work for information. The construction plan submission shall include the following as a minimum:

1. The method of foundation excavation and preparation;
2. Details on the construction of the granular levelling pad;
3. The method of placement of EPS including temporary ballasting (if required) and protection of the material during installation;
4. The methods and limits of placement of polyethylene sheeting;
5. The method of placement of the concrete protection slab;
6. The method of placement of sub-base material; and
7. The method of placement of side slope cover.

7.0 MATERIALS

7.1 Granular Levelling Pad

The levelling pad shall consist of a Granular 'A' material in accordance with OPSS 1010.

7.2 Rigid Expanded Polystyrene

The polystyrene shall meet the requirements for EPS22, as defined by ASTM D6817/D6817M-17, as follows:

Property	Unit	Requirement	Test Procedure
Geometry	mm	1200 x 600 x 100	
Tolerances: Linear Flatness Squareness Thickness		± 0.5%	
Compressive Strength at 5% (max) strain	kPa (min)	115	ASTM D1621 (Procedure A)
Flexural Strength	kPa (min)	276	ASTM C203, Method 1, Procedure B.2.7.4
Dimensional Stability	% linear change (max)	±1.5%	ASTM D2126, Procedure G

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Flammability	Limiting Oxygen Index (min)	24	ASTM D2863
Surface Burning Characteristic	Flame Spread rating (max)	500	CAN/ULC - 51022
Water Absorption	% by Volume (max)	4	ASTM D2842

The maximum design permanent stress level must not exceed 30% of the compressive strength of the material at 5% strain.

The EPS shall be resistant to common inorganic acids and alkalis.

The EPS shall be resistant to biological degradation caused by organisms or enzymes.

The EPS shall be inert, non-nutritive and highly stable and shall not produce undesirable gases or leachate.

Each block of the same production lot shall be stamped with the same production code showing plant identification, type and date of production. The polystyrene shall be free from defects affecting serviceability.

7.3 Concrete Protection Slab

The Concrete for the concrete protection slab shall be in accordance with the Contract Drawings and OPSS.MUNI 904.

8.0 Protection Membrane

Protection membrane shall be Terrafix Geomembrane 40mil HDP; Terrafix 440-2000 or approved equivalent.

8.0 CONSTRUCTION

8.1 Delivery Storage and Handling

The product shall be suitably marked to identify its type, number and the manufacturer's name or trademark.

The Contractor shall protect the EPS from exposure to sunlight to avoid ultraviolet degradation and in accordance with the Manufacturer's written instructions.

Protection of the materials and works from damage by weather, traffic, construction staging, fire or vandalism or any other cause shall be the responsibility of the Contractor and the Contractor shall make no claim against the Owner for such damages.

8.2 Levelling Pad

Place and compact a 150 mm thick layer of Granular 'A' material in accordance with OPSS.PROV 501 to within 30mm of the design elevation. The levelling pad shall not deviate by more than 10 mm over a 3 m distance in any direction over limits of the bottom course of EPS blocks. The levelling pad shall not be placed on frozen ground.

8.3 EPS Installation

Installation of the EPS shall be in accordance with the following or the manufactures written instructions, whichever is more stringent:

1. The individually marked blocks shall be placed on the prepared levelling pad. The top surface of the first layer of blocks is to be set plane and level. Local trimming of the blocks may be necessary.
2. Subsequent successive layers shall be oriented with the long axis of blocks positioned at 90 degrees to the previous layer. Vertical joint planes shall not be continuous. Block joints shall be offset and staggered between layers.
3. Blocks shall be checked to ensure the installation tolerances are met before proceeding with the installation of the next layer. Blocks shall be installed with a maximum joint opening of 10 mm and a maximum differential in height between adjacent blocks of 5 mm in the same layer.
4. Sloping end adjustments shall be accomplished by levelling terraces in the subsoil in accordance with the block thickness.
5. Temporary ballast shall be provided as necessary to prevent movement of EPS both in storage and as placed due to windy conditions. Timber fasteners or equivalent shall be used as necessary.
6. The EPS embankment shall be protected from accidental ignition due to welding, smoking, grinding or cutting tools, or other sources. The Contractor shall take all reasonable precautions to prevent ignition of the EPS.
7. The EPS shall be protected from organic solvents and other aggressive, harmful chemicals during construction.
8. Exposed blocks shall be covered immediately to avoid possible burrowing by animals.
9. Individually marked blocks shall be fabricated and placed to ensure the top surface matches the elevation and cross fall shown on the drawings.
10. The side slope of the EPS embankment shall be covered with fill material as specified elsewhere in the Contract Documents.

8.4 Protection Membrane

The top surface and side surfaces of the EPS shall be covered with protection membrane. Membrane seams shall be welded shut. Membrane installation shall be installed in accordance with the manufacturer's written instructions. The ambient air temperature and EPS temperature shall be greater than 10 degrees Celsius and rising when beginning installation of the protection membrane on any given day.

8.5 Equipment

All cutting of EPS material shall be by electric equipment or by hand.

Heavy equipment shall chosen and restricted in operation so as to prevent damage to the EPS and in accordance with the manufacturer's written recommendations or instructions. EPS damaged by the Contractors operations or equipment shall be replaced at no cost to the Owner.

9.0 QUALITY CONTROL

Quality verification test certificates for each production lot shall be submitted to the Contract Administrator prior to incorporation of the material in the work, showing compliance with all material and geometric requirements of the Contract Documents.

10.0 QUALITY ASSURANCE

The Contract Administrator may undertake an independent testing program for the EPS works. The Contractor shall provide a minimum of 48 hours written notice prior to the arrival of EPS material delivery to the site.

10.1 Sampling and Testing

Testing of EPS material shall be done by a recognized testing laboratory accredited by the Standards Council of Canada.

Sufficient sampling material shall be obtained from blocks randomly selected by the Contract Administrator from each production lot at the time of material arrival on site. A minimum of 1 block shall be tested for material properties and 3 blocks tested for compressive strength. The right to accept or reject the results of the tests shall be at the sole discretion of the Contract Administrator.

10.2 Acceptance and Rejection

Failure of any one of the sample blocks to comply with any requirements of the Contract Documents shall be cause for rejection of the production lot from which it was taken.

Replacement of blocks and all associated works for product lots which are rejected shall be at no extra cost to the Owner.

11.0 MEASUREMENT FOR PAYMENT

11.1 Expanded Polystyrene Fill at Abutments

Measurement of the above tender item shall be by volume in cubic metres measured in its final position.

12.0 BASIS OF PAYMENT

12.1 Expanded Polystyrene Fill at Abutments

Payment at the Contract price for the above tender item shall be full compensation for all labour, materials and equipment required to do the work, including but not limited to the following:

- Supply, installation and compaction of granular levelling pad;
- Supply, installation and protection of EPS blocks;
- Supply and installation of protection membrane; and
- Supply and installation of concrete protection slab.

Any costs associated with thawing or heating of frozen ground shall be deemed to be included in the cost of this item.

SPR. 52 Extruded Polystyrene Fill at Abutments

For the unit price in Annex A, the contractor shall remove and dispose of any Invasive Phragmites as directed by the City's Environmental staff. All works associated with working in and around and ultimately the removal of the Phragmites shall be in accordance with the Ontario Ministry of Natural Resources document *Invasive Phragmites – Best Management Practices 2011*, contained in Annex M.

END OF ANNEX C