

March 8, 2022

Dear Sir and/or Madam:

Re: UPDATED City of Windsor Standard Specifications

Supplementary Specifications and Mandatory Procedures and Practices (January 2022)
S-4 – Granular Base & Aggregates (February 2022)
S-5 – Concrete Curb and Gutter Systems (February 2022)
S-6 – Concrete Sidewalk and Driveway Approaches (February 2022)
S-8 – Sewer Pipeline and Culvert Rehabilitation by Cured-in-Place Pipe (February 2022)
S-9 – Concrete (February 2022)
S-10 – Construction Specification for Hot Mix Asphalt (February 2022)
S-14 – Sodding (February 2022)
S-15 – Seeding (February 2022)
S-30 – Bridge (February 2022)
S-32 – CCTV Sewer Inspection (February 2022)
S-34 – Topsoil (February 2022)

Over the past few years, we have had an internal Specification Review Committee working on revising our existing Standard Specifications and developing new Standard Specifications. This group has reviewed our current Specifications and referenced to other Municipal Standard Specifications, as well as the Ontario Provincial Standard Specifications, and had feedback discussions with the Windsor Heavy Construction Association. This letter is to introduce you to our latest eleven (11) updated Standard Specifications listed above, as well as an updated Supplementary Specifications and Mandatory Procedures and Practices.

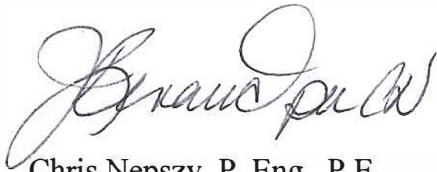
For all City of Windsor tenders after March 1, 2022, the Contract shall follow the updated City of Windsor Standard Specifications listed above. The updated specifications can be found and downloaded from the City of Windsor website:

<https://www.citywindsor.ca/business/buildersanddevelopers/Pages/Standard-Specifications.aspx>

Please distribute the attached documents to your members so that they may update their Book 2 accordingly with these updated and new specifications. The Specification Review Committee is continuing to undertake revisions and additions to the remainder of our Standard Specifications and Engineering Drawings – Book 2, and these updates will be forthcoming.

Should you have any questions with the new specifications, please contact Mr. Andrew Lewis, Coordinator of Right-of-Way and Field Services at 519-255-6560, ext. 4229 (alewis@citywindsor.ca) or Ms. Jane He, Construction Standards Lead at 519-255-6257, ext. 6358 (jhe@citywindsor.ca).

Sincerely,



Chris Nepszy, P. Eng., P.E.
Commissioner of Infrastructure Services/City Engineer/Corporate Leader
Environmental Protection & Transportation,
Public Works, Parks & Facilities

JH/sl

cc: Executive Director of Operations/Deputy City Engineer, Attn: Shawna Boakes
Executive Director of Engineering/Deputy City Engineer, Attn: France Isabelle-Tunks
Coordinator, ROW and Field Services, Attn: Andrew Lewis
Manager of Contracts, Field Services & Maintenance, Attn: Phong Nguy
Drafting Supervisor, Attn: Phil Ubene
Manager of Traffic Operations, Attn: Ian Day
Contracts Coordinator, Attn: CJ Hartford
Maintenance Coordinator, Attn: Roberta Harrison
Manager of Right of Way, Attn: Adam Pillon
Manager of Design, Attn: Fahd Mikhael
Construction Standards Lead, Attn.: Jane He
Transportation Planning, Attn: Jeff Hagan
ROW Permit Clerks
Manager of Parks Development, Attn: Wadah Al-Yassiri
Essex-Kent Chapter of Consulting Engineers
Enwin Utilities Ltd. Attn: Christopher Manzon
Enbridge Gas Inc.
District Energy Windsor
Heavy Construction Association of Windsor, Attn: Jim Lyons
Bell Canada Limited
Windsor Utilities Commission
Cogeco Cable Systems
Telus
MNSI

Attachments: Supplementary Specifications and Mandatory Procedures and Practices (January 2022)
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CITY OF WINDSOR

SUPPLEMENTARY SPECIFICATIONS

AND

MANDATORY PROCEDURES AND PRACTICES

JANUARY 2022

BOOK OF SUPPLEMENTARY SPECIFICATIONS AND MANDATORY PROCEDURES AND PRACTICES

The specifications, procedures, and practices contained in this document shall be used on all City contracts and take precedent over City of Windsor General Specifications and Ontario Provincial Standard Specifications.

These specifications, procedures, and practices shall not be revised or altered without the expressed consent of the City Engineer.

Where these specifications, procedures, and practices do not meet a site-specific condition, in whole or in part, that portion or portions of the specification, procedure, or practice shall be altered and placed in the Special Provisions for that contract only.

To avoid future ambiguity, these supplementary specifications shall be referred to as Supplementary Specifications I, (SS 1, SS 2, SS 3, etc.) These specifications shall be reviewed periodically.

**BOOK OF SUPPLEMENTARY SPECIFICATIONS
AND MANDATORY PROCEDURES
AND PRACTICES**

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BOOK OF SUPPLEMENTARY SPECIFICATIONS AND MANDATORY PROCEDURES AND PRACTICES

1. **REVISED STANDARD SPECIFICATIONS AND GENERAL CONDITIONS (January 2022)**

As of January 2022, the City of Windsor Standard Specifications and AS-drawings are all released through the following website, with the revision dates.

<http://www.citywindsor.ca/business/buildersanddevelopers/Pages/Standard-Specifications.aspx>

<http://www.citywindsor.ca/business/buildersanddevelopers/Pages/Standard-Engineering-Drawings.aspx>

The latest revisions shall apply to all City of Windsor Contracts that are signed after the Specification and AS-drawing revision dates.

2. **MANAGEMENT OF EXCAVATED SOIL AND ROCK ON-SITE AND OFF-SITE (January 2022)**

General

All materials that are not Excess Soil, but are no longer required at the Project Area by the City Engineer, shall be removed from the Project Area and lawfully disposed of by the Contractor at its own expense.

The Contractor shall make its own arrangement as to transportation and disposal, but in doing so must comply with all federal, provincial, or municipal statutes, regulations, codes, or by-laws, and any orders, permits, approvals, or other regulatory instruments issued under such statutes, regulations, codes or by-laws (together, “Applicable Laws”).

The Contractor shall as necessary, excavate, manage, reuse, process, segregate, store, transport, track and dispose of offsite, and complete any other handling required for proper management, reuse and/or disposal of Soil, Crushed Rock and Excess Soil each as defined in Ontario Regulation 406/19 and in accordance with the requirements of all Applicable Laws including, but not limited to:

- The *Environmental Protection Act*, R.S.O. 1990, c.E.19 (“EPA”);
- Ontario Regulation 406/19: On-Site and Excess Soil Management (the “Regulation”);
- Regulation 347 (General – Waste Management);
- Ontario Regulation 351/12 (Registrations under Part II.2 of the Act – Waste Management Systems);

- Ontario Regulation 153/04 (Records of Site Condition – Part XV.1 of the Act);
- Any additional regulations under the EPA as may be applicable to the above work, including but not limited to additional regulations pertaining to waste and/or source separation of waste (including Ontario Regulation 103/94);
- The Rules for Soil Management, dated December 8, 2020 (the “Rules”) and Excess Soil Quality Standards, dated December 8, 2020 (the “Standards”); and,
- The Beneficial Reuse Assessment Tool (“BRAT”), where applicable; and,
- All as amended (collectively, “Ontario’s Excess Soil and Waste Laws”).

Capitalized terms used in this section shall have the meanings assigned to them in the Regulation and the Rules and the Standards, unless expressly amended herein.

For clarity, capitalized terms: Owner, Contractor, Work and Working Day shall have the meanings assigned in the General Conditions and the Mandatory Contract Terms of this RFT.

References to Soil in this section shall include Soil, Crushed Rock and/or Soil mixed with Crushed Rock, each as defined by the Regulation.

The Contractor represents and warrants that it is familiar with and knowledgeable of Ontario’s Excess Soil and Waste Laws.

To the extent the Contractor is required by the terms herein to send a notice to or seek approval or consent from the Owner and the Contractor shall include or copy the Owner’s Qualified Person (QP) on any such correspondence. Approval or consent from the Owner shall mean approval or consent that is provided in writing.

Material Management

The Contractor shall prepare an excavation contingency plan in accordance with section 23 of the Regulation and submit the plan to the Owner for review and approval prior to the Contractor starting excavation in the Project Area.

On-site storage of excavated Soil at the Project Area will not be permitted unless the Owner has provided its prior approval in writing. If Owner approval has been obtained, the Contractor shall conduct on-site storage of excavated Soil at the Project Area in compliance with Ontario’s Excess Soil and Waste Laws.

If the Contractor intends to process excavated Soil at the Project Area, the Contractor shall notify the Owner and shall obtain approval prior to conducting any processing activities. If Owner approval has been obtained, the Contractor shall conduct all excavated Soil processing at the Project Area in accordance with section 6 of the Regulation and the Rules and shall ensure processing activities are conducted in a manner that would not result in the Soil at the Project Area being designated as waste due to processing.

If special excavated Soil processing activities occur on-site involving mixing with a natural or synthetic polymer for the purpose of dewatering and solidifying the excavated Soil, the Contractor shall retain a QP to meet the requirements of subsection 6(4) of the Regulation. The Contractor shall provide the Owner with a copy of any documentation or the Contractor's QP prepares as required by section 6 of the Regulation. The Contractor shall provide the owner of any Reuse Sites that have agreed to receive the Soil a copy of the document prepared by the Contractor's QP as required by paragraph 6(4).3 of the Regulation prior to transporting the Soil from the Project Area.

The costs associated with this special work done by the QP will be subject to the approval of the City Engineer.

The Contractor shall employ appropriate Soil segregation practices during handling, temporary storage and transportation to ensure mixing of Soils of different qualities does not occur.

Import of Excess Soil

All Excess Soil being brought to the Project Area shall meet the requirements set out in Ontario's Excess Soil and Waste Laws and shall be approved by the Owner prior to Excess Soil being imported for reuse to the Project Area.

The Contractor shall provide the Owner with the following information, for review and approval no later than ten (10) Working Days prior to the start of importation of Excess Soil to the Project Area:

- Information identifying the location, owner, operator of the proposed source site, and the associated contact information;
- Quantity of Excess Soil required for the Work;
- Soil quality standard applicable under the Standards (or, if applicable and approved by the Owner, site-specific standard generated by a QP through the BRAT) for Excess Soil with sampling and analysis results satisfactory to the Owner's QP;
- A copy of any permits, approvals, and/or licences applicable to the source site Excess Soil;
- Procedures the Contractor will employ for load management and inspection of incoming loads in accordance with section 19 of the Regulation, including those pertaining to segregation and record management; and,
- Any other information about the proposed Excess Soil the Owner may reasonably require.

The Contractor shall ensure the Excess Soil and its management and handling meets the requirements of Ontario's Excess Soil and Waste Laws and shall in no circumstances deposit a material designated as waste, other than Excess Soil at the Owner's property or Project Area. In identifying source sites to meet clean fill needs, the Contractor shall give

priority consideration to other projects the Owner is carrying out, that based on the foregoing meet the applicable Standard for quality.

Salt-impacted Excess Soil may be used at the Project Area as fill material in accordance with the recommendations provided in the Excess Soil Reuse Planning reports and geotechnical investigation reports prepared for this project and as approved by the Owner. The Contractor shall comply with the documentation and management requirements of the Regulation and Rules for salt-impacted Soil.

The Contractor acknowledges the Owner must provide written consent to the source site owner via the Contractor in a form acceptable to the Owner and no other commitments or agreements shall be made with the owner or operator of the source site of the Excess Soil without the Owner's prior written approval. Any Excess Soil brought onsite without the Owner approval in writing shall be rejected; any costs associated with removal and remediation of the Project Area, where such Excess Soil exceeds the soil quality standard or quantity as approved by the Owner under this section, shall be borne by the Contractor.

The Contractor shall make best efforts to seek that reliance is extended to the Owner by the QP for the source site on any reports, data and recommendations they have prepared, used to identify suitability of Excess Soil from a source site to be reused at the Project Area. Reliance under this section means reliance on terms acceptable to the Owner.

Chemical Analysis and Results of Excess Soil

The Excess Soil Reuse Planning reports and geotechnical investigation reports prepared for this project have been provided for information purposes to assist identification of appropriate Reuse Sites and Soil management activities on this project. It is the Contractor's responsibility to review and ensure its understanding of the Excess Soil Reuse Planning reports and geotechnical investigation reports prepared for the project. The Contractor shall not claim any misunderstanding with regard to subsurface physical or chemical conditions provided in the reports for this Contract.

Excess Soil/Excess Material

Soil excavated in carrying out the Work of this Contract, that is not being reused at the Project Area, shall be removed from the Project Area and deposited at a Reuse Site or other suitable waste disposal site operating under an approval from Ontario's Ministry of the Environment, Conservation and Parks (MECP), as approved by the Owner, at the Contractor's expense in accordance with Ontario's Excess Soil and Waste Laws and Ontario Provincial Standard Specifications 180 ("OPSS 180"). To the extent that there is

any conflict or inconsistency between Ontario's Excess Soil and Waste Laws and OPSS 180, Ontario's Excess Soil and Waste Laws shall govern.

The Contractor shall not commence construction until the Owner's prior written approval of the Contractor's choice of all proposed receiving facilities (whether for storage, processing, reuse, and/or disposal) has been provided. The Contractor shall be responsible for identifying and making deposit arrangements acceptable to the Owner at appropriate off-project Reuse Sites based on the quality, geotechnical suitability and quantity of Excess Soil from the Project Area and in accordance with Ontario's Excess Soil and Waste Laws.

No claims related to delays while sourcing a lawful Reuse Site (or other MECP-approved receiving site) or delays related to acceptance of Excess Soil/excess material by the Reuse Site (or other MECP-approved receiving site) will be paid to the Contractor.

Ten (10) Working Days prior to the start of construction the Contractor shall provide the Owner with the following information for review, approval and where applicable, incorporation into an Excess Soil Destination Assessment Report by the Owner's QP:

- Identification of the location of the Contractor's proposed Reuse Site(s) (or other MECP-approved receiving sites) and the name and contact information for their owner, operator and QP, as applicable;
- Where Reuse Sites are governed by an instrument listed in section 3(2)4 of the Regulation ("Reuse Site Instrument"):
 - A copy of the Reuse Site Instrument; and,
 - The Soil quality standard under the Standards (or, if applicable and approved by the Owner, site-specific standard generated by a QP through the BRAT) applicable to the Reuse Site under the Rules and Standards or as established by the Reuse Site's Qualified Person.
- Where Reuse Sites are not governed by a Reuse Site Instrument:
 - A description of the beneficial purpose for which the Excess Soil from the Project Area will be used at the Reuse Site, as contemplated in section 5(1)3 of the Regulation; and,
 - Written confirmation that the Excess Soil, including its quantity and quality, will meet the timing and all other requirements for Excess Soil placement at the Reuse Site in accordance with section 5 of the Regulation.
- Contingency measures the Contractor will implement, including but not limited to, location of an alternate site in the event Excess Soil cannot be deposited at the locations listed;

- Identification and location of any interim sites permitted by Ontario's Excess Soil and Waste Laws, including Class 1 Soil Management Sites, Class 2 Soil Management Sites, Local Waste Transfer Facilities, Retail Landscaping Soil Depots, and/or Residential Development Soil Depots (collectively, "Temporary Sites") proposed to be used to temporarily store and/or process Excess Soil, as well as the name and contact information for the owner and operator for each site, or waste disposal sites approved by MECP to accept Excess Soil for final disposal, as well as the name and contact information for the owner and operator for each site; and,
- A description of the proposed Reuse Site's (or other MECP-approved receiving site) capacity and requirements for the deposit of Excess Soil and confirmation that those requirements can and will be complied with by the Contractor;
- A copy of the Environmental Compliance Approval issued by the MECP for each Class 1 Soil Management Site the Contractor will be using to temporarily store and/or process the Excess Soil and/or waste disposal site the Contractor will be using to dispose of the Excess Soil, if applicable;
- A copy of Ontario Provincial Standard Form 180-2 (OPSS 180-2), "SITE SELECTION NOTIFICATION FOR MATERIAL MANAGED AS DISPOSABLE FILL" or another form of consent acceptable to the Owner. The Contractor is not permitted to start any excavation work until this signed consent has been approved by the Owner; and,
- Any other information about the proposed Reuse Site (or other MECP-approved receiving site) the Owner may reasonably require.

To the extent that excess material is neither excavated Soil nor Excess Soil but otherwise constitutes "waste" pursuant to the EPA and Reg. 347 ("Non-Soil Waste"), the Contractor shall manage, transport, and dispose of the Non-Soil Waste and ensure that the Non-Soil Waste is managed, transported, and disposed of in accordance with the EPA, Regulation 347, Ontario Regulation 351/12 and other regulations under the EPA, as may be applicable, including but not limited to ensuring that the Non-Soil Waste is transported by a hauler approved by the MECP to transport the Non-Soil Waste and is disposed of at a waste disposal site approved by the MECP to receive the Non-Soil Waste for final disposal. All Non-Soil Waste must be finally disposed of promptly at the time of excavation, except where analytical testing is required to determine the appropriate MECP-approved waste disposal site, in which case required sampling must be carried out immediately and Non-Soil Waste must be finally disposed of within seven (7) calendar days following receipt of analytical results.

Any additional chemical or geotechnical testing required by a Reuse Site shall be at the Contractor's expense without an entitlement to an extension of the Contract time. Where additional testing is required by a Reuse Site, the Contractor shall retain a QP to oversee and carry out the testing, where applicable. All resulting recommendations and analysis results shall be provided to the Owner. The Contractor shall ensure its QP extends reliance

on all reports and recommendations prepared for the management of Excess Soil in the Project Area to the Owner and on request of the Owner or operator extends reliance to the owner or operator of a Reuse Site. Reliance under this section means reliance on commercially reasonable terms acceptable to the Owner.

Where the use of Temporary Sites is approved by the Owner for storage of Excess Soil, all Excess Soil must be placed at the final Reuse Site (or other MECP-approved receiving site) within sixty (60) days after the substantial completion date.

The Contractor shall submit to the Owner a notice of final placement of all Excess Soils and excavated Soils including date the last load of Soil was removed from the Project Area, and final disposal of all Non-Soil Waste, related to or arising from the project. The Contractor shall submit to the Owner a signed copy of Ontario Provincial Standard Form 180-3 (OPSF 180-3) "PROPERTY OWNER'S RELEASE within sixty (60) days after the substantial completion date.

The OPSF 180-2 and OPSF 180-3 are included in the appendix of this RFT and apply to any item that includes excavation, removal and reuse of Excess Soil.

All costs associated with the requirements of this section are to be included within the unit prices for those items.

Hauling and Transportation

The Contractor is responsible for retaining haulers for transportation of Excess Soil and for ensuring that any vehicle hauling Excess Soil from the Project Area meets all criteria outlined in Section 17 of the Regulation.

Prior to commencement of excavation, the Owner will provide the Contractor with an excel file to be used to track the information required by section 18 of the Regulation and a Hauling Record template to be used for each load of Excess Soil - Please refer to the Appendices of this RFT for the excel tracking file and the template of Hauling Record. The Contractor shall ensure the Hauling Record is used to record the required information for every load of Excess Soil leaving the Project Area. The Contractor shall submit the excel tracking form and copies of all completed Hauling Records on a weekly basis to the Owner and keep the Hauling Record available upon request for two (2) years from the date the form is filled, including all backup documentation.

The Contractor shall cause any person who is operating a vehicle for the purpose of transporting Excess Soil to have available at all times during the transportation a completed Hauling Record for every load either in hard copy or electronic version.

The Contractor shall cause any person who is operating a vehicle for the purpose of transporting Excess Soil to, upon arriving at a Temporary Site, or Reuse Site (or other MECP-approved receiving site) complete the receiver information on the Hauling Record and ensure the receiving site representative signs the declaration on the Hauling Record.

Tracking

The Contractor shall develop and apply a tracking system, where required by and in accordance with section 16 of the Regulation and Section B of the Rules, to be used to track information about each load of Excess Soil during its excavation, on-site stockpiling (where permitted), transportation and deposit at a Reuse Site (or other MECP-approved receiving site) and any transportation to and from a Temporary Site and all other information required by the Regulation and the Rules.

The Contractor shall:

- Ensure the Owner and the Owner's QP have unrestricted access to the tracking system and information collected; and,
- Ensure all Subcontractors that are involved or engaged in any way in the excavation, management, testing, sampling, analysis, transportation or disposal of Excess Soil from the Project Area use and are integrated into, familiar with and trained on the Excess Soil tracking system.

Municipal By-laws and Instruments

The Contractor shall comply with all requirements of Municipal by-laws, instruments, ordinances, regulations, directions, orders, rules and guidelines that are applicable to excavated Soil generated at the Project Area, Excess Soil leaving the Project Area and the work, services and obligations described herein (regardless of whether such requirements exceed or are more stringent or onerous than the requirements of Ontario's Excess Soil and Waste Laws).

Records

The Contractor shall retain a copy of the Contract (including all Contract Documents) for seven (7) years from the date the Contract was entered into. The Contractor shall retain copies of all subcontracts and supply agreements it enters into with Subcontractors or suppliers relating to the management of Excess Soil, including the transportation or importation (if permitted) of Excess Soil, for seven (7) years after the date such subcontracts or supply agreements were entered into.

The Contractor hereby grants to, and agrees to obtain for the Owner a perpetual, irrevocable, fully paid-up, royalty-free, worldwide, right and licence to access, use, copy, support, maintain, modify, sublicense, assign and distribute all notices, analyses, data, results, reports, inspection certificates and other documentation related to Excess Soil that the Contractor (or its Subcontractors, suppliers or consultants) created or acquired during the course of the Contract, including all documentation and records created or acquired under the Regulation, all information and data tracked and stored on the Soil tracking system, any documentation received by the Contractor (or its Subcontractors, suppliers or consultants) from any sites from which Soil was imported to the Project Area (if permitted), and any documentation provided to the Contractor (or its Subcontractors,

suppliers or consultants) from Reuse Sites or other MECP-approved receiving sites where Soil was temporary or permanently deposited (collectively “**Excess Soil Records**”).

Excess Soil Records shall be provided to the Owner upon request or made available to the Owner and its representatives for audit upon request. The foregoing shall not be construed to limit, revoke or abridge any other rights, powers, or obligations relating to audit which the Owner may have at law or by contract.

This section shall survive termination or expiration of the Contract.

Filing Notice in the Registry

The Contractor acknowledges where filing a notice in the Registry is required by the Regulation:

1. The Owner will complete requirements for filing notices in the Registry for the Project;
2. No Excess Soil shall be removed from the Project Area until the Contractor obtains written confirmation the notice has been filed in the Registry, in accordance with and containing all information required by the Regulation or where the Owner has provided approval to remove Excess Soil from the Project Area in circumstances permitted by section 8(3) of the Regulation;
3. The Owner will ensure that the documentation requirements set out in sections 11 to 15 of the Regulation are fulfilled; and,
4. Where the requirements of section 19 of the Regulation apply to the Project Area, no Excess Soil from another Project shall be deposited at the Project Area until the notice has been filed in the Registry in accordance with and containing all information required by the Regulation.

Where removal is approved by the Owner in accordance with section 8(3) of the Regulation, the Contractor shall ensure that the required sampling is conducted promptly upon delivery of the Excess Soil to the Temporary Site. Before the Excess Soil is transported from the Temporary Site to a Reuse Site (or other MECP-approved receiving site) under this section, the Contractor shall obtain written confirmation the notice has been filed in the Registry.

The Contractor shall provide additional information as requested by the Owner or the Owner’s QP on reasonable notice to facilitate filing of the notices and updates to the Registry.

The Contractor shall be familiar with the contents of all notices filed and shall notify and provide updated information to the Owner forthwith of any errors, changes required or missing information in the notices (and updates to the notice).

The Contractor shall provide written notice to the Owner within five (5) Working Days of removal of the last load of Soil that will become Excess Soil for the Project from a Project Area or Temporary Site, with the final quantity of all Soil removed from the Project Area.

Where a notice is filed in the Registry for Excess Soil being imported to the Project Area, the Contractor shall provide written notice to the Owner within five (5) Working Days after the final load of Excess Soil has been deposited at the Project Area.

Subcontractors

The Contractor shall ensure it enters into written agreements with its subcontractors to require them to perform their work in accordance with, and subject to, the terms and conditions of this Contract, including but not limited to requirements outlined in Ontario's Excess Soil and Waste Laws. The Contractor acknowledges and agrees that it shall be as responsible to the Owner for acts and omissions of its Subcontractors, and persons employed by them, as for acts and omissions of persons directly employed by it.

Payment

There is no payment associated with these requirements. **The costs are to be included within the unit prices for the items that require excavated Soil, Excess Soil, excess material and Non-Soil Waste management, including but not limited to, excavation, transporting and disposal of Soil, excess material and/or Non-Soil Waste as part of sewer, watermain, and road construction.**

No payments will be made until all tracking documentation has been submitted and approved for the pay period in the progress certificate.

3. HARD SURFACE REMOVAL (Basis of Payment) (January 2022)

The removal of all hard surface features encountered in construction, such as pavements, alleys, driveways and sidewalks shall be measured by the square metre. When any curb and gutter are removed in conjunction with a hard surface, it shall be included in the square metre measurement and shall not be measured and paid separately. Saw cutting costs in conjunction with a hard surface removal shall be included in the hard surface removal unit price, with the exception of sewer & watermain trench work, unless otherwise identified in the tender.

For sewer construction, the trench must be sawcut and will be paid for under its own item or as per the description of the contract documents. Breaking the asphalt shall not be permitted.

All other curb and gutter removal that are not removed in conjunction with hard surface pavement removal shall be measured separately and paid by the linear metre.

4. THE USE OF BULK WATER FILL STATIONS (BWFS) (January 2022)

The Contractor is reminded that the use of fire hydrants WILL NOT be permitted for any construction related activities. In lieu of fire hydrants, the Contractor is to use Bulk Water Fill Stations (BWFS) at EnWin's Rhodes Drive Operating Centre and other available locations.

Separate Payment will NOT be made for water required during sewer and road construction, including compaction of all backfill & base material, pavement, curbs & gutters, driveways, sidewalks or any other structures. The water usage for these items shall be included in the unit price for each individual item.

The water application for dust control will be paid by unit price. Please refer to City of Windsor Standard Specification S-14 & S-15 for the water application and payment in boulevard restoration.

5. BACKFILL PRACTICES (February 2015)

The Contractor shall follow the City of Windsor Standard Drawings AS-536, AS-310A, B & C and specific requirements shown in the tender documentation for the material use and backfilling method unless specified otherwise in the next paragraphs.

Sewer Trench Backfill

If full granular backfill is required at any section between two manholes of one sewer run, that entire run shall be backfilled with the same granular material, with the exception of the following case.

Full granular material backfill is required for any sewer trench crossing a road intersection even if the sewer trench is deep enough for native backfill as per AS-536. In this case, the granular backfill shall continue to the end of curving section of the intersection as shown on the tender drawings and then change back to required native backfill as per AS-536.

Maintenance Stone over Trench Area

All underground work shall be completed prior to the start of road cutting. This shall be applicable to all underground work including but not limited to sewer main, catchbasin leads, private drain connections, and watermain and water services.

The Contractor will be required to backfill all sewer trench excavations within the roadway and the sidewalk to an elevation of 100mm (4") below the existing surface elevation with granular trench backfill material as per AS-536. The Contractor shall complete the top 100mm (4") backfilling by placing, compacting, and maintaining Granular "A" material or other approved materials to match existing surface grade before the road cut.

The cost for these materials shall be included in the unit bid price for the sewer main, watermain, catchbasin leads, conduits, and/or connections installed and shall be

compensated in full for all labour, equipment and materials required to execute the work as specified herewith. There will be no payment for the maintenance of the materials above the sub-grade.

6. ASPHALT ESCALATION (December 2012)

The payment for liquid asphalt will be adjusted based on the Ministry of Transportation’s (MTO) performance graded asphalt cement price index. The price index will be published monthly on MTO Contract Bulletin and displayed on the Ontario Hot Mix Producers Association (OHMPA) website (www.ohmpa.org). 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, Freight on Board (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 price adjustment per tonne of new asphalt cement (AC) will be established for each month in which paving occurs when the price index for the month differs by more than \$15 from the price index for the month prior to Tender Opening. When the price index differential is less than \$15, there will be no payment adjustment for that month. Payment adjustments due to changes in the price index are independent of any other payment adjustments made to the hot mix tender 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.

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

ASPHALT CEMENT PRICE ADJUSTMENT, PA	
I_P	Paving within Approved Contract Time
$I_P > I_{TO} + 15$	$PA = (I_P - I_{TO} - 15) \times T_{AC}$
$I_P < I_{TO} - 15$	$PA = (I_{TO} - I_P - 15) \times T_{AC}$

Where:

- PA** = Payment adjustment for new asphalt cement, in dollars
- I_{TO}** = Performance graded asphalt cement price index for the month prior to Tender Opening
- I_P** = Performance graded asphalt cement price index for the month in which paving occurs
- T_{AC}** = Quantity of new asphalt cement in tonnes

The quantity of asphalt cement includes all grades of **new** asphalt cement supplied by the Contractor with and without polymer modifiers. For each month in which a payment adjustment has been established, the quantity of the escalation/de-escalation will be calculated using the hot mix quantity accepted in the Work and its corresponding asphalt cement content as required by the job mix formula. The Recycled Asphalt Product (RAP) component of the job mix formula shall not be included.

Two calculation examples are listed below including the deduction of AC content in the RAP and the payment adjustment for either the Contractor or the Owner.

	Example One ($I_P > I_{TO} + 15$)	Example Two ($I_P < I_{TO} - 15$)
Mix Type	HL4	HL4
Total Tonnes	100	100
% AC Total	5%	5%
%RAP used	15%	15%
%AC in RAP	4.0%	4.0%
Total Tonnes AC in Mix	$100 \times 5\% = 5$	$100 \times 5\% = 5$
Tonnes AC in RAP	$100 \times 15\% \times 4\% = 0.6$	$100 \times 15\% \times 4\% = 0.6$
Tonnes New AC (T_{AC})	Total AC – AC in RAP = $5 - 0.6 = 4.4$	Total AC – AC in RAP = $5 - 0.6 = 4.4$
Price Index I_{TO}	\$624.25 (Feb. 2011 Index)	\$679.25 (Jul. 2011 Index)
Price Index I_P	\$688.75 (Jun. 2011 Index)	\$641.50 (Sep. 2011 Index)
Payment Adjustment	$PA = (I_P - I_{TO} - 15) \times T_{AC} =$ $(688.75 - 624.25 - 15) \times 4.4 =$ \$217.80	$PA = (I_{TO} - I_P - 15) \times T_{AC} =$ $(679.25 - 641.50 - 15) \times 4.4 =$ \$100.10
Money to	Contractor ($I_P > I_{TO} - 15$)	Owner ($I_P < I_{TO} - 15$)

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

7. CONCRETE PIPE STRUCTURAL REPAIRS (December 2012)

Concrete pipe longitudinal crack widths in the range of 0.25 – 2.5 mm (0.01 – 0.1 inch) shall be repaired by a method approved by the City Engineer prior to the acceptance of the work.

Concrete pipe longitudinal cracks larger than 2.5mm (0.10 inch) in width shall require structural repairs. Concrete pipe longitudinal cracks larger than 5 mm (whether stable or not) OR larger than 2.5 mm and that are unstable shall be removed and replaced. Circumferential cracks that allow inflow but are not offset vertically shall be repaired to provide a water-tight seal. Circumferential cracks that are offset vertically shall be repaired structurally.

Before structural repairs are undertaken on an installed RCP/CP, the pipe shall be structurally evaluated to determine if the installed pipe system has reached equilibrium and the pipe has proven to have capability to support the load.

Acceptable repair actions for a crack that needs structural repairs could include the following:

- Link-pipe; or,
- Cured in place pipe (CIPP); or,
- Grout the cracks with sodium silicate based or epoxy based resin materials.

All above listed criteria and repair methods are subject to the review & approval of the City Engineer in each specific project.

8. PRIVATE DRAIN AND CATCHBASIN CONNECTIONS (May 2017)

Location of the Private Drain/Catchbasin Connections

The locations of existing private drain/catchbasin connections, as shown on the Contract Drawings, are in accordance with the most current information available and are NOT certified to be accurate. The Contractor shall expose an existing private drain/catchbasin connection before commencing sewer construction in order to determine its exact location if necessary. The cost of this work shall be included in the unit price bid per metre of sanitary or storm private drain connections.

In addition, the Contractor shall ensure that all buildings and catch basins on a construction project have been reconnected to the proper sewers. This shall be achieved by either dye or smoke testing, or by use of a mini-camera or C.C.T.V. inspection if necessary.

Number of Private Drain Connections

The number of sanitary and storm private drain connections listed in the Schedule of Unit Prices are estimated. The intent of this specification is to aid the Contractor in preparing the bid. No claim for an extra will be made by the Contractor on the basis of a variation in the number of connections unless under the approval of the City Engineer.

9. SALVAGE OF METAL MATERIALS (February 2013)

Where City of Windsor manhole and catchbasin frames and covers require replacement, the Contractor shall remove the old frames and covers and transport them to the City of Windsor Operations yard at 1531 Crawford Avenue.

Any miscellaneous metals encountered or removed during construction on this contract, shall remain the property of the City of Windsor and shall also be transported to the City of Windsor Operations Yard at 1531 Crawford Avenue. **Proof of delivery (signature of City of Windsor employee at Crawford Yard) shall be provided by the Contractor.**

The cost for the above salvage and transportation shall be included as part of the unit prices bid in the Schedule of Unit Prices, as no additional cost for this work will be paid.

10. MAINTENANCE OF FLOW IN SEWERS (February 2015)

The Contractor shall maintain the flow from all sewers, private drain connections and catch basin leads during the construction of the works. The Contractor shall be prepared to pump, divert, or find other means of maintaining flows during construction. The Contractor shall submit to the Engineer for review, the proposed construction method, which shall include the equipment to be used to maintain the flow in the sewers and connections.

The unit price bid in the Schedule of Unit Prices for construction of sewers, manholes, private drain connections and catch basin leads shall include all costs to maintain flows in sewers and connections as no additional remuneration will be paid.

11. LAYOUT (January 2022)

The Contractor is responsible for the sewer & watermain layout and the City is responsible for the rest of construction layout work, including but not limited to roads, curbs & gutters, sidewalks & multiuse trails. Electronic construction drawings in AutoCAD file format will be made available at the Contractor's request. The Contractor shall sign the form of Terms and Conditions for use of Digital Electronic Files prior to the usage of AutoCAD file provided by the City. The benchmark and points of reference for setting out can be provided as well for the purpose of manual layout. The Contractor is responsible

for maintaining these points and using them for locating all structures and grade stakes required for the proper location and installation of the work.

12. EXCAVATIONS IN THE VICINITY OF GAS LINES (December 2008)

All excavations in the vicinity of gas lines shall be carried out in accordance with:

1. The Occupational Health and Safety Act and Regulations which apply under this Act, including regulations for construction projects; and,
2. The Technical Standards and Safety Act and Regulations that apply under this Act.

The Contractor is referred to the “Guidelines for Excavations in the Vicinity of Gas Lines”, prepared by the Technical Standards and Safety Authority. The procedures described herein are prepared in the interest of safety to the general public, the workers carrying out the excavation, and the prevention of damage to gas lines and property.

13. BACKFILL AROUND GAS MAINS (January 2022)

The Contractor shall be responsible to backfill around all gas mains exposed during the course of construction in accordance with City of Windsor Standard Specification S-39 Backfill Around Utilities, or any other superseding standard of Enbridge, unless otherwise directed by Enbridge in writing. The above specification shall govern work around gas lines.

14. STREETLIGHTING INFRASTRUCTURE (January 2022)

Any and all materials, labour, approvals, drawings, and equipment required for the purpose of removing and replacing existing street lighting poles are to be fully included in the lump sum tender price. The mast arms and luminaries on the existing poles are to be transferred to the new poles unless otherwise specified in the contract documents. The removed poles are to be disposed of or as directed by the City Engineer.

The Contractor is referred to the “Street Lighting Design and Installation Guidelines”, prepared by the City of Windsor – Traffic Operations for the installation and the approval of connections.

<https://www.citywindsor.ca/business/buildersanddevelopers/Pages/Municipal-Infrastructure-Requirements.aspx>

15. TREE PROTECTION AND FINES (January 2022)

In accordance with City of Windsor policy, the Contractor shall exercise the utmost caution to ensure the protection of trees (above and below ground) during construction activities. If trees are damaged or mistakenly removed due to the construction activities, the Contractor shall be assessed the appraised value of the trees, as determined by the City Forester. The appraised value of the trees shall be determined using the Guide for Plant Appraisal 10th Edition.

All City trees must be protected during the construction of the project. Tree protection fencing shall be installed around the perimeter of the tree's drip line to protect the critical root zone of the tree and the main stem (trunk) from mechanical damage. The installation and positioning of the tree protection fencing by the contractor shall be assessed and approved by the City Forester or his designate prior to the commencement of the project. It is prohibited to move or reposition the tree protection fencing during the construction of the project unless authorization by the City Forester or his designate is obtained.

All City owned trees along the public Right of Way or within City parks that present interference issues for construction machinery, shall be trimmed by the Contractor in advance of the construction project in an effort to reduce damages to City owned trees during construction. The Parks Department (Forestry Division) shall provide the Contractor, a list of approved professional Tree Care companies to retain for the project. The Contractor is responsible for coordinating an onsite meeting with the Manager of Forestry and Natural Areas or his designate along with the Contractor's chosen tree trimming sub-contractor (attained from the City's approved list of tree companies) to review the scope of the tree trimming requirements for the protection of trees during the project. The Contractor will be responsible for scheduling and monitoring the required tree trimming by an approved tree trimming sub contractor. The Contractor's attention is brought to Standard Drawing AS-507, Guidelines for Tunnelling Lengths Near or at Trees, and to the fact that should it be necessary to excavate closer to an existing tree than is acceptable to the City Forester, then the City Forester shall be notified and approval shall be granted by the City Forester prior to the work being performed.

S-4 GRANULAR BASE and AGGREGATES

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4.01 SCOPE OF WORK

The work shall consist of supplying, weighing, delivering, placing, and compacting as directed, select base course material of a nature that will conform to this specification.

4.02 RELATED DOCUMENTS AND REFERENCES

- City of Windsor General Conditions
- City of Windsor S-13,
- City of Windsor Recycled Aggregate Quality Control Program (RAQCP)
- OPSS.MUNI (314, 501, 1001, 1004, 1010)
- MTO Laboratory Testing Manual (LS-602, LS-623, LS-706, LS-704, LS-625, LS-607)

4.03 MATERIALS

Materials shall be selected or processed so as to conform to the requirements of this specification unless otherwise specified and pre approved by the City of Windsor. The Contractor shall submit their intended sources of materials to be used on their project to the City Engineer prior to delivering any materials to site. The City Engineer reserves the right to test the materials from the source or request specific test results from the Contractor for the materials intended to be supplied prior to approving use of these materials.

Like materials shall come from the same supplier and source for the entire project.

A change in supplier or source, should it be necessary must be pre-approved by the City Engineer. Changes in suppliers or sources without pre-approval may result in a request for third party sampling, laboratory testing and field compaction testing at Contractor's expense.

4.04 GENERAL REQUIREMENTS

4.04.01 Granular "A"

Granular A shall be according to OPSS.MUNI 1010 and satisfy all requirements of Table 1 and Table 2 in the OPSS.MUNI 1010 unless otherwise directed or specified and pre-approved by the City Engineer.

The use of Granular A for sewer trench backfill will require full depth compaction testing by a third party geotechnical consultant.

4.04.02 Granular "B"

Granular B shall be according to OPSS.MUNI 1010 and satisfy all requirements of OPSS.MUNI 1010 Table 1 and Table 2 unless otherwise directed or specified and pre-approved by the City Engineer. Granular B Type I shall not be used without approval by the City Engineer and will require additional testing requiring third party geotechnical consultation at the expense of the contractor. Additional testing includes but is not limited to laboratory gradation and standard Proctor testing of the granular A and granular B Type I. Also, compaction testing of the granular A separation barrier and compaction testing of the granular B Type I trench backfill throughout its entire depth. In addition to testing requirements drainage of the mainline trench cut, at the surface, is to be maintained to avoid any ponding or pooling of water in the trench cut prior to road excavation. Should tracking of the granular material take place during construction, the truck routes must be kept clean of tracked material and if necessary, catch basins on adjacent roadways need to be maintained and cleaned prior to demobilization from the site.

The use of Granular B Type II for sewer trench backfill will require full depth compaction testing by a third party geotechnical consultant.

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4.04.03 Clear Stone

Unless otherwise directed or specified and pre-approved by the City, clear stone shall be according to OPSS.MUNI 1004 Table 1 and Table 2 for 16mm clear stone.

Alternatively, subject to the pre-approval of the City Engineer, 19mm nominal size clear stone can be used if the material meets the following requirements:

- Table 1 Physical Property Requirements for Clear Stone in OPSS.MUNI 1004 and Revised Table 2 of Gradation Requirements (herein) including City of Windsor 19mm nominal size clear stone.

Table 2 (Revised) Gradation Requirements for Clear Stone

<i>Sieve Designation</i>	<i>Nominal Maximum Size</i>			
	<i>16 mm</i>	<i>19 mm Type I</i>	<i>19 mm Type II</i>	<i>19 mm City of Windsor</i>
	<i>% passing</i>			
<i>26.5 mm</i>	---	100	100	100
<i>19.0 mm</i>	100	90-100	90-100	70-100
<i>16.0 mm</i>	96-100	---	65-90	45-100
<i>13.2 mm</i>	67-86	---	---	28-86
<i>9.5 mm</i>	29-52	0-55	20-55	0-55
<i>4.75 mm</i>	0-10	0-10	0-10	0-10
<i>75 µm</i>	0-2	0-2	0-2	

4.04.04 Open Graded Drainage Layer (OGDL)

OGDL shall be of the type specified in the contract drawings. For asphaltic or Portland cement stabilized OGDL refer to City of Windsor S-41. In the case of standalone granular OGDL, the material shall satisfy the physical requirements of OPSS 1010 Table for Granular 'O'. Said material is to be comprised of 100% crushed and non-recycled material and have the following gradation:

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<i>Sieve Designation</i>	<i>% passing</i>
<i>37.5mm</i>	<i>100</i>
<i>26.5mm</i>	<i>95 - 100</i>
<i>19.0mm</i>	<i>90 - 100</i>
<i>16.0mm</i>	<i>65 - 100</i>
<i>13.2mm</i>	<i>40 - 86</i>
<i>9.5mm</i>	<i>20 - 55</i>
<i>4.75mm</i>	<i>0 - 10</i>
<i>2.36mm</i>	<i>0 - 5</i>
<i>75um</i>	<i>0 - 2</i>

Granular OGDG shall be placed in the location and at the thickness and grade specified in the contract documents and be consolidated by means of a smooth drum roller so as to satisfy the finished grade tolerances of this specification.

4.04.05 Reclaimed / Recycled Aggregate

The use of recycled materials will not be permitted for road base or any frost susceptible application without specific source and stockpile control and written pre-approval from the City Engineer.

All material produced of a reclaimed or recycled source shall be according to OPSS 1010 and The City of Windsor Recycled Aggregate Quality Control Program (R.A.Q.C.P).

All of the requirements of The City of Windsor Recycled Aggregate Quality Control Program (R.A.Q.C.P.) must be completely satisfied, including all testing, analysis, remedial actions, paperwork, and approvals prior to delivery of any reclaimed aggregate whatsoever.

Prior to the use of recycled aggregate materials on any project, the following procedures are to be implemented:

- A) Application to use recycled aggregate is completed and submitted to the Field Services Office.
- B) The City of Windsor will no longer require Bill of Lading Tickets.
- C) Environmental testing (leachate) to be submitted for approval annually per source pile under procedures for leachate extraction in Ontario Regulation 347 of the Environmental Protection Act. If additional material is added to the tested stockpile or a new stockpile is generated, a new submission and approval will be required.

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- D) Sieve analysis testing, percent asphalt coated particles, percent wood, clay brick, gypsum/gypsum board, plaster (deleterious materials) and plasticity index analysis shall be submitted for approval from the stockpile specifically for that project.
- E) When a stockpile is scheduled to be sampled for environmental and/or physical property testing the City shall be given 24 hours advance notice to arrange their own site observation and sampling. Should such notice not be given, the City reserves the right to require re-testing of the said stockpile.
- F) The City shall be granted the access to the stockpiles for monitoring purposes throughout the construction season.

Any reclaimed material delivered without such approval will be immediately removed from the project at the contractor's expense.

The gradation requirements for City of Windsor 0-75 mm recycled shall be:

<i>Sieve Designation</i>	<i>% passing</i>
<i>75.0mm</i>	<i>100</i>
<i>50.0mm</i>	<i>80-100</i>
<i>37.5mm</i>	<i>68-95</i>
<i>26.5mm</i>	<i>50-90</i>
<i>16.0mm</i>	<i>34-80</i>
<i>9.5mm</i>	<i>28-75</i>
<i>4.75mm</i>	<i>20-55</i>
<i>1.18mm</i>	<i>10-40</i>
<i>300um</i>	<i>5-22</i>
<i>75um</i>	<i>0-10</i>

The physical requirements that apply to recycled aggregate shall be:

1. Plasticity Index (LS-704) required.
2. Asphalt Coated Particles (LS-621) required.
3. Determination of Amount of Contamination (LS-630) required.
4. Percent Crushed (LS-607) when requested.

All delivered suspect materials will be refused. Any load of recycled material may be rejected in the field based on visual detection of deleterious materials. Such a rejection may result in the requirement for additional testing of the source stockpile.

The Ministry of the Environment may be notified by the City of Windsor of the location of any reclaimed aggregates not classified as inert and recyclable by Ontario Regulation 347.

4.05 HAULING AND PLACING

It is the responsibility of the contractor to consistently deliver the approved granular material to the work site in an appropriate manner and with suitable equipment and to deposit it there in such a way that no contamination or segregation takes place.

Delivered material may be placed directly into the work or be stockpiled on site for use but should not be moved excessively. Material will not be permitted to be stockpiled off site unless approved by the City Engineer.

All road base material shall be placed in uniform lifts not more than 300mm thick (after compaction) and according to plan grades.

All granular trench backfill shall be placed in uniform lifts not more than 1.0 m thick (after compaction)

The underlying lifts must be completely and uniformly compacted, be free of contaminants and approved by the City Engineer prior to placement of additional material.

Material shall be free of frost and frozen clumps.

Material shall not be placed on frozen material or ground.

Material shall not be transported to the site in a state of excessive moisture.

Should the site inspector observe that the material delivered to the site is being handled or placed in such a manner that the material is being contaminated or segregated, the Contractor shall be notified to modify their handling and placing practices to eliminate segregation or contamination to the satisfaction of the City Engineer. Should the improper handling and placing practice continue after discussions and documentation with the Contractor, any material so compromised may be subject to removal or other remedial action at the contractors' expense on the instructions of the City Engineer under GC 5.03.

4.06 QUALITY ASSURANCE

Setting as a standard testing frequency, Granular A and Granular B Type II materials shall be tested for gradation at a minimum of one sample for every 2500 tonnes delivered to site. Projects in which granular quantities for road base are less than 2500 tonnes may have additional sampling carried out in order to avoid a single sample representing all material in the Work. **Testing of materials at the source shall not replace the requirement of testing**

the materials delivered to site for conformance to the specifications. The City Engineer has the right to verify and confirm the quality of delivered Granular A and Granular B Type II source materials through visual inspection and necessary testing at any time during the construction. Notwithstanding standard testing frequency, sampling and testing of granular materials shall be carried out at the start of trench work (i.e. watermain, storm sewer or sanitary sewer) and at the start of road cut activities regardless of the quantity of material that has been delivered to site.

Quarried clear stone shall be tested as requested by the City Engineer. Clear stone that are not 100% quarried material shall meet Table 1 Physical Property Requirements for Clear Stone in OPSS.MUNI 1004 and the Revised Table 2 – Gradation Requirements for Clear Stone in the Section 4.04.03. The Contractor shall be responsible for assuring conformance to the specifications and shall provide the required clear stone test results at the Contractor's expense. The material shall be tested and a report shall be provided prior to delivery of the material to site for each project respectively. Current test results (within the month for local quarried/crushed material and each time a new shipment is received at the docks) are required and out of date testing reports are not acceptable. Clear stone shall be pre-approved prior to the start of the project.

The City will give 24 hours notice to the Contractor when the City Engineer is to be on site taking specific material samples. The Contractor can elect to sample themselves, have an independent third party carry out sampling on their behalf. Note that a dual agent shall not be allowed in the project QA/QC testing.

The Contractor will make available all necessary equipment and personnel to prepare a sampling pad of the end dumped delivered materials in order to obtain representative samples of the granular materials. If the Contractor elects to sample or have a third party sample the material(s), the Contractor or third party representing the Contractor shall direct the blending and preparation of sampling pad of the site delivered material such that representative samples can be obtained. If the Contractor elects not to sample themselves or not to have a third party sample the material(s) the City shall direct the sampling operations to obtain representative samples of the material(s).

Should the Contractor elect to sample the material, the QC, QA and referee sample shall be obtained by the Contractor or Contractor's third party representative, unless otherwise requested by the Contractor. The QC sample will be held by the Contractor or their third party representative. The QA and referee sample will be held by the City Engineer. If the Contractor elects not to sample, the representative of the City Engineer will only obtain QA and referee samples.

Note that the final decision on the acceptance/rejection of the material will be made based on the QA and referee sampling results.

The time period for completing QC and QA testing shall be a maximum of three (3) working days from the date of sampling. When referee testing is required the Contractor and City Engineer shall mutually agree upon a CCIL certified testing laboratory within a maximum of three (3) working days after the completion of the QC and QA testing.

Referee testing shall be completed within a maximum of three (3) working days from the date of delivery of the sample to the referee testing laboratory. The agreed upon referee testing laboratory shall allow both the Contractor and the City Engineer the opportunity to witness the referee testing. If for specific reasons, in person witnessing of the referee testing cannot be accommodated, the referee testing laboratory shall provide a recorded video record of the testing throughout its entirety which shall include documentation that records the laboratory technician performing all aspects of the work, dates and times of testing. The results of referee testing shall be reported, clearly indicating whether results meet OPSS or applicable City of Windsor gradation requirements or any other test requirements for which the sample was tested. Results shall be forwarded to the City Engineer and the Contractor.

The referee test results shall be binding on both the owner and the Contractor. When a referee test result shows that the Granular A and Granular B Type II granular base aggregates do not meet the requirements of this specification, the aggregates represented by the test result, including aggregates in existing stockpiles or in the Work, shall not be accepted. Both the City and the Contractor shall review, agree, and identify limits of the affected area that has been placed as well as stockpiles affected. The contractor shall remove the aggregates from the Work at no cost to the Owner. Alternatively, the City may accept a payment reduction if a mutual agreement can be made through discussions between the Project Manager and the Contractor.

Regardless of the negotiation of a reduced price payment, the warranty provisions in the contract shall apply.

When the referee test result shows that the aggregates meet the requirements of this specification, the aggregates represented by the sample shall be accepted.

The City shall be responsible for the cost of the referee testing provided that the referee test results show that the aggregates meet applicable specifications. Otherwise, the Contractor shall be responsible for the cost.

4.07 COMPACTION

The rate of placing material shall be controlled by the contractor's ability to achieve the required degree of compaction.

The type of compaction equipment used shall be suited to the material, degree of compaction required and space available.

Water for the purpose of compaction shall be according to OPSS 506 and free be of any contaminants that would adversely affect the material or the environment unless pre-approved and accepted by the City of Windsor (in the case of brine).

The contractor shall be aware that the cost of any water used in compaction is to be included in the Unit Price bid in the Form of Tender.

All road base material shall be placed and graded in uniform lifts not more than 300mm thick (after compaction) and is to be compacted to its target density over its entire depth and cross section and approved prior to placement of subsequent lifts or pavement structures.

4.08 COMPACTION REQUIREMENTS

The frequency and locations of compaction tests shall be determined by the City Engineer.

The degree of compaction of granular base materials shall be specified in the contract and will be measured by means of a portable nuclear density gauge that satisfies the requirements of OPSS 501

Target densities for compaction tests shall be determined by:

1. A specified percentage of a standard proctor density as determined by MTO LS-623 and LS-706
2. A density achieved through the completion of a test strip as per OPSS 501.07.04.01
When a test strip is required the contractor will facilitate the equipment and personnel as required and at no cost to the City of Windsor in accordance to City of Windsor GC 5.02

4.09 FINAL ROLLING AND GRADING

Once overall material thickness has been attained, the surface shall be further shaped and compacted so as to be smooth, true to proposed grade and be free from ruts or waves.

The tolerance for the finish granular grade shall not be more than 10mm at any place along a 3.0m straight edge in any direction except across the crown or at design grade changes.

Any area of the granular base that is found to be soft and yielding or is comprised of segregated or contaminated material shall be removed and replaced with suitable material to the satisfaction of the City Engineer.

4.10 MAINTENANCE OF BASE

It is solely the contractor's responsibility to completely maintain the base course to the required cross section, free from ruts, potholes, segregation, contamination or any adversities and at the required level of compaction until pavement or structure is placed.

The City of Windsor will incur no costs or responsibilities associated with final grade base maintenance.

Final acceptance of the base course is at the authority of the City Engineer and will immediately precede paving.

Any pavement or structure placed on a base course without expressed City approval is subject to removal at the contractor's expense.

4.11 MEASUREMENT FOR PAYMENT

Measurement for payment of selected Granular Base Course Material will only be made of those materials acceptable for use under this specification.

The unit of measurement will be that as provided for in the Tender.

4.12 BASIS OF PAYMENT

Payment will be made at the unit prices bid on the Tender and for the quantities determined by the collected delivery tickets. The delivery tickets must be supplied to the City Engineer within 24 hours of delivery or the City Engineer reserves the right to refuse acceptance of the delivery tickets.

Such payment shall constitute full compensation for supplying, weighing, and hauling the material; for placing, spreading, blading, compacting, maintaining, and any other cause whatsoever for all work performed in connection with the supply of the materials and any other incidentals necessary to complete the items that are not herein specified for payment otherwise.

S-5 CONCRETE CURB AND GUTTER SYSTEMS

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5.01 SCOPE OF WORK

This specification covers the requirements for the construction of concrete curb and gutter, setbacks, gutter outlets, and bullnoses together with the installation of catchbasin frames and grates that lie within the flow lines of the curb and gutter system.

5.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

- S-4 Granular Base and Aggregates
- S-7 Concrete Pavement and Concrete Base
- S-9 Concrete
- S-14 Sodding
- S-15 Seeding
- S-34 Topsoil
- OPSS 353 and OPSS.MUNI 353
- OPSS.MUNI 1308
- AS 103

- AS-208 & 208A
- AS-216
- AS-506
- AS-535
- AS-546

5.03 MATERIALS

The Contractor will supply all materials. Materials shall meet the requirements of the following:

5.03.01 CONCRETE

Concrete shall be as per City of Windsor Standard Specification S-9 – Concrete.

5.03.02 JOINT MATERIALS, FORMS AND STEEL REINFORCEMENT

Joint materials, forms, and steel reinforcement shall be as per requirements of OPSS 353 and the following requirements:

The forms shall be of wood, metal, or other suitable material that is straight and free from warp, having sufficient strength to resist the pressure of the concrete without deflection or loss. Division plates shall be metal.

5.03.03 CATCH BASIN FRAMES AND GRATES

Catch basin frames and grates shall be according to OPSS.MUNI 353.

5.03.04 CURING COMPOUND

Curing compound shall be as per City of Windsor Standard Specification S-9 Concrete.

5.04 CONSTRUCTION

Prior to starting the work, documentation shall be submitted, verifying that the Contractor's representative of the placing crew shall be on site and shall have the ACI Flatwork Certification according to OPSS.MUNI 353 (Effective April 1, 2022).

5.04.01 GRANULAR BASE

Granular materials for the construction of a base shall be of the type and depth specified in the contract drawings and be according to City of Windsor Standard Specification S-4 Granular Base and Aggregates.

The foundation shall be excavated and filled with suitable material to the required grades and lines. Filled sections shall be compacted and extend a minimum of 0.3 metres (1 foot) outside the form lines.

Compaction shall be according to specified compaction requirements in the contract drawings, City of Windsor Standard Specification S-4 and OPSS.MUNI 353.

5.04.02 FORMWORK

Formwork shall be according to OPSS.MUNI 353 and shall be set true to the lines and grades specified in the contract documents and in direct contact with the granular foundation.

The front and back of the forms shall extend for the full depth of the concrete. All of the forms shall be braced and staked so that they remain in both horizontal and vertical alignment until their removal. They shall be cleaned and coated with an approved form-release agent before concrete is placed against them.

The concrete shall be deposited into the forms without segregation and then it shall be tamped and spaded or mechanically vibrated for through consolidation. Low roll or mountable curbs may be formed without the use of a face form by using a straightedge and template to form the curb face. When used, face forms shall be removed as soon as possible to permit finishing. Front and back forms shall be removed without damage to the concrete after it has set.

5.04.03 JOINTS

5.04.03(a) Contraction Joints

Transverse weakened-planed contraction joints shall be constructed at right angles to the curb line. When concrete curb and gutter is constructed adjacent to concrete pavement, the transverse joint spacing of the curb and gutter shall coincide with that of the concrete pavement. When concrete curb and gutter is constructed adjacent to asphalt pavement, transverse joints shall have a uniform spacing not exceeding 5m.

The width of the contraction joint shall be 3 to 5 mm and a minimum depth of 65 mm.

Contraction joints maybe sawed, hand-formed, or made by 3mm thick division plates in the formwork. Sawing shall be done early after the concrete has set to prevent the formation of uncontrolled cracking. The joints may be hand-formed either by (1) using a narrow or triangular jointing tool or a thin metal blade to impress a place of weakness

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into the plastic concrete, or (2) inserting 3mm thick steel strips into the plastic concrete temporarily. Steel strips shall be withdrawn before final finishing of the concrete. Where division plates are used to make contraction joints, the plates shall be removed after the concrete has set and while the forms are still in place.

5.04.03(b) Expansion (Isolation) Joints

Expansion joints shall be constructed between the curb and abutting immovable structures, including catchbasin frames, abutting sidewalks, driveways, gutter outlets or any other structures where cracking is likely to occur.

When the curb and gutter system is placed adjacent to the concrete pavement, longitudinal joints, as shown in the contract documents, shall be sawn between a curb and gutter system and concrete pavement. The joint shall be sealed with liquid joint sealer. All the work shall be according to City of Windsor Standard Specification S-9 Concrete and S-7 Concrete Pavement and Concrete Base.

Expansion joint material shall be set in place before concrete placement begins and shall be supported by removable forms. Filler material for isolation joint shall be furnished in a single 12-20mm thick piece for the full depth and width of the joint and meet the requirements of OPSS.MUNI 1308, except that cork expansion fillers will not be accepted.

Joint filler panels shall be set in a vertical position and, if for transverse joints, shall be set normal to the inside edge of the structure.

Panels shall be pre-cut from a single piece to the shape of the cross-section as shown on the standard drawings, but so as to provide a 6mm recess on the exposed surfaces. Cutting and tolerances shall conform to OPSS.MUNI 1308.

All concrete immediately above the filler material shall be carefully removed to form a 6 mm deep, 12 mm wide recess then finishing both edges of each joint to 5 mm radius with a suitable short edging tool.

Expansion joints in a slipformed curb or curb and gutter shall be constructed with an appropriate hand tool by raking or sawing through partially set concrete for the full depth and width of the section. The cut shall be only wide enough to permit a snug fit for the joint filler. After the filler is placed, open areas adjacent to the filler shall be filled with concrete and then trowelled and edged. Alternately, an expansion joint may be installed by removing a short section of freshly extruded curb and gutter immediately, installing temporary holding forms, placing the expansion joint filler, and replacing and reconsolidating the concrete that was removed. Contaminated concrete shall be discarded.

5.04.03(c) Construction Joints

A 5-mm bituminous fibre joint filler shall be placed at the point of interruption before recommencing the placement of concrete curbs and gutters.

5.04.04 CONCRETE PLACEMENT

Concrete placement shall be according to City of Windsor Standard Specification S-9 and the following requirements:

- a) Concrete shall not be placed until the foundation and the forms or stringline have been inspected and approved by the City Engineer.
- b) The concrete shall be placed and consolidated such that segregation of the aggregate does not occur. The concrete shall be placed and consolidated against all formwork; all entrapped air shall be eliminated.
- c) Concrete shall be placed continuously. Contact with partially set concrete shall be avoided. When placement of concrete is interrupted, it shall be at a vertical form. 5 mm bituminous fibre joint filler shall be placed at the point of interruption before recommencing placement of concrete.
- d) The concrete shall be placed either by an acceptable slipform/extrusion machine, or by formed method, or the combination of these methods. The forms or stringline shall be set true to the lines and grades specified in the Contract Documents and in direct contact with the subgrade or granular course.

The restriction of concrete placement shall be as per City of Windsor Standard Specification S-9 Concrete.

5.04.05 MACHINE PLACEMENT

The slipform/extrusion machine approved shall be so designed as to place, spread, consolidate, screed, and finish the concrete in one complete pass in such a manner that a minimum of hand finishing will be necessary to provide a dense and homogeneous concrete section. The machine shall shape, vibrate, and/or extrude the concrete section being placed. It shall be operated with as nearly a continuous forward movement as possible. All operations of mixing, delivery, and spreading concrete shall be so coordinated as to provide uniform progress, with stopping and starting of the machine held to a minimum.

5.04.06 CONCRETE FINISHING

Concrete finishing shall be according to City of Windsor Standard Specification S-9, OPSS.MUNI 353 and the following requirements:

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- a) The concrete on the upper surfaces shall be finished smooth, if necessary, by means of magnesium or aluminum trowels and then it shall be given a final surface texture using a light broom or burlap drag. The finished surfaces shall be free of open texturing, plucked aggregate and local projections.
- b) Back edges shall be rounded by use of a 5 mm radius edging tool. Neat cement shall not be used as a drier to facilitate finishing. Care shall be taken to avoid over finishing or working more mortar to the surface than is actually required.

5.04.07 CONCRETE CURING AND PROTECTION

The curing and protection of the completed curbs and gutters, including winter protection for concrete, shall be according to City of Windsor Standard Specification S-9 and the following requirements:

- a) The protection of concrete structures until their acceptance onto maintenance by the Corporation shall be the sole responsibility of the Contractor. The presence of footprints or other markings on the completed joint location of the curbs and gutters shall require saw cutting, removal, and replacement of the complete section at the Contractor's expense, unless otherwise directed by the City Engineer.
- b) The deficiency markings on the non-joint locations shall be repaired by the Contractor at the Contractor's expense at the direction of the City Engineer.

5.04.08 CONCRETE TOLERANCES

The exposed surfaces of the finished concrete shall be such that, when tested with a 3 m long straight edge placed anywhere along the surface parallel to the edge of curb face, there shall be no deviation greater than 3 mm between the bottom of the straight edge and the surface of the concrete nor shall there be any deviation from alignment in excess of 3 mm.

5.04.08(a) Temporary Asphalt Box Outs at Precast Catchbasins (Gutter outlet)

In staged construction where the surface asphalt will not be placed at the time of construction, the concrete box outs for standard pre-cast catchbasins shall not be constructed. The Contractor shall be required set catchbasin frames and covers with the base asphalt and construct a temporary asphalt box out with proper drainage grading and a raised curb behind the catchbasin. The length of the asphalt curb shall be included in the measurement of the catchbasin. No other payment will be made for this work. The costs for the work specified under this item shall be included in the tender item for the placement of catchbasin.

5.04.08(b) Temporary Road Drainage at Curb Inlet Catchbasins (setbacks)

Where curb inlet catchbasins are installed as per AS-546 and the surface asphalt course will not be placed until the following year, a temporary “V” groove shall be left in the concrete pan of the curb inlet box out for temporary road drainage purpose or as directed by the City Engineer. The costs for the work specified under this item shall be included in the tender item for the placement of catchbasin.

5.05 BACKFILLING

As soon as the City Engineer permits, the Contractor shall backfill the spaces in front and back of curbs with suitable material to the required elevation. The fill material shall be thoroughly tamped in layers.

Where boulevard restoration is required, it shall be done as described in the following City of Windsor Standard Specifications:

- S-34 for Topsoil
- S-14 for Sodding
- S-15 for Seeding.

5.06 DAMAGE TO ADJACENT BOULEVARDS AND PAVEMENTS

The Contractor will be required to make good, as directed, all damage done to the roadway or pavements while the work is in progress.

The Contractor will be required to remove all rubbish and material from the pavement and boulevards adjoining the curb and gutter system and restore the same to as good and clean condition as they were before commencing the work. Should the Contractor choose to use plastic as their method of protection, when removed from the concrete, all plastic is to be removed and disposed of at the Contractor’s expense. If any of the sod beyond the area of construction is destroyed by the Contractor or his employees, he will be required to replace it, at his expense, with new sod to the approval of the City Engineer.

5.07 TESTING AND QUALITY ASSURANCE

The testing and quality assurance for all concrete poured for curb and gutter system shall conform to the requirements contained in the City of Windsor Standard Specification S-9 for Concrete and the following requirements:

- a) The Contractor shall be responsible for the line and grade of the forms as provided by the City Engineer or will be responsible to match existing conditions when required.

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- b) The Contractor shall be responsible for the concrete work during the curing time and when the forms are removed until the work is accepted by the City Engineer.
- c) In no case shall ponding water over allowable drainage duration or exceed the specified grade at gutter lines be accepted. All areas with pond water or having insufficient/excessive cross fall, including those caused by poor construction and finishing methods, shall be removed and replaced at the Contractor's expense.

5.08 MEASUREMENT FOR PAYMENT

5.08.01 CONCRETE CURBS AND GUTTERS

Measurement will be made in linear meters along the base of the curb or along the flow of the gutter, of the total length of curb and gutter installed whether straight or circular and without separation into types.

5.08.02 SETBACKS AND GUTTER OUTLETS

For measurement purpose, a count will be made of the number of setbacks (curb-inlet catchbasin) and gutter outlets (standard catchbasin) installed without separation into types.

5.08.03 CONCRETE SPILLWAYS

Measurement shall be made in metres along the flow line from the end of the gutter outlet to the spillway termination.

5.08.04 GRANULAR BASE COURSE

Measurement shall be made in tonnes. This item shall be included in the measurement and unit price submitted for the supply and placement of granular materials.

5.08.05 WATER

This item shall be included in the unit price submitted for the placement of the new concrete curb and gutter system since no separate measurement and payment shall be made for this item.

5.08.06 REMOVAL OF OLD CURB AND GUTTER

Measurement shall be made in square meters of the total hard surface area removed as directed by the City Engineer. This item shall be included in the measurement and unit price submitted for the removal of existing road pavement, unless otherwise listed in the contract documents.

5.09 BASIS OF PAYMENT

- Concrete Curbs and Gutters – Item
- Setbacks (Curb in-let Catch Basin) – Item
- Concrete Gutter Outlets (Standard Catch Basin) – Item
- Concrete Spillway – Item

The Contract prices for the various components making up the curb and gutter system will be full compensation for supplying all labour and equipment and completely installing in accordance with this specification, the curb and gutter system as called for in the plans and for supplying all materials.

Excavation required to set the various components to the required line and grade will be considered as part of the work of installing the curb and gutter system; however, should such excavation overlap excavation required for any other work under the contract, then payment shall be made in accordance with the specification for such other work as though no excavation were required for the curb and gutter system construction.

There will be no separate payment item for concrete used for fillets in bullnoses. The costs shall be included under this item unless otherwise specified in the contract documents.

5.09.01 GRANULAR BASE COURSE – INCLUDED IN ITEM FOR GRANULAR MATERIALS

Payment will be made at the contract unit price per tonne for the measured quantities. This item shall be paid under a separate item for the supply and placement of granular materials; therefore the item shall be excluded in the unit price submitted for the construction of curbs and gutter unless otherwise stated in the tender documents.

5.09.02 HOT MIX ASPHALT

Hot mix asphalt used in the construction of curb and gutter system shall be paid for at the Contract price for the appropriate Hot Mix Asphalt tender item.

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CONCRETE SIDEWALK AND DRIVEWAY APPROACHES

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6.01 SCOPE OF WORK

This specification covers the requirements for the construction of concrete sidewalk, including commercial and residential driveway approaches.

6.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

- S-9 Concrete
- S-4 Granular Base and Aggregates
- AS-204
- AS-222
- AS-401 to AS-404
- AS-506
- OPSS 351 and OPSS.MUNI 351
- OPSS 501
- OPSS.MUNI 1308

6.03 MATERIALS

The Contractor will supply all materials. Materials shall meet the following requirements:

- a) Concrete shall be as per City of Windsor Standard Specification S-9 for Concrete.
- b) Joint filler material shall be according to OPSS 1308

6.04 CONSTRUCTION

Prior to starting the work, documentation shall be submitted, verifying that the Contractor's representative of the placing crew shall be on site and shall have the ACI Flatwork Certification according to OPSS.MUNI 351 (Effective April 1, 2022).

6.04.01 Removal of Existing Materials

All existing sidewalks and driveway approaches, as indicated, shall be removed, and the Contractor shall dispose of the material at his own discretion.

The Contractor shall indemnify the owner from all damage caused by him to any private or public services at any time during the construction of the sidewalk or drive and for any other damage caused by any neglect on his part of this or any other condition of this contract.

Any private walks that are cut, damaged, or altered in any way shall be repaired in a manner satisfactory to the City Engineer.

The Contractor shall remove the existing sidewalk in small portions only, sufficient to carry on the day's work and so as to interfere with the business of the street as little as possible.

The Contractor may remove larger sections than stated above upon approval of the City Engineer. The Contractor shall provide accessible access to all affected properties adjacent to where the removals have taken place at the end of each working day before leaving the site, to insure safety to the public.

6.04.02 Location

Where the location and elevation of the sidewalk is not indicated specifically on a plan, a location and elevation shall be established in the field as per the applicable City of Windsor AS drawing and approved by the City Engineer. The cross fall on the boulevard from the sidewalk to the curb shall not be less than 2%, and not be more than 8% or as directed by the Engineer. In all cases, positive drainage of the boulevard shall be maintained.

When sidewalks are to be constructed or reconstructed and drive approaches are present, the sidewalk shall be placed through the existing drives or drive approaches. This will ensure that the finish and colour of the sidewalk will be consistent through all drives and drive approaches.

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When sidewalk are constructed or reconstructed in close proximity to existing buildings, steps shall be taken, whenever possible, to construct the sidewalk so as to provide unrestricted wheelchair access. Any sidewalk which can be constructed within the minimum and maximum cross fall specified herein shall be so constructed to provide wheelchair access. All requests for wheelchair access shall be considered by the City Engineer.

Unless the distance between the curb and the front of the sidewalk exceeds 1.2 metres, the sidewalk will be poured integral with the driveway. Transverse deep-cut trowel joints or saw cuts will delineate the driveway from the walk. No longitudinal trowel joints or saw cuts to delineate the sidewalk will be permitted. If the driveway requires contraction joints, the saw cuts will be placed to provide panels of generally equal size. Where possible, the jointing shall generally conform to match the jointing pattern of the existing driveway. Where the distance between the back of curb and sidewalk exceeds 1.2 metres, the Contractor will have the option of placing the sidewalk independently of the remaining driveway section. Both the panel in front of the sidewalk and the panel in back of the sidewalk shall be at least 1.2 metres wide. Consideration will be given to the size of the panels being matched. The condition of the existing drive will be taken into consideration. If the sidewalk is poured independent of the driveways, care will be taken to ensure that the grade is generally an extension of the driveway. The grade of the remaining driveway line will be considered and care taken that the transition is smooth and an acceptable grade is achieved. When placing the sidewalk independent of the driveway, care will be taken to stay consistent with the method used for driveways on the remainder of the block (i.e., integral or independent). When replacing all driveways on a block as part of the restoration of road or sewer work, one method will be used for the entire block.

When the distance between the back of curb and front of sidewalk is less then 600mm, the sidewalk shall extend to the back of the curb with a minimum width of 1.5m.

6.04.03 Excavation

Excavation shall be to the depth as shown on the plans or as required during the course of the work by the City Engineer, and the disturbed material in the bottom of the excavation shall be thoroughly consolidated to the satisfaction of the City Engineer. Water shall be used as an aid to compaction where required. The base of the excavation shall be compacted and shall be witnessed and documented by the site inspector. Surplus excavated materials, not required for backfilling, shall be disposed of at the Contractor's cost. The work of excavation shall include any clearing and grubbing encountered.

The Contractor shall ensure that during excavation no damage to any existing trees or the root systems of any trees occurs. Should damage occur due to the negligence of the contractor, the City Forester will be notified to assess the damage. The monetary value of the damage shall be borne by the Contractor.

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Additional excavation to remove unsuitable sub grade material shall be at the direction of the City Engineer and shall be paid at the direction of the City Engineer. Any additional Granular 'A' or required engineered fill shall also be paid at the direction of the City Engineer.

6.04.04 Base

On the sub-grade, brought to the correct line and elevation, as above described, shall be placed a layer of Granular 'A' Base Course, which shall have a minimum uniform thickness of at least fifty (50) millimetres. The Granular 'A' Base Course shall be compacted according to OPSS 501 and S-4 and shall be witnessed and documented by the site inspector.

The field density determination will be made in accordance with OPSS 501 and S-4. The surface of the base shall have a minimum 2% cross fall towards the road. The subgrade shall be well wetted prior to the placing of the concrete. At no time shall the Contractor place concrete on a frozen granular sub-base.

6.04.05 Forms

Forms shall be of wood or metal and of sufficient strength to resist springing, tipping or other displacement due to the placing of concrete and such other loads as may be superimposed during construction. Forms shall be free from warps, splits, holes, and bulges and all bolts, rivets and fittings shall be countersunk. Forms shall be erected without the use of internal ties and shall be sufficiently tight to prevent the leakage of mortar. The faces of forms against which concrete is to be placed shall, before the placing of concrete, be thoroughly cleaned and coated with an approved release agent or other approved material. Forms when tested with a 3-metre straight edge or curved template shall not deviate on the top surface more than 3mm nor on the inside faces more than 6mm from the testing edge of the template.

6.04.06 Contraction Joints

Transverse weakened-planed contraction joints shall be constructed at right angles to the sidewalk line.

Contraction joints shall be placed transversely as shown on drawing AS-401 and AS-403. The width of the contraction joint shall be 3 to 5 mm and a minimum depth of 65 mm or at least one fourth of the thickness of the concrete depth.

Contraction joints maybe sawed, hand-formed, or made by 3mm thick division plates in the formwork. Sawing shall be done early after the concrete has set to prevent the formation of uncontrolled cracking. The joints may be hand-formed either by (1) using a narrow or triangular jointing tool or a thin metal blade to impress a place of weakness into the plastic concrete, or (2) inserting 3mm thick steel strips into the plastic concrete temporarily. Steel strips shall be withdrawn before final finishing of the concrete. Where division plates are used to make contraction joints, the plates shall be removed after the concrete has set and

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while the forms are still in place. All longitudinal contraction joints and transverse contraction joints longer than 1.8m in length shall be sawcut.

Deep trowel joints must be constructed in a workman like manner, to the satisfaction of the City Engineer.

6.04.07 Full Depth Expansion (Isolation) Joints

Full depth isolation joints shall be used on all driveways, change in sidewalk direction, and where the sidewalk meets the curb at all intersections. Isolation joints will be placed at both the curb and where the new driveway approach abuts an existing hard surface at or toward private property. Existing surfaces will be cut to a true, full depth vertical face so that the jointing material will fit flush to the existing surfaces. Extra full-depth saw cutting and chipping may be required to achieve this. Full-depth isolation joint material will be placed between all buildings, driveways, change in sidewalk direction, and sidewalks. Transverse full-depth isolation joints will be required from time to time to intercept or change contraction joint patterns, at areas of expected differential movement, or where directed by the City Engineer.

Isolation joints shall be formed with 12mm thick full-depth joint filler material meeting the requirements of OPSS 1308, except that cork expansion fillers will not be accepted. Preformed sponge rubber expansion joint material shall be 12mm thick and may only be used in conjunction with the areas outlined in Section 6.04.09. In all other areas, non-extruding and resilient bituminous type expansion joint is to be used, unless approved by the City Engineer.

Panels of expansion joint shall be pre-cut from a single piece to the shape of the cross-section as shown on the standard drawings, but so as to provide a 5 mm recess on the exposed surfaces. Cutting and tolerances shall conform to OPSS 1308.

Transverse expansion joints shall have a maximum spacing of 18 metres. In addition to the foregoing, expansion joints shall be constructed wherever shown on the standard plans.

6.04.08 Construction Joints

A 5-mm bituminous fibre joint filler shall be placed at the point of interruption before recommencing the placement of concrete sidewalks or driveways.

6.04.09 Appurtenances in the Sidewalk and Driveways

The Contractor must carefully fit the sidewalk and/ or driveways around all permanent openings and must take special care to prevent damage to any utility, which may be in or under the sidewalk and/ or driveways. The Contractor shall remove iron gratings, covers, etc., for areaways, etc., and shall replace them in position in a neat and competent manner.

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Any and all appurtenances to the sidewalk and/ or driveways shall be designed and constructed in such a manner so as not to negatively affect the longevity, performance, and safe use of the sidewalk and/ or driveways. Poles, hydrants, structures, and driveways shall be isolated with full-depth isolation joint material. Manholes, junction boxes, water valves, cleanouts etc. shall be set to exactly match the finished grade of the sidewalk and/ or driveways

Raised planters and landscaped curbs shall be a minimum of 150mm high and shall be permitted only in areas where a minimum 1.5m clear walkway can be maintained.

Any and all appurtenances shall not adversely affect the drainage pattern of the sidewalk/boulevard areas. The installation of catchbasins shall be considered an option when the placement of a sidewalk and/ or driveways adversely affect the drainage pattern by restricting or altering any drainage areas.

A minimum clearance of 300mm from the closest edge of the sidewalk and/ or driveways, shall be provided for street lighting/hydro poles, fire hydrants and other vertical obstructions.

Street furniture installation on a sidewalk shall be as per City of Windsor Street Opening permit requirements or as approved by the City Engineer.

6.04.10 Concrete Placement

Concrete placement shall be according to City of Windsor Standard Specification S-9 and the following requirements:

Concrete shall not be placed until the foundation and the forms have been inspected and approved by the City Engineer.

Concrete is to be placed at or near its permanent location and consolidated such that segregation of the aggregate does not occur. The concrete shall be placed and consolidated against all formwork; all entrapped air shall be eliminated.

Concrete shall be placed continuously. Contact with partially set concrete shall be avoided. When placement of concrete is interrupted, it shall be at a vertical form. 5 mm bituminous fibre joint filler shall be placed at the point of interruption before recommencing placement of concrete.

The concrete shall be placed true to the lines and grades specified in the Contract Documents.

The restriction of concrete placement shall be as per City of Windsor Standard Specification S-9 – General Concrete Specification

6.04.11 Finishing

The surface of concrete sidewalks and driveways shall be given a broomed finish, after finishing with a magnesium or aluminum float, unless otherwise specified by the City Engineer. The protection of concrete structures until their acceptance onto maintenance by the Corporation shall be the sole responsibility of the Contractor. The presence of footprints or other markings on the completed sidewalk/driveway shall require saw cutting, removal, and replacement of the complete section at the Contractor's expense. Exterior paths of travel shall only be given a broom finish and never a "stamped" concrete finish. When a "stamped" concrete finish has been specified for a drive approach or a specific accent area not intended for pedestrian traffic, it shall be imperative that water does not pond due to improper application and finishing procedures with the specified patterns. Areas adversely affected by the application of stamping moulds shall be removed and replaced at the Contractor's expense.

Unless otherwise provided, back edges shall be rounded by use of a 6mm radius-edging tool. While it is not necessary to remove the edger mark, the method will be consistent for the entire contract. Care shall be taken to ensure that the plastic concrete is firm enough to prevent ridges from forming from the concrete slurry while finishing the edging.

In no cases shall sidewalks pond water or exceed the specified grade to be accepted. All areas which pond water or have insufficient/excessive cross fall, including those caused by poor construction and finishing methods, shall be removed and replaced at the Contractor's expense.

6.04.12 Curing and Protection

The curing and protection of the completed sidewalk and driveway shall conform to the requirements contained in the Standard Specification for Concrete (S-9).

6.04.13 Backfilling and Shouldering

As soon as the City Engineer will permit, the Contractor shall backfill at each edge of the walk and shall place earth shouldering at the edges of the sidewalk with an approved backfill material to grades approved by the City Engineer. If the forms are stripped from the concrete, but not immediately backfilled behind the removal operation, the Contractor shall cure or protect all exposed areas where the forms were removed, as outlined in Standard Specification for Concrete (S-9), unless otherwise directed by the City Engineer.

6.05 PROTECTION OF THE SIDEWALK AND DRIVEWAY FROM TRAFFIC

The Contractor shall by barricades, guards, or by other means, protect all sidewalk surfaces from harm by traffic until the City Engineer authorizes the sidewalk to be opened to public

use. This period shall, for pedestrian traffic, not exceed 72 hours and for the opening of lane or driveway crossing, not exceed 7 days.

The Contractor shall at all times, prior to the opening to traffic, provide suitable bridging as other means of access to adjacent properties, but will only be required to do so at existing traffic points.

The Contractor shall be held responsible for any damage or defacing done to the finished work by other parties until the finished work is accepted by the City Engineer and shall repair or replace any damaged or defaced portion of the work as required by the City Engineer.

6.06 DAMAGE TO ADJACENT BOULEVARDS AND PAVEMENTS

The Contractor will be required to make good, as directed, all damage done to the roadway or pavements while the work is in progress.

The Contractor will be required to remove all rubbish and material from the boulevards adjoining the sidewalk and restore the same to as good and clean condition as they were before commencing the work. Should the Contractor choose to use plastic as their method of protection, when removed from the concrete, all plastic is to be removed and disposed of at the Contractor's expense. If any of the sod beyond the area of construction is destroyed by the Contractor or his employees, he will be required to replace it, at his expense, with new sod to the approval of the City Engineer.

6.07 QUALITY ASSURANCE

The quality assurance for all concrete poured for sidewalks and driveways shall conform to the requirements contained in the Standard Specification for Concrete (S-9).

The Contractor shall be responsible for the line and grade of the forms as provided by the City Engineer or will be responsible to match existing conditions when required.

Prior to any concrete being poured, the forms and granular base shall be inspected by the City Engineer. The Contractor shall notify the City Engineer a minimum 24 hours before the concrete pour is to take place to allow sufficient time to review the granular base and forms.

The Contractor shall be responsible for the concrete work during the curing time and when the forms are removed until the work is accepted by the City Engineer.

Positive drainage shall be constructed and maintained in all finished work areas including sidewalks, adjacent driveway & boulevard, and wheelchair ramps.

6.08 MEASUREMENT FOR PAYMENT

6.08.01 Sidewalk

Measurement will be made in square metres of the total area of sidewalk installed.

6.08.02 Driveway Approaches

Measurement will be made in square metres of the total area of driveway approaches installed.

6.08.03 Granular Base Course

This item shall be included in the unit price submitted for the placement of the new concrete unless otherwise stated in the tender documents.

6.08.04 Water

No measurement for payment required for this item.

6.08.05 Removal of Old Sidewalk and Driveway Approaches

Measurement will be made in square metres of the total area removed as directed by the City Engineer.

6.09 BASIS OF PAYMENT

6.09.01 Sidewalk and Driveway Approaches

The Contract prices for the various components making up the sidewalk or the driveway approaches will be full compensation for supplying all labour and equipment and completely installing in accordance with this specification, the sidewalk or driveway approach as called for in the plans and for supplying all material.

Excavation required to set the various components to the required line and grade will be considered as part of the work of installing the sidewalk or driveway approach; however, should such excavation overlap excavation required for any other work under the contract, then payment shall be made in accordance with the specification for such other work as though no excavation were required for sidewalk or driveway approach construction.

6.09.02 Granular Base Course

This item shall be included in the unit price submitted for the placement of the new concrete unless otherwise stated in the tender documents.

6.09.03 Water

This item shall be included in the unit price submitted for the placement of the new concrete.

6.09.04 Removal of Old Sidewalk and Driveway Approaches

Payment will be made at the contract unit price per square metre for the measured quantities.

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SEWER PIPELINE AND CULVERT REHABILITATION BY CURED-IN-PLACE PIPE

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8.01 SCOPE OF WORK

This specification covers the requirements for the rehabilitation of sewer pipelines by the installation of a tight fitting cured-in-place pipe liner.

8.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

ASTM International

- D 638 Standard Test Method For Tensile Properties of Plastics
- D 790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- D 2990 Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
- F 1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

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- F 1743 Standard Practice for the Rehabilitation of Existing Pipelines and Conduits by Pulled-in –Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)
- S-32
- OPSS.MUNI 460

8.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

- a) **Cured-In-Place Pipe (CIPP) Lining** means the rehabilitation of sewers and watermains by installation of a CIPP liner system within an existing pipe.
- b) **Engineer** means a professional engineer licensed by the Professional Engineers Ontario to practice in the Province of Ontario.
- c) **Resin** means a general purpose, unsaturated, styrene-based, thermoset resin and catalyst system or an epoxy resin and hardener that is compatible with the inversion process.

8.04 SUBMISSION & DESIGN REQUIREMENTS

Submission requirements shall be in accordance with OPSS.MUNI 460.

8.05 MATERIALS

Material requirements shall be in accordance with OPSS.MUNI 460.

8.06 CCTV EQUIPMENT

Equipment requirements shall be in accordance with City of Windsor S-32 CCTV Sewer Inspection.

8.07 CONSTRUCTION

Construction requirements shall be in accordance with OPSS.MUNI 460. All lateral connections to the mainline sewer must have top hats or tee liners installed to a minimum of 250mm from the mainline sewer into the lateral pipe. The lateral connection top hats or tee liners installation will be undertaken immediately after the mainline sewer lining is completed.

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SEWER PIPELINE AND CULVERT REHABILITATION
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8.08 CCTV INSPECTION

CCTV Inspection requirements shall be in accordance with City of Windsor S-32 CCTV Sewer Inspection.

8.09 QUALITY ASSURANCE AND TESTING

Quality Assurance and Testing requirements shall be in accordance with OPSS.MUNI 460.

8.10 MEASUREMENT FOR PAYMENT

Measurement for payment requirements shall be in accordance with OPSS.MUNI 460. Top hat or tee liners shall be paid under the applicable item at the unit rate in the Schedule of Unit Prices.

8.11 BASIS OF PAYMENT

Basis of payment requirements shall be in accordance with OPSS.MUNI 460

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9.01 SCOPE OF WORK

Work shall consist of supplying, delivering, placing, finishing, and curing Portland cement concrete as directed and of a nature that will conform to these specifications.

Ambient and forecast temperatures shall be those reported by Environment Canada at the Windsor Ontario Airport.

9.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

- City of Windsor General Conditions & Special Provisions
- S-5
- S-6
- S-7
- OPSS.MUNI 904

- OPSS.MUNI 1350
- OPSS 350
- OPSS.MUNI 351
- OPSS.MUNI 353
- OPSS.MUNI 360
- OPSS.MUNI 362
- OPSS.MUNI 1001
- OPSS.MUNI 1002
- OPSS.MUNI 1305
- OPSS 1315
- Canadian Standards Association CSA (A23, A3000)

9.03 MATERIALS

All materials used in the production of concrete shall be according to OPSS.MUNI 1350 unless otherwise approved by the City Engineer. Coarse aggregate size for full depth repair of concrete pavement and concrete base shall meet the requirements of OPSS.MUNI 360.

9.04 PERFORMANCE REQUIREMENTS OF CONCRETE

Unless otherwise specified in the contract documents, concrete shall be 32 MPa at 28 days and will satisfy the requirements of OPSS.MUNI 1350 and the City of Windsor Plastic Properties (2022) table below.

The performance of the concrete shall be measured at 28 days and will be determined by the average compressive strength of at least two cylinders cast and cured according to CSA A23.2.

When the average compressive strength of two 28 days performance cylinders fail to meet the compressive strength requirements an additional cylinder may be tested at 56 days at the discretion of the City Engineer. If the compressive strength at 56 days fails to meet the required strength, the concrete shall be considered non-compliant to the City specification.

The compressive strength of cored concrete samples will not be considered for acceptance purposes.

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CONCRETE

City of Windsor Concrete Properties (2022)

APPLICATION	CSA EXPOSURE CLASS	MAXIMUM W/CM RATIO	RANGE FOR SLUMP* (MM)	28 DAY COMPRESSIVE STRENGTH	PLASTIC AIR CONTENT **RANGE	MAXIMUM NOMINAL AGG. SIZE (MM)	DISCHARGE TEMP*** °C	CITY OF WINDSOR SPEC.
CONCRETE BASE (FORMED)	C - 2	0.45	50-110	32 MPA	4 - 7 %	37.5	10 - 28	S - 7
PAVEMENT (FORMED)	C - 2	0.45	50-110	32 MPA	4 - 7 %	37.5	10 - 28	S - 7
PAVEMENT (SLIP-FORM)	C - 2	0.45	20-60	32 MPA	4 - 7 %	37.5	10 - 28	S - 7
CURB & GUTTER	C - 2	0.45	20-60	32 MPA	5 - 8 %	19.0	10 - 30	S - 5
SIDEWALK	C - 2	0.45	80-120	32 MPA	5 - 8 %	19.0	10 - 28	S - 6
FAST TRACK PAVEMENT	C - 2	0.45	150 MAX.	32 MPA	5 - 8 %	19.0	15 - 35	
UN-SHRINKABLE FILL	N/A	N/A	150 MIN.	0.7 MPA MAXIMUM	N/A	25.0	10 - 28	S - 24
ALL OTHER MIXES	AS SPECIFIED							

*Slump, Slump Flow CSA A23.2-5c

**Air Content CSA A23.2-4c or A23.2-7c

***Concrete Temperature ASTM C 1064

Concrete not meeting the plastic properties shown above are rejectable and are not to be included in the work unless such variances are pre-approved and accepted by the City Engineer.

9.05 TESTING

The frequency of testing shall be determined by the City Engineer.

The contractor will assist the City of Windsor in the taking of randomly timed samples as required.

The City Engineer shall perform the field testing of the materials plastic properties and will cast performance cylinders in accordance with CSA A23.2.

Field cured cylinders (cured to mimic the conditions and temperatures experienced by structure) for the purpose of estimating placed concrete strength development may be cast from time to time but are not the responsibility of the City of Windsor. Such cylinders may be used for information only and are not to be used as the 28 day design strength value.

The Contractor is responsible to notify the City Engineer a minimum of 24 hours prior to the placement of concrete to set up the required testing. Failure to provide 24 hours notice shall result in the Contractor being responsible to retain the services of a third party Geo-Tech Consultant to undertake the required field testing and cylinder casting required by the City Engineer. The field and lab test results must be provided to the City Engineer prior to payment of the placed concrete.

9.06 PRODUCTION

Concrete will satisfy OPSS.MUNI 1350.07

All Batching Plants and equipment shall be according to the certification requirements of Concrete Ontario or an equivalent certification.

Proof of certification must be available to City Engineer upon request.

Concrete produced without such certification or equivalent thereof will not be acceptable.

9.07 DELIVERY

Delivery of concrete will satisfy OPSS.MUNI 1350.07.05

All concrete delivery trucks and equipment shall be according to the certification requirements of Concrete Ontario and shall be equipped with an onboard, self contained washout system or equivalent to eliminate the discharge of any waste water into the environment.

All site adjustments to the delivered concrete materials are to be disclosed to, approved, and witnessed by the City Engineer.

9.08 PLACING

Any concrete placed without expressed consent from the City Engineer is subject to removal at the Contractor's expense.

Concrete is to be placed in accordance with OPSS.MUNI 904.07.06 and the relative City of Windsor Standard Specification.

- In any conditions, at time of discharge, the concrete is to be between 10°C and 28°C unless otherwise specified or pre-approved by the City Engineer.
- Immediately prior to concrete placement the base is to be made wet by means of a uniform spray of water sufficient to wet the base thoroughly without leaving standing water (regardless of "hot" or "cold" weather considerations).
- In lieu of the water spray, a sub grade moisture vapour barrier satisfying OPSS.MUNI 1305 may be used.
- Concrete must be placed and consolidated such that segregation of the aggregate does not occur.
- Complete discharge of the concrete from the truck shall be completed within 90 minutes after the introduction of mixing water.
- Concrete delivered by non-agitating equipment – discharge of concrete shall be completed within 30 minutes of the introduction of the mixing water to the cement and aggregates (OPSS.MUNI 1350.07.05.01.03)
- The batch time is the time printed on the ticket is the start of the 90-minute period.
- The discharge time is 60 minutes when hot weather concrete protocols are in effect.
- Concrete not placed within the allotted time is not to be accepted.

Concrete placing restrictions as per OPSS.MUNI 904

Cold weather

Cold weather conditions exist when the ambient air temperature is at or below 5°C and or is forecast to be at or below 5°C within 96 hrs of concrete placement.

- No concrete shall be placed out of doors when the ambient air temperature is below 0°C
- No Concrete shall be placed on a base that is frozen or snow covered
- Any surfaces against which concrete is to be placed must be at or above 3°C

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- Concrete placed on a granular base that has been subjected to de-icing chemicals shall be protected from that base by a continuous moisture vapor barrier for all flatwork and whenever possible
- Curing compounds shall not be used during cold weather concrete placement. Rather:

Crystal-Loc or similar approved sealants are to be applied according to the manufacturer's instructions shall, in concert with adequate vapor barrier curing and thermal protection be used for all concrete placed on or after the first day of November or whenever the likely hood exists of de-icing of other chemical attacks on the concrete can be anticipated within the 28 day curing period.

Every effort will be made to minimize the time the concrete is exposed to cold weather conditions during the initial period of curing. Protection removed to allow for cutting, spraying, form stripping or other necessary operations to take place is to immediately replaced and secured for the completion of the required curing period.

Hot weather

Hot weather conditions exist when ambient air temperature is at or above 28°C or is forecast to be at or above 28°C within 24 hours of concrete placement.

- Concrete delivered by means of an agitating truck mixer must be completely unloaded within 60 minutes from its batch time during "hot weather"
- Surfaces against which concrete is to be placed must be wet and shall not exceed **35°C** at time of placement
- No concrete is to be placed or scheduled to be placed when the ambient air temperature exceeds 32°C for concrete pavement and concrete base or when the ambient air temperature exceeds 35°C for curb and gutter or sidewalk
- Curing protocols are to commence immediately

Any concrete placed in a condition outside of these specifications may be subject to removal at the contractor's expense.

9.09 FINISHING

Finishing operations shall be according to OPSS.MUNI 904 and the appropriate City of Windsor Standard Specification or OPSS Specification listed below:

- S-5 Concrete Curb and Gutter
- S-6 Concrete Sidewalk and Driveway Approaches
- S-7 Concrete Pavement

- OPSS 350 – Concrete Pavement and Concrete Base

Finish Tolerances

Finished concrete tolerances shall be according to the appropriate City of Windsor Standard Specification.

9.10 CURING

All poured concrete must be appropriately cured.

Curing shall be according to OPSS.MUNI 904 with the exception that all concrete is to be cured for a minimum of 5 days at a temperature not below 10°C or above 70°C

All curing materials and equipment are to be on site and in working order prior to the start of concrete placement.

In the case of liquid compounds, the curing application shall commence immediately. The application start time may vary with site conditions, sun, temperature and/or wind and is to be done to the satisfaction of the City Engineer. The concentration and application of the curing compound shall be consistent with the manufacturer's written direction.

Unless otherwise specified and pre-approved, all curing compounds are to be of the white-pigmented variety and be according to OPSS 1315.

Immediately prior to application, the curing compound is to be mechanically agitated to the satisfaction of the City Engineer.

In the case of a moisture vapour barrier being used for curing, it shall be done according to OPSS.MUNI 1305.

Application of moisture vapour barrier curing shall commence as soon as practical after the finishing operation without marking the finished product.

Edges and seems are to be fastened tightly, sealed and secured.

Concrete not adequately cured will not be accepted.

9.11 MEASUREMENT FOR PAYMENT

Measurement for payment for concrete will only be made of that material accepted by the City Engineer.

The Unit of measurement will be that as provided for in the Form of Tender.

9.12 BASIS OF PAYMENT

Payment will be made at the unit prices bid on the Form of Tender and for the quantities determined by the applicable method of measurement.

Payment will only be made when the finished product is deemed acceptable by the City Engineer.

Such payment shall constitute full compensation for supplying, delivering, placing, finishing, curing, protecting and maintaining and any other cause whatsoever for all work performed in connection with the supply of the materials and any other incidentals necessary to complete the items which are not herein specified for payment otherwise.

Where high early strength concrete fails to meet the 3 days strength requirement the concrete shall be considered non-compliant and the Contractor shall be paid standard concrete price as noted in the Form of Tender subject to the concrete meeting 28 days compressive strength requirement.

Cooling of concrete during "Hot Weather Concreting" and associated costs will not be paid unless pre-approved and accepted by the City Engineer in cases where it is agreed to be necessary to meet project schedule or where concrete must be placed for other necessary circumstances.

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CONSTRUCTION SPECIFICATION FOR HOT MIX ASPHALT

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10.01 SCOPE OF WORK

This specification covers the requirements for the placement and compaction of hot mix asphalt for pavement construction and other uses in the City of Windsor.

10.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

- OPSS.PROV 308
- OPSS.MUNI 310
- OPSS.MUNI 1003
- OPSS.MUNI 1101
- OPSS.MUNI 1103
- OPSS.MUNI 1150
- OPSS.MUNI 1151

10.03 MIX DESIGNS

The mix design shall be the responsibility of the contractor. The job mix formula selected for use shall produce hot mix that will meet the requirements of OPSS.MUNI 1150 and OPSS.MUNI 1151 with amendment to section 1150.04.01.01.01 Reclaimed Asphalt Pavement Proportions: part a) changed to: RAP will not be permitted for surface course mixes; part b) changed to: A maximum of 15% by mass of RAP shall be permitted for HL 4, HL 8, and medium duty binder courses. OPSS.MUNI 1151 Section 1151.04.01.01 RAP Proportions shall be amended such that RAP will not be permitted in SMA, 12.5FC1, 12.5FC2 or any other surface course Superpave mix and up to a maximum of 15% RAP is permitted in binder course Superpave mixes.

Mix Designs shall be submitted for every project to the City Engineer at least two (2) days prior to the paving. Any changes to the Mix Design shall be submitted to the City Engineer before the mix is used on a City project.

If for any reason the Contractor requests to change designed asphalt paving specified in the Contract, a request in writing at least 48 hours prior to the paving shall be submitted to the City Engineer for approval. The request shall outline the reasons for the request, the substituted mix design for use, and the cost difference between substituted mix and the original Contract mix.

10.04 MATERIALS

Materials shall meet the requirements of OPSS.MUNI 310.

Materials used in the production of Hot Mix Asphalt shall meet the requirements of OPSS.MUNI 1150 for Marshall Mixes and OPSS.MUNI 1151 for Superpave and SMA mixes.

Tack coat material shall meet the requirements of OPSS.MUNI 1103.

HMA found to contain any material of any type other than the materials specified in the Mix Design, including but not limited to Re-Refined Engine Oil Bottoms (REOB), shall require that the HMA be removed and replaced at the Contractor's expense.

10.05 EQUIPMENT

Equipment shall meet the requirements of OPSS.MUNI 310.

10.06 CONSTRUCTION

Construction shall meet the requirements of OPSS.MUNI 310 and the requirements of OPSS.PROV 308 construction specification for Tack Coating and Joint Painting.

Where more than one course of HMA is to be placed in the same day, OPSS.MUNI 310.07.06.02 shall be followed.

The use of water to cool the HMA shall not be allowed unless approved by the City Engineer.

10.07 QUALITY ASSURANCE

Quality assurance shall meet the requirements of OPSS.MUNI 310.08 except the following changes:

Aggregate Gradation and Asphalt Cement Content Acceptance

Aggregate gradation and asphalt cement content test results for HMA samples based on LS-282 and LS-292 shall meet the tolerance requirements as specified in Table 7. A total of two borderline test results for the same two attributes representing up to 1000 tonnes of HMA production shall result in the work being deemed rejectable. A total of three borderline test results for the same attribute representing greater than 1000 tonnes up to 5000 tonnes of HMA production shall result in the work being deemed rejectable.

If the HMA is deemed rejectable according to Table 7, both the City and the Contractor shall review, agree, and identify the limits of the rejected HMA that has been placed. Limits of the rejectable HMA based on the first sample shall be represented by the area between the commencement of paving and the second sample. Limits of the rejectable HMA based on the second sample shall be represented by the area between the second sample and the third sample or the completion of the paving, etc. Referee samples within the limits of the affected area shall be delivered to a third party referee laboratory to verify the aggregate gradation or asphalt cement content or both. When the results of the referee samples are deemed rejectable according to Table 7, the HMA pavement shall be removed and replaced with acceptable HMA pavement at the Contractor's costs. Alternatively, the City may accept a payment reduction if a mutual agreement can be made through discussions between the Project Manager and the Contractor.

Hot Mix Asphalt Properties Acceptance

Marshall test results for hot mix samples based on LS test procedures shall meet the requirements specified in Table 8 (in OPSS.MUNI 310). The production air voids for all HMA mixes shall be evaluated according to Table 9.

If the HMA does not meet Table 8 minimum requirements for Marshall stability or Marshall flow or is deemed rejectable for air voids according to Table 9, both the City Engineer and Contractor shall review, agree, and identify the limits of rejected HMA that has been placed. Referee samples within the limits of the affected area shall be delivered by the City to a mutually agreed upon third party referee laboratory to verify Marshall test or air void results or both. When the results from the referee samples do not meet Table 8 minimum requirements or are deemed rejectable according to Table 9, the HMA pavement shall be removed and replaced with acceptable HMA pavement. Alternatively, the City Engineer may accept a payment reduction if a mutual agreement can be made through discussions between the Project Manager and the Contractor.

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CONSTRUCTION SPECIFICATION FOR HOT MIX ASPHALT

The Contractor shall notify the City Engineer 24 hours prior to the commencement of paving operations. A representative of the City's Field Services QA staff will contact the Contractor's QC staff to arrange for a mutually agreeable time to carry out Hot Mix Asphalt (HMA) sampling.

A minimum of one (1) HMA Sample will be taken for each 500 tonnes HMA placed on a project. The minimum number of samples for any project less than 500 tonnes HMA shall be two (2). Plate samples will not be allowed on surface course mixes. Plate samples may be used on binder course mixes, however, bulk shovel samples obtained from the paving equipment and split by Quartermaster equipment is the preferred sampling method. Sampling and splitting equipment shall be free of any chemical agents that will be in contact with the HMA sample. A sample shall be jointly obtained by the QC and QA representatives and shall comprise of the minimum sampling size of HMA as outlined in Table 6 of OPSS.MUNI 310. One box will be held by the Contractor for QC testing, two boxes will be held by the City, one box for QA testing and one box for possible referee testing. Each party will supply clean empty boxes for their respective sample(s). The HMA samples obtained shall be accepted by both parties indicating agreement that sampling was carried out in an acceptable manner and that the samples obtained are accepted for laboratory testing purposes. Should one of the parties not be able to attend the sampling event, the other party may sample, split by Quartermaster and box the HMA samples provided that the party not in attendance has a knowledgeable representative on site to witness and confirm the sampling was carried out in an acceptable manner. The boxes shall be labelled and delivered to the other party's site representative.

Lab testing requirements shall be extraction and gradation including Marshall Compliance Properties or Superpave Volumetrics for each of the samples taken unless otherwise approved by the City Engineer. Test results shall be compared to the Mix Design supplied by the Contractor and to other relevant specifications.

HMA QA sample(s), when possible, will be delivered to the testing laboratory the same day as sampled. Testing laboratories will carry all applicable certifications for the test(s) that they will be performing. Tests will be carried out in accordance with the appropriate LS Standards. Note that a dual agent shall not be allowed in the project QA/QC testing. A maximum period of three (3) working days shall be allowed for completion of the testing and a report will be generated and delivered to the City's Field Services Supervisor forthwith. Upon receipt of the test results, the report shall be shared between the City's Field Services Supervisor and the Contractor. QA test results shall be evaluated against the requirements outlined OPSS.MUNI 310, the contract documents and applicable Standard Specifications. Rejectable QA results will necessitate testing of the referee sample if requested by the Contractor. Within a maximum of period of three (3) working days of receipt of rejectable results, the City Engineer and Contractor shall agree upon a laboratory for referee testing to be carried out. The referee testing laboratory shall carry all applicable certifications for the test(s) that they will be performing and testing of the referee sample shall be carried out in accordance with appropriate LS Standards. A maximum period of three (3) working days shall be allowed for completion of the referee testing and a report will be generated and delivered to the Contractor and the City's Field Services Supervisor. The test report shall

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categorize the results as acceptable or rejectable. Should a local laboratory not be able to accommodate the testing requirements, another laboratory shall be agreed upon by both the Contractor and the City Engineer and retained by the City Engineer. The agreed upon referee testing laboratory shall allow both the Contractor and the City Engineer the opportunity to witness the referee testing of the HMA. If for specific reasons, witnessing of the referee testing cannot be accommodated, the referee testing laboratory shall provide recorded video record of the testing throughout its entirety, which shall include documentation that records the laboratory technician performing all aspects of the work, dates and times of testing.

Referee test results shall be binding on both the Owner and the Contractor.

For outsourced projects in which the City's QA staff is not involved with the inspection and testing, field sampling and laboratory testing of HMA by geotechnical consultants and/or others will follow the same sampling and testing protocols and timelines as noted above. Upon completion of laboratory testing, the test report shall, within the timeframe noted above, be reported to Engineer of Record copying the City Engineer. Referee testing will follow the same protocols as noted above.

At the discretion of the City Engineer, the Contractor may be requested to provide Performance Graded Asphalt Cement (PGAC) tank samples, **which shall be obtained during the production of HMA**. Sampling of a QC, QA and referee sample shall be obtained in accordance with OPSS.MUNI 1101.08.03 in the presence of a representative of the City's QA staff. Quality Assurance Testing for PGAC Grading shall be carried out as outlined in OPSS.MUNI 1101.08.04. In addition to PGAC Grading, additional PGAC testing outlined in OPSS 1101, Table 1 may be carried out from time to time. The Contractor shall be notified when PGAC testing is required and additional samples will be taken to accommodate testing. Test results shall be compared to OPSS.MUNI 1101. The contractor and the City Engineer shall inform each other of their intended testing laboratory. Note that a dual agent shall not be allowed in the project QA/QC testing. The laboratory shall carry all applicable certifications for the test(s) in which they will perform. QA test results shall be evaluated against the requirements outlined in the OPSS.MUNI 1101. Upon completion of the QA testing the results shall be shared with the Contractor. Rejectable results will necessitate testing of the referee sample. Within a maximum period of three (3) days of receipt of rejectable results, the City Engineer and Contractor shall agree upon a laboratory for referee testing to be carried out. The referee testing laboratory shall carry all applicable certifications for the test(s) that they will perform. Testing of the referee sample shall be carried out according to appropriate LS Standards. A report will be generated and delivered to the Contractor and the City's Field Services Supervisor. The report shall categorize the results as acceptable, or rejectable, where applicable. The agreed upon referee testing laboratory shall allow both the Contractor and the City Engineer the opportunity to witness the referee testing of the PGAC. If for specific reasons, witnessing of the referee testing cannot be accommodated, the referee testing laboratory shall provide a recorded video record of the testing throughout its entirety, which shall include documentation that records the laboratory technician performing all aspects of the work, dates and times of testing.

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Referee test results shall be binding on both the Owner and the Contractor.

When requested, the Contractor shall provide the City's QA representative with access to its asphalt plant control room in order to obtain copies of the batching records and to document plant operations during the production of hot mix asphalt for the Contract. If for specific reasons, the City QA representative cannot be granted access to the control room, batching records shall be provided when requested. The information collected from the Contractor's hot mix asphalt control room will be used solely to compare the as-produced mix to the mix design accepted by the City. All information collected by the City's QA representative will be shared with the Contractor and will be kept in strict confidence by the City. The City shall also be granted access to the asphalt plant yard during the construction season, upon request, to routinely sample aggregates, asphalt cement and observe operations.

10.08 MEASUREMENT FOR PAYMENT

Measurement for payment shall meet the requirements of OPSS.MUNI 310.

10.09 BASIS OF PAYMENT

Basis of payment shall meet the requirements of OPSS.MUNI 310 except as otherwise amended in this document.

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CONSTRUCTION SPECIFICATION FOR SODDING

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14.01 SCOPE OF WORK

This Specification refers the requirements for the restoration of grassed areas by sodding.

Starting from January 1, 2013, sodding shall be placed in single family residential areas and seeding in multi-residential, commercial, industrial and park areas unless specified otherwise in the contract documents or at the discretion of the City Engineer.

The work shall include:

1. Levelling, tilling or otherwise preparing existing areas of suitably arable soil
2. Placing sod
3. Applying fertilizer
4. Watering
5. Maintenance for 60 days

Unless otherwise specified, the prices quoted in the contract documents shall include the furnishing of all materials, supplies, equipment, and labour necessary to complete the work required under the contract documents.

14.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

- S-34 Topsoil
- OPSS.MUNI 802 Construction Specification for Topsoil

S-14
CONSTRUCTION SPECIFICATION FOR SODDING

- OPSS.MUNI 803 Construction Specification for Sodding
- OPSS.MUNI 206 Grading

14.03 MATERIALS

The Contractor shall supply materials including but not limited to sod, fertilizer, and water as per OPSS.MUNI 803.05 and the contract documents.

14.04 CONSTRUCTION

14.04.01 PREPARATION

All work shall be carried out in a professional manner with care taken to protect existing structures and grassed areas. The work shall be undertaken in such a manner as to minimize the inconvenience to the residents and, as much as possible, blend with existing conditions. The grading shall be carried out as per OPSS.MUNI 206 and in such a manner as to provide positive drainage for all walkways, sidewalks, and driveways. Steps shall be taken to ensure that all existing drainage patterns are maintained and improved if possible and that the City right-of-way has positive drainage over roadside curbs or to an appropriate drainage inlet structure. Any correction required to obtain the above noted shall be at the expense of the Contractor.

Topsoil shall be supplied and placed as per OPSS.MUNI 802. After the tilling of suitably arable soil, left in place to a depth of at least 50mm, and prior to the placing of the sod, the site shall be reviewed by representatives from the City, General Contractor and Landscaping sub-contractor.

14.04.02 OPERATIONAL CONSTRAINTS

Sodding shall not commence until the surface preparation has been approved in writing by the Engineer. Sodding shall commence within 7 Days of surface preparation. The Contractor shall maintain the surface and control erosion until the sod is in place.

Sod shall not be placed when in a frozen condition, during summer months when weather conditions result in periods of dormancy, under adverse field conditions such as high wind, frozen soil, or soil covered with snow, ice, or standing water.

The following modifications and reminders shall be noted:

Pegging

Pegging shall be done where indicated in the Contract Documents. Plastic biodegradable stakes shall be allowed.

S-14
CONSTRUCTION SPECIFICATION FOR SODDING

Fertilizer

Fertilizer shall be applied as per OPSS.MUNI 803. The Contractor shall also implement the topsoil improvement recommended by a professional analysis report if it is applicable.

Water

The Contractor is to include all water costs in their bid price. The Contractor shall be responsible for the watering during the maintenance period as specified in Section 14.04.04. Watering shall be carried out as often as necessary to promote growth and rooting of the sod. The sod should never be allowed to become brown or dormant between the placing period and the end of the maintenance period. The City reserves the right to request the Contractor's records of watering. No additional compensation will be made for watering.

14.04.03 TRIMMING AND PLACING

The placement of the sod shall be as per OPSS.MUNI 803. The existing areas shall be neatly trimmed by the use of a sod cutter. The finishing grade shall match existing grade exactly and uniformly, blending with the existing surfaces to make a seamless transition. Care shall be taken to place all sod slightly below all sidewalks, lead walks, and driveways to ensure water runoff.

14.04.04 MAINTENANCE OF INSTALLED SOD

The maintenance period does not start until 100 percent of the sod is placed unless mutually agreed by the City of Windsor and the Contractor. The sod shall be maintained for 60 consecutive days after sodding is complete on the entire project, excluding the winter dormant periods between November 15 and April 15 as shown in Table 1 of OPSS.MUNI 803.

The Contractor shall take the responsibility of their lawn mowing, including the first cut during the maintenance period and as required throughout the maintenance period to maintain a height of 50 to 100 millimetres, unless otherwise specified in the contract documents. At the end of the maintenance period the sod shall be cut to a height of between 50 and 75 millimetres.

Where the Engineer is agreeable to late season placement of sod and it is not possible to determine the acceptability of the sod until the following growing season, those areas deemed unacceptable due to causes beyond the control of the Contractor (road salting, heavy pedestrian traffic, etc.) shall, at the discretion of the Engineer in consultation with the Contractor, be resodded at the unit price in the tender documents. The Contractor shall be paid for the original sodding and the area requiring resodding.

14.05 QUALITY CONTROL

The City shall take steps to record the acceptability of the sodded areas by the use of photos, videotaping or other means deemed necessary at the end of the maintenance period when the sodded areas are deemed acceptable. If after the maintenance period, the sodded restoration is not to City approval, the City reserves the right to extend the maintenance period until restoration is deemed acceptable.

14.05.01 INFORMATION TO THE RESIDENT

In conjunction with the placing of sod, the City shall inform the residents of the limits of the Contractor's responsibilities and what steps the resident can take to assist in promoting and maintaining a flourishing lawn (the first notice letter to the residents). The homeowners shall be informed in writing that the sodded areas have been deemed acceptable and further maintenance and care will be their responsibility at the end of the maintenance period (the second notice letter to the residents).

14.06 MEASUREMENT FOR PAYMENT

The placement of sod, including watering, cutting, fertilizing and weed spraying shall be paid based on the Schedule of Unit Prices in the Contract.

14.07 BASIS OF PAYMENT

Payment at the Contract price for the above items shall be full compensation for all labour, equipment, and materials to do the work. Payment shall include the supplying and placing of topsoil, seed, watering, weeding, fertilizing, and maintenance until final acceptance, as well as, seed replacement and water for seed when no separate item for payment exists for such work.

S-15 CONSTRUCTION SPECIFICATION FOR SEEDING

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15.01. SCOPE OF WORK

This specification covers the requirements for restoration of grassed areas by use of the seeding method. OPSS.MUNI 804, Construction Specification for Seed and Cover shall be used as a reference.

Starting January 1, 2013, seeding shall only be used in multi-residential, commercial, industrial and park areas unless specified otherwise in the contract documents or at the discretion of the City Engineer.

15.02. REFERENCES

This specification refers to the following standards, specifications, or publications:

- S-34 Topsoil
- OPSS.MUNI 802 Construction Specification for Topsoil
- OPSS.MUNI 804 Construction Specification for Seeding and Cover
- OPSS.MUNI 206 Grading

15.03. MATERIAL

15.03.01 SEED

The following is acceptable in addition to OPSS.MUNI 804:

S-15
CONSTRUCTION SPECIFICATION FOR SEEDING

Seeding Mix: 40% Turf Type Perennial Rye
40% Fescue
20% Blue Grass

Nurse Crop: Annual Rye Grass

15.03.02 HYDRAULIC MULCH

Hydraulic mulch shall be dry, free of weeds and other foreign materials and shall be supplied in sealed packages bearing the manufacturer's label indicating product name and mass.

Hydraulic mulch shall be capable of dispersing rapidly in water to form homogeneous slurry and remain in such a state when agitated or mixed with other specified materials. When applied, hydraulic mulch shall be capable of forming an absorptive and cohesive mat, which will allow moisture to percolate into the underlying soil. Hydraulic mulch shall not inhibit growth or germination of the seed mix.

15.03.03 BONDED FIBRE MATRIX

Bonded Fibre Matrix (BFM) shall be a hydraulically applied product, which after application is capable of adhering to the soil in a 100% biodegradable uniform and continuous mat. In a dry state, BFM shall be comprised of not less than 70% by weight long stranded wood fibres held together by organic or mineral bonding agents or both. When hydrated, the BFM shall form a viscous material that when applied and dried, creates a high-strength, porous and erosion-resistant mat. The bonding agent shall not dissolve or disperse upon re-wetting. BFM shall not inhibit the germination or growth of plant material.

15.03.04 EROSION CONTROL BLANKET – FUTURA OR EQUIVALENT (BIODEGRADABLE)

ECB shall be supplied in a dry, rolled mat protected with an outer waterproof wrap bearing the manufacturer's original label indicating product name and application instructions.

Erosion control blanket (ECB) shall be of a consistent thickness with a 100% biodegradable even fibre distribution. The ECB shall be covered on top with a biodegradable and photodegradable plastic mesh. ECB may also be sewn together with cotton thread.

15.03.05 EROSION CONTROL BLANKET STAPLES

Staples shall be U-shaped, constructed of wire with a diameter of at least 2.5mm, with legs at least 150mm long and 25mm apart.

S-15
CONSTRUCTION SPECIFICATION FOR SEEDING

15.03.06 FERTILIZER:

5-20-20 (with 50% sulphur coated urea)

15.04. CONSTRUCTION

All work shall be carried out in a professional manner with care taken to protect existing structures and grassed areas. The work shall be undertaken in such a manner as to minimize the inconvenience to the residents and, as much as possible, blend in with existing conditions.

The work shall include:

1. Leveling, tilling or otherwise preparing existing areas of suitably arable soil
2. Applying fertilizer
3. Placing of seed
4. Placing mulch or erosion blanket as per the Contract
5. Weed control
6. Watering
7. Maintenance for 60 days

Unless otherwise specified, the prices quoted in the contract documents shall include the furnishing of all materials, supplies and equipment, all labour, construction tools and transportation services necessary to complete the work required under the contract.

15.04.01 PREPARATION

The grading shall be carried out as per OPSS.MUNI 206 and in such a manner as to provide drainage for all walkways, sidewalks, and driveways. Steps shall be taken to ensure that all existing drainage patterns are maintained and that the City right-of-way has positive drainage over roadside curbs or to an appropriate drainage inlet structure. Any correction required to obtain the above noted shall be at the expense of the Contractor.

At the time of seeding, all surface areas designated for seeding shall have a fine-graded, uniform placed imported topsoil surface and shall exhibit no evidence of erosion. The surface shall be uniformly cultivated to a minimum depth of 50 mm and shall not have surface stones greater than 25 mm in diameter, foreign material, and weeds or other unwanted vegetation.

15.04.02 SEEDING OPERATIONAL CONSTRAINTS

The seeding operation shall not commence until the Engineer has approved in writing the surface preparation, seed mix, and cover types.

Seed and cover application or re-application shall not be carried out under adverse weather conditions such as high wind or heavy rain or when field conditions are not conducive to seed germination such as frozen soil or soil covered with snow, ice, or standing water.

The Contractor shall maintain the site and control erosion until final acceptance of the seed and cover.

The surface to be seeded shall be prepared not more than 7 days before the seeding operation.

No seed or cover shall come in contact with the foliage of any trees, shrubs, or other vegetation, except as specified in the Seeding subsection. No seed or cover shall come in contact with water bodies.

To ensure a suitable drying and curing period, BFM shall not be applied when rainfall is expected, during rainfall, or immediately after rainfall.

15.04.03 PLACEMENT RATE (APPROXIMATE)

Seed:	25kg/1000m ²
Nurse Crop:	0.5kg/1000m ² (minimal)
Hydraulic Mulch:	170 kg/1000m ²
Bonded Fibre Matrix:	340 kg/1000m ²
Erosion Control Blanket:	to cover
Fertilizer:	40 kg/1000m ²

15.04.04 WATERING

The Contractor is to include all water costs in their bid price. The Contractor shall be responsible for the watering during the maintenance period as specified in Section 15.04.06. The City reserves the right to request the Contractor's records of watering. No additional compensation will be made for watering.

15.04.05 SEASONAL METHODS

Generally, seeding shall not be required between approximately June 1 and July 31. Areas left dormant over this period shall be treated with a suitable weed control method.

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CONSTRUCTION SPECIFICATION FOR SEEDING

Between the spring thaw and May 31 and from October 1 to October 31, seeding with a nurse crop shall be required.

Seeding which takes place between August 1 and September 30 shall not require a nurse crop.

If weather conditions during the time periods specified are not typical, the Contractor, who shall be solely responsible for the final product, shall, based on prevailing weather conditions, determine which method will be used.

Where conditions allow, drill seeding shall be acceptable.

The Contractor may choose to undertake the seeding between June 1 and July 31, with the approval of the Engineer. However, this shall not relieve the Contractor of responsibility to achieve an acceptable final product, and no additional payment shall be made to the Contractor for extra work required when undertaking work during this time period.

When the Engineer instructs the Contractor to carry out seeding during this period, mutually acceptable conditions shall be negotiated.

The Contractor is reminded that these dates are approximate and have been put in place in recognition that seasonal conditions are a factor in achieving an acceptable product.

15.04.06 MAINTENANCE

The maintenance period does not start until 100 percent of the seed is placed unless mutually agreed by the City of Windsor and the Contractor. The seed shall be maintained for 60 consecutive days after seeding is complete on the entire project, excluding the winter dormant periods between November 15 and April 15 as shown in Table 3 of OPSS.MUNI 804.

The Contractor shall be responsible for the watering during the maintenance period specified in Section 15.04.04. The cost for watering shall be included in the square meter price for seed.

The Contractor shall take the responsibility of the lawn mowing, including the first cut during the maintenance period and as required throughout the maintenance period to maintain a height of 50 to 100mm unless otherwise specified in the contract documents. At the end of the maintenance period, the sod shall be cut to a height of between 50 to 75mm. Remove clippings longer than 20mm in length.

When the Engineer is agreeable to late season seeding, where it is not possible to determine the acceptability of the seeded areas until the following growing season, those areas deemed unacceptable due to causes beyond the control of the Contractor (road salting, heavy pedestrian traffic, etc.) shall, at the discretion of the Engineer in consultation with the Contractor, be reseeded at the unit price in the tender documents. The Contractor shall be paid for the original seeding and the area requiring reseeding.

15.05. QUALITY CONTROL

The City shall take steps to record the acceptability of the seeded areas by the use of photos, videotaping or other means deemed necessary at the end of the maintenance period when the seeded areas are deemed acceptable. If after the maintenance period, the seeded restoration is not to City approval, the City reserves the right to extend the maintenance period until restoration is deemed acceptable.

INFORMATION TO THE RESIDENT

In conjunction with the seeding, the City shall inform the residents of the limits of the Contractor's responsibilities and what steps the resident can take to assist in promoting and maintaining a flourishing lawn (the first notice letter to the residents). The homeowners shall be informed in writing that the seeded areas have been deemed acceptable and further maintenance and care will be their responsibility at the end of the maintenance period (the second notice letter to the residents).

15.06. MEASUREMENT FOR PAYMENT

The placement of seed, including watering, cutting, fertilizing and weed spraying shall be paid based on the Schedule of Unit Prices in the Contract.

15.07. BASIS OF PAYMENT

Payment at the Contract price for the above items shall be full compensation for all labour, equipment, and materials to do the work. Payment shall include the supplying and placing of topsoil, seed, watering, weeding, fertilizing, and maintenance until final acceptance, as well as, seed replacement and water for seed when no separate item for payment exists for such work.

S-30 BRIDGES

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30.01 SCOPE OF WORK

Construction or rehabilitation of bridges in the City of Windsor

30.02 REFERENCES

OPSS 902	Construction Specification for Excavating and Backfilling Structures
OPSS.MUNI 903	Construction Specifications for Deep Foundations
OPSS.MUNI 904	Construction Specifications for Concrete Structures
OPSS.MUNI 905	Construction Specifications for Steel Reinforcement for Concrete
OPSS.MUNI 906	Construction Specifications for Structural Steel for Bridges
OPSS.MUNI 907	Construction Specifications for Structural Wood Systems
OPSS.MUNI 908	Construction Specifications for Metal Traffic Barriers and Metal Railings for Structures
OPSS.MUNI 909	Construction Specifications for Prestressed Concrete – Precast Members
OPSS.MUNI 910	Construction Specifications for Stressing Systems for Post-tensioning
OPSS.MUNI 911	Construction Specifications for Coating Structural Steel Systems
OPSS.MUNI 913	Construction Specifications for Embedded Work in Structures for Electrical Systems
OPSS.MUNI 914	Construction Specifications for Waterproofing Bridge Decks with Hot Applied Asphalt Membrane
OPSS.MUNI 915	Construction Specifications for Sign Support Structures

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OPSS.MUNI 918	Construction Specifications for Modular Bridge Structures for Temporary Installations
OPSS.MUNI 919	Construction Specifications for Formwork and Falsework
OPSS.MUNI 920	Construction Specifications for Deck Joint Assemblies, Preformed Seals, Joint Fillers, Joint Seals, Joint Sealing Compounds and Waterstops-Structures
OPSS.MUNI 922	Construction Specifications for Installation of Bearings
OPSS.MUNI 928	Construction Specifications for Structure Rehabilitation – Concrete Removal
OPSS.MUNI 929	Construction Specifications for Abrasive Blast Cleaning – Concrete Construction
OPSS.MUNI 930	Construction Specifications for Structure Rehabilitation – Concrete Patches and Overlays
OPSS.MUNI 931	Construction Specifications for Structure Rehabilitation – Shotcrete
OPSS.MUNI 932	Construction Specifications for Crack Repair – Concrete
OPSS.MUNI 942	Construction Specifications for Prestressed Soil and Rock Anchors
OPSS.MUNI 950	Construction Specifications for Glass Fibre Reinforced Polymer Reinforcing Bar

30.03 MATERIALS

As per OPS.

30.04 CONSTRUCTION

As per OPS.

30.05 MEASUREMENT FOR PAYMENT

As per OPS.

30.06 BASIS OF PAYMENT

As per OPS.

S-32 CCTV SEWER INSPECTION

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32.01. SCOPE OF WORK

This specification shall be for the review and acceptance of any municipal sewer mainline or private drain connection installed or rehabilitated in the Corporation of the City of Windsor. The CCTV inspection work will be performed by municipal forces or by a private contractor approved by the Corporation of the City of Windsor.

32.02. REFERENCES

This specification refers to the following standards, specifications, or publications:

- OPSS.MUNI 409

32.03. SUBMISSION AND DESIGN REQUIREMENTS

Submission requirements shall be in accordance with OPSS.MUNI 409.

32.04. MATERIALS

Material requirements shall be in accordance with OPSS.MUNI 409 with the exception of the following.

All media storage to be submitted to the Corporation shall be in digital format (USB jump drive, USB external hard drive or cloud services) unless otherwise specified by the City Engineer.

When the Corporation discovers any deficiency during the CCTV inspection or review of the submitted CCTV inspection, the Corporation will supply a digital copy of the CCTV inspection showing said deficiency at no charge at the request of the contractor.

32.05. EQUIPMENT

Equipment requirements shall be in accordance with OPSS.MUNI 409. The Contractor shall also be required to adhere to the following.

32.05.01 Zoom Camera Equipment

The zoom camera equipment, computer, video recording equipment and ancillary supplies necessary to complete the zoom camera inspections must be transported in a mobile light duty truck. This vehicle shall be of appropriate size and weight to allow for inspections of manholes located on City streets within close proximity. Additionally, the Contractor shall make further provisions to perform off-road inspections in, but not limited to, recreational trails, alleys, sidewalks, and green spaces.

All inspections performed off-road using mobile and /or portable set-ups must be of the same video quality as those performed from the truck mounted system.

32.05.02 Zoom Camera

The inspection and evaluation of the sewer systems must be performed using a waterproof, pan and tilt colour camera, capable of entering into a minimum manhole cover size of 300 millimetres (mm). The zoom camera must be equipped with a remote controlled and integrated lighting system capable of providing clear image of the interior of the sewer pipe for a distance varying between 15 metres (m) to 30 m for small diameter pipe (such as 200 mm to 250 mm) and 30 m to 100 m in larger diameter pipe. Controlled from inside the mobile unit, the numerous individual adjustable light shadows are eliminated and "hot spots" are illuminated.

The camera shall be equipped with an optic telephoto lens with sufficient magnification that the farthest image is not degraded by the effects of pixelization. The camera will be capable of focusing in on objects to a minimum of 150 mm from the camera lens. The camera pan and tilt feature shall be capable of inspecting 360 degrees of a pipe, manhole or junction for (pipe circumference) pipes from 200 mm to 3000 mm in diameter, without raising or lowering the boom.

The camera must be detachable from the mobile unit for inspection of difficult locations using a tripod. The equipment must be capable of lowering the camera to a depth of at least 15 m inside the manhole.

32.05.03 Wide Angle Lens Manhole Inspection Camera

For detailed manhole inspections required under this Contract, the inspection and evaluation of the sewer manholes must be performed using a waterproof wide-angle lens, colour camera capable of entering into a minimum manhole cover size of 300 mm. The camera must be equipped with a compatible remote controlled, integrated lighting system capable of clearly illuminating the interior of the manhole.

32.06. CONSTRUCTION

Construction requirements shall be in accordance with OPSS.MUNI 409 with the exception of the following.

The Contractor is to notify the corporation, in writing, a minimum of 72 hours in advance of their scheduled sewer cleaning to request a CCTV sewer inspection on capital rehabilitation projects unless otherwise specified in the tender documents.

Should the corporation fail to schedule the requested CCTV inspection, on capital rehabilitation projects, after being notified in writing by the Contractor that the said sewers were ready for CCTV inspection, the corporation shall not hold the Contractor responsible for the cleanliness of the sewer unless otherwise specified in the tender documents.

Should it be found that during the CCTV inspection that the subject sewers are not cleaned properly, contain construction debris, or the Contractor does not have the proper access points available to the CCTV operators, the Corporation shall direct the CCTV inspection crew to leave the site unless otherwise specified in the tender documents.

Should this occur then the Contractor shall undertake the required cleaning and subsequent CCTV inspection work entirely at their expense and submit the required CCTV inspections for review and acceptance by the Corporation unless otherwise specified in the tender documents.

Immediately before the CCTV inspection of PDC's, the Contractor shall introduce a minimum of 10 litres of water, via the cleanout, to assist the CCTV operator in their inspection. Failure to assist in this requirement will result in the removal of the CCTV inspection crew from the site as noted above. The Contractor shall also provide assistance in the opening of all PDC's for inspection via the cleanout and for the laying of the pipes, backfilling with granular material, the supply and use of all appliances and materials, the disposal of all surplus excavated materials and the satisfactory cleaning of the site and for all work required under this specification, excepting those items for which other payment is herein provided.

If the CCTV inspection is for the review of an existing PDC, the PDC shall be flushed by the contractor immediately prior to placing the camera into the PDC. If debris removal, such as root infiltration, is required then this must be undertaken prior to the CCTV inspection.

32.07. CCTV INSPECTION

CCTV inspection requirements shall be in accordance with OPSS.MUNI 409 with the exception of the following.

When PDC CCTV inspection is being undertaken, the chainage will begin at the access point, the cleanout, located at or close to property line or located in the right of way, and be measured in metres toward the municipal mainline sewer or towards the building structure to determine the location of any deficiencies, if encountered. Prior to placing the camera into the cleanout or point of PDC access, video footage of the front of the property the PDC services shall be recorded prior to the CCTV of the pipe to confirm that the camera is being placed into the PDC at the required property.

32.08. QUALITY ASSURANCE

Quality assurance requirements shall be in accordance with OPSS.MUNI 409.

32.09. MEASUREMENT FOR PAYMENT

Measurement for payment requirements shall be in accordance with OPSS.MUNI 409. The Contractor shall also be required to adhere to the following.

32.09.01 Reports & Submittals

The Contractor shall submit the following deliverables for each work order completed in the contract:

- a) A final invoice showing details of hours/meters inspected.
- b) Maps to highlight inspections completed.
- c) Video inspection data including defect-coding data recorded on a media storage as outlined in Section 32.04. Video files names shall include:
 - Pipe segment ID
 - Date
 - Time
 - Starting manhole (for Zoom pole inspections only)
- d) The digital data to be formatted to enable uploading of the defect-coding data. All data must undergo Infrastructure Management System's (IMS) quality assurance program to be considered completed.
- e) WRc or PACP survey details must be time indexed to the digital video in a manner that will allow the images to be displayed when the survey data is viewed.

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CCTV SEWER INSPECTION

- f) A summary excel spreadsheet for all pipes inspected submitted on a project basis. The spreadsheet will consist of the following completed columns.
- Type of inspection completed (completed pipe or partial pipe).
 - For Zoom inspections, use separate tabs for complete inspections, partial inspections and inspections not complete.
 - Pipe segment ID (Combination of the upstream and downstream manhole separated by underscore: (UpstreamMH_DownstreamMH))
 - Date of Inspection (Both dates for Zoom inspections)
 - Node Upstream
 - Node Downstream
 - Starting Manhole (For Zoom only)
 - Street Name
 - Structural and O&M grade for each pipe segment
 - Length in metres
 - Pre-cleaned
 - Purpose of Survey Inspection status
 - Indicate if this is a full PACP inspection, or just an isolated Investigation.
 - Additional Comments
 - Video Name – this column must contain all video file names by pipe segment
 - Indicate the reason why any assignment inspections were not completed
- The corresponding grade that is displayed should be based on the latest version of PACP/ MACP grading system.
- g) A video report including the pipe segment ID, video name (unique segment ID_date_time), and report name.
- h) Corresponding PDF inspection reports consisting of all pipe inspections with upstream and downstream views and their combined score and results of the inspections with commentary, pictures and diagrams must be included in a separate file.
- i) PDF names shall include:
- Pipe segment ID
 - Date
 - Time
- j) Completed variance report, if applicable. The variance report will consist of the following.
-

- Project Number
- Activity (CCTV or Zoom)
- Date
- Technician
- Location (Street, From, To)
- Plan
- Notes (i.e., not found, doesn't exist anymore, etc.)

Data shall be configured according to the definitions and database structures included in OPSS 409. Video must be able to be viewed using the latest version of Windows Media Player and have the ability to use all features of the video player including fast forward capability.

32.10. BASIS FOR PAYMENT

Basis for payment requirements shall be in accordance with OPSS.MUNI 409 with the exception of the following.

Any deficiencies found by the Corporation shall be deemed as deficient until the required remedial action is undertaken by the Contractor. Once the required remedial action has been undertaken, the corporation shall require that the contractor request to have the deficient section of sewer reviewed again. This review shall be done at the Contractor's expense and submitted to the Corporation for review and acceptance.

Payment will be made at the contract unit price per unit upon submission of the CCTV report for the cleaning and CCTV report of the applicable sewers as stated in the tender documents.

There is no payment by the Corporation for PDC CCTV reports submitted for review to the City of Windsor.

S-34 TOPSOIL

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34.01. SCOPE OF WORK

This specification covers the requirements for the stockpiling, supplying, and placing of topsoil. Use of this specification or any other specification shall be according to the Contract Documents.

The work shall include:

- Topsoil testing analysis and necessary amendments to the topsoil;
- Supply of topsoil;
- Preparation of the site;
- Placement of the topsoil.

34.02. REFERENCES

This specification refers to the following standards, specifications, or publications:

- OPSS.MUNI 802 Construction Specification for Topsoil
- OPSS.MUNI 206 Grading

34.03. MATERIALS

Topsoil shall be a fertile loam screened and free from:

1. Debris and stones over 25mm in size;

-
2. Roots, coarse vegetative material occupying more than 2% of soil volume, in size that cannot be covered by the depth of topsoil specified in the Contract Documents.

Imported topsoil shall not have contaminants that adversely affect plant growth.

34.04. QUALITY CONTROL

The Contractor is responsible for topsoil testing analysis and to identify requirements for amendments to topsoil as specified for sod/seed areas and planting areas within the contract documents. The City Engineer shall review and approve the topsoil source and the soil test report from an Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) accredited laboratory with recommendations for use on lawns or trees and shrubs prior to topsoil deliveries. This testing shall be the responsibility of the Contractor.

Prior to the topsoil being delivered to the site, the results of the testing shall be presented in writing by the testing laboratory to the City of Windsor, clearly depicting the results of each defined tested category, along with a statement verifying its suitability for its intended use or the remedial action required.

Soil contaminated with calcium chloride, heavy metal contaminants, petroleum products and other toxic materials shall not be accepted as topsoil and shall not be allowed to be transported on site.

Topsoil shall be tested at least annually and anytime the source of the topsoil has changed. The City shall be notified when a new source of topsoil is to be tested.

The City reserves the right to test the topsoil after delivery. The Contractor shall be notified if the City intends to sample the insitu topsoil. If the Contractor elects to sample or have the topsoil sampled on their behalf, the Contractor or their representative will obtain a QC, QA and referee sample. The Contractor shall hold the QC sample and the City shall hold the QA and referee samples. If the material is determined to be out of specification as a result of the QA testing the topsoil shall be corrected (if possible) as noted in the testing lab's report or removed from the site at the Contractor's cost. The Contractor can request additional testing of the referee sample at their cost. The Contractor shall arrange a mutually agreed OMAFRA accredited lab to test the referee sample. Cost associated with referee testing shall be the responsibility of the Contractor. A copy of the test report and the testing lab's recommendations shall be supplied to the City Engineer. Results not meeting the specifications will require that the topsoil shall be corrected (if possible) or removed from the site at the Contractor's cost.

The City shall be granted access to the stockpiles/topsoil sites for monitoring purposes throughout the construction season.

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TOPSOIL

Table 1: Topsoil Chemical Test Requirements	
Criteria	City of Windsor Requirement
pH Level	5.5 to 7.8
Organic matter, % *	Minimum 3.0
Phosphorus (Olsen P), ppm	10 to 60
Total Soluble Salts, ($\mu\text{s}/\text{cm}$ or mmhos/cm)	<1.5
Sodium – Base Saturation (%)	<2.0
Atrazine or Sterilants (ppm) **	

****Note: To reach required percentage, organic amendment may be required. The Contractor shall be responsible for selecting industry acceptable organic matter sources which shall be free from any pathogen that have potential concerns to the public health & safety.***

***** Testing for the presence of sterilants shall be mandatory when these chemical agents have been identified as being used on the proposed source of topsoil within the past 3 years and the testing lab shall provide comments based on their findings.***

Table 2: Topsoil Heavy Metals Test Requirements		
Criteria	Mean Metal Content in Uncontaminated Soil (ppm or $\mu\text{g}/\text{g}$)	City of Windsor Requirement – MOE Maximum Permissible Metal Content (ppm or $\mu\text{g}/\text{g}$)
Arsenic (ppm)	7	14
Cadmium (ppm)	0.8	1.6

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Table 2: Topsoil Heavy Metals Test Requirements		
Criteria	Mean Metal Content in Uncontaminated Soil (ppm or µg/g)	City of Windsor Requirement – MOE Maximum Permissible Metal Content (ppm or µg/g)
Chromium (ppm)	15	120
Cobalt (ppm)	5	20
Copper (ppm)	25	100
Lead (ppm)	15	60
Mercury (ppm)	0.1	0.5
Molybdenum (ppm)	2	4
Nickel (ppm)	16	32
Selenium (ppm)	0.4	1.6
Zinc (ppm)	55	220

34.05. CONSTRUCTION

34.05.01 Stockpiling Topsoil

Topsoil shall be removed, stockpiled, and managed according to the Contract Documents. If allowed to be piled on site, stockpiles shall be constructed neatly with uniform surfaces. When required, the top surface shall be dished. Topsoil shall not be piled on the road or sidewalk. Topsoil that is removed from a site shall not be brought back to the site or to any other site without retesting in accordance with this specification.

34.05.02 Preparation for Topsoil

Areas where topsoil is to be placed shall be fine graded to a uniform surface according to OPSS.MUNI 206 and Contract Documents. The graded surface shall be free of all debris, roots, branches, and stones in excess of 25mm diameter and other deleterious

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materials. Any soil contaminated with calcium chloride, toxic materials, petroleum products and other toxic materials shall be removed and disposed of legally off-site at sole costs of the Contractor.

The surface shall be loosened to a depth of at least 50mm prior to placing the topsoil.

If it is determined that the tilling of existing on-site material resulted in deleterious materials, a price for this removal shall be negotiated with the City. All other deleterious material shall be removed at the Contractor's cost.

In case of a dispute, the City reserves the right to seek an opinion from a third party.

These areas shall be maintained in the condition described above until the topsoil is placed.

34.05.03 Inspection

Prior to placing the topsoil, the site shall be reviewed by the Engineer, the General Contractor, and Landscaping Sub-contractor. The consequence of omitting the review step shall be fully borne by the Contractor.

34.05.04 Placement of Topsoil

The topsoil shall be spread on unfrozen sub-grade, free of standing water, uniformly to a depth of 100mm or as per Contract Documents in the case of sodding or seeding. The imported topsoil may be feathered to meet existing grade. If the area of imported soil is used as beds for shrubs or perennial plants, the depth of placement shall be 500mm.

Topsoil shall be rolled with a mechanical roller of a minimum weight of 220kg, minimum width of 760mm roller, to consolidate it in areas to be seeded or sodded, leaving the surface smooth, uniform, firm against deep foot printing, and to the satisfaction of the Engineer. Before placement of the sod or seed the surface of the topsoil shall be scarified to a depth sufficient to promote root growth into the topsoil.

34.06 MEASUREMENT FOR PAYMENT

All topsoil will be measured and paid as imported topsoil. Measurement shall be by volume in cubic metres of topsoil imported and placed. The cost for stockpiling on site for the temporary storage purpose shall be included in the placing price because no extra cost will be paid for this work.

34.07 BASIS OF PAYMENT

Payment at the Contract price for the above item shall be full compensation for all labour, equipment, and materials to do the work.