

**THE REGIONAL MUNICIPALITY OF NIAGARA**

**2017-T-107 Contract RN 17-07  
Reconstruction of Regional Road 89  
Between Burleigh Hill Drive and  
Tremont Drive  
In the City of St. Catharines**

**ADDENDUM NO. 2**

**I DIRECTIVE**

This addendum shall form an integral part of the plans and specifications for the above noted project and shall be read in conjunction therewith. This addendum shall, however, take precedence over all requirements of the previously issued drawings and specifications with which it may prove to be at variance, unless otherwise clarified by the Engineer.

This addendum must be signed by the Tenderer in the appropriate space and must be attached to the back of the Form of Tender and placed in the Envelope for submission at the time of tendering. Tenders not including this addendum signed as requested may be rejected as informal.

**II REVISIONS**

**1 SPECIFICATIONS**

- 1.1 **Special Provisions Contract Items Supplementary**, Section 22, shall be revised as follows:
- .1 The provisions of OPSS 310, OPSS.PROV 1101, OPSS.MUNI 1151, OPSS.PROV 1151 and NPSCD B14 shall apply except as amended or extended herein:
  - .2 The Contractor shall include in the unit prices all materials, labour and equipment necessary for the supply, placement and compaction of hot mix asphalt including sawcutting, power sweeping prior to asphalt placement and disposal of debris.
  - .3 Notwithstanding NPSCD Clause B14.07 Commencement of Paving and Placing Asphalt, the construction schedule for surface course paving shall be waived. However, the Contract Administrator will, on a daily basis, decide if operations can continue on a day to day basis.
  - .4 The Contractor shall use SP 19 asphalt design mix for all base works within the Glendale Avenue road corridor. HL8 HS shall be used for the Tremont Drive corridor and for all driveways.
  - .5 The Contractor shall use SP 12.5 FC2 asphalt design mix for all surface works within the Glendale Avenue road corridor. HL3 HS shall be used for the Tremont Drive corridor.
  - .6 The Contractor shall pave the surface course (HL3 HS and SP 12.5 FC2) full road width in echelon including the use of a Mechanical Transfer Vehicle (Shuttle Buggy). All pavers shall be operated at the same time within 60 m of the next paver so that a hot joint is obtained between the lanes of hot mix asphalt being placed. Standby equipment must be on-site should a breakdown occur.
  - .7 The Region will permit full road closure for full width echelon paving of the surface course asphalt. Echelon paving means all lanes, complete asphalt surface from curb to curb, or curb to center median. Contractor to note that additional machinery (ie shuttle buggy, pavers, etc.) are to be included in the tender price. All traffic control required for this operation, including but not limited to: control through the work zone and traffic control personnel at intersections shall be deemed to be included in the appropriate item in the Form of Tender.
  - .8 Asphalt shall be placed to the depths as indicated on the Contract Drawings. Placement of asphalt shall be at a maximum of 60 mm lifts.

- .9 Where one traffic lane is being paved, the asphalt paver used must be capable of paving one entire lane in a single pass (min. 4.25 m).
- .10 After placement and compaction of asphalt, the Contractor shall ensure that all structure covers and catchbasin grates are free of asphalt and can be opened with minimal effort.
- .11 Adjustments for all new precast maintenance holes for base and surface asphalt are deemed to be included in their respective unit price in the Form of Tender.
- .12 Adjustments to base asphalt for new catchbasins and new valve boxes are deemed to be included in their respective unit price in the Form of Tender. Payment will be made for adjustment from base asphalt to surface asphalt only under "Adjustment of Appurtenances" Item in Form of Tender.
- .13 All structures and appurtenances shall be set to base asphalt grade prior to winter shut down. No ramping is permitted. Adjustments for top asphalt will be completed in the spring per Contract requirements. If structures and appurtenances are set to top asphalt and ramped, the Contractor is responsible for damage and/or movement due to winter snow removal, vehicular traffic, etc. All costs associated with this shall be deemed to be included in the tender price. No additional fees will be considered.
- .14 Contractor to note temporary asphalt ramping will be required at driveways and intersecting roadways. This work is to be included and no additional fees will be considered.
- .15 Compaction testing during placement and rolling stage shall be by nuclear density gauge. The Marshall Maximum Relative Density (MRD) shall have a compaction percentage of at least 93% and have a minimum of 5 nuclear density test readings in 500m single lane pavement (10 tests per 250m, 2 lane pavement).
- .16 For all driveways, asphalt surface shall be HL3F (Fine) and asphalt base shall be HL8 MDBC.
- .17 **AMENDMENT TO OPSS.PROV 1101, NOVEMBER 2014 - Additional Test Results and Samples for Performance Graded Asphalt Cement (PGAC)**

## 1101.02 REFERENCES

Section 1101.02 of OPSS.PROV 1101 is amended by the deletion of the following under **American Association of State Highway and Transportation Officials (AASHTO)**:

TP 70 Multiple Stress Creep and Recovery (MSCR) of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)

Section 1101.02 of OPSS.PROV 1101 is further amended by the addition of the following under **American Association of State Highway and Transportation Officials (AASHTO)**:

T 350-14 Standard Method of Test for Multiple Stress Creep Recovery (MSCR) Test of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)

**1101.04 DESIGN AND SUBMISSION REQUIREMENTS**

**1101.04.01 Submission Requirements**

Subsection 1101.04.01 of OPSS.PROV 1101 is amended by the addition of the following clause:

**1101.04.01.02 PGAC Documentation**

For each grade of PGAC specified in the Contract Documents, the Contractor shall supply the following items to the Contract Administrator prior to the commencement of HMA production:

- a) PGAC documentation from the asphalt cement supplier in the form of bill of lading and certificate of analysis, confirming the grade of PGAC. The bill of lading and certificate of analysis shall also be supplied for each subsequent delivery of PGAC that will be used for the HMA production.
- b) Documentation identifying the PGAC storage tank that the PGAC will be supplied from for the HMA production. The Contractor shall notify the Contract Administrator and provide updated documentation prior to changing the storage tank that is being used to supply PGAC for the HMA production.

**1101.08 QUALITY ASSURANCE**

**1101.08.02 Anti-Stripping Additive**

Subsection 1101.08.02 of OPSS.PROV 1101 is deleted in its entirety and replaced with the following:

**1101.08.02 Asphalt Cement Anti-Stripping Treatment**

The Contractor may request that an allowance be made for the impact of the asphalt cement anti-stripping treatment on a PGAC grade for QA or referee purposes provided that when production begins the Contractor submits to the Contract Administrator complete AASHTO M 320 test results for the following:

- a) Asphalt cement with anti-stripping treatment at the percentage identified in the mix design.
- b) Asphalt cement without the anti-stripping treatment.

**1101.08.03 Sampling**

Subsection 1101.08.03 of OPSS.PROV 1101 is amended by deleting the last paragraph in its entirety and replacing it with the following:

Sampling frequency, minimum quantities and additional labelling shall be as shown in Table 2.

**1101.08.06 Referee Testing**

Subsection 1101.08.06 of OPSS.**PROV** 1101 is amended by deleting the first paragraph in its entirety and replacing it with the following:

Referee testing by an independent laboratory may be invoked by the Contractor for any lot of PGAC within 5 Days of receiving all the QA test results for the lot.

Table 1 is deleted in its entirety and replaced with the following:

**Table 1  
Additional Testing Requirements and Acceptance Criteria for All PGAC Grades (Note 1)**

PGAC Grade	Property and Attributes (Unit)	Test Method	Results Reported Rounded To The Nearest	Acceptance Criteria	Major Borderline	Rejectable
All PGAC Grades	Ash Content, % by mass of residue (%)	LS-227	0.01	≤ 0.60	> 0.60 and ≤ 0.80	> 0.80
All PGAC Grades Except PG58-28 and PG52-34	Non-recoverable creep compliance at 3.2 kPa ( $J_{nr-3.2}$ ) ( $kPa^{-1}$ )	AASHTO T 350 testing conducted at 58°C	0.01	< 4.50	N/A	≥ 4.50
	Average percent recovery at 3.2 kPa ( $R_{3.2}$ ) (%)		0.1	> the lesser of 55.0 or $[(29.371)(J_{nr-3.2})^{0.2633}]$	N/A	≤ the lesser of 45.0 or $[(29.371)(J_{nr-3.2})^{-0.2633}-10]$
	Percent difference in non-recoverable creep compliance between 0.1 kPa and 3.2 kPa, $J_{nr diff}$ (%)		0.1	Testing carried out for information purposes only		
PG70-28, PG64-28, PG58-28	CTOD, $\delta_t$ (mm)	LS-299	0.1	≥ 10.0	< 6.0 and ≥ 4.0	< 4.0
	Low temperature limiting grade (LTLG) (°C)	LS-308	0.1	≤ -28.0	> -25.0 and ≤ -22.0	> -22.0
	Grade Loss (°C)	LS-308	0.1	≤ 6.0	> 6.0 and ≤ 8.0	> 8.0
Notes:						
1. PGAC grades are as specified in the Contract Documents.						

**.18 AMENDMENT TO OPSS.PROV 1151, NOVEMBER 2016 - Mix Design Criteria and Asphalt Cement Anti Stripping Treatment**

**1151.04.01.01 General**

Clause 1151.04.01.01 of OPSS.**PROV** 1151 is amended by the addition of the following:



18.09 Quality Assurance

The hot mix asphalt quality will be determined on the basis of QA test data.

18.09.01 Field Adjustment

Field adjustments (changes to the Job-Mix Formula (JMF) and Mix Design) will be permitted but have to be carried out in accordance with OPSS.MUNI 1151.04.02.04. Permitted field adjustments to a JMF are given in Table 10 of OPSS.MUNI 1151. Only one field adjustment per mix type on a project will be permitted.

The hot mix asphalt compaction shall be assessed on the basis of nuclear density gauge testing. Nuclear density gauge data alone will not be used to reject asphalt mix compaction. Each nuclear density gauge used on a project shall be calibrated against a minimum of three cores of binder course and surface course mixes placed in the same project.

18.09.02 Compaction

Asphalt compaction testing during the placement and rolling stage shall be by nuclear density gauge. OPSS 310 Table 10 is amended and the criteria for assessing mix compaction by nuclear density gauge is given in Table 5. The specified compaction is expressed as a percentage of the Maximum Relative Density (MRD), as established from the approved asphalt mix design for the project, and verified by QA testing and asphalt core correlation.

The frequency of nuclear gauge testing in OPSS 310.08.04.02 is amended such that compaction of a given area of pavement shall be assessed by a minimum of five nuclear density test readings. The pavement area to be assessed should be a maximum of 0.5 lane-km of pavement (i.e. 250 m of 2 lane pavement). The average of at least five nuclear readings for a given area shall not be less than the specified percent compaction given in Table 5, with no individual test results being more than 3 % below the specified percent compaction.

Nuclear density test results will be used as a guide to assessing in-place compaction and will not be used to reject the mix compaction. Where compaction results by nuclear gauge do not meet the specifications, the owner may elect to have cores (minimum 100 mm diameter) taken to assess the in-place mix density. The core density and compaction data shall be determined according to OPSS 310.08.04.03. Where compaction results from core densities do not meet specifications and are below the specified values of 93% MRD

for Superpave 9.5, 12.5 and 12.5 FC1 and 92% MRD for Superpave 19 and 25, the coring and testing will be at the contractor's expense.

**TABLE 5  
COMPACTION CRITERIA BY NUCLEAR GAUGE  
FOR ACCEPTANCE OR REJECTION**

MIX TYPE	AVERAGE OF COMPACTION RESULTS BASED ON NUCLEAR DENSITIES (% MRD)			
	MEETS SPECIFICATION	ACCEPTABLE	BORDERLINE	REJECTABLE
Surface Course: Superpave 9.5, 12.5, 12.5 FC1 and 12.5 FC2	≥ 93 %	< 93 % & ≥ 92 %	< 92 % & ≥ 91 %	< 91 %
Binder Course: Superpave 19 and 25	≥ 92 %	< 92 % & ≥ 91 %	< 91% & ≥ 90 %	< 90 %

18.09.03 Joint Compaction

The measured joint compaction using a nuclear density gauge should not be lower than that provided in Table 6. Joint compaction should be measured within 0.3 of the joint.

**TABLE 6  
MINIMUM REQUIRED JOINT COMPACTION**

LAYER	MINIMUM LONGITUDINAL JOINT COMPACTION
Surface Course	91.5 %
Binder Course	90.5 %

18.09.04 QA Field Sampling

OPSS 310.08.01 is amended to include the following:

Field samples for QA testing shall be plate samples (minimum 300 mm x 300 mm) obtained during asphalt placement and compaction procedures. Samples obtained from the spreader hopper or truck box shall not be used for QA testing.

Alternatively, samples can also be obtained from the Mechanical Transfer Vehicle (MTV) during placement of HMA and prior to transferring the mix to the paver. For MTV sampling, the mix is dumped directly from the MTV into a specially designed funnel which

splits the mix into four containers, each holding approximately 45kg of mix. The mix from one of the containers is then poured into a separate splitting apparatus (QuarterMaster), which is placed on a level surface. This apparatus splits the sample into four buckets, each with 11.3kg capacity. The split is repeated once or twice until a uniform sample is obtained. Sampled material is then transferred to carton boxes and then into bags for security sealing and shipment to the laboratory. The success of the sampling process depends primarily on the leveling of the sampling device and should be conducted while the MTV is under full operation (sampling should be avoided if the MTV is not thoroughly heated).

Samples shall be collected by the contractor at locations generated by random numbers and/or as agreed with the owner, for longitudinal chainage and transverse offset from edge of pavement. These samples shall be representative of the main lane paving operations. At each location, the contractor shall take three samples (within a 3 m longitudinal length) and the samples shall be packed in separate cardboard boxes supplied by the contractor. The box samples shall be numbered in sequence for a given contract, and shall be marked "A", "B", and "C" and include the following minimum identification: date; longitudinal chainage or municipal address opposite the sample location; offset in metres from edge of pavement; contract number, and street name. A typical sequence of samples would be identified as 1A, 1B, 1C, and 2A, 2B, and 2C.

Two of the samples from each sample location shall be the property of the owner. The contractor shall obtain and complete a Bituminous Sample Identifier Forms for each sample. The asphalt mix samples designated for the owner shall be given directly to the owner's representative at the paving site.

#### 18.09.05 QA Sampling And Testing Frequency

OPSS 310.08, Table 6, is amended and replaced by Table 7 in this specification.



**TABLE 7  
CRITERIA FOR SAMPLING AND TESTING TO DETERMINE  
IN-PLACE ASPHALT CEMENT CONTENT**

<b>MIX TYPE</b>	<b>MINIMUM TEST SAMPLES BASED ON ASPHALT PLANT'S DAILY MIX PRODUCTION</b>		
	$\leq 500$ tonnes/day	$> 500$ tonnes & $< 1000$ tonnes/day	$\geq 1000$ tonnes/day
Surface Course	3	3	2 per 500 tonnes
Binder Course	3	3	2 per 500 tonnes
HMA in Driveways, Boulevards and Pathways	Field decision by Owner's representative		

#### 18.10 Tolerance for Asphalt Production

The tolerances for asphalt mix production compared with the Job Mix Formula gradation and asphalt cement content are as in Table 7 of OPSS 310 with the exception of the asphalt cement content. The tolerances are summarized in Table 8 below.

**TABLE 8  
TOLERANCES FOR THE JOB-MIX FORMULA  
GRADATION AND ASPHALT CEMENT CONTENT**

MIX	ATTRIBUTE	MINIMUM TEST SAMPLES BASED ON ASPHALT PLANT'S DAILY MIX PRODUCTION		
		Acceptable	Borderline	Rejectable
Surface Course	DLS, 4.75 mm Sieve Size	< 5.0	5.0 to 7.5	> 7.5
	600 µm Sieve Size	< 3.5	3.5 to 5.0	> 5.0
	75 µm Sieve Size	< 2.0	2.0 to 3.0	> 3.0
Binder and Levelling Courses	DLS, 4.75 mm Sieve Size	< 7.0	7.0 to 10.0	>10.0
	600 µm Sieve Size	< 4.5	4.5 to 6.0	> 6.0
	75 µm Sieve Size	< 2.0	2.0 to 3.0	> 3.0
All Mixes	Asphalt Cement Content	< 0.20	0.20 to 0.30	> 0.30
<p>Note:</p> <ol style="list-style-type: none"> <li>1. Tolerance on the job-mix formula apply as both plus and minus from the job-mix formula</li> </ol>				

18.11 Aggregate Gradation and Asphalt Cement Content Acceptance

OPSS 310.08.04 is deleted and replaced by the following:

If the HMA is borderline for aggregate gradation or asphalt cement content specified in Table 8, the Contractor shall take immediate corrective action through process control at the HMA plant. A total of three consecutive borderline test results for any attribute representing up to 1,000 tonnes of HMA production shall result in the work being deemed rejectable and shall be removed and replaced with acceptable HMA.

Rejected HMA due to aggregate gradation, such as non-compliance on the DLS 4.75mm, 600 µm, or 75 µm sieve sizes, or non-compliance due to the asphalt cement content specified in Table 8, shall be removed and replaced with acceptable HMA.