



September 15<sup>th</sup>, 2023

TY202002.1100 (HIR)

City of Greater Sudbury  
PO Box 5000, Station 'A'  
200 Brady Street  
Sudbury, Ontario P3A 5P3  
Cell: 705-923-1350  
[Miranda.Edwards@greatersudbury.ca](mailto:Miranda.Edwards@greatersudbury.ca)

Attention: Miranda Edwards, Project Manager - Engineering Services

Subject: City of Greater Sudbury – ENG21-38 - Hot In-Place Recycling (HIR), Pilot Project on Kingsway (MR 55) from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

## 1. INTRODUCTION

The City of Greater Sudbury (CGS) has selected HIR as a pilot project for Kingsway (MR 55) from 375m West of Hwy 17 Bypass to 400m East of Second Avenue as a sustainable resurfacing strategy with 100% use of existing material. Site location is shown in Appendix Figures.

The objective of the HIR Pilot Project is to restore the existing aged, cracked, worn or rutted surface course to the same quality as a new hot mix overlay in a cost-effective manner<sup>1</sup>. The HIR process consists of four steps:

1. Softening of the asphalt pavement surface with heat
2. Scarification and/or mechanical removal of the surface material
3. Mixing of the material with recycling agent (rejuvenator), asphalt binder, or new mix, and
4. Laydown and paving of the recycled mix on the pavement surface and recompacting the existing bituminous pavement.

One of the critical components in the HIR process during paving is the asphalt rejuvenator that can penetrate into the asphalt and restore those reactive components that have been lost due to oxidation causing aging.

The asphalt rejuvenator increases penetration value of the asphalt cement in the top portion of the pavement and should extend the pavement's lifecycle, seals the pavement against intrusion of air and water, and increase the durability of the asphalt in the top portion of the pavement by improving the chemical composition of the asphalt cement content.

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<sup>1</sup> *Transportation Research Record 1337, Asphalt Technology for Hot-In-place Surface Recycling*, John Emery and Masahisa Terao.



## 2. GENERAL

### 2.1 Short List - Candidate Roads

The Project Team in 2020 for the hot in-place recycling (HIR) for roads selection establishing the Project Specifications and generating the Tender Document included Mr. Stephen P. Holmes, P.Eng., Roads Engineer, Infrastructure Capital Planning - City of Greater Sudbury, Mr. Param Dhillon, P.Eng., Principal, General Manager of PNJ Engineering Inc., Ms. Hoda Seddik, M.A.Sc., P.Eng., Principal Pavement Engineer of Wood, and Mr. Dan Cacciotti, Senior Geotechnical Engineer and Project Manager of Wood.

Based on the discussion between the above Project Team, visual assessment of some of the roads, comprehensive desktop review of available Geotechnical Report(s), review of Pavement Condition Index (PCI) and contactors inputs, it was decided 4 roads were potential candidates for HIR including Elm St, (MR 35), Kingsway (MR 55), Radar Road (MR 85) and Bancroft Dr (MR 70).

Table 1 presents Kingsway selection for HIR and Photo 1 shows its condition in 2020. Tables 2 to 4 are the field investigation and laboratory testing carried out in 2020 for Kingsway.

Table 1: Selected Road Sections <sup>(1)</sup> for HIR and Candidate Road Sections <sup>(2)</sup>

Road Name	From	To	Length Approx. Km	# of Lanes in both Direction	Lane-km
Rural Kingsway	Falconbridge Rd (MR 86) <sup>(1)</sup>	Levesque St <sup>(1)</sup>	2.8	4	11.2
	Levesque St <sup>(2)</sup>	SE bypass of Trans Canada Hwy 17 <sup>(2)</sup>	1.7	4	6.8

Notes: <sup>(1)</sup> Selected Road section. <sup>(2)</sup> Candidate road section.



Photo 1: Kingsway Condition in 2020 Prior to HIR



Table 2: 2020 HIR Selected Road Sections and Proposed Field Program

Road Name	From	To	Length Approx. Km	# of Lanes in both Direction	Lane-km	# of Tests	Coring Investigation
Kingsway	Falconbridge Rd (MR 86)	Levesque St	2.8	4	11.2	6 tests	3 cores per location X 6 Locations = 18 cores

Table 3: Detailed Fieldwork by Station

Rural Kingsway from Falconbridge Rd (MR 86) to Levesque St ~ 2.8 km 18 cores	CORE# K-1	CORE# K-2	CORE# K-3	CORE# K-4	CORE# K-5	Core# K-6
	(0+250)	(0+750)	(1+250)	(1+750)	(2+250)	(2+750)
	NB	SB	NB	SB	NB	SB
	MDL2	MDPL1	MDPL1	MDL2	MDL2	MDPL1

Table 4: Proposed Laboratory Program

Quantity	RAP evaluation and laboratory testing to determine the followings characteristics
6 Tests	LS-282 Quantitative Extraction of Asphalt Cement and Analysis of Extracted Aggregate from Bituminous Paving Mixtures. AC/Gradation One test per each station.
6 Tests	Pavement Compaction Cores (MRD Method LS-287) and In-Situ Air Voids = (100 - %Comp).
12 Tests	LS-284 Recovery of Asphalt from Solution by Abson Method or Rotavapor. Mass of extracted bitumen to contact PGAC verification and Penetration Test = 75-100 g i.e. 2 cores/location.
6 Tests	ASTM D5/ LS 200 Penetration of Bituminous Materials Determine the penetration at 25°C.
6 Tests	Viscosity Testing as per ASTM D 4402 to determine the flow characteristics of the asphalt cement of pavement cores obtained on site.
6 Tests	R 29 PG verification. The recovered asphalt samples from the cores <u>will not be aged</u> in either the Rolling Film Oven (RFO) that simulates the ageing (harding) characteristics that the AC experiences going through an asphalt plant or Pressure Aging Vessel which simulates approximately 9 years in-place performance or ageing of AC (Oxidation and hardening or stiffening of AC).

The laboratory test results from the 2020 road selection program are detailed in Appendix A.

### 3 TENDER CONTRACT ENG21-38 FOR HOT IN-PLACE RECYCLING

Road Surface Recycling Ltd. (RSR) "Contractor", acknowledged that they have read, understood and agree with all declarations in the Contract ENG21-38 Tender for Hot In-Place Recycling before their Bid Submission for the CGS.

The Contractor shall be responsible for the preparation of the existing HMA by removing all



materials such as cold mix patching material, crack sealant and spray patch material, as the Contractor deems necessary, to heat, hot mill, blend, and place the HIR mix to meet the surface tolerance and surface appearance as specified in the contract documents.

Construction Specification for HIR was in accordance with OPSS.MUNI 332 and acceptance of HIR mix was based on the following criteria:

• Surface Tolerance	The surface of pavement shall be such that when tested with a 3 m long straight edge placed in any location and direction, except across the crown or drainage gutters, there shall not be a gap greater than 3 mm between the bottom of the straight edge and the surface of the HIR.
• Surface Appearance	Visual appearance shall not have flushing, bleeding, segregation, fat spot, surface damage, cracking, or surface contamination.
• Asphalt Cement Content and Aggregate Gradation Acceptance	Meets design of HL 3 according to OPSS.MUNI 1150.
• Mix Properties	%AC, %Air voids, gradation as per OPSS.MUNI 332
• Lift Thickness	50 mm
• Recovered Asphalt Cement Performance Grade and Penetration	PGAC 64-34 Penetration 70 to 140 mm
• Compaction Requirements	Minimum 92%

#### 4 PAVING OPERATION AND NON-CONFORMANCE

On June 20th, 2023, HIR operation began on Kingsway (MR 55) in the middle lane with RSR performing Quality Control testing (QC) and WSP completing Quality Assurance (QA) testing, and non-conformance issues were identified that are summarized below.

Appendix B presents the CGS and WSP inspection field reports during paving with selected site photos during paving documented in Appendix C.

The CGS has concerns regarding the non-conformances to the specification requirements described in Section 3. The Contractor has been allowed to continue their operations with the commitment of improving the processes and being able to meet the specification requirements stated in the tender.

The CGS has allowed the Contractor to continue working and performing the recycling process in the centre-lane of the road to attempt to achieve the specification requirements.

It was decided to stop the paving operation on July 11th, 2023, and shut down on July 12th, 2023, after the contractor could not demonstrate significant improvement to their equipment or operations.



OPSS.MUNI 332 Requirements	Non-Conformance
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<p>1. As per OPSS MUNI 332.07.04.02</p> <p><a href="#">Paving, the temperature of the HIR mix</a> immediately behind the screed and prior to rolling shall not be less than 120 °C.</p>	<p>Not able to meet the temperature specification of 120°C with temperatures ranging from 60 to 90°C and which was indicated by Road Surface Recycling (RSR) on the first day of operation.</p>
<p>2. As per OPSS MUNI 332.06.03</p> <p><a href="#">Heating Unit</a>, open flame heating of the existing HMA pavement shall not be permitted.</p>	<p>The equipment does not maintain steady heating and open flames were noted that are igniting the crack seal material.</p>
<p>3. OPSS MUNI 332.0702</p> <p><a href="#">Preparation of Existing Asphalt</a>, milled existing HMA surfaces shall be clean and free of all loose, broken, and foreign materials and shall be swept with a power broom.</p>	<p>Not maintaining a clean surface free of all loose debris (milled asphalt left in place) resulted in poor bonding between the HIR and existing asphalt layer. Poor bonding was witnessed with core samples taken on site.</p>
<p>4. As per OPSS 332.06.04.01</p> <p><a href="#">Hot Milling Unit, the hot milling unit shall be capable of uniformly milling</a> the preheated HMA to the hot milling depth specified in the mix design.</p>	<p>The hot milling unit is not milling the existing asphalt to the required 50 mm depth uniformly.</p>
<p>5. As per OPSS 332.06.04.02</p> <p><a href="#">Blending Unit shall be capable of thoroughly mixing the hot milled material</a>, rejuvenating agent, and beneficiating HMA.</p>	<p>Not achieved based on the field team witnessing unblended chunks of asphalt behind the recycling unit.</p>

<p>6. Division Special Provision #12, SP#1, 332.07.01 <a href="#">Quality Control</a></p>	Properties	AC %	Air Voids %	9.5 mm	4.75 mm	75 um	Comp %	HIR Lift Thickness mm	PEN mm
	JMF	5.0	3.8	88.5	57	4.3	Min 92	50	70-140
<p>7. As per OPSS 332.08.08.01, Compaction Requirements</p>	Presented in Section 4 below								
<p>8. Gradation requirements</p>									



#### 4.1 QA / QC Test Results

All QA and QC test results are detailed in Appendix D that includes core photos.

##### 4.1a. Summary of WSP QA Mix Properties Results for Kingsway Road (MR 55) HIR

Location	Properties	AC %	Air Voids %	9.5 mm	4.75 mm	75 um
	JMF	5.0	3.8	88.5	57	4.3
Sta. 0+220 (Lot 1-1) Kingsway, Centre TL , Sampled June 20		4.76	5.5**	90.1**	58.4**	4.6
Sta. 1+070 (Lot 1-2) WB Lt TL Sampled June 21		4.76	4.0	81.5***	54.1**	4.8
Sta. 1+817 (Lot 1-3) Centre TL Sampled June 28		4.9	5.1**	80.6***	53.6**	4.2
Sta. 3+300 (Lot 1-4)_EBPL Sampled June 29		5.29	3.7	87.0**	57.6	4.2
Sta. 2+840 (Lot 1-5)_EBPL Sampled July 10		4.66**	5.0	78.2***	53.9**	4.8
Sta. 1+745 (Lot 1-6)_EBPL Sampled July 11		5.03	3.8	83.6**	56.6	4.7
Sta. 1+700 (Lot 1-7)_EBPL Sampled July 11		5.01	4.9	82.8***	56.1	4.8

\*\* Borderline

\*\*\* Rejectable

##### 4.1b. Summary of RSR QC Mix Properties Results for Kingsway Road (MR 55) HIR

Location	Properties	AC %	Air Voids %	9.5 mm	4.75 mm	75 um
	JMF	5.0	3.8	88.5	57	4.3
Sta. 0+220 (Lot 1-1), Sampled June 29		5.1	4.0	86.2**	57.0	4.3
Sta. 1+070 (Lot 1-2), Sampled June 29		5.4**	3.3	82.3***	55.9	4.1
Sta. 1+817 (Lot 1-3), Sampled June 29		5.3**	3.5	80.4***	53.5	4.0
Sta. 3 + 300 (Lot 1-4), Sampled June 29		5.6***	2.5	89.5**	56.6	3.7
Sta. 2+840 (Lot 1-5), Sampled July 10		5.0	4.2	82.3***	56.7	4.3
Sta. 1+745 (Lot 1-6), Sampled July 11		5.5**	3.0	82.8***	54.1**	4.2

\*\* Borderline

\*\*\* Rejectable



4.2a WSP QA Compaction (%) for Lot 1

Sublots	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9	1-10
Station:	0+170	0+675	1+190	1+635	2+694	3+325	3+492	3+025	2+826	2+600
Lane:	CL	CL	CL	EBL	CL	WBL@ 3 <sup>rd</sup> Ave.	EBPL	EBPL	EBPL	EBPL
Date Paved:	June 20	June 21	June 21	June 23	June 28	June 29	June 29	July 10	July 10	July 10
Date Sampled:	June 21	June 22	June 22	June 23	June 29	June 29	June 30	July 11	July 11	July 19
HIR Thickness (as received) mm	39	45	56	55	Unclear	50	Unclear	Unclear	Unclear	28
Thickness (as cut) mm	51	45	52	55	49	50	113	46	50	28
Bonded /Unbonded	Bonded	Bonded	Unbonded	Unbonded	Unclear	Unbonded	Unclear	Unclear	Unclear	Unbonded
Percent Compaction %	86.5	93.1	94.4	92.7	92.4	91.1	94.9	88.8	94.8	88.8
Condition of sample	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Specifications	Minimum 92%									

4.2b. RSR QC Compaction (%) for Lot 1

Stations	0 + 170	1 + 065	1 + 190	1 + 635	2 + 694	3 + 325	3 + 492	3+025	2+826
Sublot	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9
Date Sampled	June 21	June 22	June 22	June 28	June 29	June 29	June 30	July 11	July 11
Thickness (mm)	49	44	52	48	42	50	52	21	30
% Compaction	88	94.2	94.2	92.7	91.2	91.3	95	87.6	91.2
Specifications	Minimum 92%								



WSP QA Compaction (%) for Lot 2

Sublots	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8	2-9	2-10
Station:	2+500	2+400	2+300	2+200	2+100	2+000	1+900	1+800	1+700	1+615
Lane:	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL
Date Paved:	July 11	July 11	July 11	July 11	July 11	July 11	July 11	July 11	July 11	July 11
Date Sampled:	July 19	July 19	July 19	July 19	July 19	July 20	July 20	July 20	July 20	July 20
HIR Thickness (as received) mm	35	38	35	31	53	41	39	28	32	46
Thickness (as cut) mm	35*	34	31	31	48	39	39	22	32*	31
Bonded /Unbonded	Unbonded	Bonded	Unbonded	Unbonded	Bonded	Bonded	Partially bonded	Bonded	Unbonded	Bonded
Percent Compaction %	92.6	89.0	91.7	91.6	96.7	91.5	88.9	91.0	85.2	95.0
Condition of sample	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Specifications	Minimum 92%									



WSP QA Compaction (%) for Lot 3

Sublots	2-1	2-2	2-3	2-4	2-5	2-6	2-7
Station:	1+468	1+370	1+270	1+000	0+900	0+800	0+735
Lane:	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL
Date Paved:	Aug 11	Aug 11	Aug 11	Aug 11	Aug 11	Aug 11	Aug 11
Date Sampled:	Aug 21	Aug 21	Aug 21	Aug 21	Aug 21	Aug 21	Aug 21
HIR Thickness (as received) mm	35	33	45	40	45	47	45
Thickness (as cut) mm	34	29	45	39	45	43	45
Bonded /Unbonded	Unbonded	Bonded	Unbonded	Bonded	Unbonded	Bonded	Bonded
Percent Compaction %	88.5	90.5	94.7	92.4	91.1	96.0	94.1
Condition of sample	Good	Good	Good	Good	Good	Good	Good
Specifications	Minimum 92%						

WSP QA Penetration (mm)

Location	Date Sampled	Average Penetration (mm)
Lot 1-1	July 11	71
Lot 2 Sta 1+745 (Centre Lane)	July 11	138
Specifications	Accep. 70-140	Rejectable*** < 60 & > 150

No RSR QC penetration results have been provided.



4.4a. WSP QA Performance Graded Asphalt Cement (PG64-34)

Sample Description: Contract # ENG21-38, Kingsway MR #55, Lot 1 Sublot 1, HIR HL3 Mix 1523, Sta. 0+220

Date Sampled: June 20, 2023		Submitted Grade: PG 64-34			
Date Received: June 26, 2023		WSP Lab No.: WHB23-02223			
Date Tested: July 3, 2023		Tested By: E. Shafiee, C. Nickolson			
<b>Continuous Grade: PG 61.1-17.3(15.9)</b>		<b>Final Grade: PG 58-16</b>			
Test Property	Test Result	OPSS.MUNI 1101 Requirements		Test Method	
Recovered Binder					
Ash Content: (% by Mass)	0.7	Acceptable	Rejectable	MTO LS-227	
		≤ 1.0	> 1.0		
Dynamic Shear, G'Sin δ, at 58 °C, 10 rad/s: (kPa)	2.98	2.20 Min.		AASHTO T315	
Dynamic Shear, G'Sin δ, at 64 °C, 10 rad/s: (kPa)	1.48 **	2.20 Min.			
Pressure Aging Vessel Residue					
Dynamic Shear, G'Sin δ, at 16 °C, 10 rad/s: (kPa)	4983	5000 Max.		AASHTO T315	
Dynamic Shear, G'Sin δ, at 13 °C, 10 rad/s: (kPa)	5816 **	5000 Max.			
Creep Stiffness at -8 °C	S at 60s (MPa)	31	300 Max.		AASHTO T313
	m-value at 60s	0.308	0.300 Min.		
Creep Stiffness at -12 °C	S at 60s (MPa)	49 **	300 Max.		
	m-value at 60s	0.271 **	0.300 Min.		
DENT, CTOD, δ <sub>i</sub> at 15 °C: (mm)	5.5	Acceptable	Rejectable	MTO LS-299	
		≥ 12.0	< 12.0		
eBBR Grade Loss (°C)	6.2	≤ 6.0	> 6.0	MTO LS-308	
eBBR Low Temperature Limiting Grade, LTLG: (°C)	-3.5	≤ -31.0	> -31.0		
<p>Note: Shaded areas indicate results lying outside of acceptable limits. ** Testing results used only to determine actual high and/or low temperature grade. These results do not indicate that the sample does not meet specifications.</p> <p>Recovery of asphalt cement was completed as per MTO LS-284.</p>					



Sample Description: **Contract # ENG21-38, Kingsway MR #55 EBL, Lot 2, HIR HL3 Mix 1523, Sta. 1+745**

Date Sampled: July 11, 2023		Submitted Grade: PG 64-34			
Date Received: July 12, 2023		WSP Lab No.: WHB23-02506			
Date Tested: July 24, 2023		Tested By: E. Shafiee, C. Nickolson			
<b>Continuous Grade: PG 49.6-34.6(4.7)</b>		<b>Final Grade: PG 46-34</b>			
Test Property	Test Result	OPSS.MUNI 1101 Requirements		Test Method	
Recovered Binder					
Ash Content: (% by Mass)	0.6	Acceptable	Rejectable	MTO LS-227	
		≤ 1.0	> 1.0		
Dynamic Shear, G*/Sin δ, at 46 °C, 10 rad/s: (kPa)	3.15	2.20 Min.		AASHTO T315	
Dynamic Shear, G*/Sin δ, at 52 °C, 10 rad/s: (kPa)	1.57 **	2.20 Min.			
Pressure Aging Vessel Residue					
Dynamic Shear, G*Sin δ, at 7 °C, 10 rad/s: (kPa)	4258	5000 Max.		AASHTO T315	
Dynamic Shear, G*Sin δ, at 4 °C, 10 rad/s: (kPa)	5233 **	5000 Max.			
Creep Stiffness at -24 °C	S at 60s (MPa)	65	300 Max.		AASHTO T313
	m-value at 60s	0.304	0.300 Min.		
Creep Stiffness at -30 °C	S at 60s (MPa)	128 **	300 Max.		
	m-value at 60s	0.261 **	0.300 Min.		
DENT, CTOD, δ <sub>i</sub> at 15 °C: (mm)	4.8	Acceptable	Rejectable	MTO LS-299	
		≥ 12.0	< 12.0		
eBBR Grade Loss (°C)	9.7	≤ 6.0	> 6.0	MTO LS-308	
eBBR Low Temperature Limiting Grade, LTLG: (°C)	-23.9	≤ -31.0	> -31.0		
<p>Note: Shaded areas indicate results lying outside of acceptable limits. ** Testing results used only to determine actual high and/or low temperature grade. These results do not indicate that the sample does not meet specifications.</p> <p>Recovery of asphalt cement was completed as per MTO LS-284</p>					



4.4b. RSR (PNJ) QC Performance Graded Asphalt Cement (PG64-34)



70 Galaxy Blvd., Suite 100  
Toronto, Ontario M9W 4Y6

Tel: 905 597 8383 • Fax: 905 597 0825

**Performance Grade Asphalt Cement Grading Test Report**

<b>Project No :</b>	<u>22-1008-02</u>	<b>PNJ Lab No.:</b>	<u>8576</u>
<b>Client :</b>	<u>Road Surface Recycling</u>	<b>Date Sampled:</b>	<u>28-Jun-23</u>
<b>Attention :</b>	<u>Mr. Frank Crupi</u>	<b>Sample Field ID:</b>	<u>Lot 1-3, Stn 1+817, WB Lane</u>
<b>Address :</b>	<u>57 Notion Road, Ajax ON, L1S 6K7</u>	<b>Tested By :</b>	<u>Akash Jani</u>
		<b>Contract :</b>	<u>ENG - 21-38 Kingsway Rd.</u>

Specified Tests and PGAC Characteristics	Test Temp.	Unit	Specification Min.	Specification Max.	Sample Results	Low Temp Graphs	
<b>Tests on Recovered PGAC</b>							
Ash Content 1.0 % Maximum		%	-	0.60%	0.945	<p>m-value Temp. @ 0.300 (-) 30.5</p>	
Penetration, ASTM D5	25.0	dmm	-	-	56.8		
Complex Shear Modulus, G*	58.0	kPa	-	-	-		
Phase Angle, d		degree	-	-	-		
G* / sin d		kPa	1.0Kpa	-	-		
Complex Shear Modulus, G*	64.0	kPa	-	-	-		
Phase Angle, d		degree	-	-	-		
G* / sin d		kPa	1.0Kpa	-	-		
<b>Tests on RTFO Residue</b>							
AASHTO T240 - Mass Loss / Gain							
Mass Change (use minus sign "-" if loss)	163 °C	% Loss	1.00%	-	-	<p>Stiffness Temp. @ 300.00 (-) 43.8</p>	
AASHTO T315, Dynamic Shear Rheometer							
Complex Shear Modulus, G*	64.0	kPa	-	-	4.033		
Phase Angle, d		degree	-	-	69.8		
G* / sin d		kPa	2.2 Kpa	-	4.297		
Complex Shear Modulus, G*	70.0	kPa	-	-	2.083		
Phase Angle, d		degree	-	-	72.5		
G* / sin d		kPa	2.2 Kpa	-	2.183		
<b>Tests on PAV Residue</b>							
AASHTO T315, Dynamic Shear Rheometer							
Complex Shear Modulus, G*	13.0	kPa	-	-	7067.6		
Phase Angle, d		degree	-	-	36.2		
G* .sin d		kPa	-	5000.0	4176.3		
Complex Shear Modulus, G*	10.0	kPa	-	-	9826		
Phase Angle, d		degree	-	-	34.6		
G* / sin d		kPa	-	5000.0	5583.5		
AASHTO T313, Bending Beam Rheometer							
Creep Stiffness	-18.0	MPa	-	300.0	90.2		
Slope, m-value		-	0.300	-	0.314		
Creep Stiffness	-24.0	MPa	-	300.0	170		
Slope, m-value		-	0.300	-	0.281		

**Comments:** *Tested PGAC Sample meets 64°C, 13°C, and -18°C, Grade as PG (64-28)  
True continuous High Grade is 69.8°C and Low Grade is -30.5°C*



### Performance Grade Asphalt Cement Grading Test Report

**Project No :** 22-1008-02  
**Client :** Road Surface Recycling  
**Attention :** Mr. Frank Crupi  
**Address :** 57 Notion Road, Ajax ON, L1S 6K7

**PNJ Lab No.:** 8687  
**Date Sampled:** 11-Jul-23  
**Sample Field ID:** Lot -2, Strn 1+745, EB Lane  
**Tested By :** Akash Jani  
**Contract :** ENG - 21-38 Kingsway Rd.

Specified Tests and PGAC Characteristics	Test Temp.	Unit	Specification Min.	Max.	Sample Results	Low Temp Graphs
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**Tests on Recovered PGAC**

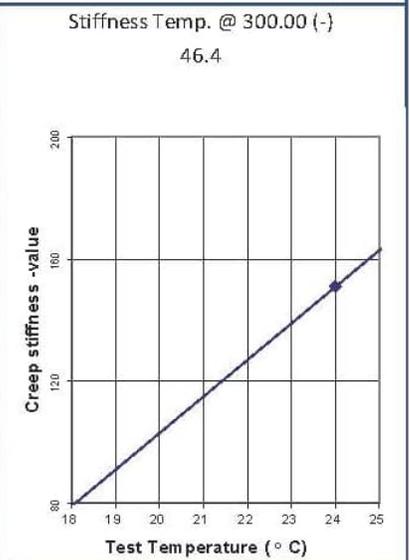
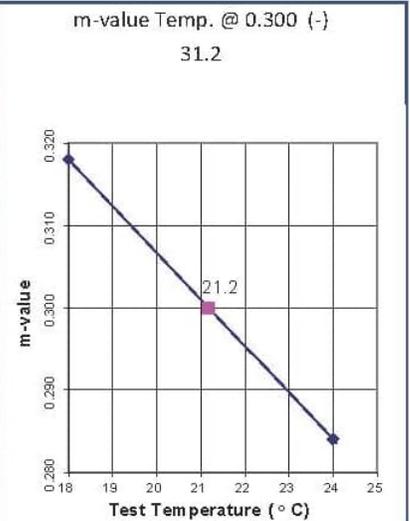
Ash Content 1.0 % Maximum		%	-	0.60%	0.955
Penetration, ASTM D5	25.0	dmm	-	-	58.3
Complex Shear Modulus, G*	58.0	kPa	-	-	-
Phase Angle, d		degree	-	-	-
G* / sin d	64.0	kPa	1.0Kpa	-	-
Complex Shear Modulus, G*		kPa	-	-	-
Phase Angle, d	64.0	degree	-	-	-
G* / sin d		kPa	1.0Kpa	-	-

**Tests on RTFO Residue**

AASHTO T240 - Mass Loss / Gain					
Mass Change (use minus sign "-" if loss)	163 °C	% Loss	1.00%	-	-
AASHTO T315, Dynamic Shear Rheometer					
Complex Shear Modulus, G*	64.0	kPa	-	-	3.802
Phase Angle, d		degree	-	-	66.6
G* / sin d	70.0	kPa	2.2 Kpa	-	4.142
Complex Shear Modulus, G*		kPa	-	-	2.019
Phase Angle, d	70.0	degree	-	-	69
G* / sin d		kPa	2.2 Kpa	-	2.162

**Tests on PAV Residue**

AASHTO T315, Dynamic Shear Rheometer					
Complex Shear Modulus, G*	10.0	kPa	-	-	8500.57
Phase Angle, d		degree	-	-	34.4
G* .sin d	10.0	kPa	-	5000.0	4805.21
Complex Shear Modulus, G*		kPa	-	-	11742.7
Phase Angle, d	10.0	degree	-	-	33
G* / sin d		kPa	-	5000.0	6387.5
AASHTO T313, Bending Beam Rheometer					
Creep Stiffness	-18.0	MPa	-	300.0	79
Slope, m-value		-	0.300	-	0.318
Creep Stiffness	-24.0	MPa	-	300.0	151
Slope, m-value		-	0.300	-	0.284



**Comments:** Tested PGAC Sample meets 64°C, 10°C, and -18°C, Grade as PG (64-28)

True continuous High Grade is 69.8°C and Low Grade is -31.2°C



## 5 PAVEMENT ASSESSMENT

### 5.1 Confirmation of Hot Mix Asphalt

On July 21, 2023, a further core investigation was carried on the lower lift below the HIR to determine the presence of hot mix, type of mix and its properties are summarized in the Table below and detailed in Appendix E.

Also, the HIR mix design which was designed by PNJ Engineering Inc is included in Appendix E.

Location	HMA Tested Thickness (mm)	AC%	(DLS) 13.2 mm	(DLS) 9.5 mm	4.75 mm	75 um
Sta. 3+550 EB Curb Lane (Binder -HL 8/ HD8C)	81	4.86	83.1	-	50.2	4.7
Sta. 2+250, EB Curb Lane (HL 8/ HD8C /HL3)	71	4.88	100.0	86.0	60.5	3.9
Sta. 3+550 EB Curb Lane (HL3)	44	4.80	-	85.1	57.8	2.7

### 5.2 Visual Assessment

On July 27, 2023, WSP visited the site and met with the CGS representatives to conduct a visual pavement condition inspection of the existing road surface of HIR within the project area to identify concerns and signs of distresses. The identification and classification of the pavement distresses were carried out in accordance with the MTO's "Flexible Pavement Condition Rating Manual – Guidelines for Municipalities", SP-022.

Selected photographs showing the existing condition of the investigated road section including predominant surface defects are presented in Appendix F.

- Segregation was noted - slight to medium predominately at mid-lane with a density range from 30 to 50%. This might be due the pavement not sufficiently heated.
- Fat Spots (multiple small) were observed in some locations due to faulty construction practices or oil spill.
- Flushing /bleeding was observed through 10 to 15% of the assessment area. This might be due to improper mixing or high rejuvenating content.
- Transverse cracking - slight/few cracking were observed in isolated areas near the concrete curb of the island that ranged from 170 mm to 370 mm in length.

### 5.3 Surface Tolerance

WSP carried out smoothness surveying using a 3.0 m straight edge that was placed at 50m intervals and 3 equally spaced measurements were taken at each interval along the straight edge. If, after a few intervals, the measurements continued to be within specification, the intervals would extend to every 100m and go back to 50m if it was determined that the specification was again, not being met. All scallop measurements were referenced by Lot and subplot. The testing started from Sta. 3+887, moving eastbound, and ended at approximately Sta. 0+770. A feeler gauge, measured to 3 mm, was used to determine whether the deviation was greater than, less than, or equal to 3.0 mm.

A total 54 lots with 3 sublots each (~ 162 measurements) were taken with a deviation from the straight edge to the ground as follows:

- 57.4% of measurements were either equal to or less than 3 mm;
- 18% between 3 and 4 mm;
- 15.4% were between 4 and 5 mm;
- 6.2% were between 5 and 6 mm, and
- 3% were greater than 6 mm.



Photo 2: Surface Smoothness Testing with a 3 m Long Straight Edge

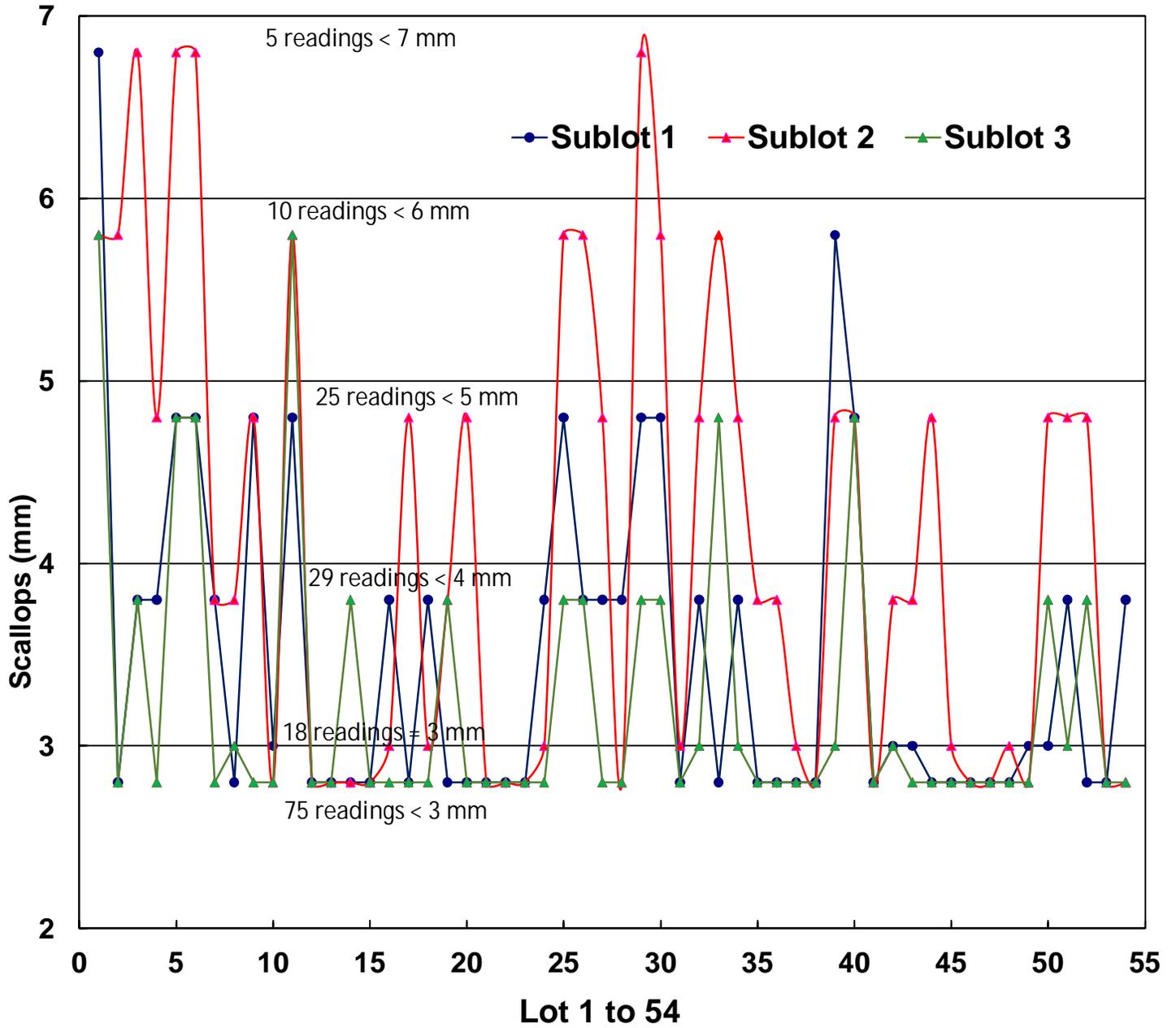


Figure 1: Smoothness Testing.



## 6 HL 3 Mix Properties for HIR

### 6.1 AC/Gradation and % Air Voids

Extraction/Gradation tests were carried out as per MTO LS-282 on QA and QC samples and were compared to OPSS.MUNI 1150 and OPSS.MUNI 310 for Hot Mix Asphalt, results summarized below.

- Seven (7) QA HL 3 results exhibited four (4) samples rejected on the 9.5 mm sieve size and three (3) samples were borderline, one (1) sample borderline on 4.75 mm sieve size and one (1) sample was borderline for %AC. Two (2) samples were borderline for % air voids.
- Six (6) QC HL 3 results exhibited four (4) samples rejected on the 9.5 mm sieve size and two (2) samples borderline, one (1) sample borderline on 4.75 mm sieve size and two (2) samples were borderline and one (1) sample was rejectable for %AC. All six (6) samples were acceptable for % air voids.

	AC %	Air Voids %	9.5 mm	4.75 mm	75 um
QA	Borderline 14%	Borderline 29%	100% (between Borderline and Rejectable)	Borderline 14%	Acceptable
QC	67% (between Borderline and Rejectable)	Acceptable	100% (between Borderline and Rejectable)	Borderline 17%	

WSP believes that the rate of deterioration of a pavement built with a lower average quality material being in borderline /rejectable zone for gradation, asphalt cement content and air voids, will deteriorate faster compared with pavement built with higher quality material under identical conditions of pavement structural design and traffic loads.

### 6.2 HIR Lift Thickness

- Twenty-seven (27) QA core samples measured for lift thickness and had twenty-one (21) core thickness less than 50 mm, i.e. 78% of the core had thickness less than 50 mm.
- Nine (9) QC core samples measured for lift thickness and had six (6) core thickness less than 50 mm, i.e. 67% of the core had thickness less than 50 mm.

The deficient thickness of HIR can impact the pavement structure adequacy and the rate of crack reflecting / propagating from underlying layers.

### 6.3 Compaction and Bonding of Asphalt Pavement

- Ten (10) QA core samples tested for compaction in "Lot 1" exhibited four (4) cores had percent of compaction less than 92% and four (4) cores were de-bonded.
- Ten (10) QA core samples tested for compaction in "Lot 2" exhibited five (5) cores had percent of compaction less than 92% and four (4) cores were de-bonded.
- Seven (7) QA core samples tested for compaction in "Lot 3" exhibited three (3) cores had percent of compaction less than 92% and three (3) cores were de-bonded.



- Nine (9) QC core samples tested for compaction in "Lot 1" exhibited five (5) cores had percent of compaction less than 92%.

	% Compaction	Debonded
QA	44% of cores had compaction less than 92%	41% of cores debonded
QC	56% of cores had compaction less than 92%	-

Compaction is vital as it provides cohesion to the asphalt-aggregate matrix. Cohesion is considered as the overall integrity of the material when subjected to load and stress. Inadequate compaction will cause early rutting (deformation) due to lower shear strength and can exhibit early cracking and ravelling.

## 6.4 Recovered Asphalt Penetration and Performance Graded Asphalt Cement

### 6.4.1 Penetration

High penetration values mean softer asphalt and low penetration values are indicative of harder, aged, oxidized asphalt.

- Two (2) QA results for penetration were tested and measured to be acceptable.

### 6.4.2 Performance Graded Asphalt Cement (PGAC)

- Two (2) QA PGAC sample results did not meet PGAC 64-34 requirements. PGAC exhibited rejectable for final grade. Failed (DENT) Test (LS-299), which reflects potential for fatigue cracking at intermediate temperatures. Also, the samples failed the Extended Bending Beam Rheometer (BBR) Testing (308), which reflects physical hardening properties to determine low temperature PG properties after the beam has been conditioned at low temperatures for 72 hours (3 days).
- Two (2) QC PGAC sample results did not meet PGAC 64-34 requirements. The reports indicated low end failing temperatures at the lower temperature.

### 6.4.1 Pavement Core Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

Twenty-seven (27) cores were tested for compaction with 41% of the cores de-bonded that prompted further testing to determine the interlayer bonding.

Eighteen (18) QA core samples were cored for Interlayer Shear Strength (ISS) testing as presented in the Table below. Eight (8) cores were already de-bonded during coring and as a result the lower lifts were not removed from the roadway and were left in-place while the remaining 10 cores were tested.

<i>19Jul2023</i>	<i>20Jul2023</i>	<i>21Jul2023</i>
Sta. 2+100 Lot 2 -5 <sup>(1)</sup>	Sta. 1+615 Lot 2 -10 <sup>(1)</sup>	Sta. 0+735 Lot 3 -7 <sup>(1)</sup>
Sta. 2+300 Lot 2 -3 <sup>(1)</sup>	Sta. 1+700 Lot 2 -9 <sup>(1)</sup>	Sta. 0+800 Lot 3 -6 <sup>(1)</sup>
Sta. 2+400 Lot 2 -2 <sup>(1)</sup>	Sta. 1+800 Lot 2 -8	Sta. 0+900 Lot 3 -5
Sta. 2+500 Lot 2 -1	Sta. 1+900 Lot 2 -7	Sta. 1+000 Lot 3 -4 <sup>(1)</sup>
Sta. 2+600 Lot 1 -10	Sta. 2+000 Lot 2 -6 <sup>(1)</sup>	Sta. 1+270 Lot 3 -3
		Sta. 1+468 Lot 3-1 <sup>(1)</sup>

Notes: <sup>(1)</sup> Core samples with bonded lower lift.



The remaining ten (10) core samples were tested as per AASHTO TP 114 to determine the Interlayer Shear Strength (ISS) between the asphalt layers. The test results are detailed in Appendix E and summarized in the Table below.

Sublots	2-2	2-3	2-5	2-6	2-9 <sup>(1)</sup>	2-10	3-1 <sup>(1)</sup>	3-4	3-6	3-7
Station:	2+400	2+3000	2+100	2+000	1+700	1+615	1+468	1+000	0+800	0+735
Lane:	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL	EBPL
Date Paved:	19 July	19 July	19 July	19 July	19 July	19 July				
Date Sampled:	3 Aug	3 Aug	3 Aug	3 Aug	3 Aug	3 Aug				
HIR Thickness (Top) mm	50.3	30.5	40.1	44.8	34.9	44.1	45.4	40.1	50.3	45.5
Thickness (Bottom) mm	50.5	50.5	50.7	45.5	50.5	50.0	50.0	41.1	50.9	45.5
ISS (kPa)	439.5	301.2	275.4	242.5	64.2	427.6	182.5	336.1	345.3	425.4

Notes: <sup>(1)</sup> Contains dirt.

Poor bonding is considered for values below 275 kPa.

A total of eighteen (18) QA cores were obtained for Interlayer Shear Strength (ISS) testing 8 of which debonded on site. Three (3) cores failed the ISS test totaling 10 cores with poor shear strength (i.e. 61.1%).

The pavements with a better interlayer bonding can bear the traffic load and disperse the load from top to bottom, whereas a poor bonding conditions can lead to the early damage and premature cracking under the vehicle loads or moisture<sup>2, 3</sup>.

Also, interlayer slippage cracking is commonly observed damage due to poor interface bonding between the asphalt overlay and underlayer, which is generally caused by the turning and braking of the vehicle (Kumar and Saride, 2018).

<sup>2</sup> *Characterization of asphalt concrete layer interfaces Transportation Research Record, 1778 (2001), pp. 132-139.*

<sup>3</sup> *J. Wang, F. Xiao, Z. Chen, et al. Application of tack coat in pavement engineering, Construction and Building Materials, 152 (2017), pp. 856-871*

## 7 IMPLICATION OF NON-CONFORMANCE ON LONG TERM PAVEMENT PERFORMANCE

### 7.1 Low Temperature and Bonding of Layers

HIR process forms a thermal bond between asphalt layer(s) if the temperature is controlled. However, RSR was not able to meet the temperature specification of 120°C and temperature ranged from 60 to 90°C that slowed down the rejuvenator to penetrate through the asphalt causing poor thermal bond between layers and the layers not to be intact.

The importance of the bonding is to distribute the traffic load from a relatively small area on the surface over a very much wider area to the granular layers and then to the subgrade<sup>4</sup> (Refer to Photo 3).

Noteworthy, there are 2 critical strains regarding performance of pavement structure, one is the horizontal tensile strain at the bottom of the lowest asphalt layer, and vertical compressive strain at the top of the subgrade.<sup>4</sup> (Refer to Photo 4).

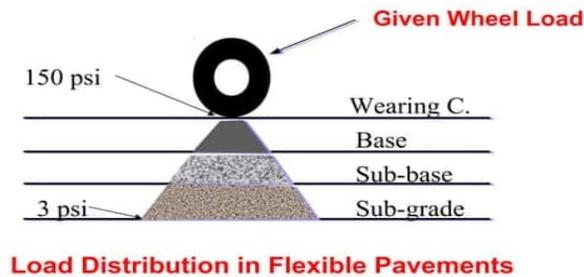
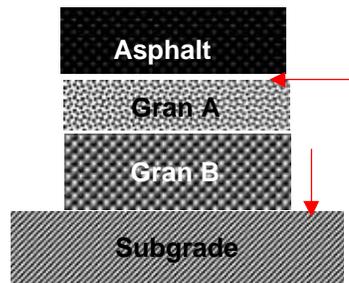


Photo 3: Spread of Wheel Load Pressure through Pavement Structure



$\epsilon_H$  = Horizontal Tensile Strain  
at the bottom in of the lowest asphalt layer  
If exceeded will cause Fatigue/Long Cracking)

$\epsilon_V$  = Vertical Tensile Strain  
at the top of subgrade  
If exceeded will cause Rutting  
(depression in the wheel path)

Photo 4: Critical Strains

<sup>4</sup> *The Design and Construction of Asphalt Pavements, Department of Civil Engineering, University of Waterloo, Norman McLeod et al, 1985.*



Thus, poor bonding impedes the loads to be transmitted to the lower pavement layers negatively impacting the pavement performance causing slippage cracks, delamination, and alligator cracking<sup>5</sup>.

## 8 SYNOPSES

The QA results from field observations and laboratory testing along the Kingsway centre lane / merge lane revealed that the pavement is built with a lower average quality material with insufficient compaction, poor thermal bonding between asphalt layers, deficient layer thickness, and inappropriate PGAC that did not meet the specification requirements as summarized below.

<ul style="list-style-type: none"> <li>• Surface Tolerance</li> </ul>	162 measurements	57.4% of measurements were either equal to or less than 3 mm measured by 3 m long straight edge.										
<ul style="list-style-type: none"> <li>• Surface Appearance</li> </ul>		<p>Segregation was noted - slight to medium predominately at mid-lane with a density range from 30 to 50%. This might be due to the pavement not being sufficiently heated.</p> <p>Fat Spots (multiple small areas) were observed in some locations due to faulty construction practices or oil spill.</p> <p>Flushing /bleeding was observed through 10 to 15% of the assessment area. This might be due to improper mixing or high rejuvenating content.</p> <p>Transverse cracking - slight/few cracking was observed in isolated areas near the concrete curb (island) that ranged from 170 mm to 370 mm in length.</p>										
<ul style="list-style-type: none"> <li>• Asphalt Cement Content and Aggregate Gradation Acceptance</li> </ul>	7 samples	<table> <tr> <td>AC %</td> <td>14% Borderline</td> </tr> <tr> <td>Air Voids %</td> <td>29% Borderline</td> </tr> <tr> <td>9.5 mm Sieve</td> <td>100% between Borderline and Rejectable</td> </tr> <tr> <td>4.75 mm Sieve</td> <td>14% Borderline</td> </tr> <tr> <td>75 um Sieve</td> <td>Acceptable</td> </tr> </table>	AC %	14% Borderline	Air Voids %	29% Borderline	9.5 mm Sieve	100% between Borderline and Rejectable	4.75 mm Sieve	14% Borderline	75 um Sieve	Acceptable
AC %	14% Borderline											
Air Voids %	29% Borderline											
9.5 mm Sieve	100% between Borderline and Rejectable											
4.75 mm Sieve	14% Borderline											
75 um Sieve	Acceptable											
<ul style="list-style-type: none"> <li>• Lift Thickness</li> </ul>	27 HIR cores	78% of the core had thicknesses less than 50 mm.										
<ul style="list-style-type: none"> <li>• Recovered Asphalt Cement Performance Grade and Penetration</li> </ul>	2 samples	Penetration testing was acceptable.										
	4 samples	PGAC sample results did not meet PGAC 64-34 requirements.										
<ul style="list-style-type: none"> <li>• Compaction Requirements</li> </ul>	27 HIR cores	44% of cores had compaction less than 92%.										

<sup>5</sup> *Asphalt Technology New, Bonding of Layers is Critical to Good Performance.*



As a result of the described deficiencies, the road is experiencing surface defects such as segregation, flushing, fat spots and transverse cracking. Typical service life for hot in-place recycling (HIR) is about 7 years for Freeway and 9 years for non-Freeway<sup>6</sup>. These described deficiencies will cause premature distresses and drop its remaining service life by at least 3 to 4 years, thus increasing the maintenance cost of rout and crack sealing, hot mix patching, and surface sealing.

Overall, the quality of the HIR was poor, the work frequently did not meet the project specification requirements.

## 9 CLOSURES

The attached Report Limitations are an integral part of this report.

We trust that this letter is satisfactory for your purposes. Should there be any questions, or if we can be of further, please do not hesitate to contact us at your convenience.

WSP E&I Canada Limited

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Name: Hoda Seddik, M.A.Sc., P.Eng.  
Consulting Engineer  
Title: Senior Principal Pavement Engineer  
[hoda.seddik@wsp.com](mailto:hoda.seddik@wsp.com)

---

Name: David M Brown  
Title: Senior Associate Project Manager  
[david.m.brown@wsp.com](mailto:david.m.brown@wsp.com)

---

Name: Ludomir Uzarowski, Ph.D., P.Eng.  
Title: Principal, Senior Pavement and  
Materials Engineer  
Independent QC Reviewer  
[ludomir.uzarowski@wsp.com](mailto:ludomir.uzarowski@wsp.com)

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<sup>6</sup> Ontario Ministry of Transportation (MTO). 2013. *Pavement Design and Rehabilitation Manual (Table 3.3.1)*.

# REPORT LIMITATIONS

## Limitations to Geotechnical Reports

1. The work performed in the preparation of this report and the conclusions presented herein are subject to the following:
  - a) The contract between WSP and the Client, including any subsequent written amendment or Change Order duly signed by the parties (hereinafter together referred as the "Contract");
  - b) Any and all time, budgetary, access and/or site disturbance, risk management preferences, constraints or restrictions as described in the contract, in this report, or in any subsequent communication sent by WSP to the Client in connection to the Contract; and
  - c) The limitations stated herein.
2. **Standard of care:** WSP has prepared this report in a manner consistent with the level of skill and are ordinarily exercised by reputable members of WSP's profession, practicing in the same or similar locality at the time of performance, and subject to the time limits and physical constraints applicable to the scope of work, and terms and conditions for this assignment. No other warranty, guaranty, or representation, expressed or implied, is made or intended in this report, or in any other communication (oral or written) related to this project. The same are specifically disclaimed, including the implied warranties of merchantability and fitness for a particular purpose.
3. **Limited locations:** The information contained in this report is restricted to the site and structures evaluated by WSP and to the topics specifically discussed in it, and is not applicable to any other aspects, areas or locations.
4. **Information utilized:** The information, conclusions and estimates contained in this report are based exclusively on: i) information available at the time of preparation, ii) the accuracy and completeness of data supplied by the Client or by third parties as instructed by the Client, and iii) the assumptions, conditions and qualifications/limitations set forth in this report.
5. **Accuracy of information:** No attempt has been made to verify the accuracy of any information provided by the Client or third parties, except as specifically stated in this report (hereinafter "Supplied Data"). WSP cannot be held responsible for any loss or damage, of either contractual or extra-contractual nature, resulting from conclusions that are based upon reliance on the Supplied Data.
6. **Report interpretation:** This report must be read and interpreted in its entirety, as some sections could be inaccurately interpreted when taken individually or out-of-context. The contents of this report are based upon the conditions known and information provided as of the date of preparation. The text of the final version of this report supersedes any other previous versions produced by WSP.
7. **No legal representations:** WSP makes no representations whatsoever concerning the legal significance of its findings, or as to other legal matters touched on in this report, including but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.
8. **Decrease in property value:** WSP shall not be responsible for any decrease, real or perceived, of the property or site's value or failure to complete a transaction, as a consequence of the information contained in this report.
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10. **Assumptions:** Where design recommendations are given in this report, they apply only if the project contemplated by the Client is constructed substantially in accordance with the details stated in this report. It is the sole responsibility of the Client to provide to WSP changes made in the project, including but not limited to, details in the design, conditions, engineering or construction that could in any manner whatsoever impact the validity of the recommendations made in the report. WSP shall be entitled to additional compensation from Client to review and assess the effect of such changes to the project.
11. **Time dependence:** If the project/works contemplated by the Client is not undertaken within a period of 18 months following the submission of this report, or within the time frame understood by WSP to be contemplated by the Client at the commencement of WSP's assignment, and/or, if any changes are made, for example, to the elevation, design or nature of any development on the site, its size and configuration, the location of any development on the site and its orientation, the use of the site, performance criteria and the location of any physical infrastructure, the conclusions and recommendations presented herein should not be considered valid unless the impact of the said changes is evaluated by WSP, and the conclusions of the report are amended or are validated in writing accordingly.

Advancements in the practice of geotechnical engineering, engineering geology and hydrogeology and changes in applicable regulations, standards, codes or criteria could impact the contents of the report, in which case, a supplementary report may be required. The requirements for such a review remain the sole responsibility of the Client or their agents.

WSP will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

12. **Limitations of visual inspections:** Where conclusions and recommendations are given based on a visual inspection conducted by WSP, they relate only to the natural or man-made structures, slopes, etc. inspected at the time the site visit was performed. These conclusions cannot and are not extended to include those portions of the site or structures, which were not reasonably available, in WSP's opinion, for direct observation.
13. **Limitations of site investigations:** Site exploration identifies specific subsurface conditions only at those points from which samples have been taken and only at the time of the site investigation. Site investigation programs are a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions.

The data derived from the site investigation program and subsequent laboratory testing are interpreted by trained personnel and extrapolated across the site to form an inferred geological representation and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Despite this investigation, conditions between and beyond the borehole/test hole locations may differ from those encountered at the borehole/test hole locations and the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

Final sub-surface/bore/profile logs are developed by geotechnical engineers based upon their interpretation of field logs and laboratory evaluation of field samples. Customarily, only the final bore/profile logs are included in geotechnical engineering reports.

Bedrock, soil properties and groundwater conditions can be significantly altered by environmental remediation and/or construction activities such as the use of heavy equipment or machinery, excavation, blasting, pile-driving or draining or other activities conducted either directly on site or on adjacent terrain. These properties can also be indirectly affected by exposure to unfavorable natural events or weather conditions, including freezing, drought, precipitation and snowmelt.

During construction, excavation is frequently undertaken which exposes the actual subsurface and groundwater conditions between and beyond the test locations, which may differ from those encountered at the test locations. It is recommended practice that WSP be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered at the test locations, that construction work has no negative impact on the geotechnical aspects of the design, to adjust recommendations in accordance with conditions as additional site information is gained and to deal quickly with geotechnical considerations if they arise.

Interpretations and recommendations presented herein may not be valid if an adequate level of review or inspection by WSP is not provided during construction.

14. **Factors that may affect construction methods, costs and scheduling:** The performance of rock and soil materials during construction is greatly influenced by the means and methods of construction. Where comments are made relating to possible methods of construction, construction costs, construction techniques, sequencing, equipment or scheduling, they are intended only for the guidance of the project design professionals, and those responsible for construction monitoring. The number of test holes may not be sufficient to determine the local underground conditions between test locations that may affect construction costs, construction techniques, sequencing, equipment, scheduling, operational planning, etc.

Any contractors bidding on or undertaking the works should draw their own conclusions as to how the subsurface and groundwater conditions may affect their work, based on their own investigations and interpretations of the factual soil data, groundwater observations, and other factual information.

15. **Groundwater and Dewatering:** WSP will accept no responsibility for the effects of drainage and/or dewatering measures if WSP has not been specifically consulted and involved in the design and monitoring of the drainage and/or dewatering system.
16. **Environmental and Hazardous Materials Aspects:** Unless otherwise stated, the information contained in this report in no way reflects on the environmental aspects of this project, since this aspect is beyond the Scope of Work and the Contract. Unless expressly included in the Scope of Work, this report specifically excludes the identification or interpretation of environmental conditions such as contamination, hazardous materials, wild life conditions, rare plants or archeology conditions that may affect use or design at the site. This report specifically excludes the investigation, detection, prevention or assessment of conditions that can contribute to moisture, mould or other microbial contaminant growth and/or other moisture related deterioration, such as corrosion, decay, rot in buildings or their surroundings. Any statements in this report or on the boring logs regarding odours, colours, and unusual or suspicious items or conditions are strictly for informational purposes
17. **Sample Disposal:** WSP will dispose of all uncontaminated soil and rock samples after 30 days following the release of the final geotechnical report. Should the Client request that the samples be retained for a longer time, the Client will be billed for such storage at an agreed upon rate. Contaminated samples of soil, rock or groundwater are the property of the Client, and the Client will be responsible for the proper disposal of these samples, unless previously arranged for with WSP or a third party.

# APPENDIX FIGURES

## Aerial Mapping

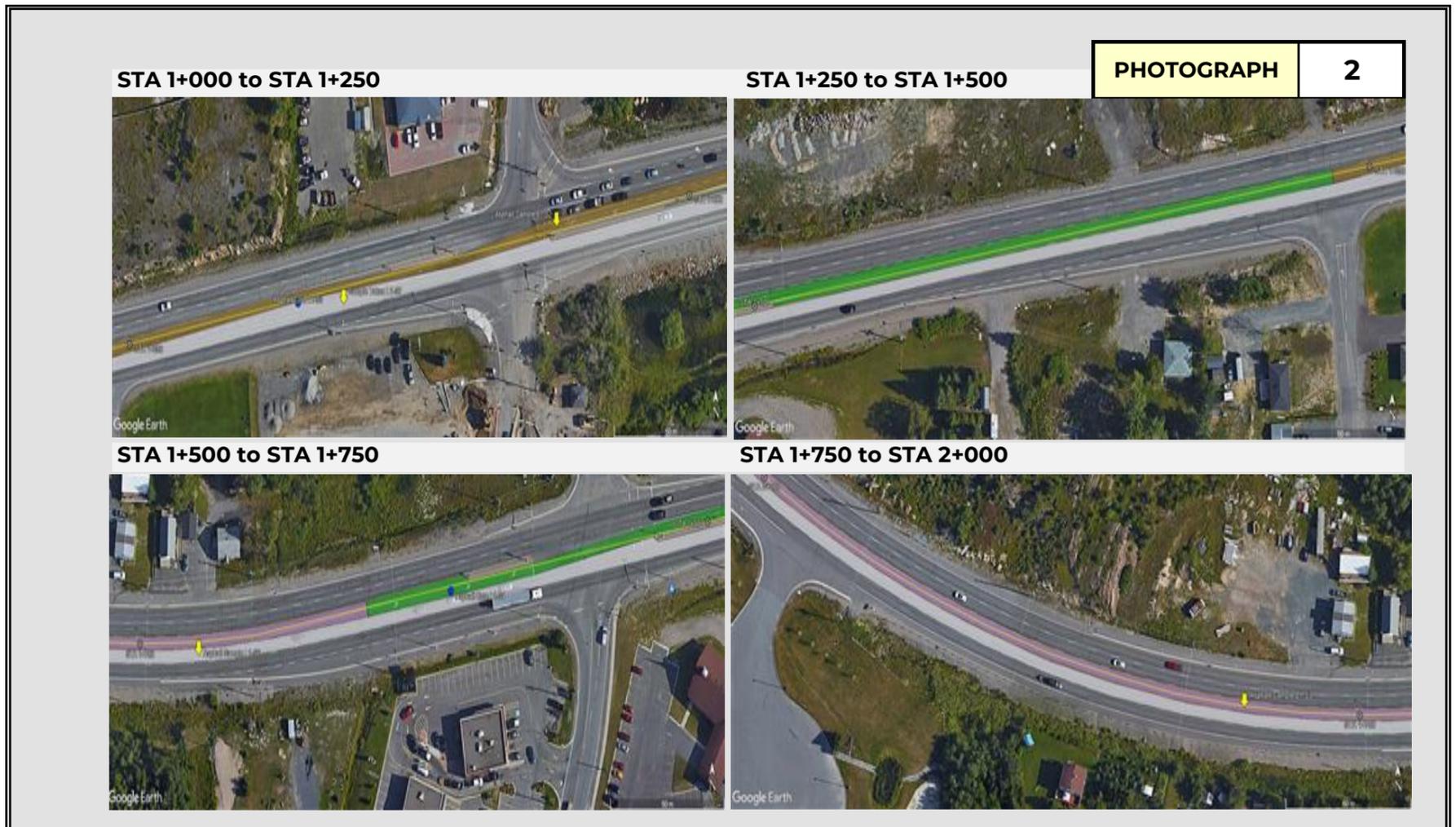


## APENDIX FIGURES - AERIAL MAPPING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT LOCATION** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

ENCLOSURE

1

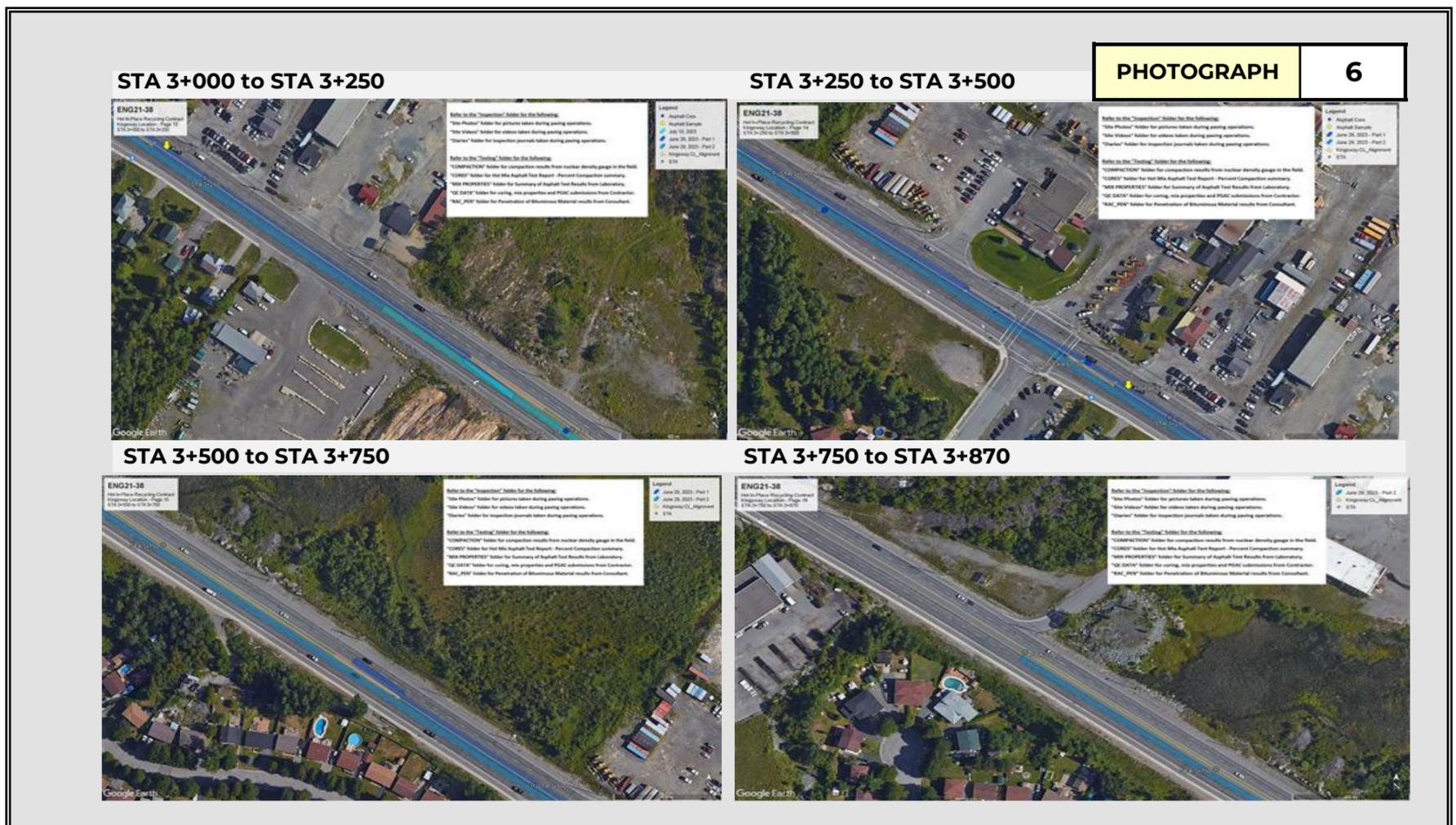
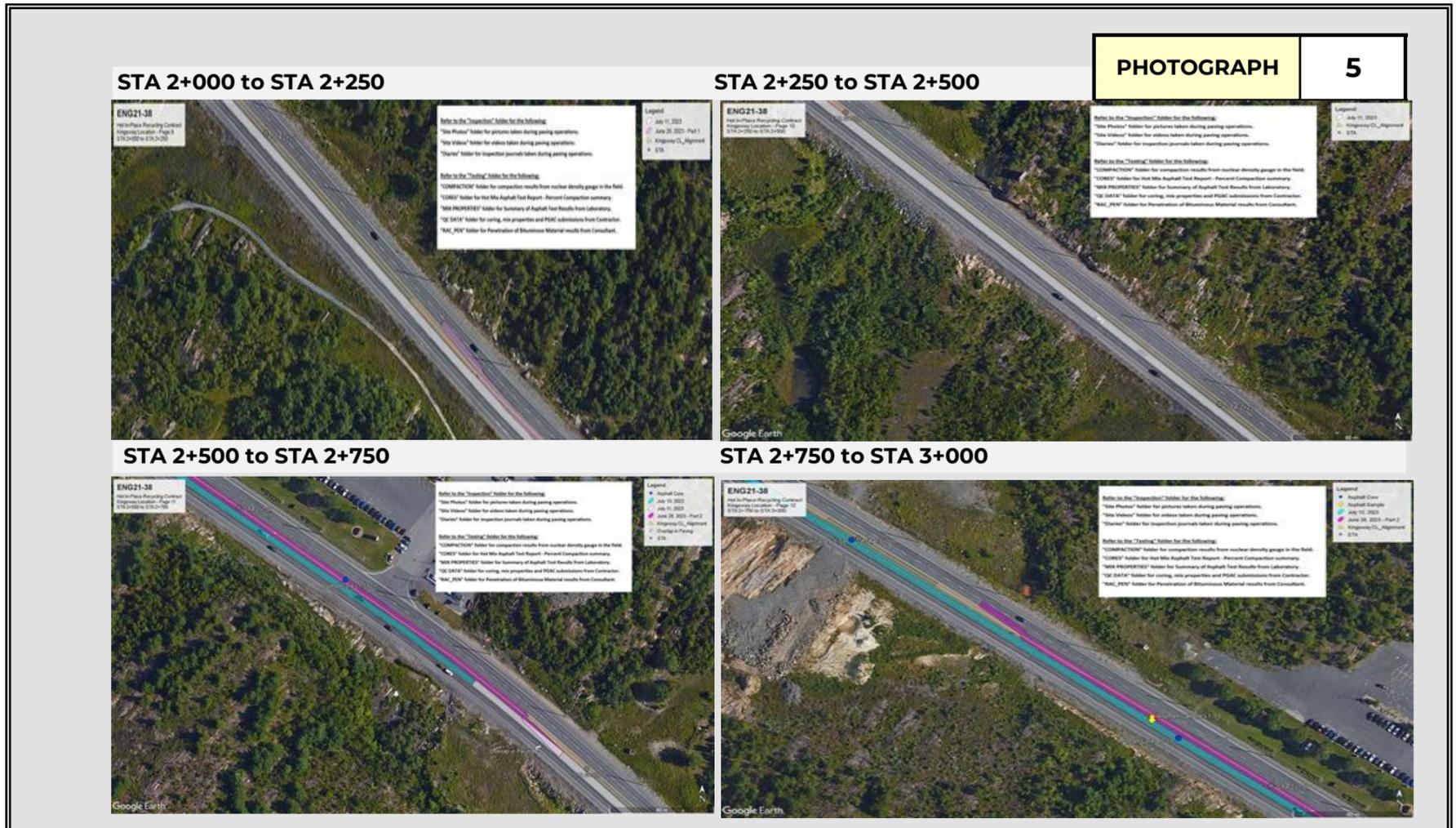


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ENCLOSURE

2



# APPENDIX A

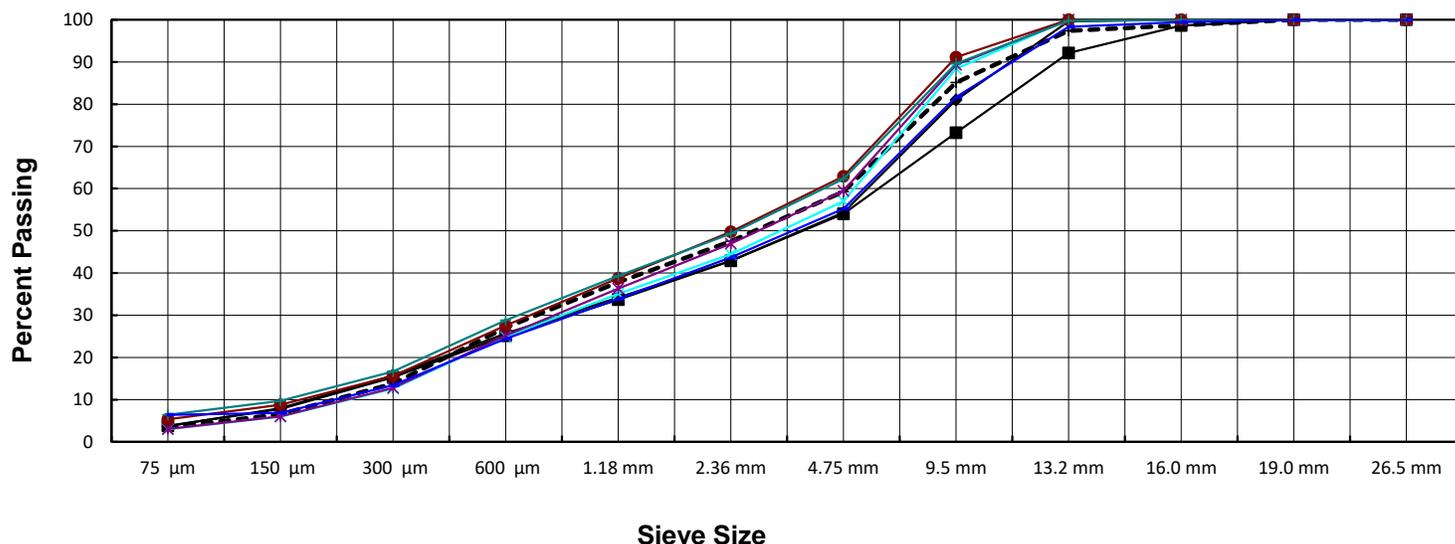
## Laboratory Test Results Prior to HIR in 2020

## ASPHALT CONCRETE QUALITY CONTROL REPORT

Client: <u>City of Greater Sudbury</u>	DATE: <u>23-Jun-20</u>
PROJECT: <u>Asphalt HIR Pilot Project, Sudbury</u>	LAB No.: <u>Asp20-179-180-181-182-183-184</u>
File No: <u>TY202002 - The City of Greater Sudbury</u>	Solvent: _____
Location: <u>Kingsway from Falconbridge Rd (MR 86) to Levesque St ~ 2.8 km</u>	ASPHALT TYPE: _____
SAMPLE DATE: <u>18-Jun-20</u> MIX TYPE: <u>Surface Course</u>	DATE RECEIVED: <u>18-Jun-20</u>
Lift # (mm)	SAMPLE METHOD: <u>Cores</u>

SIEVE SIZE	% PASSING SPECIFICATION		Kingsway - Top Layer						Top Average
	HL3	HL4	ID -179 0+250, NBL2	ID-180 0+750, SBPL1	ID-181 1+250, NBPL1	ID-182 1+750, SBL2	ID-183 2+250, NBL2	ID-184 2+750, SBPL1	
26.5 mm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
19.0 mm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
16.0 mm	100.0	98.6	98.7	100.0	100.0	100.0	100.0	99.5	99.7
13.2 mm	99.6	92.1	97.4	100.0	100.0	100.0	99.8	98.3	99.2
9.5 mm	81.0	73.2	85.1	88.3	89.3	91.1	89.6	81.7	87.5
4.75 mm	54.3	54.0	59.3	57.0	59.5	62.9	62.3	55.2	59.4
2.36 mm	42.9	42.9	47.5	44.5	46.9	49.7	49.4	43.7	47.0
1.18 mm	34.2	33.7	37.8	35.1	36.3	38.8	39.3	33.9	36.8
600 µm	25.7	25.1	27.1	24.9	25.2	27.6	28.8	24.4	26.3
300 µm	15.7	15.3	13.8	12.6	12.8	15.6	16.7	13.4	14.2
150 µm	8.0	7.8	6.5	6.0	6.0	8.8	9.7	6.9	7.3
75 µm	3.7	3.8	3.4	3.0	3.1	5.3	6.4	3.9	4.2
% AC	5.3	5.3	5.04	4.87	4.97	4.78	5.09	4.99	5.0

COMPACTION								
Average Thickness (mm)	50.7	42.1	54.3	27.2	44.1	40.4		43.1
MRD	2.507	2.508	2.509	2.519	2.513	2.494		2.508
BRD	2.359	2.372	2.345	2.393	2.455	2.394		2.386
Compaction (%)	94.1	94.6	93.5	95.0	97.7	96.0		95.1
In-Situ Air Voids (%)	5.90	5.42	6.54	5.00	2.31	4.01		4.86



Street Name	Sample #	Station	Rotational Viscosity, 135°C, Pa·s	*Penetration at 25°C (1/10mm)	PGAC
<b>Rural Kingsway</b> <b>Kingsway</b> <b>from Falconbridge Rd (MR 86) to Levesque St</b> <b>~ 2.8 km</b>	K1	(0+250)_NB MDL2	1.11	60	67.2 - 39.8
	K2	(0+750)_SB MDPL1	1.92	27	82.7 - 26.1
	K3	(1+250)_NB MDPL1	1.18	42	73.8 - 34
	K4	(1+750)_SB MDL2	1.19	31	77.9-24
	K5	(2+250)_NB MDL2	0.41	109	60.9 - 43.8
	K6	(0+750)_SB MDPL1	2.91	32	84.1 - 32.1

Kingsway sample K5 where pen is 109dmm.

This value is considered good but high compared to the other results. so we can considered it as anomaly.

# Recovered Asphalt Binder Testing

Client: <b>City of Greater Sudbury</b> <b>Attn: Stephen P. Holmes, P.Eng.</b> <b>stephen.holmes@greatersudbury.ca</b>		Wood Project No.: <b>TY202002</b>		
		Client Information: <b>Kingsway</b> <b>ASP20-0179 - K1</b>		
		Product Information: <b>Abson Recovered Material</b>		
Date Sampled: -	Wood Sample No.: <b>196</b>			
Date Received: <b>June 22-26, 2020</b>	Client Sample No.: <b>MTO013</b>			
Date Tested: <b>June 28, 2020</b>	Testing Technician: <b>J. Anstey</b>			
Extracted Binder	Test Method	Trial #1	Trial #2	Specifications
*Rotational Viscosity, 135°C, Pa·s	AASHTO T316	<b>1.11</b>		
*Penetration at 25°C (1/10mm)	AASHTO T49	<b>60</b>		
*Dynamic Shear Phase Angle, $\delta$ $G^*/\sin\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>76.1</b> <b>3.18</b> <b>64.0</b>	<b>78.8</b> <b>1.57</b> <b>70.0</b>	Minimum 2.20 kPa
PAV Residue	AASHTO R28			
*Dynamic Shear Phase Angle, $\delta$ $G^*\sin\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>44.4</b> <b>4370</b> <b>10.0</b>	<b>41.7</b> <b>6200</b> <b>7.0</b>	Maximum 5000 kPa
*Bending Beam Rheometer Creep Stiffness Test Temp. at 60 second, °C m-value	AASHTO T313	<b>57</b> <b>-18.0</b> <b>0.401</b>	<b>133</b> <b>-24.0</b> <b>0.350</b>	
Classification Grade	<b>67.2-39.8</b>			

**Comments:**

\*\* PGAC was extracted from samples by the Abson Recovery Test Method. When asphalt binder is extracted from samples the recovered sample has already been age-hardened to some extent, and as a result, not all of the parameters relating to the conformance of the high-end classification temperature can be determined accurately. The low-end temperature of the recovered asphalt binder is based on aged material and therefore can be determined on recovered asphalt binder using the Bending Beam Rheometer test (BBR).

## Recovered Asphalt Binder Testing

Client: <b>City of Greater Sudbury</b> <b>Attn: Stephen P. Holmes, P.Eng.</b> <b>stephen.holmes@greatersudbury.ca</b>		Wood Project No.: <b>TY202002</b>		
		Client Information: <b>Kingsway</b> <b>ASP20-0180 - K2</b>		
		Product Information: <b>Abson Recovered Material</b>		
Date Sampled: -		Wood Sample No.: <b>196</b>		
Date Received: <b>June 22-26, 2020</b>		Client Sample No.: <b>MTO013</b>		
Date Tested: <b>June 28, 2020</b>		Testing Technician: <b>J. Anstey</b>		
Extracted Binder	Test Method	Trial #1	Trial #2	Specifications
*Rotational Viscosity, 135°C, Pa·s	AASHTO T316	<b>1.92</b>		
*Penetration at 25°C (1/10mm)	AASHTO T49	<b>27</b>		
*Dynamic Shear Phase Angle, $\delta$ G*/sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>72.9</b> <b>2.38</b> <b>82.0</b>	<b>76.1</b> <b>1.19</b> <b>88.0</b>	Minimum 2.20 kPa
PAV Residue	AASHTO R28			
*Dynamic Shear Phase Angle, $\delta$ G* sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>35.6</b> <b>3950</b> <b>19.0</b>	<b>32.9</b> <b>5200</b> <b>16.0</b>	Maximum 5000 kPa
*Bending Beam Rheometer Creep Stiffness Test Temp. at 60 second, °C m-value	AASHTO T313	<b>92</b> <b>-18.0</b> <b>0.290</b>	<b>167</b> <b>-24.0</b> <b>0.258</b>	
Classification Grade		<b>82.7-26.1</b>		

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# Recovered Asphalt Binder Testing

Client: <b>City of Greater Sudbury</b> <b>Attn: Stephen P. Holmes, P.Eng.</b> <b>stephen.holmes@greatersudbury.ca</b>		Wood Project No.: <b>TY202002</b>		
		Client Information: <b>Kingsway</b> <b>ASP20-0181 - K3</b>		
		Product Information: <b>Abson Recovered Material</b>		
Date Sampled: -	Wood Sample No.: <b>196</b>			
Date Received: <b>June 22-26, 2020</b>	Client Sample No.: <b>MTO013</b>			
Date Tested: <b>June 28, 2020</b>	Testing Technician: <b>J. Anstey</b>			
Extracted Binder	Test Method	Trial #1	Trial #2	Specifications
*Rotational Viscosity, 135°C, Pa·s	AASHTO T316	<b>1.18</b>		
*Penetration at 25°C (1/10mm)	AASHTO T49	<b>42</b>		
*Dynamic Shear Phase Angle, $\delta$ G*/sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>74.1</b> <b>3.51</b> <b>70.0</b>	<b>76.8</b> <b>1.65</b> <b>76.0</b>	Minimum 2.20 kPa
PAV Residue	AASHTO R28			
*Dynamic Shear Phase Angle, $\delta$ G* sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>37.5</b> <b>3990</b> <b>13.0</b>	<b>35.1</b> <b>5320</b> <b>10.0</b>	Maximum 5000 kPa
*Bending Beam Rheometer Creep Stiffness Test Temp. at 60 second, °C m-value	AASHTO T313	<b>63</b> <b>-18.0</b> <b>0.339</b>	<b>130</b> <b>-24.0</b> <b>0.300</b>	
Classification Grade	<b>73.8-34.0</b>			

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## Recovered Asphalt Binder Testing

Client: <b>City of Greater Sudbury</b> <b>Attn: Stephen P. Holmes, P.Eng.</b> <b>stephen.holmes@greatersudbury.ca</b>		Wood Project No.: <b>TY202002</b>		
		Client Information: <b>Kingsway</b> <b>ASP20-0182 - K4</b>		
		Product Information: <b>Abson Recovered Material</b>		
Date Sampled: -		Wood Sample No.: <b>196</b>		
Date Received: <b>June 22-26, 2020</b>		Client Sample No.: <b>MTO013</b>		
Date Tested: <b>June 28, 2020</b>		Testing Technician: <b>J. Anstey</b>		
Extracted Binder	Test Method	Trial #1	Trial #2	Specifications
*Rotational Viscosity, 135°C, Pa·s	AASHTO T316	<b>1.19</b>		
*Penetration at 25°C (1/10mm)	AASHTO T49	<b>31</b>		
*Dynamic Shear Phase Angle, $\delta$ G*/sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>78.3</b> <b>2.81</b> <b>76.0</b>	<b>81.2</b> <b>1.34</b> <b>82.0</b>	Minimum 2.20 kPa
PAV Residue	AASHTO R28			
*Dynamic Shear Phase Angle, $\delta$ G* sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>35.3</b> <b>4970</b> <b>16.0</b>	<b>33.1</b> <b>6370</b> <b>13.0</b>	Maximum 5000 kPa
*Bending Beam Rheometer Creep Stiffness Test Temp. at 60 second, °C m-value	AASHTO T313	<b>125</b> <b>-18.0</b> <b>0.282</b>	<b>224</b> <b>-24.0</b> <b>0.255</b>	
Classification Grade		<b>77.9-24.0</b>		

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## Recovered Asphalt Binder Testing

Client: <b>City of Greater Sudbury</b> <b>Attn: Stephen P. Holmes, P.Eng.</b> <b>stephen.holmes@greatersudbury.ca</b>		Wood Project No.: <b>TY202002</b>		
		Client Information: <b>Kingsway</b> <b>ASP20-0183 - K5</b>		
		Product Information: <b>Abson Recovered Material</b>		
Date Sampled: -		Wood Sample No.: <b>196</b>		
Date Received: <b>June 22-26, 2020</b>		Client Sample No.: <b>MTO013</b>		
Date Tested: <b>June 28, 2020</b>		Testing Technician: <b>J. Anstey</b>		
Extracted Binder	Test Method	Trial #1	Trial #2	Specifications
*Rotational Viscosity, 135°C, Pa·s	AASHTO T316	<b>0.41</b>		
*Penetration at 25°C (1/10mm)	AASHTO T49	<b>109</b>		
*Dynamic Shear Phase Angle, $\delta$ G*/sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>77.6</b> <b>3.11</b> <b>58.0</b>	<b>80.7</b> <b>1.53</b> <b>64.0</b>	Minimum 2.20 kPa
PAV Residue	AASHTO R28			
*Dynamic Shear Phase Angle, $\delta$ G* sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>44.9</b> <b>3310</b> <b>7.0</b>	<b>42.3</b> <b>4770</b> <b>4.0</b>	Maximum 5000 kPa
*Bending Beam Rheometer Creep Stiffness Test Temp. at 60 second, °C m-value	AASHTO T313	<b>30</b> <b>-18.0</b> <b>0.445</b>	<b>72</b> <b>-24.0</b> <b>0.395</b>	
Classification Grade		<b>60.9-43.8</b>		

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## Recovered Asphalt Binder Testing

Client: <b>City of Greater Sudbury</b> <b>Attn: Stephen P. Holmes, P.Eng.</b> <b>stephen.holmes@greatersudbury.ca</b>		Wood Project No.: <b>TY202002</b>		
		Client Information: <b>Kingsway</b> <b>ASP20-0184 - K6</b>		
		Product Information: <b>Abson Recovered Material</b>		
Date Sampled: -	Wood Sample No.: <b>196</b>			
Date Received: <b>June 22-26, 2020</b>	Client Sample No.: <b>MTO013</b>			
Date Tested: <b>June 28-30, 2020</b>	Testing Technician: <b>J. Anstey</b>			
Extracted Binder	Test Method	Trial #1	Trial #2	Specifications
*Rotational Viscosity, 135°C, Pa·s	AASHTO T316	<b>2.91</b>		
*Penetration at 25°C (1/10mm)	AASHTO T49	<b>32</b>		
*Dynamic Shear Phase Angle, $\delta$ G*/sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>67.9</b> <b>2.76</b> <b>82.0</b>	<b>70.8</b> <b>1.46</b> <b>88.0</b>	Minimum 2.20 kPa
PAV Residue	AASHTO R28			
*Dynamic Shear Phase Angle, $\delta$ G*sin $\delta$ Test Temperature at 10 rad/s, °C	AASHTO T315	<b>37.4</b> <b>4120</b> <b>19.0</b>	<b>35.1</b> <b>5530</b> <b>16.0</b>	Maximum 5000 kPa
*Bending Beam Rheometer Creep Stiffness Test Temp. at 60 second, °C m-value	AASHTO T313	<b>73</b> <b>-18.0</b> <b>0.325</b>	<b>151</b> <b>-24.0</b> <b>0.288</b>	
Classification Grade	<b>84.1-32.1</b>			

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# APPENDIX B

## Diaries /Field Reports



In front of the spreader in the wind roll	1:05 PM	(2+179)	77.5 degrees
In front of spreader on milled surface	1:05 PM	(2+179)	41.6 degrees
Behind the spreader screed	1:06 PM	(2+186)	85.4 degrees
Behind 1st Preheater	2:00 PM	(1+950)	166.0 degrees
Behind 2nd Preheater	2:02 PM	(1+965)	136.5 degrees
Behind Recycler in wind roll	2:03 PM	(1+990)	75.1 degrees
In front of the spreader in the wind roll	2:04 PM	(1+993)	70.3 degrees
In front of spreader on milled surface	2:04 PM	(1+993)	55.6 degrees
Behind the spreader screed	2:05 PM	(2+010)	80.8 degrees
Behind 1st Preheater	2:45 PM	(1+800)	135.7 degrees
Behind 2nd Preheater	2:46 PM	(1+820)	137.8 degrees
Behind Recycler in wind roll	2:47 PM	(1+835)	75.4 degrees
In front of the spreader in the wind roll	2:48 PM	(1+839)	71.3 degrees
In front of spreader on milled surface	2:48 PM	(1+839)	52.6 degrees
Behind the spreader screed	2:50 PM	(1+855)	85.8 degrees
Behind 1st Preheater	3:30 PM	(1+625)	131.1 degrees
Behind 2nd Preheater	3:31 PM	(1+635)	138.6 degrees
Behind Recycler in wind roll	3:32 PM	(1+650)	85.5 degrees
In front of the spreader in the wind roll	3:33 PM	(1+655)	88.3 degrees
In front of spreader on milled surface	3:34 PM	(1+655)	60.4 degrees
Behind the spreader screed	3:35 PM	(1+665)	85.7 degrees
Behind 1st Preheater	4:15 PM	(1+400)	108.3 degrees
Behind 2nd Preheater	4:16 PM	(1+415)	123.5 degrees
Behind Recycler in wind roll	4:17 PM	(1+430)	83.3 degrees
In front of the spreader in the wind roll	4:18 PM	(1+435)	92.8 degrees
In front of spreader on milled surface	4:20 PM	(1+435)	52.6 degrees
Behind the spreader screed	4:21 PM	(1+450)	90.5 degrees

Behind 1st Preheater	5:15 PM	(1+150)	215.2 degrees
Behind 2nd Preheater	5:16 PM	(1+165)	129.5 degrees
Behind Recycler in wind roll	5:17 PM	(1+180)	91.5 degrees
In front of the spreader in the wind roll	5:19 PM	(1+184)	90.3 degrees
In front of spreader on milled surface	5:19 PM	(1+184)	58.9 degrees
Behind the spreader screed	5:20 PM	(1+200)	85.7 degrees
Behind 1st Preheater	6:00 PM	(0+990)	134.2 degrees
Behind 2nd Preheater	6:02 PM	(1+000)	159.8 degrees
Behind Recycler in wind roll	6:03 PM	(1+015)	93.5 degrees
In front of the spreader in the wind roll	6:04 PM	(1+019)	92.7 degrees
In front of spreader on milled surface	6:04 PM	(1+019)	69.5 degrees
Behind the spreader screed	6:05 PM	(1+030)	85.0 degrees
Behind 1st Preheater	7:05 PM	(0+700)	96.6 degrees
Behind 2nd Preheater	7:06 PM	(0+715)	110.3 degrees
Behind Recycler in wind roll	7:07 PM	(0+725)	95.6 degrees
In front of the spreader in the wind roll	7:08 PM	(0+730)	96.3 degrees
In front of spreader on milled surface	7:08 PM	(0+730)	62.4 degrees
Behind the spreader screed	7:10 PM	(0+745)	80.5 degrees
<b>Temperature From Scott Bass</b>			
Behind the spreader screed	12:45 PM	(2+240)	80.0 degrees
Behind Recycler in wind roll	1:20 PM	(2+110)	80.0 degrees
Behind Recycler in wind roll (Probe Temp)	1:20 PM	(2+110)	92.0 degrees
Behind the spreader screed	1:20 PM	(2+120)	86.0 degrees
Behind the spreader screed ( Probe Temp)	1:20 PM	(2+120)	67.0 degrees
Behind the spreader screed	3:00 PM	(1+175)	80.6 degrees
Behind the spreader screed	5:45 PM		90.0 degrees
Behind the spreader screed ( Probe Temp)	5:45 PM		60.0 degrees
Behind the spreader screed	6:55 PM	(0+800)	76.6 degrees

Equipment/ Labour	Equip. Number	Work Time Hours	Date: <u>Thursday, June 2, 2022</u>	Temp: <u>22 ° C</u>	Weather: <u>SUN &amp; OVERCAST</u>
1 ton p/u truck with built in coring machine	N/A		<b>Contract No./Description:</b> <u>ENG 21-38 HIR - Coring for Mix design</u>		
			<b>Location:</b> <u>MR #35 - Big Nickel Rd. to Notre Dame St. East</u>		<b>Working Day Charged:</b> <u>No</u>
			<b>Contractor:</b> <u>RSR</u>		<b>Foreman:</b> <u>Zeko Khoshaba</u>
1 Labourer			<b>Inspector:</b> <u>Rino Carniello</u>		<b>Working Hours:</b> <u>13:00 to 17:00</u>
			<b>Time</b>	<b>Diary Notes:</b>	
			12:45 pm	Received phone call that RSR arrived on site - MR#35 - to start coring operations. Spoke with foreman. He was setting up traffic control and I would be on-site shortly.	
			13:05	Arrived on-site. Contractor had already started the coring operation on the wrong portion of roadway. Contractor was coring east of Big Nickel Mine Rd. along Elm Street. This was not the limits required to be completed. Determined to be a miscommunication by the foreman with instructions that he had.	
			13:15	Contractor was advised of the correct area to be cored for project. Contractor was also advised that they would have to follow Traffic Control Manual Book 7 to conduct any work as per their submitted PSA and traffic plan. At this time they did not have the proper equipment to conduct the operation based on their submitted traffic plan and TL-22 from Book 7.	
			13:26	Contractor to set up work signs at both ends of working limits and call their office to arrange getting a sign arrow board to continue operation along MR #35. After signs were erected, the contractor left site to pick up an arrow board trailer from a local rental company.	
			14:24	Contractor returned to site with arrow board and set up and began to start coring operations	
			14:30	Coring of first hole has begun. Holes are being filled with cold patch and tamped with a hand tamper. Coring proceeded at intervals of 1.5 km westbound towards Notre Dame Street East.	
			15:45	Stopped operation for coffee break. Discussed plan with regards to the rest of the day. They had planned on finishing MR#35 and proceeding to do Radar Road later. Called for someone to relieve me. Andre Deschenes arrived to coffee shop. We all discussed that the contractor would finish MR #35 (be approx. 1 hour of work left) and that would be it for today. If any work was to take place on Radar Road and the two way part of the Kingsway, Contractor would require an additional worker to properly conduct traffic control. ie two	





<b>Equipment/Labour</b>	<b>Work Time</b>	<b>Date:</b> <u>Friday, June 30, 2023</u>	<b>Temp:</b> <u>17°C to 20°C</u>	<b>Weather:</b> <u>slight rain &amp; overcast</u>
	<b>Hours</b>	<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>		
<b>Road Surface Recycling</b>		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u>	<b>Working Day Charged:</b> _____	
Owner/VP of Reseach and Development - Frank Crupi		<b>Contractor:</b> <u>Road Surface Recycling</u>	<b>Foreman:</b> <u>Dan Touw</u>	
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Inspector:</b> <u>Tina Woodbury - Rino Carniello QA Technician</u>	<b>Working Hours:</b> <u>7:00am to 10:00 am</u>	
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Diary Notes:</b>		
Technical Coordinator - Mike Schmidt		<p>6:55am - Sent email to Miranda in regards to the weather this morning. She will email contractor to asked what their intentions are with the rain and whether they will proceed with the HIR placement.</p> <p>7:13am - Call Frank Curpi and he says the plan is to wait out the weather and start maybe around 9:30am hoping the road dries up and work until 3:30pm.</p> <p>7:25am - Arrived to site. Tina is on-site and parked at Third Ave. Beacon Lite has started setting up traffic control from Third Ave easterly to the entrance of Sudbury Mitubishi.</p> <p>7:45am - receive an from RSR stated that they have decided not to work today, due to the weather conditions and the possibility of continued rain.</p> <p>7:50am - Arrive to laydown yard to speak with RSR Lab people to arrange for core at STA 3+492. Piyush said he will make arrangements for Traffic Control and let me know.</p> <p>8:00am - Tina leaves site. Text Piyush to confirm coring will happen today.</p> <p>8:10am - Approached by Russel of Beacon Lite, with regards to an incident that happened previous evening at end of operation. He said that Frank at RSR scolded him for not taken down the traffic control when told to. Both Scott and I had RSR to make sure the road was clean and free of any debris prior to opening up the lanes to live traffic. This caused a problem between RSR and Beacon Lite. I mentioned that, it is necessary to keep everyone safe if there is still work to conduct.</p> <p>8:17am - RSR moving spreader down live lane to park at McDowell Equipment.</p> <p>8:52am - No line marking from STA 3+600 towards Third Ave. No yellow along center turn lane. No white on either side on curb lane and passing lane.</p> <p>9:09am - Beacon Lite pulling down traffic control east of Third Ave. Also setting up Traffic Control for Core Location @ STA 3+492 East Bound Passing Lane.</p> <p>9:17am - RSR lab crew arrive to set up coring operations; Ripu &amp; Piyush Core collected at STA 3+492 O/S 14 m from northernly EP Lot 1 Sub lot 7</p> <p>9:45am - Core holes are completed and have been filled in.</p> <p>9:55am - RSR lab crew leaves site.</p> <p>10:00am - Beacon Lite starts to pull down the Traffic Control for the coring that was conducted.</p> <p>10:05am - I leave site for the day.</p>		
Operator of PreHeater #PH5001 - Gary Norman				
Preheater PH300 #PH5001 (10m or 30ft)				
Oprator of Preheater - Ian Adams				
Preheater PH300 #PH5029				
Operator of Milling/Recycling Machine - Austin Laws				
Milling/Recycling Machine RU #5015				
Paving Foreman - Seth Archibald (Tail End)				
Spreader Operator - Tyrone Tucay				
Tail End Man Liam Chiasson				
Cube Truck Isuzu NRR SV-4000				
Paver CAT AP5054				
Operator - Callum Proulx				
Double Steel Drum Roller CAT CB13 #SR2101				
Operator - Donovan Kokokopenace				
Rubber Tire Roller CAT CW34 #TR2101				
Truck Driver / Labourer - Tony				
Semitruck - Mack FT - 2022				
Loader CAT930H #WL-5061 as req'd				
P/U F550 #CD-4002				
P/U Chev 2500HD Lic #BL32675				
Semitruck - Peterbilt FT 5036				

	<b>Inspector:</b> <u><i>Rino Carniello</i></u>	<b>Page :</b> <u>1</u> <b>of</b> <u>1</u>
	(Signature)	

<b>Equipment/Labour</b>	<b>Work Time</b>	<b>Date:</b> _____	<b>Temp:</b> _____ °C to _____ °C	<b>Weather:</b> _____
	<b>Hours</b>	<b>Contract No./Description:</b> _____		

## 04-ENG 21-38\_Inspector's Daily-Diary\_July 19, 2023

Equipment/ Labour	Equip. Number	Work Time Hours	Date: <u>July 19,2023</u>	Temp: <u>22° C</u>	Weather: <u>(Cloudy/Sunny)</u>
<b>Comet Construction Equipment</b>			<b>Contract No./Description:</b> <u>ENG 21-38 ( HIR)</u>		
			<b>Location:</b> <u>Kingsway,Sudbury</u>	<b>Working Day Charged:</b> <u>11.5</u>	
1XPick-up	(CD-4002)	11.0	<b>Contractor:</b> <u>RSR Paving</u>	<b>Foreman:</b> <u>Frank Crupi</u>	
1XHINO/Sign Truck	(TC-0001)	11.0	<b>Inspector:</b> <u>Rino CarnielloAkshay Borad</u>	<b>Working Hours:</b> <u>7 am- 6:30 pm</u>	
			<b>Time</b>	<b>Diary Notes:</b>	
1XLoader	(WL-5061)	11.0		<p>7:15 am- Akshay met Rino at Contractor's lay down area.</p> <p>7:35 am- Contractor was ready to start coring from the STA (2+600). - Contractor starts cones and traffic control aero boards setups.</p> <p>7:45 am - Contractor starts coring on the fast EBL at STA (2+600) with 0.5 m O/S [Lot#1 and sub-lot#10].</p> <p>8:45 am- Contractor done coring and back filling at STA (2+600).</p> <p><b>Note: Top surface of each core hole was pumping or very soft after back filling and compacting each core holes</b></p> <p>9:00 am- Contractor moves their cones and traffic control aero boards at STA (2+500).</p> <p>9:05 am- Rino calls Mandy regarding cold mix pumping(softness) after compacting each core hole.</p> <p>9:35 am - Contractor starts coring on the center of fast EBL at STA (2+500) with 2.0 m O/S from the the Island [Lo sub-lot#1].</p> <p>10:20 am- Auditor Ron from the city of greater sudbury shows up on the job site.</p> <p>10:25 am- Contractor took an extra QC sample to cross verify the thickness.</p> <p>10:40 am- Contractor done coring and back filling at STA (2+500).</p> <p>11:00 am- Contractor moves their cones and traffic control aero boards at STA (2+400).</p> <p>11:30 am - Contractor starts coring on the fast EBL at STA (2+400) with 3.25 m O/S from the the Island [Lot#2 and lot#2].</p> <p>12:30 pm - Contractor done coring and back filling at STA (2+400).</p> <p>12:40-1:00 pm- Contractor moves their cones and traffic control aero boards at STA (2+300).</p> <p>1:15 pm- Contractor starts coring on the fast EBL at STA (2+300) with 1.8 m O/S from the the Island [Lot#2 and su</p> <p><b>Note: 1:27 pm- I and Rino found few cracks at the edge of fast EBL in between STA(2+281) to (2+273) in present inspector.</b></p> <p>2:20 pm- Contractor done coring and back filling at STA (2+300).</p> <p>2:30-3:00 pm- Contractor moves their cones and traffic control aero boards at STA (2+200).</p> <p>3:25 pm- Contractor starts coring on the fast EBL at STA (2+200) with 1.8 m O/S from the the Island [Lot#2 and su</p> <p><b>Note:- 3:45pm- All core samples came apart.</b></p> <p><b>I, Rino and Inspector from WSP identified very poor quality of loose asphalts underneath the all core samples.</b></p> <p><b>3:50 pm- Frank collects some loose sample material for his own lab testing.</b></p> <p>4:10 pm- Contractor done coring and back filling at STA (2+200).</p> <p>4:20-4:50 pm- Contractor moves their cones and traffic control aero boards at STA (2+100).</p> <p>5:10 pm- Contractor starts coring on the center of fast EBL at STA (2+100) with 3.0 m O/S from the the Island [Lo sub-lot#5].</p> <p><b>5:35 pm- I,Rino and Inspector from the WSP identified few work deficiency by East end of the traffic island.</b></p> <p>6:15 pm- Contractor done coring and back filling at STA (2+100).</p> <p>6:20 pm- Contractor starts packing up their cones.</p> <p>6:30 pm- I and Rino leave job site to drop off all samples at the city yard..</p>	
<b>RSR QC/Labours</b>					
Foreman (Frank Crupi)		11.0			
Loader Operator		11.0			
3XLabourer		11.0			
2X QC Technician		11.0			
1X QA ( PNJ Consultant)		11.0			



Equipment/Labour	Work Time	Date: <u>Tuesday, July 4, 2023</u> Temp: <u>27°C to 32°C</u> Weather: <u>Sun and Clouds</u>
	Hours	
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Rino Carniello</u> <b>Working Hours:</b> _____
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b> 8:40am I arrive on site. The City's QA lab tech, Rino Carniello advised that he was on site just before 8:00am. Beacon Lite has traffic control in place to continue the hot in-place recycling operation heading Easterly from where they left off at on Thursday, June 29, 2023 at 3+139. 9:00am I arrive at RSR's laydown yard. 9:09am I send the City's Project Manager, Miranda Edwards a video recording of the pilot flames still exposed as they were prior to the "modifications". 9:20am I speak to Miranda by phone and she advises that she is on her way. 9:48am Miranda Edwards arrives on site. 11:00am Michael Schmidt, Technical coordinator with RSR advises that the diffuser plate referred to in his email, was already a part of their set up when we pointed out that it looks the same. He stated this was an oversight on his part as he doesn't have alot of experience with this kind of thing. They will now utilize a BOBCAT with a jaw attachment to spread sand on crack sealant to reduce flames. Miranda will be sending an email to RSR saying to proceed, stating that temperatures must be met, as RSR is implying that the low temperatures was the reason that proper bonding between layers is not occuring consistently. 11:40am The crew starts up their equipment and is leaving the yard. 11:55am I leave site. The traffic closure is from 3+260, East of third of Third Ave, to 2+700, West of the entrance to the Mitsubishi dealership. 12:25pm I return to site. 1:30pm Contractor blew a hydraulic line in the first heating unit PH-5001 2:30pm Rino Carniello is informed by the contractor that they will be shutting down for the day. 2:47pm Beacon Lite Manager, Grand Turner is on site for 6 minutes. 2:56pm Frank Crupi is sweeping utilizing a broom attachment CAT BU 115. Beacon Lite beginning to take down traffic control. 3:00pm I leave site.
Operator of PreHeater #PH5001 - Gary Norman		
Preheater PH300 #PH5001 (10m or 30ft)		
Opator of Preheater - Ian Adams		
Preheater PH300 #PH5029		
Operator of Milling/Recycling Machine - Austin Laws		
Milling/Recycling Machine RU #5015		
Paving Foreman - Seth Archibald (Tail End)		
Spreader Operator - Tyrone Tucay		
Tail End Man Liam Chiasson		
Cube Truck Isuzu NRR SV-4000		
Paver CAT AP5054		
Operator - Callum Proulx		
Double Steel Drum Roller CAT CB13 #SR2101		
Operator - Donovan Kokokopenace		
Rubber Tire Roller CAT CW34 #TR2101		
Truck Driver / Labourer - Tony		
Semitruck - Mack FT - 2022		
Loader CAT930H #WL-5061 as req'd		
P/U F550 #CD-4002		
P/U Chev 2500HD Lic #BL32675		
Semitruck - Peterbilt FT 5036		



Inspector:

*Scott Baas*

(Signature)

Equipment/Labour	Work Time	Date: <u>Tuesday, July 4, 2023</u> Temp: <u>27°C to 32°C</u> Weather: <u>Sun and Clouds</u>	
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>	
Road Surface Recycling Continued		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u>	Working Day Charged: _____
Contract Administrator - Veronica Vona		Contractor: <u>Road Surface Recycling</u>	Foreman: <u>Dan Touw</u>
P/U Ford F150 Lic# AT 59506		Inspector: <u>Scott Baas, Accompanied by Rino Carniello</u>	Working Hours: _____
Truck Driver/Labour - Teddy		Diary Notes:	
Operator/Labour - Frank Tomaselli			
BOBCAT S550 #B100-889			
PNJ - Third Party Lab Consultant			
Piyush Ansal			
Kuldeep Sisopiu			
Ripu Singh			
Beacon Lite Traffic Control			
Foreman/Superintendent - Russel Joly			
P/U F450 #59			
Traffic Control Person/Labour - Emmanuel Soro			
P/U GMC Sierra #31			
Traffic Control Person/Labour - Robert Chambers			
Dodge Ram #38			
Traffic Control Person/Labour - Mary Mincovitch			
Traffic Control Person/Labour - Marvel			
Traffic Control Person/Labour - Elizabeth			
Arrow boards (2)			



Inspector: \_\_\_\_\_  
*Scott Baas*  
 (Signature)

Equipment/Labour	Work Time Hours	Date: <u>Wednesday, July 5, 2023</u> Temp: <u>19°C to 29°C</u> Weather: <u>Sun and Clouds</u>
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Rino Carniello</u> <b>Working Hours:</b> _____
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b>  No work will be taking place today, the contractor has not occupied the roadway. Michael Schmidt, RSR's Technical Coordinator, sent an email last night advising that they experienced a mechanical issue yesterday afternoon and that they will be performing maintenance today. He advises that they hope to resume operations tomorrow.
Operator of PreHeater #PH5001 - Gary Norman		
Preheater PH300 #PH5001 (10m or 30ft)		
Oprator of Preheater - Ian Adams		
Preheater PH300 #PH5029		
Operator of Milling/Recycling Machine - Austin Laws		
Milling/Recycling Machine RU #5015		
Paving Foreman - Seth Archibald (Tail End)		
Spreader Operator - Tyrone Tucay		
Tail End Man Liam Chiasson		
Cube Truck Isuzu NRR SV-4000		
Paver CAT AP5054		
Operator - Callum Proulx		
Double Steel Drum Roller CAT CB13 #SR2101		
Operator - Donovan Kokokopenace		
Rubber Tire Roller CAT CW34 #TR2101		
Truck Driver / Labourer - Tony		
Semitruck - Mack FT - 2022		
Loader CAT930H #WL-5061 as req'd		
P/U F550 #CD-4002		
P/U Chev 2500HD Lic #BL32675		
Semitruck - Peterbilt FT 5036		



Inspector: \_\_\_\_\_

*Scott Baas*  
\_\_\_\_\_  
(Signature)

Equipment/Labour	Work Time	Date: <u>Wednesday, July 5, 2023</u> Temp: <u>19°C to 29°C</u> Weather: <u>Sun and Clouds</u>	
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>	
Road Surface Recycling Continued		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u>	Working Day Charged: _____
Contract Administrator - Veronica Vona		Contractor: <u>Road Surface Recycling</u>	Foreman: <u>Dan Touw</u>
P/U Ford F150 Lic# AT 59506		Inspector: <u>Scott Baas, Accompanied by Rino Carniello</u>	Working Hours: _____
Truck Driver/Labour - Teddy		Diary Notes:	
Operator/Labour - Frank Tomaselli			
BOBCAT S550 #B100-889			
PNJ - Third Party Lab Consultant			
Piyush Ansal			
Kuldeep Sisopiu			
Ripu Singh			
Beacon Lite Traffic Control			
Foreman/Superintendent - Russel Joly			
P/U F450 #59			
Traffic Control Person/Labour - Emmanuel Soro			
P/U GMC Sierra #31			
Traffic Control Person/Labour - Robert Chambers			
Dodge Ram #38			
Traffic Control Person/Labour - Mary Mincovitch			
Traffic Control Person/Labour - Marvel			
Traffic Control Person/Labour - Elizabeth			
Arrow boards (2)			



Inspector: \_\_\_\_\_ *Scott Baas* \_\_\_\_\_  
 (Signature)

07-ENG21-38 Diary - July 6 2023

Equipment/Labour	Work Time	Date: <u>Thursday, July 6, 2023</u> Temp: <u>19°C</u> Weather: <u>Rain</u>
	Hours	
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Rino Carniello</u> <b>Working Hours:</b> _____
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b>  No work will be taking place today, the contractor has not occupied the roadway. At 4:39pm yesterday, Wednesday, July 5th, 2023, RSR's Technical Coordinator, Michael Schmidt advised that due to the weather forecast, they would not be conducting any road recycling operations today.
Operator of PreHeater #PH5001 - Gary Norman		
Preheater PH300 #PH5001 (10m or 30ft)		
Oprator of Preheater - Ian Adams		
Preheater PH300 #PH5029		
Operator of Milling/Recycling Machine - Austin Laws		
Milling/Recycling Machine RU #5015		
Paving Foreman - Seth Archibald (Tail End)		
Spreader Operator - Tyrone Tucay		
Tail End Man Liam Chiasson		
Cube Truck Isuzu NRR SV-4000		
Paver CAT AP5054		
Operator - Callum Proulx		
Double Steel Drum Roller CAT CB13 #SR2101		
Operator - Donovan Kokokopenace		
Rubber Tire Roller CAT CW34 #TR2101		
Truck Driver / Labourer - Tony		
Semitruck - Mack FT - 2022		
Loader CAT930H #WL-5061 as req'd		
P/U F550 #CD-4002		
P/U Chev 2500HD Lic #BL32675		
Semitruck - Peterbilt FT 5036		



Inspector: \_\_\_\_\_

*Scott Baas*

(Signature)

Page : 1 of 2

Equipment/Labour	Work Time	Date: <u>Thursday, July 6, 2023</u>	Temp: <u>19°C</u>	Weather: <u>Rain</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>		
Road Surface Recycling Continued		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u>	Working Day Charged: _____	
Contract Administrator - Veronica Vona		Contractor: <u>Road Surface Recycling</u>	Foreman: <u>Dan Touw</u>	
P/U Ford F150 Lic# AT 59506		Inspector: <u>Scott Baas, Accompanied by Rino Carniello</u>	Working Hours: _____	
Truck Driver/Labour - Teddy		Diary Notes:		
Operator/Labour - Frank Tomaselli				
BOBCAT S550 #B100-889				
PNJ - Third Party Lab Consultant				
Piyush Ansal				
Kuldeep Sisopiu				
Ripu Singh				
Beacon Lite Traffic Control				
Foreman/Superintendent - Russel Joly				
P/U F450 #59				
Traffic Control Person/Labour - Emmanuel Soro				
P/U GMC Sierra #31				
Traffic Control Person/Labour - Robert Chambers				
Dodge Ram #38				
Traffic Control Person/Labour - Mary Mincovitch				
Traffic Control Person/Labour - Marvel				
Traffic Control Person/Labour - Elizabeth				
Arrow boards (2)				

Equipment/Labour	Work Time	Date: <u>Friday, July 7, 2023</u> Temp: <u>17°C to 24°C</u> Weather: <u>Sun and Clouds</u>
	Hours	
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Akshaykumar Borac</u> <b>Working Hours:</b> _____
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b>
Operator of PreHeater #PH5001 - Gary Norman		7:45am I arrive on site. The asphalt rollers and spreader are on the road in the East Bound fast lane. The loader has sand in the bucket and labourers are spreading the sand on the crack sealant in the existing asphalt, Easterly of 3+139, where they left off on Thursday, June 29th, 2023. The closure of the inside lanes is from East of Third, to West of the Mitsubishi dealership entrance.
Preheater PH300 #PH5001 (10m or 30ft)		8:09am Clement Cheung with WSP arrives on site to verify compaction.
Oprator of Preheater - Ian Adams		8:27am Fellow CGS inspector, Akshay arrives on site.
Preheater PH300 #PH5029		8:30am David Brown with WSP is on site briefly. I advise that they likely won't be ready for compaction for some time as once they get started they will have to preheat the road. I suggest possibly utilizing Clement elsewhere, and I'll call when recycled asphalt placement begins. David advises that he doesn't mind if Clem sticks around all day.
Operator of Milling/Recycling Machine - Austin Laws		8:40am Two heating units are now on the road.
Milling/Recycling Machine RU #5015		9:22am to 9:37am Grand Turner and Michael Gibson, with Beacon Lite, are on site.
Paving Foreman - Seth Archibald (Tail End)		9:51am Heater still are not operating. The sand mentioned above was spread on the crack sealer until 2+900 in the East Bound Fast lane.
Spreader Operator - Tyrone Tucay		10:26am I advised Clement Cheung with WSP to leave site for now. I will call him if they end up recycling today.
Tail End Man Liam Chiasson		10:30am I go to fuel up at Frobisher quickly.
Cube Truck Isuzu NRR SV-4000		11:45am I leave site. The contractor has been working on their equipment all morning.
Paver CAT AP5054		12:35pm I return to site. All equipment is off of the road. The contractor advises that the electronics have failed on the recycler and they need a new screen.
Operator - Callum Proulx		1:00pm The BOBCAT is sweeping up the sand that was placed on crack sealant earlier. Beacon Lite will be removing traffic control when the sweeping is complete.
Double Steel Drum Roller CAT CB13 #SR2101		1:10pm Beacon Lite begins removing traffic control.
Operator - Donovan Kokokopenace		1:15pm I'm advised that Frank Crupi will be sending someone to the GTA to pick up the new screen and hopes to have it installed ASAP.
Rubber Tire Roller CAT CW34 #TR2101		1:17pm Myself and Akshay leave site for the day.
Truck Driver / Labourer - Tony		
Semitruck - Mack FT - 2022		
Loader CAT930H #WL-5061 as req'd		
P/U F550 #CD-4002		
P/U Chev 2500HD Lic #BL32675		
Semitruck - Peterbilt FT 5036		



Inspector: \_\_\_\_\_

*Scott Baas*  
\_\_\_\_\_  
(Signature)

Equipment/Labour	Work Time	Date: <u>Friday, July 7, 2023</u>	Temp: <u>17°C to 24°C</u>	Weather: <u>Sun and Clouds</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>		
Road Surface Recycling Continued		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u>	Working Day Charged: _____	
Contract Administrator - Veronica Vona		Contractor: <u>Road Surface Recycling</u>	Foreman: <u>Dan Touw</u>	
P/U Ford F150 Lic# AT 59506		Inspector: <u>Scott Baas, Accompanied by Akshaykumar Borac</u>	Working Hours: _____	
Truck Driver/Labour - Teddy		Diary Notes:		
Operator/Labour - Frank Tomaselli				
BOBCAT S550 #B100-889				
PNJ - Third Party Lab Consultant				
Piyush Ansal				
Kuldeep Sisopiu				
Ripu Singh				
Beacon Lite Traffic Control				
Foreman/Superintendent - Russel Joly				
P/U F450 #59				
Traffic Control Person/Labour - Emmanuel Soro				
P/U GMC Sierra #31				
Traffic Control Person/Labour - Robert Chambers				
Dodge Ram #38				
Traffic Control Person/Labour - Marvellous Aimvan				
Traffic Control Person/Labour - Elizabeth Vanderkruids				
Traffic Control Person/Labour - Collinda St. Germain				
Arrow boards (2)				



Inspector: \_\_\_\_\_  
*Scott Baas*  
 (Signature)

Equipment/Labour	Work Time	Date: <u>Monday, July 10, 2023</u> Temp: <u>18°C to 27°C</u> Weather: <u>Sun and Clouds</u>
	Hours	
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Akshaykumar Borac</u> <b>Working Hours:</b> <u>7:00am to 8:30pm</u>
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b>
Operator of PreHeater #PH5001 - Gary Norman		8:30am Akshay arrives on site.
Preheater PH300 #PH5001 (10m or 30ft)		8:40am I arrive on site. The contractor's rollers, asphalt spreader, and loader are idle in front of 2054 the Kingsway. One heating unit is on the road, not running. The BOBCAT S550 is spreading sand on crack sealing heading easterly in the East Bound Fast Lane. The recycling unit is parked at 2054 the Kingsway.
Operator of Preheater - Ian Adams		9:10am The second heating unit is on the road.
Preheater PH300 #PH5029		9:20am City Project Manager, Miranda Edwards arrives on site.
Operator of Milling/Recycling Machine - Austin Laws		9:35am I have applied a thorough layer of City issued Croc Bloc SPF 30 sunscreen to in preparation for today's warm weather.
Milling/Recycling Machine RU #5015		9:45am Connor Chow, with Wester Surety is on site. The contractor is having issues with their recycling/hot milling unit.
Paving Foreman - Seth Archibald (Tail End)		12:05pm Miranda and Connor leave site. I reminded Miranda of OPSS332.07.04.02 which states that "The contractor shall complete and maintain a table with the following information for each station in each direction: Location, Station Number, Uncompacted recycled mix depth at left, center and right of the lane, Rejuvenator count for that station, travel speed, Mix temperature, existing and final crosfall, and existing and final lane width.
Spreader Operator - Tyrone Tucay		12:40pm I leave site. Heaters are not active yet and the contractor continues to work on their recycling/hot milling unit.
Tail End Man Liam Chiasson		1:40pm I return to site. The contractor is moving the recycling unit onto the road from the entrance of 2054 the Kingsway. The first heating unit is now heating the roadway.
Cube Truck Isuzu NRR SV-4000		2:30pm The contractor seems to be throwing sand on a hydraulic spill at 3+200, just east of the entrance to 2054 the Kingsway in the East Bound Fast Lane.
Paver CAT AP5054		2:35pm The 2nd heater is now heating the roadway as well.
Operator - Callum Proulx		3:02pm The Hot Milling process is underway at 3+149 in the East Bound Fast Lane.
Double Steel Drum Roller CAT CB13 #SR2101		3:15pm The windrow at 3+140 in the East Bound Fast Lane is 117 Celcius with probe, which is the hottest temperature observed thus far. The milled surface temp is 76 Celcius using the infrared thermometer.
Operator - Donovan Kokokopenace		The temp behind the first heater is 66.7 Celcius at 3+080. The temp behind the second heater (PH5029) is 146 Celcius at 3+100. The milled surface in front of the spreader is 43 Celcius at 3+140.
Rubber Tire Roller CAT CW34 #TR2101		3:30pm I observe and photograph yet again that the thickness at the edge of the lane is no where near 50mm and there continues to be a skim on cooled RAP on the surface in front of the spreader.
Truck Driver / Labourer - Tony		3:40pm Temp 72 Celcius at spreader augers, 76.2 Celcius with the probe. Temp 90 Celcius behind the screed.
Semitruck - Mack FT - 2022		3:59pm Temp 79 Celcius behind screed at 3+100. Note that Connor Chow left site shortly after the hot milling process began, I'm unaware of the exact time.
Loader CAT930H #WL-5061 as req'd		4:10pm The hot milling/ recycling unit continues having milling depth issues, it is stopped at 3+045 +/- . The spreader is stopped at 3+065 +/- .
P/U F550 #CD-4002 (used by PNJ)		4:14pm There is still noticeable RAP, 1 inch thick on the North end of the EB Fast lane @ 3+060. Mandi is present and observes the same. Plans to discuss the matter with WSP's paving engineer, Hoda Seddik.
P/U Chev 2500HD Lic #BL32675		4:40pm The recycling unit backs up to within a few metres of the spreader 3+050 to re mill as much as possible.
Semitruck - Peterbilt FT 5036		



Inspector: \_\_\_\_\_

*Scott Baas*  
\_\_\_\_\_  
(Signature)

Equipment/Labour	Work Time	Date: <u>Monday, July 10, 2023</u> Temp: <u>18°C to 27°C</u> Weather: <u>Sun and Clouds</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Road Surface Recycling continued		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> Working Day Charged: _____
Operator/Labourer Frank Tomaselli		Contractor: <u>Road Surface Recycling</u> Foreman: <u>Dan Touw</u>
BOBCAT S550		Inspector: <u>Scott Baas, Accompanied by Akshaykumar Borac</u> Working Hours: <u>7:00am to 8:30pm</u>
Broom Bucket Att BU115		<b>Diary Notes:</b>
Jaw attachment to spread sand on crack sealant		<p>4:58pm City PM, Miranda Edwards leaves site. Fellow inspector, Akshay continues to steadily document temperature readings along the HIR train. I return to my work van to work on this diary.</p> <p>6:15pm Sample Lot 1 Sub 5 provided to the City by PNJ's lab techs.(Loose Mix for AC content, Aggregate Gradation and Mix properties) at 2+840 in the center of the East Bound Fast lane from the windrow. The windrow temp was 110 Celcius.</p> <p>6:25pm Temp of recycled mix behind the spreader is 93 Celcius with probe.</p> <p>6:30pm I document alot of open flame below the first heater PH-5001 between 2+750 and 2+700. Alot of smoke is being produced, I photograph and record this and send it to PM, Miranda Edwards. At this time, Frank Crupi is operating the loader and has two labourers spreading sand on the crack sealer with hand shovels to the East of the operation where the train is heading.</p> <p>7:03pm Akshay and I have marked out the location of Core Lot 1 Sub 8 at 3+025 in the East Bound Fast Lane.</p> <p>7:10pm Akshay and I have marked out the location of Core Lot 1 Sub 9 at 2+825 in the East Bound Fast Lane.</p> <p>7:14pm PNJ is checking compaction readings with their nuclear density gauge. They advise that in the first 100m +/- compaction is between 88 to 91%</p> <p>Akshay advises that between 4:45pm and 6:35pm, the temperature range behind the spreader screed, is 73.5 Celcius to 105.7 Celcius.</p> <p>7:20pm The hot milling/ recycling unit stops for the day at 2+600 in the East Bound Fast Lane.</p> <p>7:26pm The temp behind the spreader is 83.5 Celcius at 2+610. The temp is 101.2 Celcius in the windrow, in front of the spreader. The temp is 73.6 Celcius on the milled surface in front of the spreader, outside of the windrow.</p> <p>7:40pm Placement of recycled asphalt is complete for the day at 2+600 in the East Bound Fast Lane. I speak with Ripu, with PNJ who advises that today's compaction average is 90.7%. Of the 8 readings taken, 3 shots were over 92% as required.</p> <p>7:56pm The loader has scraped the road to the east of 2+600. Beacon Lite is removing traffic control. RSR's equipment is heading Easterly to park for the night.</p> <p>8:29pm Traffic control is mostly removed, Beacon Lite remains on site, removing remaining signage.</p>
Labourer/Truck Driver - Teddy		
Trainee - Owen Dykstra - Heater		
Trainee - Ken Bergeron-Dupuis - Paver		
Trainee - Zach Rivard - Recycler Unit		
PNJ - Third Party Lab Consultant		
Piyush Ansal		
Kuldeep Sisopiu		
Ripu Singh		
Beacon Lite Traffic Control		
Foreman/Superintendant - Russel Joly		
P/U F450 #59		
Traffic Control Person/Labour Collinda St. Germain		
P/U GMC Sierra #31		
Traffic Control Person/Labour - Robert Chambers		
Dodge Ram #38		
Traffic Control Person/Labour - Emanuel Soro		
Traffic Control Person/Labour Elizabeth Vanderkruys		
Arrow boards (2)		

10-ENG21-38 Diary - July 11 2023 - EBFL 2+610 to 0+702

Equipment/Labour	Work Time Hours	Date: <u>Tuesday, July 11, 2023</u> Temp: <u>18°C to 25°C</u> Weather: <u>Sun and Clouds</u>
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Akshaykumar Borac</u> <b>Working Hours:</b> <u>7:00am to 8:30pm</u>
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b>
Operator of PreHeater #PH5001 - Gary Norman		8:25am Fellow CGS inspector, Akshay, arrives on site.
Preheater PH300 #PH5001 (10m or 30ft)		9:05am I arrive on site. Akshay advises that both heaters fired up at 9:00am. The BOBCAT has sand in it's bucket, Frank and 2 labourers are hand shovelling sand on the crack sealant East of yesterday end station of 2+600 in the East Bound Fast Lane.
Operator of Preheater - Ian Adams		9:35am I observe open flames from the heating units, as per usual.
Preheater PH300 #PH5029		9:53am Frank Crupi advises that he's not happy this morning, that he knows the City is trying to shut his operation down. States that the other recycling company wouldn't be able to recycle with all the crack sealant. Advises that his lawyers will get involved and he'll be back in 2 years finishing this job. Says he's aware of the corruption at the City of Sudbury with may request an FOI. I advise that I have nothing to say on this matter.
Operator of Milling/Recycling Machine - Austin Laws		9:57am A large amount of dark smoke is observed and photographed, and recorded at the preheaters.
Milling/Recycling Machine RU #5015		10:00am Open flame is observed and recorded.
Paving Foreman - Seth Archibald (Tail End)		10:05am Hot milling/recycling begins at 2+610 in the East Bound Fast Lane, heading Easterly.
Spreader Operator - Tyrone Tucay		10:10am Recycled asphalt in windrow temp is 135 Celcius at 2+605.
Tail End Man Liam Chiasson		10:15am I head to 3+025 in the East Bound Fast Lane, with PNJ's Ripu Momi where I'm advised that Piyush Ansal and Kuldeep Sisopiu actually work for RSR, it's only Ripu that work for PNJ, contrary to what previous diaries indicate.
Cube Truck Isuzu NRR SV-4000		10:28am 1st Core Lot 1 Sub 8 at 3+025 is not bonded to the subsequent layer and breaks apart.
Paver CAT AP5054		10:56am 5 cores have been taken at 3+025, not one was bonded to the subsequent layer, they all broke apart. The thickness of was as little as 20mm, and loose material was observed, photographed and recorded. I had expressed concern about bonding and blending in these areas a number of times in emails. I advised the lab techs that for the next subplot, I'd like the cores to be drilled at different offsets to get a good representation across the lane. The have no issues with this idea. The plan was to take a QA and REF sample for a shear strength test, in addition to the QA, Ref and QC Cores for A/C Content, Aggregate gradation, and mix properties. These extra two cores won't be sent out as they were not bonded to the subsequent layer and therefore can not be tested.
Operator - Callum Proulx		11:08am We have all moved up to Core Lot 1 Sub 9 at 2+824 in the East Bound Fast Lane
Double Steel Drum Roller CAT CB13 #SR2101		11:30am Beacon Lite has adjusted the traffic control to accomodate the core sampling at 2+824.
Operator - Donovan Kokokopenace		11:37am Ripu Momi backs into the City van #S948-10 which is issued to myself at extremely low speed, in F550 #CD-4002. Piyush Ansal was guiding him with hand signals. A very small amount of damage was done to the front of the van.
Rubber Tire Roller CAT CW34 #TR2101		11:42am I inform, the Manager and Coordinator of Construction Services about the damage and send pictures.
Truck Driver / Labourer - Tony		11:52am The coordinator of Construction Services, Shawn Hinton is on site. He advises that the van is over 10 years old and has significant wear and doesn't feel it's worth making an issue.
Semitruck - Mack FT - 2022		11:55am The contractor is drilling out the cores at Lot 1 Sub 9 in the East Bound Fast Lane, the offsets from the yellow line at the center lane, will be 0.5m, 1.1m, 1.6m, 1.9m, 3.2m
Loader CAT930H #WL-5061 as req'd		12:11pm 5 Cores were drilled at the location for Core Lot 1 Sub 9. All 5 cores were not bonded to the subsequent layer and therefore, the 2 cores for the Shear Strength test, won't be required.
P/U F550 #CD-4002 (used by PNJ)		12:22pm Shawn Hinton leaves site. PNJ and RSR's lab techs advise that they've never had the cores break like this before.
P/U Chev 2500HD Lic #BL32675		
Semitruck - Peterbilt FT 5036		
Contract Administator - Veronica Vona		
P/U F150		



Inspector:

*Scott Baas*  
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(Signature)

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Equipment/Labour	Work Time	Date: <u>Tuesday, July 11, 2023</u>	Temp: <u>18°C to 25°C</u>	Weather: <u>Sun and Clouds</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>		
Road Surface Recycling continued		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u>	Working Day Charged: _____	
Operator/Labourer Frank Tomaselli		Contractor: <u>Road Surface Recycling</u>	Foreman: <u>Dan Touw</u>	
BOBCAT S550		Inspector: <u>Scott Baas, Accompanied by Akshaykumar Borac</u>	Working Hours: <u>7:00am to 8:30pm</u>	
Broom Bucket Att BU115		<b>Diary Notes:</b>		
Jaw attachment to spread sand on crack sealant		12:33pm Russel Joly with Beacon Lite calls to advise that he's placed a cone over a traffic hand hole like in the paved shoulder on the South side of the Kingsway between the Truck Training Center and the Mitsubishi dealership.		
Labourer/Truck Driver - Teddy		12:45pm The asphalt temp is 80 Celcius behind the spreader screed at 2+240 in the East Bound Fast lane.		
Trainee - Owen Dykstra - Heater		12:49pm I photograph the handhole and will call it in to operations in the future to have it assessed as there seems to be some washout happening around it.		
Trainee - Ken Bergeron-Dupuis - Paver		1:04pm The heaters are at 2+100 in the East Bound Fast Lane.		
Trainee - Zach Rivard - Recycler Unit		1:10pm Mohammed Shoaib, Pavement Engineer with WSP arrives on site.		
		1:20pm The recycled asphalt is 84 Celcius in the windrow at 2+110 (92 Celcius with probe). The milled surface/this layer of RAP, outside of the windrow in front of the spreader is at 46 Celcius. The asphalt behind the spreader screed, is 86 Celcius (67 Celcius) with probe. Mohammed Shoaib is a witness to these temperatures.		
PNJ - Third Party Lab Consultant		1:27pm In the edge of the lane at 2+100, the asphalt being placed by spreader is only 20mm thick, Mohammed is a witness to this as well.		
Ripu Singh		1:40pm I leave site for lunch.		
Kuldeep Sisopiu - RSR Lab Tech		2:30pm I return to site.		
Piyush Ansal - RSR Lab Tech		2:45pm The asphalt spreader is at 1+825 in the East Bound Fast lane. Surface temp on the loose skim of RAP in front of the spreader is 41 Celcius.		
Beacon Lite Traffic Control		3:00pm The asphalt behind the spreader screed at 1+775 is 80.6 Celcius.		
Foreman/Superintendent - Russel Joly		3:04pm The contractor is preparing to provide Sample Lot 1 Sub 6 Loose Mix for AC Content, Aggregate Gradation, and Mix Properties as well as Lot 2 RAC Performance Grade, and Lot 2 Penetration.		
P/U F450 #59		3:07pm The above noted samples are taken by Ripu Momi and Piyush Ansal at 1+745 from the windrow in the center of the East Bound Fast lane on the Kingsway. Temperature is 96.4 celcius.		
Traffic Control Person/Labour Collinda St. Germain		3:10pm I speak with Mohammed. He agrees that the thickness is not consistent throughout the lane, there is still open flame on the asphalt, and that the RAP that remains on the asphalt loose below 50 Celcius will not blend and bond properly. I show him the video recording or the loose material removed from the core on the outside of the lane(not within 250mm of the edge as per OPSS 332). He advises that if they're Hot In Place Recycling tomorrow, he will be here. I advised that from what I understood from City Project Manager, Miranda Edwards, if he is in full agreement that they are not meeting specifications as we've observed, the contractor may be directed to stop work after today. He asked what the weight of the roller was, as well as how many passes they do. I advised that the roller is a 12 tonne, and that I wasn't sure how many passes they do. I did state that to my knowledge, it's very important to compact asphalt before it cools, to achieve adequate compaction and to avoid cracking. He agreed.		
P/U GMC Sierra #31		3:20pm The intersection of the Kingsway at Levesque is closed to left turns. The heaters are now preheating the intersection.		
Traffic Control Person/Labour - Robert Chambers		4:27pm The paver is approaching 1+400 heading Easterly in the East Bound Fast lane. The rubber tire roller is still rolling in the intersection at Levesque, it is still closed to left turns.		
Dodge Ram #38		4:55pm The intersection of the Kingsway and Levesque is now open, not sure how long it's been open at this time as I've been typing this diary.		
Traffic Control Person/Labour Emanuel Soro				
Traffic Control Person/Labour Elizabeth Vanderkruys				
Arrow boards (2)				



Inspector: \_\_\_\_\_  
*Scott Baas*  
 (Signature)

Equipment/Labour	Work Time	Date: <u>Tuesday, July 11, 2023</u> Temp: <u>18°C to 25°C</u> Weather: <u>Sun and Clouds</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>
		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> Working Day Charged: _____
		Contractor: <u>Road Surface Recycling</u> Foreman: <u>Dan Touw</u>
		Inspector: <u>Scott Baas, Accompanied by Akshaykumar Borac</u> Working Hours: <u>7:00am to 8:30pm</u>
		<b>Diary Notes:</b>
		5:10pm The intersection of the Kingsway and Moonlight is closed to left turns. The preheaters are entering the intersection.
		5:15pm WSP's pavement engineer, Mohammed Shoaib, leaves site.
		5:17pm Lot 1 Sub 7 Loose Mix sample for AC Content, Aggregate gradation, and mix properties, is provided by Ripu Momi and Piyush Ansal from the windrow at 1+170 in the East Bound Fast lane between the recycler and spreader. The temp is 84.1 Celcius.
		5:23pm A significant amount of smoke is observed from heating units at the intersection.
		5:30pm City PM Miranda Edwards is on site. She advised Frank that Veronica Vone, their Contract Administrator, is waving traffic through the red light in the East Bound Lane. Frank immediately heads over to advise Veronica to stop. I take video of open flames from heating unit in the intersection, which has no crack sealant.
		5:43pm Two fire trucks go through the intersection heading East bound.
		5:44pm The asphalt spreader is at the easterly edge of the intersection of Kingsway at Moonlight in the East Bound Fast Lane. The asphalt temperature behind the screed is 90 Celcius the infrared gun, 60 Celcius with the probe.
		5:47pm A third fire truck goes through the intersection heading East bound.
		6:01pm Rolling is complete in the Moonlight intersection, the intersection is reopened to left turns.
		6:04pm Connor Chow, with Western Surety is on site.
		6:55pm The first heater is now at 0+720 in the East Bound fast lane. The asphalt spreader is at 0+800 and the asphalt temp is 76.6 Celcius behind the screed.
		7:06pm I photograph and video record gravel and broken asphalt along the curb line between 0+750 and 0+800. Fellow City inspector Akshay advises that it's been like that most of the way up the hill along the curb line.
		7:20pm Heating units are done for the day.
		7:33pm Connor Chow, with Wester Surety is walking back to his vehicle to leave site.
		7:34pm I photographed cracking at 0+840 along the curb line in the East Bound Fast lane.
		7:38pm I photographed asphalt already blown out in the curb line at 0+785
		7:41pm City PM, Miranda Edwards heads back to her vehicle to leave site. Recycled asphalt placement is complete for the day at 0+702. (16+/-m East of the end of the island/ to the West side of the Snowmobile crossing joint)
		7:52pm Fellow inspector, Akshay and myself both leave site to fill out and make copies of the proper sample sheets, drop off samples at the St. Clair Depot, finish updating diaries and spreadsheets in J drive, etc. The contractor continues rolling/ compacting. The contractor has left the East Bound Fast lane closed from West of the entrance to the Mitsubishi Dealership, to where they completed asphalt placement.

11-ENG21-38 Diary - July 12 2023

Equipment/Labour	Work Time Hours	Date: <u>Wednesday, July 12, 2023</u> Temp: <u>16°C to 24°C</u> Weather: <u>Sun and Clouds</u>
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Akshaykumar Borac</u> <b>Working Hours:</b> _____
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b> 8:35am Fellow inspector Akshay arrived on site. He advises that the traffic control was already in place, and the rollers, spreader, and the loader were on the road at this time. 8:45am The first heating unit was on the road. 9:05am The second heating unit is on the road. 9:13am I arrive on site. The contractor has four labourers spreading sand from the loader bucket with hand shovels, Easterly of where paving stopped yesterday at 0+702 in the East Bound fast lane. 9:20am The heating process begins. 9:30am I speak to the City's Project Manager, Miranda Edwards and advise that the contractor has occupied the roadway, despite her email from last night at 10:44pm indicating that work cannot proceed. 9:34am Miranda Edwards send an email to the contractor advising them that "You are not authorized to close lanes traffic at this time. <b>Please remove the traffic control and your equipment from the roadway.</b> " 9:49am I call Frank Crupi to ensure that he has received the email advising them to shut down their operations. He advises that he's received it. He tells me that this will be a public relations nightmare. He says he will be submitting time and materials to be paid for this delay. He says that he'll go in front of council and won't stay quiet. He admits to being too thin on the edge of the lane to date. He says that he had a meeting with Austin this morning and told him he needs to fix this. I reminded him that I watched him tell him to go deeper in the beginning, and reminded them multiple times in emails and nothing has changed. He mentioned that cores shouldn't be taken near the edge of a lane. I advise him that the spec says that it can't be taken within 250mm of the edge of the lane or longitudinal joints, which they weren't. He mentioned that it should be at random. I said that they owner has the right to take samples where they desire. 10:15am Miranda Edwards arrives on site. All equipment is off of the road except for the BOBCAT and labourers that are removing the sand that was placed earlier. 10:30am The loader is doing a final scrape of the roadway. 11:00am Veronica Vona (RSR), Michael Schmidt (RSR), Akshay Borad (CGS), Luciano Valle (CGS), Miranda Edwards (CGS), and myself are in the parking lot at Royal Distributing waiting for Frank Crupi to start the site meeting. 11:20am Frank Crupi joins us and the meeting begins. Refer to meeting minutes and video recording for more info. 12:10pm The site meeting is complete. Traffic control is all removed (not certain of the exact time removal was complete). 12:25pm Mandi and Akshay leave site. 12:42pm I leave site following a conversation with Frank Crupi in which he provided information/opinion regarding HIR. He advised that he understands that I'm just doing my job and has no issue with me. He states that he predicts that City Council will vote to allow RSR to finish Kingsway by tomorrow.
Operator of PreHeater #PH5001 - Gary Norman		
Preheater PH300 #PH5001 (10m or 30ft)		
Operator of Preheater - Ian Adams		
Preheater PH300 #PH5029		
Operator of Milling/Recycling Machine - Austin Laws		
Milling/Recycling Machine RU #5015		
Paving Foreman - Seth Archibald (Tail End)		
Spreader Operator - Tyrone Tucay		
Tail End Man Liam Chiasson		
Cube Truck Isuzu NRR SV-4000		
Paver CAT AP5054		
Operator - Callum Proulx		
Double Steel Drum Roller CAT CB13 #SR2101		
Operator - Donovan Kokokopenace		
Rubber Tire Roller CAT CW34 #TR2101		
Truck Driver / Labourer - Tony		
Semitruck - Mack FT - 2022		
Loader CAT930H #WL-5061 as req'd		
P/U F550 #CD-4002 (used by PNJ)		
P/U Chev 2500HD Lic #BL32675		
Semitruck - Peterbilt FT 5036		
Contract Administator - Veronica Vona		
P/U F150		



Inspector:

*Scott Baas*

(Signature)

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Equipment/Labour	Work Time	Date: <u>Wednesday, July 12, 2023</u>	Temp: <u>16°C to 24°C</u>	Weather: <u>Sun and Clouds</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>		
Road Surface Recycling continued		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u>	Working Day Charged: _____	
Operator/Labourer Frank Tomaselli		Contractor: <u>Road Surface Recycling</u>	Foreman: <u>Dan Touw</u>	
BOBCAT S550		Inspector: <u>Scott Baas, Accompanied by Akshaykumar Borac</u>	Working Hours: _____	
Broom Bucket Att BU115		Diary Notes:		
Jaw attachment to spread sand on crack sealant				
Labourer/Truck Driver - Teddy				
Trainee - Owen Dykstra - Heater				
Trainee - Ken Bergeron-Dupuis - Paver				
Trainee - Zach Rivard - Recycler Unit				
PNJ - Third Party Lab Consultant				
Ripu Singh				
Kuldeep Sisopiu - RSR Lab Tech				
Piyush Ansal - RSR Lab Tech				
Beacon Lite Traffic Control				
Foreman/Superintendent - Russel Joly				
P/U F450 #59				
Traffic Control Person/Labour Collinda St. Germain				
P/U GMC Sierra #31				
Traffic Control Person/Labour - Robert Chambers				
Dodge Ram #38				
Traffic Control Person/Labour - Emanuel Soro				
Traffic Control Person/Labour Elizabeth Vanderkruys				
Arrow boards (2)				



Inspector: \_\_\_\_\_ *Scott Baas* \_\_\_\_\_  
 (Signature)

**12-ENG21-38 Diary - June 20 2023 - Center Lane 0+075 to 0+238**

Equipment/Labour	Work Time Hours	Date: <u>Tuesday, June 20, 2023</u> Temp: <u>~17C to 30°C</u> Weather: <u>Sunny and Hot</u>
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Rino Carniello</u> <b>Working Hours:</b> <u>7:00am to 2:30pm</u>
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b> 7:45am I arrive on site and am waiting in traffic on the Kingsway just East of Moonlight. The contractor has 4 lanes closed, and has traffic down to one lane, alternating in the outer East Bound Lane on the Kingsway between 300m, West of the Hwy 17 Bypass and the Island 1000m West of the Hwy 17 Bypass. Note that the paving will begin 375m West of the Hwy 17 Bypass, which is 0+075 as the contractor began their chainage 300m West of the Hwy 17 Bypass at 0+000. The chainage increases in the Westerly direction in this case. 8:01am I speak to City project manager and advise of the situation as mentioned above. 8:15am I speak to City PM Miranda Edwards and advise of open flame on the asphalt. I text pictures and videos. This does not conform to OPSS 332.06.03 which states that "Heating units shall apply heat in a uniform manner to the surface of the existing pavement to be hot milled. Open flame heating of the existing HMA pavement shall not be permitted. 8:30am I speak to the Site Superintendant, Dan Teow and advise that he is not conforming to Division #3 Section #6 Operational Constraints, which specifies that "The contractor shall maintain a minimum of one (1) lane open at all times on 2 lane roads and minimum of one (1) lane in each direction on 4 lane roads. He advises that he will move his equipment and will have the subcontractor open the outer WBL as soon as possible. 8:47am I send an email to City PM Miranda Edwards and copy the Manager (Luciano Valle) and Coordinator (Shawn Hinton) of Construction Services with the Division #3 Section #6 non conformance as stated above. 9:07am I have noted and photographed blackened/scorched asphalt in the Center turn lane between 0+075 and 0+100. The contractor's traffic control sub contractor, Beacon Lite, is opening the outer West Bound Lane and now has the 3 center lanes closed off between 300m West of the Hwy 17 Bypass, and 1000m West of the Hwy 17 Bypass. 10:15am Preheating continues in the center lane at 0+075 heading Westerly. 10:20am City PM, Miranda Edwards is on site. PNJ has 3 QC reps on site, measuring widths and will be taking samples, and doing lab tests as required. 10:45am The asphalt surface temperature behind the 1st preheater is 100 Celcius, The asphalt surface temp behind the 2nd preheater is 130 Celcius. 11:25am The contractor has milled 50mm to from 0+075, Westerly 75m to 0+150 in the center lane. The windrow in the center of the center lane, left behind by the recycling machine, is 65 Celcius. The open flame from the preheaters seems to only be from the pilots at this point, active flames otherwise are from the crack sealant catching fire. The contractor is throwing sand from the shoulder on the crack sealant near the outer edge of the heaters, to prevent the active flames. The asphalt surface is now 52 Celcius directly behind the 2nd of 2 preheaters. 11:36am The contractor has paved between 0+075 and 0+140 in the Center lane. Foreman, Seth Archibald, the paving foreman is raking fines into the seemingly torn mat for the first 20+/-m. The temperature directly behind the screed during placement is 74 Celcius at this time. QA Tech, Rino Carniello advises that he didn't read any temps over 80 Celcius either, OPSS 332.07.04.02 states that the underlying pavement shall be heated to a minimum of 50 Celcius and that the asphalt directly behind the screed shall be a minimum of 120 Celcius. I advised Frank of the fact that the asphalt temperature is below 80 Celcius when it should be at least 120 Celcius.
Operator of 1st PreHeater - Gary Norman		
Preheater PH300 #PH5001 (10m or 30ft)		
Oprator of 2nd Preheater - Ian Adams		
Preheater PH300 #PH5029		
Operator of Milling/Recycling Machine - Austin Laws		
Milling/Recycling Machine RU #5015		
Paving Foreman - Seth Archibald (Tail End)		
Spreader Operator - Tyrone Tucay		
Tail End Man Teddy Jose		
Cube Truck Isuzu NRR SV-4000		
Paver CAT AP5054		
Operator - Liam Chiasson		
Double Steel Drum Roller CAT CB13 #SR2101		
Operator - Donovan Kokokopenace		
Rubber Tire Roller CAT CW34 #TR2101		
Truck Driver / Labourer - Tony		
Tractor - Mack FT - 2022		
Loader CAT930H #WL-5061 as req'd		
P/U F550 #CD-4002		
P/U Chev 2500HD Lic #BL32675		
Tractor - Peterbilt FT 5036		



**Inspector:** \_\_\_\_\_

*Scott Baas*  
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 (Signature)

**Page :** 1 **of** 3

Equipment/Labour	Work Time	Date: <u>Tuesday, June 20, 2023</u>	Temp: <u>~17C to 30°C</u>	Weather: <u>Sunny and Hot</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>		
PNJ - Third Party Lab Consultant		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u>	Working Day Charged: _____	
Piyush Ansal		Contractor: <u>Road Surface Recycling</u>	Foreman: <u>Dan Teow</u>	
Kuldeep Sisopiu		Inspector: <u>Scott Baas, Accompanied by Rino Carniello</u>	Working Hours: <u>7:00am to 2:30pm</u>	
Ripu Singh		<b>Diary Notes:</b>		
		11:45am Frank instructed his spreader operator to slow down. Paving foreman, Seth Archibald advised that they're greatly understaffed. Frank stated that he will not get the desired 120 Celcius minimum temp out of the spreader, as the spreader's heaters arent capable of doing so. He assured me that what really matters is compaction and that he won't have any problems meeting minimum compaction requirements. I noticed that there is a skim of heated, softened asphalt approx 15mm to 20mm thick, on the subsequent asphalt layer. Frank states that he doesn't want to mill to or into the subsequent layer, as that's where the dirt and sand is. My concern would be that there is a cooler skim topped with recycled asphalt that is 40+ Celcius below the specified minimum temperature.		
Beacon Lite Traffic Control		12:00pm The paving operation has stopped at 0+200 in the Center lane. The asphalt coming out of the spreader, directly behind the screed continues to be around 65 Celcius.		
Foreman/Superintendent - Russel Joly		12:07pm Frank informs that they may be shutting down for the day as the recycler likely blew a gasket.		
Manager - Grant Turner		12:10pm Paver resumes, asphalt is 66 Celcius.		
P/U Ford F150 #6		12:16pm As this is a "test strip", I ask Frank Kruppi if he'll be replacing what was paved today, or if he plans to leave it in place. He advise that he doesn't plan to redo it. Rino is arranging for samples to be taken with PNJ at this time.		
Labourer / TCP - Michael Gibson		12:23pm Recycled asphalt from the windrow ahead of the spreader is being placed in boxes by PNJ's QC Rep. The following samples are taken at 0+220 in the Center Lane.		
P/U Dodge 1500 #38		LOT 1 Sublot 1 HIR Loose Mix - A/C content, Aggregate Gradation and Mix Properties		
Labourer / TCP - Jeff Foscett		LOT 1 HIR Loose Mix - Penetration		
P/U F450 #59		LOT 1 HIR Loose Mix - RAC Performance Grade		
Labourer / TCP - Jim Comeau		Rino Carniello would like it documented that the contractor's shovels used for sampling have diesel on them. Frank Kruppi advises that the recycling unit is officially down for the day.		
Dodge Ram 1500 #111		12:35pm I break for lunch. The paver still hasn't move from 0+220.		
Arrow Boards (2)		1:00pm Tyler Bond, with Wood is on site in a Chev Silverado to take compaction readings using a nuclear density gauge.		
		1:10pm The recycling machine is off of the road for the day, pulled into Cambrian Ford's Easterly entrance.		
		1:18pm The paver is off the road, recycled asphalt placement today took place between 0+075 and 0+238+/- in the center lane, 3.5m wide.		
2 - Paid Duty GSPS officers		1:20pm Asphalt rolling is complete. Miranda and I discuss sending out an email reminding the contractor of the requirement for temporary pavement marking tape, acknowledging the temperature spec not being met, as well as sweeping debris off the road, prior to reopening.		
		1:30pm Rino advised that he reminded Seth Archibald, the paving foreman, that the road must be swept prior to reopening. Seth stated that he would go get some brooms.		
		1:33pm All equipment is off of the road. Traffic control is still in place, as compaction readings are still taking place.		
		1:50pm I leave site. The paid duty officers and traffic control remain in place. The contractor seems to be sweeping the West bound fast lane by hand.		
		*Rino advised later in the day that he left at 2:15pm and that he the contractor had not adequately swept before removing traffic control		



Inspector: \_\_\_\_\_  
*Scott Baas*  
 (Signature)



**13 - June 21 2023 - Center Lane 0+213 to 0+752 and 0+901 to 1+280**

Equipment/Labour	Work Time	Date: <u>Wednesday, June 21, 2023</u> Temp: <u>17°C to 30°C</u> Weather: <u>Sunny and Hot</u>
	Hours	
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Rino Carniello</u> <b>Working Hours:</b> <u>7:00am to 6:40pm</u>
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b>
Operator of 1st PreHeater #PH5001 - Gary Norman		7:35am I arrive on site. Traffic is in the outer West Bound Lane and the Outer East Bound Lane and is flowing well in both directions. The contractor has two preheating units in the center lane on the Kingsway from 0+213+/-, heading Westerly. The contractor will be redoing roughly 20m of what was placed yesterday.
Preheater PH300 #PH5001 (10m or 30ft)		7:43am The recycling unit is moving onto the road.
Operator of 2nd Preheater - Ian Adams		8:00am The paid duty officers arrive on site (2). The paver is about to walk onto roadway from Cambrian Ford's Easterly entrance.
Preheater PH300 #PH5029		8:12am The paver is in place behind the Milling/Recycling unit. Milling has not began yet.
Operator of Milling/Recycling Machine - Austin Laws		8:20am Russell from Beacon Lite requested documentation from the City permitting the contractor to have closures in the intersection at Moonlight. Rino advised him that all traffic control is the contractor's responsibility. We simply look at traffic control plans for clarification, to express concern, and for our safety to understand the closure that we're working in. We are not at all responsible for the closures. Michael Gibson with Beacon Lite advises that he will be on and off site throughout the day as required, Grand Turner will not be on site today.
Milling/Recycling Machine RU #5015		9:16am The Milling/Recycling process begins at 0+213 +/-, heading Westerly, in the Center lane on the Kingsway (515m West of the Hwy 17 Bypass). Rino Carniello advises that he had temp readings of 260 Celcius behind the 2nd preheater, and that there is obvious open flame on the asphalt again today. The Pavement Preservation & Recycling Alliance (PPRA) recommends temps no higher than 190 Celcius, they recommend that loosed asphalt temps be between 110 and 150 Celcius.
Paving Foreman - Seth Archibald (Tail End)		9:25am Rino verifies that the temperature of the windrow left by the milling/recycling unit is 97 Celcius, using the infrared temp gun. The contractor's probe indicates 115 Celcius in the same windrow. This is prior to being picked up by the spreader. Rino Carniello and I take a moment to apply City of Greater Sudbury issued, Croc Block SPF 30 sunscreen in preparation of the heat to come throughout the day.
Spreader Operator - Tyrone Tucay		9:34am The paver begins picking up recycled asphalt in the Center lane at 0+213, heading Westerly.
Tail End Man Teddy Jose		9:38am The milling/recycling unit is approx 35m ahead of the paver. The asphalt behind the recycler is 115 Celcius on the contractor's probe, I read 91 Celcius. At this time the asphalt surface behind the first preheater PH 5001 98 Celcius, and the temp behind the second preheater PH5029 is 118 Celcius
Cube Truck Isuzu NRR SV-4000		9:47am The asphalt from the spreader is at 100 Celcius with the contractor's probe.
Paver CAT AP5054		10:10am City PM, Miranda Edwards is on site. Recycled asphalt has now been placed in the Center lane on the Kingsway to 0+300. Asphalt behind spreader screed is 94 Celcius with infrared gun as well as the contractor's probe.
Operator - Liam Chiasson		10:23am Rino has been informed by PNJ that there is not enough power for them to run their lab and perform required testing. The contractor is attempting to get an adequate generator.
Double Steel Drum Roller CAT CB13 #SR2101		10:30am Construction Services Coordinator, Shawn Hinton is on site. I leave site.
Operator - Donovan Kokokopenace		10:50am I return to site. RSR Contract administrator, Veronica Vona is on site, with her F150 pick up. Heating, milling, recycling and paving continue in the Westerly direction in the center lane on the Kingsway.
Rubber Tire Roller CAT CW34 #TR2101		11:00am City PM, Miranda Edwards advises that she has informed Transit and the City Landfill site that the contractor will be setting up traffic control between 12:00pm and 2:00pm at the Moonlight Intersection to prevent traffic from driving on the fresh mat which will be from the West Bound left turn lane to the East Bound Left turn lane.
Truck Driver / Labourer - Tony		
Tractor - Mack FT - 2022		
Loader CAT930H #WL-5061 as req'd		
P/U F550 #CD-4002		
P/U Chev 2500HD Lic #BL32675		
Tractor - Peterbilt FT 5036		



**Inspector:** \_\_\_\_\_

*Scott Baas*  
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(Signature)

**Page :** 1 **of** 3

Equipment/Labour	Work Time	Date: <u>Wednesday, June 21, 2023</u> Temp: <u>17°C to 30°C</u> Weather: <u>Sunny and Hot</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>
PNJ - Third Party Lab Consultant		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> Working Day Charged: _____
Piyush Ansal		Contractor: <u>Road Surface Recycling</u> Foreman: <u>Dan Touw</u>
Kuldeep Sisopiu		Inspector: <u>Scott Baas, Accompanied by Rino Carniello</u> Working Hours: <u>7:00am to 6:40pm</u>
Ripu Singh		<b>Diary Notes:</b>
		11:05am Mitch Dupont, with Wood is on site to acquire compaction readings utilizing a nuclear density gauge. Compaction checks were all above the minimum 92%.
		11:18am Recycled asphalt windrow is 80 Celcius behind the milling/recycling unit, and 89 Celcius at 0+535 directly behind the asphalt spreader screed.
Beacon Lite Traffic Control		11:45am Mich Dupont, with Wood is off site. Wood has someone coming back later on to continue with compaction checks.
Foreman/Superintendent - Russel Joly		12:00pm The paver is approaching the East end of island, to the East of Moonlight at approx 0+700 or 1000m West of the Hwy 17 Bypass. The heating units and the milling/recycling units are to the West in the West Bound Fast lane. The paid duty officer has moved to the West Bound left turn lane, just East of the Intersection at Moonlight, as Beacon Lite is preparing traffic control for when the contractor's operation goes through the intersection.
Labourer / TCP - Michael Gibson		12:45pm The contractor has milled from the East end of the above mentioned island to 0+752 in the West Bound Fast Lane. The paver will be stopping at 0+752, as the first preheater blew alternator belts, and there is a leak from the milling/recycling machine.
P/U Dodge 1500 #106		1:05pm City PM, Miranda Edwards leaves site. The contractor has paved to 0+752, in the West Bound Fast Lane. When the equipment hit the tapered end of the island it veered out in the West Bound Fast lane (Started tapering at approx 0+700). Also, Frank Kruppi has advised that there will be approx 4 inches of existing asphalt left between the face of the barrier curb and the newly placed recycled asphalt.
Labourer / TCP - Justin Rutland		2:30pm Rino Carniello and I have determined that Core #1 will be at 0+170 in the Center Lane of the Kingsway, and the Core #2 will be at 0+675 in the Center Lane of the Kingsway.
P/U Dodge 1500 #38		2:30pm Alex MacMillan with Wood/WSP is on site to check more compaction. Rino mentions that the contractor is moving their traffic control to just East of the East end of the Island, on the East side of Moonlight. He agrees to use his truck with built in arrow board and go with Alex while he gets compaction readings in the Center lane of the Kingsway. Veronica Vona is still on site.
Labourer / TCP - Jeff Foscett		2:40pm City PM, Miranda Edwards calls looking for an update to keep Transit and The City Landfill. I advise that nothing has moved yet but I will call Frank Kruppi to find out if he has an estimated time line for when they will be in the intersection at Moonlight.
P/U F450 #59		3:06pm Rino Carniello informs me that the crew will be skipping a section and going to the intersection. He says that they advise that the area in the West Bound Fast lane that they just paved (50m+) will be redone when they do the West bound fast lane in it's entirety. Rino also reminded the crew to make sure to put more sand on the oil spill at 0+770 in the West bound fast lane, where the recycling/milling machine broke down.
Labourer / TCP - Jim Comeau		3:15pm The contractor has both heaters actively preheating the existing asphalt at 0+900+/- heading Westerly. in the West Bound Fast Lane.
Dodge Ram 1500 #111		3:30pm The temperature of the surface asphalt behind the first heating unit is 90 Celcius. The temperature of the surface asphalt behind the second heading unit is 80 Celcius.
Arrow Boards (2)		3:45pm Alex MacMillan with Wood/WSP has left site.
		3:48pm Placement of recycled asphalt begins at 0+901 in the WB Fast Lane heading Westerly.
		4:07pm City QA Lab Tech, Rino Carniello is heading to 0+170 with PNJ to acquire Core Lot 1 Sub 1 in the Center Lane on the Kingsway
2 - Paid Duty GSPS officers		



Inspector: \_\_\_\_\_  
*Scott Baas*  
 (Signature)

Equipment/Labour	Work Time	Date: <u>Wednesday, June 21, 2023</u> Temp: <u>17°C to 30°C</u> Weather: <u>Sunny and Hot</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>
		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> Working Day Charged: _____
		Contractor: <u>Road Surface Recycling</u> Foreman: <u>Dan Touw</u>
		Inspector: <u>Scott Baas, Accompanied by Rino Carniello</u> Working Hours: <u>7:00am to 6:40pm</u>
		<b>Diary Notes:</b>
		4:16pm Traffic control in the EBL's East of Moonlight is removed. The first 35m asphalt placed in the West Bound Fast lane (pre rubber tire, appears to be moderately segregated at best (0+901 to 0+935).
		4:23pm Surface Temp is 85 Celcius behind the screed at 0+995 in the West Bound Fast Lane/ West Bound left turn lane.
		Windrow of asphalt left by the recycler is 75 Celcius as it enters the spreader
		Windrow of asphalt left by the recycler is 90 Celcius as it exits the recycler
		Surface of existing asphalt is 87 Celcius behind the 2nd preheater
		Surface of existing asphalt is 86 Celcius behind the 1st preheater
		4:25pm The preheaters are now in the intersection between the West Bound left turn lane and the East Bound left turn lane. Police officers are parked and directing traffic on the North and South sides of the intersection to prevent traffic from entering the area.
		4:33pm Recycled asphalt has been placed to 1+040 in the West Bound turn lane, it seems as though the minimum width is 3.6m so this overlaps into the West Bound fast lane, which is to be done at a later date.
		4:38pm The recycler/milling unit enters the intersection.
		4:40pm Asphalt behind 1st heater is 100 Celcius. Asphalt behind 2nd heater is 93 Celcius.
		4:42pm Loose Mix Sample Lot 1 Sublot 2 is taken by Kuldeep Sisodia at 1+070 just east of the Moonlight intersection in the West Bound left turn lane, 2m from the Center island. The temp is 88 Celcius.
		4:48pm The asphalt behind the spreader screed is 98 Celcius as it enters the intersection.
		4:50pm Rino Carniello calls to advise that the contractor's core compactor is not working. I advise him that if they can't get it working, they'll have to make sure the core is cleaned out or recore what they've put in and compact it properly at a later time.
		5:02pm Recycled asphalt has been placed through the intersection between the left turn lanes.
		5:16pm Placement of recycled asphalt continues in the East bound left turn lane, heading Westward back into the center lane.
		5:35pm The asphalt in the intersection has cooled to 62 Celcius.
		5:40pm The intersection is now reopened. Paid Duty officers at one the East and West side of the intersection.
		5:51pm Frank Kruppi is using the loader to scrape/remove asphalt that was tracked from today's paving limit at 1+280 in the Center Lane (@ Yollie St.) to 1+360 at the entrance to the KED Lot that RSR is using for their laydown area. The paver is approaching the limit at this time and is almost done for the day.
		5:58pm Recycled asphalt placement is complete for the day. Contractor is raking the temporary tie in.
		6:00pm Rino Carniello is off site.
		6:07pm The asphalt spreader is off the road. Rolling with the Double Steel Drum and the Rubber Tire roller continue.
		6:20pm Both rollers are off the road and done for the day. The contractor's QC is still verifying compaction at this time.
		6:22pm All equipment is off site. Beacon Lite is tearing down traffic control on the Kingsway from East of Moonlight to West of Levesque St.
		6:40pm All traffic control is removed. Everyone is off site, including the paid duty officers.
		6:45pm I leave site.

14-ENG21-38 Diary - June 22 2023 - Center Lane 1+258 to 1+685

Equipment/Labour	Work Time Hours	Date: Thursday, June 22, 2023	Temp: 23°C to 32°C	Weather: Sunny and Hot
Road Surface Recycling		Contract No./Description: ENG21-38 Tender for Hot In-Place Recycling		
Owner/VP of Reseach and Development - Frank Crupi		Location: Kingsway, 375m West of the HWY 17 Bypass to Frobrisher	Working Day Charged: _____	
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		Contractor: Road Surface Recycling	Foreman: Dan Touw	
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		Inspector: Scott Baas, Accompanied by Rino Carniello	Working Hours: 7:00am to 2:00pm	
Technical Coordinator - Mike Schmidt		Diary Notes:		
Operator of 1st PreHeater #PH5001 - Gary Norman		7:45am I arrive on site. Traffic control is in place to continue Hot In-Place Recycling in the Center Lane (s) on the Kingsway, through the intersection of Levesque Street.		
Preheater PH300 #PH5001 (10m or 30ft)		8:00am Two GSPS paid duty officers are on site. The HIR "train" has been on the road for approx 10 minutes. The heaters are beging to preheat.		
Opator of 2nd Preheater - Ian Adams		8:40am There is a vehicular accident in the outer West bound lane at approx 1+300. Toyota Tundra License # BK 56683 rear ended Toyota Tacoma License plate #793 8YY. One of the Police officers on site is tending to the matter which does not appear serious.		
Preheater PH300 #PH5029		8:45am Temperatures behind the 2nd of 2 heating units is between 100 and 130 Celcius at the starting point for the day (1+258).		
Operator of Milling/Recycling Machine - Austin Laws		8:55am The recycling/hot milling unit begins at 1+258 in the Center Lane on the Kingsway, heading Westerly.		
Milling/Recycling Machine RU #5015		9:04am The loader is cleaning up the joint at the start point.		
Paving Foreman - Seth Archibald (Tail End)		9:05am Rino advised that he's received a test message from Piyush, stating that PNJ would like to repair yesterday's core holes. Rino advised that as per their conversation yesterday night, they must have traffic control in place.		
Spreader Operator - Tyrone Tucay		9:10am Rino informs Frank of the requirement for traffic control when acquiring asphalt cores. Frank fully agrees.		
Tail End Man Teddy Jose		9:18am Asphalt spreader begins placing recycled asphalt at 1+258 in the Center lane heading Westerly.		
Cube Truck Isuzu NRR SV-4000		9:24am The temperature of the asphalt directly behind the paver's screed is 91 Celcius.		
Paver CAT AP5054		10:00am City Project Manager, Miranda Edwards, and the Manager of Construction Services, Luciano Valle are on site for the progress meeting.		
Operator - Liam Chiasson		10:15am The paver is at 1+400 heading Westerly, approaching the intersection at Levesque.		
Double Steel Drum Roller CAT CB13 #SR2101		Michael Schmidt, Veronica Vona, Luciano, Miranda, and myself attend the meeting which is in the entrance to RSR's laydown area. Michael advises that we will get test results today and tomorrow. Miranda advises that if this doesn't happen, they will not proceed with work, until the City receives satisfactory results. Miranda advises that the City would like the results from the most recent work, to be prioritized to ensure that the latest materials are acceptable. Michael fully agrees and will provide a time line for all sampling by email. We discuss temperature specs not being met as well as the thin layer of RAP being left on the hot milled surface, prior to asphalt placement as well which Michael says he will address these issues as well.		
Operator - Donovan Kokokopenace		10:20am Rino Carniello arrives at the progress meeting. The contractor provided core samples Lot 1 Sub 2 at 0+675 in the center lane on the Kingsway at o/s 8.5m from Southerly EP (white line) and Lot 1 Sub 3 at 1+190 in the Center lane at o/s 11m from Northerly EP. Rino addresses traffic controls concern regarding the QC requiring traffic control when drilling out asphalt cores outside of the construction zone. Mike will bring this up as well. Miranda agrees to allow them to submit gradation sample results today and the RAC and penetration results tomorrow by end of day.		
Rubber Tire Roller CAT CW34 #TR2101		10:48am The meeting is complete. The asphalt spreader is placing recycled asphalt at 1+515 +/- . The hot milling/ recycling machine is 1/2 way across that intersection at Levesque. Temperature is 88 Celcius behind the spreader's screed at this time.		
Truck Driver / Labourer - Tony		11:30am Luciano Vale leaving site. Miranda is doing media interview with Alana Toth, with CTV News, in front of the Time Horton's		
Tractor - Mack FT - 2022		11:54am The media interview is over, Alana Toth is in her car in the Tim Horton's parking lot, the hot milling/recycling machine blew a hydraulic motor as per the contractor. Paver is stopped at 1+660 in the Center lane.		
Loader CAT930H #WL-5061 as req'd				
P/U F550 #CD-4002				
P/U Chev 2500HD Lic #BL32675				
Tractor - Peterbilt FT 5036				



Inspector:

*Scott Baas*

(Signature)

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Equipment/Labour	Work Time	Date: <u>Thursday, June 22, 2023</u> Temp: <u>23°C to 32°C</u> Weather: <u>Sunny and Hot</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>
PNJ - Third Party Lab Consultant		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> Working Day Charged: _____
Piyush Ansal		Contractor: <u>Road Surface Recycling</u> Foreman: <u>Dan Touw</u>
Kuldeep Sisopiu		Inspector: <u>Scott Baas, Accompanied by Rino Carniello</u> Working Hours: <u>7:00am to 2:00pm</u>
Ripu Singh		<b>Diary Notes:</b>
		12:15pm The hot milling/recycling machine is parked in their laydown area. The paver is moving again, paving to 1+685 in the center lane where the hot milling/ recycling machine broke down.
		12:24pm Recycled asphalt placement is complete and the contractor is raking the end joint.
		12:30pm Heaters and the asphalt spreader/ paver are walking back to the contractor's laydown area entrance at 1+360 +/-.
Beacon Lite Traffic Control		12:49pm Rolling is complete in the intersection at Levesque and are pulling out, the paid duty officer is leaving the intersection as well.
Foreman/Superintendent - Russel Joly		1:02pm Rino Carniello advises that Russel Joly with Beacon Lite stated that Frank Crupi would let him know by 2:00pm if the contractor will be continuing to work today or not as they likely won't be able to replace the hydraulic motor on the hot milling / recycling machine immediately.
Labourer / TCP - Michael Gibson		1:06pm Rino Carniello leaves site to bring asphalt cores to Wood. PNJ, RSR's sub contracted lab crew is taking compaction readings utilizing a nuclear density gauge. Beacon Lite is placing the temporary pavement marking tape for RSR.
P/U Dodge 1500 #106		1:20pm to 1:35pm Construction coordinator, Shawnathon Hinton is on site.
Labourer / TCP - Justin Rutland		1:35pm Beacon Lite is removing traffic control.
P/U Dodge 1500 #38		1:50pm I speak with RSR's foreman, Dan Touw who advises that they're done for the day. Beacon Lite continues to remove traffic control. I leave site.
Labourer / TCP - Jeff Foskett		
P/U F450 #59		
Labourer / TCP - Jim Comeau		
Dodge Ram 1500 #111		
Arrow Boards (2)		
2 - Paid Duty GSPS officers		







Equipment/Labour	Work Time	Date: <u>Wednesday, June 28, 2023</u> Temp: <u>10°C to 24°C</u> Weather: <u>Sun and Clouds</u>
	Hours	
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Rino Carniello</u> <b>Working Hours:</b> <u>7:00am to 8:00pm</u>
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b>
Operator of 1st PreHeater #PH5001 - Gary Norman		8:50am I arrive on site. Traffic control is in place and flowing in the outer lanes on the Kingsway between 1+300+/- and 3+200+/- Rino arrived at 7:45am, all equipment was on the road at that time.
Preheater PH300 #PH5001 (10m or 30ft)		8:30am The contractor started heating the roadway. A third heater is being used today, PH2021 pulled by Mack PT2020. I'm advised by Beacon Lite Foreman, Russel Joly, that there will not be Paid Duty Officers utilized today. Two new employees are on site working for RSR, David Bozic will be training to run one of the heaters and Callum Proulx will be going on the dual steel drum roller.
Operator of 2nd Preheater - Ian Adams		9:10am The hot milling/ recycling unit begins on the Kingsway in the center lane starting at 1+661 West of Levesque street, heading westerly.
Preheater PH300 #PH5029		9:18am The hot milling/ recycling unit broke down at 1+670.
Operator of Milling/Recycling Machine - Austin Laws		9:26am Rino Carniello advises that they should not be exiting the isolated work zone and crossing the open lane of traffic by foot, without a stop/slow sign and that they would review the traffic control requirements. He also advises that the oil spill left by the hot milling/recycling machine likely requires a spill kit.
Milling/Recycling Machine RU #5015		9:45am Core Sample Lot #1 Sublot #4 Asphalt cores have been provided to Rino Carniello by PNJ at 1+635, 11m from the N. edge of pavement white line.
Paving Foreman - Seth Archibald (Tail End)		10:10am Rino Carniello leaves site to deliver cores. One traffic control person is flagging at the easterly end of the closure, one is at the entrance to the Truck Training Center. Traffic is pushed to the outer Lanes from West of Yollie Street to East of Third. The contractor would like to pave through the intersection at Third street today if possible.
Spreader Operator - Tyrone Tucay		10:54am The hot milling/recycling machine is back in position and operational at 1+670 on the West side of Levesque.
Tail End Man Liam Chiasson		11:10am The hot milling/recycling process officially resumes.
Cube Truck Isuzu NRR SV-4000		11:43am Rino Carniello returns to site.
Paver CAT AP5054		11:54am The temperature in the windrow behind the hot milling/recycling unit just below 80 Celcius. They are still leaving a lip approximately 0.4m from the edges of the milled area, in which the milling is not as deep, milling depth continues to be inconsistent. There is a bunch of balls in the recycled asphalt in the windrow left behind the recycler, between the start point at 1+661 and 1+725. The operator of the hot milling/recycling machine, Austin Laws, says that the chunks are because he turned of the heaters due to open flames.
Operator - Callum Proulx		12:10pm Recycled asphalt directly behind spreader screed is at 60 Celcius. I leave site.
Double Steel Drum Roller CAT CB13 #SR2101		1:35pm I return to site.
Operator - Donovan Kokokopenace		1:22pm Rino texted and advised that they've paved almost to the start of the island at 2+100 +/-, still not meeting the minimum temp requirements. QC compaction guage is reading below required compaction percentage. Rino has called for QA compaction checks, Wood will be on site around 2:30pm. Rino received Loose Mix Sample Lot 1 Sub 3 at 1+817 in the center lane from PNJ while I was gone. (A/C content, Aggregate Gradation and Mix Properties)
Rubber Tire Roller CAT CW34 #TR2101		1:50pm Rino Carniello leaves site.
Truck Driver / Labourer - Tony		2:08pm Contractor has paved to 2+140 +/- in the West Bound Fast Lane after veering around the island. The heaters are West of the island, West of 2+560.
Tractor - Mack FT - 2022		
Loader CAT930H #WL-5061 as req'd		
P/U F550 #CD-4002		
P/U Chev 2500HD Lic #BL32675		
Tractor - Peterbilt FT 5036		
Trainee on heating unit - David Bozic		



Inspector: \_\_\_\_\_

*Scott Baas*  
\_\_\_\_\_  
(Signature)

Equipment/Labour	Work Time	Date: <u>Wednesday, June 28, 2023</u> Temp: <u>10°C to 24°C</u> Weather: <u>Sun and Clouds</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Road Surface Recycling Continued		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> Working Day Charged: _____
Contract Administrator - Veronica Vona		Contractor: <u>Road Surface Recycling</u> Foreman: <u>Dan Touw</u>
P/U Ford F150 Lic# AT 59506		Inspector: <u>Scott Baas, Accompanied by Rino Carniello</u> Working Hours: <u>7:00am to 8:00pm</u>
Operator of 3rd heating unit - Teddy		<b>Diary Notes:</b>
Tractor Truck pulling 3rd heating unit PT-2020		2:13pm Tyler Bond is on site with Wood. He will be taking compaction reading utilizing a nuclear density gauge between 1+661 and 2+100 in the Center lane on the Kingsway, West of Levesque.
3rd Heating Unit PH2021		2:25pm Rino Carniello returns to site.
		2:40pm I leave site, Rino advises that the QA Compaction tests were half passing and half failing, although the QA readings were higher than RSR's consultant, PNJ's readings.
PNJ - Third Party Lab Consultant		3:05pm Hot Milling/recycling process begins at 2+532 in the East Bound Fast Lane, and veers into the center lane around the island, heading Westerly. They seem to be having issues with the propane freezing up.
Piyush Ansal		3:10pm I return to site. Traffic control is at 3+200 on the Westerly end.
Kuldeep Sisopiu		3:25pm Grant Turner and Mike Gibson with Beacon Lite are on site, to discuss the plan to go across Third Avenue, without paid duty police officers. They plan not allow any left hand turns, have signs and will cone off the area. Their regional Manager, Raymond O'Connell is on site as well.
Ripu Singh		4:00pm Councillor Bill Leduc is on site to check on the job. Rino Carniello and myself advise of non conformances in which we have and will again be informing the City's project manager of. The include the skim of RAP left on the hot milled surface, temperatures not being met, open flame, etc. I explained that rolling asphalt at low temperatures ultimately results in premature cracking and failure. He inquires what the result will be, whether they will have to redo areas at their cost. I advise that this is a project management decision. He then proceeds to hug the contractor's Contract Administrator, Veronica Vona.
Beacon Lite Traffic Control		4:12pm Rino advises that he's reading 70 Celcius behind the asphalt spreader.
Foreman/Superintendent - Russel Joly		4:46pm Rino advises that he feels that the contractor's brand new roller operator is missing spots, he's observing roller marks due to turning too sharply on the mat. He refers to OPSS 332.07.06 and OPSS 310 which require uniform rolling.
P/U F450 #59		5:13pm I send email to the City's Project Manager, Miranda Edwards, about numerous non conformances.
Traffic Control Person/Labour - Laurie Loach		5:27pm The asphalt spreader has placed recycled asphalt in the center lane on the Kingsway to 2+850.
P/U GMC Sierra #31		6:00pm Rino Carniello leaves site.
Traffic Control Person/Labour - Robert Chambers		6:12pm Recycled asphalt placement is complete for the day. The contractor paved to the Easterly end of the island at 2+925 +/- in the center lane and veered out and paved to 2+953 in the WB Fast lane.
Dodge Ram #38		6:15pm The contractor is raking the end joint. Beacon Lite is beginning to tear down traffic control at the Westerly limit in the East bound lanes. Rolling of the recycled asphalt continues.
Traffic Control Person/Labour - Emanuel Soro		6:32pm Rolling is complete. Beacon Lite continues to remove cones in the EBL's to West of Third avenue as they had set up to cross the intersection with the HIR operation. Contractor is walking equipment to McDowell, across from Third Ave to park over night.
Traffic Control Person/Labour - Shawn Petchey		6:37pm All equipment is off the road other than Beacon Lite
Traffic Control Person/Labour - Dave Donison		6:50pm All Traffic Cones in the EBL's are removed
Traffic Control Person/Labour - Mary Mincovitch		7:11pm RSR is placing temporary pavement marking tape between 2+560 (West of Island) and 2+925(East end of Island, East of Third Ave.)
Traffic Control Person/Labour - Burhan Paramb		7:20pm Beacon Lite is removing the cones in the WBL's heading Easterly
Arrow boards (2)		



Equipment/Labour	Work Time Hours	Date: <u>Thursday, June 29, 2023</u> Temp: <u>19°C to 25°C</u> Weather: <u>Sun and Clouds</u>
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling</u>
Owner/VP of Reseach and Development - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Dan Touw</u>
Superint. - Dan Touw (on Hot Milling/Recycling Unit)		<b>Inspector:</b> <u>Scott Baas, Accompanied by Rino Carniello</u> <b>Working Hours:</b> <u>7:00am to 8:00pm</u>
Technical Coordinator - Mike Schmidt		<b>Diary Notes:</b>
Operator of PreHeater #PH5001 - Gary Norman		8:00am Rino Carniello arrived on site. Equipment is on the road and preparing to get going.
Preheater PH300 #PH5001 (10m or 30ft)		8:35am Asphalt core Lot 1 Sub 5 was provided to Rino by PNJ at 2+694 in the Center Lane 10m from Northerly EP Line.
Operator of Preheater - Ian Adams		8:50am The hot milling/recycling operation began following preheating on the Kingsway at 3+663 in the West Bound Fast lane, heading Easterly veering into the Center lane towards Third Avenue. There isn't and won't be any paid duty police officers on site.
Preheater PH300 #PH5029		9:20am I arrive on site.
Operator of Milling/Recycling Machine - Austin Laws		9:35am Rino calls City PM Miranda Edwards about WSP supplying someone next week as was expected. Miranda advises that she's unsure. Rino advises that the temperatures are 80 Celcius in the windrow behind the hot milling/recycling machine, and 60 Celcius behind the spreader screed, still nowhere near the specified 120 degrees.
Milling/Recycling Machine RU #5015		10:30am One of the three heaters is through the intersection at Third going left turn lane to left turn lane. 80 Celcius with probe behind the spreader at this time. Rino advises that David Bozic, new guy from yesterday is not on site today. Russel Joly advises that Burnam, who was here yesterday is not on site today.
Paving Foreman - Seth Archibald (Tail End)		10:40am 80.2 Celcius behind the screed, 85 to 90 Celcius right in front of the spreader where windrow is being picked up.
Spreader Operator - Tyrone Tucay		10:51am Rino sends pic of severe cracking at 3+616 in center lane. Will revisit later.
Tail End Man Liam Chiasson		11:18am Windrow behind the hot milling/ recycling machine is above 100 Celcius, behind the spreader screed it is 96.1 Celcius.
Cube Truck Isuzu NRR SV-4000		11:50am The spreader is at 3+200. The intersection is still closed at Third Ave. Rino leaves site.
Paver CAT AP5054		12:30pm Rino Carniello returns to site. The intersection at Third Ave is open again.
Operator - Callum Proulx		12:56pm Recycled asphalt has been placed in the Center lane to the West end of the island at 3+090+/- and veered out into the EB Fast lane and will be going to 3+060. They're almost there now.
Double Steel Drum Roller CAT CB13 #SR2101		1:20pm The contractor dealt with a truck that lost a tire in the outside EBL, West of Third. They found all of the lug nuts that fell off and refasted the tire, as well as tightened the rest on all tires, which were reportedly loose. They had to adjust their cones for traffic to go around.
Operator - Donovan Kokokopenace		2:46pm The contractor's equipment has all been at the Westerly limit in the EB Fast lane for some time now working on their equipment.
Rubber Tire Roller CAT CW34 #TR2101		3:15pm Progress meeting begins. In attendance are City PM - Miranda Edwards, Manager of Construction Services - Luciano Valle, Myself, City QA Lab Tech - Rino Carniello, RSR Owner Frank Crupi, RSR Contract Administrator - Veronica Vona, RSR - Technical Coordinator - Michael Schmidt. Refer to meeting minutes created by PM Miranda Edwards. Discussed deficiencies from yesterday's non conformance email.
Truck Driver / Labourer - Tony		-RAC test results to be provided by Wednesday
Semitruck - Mack FT - 2022		-contractor will install diffuser plates and place fine sand ahead of heaters to minimize flames
Loader CAT930H #WL-5061 as req'd		-contractor states that compaction will improve
P/U F550 #CD-4002		3:42pm Hot milling/recycling is underway at 3+900 in the East Bound fast lane, heading easterly.
P/U Chev 2500HD Lic #BL32675		4:00pm Meeting is over. The heater pulled by the Tractor Truck is down
Semitruck - Peterbilt FT 5036		4:13pm Paving is underway at 3+900 in the East Bound fast lane, heading easterly.



Inspector: \_\_\_\_\_

*Scott Baas*  
\_\_\_\_\_  
(Signature)

Equipment/Labour	Work Time	Date: <u>Thursday, June 29, 2023</u>	Temp: <u>19°C to 25°C</u>	Weather: <u>Sun and Clouds</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling</u>		
Road Surface Recycling Continued		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u>	Working Day Charged: _____	
Contract Administrator - Veronica Vona		Contractor: <u>Road Surface Recycling</u>	Foreman: <u>Dan Touw</u>	
P/U Ford F150 Lic# AT 59506		Inspector: <u>Scott Baas, Accompanied by Rino Carniello</u>	Working Hours: <u>7:00am to 8:00pm</u>	
Operator of heating unit - Teddy		<b>Diary Notes:</b>		
Semitruck pulling 3rd heating unit PT-2020		4:38pm Rino is heading to witness and receive Core Sample Lot 1 Sublot 6 at 3+325, 8m from Northerly EP in the Center Lane/WB left turn lane @ Third Ave.		
3rd Heating Unit PH2021		6:03pm The contractor's heating equipment has entered the Intersection at Third Avenue in the East Bound Fast Lane, heading Easterly. The intersection is closed to left turns at this time.		
PNJ - Third Party Lab Consultant		6:10pm 80 Celcius in the Windrow behind the hot milling/recycling unit, 70 Celcius behind the spreader screed.		
Piyush Ansal		6:15pm The spreader's screed is at 3+386, in the East Bound Fast Lane, about to enter the Intersection at Third Ave., heading Easterly. Construction Services Coordinator just stopped in briefly to check out the operation.		
Kuldeep Sisopiu		6:28pm Rino will be getting Loose Mix Sample shortly, Lot 1 Sub 4 from PNJ at 3+300 in the East Bound Fast Lane for A/C content, Aggregate Gradation and Mix Properties		
Ripu Singh		7:00pm The Third Avenue Intersection is paved and rolled, it is open to left turns again. Contractor continues to head Easterly, East of Third Avenue in the East Bound Fast Lane.		
		7:30pm Rino advised that he requested that Frank have patties left all over the road cleaned up prior to reopening, specifically between 2+950 and 3+150. Rino advises that Frank stated that it's stuck there and he can't take it off.		
Beacon Lite Traffic Control		7:41pm Rino Carniello leaves site.		
Foreman/Superintendent - Russel Joly		7:43pm Recycled asphalt placement is complete in the East Bound fast lane up to 3+139		
P/U F450 #59		8:12pm Beacon Lite is waiting for RSR to clean up the road, then they will be tearing down the traffic control. They's already removed the cones from the West Bound lanes from East of Third Ave. to 3+350.		
Traffic Control Person/Labour - Laurie Loach		8:25pm Paving Foreman Seth Archibald advises that Frank is on his way back with the loader to scrape the patties off of the road.		
P/U GMC Sierra #31		8:33pm Frank is in the loader attempting to remove the patties left behind in the East Bound Fast Lane at 3+050 heading Easterly. Frank advises that a bunch of them are stuck there and won't come off.		
Traffic Control Person/Labour - Robert Chambers		8:40pm I leave site. Beacon Lite is still removing cones from 3+350, westerly in the West Bound Lanes, and still has to remove the cones the entire length in the East Bound Lanes.		
Dodge Ram #38				
Traffic Control Person/Labour - Emanuel Soro				
Traffic Control Person/Labour - Shawn Petchey				
Traffic Control Person/Labour - Dave Donison				
Traffic Control Person/Labour - Mary Mincovitch				
Arrow boards (2)				

Equipment/Labour	Work Time	Date: <u>Wednesday, July 19, 2023</u> Temp: <u>10°C to 15°C</u> Weather: <u>Sun &amp; Cloud</u>
	Hours	
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling - CORING</u>
Owner/VP - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Kuldeep Sisopiu</u>
Traffic Control Truck / Labourer - Ken Dupuis		<b>Inspector:</b> <u>Akshay Borad/Rino Carniello</u> <b>Working Hours:</b> <u>7:00am to 6:30 pm</u>
<b><u>Loader CAT930H #WL-5061 Operators:</u></b>		<b>Diary Notes:</b>
Liam Chiasson		7:05 am - arrive to laydown yard and speak with Frank Crupi (RSR) about today's coring operation. Coring area will be conducted on East Bound Passing Lane from approx. Stationing 2+600 to 0+600.
Zach Ricard		- Frank says he has traffic control ready to be set up for one (1) lane closure as per Book 7.
<b><u>P/U F550 #CD-4002/Coring vehicle</u></b>		- Frank expresses concerns on how the city made the decision to stop their work and comments on how it was undertaken. He says "I am not please with how it was handled", Alot of cursing and acqusations made toward the PM and the Director.
<b><u>Coring Crew:</u></b>		7:20 am - crew leaves laydown yard to set up Traffic Control.
Ripu Singh - PNJ		7:22 am - Askshay arrives at laydown yard.
Kuldeep Sisopiu - RSR Lab Tech		7:45 am - Tyler Bond from WSP arrives to site.
Piyush Ansal - RSR Lab Tech		-Coring operation has begun at <b>Core #1-10 STA 2+600 o/s 0.5m from south yellow line</b> . First core has heavy crack sealer in and around the core. This core is also damaged.
<b><u>Labourers:</u></b>		Will retake core at 1.0 offset to that one. Five cores taken from first location and all cores did not bond with the underlying material.
Donovan Kokokopenace		9:05 am - I called Miranda to let her know about the coldmix and how it was soft, spongy and pumping and she said to proceed as is.
Callum Proulx		9:15 am - <b>Core #1-10 complete</b> . NOTE: while backfilling the core holes, using the cold mix supplied to the contractor, I observed that there was pumping happening.
Tony ?		9:36 am - Start second location. <b>Core #2-1 STA 2+500 o/s 2.0m from island south curb</b> . Another 5 cores taken and 3 out of the 5 did not bond with the underlying material.
		10:10 am - Frank Crupi arrives to Core #2 location. He states he is not impressed with the core thicknesses and demands a new core at the location of 2+506 from the original location at 2+500. I make him aware that this core will not be considered in our assessment, as it is outside from the agreed upon original core location. He acknowledges that it is for his own reference.
		10:24 am - Ron Foster (Auditor) arrives on-site. He is here to observe the coring work being done.
		10:45 am - RSR taking their additional core from STA 2+506 o/s 2.2m from island south curb. Core was thicker at this location.
		11:07 am - Frank pulled out a steel straight edge and layed it across the width of the lane. This showed that the lane was inverted at the center. Frank said that there was a possibility that near the above noted location that the spreader had been adjusted incorrectly and that the asphalt was placed thicker in the middle area of the spreader. Frank says it could be the cause of the thinner measurements on the outside edges of the paved lane.
		11:20 am - <b>Core #2-1 complete</b>
		11:30 am - Frank leaves site
		11:38 am - Start third location. <b>Core #2-2 STA 2+400 o/s 3.25m from island south curb</b> . 5 cores taken at location and 3 of 5 have no bond.
		12:15 pm - Akshay leaves for lunch.
		12:30 pm - Akshay returns to site.
		12:45 pm - Ron Foster leaves for lunch
		1:02 pm - <b>Core #2-2 complete</b>



Inspector:

*Rino Carniello*

(Signature)

Equipment/Labour	Work Time	Date: <u>Wednesday, July 19, 2023</u> Temp: <u>10°C to 15°C</u> Weather: <u>Sun &amp; Cloud</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling - CORING</u>
		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> Working Day Charged: _____
		Contractor: <u>Road Surface Recycling</u> Foreman: <u>Kuldeep Sisopiu</u>
		Inspector: <u>Akshay Borad/Rino Carniello</u> Working Hours: <u>7:00am to 6:30 pm</u>
		<b>Diary Notes:</b>
		1:05 pm - Start fourth location. <b>Core #2-3 STA 2+300 o/s 1.8m from island south curb.</b> 2 out of the 5 cores taken had no bond.
		1:27 pm - observe cracks within the HIR along island curb from STA. 2+281 to 2+273
		2:04 pm - Ron Foster returns from lunch.
		Akshay leaves site
		2:15 pm Akshay returns
		2:20 pm - <b>Core #2-3 completed.</b>
		2:22 pm - Work pauses for everyone to take a lunch break.
		3:15 pm - Everyone returns from lunch
		3:22 pm - Start <b>Core #2-4 STA 2+200 o/s 1.0m from island south curb.</b>
		receive phone call from Miranda. She says that we are to take all QC core samples and hold onto them. RSR told her that they will not be testing their QC cores.
		3:25 pm - I ask Ripu if he can confirm this and he asked Kuldeep to confirm with Frank.
		3:30 pm - First core attempt; core fell apart when extracted. Also note that the HIR started to lift around core barrel while drilling
		3:40 pm - Ripu told me Frank is on his way back to the site to discuss the QC cores.
		3:44 pm - Second Core; as drill bit was being raised material fell out. Looked like thick pudding. Inspected material. Looked very soft and pyleable. Not compact as asphalt should be.
		3:53 pm - Third Core; same as second
		4:09 pm - Fourth Core; same as Second and Third.
		4:25 pm - Fifth Core; underlying material present but was not extracted out of the hole.
		Note: Core samples 1 to 5 at this location the upper layer was extracted and all were solid but none of the cores bonded to the underlying material.
		4:29 pm - Frank arrives and directs Ripu (PNJ) to core additional cores at STA 2+200. He wants to see what lies underneath the HIR
		5:00 pm - <b>Core #2-4 complete.</b>
		Tyler Bond of WSP has to leave site. It was discussed between myself, Ron, Akshay, and Tyler that any additional cores taken today will be documented by City Representatives under the witness of the Auditor. This information would then be provided to Tyler (WSP) through an email for his documentation. Everyone was in agreement of this.
		5:05 pm - Tyler Leaves Site
		5:20 pm - Start <b>Core 2-5 STA 2+100 o/s 3.0m from south yellow line.</b> All cores looked to have bonded to the underlying material and there was no signs of cracking or crack sealer.
		Again all core documentation was witnessed by Auditor.
		6:15 pm - <b>Core 2-5 completed.</b>
		6:20 pm - All operations cease for the day and will continue tomorrow. Ron Foster leaves site.
		6:25 pm - All traffic control has been taken down and all remaining personnel have left site for the evening.

Equipment/Labour	Work Time Hours	Date: <u>Thursday, July 20, 2023</u> Temp: <u>10°C to 15°C</u> Weather: <u>Sun &amp; Cloud changing into Rain</u>
Road Surface Recycling		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling - CORING</u>
Owner/VP - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Kuldeep Sisopiu</u>
Traffic Control Truck / Labourer - Ken Dupuis		<b>Inspector:</b> <u>Akshay Borad/Rino Carniello</u> <b>Working Hours:</b> <u>7:00am to 11:30am</u>
<b><u>Loader CAT930H #WL-5061 Operators:</u></b>		<b>Diary Notes:</b>
Liam Chiasson		7:03 am - arrive at laydown area and discuss plan for coring operations. Head to Truck Training Centre and await traffic Control to be set up.
Zach Ricard		7:10 am - Meet everyone at Truck Traing Centre to determine where next location is to be drilled. Tyler Bond (WSP) at training facility as well
<b><u>P/U F550 #CD-4002/Coring vehicle</u></b>		7:31 am Mobilize and set up to drill.
<b><u>Coring Crew:</u></b>		7:39 am - Start <b>Core #2-6 STA 2+000 o/s 2.0 from south yellow line.</b>
Ripu Singh - PNJ		7:40 am - RSR labourer call me over to show me a water bottle embedded into the HIR. STA 2+025. Photos taken
Kuldeep Sisopiu - RSR Lab Tech		All cores from this location were bonded to the under lying layer.
Piyush Ansal - RSR Lab Tech		8:20 am - <b>Core #2-6 completed.</b> Akshay arrives to site.
<b><u>Labourers:</u></b>		8:26 am - Start <b>Core #2-7 STA 1+900 o/s 0.7 m from south yellow line.</b>
Donovan Kokokopenace		8:41 am - Frank Crupi arrives on-site.
Callum Proulx		8:50 am - Frank leaves site.
Tony ?		9:00 am - <b>Core #2-7 complete.</b> All cores at this location had no bond to underlying layer.
		9:12 am - Start <b>Core #2-8 STA 1+800 o/s 2.6m from south yellow line.</b>
		9:43 am - <b>Core #2-8 complete.</b> All cores at this location had no bond to underlying layer.
		9:50 am - Start <b>Core #2-9 STA 1+700 o/s 1.4 from south yellow line.</b>
		10:33 am - <b>Core #2-9 complete.</b> 1 out of the 5 cores did not bond to the underlying layer.
		10:45 am - Start <b>Core #2-10 STA 1+615 o/s 3.9 from island south curb.</b> This location was shy of the 100 m mark due to impeding into the intersection of Levesque Street. All parties on-site were in agreement of doing this for safety concerns.
		11:15 am - <b>Core #2-10 complete.</b> All cores at this location were bonded to the underlying layer.
		Rain begins and it is heavy.
		11:20 am - Decision is made to shut down and get off the road. Traffic control being taken down. Crews leave roadway.
		11:25 am - Arrive to laydown yard and call Frank. He confirms that we will hold off on coring for the rest of the day due to weather forecast of heavy rain for the foreseeable day. We will resume operations the next morning.
		11:30 am - Myself, Akshay and Tyler Bond (WSP) leave site for the day.



Inspector: \_\_\_\_\_ *Rino Carniello* \_\_\_\_\_  
(Signature)

Equipment/Labour	Work Time	Date: <u>Friday, July 21, 2023</u> Temp: <u>14°C to 25°C</u> Weather: <u>Mostly Sunny</u>
	Hours	
<b>Road Surface Recycling</b>		<b>Contract No./Description:</b> <u>ENG21-38 Tender for Hot In-Place Recycling - CORING</u>
Owner/VP - Frank Crupi		<b>Location:</b> <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> <b>Working Day Charged:</b> _____
P/U (Frank) Dodge Ram Eco Diesel Lic #BB688-12		<b>Contractor:</b> <u>Road Surface Recycling</u> <b>Foreman:</b> <u>Kuldeep Sisopiu</u>
<b>Traffic Control Truck / Labourer - Ken Dupuis</b>		<b>Inspector:</b> <u>Akshay Borad/Rino Carniello</u> <b>Working Hours:</b> <u>7:00am to 5:30pm</u>
<b>Loader CAT930H #WL-5061 Operators:</b>		<b>Diary Notes:</b>
Liam Chiasson		7:10 am - Arrive at laydown yard. Receive phone call from Tyler Bond (WSP) parked at Church on Levesque since 7am.
Zach Ricard		7:30 am - Traffic Control being set up.
<b>P/U F550 #CD-4002/Coring vehicle</b>		7:35 am - Start <b>Core #3-1 STA 1+468 o/s 0.6m from south yellow line</b> . NOTE: core location adjusted from the 100 m interval, do to the intersection just west of us at Levesque St. Try to keep traffic control from impeding the intersection.
<b>Coring Crew:</b>		8:12 am - Akshay arrives to site.
Ripu Singh - PNJ		8:20 am - <b>Core #3-1 complete</b> . 2 of the 5 cores have no bond to underlying layer.
Kuldeep Sisopiu - RSR Lab Tech		8:29 am - Start <b>Core #3-2 STA 1+370 o/s 1.6m from south yellow line</b> .
Piyush Ansal - RSR Lab Tech		9:00 am - <b>Core #3-2 complete</b> . 2 of 5 cores have no bond to underlying layer.
<b>Labourers:</b>		9:15 am - Start <b>Core #3-3 STA 1+270 o/s 2.5m from south yellow line</b> .
Donovan Kokokopenace		9:33 am - Discuss next hole location as it will end up just east of Moonlight Ave and there is cause for safety concern as the location will be in the passing lane between the turn lane into the dump and the curb lane. Tyler Bond (WSP), Rupi Momi (PNJ), Kuldeep Sisopiu and Myself all agree that we will move the next hole to the eastside of the the moonlight intersection to accomadate all the traffic control setup.
Callum Proulx		9:45 am - As I was walking to mark out next core location, notice a defect in the east bound passing lane just west of the westerly Island bullnose. I called Miranda and mentioned that it looks like a sink hole is starting but wasn't sure at this time. It may also be a laydown defect from the HIR placement.
Tony ?		9:55 am - <b>Core #3-3 complete</b> . No bonding on any of cores to underlying layer.
		Ken Dupuis mentions that the Loader is leaking hydraulic fluid at the intersection of Yollie and the Kingsway. Zach Ricard puts down some sand from side of road onto the spill area.
		10:00 am - All crews and equipment off road to gauge where the next hole will be located east of Moonlight Ave.
		10:23 am - Resume operations. Ron Foster (Auditor) arrives to site to witness coring operations.
		10:25 am - Start <b>Core #3-4 STA 1+000 o/s 1.2m from island south curb</b> . NOTE: skipped to this location so traffic control would not impede the Moonlight intersection.
		11:00 am - <b>Core #3-4 complete</b> . All cores bonded to underlying layer.
		11:05 am - Start <b>Core #3-5 STA 0+900 o/s 0.7m from island south curb</b> .
		11:41 am - Miranda arrives to site.
		11:50 am - <b>Core #3-4 complete</b> . All cores not bonded to underlying layer.
		12:00 pm - Decision to skip next hole at 0+800 Core #3-6, because coring truck needed to be turned around in order to core the o/s decided on.
		12:12 pm - Start <b>Core #3-7 STA 0+735 o/s 1.8m from island south curb</b> .
		12:40 pm - <b>Core #3-7 complete</b> . All cores bonded to underlying layer.
		12:55 pm - Start <b>Core #3-6 STA 0+800 o/s 3.2m from island south curb</b> .
		1:40 pm - <b>Core #3-6 complete</b> . 1 of 5 cores did not bond to underlying layer.
		1:50 pm - shutdown for lunch.



Inspector:

*Rino Carniello*

(Signature)

Equipment/Labour	Work Time	Date: <u>Friday, July 21, 2023</u> Temp: <u>14°C to 25°C</u> Weather: <u>Mostly Sunny</u>
	Hours	Contract No./Description: <u>ENG21-38 Tender for Hot In-Place Recycling - CORING</u>
		Location: <u>Kingsway, 375m West of the HWY 17 Bypass to Frobrisher</u> Working Day Charged: _____
		Contractor: <u>Road Surface Recycling</u> Foreman: <u>Kuldeep Sisopiu</u>
		Inspector: <u>Akshay Borad/Rino Carniello</u> Working Hours: <u>7:00am to 5:30pm</u>
		<b>Diary Notes:</b>
		2:30 pm - meet up with everyone at Royal Distributing. Coring of the length of HIR (2+600 to 0+600) has been complete. Request was made from RSR to core an additional 4 locations of the old existing asphalt (5 cores per location) to investigate the thickness and some other testing attributes of both surface and binder layers. After a few email exchanges, Miranda granted RSR's request.
		2:35 pm - the following group discussed the plan on the new core locations. Miranda Edwards, Tyler Bond (WSP), Ripu Momi (PNJ) and Myself.
		It was agreed upon by everyone that Tyler (WSP) will choose the 4 new locations of the cores for the additional testing requested by RSR. Locations will be chosen by Tyler at random locations across the limits of the job in the existing asphalt, not recycled as of yet. Random Stationing selected as follows: 0+350, 1+450, 2+250, 3+550. it was also discussed, due to time constraints that the coring of the additional locations will not proceed no later than 5:30 pm.
		2:45 pm - Everyone heads down to Mcdowell equipment to prepare to core additional locations. Aksay and Myself mark out new coring locations.
		2:54 pm - Receive a text from Ripu saying Frank changed his request and that 1 core instead of 5 cores will be extracted from each new location. Inform Miranda about decision and request RSR to provide written request of this change.
		3:00 pm - Ask Ripu to have RSR sent email request for change in coring. Inform him that there will be 1 core for RSR and 1 Core for the city at each new location.
		3:30 pm - Start <b>Core #1 STA 3+550 o/s 3.0m from curb face</b> . 4 cores drilled and 2 of them separated from the underlying layer. The 2 cores that separated were rejected for testing due to the request that RSR requested testing on both the surface and binder course's. the 1st core was extracted intact, the 2nd and 3rd - only the surface layer came out and the 4th; both layers came out but it was separated.
		4:30 pm - <b>Core #1 completed.</b>
		4:45 pm - Start <b>Core #2 STA 2+250 o/s 2.0m from white line of edge of road</b> . 1st core broke apart. 2nd core stuck in barrel. 2nd core looks to be only one lift.
		5:15 pm - decision was made that this hole will not be warranted for testing because both cores drilled only had upper layer extracted and there will be no more time to do anymore holes. We all agree that operations will stop for the day.
		5:25 pm - <b>Core #2 complete.</b>
		5:30 pm - Traffic control is torn down and all parties leave site for the day.
		<b>NOTE: the offsets for each additional core hole, were also selected by Tyler (WSP) at random spots at the stationing given.</b>



Inspector: \_\_\_\_\_

*Rino Carniello*

(Signature)

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KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Date:	05 July 2023
Reported by:	Mohamad Shoaib, Ph.D., P.Eng.
Reviewed by:	David M Brown, Senior Associate Project Manager
WSP Personnel on site:	Mohamad Shoaib, Ph.D., P.Eng.
CGS Contact:	Scott Baas, C. Tech., rcsi
Weather:	29°C, Sun
Work Hours:	Start of shift: 12:00 AM End of shift: 13:30 PM

Contractor:	Road Surface Recycling (RSR)
Supervisor:	Dan Touw
Equipment:	<ul style="list-style-type: none"><li>N/A</li></ul>

Action Items:
<ul style="list-style-type: none"><li>WSP arrival on the site.</li><li>No activities were being conducted by RSR.</li><li>WSP left site due RSR equipment failure.</li></ul>

Health and Safety:

- N/A.

Surveys:

N/A.

Construction Quality Assurance:

N/A

Observations:

- N/A.

Discussions:

- N/A

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Date:	11 July 2023
Reported by:	Mohamad Shoaib, Ph.D., P.Eng.
Reviewed by:	David M Brown, Senior Associate Project Manager
WSP Personnel on site:	Mohamad Shoaib, Ph.D., P.Eng.
CGS Contact:	Scott Baas, C. Tech., rcsi
Weather:	23 to 25°C, Sun
Work Hours:	Start of shift: 12:20 AM End of shift: 17:20 PM

Contractor:	Road Surface Recycling (RSR)
Supervisor:	Dan Touw
Equipment:	<ul style="list-style-type: none"><li>• Multi Equipment</li></ul>

Action Items:
<ul style="list-style-type: none"><li>• Meeting with City of Greater Sudbury (CGS) Inspector.</li><li>• Measuring the asphalt temperature with CGS inspector.</li><li>• Discussing the speed of the equipment with the RSR Foreman.</li><li>• Discussing the thickness with the RSR milling operator.</li></ul>

Health and Safety:

- More precautions are required when working on the road. Look around and make eye contact before passing by heavy equipment.

Surveys:

No surveyor was on site today.

Construction Quality Assurance:

- WSP representative was onsite to complete Quality Assurance (QA) inspections as construction progresses along the Kingsway.
- CGS representatives were onsite to conduct testing and sampling,
  - Measuring the thickness of the asphalt layer.
  - Measuring the temperature of the asphalt layer.
  - Collecting 6 boxes of samples to be tested to confirm the specifications indicated in OPSS1003.
  - Observing compaction tests on the asphalt top surface by RSR.

Observations:

- Cracking was observed on the newly placed asphalt parapedicular to the road directions as shown in the pictures in multiple locations along the East Bound Fast lane.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



- Measured temperatures in the front of the spreader screed ranged from 45°C to 60 °C at the East Bound Fast lane (2+240, 2+110, 1+825, and 1+775).
- Measured temperatures behind the spreader screed ranged from 60°C to 85 °C at the East Bound Fast lane (2+240, 2+110, 1+825, and 1+775)The newly placed asphalt thickness in some places was as thin as 20 mm at the East Bound Fast lane (2+240 and 2+110).
- Open flame was observed in contact with the road surface.
- Sand was placed on the crack sealant prior to preheating to eliminate the flare-ups during heating.

Discussions:

- Open flame and asphalt temperatures were discussed with the CGS representative.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photos:



Photo 1: RSR preheating the road surface along the Kingsway.



Photo 2: Open flame was observed in contact with the road surface.



Photo 3: Placing sand over the crack sealant to avoid flare-ups during heating.



Photo 4: RSR Quality Control collecting samples from the asphalt.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photo 5: Placing hot-in-place recycled asphalt.



Photo 6: compacting the asphalt lift with a smooth-drum roller (12 T).



Photo 7: Measuring the asphalt temperature behind the spreader screed.



Photo 8: Perpendicular cracks along the road.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Date:	12 July 2023
Reported by:	Mohamad Shoaib, Ph.D., P.Eng.
Reviewed by:	David M Brown, Senior Associate Project Manager
WSP Personnel on site:	Mohamad Shoaib, Ph.D., P.Eng.
CGS Contact:	Scott Baas, C. Tech., rcsi
Weather:	18°C, Sun
Work Hours:	Start of shift: 07:20 AM End of shift: 08:30 PM

Contractor:	Road Surface Recycling (RSR)
Supervisor:	Dan Touw
Equipment:	<ul style="list-style-type: none"><li>N/A</li></ul>

Action Items:
<ul style="list-style-type: none"><li>WSP on site.</li><li>No contractor activities were being completed on site.</li><li>WSP left the site based on the email from CGS stating no activities will be completed today.</li></ul>

Health and Safety:

- N/A.

Surveys:

N/A.

Construction Quality Assurance:

N/A

Observations:

- N/A.

Discussions:

- N/A

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Date:	20 July 2023
Reported by:	Tyler Bond
Reviewed by:	David M Brown, Senior Associate Project Manager
WSP Personnel on site:	Tyler Bond
CGS Contact:	Rino Carniello
Weather:	17 to 19°C, Sun and cloud
Work Hours:	Start of shift: 07:00 End of shift: 11:30

Contractor:	Road Surface Recycling (RSR)
Supervisor:	Frank Crupi
Equipment:	<ul style="list-style-type: none"><li>• Multi Equipment</li></ul>

Action Items:
<ul style="list-style-type: none"><li>• Meeting with City of Greater Sudbury (CGS) Inspector.</li><li>• Observing the drilling/coring of asphalt.</li><li>• Measuring the asphalt core thicknesses with CGS inspector.</li><li>• Making notes on the quality of asphalt cores.</li></ul>

Health and Safety:

- Caution around traffic/mobile equipment. Dress for the weather.

Surveys:

No surveyor was on site today.

Construction Quality Assurance:

- WSP representative was on site to complete Quality Assurance (QA) inspections for the coring of asphalt.
- CGS representatives were on site to take notes, observe the coring of asphalt, and collect core samples.
  - Determining where to core asphalt.
  - Making observations of the asphalt coring.
  - Measuring the thickness of the asphalt layer.
  - Collecting asphalt core samples.

Observations:

- 5 sets of 5 cores were drilled and collected for testing.
- Asphalt core holes were spaced approximately 1 m apart.
- The table below summarizes the asphalt core locations and measurements.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Set #	Location and Time	Core #	Asphalt Thickness (mm)	Underlying Material Thickness (mm)	Cracks/Voids?
7	STA 2+000 o/s 2.0m from South yellow line 07:39	7A	35	45-50	Small void
		7B	87*		No
		7C	90*		No
		7D	45	45	No
		7E	40-45	44-49	No
8	STA 1+900 o/s 0.7m from South yellow line 08:26	8A	43-58*		Small void
		8B	40-62*		Uneven bottom
		8C	45-69*		Uneven bottom
		8D	40-69*		Uneven bottom
		8E	40-65*		Uneven bottom
9	STA 1+800 o/s 2.6m from South yellow line 9:11	9A	50	0	Small void
		9B	52	0	Voids around bottom edge
		9C	48	0	5-10 mm void
		9D	46	0	No
		9E	45	0	No
10	STA 1+700 o/s 1.4m from South yellow line 9:51	10A	94*		No
		10B	35	60	Voids around bottom edge
		10C	34	0	No
		10D	35	56	Small void
		10E	35	55	No
11	STA 1+615 o/s 3.9m from South yellow line 10:42	11A	87-93*		No
		11B	47	47	Voids around bottom edge
		11C	42	55-60	Small void on top edge, uneven bottom
		11D	45	40-55	No
		11E	45	35-50	No

\* = could not discern asphalt from underlying material.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



- Voids observed in the asphalt cores were mostly present due to singular pieces of granular material that had been dislodged from the matrix.
- RSR requested and took Core 9B for their own testing/observations.
- Core 10C was difficult to remove and ended up breaking in-situ or ‘popping out’ upon removal. Unable to determine whether the remainder of the sample was asphalt or underlying material, but the core was one consistent layer approximately 34 mm thick on all edges.
- Core 10D and 10E had chunks of rubber stuck to the outside of the sample. As shown in Photos 3 and 4.
- Section of loose/cracked asphalt observed next to the centre island around STA1+615. As shown in Photo 5.
- Core holes were backfilled using a cold mix asphalt provided by RSR loader.
- Voids caused by loose materials were observed in multiple locations.
  - A plastic bottle was found in the surface of the asphalt and was easily removed (near STA 2+000). As shown in Photo 7.
  - Chunks of rubber, loose in the surface of the asphalt, were observed (STA1+703). As shown in Photo 2.

Discussions:

- The table below summarizes the information provided to WSP by CGS for the 6<sup>th</sup> set of cores collected on 19 July 2023.

Set #	Location and Time	Core #	Core Thickness (mm)	Cracks/Voids?
6	STA 2+100 o/s 3.0m from South yellow line 17:20	6A	105	No
		6B	110	No
		6C	80	No
		6D	90	No
		6E	100	No

Note: Only core thickness was provided – there was no distinction between asphalt thickness and underlying material thickness.

- CGS suspended work at 11:15 due to heavy rain. CGS updated WSP at 11:30 that work was being shut down for the day due to weather.
- RSR will be on site tomorrow morning at 7am to continue the asphalt coring.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photos:



Photo 1: Bottom of Core 9B, showing voids around edges.



Photo 2: Voids/pieces of loose rubber after being removed from the surface of the asphalt.



Photo 3: Strand of rubber that was stuck to Core 10D upon removal from the ground.



Photo 4: Core 10E with chunk of rubber stuck to the outside of the sample.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)

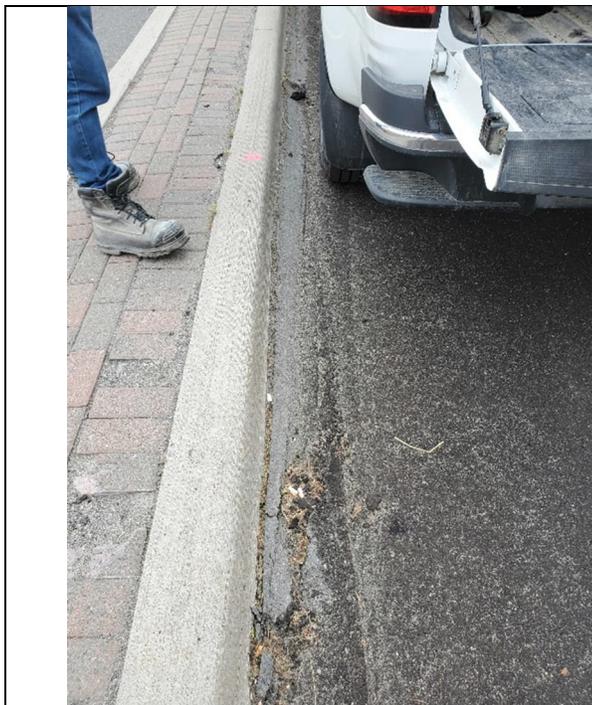


Photo 5: Cracks/loose asphalt observed in the section along the centre island.



Photo 6: Core 11C with uneven bottom edge.



Photo 7: Plastic bottle observed in the surficial asphalt near STA 2+000.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Date:	21 July 2023
Reported by:	Tyler Bond
Reviewed by:	David M Brown, Senior Associate Project Manager
WSP Personnel on site:	Tyler Bond
CGS Contact:	Rino Carniello
Weather:	18 to 27°C, Sunny, some clouds
Work Hours:	Start of shift: 07:00AM End of shift: 17:30PM

Contractor:	Road Surface Recycling (RSR)
Supervisor:	Frank Crupi
Equipment:	<ul style="list-style-type: none"><li>• Multi Equipment</li></ul>

Action Items:
<ul style="list-style-type: none"><li>• Meeting with City of Greater Sudbury (CGS) inspector.</li><li>• Observing the drilling/coring of asphalt.</li><li>• Measuring the asphalt core thicknesses with CGS inspector.</li><li>• Making notes on the quality of asphalt cores.</li></ul>

Health and Safety:

- Caution around traffic/mobile equipment. Dress for the weather, stay hydrated.

Surveys:

No surveyor was on site today.

Construction Quality Assurance:

- WSP representative was on site to complete Quality Assurance (QA) inspections for the coring of asphalt.
- CGS representatives were on site to take notes, observe the coring of asphalt, and collect core samples.
  - Determining where to core asphalt.
  - Making observations of the asphalt coring.
  - Measuring the thickness of the asphalt layer.
  - Collecting asphalt core samples.

Observations:

- The final 7 sets of 5 cores and 2 additional sets of 2 cores were drilled and collected for testing.
- Asphalt core holes were spaced approximately 1 m apart.
- The table below summarizes the asphalt core locations and measurements.
- Core Sets 1-18 were collected in the Kingsway eastbound passing lane.
- Additional Core Sets 1-2, requested by RSR, were collected in the Kingsway eastbound curb lane.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Set # (Lot/Sublot)	Location and Time	Core #	Asphalt Thickness (mm)	Underlying Material Thickness (mm)	Cracks/Voids?
12 (3-1)	STA 1+468 o/s 0.6m from South yellow line 07:37	12A	40-65*		Small voids
		Q/A			
		12B	40-63*		Small voids
		REF			
		12C	40	60	Small voids
		Q/C			
		12D	45	45-65	Small voids
		Q/A			
		12E	40	55-60	Small voids
		REF			
13 (3-2)	STA 1+370 o/s 1.6m from South yellow line 08:30	13A	35	46	10mm void
		Q/C			
		13B	35	46	Small voids
		Q/A			
		13C	33	47	Small voids
		REF			
		13D	33	0	No
		REF			
		13E	34	0	No
		Q/A			
14 (3-3)	STA 1+270 o/s 2.5m from South yellow line 9:13	14A	45-65*		Uneven bottom
		Q/A			
		14B	45-57*		Uneven bottom
		Q/C			
		14C	60*		Small voids
		REF			
		14D	55-60*		Small voids
		REF			

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



		14E Q/A	50-55*		Small voids
15 (3-4)	STA 1+000 o/s 1.2m from South yellow line 10:24	15A Q/A	42	54	Small voids
		15B Q/C	40	52	Small voids
		15C REF	42	54	Small voids
		15D Q/A	40	40-45	Small voids
		15E REF	65-85*		Uneven bottom
16 (3-5)	STA 0+900 o/s 0.7m from South yellow line 11:07	16A Q/A	45-47	0	Small voids
		16B Q/C	40-49*		Small voids
		16C REF	43-45	0	Small voids
		16D Q/A	45	0	Small voids
		16E REF	48-50*		No
17 (3-6)	STA 0+800 o/s 3.2m from South yellow line 12:55	17A Q/A	70-80*		Small voids, uneven bottom
		17B Q/C	70-100*		Uneven bottom
		17C REF	70-95*		Small voids, uneven bottom
		17D Q/A	93-108*		Uneven bottom
		17E	45-55*		Uneven bottom

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



		REF			
18 (3-7)	STA 0+735 o/s 1.8m from South yellow line 12:12	18A	88*		Small void
		Q/A			
		18B	92*		Small voids
		Q/C			
		18C	75-85*		Uneven bottom
		REF			
		18D	45	45-50	Small void
		Q/A			
		18E	75-90*		Small void
		REF			

\* = could not discern asphalt from underlying material.

- RSR requested additional cores at 4 locations along the Kingsway curb lane. RSR was only able to complete coring at 2 locations before the end of day. The table below summarizes the results from these additional locations.

Set #	Location and Time	Core #	Asphalt Thickness (mm)	Underlying Material Thickness (mm)	Cracks/Voids?
Additional Set 1	STA 3+550 o/s 3.0m from North white line 15:30	A1A	120*		No
		A1B	130*		Broken upon removal
Additional Set 2	STA 2+250 o/s 2.0m from North white line 16:41	A2A	80*		Broken in 3 pieces
		A2B	72*		Small voids

\* = could not discern asphalt from underlying material.

- Additional Core Set 1 required 4 attempts to get sufficiently thick samples. Attempts 2 and 3 resulted in cores 42 mm and 45 mm, respectively – an insufficient thickness to satisfy RSR's request – and were not kept for testing.
- Core A1B was stuck within the drill bit upon removal from the ground. It was broken when being pulled out of the drill bit by hand by RSR. The surficial section was 41 mm and the bottom was 89 mm, as shown in Photo 5.
- Core A2A was also stuck within the drill bit upon removal from the ground and an undeterminable amount of wet asphalt and/or underlying material fell back into/around the core hole.

## KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO 1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



- This core also broke when eventually pulled out of the drill bit by hand by RSR. The resulting sample consisted of 3 main sections. As shown in Photo 6.
- There is a thin strip of older, existing asphalt along the centre island that has areas of loose/broken asphalt. As shown in Photo 3.
- Voids observed in the asphalt cores were mostly present due to singular pieces of granular material that had been dislodged from the matrix.
- Core holes were backfilled using a cold mix asphalt provided by RSR loader.

### Discussions:

- CGS (Rino) skipping a 100 m interval for Set 15 (3-4) to avoid traffic control issues around the intersection of Kingsway and Moonlight Ave.
- During the coring of Set 17 (3-6), RSR formally requested that additional cores be taken from the older, existing asphalt along the length of the Kingsway project (between STA 0+000 and 3+700) for additional testing. RSR requested that these additional cores be drilled down to sufficient depth that underlying material be a part of the sample. CGS assumed this means a minimum core thickness of 50 mm be taken. Originally it was proposed that 3 cores for RSR and 3 cores for CGS would be collected at 4 different locations. This ended up being reduced to 1 additional core for RSR and 1 additional core for CGS at 4 different locations with RSR and CGS representatives agreeing that no referee asphalt core would be taken.
  - CGS requested that WSP, a neutral third party, determine the 4 random locations and core hole locations. WSP (Tyler) proposed that the 2 cores per location would be spaced approximately 1 m apart at the following stationing in the eastbound, curb lane:
    - STA 3+550;
    - STA 2+250;
    - STA 1+450; and
    - STA 0+350.
  - RSR was able to complete 2 cores at Additional Location 1 (STA 3+550) and 2 cores at Additional Location 2 (STA 2+250) before WSP and CGS had to leave site at 17:30.
- CGS (Rino) requested WSP reissue reports with updated labelling.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photos:

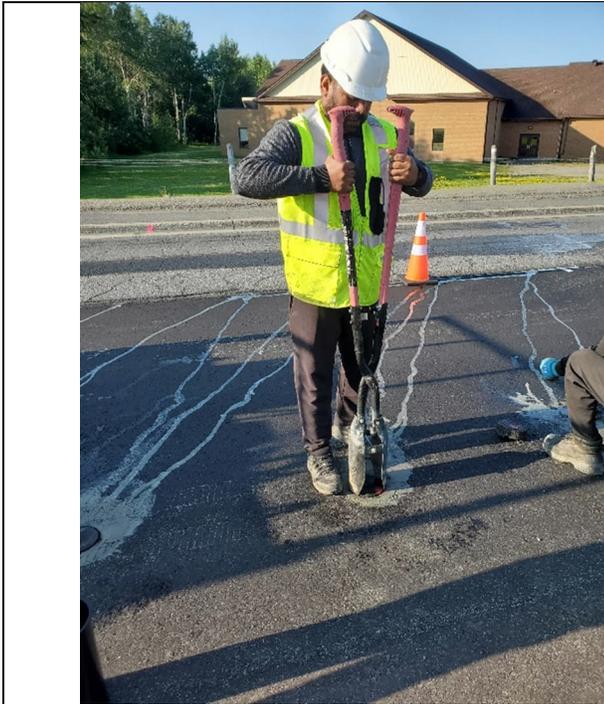


Photo 1: RSR removing a core sample from the ground.



Photo 2: Core 17B (3-6, Q/C) with rubber stuck to outside of core sample.

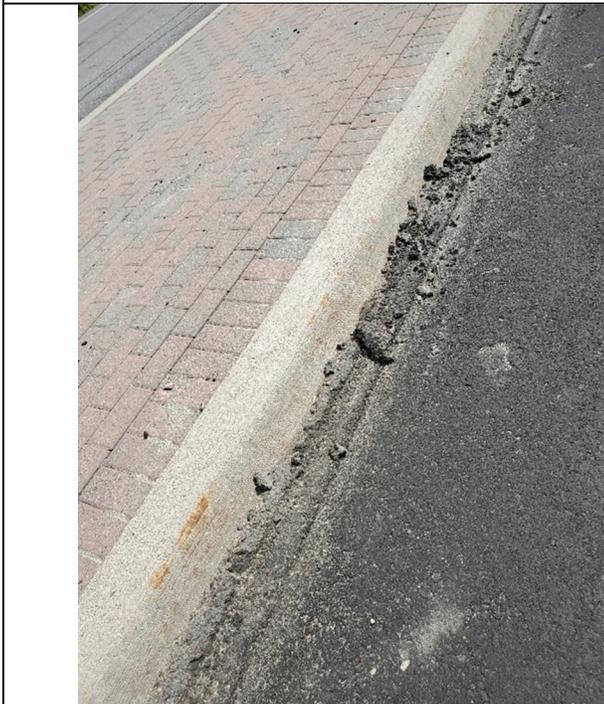


Photo 3: Broken/loose older existing asphalt in thin strip along the eastbound passing lane centre island.



Photo 4: Coring Set 17 along Kingsway at STA 0+800, offset 3.2m from South yellow line.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photo 5: Additional Set 1, Core A1A.



Photo 6: Additional Set 1, Core A1B, broken into 2 pieces.



Photo 7: Additional Set 2, Core A2A, broken into 3 pieces.



Photo 8: Additional Set 2, Core A2B.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Date:	19 July 2023
Reported by:	Tyler Bond
Reviewed by:	David M Brown, Senior Associate Project Manager
WSP Personnel on site:	Tyler Bond
CGS Contact:	Rino Carniello
Weather:	14 to 27°C, Sun and cloud
Work Hours:	Start of shift: 07:00 End of shift: 17:00

Contractor:	Road Surface Recycling (RSR)
Supervisor:	Frank Crupi
Equipment:	<ul style="list-style-type: none"><li>• Multi Equipment</li></ul>

Action Items:
<ul style="list-style-type: none"><li>• Meeting with City of Greater Sudbury (CGS) Inspector.</li><li>• Observing the drilling/coring of asphalt.</li><li>• Measuring the asphalt core thicknesses with CGS inspector.</li><li>• Making notes on the quality of asphalt cores.</li></ul>

Health and Safety:

- Caution around traffic/mobile equipment. Wear sunscreen and stay hydrated.

Surveys:

No surveyor was on site today.

Construction Quality Assurance:

- WSP representative was on site to complete Quality Assurance (QA) inspections for the coring of asphalt.
- CGS representatives were on site to take notes, observe the coring of asphalt, and collect core samples.
  - Determining where to core asphalt.
  - Making observations of the asphalt coring.
  - Measuring the thickness of the asphalt layer.
  - Collecting asphalt core samples.

Observations:

- 6 sets of 5 cores were drilled and collected for testing.
- Asphalt core holes were spaced approximately 1 m apart.
- The table below summarizes the asphalt core locations and measurements.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Set #	Location and Time	Core #	Asphalt Thickness (mm)	Underlying Material Thickness (mm)	Cracks/Voids?
1	STA 2+600 o/s 0.5m from yellow line 07:45	1A	40-45	0	No
		1B	40-45	0	No
		1C	33-35	0	No
		1D	42	0	No
		1E	41	0	No
2	STA 2+500 o/s 2.0m from centre island 09:36	2A	34	0	No
		2B	34	0	No
		2C	30	0	No
		2D	30	65	No
		2E	30	85	No
3	STA 2+400 o/s 3.25m from centre island 11:30	3A	35-40	20-50	No
		3B	30-40	0	No
		3C	30-35	20-25	Small voids
		3D	35-40	50	No
		3E	30	100	No
4	STA 2+300 o/s 1.8m from centre island 13:00	4A	45-65*		No
		4B	35	90	Small voids
		4C	35	85	No
		4D	47-75*		No
		4E	105*		Small voids
5	STA 2+200 o/s 1.0m from centre island 15:22	5A	46	0	No
		5B	50	0	Small voids
		5C	45	0	No
		5D	50	0	No
		5E	45	0	No

\* = could not discern asphalt from underlying material.

- Voids observed in the asphalt cores were mostly present due to singular pieces of granular that had been dislodged from the matrix.
- Core 1A and 1B were drilled approximately 50 mm deep before removing the cores. The remainder of the day, RSR drilled to approximately 140 mm depth.

## KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO 1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



- Core 1B was jammed in drill bit. An open flame was observed in contact with the drill bit to remove the core.
- RSR cored their own asphalt core for testing at STA 2+506, o/s 2.2 m from centre island.
- Core 4E was fractured upon removal and had to be re-cored.
- Core 5A, when removed from the ground, caused the edge around the core to lift and fracture. As shown in Photo 6.
- Cores 5A, 5B, 5C, and 5D all had an undeterminable amount of wet, malleable asphalt/underlying material that fell off the core sample and into the hole when raising the drill bit from the ground. As shown in Photo 2 below.
- Core holes were backfilled using a cold mix asphalt provided by RSR loader.
  - Cores 1A and 1B holes were not properly dried before placing and packing cold mix asphalt. This resulted in water “pumping” from the edges of the holes while being packed. All other core holes were dried adequately before backfilling.
- Cracking (75-150 mm long) was observed on the asphalt, perpendicular to the direction of the road in multiple locations along the east bound passing lane. As shown in Photo 5.

### Discussions:

- RSR will be on site tomorrow morning at 7am to continue the asphalt coring.
- WSP had to leave site at 17:00. CGS (Miranda) said CGS will provide the observational information for the 6<sup>th</sup> set of cores collected.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO 1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photos:



Photo 1: Core 2B next to its sample mould.



Photo 2: Wet, malleable asphalt/underlying material from the 5<sup>th</sup> set of cores.



Photo 3: Core 3E next to its mould. Line between asphalt and underlying material is distinct.



Photo 4: RSR packing the cold mix asphalt backfill.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photo 5: Cracks observed in the asphalt along the centre island.



Photo 6: Core 5A hole with lifted/fractured edges.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Date:	27 July 2023
Reported by:	Tyler Bond
Reviewed by:	David M Brown, Senior Associate Project Manager
WSP Personnel on site:	Tyler Bond, Hoda Seddik
CGS Contacts:	Rino Carniello, Miranda Edwards, Scott Baas
Weather:	24 to 33°C, Sunny, some clouds
Work Hours:	Start of shift: 08:00AM End of shift: 17:00PM

Contractor:	N/A
Supervisor:	N/A
Equipment:	<ul style="list-style-type: none"><li>N/A</li></ul>

Action Items:
<ul style="list-style-type: none"><li>Meeting with City of Greater Sudbury (CGS) inspectors.</li><li>Visual inspection of asphalt quality/deficiencies.</li><li>Asphalt level check.</li><li>Making notes and observations on the quality of asphalt and type of deficiency.</li></ul>

Health and Safety:

- Caution around traffic – follow traffic control plan. Dress for the weather, stay hydrated.

Surveyors:

- Justin from CGS.

Traffic Control:

- Beacon Lite Ltd.

Construction Quality Assurance:

- WSP representatives on site to complete asphalt quality visual inspection for the length of the project, as well as document the inspection with photos and field notes.
  - CGS also requested that WSP perform an asphalt level check.
- CGS representatives were on site to take notes, observe, and provide context to WSP regarding the construction process.

Work Summary / Observations:

- All work and observations were documented, and will be referenced to, as survey points by CGS.
  - CGS will provide WSP with survey data and stationing at a later date.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



- WSP performed the asphalt level check until 9:45 when CGS shut the level check work down as it was slowing down the visual inspection.
  - A \$1 coin and \$0.25 coin were measured to be 3 mm when stacked on top of one another. These were used with a 25x25x3000mm straight edge (as shown in Photo 1) to determine whether the level was sufficient. If the gap was determined to be more than 3 mm, the gap was measured with a metric measuring tape.
  - The inspection and asphalt level check started at approximately STA 3+890 moving eastbound.
- The table below summarizes the asphalt level check work that was performed.

Time	Section #	Survey Point #	Gap Thickness (mm)
9:17 am	1	1	4
		2	3*
		3	Less than 3
9:30 am	2	4	3
		5	4
		6	3
9:40 am	3	7	Less than 3
		8	4.5
		9	Less than 3

\* = indicates a photo of this observation is shown below.

- The visual inspection of the asphalt focused on noting deficiencies in the Kingsway eastbound passing lane's asphalt (flushing, segregation severity, cracks, loss of aggregate, etc.).
  - Stationing was not used for this – CGS survey points were used to locate/document the observations made.
- The table below summarizes the findings from the visual inspection.

Time	Section #	Survey Point(s) (#)	Observation/comment
9:17	1	Between 3 and 4	Slight to moderate segregation. *
9:30	2	8, 9, 10, 11	Slight to severe segregation.
9:40	3	12, 13, 14, 15, 16	Severe segregation.
9:57	4	17, 18, 19, 20	Moderate segregation starts.
10:00	5	21, 22, 23, 24	Moderate segregation continues.
10:02	6	25, 26, 28, 29	Moderate segregation continues.
10:04	7	30, 31, 32, 33	Moderate segregation continues.
10:09		34	5 fat spots.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



10:10		35	1 fat spot.
10:10		36	2 fat spots.
10:11		37	1 fat spot.
10:13	8	38, 39, 40, 41	Moderate segregation continues. *
10:20		42, 43	Fat spots.
10:21	9	44, 45, 46, 47	Moderate to severe segregation.
10:23		48	Severe segregation area.
10:28	10	49, 50, 51	Flushing observed. *
10:30	11	52, 53, 54, 55	Moderate segregation continues.
10:31	12	56, 57, 58, 59	Flushing observed and moderate to severe segregation.
11:12	13	60, 61, 62, 63	Moderate segregation continues.
11:15	14	64, 65, 66, 67	Moderate to severe segregation. *
11:19		68, 69	Hydraulic oil contamination *
11:21		70, 71	Hydraulic oil contamination
11:24	15	72, 73, 74, 75	Moderate segregation continues.
11:26		76	Poor construction jointing.
<p>Based on visual observations for the first ~700 m, and due to the continuous moderate segregation observed on the roadway, CGS and WSP have decided to stop making observations section by section and assume the road to be exhibiting mostly moderate segregation. Moving forward the crew will continuously walk down the project length taking observations every 100 m, as well as making note of any segregation changes or deficiencies.</p>			
11:47		78, 79	Moderate segregation continues.
11:56	16	80, 81, 82, 83	STA 2+950, westbound passing lane, severe segregation.
11:57	17	84, 85	Severe segregation. Slight segregation starts at Survey Point 85.
13:23		86	Slight segregation continues.
13:24		87	Fat spots.
13:32		88, 89	Burned asphalt on surface of asphalt edge along curb lane.
13:34		90	Slight segregation continues.
13:38		91	Slight segregation continues.
13:39		92	Fat spot.
13:39		93	Fat spot. *
13:40		94, 95	Slight segregation ends, moderate segregation begins.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



13:42		96, 97, 98, 99	Moderate segregation.
13:45		100, 101	Burned asphalt on surface of asphalt edge along curb lane. *
13:58		102	Moderate segregation ends, slight segregation starts.
13:59		103, 104, 105	Moderate segregation starts.
14:02		106	Fat spots. "Pumping" was observed when pressing repeatedly on surface of fat spot with a boot. Unknown liquid came to surface.
14:07		107	Slight to moderate segregation.
14:09		108, 109	Flushing observed, slight segregation starts.
14:12		110	Slight segregation continues.
14:14		111, 112	Fat spots. Slight segregation ends, moderate segregation starts.
14:19		113, 114	Crack observed in asphalt, perpendicular to centre island.
14:20		115	24 cm crack observed in asphalt, perpendicular to centre island.
14:23		116	17 cm crack observed in asphalt, perpendicular to centre island.
14:25		117, 118	25 cm crack observed in asphalt, perpendicular to centre island. *
14:26		119	Slight to moderate segregation.
14:28		120	Slight segregation starts.
14:32		121	Slight segregation continues.
14:35		122, 123	Fat spots.
14:36		124, 125	Fat spots. *
14:38		126	Isolated moderate segregation.
14:39		127	Fat spot.
14:40		128	Slight segregation continues.
14:44		129, 130	Slight segregation ends, moderate segregation starts.
14:46		131	Fine hair cracks, assumed due to compaction.
15:16		132, 133, 134, 135	Moderate segregation continues.
15:17		136	Rubber stuck in surficial asphalt.
15:34		137	Moderate segregation ends, slight segregation starts.
15:35		138	Fat spots.
15:36		139	Flushing observed.
15:39		140	Slight to moderate segregation.
15:41		141	Loss of aggregate (ravelling) in surficial asphalt.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



15:48		142	Slight segregation ends, moderate segregation starts.
15:52		143	Fat spots in centre lane.
15:53		144	Moderate segregation continues.
15:56		145	Moderate in mid-lane.
15:58		146	Loss of aggregate (ravelling) in surficial asphalt.
16:04		147, 148	Loss of aggregate (ravelling) in surficial asphalt.
16:05		149	Eastbound lane is moderate segregation. Centre lane is slight segregation.
16:06		150	Fat spot.
16:07		151	Fat spot.
16:10		152, 153	Fat spot.
16:13		154	Eastbound lane is moderate segregation. Centre lane is slight segregation.
16:17		155	Moderate segregation continues.
16:18		156, 157	Line of severe segregation.
16:20		158	Moderate segregation continues.
16:22		159	Moderate segregation ends, slight segregation starts.
16:24		160	Fat spot.
16:25		161	Slight segregation continues.
16:29		162, 163	37 cm transfer crack.
16:35		164, 165	Moderate segregation mid-lane.
16:37		166	Fat spot, as well as loss of aggregate (ravelling) in surficial asphalt.
16:38		167, 168, 169	Severe segregation. *
16:41		170, 171	Flushing observed.
16:45			Eastbound passing lane ended. CGS ended work for the day.

\* = indicates a photo of this observation is shown below.

Discussions:

- In addition to the visual inspection, CGS requested that WSP perform an asphalt level check while on site.
  - WSP had checked 3 locations before CGS shut down the level check work as it was drastically slowing down the visual inspection.
  - CGS say WSP will need to come back at a later date to perform the asphalt level check.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



- CGS (Miranda) said stationing would not be used in our notes for the visual inspection. CGS took survey shots all throughout the visual inspection and will provide WSP with the stationing once the survey data is reviewed.
- CGS (Miranda) says they will provide their notes and photos to WSP to assist with their understanding and reporting.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photos:



Photo 1: 3 m straight edge, used for level check.



Photo 2: CGS and WSP checking asphalt level at Section 1.



Photo 3: Survey Point 2, mid-lane 3 mm gap



Photo 4: Moderate segregation at Section 8.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photo 5: Flushing observed in Section 10.



Photo 6: Moderate to severe segregation in Section 14.

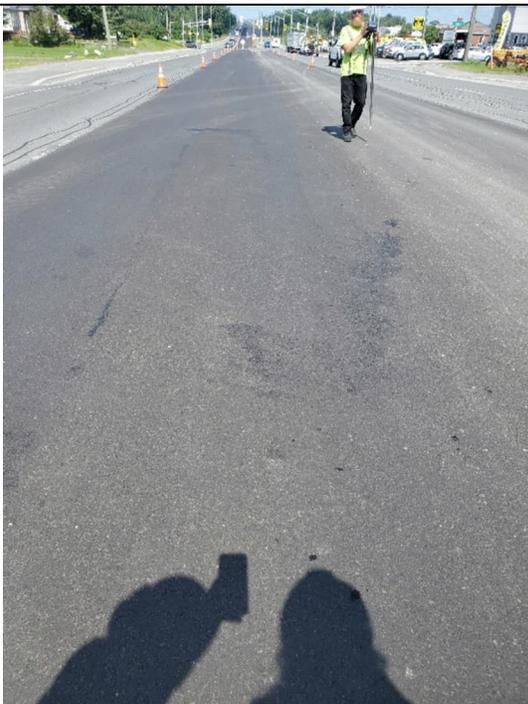


Photo 7: Hydraulic oil contamination at Survey Point 68-69.



Photo 8: Fat spot observed at Survey Point 93.

KINGSWAY (MR 55) FROM FALCONBRIDGE HIGHWAY (MR 86) TO  
1.5 KM EAST OF FALCONBRIDGE HIGHWAY (MR 86)



Photo 9: Burned asphalt at Survey Points 100 and 101.



Photo 10: Crack observed at Survey Point 117 and 118.



Photo 11: Fat spots observed at Survey Points 124 and 125.



Photo 12: Severe segregation at Survey Point 169.

# APPENDIX C

## Site Photos

# APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT LOCATION** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

ENCLOSURE

1

STA. 0+000 to STA. 0+250

<b>PHOTOGRAPH</b>	<b>1</b>
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The left photograph shows a close-up of a large, dark metal paving machine component resting on a gravel surface. The right photograph shows a worker in a high-visibility vest standing on a road with a paving machine. A yellow surveying device is visible in the foreground, displaying the number 38.7.

STA. 0+000 to STA. 0+250

<b>PHOTOGRAPH</b>	<b>2</b>
-------------------	----------

The left photograph shows a wide view of a road construction site with a paving machine and a car in the distance. A yellow surveying device is visible in the foreground, displaying the number 58.2. The right photograph shows a road with several orange traffic cones and a paving machine in the distance under a clear blue sky.

### APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

2

STA. 0+213 Westerly Center Lane

PHOTOGRAPH	3
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The left photograph shows a close-up of a paving machine's rear section with a license plate '179-78Y' and steam rising from the freshly laid asphalt. The right photograph shows a wider view of the road surface with steam rising from a large area of newly paved asphalt.

STA. 0+213 Westerly Center Lane

PHOTOGRAPH	4
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The photograph shows a construction site on a paved road. A large green machine with a canopy is the central focus. A dark grey SUV is parked in the foreground on the left. A worker in an orange safety vest is visible in the middle ground. Orange traffic cones are placed on the road. The sky is clear and blue.

### APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

3

STA. 0+900 Westerly Center Lane		<b>PHOTOGRAPH</b>	<b>5</b>
			

STA. 0+900 Westerly Center Lane	STA. 0+750 to 0+800 EBFL	<b>PHOTOGRAPH</b>	<b>6</b>
			

### APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

4

STA.750 to 0+800 EBFL		STA. 0+785 EBFL	<b>PHOTOGRAPH</b>	<b>7</b>

@ Moonlight Center Lane	West of Moonlight EBFL	<b>PHOTOGRAPH</b>	<b>8</b>

## APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

5

STA. 1+258 Westerly Center Lane	Kingsway @ Levesque Center Lane	<b>PHOTOGRAPH</b>	<b>9</b>
			

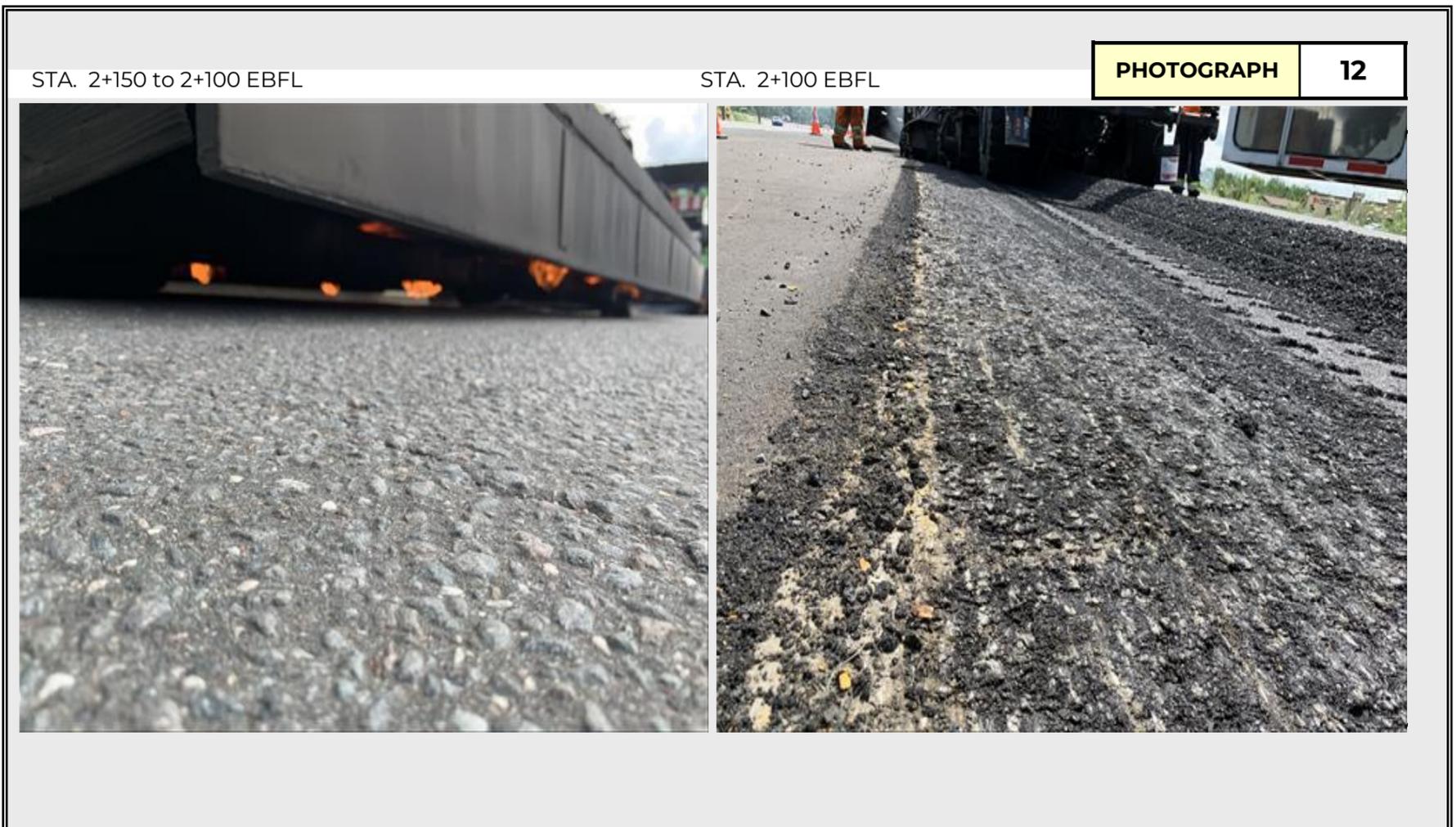
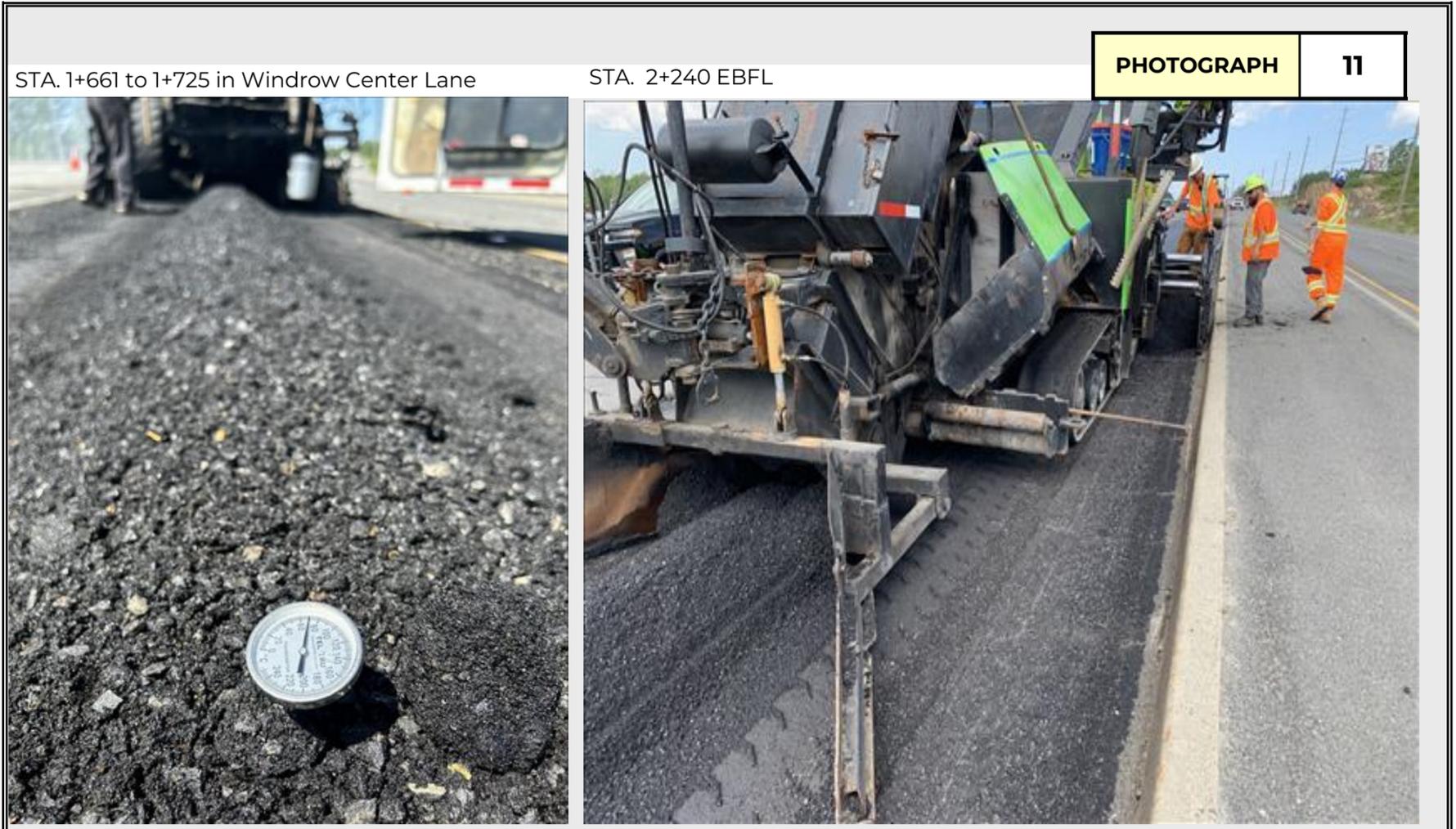
Levesque to 1+685 Center Lane	STA. 1+661 to 1+725 in Windrow Center Lane	<b>PHOTOGRAPH</b>	<b>10</b>
			

## APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

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### APPENDIX C - SITE PHOTOS DURING PAVING

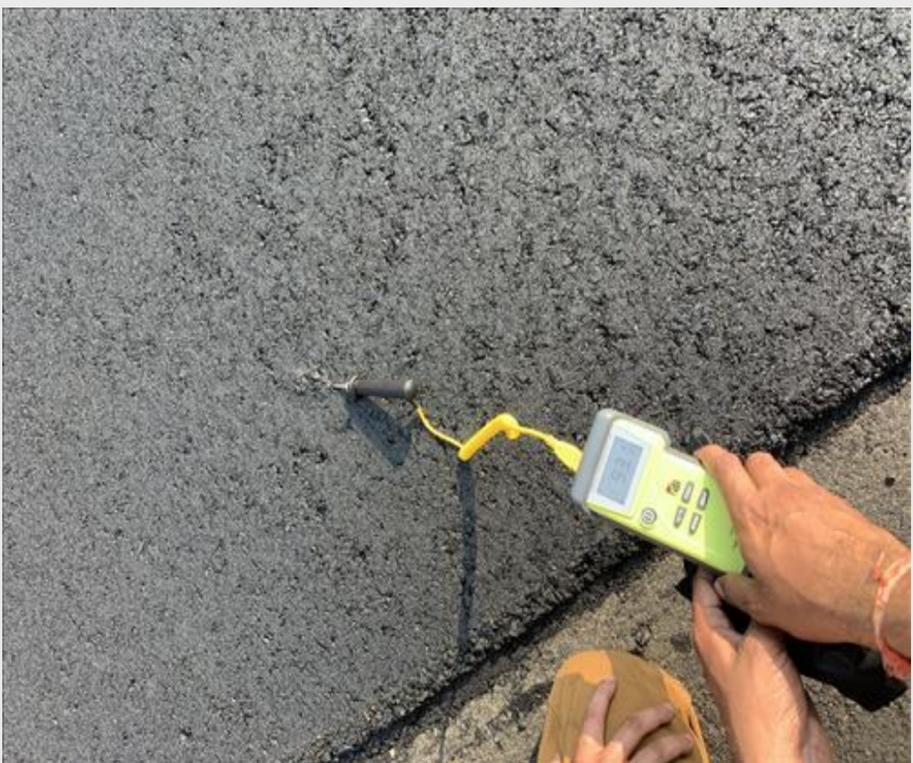
**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

STA. 2+840 to 2+750 EBFL	STA. 2+2750 to 2+700	<b>PHOTOGRAPH</b>	<b>13</b>

STA. 2+2750 to 2+700	STA. 2+610 Easterly EBFL	<b>PHOTOGRAPH</b>	<b>14</b>

### APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

STA. 2+610 Easterly EBPL	STA. 2+840 to 2+750 EBPL	<b>PHOTOGRAPH</b>	<b>15</b>
			

STA. 2+824 EBPL	<b>PHOTOGRAPH</b>	<b>16</b>
		

## APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

9

Third to 3+139 EBFL	STA. 3+140 EBFL	<b>PHOTOGRAPH</b>	<b>17</b>
			

STA. 3+140 to 3+100 EBFL		<b>PHOTOGRAPH</b>	<b>18</b>
			

### APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

STA. 3+100 to 3+060 EBFL		<b>PHOTOGRAPH</b>	<b>19</b>
			

STA. 3+060 EBFL	STA. 3+025 EBFL	<b>PHOTOGRAPH</b>	<b>20</b>
			

### APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

STA. 3+663 to Third Center Lane		<b>PHOTOGRAPH</b>	<b>21</b>
			

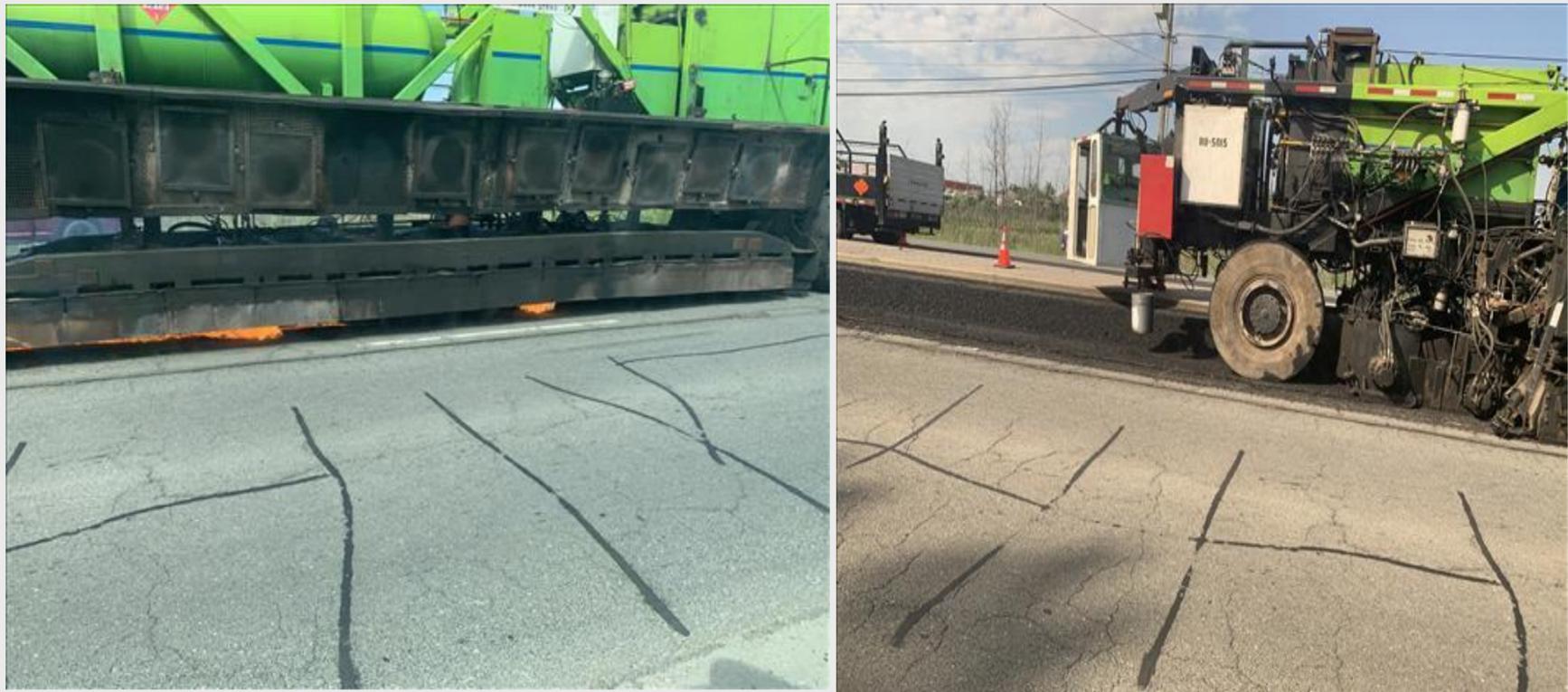
East of Third Center Lane	STA. 3+900 to Third EBFL	<b>PHOTOGRAPH</b>	<b>22</b>
			

### APPENDIX C - SITE PHOTOS DURING PAVING

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

STA. 3+900 to Third EBFL

<b>PHOTOGRAPH</b>	<b>23</b>
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STA. 3+900 to Third EBFL

<b>PHOTOGRAPH</b>	<b>24</b>
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# APPENDIX D

## Laboratory Test Results

# APPENDIX D-1

## Mix Properties

33 Mackenzie Street  
 Sudbury, Ontario, P3C 4Y1  
 Telephone: (705) 524-6861  
 Fax: (705) 524-1984



**SUMMARY OF ASPHALT TEST RESULTS**

**Project No.:** TY20202.1100  
**WSP E&I Project #:** TY20202.1100  
**Project:** CGS HIR ENG 21-38  
**Lab #:** G1265

**Contractor:** RSR  
**Asphalt Supplier:** RSR

**FIELD DATA:**

**Lot/Sublot#:** 01/01  
**Sample Type:** HIR-HL3  
**Sample Location:** Kingsway, Center Turn Lane Sta. 0+220  
**Municipal Road:** MR55

**Date Sampled:** June 20, 2023  
**Date Received:** June 20, 2023  
**Date Reported:** June 23, 2023

**LABORATORY TESTS:**

**Job Mix Formula:** 1523

**Tested by:** JM

**Marshall Properties:**

Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
Bulk Relative Density	2.370	2.415							
Maximum Relative Density	2.509	2.511							
Air Voids (%):	5.5	3.8		2.5-5.0	1.4-2.4, 5.1-6.0	<1.5, >6.0		*	
Stability (N @ 60 °C):	15363	15445		8900 min			*		
Flow (0.25 mm):	13.7	11.4		8-14			*		
% VMA	N/A	N/A							
Asphalt Cement Content (%):	4.76	5.00	-0.24	<0.30	0.30- 0.50	>0.50	*		

**Gradation**

Sieve Size (mm)	Results	JMF	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
26.5 mm	100.0	100.0	0.0						
19.0 mm	100.0	100.0	0.0						
16.0 mm	100.0	100.0	0.0						
13.2 mm	99.5	99.0	0.5						
9.5 mm	90.1	88.5	1.6	<1.0	1.0-5.0	>5.0		*	
4.75 mm	58.4	57.0	1.4	<1.0	1.0-5.0	>5.0		*	
2.36 mm	45.8	44.9	0.9						
1.18 mm	36.2	35.9	0.3						
600 µm	26.5	25.7	0.8						
300 µm	16.1	14.5	1.6						
150 µm	8.2	7.3	0.9						
75 µm	4.6	4.3	0.3	<1.0	1.0-3.0	>3.0	*		

**Remarks:**

\*OPSS.Muni 332  
Sample results fall within borderline limits for the 9.5 and 4.75 sieves as well as the Air Voids.  
Recompaction Temperature 115°C

**Issued by:**

  
 Tina Gauthier, Laboratory Manager

33 Mackenzie Street  
 Sudbury, Ontario, P3C 4Y1  
 Telephone: (705) 524-6861  
 Fax: (705) 524-1984



### SUMMARY OF ASPHALT TEST RESULTS

**Project No.:** CA0007261.6367  
**WSP E&I Project #:** TY20202.1100  
**Project:** CGS HIR ENG 21-38  
**Lab #:** G1267

**Contractor:** RSR  
**Asphalt Supplier:** RSR

**FIELD DATA:**

**Lot/Sublot#:** 01/02  
**Sample Type:** HIR-HL3  
**Sample Location:** Kingsway, WB Left Turn Lane Sta. 1+070  
**Municipal Road:** MR55

**Date Sampled:** June 21, 2023  
**Date Received:** June 22, 2023  
**Date Reported:** June 27, 2023

**LABORATORY TESTS:**

**Job Mix Formula:** 1523

**Tested by:** HAB/JM

**Marshall Properties:**

Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
<b>Bulk Relative Density</b>	<b>2.401</b>	2.415							
<b>Maximum Relative Density</b>	<b>2.501</b>	2.511							
<b>Air Voids (%):</b>	<b>4.0</b>	3.8		2.5-5.0	1.4-2.4, 5.1-6.0	<1.5, >6.0	*		
<b>Stability (N @ 60 °C):</b>	<b>14210</b>	15445		8900 min			*		
<b>Flow (0.25 mm):</b>	<b>11.8</b>	11.4		8-14			*		
<b>% VMA</b>	<b>N/A</b>	N/A							
<b>Asphalt Cement Content (%):</b>	<b>4.76</b>	5.00	-0.24	<0.30	0.30- 0.50	>0.50	*		

**Gradation**

Sieve Size (mm)	Results	JMF	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
<b>26.5 mm</b>	<b>100.0</b>	100.0	0.0						
<b>19.0 mm</b>	<b>100.0</b>	100.0	0.0						
<b>16.0 mm</b>	<b>100.0</b>	100.0	0.0						
<b>13.2 mm</b>	<b>98.2</b>	99.0	-0.8						
<b>9.5 mm</b>	<b>81.5</b>	88.5	-7.0	<1.0	1.0-5.0	>5.0			*
<b>4.75 mm</b>	<b>54.1</b>	57.0	-2.9	<1.0	1.0-5.0	>5.0		*	
<b>2.36 mm</b>	<b>43.8</b>	44.9	-1.1						
<b>1.18 mm</b>	<b>34.6</b>	35.9	-1.3						
<b>600 µm</b>	<b>25.3</b>	25.7	-0.4						
<b>300 µm</b>	<b>15.3</b>	14.5	0.8						
<b>150 µm</b>	<b>7.9</b>	7.3	0.6						
<b>75 µm</b>	<b>4.8</b>	4.3	0.5	<1.0	1.0-3.0	>3.0	*		

**Remarks:** \*OPSS.Muni 332  
*Sample results fall within borderline limits for the 4.75 sieve and rejectable for 9.5 sieve.*  
 Recompaction Temperature 115°C

**Issued by:**

Tina Gauthier, Laboratory Manager

33 Mackenzie Street  
 Sudbury, Ontario, P3C 4Y1  
 Telephone: (705) 524-6861  
 Fax: (705) 524-1984



### SUMMARY OF ASPHALT TEST RESULTS

**Project No.:** CA0007261.6367  
**WSP E&I Project #:** TY20202.1100  
**Project:** CGS HIR ENG 21-38  
**Lab #:** G1282

**Contractor:** RSR  
**Asphalt Supplier:** RSR

**FIELD DATA:**

**Lot/Sublot#:** 01/03  
**Sample Type:** HIR-HL3  
**Sample Location:** Centre Turn Lane  
**Municipal Road:** MR55

**Date Sampled:** June 28, 2023  
**Date Received:** June 29, 2023  
**Date Reported:** July 10, 2023

**LABORATORY TESTS:**

**Job Mix Formula:** 1523

**Tested by:** JM

**Marshall Properties:**

Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
Bulk Relative Density	2.368	2.415							
Maximum Relative Density	2.494	2.511							
Air Voids (%):	5.1	3.8		2.5-5.0	1.4-2.4, 5.1-6.0	<1.5, >6.0		*	
Stability (N @ 60 °C):	12400	15445		8900 min			*		
Flow (0.25 mm):	12.3	11.4		8-14			*		
% VMA	N/A	N/A							
Asphalt Cement Content (%):	4.90	5.00	-0.10	<0.30	0.30- 0.50	>0.50	*		

**Gradation**

Sieve Size (mm)	Results	JMF	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
26.5 mm	100.0	100.0	0.0						
19.0 mm	100.0	100.0	0.0						
16 mm	100.0	100.0	0.0						
13.2 mm	99.6	99.0	0.6						
9.5 mm	80.6	88.5	-7.9	<1.0	1.0-5.0	>5.0			*
4.75 mm	53.6	57.0	-3.4	<1.0	1.0-5.0	>5.0		*	
2.36 mm	43.1	44.9	-1.8						
1.18 mm	34.0	35.9	-1.9						
600 µm	24.5	25.7	-1.2						
300 µm	14.5	14.5	0.0						
150 µm	7.2	7.3	-0.1						
75 µm	4.2	4.3	-0.1	<1.0	1.0-3.0	>3.0	*		

**Remarks:**

\*OPSS.Muni 332

*Sample results fall within borderline limits for the Air Voids and 4.75 mm sieve and rejectable limit for the 9.5 mm sieve.*

Recompaction Temperature 115°C

**Issued by:**

Tina Gauthier, Laboratory Manager

33 Mackenzie Street  
 Sudbury, Ontario, P3C 4Y1  
 Telephone: (705) 524-6861  
 Fax: (705) 524-1984



**SUMMARY OF ASPHALT TEST RESULTS**

**Project No.:** CA0007261.6367  
**WSP E&I Project #:** TY20202.1100  
**Project:** CGS HIR ENG 21-38  
**Lab #:** G1283

**Contractor:** RSR  
**Asphalt Supplier:** RSR

**FIELD DATA:**

**Lot/Sublot#:** 01/04  
**Sample Type:** HIR-HL3  
**Sample Location:** East Bound Pass Lane  
**Municipal Road:** MR55

**Date Sampled:** June 29, 2023  
**Date Received:** June 30, 2023  
**Date Reported:** July 10, 2023

**LABORATORY TESTS:**

**Job Mix Formula:** 1523

**Tested by:** JM

**Marshall Properties:**

Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
Bulk Relative Density	2.403	2.415							
Maximum Relative Density	2.494	2.511							
Air Voids (%):	3.7	3.8		2.5-5.0	1.4-2.4, 5.1-6.0	<1.5, >6.0	*		
Stability (N @ 60 °C):	11577	15445		8900 min			*		
Flow (0.25 mm):	12.3	11.4		8-14			*		
% VMA	N/A	N/A							
Asphalt Cement Content (%):	5.29	5.00	0.29	<0.30	0.30- 0.50	>0.50	*		

**Gradation**

Sieve Size (mm)	Results	JMF	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
26.5 mm	100.0	100.0	0.0						
19.0 mm	100.0	100.0	0.0						
16 mm	100.0	100.0	0.0						
13.2 mm	99.5	99.0	0.5						
9.5 mm	87.0	88.5	-1.5	<1.0	1.0-5.0	>5.0		*	
4.75 mm	57.6	57.0	0.6	<1.0	1.0-5.0	>5.0	*		
2.36 mm	44.6	44.9	-0.3						
1.18 mm	36.0	35.9	0.1						
600 µm	26.3	25.7	0.6						
300 µm	15.3	14.5	0.8						
150 µm	7.7	7.3	0.4						
75 µm	4.2	4.3	-0.1	<1.0	1.0-3.0	>3.0	*		

**Remarks:**

\*OPSS.Muni 332  
 Sample results fall within borderline limits for the 9.5 mm sieve.  
 Recompaction Temperature 115°C

**Issued by:**

  
 Tina Gauthier, Laboratory Manager

33 Mackenzie Street  
 Sudbury, Ontario, P3C 4Y1  
 Telephone: (705) 524-6861  
 Fax: (705) 524-1984



### SUMMARY OF ASPHALT TEST RESULTS

**Project No.:** CA0007261.6367  
**WSP E&I Project #:** TY20202.1100  
**Project:** CGS HIR ENG 21-38  
**Lab #:** G1363

**Contractor:** RSR  
**Asphalt Supplier:** RSR

**FIELD DATA:**

**Lot/Sublot#:** 01/05  
**Sample Type:** HIR-HL3  
**Sample Location:** East Bound Fast Lane  
**Municipal Road:** MR55

**Date Sampled:** July 10, 2023  
**Date Received:** July 11, 2023  
**Date Reported:** July 14, 2023

**LABORATORY TESTS:**

**Job Mix Formula:** 1523

**Tested by:** JM

**Marshall Properties:**

Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
Bulk Relative Density	2.404	2.415							
Maximum Relative Density	2.531	2.511							
Air Voids (%):	5.0	3.8		2.5-5.0	1.4-2.4, 5.1-6.0	<1.5, >6.0	*		
Stability (N @ 60 °C):	11311	15445		8900 min			*		
Flow (0.25 mm):	10.7	11.4		8-14			*		
% VMA	N/A	N/A							
Asphalt Cement Content (%):	4.66	5.00	-0.34	<0.30	0.30- 0.50	>0.50		*	

**Gradation**

Sieve Size (mm)	Results	JMF	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
26.5 mm	100.0	100.0	0.0						
19.0 mm	100.0	100.0	0.0						
16 mm	100.0	100.0	0.0						
13.2 mm	92.3	99.0	-6.7						
9.5 mm	78.2	88.5	-10.3	<1.0	1.0-5.0	>5.0			*
4.75 mm	53.9	57.0	-3.1	<1.0	1.0-5.0	>5.0		*	
2.36 mm	42.8	44.9	-2.1						
1.18 mm	34.1	35.9	-1.8						
600 µm	24.8	25.7	-0.9						
300 µm	14.4	14.5	-0.1						
150 µm	7.7	7.3	0.4						
75 µm	4.8	4.3	0.5	<1.0	1.0-3.0	>3.0	*		

**Remarks:**

\*OPSS.Muni 332

*Sample results fall within borderline limits for Asphalt Cement Content and the 4.75 mm sieve and rejectable limits for the 9.5 mm sieve.*

Recompaction Temperature 115°C

**Issued by:**

Tina Gauthier, Laboratory Manager



### SUMMARY OF ASPHALT TEST RESULTS

**Project No.:** CA0007261.6367  
**WSP E&I Project #:** TY20202.1100  
**Project:** CGS HIR ENG 21-38  
**Lab #:** G1365

**Contractor:** RSR  
**Asphalt Supplier:** RSR

**FIELD DATA:**

**Lot/Sublot#:** 01/06  
**Sample Type:** HIR-HL3  
**Sample Location:** East Bound Fast Lane  
**Municipal Road:** MR55

**Date Sampled:** July 11, 2023  
**Date Received:** July 13, 2023  
**Date Reported:** July 18, 2023

**LABORATORY TESTS:**

**Job Mix Formula:** 1523

**Tested by:** HK/JM

**Marshall Properties:**

Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
Bulk Relative Density	2.404	2.415							
Maximum Relative Density	2.497	2.511							
Air Voids (%):	3.8	3.8		2.5-5.0	1.4-2.4, 5.1-6.0	<1.5, >6.0	*		
Stability (N @ 60 °C):	12133	15445		8900 min			*		
Flow (0.25 mm):	12.2	11.4		8-14			*		
% VMA	N/A	N/A							
Asphalt Cement Content (%):	5.03	5.00	0.03	<0.30	0.30- 0.50	>0.50	*		

**Gradation**

Sieve Size (mm)	Results	JMF	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
26.5 mm	100.0	100.0	0.0						
19.0 mm	100.0	100.0	0.0						
16 mm	100.0	100.0	0.0						
13.2 mm	98.9	99.0	-0.1						
9.5 mm	83.6	88.5	-4.9	<1.0	1.0-5.0	>5.0		*	
4.75 mm	56.6	57.0	-0.4	<1.0	1.0-5.0	>5.0	*		
2.36 mm	45.1	44.9	0.2						
1.18 mm	35.1	35.9	-0.8						
600 µm	25.0	25.7	-0.7						
300 µm	14.7	14.5	0.2						
150 µm	7.6	7.3	0.3						
75 µm	4.7	4.3	0.4	<1.0	1.0-3.0	>3.0	*		

**Remarks:** \*OPSS.Muni 332  
 Sample results fall within borderline limits for 9.5 mm sieve

Recompaction Temperature 115°C

**Issued by:**

Tina Gauthier, Laboratory Manager

33 Mackenzie Street  
 Sudbury, Ontario, P3C 4Y1  
 Telephone: (705) 524-6861  
 Fax: (705) 524-1984



### SUMMARY OF ASPHALT TEST RESULTS

**Project No.:** CA0007261.6367  
**WSP E&I Project #:** TY20202.1100  
**Project:** CGS HIR ENG 21-38  
**Lab #:** G1366

**Contractor:** RSR  
**Asphalt Supplier:** RSR

**FIELD DATA:**

**Lot/Sublot#:** 01/07  
**Sample Type:** HIR-HL3  
**Sample Location:** East Bound Fast Lane  
**Municipal Road:** MR55

**Date Sampled:** July 11, 2023  
**Date Received:** July 11, 2023  
**Date Reported:** July 18, 2023

**LABORATORY TESTS:**

**Job Mix Formula:** 1523

**Tested by:** HK/JM

**Marshall Properties:**

Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
Bulk Relative Density	2.380	2.415							
Maximum Relative Density	2.503	2.511							
Air Voids (%):	4.9	3.8		2.5-5.0	1.4-2.4, 5.1-6.0	<1.5, >6.0	*		
Stability (N @ 60 °C):	12337	15445		8900 min			*		
Flow (0.25 mm):	13.5	11.4		8-14			*		
% VMA	N/A	N/A							
Asphalt Cement Content (%):	5.01	5.00	0.01	<0.30	0.30- 0.50	>0.50	*		

**Gradation**

Sieve Size (mm)	Results	JMF	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
26.5 mm	100.0	100.0	0.0						
19.0 mm	100.0	100.0	0.0						
16 mm	100.0	100.0	0.0						
13.2 mm	99.4	99.0	0.4						
9.5 mm	82.8	88.5	-5.7	<1.0	1.0-5.0	>5.0			*
4.75 mm	56.1	57.0	-0.9	<1.0	1.0-5.0	>5.0	*		
2.36 mm	45.0	44.9	0.1						
1.18 mm	35.1	35.9	-0.8						
600 µm	25.2	25.7	-0.5						
300 µm	15.0	14.5	0.5						
150 µm	7.8	7.3	0.5						
75 µm	4.8	4.3	0.5	<1.0	1.0-3.0	>3.0	*		

**Remarks:**

\*OPSS.Muni 332

*Sample results fall within rejectable limits on the 9.5 mm sieve*

Recompaction Temperature 115°C

**Issued by:**

Tina Gauthier, Laboratory Manager



**RSR ASPHALT MIX CHECK SUMMARY**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	29-Jun-23	LAB NO.:	8455
CONTRACT NO.:	ENG 21-38	DATE REC'D:	29-Jun-23	LOT NO.:	1
PROJECT:	Kingsway Road (MR55) HIR	TIME SAMPLE TAKEN:	06:40 PM	SUBLOT NO.:	4
LOCATION:	3 + 300	DATE TESTED:	30-Jun-23	MIX CODE	1523
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	04-July-23	MIX TYPE:	HL-3

**LABORATORY INFORMATION TEST RESULTS**

EXTRACTION / GRADATION		NUMBER OF GYRATIONS	
SIEVE SIZE (mm)	PERCENT PASSING		
		@Nini	NA
		@Ndes	NA
		@Nmax	NA
25	100.0	<b>VOLUMETRIC PROPERTIES</b>	
19	100.0	Stability	11120.0
16	100.0	Flow	10.0
13.2	100.0	PERCENT AIR VOIDS	2.5
9.5	89.5	Briquette Mass	1250.0
4.75	56.6	Mixing Temp.	120.00
2.36	43.6	PERCENT Gmm @Nini	NA
1.18	34.6	PERCENT Gmm @Ndes	NA
0.6	25.4	PERCENT Gmm @Nmax	NA
0.3	14.9		
0.15	7.3		
0.075	3.7		
PAN	2.3	Gmb	2.436
AC (%)	5.60	Gmm	2.499

**ASPHALT CEMENT**

PGAC GRADE	RE-COMP TEMP.
-	115.0

**COMMENTS**

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**TESTED BY:**

**REVIEWED BY:**

R.M/P.A/K.S		
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**RSR ASPHALT MIX CHECK SUMMARY**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	20-Jun-23	LAB NO.:	8450
CONTRACT NO.:	ENG 21-38	DATE REC'D:	20-Jun-23	LOT NO.:	1
PROJECT:	Kingsway Road (MR55) HIR	TIME SAMPLE TAKEN:	12:20 PM	SUBLOT NO.:	1
LOCATION:	0 + 220	DATE TESTED:	21-Jun-23	MIX CODE	1523
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	23-Jun-23	MIX TYPE:	HL-3

**LABORATORY INFORMATION TEST RESULTS**

EXTRACTION / GRADATION		NUMBER OF GYRATIONS	
SIEVE SIZE (mm)	PERCENT PASSING		
		@Nini	NA
		@Ndes	NA
		@Nmax	NA
25	100.0	<b>VOLUMETRIC PROPERTIES</b>	
19	100.0		
16	100.0	Stability	
13.2	100.0	Flow	
9.5	86.2	PERCENT AIR VOIDS	4.0
4.75	57.0	Briquette Mass	1250.0
2.36	44.5	Mixing Temp.	120.00
1.18	35.0	PERCENT Gmm @Nini	NA
0.6	25.7	PERCENT Gmm @Ndes	NA
0.3	15.6	PERCENT Gmm @Nmax	NA
0.15	7.8		
0.075	4.3		
PAN	2.4	Gmb	2.411
AC (%)	5.10	Gmm	2.511

**ASPHALT CEMENT**

<b>PGAC GRADE</b>	<b>RE-COMP TEMP.</b>
-	115.0

**COMMENTS**

**TESTED BY:**

**REVIEWED BY:**

R.M.P./K.S		
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**RSR ASPHALT MIX CHECK SUMMARY**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	21-Jun-23	LAB NO.:	8451
CONTRACT NO.:	ENG 21-38	DATE REC'D:	21-Jun-23	LOT NO.:	1
PROJECT:	Kingsway Road (MR55) HIR	TIME SAMPLE TAKEN:	04:42 PM	SUBLOT NO.:	2
LOCATION:	1 + 070	DATE TESTED:	22-Jun-23	MIX CODE	1523
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	23-Jun-23	MIX TYPE:	HL-3

**LABORATORY INFORMATION TEST RESULTS**

EXTRACTION / GRADATION		NUMBER OF GYRATIONS	
SIEVE SIZE (mm)	PERCENT PASSING		
		@Nini	NA
		@Ndes	NA
		@Nmax	NA
25	100.0		
19	100.0		
		VOLUMETRIC PROPERTIES	
16	100.0	Stability	
13.2	99.1	Flow	
9.5	82.3	PERCENT AIR VOIDS	3.3
4.75	55.9	Briquette Mass	1250.0
2.36	44.8	Mixing Temp.	120.00
1.18	35.0	PERCENT Gmm @Nini	NA
0.6	25.4	PERCENT Gmm @Ndes	NA
0.3	15.1	PERCENT Gmm @Nmax	NA
0.15	7.4		
0.075	4.1		
PAN	3.0	Gmb	2.427
AC (%)	5.40	Gmm	2.509

**ASPHALT CEMENT**

PGAC GRADE	RE-COMP TEMP.
-	115.0

**COMMENTS**

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**TESTED BY:**

**REVIEWED BY:**

R.M.P./A/K.S		
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**RSR ASPHALT MIX CHECK SUMMARY**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	28-Jun-23	LAB NO.:	8455
CONTRACT NO.:	ENG 21-38	DATE REC'D:	28-Jun-23	LOT NO.:	1
PROJECT:	Kingsway Road (MR55) HIR	TIME SAMPLE TAKEN:	12:30 PM	SUBLOT NO.:	3
LOCATION:	1 + 817	DATE TESTED:	28-Jun-23	MIX CODE	1523
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	04-July-23	MIX TYPE:	HL-3

**LABORATORY INFORMATION TEST RESULTS**

EXTRACTION / GRADATION		NUMBER OF GYRATIONS	
SIEVE SIZE (mm)	PERCENT PASSING	@Nini	NA
25	100.0	@Ndes	NA
19	100.0	@Nmax	NA
16	100.0	VOLUMETRIC PROPERTIES	
13.2	99.1	Stability	13240.0
9.5	80.4	Flow	10.0
4.75	53.5	PERCENT AIR VOIDS	3.5
2.36	42.6	Briquette Mass	1250.0
1.18	36.4	Mixing Temp.	120.00
0.6	24.4	PERCENT Gmm @Nini	NA
0.3	14.4	PERCENT Gmm @Ndes	NA
0.15	7.1	PERCENT Gmm @Nmax	NA
0.075	4.0		
PAN	3.0	Gmb	2.417
AC (%)	5.30	Gmm	2.505

**ASPHALT CEMENT**

PGAC GRADE	RE-COMP TEMP.
-	115.0

**COMMENTS**

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**TESTED BY:**

**REVIEWED BY:**

R.M/P.A/K.S		
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**RSR ASPHALT MIX CHECK SUMMARY**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	10-July-23	LAB NO.:	8461
CONTRACT NO.:	ENG 21-38	DATE REC'D:	10-July-23	LOT NO.:	1
PROJECT:	Kingsway Road (MR55) HIR	TIME SAMPLE TAKEN:	06:15 PM	SUBLOT NO.:	5
LOCATION:	2 + 840 o/s 4.0m from C.L.	DATE TESTED:	10-July-23	MIX CODE	1523
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	12-July-23	MIX TYPE:	HL-3

**LABORATORY INFORMATION TEST RESULTS**

EXTRACTION / GRADATION		NUMBER OF GYRATIONS	
SIEVE SIZE (mm)	PERCENT PASSING		
		@Nini	NA
		@Ndes	NA
		@Nmax	NA
25	100.0	<b>VOLUMETRIC PROPERTIES</b>	
19	100.0	Stability	13100.0
16	97.0	Flow	10.5
13.2	95.4	PERCENT AIR VOIDS	4.2
9.5	82.3	Briquette Mass	1250.0
4.75	56.7	Mixing Temp.	120.00
2.36	44.6	PERCENT Gmm @Nini	NA
1.18	35.0	PERCENT Gmm @Ndes	NA
0.6	25.1	PERCENT Gmm @Nmax	NA
0.3	14.6		
0.15	7.3		
0.075	4.3		
PAN	3.2	Gmb	2.422
AC (%)	5.00	Gmm	2.528

**ASPHALT CEMENT**

PGAC GRADE	RE-COMP TEMP.
-	115.0

**COMMENTS**

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**TESTED BY:**

**REVIEWED BY:**

R.M/P.A/K.S		
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**RSR ASPHALT MIX CHECK SUMMARY**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	11-July-23	LAB NO.:	8464
CONTRACT NO.:	ENG 21-38	DATE REC'D:	11-July-23	LOT NO.:	1
PROJECT:	Kingsway Road (MR55) HIR	TIME SAMPLE TAKEN:	03:05 PM	SUBLOT NO.:	6
LOCATION:	1 + 745 o/s 5.5m from C.L.	DATE TESTED:	11-July-23	MIX CODE	1523
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	12-July-23	MIX TYPE:	HL-3

**LABORATORY INFORMATION TEST RESULTS**

EXTRACTION / GRADATION		NUMBER OF GYRATIONS	
SIEVE SIZE (mm)	PERCENT PASSING	@Nini	NA
25	100.0	@Ndes	NA
19	100.0	@Nmax	NA
16	100.0	VOLUMETRIC PROPERTIES	
13.2	99.0	Stability	12140.0
9.5	82.8	Flow	9.0
4.75	54.1	PERCENT AIR VOIDS	3.0
2.36	43.3	Briquette Mass	1250.0
1.18	33.9	Mixing Temp.	120.00
0.6	24.1	PERCENT Gmm @Nini	NA
0.3	14.1	PERCENT Gmm @Ndes	NA
0.15	7.0	PERCENT Gmm @Nmax	NA
0.075	4.2		
PAN	3.3	Gmb	2.427
AC (%)	5.50	Gmm	2.503

**ASPHALT CEMENT**

PGAC GRADE	RE-COMP TEMP.
-	115.0

**COMMENTS**

**TESTED BY:**

**REVIEWED BY:**

R.M/P.A/K.S		
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# APPENDIX D-2

## Compaction Results

# HOT MIX ASPHALT TEST REPORT PERCENT COMPACTION



**Contract Number:** ENG 21-38  
**Road Name:** Kingsway (MR #55)  
**Region:** City of Greater Sudbury  
**Lot Number:** 1  
**Contractor:** RSR  
**Mix Type:** HL3-HIR

**Date Tested:** July 25, 2023  
**Date Reported:** July 27, 2023  
**WSP Project No.:** CA0007261.6367

Material Properties	Sublot				
	1	2	3	4	5
Thickness (as received) mm	76	45	56	55	111
HIR Thickness (as received) mm	39	45	56	55	Unclear
Thickness (as cut) mm	51	45*	52	55*	49
Bonded or Unbonded	Bonded	Bonded	Unbonded	Unbonded	Unclear
Bulk Specific Gravity (Gmb) Mg/m <sup>3</sup>	2.167	2.324	2.360	2.323	2.321
Maximum Specific Gravity (Gmm) Mg/m <sup>3</sup>	2.505	2.496	2.501	2.507	2.511
Percent Compaction (corrected) %	86.5	93.1	94.4	92.7	92.4

<b>Date Paved:</b>	June 20, 2023	June 21, 2023	June 21, 2023	June 23, 2023	June 28, 2023
<b>Date Sampled:</b>	June 21, 2023	June 22, 2023	June 22, 2023	June 23, 2023	June 29, 2023
<b>Lane:</b>	CL	CL	CL	EBL	CL
<b>Station:</b>	0+170	0+675	1+190	1+635	2+694

<b>Condition of Sample:</b>	Good	Good	Good	Good	Good
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Material Properties	Sublot				
	6	7	8	9	10
Thickness (as received) mm	50	113	46	50	28
HIR Thickness (as received) mm	50	Unclear	Unclear	Unclear	28
Thickness (as cut) mm	50*	50	46*	50*	28*
Bonded or Unbonded	Unbonded	Unclear	Unclear	Unclear	Unbonded
Bulk Specific Gravity (Gmb) Mg/m <sup>3</sup>	2.272	2.367	2.236	2.365	2.202
Maximum Specific Gravity (Gmm) Mg/m <sup>3</sup>	2.494	2.494	2.517	2.496	2.513
Percent Compaction (corrected) %	91.1	94.9	88.8	94.8	88.8

<b>Date Paved:</b>	June 29, 2023	June 29, 2023	July 10, 2023	July 10, 2023	July 11, 2023
<b>Date Sampled:</b>	June 29, 2023	June 30, 2023	July 11, 2023	July 11, 2023	July 19, 2023
<b>Station:</b>	WBL @ Third Ave. 3+325	EBL Passing 3+492	EBL Passing 3+025	EBL Passing 2+826	EBL Passing 2+600

<b>Condition of Sample:</b>	Good	Good	Good	Good	Good
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**Remarks:** \*Sample was not cut, tested core as received  
Samples 1/1 to 1/9 were previously submitted.

**Issued by:**

Tina Gauthier, Laboratory Manager

# HOT MIX ASPHALT TEST REPORT PERCENT COMPACTION



**Contract Number:** ENG 21-38  
**Road Name:** Kingsway (MR #55)  
**Region:** City of Greater Sudbury  
**Lot Number:** 2  
**Contractor:** RSR  
**Mix Type:** HL3-HIR

**Date Tested:** June 25, 2023  
**Date Reported:** July 27, 2023  
**WSP Project No.:** CA0007261.6367

Material Properties	Sublot				
	1	2	3	4	5
Thickness (as received) mm	35	68	47	34	108
HIR Thickness (as received) mm	35	38	35	31	53
Thickness (as cut) mm	35*	34	31	31	48
Bonded or Unbonded	Unbonded	Bonded	Unbonded	Unbonded	Bonded
Bulk Specific Gravity (Gmb) Mg/m <sup>3</sup>	2.302	2.224	2.284	2.271	2.393
Maximum Specific Gravity (Gmm) Mg/m <sup>3</sup>	2.500	2.515	2.515	2.506	2.474
Percent Compaction (corrected) %	92.6	89.0	91.7	91.6	96.7
<b>Date Paved:</b>	July 11, 2023	July 11, 2023	July 11, 2023	July 11, 2023	July 11, 2023
<b>Date Sampled:</b>	July 19, 2023	July 19, 2023	July 19, 2023	July 19, 2023	July 19, 2023
<b>Lane:</b>	EB Pass Lane	EB Pass Lane	EB Pass Lane	EB Pass Lane	EB Pass Lane
<b>Station:</b>	2+500	2+400	2+300	2+200	2+100
<b>Condition of Sample:</b>	Good	Good	Good	Good	Good
Material Properties	Sublot				
	6	7	8	9	10
Thickness (as received) mm	89	47	43	32	80
HIR Thickness (as received) mm	41	39	28	32	46
Thickness (as cut) mm	39	39	22	32*	31
Bonded or Unbonded	Bonded	Partially bonded	Bonded	Unbonded	Bonded
Bulk Specific Gravity (Gmb) Mg/m <sup>3</sup>	2.286	2.221	2.288	2.141	2.370
Maximum Specific Gravity (Gmm) Mg/m <sup>3</sup>	2.502	2.500	2.515	2.537	2.494
Percent Compaction (corrected) %	91.5	88.9	91.0	85.2	95.0
<b>Date Paved:</b>	July 11, 2023	July 11, 2023	July 11, 2023	July 11, 2023	July 11, 2023
<b>Date Sampled:</b>	July 20, 2023	July 20, 2023	July 20, 2023	July 20, 2023	July 20, 2023
<b>Lane:</b>	EB Pass Lane	EB Pass Lane	EB Pass Lane	EB Pass Lane	EB Pass Lane
<b>Station:</b>	2+000	1+900	1+800	1+700	1+615
<b>Condition of Sample:</b>	Good	Good	Good	Good	Good

**Remarks:** \*Sample was not cut, tested core as received

*Typo in original results*

**Issued by:**

Tina Gauthier, Laboratory Manager

# HOT MIX ASPHALT TEST REPORT PERCENT COMPACTION



**Contract Number:** ENG 21-38  
**Road Name:** Kingsway (MR #55)  
**Region:** City of Greater Sudbury  
**Lot Number:** 3  
**Contractor:** RSR  
**Mix Type:** HL3-HIR

**Date Tested:** August 1, 2023  
**Date Reported:** July 8, 2023  
**WSP Project No.:** CA0007261.6367

Material Properties	Sublot				
	1	2	3	4	5
Thickness (as received) mm	44	79	49	91	45
HIR Thickness (as received) mm	35	33	45	40	45
Thickness (as cut) mm	34	29	45	39	45*
Bonded or Unbonded	Unbonded	Bonded	Unbonded	Bonded	Unbonded
Bulk Specific Gravity (Gmb) Mg/m <sup>3</sup>	2.219	2.228	2.352	2.298	2.275
Maximum Specific Gravity (Gmm) Mg/m <sup>3</sup>	2.525	2.491	2.484	2.493	2.497
Percent Compaction (corrected) %	88.5	90.5	94.7	92.4	91.1
<b>Date Paved:</b>	August 11, 2023				
<b>Date Sampled:</b>	August 21, 2023				
<b>Lane:</b>	EB Pass Lane				
<b>Station:</b>	1+468	1+370	1+270	1+000	0+900
<b>Condition of Sample:</b>	Good	Good	Good	Good	Good
Material Properties	Sublot				
	6	7	8	9	10
Thickness (as received) mm	69	86			
HIR Thickness (as received) mm	47	45			
Thickness (as cut) mm	43	45			
Bonded or Unbonded	Bonded	Bonded			
Bulk Specific Gravity (Gmb) Mg/m <sup>3</sup>	2.394	2.358			
Maximum Specific Gravity (Gmm) Mg/m <sup>3</sup>	2.493	2.506			
Percent Compaction (corrected) %	96.0	94.1			
<b>Date Paved:</b>	August 11, 2023	August 11, 2023			
<b>Date Sampled:</b>	August 21, 2023	August 21, 2023			
<b>Lane:</b>	EB Pass Lane	EB Pass Lane			
<b>Station:</b>	0+800	0+735			
<b>Condition of Sample:</b>	Good	Good			

**Remarks:** \*Sample was not cut, tested core as received

**Issued by:**

Tina Gauthier, Laboratory Manager



**PERCENT COMPACTION ASPHALT  
CORES  
LS-262**

CLIENT: City of Greater Sudbury	DATE SAMPLED: 21-Jun-23	MIX CODE.: 1523
CONTRACT NO.: ENG 21-38	DATE RECIEVED: 21-Jun-23	LAB NO.: 8452
PROJECT: Kingsway Road (MR 55) HIR		LOT NO.: 1
LOCATION: 0 + 170	DATE TESTED: 23-Jun-23	SUBLOT NO 1
CONTRACTOR: Road Surface Recycling (R.S.R.)	DATE REPORTED: 24-Jun-23	TESTED BY: R.M/P.A/K.S

**ASPHALT INFORMATION**

IMMEDIATE SUBSTRATE:	-
LIFT:	-
CONDITION:	GOOD
MIX TYPE:	HL-3

**LABORATORY RESULTS**

THICKNESS (mm) AVERAGE	49
Correctional Factor (0.1% for each mm <40mm) (%)	0.0
MASS OF SPECIMEN	1803.2
MASS OF OVEN DRIED SPECIMEN	1770.5
SSD MASS AFTER IMMERSION IN WATER	1833.5
MASS OF SPECIMEN IN WATER	1017.2
TEMPERATURE OF WATER, °C	25
VOLUME	816.3
BULK RELATIVE DENSITY (BRD)	2.209
<b>BULK RELATIVE DENSITY (BRD) - CORRECTED</b>	<b>2.209</b>
MIX PROPERTIES - MAXIMUM RELATIVE DENSITY (MRD)	2.511
PERCENT COMPACTION (%)	88.0
<b>PERCENT COMPACTION - CORRECTED (%)</b>	<b>88.0</b>

**COMMENTS:**



**PERCENT COMPACTION ASPHALT  
CORES  
LS-262**

CLIENT: City of Greater Sudbury	DATE SAMPLED: 22-Jun-23	MIX CODE.: 1523
CONTRACT NO.: ENG 21-38	DATE RECIEVED: 22-Jun-23	LAB NO.: 8453
PROJECT: Kingsway Road (MR 55) HIR		LOT NO.: 1
LOCATION: 1 + 065	DATE TESTED: 24-Jun-23	SUBLOT NO 2
CONTRACTOR: Road Surface Recycling (R.S.R.)	DATE REPORTED: 24-Jun-23	TESTED BY: R.M/P.A/K.S

**ASPHALT INFORMATION**

IMMEDIATE SUBSTRATE:	-
LIFT:	-
CONDITION:	GOOD
MIX TYPE:	HL-3

**LABORATORY RESULTS**

THICKNESS (mm) AVERAGE	44
Correctional Factor (0.1% for each mm <40mm) (%)	0.0
MASS OF SPECIMEN	1830.5
MASS OF OVEN DRIED SPECIMEN	1816.9
SSD MASS AFTER IMMERSION IN WATER	1832.0
MASS OF SPECIMEN IN WATER	1057.8
TEMPERATURE OF WATER, °C	25
VOLUME	774.2
BULK RELATIVE DENSITY (BRD)	2.364
<b>BULK RELATIVE DENSITY (BRD) - CORRECTED</b>	<b>2.364</b>
MIX PROPERTIES - MAXIMUM RELATIVE DENSITY (MRD)	2.511
PERCENT COMPACTION (%)	94.2
<b>PERCENT COMPACTION - CORRECTED (%)</b>	<b>94.2</b>

**COMMENTS:**



**PERCENT COMPACTION ASPHALT  
CORES  
LS-262**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	22-Jun-23	MIX CODE.:	1523
CONTRACT NO.:	ENG 21-38	DATE RECIEVED:	22-Jun-23	LAB NO.:	8454
PROJECT:	Kingsway Road (MR 55) HIR			LOT NO.:	1
LOCATION:	1 + 190	DATE TESTED:	24-Jun-23	SUBLOT NO	3
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	24-Jun-23	TESTED BY:	R.M/P.A/K.S

**ASPHALT INFORMATION**

IMMEDIATE SUBSTRATE:	-
LIFT:	-
CONDITION:	GOOD
MIX TYPE:	HL-3

**LABORATORY RESULTS**

THICKNESS (mm) AVERAGE	52
Correctional Factor (0.1% for each mm <40mm) (%)	0.0
MASS OF SPECIMEN	2275.5
MASS OF OVEN DRIED SPECIMEN	2261.0
SSD MASS AFTER IMMERSION IN WATER	2277.1
MASS OF SPECIMEN IN WATER	1314.7
TEMPERATURE OF WATER, °C	25
VOLUME	962.4
BULK RELATIVE DENSITY (BRD)	2.364
<b>BULK RELATIVE DENSITY (BRD) - CORRECTED</b>	<b>2.364</b>
MIX PROPERTIES - MAXIMUM RELATIVE DENSITY (MRD)	2.511
PERCENT COMPACTION (%)	94.2
<b>PERCENT COMPACTION - CORRECTED (%)</b>	<b>94.2</b>

**COMMENTS:**



**PERCENT COMPACTION ASPHALT  
CORES  
LS-262**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	28-Jun-23	MIX CODE.:	1523
CONTRACT NO.:	ENG 21-38	DATE RECIEVED:	28-Jun-23	LAB NO.:	8456
PROJECT:	Kingsway Road (MR 55) HIR			LOT NO.:	1
LOCATION:	1 + 635 o/s 11.0m from EOP	DATE TESTED:	28-Jun-23	SUBLOT NO	4
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	30-Jun-23	TESTED BY:	R.M/P.A/K.S

**ASPHALT INFORMATION**

IMMEDIATE SUBSTRATE:	-
LIFT:	-
CONDITION:	GOOD
MIX TYPE:	HL-3

**LABORATORY RESULTS**

THICKNESS (mm) AVERAGE	48
Correctional Factor (0.1% for each mm <40mm) (%)	0.0
MASS OF SPECIMEN	1981.2
MASS OF OVEN DRIED SPECIMEN	1963.6
SSD MASS AFTER IMMERSION IN WATER	1984.3
MASS OF SPECIMEN IN WATER	1140.3
TEMPERATURE OF WATER, °C	25
VOLUME	844.0
BULK RELATIVE DENSITY (BRD)	2.327
<b>BULK RELATIVE DENSITY (BRD) - CORRECTED</b>	<b>2.327</b>
MIX PROPERTIES - MAXIMUM RELATIVE DENSITY (MRD)	2.510
PERCENT COMPACTION (%)	92.7
<b>PERCENT COMPACTION - CORRECTED (%)</b>	<b>92.7</b>

**COMMENTS:**



**PERCENT COMPACTION ASPHALT  
CORES  
LS-262**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	29-Jun-23	MIX CODE.:	1523
CONTRACT NO.:	ENG 21-38	DATE RECIEVED:	29-Jun-23	LAB NO.:	8457
PROJECT:	Kingsway Road (MR 55) HIR			LOT NO.:	1
LOCATION:	2 + 694 o/s 11.0m from EOP	DATE TESTED:	29-Jun-23	SUBLOT NO	5
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	30-Jun-23	TESTED BY:	R.M/P.A/K.S

**ASPHALT INFORMATION**

IMMEDIATE SUBSTRATE:	-
LIFT:	-
CONDITION:	GOOD
MIX TYPE:	HL-3

**LABORATORY RESULTS**

THICKNESS (mm) AVERAGE	42
Correctional Factor (0.1% for each mm <40mm) (%)	0.0
MASS OF SPECIMEN	1622.6
MASS OF OVEN DRIED SPECIMEN	1594.0
SSD MASS AFTER IMMERSION IN WATER	1624.2
MASS OF SPECIMEN IN WATER	926.8
TEMPERATURE OF WATER, °C	25
VOLUME	697.4
BULK RELATIVE DENSITY (BRD)	2.286
<b>BULK RELATIVE DENSITY (BRD) - CORRECTED</b>	<b>2.286</b>
MIX PROPERTIES - MAXIMUM RELATIVE DENSITY (MRD)	2.505
PERCENT COMPACTION (%)	91.2
<b>PERCENT COMPACTION - CORRECTED (%)</b>	<b>91.2</b>

**COMMENTS:**



**PERCENT COMPACTION ASPHALT  
CORES  
LS-262**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	29-Jun-23	MIX CODE.:	1523
CONTRACT NO.:	ENG 21-38	DATE RECIEVED:	29-Jun-23	LAB NO.:	8458
PROJECT:	Kingsway Road (MR 55) HIR			LOT NO.:	1
LOCATION:	3 + 325 o/s 8.0m from EOP	DATE TESTED:	29-Jun-23	SUBLOT NO	6
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	30-Jun-23	TESTED BY:	R.M/P.A/K.S

**ASPHALT INFORMATION**

IMMEDIATE SUBSTRATE:	-
LIFT:	-
CONDITION:	GOOD
MIX TYPE:	HL-3

**LABORATORY RESULTS**

THICKNESS (mm) AVERAGE	50
Correctional Factor (0.1% for each mm <40mm) (%)	0.0
MASS OF SPECIMEN	2179.4
MASS OF OVEN DRIED SPECIMEN	2145.9
SSD MASS AFTER IMMERSION IN WATER	2184.7
MASS OF SPECIMEN IN WATER	1246.4
TEMPERATURE OF WATER, °C	25
VOLUME	938.3
BULK RELATIVE DENSITY (BRD)	2.287
<b>BULK RELATIVE DENSITY (BRD) - CORRECTED</b>	<b>2.287</b>
MIX PROPERTIES - MAXIMUM RELATIVE DENSITY (MRD)	2.505
PERCENT COMPACTION (%)	91.3
<b>PERCENT COMPACTION - CORRECTED (%)</b>	<b>91.3</b>

**COMMENTS:**



**PERCENT COMPACTION ASPHALT  
CORES  
LS-262**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	30-Jun-23	MIX CODE.:	1523
CONTRACT NO.:	ENG 21-38	DATE RECIEVED:	30-Jun-23	LAB NO.:	8460
PROJECT:	Kingsway Road (MR 55) HIR			LOT NO.:	1
LOCATION:	3 + 492 o/s 14.0m from EOP	DATE TESTED:	30-Jun-23	SUBLOT NO	7
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	24-Jun-23	TESTED BY:	R.M/P.A/K.S

**ASPHALT INFORMATION**

IMMEDIATE SUBSTRATE:	-
LIFT:	-
CONDITION:	GOOD
MIX TYPE:	HL-3

**LABORATORY RESULTS**

THICKNESS (mm) AVERAGE	52
Correctional Factor (0.1% for each mm <40mm) (%)	0.0
MASS OF SPECIMEN	2353.8
MASS OF OVEN DRIED SPECIMEN	2343.4
SSD MASS AFTER IMMERSION IN WATER	2355.8
MASS OF SPECIMEN IN WATER	1368.4
TEMPERATURE OF WATER, °C	25
VOLUME	987.4
BULK RELATIVE DENSITY (BRD)	2.373
<b>BULK RELATIVE DENSITY (BRD) - CORRECTED</b>	<b>2.373</b>
MIX PROPERTIES - MAXIMUM RELATIVE DENSITY (MRD)	2.499
PERCENT COMPACTION (%)	95.0
<b>PERCENT COMPACTION - CORRECTED (%)</b>	<b>95.0</b>

**COMMENTS:**



**PERCENT COMPACTION ASPHALT  
CORES  
LS-262**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	11-Jul-23	MIX CODE.:	1523
CONTRACT NO.:	ENG 21-38	DATE RECIEVED:	11-Jul-23	LAB NO.:	8462
PROJECT:	Kingsway Road (MR 55) HIR			LOT NO.:	1
LOCATION:	3 + 025 o/s 0.3m from Island	DATE TESTED:	11-Jul-23	SUBLOT NO	8
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	12-Jul-23	TESTED BY:	R.M/P.A/K.S

**ASPHALT INFORMATION**

IMMEDIATE SUBSTRATE:	-
LIFT:	-
CONDITION:	GOOD
MIX TYPE:	HL-3

**LABORATORY RESULTS**

THICKNESS (mm) AVERAGE	21
Correctional Factor (0.1% for each mm <40mm) (%)	1.9
MASS OF SPECIMEN	1056.2
MASS OF OVEN DRIED SPECIMEN	1034.3
SSD MASS AFTER IMMERSION IN WATER	1076.4
MASS OF SPECIMEN IN WATER	593.7
TEMPERATURE OF WATER, °C	25
VOLUME	482.7
BULK RELATIVE DENSITY (BRD)	2.143
<b>BULK RELATIVE DENSITY (BRD) - CORRECTED</b>	<b>2.143</b>
MIX PROPERTIES - MAXIMUM RELATIVE DENSITY (MRD)	2.499
PERCENT COMPACTION (%)	85.7
<b>PERCENT COMPACTION - CORRECTED (%)</b>	<b>87.6</b>

**COMMENTS:**



**PERCENT COMPACTION ASPHALT  
CORES  
LS-262**

CLIENT:	City of Greater Sudbury	DATE SAMPLED:	11-Jul-23	MIX CODE.:	1523
CONTRACT NO.:	ENG 21-38	DATE RECEIVED:	11-Jul-23	LAB NO.:	8463
PROJECT:	Kingsway Road (MR 55) HIR			LOT NO.:	1
LOCATION:	Z + 826 o/s 0.5m from Yellow Line	DATE TESTED:	11-Jul-23	SUBLOT NO	9
CONTRACTOR:	Road Surface Recycling (R.S.R.)	DATE REPORTED:	12-Jul-23	TESTED BY:	R.M/P.A/K.S

**ASPHALT INFORMATION**

IMMEDIATE SUBSTRATE:	-
LIFT:	-
CONDITION:	GOOD
MIX TYPE:	HL-3

**LABORATORY RESULTS**

THICKNESS (mm) AVERAGE	30
Correctional Factor (0.1% for each mm <40mm) (%)	1.0
MASS OF SPECIMEN	1447.7
MASS OF OVEN DRIED SPECIMEN	1435.1
SSD MASS AFTER IMMERSION IN WATER	1450.1
MASS OF SPECIMEN IN WATER	820.4
TEMPERATURE OF WATER, °C	25
VOLUME	629.7
BULK RELATIVE DENSITY (BRD)	2.279
<b>BULK RELATIVE DENSITY (BRD) - CORRECTED</b>	<b>2.279</b>
MIX PROPERTIES - MAXIMUM RELATIVE DENSITY (MRD)	2.528
PERCENT COMPACTION (%)	90.2
<b>PERCENT COMPACTION - CORRECTED (%)</b>	<b>91.2</b>

**COMMENTS:**

# APPENDIX D-3

## Core Photos

## APPENDIX D - HIR CORE PHOTOS

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT LOCATION** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

ENCLOSURE

1

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #ffff00;"><b>PHOTOGRAPH</b></td> <td style="text-align: center;"><b>1</b></td> </tr> </table>	<b>PHOTOGRAPH</b>	<b>1</b>
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<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #ffff00;"><b>July 19_Lot# 1 (Sub-1-10)</b></td> </tr> <tr> <td style="text-align: center;">STA. 2+600</td> </tr> </table>		<b>July 19_Lot# 1 (Sub-1-10)</b>	STA. 2+600
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## APPENDIX D - HIR CORE PHOTOS

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT LOCATION** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

ENCLOSURE

2

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<b>July 19_Lot# 2-2</b>							
STA. 2+400							

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<b>July 19_Lot# 2-3</b>							
STA. 2+300							

## APPENDIX D - HIR CORE PHOTOS

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
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ENCLOSURE

3

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## APPENDIX D - HIR CORE PHOTOS

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ENCLOSURE

4

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## APPENDIX D - HIR CORE PHOTOS

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ENCLOSURE

5

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## APPENDIX D- HIR CORE PHOTOS

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**PROJECT LOCATION** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

ENCLOSURE

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	<b>PHOTOGRAPH</b>	<b>11</b>
<b>July 20_Lot# 2-10</b>		
STA. 1+615		

	<b>PHOTOGRAPH</b>	<b>12</b>
<b>July 21_Lot# 3-2</b>		
STA. 1+370		

## APPENDIX D - HIR CORE PHOTOS

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT LOCATION** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

ENCLOSURE

7

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<b>July 21_Lot# 3-4</b>							
STA. 1+000							

## APPENDIX D - HIR CORE PHOTOS

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT LOCATION** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

ENCLOSURE

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<b>July 21_Lot# 3-5</b>							
STA. 0+900							

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<b>PHOTOGRAPH</b>	<b>16</b>						
<b>July 21_Lot# 3-6</b>							
STA. 0+800							



## APPENDIX D - HIR CORE PHOTOS

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT LOCATION** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

ENCLOSURE

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<b>PHOTOGRAPH</b>	<b>17</b>
<b>July 21_Lot# 3-7</b>	
STA. 0+735	

# APPENDIX D-4

## Penetration Results & PGAC Results



**PENETRATION OF  
BITUMINOUS MATERIAL  
(MTO LS-200)**

City of Greater Sudbury  
200 Brady Street  
Sudbury, ON, P3A 5P3

July 28, 2023  
WSP Project Number: CA0007261.6367

Sample Description: **ENG 21-38, Sudbury, Kingsway (MR 55), 1, 61265, Supplier:RSR**

Date Sampled:	July 11, 2023	Date Tested:	July 25, 2023
Date Received:	July 14, 2023	Tested By:	C. Nickolson

Sample ID	Golder Laboratory Number	Location	Average Penetration (mm)
Lot 1 Sub lot 1	WHB23-02224	Whitby	71
Recovery of asphalt cement by Rotavapor as per MTO LS-284.			

Data Input By: C. Nickolson

Reviewed by: \_\_\_\_\_

John Taylor, Laboratory Supervisor



Notice: The test data given herein pertain to the sample provided, and may not be applicable to material from other production zones/periods.  
This report constitutes a testing service only. Interpretation of the data given here may be provided upon request.

WSP Canada Inc., 100 Scotia Court Whitby, Ontario, Canada L1N 8Y6 Tel: 905-723-2727 Fax: 905-723-2182



**PENETRATION OF  
BITUMINOUS MATERIAL  
(MTO LS-200)**

City of Greater Sudbury  
200 Brady Street  
Sudbury, ON, P3A 5P3

July 31, 2023  
WSP Project Number: CA0007261.6367

Sample Description: **ENG 21-38, Kingsway (MR 55), East Bound Fast Lane, Lot 2, Sta. 1+745, Center of lane, Supplier: Recycled**

Date Sampled: July 11, 2023	Date Tested: July 31, 2023
Date Received: July 14, 2023	Tested By: C. Nickolson

Sample ID	WSP Laboratory Number	Location	Average Penetration (mm)
Lot 2	WHB23-02507	Kingsway (MR 55)	138
Recovery of asphalt cement by Rotavapor as per MTO LS-284.			

Data Input By: C. Nickolson

Reviewed by: \_\_\_\_\_

  
Jeremy Rose, Laboratory Supervisor



Notice: The test data given herein pertain to the sample provided, and may not be applicable to material from other production zones/periods.  
This report constitutes a testing service only. Interpretation of the data given here may be provided upon request.

WSP Canada Inc., 100 Scotia Court Whitby, Ontario, Canada L1N 8Y8 Tel: 905-723-2727 Fax: 905-723-2182



# HIGH AND LOW TEMPERATURE CLASSIFICATION OF PERFORMANCE GRADED ASPHALT CEMENT PG 64-34 RECOVERED FROM HOT MIX ASPHALT (OPSS.MUNI 1101)

Greater Sudbury

July-24-23

WSP Project Number: CA0007261.6367

Attention: Rino Camiello

Sample Description: Contract # ENG21-38, Kingsway MR #55, Lot 1 Sublot 1, HIR HL3 Mix 1523,  
Sta. 0+220

Date Sampled: June 20, 2023		Submitted Grade: PG 64-34		
Date Received: June 26, 2023		WSP Lab No.: WHB23-02223		
Date Tested: July 3, 2023		Tested By: E. Shafiee, C. Nickolson		
Continuous Grade: PG 61.1-17.3(15.9)		Final Grade: PG 58-16		
Test Property	Test Result	OPSS.MUNI 1101 Requirements		Test Method
Recovered Binder				
Ash Content: (% by Mass)	0.7	Acceptable ≤ 1.0	Rejectable > 1.0	MTO LS-227
Dynamic Shear, G*/Sin δ, at 58 °C, 10 rad/s: (kPa)	2.98	2.20 Min.		AASHTO T315
Dynamic Shear, G*/Sin δ, at 64 °C, 10 rad/s: (kPa)	1.48 **	2.20 Min.		
Pressure Aging Vessel Residue				
Dynamic Shear, G*/Sin δ, at 16 °C, 10 rad/s: (kPa)	4983	5000 Max.		AASHTO T315
Dynamic Shear, G*/Sin δ, at 13 °C, 10 rad/s: (kPa)	5816 **	5000 Max.		
Creep Stiffness at -8 °C	S at 60s (MPa)	31	300 Max.	
	m-value at 60s	0.308	0.300 Min.	
Creep Stiffness at -12 °C	S at 60s (MPa)	49 **	300 Max.	
	m-value at 60s	0.271 **	0.300 Min.	
DENT, CTOD, δ <sub>t</sub> at 15 °C: (mm)	5.5	Acceptable	Rejectable	MTO LS-299
		≥ 12.0	< 12.0	
eBBR Grade Loss (°C)	6.2	≤ 6.0	> 6.0	MTO LS-308
eBBR Low Temperature Limiting Grade, LTLG: (°C)	-3.5	≤ -31.0	> -31.0	
<p>Note: Shaded areas indicate results lying outside of acceptable limits. ** Testing results used only to determine actual high and/or low temperature grade. These results do not indicate that the sample does not meet specifications.</p> <p>Recovery of asphalt cement was completed as per MTO LS-284</p>				

Data Input By: E. Shafiee

Reviewed by:

  
Jeremy Rose, Laboratory Supervisor



Notice: The test data given herein pertain to the sample provided, and may not be applicable to material from other production zones/periods. This report constitutes a testing service only. Interpretation of the data given here may be provided upon request.

WSP Canada Inc., 100 Scotia Court Whitby, Ontario, Canada L1N 8Y6 Tel: 905-723-2727 Fax: 905-723-2182



## HIGH AND LOW TEMPERATURE CLASSIFICATION OF PERFORMANCE GRADED ASPHALT CEMENT PG 64-34 RECOVERED FROM HOT MIX ASPHALT (OPSS.MUNI 1101)

City of Greater Sudbury  
200 Brady Street  
Sudbury, ON, P3A 5P3

August-01-23  
WSP Project Number: CA0007261.6367  
Attention: Rino Carniello

Sample Description: Contract # ENG21-38, Kingsway MR #55 EBL, Lot 2, HIR HL3 Mix 1523, Sta. 1+745

Date Sampled: July 11, 2023		Submitted Grade: PG 64-34		
Date Received: July 12, 2023		WSP Lab No.: WHB23-02506		
Date Tested: July 24, 2023		Tested By: E. Shafiee, C. Nickolson		
<b>Continuous Grade: PG 49.6-34.6(4.7)</b>		<b>Final Grade: PG 46-34</b>		
Test Property	Test Result	OPSS.MUNI 1101 Requirements		Test Method
<b>Recovered Binder</b>				
Ash Content: (% by Mass)	0.6	Acceptable	Rejectable	MTO L5-227
		≤ 1.0	> 1.0	
Dynamic Shear, G*/Sin δ, at 40 °C, 10 rad/s: (kPa)	3.15	2.20 Min.		AASHTO T315
Dynamic Shear, G*/Sin δ, at 52 °C, 10 rad/s: (kPa)	1.57 **	2.20 Min.		
<b>Pressure Aging Vessel Residue</b>				
Dynamic Shear, G*/Sin δ, at 7 °C, 10 rad/s: (kPa)	4258	5000 Max.		AASHTO T315
Dynamic Shear, G*/Sin δ, at 4 °C, 10 rad/s: (kPa)	5233 **	5000 Max.		
Creep Stiffness at -24 °C	S at 60s (MPa)	65	300 Max.	AASHTO T313
	m-value at 60s	0.304	0.300 Min.	
Creep Stiffness at -30 °C	S at 60s (MPa)	128 **	300 Max.	
	m-value at 60s	0.261 **	0.300 Min.	
DENT, CTOD, δ, at 15 °C: (mm)	4.8	Acceptable	Rejectable	MTO L5-289
		≥ 12.0	< 12.0	
wBBR Grade Loss (°C)	9.7	≤ 6.0	> 6.0	MTO L5-308
wBBR Low Temperature Limiting Grade, LTLG: (°C)	-29.9	≤ -31.0	> -31.0	
<p>Note: Shaded areas indicate results lying outside of acceptable limits. ** Testing results used only to determine actual high and/or low temperature grade. These results do not indicate that the sample does not meet specifications.</p> <p>Recovery of asphalt cement was completed as per MTO L5-284</p>				

Data Input By: E. Shafiee

Reviewed by:

  
Jeremy Rose, Laboratory Supervisor



Notice: The test data given herein pertain to the sample provided, and may not be applicable to material from other production zones/periods. This report constitutes a testing service only. Interpretation of the data given here may be provided upon request.

WSP Canada Inc., 100 Scotia Court Whitby, Ontario, Canada L1N 8Y8 Tel: 905-723-2727 Fax: 905-723-2182

## Performance Grade Asphalt Cement Grading Test Report

**Project No :** 22-1008-02  
**Client :** Road Surface Recycling  
**Attention :** Mr. Frank Crupi  
**Address :** 57 Notion Road, Ajax ON, L1S 6K7

**PNJ Lab No.:** 8576  
**Date Sampled:** 28-Jun-23  
**Sample Field ID:** Lot 1-3, Stn 1+817, WB Lane  
**Tested By :** Akash Jani  
**Contract :** ENG - 21-38 Kingsway Rd.

Specified Tests and PGAC Characteristics	Test Temp.	Unit	Specification Min.	Specification Max.	Sample Results	Low Temp Graphs
--	------------	------	--------------------	--------------------	----------------	-----------------

### Tests on Recovered PGAC

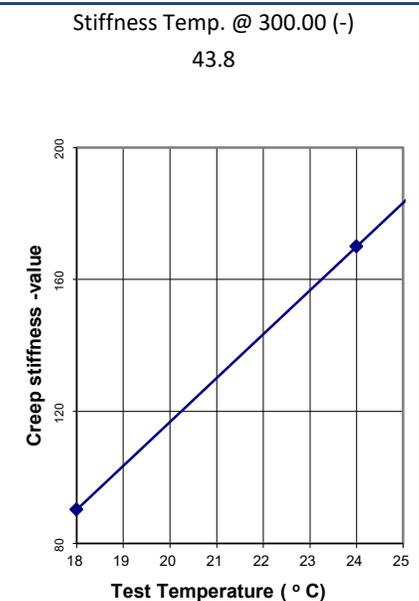
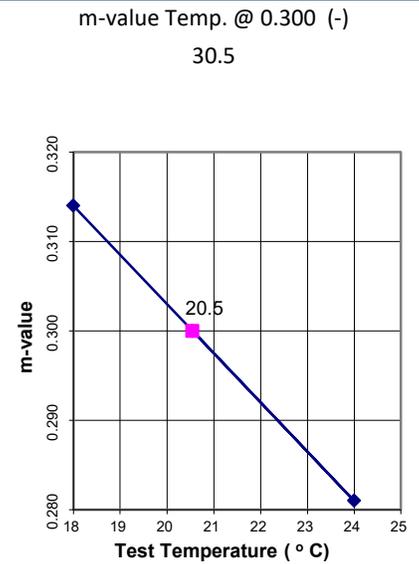
Ash Content 1.0 % Maximum		%	-	0.60%	0.945
Penetration, ASTM D5	25.0	dmm	-	-	56.8
Complex Shear Modulus, G*	58.0	kPa	-	-	-
Phase Angle, d		degree	-	-	-
G* / sin d		kPa	1.0Kpa	-	-
Complex Shear Modulus, G*	64.0	kPa	-	-	-
Phase Angle, d		degree	-	-	-
G* / sin d		kPa	1.0Kpa	-	-

### Tests on RTFO Residue

AASHTO T240 - Mass Loss / Gain					
Mass Change (use minus sign "-" if loss)	163 °C	% Loss	1.00%	-	-
AASHTO T315, Dynamic Shear Rheometer					
Complex Shear Modulus, G*	64.0	kPa	-	-	4.033
Phase Angle, d		degree	-	-	69.8
G* / sin d		kPa	2.2 Kpa	-	4.297
Complex Shear Modulus, G*	70.0	kPa	-	-	2.083
Phase Angle, d		degree	-	-	72.5
G* / sin d		kPa	2.2 Kpa	-	2.183

### Tests on PAV Residue

AASHTO T315, Dynamic Shear Rheometer					
Complex Shear Modulus, G*	13.0	kPa	-	-	7067.6
Phase Angle, d		degree	-	-	36.2
G* .sin d		kPa	-	5000.0	4176.3
Complex Shear Modulus, G*	10.0	kPa	-	-	9826
Phase Angle, d		degree	-	-	34.6
G* / sin d		kPa	-	5000.0	5583.5
AASHTO T313, Bending Beam Rheometer					
Creep Stiffness	-18.0	MPa	-	300.0	90.2
Slope, m-value		-	0.300	-	0.314
Creep Stiffness	-24.0	MPa	-	300.0	170
Slope, m-value		-	0.300	-	0.281



**Comments:** Tested PGAC Sample meets 64°C, 13°C, and -18°C, Grade as PG ( 64-28 )  
 True continous High Grade is 69.8°C and Low Grade is -30.5°C

Date Issued: July 17, 2023

Reviewed By:   
 Prabhdeep Lubana, P. Eng.

## Performance Grade Asphalt Cement Grading Test Report

**Project No :** 22-1008-02  
**Client :** Road Surface Recycling  
**Attention :** Mr. Frank Crupi  
**Address :** 57 Notion Road, Ajax ON, L1S 6K7

**PNJ Lab No.:** 8687  
**Date Sampled:** 11-Jul-23  
**Sample Field ID:** Lot -2, Stn 1+745, EB Lane  
**Tested By :** Akash Jani  
**Contract :** ENG - 21-38 Kingsway Rd.

Specified Tests and PGAC Characteristics	Test Temp.	Unit	Specification Min.	Max.	Sample Results	Low Temp Graphs
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### Tests on Recovered PGAC

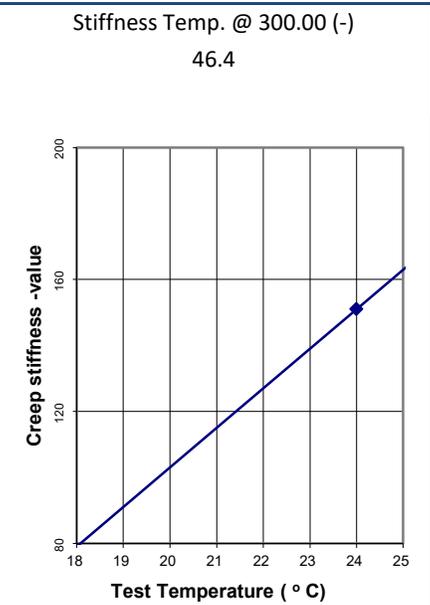
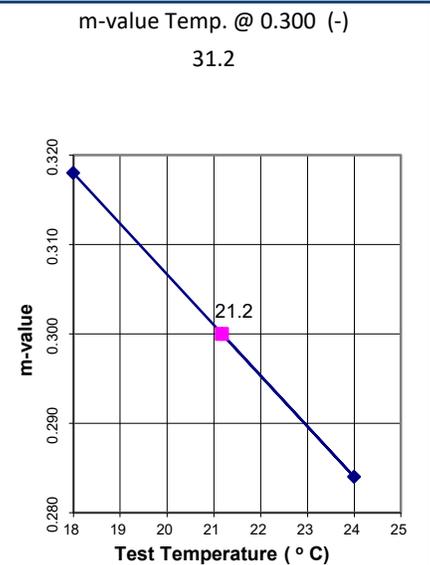
Ash Content 1.0 % Maximum		%	-	0.60%	0.955
Penetration, ASTM D5	25.0	dmm	-	-	58.3
Complex Shear Modulus, G*	58.0	kPa	-	-	-
Phase Angle, d		degree	-	-	-
G* / sin d		kPa	1.0Kpa	-	-
Complex Shear Modulus, G*	64.0	kPa	-	-	-
Phase Angle, d		degree	-	-	-
G* / sin d		kPa	1.0Kpa	-	-

### Tests on RTFO Residue

AASHTO T240 - Mass Loss / Gain					
Mass Change (use minus sign "-" if loss)	163 °C	% Loss	1.00%	-	-
AASHTO T315, Dynamic Shear Rheometer					
Complex Shear Modulus, G*	64.0	kPa	-	-	3.802
Phase Angle, d		degree	-	-	66.6
G* / sin d		kPa	2.2 Kpa	-	4.142
Complex Shear Modulus, G*	70.0	kPa	-	-	2.019
Phase Angle, d		degree	-	-	69
G* / sin d		kPa	2.2 Kpa	-	2.162

### Tests on PAV Residue

AASHTO T315, Dynamic Shear Rheometer					
Complex Shear Modulus, G*	10.0	kPa	-	-	8500.57
Phase Angle, d		degree	-	-	34.4
G* .sin d		kPa	-	5000.0	4805.21
Complex Shear Modulus, G*	10.0	kPa	-	-	11742.7
Phase Angle, d		degree	-	-	33
G* / sin d		kPa	-	5000.0	6387.5
AASHTO T313, Bending Beam Rheometer					
Creep Stiffness	-18.0	MPa	-	300.0	79
Slope, m-value		-	0.300	-	0.318
Creep Stiffness	-24.0	MPa	-	300.0	151
Slope, m-value		-	0.300	-	0.284



**Comments:** Tested PGAC Sample meets 64°C, 10°C, and -18°C, Grade as PG ( 64-28 )  
 True continous High Grade is 69.8°C and Low Grade is -31.2°C

Date Issued: July 17, 2023

Reviewed By :



Prabhdeep Lubana, P. Eng.

# **APPENDIX E-1**

**2023**

**Presence of Hot Mix  
below HIR**

**2023**

**PNJ HIR Mix Design  
for Kingsway (MR55)**

**WSP Canada Inc.**  
 33 Mackenzie Street  
 Sudbury, Ontario, P3C 4Y1  
 Telephone: (705) 524-6861  
 Fax: (705) 524-1984



**SUMMARY OF ASPHALT TEST RESULTS**

<b>Project No.:</b>	CA0007261.6367	<b>Contractor:</b>	N/A
<b>WSP E&amp;I Project #:</b>	TY20202.1100	<b>Asphalt Supplier:</b>	N/A
<b>Project:</b>	CGS HIR ENG 21-38		
<b>Lab #:</b>	G1483		

**FIELD DATA:**

<b>Lot/Sublot#:</b>	Core Sample 1	<b>Date Sampled:</b>	July 21, 2023
<b>Sample Type:</b>	HDBC	<b>Date Received:</b>	July 21, 2023
<b>Sample Location:</b>	Kingsway, EB Curb Lane Sta. 3+550	<b>Date Reported:</b>	August 10, 2023
<b>Municipal Road:</b>	Kingsway		
<b>Job Mix Formula:</b>	N/A	<b>Tested by:</b>	HAB/JM

**Laboratory Test Results**

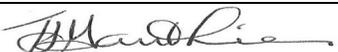
Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
Total Core Thickness as received, mm:	124								
HDBC Lift Thickness tested, mm:	81								
Air Voids (%):	N/A								
Stability (N @ 60 °C):	N/A								
Flow (0.25 mm):	N/A								
% VMA	N/A								
Asphalt Cement Content (%):	4.86								

**Gradation**

Sieve Size (mm)	Results	JMF	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
26.5 mm	100.0								
19.0 mm	98.8								
16.0 mm	94.1								
13.2 mm	83.1								
9.5 mm	68.0								
4.75 mm	50.2								
2.36 mm	39.3								
1.18 mm	30.2								
600 µm	21.9								
300 µm	13.5								
150 µm	7.5								
75 µm	4.7								

**Remarks:** Existing In-situ asphalt  
 Sample tested required an additional 5 minute soak

**Issued by:**

  
 Tina Gauthier, Laboratory Manager

WSP Canada Inc.  
 33 Mackenzie Street  
 Sudbury, Ontario, P3C 4Y1  
 Telephone: (705) 524-6861  
 Fax: (705) 524-1984



**SUMMARY OF ASPHALT TEST RESULTS**

**Project No.:** CA0007261.6367 **Contractor:** N/A  
**WSP E&I Project #:** TY20202.1100 **Asphalt Supplier:** N/A  
**Project:** CGS HIR ENG 21-38  
**Lab #:** G1484

**FIELD DATA:**

**Lot/Sublot#:** Core Sample 2 **Date Sampled:** July 21, 2023  
**Sample Type:** HL3/HDBC **Date Received:** July 21, 2023  
**Sample Location:** Kingsway, EB Curb Lane Sta. 2+250 **Date Reported:** August 10, 2023  
**Municipal Road:** Kingsway  
**Job Mix Formula:** N/A **Tested by:** HAB/JM

**Marshall Properties:**

Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
Total Core Thickness as received, mm:	71								
Lift Thickness tested, mm:	71*								
Air Voids (%):	N/A								
Stability (N @ 60 °C):	N/A								
Flow (0.25 mm):	N/A								
% VMA	N/A								
Asphalt Cement Content (%):	4.88								

**Gradation**

Sieve Size (mm)	Results	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
26.5 mm	100.0							
19.0 mm	100.0							
16.0 mm	100.0							
13.2 mm	100.0							
9.5 mm	86.0							
4.75 mm	60.5							
2.36 mm	48.9							
1.18 mm	37.8							
600 µm	25.9							
300 µm	14.2							
150 µm	6.8							
75 µm	3.9							

**Remarks:** Existing In-situ asphalt  
*\*Tested full core, no clear split within core. Visually, looked like the same material throughout core.*

**Issued by:**

  
 Tina Gauthier, Laboratory Manager

**WSP Canada Inc.**  
 33 Mackenzie Street  
 Sudbury, Ontario, P3C 4Y1  
 Telephone: (705) 524-6861  
 Fax: (705) 524-1984



**SUMMARY OF ASPHALT TEST RESULTS**

<b>Project No.:</b>	CA0007261.6367	<b>Contractor:</b>	N/A
<b>WSP E&amp;I Project #:</b>	TY20202.1100	<b>Asphalt Supplier:</b>	N/A
<b>Project:</b>	CGS HIR ENG 21-38		
<b>Lab #:</b>	G1482		

**FIELD DATA:**

<b>Lot/Sublot#:</b>	Core Sample 1	<b>Date Sampled:</b>	July 21, 2023
<b>Sample Type:</b>	HL3	<b>Date Received:</b>	July 21, 2023
<b>Sample Location:</b>	Kingsway, EB Curb Lane Sta. 3+550	<b>Date Reported:</b>	August 10, 2023
<b>Municipal Road:</b>	Kingsway		
<b>Job Mix Formula:</b>	N/A	<b>Tested by:</b>	HAB/JM

**Laboratory Test Results**

Test	Results	JMF	Variance from JMF	Acceptable Range*	Borderline	Rejectable Range	Acceptable	Borderline	Rejectable
<b>Total Core Thickness as received, mm:</b>	124								
<b>HL3 Lift Thickness tested, mm:</b>	44								
<b>Air Voids (%):</b>	N/A								
<b>Stability (N @ 60 °C):</b>	N/A								
<b>Flow (0.25 mm):</b>	N/A								
<b>% VMA</b>	N/A								
<b>Asphalt Cement Content (%):</b>	4.80								

**Gradation**

Sieve Size (mm)	Results	Variance from JMF	Acceptable Variance*	Borderline	Rejectable Variance	Acceptable	Borderline	Rejectable
26.5 mm	100.0							
19.0 mm	100.0							
16.0 mm	100.0							
13.2 mm	98.5							
9.5 mm	85.1							
4.75 mm	57.8							
2.36 mm	48.4							
1.18 mm	39.1							
600 µm	27.5							
300 µm	14.3							
150 µm	5.6							
75 µm	2.7							

**Remarks:** Existing In-situ asphalt  
 Sample tested required an additional 5 minute soak

**Issued by:**

  
 Tina Gauthier, Laboratory Manager

May 29, 2023

Project No.: 22-1008-02

Road Surface Recycling  
57 Notion Road  
Ajax, Ontario  
L1S 6K7

Attention: Mr. Frank Crupi

Dear Sir:

**Subject: Hot-In-Place Recycling – Mix Design  
Kingsway (MR 55) from Falconbridge Hwy. (MR 86) to 1.5 E of Falconbridge Hwy. (MR 86)  
City of Greater Sudbury**

---

PNJ Engineering Inc. (PNJ) has been retained by RSR Road Surface Recycling Limited, to examine, formulate and produce a Hot-In-Place Recycling mix design for the above captioned project.

In order to complete the mix design, PNJ was supplied with a total of 12 full depth asphalt core specimens. Six cores were taken from Kingsway East Bound and six cores were sampled from Kingsway West Bound. A sample of Asphalt Acetifin Supplement (AAS) was also provided to PNJ to be used as a rejuvenator.

The mix design methodology consisted of performing the following tasks:

- Determine the in-situ properties of the existing surface course material: total thickness, surface layer thicknesses, asphalt content, mix gradation, recovered penetration, table 1.
- Determine if in-situ AC contains Polymers via MSCR Test
- Determine the effect of the rejuvenator on the extracted asphalt cement by adding and analysing various percentages of application, table 2.
- Determine HIR mix Air Voids at the optimum rejuvenator application, and if beneficiating fine aggregates are required to attain compliance, table 3.
- Determine mix gradation after rejuvenation accounting for HIR processing in comparison with the in-situ properties, table 4.
- Establish true PGAC grade for the in-situ extracted binder, and binder after rejuvenation.

#### **Mix Design Criteria**

HIR Depth	50mm
Mix Type	HL3 OPSS
Air Voids	3.5 to 4.5
Penetration	min. 70

PGAC Grade	64-34
Stability (N)	8,900 min.
Flow (0.25mm)	8.0 min.

**Findings**

**The Top 50mm material from the supplied core samples was separated and tested for in-situ properties.** The existing surface course thickness ranges from 34mm to 47mm, with an average of 41mm. The base layer of the core appears to be similar to the surface course. The in-situ properties of the top 50mm material separated, are presented below:

**Table 1  
Existing Surface Course Mix Properties**

<b>Mix Gradation Sieve Size (mm)</b>	<b>Kingsway Percent Passing</b>
16.0	100.00
12.5	99.2
9.5	88.7
4.75	55.3
2.36	43.6
1.18	34.7
0.600	24.7
0.300	13.5
0.150	6.4
0.075	3.4
AC Content (%)	4.71
Penetration (dmm)	41
MSCR	53.34%

The loose mix sample created from the cores was used to establish the mix design. To determine the amount of rejuvenator required, 3 trials were carried out at rejuvenation rates of 4%, 6%, and 8%. The resultant penetration values are presented in the Table below. During the determination of the required penetration, the recovered asphalt samples indicated resistance to the rejuvenation due to presence of polymers in the existing asphalt. To determine the presence of polymers MSCR testing was performed on the recovered asphalt cement. The average percent recovery of the existing asphalt was 53.34%, which confirms the presence of polymers.

**Table 2**  
**Rejuvenator Addition Trials**

Percent Rejuvenator	Penetration (dmm)
4	63
6	73
8	86

Based on the above test results rejuvenator addition of 6.0 percent is recommended.

In addition, the true PGAC Grade was determined at 6.0% rejuvenation. The objective is to achieve a rejuvenated PGAC Grade of 64-34 and lab Air voids in the 3.5% to 4.5% range. Mix properties were determined at this rejuvenation rates and the results are presented in the Tables below.

**Table 3**  
**Mix Properties at Recommended Rejuvenation**

	After Rejuvenation
Rejuvenation Rate (%)	6.0
Bulk Relative Density	2.415
Maximum Relative Density	2.511
Air Voids (%)	3.8
Resultant AC (%)	5.0
Stability (N)	15,445
Flow (0.25mm)	11.4
True PGAC Grade	64.9-36.2

**Table 4**  
**Mix Gradation comparison after Rejuvenation**

Mix Gradation	Before Rejuvenation	After Rejuvenation
Sieve Size (mm)	Percent Passing	Percent Passing
16.0	100.00	100.00
12.5	99.2	99.0
9.5	88.7	88.5
4.75	55.3	57.0
2.36	43.6	44.9
1.18	34.7	35.9
0.600	24.7	25.7
0.300	13.5	14.5
0.150	6.4	7.3
0.075	3.4	4.3
AC Content%	4.71	5.00
Air Voids%		3.8

The results for the mix air voids after rejuvenation are considered to be satisfactory and addition of beneficiating fine aggregates is not required. **The AC content for this project will increase by approximately 0.39% as a result of the required rejuvenation.**

Please note that HIR mix designs are static and may require modification and adjustments after initial HIR production to account for variability within the in-place material. This further is warranted as lab samples may not inherently be representative of the project. Factors may include, pavement anomalies, limited patched or alternative HMA mixes and or surface treatments within contracted road boundaries. Lab designs venture to simulate HIR heating, milling and mixing in the field and use results as an initial guideline starting point. Allowances of up to 2% within the QA / QC Aggregate Gradation Analysis during the HIR process may be considered with no detrimental effect upon the HIR mix and/or its performance. HIR processes can be effected by deleterious materials found on or within the working 50-60mm surface course. Existing surface treatments may pond in depressed or wheel rutted areas and go unchecked for consistency during the original application. This leads to fluctuations in both aggregate gradation and AC content upon recycling and cannot be accounted for, as it infiltrates and impacts both the HIR mix properties.

The above targets values are based on Lab analysis with a limited amount of materials. Sample of the production materials shall be obtained on a daily basis to carry out the quality assurance/quality control allowing for changes to the target in response to the in-place material variability and improve the mix quality.

We trust the above information is satisfactory for your purposes. Please do not hesitate to contact us if you have any questions or further information is required.

Sincerely,  
**PNJ Engineering Inc.**



Prabhdeep Lubana, P.Eng.  
Manager Laboratory Services



Param Dhillon, P. Eng.  
General Manager

## HOT IN-PLACE RECYCLING MIX DESIGN REPORT

HL-3 HIR

**Project Number:** 22-1005-01  
**Specifications:** HL-3 OPSS 1150  
**Contract:** Kingsway - Greater Sudbury  
**Location:** Kingsway - Greater Sudbury  
**Client:** Road Surface Recycling  
**Street:** Kingsway

**Mix No:** 1523  
**Date Completed:** May 29, 2023  
**Asphalt Cement Type:** 64-34  
**Asphalt Cement Supplier:** N/A  
**Mixing Temperature:** 120 °C  
**Compaction Temperature:** 115 °C

### JOB MIX FORMULA

AC %	Seives	50.0	37.5	25.0	19.0	16.0	13.2	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075
5.0	JMF	100.0	100.0	100.0	100.0	100.0	99.0	88.5	57.0	44.9	35.9	25.7	14.5	7.3	4.3

### Aggregate Gradation

CA 1 %																
CA 2 %																
CA 3 %																
FA 1 %																
FA 2 %																
FA 3 %																
FA 4 %																
RAP 1 %																
RAP 2 %																

Properties	Selected	Specification	Immersion Marshall:	N / A	Spec. Min 70
BRD (Gmb)	2.415		Additive Supplier:		
MRD(Gmm)	2.511		Additive Type:	AAS 50	
% Air Voids (Va)	3.8	3.5 4.5	% Additive:	6.0	
% VMA		13.5			
Stability (N)	15,445	8,900	Dust Returned (%):		
Flow (0.25 mm)	11.4	8	Asphalt Film Thickness:		µm

% AC in Mix	4.7
% Rejuvenator Added	0.28
Total AC	5.0

Briquette Wt. (g) :	1250
Recomp Temp. (°C) :	115

	Aggregate Name	Aggregate Source	DSL Number	Specific Gravity	Absorption
CA 1					
CA 2					
CA 3					
FA 1					
FA 2					
FA 3					
FA 4					
RAP 1					
RAP 2					
	Combined Specific Gravity				

- The Mix Design is based on average properties of supplied core samples.

Test Data Certified By:



Param Dhillon, P.Eng.

# TESTING APPENDIX

## **QA & QC Testing General Notes for HIR Mix Compliance.**

### **Gyratory Compactor Testing**

HIR uses rejuvenating oil to adjust the PG Grade (softness) of the existing Asphalt Cement (AC) content within the asphalt road mix. Rejuvenator oil is specifically designed and temperature sensitive. Lab testing temperatures prescribed must and shall be adhered to during lab testing procedures. Applying Pam oils or other release/cutting agents during the lab test procedures increases the rejuvenation of the sample mix by as much as 10%. The unsanctioned use of these agents deems the sample contaminated and test results comprised.

- HIR Mix shall not be exposed to release or cutting agents (Pam Oil or others)
- No release/cutting agents shall be allowed or applied to working areas, benches, tables, vessels, molds or any associated tools that may contact the HIR sample.
- The HIR mix sample to be tested shall be heated to the temperature as indicated in the HIR Mix Design to within +/- 2oC.
- The Gyratory compactor mold/s shall be heated simultaneously with the HIR mix sample in the same oven to ensure mix design test temperature compliance.
- The HIR Mix shall not be heated at any time above the temperature indicated in the Mix Design.

### **Compaction Cores**

Compaction cores shall be prepared and tested according to LS-262 Method of Test for Bulk Relative Density of Compacted Bituminous Mixture

Note: LS-262 does not, mention, indicate nor condone the use of a hammer and chisel to separate core samples. Hammer/Chisel use deems test results invalid.

**LS-262** states the following:

**3.1 Procedure of ASTM D 2726 shall be followed, ....**

**ASTM D 2726** states the following:

**8. Test Specimens:**

**8.3 Specimens shall be free of foreign materials such as seal coat, tack coat, foundation material, soil, paper, or foil. When any of these materials are visually evident, they shall be removed by sawing in accordance with 8.6.**

“Compacted Core samples shall be **saw cut** to trim off excess materials from the bottom of the HIR core sample. No other method of separation shall be used or recognized for test results”.

**PG Grade Procedure:**

Rolling Thin Film Oven (RTFO) Shall not be used on HIR mix samples.

# APPENDIX E-2

## Results of Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

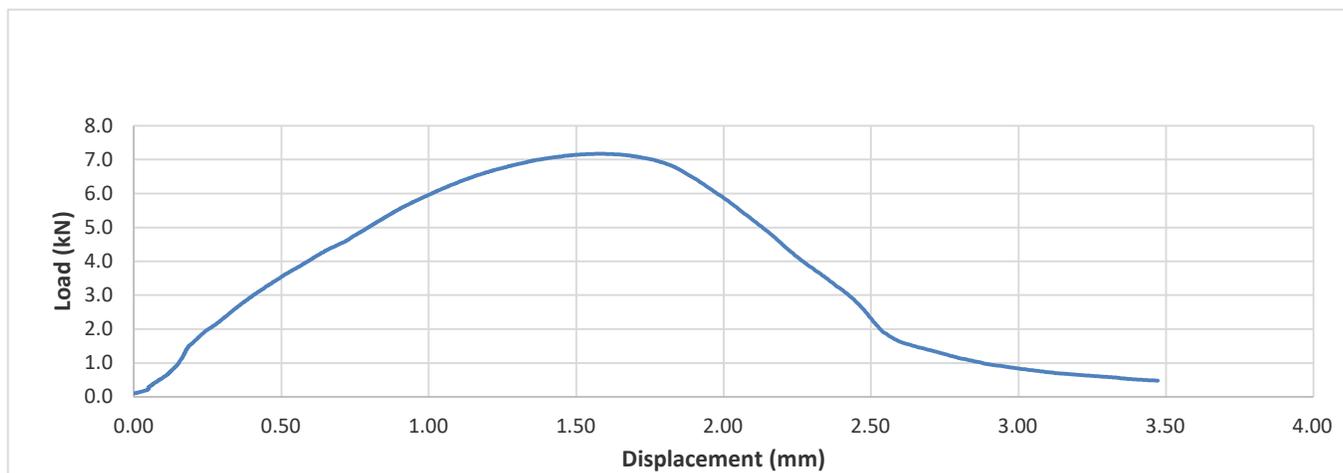
CLIENT:	City of Greater Sudbury	DATE:	11-Aug-23
TEST DATE:	11-Aug-23	WSP LAB #:	A128
PROJECT #:	TY202002.1100	CORE IDENTIFICATION:	Lot 2-2
CLIENT CONTRACT #	Eng 21-38 Part A	QA TAG #:	m/a
LOCATION:	Kingsway MR#55, Sudbury	TRAFFIC DIRECTION:	non
LOCATION OF SAMPLE:	Lot 2-2, Sta.2+400, EB Pass Lane	SUPPLIER:	RSR
DATE SAMPLED :	19-Jul-23	SAMPLED BY:	R.M./RSR
DATE RECEIVED:	3-Aug-23	SAMPLE METHOD :	Core
MIX TYPE:	HIR (HL3)	CONDITIONING:	25
		TEST TEMPERATURE:	25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A128	
CORE IDENTIFICATION:	Lot 2-2	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.1
	D2	144.1
	D3	144.2
	D4	144.1
Average (mm)	144.1	
Std Dev (mm)	0.0	
Thickness (mm)	Top	50.3
	Bottom	50.5

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163143
Normal Load (kPa)	0
Max. Axial Load (kN)	7.17
Interlayer Shear Strength (kPa)	439.5

Failure Surface Location:	Interface
Appearance of Interface	None



Tested by: RP/OL

Reviewed by: O Lazic

## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

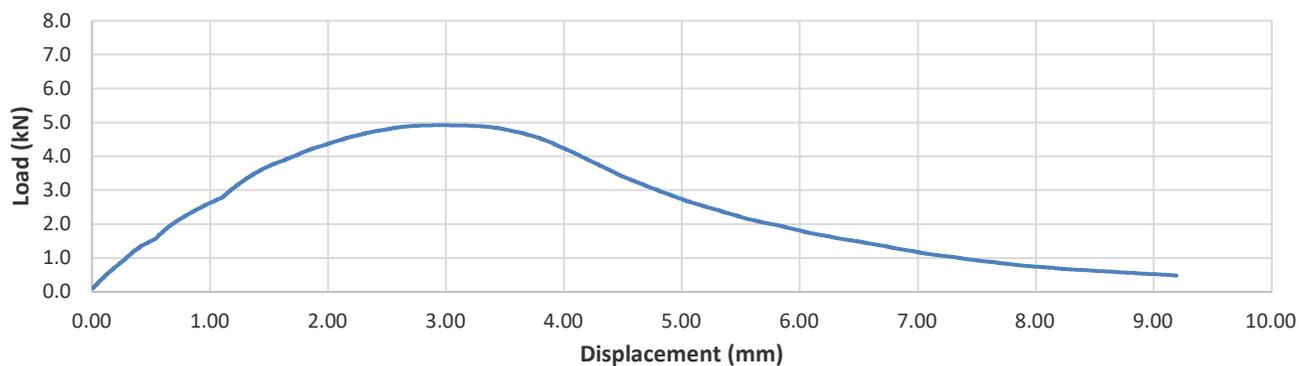
CLIENT:	City of Greater Sudbury	DATE:	11-Aug-23
TEST DATE:	11-Aug-23	WSP LAB #:	A125
PROJECT #:	TY202002.1100	CORE IDENTIFICATION:	Lot 2-3
CLIENT CONTRACT #	Eng 21-38 Part A	QA TAG #:	m/a
LOCATION:	Kingsway MR#55, Sudbury	TRAFFIC DIRECTION:	non
LOCATION OF SAMPLE:	Lot 2-3, Sta.2+300, EB Pass Lane	SUPPLIER:	RSR
DATE SAMPLED :	19-Jul-23	SAMPLED BY:	R.M./RSR
DATE RECEIVED:	3-Aug-23	SAMPLE METHOD :	Core
MIX TYPE:	HIR (HL3)	CONDITIONING:	25
		TEST TEMPERATURE:	25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A125	
CORE IDENTIFICATION:	Lot 2-3	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.1
	D2	144.4
	D3	144.3
	D4	144.1
Average (mm)	144.2	
Std Dev (mm)	0.2	
Thickness (mm)	Top	30.5
	Bottom	50.5

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163369
Normal Load (kPa)	0
Max. Axial Load (kN)	4.92
Interlayer Shear Strength (kPa)	301.2

Failure Surface Location:	Interface
Appearance of Interface	None



Tested by: RP/OL

Reviewed by: O Lazic

## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

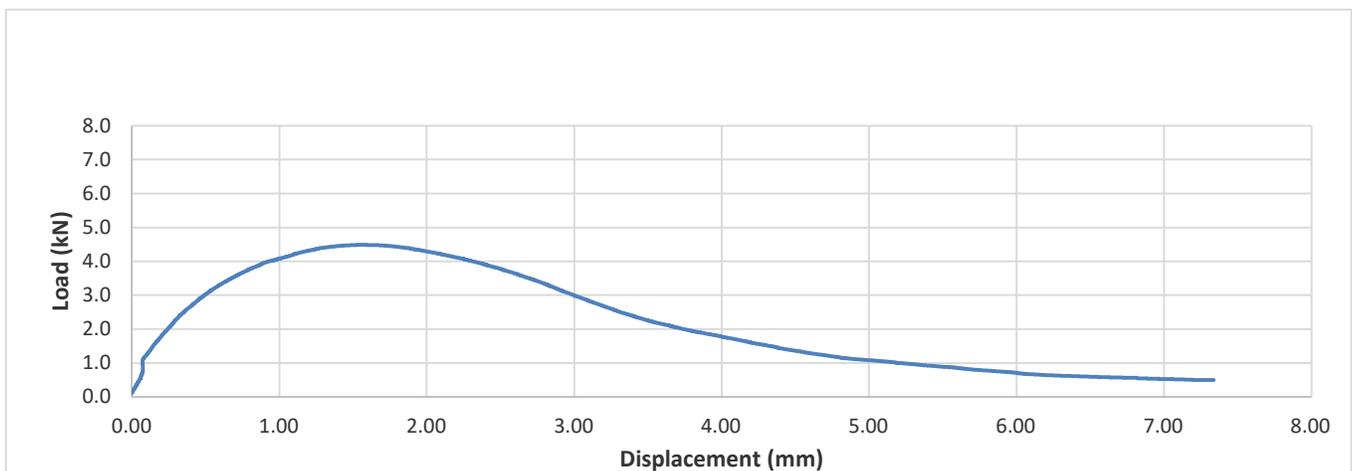
CLIENT:	City of Greater Sudbury	DATE:	11-Aug-23
TEST DATE:	11-Aug-23	WSP LAB #:	A126
PROJECT #:	TY202002.1100	CORE IDENTIFICATION:	Lot 2-5
CLIENT CONTRACT #	Eng 21-38 Part A	QA TAG #:	m/a
LOCATION:	Kingsway MR#55, Sudbury	TRAFFIC DIRECTION:	non
LOCATION OF SAMPLE:	Lot 2-5, Sta.2+100, EB Pass Lane	SUPPLIER:	RSR
DATE SAMPLED :	19-Jul-23	SAMPLED BY:	R.M./RSR
DATE RECEIVED:	3-Aug-23	SAMPLE METHOD :	Core
MIX TYPE:	HIR (HL3)	CONDITIONING:	25
		TEST TEMPERATURE:	25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A126	
CORE IDENTIFICATION:	Lot 2-5	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.1
	D2	144.0
	D3	144.1
	D4	144.1
Average (mm)	144.1	
Std Dev (mm)	0.0	
Thickness (mm)	Top	40.1
	Bottom	50.7

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163030
Normal Load (kPa)	0
Max. Axial Load (kN)	4.49
Interlayer Shear Strength (kPa)	275.4

Failure Surface Location:	Interface
Appearance of Interface	None



Tested by: RP/OL

Reviewed by: O Lazic



## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

CLIENT: City of Greater Sudbury  
 TEST DATE: 11-Aug-23  
 PROJECT #: TY202002.1100  
 CLIENT CONTRACT # Eng 21-38 Part A  
 LOCATION: Kingsway MR#55, Sudbury  
 LOCATION OF SAMPLE: Lot 2-6, Sta.2+000, EB Pass Lane  
 DATE SAMPLED: 20-Jul-23  
 DATE RECEIVED: 3-Aug-23  
 MIX TYPE: HIR (HL3)

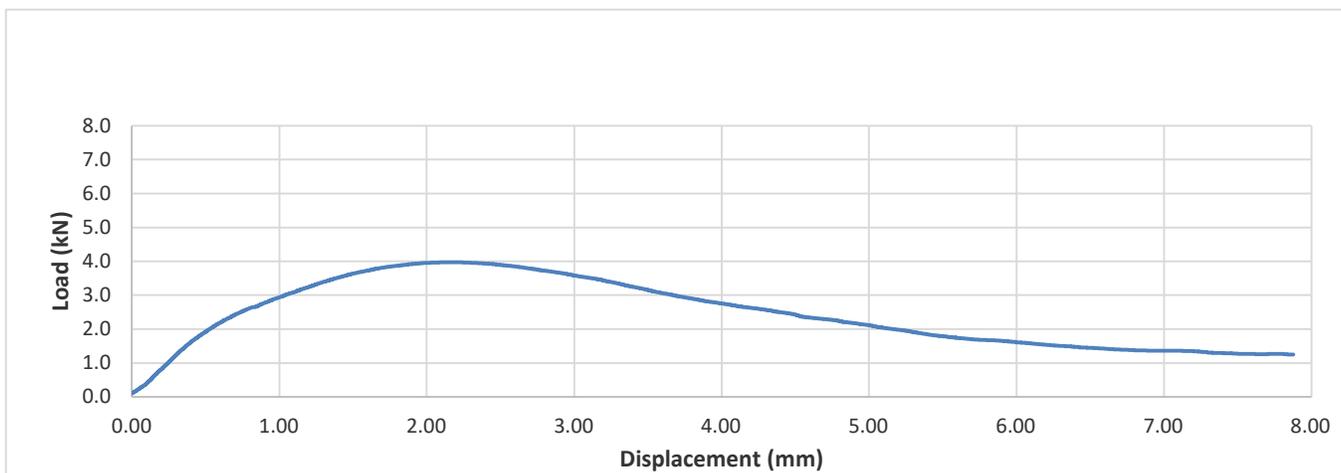
DATE: 11-Aug-23  
 WSP LAB #: A121  
 CORE IDENTIFICATION: Lot 2-6  
 QA TAG #: m/a  
 TRAFFIC DIRECTION: non  
 SUPPLIER: RSR  
 SAMPLED BY: R.M./RSR  
 SAMPLE METHOD: Core  
 CONDITIONING: 25  
 TEST TEMPERATURE: 25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A121	
CORE IDENTIFICATION:	Lot 2-6	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.4
	D2	144.5
	D3	144.2
	D4	144.4
Average (mm)	144.4	
Std Dev (mm)	0.1	
Thickness (mm)	Top	44.8
	Bottom	45.5

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163709
Normal Load (kPa)	0
Max. Axial Load (kN)	3.97
Interlayer Shear Strength (kPa)	242.5

Failure Surface Location:	Interface
Appearance of Interface	None



Tested by: RP/OL

Reviewed by: O. Lazic



## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

CLIENT: City of Greater Sudbury  
 TEST DATE: 11-Aug-23  
 PROJECT #: TY202002.1100  
 CLIENT CONTRACT # Eng 21-38 Part A  
 LOCATION: Kingsway MR#55, Sudbury  
 LOCATION OF SAMPLE: Lot 2-9, Sta.1+700, EB Pass Lane  
 DATE SAMPLED: 20-Jul-23  
 DATE RECEIVED: 3-Aug-23  
 MIX TYPE: HIR (HL3)

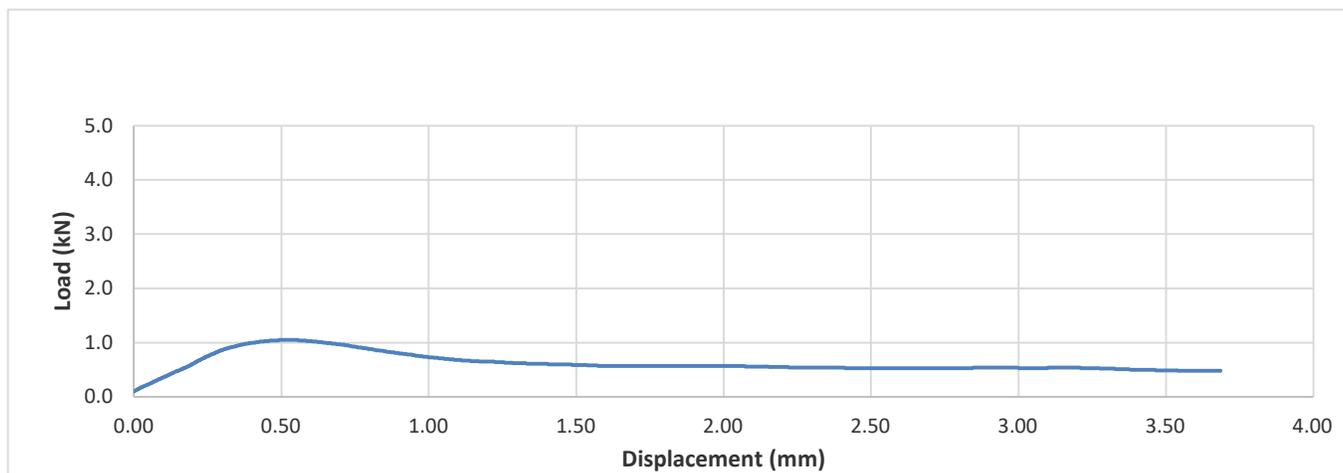
DATE: 11-Aug-23  
 WSP LAB #: A127  
 CORE IDENTIFICATION: Lot 2-9  
 QA TAG #: m/a  
 TRAFFIC DIRECTION: non  
 SUPPLIER: RSR  
 SAMPLED BY: R.M./RSR  
 SAMPLE METHOD: Core  
 CONDITIONING: 25  
 TEST TEMPERATURE: 25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A127	
CORE IDENTIFICATION:	Lot 2-9	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.3
	D2	144.3
	D3	144.2
	D4	144.4
Average (mm)	144.3	
Std Dev (mm)	0.1	
Thickness (mm)	Top	34.9
	Bottom	50.5

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163539
Normal Load (kPa)	0
Max. Axial Load (kN)	1.05
Interlayer Shear Strength (kPa)	64.2

Failure Surface Location:	Interface
Appearance of Interface	<u>contaminants</u>



Tested by: RP/OL

Reviewed by: O. Lazic

## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

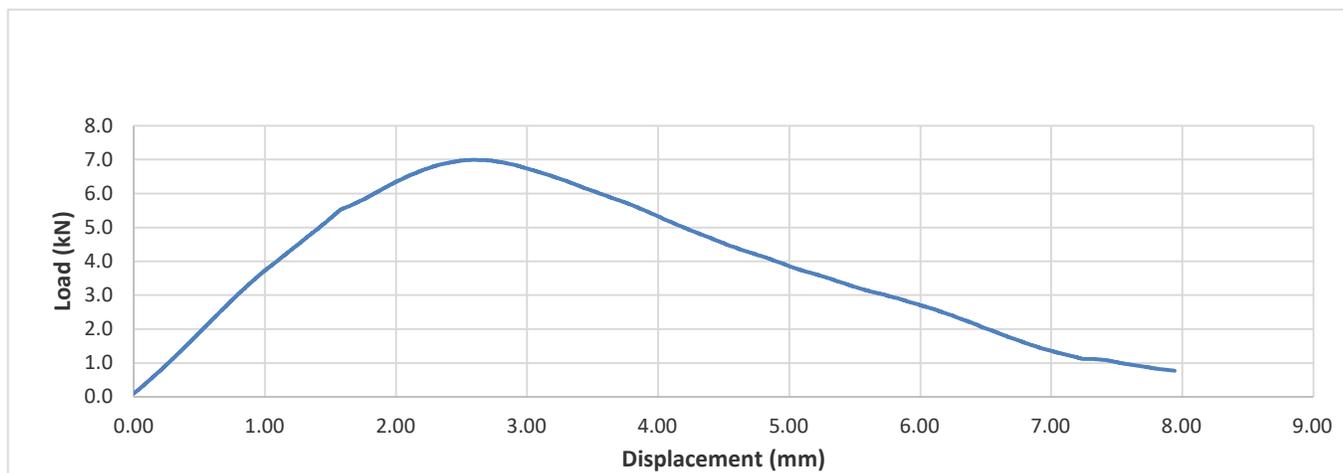
CLIENT:	City of Greater Sudbury	DATE:	11-Aug-23
TEST DATE:	11-Aug-23	WSP LAB #:	A129
PROJECT #:	TY202002.1100	CORE IDENTIFICATION:	Lot 2-10
CLIENT CONTRACT #	Eng 21-38 Part A	QA TAG #:	m/a
LOCATION:	Kingsway MR#55, Sudbury	TRAFFIC DIRECTION:	non
LOCATION OF SAMPLE:	Lot 2-10, Sta.1+615, EB Pass Lane	SUPPLIER:	RSR
DATE SAMPLED :	20-Jul-23	SAMPLED BY:	R.M./RSR
DATE RECEIVED:	3-Aug-23	SAMPLE METHOD :	Core
MIX TYPE:	HIR (HL3)	CONDITIONING:	25
		TEST TEMPERATURE:	25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A129	
CORE IDENTIFICATION:	Lot 2-10	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.5
	D2	144.4
	D3	144.1
	D4	144.1
Average (mm)	144.3	
Std Dev (mm)	0.2	
Thickness (mm)	Top	44.1
	Bottom	50.0

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163483
Normal Load (kPa)	0
Max. Axial Load (kN)	6.99
Interlayer Shear Strength (kPa)	427.6

Failure Surface Location:	Interface
Appearance of Interface	None



Tested by: RP/OL

Reviewed by: O Lazic

## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

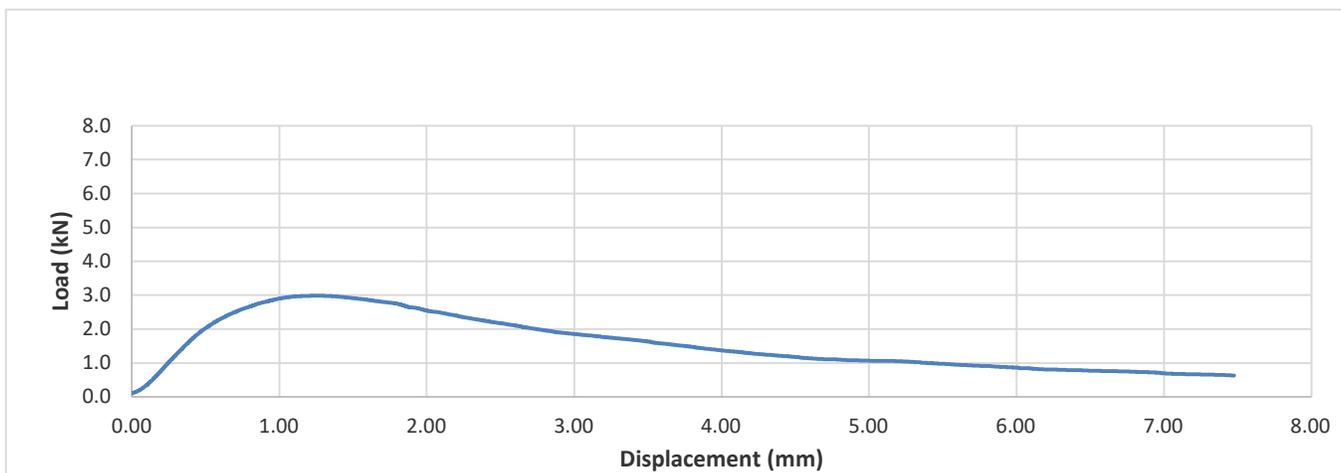
CLIENT:	City of Greater Sudbury	DATE:	11-Aug-23
TEST DATE:	11-Aug-23	WSP LAB #:	A124
PROJECT #:	TY202002.1100	CORE IDENTIFICATION:	Lot 3-1
CLIENT CONTRACT #	Eng 21-38 Part A	QA TAG #:	m/a
LOCATION:	Kingsway MR#55, Sudbury	TRAFFIC DIRECTION:	non
LOCATION OF SAMPLE:	Lot 3-1, Sta.1+468, EB Pass Lane	SUPPLIER:	RSR
DATE SAMPLED:	21-Jul-23	SAMPLED BY:	R.M./RSR
DATE RECEIVED:	3-Aug-23	SAMPLE METHOD:	Core
MIX TYPE:	HIR (HL3)	CONDITIONING:	25
		TEST TEMPERATURE:	25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A124	
CORE IDENTIFICATION:	Lot 3-1	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.3
	D2	144.5
	D3	144.3
	D4	144.7
Average (mm)	144.5	
Std Dev (mm)	0.2	
Thickness (mm)	Top	45.4
	Bottom	50.0

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163880
Normal Load (kPa)	0
Max. Axial Load (kN)	2.99
Interlayer Shear Strength (kPa)	182.5

Failure Surface Location:	Interface
Appearance of Interface	<u>contaminants</u>



Tested by: RP/OL

Reviewed by: O Lazic

## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

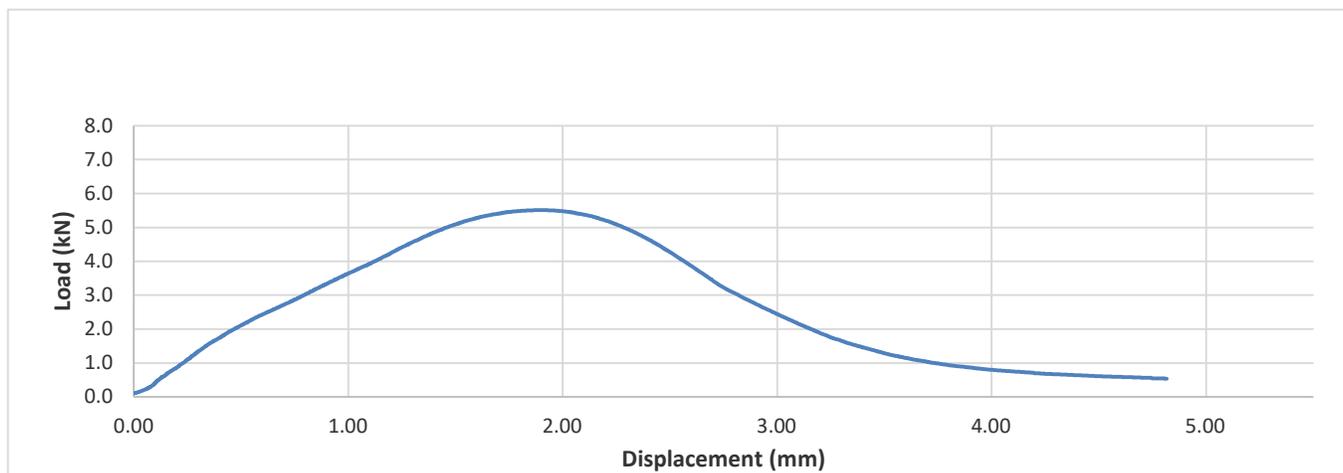
CLIENT:	City of Greater Sudbury	DATE:	11-Aug-23
TEST DATE:	11-Aug-23	WSP LAB #:	A122
PROJECT #:	TY202002.1100	CORE IDENTIFICATION:	Lot 3-4
CLIENT CONTRACT #	Eng 21-38 Part A	QA TAG #:	n/a
LOCATION:	Kingsway MR#55, Sudbury	TRAFFIC DIRECTION:	non
LOCATION OF SAMPLE:	Lot 3-4, Sta.1+000, EB Pass Lane	SUPPLIER:	RSR
DATE SAMPLED :	21-Jul-23	SAMPLED BY:	R.M./RSR
DATE RECEIVED:	3-Aug-23	SAMPLE METHOD :	Core
MIX TYPE:	HIR (HL3)	CONDITIONING:	25
		TEST TEMPERATURE:	25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A122	
CORE IDENTIFICATION:	Lot 3-4	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.5
	D2	144.5
	D3	144.6
	D4	144.3
Average (mm)	144.5	
Std Dev (mm)	0.1	
Thickness (mm)	Top	40.1
	Bottom	41.1

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163936
Normal Load (kPa)	0
Max. Axial Load (kN)	5.51
Interlayer Shear Strength (kPa)	<b>336.1</b>

Failure Surface Location:	Interface
Appearance of Interface	None



Tested by: RP/OL

Reviewed by: O Lazic

## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

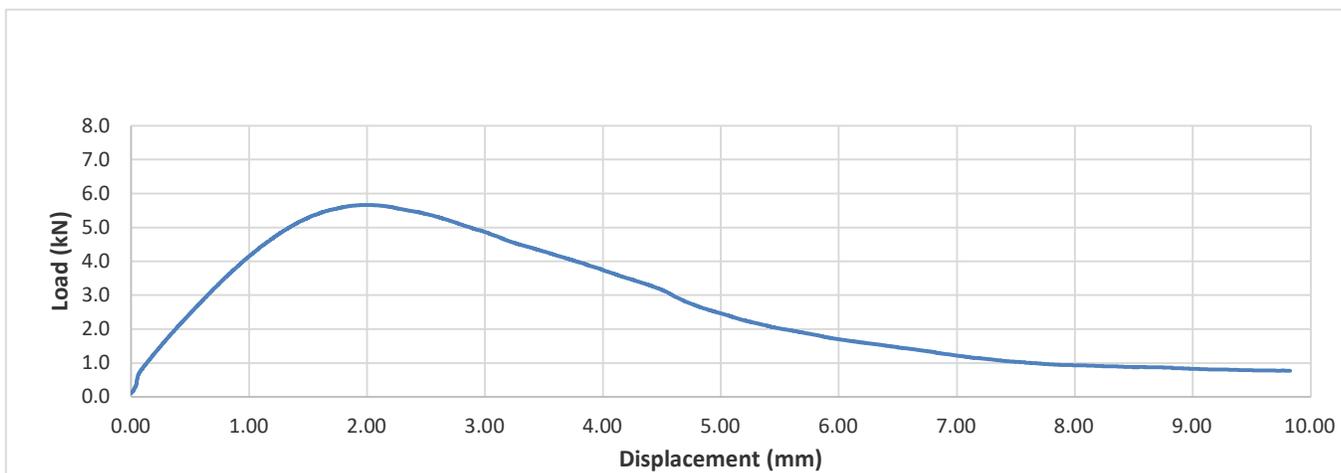
CLIENT:	City of Greater Sudbury	DATE:	11-Aug-23
TEST DATE:	11-Aug-23	WSP LAB #:	A123
PROJECT #:	TY202002.1100	CORE IDENTIFICATION:	Lot 3-6
CLIENT CONTRACT #	Eng 21-38 Part A	QA TAG #:	m/a
LOCATION:	Kingsway MR#55, Sudbury	TRAFFIC DIRECTION:	non
LOCATION OF SAMPLE:	Lot 3-6, Sta.0+800, EB Pass Lane	SUPPLIER:	RSR
DATE SAMPLED :	21-Jul-23	SAMPLED BY:	R.M./RSR
DATE RECEIVED:	3-Aug-23	SAMPLE METHOD :	Core
MIX TYPE:	HIR (HL3)	CONDITIONING:	25
		TEST TEMPERATURE:	25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A123	
CORE IDENTIFICATION:	Lot 3-6	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.6
	D2	144.4
	D3	144.2
	D4	144.7
Average (mm)	144.5	
Std Dev (mm)	0.2	
Thickness (mm)	Top	50.3
	Bottom	50.9

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163936
Normal Load (kPa)	0
Max. Axial Load (kN)	5.66
Interlayer Shear Strength (kPa)	345.3

Failure Surface Location:	Interface
Appearance of Interface	None



Tested by: RP/OL

Reviewed by: O Lazic

## Standard Method of Test for Determining the Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

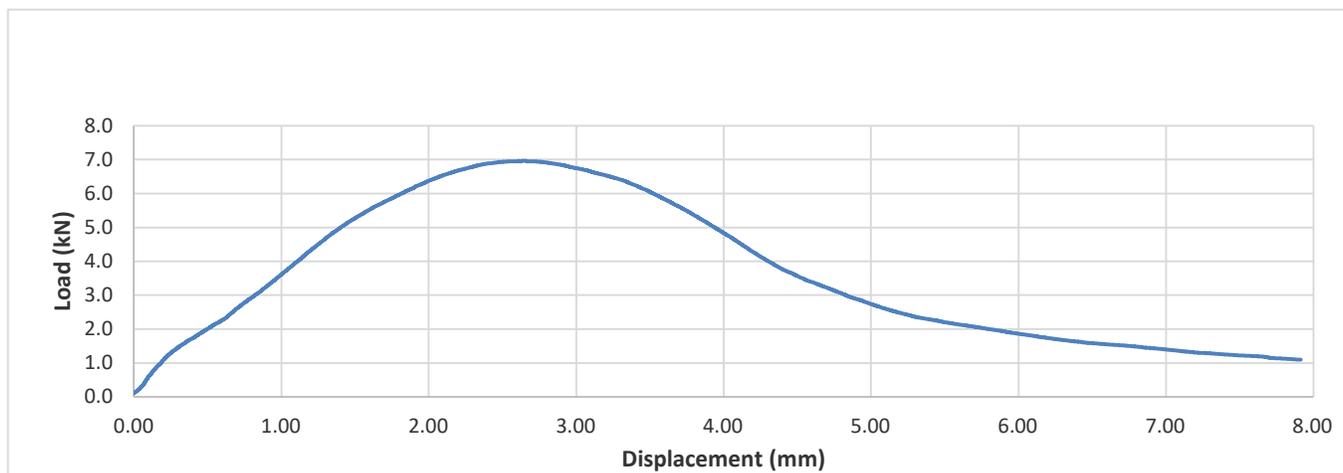
CLIENT:	City of Greater Sudbury	DATE:	11-Aug-23
TEST DATE:	11-Aug-23	WSP LAB #:	A120
PROJECT #:	TY202002.1100	CORE IDENTIFICATION:	Lot 3-7
CLIENT CONTRACT #	Eng 21-38 Part A	QA TAG #:	m/a
LOCATION:	Kingsway MR#55, Sudbury	TRAFFIC DIRECTION:	non
LOCATION OF SAMPLE:	Lot 3-7, Sta.0+735, EB Pass Lane	SUPPLIER:	RSR
DATE SAMPLED :	21-Jul-23	SAMPLED BY:	R.M./RSR
DATE RECEIVED:	3-Aug-23	SAMPLE METHOD :	Core
MIX TYPE:	HIR (HL3)	CONDITIONING:	25
		TEST TEMPERATURE:	25

### TEST RESULTS

Specimen Information		
WSP LAB #:	A120	
CORE IDENTIFICATION:	Lot 3-7	
Percent Air Voids	N/A	
Core Diameter (mm)	D1	144.3
	D2	144.5
	D3	144.2
	D4	144.3
Average (mm)	144.3	
Std Dev (mm)	0.1	
Thickness (mm)	Top	45.5
	Bottom	50.0

Test Data	
Axial Load Control	Servo hydraulic
Axial Rate (mm/min)	2.54
Preload (kN)	0.10
Sample Area (m <sup>2</sup> )	0.0163596
Normal Load (kPa)	0
Max. Axial Load (kN)	6.96
Interlayer Shear Strength (kPa)	425.4

Failure Surface Location:	Interface
Appearance of Interface	None



Tested by: RP/OL

Reviewed by: O Lazic

## APPENDIX E - Interlayer Shear Strength (ISS) of Asphalt Pavement Layers

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT LOCATION** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave, Sudbury – Ontario

ENCLOSURE

1

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;"><b>PHOTOGRAPH</b></td> <td style="width: 30%; text-align: center;"><b>1</b></td> </tr> <tr> <td colspan="2" style="text-align: center; background-color: #ffff00;"><b>Lot 2-9, Sta.1+700, EBPL</b></td> </tr> <tr> <td colspan="2" style="height: 200px;"></td> </tr> </table>	<b>PHOTOGRAPH</b>	<b>1</b>	<b>Lot 2-9, Sta.1+700, EBPL</b>			
<b>PHOTOGRAPH</b>	<b>1</b>						
<b>Lot 2-9, Sta.1+700, EBPL</b>							

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;"><b>PHOTOGRAPH</b></td> <td style="width: 30%; text-align: center;"><b>2</b></td> </tr> <tr> <td colspan="2" style="text-align: center; background-color: #ffff00;"><b>Lot 3-1, Sta.1+468, EBPL</b></td> </tr> <tr> <td colspan="2" style="height: 200px;"></td> </tr> </table>	<b>PHOTOGRAPH</b>	<b>2</b>	<b>Lot 3-1, Sta.1+468, EBPL</b>			
<b>PHOTOGRAPH</b>	<b>2</b>						
<b>Lot 3-1, Sta.1+468, EBPL</b>							

# APPENDIX F

## Pavement Condition Survey

## APPENDIX F - PAVEMENT CONDITION SURVEY

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

1

		<p><b>PHOTOGRAPH</b></p>	<p><b>1</b></p>
		<p><b>STA 0+000 to STA 0+250</b></p> <p>Slight - Segregation Medium Segregation</p>	

		<p><b>PHOTOGRAPH</b></p>	<p><b>2</b></p>
		<p><b>STA 0+000 to STA 0+250</b></p> <p>Medium - Segregation Severe Segregation</p>	

## APPENDIX F - PAVEMENT CONDITION SURVEY

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE 2

	<b>PHOTOGRAPH</b>	<b>3</b>
	<b>STA 0+250 to STA 0+500</b>	
<p>Medium - Segregation            Severe Segregation</p>		

	<b>PHOTOGRAPH</b>	<b>4</b>
	<b>STA 0+250 to STA 0+500</b>	
<p>Medium - Segregation            Moderate Flushing/Bleeding</p>		

## APPENDIX F - PAVEMENT CONDITION SURVEY

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

3

		<b>PHOTOGRAPH</b>	<b>5</b>
		<b>STA 0+500 to STA 0+750</b>	
		Moderate Flushing/Bleeding	

		<b>PHOTOGRAPH</b>	<b>6</b>
		<b>STA 0+500 to STA 0+750</b>	
		Fat Spot	
		Medium - Segregation	

## APPENDIX F - PAVEMENT CONDITION SURVEY

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

4

		<p><b>PHOTOGRAPH</b></p>	<p><b>7</b></p>
<p><b>STA 0+750 to STA 1+000</b></p>		<p>Severe Flushing/Bleeding Medium - Segregation</p>	

		<p><b>PHOTOGRAPH</b></p>	<p><b>8</b></p>
<p><b>STA 1+000 to STA 1+250</b></p>		<p>Severe Segregation Medium - Segregation</p>	

## APPENDIX F - PAVEMENT CONDITION SURVEY

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

5

		<p><b>PHOTOGRAPH</b></p>	<p><b>9</b></p>
<p><b>STA 1+250 to STA 1+500</b></p>			
<p>Slight to Medium - Segregation Transverse Crack</p>			

		<p><b>PHOTOGRAPH</b></p>	<p><b>10</b></p>
<p><b>STA 1+250 to STA 1+500</b></p>			
<p>Transverse Crack Slight to Medium - Segregation</p>			

## APPENDIX F - PAVEMENT CONDITION SURVEY

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

6

		<p><b>PHOTOGRAPH</b></p>	<p><b>11</b></p>
<p><b>STA 1+500 to STA 1+750</b></p>		<p>Small Fat Spots          Moderate Flushing/Bleeding</p>	

		<p><b>PHOTOGRAPH</b></p>	<p><b>12</b></p>
<p><b>STA 1+750 to STA 2+000</b></p>		<p>Medium - Segregation</p>	

## APPENDIX F - PAVEMENT CONDITION SURVEY

**PROJECT NO.** City of Greater Sudbury – ENG21-38 (WSP Project #TY202002.1100)  
**PROJECT** Pilot Project on Kingsway from 375m West of Hwy 17 Bypass to 400m East of Second Ave,  
**LOCATION** Sudbury – Ontario

ENCLOSURE

7

		<p><b>PHOTOGRAPH</b></p>	<p><b>13</b></p>
<p><b>STA 2+000 to STA 2+250</b></p>			
<p>Fat Spots Transverse Crack</p>			

		<p><b>PHOTOGRAPH</b></p>	<p><b>14</b></p>
<p><b>STA 2+250 to STA 2+500</b></p>			
<p>Fat Spot Medium - Segregation</p>			



## APPENDIX F - PAVEMENT CONDITION SURVEY

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ENCLOSURE 8

		<b>PHOTOGRAPH</b>	<b>15</b>
		<b>STA 2+500 to STA 2+750</b>	
		Moderate Flushing/Bleeding Ravelling/Severe Segregation	