N’Dilo Paving Project – 2011

Quality Management Submittals

Submitted by: Deton’Cho Nuna Asphalt Producers Limited

March 2012

INDEX of SUBMITTALS

1. EZ Street N'Dilo Mix Design
2. Letter of Qualifications – CTI Labs (Florida, USA)
3. LA Abrasion Report 5499-1 - Test Report April 29, 2011
4. Ace Aggregate Material – Sieve Report 5555-2 Report Date: Sept.3, 2011
5. Ace Aggregate Material – Sieve Report 5563-1 Report Date: Sept.4, 2011
6. Ace Aggregate Material – Sieve Report 5570 Report Date: Sept.10,2011
7. Ace Aggregate Material – Sieve Report 5572 Report Date: Sept.12,2011
8. Ace Aggregate Material – Sieve Report 5570 (2) Report Date: Sept.14,2011
9. Ace Aggregate Material – Sieve Report 5581 Report Date: Sept.20,2011
10. Asphalt Mixture Analysis Report Report Date: Sept.12,2011
11. Relative Density and Absorption of Aggregate Report Date: April 29,2011
12. eba Summary of Quality Testing Report Date: Feb.9,2012
13. Yellowknives Dene First Nation Letter Date: Sep.7,2011
14. Photos

End of Submittals

EZ Street® Surfacing Asphalt-Aggregate Mixture Design

EZ 070-24 Ndilo

Producer: This EZ Street® Polymer Modified Design is designed and produced in accordance with The EZ Street® Company's methodology of design of dense graded asphaltic concrete.

Materials and Proportions

Agg. No.			
1.	100%	1/2" minus Crushed Gravel	Ace Quarry
2.			
3.			
4.			
5.			
6.			
	100%		

Sieve Size	Agg. #1	Agg. #2	Agg. #3	Agg. #4	Agg. #5	Agg. #6	Job Mix Formula	Tolerance Range
3/4"	100						100	100
1/2"	100						100	95 - 100
3/8"	95						95	90 - 100
#4	62						62	58 - 66
#8	40						40	36 - 44
#16	27						27	23 - 31
#30	19						19	15 - 23
#50	13						13	10 - 16
#100	10						10	7 - 13
#200	6.8						6.8	5.3 - 8.3
	2.670						2.670	

Percent Pre-Coat	1.2	%
Percent Final Blend	4.5	%
Total	5.7	%

Steve Survis
Vice President/GM
CTI-Construction Testing & Inspection, Inc.

CTI - Construction Testing and Inspection Inc.

Construction Engineering, Testing and Laboratory Services (10 years).

Five locations in the US (Florida).

Contact for NWT Surfacing and Runway Projects:
Steve Survis, Vice-President and General Manager

Asphalt: Specializing in Engineering Analysis Reports (EAR) for all phases of Asphalt construction.

Flowable Fill: Strength testing by way of hand held pocket penetrometer in accordance with ASTM C 403.

Concrete Testing: Full service CCRL and CMEC accredited facilities for, field and lab testing, all relevant areas associated with Concrete construction.

Aggregates: Providing a full battery of services for providing quality control data for mines and producers.

Soils: Full service AMRL and CMEC accredited facilities for both field and lab testing, including provision of Sand Cone Density testing.

Contractor Quality Control (CQC) for Florida Department of Transportation (DOT): All facets of testing and inspection associated with CQC for the Florida DOT.

Runway Construction and Testing: Specializing in the FAA P-401 specification for runway construction.

Qualifications

- American Association of State Highway and Transportation Officials (AASHTO)
- American Society for Testing Materials (ASTM) D3666 Asphalt
- American Society for Testing Materials (ASTM) D3740 Soils
- AASHTO Materials Reference Laboratory (AMRL)
- AASHTO Cement and Concrete Materials Reference Laboratory (CCRL)
- American Council of Independent Laboratories (ACIL)
- Florida Department of Transportation (FDOT) Certified Consultant
- Construction Materials Engineering Council (CMEC)
- Asphalt Contractors Association of Florida (ACAF)
- Laboratories and Technicians CQC Compliant for FDOT
- US ARMY Corp of Engineers Validated
- CTQP Certified Lab & Field Technicians
- American Concrete Institute Certified Technicians in Lab and Field (ACI)

Corporate Office
509 Sawgrass Corporate Parkway
Sunrise, FL 33325
Phone: (954) 835-6000
Fax: (954) 835-6060

LOS ANGELES ABRASION of SMALL-SIZE COARSE AGGREGATE

CAN/CSA A23.2 - 16A

Project No:	Y14101238.001	**Sample No.:**	5499-1
Project:	EZ Street 2011 Testing Services	**Date Sampled:**	April, 2011
Client:	Nuna Logistics Limited	**Sampled By:**	Client
		Date Tested:	April 29, 2011
Attention:	Christopher Hunt **Fax:** 867.920.7750	**Tested By:**	RA / BM
Email:	chris@nunainnovations.com	**Office:**	

Description: 12.5 mm minus crushed gravel

Source: Ace Pit

Sample Location: Yellowknife

Supplier Ace Enterprises Ltd.

Test Grading Sieve Size (mm)		**Mass of Indicated Sizes** (g)					
Passing	Retained	**Grading A**	**Grading B**	**Grading C**	**Grading D**	**Grading E**	**Sample 5499-1**
40	28	1250 ± 25	--	--	--	--	
28	20	1250 ± 25	--	--	--	--	
20	14	1250 ± 10	2500 ± 10	--	--	--	
14	10	1250 ± 10	2500 ± 10	2500 ± 10	--	--	
10	5	--	--	2500 ± 10	5000 ± 10	--	5000.5
5	2.5	--	--		--	5000 ± 10	
Total:		5,000 ± 10					5,000.5

Test Grading	**Size Range**	**Initial Mass** (g)	**Final Mass** (g)	**Mass Loss** (g)	**Loss** (%)
D	10-5mm	5000.5	4203.6	796.9	**16**

CSA A23.1, Table 12: Maximum Abrasion Loss 50% by mass of sample

(Note §§: 35% by mass of sample for concrete surface subjected to significant wear)

Remarks:

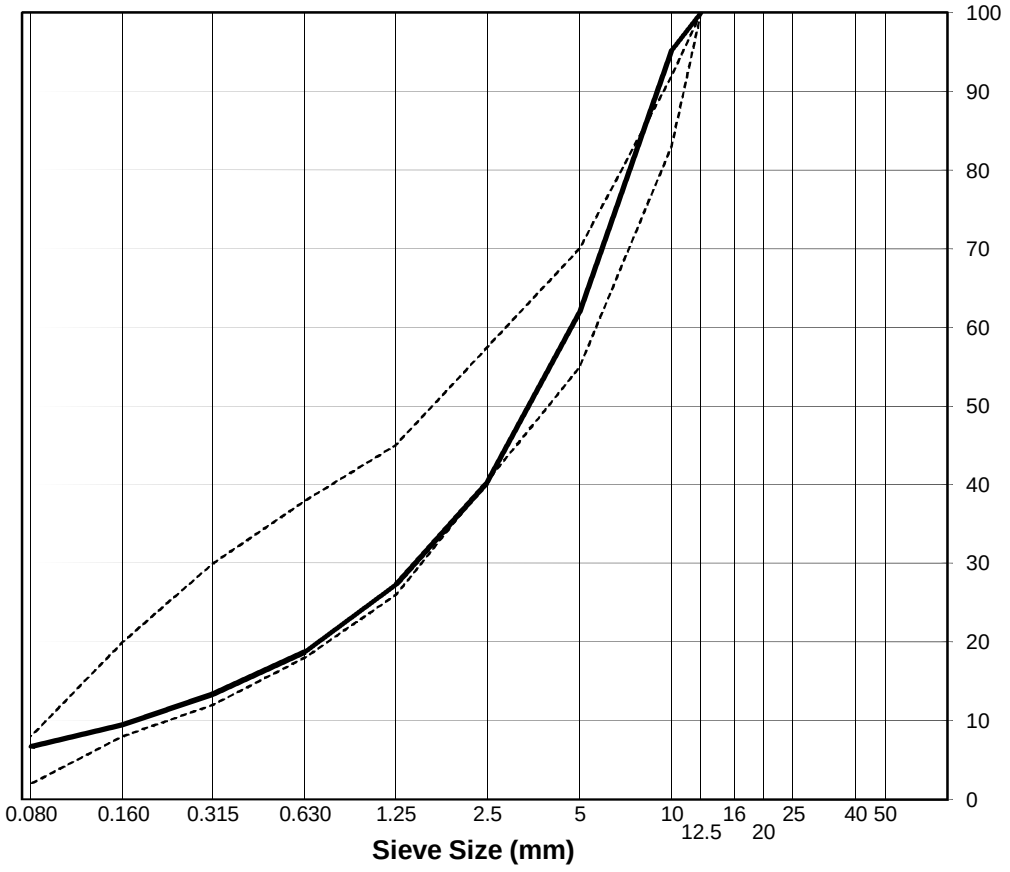
Reviewed By: _____ P. Eng.

SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	Y14101238.001	Sample No.:	5555-2
Project:	Cold Asphalt Testing Services	Date Received:	August 31, 2011
Client:	NUNA Logistics Ltd.	Sampled by:	Chris Hunt
Attention:	Chris Hunt	Date Tested:	September 3, 2011
Email:	chris@asphalt.ca	Tested by:	JM Office: Yellowknife
Description:	SAND and GRAVEL, trace fines (clay/silt)	Moisture Content (as received):	1.6%
		No. Crushed Faces:	Two (2) or Three (3)
Source:	Ace Quarry	By Particle Mass:	
Supplier:	Ace Enterprises		
Sample Location:	Belt Sample		
Specification:	Yellowknife 12.5 mm Asphalt Mix		

Sieve Size	Percent Passing
12.5	100
10	95
5	62
2.5	40
1.25	27
0.630	19
0.315	13
0.160	9
0.080	6.8



Remarks:

Reviewed By: _____ P.Eng.

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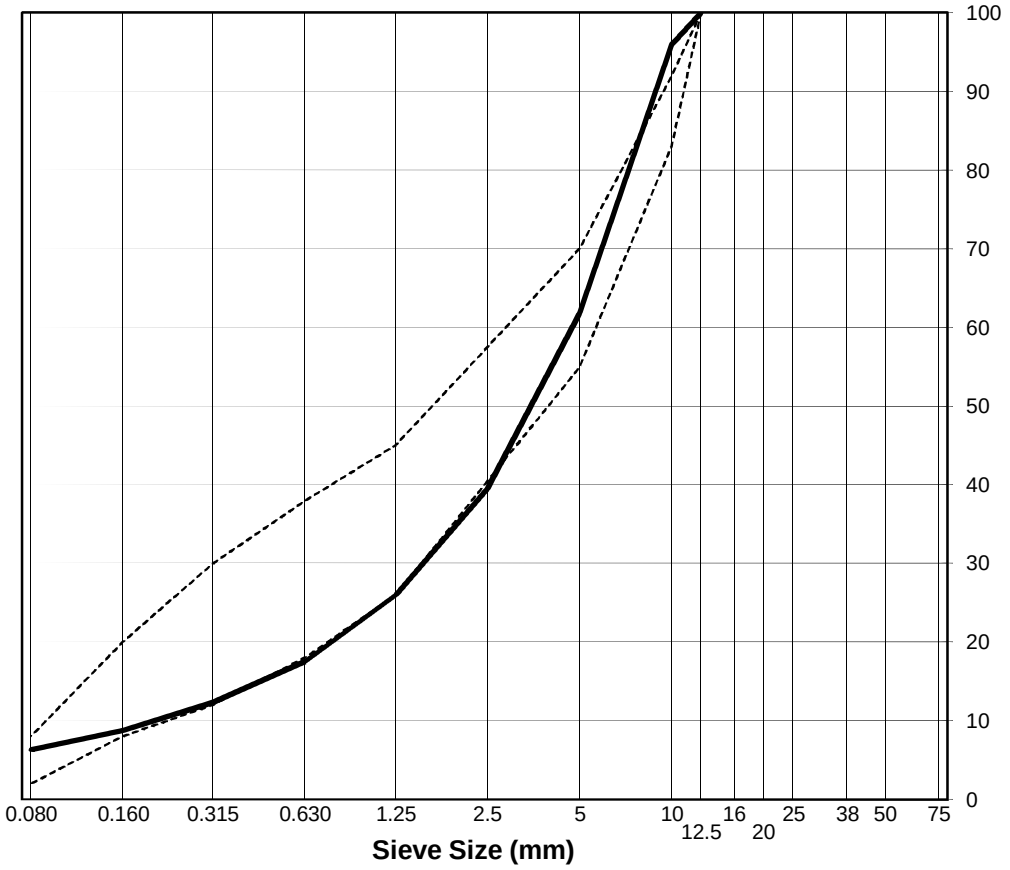
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	Y14101238.001	Sample No.:	5563-1
Project:	Cold Asphalt Testing Services	Date Received:	September 4, 2011
Client:	NUNA Logistics Ltd.	Sampled by:	Chris Hunt
Attention:	Chris Hunt	Date Tested:	September 4, 2011
Email:	chris@asphalt.ca	Tested by: JM	Office: Y141
Description:	SAND and GRAVEL, trace fines (clay/silt)	Moisture Content (as received):	2.3%
		No. Crushed Faces:	Two (2) or Three (3)
Source:	Kam Lake Quarry	By Particle Mass:	
Supplier:	Ace Enterprises Ltd.		
Sample Location:	Stockpile		
Specification:	Yellowknife 12.5 mm Asphalt Mix		

Sieve Size	Percent Passing
12.5	100
10	96
5	62
2.5	40
1.25	26
0.630	18
0.315	12
0.160	9
0.080	6.3



Remarks:

Reviewed By: _____ P.Eng.

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eba Report 5563-1

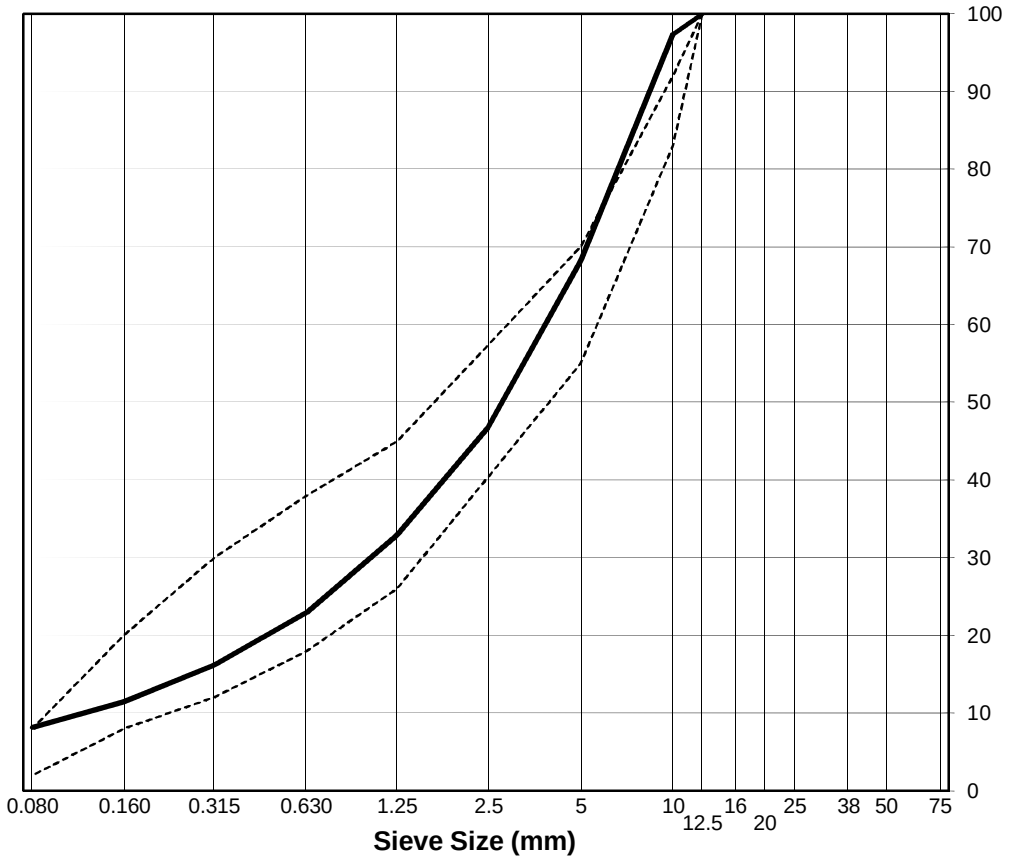
Aggregate Sample

SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	Y14101238	Sample No.:	5570
Project:	Cold Asphalt Testing Services	Date Received:	September 9, 2011
Client:	Nuna Logistics	Sampled by:	Client
Attention:	Chris Hunt	Date Tested:	September 10, 2011
Email:	chris@asphalt.ca	Tested by:	AR Office: Yellowknife
Description:	SAND, gravely, trace fines	Moisture Content (as received):	2.1%
		No. Crushed Faces:	Two (2) or Three (3)
Source:	Kam Lake Quarry	By Particle Mass:	
Supplier:	Not provided		
Sample Location:	Not provided		
Specification:	Yellowknife 12.5 mm Asphalt Mix		

Sieve Size	Percent Passing
12.5	100
10	97
5	68
2.5	47
1.25	33
0.630	23
0.315	16
0.160	11
0.080	8.2



Remarks:

Reviewed By: _____ P.Eng.

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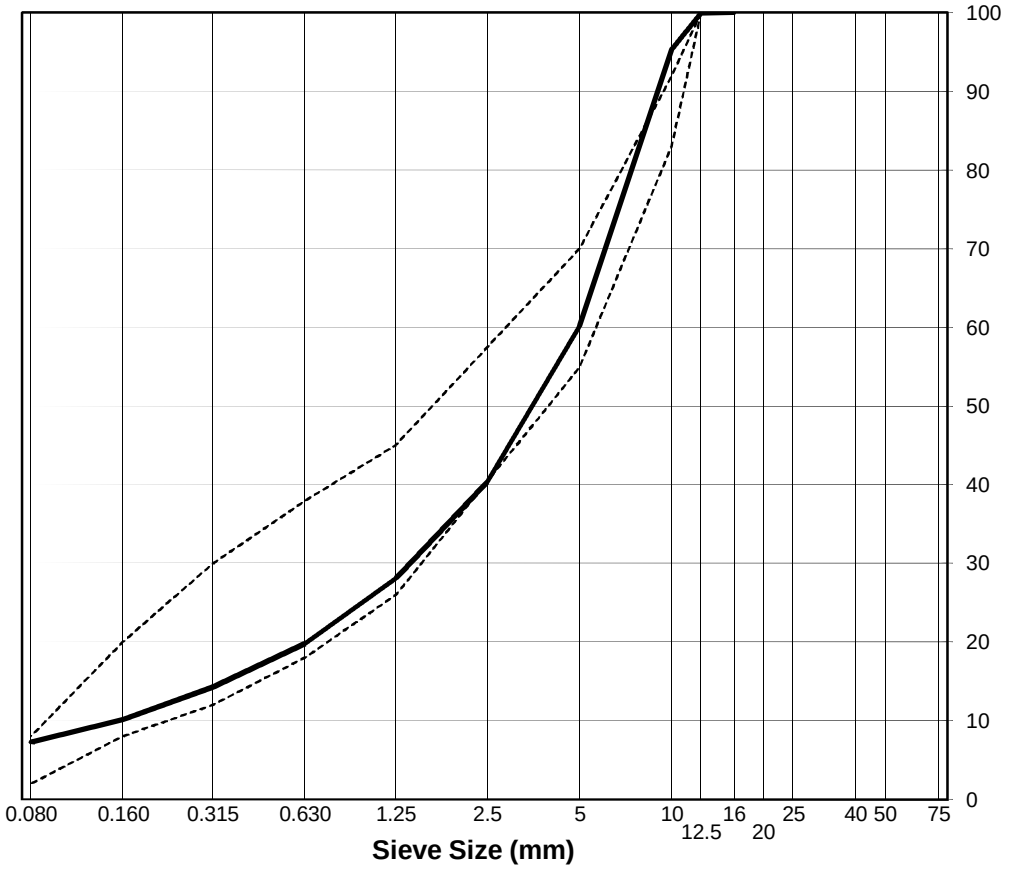
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	Y14101238.001	Sample No.:	5572
Project:	Asphalt Testing Services	Date Sampled:	Not provided
Client:	EZ St. Paving (Nuna Logistics Ltd.)	Sampled by:	Client
Attention:	Chris Hunt	Date Tested:	September 12, 2011
Email:	chris@asphalt.ca	Tested by:	AR Office: Yellowknife
Description:	SAND and GRAVEL, trace fines	Moisture Content (as received):	1.3%
		No. Crushed Faces:	Two (2) or Three (3)
Source:	Kam Lake Quarry	By Particle Mass:	
Supplier:	Not Provided		
Sample Location:	Ace Enterprises Ltd.		
Specification:	Yellowknife 12.5 mm Asphalt Mix		

Sieve Size	Percent Passing
16	100
12.5	100
10	95
5	60
2.5	40
1.25	28
0.630	20
0.315	14
0.160	10
0.080	7.3



Remarks:

Reviewed By: _____ P.Eng.

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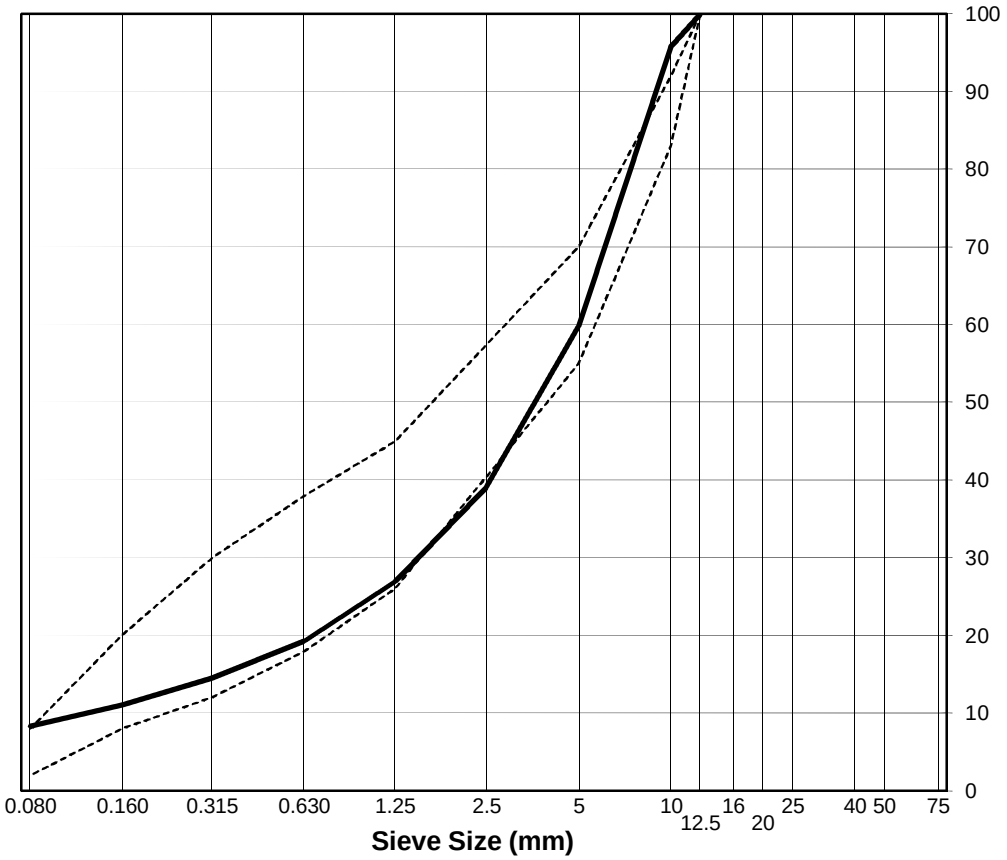
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	Y14101238	Sample No.:	5570
Project:	Cold Asphalt Testing Services	Date Received:	September 13, 2011
Client:	Nuna Logistics	Sampled by:	Client
Attention:	Chris Hunt	Date Tested:	September 14, 2011
Email:	chris@asphalt.ca	Tested by:	AR Office: Yellowknife
Description:	SAND and GRAVEL, trace fines	Moisture Content (as received):	2.0%
		No. Crushed Faces:	Two (2) or Three (3)
Source:	Kam Lake Quarry	By Particle Mass:	
Supplier:	Ace Enterprises Ltd.		
Sample Location:	Not provided		
Specification:	Yellowknife 12.5 mm Asphalt Mix		

Sieve Size	Percent Passing
12.5	100
10	96
5	60
2.5	39
1.25	27
0.630	19
0.315	15
0.160	11
0.080	8.3



Remarks:

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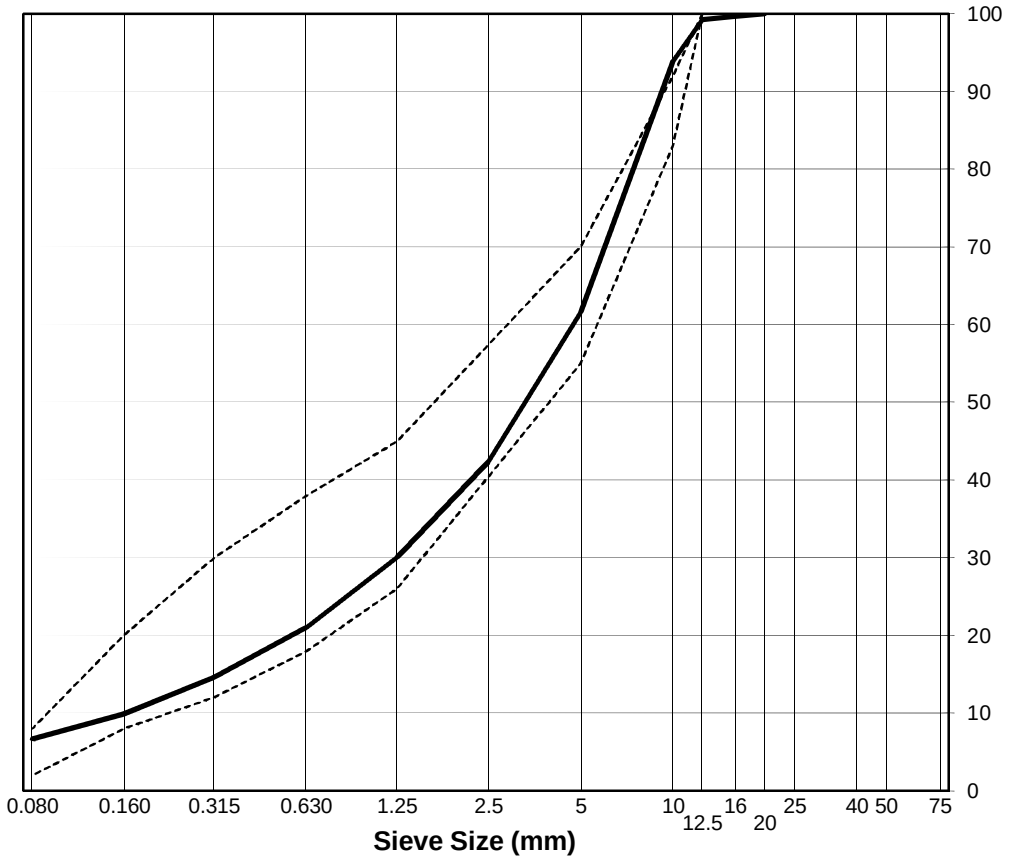
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	Y14101238	Sample No.:	5581
Project:	Cold Asphalt Testing Services	Date Received:	September 17, 2011
Client:	Nuna Logistics	Sampled by:	Client
Attention:	Chris Hunt	Date Tested:	September 20, 2011
Email:	chris@asphalt.ca	Tested by:	AR Office: Yellowknife
Description:	SAND and GRAVEL, trace fines	Moisture Content (as received):	0.7%
		No. Crushed Faces:	Two (2) or Three (3)
Source:	Kam Lake Quarry	By Particle Mass:	
Supplier:	Ace Enterprises Ltd.		
Sample Location:	Not provided		
Specification:	Yellowknife 12.5 mm Asphalt Mix		

Sieve Size	Percent Passing
20	100
16	100
12.5	99
10	94
5	62
2.5	42
1.25	30
0.630	21
0.315	15
0.160	10
0.080	6.7



Remarks:

Reviewed By: _____ P.Eng.

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ASPHALT MIXTURE ANALYSIS REPORT

Project:	Asphalt Testing Services	Sample Number:	
Project No.:	Y14101238.001	Mix Type:	
Client:	Det'on Cho Nuna Asphalt Producers	Date Sampled:	September 12, 2011
Attention:	Brent Saive	Sampled By:	Client
	Fax:	Time:	
Supplier:	Client	Mix Temp. (^{o}C):	
Sample Location:	Mid Section of Stockpile		

Property	Test Value	Specified Tolerance	Property	Test Value	Specified Tolerance
AC Content (%, by mix):	4.75		Air Voids(%)		
Fracture (%, 2+ faces):			V.M.A. (%)		
Bulk Relative Density:	2.321	-	V.F.A. (%)		
Maximum Relative Density:		-	Stability (kN)	14.2	
Film Thickness (mm):			Flow (0.25mm Units)	9.4	

Remarks: Modified Marshall Method used. Reported asphalt content is after oven-curing. Production asphalt content would have been higher than indicated, as a result of volatile constituent "burn off" during the oven-cure process. Reported production asphalt content was 5.7%

Reviewed By: _____ P.Eng.

Relative Density and Absorption of Aggregate

Project:	EZ Street Testing Services	**Sample No.:**	5499-1
Project No:	Y14101238.001	**Date Sampled:**	April, 2011
Client:	Nuna Logistics Ltd.	**Date Tested:**	April 29-30, 2011
		Tested By:	NR/BM
		Lab Location :	Yellowknife

Source: Ace Enterprises Ltd.

Description: 16 mm minus crushed gravel

Fine Aggregate

CSA Designation A23.2-6A

Description	AVG.
Bulk Relative Density	2.64
Bulk Relative Density (SSD)	2.66
Apparent Relative Density	2.69
Absorption (%)	0.69

Coarse Aggregate

CSA Designation A23.2-12A

Description	AVG.
Bulk Relative Density	2.68
Bulk Relative Density (SSD)	2.69
Apparent Relative Density	2.70
Absorption (%)	0.31

Remarks:

Reviewed By: _____ P.Eng.

A TETRA TECH COMPANY

February 9, 2012

ISSUED FOR USE
EBA FILE: Y14101442
Via Email: brents@nunalogistics.com

Det'on Cho Nuna Asphalt Producers Limited
#202, 5109 48 Street
Yellowknife, NT X1A 2N5

Attention: Brent Saive, Project Manager

Subject: N'Dilo Street Paving – Summary of Quality Assurance Testing

Introduction

EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company (EBA) was requested by Deton'Cho Nuna Asphalt Producers Limited (Det'on Cho Nuna) to conduct quality assurance testing associated with the production and placement of EZ Street asphalt on streets in the N'Dilo area of Yellowknife, NT. This letter summarizes the findings from this testing.

Mix Testing

A "modified Marshall" analysis on a sample of the mix was conducted. The results are summarized below:

- Marshall Density: 2321 kg/m^3
- Asphalt Content: 4.5%, by mass of mix
- Stability: 14.2 kN
- Flow: 9.4 0.25 mm units

A report incorporating the foregoing has been previously provided.

It should be noted the measured asphalt content is expected to be less than the production asphalt content. The modified Marshall method involves curing the sample in a 135°C oven overnight (14 to 18 hours), prior to conducting the Marshall analysis. It is understood that this is intended to simulate some degree of field curing. This oven-curing "burns off" some of the more volatile constituents of the asphalt. The reported production asphalt content was 5.7%.

Field Density Testing

A nuclear densometer was used to measure approximate densities of the asphalt on September 25, 2011, five days following placement. The average of 11 measurements indicated an average density of 2252 kg/m^3, representing 97.0% of the modified Marshall reference density. Complete results were previously provided.

Core Density and Thickness

Following "freeze-up" 13 cores of the asphalt were obtained on December 16, 2011. The average density of the cores was determined to be 2289 kg/^{3}, representing 98.6% of the modified Marshall reference density. The average core thickness was determined to be 45 mm. Complete results were previously provided.

EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company
PO Box 2244, 201, 4916 - 49 Street
Yellowknife, NT X1A 2P7 CANADA
p. 867.920.2287 f. 867.873.3324

Closure

This letter and its contents are intended for the sole use of Det'on Cho Nuna Asphalt Producers Limited and their agents. EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company, does not accept any responsibility for the accuracy of any of the data or the analysis contained or referenced in the letter when the letter is used or relied upon by any Party other than Det'on Cho Nuna Asphalt Producers Limited, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in EBA's Services Agreement. EBA's General Conditions for construction services are attached to this letter.

We trust this letter meets your present requirements. If you have any questions or comments, please contact the undersigned.

Sincerely,
EBA Engineering Consultants Ltd.

Prepared by:

Ed Hoeve, P.Eng.
Project Director, NT/NU Region
Direct Line: 867.766.3728 x222
ehoeve@eba.ca

cc: Daryl Nixon, EBA Edmonton

Attachment: General Conditions

Yellowknives Dene First Nation
P.O. Box 2514
Yellowknife, NT X1A 2P8

Dettah
Telephone: (867) 873-4307
Facsimile: (867) 873-5969

Ndilo
Telephone: (867) 873-8951
Facsimile: (867) 873-8545

Warren McLeod
FSC Engineering
4910-53rd Street, P.O. Box 1777
Yellowknife, NT X1A 2P4

September 7th, 2011

Dear Warren

Please accept this letter as confirmation that the Yellowknives Dene First Nations accepts the substitution of "Polymer Modified Cold Asphalt EZStreet" in place conventional "Hot Asphalt" for the paving project in N'dilo.

We also further confirm that we accept the EZStreet Polymer Modified design mix specification of 55mm Loose (.20 Compaction) which will provide a finished depth of 44mm, in place of the (Hot Asphalt) design depth called out at 60mm.

Sincerely,

Chief Edward Sangris
Yellowknives Dene First Nation – Dettah

Chief Ted Tsetta
Yellowknives Dene First Nation – N'dilo


1750-C
MAULDIN