AMERICAN ENGINEERING TESTING, INC.

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February 3, 2016

Mr. Terry Maier, President
Team Laboratory Chemical Corp.
28650 State Highway 34
Detroit Lakes, MN 56501

RE: Base One Stabilized Aggregate Base
Lamoure, Mountrail, Richland and Sargent Counties, North Dakota
AET Project No. 28-00960/28-01065

Dear Mr. Maier:

We are submitting this letter report of the pavement analysis we performed on the county roads with aggregate base or reclaimed bituminous/aggregate base stabilized with Base One, located in Lamoure, Mountrail, Richland and Sargent Counties, North Dakota.

1.0 BACKGROUND

Team Lab's Base One stabilization system is a highly concentrated and environmental friendly liquid product that improves the pavement strength at low cost. Stabilization is now affordable option that can be considered whenever aggregate and/or reclaimed bituminous are being processed and compacted for load bearing bases.

In the green road rating system, 1-5 credit points are assigned to the pavement reuse, 50-90% of existing pavement materials by estimated volume. In place aggregate and/or reclaimed bituminous stabilized with Base One can produce up to 100% reuse of the in-place pavement materials, thereby having all the five credit points.

To evaluate the strength of a pavement base layer stabilized with Base One, the non-destructive tests, Falling Weight Deflectometer (FWD) and Ground Penetrating Radar (GPR) were used in the field. The FWD equipment is capable of simultaneously providing Resilient Modulus measurement of the stabilized base layer in a non-destructive manner while testing the performance of many miles of road in a single day. The FWD produces a force impulse through the layers which closely simulates a moving wheel load and it provides a means to determine the equivalency of various materials in relation to their ability to support dynamic or repetitive loading. The GPR equipment is capable of measuring the pavement layer thickness in a highway speed and minimizing the errors in backcalculating the Resilient Modulus from FWD data.

2.0 RESULTS

A 1.75 mile section of CR 61 from ND 46 to 1.75 miles South in Marion, Lamoure County was selected for FWD and GPR testing in 2015. The new pavement was designed for a 20-year design ESALs of 414,000 (SN=3.3) and consisted of 5" Superpave FAA43 over 15" aggregate and reclaimed asphalt blend with the upper 6" stabilized with Base One. The results are shown in the following table.

Roadway	Termini		a_2		ESN		Spring Load Capacity (Tons)	
	From	To	15th	AVG.	15th	AVG.	15th	AVG.
CR 61	ND 46	1.75 mi. S	0.17	0.21	4.0	4.3	12.6	13.6

ESN = Effective Structural Number, a_2 = layer coefficient, 15^{th} = 15^{th} Percentile.

A 7.35 mile section of CR 3 Road from 51^{st} Street NW to 44^{th} Street NW in the north of Parshall, Mountrail County was selected for FWD and GPR testing in 2015. The new pavement was designed for a 20-year design ESALs of 1,550,000 (SN=3.5) and consisted of 5.5" Superpave FAA45 over 14" aggregate base with the upper 8" stabilized with Base One. The results are shown in the following table.

Roadway	Termini		a_2		ESN		Spring Load Capacity (Tons)	
	From	To	15th	AVG.	15th	AVG.	15th	AVG.
CR 3	51st St NW	44th St NW	0.14	0.17	3.6	3.9	12.6	13.7

ESN = Effective Structural Number, a_2 = layer coefficient, 15^{th} = 15^{th} Percentile.

A 9.93 mile section of Sanish Road from 30^{th} Avenue NW to ND 23 in the south of New Town, Mountrail County was selected for FWD and GPR testing in 2015. The new pavement was designed for a 20-year design ESALs of 1,550,000 (SN=3.5) and consisted of 6" Superpave FAA45 over 18" aggregate and reclaimed asphalt blend with the upper 8" stabilized with Base One for the southern portion and 6" Superpave FAA45 over 11" aggregate and reclaimed asphalt blend with top 8" stabilized with Base One over 6" Class 3 subbase for the northern portion. The results are shown in the following table.

Roadway	Termini		a_2		ESN		Spring Load Capacity (Tons)	
	From	To	15th	AVG.	15th	AVG.	15th	AVG.
Sanish Rd	30th Ave NW	36th Ave NW	0.15	0.18	4.7	5.1	12.7	14.0
Sanish Rd	36th Ave NW	ND 23	0.14	0.16	4.1	4.4	13.1	14.0

ESN = Effective Structural Number, a_2 = layer coefficient, 15^{th} = 15^{th} Percentile.

An 11.32 mile section of BIA Route 6 from 86th Avenue to 31st Street in the south of New Town, Mountrail County was selected for FWD and GPR testing in 2015. The new pavement was originally designed for an SN of 3.96 and consisted of 6"of Superpave FAA45 over 18" aggregate bases. A value engineering proposal was accepted with an SN of 4.68 which consisted of 6" Superpave FAA45 over 8" aggregate stabilized with Base One over 12" cement treated subgrade soils. The results are shown in the following table.

Roadway	Termini		a_2		ESN		Spring Load Capacity (Tons)	
	From	To	15th	AVG.	15th	AVG.	15th	AVG.
BIA Route 6	86th Ave NW	31st St	0.18	0.22	6.1	6.5	10.1	11.2

ESN = Effective Structural Number, a_2 = layer coefficient, 15^{th} = 15^{th} Percentile.

A 4 mile section of CR 22 from ND 127 to 4 miles West in Fairmount, Richland County was selected for FWD and GPR testing in 2015. The new pavement was designed for a 20-year design ESALs of 461,492 (SN=3.9) and consisted of 6.5" Superpave FAA45 over 15" aggregate and reclaimed asphalt blend with the upper 5" stabilized with Base One. The results are shown in the following table.

Roadway	Termini		a_2		ESN		Spring Load Capacity (Tons)	
	From	To	15th	AVG.	15th	AVG.	15th	AVG.
CR 22	ND 127	4 mi. W	0.16	0.22	4.1	4.6	11.7	12.7

ESN = Effective Structural Number, a_2 = layer coefficient, 15^{th} = 15^{th} Percentile.

A 3.17 mile section of CR 14 from 94th Street SE to 97th Street SE in the south of Geneseo, Sargent County was selected for FWD and GPR testing in late spring and summer of 2015. The new pavement was designed for a 20-year design ESALs of 125,000 (SN=2.5) and consisted of 4.5" Superpave FAA43 over 8" aggregate and reclaimed asphalt blend with the upper 5" stabilized with Base One. The results are shown in the following table.

Roadway	Termini		Season	a_2		ESN		Spring Load Capacity (Tons)	
	From	To		15th	AVG.	15th	AVG.	15th	AVG.
CR 14	94th ST SE	97th St SE	Late Spring	0.15	0.19	2.9	3.2	11.1	12.9
			Summer	0.17	0.22	3.0	3.3	10.7	11.2

ESN = Effective Structural Number, a_2 = layer coefficient, 15^{th} = 15^{th} Percentile.

The FWD results for Sargent County showed an improvement in strength (Resilient Modulus) of the reclaimed base layer stabilized with Base One, from 80,000 psi in the late spring to 112,000 psi in summer. The FWD and GPR results from CR 14 showed the effect of spring thaw on the strength of the base layer stabilized with Base One in a similar way to the aggregate base. The strength of the Base One stabilized base layer (a_2=0.19) is still higher than that of high quality crushed aggregate base layer (a_2=0.14).

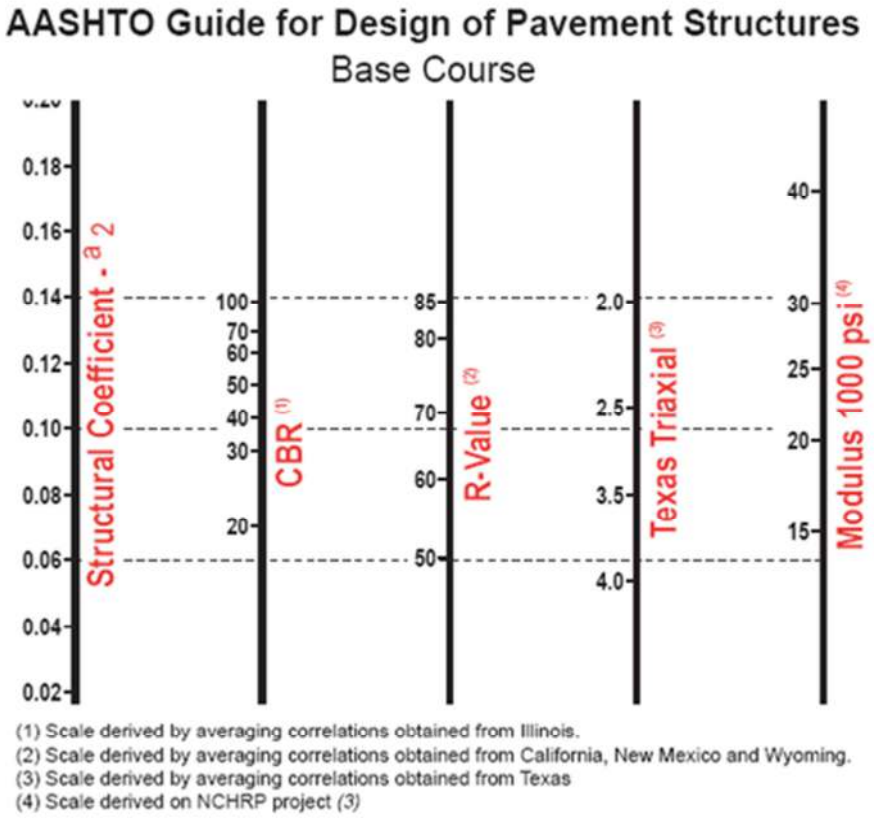
The FWD and GPR results for county roads in North Dakota showed the strength (Resilient Modulus) of the reclaimed base layer stabilized with Base One, ranging from 48,000 to 114,000 psi.

Using the following comparative chart provided by the American Association of State Highway Transportation Officials (AASHTO) for correlation with other standard index tests for additional perspective, the FWD testing demonstrated that the stabilized base was significantly stronger than 30,000 psi, a Resilient Modulus value that correlates with a CBR of 100, and an R-Value of 85.

The measurements from this group of test values are representative of base materials with the quality between crushed aggregate and crushed gravel, so the higher moduli of the reclaimed material stabilized with the Base One (48,000 to 114,000 psi, or 1.6 to 3.8 times the referenced 30,000 psi strength) demonstrate in materials engineering measurements how this advanced broad spectrum stabilization technology is producing an entirely new level of field performance and solving problems previously unaddressed.

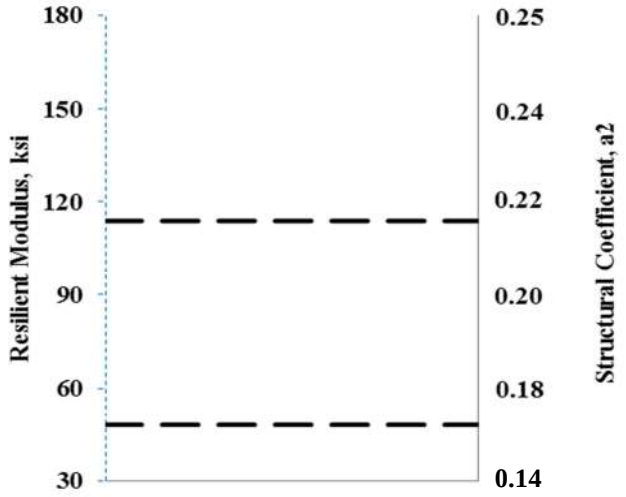
The national referenced base modulus is for the ideal crushed aggregate base materials and higher than the base material available locally. In North Dakota, the high quality crushed aggregate base and reclaimed asphalt blend base has a resilient modulus of 19,000 psi. The comparison of the lowest average base modulus of the seven sections evaluated to that of the NDDOT referenced base modulus for crushed aggregate and reclaimed asphalt blend base showed a 1.4 equivalency factor.

The FWD results from all the test sections showed an all-season road and much improved SN as compared to the design SN.



3.0 CONCLUSIONS

Values of back calculated (from field FWD testing) resilient moduli typically fall within a range of 48 ksi to 114 ksi. This is considered structurally effective in terms of stress distribution but yet not so stiff as to induce excessive shrinkage cracking distress. The estimated layer coefficient under test conditions ranges from 0.16 to 0.22 for Base One stabilized RAP and aggregate blend base as shown in the following chart.



Sincerely,
American Engineering Testing, Inc.

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