Pavement Design

TO: Program Manager Reynolds

FROM: State Pavement Design Engineer Carroll
Assistant State Pavement Design Engineer Kim

DATE: March 12, 2025

RE: I-95 Over Lake Marion Supplementary Pavement Investigation

This memo provides a brief summary of our investigation and findings for the above referenced pavement section. On February 25, 2025, representatives from the Office of Materials and Research visited I-95 between mile markers 98 to 102 to evaluate the existing pavement shoulder structure. The investigation consisted of performing Falling Weight Deflectometor (FWD) testing and cutting cores. Additionally, cores were also taken on Bass Drive and St Paul Road. The following is a summary of our observations.

Pavement Investigation

MM 98-102 Pavement Shoulders

Outside Shoulder:
A total of 16 pavement cores were taken in the outside shoulder with half of the coming from just outside the white line and the other half coming from the edge of the pavement. The average depth of asphalt on the outside shoulder is just under 5 inches in thickness ranging from 3-9.5 inches of asphalt based on the 16 cores. The cores showed various types of base materials throughout the 16 cores including full depth asphalt, concrete, and graded aggregate base with marine limestone base being the most common base type encountered.

The traffic data on ITMS estimates that the AADT for this section is 39,400 with 22 percent trucks and a Road Group of O. Historical data in the area indicates that a soil support value for the area could range from 2.5-3.5. Based on this data a structural number of approximately 4.61 would be required for a 2 year design.

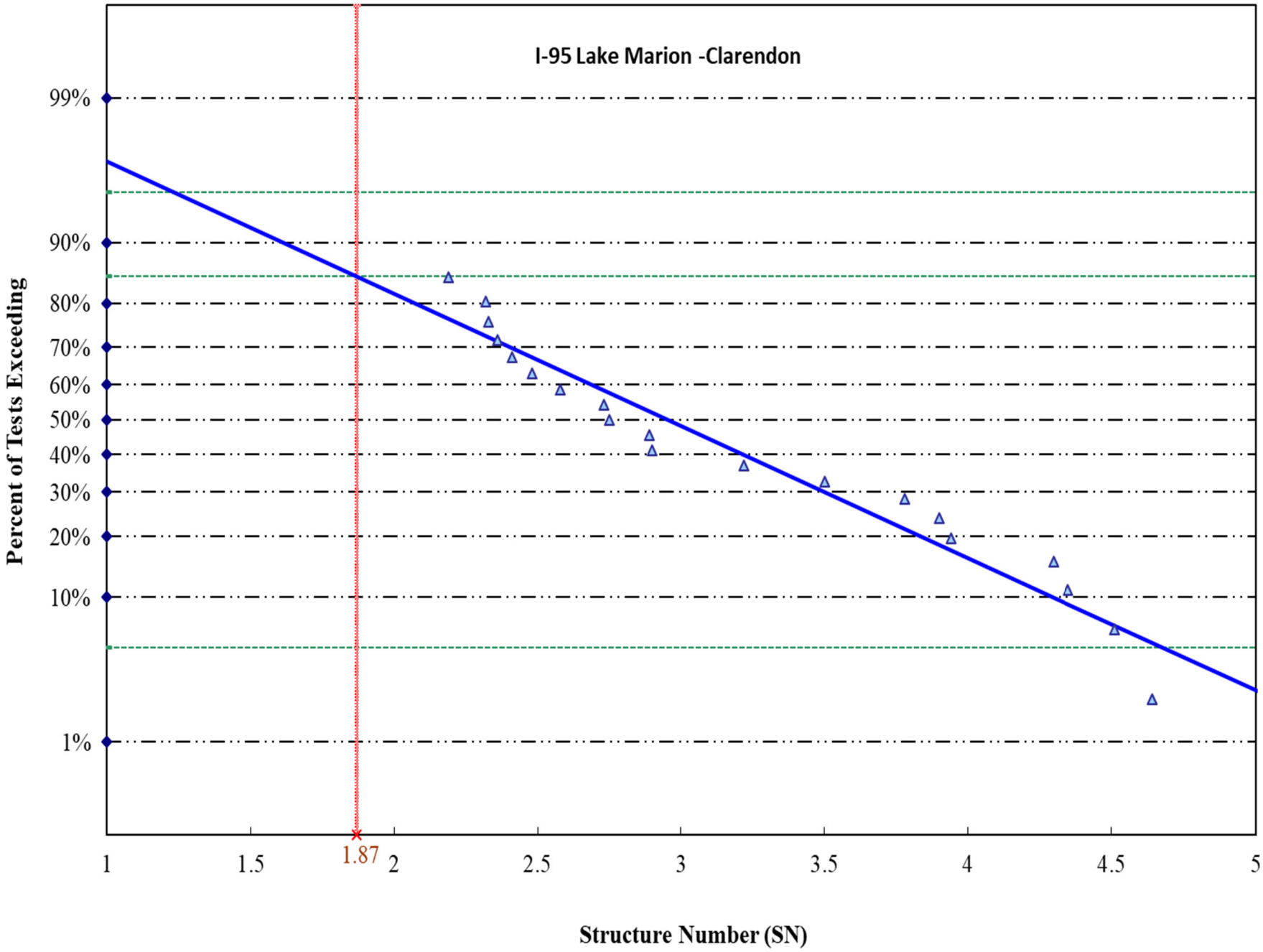
FWD testing results show that the outside shoulder pavement structure is highly variable with structural number values ranging from 2.19 – 4.64. An existing structural number of 1.87 was determined based on the statistical analysis of the results. This is a value lower than any tests due to the variability of the test results and the probability of missing the lowest values during field testing. Additionally, a subgrade modulus value of 8623 psi also indicates that the soils may be worse than historical references and mechanistically would be more indicative of something in the 1-2 range. Significant repairs would be required to bring the pavement to a desired SN that could comfortably carry temporary traffic. Alternatively, a mechanistic analysis was performed using

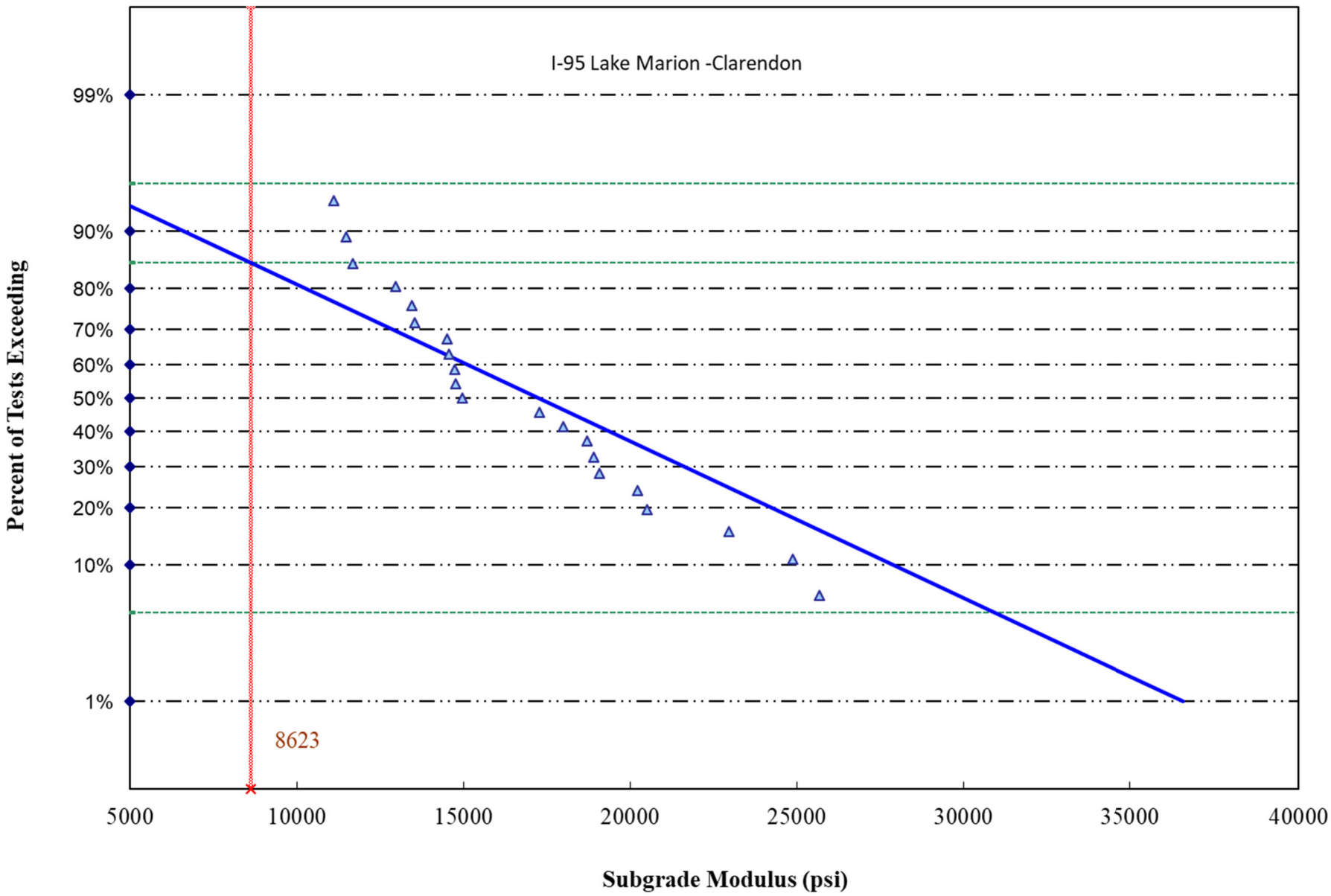
the 1100 psy of asphalt over a poor subgrade, which indicates a 3 plus year design. This design has been included in the RFP for temporary designs.

Attachment

- FWD Data – Outside Shoulder
- Core Log – Outside Shoulder
- Core Pictures –Outside Shoulder
- Core Log – Bass Drive and St Paul Road
- Core Pictures – Bass Drive and St Paul Road

FWD Data – Outside Shoulder


I-95 Lake Marion -Clarendon
99%
90%
80%
70%
60%
50%
40%
30%
20%
10%
1%
Percent of Tests Exceeding
1
1.5
1.87
2
2.5
3
3.5
4
4.5
5
Structure Number (SN)


I-95 Lake Marion -Clarendon
99%
90%
80%
70%
60%
50%
40%
30%
20%
10%
1%
Percent of Tests Exceeding
8623
5000
10000
15000
20000
25000
30000
35000
40000
Subgrade Modulus (psi)

Core Log – Outside Shoulder

Requestor: Dahae | Road Name / Number & County: I-95 Lake Marion

FWD File Number: | Date: 2-25-26 | Operators: Luke

Lane / Direction: EB | Start Location (MP): 98 | End Location (MP): 102

Core #	Mile Marker	~~Total Depth~~ OGFC	Asphalt Depth	PCC Depth	Distance to Sand AC	Top Down Crack	Bottom Up Crack	Debonded Depth	Mix Problem	Voids	Notes	
1	0.06		3.75	8.5					Lean concrete ?		before the bridge	white line
2	0.06		3.00				1.5-3	1.5	CSAB ??			edge
3	0.19		4.25					2.75	CSAB ?			white line
4	0.19	included	6.00					2.4	CSAB			edge
5	1.17	1.5 OGFC	5.0	8? PCC	—	cracking	retrieve		No picture		on island	WL
6	1.17	NO OGFC	4.5					1.5	CSAB			edge
⑦	WB										no more core	
7	0.0	(1.5) OGFC	4	? PCC					PCC		(MID MM - 1.0)	WL
8	0.0	NO OGFC	4.25						CSAB			edge
9	0.1	1.25 OGFC	3.5	half PCC half GAB					GAB			WL
10	0.1	NO OGFC	4.0	PCC				2.0	CSAB			edge
11		1.25 OGFC	4.5	8.5					PCC		on island	WL
12		NO OGFC	5.0					1.5 4	CSAB		on island	edge
13	0.9	1.25 OGFC	4.5	PCC 8.75							"	WL
14	0.9	NO OGFC	4.75				3.5 -4.75	3.5	CSAB		"	edge
15	2.23	NO OGFC	8.5					6.5	CSAB		off the bridge	WL
16	2.23	NO OGFC	9.5					4 2.25	CSAB			edge

***Any reference to gab or csab in field log is MLBC / GAB.**

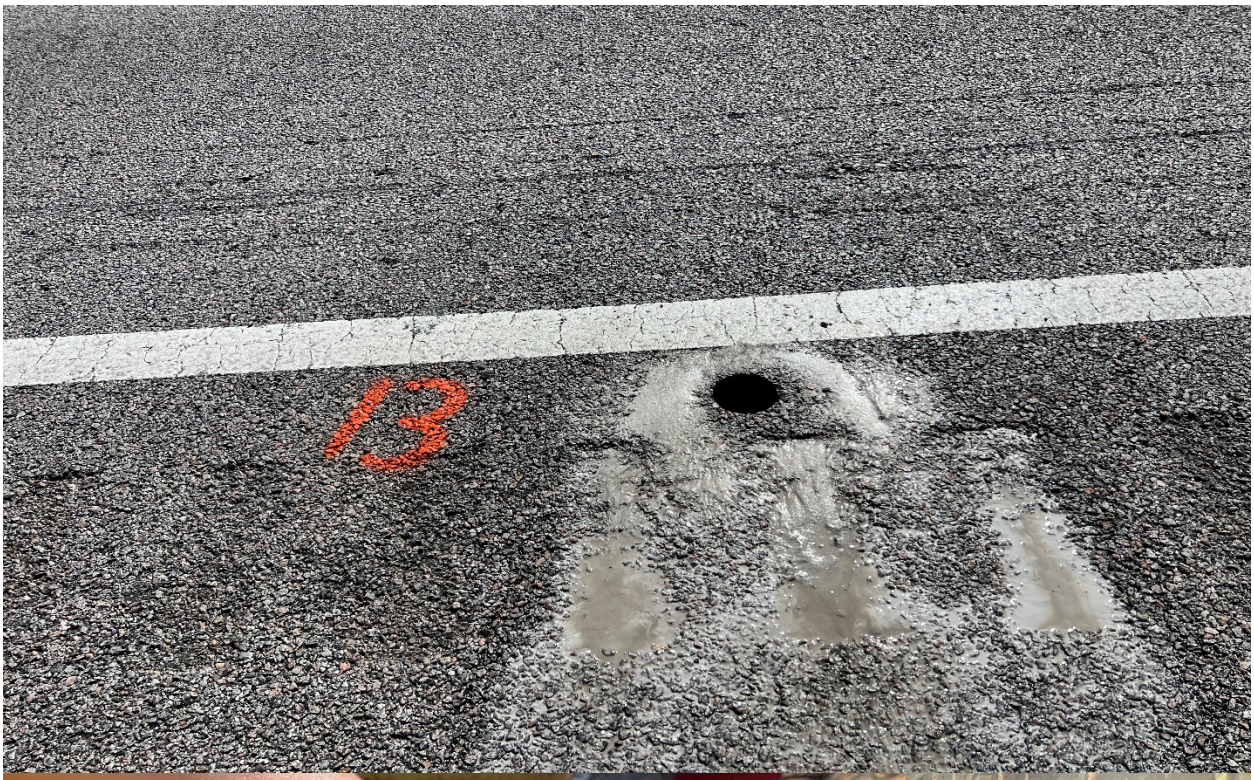
Core Pictures – Outside Shoulder


South Carolina


1
2
3
4
5
6
7


KOMELON
NYLON COAT


KOMELON
NYLON
COAT


13


1
2
3
4
5
6
KOMELON
NYLON COAT
DURA-NY-COAT


15


KOMELON
YELLOW COAT


16

Core Log – Bass Drive and St Paul Rd

Requestor: Dahae

Road Name / Number & County: Bass Dr.

FWD File Number:

Date: 2-25-26

Operators: Luke

Lane / Direction: EB

Start Location (MP):

End Location (MP):

Core #	Mile Marker	Total Depth	Asphalt Depth	OGFC	Distance to Sand AC	Top Down Crack	Bottom Up Crack	Debonded Depth	Mix Problem	Base Type	Notes
1	West end		9.5		No #1 Core			2.5 stripping 6"	2.5 -6	Sand clay	Road closed.
2	west end		10.00					2.5 stripping 4.5	2.5 -4.5	Sand clay	
	St Paul Rd										
3	east end		7.5		6-7.5	No #3 Core		3.5 stripping		Sand clay	
4			7.0		6-7			6	stripping	sand clay	
					0			0			

Core Pics – Bass Drive and St Paul Rd


SG87134
Boss
2


1
2
3
4
5
6
7
8
9
10


3


KOMELON
NYLON COAT