

Line	ADT ⁽¹⁾	Design Life (Years)	Super Paye Mix Thickness			
			S9.5C	S9.5B	I19.0C	B25.0C
-L- (STA 21+50 to 25+76)	10,700	0.25	3.0			4.0
-L- (STA 22+50 to 28+00)						

1. ADT are based on project let year: 2026

you responded to my



The subgrade should be prepared in accordance with NCDOT Specifications Section 500. Prevention of infiltration of water into the subgrade is essential for successful performance of the pavements.

you still didnt make text justified. Should go to full width of page.



Prepared by,

Sanad Musafer
Designer I, Geotechnical

Maxime Metry, P.E.
Project Engineer II, Geotechnical
Registered, North Carolina 056190



Attachments:

- Provide Information: Design Data and Plan View
- 2019 NCDOT Pavement Design Manual (Select Pages)
- Calculation Summary

You didnt include this...

PROVIDED INFORMATION

DESIGN DATA

PLAN VIEW

your missing
selected pages
from pavement
design manual.



ADDED PAGE BREAK
AND PAGES FROM
MANUAL

From: Porter Jones <wpjones@rkk.com>
Sent: Wednesday, May 6, 2026 1:28 PM
To: Scott Blevins <sblevins@rkk.com>; Gregory Goins <ggoins@rkk.com>
Cc: Erin Seals <eseals@rkk.com>; Roman Prokopovych <rprokopovych@rkk.com>
Subject: RE: R-5810 temporary pavement design

Hello Greg,

Just would like to keep you up to date. Just had some DQC comments needed. We will now need temporary pavement is needed for a pipe from -L- Sta 22+26 to -L- Sta 28+19 on the outside of the NB lanes and from -L- Sta 22+26 to -L- Sta 28+19 on the outside of the NB lanes. I am currently working on revising the TMP to show these revised limits.

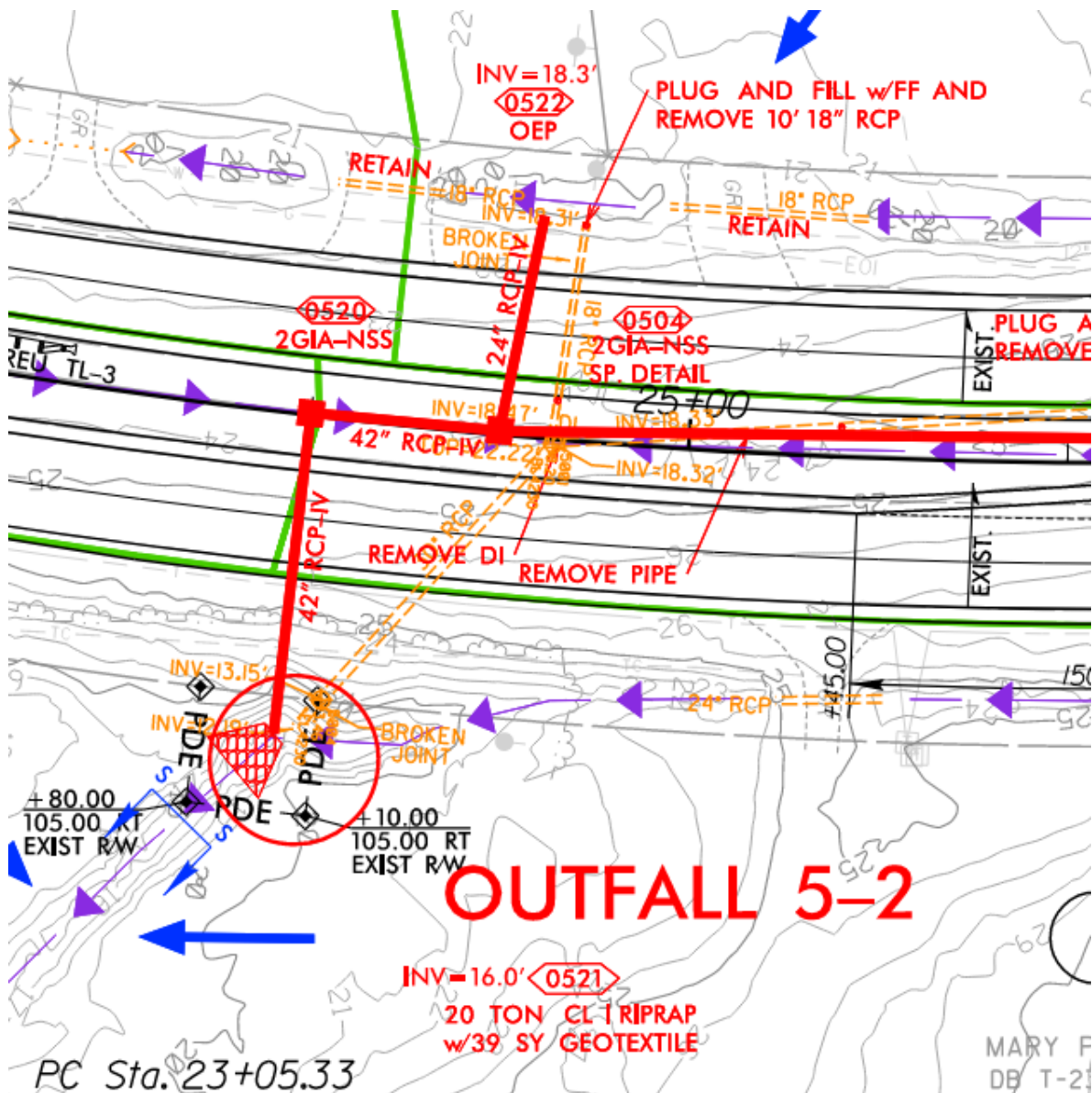
Thanks,
Porter

From: Scott Blevins <sblevins@rkk.com>
Sent: Wednesday, May 6, 2026 9:21 AM
To: Gregory Goins <ggoins@rkk.com>
Cc: Porter Jones <wpjones@rkk.com>; Erin Seals <eseals@rkk.com>; Roman Prokopovych <rprokopovych@rkk.com>
Subject: R-5810 temporary pavement design

Hey Greg,
Thanks for helping out on the temporary pavement design. Temporary pavement is needed for a pipe installation from -L- Sta 21+50 to -L- Sta 25+76 on the median side of the NB lanes and from -L- Sta 22+50 to -L- Sta 28+00 on the outside of the NB lanes. The plan view and traffic volumes are shown below. It is a short duration....< 1 month. Let us know if you need additional information.

Please include the email on one sheet, the plan sheet on a nother and the title page that has the Design Data with a box around it. Looks cleaner than how you have this presented now. Also highlight what information is important from the email. Ie highlight the stations/locations

to the amount of temp pavement Sta 25+82 on the median side of the lanes for clarity. I am currently working on



DESIGN DATA	
ADT 2026 =	10,700
ADT 2046 =	15,306
K =	5%
D =	60%
T =	13% *
V =	60 MPH
* TTST = 8% DUAL 5%	
FUNC CLASS =	
PRINCIPAL ARTERIAL	

CALCULATION SUMMARY



Job No.: R-5810

Task: Flexible Asphalt Temporary Pavement Design

Job Name: US 17 from North of SR 1205 to SR 1119

By: SWM

Date: 5/26/2026

Checked By: MM

Date: 5/26/2026

Flexible Asphalt Temporary Pavement Design**References:**

- 1) NCDOT Pavement Design Procedure AASHTO 1993 Method, NCDOT Materials and Tests Unit - Pavement Section, January 4, 2019.
- 2) AASHTO Guide for Design of Pavement Structures 1993

Forecasted Traffic Volumes and Years

Construction Year:	2026	
Design Period:	0.25	years
Level of Loading Design Period:	20	years
Initial ADT, $ADT_{Initial}$:	10,700	vpd
Initial ADT Year, $Year_{Initial}$:	2026	
Future ADT, ADT_{Future} :	15,306	vpd
Future ADT Year, $Year_{Future}$:	2046	

NCDOT Pavement Design Procedure (page 10)
NCDOT Pavement Design Procedure (page 7)
Provided by HNTB Traffic Forecasting
Provided by HNTB Traffic Forecasting
Provided by HNTB Traffic Forecasting
Provided by HNTB Traffic Forecasting

Traffic Design Inputs

TTST Loading Factor, $TTST_F$:	0.80	,	Urban Other	NCDOT Pavement
% Multiple Unit Multiple Axle Trucks, %TTST:	1	%		Design Procedure (page 4)
DUALS Loading Factor, $DUAL_F$:	0.25	,	Urban Other	NCDOT Pavement
% Single Unit Single Axle Trucks, %DUALS:	2	%		Design Procedure (page 4)
Lane Distribution Factor, L_D :	0.90	,	2 Lane/Direction	
% Direction:	50	%		NCDOT Pavement Design Procedure (page 4)
Initial Serviceability Index, P_0 :	4.20			NCDOT Pavement Design Procedure (page 1)
Terminal Serviceability Index, P_t :	2.50			NCDOT Pavement Design Procedure (page 4)
$\Delta PSI, P_0 - P_t$:	1.70			
Std Error of Traffic and Performance Prediction, S_0 :	0.45			NCDOT Pavement Design Procedure (page 1)
Reliability:	90	,	Primary	NCDOT Pavement
Standard Normal Deviate, Z_R :	-1.282			Design Procedure (page 5)

Soil Design Inputs

Subgrade Soil California Bearing Ratio, CBR: 6 %

Traffic Percent Growth

NCDOT Pavement Design Procedure (page 3)

$$\%Growth = (10^{\frac{\log_{10}(\frac{ADT_{Future}}{ADT_{Initial}})}{(Year_{Future} - Year_{Initial}) * 365.25}} * 365.25 - 365.25) * 100 = 1.79 \%$$

where,

 ADT_{Future} = Future ADT Traffic Count (vpd) $Year_{Future}$ = Future ADT Year $ADT_{Initial}$ = Initial ADT Traffic Count (vpd) $Year_{Initial}$ = Initial ADT Year**Average Annual Daily Traffic in the Year of Construction**

NCDOT Pavement Design Procedure (page 3)

$$ADT_C = ADT_{Initial} * (1 + \frac{\%Growth}{100 * 365.25})^{((Year_{Construction} - Year_{Initial}) * 365.25)} = 10,700 \text{ vpd}$$

where,

 ADT_C = Average Annual Daily Traffic in Construction Year (vpd) $Year_{Construction}$ = Construction ADT Year $ADT_{Initial}$ = Initial ADT Traffic Count (vpd) $Year_{Initial}$ = Initial ADT Year

% Growth = Percent Traffic Growth

Determine Traffic ESALS (W_{18})

NCDOT Pavement Design Procedure (page 3)

$$ESALS_{Total} = \frac{((1 + \frac{\%Growth}{100 \cdot 365.25})^{(365.25 \cdot N_D)} - 1) \cdot (ADT_C \cdot \frac{\%TTST}{100} \cdot TTST_F + ADT_C \cdot \frac{\%Duals}{100} \cdot Dual_F) \cdot \frac{\%Direction}{100} \cdot L_D}{\ln(1 + \frac{\%Growth}{100 \cdot 365.25})}$$

where,

ESALS_{Total} = 18 Kip Equivalent Single Axle Load

% Growth = Percent Traffic Growth

ADT_C = Average Annual Daily Traffic in Construction Year (vpd)N_D = Design Number of YearsL_D = Lane Distribution Factor

% DUALs = Percent Single Unit Single Axle Trucks

% Direction = Percent Direction Split of Traffic in Each Direction

% TTSTs = Percent Multiple Unit Multiple Axle Trucks

DUAL_F = DUALs Loading FactorN_D = Design Number of Years

$$ESALS_{Total} = \frac{5,729}{549,811} \cdot 18 \text{ Kip Equivalent Single Axle Load } (W_{18}) \cdot \frac{0.25 \text{ year Design Period}}{20 \text{ year Level of Loading Design Period}}$$

Subgrade Resilient Modulus (M_R)

NCDOT Pavement Design Procedure (page 1)

$$M_R = 2555 \cdot (CBR \text{ VALUE})^{0.64} = 8,045 \text{ psi}$$

Required Structural Number of Flexible Asphalt Pavement

NCDOT Pavement Design Procedure (page 1)

$$\log(W_{18}) = Z_R \cdot S_o + 9.36 \cdot \log(SN + 1) - 0.20 + \frac{\log\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN + 1)^{5.19}}} + 2.32 \cdot \log(M_R) - 8.07$$

where,

ESALS_{Total} = 18 Kip Equivalent Single Axle LoadZ_R = Standard Normal DeviateS_o = Standard Error of Traffic and Performance PredictionM_R = Subgrade Resilient Modulus (psi)

SN = Structural Number of Flexible Asphalt Pavement Section

REARRANGE EQUATION AND SET = 0 BY TRIAL AND ERROR CHANGING THE 'SN'

$$Z_R \cdot S_o + 9.36 \cdot \log(SN + 1) - 0.20 + \frac{\log\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN + 1)^{5.19}}} + 2.32 \cdot \log(M_R) - 8.07 - \log(W_{18}) = 0$$

$$0.000 = 0$$

$$\text{Required SN} = 1.401$$

Required Structural Number of Flexible Asphalt Pavement

$$SN = a_1 d_1 + a_2 d_2 m_2 + a_3 d_3 m_3 + a_i d_i m_i \dots\dots$$

where,

SN = Structural Number of Flexible Asphalt Pavement Section

m_i = Drainage Layer Coefficientsa_i = Structural Layer Coefficientsd_i = Thickness of Layers (inches)

Material Type	Design 'a'	Design 'm'
Surface Mix (S9.5B, S9.5C, S9.5D)	0.44	--
Intermediate Mix (I19.0C)	0.44	--
Base Mix (B25.0C)	0.30	--
Granular Base (ABC Stone)	0.14	1.00
Cement Treated Base (CTABC)	0.23	1.00
Granular Subbase (PADC)	0.14	1.00
Lime/Cement Stabilized Subgrade	1.00	1.00

NCDOT Pavement Design Procedure (page 6)

Thickness (inches) ¹								Design SN	Check SN ²
Design No.	Surface Mix	Intermediate Mix	Base Mix	Granular Base	CT Base	Granular Subbase	L/C Subgrade		
1	2.50		4.00					2.300	OK
2	1.50			6.00				1.500	OK

Notes:

1) Check that pavement section thicknesses meet 'Required Pavement Designs (page 10)'

2) 'Design SN' must be within 0.10 of 'Required SN'

Surface Mix Design ESALS = 549,811, 18 Kip Equivalent Single Axle Load, 20 year Level of Loading Design Period

Surface Mix Design Type = S9.5B NCDOT Pavement Design Procedure (page 7)

where are you getting 1.5" from, i dont get it? it should be 2.5" revise or call me and explain

you are reporting S9.5B here, so you need to revise your Letter on Page 1 becuae you put the values under S9.5C

