

UND Senior Design Project Overview

UND UNIVERSITY OF
NORTH DAKOTA
COLLEGE OF ENGINEERING & MINES

NORTH
Dakota | Transportation
Be Legendary.

North Dakota Asphalt Conference

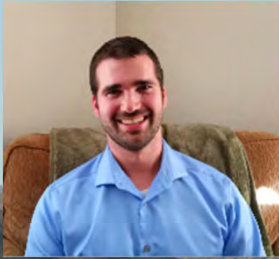
Virtual - April 6, 2021

Capstone Problem Statement



“Investigation, Analysis, and Design of Pavement Strategies to Eliminate Depressed Transverse Cracking in Hot Bituminous Pavements”

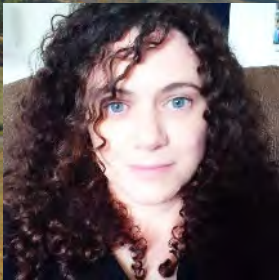
Students



Joseph Renze



Cole Nelson



Rory Bryant



Mitchell Nistler



Carter Ueland

Academic Advisor

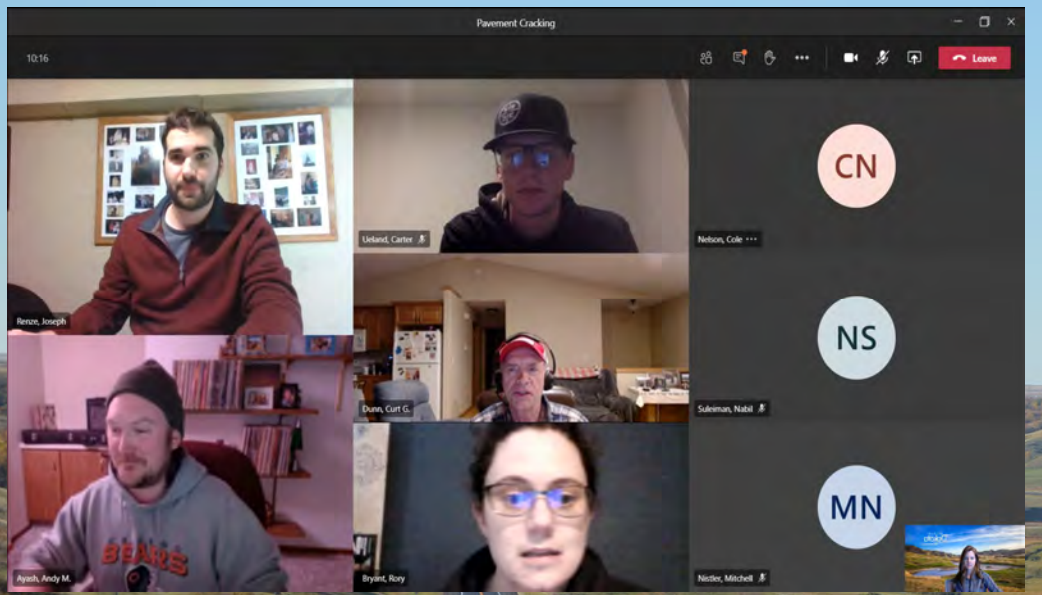
Dr. Nabil Suleiman

NDDOT Agency Mentors

Curt Dunn

Andy Ayash

Amy Beise



2020

Pavement Cracking Study North Highway 32, North Dakota

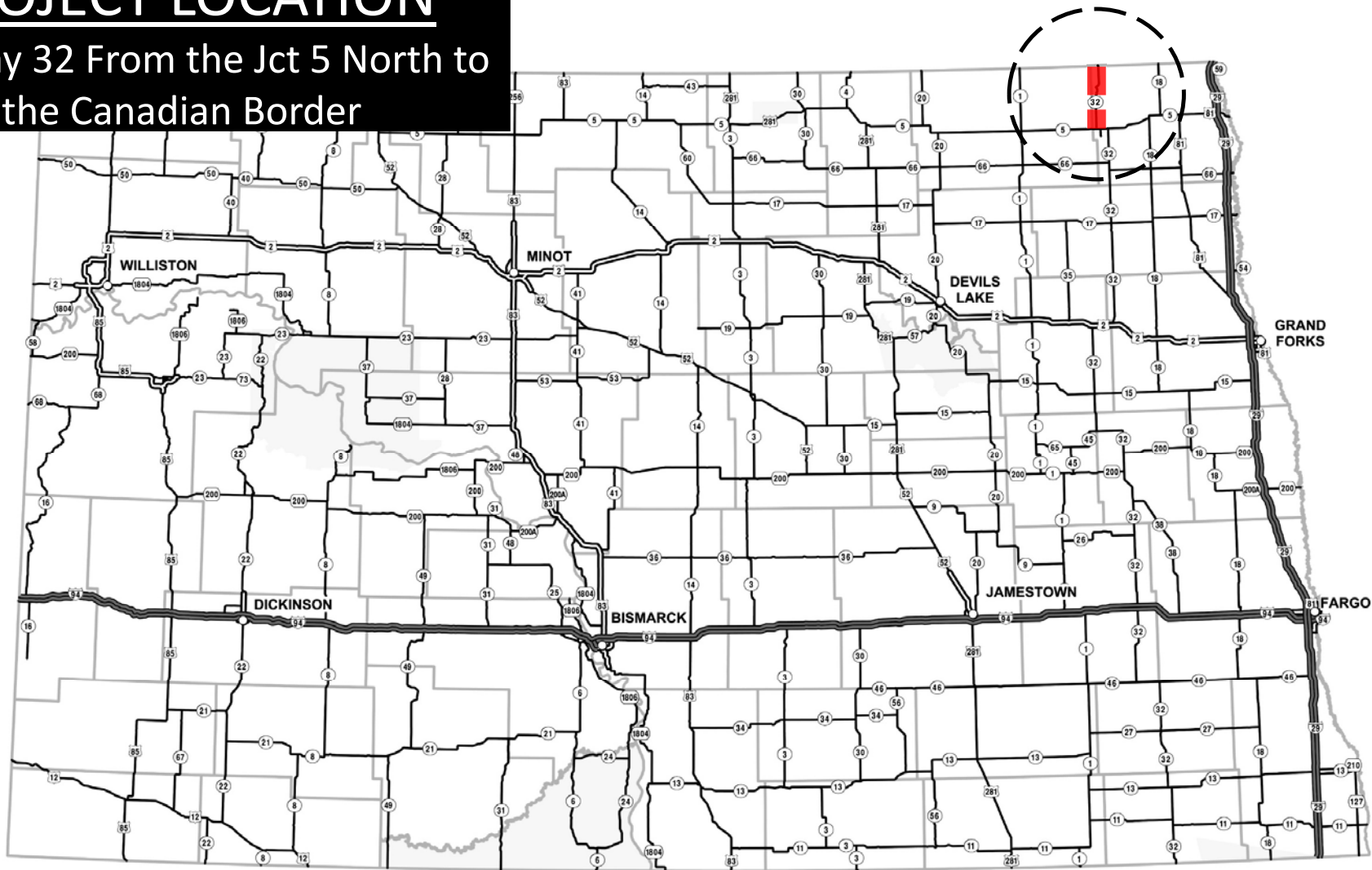
ENGINEER DESIGN REPORT
UNIVERSITY OF NORTH DAKOTA, CE 482 – CIVIL ENGINEERING
DESIGN I, FALL 2020

PREPARED BY: SMOOTH PAVEMENTS 'R' US
BRYANT, RORY
NELSON, COLE
NISTLER, MITCHELL
RENZE, JOSEPH
UELAND, CARTER

PREPARED FOR: UNIVERSITY OF NORTH DAKOTA
AND NORTH DAKOTA DEPARTMENT OF
TRANSPORTATION

PROJECT LOCATION

Highway 32 From the Jct 5 North to
the Canadian Border



History of Highway 32

Grade

1957

2.5" Overlay

1983

Chip Seal

2000

Chip Seal

2014

1958

Roadway Paved

2.5" Asphalt

2.0" Stabilized Base

5.0" Aggregate Base

1995

Chip Seal

2011

Mill & 2.0"
Overlay

20XX

20XX

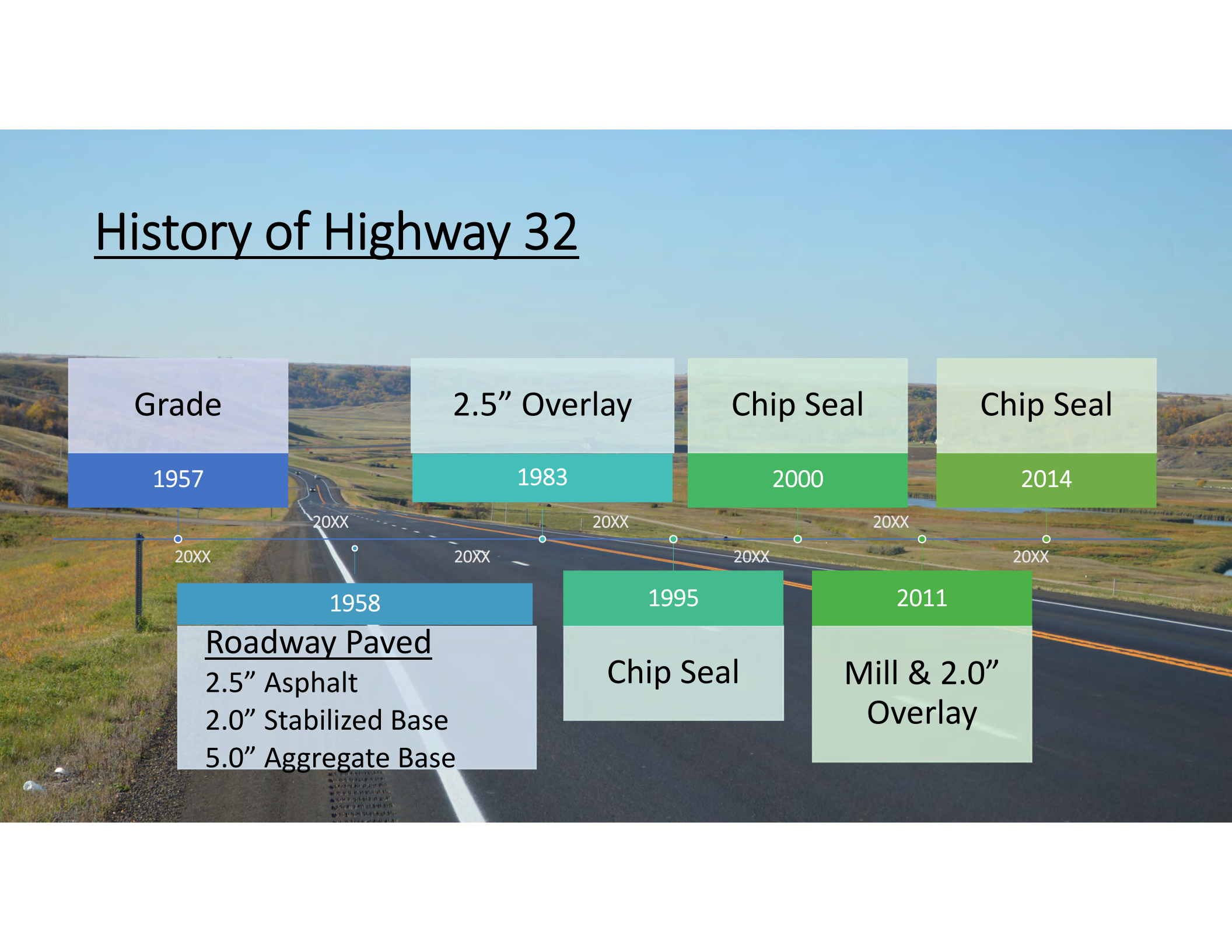
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Site Visit October 7, 2020



Cracked Section



Control Section



REMOVAL









Field Visit – Investigation



Field Visit – Investigation



Highway 32 Cross Section



2" RAP SUPERPAVE FAA 43 - 2011

0.5" HBP - 1983

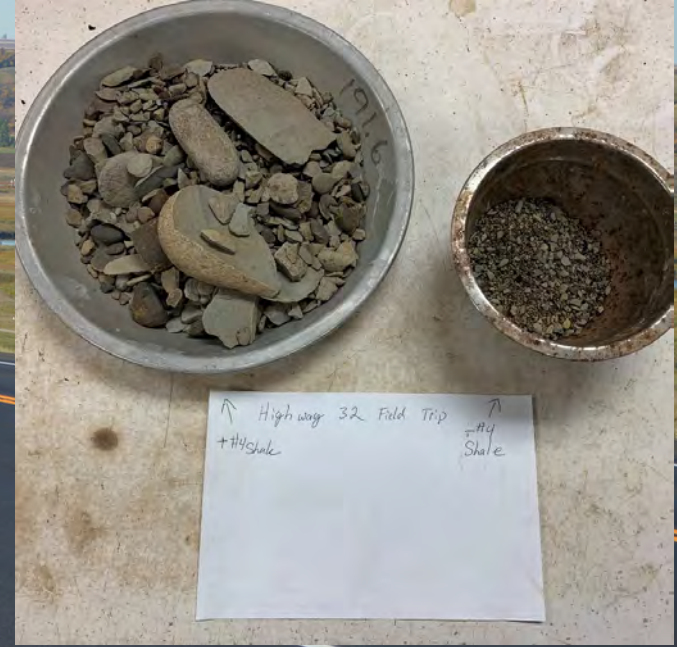
2.5" HBP - 1958

2" Asphalt Stabilized Base - 1958

5" Aggregate (Pit Run) Base - 1958



Base and Subgrade





Pavement & Stabilized Base

Pavement Layer	Depth (in)	In-Place Density % of MTD	Residual Binder Content (Burn Off)
Top Lift (HBP)	2	92.8	7.3
Middle Lift (HBP)	3	93.3	8.8
Bottom Lift (Stabilized Base)	2	86.3	9.5



2" Top Lift (HBP)

3.0" Middle Lift (HBP)

2" Bottom Lift (Stabilized Base)

THANK YOU!!!

Colter Schwagler Rory Bryant Cole Nelson Mitchell Nistler
Chad Taylor Matt Vold Amy Beise Andy Ayash Joseph Renze
Sean Marshall Ken Swedeen Carter Ueland
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Richard Kendall Matt Linneman
Jesse Kadrmas Tim Stegman Joe Davis
Caleb Christman Ed Pavlish
Lincoln Marshall Clayton Schumaker
Randy Ermer Bobby Usher
Casey Dahl
Brian James Thompson



Thank You

Good Luck Class of 2021 Seniors

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