

- WISE ROADS 2020 -

Gravel Road Research



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West Dakota Energy Association, WDEA, Annual Meeting

Research conducted by the North Dakota Local Technical Assistance Program (NDLTAP), a Program of the Upper Great Plains Transportation Institute, in partnership with the Western Dakota Energy Association (WDEA) and the North Dakota Department of Transportation (NDDOT).



Wise Roads

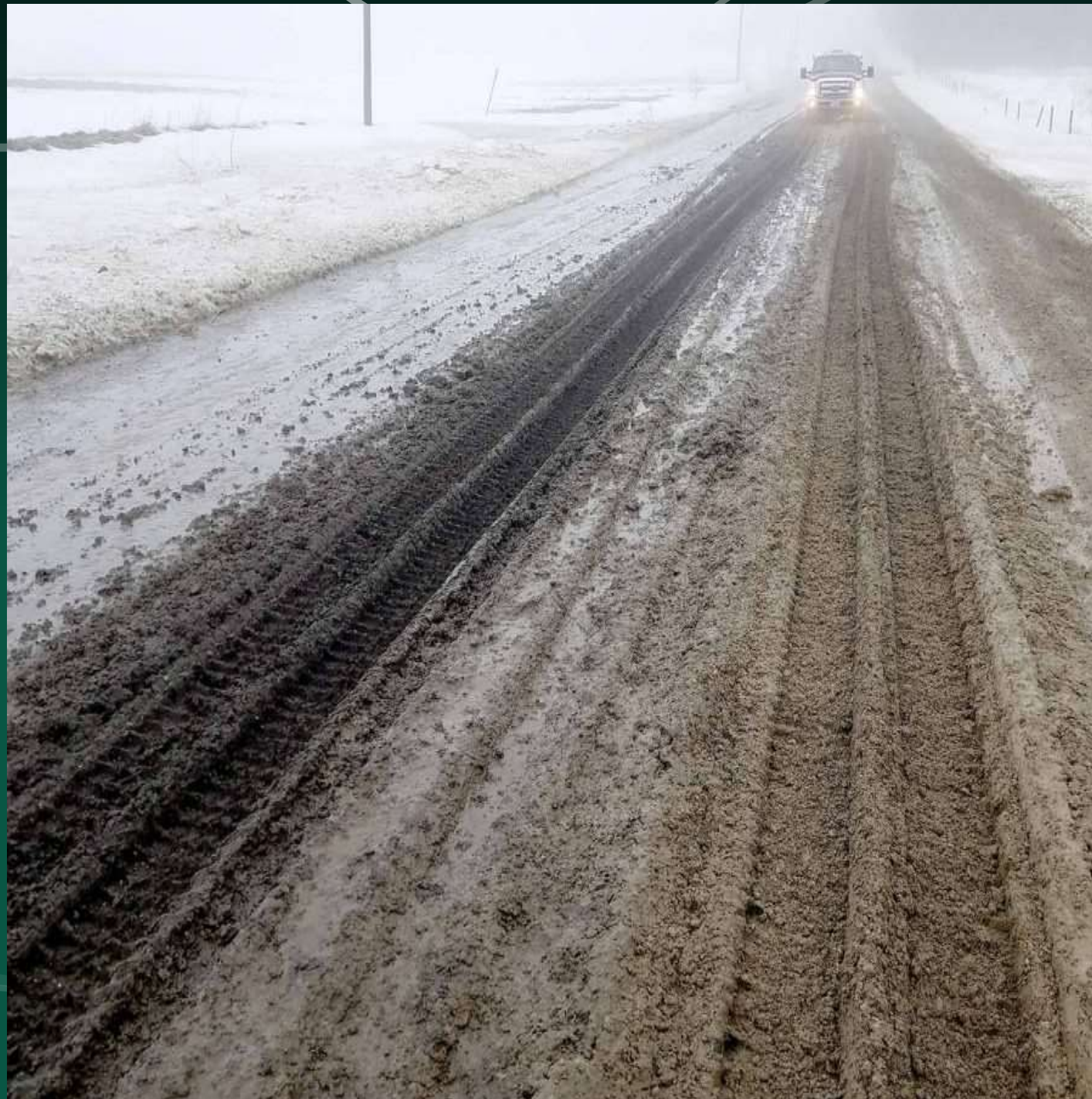
*'Weather Information System to Effectively
Reduce Oilfield Delays and Disruptions'*



Problem:

Muddy Gravel Roads Can't Carry Loads

When inclement weather strikes, local governments impose weight restrictions on gravel roads that prohibit the movement of oilfield truck traffic until road conditions improve.

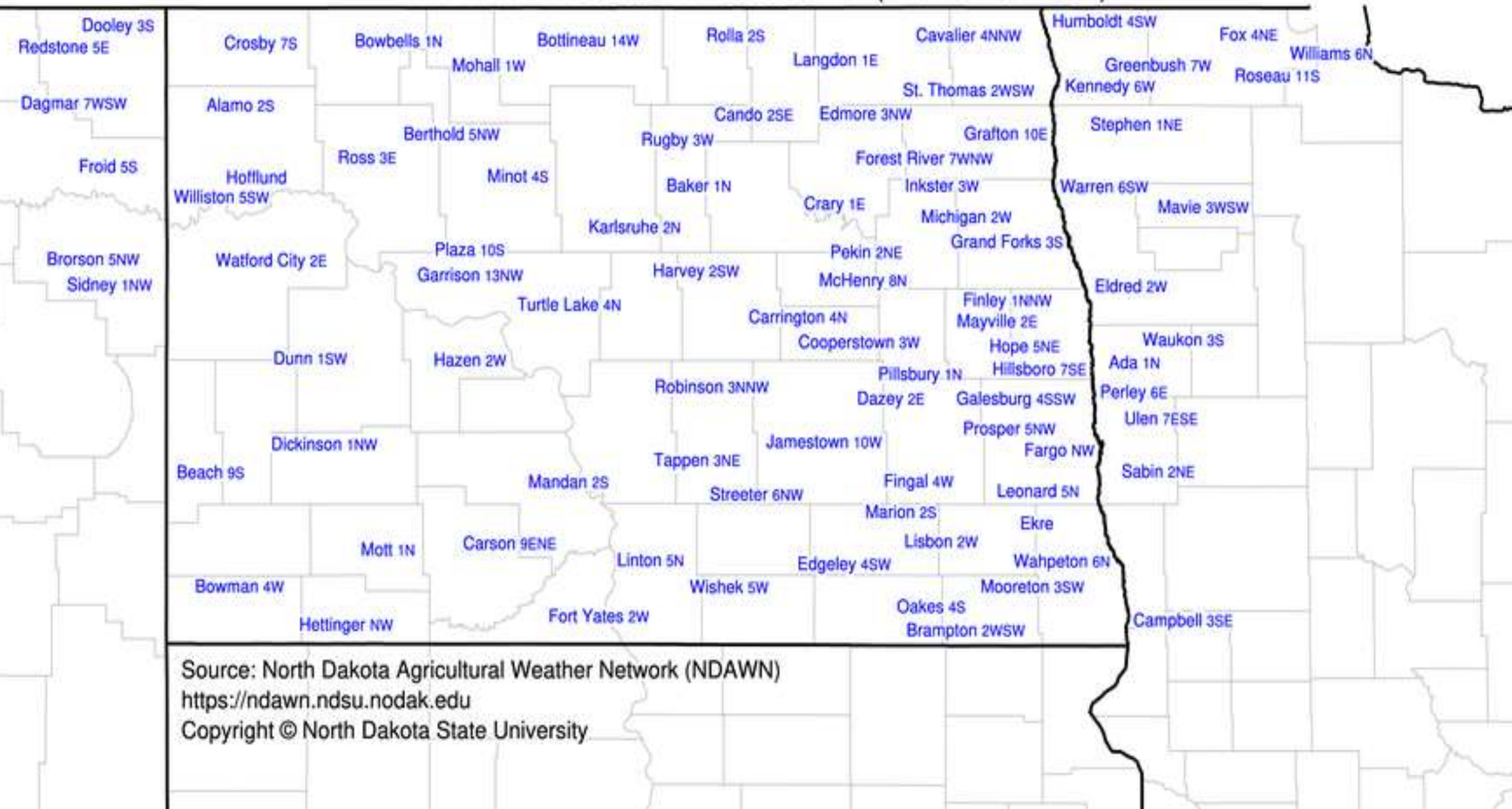


How can
technology turn
this into a
**Smart
Road?**





NDAWN Station Locations (2019-07-02)



Toward
365





Wise Roads Project

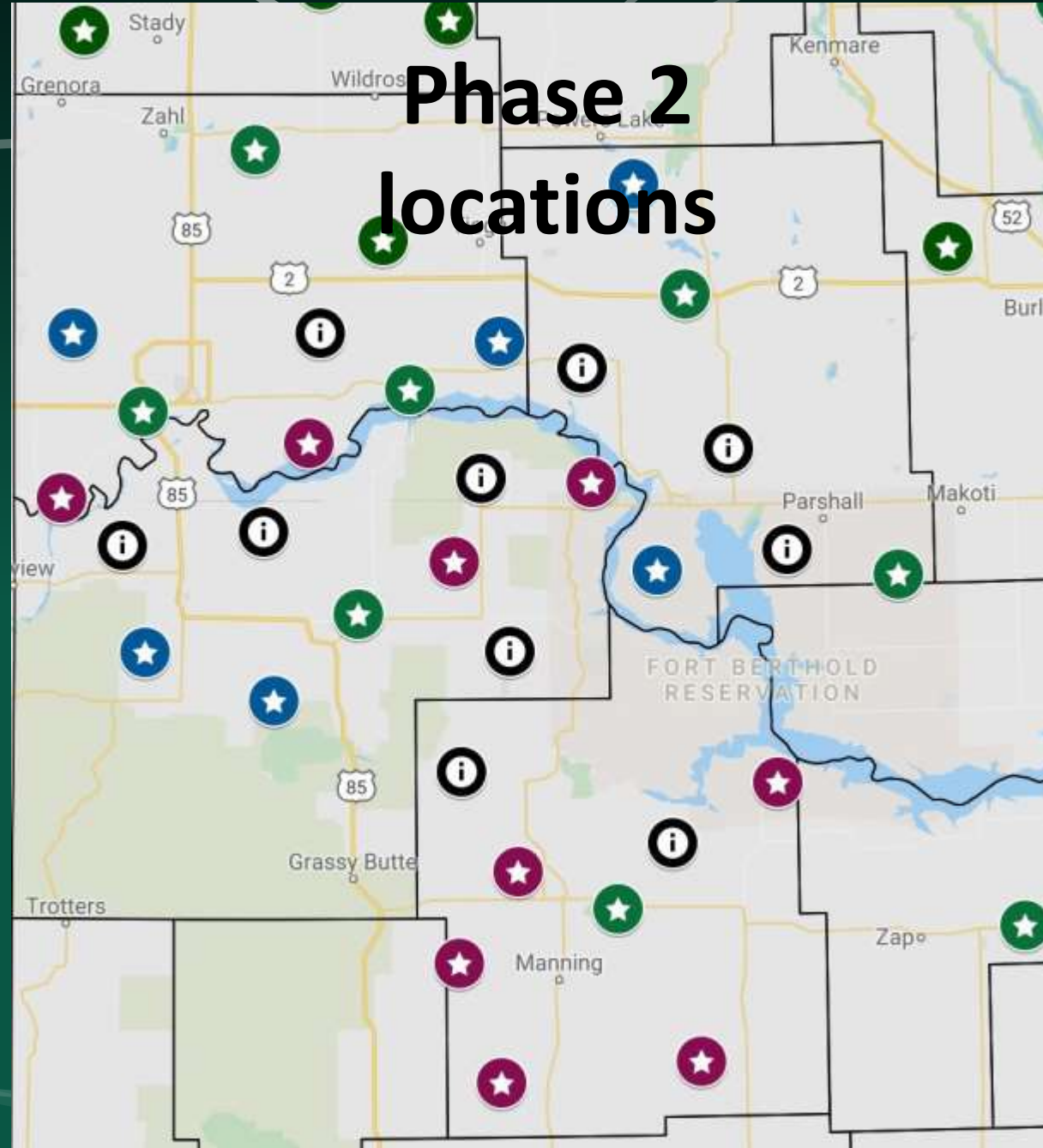
- ✓ Work with research partners, agriculture, and Industry to maximize benefit
- ✓ Install research-grade weather stations in areas with heavy oilfield traffic
- ✓ Make data publicly available through NDAWN, LoadPass and other sites
- ✓ Provide training to road managers through LTAP



Phase 1 locations – 10 stations

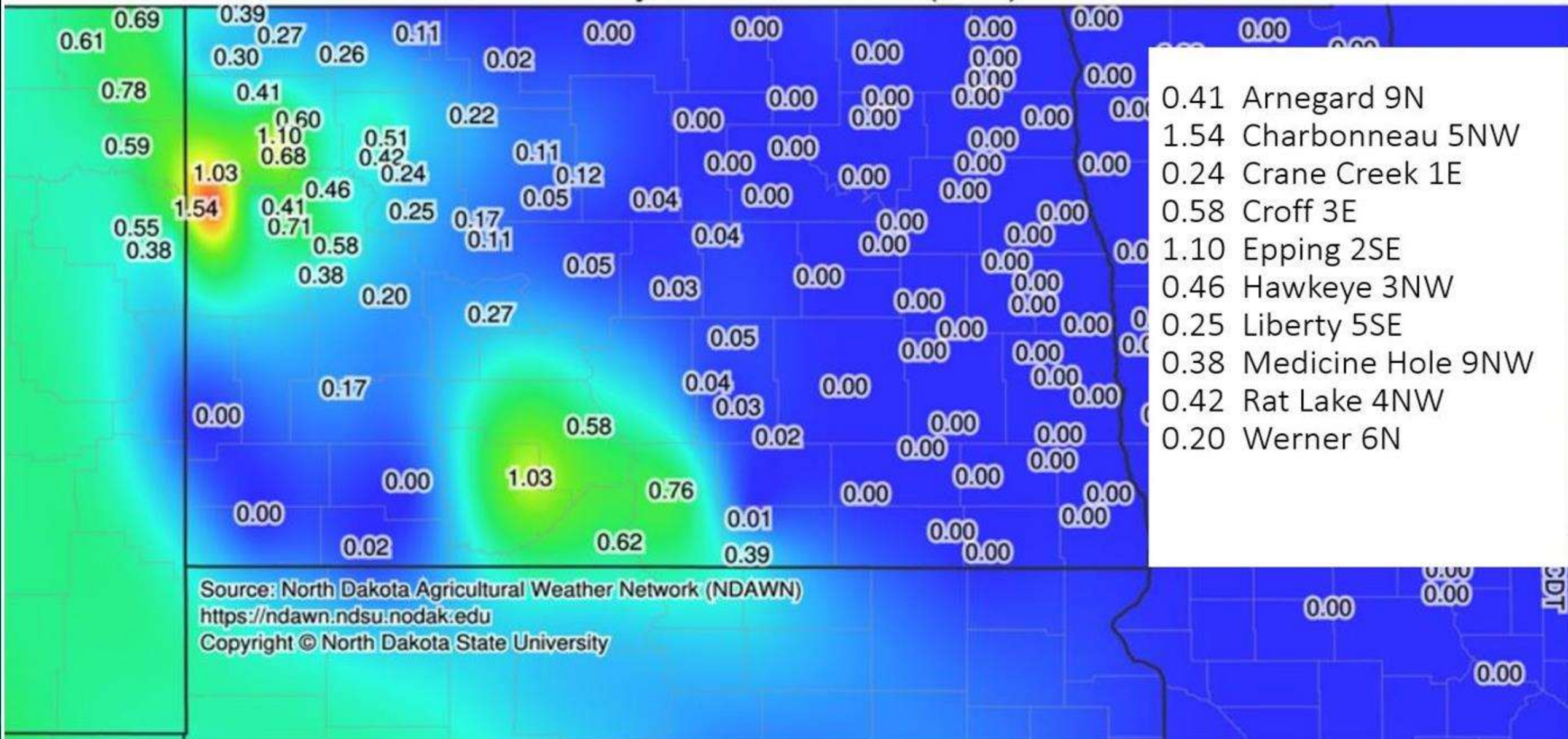


Phase 2 locations





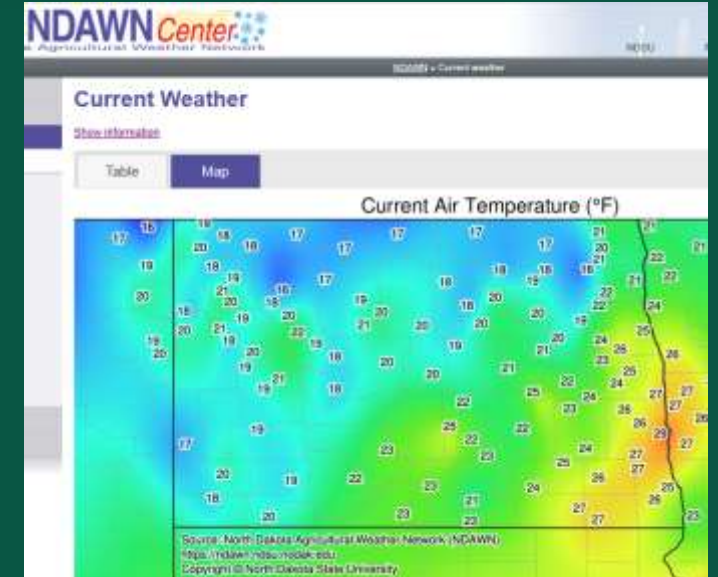
Today's Total Rainfall (inch)



The new stations can be identified by the precipitation numbers on the map. The names are either related to a nearby community or the township in which the station is located.

EXPECTATIONS OF THE PROJECT

- ▶ County Road Departments can use the weather data to determine the area of impact for weight restrictions
- ▶ County Road Departments use weather station locations to create/modify road “zones” for issuing restrictions
- ▶ Forecast and weather accessible from:
 - ▶ Ndenergy.org and LoadPassPermits.com
 - ▶ NDAWN (ndawn.ndsu.nodak.edu)
 - ▶ County Websites
 - ▶ UGPTI - GRIT



GRAVEL ROAD WARRIOR

NDSU UPPER GREAT PLAINS
TRANSPORTATION INSTITUTE

Better Gravel = Better Roads =
SAFER ROADS

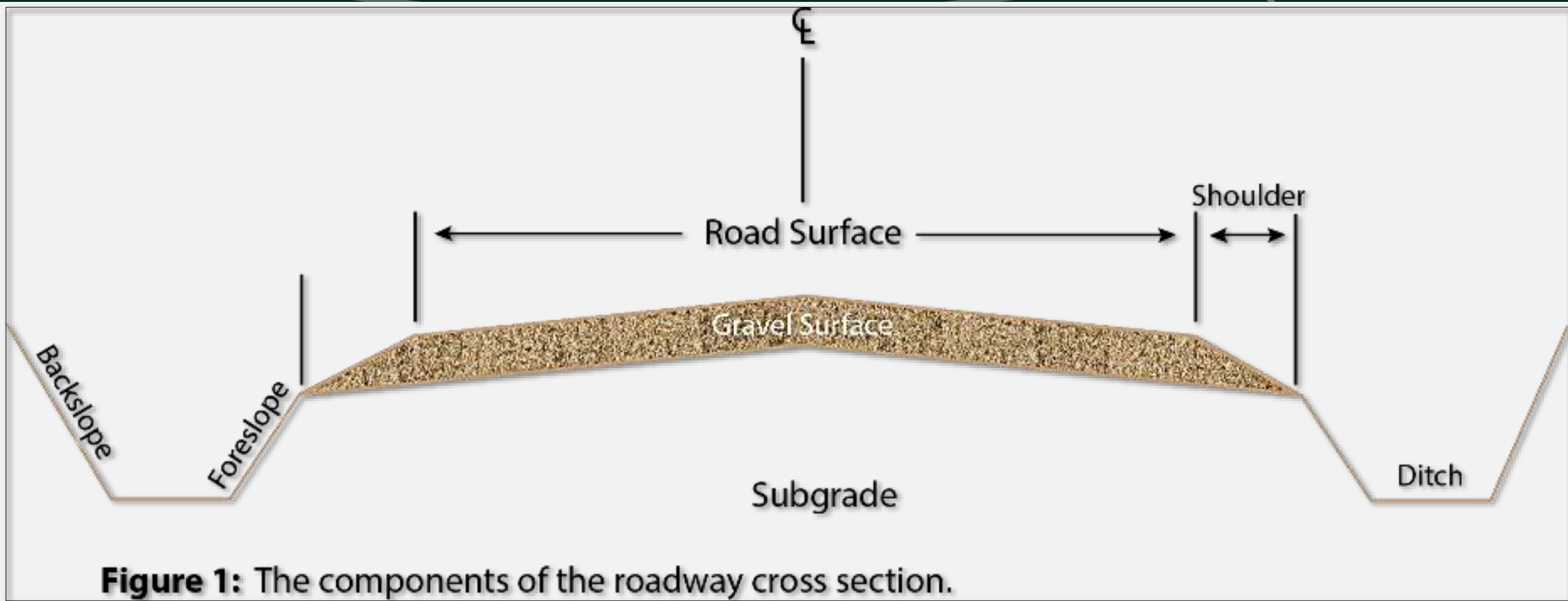


www.ndltap.org/resources/

**VISION
ZERO**
Zero Fatalities. Zero Injuries.

Roadway Condition Assessments





Subgrade Strength

Gravel Depth

05/20/2020 13:20

Roadway Slope



05/20/2020 13:14

INSTRUMENTS THAT HELP YOU MAKE THE GRADE

SLOPE METER NO. 2

THIS PRECISION INSTRUMENT MOUNTED ON HIGHWAY
CONSTRUCTION MACHINERY WILL SHOW THE
SETTING OF THE BLADE FOR A DESIRED SLOPE.

MANUFACTURED BY

SLOPE METER, INC.

MINNEAPOLIS, MN 55432

U.S. PATENT NO. 2,357,817 SEPT. 12, 1944; CANADIAN NO.

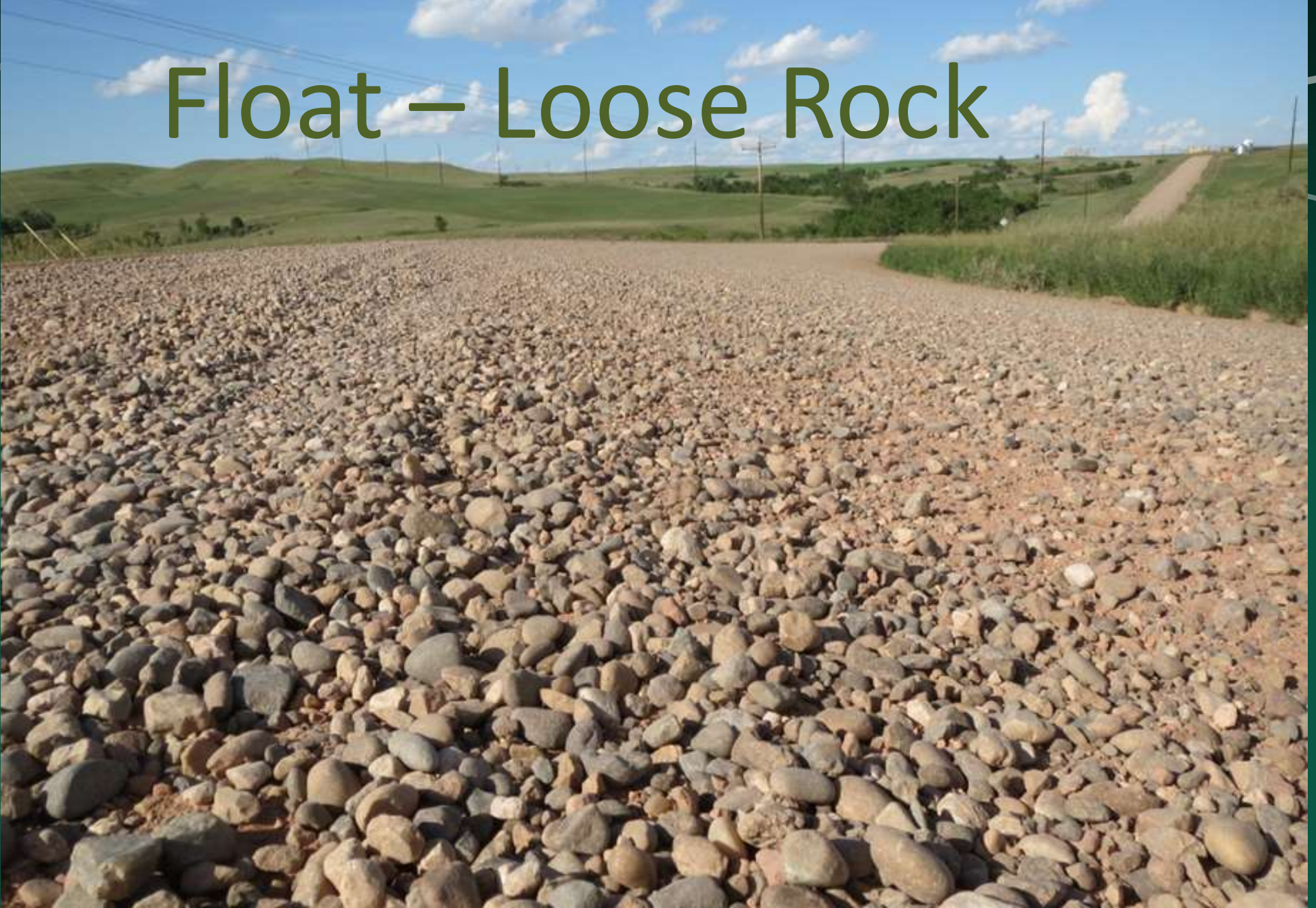
U.S.A.

437,280 OCT. 8, 1946; BRITISH NO. 581,873 JULY 6, 1944

4% Slope on Gravel

10 8 6 4 2 0 2 4 6 8 10 12

Float – Loose Rock



Float



05/20/2020 14:00

Corrugations = Wash Boarding



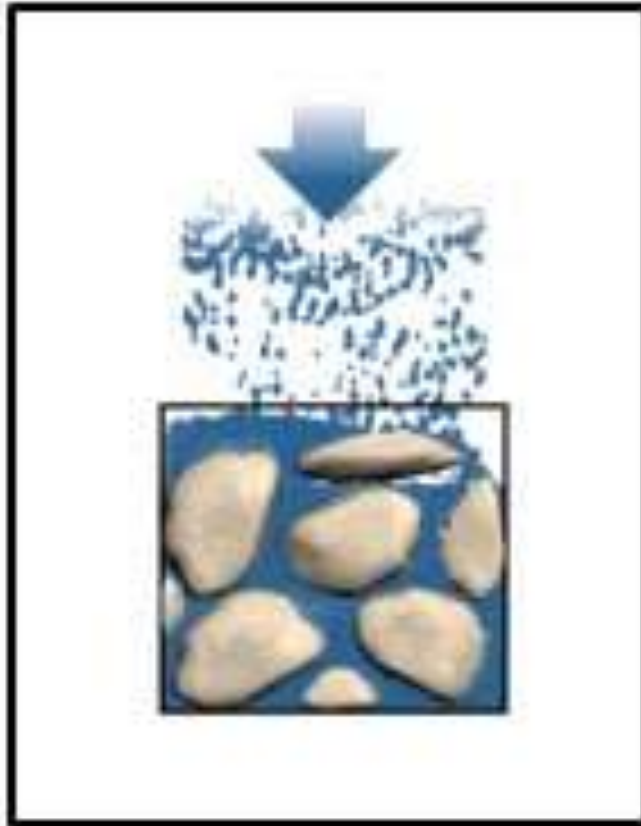
Gravel

Material Assessment

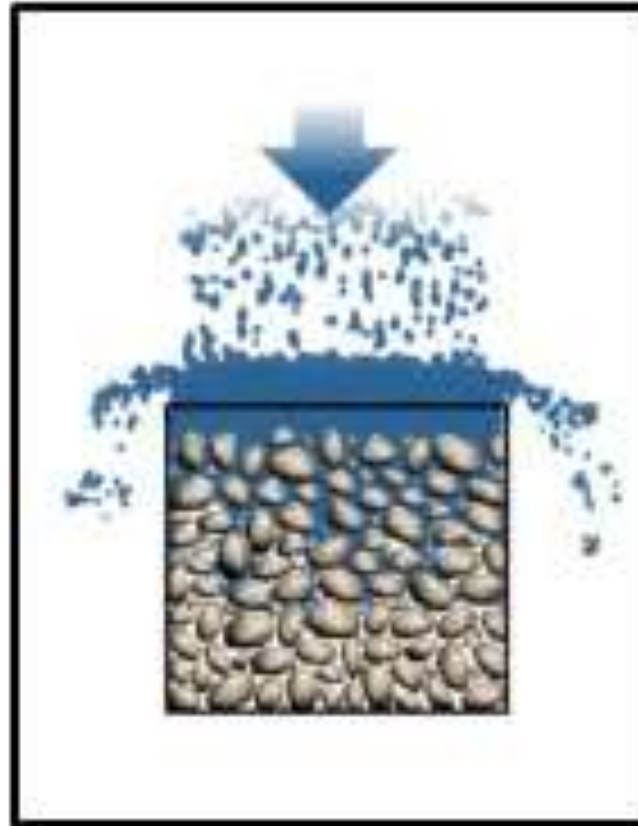


Gravel Quality – Gradation and Binder

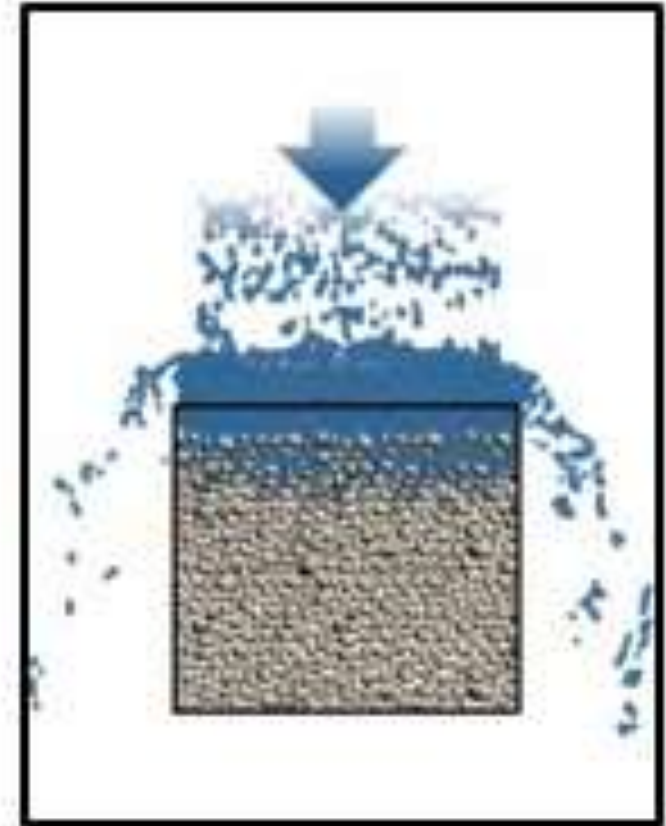
Infiltration Variations by Soil Texture



Sand



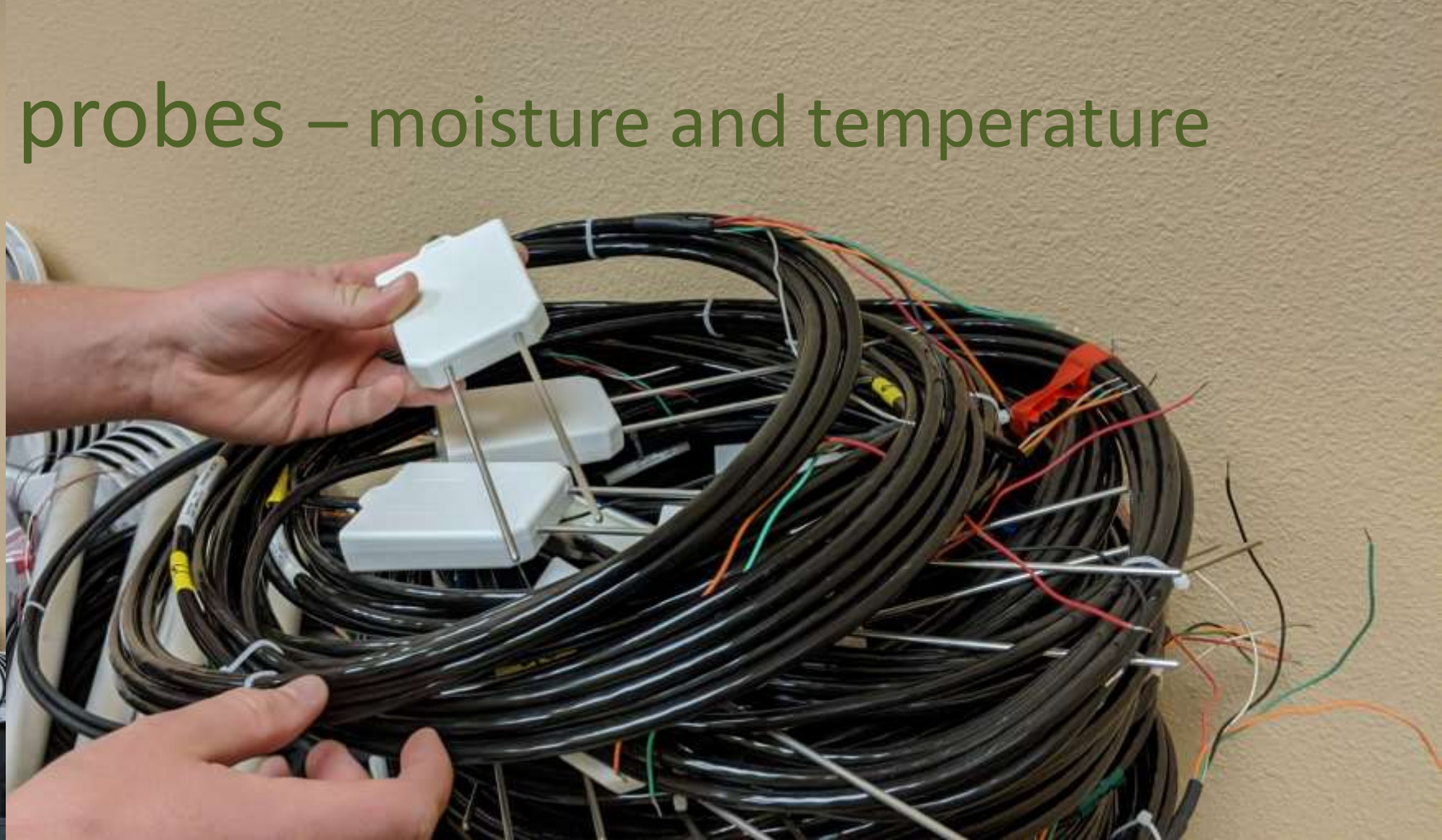
Silt



Clay

©The COMET Program

Subsurface probes – moisture and temperature





Traffic Counts



Gravel Roadway Properties

plus

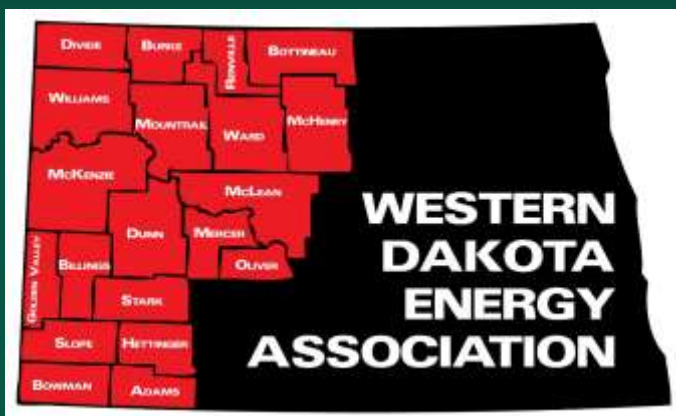
Rainfall Event Data

Equates to refined roadway condition data:

TOWARD 365 Prediction Model



NORTH
Dakota | Transportation
Be Legendary.™



NDSU

UPPER GREAT PLAINS
TRANSPORTATION INSTITUTE
NORTH DAKOTA LOCAL TECHNICAL ASSISTANCE PROGRAM

NDLTAP & WDEA

Together, we do great things!





DUNN COUNTY

North Dakota

Save the Date

Thursday, December 17, 2020 – 9 AM – 3 PM MT (10 AM – 4 PM CT)

NDLTAP/WDEA Western Energy Roundtable

Dunn County is hosting the event at their
NEW shop in Halliday

WISE ROADS 2020

Weather Information System to Effectively
Assess Rain Influenced Gravel Road Conditions



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and Gas Research Council

