



# GOODHUE COUNTY MINNESOTA

TO EFFECTIVELY PROMOTE THE SAFETY, HEALTH, AND WELL-BEING OF OUR RESIDENTS

**COMMITTEE OF THE WHOLE AGENDA**  
**CANNON VALLEY FAIRGROUNDS**  
**800 NORTH 9TH STREET**  
**CANNON FALLS, MN**

**JULY 2, 2019**  
**9:30 A.M.**

1. CR 23 Frost Boil Repairs.

Documents:

[CR 23 Repair.pdf](#)

# GOODHUE COUNTY DEPARTMENT OF PUBLIC WORKS



**Gregory Isakson, P.E.**  
**Public Works Director/County Engineer**

HIGHWAYS ♦ PARKS ♦ SOLID WASTE

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TO: Honorable County Commissioners  
Scott Arneson, County Administrator

FROM: Greg Isakson, Public Works Director

RE: 02 Jul Committee of the Whole Meeting  
**Options to Repair Frost Boils on CR 23**

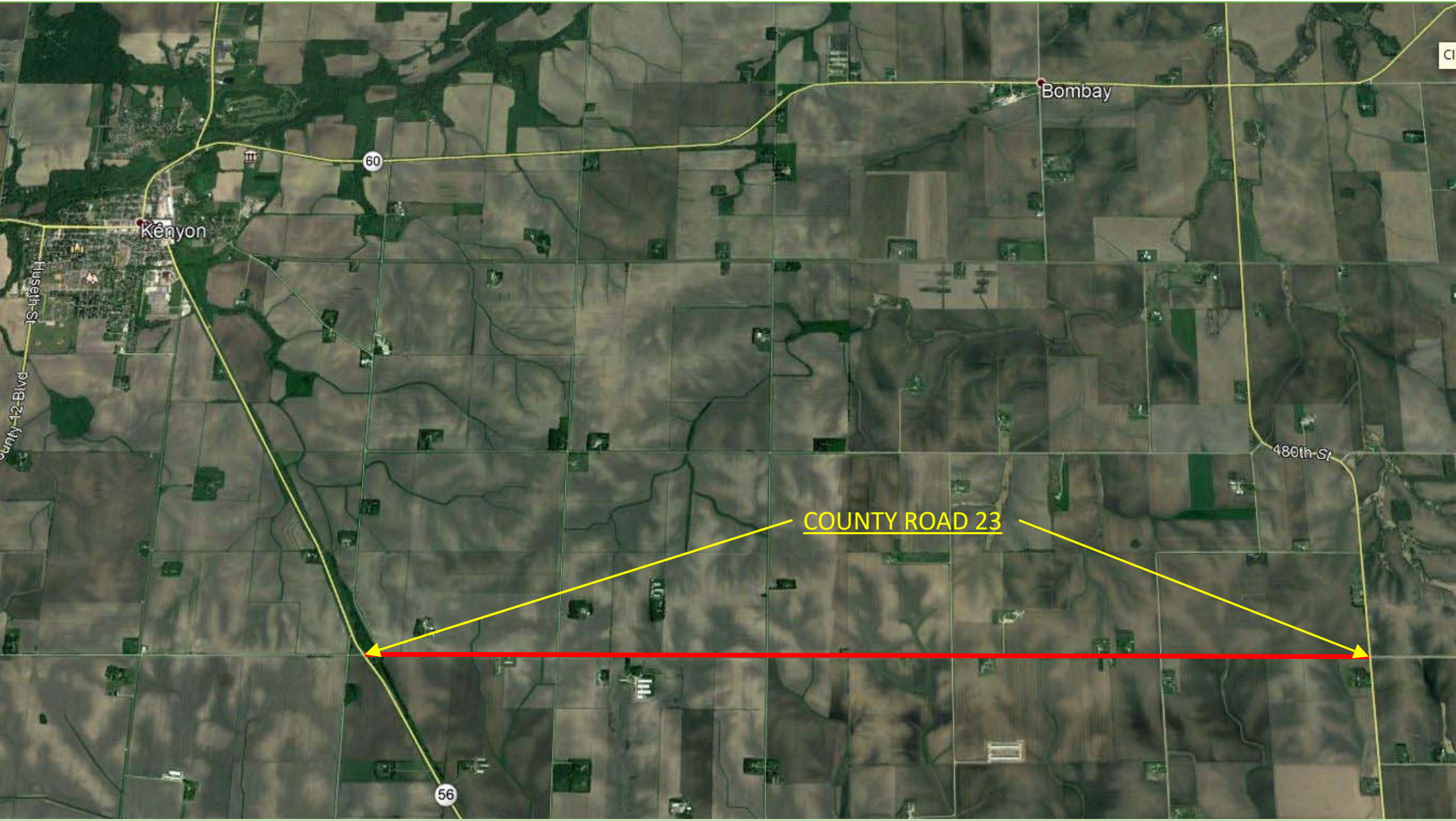
Date: 26 Jun 19

Staff will discuss several options to repair the damage to CR 23, which is in poor condition after this spring's weather conditions.

# Cement Stabilization Full Depth Reclamation (CSFDR)

Committee of the Whole Presentation

02 July 2019



Kenyon

Bombay

60

56

480th St

COUNTY ROAD 23

County 12 Blvd

# Maintenance Effort

- County forces have been blading and placing oversized rock in the frost boil areas. Sub-base continues to yield.
- Contributing factors affecting the road bed:
  - 1. Drainage potential
  - 2. Heavy loads
  - 3. Poor soils
- Mitigative work:
  - 1. Road top cross slope – 4%
  - 2. Modified French Drains
  - 3. Ditch cleaning including culvert replacements



# 2019 Spring Road Restrictions

- Road restrictions started March 15, 2019 and lasted until May 10, 2019.
- Goodhue County Aggregate Roads
  - Posted to 6 Tons.
  - CSAH 23 reduced to 5 Tons – Still in effect
  - Typically keep postings on aggregate roads for additional 2-weeks.

# May 7<sup>th</sup> Options Revisited

- 1. Shoulder Edge Drains, Geotextile Fabric, & 6" Aggregate Surfacing.
  - \$635,000
- 2. Shoulder Edge Drain, Cement Stabilization, & 6" Aggregate Surfacing.
  - \$940,000
- 3. Core Roadway, Build Road Back Up, 6" Agg. Surf., & Shoulder Edge Drain
  - \$2,800,000
- 4. Build Roadway Up From Existing Grade & Shoulder Edge Drain
  - \$1,700,000



# So how do we solve the problem?

## Shoulder Edge Drain, Cement Stabilization, & Aggregate Surfacing

- Edge drain in each shoulder: \$200,000
- Cement Stabilization: \$480,000
- 6" Class 5 aggregate: \$260,000
  
- **TOTAL** **\$940,000**

*\* This is a preliminary estimate based on industry averages. Actual costs may vary.*

# What is cement stabilization?

- Invented by Benjamin Flynn in Louisiana after WW1.
- Cement stabilization is a form of full-depth-reclamation that incorporates cement powder and water into existing, in-place base material.
- The mixing process is accomplished with the use of a reclaiming machine.
  - Average cement content ranges from 5-8%.
  - Once mixed the material is compacted to high density.
  - This process produces a semi-rigid material that continually gains strength over time, much the same as concrete.

# CONSTRUCTION

## Spreading Cement



# CONSTRUCTION

## Cement Incorporation



# CONSTRUCTION

Cement Incorporation



# CONSTRUCTION

## Breakdown Rolling



# CONSTRUCTION

## Initial Blading



# CONSTRUCTION





# CONSTRUCTION



Finish Rolling & Final Trimming

# CONSTRUCTION



Final Trimming

# CONSTRUCTION

Finished CSFDR



# CONSTRUCTION

Finished CSFDR



## CONSTRUCTION & PERFORMANCE TESTING (McLeod County)

- FWD Results
  - Significant strength increase over non-stabilized roadway – all stabilized sections > 10 tons
  - No direct correlation between cement content and strength

Section	Length	Thickness	Modulus	Load Capacity
	feet	in.	ksi	tons/axle
South Gravel	1300	4.8	16.7	<b>4.8</b>
1	1300	14.5	362.1	<b>20.0</b>
2	1300	14.6	560.9	<b>21.8</b>
3	1300	11.1	438.6	<b>19.0</b>
4	1300	10.1	280.4	<b>10.8</b>
North Gravel	1300	7.6	16.4	<b>5.4</b>

# FEMA

- March 12<sup>th</sup> – April 28<sup>th</sup> Disaster Declaration: Severe Storms, Straight-Line Winds, and Flooding.
  - Public Works was encouraged to submit projects related to frost boils.
    - Two applications were filed
      - 1. CR 23: Shoulder Edge Drain & Cement Stabilization
      - 2. Individual frost boil repairs on the County system.
  - July 11<sup>th</sup>: Applicant briefing
    - FEMA will need to know what our construction intentions for CR 23 will be.
      - If funding is granted for the CR 23 project it will more than likely be pro-rated: frost boil length vs total length
      - Frost Boil Length: 13,923 feet                      Road Length: 25,344 feet                      ~ 55% Frost Boils
      - Funding may not be granted and a decision of what to do to CR 23 will still need to be made.

# Capital Outlay & Funding Shortfall

- A project is not currently programmed or budgeted for.
- Must use local funds since CR 23 is a County Road and not on the State Aid system.
- Shoulder edge drain could be a possibility in 2019.
  - CSAH 7 culvert project estimate much higher than anticipated
  - Project can be delayed
  - ~\$300,000 would be available
  - Staff recommends pursuing edge drain and ditch cleaning in 2019 and completing the cement stabilization in 2020.

QUESTIONS?