



Low Water Crossing - Stark County Bakken Briefings, by Curt Glasoe

Photo credits - Todd Miller Stark County Road Operations Specialist



Winter Survival - Stark County Success Story
Low Water Crossing Provides Solution to Closed Bridge South of
Richardton, ND



Turning lemons into lemonade. Closure of a structurally deficient and functionally obsolete off-system bridge that was a critical link for local ag producers, created an opportunity for Stark County's road department. Al Heiser, Stark County Road Superintendent, challenged his crew to consider options, find a solution and construct a replacement in 2015.

To help his crew evaluate options, Al called on NDLTAP. Dale Heglund, NDLTAP Director, Curt Glasoe, Western Technical Support Representative, and Ron Eck, Senior Advisor West Virginia LTAP assessed the site in June 2015.

Recommendations for Al Heiser to consider

- Since the grades were relatively low on both sides of the creek, it was recommended to relocate the road and use sheet pile on each side of the creek crossing with some relief through the piles to pass the Q2 flow.
- The Q2 flow is 309 CFS, so four squashed 24" diameter or three squashed 30" diameter culverts will handle that flow and acceptable velocity.
- Remove and replace all topsoil in the newly disturbed areas.
- The sheet pile should have minimum depth of 6' feet below stream bed elevation, with the culverts placed at the present creek elevation bottom and fastened to or welded the sheet pile walls.
- The culvert inlets should be placed at the same elevation in the creek to ease the flow and also present the best clearing alternative. This should result in the lowest road maintenance cost in the future.
- The top of the piling at each end of the crossing should be one foot above the Q100 flow to prevent erosion around the ends of the crossing during this flood stage.

- Remove the existing bridge and abutments to prevent any safety issues from off road use in the future.



County Construction

The county utilized their own crews and equipment to construct the new double lane crossing in late summer. The project utilized eleven foot "I" beam piles driven approximately seven feet below stream bed with treated timber plank backing to four feet below the streambed elevation. They placed three culverts in the crossing at stream bed elevation and fastened them to the walls. The crossing was completed by placing 65 yards of concrete between the timber walls and between the culverts to hold the crossing in place. Some concrete slab riprap was used in the concrete fill between the culverts and on the downstream side of the crossing also. The topsoil was replaced on all the disturbed areas. The ditches were seeded and erosion control straw wattles were placed appropriately along the entire length of the project.



The old bridge was removed with the abutments left in place on the old crossing. The new road directs all traffic away from the old structure location.

Flexible cables mark the corners of the crossing location to be used during high water flow, and they should be maintenance free due to their flexibility.

Project Summary

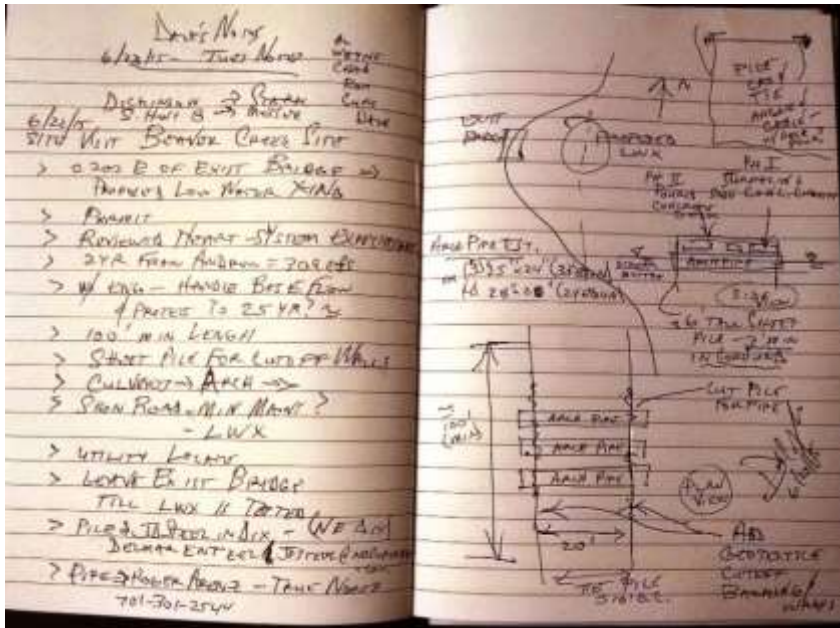
Al shared that he is extremely proud of his crew and the end product. His crew evaluated the suggested improvement options and figured out ways to improve the recommended options and also to save money by using county owned salvaged stockpiled materials. The result is an inexpensive crossing that will stand up to anticipated stream challenges. NDLTAP/Stark County fall and winter inspections confirm that the crossing is built to last. The next flood event will be the real test to its viability. Local ag producer Phillip Messer, shared that he was pleased that the County was able to provide a crossing to replace the closed bridge. "The County did the best that they could do. The crossing provides a solution that is real good for our needs. A big rain will test the crossing. Good project." - Phillip Messer.



This project is another great example of County ingenuity and efforts to better our transportation network.



Al Heiser discussing new alignment and grade



Dale Heglund field notes

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