

DITCH INSPECTION

CD25

STEARNS COUNTY MINNESOTA

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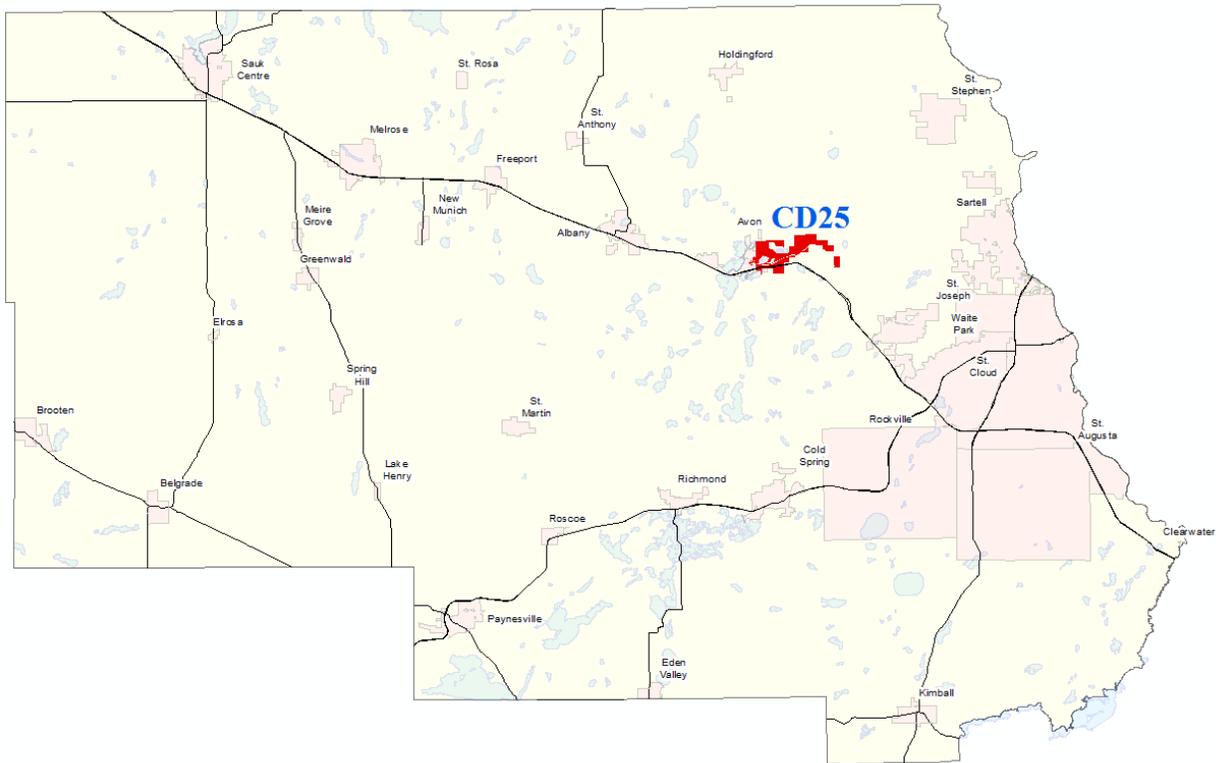
Introduction

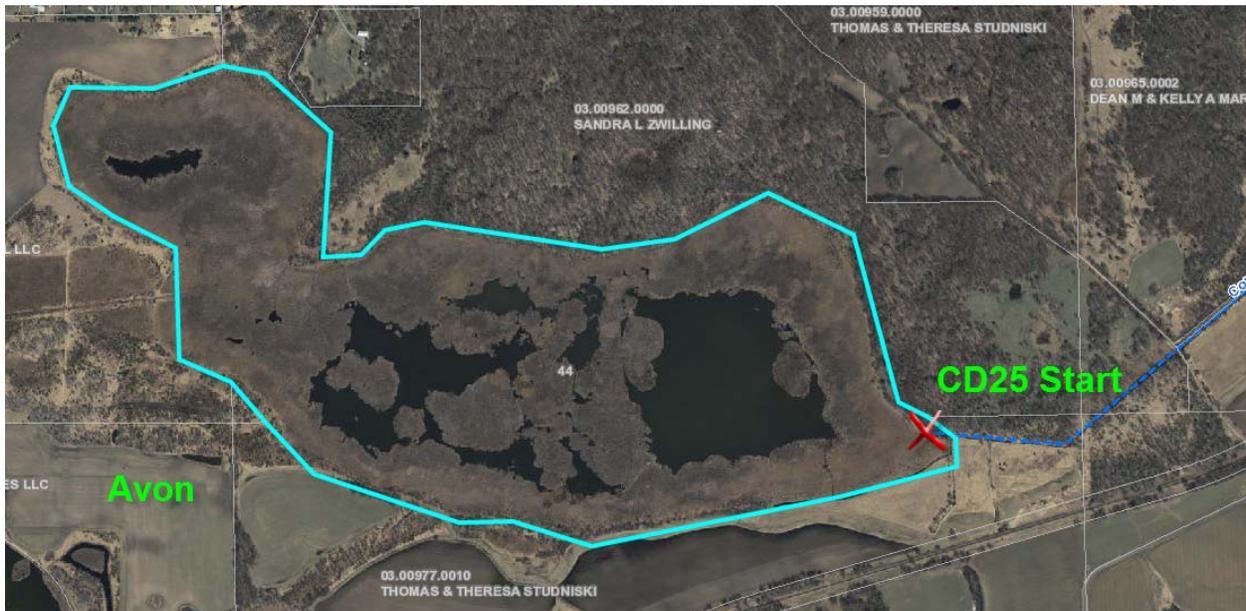
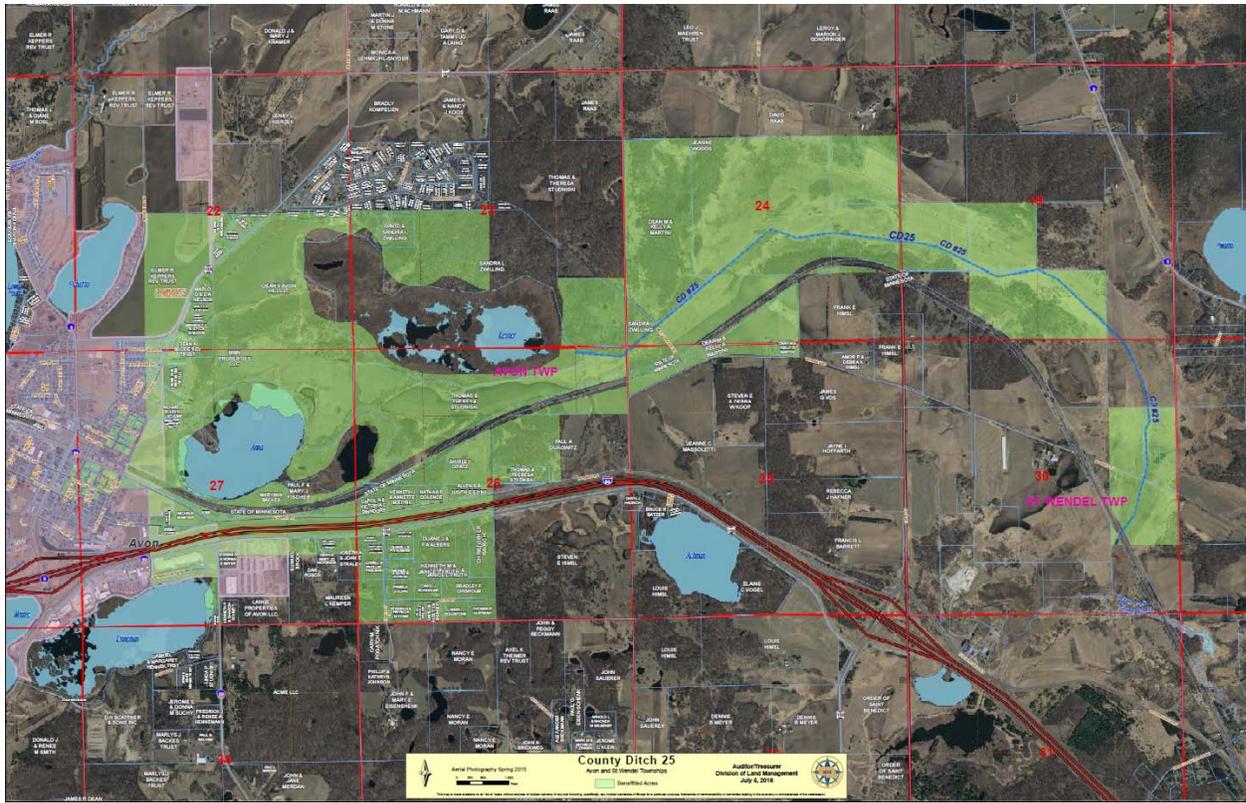
Stearns County Ditch 25 was established in 1905. The ditch is 3.1 miles in length and contains roughly 1,681 benefitted acres.

Past history of CD25 shows that in 1945 a clean out was requested and completed. A clean out occurred on the eastern portion of the ditch in 2007. Current county staff began working with property owners and inspecting the ditch in 2015.

CD25 is both a legal county ditch and public waters. The DNR requires review of drainage projects and may also require a permit for work in the ditch or a letter of permission. During the winter of 2016, communication with DNR was ongoing to review the ditch and its impact on Kepper Lake.

DNR concerns were that any repair project would negatively impact Kepper Lake by draining water levels lower than the run out elevation. The proposed solution was to create a control structure that would not allow water to be lower below a specified elevation that the DNR would establish.





Kepper Lake

Based on DNR requirements related to Kepper Lake, a repair plan was brought before the Drainage Authority in May of 2016. The proposed repair plan called for engineering services to determine the details of a ditch repair as well as specifications for a control structure on CD25 at or near Kepper Lake that was required by the DNR. The estimated cost of the engineering was between \$9000 and \$14,000 depending on the findings with a potential project cost of \$35,000 depending on findings of the engineers report.

The Drainage Authority heard this request on May 17, 2016 and a motion was made to direct staff to find alternative solutions. The engineering repair plan as proposed was not approved by the Drainage Authority. Cost of the proposed control structure and engineering as well as lack of support from the property owners originally requesting the repair were all factors in the decision.

Since May of 2016, staff has continued to work with the DNR and property owners to create a repair plan to bring to the Drainage Authority for review that would improve the working condition of the ditch.

DITCH CHANNEL

The Amended Engineer's Report dated Nov 27, 1905 shows a ditch bottom width of 4 feet. There is no mention of the side slopes in the report. The amended report was based on residents of Avon requesting a change from the original ditch design which would have extended the proposed ditch through Lake Anna.

Inspection

Beginning in 2015, local property owners began asking for assistance with the ditch to relieve flooding that was not allowing for haying of meadows.

Stearns County Survey staff created an elevation profile of current ditch bottom conditions. The documents (from 1905) establishing the original ditch construction profile listed elevations that could not be readily converted to any elevation datum currently in use. Because of this, it was impossible to make a reliable comparison between the original construction and current conditions.

In the fall of 2016, Stearns County funded an engineering study to re-establish the ditch profile in accordance with MN Statute 103E.101A. The engineers report delivered two essential pieces of information to provide information required by the DNR. First was the re-established elevation profile. This was created by a licensed engineer using the original construction documents, field review, and soil borings. The second deliverable was evaluation of impact of repair work to Kepper Lake. The report titled “Stearns County Ditch 25 Profile Evaluation” is included as part of this inspection report.

During the December 2016, Stearns County staff evaluated the engineer report and continued to work with DNR on a proposed repair. After review, the DNR appeared open to work in the ditch east of the culverts at Meadowview Rd, but maintained that work between Kepper Lake and Meadowview Road would negatively impact Kepper Lake.

In March of 2017, multiple property owners on the ditch who had considered performing private repairs with assistance from Stearns County staff communicated that they preferred a system repair that would have a much larger repair area.

On April 10, 2017, county staff and DNR staff visited the area of CD25 between Kepper Lake and Meadowview Road to review field conditions together in an attempt to agree on a possible actionable repair plan. Field conditions showed the channel to be intact and flowing with water, but many instances of downed trees creating potential obstructions during rain events. The width of the channel looked acceptable with the exception of several beaver dam remnants.

Field inspection at the beginning of the ditch showed that water does not flow in quantity from Kepper Lake into CD25. There are three things happening that appear to affect flow from Kepper Lake to CD25.

1. The original ditch design called for the ditch to extend into the lake and be at an elevation about 4 feet below the lake water elevation as it was in 1905. Current conditions show that the lake water has effectively drained to the current ditch bottom elevation. DNR states the lake run out elevation to be 1120.9 feet. Stearns County survey collection shows the current bottom to be about 1120.5. The re-established engineers starting point is 1119.6.

Two issues are created by these elevations. First, the current ditch bottom is higher than what the engineer has established as the begin elevation. Second, the DNR has indicated that they would not grant permission for the current ditch bottom at the start point to be lowered because it may affect lake water levels.

2. Although the current ditch bottom is higher than what the reestablished starting elevation calls for, field inspection shows that lowering the starting point of the ditch may not channel free flowing water from Kepper Lake into CD25 due to the earthen bog material that exists between the ditch and open lake water. The recommendation would still be to set the begin point elevation at 1119.6.



Photo showing material between ditch start point and open water



Stake marking beginning point of ditch

Current conditions show that unless lake water rises, or Stearns County is allowed to channel into Kepper Lake, lowering the elevation of the ditch beginning point may not have the desired impact.

3. There is a private ditch south of Kepper Lake that flows into CD25 approximately 160 feet from the beginning point. On April 10, 2017, the flow from the private ditch was free flowing and visual inspection showed all the water in CD25 east of the point where the private ditch flows into CD25 was coming from the private ditch not the ditch beginning point. The private ditch appears to be moving water out of Kepper Lake into CD25.



Visual of private ditch flowing into CD25



Close up of the point where private ditch enters CD25

Additional field verification was completed on 4/20/2017 after a period of rain. As with the April 10, 2017 field observation, there is limited water movement out of Kepper Lake into CD25 at the start point.

Field inspection from Meadowview Rd shows the ditch on the east and west of the road is completely overgrown with trees, obstructed with downed wood and grass mats. The water is freely flowing around a large slumped in portion of the channel, but flow is directly impacted. This is where a repair should be considered.

East of Meadowview Rd, the ditch has alignment problems, deposits of sediment, and the channel is greatly constricted in places.



Photo of ditch channel filled with earth and trees



Photo standing on Meadowview Rd looking east.



Photo from the Woods property showing slumping and narrowing of channel.



Photo showing narrowing of CD25



One of many examples of downed trees and grass mats in ditch channel but the width of the channel looks good



Photo from the end of the ditch in the general area of Norway Rd showing narrowing and alignment issues

Conclusion

Since 2015, Stearns County has been working to evaluate CD25 and plan for a potential repair.

The following data has been collected:

- Survey As Built of the current ditch
- Engineer's Report that reestablishes the original elevation profile
- Photos of the condition of the ditch
- Firsthand accounts by staff performing inspection onsite

Water freely flows throughout the ditch, but capacity is constricted. The ditch from Kepper Lake to the end spanning over 3 miles is in disrepair. The channel is narrower than the original designed width east of Meadowview Rd, timber is obstructing the channel, and slumping is frequent.

Elevation data shows the ditch to be mostly at design grade but multiple locations of sediment build up can be found throughout the entire ditch with the worst build up occurring at the end of the ditch.

The ditch should be free of wood and earth piles. Reestablishing a 4 foot ditch bottom as designed will increase capacity and flow of the ditch. Exact impacts to benefitted property from any repair are unknown without further engineering review.

The physical condition of the land surrounding the ditch does create obstacles to performing any repair. The entire region is saturated with water and the water table is very near to the top of soil which makes the ground extremely soft and muddy. Any repair using heavy equipment may require the work be done in frozen conditions for the sake of access.

Any repair will require permission from the DNR and of course approval by the Stearns County Drainage Authority.