



November 22, 2019

Board of Managers  
Heron Lake Watershed District  
1008 3<sup>rd</sup> Avenue  
PO Box 345  
Heron Lake, MN 56137

Re: BWSR Advisory Report – Judicial Ditch #3 Improvement, Jackson County

Dear Managers,

On behalf of the Minnesota Board of Soil and Water Resources, I offer this advisory report in accordance with Minnesota Statutes, Section 103D.711, Subdivision 5. The focus of this advisory report includes:

- A statement about the completeness of the report in relation to statutory requirements;
- A statement as to whether or not the report presents a practical plan;
- Recommendations for changes, if considered advisable, and;
- A recommendation as to whether a soil survey appears advisable.

The *Preliminary Engineering Report for: Judicial Ditch 3 Improvements: Jackson County, Minnesota* (dated October 2019), was reviewed to prepare this advisory report.

### **Completeness of the Report**

The report is complete in accordance with the Minnesota Statutes Section 103D.711, Subdivision 2 and Section 103E.015, Subdivision 1. However, clarity could be provided in several areas. I suggest that the following items be reviewed and clarified where possible:

- The tile line and ditch labels are difficult to read on the Existing Watershed Map, so it is hard to discern which tile lines will be modified. A map that shows the work to be completed for each tile line would be helpful.
- There is no information provided that explains what “Yes” (green) or “No” (purple) means with respect to the tile lines on the Proposed Watershed Maps.
- Exhibit numbers or letters in the text and on the exhibits would be helpful to relate the report to the exhibits.
- Many of the legends in the exhibits are cutoff or have symbols overlapping (e.g. – Overall Hydrologic Soils Map) so it is difficult to discern the information on the maps.

- Sheet 26, Sheet 37, Sheet 101, and 102 reference the incorrect sheets for the pond details.
- The report mentions several proposed storage areas, but it is unclear if the calculations in Appendix D assume ALL of these storage areas (e.g. – the wetland in the eastern portion of the watershed) are included in the proposed modeling. Since the basin locations also have not been finalized, I suggest that the engineer model each location to make sure the attenuation of peak flows occurs under all scenarios (if this has not already been completed).

### **Practicality of the Plan**

Overall, I believe that the plan as presented is practical. While some of the changes to the tile lines and culverts were not clear from the draft report (see previous comments), overall, the proposed project should promote drainage in the watershed.

### **Recommendations for Changes**

I have no specific suggestions for design changes, however I suggest that the engineer further review the hydraulic modeling to make sure the project, especially the storage areas will perform as presented. I suggest that the following items be reviewed by the engineer:

- ***The adequacy of the outlet.*** If not already reviewed, the engineer should compare flow hydrographs under existing and proposed conditions from Branch 1/Main Ditch to evaluate how the peak flow rates and total runoff volumes to South Heron Lake change between the two scenarios. This will help to understand any potential effect from the project on South Heron Lake and its outlet.
- ***The function of the proposed storage basins.*** Without having reviewed the hydrologic and hydraulic modeling, I am unable to agree that the proposed storage basins will provide enough of an attenuation of flows so that there will not be an increase in flow rate from the system. The locations where there are decreases in flow are counterintuitive from where the storage locations are placed (e.g. – the decreases in flow rate at crossing #4, upstream of the storage, or the decreases in flow rate for smaller events at crossing #15, but then the increase in flow rate for the same events at crossings #7 and #8 downstream.
- ***The negative flow rates.*** Negative flow rates in an XP-SWMM model, (as presented in Appendix D) can be due to backflow or they can be an indication of model instability. If the model is unstable, the results are unreliable. The model should be reviewed at the negative flow rate locations to make sure they are a true backflow condition.

Lastly, I encourage the engineer to consider additional armoring at the downstream end of the 2-stage ditches. There will be an increase in velocity as runoff is restricted from a wider “floodplain” area back into a smaller channel. This can result in erosion of the ditch downstream of the inline basin. Velocities should be evaluated so appropriate vegetation and/or armoring can be used at these locations.

### **Recommendations for Soil Survey**

I do not believe that a soil survey is necessary for this improvement project.

Please feel free to contact me at 651-297-2907 (email [rita.weaver@state.mn.us](mailto:rita.weaver@state.mn.us)) if you have questions regarding this advisory report.

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Weaver', with a long horizontal flourish extending to the right.

Rita Weaver, PE, CFM  
Chief Engineer

CC: John Jaschke, Director  
Ed Lenz, Southern Region Supervisor  
Douglas Goodrich, Board Conservationist  
Mark Hiles, Clean Water Specialist  
John Hansel, Wetland Specials  
Tom Kresko, DNR Area Hydrologist  
Jan Voit, HLWD Administrator  
Chuck Brandel, PE, ISG

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