memo

651 Hale Avenue North Oakdale, Minnesota 55128 telephone: 651.770.8448 facsimile: 651.770.2552 www.eorinc.com

Date | 4-29-2011

To | Chisago Lakes LID Board of Managers

cc | Jerry Spetzman

From | Greg Graske

Regarding | Spring Channel and Outlet Structure Inspection

On April 21st, 2011 an inspection of the Chisago Lakes Outlet Channels and Structures was conducted. Chisago County staff Jerry Spetzman along with EOR engineer Greg Graske performed the field inspection. The following summarizes the inspection, actions performed, and any future actions recommend. Actions in red are recommended for action in the near future, actions in orange are action that require future follow or monitoring up but are not urgent, and actions in green are minor maintenance items that were completed in field prior to this report.

Channel from Chisago Lake to Wallmark Lake

The entire length of the channel from Chisago Lake to Wallmark Lake was walked. Erosion in the channel near the connection with Chisago Lake was noted in previous inspections. Reshaping of this section and installation of rock checks was completed last fall. Final site restoration by the contractor is still needed this spring.

Photos: left-exposed/eroding bank caused by head cut last fall, right- reshaped channel with rock checks

Just downstream of these areas is a large box culvert that flows under Stinson Avenue and Highway 8. The landowner at the upstream end of the box culvert is concerned about water levels and stormwater flowing towards Chisago Lake that he feels should be flowing out towards Wallmark Lake. The Board has authorized televising the box culvert. Winter conditions did not allow for televising. Visu-Sewer is scheduled to visit the site and give EOR feedback on when the pipe can be televised.

Similar to the last two inspections just North of North Avenue it was noted that several large branches had been placed across the channel to provide a crossing for a path from the nearby tot lot. These logs should be removed. Because this appears to be an ongoing problem the CLLID has directed District Staff to

work with the park owner to determine if a bridge should be place at this location to allow for crossing the channel without placing obstructions in the channel. Discussions are ongoing. A downed tree was also noted just to the east of where the channel crosses Lake Pointe Drive. The downed tree should also be removed.


Photos: left-rock placed above pipe invert, right-branches placed in channel

Recommended Action:

- Proceed with final restoration of channel near Chisago Lake (see punch list provided by EOR).
- Remove debris and logs at the pond outlet
- Remove large branches in channel north of Tot Lot
- Remove downed tree east of Lake Pointe Drive

Suggested Follow Up:

- Continue discussions with park owner regarding placement of small foot bridge across the channel.

Channel from Wallmark Lake to County Road 19

In previous inspections very little water and no noticable flow was observed in the outlet channel from Wallmark Lake to County Road 19. During this inpection the channel had significantly more water in it and flow was observed. This appears to indicate the Wallmark Lake is outleting. Lake levels are up compared to last year.

Suggested Follow Up:

- Continue to monitor Wallmark Lake levels relative to the OHW for any indication of obstruction.

Channel from Chisago Lake to Green Lake

The entire length of the channel from Chisago Lake to Green Lake was walked. Between Chisago Lake and County Road 83 had been a location for frequent beaver activity and dams. The CLLID hired a trapper last year to remove the beavers and the dam was removed by the contractor. No new beaver activity was observed. The large beaver dam midway between County Road 83 and the outlet structure going into Green Lake was also removed last fall. The remnants of a new beaver hut still requires removal. No new beaver activity was noted. Backhoe tracks through the channel were noted and

appeared to have been created during maintenance activities, the contractor needs to clean this area up and remove sediment humps in the channel.


Photos: left-tree down in channel, right - new beaver dam near Chisago Lake

Stabilization of erosion areas had started last fall, however snow prevent finalization of the work. The contractor need to finish restoration of these sites.

Recommended Action:

- Remove partial beaver hut from channel
- Remove sediment humps in channel
- Finish site restoration of fall erosion maintenance project (see punch list provided by EOR)

Suggested Follow Up:

- Continue to monitor for Beaver activity in channel

Outlet Structure from Chisago Lake Outlet Channel into Green Lake

The outlet structure connecting the channel from Chisago Lake to Green Lake was visited. The structure was cleared of debris last fall and everything looked good during the inspections. The gates were opened to test operation and water did flow through the structure to Green Lake. The gates were returned to the closed position upon completion of the inspection.

The undertow sign is in need of replacement. District Staff has the new signs for this weir and the Lake Ellen weir and they will be installed soon.

Photos: left-water flowing from outlet structure into Green Lake, right-faded undertow sign

Recommended Action:

- None

Suggested Follow Up:

- Monitor site for continued beaver activity and need for beaver control.
- Replace faded undertow warning sign.

Minor Maintenance Items Completed:

- Greased the fittings in each of the crank boxes.

Outlet Structure and Pipe between Lake Ellen and Swamp Lake

The outlet structure on Lake Ellen was visited. Debris was removed from around the Lake Ellen structure last year. The gate was exercised and appeared to be operational. The emergency management plan calls for the gate to be open when the lake level is 891.5. The plan also says that the gate may remain closed when lake levels are below 891.0. Lake Ellen was below the weir overflow elevation, therefore the gate was left closed. No new beaver activity was observed.

Photos: left-erosion control device installed in farm field, right- outlet to Swamp Lake

Leaving the outlet structure is a long pipe that discharges to Swamp Lake. About a third of the way downstream is a manhole with an inlet structure that is located in the middle of the farm field. It was recommended previously that a sediment control device or structure modifications be located above or around this structure to limit sediment into pipe. The erosion control device was installed last fall and appears to have been effective through the spring melt. The down stream end of the pipe is partially submerged and the water at the outlet was less cloudy then previously observed.

Recommended Action:

- None

Suggested Follow Up:

- Monitor Beaver Activity going forward and determine need for additional beaver control.
- Periodically exercise the gates to maintain them in working order.
- Engineer to obtain and review plans and make recommendation for dewatering pipe prior to televising, if maintenance at Swamp Lake outlet does not sufficiently lower water levels.
- Replace undertow warning sign similar to Lofton Avenue wier.

Minor Maintenance Items Completed:

- Greased the fittings in each of the crank boxes.
- Exercised Gate

Swamp Lake Outlet

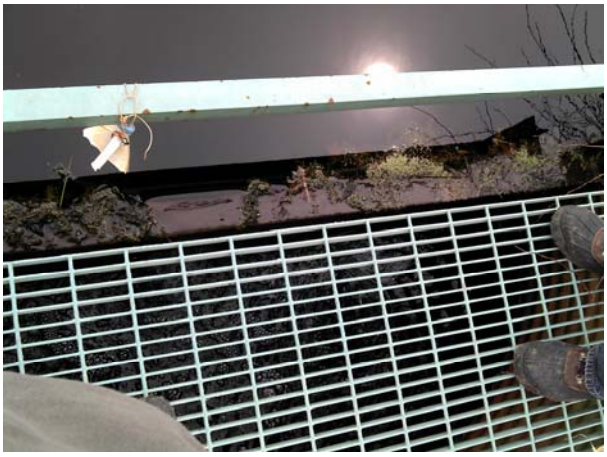
The Swamp Lake outlet pipes under County Road 80 were visited. This location has 7 pipes under the road to convey flow. Water was flowing at the time of the inspection. In previous inspection the pipes were partially filled with water due to rock and debris just downstream of the culverts that appeared to be obstructing some of the flow causing tailwater on the pipes. The obstruction has for the most part been removed by the contractor and water is free flowing through 5 of the 7 pipe. Addition clean out around the two outermost pipe is recommended.

Photos: Outlet End of pipes leaving Swamp Lake

Recommended Action:

- Additional Minor clean-out at outlet end of pipes and reconfigure rip rap.

Ivy wood Outlet Structure




The culvert crossing under Ivywood Trail was visited. It was thought that this structure does not provide any conveyance due to the outlet channel to Carlos Avery WMA never being completed. However, water was flowing through the Ivywood crossing during the inspection and it appeared that water may be making its way back through a wooded swamp and possibly into Carlos Avery.

Recommended Action:

- Get direction from the Board on whether to investigate whether there is a connection to Carlos Avery.

Bloomquist Creek Crossings @ County Road 19 and Ivywood Trail

The Bloomquist Creek Crossing at Ivywood Trail was visited. A new culvert had recently been installed at this location. Water was flowing through the stream and no maintenance issues were noted. The Bloomquist Creek Crossing at County Road 19 was also visited and water was flowing at this location also. The upstream end of the pipe was submerged as noted in the previous inspection report. It was unclear why the upstream end of this culvert was submerged however water appeared to be flowing freely. Beaver dams both north and south of County Road 19 were previously reported by a landowner to District staff. It appeared that the beaver dams had been remove and water levels had dropped. No obstructions were noted. No Action Needed


Photos: Bloomquist Creek Crossing @ Ivywood