



March 1, 2017

Cal R. Ludeman
Secretary of the Senate
231 State Capitol
75 Rev. Dr. Martin Luther King Jr. Blvd.
St. Paul, MN 55155-1606

Patrick D. Murphy
Chief Clerk of the House of
Representatives
211 State Capitol
75 Rev. Dr. Martin Luther King Jr. Blvd.
St. Paul, MN 55155-1606

Dear Secretary Ludeman and Chief Clerk Murphy:

Enclosed is the Department of Natural Resources (DNR) report on the examination of the Ramsey Dam on the Cedar River in Mower County. The report is being submitted in accordance with Minnesota Statutes 2016, section 103G.525, which requires the DNR to file a report on any proposed transfer of a privately owned dam to a public entity of the state. The DNR requests that this report be reviewed during this legislative session. **The transfer cannot occur until either the legislature acts to approve it or the session ends without the legislature prohibiting the transfer.**

Hormel Foods Corporation (Hormel Foods) is the current owner of the dam. Hormel Foods no longer uses the dam as a backup water supply and is planning to transfer ownership of the dam to the City of Austin. The City of Austin has expressed a desire to obtain the dam to maintain recreation on the dam's reservoir and provide flood reduction within city limits.

Transferring the ownership of a private dam to a public entity would shift the liability and responsibility for dam operations, maintenance, repairs, inspections, reporting, and funding from a private owner to the public. Dams owned by non-state public entities are eligible to receive state funds through the grant program authorized by Minnesota Statutes 2016, section 103G.511. Private owners are not eligible for this state funding. There are approximately 400 dams owned by public entities other than the state in Minnesota. This transfer could divert funds from other publically owned dams. It is estimated that the Ramsey Dam would need over \$600,000 of repairs to bring it up to satisfactory condition. The DNR recommends that the current owner either bring the dam up to acceptable standards or provide repair funds to the city as a condition of the transfer, to avoid adding to demand for limited state grant funds.

If you have any questions, please contact Jason Boyle of our Dam Safety Unit at 651-259-5715.

Sincerely,



Tom Landwehr
Commissioner

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Committee Chair
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Representative Dean Urdahl, Capital Investment Committee Chair
Bob Meier, DNR Assistant Commissioner for Legislative Affairs
Jason Boyle, DNR Dam Safety Engineer
Paul Eickhoff, Supervising Staff Engineer, Hormel Foods Corporate Services, LLC
Steven Lang, City Engineer, City of Austin
David Forland, Owner of Old Mill Restaurant

LEGISLATIVE REPORT ON THE TRANSFER OF OWNERSHIP OF THE RAMSEY DAM

March 1, 2017

Abstract

This report is being submitted in accordance with Minnesota Statutes, section 103G.525, which requires the Department of Natural Resources to file a report on any proposed transfer of a privately owned dam to a public entity of the state.

Jason Boyle
State Dam Safety Engineer
Ecological and Water Resources Division
Department of Natural Resources

Legislative Report on the Transfer of the Ramsey Dam in Mower County

Location

The Ramsey Dam is located approximately 2 miles north of the City of Austin on the Cedar River in Mower County, as shown on the attached location map.

Ownership

The Ramsey Dam is currently owned by Hormel Foods Corporation (Hormel Foods). Adjacent to the left (south) abutment of the dam is a former mill and millrace that is now the Old Mill Restaurant, which is owned by David Forland. The proposed transfer of the dam from Hormel Foods to the City of Austin would not include the former mill.

The transfer of the dam would include the dam and 1.6 deeded acres, designated as parcel 34.887.0170. The DNR recommends that the new dam owner should ensure that proper easements on both sides of the river are obtained or transferred so that the new owner would have access to do any maintenance or repairs to the dam.

The dam was originally built in 1872 on the Cedar River to develop water power for a mill.

The 1978 National Dam Safety Inspection Report¹ provides the following summary regarding ownership history of the Ramsey Dam:

- The Governor of Minnesota issued a territorial grant for the original construction to Mr. Matthew Gregson.
- From 1901 until 1934, the mill was operated by Mr. J. H. Meyer in conjunction with Mr. Walter Meyer.
- In 1948, Mr. Ray Stromer, the owner of the mill and dam at that time, converted the mill into a restaurant.
- In 1974, the Geo. A. Hormel and Co (Hormel Foods) purchased the dam from Mr. Ray Stromer. However, Mr. Stromer retained possession of the restaurant (mill) and the millrace for the former mill.

Function of the Dam

The dam was originally used to provide water for the mill. The mill is no longer functional, so the dam is no longer operated and it acts as an uncontrolled overflow weir. At one time, the reservoir was used for water supply by the municipal power plant, but that is no longer the case. The Ramsey Dam provides recreational opportunities and flood control for the City of Austin. Modeling results using a 2017 XP-SWMM model indicate that the dam reduces the 100-year peak discharge on the Cedar River just upstream of the City of Austin by approximately 6%.²

Description of Dam

The 1978 National Dam Safety Program Inspection report provides details on the construction history of the Ramsey Dam. No drawings or documentation of any previous construction, reconstruction, or repairs are known to exist. The report describes the 13-foot tall dam as having three principal

¹ National Dam Safety Program Inspection Report. 1978.

² Email from Barr Engineering and attachment "Ramsey_Mill_Dam_Reduction_XP-SWMM", February 15, 2017.

components: 1) a 138-foot concrete gravity spillway, 2) left and right earthen embankments, and 3) the millrace and the mill (now a restaurant).

The concrete spillway's uncontrolled crest has a steeply sloping downstream face and a short horizontal downstream apron. The original dam was reportedly constructed of rock filled timber cribs made of logs. The logs were reportedly replaced with railroad ties at an unknown date. The rock fill within the right (north) and middle sections of the spillway were reportedly filled and capped with concrete in the 1920s. No modification was made to the left section of the spillway at that time. The left section of the spillway failed in the 1940s. In 1947, the left section of the spillway was repaired by the construction of a concrete gravity spillway. Reportedly no coffer dam was constructed, and it is likely that the concrete in lower portions of the structure was placed under water. The upstream side of the spillway is presumably constructed on hard clay and the lower portion of the spillway constructed on limestone.

The right earth embankment blends into the natural terrain, so it is difficult to differentiate natural topography from filled areas. The foundation material for the right earthen embankment is unknown. Hormel Foods repaired the right embankment with rock and grout in the early 1990s.

The left embankment appears to have been constructed around the time of the repair of the left spillway section in 1947. The left embankment was constructed parallel and upstream from the spillway and connects the spillway to the old mill building. Short sections of concrete, stone masonry, and grouted riprap provide the transition from the spillway to the earthen embankments. Hormel Foods repaired the left abutment in the early 1990s by placing a clay seal on the upstream side.

The headrace for the mill was reconstructed in 2014 by removing the old slide gate and replacing it with a fixed crest concrete weir. An earthen berm was constructed at the upstream end of the headrace in 2014. There is now no water control mechanism for the dam.

Previous Studies and Inspections

The dam was most recently inspected by Barr Engineering on November 7, 2014.³ The Minnesota Department of Natural Resources (DNR) Dam Safety Unit last inspected the dam earlier that year on August 6.⁴ The DNR intended to inspect the dam in 2016 to further inform this report, but that was not possible due to high water levels at the dam throughout the year. Therefore, the condition assessment in this report relies primarily on the two inspection reports from 2014. The 2014 inspections were conducted when there was no water flowing over the spillway, so most components of the dam were dry and were able to be visually inspected.

Condition of Dam

The Ramsey Dam is considered to be in poor condition. We note the following issues:

- 1) There are areas of significant concrete degradation on the spillway.

The right concrete spillway section needs to be repaired. The concrete on the right section of the spillway is severely deteriorated and has exposed rebar. Pitted areas on the spillway are likely to fail shortly. Intermediate piers are also severely deteriorated. Repairing the right spillway section entails

³ Draft copy for Ramsey Dam 2014 Inspection Report, Prepared for Hormel Foods Corporate Services, December 2014 by Barr.

⁴ Dam Inspection Report, MN Department of Natural Resources, Dam Safety Section dated August 6, 2014.

removing deteriorated concrete and overlaying with new reinforced concrete. Barr Engineering estimated the cost to overlay the deteriorated portion of the spillway at \$422,000.

- 2) A probable scour hole exists on downstream side of the spillway.

The scour hole on the downstream side of the spillway apron could lead to dam failure. Dam Safety completed a few soundings from the downstream edge of the spillway apron and found the scour hole to be at least 8 feet deep. Further soundings were not completed due to high water levels. The scour hole dimensions should be further evaluated to verify the extents and depth. Barr Engineering completed a rough cost estimate to repair a hypothetical scour hole 3 feet in depth across the entire length of the spillway for a distance of 20 feet beyond the apron at \$114,000.

- 3) Scour and erosion were noted on both embankments.

The stone masonry and reinforced concrete overlay on the left abutment are severely cracked and portions have slipped. Seepage is also occurring on the lower portion of the left abutment. Barr Engineering estimated the cost to install a filter system and riprap protection at \$53,000. Grouting the abutment and stabilizing the dislodged stones was also shown as an option by Barr Engineering.

The right earthen embankment and abutment also need repair. The reinforced concrete overlay and rock on the abutment have slipped. Portions of the abutment and earthen embankment are vulnerable to erosion as they have no armor protection. Historically, the earthen embankments have been overtopped by flood waters, most recently in September of 2016. The unstable condition of the concrete and rock on the abutment are not likely to withstand flood waters. Repairs to this portion of the dam should include stabilizing concrete and rock on the abutment and armoring the abutment and the earthen embankment to withstand erosion from flood water. No cost estimate is provided for this work.

- 4) Seepage of water was noted in the embankments and in the spillway.

Uncontrolled seepage is occurring on the lower portion of the left abutment, which could lead to piping of material and eventual failure of the abutment and dam.

- 5) The earthen embankments are overgrown with vegetation.

Large trees growing near concrete components of the dam can cause movement of the structures and could lead to dam failure. These trees should be removed.

- 6) Safety concerns due to insufficient hazard warnings.

Safety buoys and signage should also be added to the reservoir upstream of the spillway to warn recreation users of the dangers of a spillway. In 2007, a pontoon was swept over the dam. Fortunately, no lives were lost.

- 7) The 1978 National Dam Safety Program inspection report recommended the stability of the dam and overturning potential be analyzed, which has not occurred.

Insufficient data is available to evaluate the dam for the stability against overturning and sliding. It is not believed the spillway and the right abutment would meet current factor of safety criteria. It is

recommended that an investigation of the stability of the spillway and the right abutment be performed and appropriate action taken.

Due to its width, the left abutment may have a sufficient factor of safety against overturning and sliding, assuming recommended repairs are completed. Similarly, if recommended repairs are completed, both earthen embankments may meet current dam safety criteria with regard to embankment stability.

8) Lack of ability to pass large flood without overtopping embankments.

Although no hydraulic analysis was completed, the dam's hydraulic capacity will not likely meet current dam safety criteria for a small low hazard dam. Historically, the dam abutments have been overtopped on several occasions. Options to add spillway capacity were not investigated, but may prove difficult. Stabilizing and armoring the abutments and the earthen embankments is necessary, if the dam is to safely pass the future floods.

There may be other internal, underground, or underwater deficiencies that are not visible during inspections that may affect the stability of the dam.

Hazards

The dam is currently classified by the DNR as a low-hazard, Class 3 dam. The National Dam Safety Program Inspection report had classified the dam as a significant hazard dam because of its proximity to downstream residential areas. It is unlikely that residential homes in these downstream areas will be affected by a dam failure, and property damage should be limited to land erosion and low-lying outlying buildings. Potential damage to such property is consistent with a low hazard rating.

Ownership Responsibilities and Expectations

Dam ownership carries with it potential liabilities and both short and long-term financial responsibilities. A dam owner could be found liable for damages incurred from a dam failure or improper operation, as well as injuries to others because of dangerous conditions at the dam. Unless the dam is removed, the owner must perpetually maintain, operate, and repair their dam to ensure the integrity of the structure. A non-state dam owner will need to be able to meet dam safety requirements without financial assistance from the state. All active Public Waters Work Permits and Water Use Permits shall be kept current. Assignment of these permits from Hormel Foods or previous owners to the City of Austin shall require written consent of the DNR Commissioner.

Future Costs and Funding

The major short-term cost to repair the spillway, scour hole, and the left abutment was estimated by Barr Engineering to be \$589,000. The estimate is based on conceptual designs that are not fully developed, so actual costs could vary significantly. Costs associated with repairing seepage, the right abutment, removing trees, and performing stability and hydraulic capacity analyses are not included in this cost estimate. Future inspection of the scour area below the dam could reveal deficiencies beyond the estimated scour area used in the above cost estimate. Any possible recent damage to the dam from the September 2016 flood is not included in this report as we were unable to conduct an inspection following that event.

Reasonably foreseeable major long-term capital costs associated with dam safety include major rehabilitation of the concrete spillway and the dam abutments. Concrete coring was not completed to

determine the general condition of the concrete in the interior of the dam, so we are uncertain how long the spillway might last. Should the dam be removed, the dam owner would assume costs related to disposing of or controlling upstream sediment. Another future concern is the impact the karst soils prevalent in southeast Minnesota could have on the dam. Soil borings at nearby bridges indicate soft limestone should be anticipated at the dam. Although no sinkholes from karst failure have developed at the dam to date, the slow erosion of limestone rock is probable and could result in a future structural concern for the dam.

Since the dam is now privately owned, it is not eligible to receive state dam safety funding for repairs or removal. Subject to available funding, local government-owned dams are eligible to receive a state grant of up to 50% of the costs of repair (Minn. Stat., sec. 103G.511, subd.3) and up to 100% of the costs of removal (Minn. Stat., sec. 103G.515, subd.5). If ownership is transferred from a private entity to the public, the state may incur financial obligations it previously did not have.





View of dam from downstream side, no water flowing over the spillway.



Looking across the dam from the right abutment towards the left embankment and the restaurant (former mill).



Spillway



Left Abutment



Right Abutment