

**NOTICE IS HEREBY GIVEN** that a special meeting of the Village Board of the Village of Neosho shall be held on **Thursday, November 16, 2023**, 6:30 p.m., at the Neosho Village Hall, 210 S. Schuyler Street, Neosho WI.

The village hall is handicapped accessible.

**AGENDA**

- Call to Order/Roll Call.
- Receive and Review Roth Assessment Memo of Recommended or Required Actions of the Neosho Dam, Rubicon River.
- Possible direction to Millpond Dam Committee for action on Assessment Memo.
- Possible direction to modify RFQ to include Assessment Memo.
- Adjournment.

Any person who has a qualifying disability as defined by the American's With Disabilities Act, that requires the meeting or materials at the meeting to be in an accessible location or format must contact the Clerk-Treasurer at the village hall at 920-625-3086 at least one day prior to the meeting so that any necessary arrangements can be made to accommodate each request.

It is possible that members of or a quorum of members of other governmental bodies of the municipality may be in attendance at the above-stated meeting to gather information. No action will be taken by any other governmental body except by the governing body noticed above.

October 31, 2023

Village of Neosho  
PO Box 178  
Neosho, WI 53059

Re: Assessment of Recommended or Required Actions  
Neosho Dam, Rubicon River

Dear Village of Neosho:

We completed our visual inspection/assessment of the dam facility as directed by the Village per our signed scope of work dated October 5, 2023. This inspection was completed on October 17, 2023.

Prior to that inspection, we requested WDNR information that was available on the dam. What was provided was a 1954 remodel plan (1 sheet), the 1994 dam repair plans (2 sheets) and the latest filed inspection report from 2021/2022. We reviewed this information.

We are aware a contractor was also asked to view the dam and assess the condition for the purpose of providing a repair estimate. They obtained pictures of which we also reviewed thoroughly before our inspection.

The dam is a multi-faceted hydraulic facility including a rock dam integrated with concrete, a radial (tainter) gate with operability from the bridge deck, a broad-crested weir and an overflow stop-log bypass into a concrete box culvert. The dam is positioned below a highway bridge. The majority of the dam is structurally disconnected from the bridge, except for the southern outward bridge abutment is also the constraint of the southern flow-way of the main dam. The northern bridge abutment is slightly offset north of the flow-way via an annular rip rap channel of approximately 15'.

The following is our short-form assessment:

**Critical Item: Vibration.** We witnessed continuous vibration emanating from the radial gate and extending around the gate into the supporting concrete constraints. This vibration is believed to be, in our opinion, created from the weir flow hydraulics of the radial gate. That is, the water being allowed to overflow the radial gate is weir flow that drops 6-7' to the concrete flume, but in the majority of flow conditions, it is cascading along the back girders of the gate, creating a water force upon the center of the girders. This force is believed to be creating a vibration on the radial pinned structure in suspension. The vibration is a major problem for older concrete, as evidenced from the excessive surficial spalling around the entire gate structure. This condition can be immediately remediated by raising the gate to cut-off the upper weir flow. High flows will require extensive monitoring to try to manage a potentially catastrophic situation upon the

gate, although it is likely that higher flows will not cascade downward as much as low flows. Alternate solutions include installing an upper metal plate attachment on the gate to disallow high flows over the gate, or installing a weir flow attachment to extend over the gate to preclude the possibility of water cascading downward onto the girders. All temporary options mentioned herein will alter the hydraulics that were likely included in the design and could potentially alter downstream expectations for the operation of the dam.

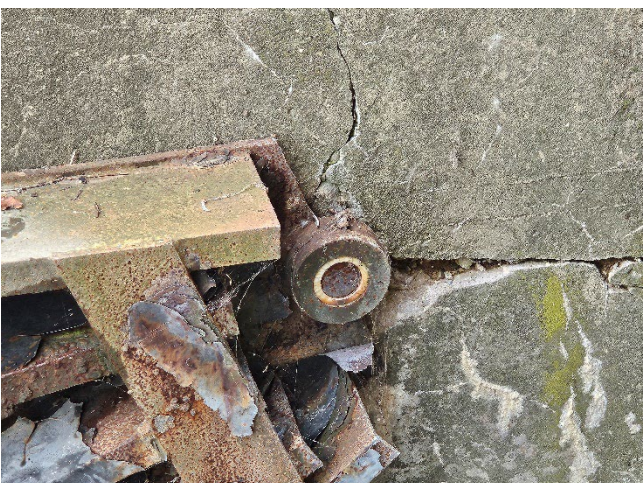
**Critical Item:** Structural Deficiencies Evident in Gate Supporting Concrete. The inspection revealed key structural deficiencies in the supporting concrete at the trunnion. See below pictures:



*North Trunnion Condition, Delamination & Structural Deficiencies*



*South Trunnion and Structural Deficiencies*



*South Trunnion Structural / Radial Cracking*

The conditions shown above are of a nature that, when combined with the vibrations and continued advanced state of concrete disrepair, conditions will advance rapidly and place the structure in a watch condition. For example, the cracking shown above





does not appear and is not mentioned in the prior 2021 inspection report. In just 2 years, we have seen substantial deterioration. This is a certainty to continue, but at more advanced rates due to the delamination of the concrete surface even if the vibration addressed.

**Critical Item:** Radial (Tainter) Gate Metal Condition. The surface condition of the gate is substantially deteriorated and placing the metal in a further exposed situation. With all things considered, it is likely necessary for the gate to be evaluated in a hydraulic review to confirm sizing and structural configuration. If after this evaluation, the gate can be kept in its current sizing, it is our belief that the gate can still be salvaged but it will be required to be taken offline and fully inspected for further direction on the most appropriate metal and structural repairs.

**Item(s):** Various Concrete Cracking. We observed several minor concrete deficiencies in various areas including on both concrete broad-crested weirs, corner or edge concrete erosion at the roller block, and corner or edge concrete erosion at the south vertical terminus of the south weir which is also the south bridge abutment. These can likely be repaired using traditional concrete repair methods. We also consider the surficial concrete delamination and spalling at the surface near the radial gate supports to be of a lesser nature than the critical areas mentioned above, but this condition may be integrated with more elaborate structural repairs for a more full-featured repair effort.

**Item:** Add a Radial Gate Opening Measurement Gauge. This can help with more precise gate operations, moreso for low-flow control. It is typically installed above the gate on the concrete wall on at least one side of the gate. It may help to find a recordable “sweet spot” in a gate level that doesn’t produce ordinary vibrations. It may also help to defend dam gate operations where downstream concerns are present.

**Item:** Bypass Stop Log & Inlet Condition. Although not integral to the main dam components, the bypass may function to lower water level and to provide secondary outlet flow. However, the inlet area of the stoplog system is substantially deteriorated. See below photos:





The stop logs are significantly bowed and the entrance concrete is deteriorated, possibly beyond repair. There are many areas of exposed rebar wherever there is an exposed concrete surface. From a visual inspection, the extent of the repair is limited to the inlet area, but the condition is advancing to become a structural roadway issue. A loss of the stoplog system would likely drain the lake at least in part.

**Actions:** The assessment and scope of work identified herein are recommended with priority importance. Short-term modifications to the radial gate, perhaps in only operations/settings, are recommended to occur as immediate as possible given all rules and regulations including notifications, if required. Gate refurbishment and concrete repair/replacement are the major work-scope items for the main dam and possibly the bypass facility. All modifications need to be done in accordance with the appropriate rules and regulations, and we also add the caveat that all capital improvements should be completed in accordance with possible WDNR Municipal Dam Grant Funding should that funding and this potential application be considered. Timing on grant matters is also of immediate importance if the work is to be funded in this biennium (March 2024 application deadline). Given the outstanding condition of the DFA (dam failure analysis) for this dam, it is also recommended that this item be completed along the earliest allowable timeframe as it will be a key feature of any dam improvement plan.

Respectfully Submitted,

**ROTH PROFESSIONAL SOLUTIONS**

Robert J. Roth, PE, President  
Dam Engineer, Municipal Engineer, Civil Engineer

cc: Liz Desmore, Dam Committee Liaison

