

Wambold Dam – Kroll Outlet Renovation

Peter R. Jensen, Chairperson

Eagle Spring Lake Management District

Kroll Outlet

Site of the original Eagleville Mill Dam (1838). Previously housed one of the last known specimens of the McCormick – Holyoke Turbine (Donated to Old World Wisconsin Historical Society for eventual display).

Major deterioration of the intake was noted and the control mechanism for water flow was wood stop boards which did not provide a reliable water control mechanism.

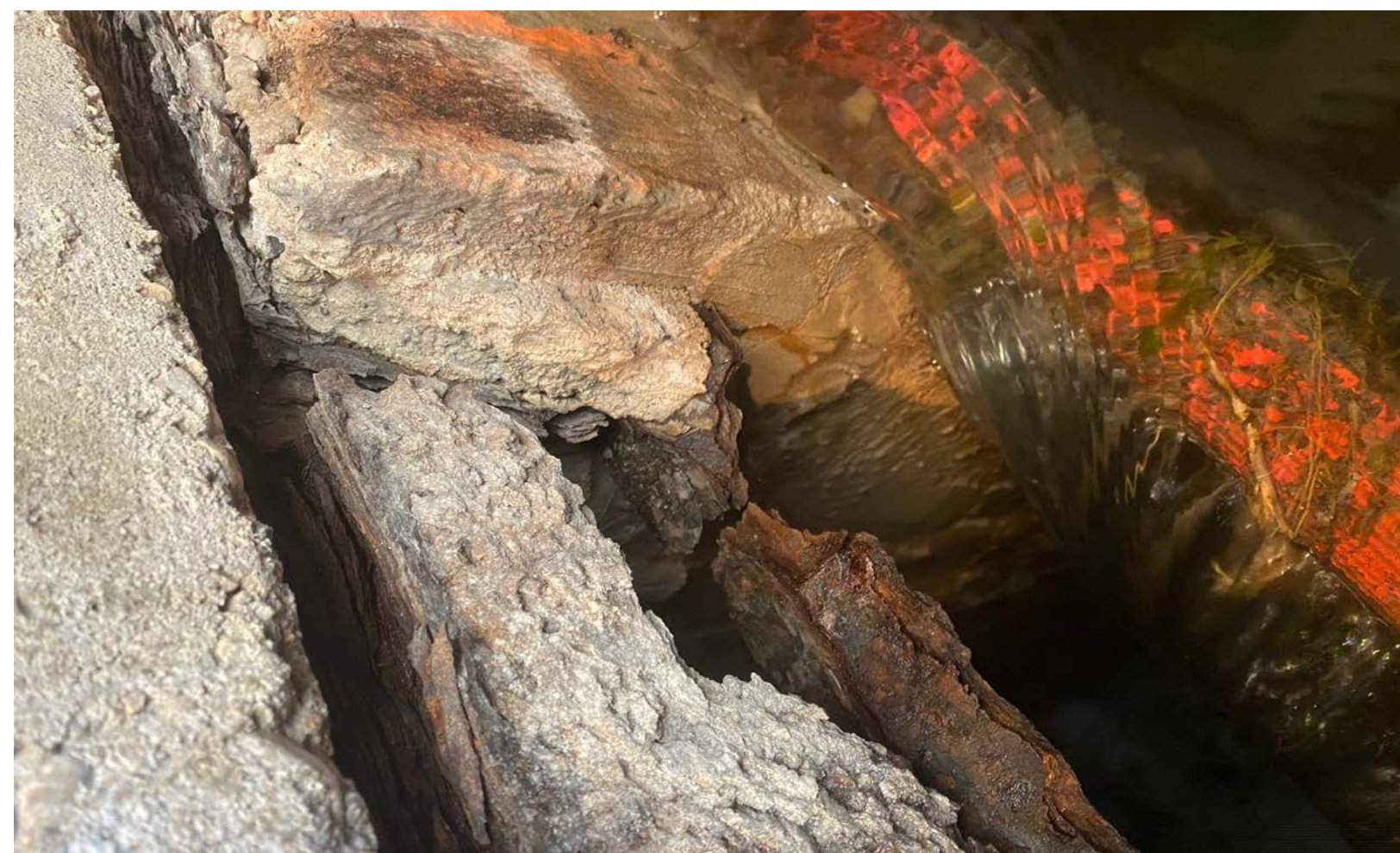
Last major construction and repair at the site was in 1935 as a WPA Project.



Known Issues and Concerns

The Kroll Outlet is one of two water control facilities that comprise Wambold Dam on Eagle Spring Lake in southern Waukesha County. Eagle Spring Lake is a 294 acre impoundment at the headwaters of the Mukwonago River. Wambold Dam is rated by the DNR as presenting a Significant Hazard.

Severe Concrete Deterioration



Concrete had major cracking and exposed aggregate in the intake structure including areas where complete failure had occurred allowing water to bypass the normal intake routing.

Major Steel Corrosion and Failure

Steel supporting the floor over the water intake chamber was severely corroded compromising its load bearing capacity.



Engineering Work

Engineering work was completed to:

- Remove and rebuild intake with new wing walls and trash grate.
- Replace all supporting steel throughout water channel (which also supports floor of building).
- Fill in adjoining underfloor crawlspace for floor support and to add sidewall support to water channel.
- Install two (2) new mechanical gates to control water flow.

Financing Arrangements

Financing was arranged through Citizen's Bank of Mukwonago.

- 4% Interest Rate
- 10 Year Note
- Construction Draw of Funds

Construction Management

Construction Management was provided by Collins Engineering.

- Produced bid specifications (314 pages)
- Issued change orders (5)
- Provided on site management and quality control
- Contract cost \$41,000.00
- Cost Savings attributed to construction manager \$64,000.00

Bidding Publication & Results

- Request for bidders published on
 - Wisconsin Vendor Net
 - Waukesha Freeman
 - Public Notice Postings
- 21 Requests for Specifications
- 4 Bids Submitted
 - High Bid = **\$609,000.00**
 - Low Bid = **\$358,000.00**
- Difference between high and low bids = **\$251,000.00!**
- Contracts signed late January 2022
- Change orders added 7% to total cost (budget allowance was 20%)

Major Cost Developments

Serious supply chain disruptions impacted project

- Ukraine Invasion & Destruction of Azovstal Steel Plant (Mariupol) responsible for 15% production of Grade 10 Stainless Steel. Steel prices rise 75%
- Construction start delayed until October 2022 pending arrival of gages and other steel.
- Concrete prices rise 35%
 - Shortage of concrete additives requiring multiple changes to mix tickets.
 - Shortages in gasketing material resolved 4 days before start of construction.

Cost Absorption

Due to excellent contract language favoring Lake District additional costs were not passed on. Construction contractor absorbed costs for project overruns.

- Force Majeure not implemented
- Favorable contract language written by Construction manager
- Contract language reviewed by competent attorneys

Trouble Everywhere!

Once construction got off the ground, problems were everywhere.

The contractor was concerned about some overhead power lines that were not shown on the plans or listed in the specifications. The temporary relocation of the lines would have cost over \$37,000.00.

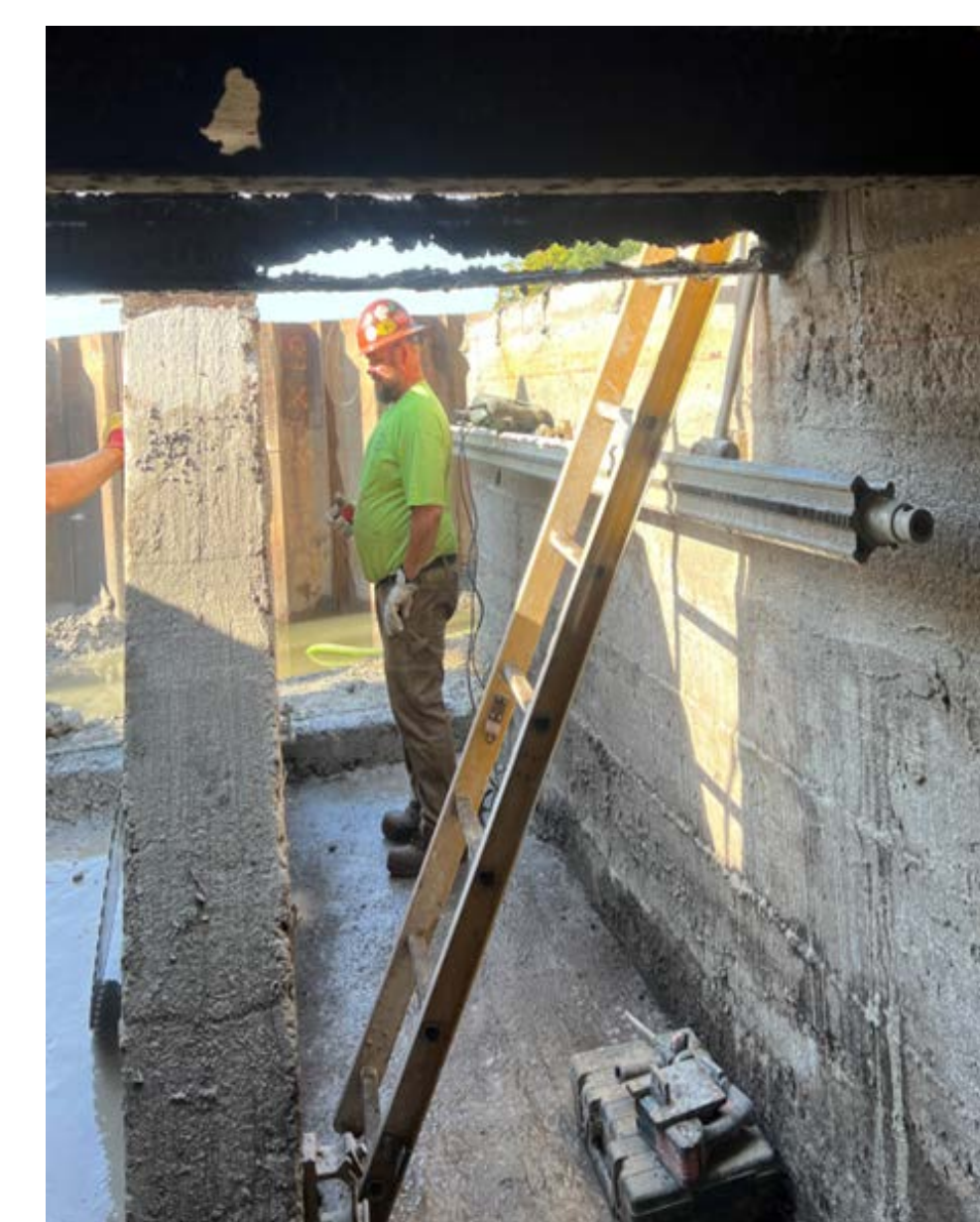


The construction manager moved the location of the coffer dam so that the contractor could safely work in the area without interference with the electric lines.

When the old intake was de-watered, a unknown concrete wall appeared and had to be removed.



The supporting steel was in much worse shape than previously thought. In some cases an entire beam was missing, and some of the supporting steel you can see through. This required support timbers to be installed before workers entered the area for safety purposes.



As concrete was cut and removed, no rebar was found in the 1935 construction. In addition, aggregate size in the concrete ranged from over a foot to pea gravel. A number of beer bottles were found in the concrete that were disposed of by the WPA days workforce as were tobacco tins a few liquor bottles. Work standards have clearly changed over the years.

Quality Control

Every load of new concrete arriving at the site was field tested for slump and air entrainment. Samples were also taken for strength testing. Five loads of concrete were rejected by the Project Manager for being out of specifications (and in some cases seriously out of compliance). This resulted in some enlightened discussions with the concrete vendor on site.



End Results

New triple galvanized steel beams were installed to support the concrete floor over the water chamber.



Two new stainless steel mechanical gates were installed to regulate the water flow.



A new intake was poured and new trash grate installed.

