



PIPELINES 2018 CONFERENCE

Toronto, Canada | July 15–18

Design, Manufacture and Microtunnel Construction of the 108- inch Diameter Low Level Outlet at NYC DEP Gilboa Dam

Everette Knight, PE/Project Engineer - Hazen

Richard Mielke, PE/Director of Engineering,
Permalok® A Northwest Pipe Company



Revitalizing Global Underground Utility Infrastructure

Project History and Background



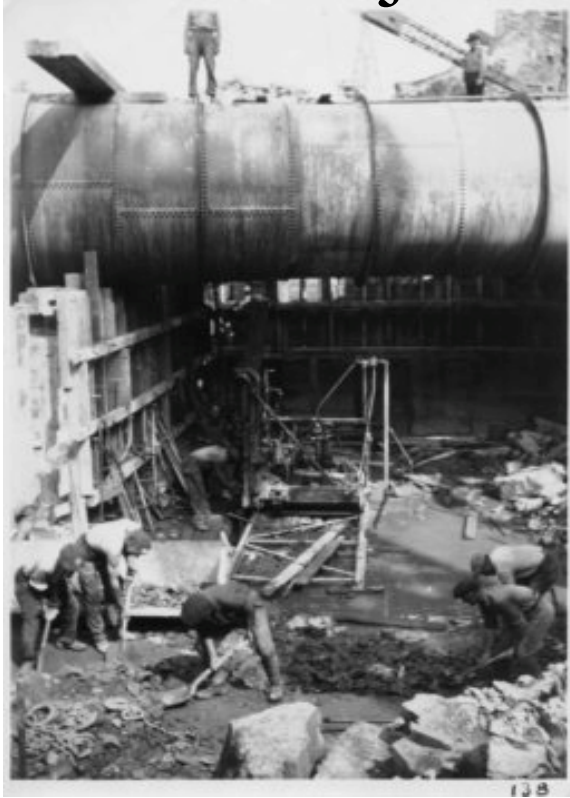
Project History and Background



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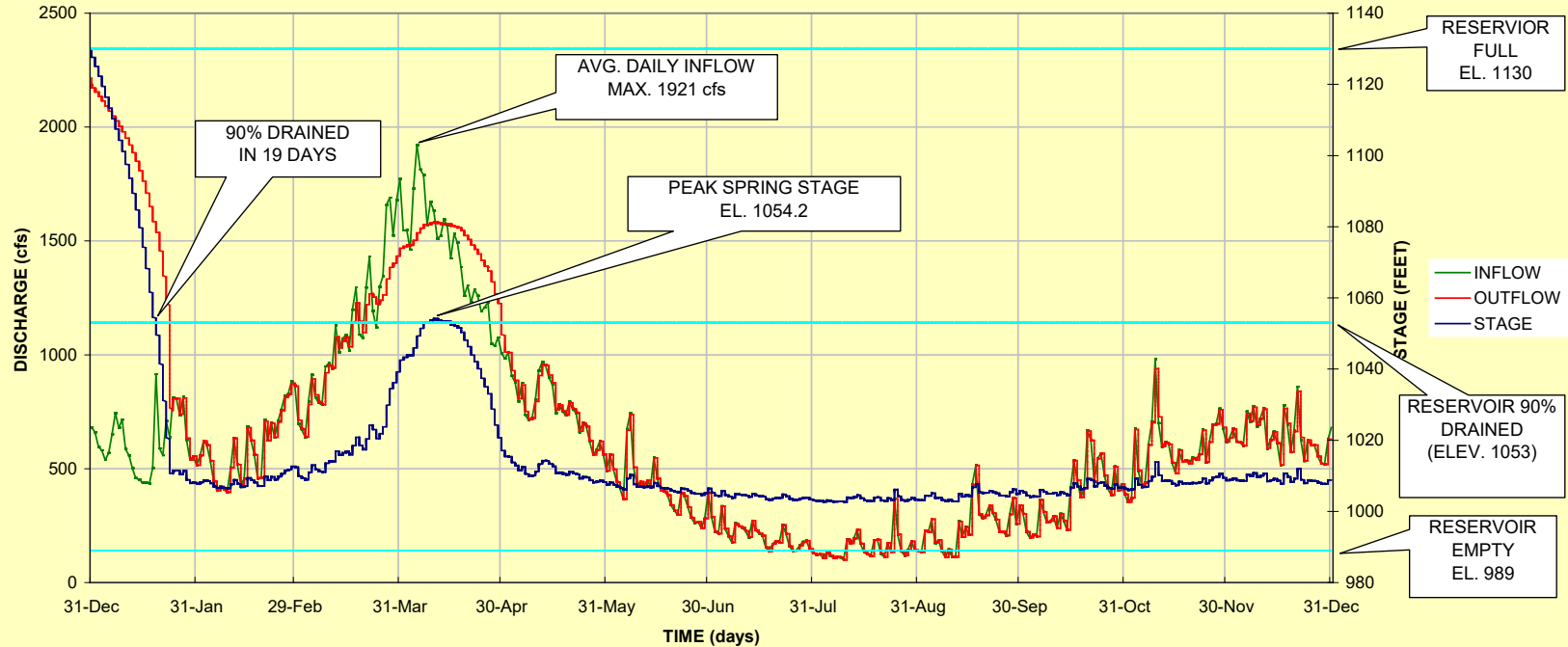


Regulatory and Design Criteria

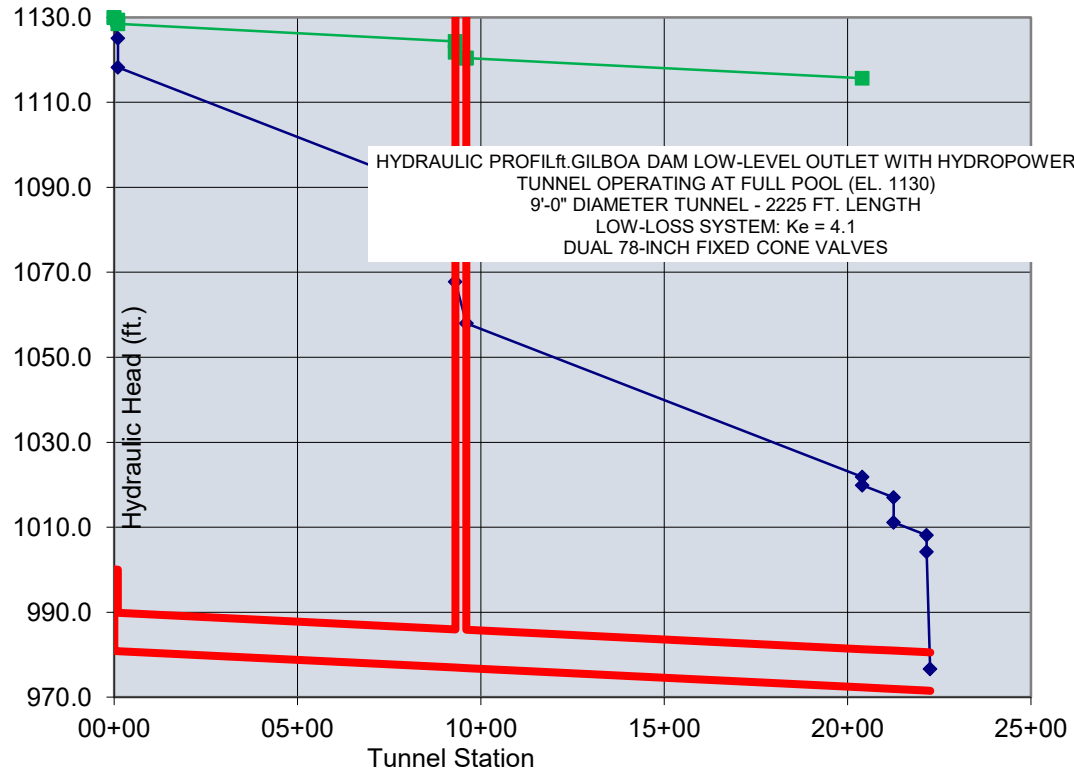
- Capacity to evacuate 90% of the reservoir storage volume under average inflow conditions; that is draw down to El 1053, in 4 months or less.
- Capacity to maintain the reservoir in a substantially dewatered state under average inflow conditions (El 1053).
- An invert elevation for the lowest drain in the range of elevation 980-1000.
- Maximum daily drawdown rates in the range of 1 to 2 feet per day, unless higher rates are deemed to be required by extreme emergencies.

Hydraulic Modeling

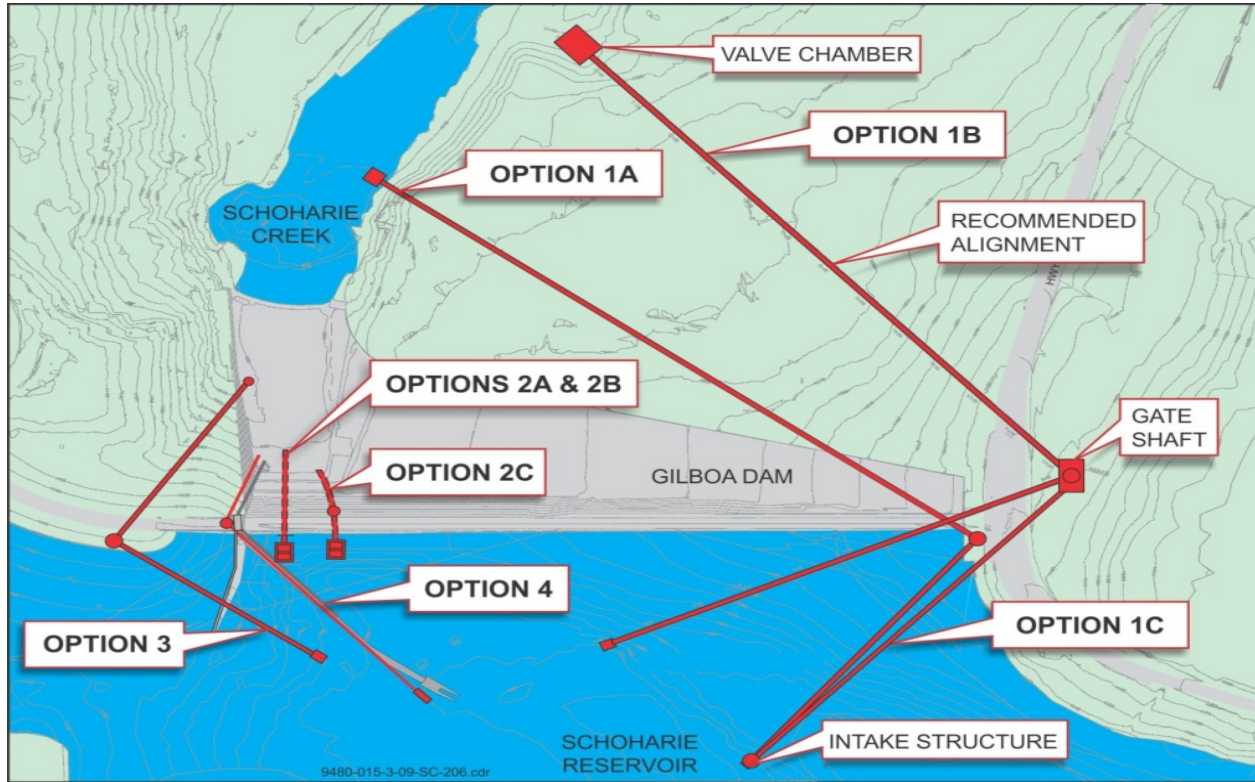
108-INCH DIAMETER TUNNEL OUTLET - 2230 FT. LENGTH
TERMINAL STRUCTURE OUTFLOW AT EL. 967



Hydraulic Modeling



Preliminary Design Options

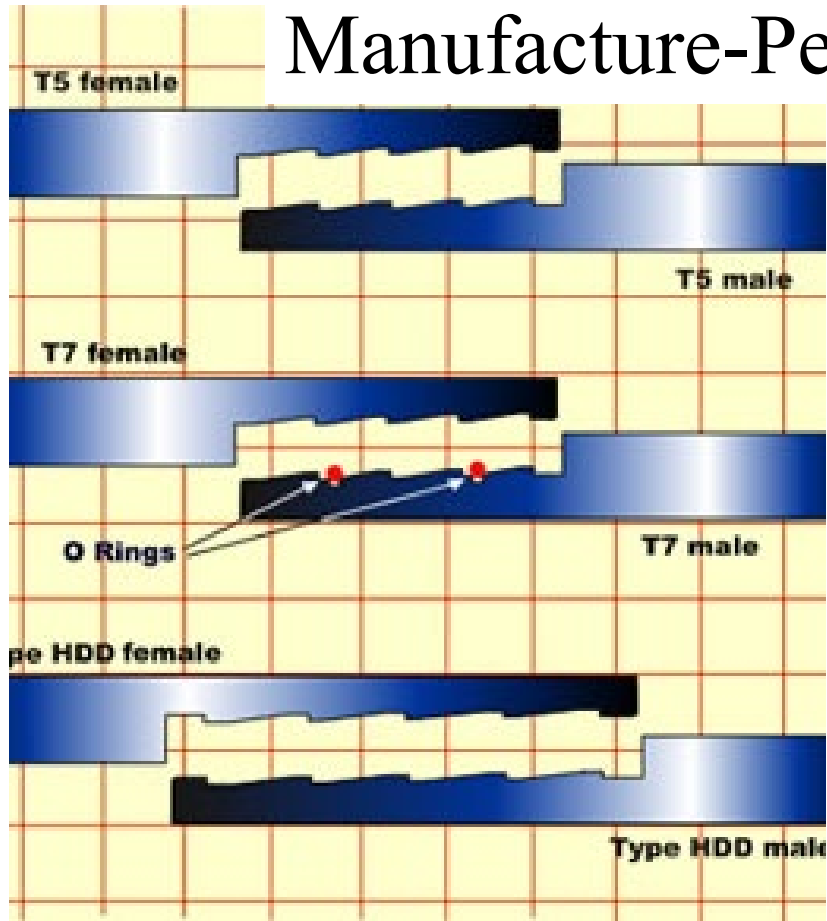


Steel Tunnel Liner Design

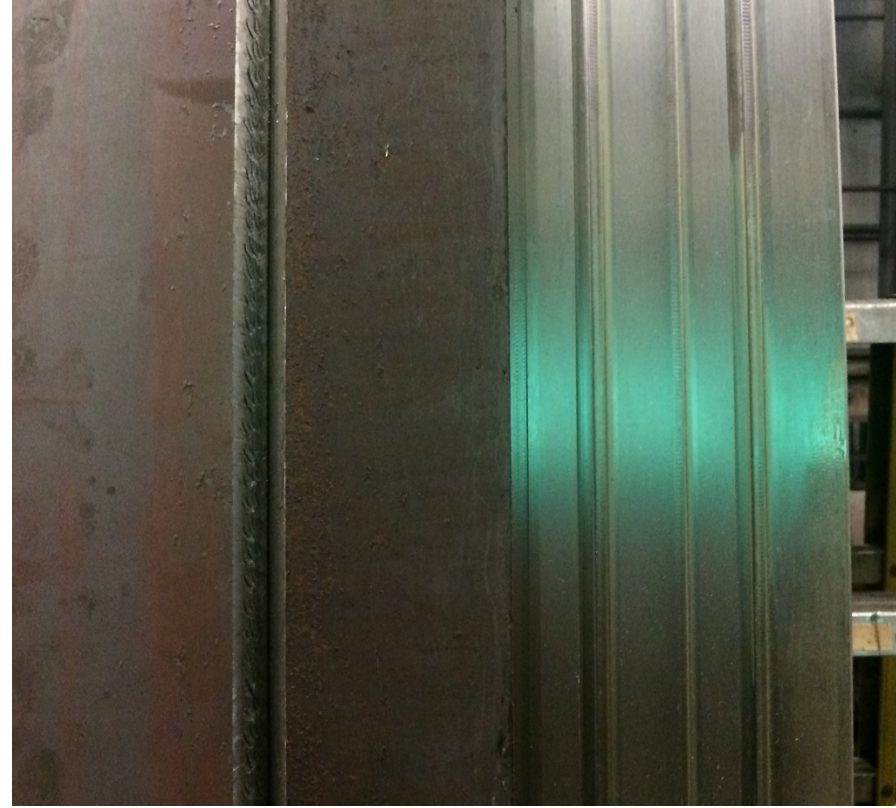


- Jacking Forces During the Microtunneling
- External loads
- Internal hydrostatic pressure
- Seismic
- Pipe joint
- Solution = 108" Diameter **Permalok** steel casing pipe with 1.375" wall thickness

Manufacture-Permalok Joint



Permalok is Manufactured per ASTM A1097



Interior Corrosion Control



Polyurethane lining per AWWA C222

Miscellaneous Lines Added In the Field For Tunnel Work

Construction



Construction



Construction







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