The Estabrook Dam Removal
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GEI Consultants, Inc.
Acknowledgments:

- Milwaukee Metropolitan Sewerage District (MMSD): Owner
- AECOM Technical Services: A/E of Record
- Terra Engineering and Construction: Contractor
- Milwaukee Riverkeeper – Advocacy organization working for swimmable, fishable rivers throughout the Milwaukee River Basin
Project Location:

Estabrook Dam:
- Milwaukee River
- Low Hazard Dam
- Constructed in 1930’s
- Normal Pool Impoundment : 200-acre-ft
- Flood Pool Impoundment: 700 acre-feet
- Spillway capacity: 25,800 cfs

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1937 Dam Construction:

I pledge you, I pledge myself, to a new deal for the American people.

(Franklin D. Roosevelt)
1937 Dam Construction:

- 1937 Shoreline
- Port Washington Road
- Limestone Excavation
- Fixed Crest Spillway (Primary)
- Gated Spillway (Secondary)
- Estabrook Park
Gated Spillway:

- Gated Spillway
- Fixed Crest Spillway
- Ice Breakers
Fixed Crest Spillway:

- Fixed Crest Spillway
- Limestone Blocks from MKE River
- Stoplogs
2008 WDNR Inspection:

- WDNR Ordered Inspection
- Consultant & WDNR noted dam safety deficiencies
  - Upgrade Gates
  - Remove Trees
  - Remove Woody Debris
  - Perform Structural analysis
- Gates opened for drawdown in summer 2008
2014 EPA Sediment Cleanup:

- EPA Phase 1
- EPA Phase 2

Sand Cover over Residual PCB's

Timeline:
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018

 dnri.wi.gov

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2016 Dam Repair & Fish Passage:

- Engineer’s Estimate – $3.4 Million
- Low Bid Received - $4.1 Million
- Milwaukee County ➔ Insufficient funding ➔ Project put on hold
- Opened Opportunity for Dam removal once again…

2016 Design

- Fish Passage through 4 left gates
  - Target Species: Northern Pike
- Gate Replacement
- Concrete Repairs
- Spillway Upgrades

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Dam Ownership Transfer

- City of Milwaukee re-zoned a parcel of Estabrook Park to non-park use
- Through a unique state law that was only recently enacted, a three-person panel sold parcel to MMSD for $1
- MMSD then transferred Milwaukee County after removal
Dam Removal Outreach

- Public Outreach – Project was contentious and high-profile
  - Government stakeholders
  - Vocal citizen groups for and against dam removal
- Two public information meetings
  - MMSD accepted written comments
  - 87% supporting dam removal unconditionally
Dam Removal Process

- HEC-RAS Hydraulic Analysis
  - Dam in place (gates open)
  - Dam in place (gates down)
  - Dam Removed
- Milwaukee River Flow Conditions
  - Flood Flows (10-, 50-, 100-, 500-year recurrence interval)
  - Low Flows (low, median, mean, spring runoff)
Dam Removal Process

• Gated Spillway
  • Removed to bedrock in the river channel
  • Removed to shoreline on the river banks
Dam Removal Process

- Fixed Crest Spillway
  - Removed to bedrock in the river channel
  - Removed to shoreline on the river banks

Dam Demolition

Natural sedimentation of void

Removal 6” min. below river bed at rebar

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Dam Removal Process

- Streambank Restoration
- Geomorphology Study
- Field Assessment
- Shear stress analysis
- Hydraulic model

Ownership Transfer / Dam Removal Design

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Permitting

- Municipal (City of Glendale, MKE County)
  - Floodplain Development
  - Erosion Control
- WDNR Permits
  - Dam Removal
  - Wetland Disturbance
  - Dredging (Sediment Removal)
  - Erosion Control
- USACE – Section 404 / Nationwide Permit
  - Wetlands
  - River Bed Disturbance (Waters of the U.S.)
  - Historical and Archeological Review & Mitigation

Ownership Transfer / Dam Removal Design

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Construction

- **Schedule**
  - Bid on October 24, 2017
  - Six Bids Received
  - Engineers Estimate - $1,700,000 Million
  - Low Bidder - $845,000
  - MMSD Received $2,300,000 in grant funding for design and construction
  - Contract Awarded: December 4, 2017
  - Notice to Proceed: January 19, 2018
  - Contractor Mobilized: February 12, 2018
  - Substantial Completion: July 31, 2018
  - Three-year Maintenance Agreement for Shoreline Restoration

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Why a Sewerage District Demolished a Dam

- MMSD 2035 Vision includes integrated watershed management
- 2,500 structures removed from the floodplain since 1999
- 1,300 structures remain at flood risk
- The dam removal reduces the current mapped floodplain upstream by taking more than 50 homes out of the floodplain.
- Updated FIRMs not yet available.
- Improved water quality
- Improved aquatic habitat
- Financially sustainable alternative for the community
Access Roads


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Cofferdam and Sediment Removal

2008 - 2018

Cofferdam

Fixed Crest Spillway

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Ice Breaker Demolition

Debris Removal

Ice Breaker Demolition


Dam Removal

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Fixed Crest Spillway Demolition


Fixed Crest Spillway

Sand Cap Area

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Material Management

- Sediment: 700 Tons
- Concrete: 1,425 Cubic Yards
- Limestone Block 1,240 Cubic Yards
- All Concrete and Limestone crushed and recycled
Post Construction


February 14, 2019

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Post Construction

Recreational Trail (recycled materials)
Post Construction
Post Construction


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Post Construction
Thank You!

- Questions?
- Concerns?
- Queries?
- Requests?
- Lunch Time?