

Four Lakes Task Force

Gladwin and Midland Counties' Delegated Authority
of the Four Lakes Special Assessment District

EGLE Public Hearing - Sanford Dam

July 5, 2023



Four Lake Task Force Introduction

- Introduction, Four Lakes Task Force (FLTF) – Dave Kepler*
- Dam Design and Safety, GEI Consultants – Andy Baxter*, Carlin Grundeman
- Flood Studies, Spicer Group (FLTF Owner's Engineer) – Steve Roznowski*, Ron Hansen

* Presenters



Permitting

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EGLE Permitting

Focus of this FLTF presentation

- Part 315 – Dam Safety - Andy Baxter, GEI
- Part 31 – Floodplains – Steve Roznowski, Spicer

Experts available for questions

- Part 301 – Inland Lakes and Streams
- Part 303 – Wetlands Protection

Other Permitting / Consultation Completed

- County Soil Erosion and Sediment Control
- Notice of Coverage (NOC)
- Road Commission Permitting
- Local Planning, Zoning and Building Permitting
- Local Floodplain Permitting
- State Historic Preservation Office
- Threatened and Endangered Species



Sanford Dam – Restoration

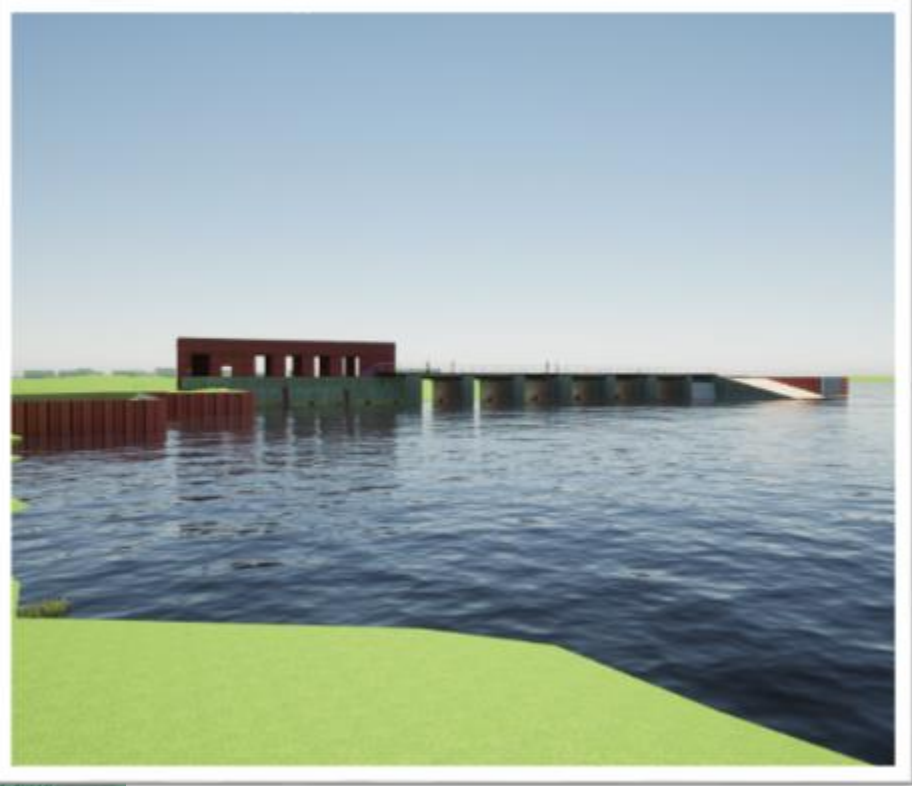
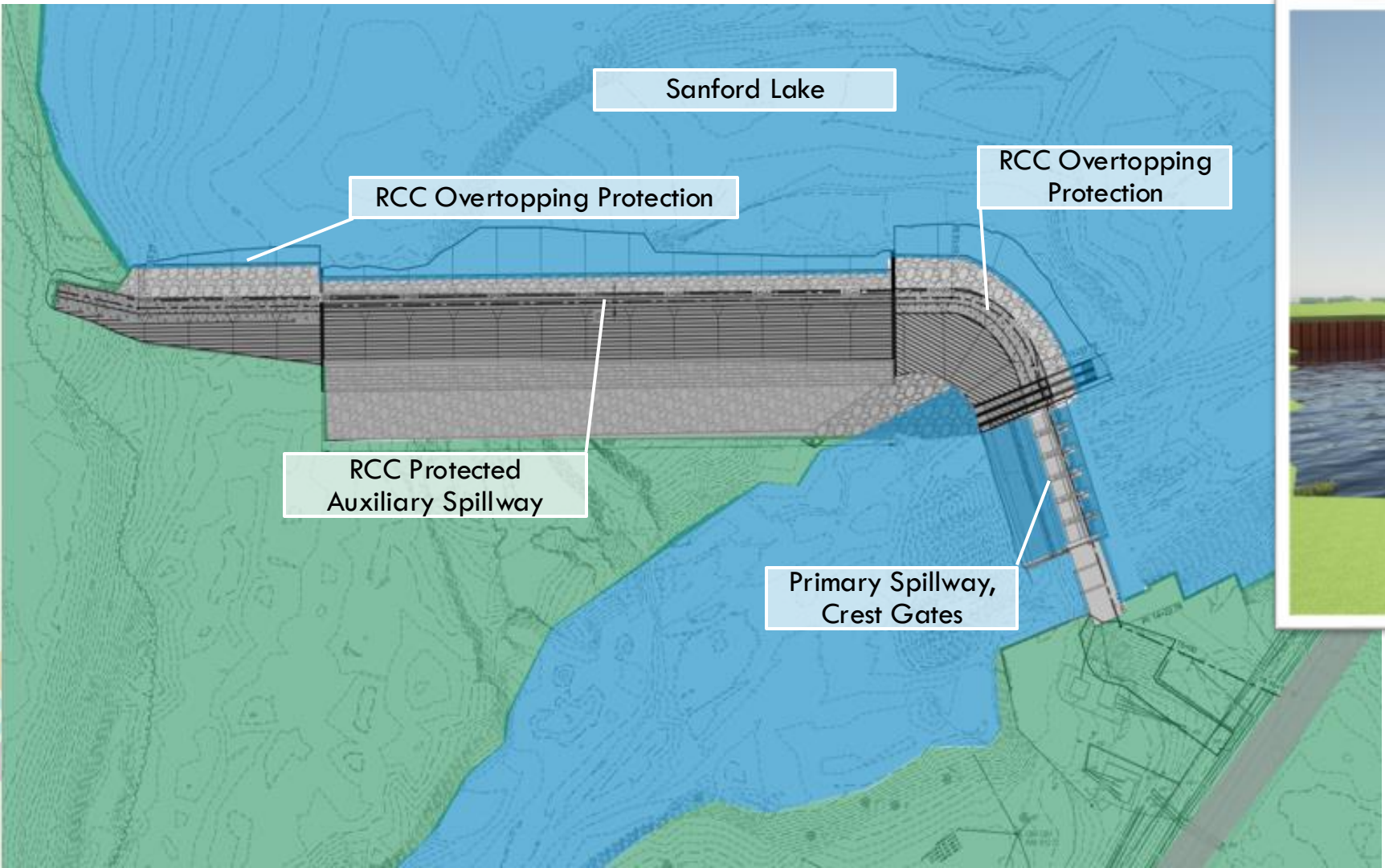
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Dam safety issues being addressed:

- ❑ Inadequate Spillway Capacity
- ❑ Embankment Dam Stability / Lack of Seepage Cutoff
- ❑ Mitigate Static Liquefaction Potential Present in Embankment and Foundation Soils
- ❑ Lack of Low-Level Outlet to Pass Base Flows
- ❑ Breached Left Embankment Needs to be Rebuilt



Sanford Dam – Restoration



Flood Study Definitions – Inflow Design Flood

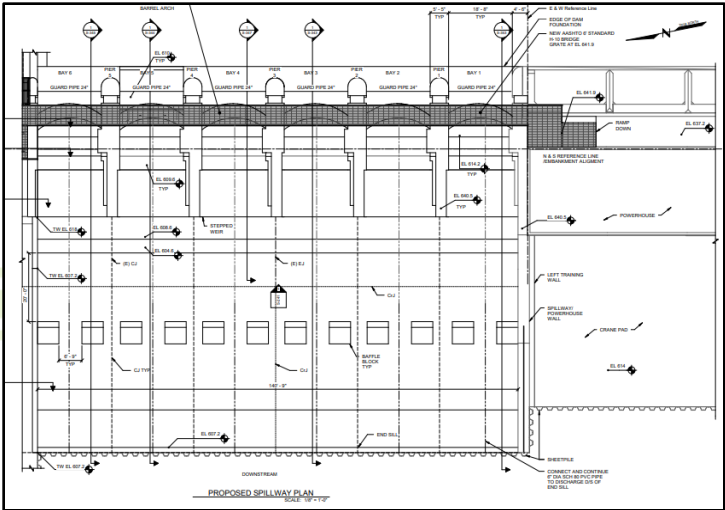
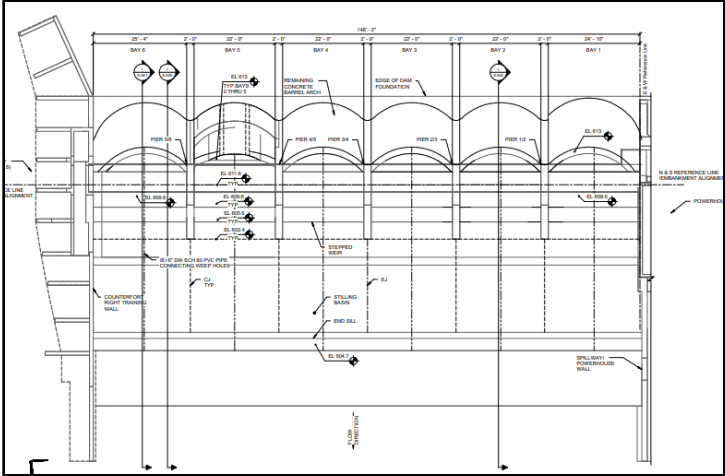
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- **Inflow Design Flood (IDF)** The first step in evaluating and designing a dam is to address hydrologic potential failure modes and reduce risks to the public
 - A major factor in Dam Safety (Environment, Great Lakes, and Energy (EGLE) Part 315 permitting).
- An Informed Risk-Based approach was used to determine the IDF
 - Based using FEMA Guidelines for Inflow Design Floods.
 - Recommended by the Association of State Association of Dam Safety Officials (ASDSO)
 - Recommended by the Michigan Task Force on Dam Safety
- Dam capacity on all four dams meets or exceeds EGLE discharge capacity for high-hazard dams



Sanford Dam – Restoration

Primary Spillway Gates



Pre-Flood Primary Spillway

- Discharge Capacity = 29,700 cfs

Proposed Primary Spillway

- Discharge Capacity = 37,800 cfs



Summary of Dam Restoration Discharge Capacity

Uses risk-based approach to meet or exceed EGLE discharge capacity for high-hazard dams

	Secord Dam		Smallwood Dam		Edenville Dam		Sanford Dam	
Parameter	Pre-Flood Spillway	Restoration Spillway	Pre-Flood Spillway	Restoration Spillway	Pre-Flood Spillway	Restoration Spillway	Pre-Flood Spillway	Restoration Spillway
IDF Inflow (cfs)	18,200		28,300		55,400		54,600	
Zero-Freeboard Tainter Gate Spillway Capacity (cfs)	8,000	13,500	10,000	20,800	20,650	44,200	29,700	37,800
Auxiliary Spillway Zero-Freeboard Capacity (cfs)	0	19,000	18,000	18,300	0	36,500	6,500	39,700
Total Spillway Capacity (cfs)	8,000	32,500	28,000	39,100	20,650	80,700	36,200	77,500
Spillway Capacity Increase	24,500 cfs		11,100 cfs		60,050 cfs		41,300	
Increase percentage	306%		40%		291%		115%	

Risk-based IDF

Risk-based IDF

Risk-based IDF

Spillway sized to pass Edenville Dam outflows and armored for overtopping

Flood Study Definitions

- **Inflow Design Flood (IDF)** The first step in evaluating and designing a dam is to address hydrologic potential failure modes and reduce risks to the public – a major factor in dam safety (Environment, Great Lakes, and Energy (EGLE) part 315 permitting).

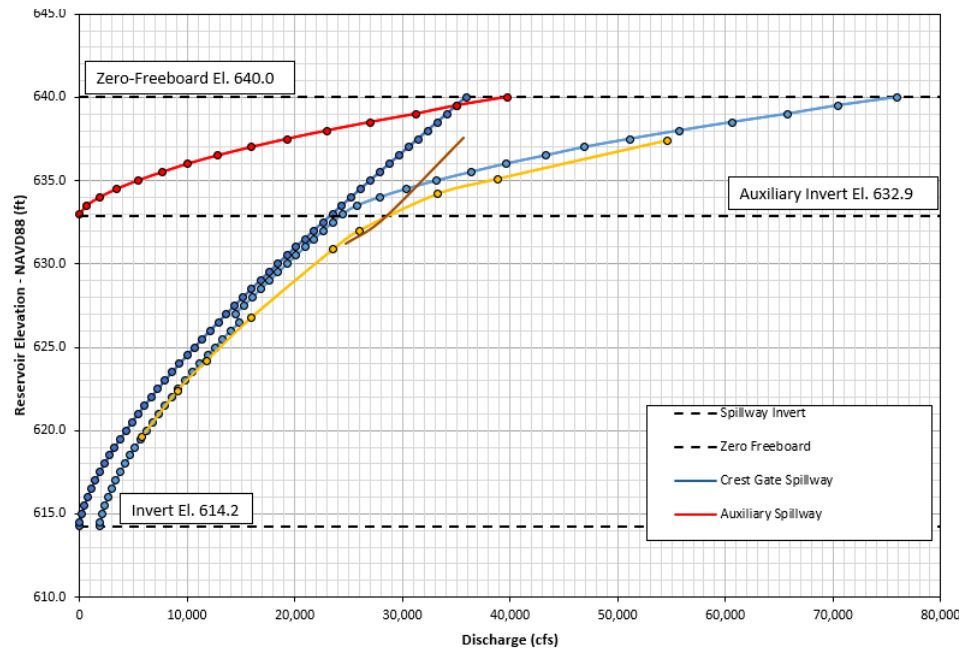
Once the dam capacity is set, lower frequency floods can be modeled

- **100-Year Floodplain (EGLE Part 31)**: The land that is inundated by water during a flood event is defined as a floodplain. In Michigan, and nationally, the term floodplain has come to mean the land area that will be inundated by the overflow of water resulting from a 100-year flood.
 - *The 100-year floodplain is an area that has a 1% chance of flooding in any given year. (one in a hundred)*
- **National Flood Insurance Program (NFIP)**: A federal program, administered by the Federal Emergency Management Agency (FEMA), that makes flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage.
 - This is not a part of permitting of the Sanford Dam



Peak Outflows from Sanford Dam

- Drainage area = 945 square miles
- Analysis March 2023
- Floods above 50-year event begin to partially attenuate peak flows

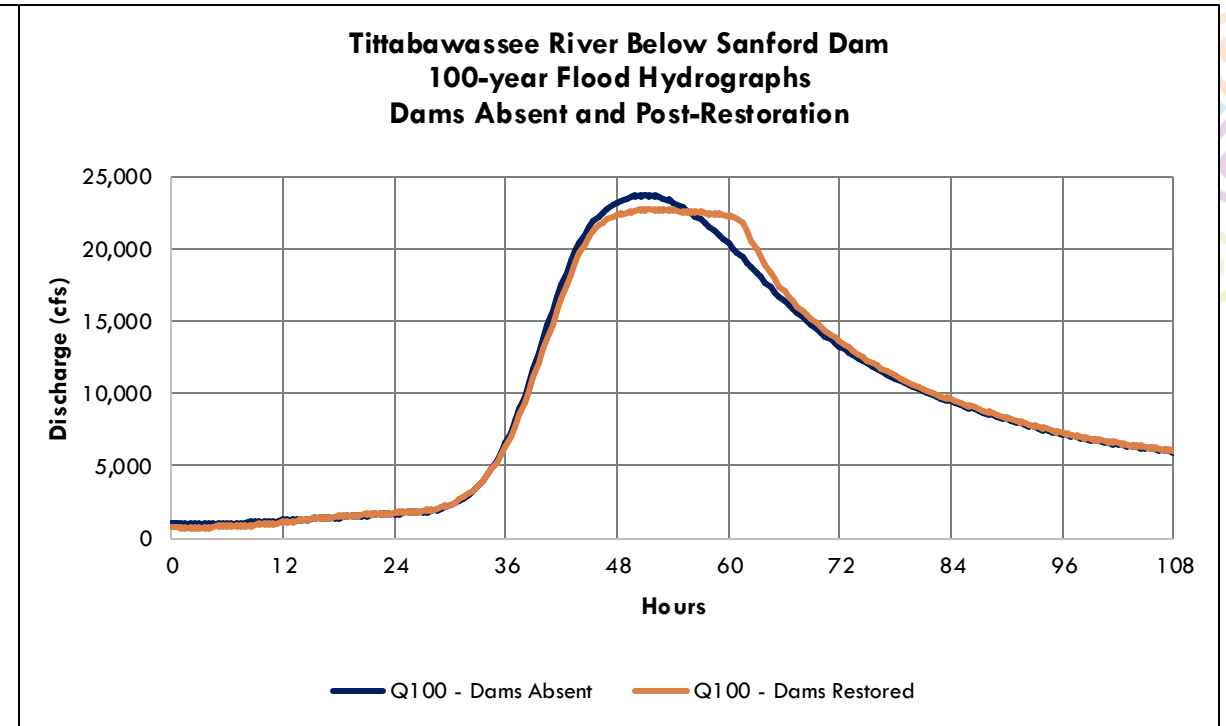
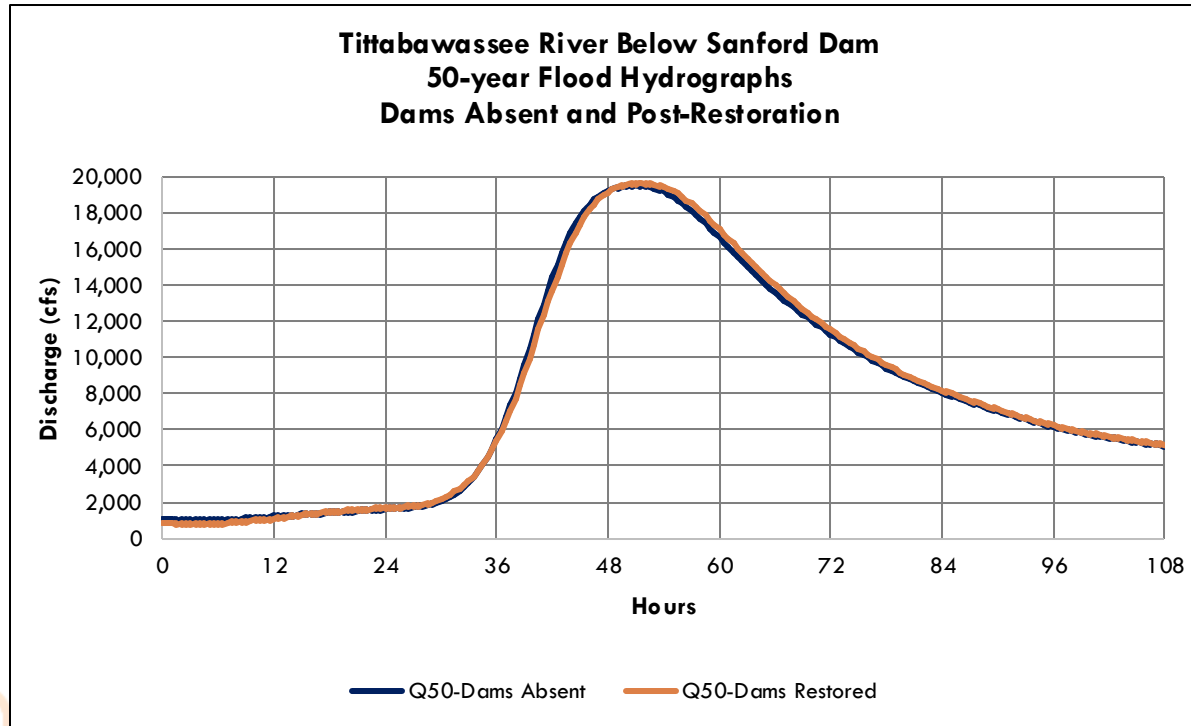


Sanford Dam
Overtopping Flood
New Capacity
77,500



Peak Outflows from Sanford Dam		
Storm Event	Dams Absent (cfs)	Post Restoration (cfs)
2-year	5,690	5,750
5-year	9,040	9,100
10-year	11,700	11,800
25-year	16,000	16,000
50-year	19,600	19,700
100-year	23,800	23,600
200-year	28,600	28,000
500-year	36,600	33,300
1,000-year	42,700	38,900
5,000-year	59,900	54,900

Peak Outflows from Sanford Dam





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Sanford Dam Restoration

