

Four Lakes Task Force

Sanford Lake Update on Repair & Schedule

February 25, 2021



Four Lakes Task Force



AGENDA

- ❑ Introduction and Welcome – Tim Holsworth
- ❑ Priority Topics – Dave Kepler
- ❑ Repairs to Restore Legal Lake Levels – Paul Drew
- ❑ Schedule – Ron Hansen
- ❑ Summary– Dave Kepler



INTRODUCTION

Tim Holsworth, President
Sanford Lake Association



PRIORITY TOPICS

Dave Kepler
President, Four Lakes Task Force



Sanford Community Pathway to Restoring Our Lake

	2020	2021	2022-2023	2024-2025	Sanford Lake Filled
Key Actions	<ul style="list-style-type: none"> Acquired property Erosion control Managed debris 	<p>RECOVERY</p> <ul style="list-style-type: none"> Stabilize Sanford Dam Remove debris <p>RESTORE</p> <ul style="list-style-type: none"> Flood/rain study Revised estimate -- May Preliminary engineering 	<p>RESTORE</p> <ul style="list-style-type: none"> Design engineering and financing, environmental 	<p>Construction</p>	
Funding Needs	Funded via private donations, state and federal funds	<p>~\$15-20 million</p> <p>Funded via private donations, state and federal funds in place!</p>	\$3-4 million in grants and donations needed for interim financing from SAD in 2022 to avoid delay	Seek grants and donations to help reduce assessments	
Property Assessments	NONE	<ul style="list-style-type: none"> Likely \$200/year for 2021- 2023 for Operations (\$50 for backlots) – Approval late this year By YE2021, Sanford capital assessments should be estimated within 30% of final number 	<ul style="list-style-type: none"> Public hearing (2023/2024) for capital assessment County approval 	<ul style="list-style-type: none"> New general assessment to replace 2021-2023 operations assessment Capital assessment for construction in late 2025 	

Critical Issues for the 2025 Return of Sanford Lake

- ❑ \$3-4 million needed in 2021 for design engineering
- ❑ Agreement on an affordable plan for Sanford Lake
 - ❑ And willingness to live with some uncertainty for another year
- ❑ Environmental restoration
 - ❑ Collaboration with the State and Federal government to identify a feasible plan for permitting





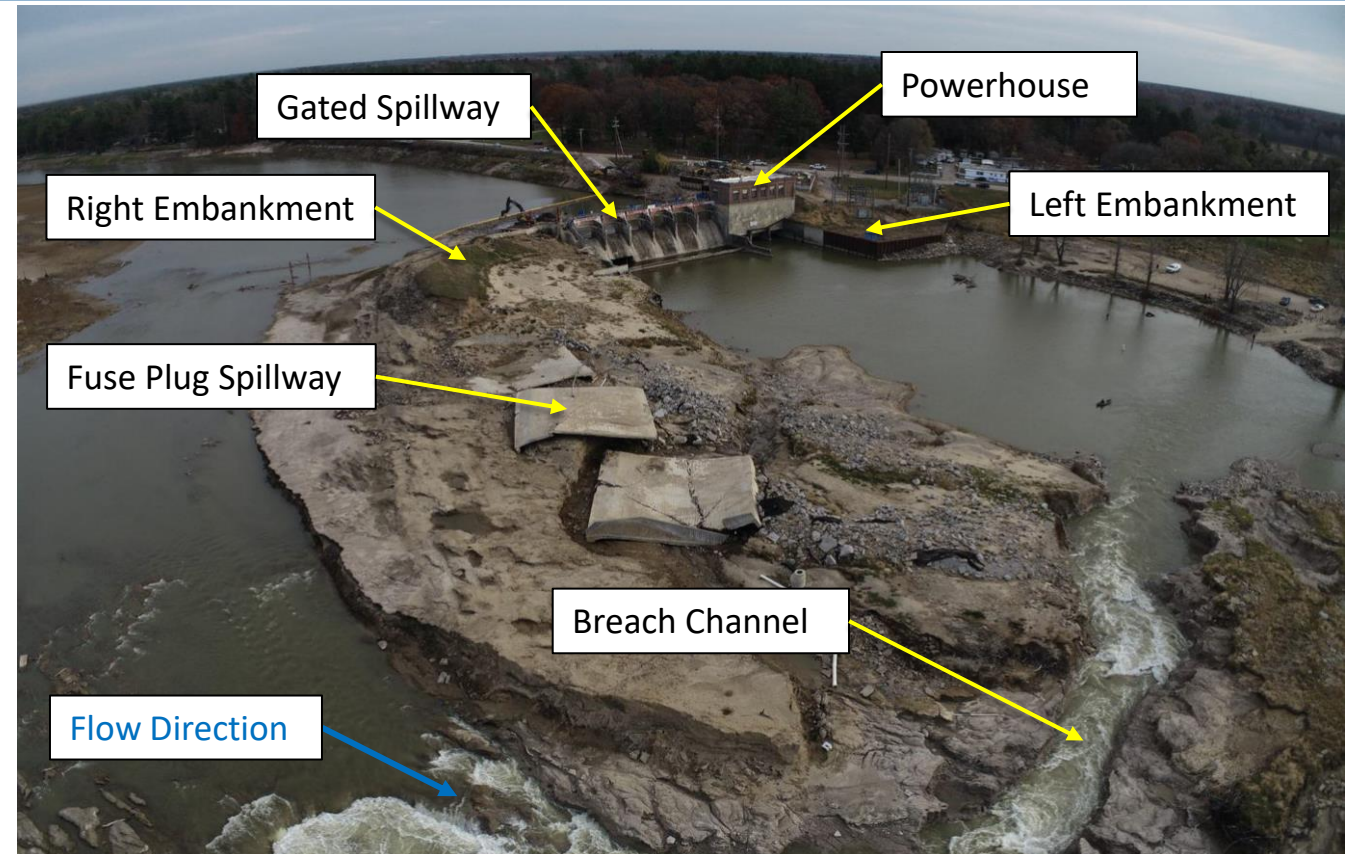
RESTORING LEGAL LAKE LEVELS

Paul Drew, P.E., CFM
Project Manager, GEI Consultants

May 2020 Flood Damage

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- ❑ Left and right embankment overtopped
- ❑ Right embankment breached
- ❑ Powerhouse and equipment damaged
- ❑ Fuse plug auxiliary spillway failed
- ❑ Tittabawassee River flows through breach channel (former right embankment)



Note: Left to Right looking in a downstream direction

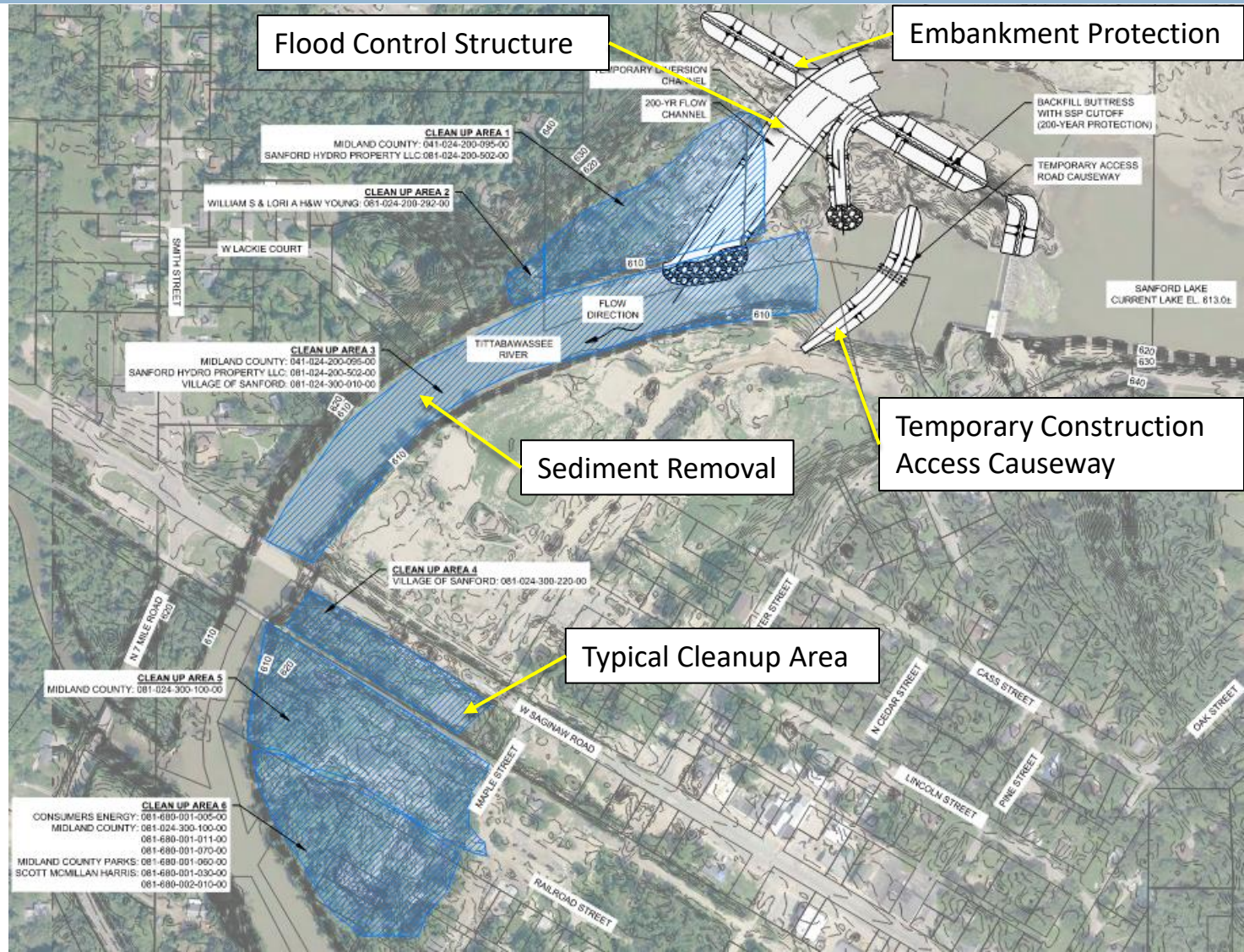
Interim Stabilization Measures

9

Future stabilization construction at Sanford includes:

- Stabilize existing breach channel
- Provide flood protection against erosion of sediment and head cutting up to the 200-year flood event
- Provide flood control structure consisting of steel sheet pile and large riprap to convey flows around the dam and minimize further head cutting and erosion
- Additional cleanup sites identified on properties immediately downstream of Sanford Dam
- Construct debris control boom (see next page)

The NRCS has identified that the Sanford Dam interim stabilization and sediment removal may be eligible for NRCS Emergency Watershed Protection (EWP) Program funding. Long-term goal to incorporate stabilization repairs in the permanent, long-term repairs.

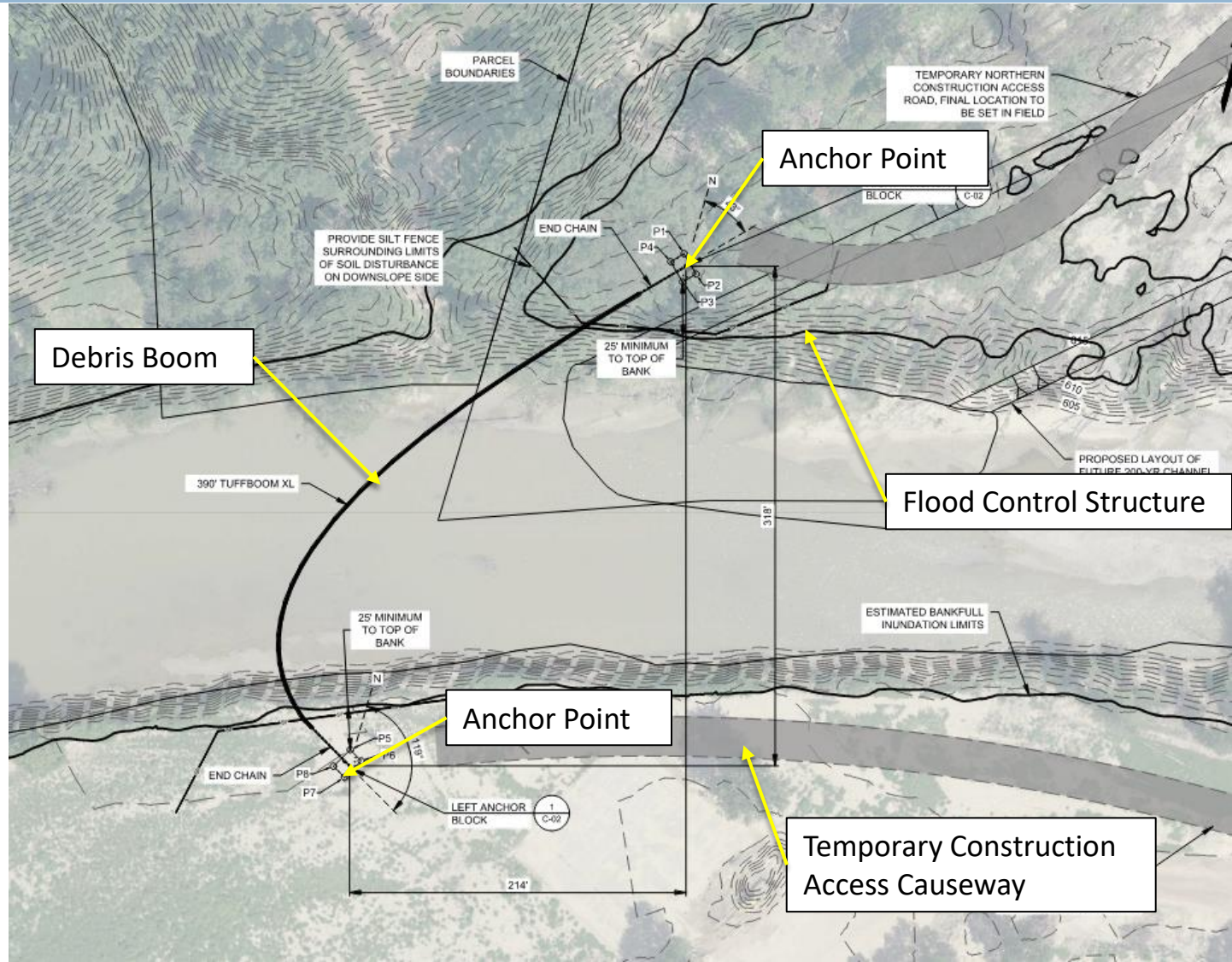


Interim Stabilization Measures (Continued)

10

- Construct debris control boom downstream of stabilization to collect large amounts of debris remaining in the upstream watershed
 - Buried anchors on channel banks
 - Access from the left shoreline to debris removal
 - Design intent to collect debris during small, frequently occurring storm events. Adequate capacity for the 10,000 cfs (5-year) flood event
 - During large flood events the boom will “break” with fuse links to not retain debris
 - Reconnect the boom following large storm event

Worthington | **TUFFBOOM**®



Long-Term Restoration - Critical Items

- ❑ **Spillway Adequacy.** Sanford is classified a High Hazard dam. Prior to May 2020 flood, the total spillway capacity was approximately 36,000 cubic feet per second (cfs) before water would begin overtopping embankments
- ❑ Prior State of Michigan 1/2 PMF was 37,000 cfs
 - ❑ Based on current on-going studies and recent flood, this will increase
- ❑ FLTF study currently estimating future spillway requirement being 47,500 cfs
- ❑ Spillway requirements still being finalized based on
 - ❑ PMP and PMF studies (Probable Maximum Precipitation and Probable Maximum Flood)
 - ❑ Inflow Design Flood Study (IDF)
 - ❑ State of Michigan Dam Safety Task Force
 - ❑ EGLE approval



A risk-based flood study will be required to determine the final capacity criteria.

Risk-Based Design Approach

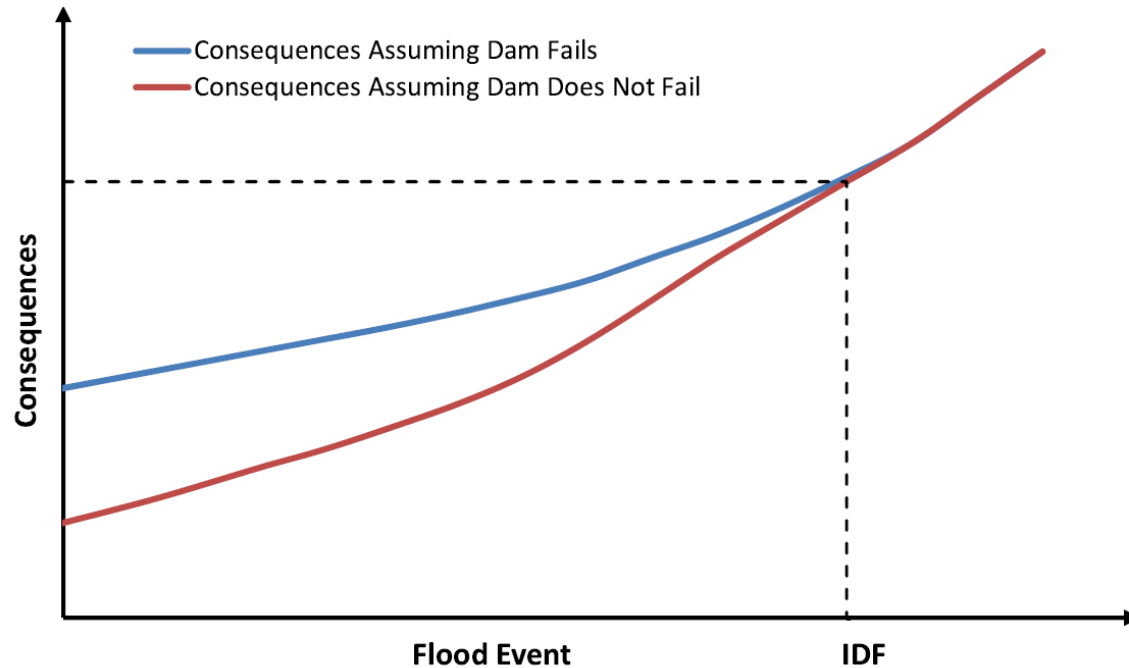


Figure 1 Conceptual Comparison of Incremental Consequences

- **The IDF/risk-based approach aligns with FEMA guidelines and recommendations of the Michigan Dam Safety Task Force guidelines for Michigan dams**
- **Inflow Design Flood that requires these steps:**
 1. Site-specific Regional Probable Maximum Precipitation (PMP) studies which are underway.
 2. Perform downstream Inundation mapping assuming dam failure for a range of flows starting from the 100-year flood up to the PMF
 3. Determine the incremental hazard increase and consequences of failure for a range of flood flows up to the PMF
 4. Use risk-based, IDF approach to inform the design spillway capacity – no less than 200-year but possibly less than the $\frac{1}{2}$ PMF

Tailwater Submergence

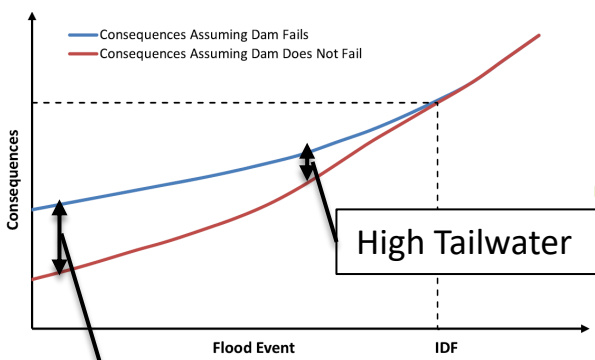
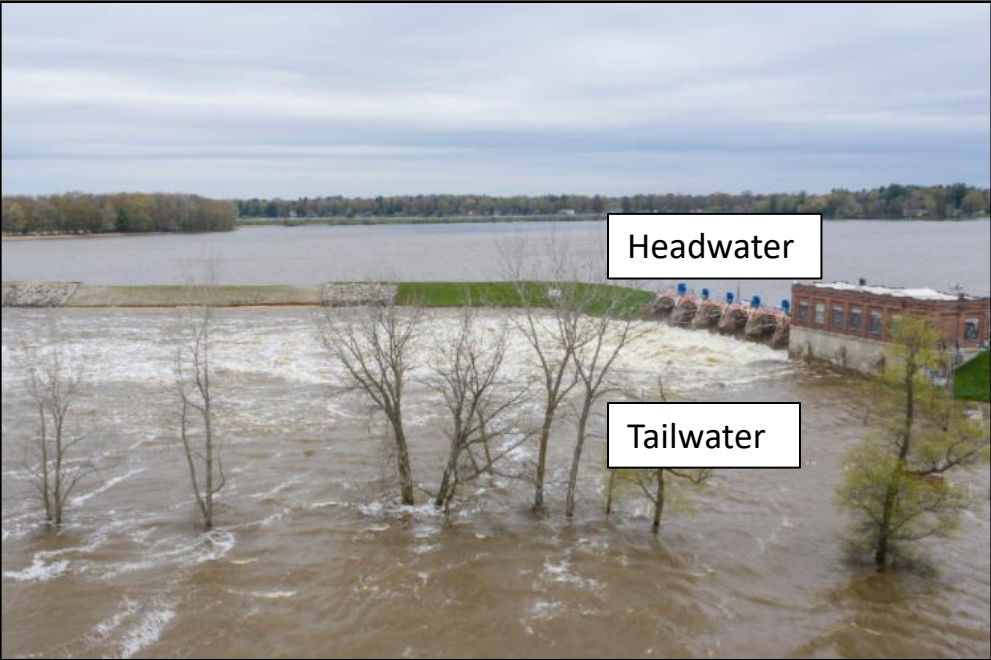
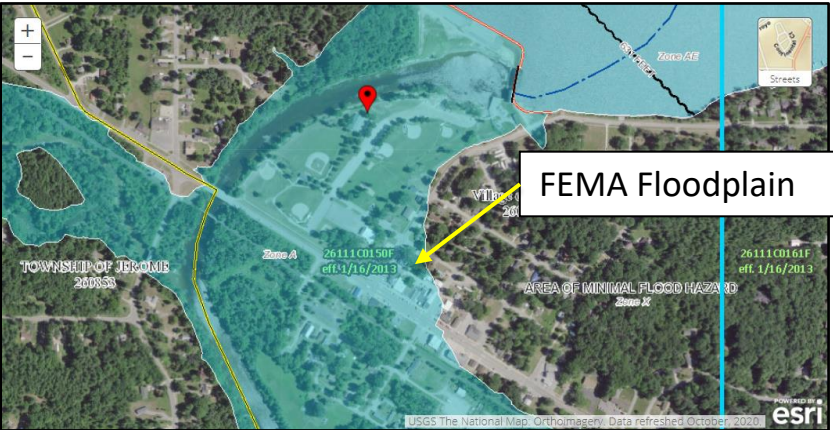


Figure 1 Conceptual Comparison of Incremental Consequences



- **May 2020 Flood Event**
 - Flood pictures from May 2020 show the complete submergence of the switchyard fence.
 - Head differential of 7 to 8 feet between headwater upstream of dam and tailwater downstream of dam
 - FEMA floodplain maps show significant flooding downstream of Sanford Dam for 100-year event
 - Example of reduced impacts between dam failure and non-failure

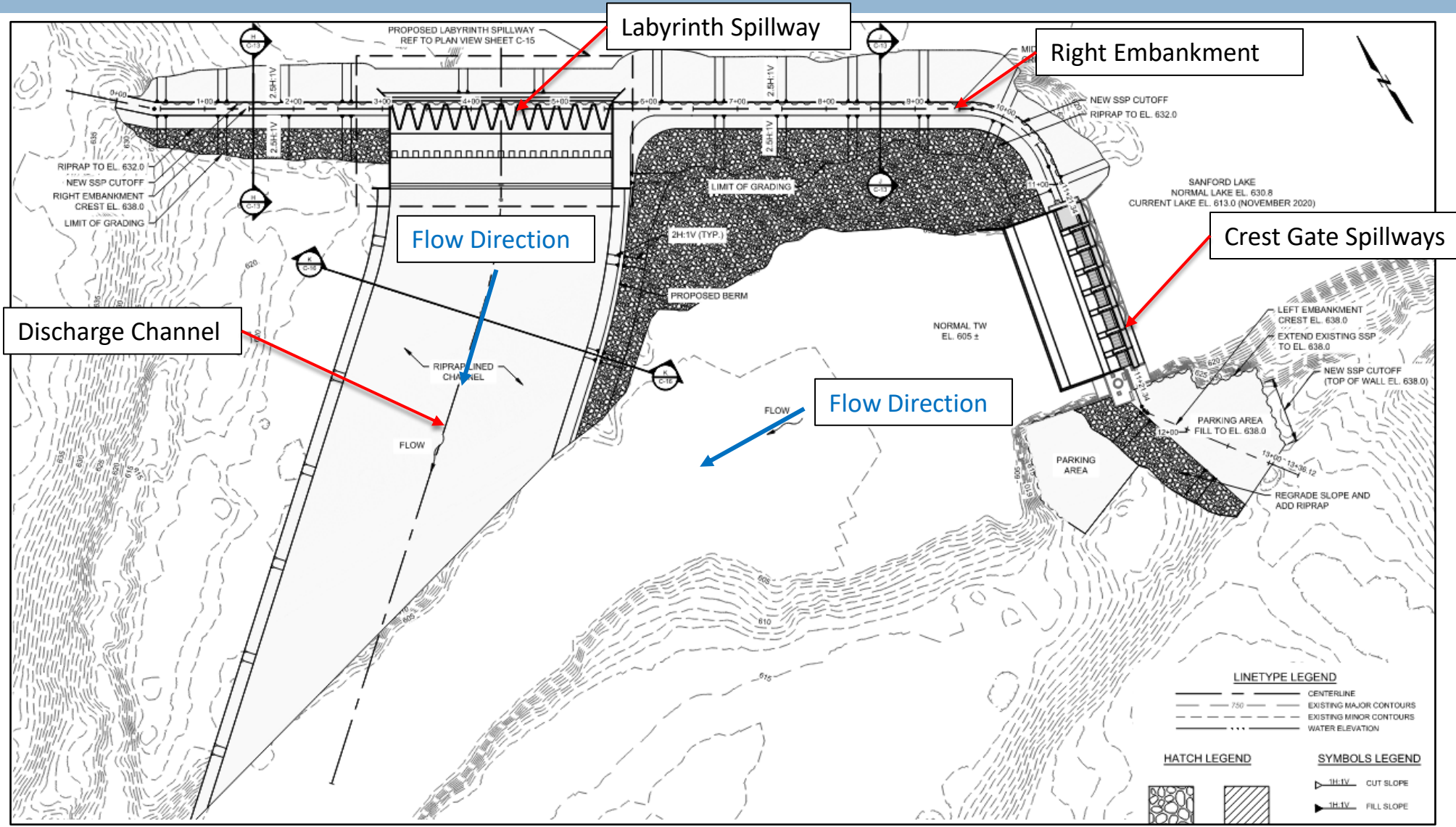
Critical Repair Items

- ❑ **Water Retaining Structures.** The right embankment breached
- ❑ Reconstruct right embankment to meet stability criteria with seepage cutoff wall and internal drainage layers to protect against seepage-induced internal erosion
- ❑ Replace existing Tainter gates with Crest Gates to increase spillway
- ❑ Construct new auxiliary spillway to increase spillway capacity

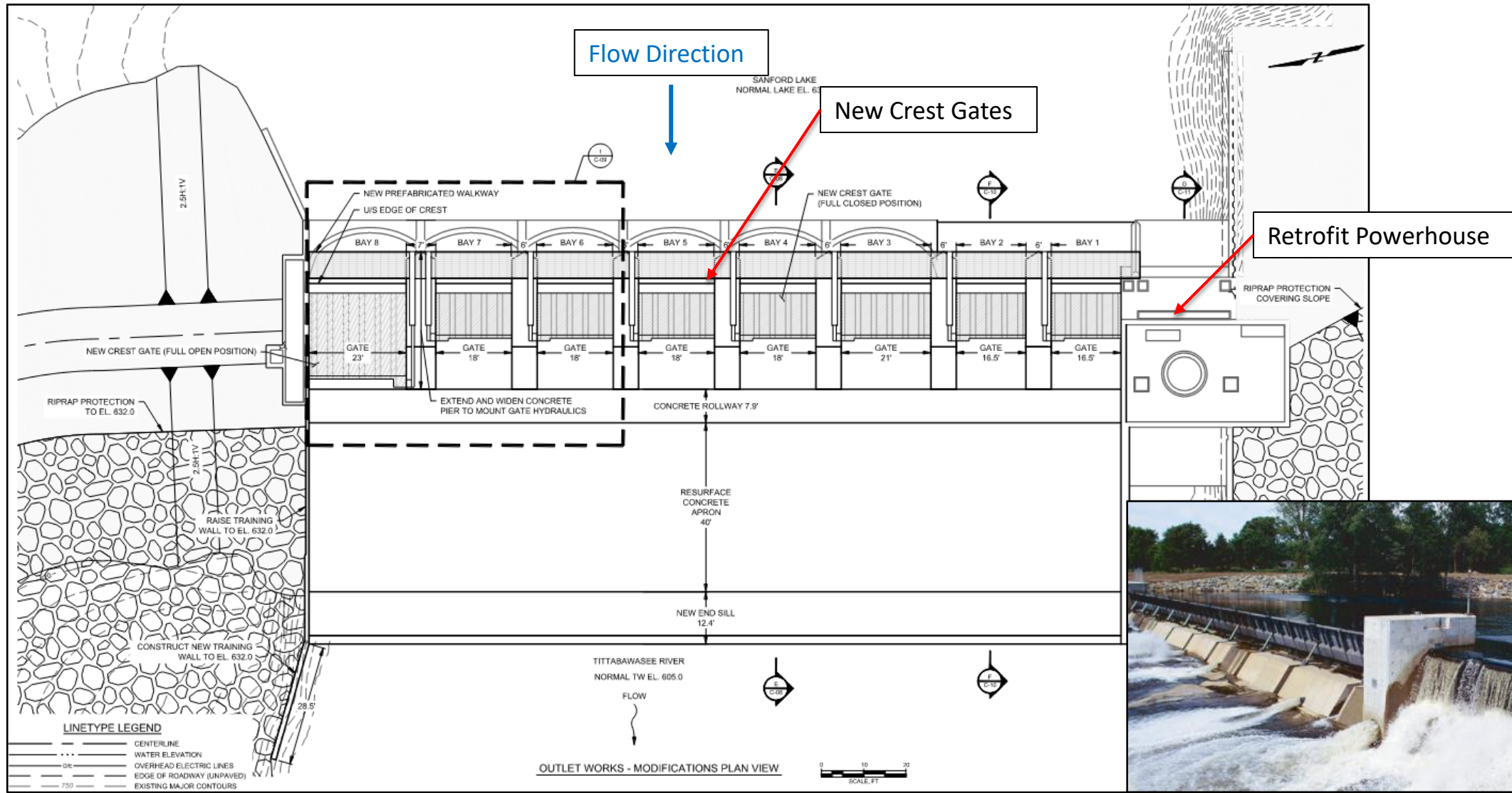


- *Geotechnical investigations and structural analyses are required to support design of new embankments and repair of existing embankments.*
- *All water retaining structures will need to be thoroughly evaluated and designed to meet State and Federal dam safety standards.*

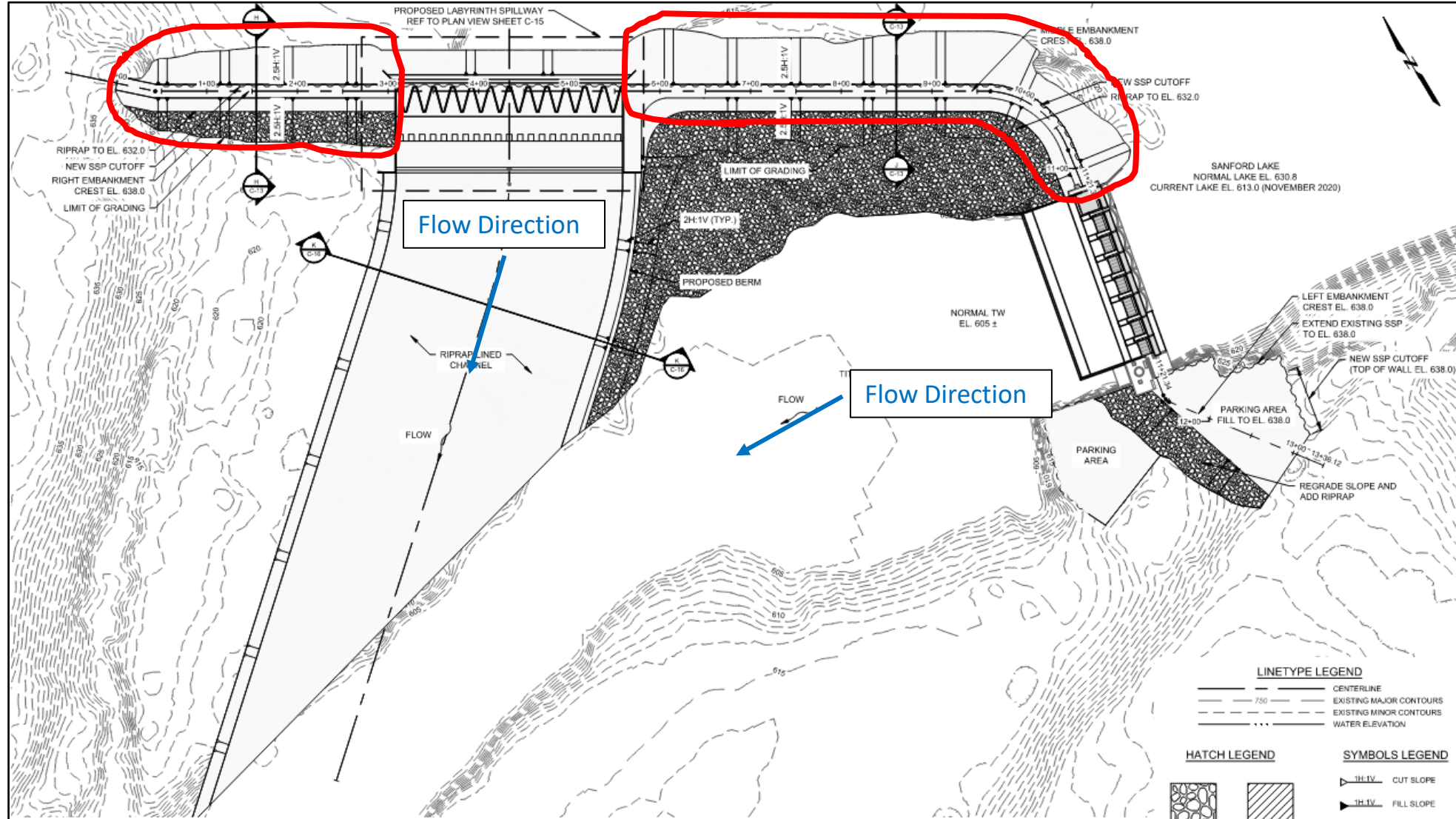
Proposed Plan View of Permanent Repairs



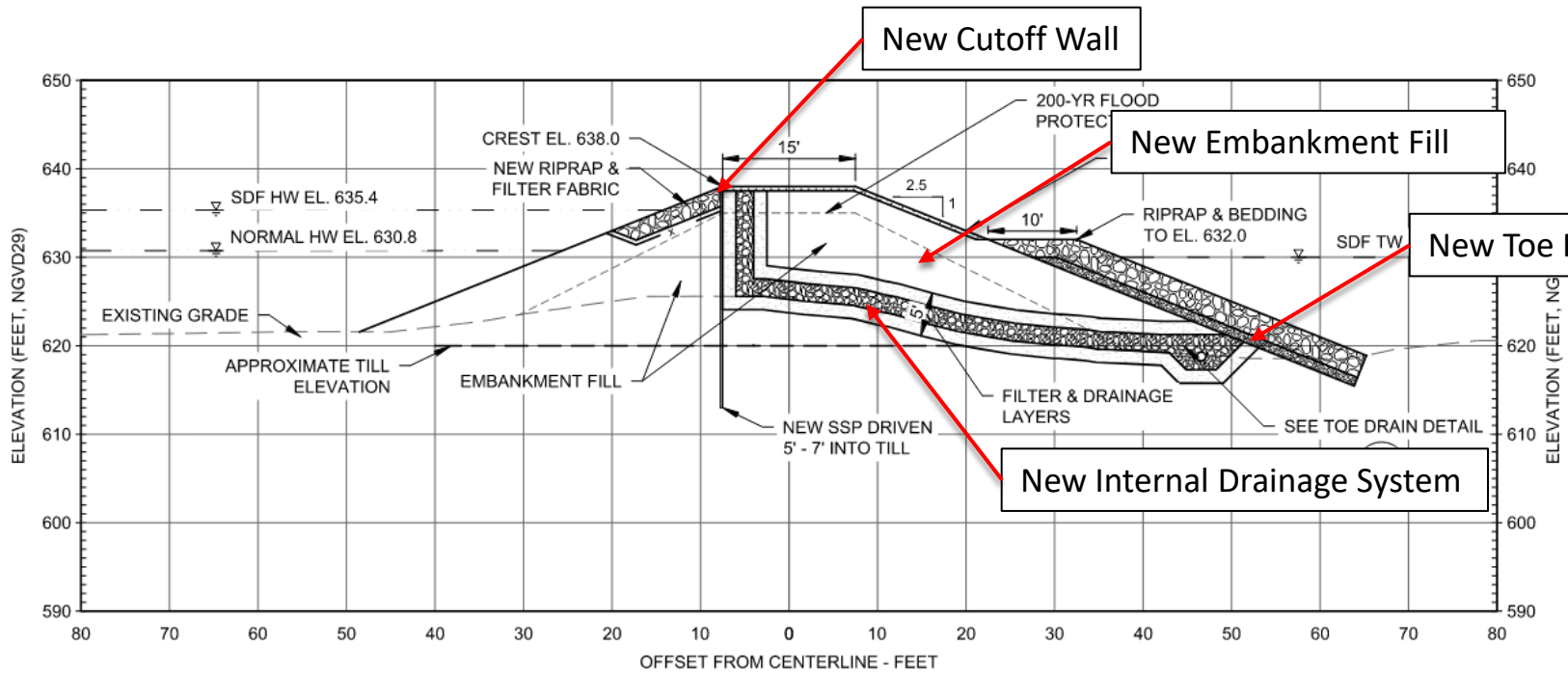
Proposed Plan View of Crest Gate Spillway



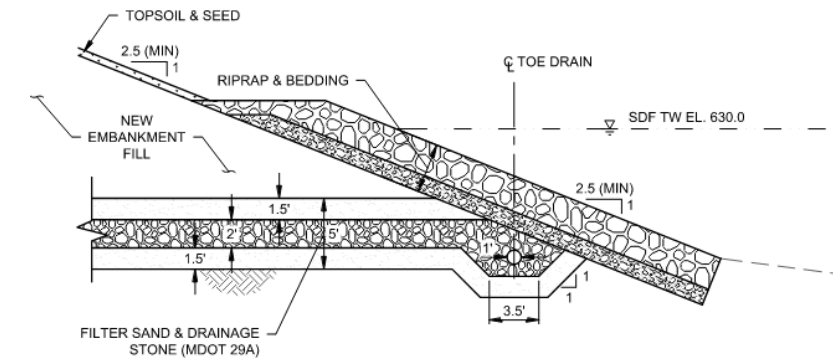
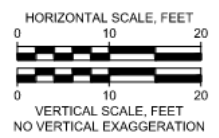
Proposed Plan View of Right Embankment



Proposed Section View of Right Embankment



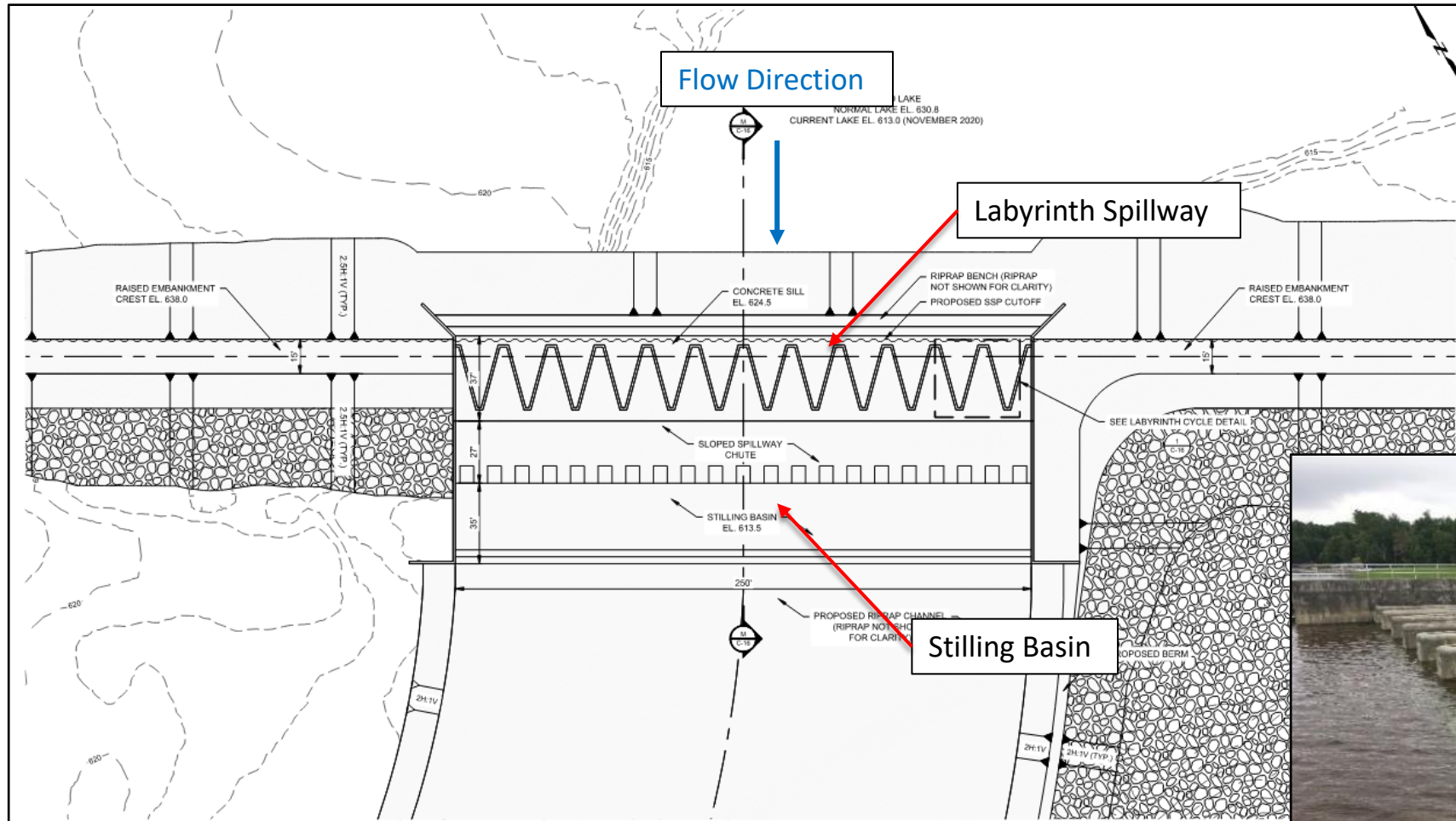
H SECTION
C-12 RIGHT EMBANKMENT



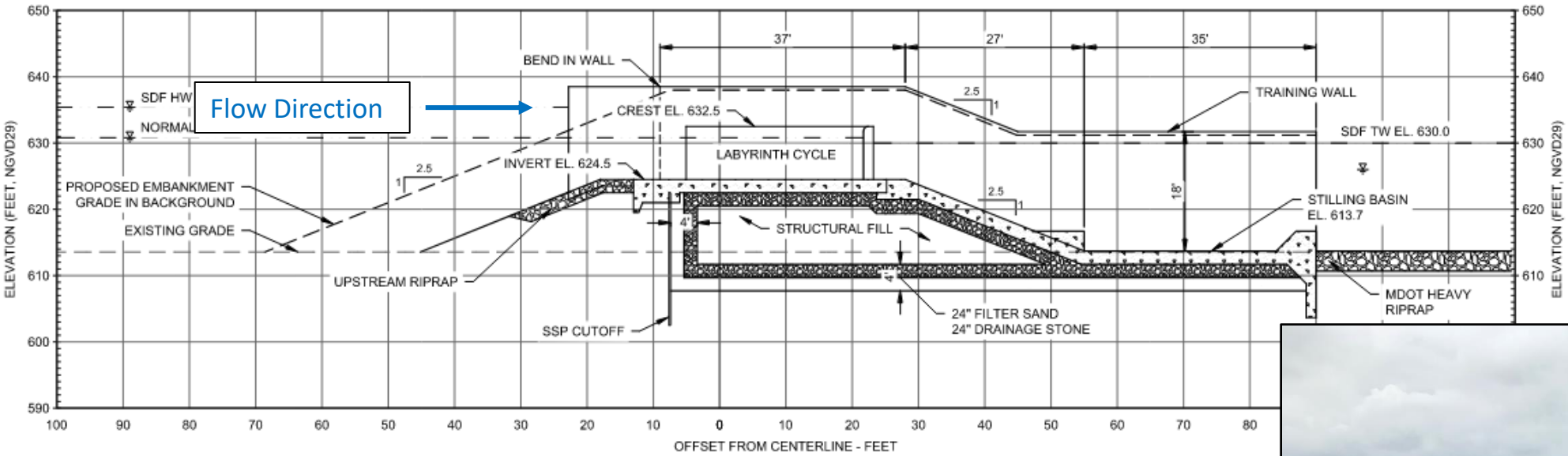
1 DETAIL
C-12 TOE DRAIN



Proposed Plan View of Labyrinth Auxiliary Spillway

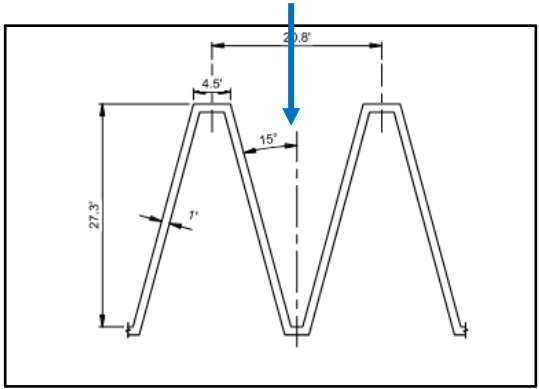
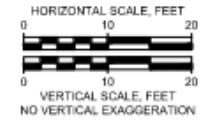


Proposed Section View of Labyrinth Auxiliary Spillway



Flow Direction

M SECTION
C-15 PROPOSED SPILLWAY





SCHEDULES AND TIMING

Ron Hansen
Engineer for FLTF, Spicer Group. Inc



Schedule Considerations and Constraints



We all have a duty of care to keep people safe.

There is a significant amount of work being done now to stabilize the Dam and model floods.

Final construction timeline is dependent on receiving regulatory permits, financing approval, establishment of the assessment rolls and county approval.



Part 307, Michigan statutes dictate the process, and USDA has requirements

We are running parallel paths to get to the start of construction.



Engineering Design Phase

Engineering is more than just design and building of a dam. There is significant modeling, environmental impact study and permitting required.

Flood Study

PMP and PMF Study

IDF Finalization

Surveying and Easements

Inspections

Soil Borings

Embankment Analysis

Spillway and Gate Analysis

Contractor Pre-qualifications

Environmental Analysis

Wetlands, Streams,

Floodplains, Mussels, Ecosystem,

Recreation

Final Design Engineering

Geotechnical

Structural

Hydraulics

Environmental

Transportation

Drainage

Electrical

Mechanical

Soil Erosion

Landscape/Restoration

EGLE Approval

USDA Financing Approval

Local Approval

Contract Documents

Specifications

Bidding

Computation of Cost

Notice to Proceed

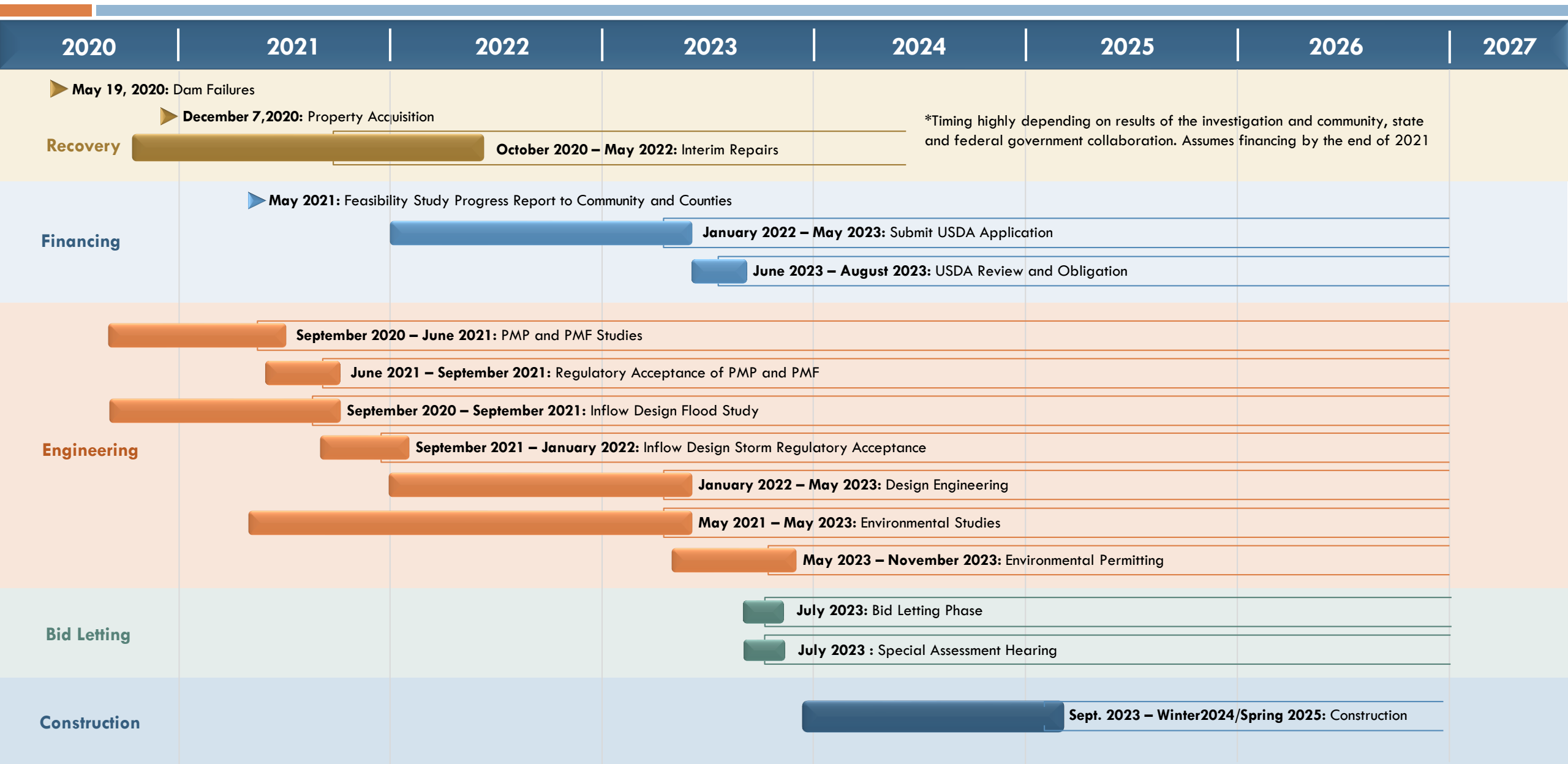


Before Construction May Begin We Need:

- ❑ Independent forensic investigation report
- ❑ Engineering
 - ❑ Preliminary engineering reports
 - ❑ Inflow Design Flood needs to be established
 - ❑ Final design and construction plans
- ❑ Submittal and approval for USDA funding approval
- ❑ Environmental studies and EGLE permitting
- ❑ Bid letting and computation of costs
- ❑ Special assessment hearings and appeals
- ❑ Approval of special assessment roll by county



Sanford Dam Recovery and Restoration Plan* (With USDA financing and engineering funded by grants)





SUMMARY

Dave Kepler
President, Four Lakes Task Force



Financial Situation Considerations

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- **FLTF has allocated the funds to get the Sanford Dam stabilized**
 - We still need to raise funds to do all the engineering for the Sanford Dam
 - If we don't this could add an extra year to the project

- **The costs presented in December will not be updated until the May report**
 - Those costs are based on the lake property owners paying 100% of the costs
 - It will take to the end of the year to determine if we have an affordable plan
 - You are encouraged to complete the PSC survey

- **Special Assessment District and Assessments**
 - We will be recommending ~\$200 per lake property owner (\$50-backlot) yearly transitional assessment
 - A capital assessment would not be likely until 2004 or later
 - *The SAD website will be updated this month & webinar in March will provide more detail*

- **Hydropower will not reduce the assessments in the next decade**
 - And would add to the time and costs to bring Wixom up



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Closing Thoughts on Sanford Lake

- ❑ **We understand the urgency to restore the lake levels for county, property owners and local businesses**
 - ❑ Our first priority has been and will be public safety
 - ❑ A revised estimate of costs will be presented in May
- ❑ **We are committed to BRING BACK SANFORD LAKE!**
 - ❑ It is the best long-term alternative for the community and the county. The dam simply can't be abandoned
 - ❑ We are advocating for state and federal support, but are not waiting for it to move forward
- ❑ **It will take community engagement and advocacy**
 - ❑ FLTF will work closely with Sanford Lake Association
 - ❑ Please join!





THANK
YOU

- ❑ See website for future meetings
- ❑ Sign up for weekly updates at bit.ly/FLTF-subs
- ❑ Send questions to info@fourlakestaskforce.org