Don’t Take Grants for Granted

Leveraging the Most from Congressional Funding Opportunities for the Life-Cycle Overhaul of an Inventory of Municipally Operated Dams

James Grimes, PE
Brandon Harris, PE

Gwinnett

Presentation Outline

- What is ARPA?
- Dams Program at Gwinnett County
- Project Scoping Process
- Resulting Scope/Project Delivery
- Status of ARPA Funded Projects
- Lessons Learned

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What is ARPA?

American Rescue Plan Act

- What is it?
  - Congressional allocation from H.R.1319 - American Rescue Plan Act of 2021 117th Congress
  - Coronavirus State and Local Fiscal Recovery Funds
  - 181.9M awarded county-wide to Gwinnett
    - 10M utilized for dam infrastructure

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What is ARPA?

American Rescue Plan Act

- **Use it or Lose It!**
  - Stipulations from the Federal Government for use of Funds
  - Must be allocated/encumbered under contract by December 2024
  - All funds spent/done with construction by December 2026
  - We hit the ground running 2022 – 2023 sourcing projects

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Dams Program at Gwinnett

Program Overview

Program Goals

- Ensure compliance with GA DNR/EPD Safe Dams Program guidelines and regulations
- Maintain safe operating conditions at all Gwinnett maintained dam sites
- Safeguard public lives and infrastructure from flood damage
- Technical resource to citizens and Gwinnett Office of Emergency Management

Approach to Projects

Projects identified through a continuous monitoring, regulatory inspection program, and life-cycle condition assessments.

- Improvement projects proactively correct any deficiencies in conditions of dams, in areas of personnel and public safety
- Dam Rehabilitation: replacement of major components in response to watershed changes or dam reclassification by regulatory agencies requiring spillway capacity upgrades, embankment overhauls etc.
- Dam Maintenance: aimed at extending service-life of dam components, providing safe operating conditions/access during inspections or emergency conditions, and returning dam to intended design state
- Dam Removal/Decommission: removal of structure if dictated by engineering, fiscal, or safety concerns

Dams Program at Gwinnett

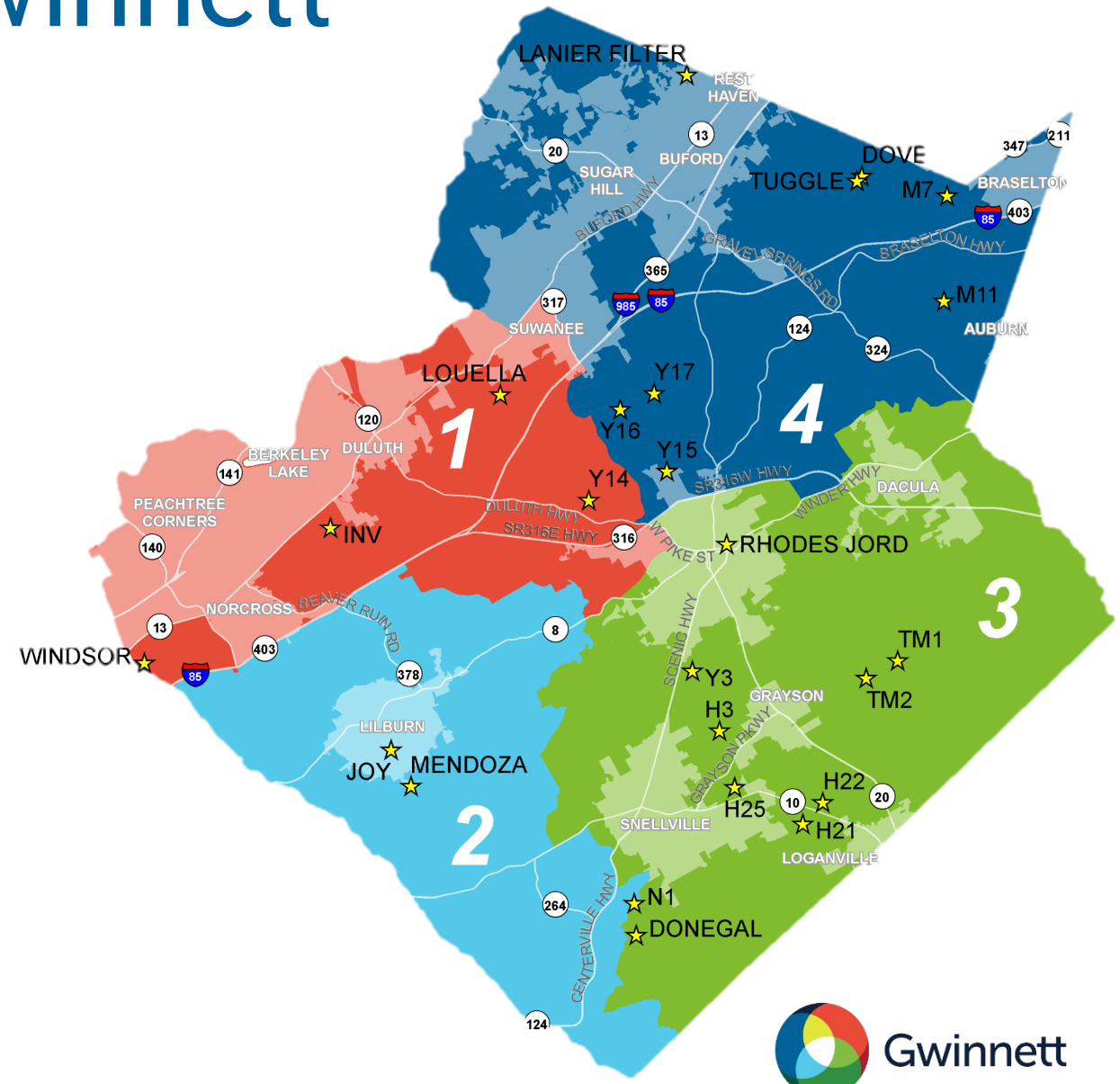
Inventory of Structures

Major Dams in Inventory (24)

- 16 High Hazard Dams
- 3 Low Hazard Dams
- 5 Exempt Monitored Impounding Structures

Cyclical Program Mandates

- Quarterly Dam Inspection of each site
- Annual Reporting to GA EDP/DNR Safe Dams
- Emergency Preparedness Exercises
- Breach modelling and mapping



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Dams Program at Gwinnett

Inventory of Structures

Dams Program at Gwinnett

Inventory of Structures

Project Scoping Process

Beginning with Project Drivers

Flood Retention
Continued design function

Extend Service-Life
50-yr intended design life of NRCS dams
Presently year 57+ for dams installed as early as 1967. Issues can be addressed by projects to extend service-life by another 20-yrs

Public Health and Safety
Well maintained high hazard structure limits risks to public and infrastructure downstream

Compliance
With state and federal agencies as an operator and facility co-sponsor

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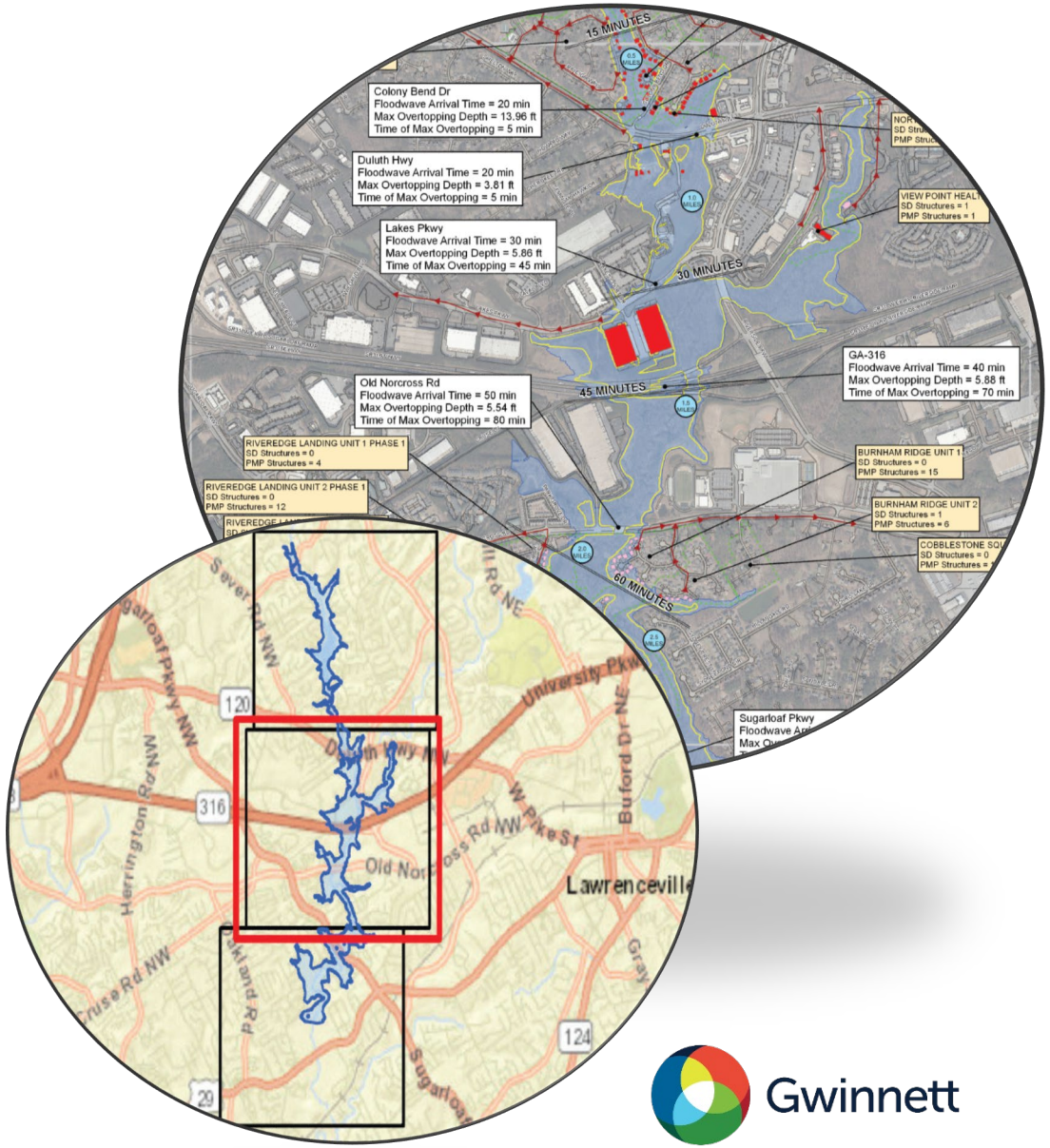
Project Scoping Process

Determining Spheres of Influence

Influence per Dam Characteristics	
Height	40 ft
Drainage Area	1,990 Acres
Storage Volume Behind Dam	1485 Acre-feet
Utility Infrastructure at Risk in Breach Zone	
Water Pressurized Main	2.71 miles of pipe in breach
Stormwater Closed Conduit	3.07 miles of pipe
Sewer	2.16 miles of pipe
Roadway	4.16 miles of roadway
Critical Infrastructure in Breach Area	
Hospitals	0 Known
Schools	0 Known
Police/Fire Station	0 Known
Population at Risks in Breach Zone (Category-1/High Hazard)	
Parcels	616 affected
Development Areas	49 Community/Development areas affected
Houses	60 at risk
Hospitals	0
Schools	0
Parks	1 in breach zone



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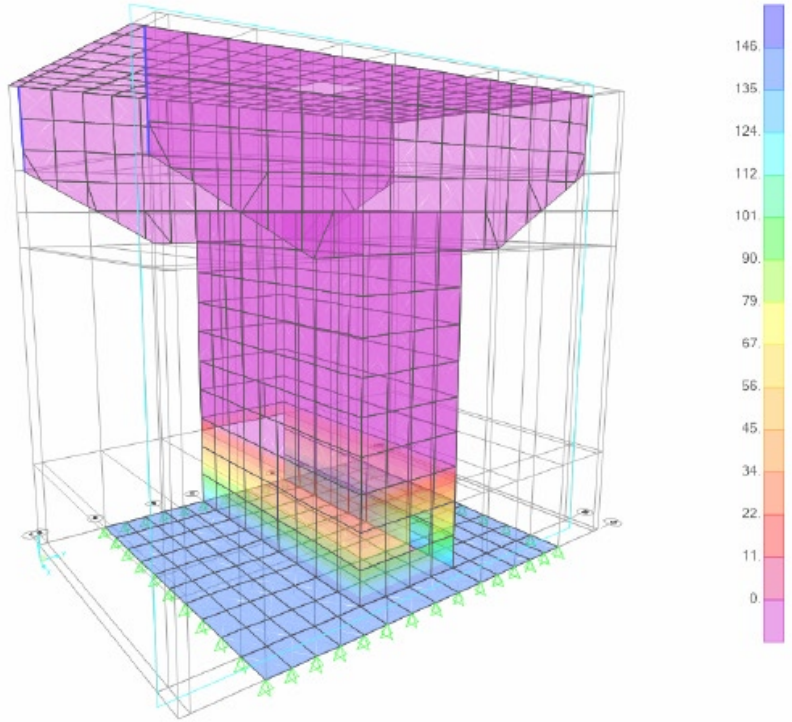
Project Scoping Process

Continuing with Existing Conditions Assessment and Asset Evaluation

- **Mining** existing as-builts and **Record Documents** for intended design state
- **Mining** quarterly visual inspections for **Persistent Maintenance Issues** requiring heavy construction or heavy landscaping
- **Detailed Visual Inspections (VIR)** of dam embankments and outer facets by GA Safe Dams Engineer-of-Record
- **Structural Concrete Condition Assessments**
    - **Underwater Diving Inspections** of risers/outlet control structures
    - **PACP CCTV Analysis** of Principal Spillway Conduits through dams
- **Mechanical Condition Assessment** of low-level gates, valve casings, and stems



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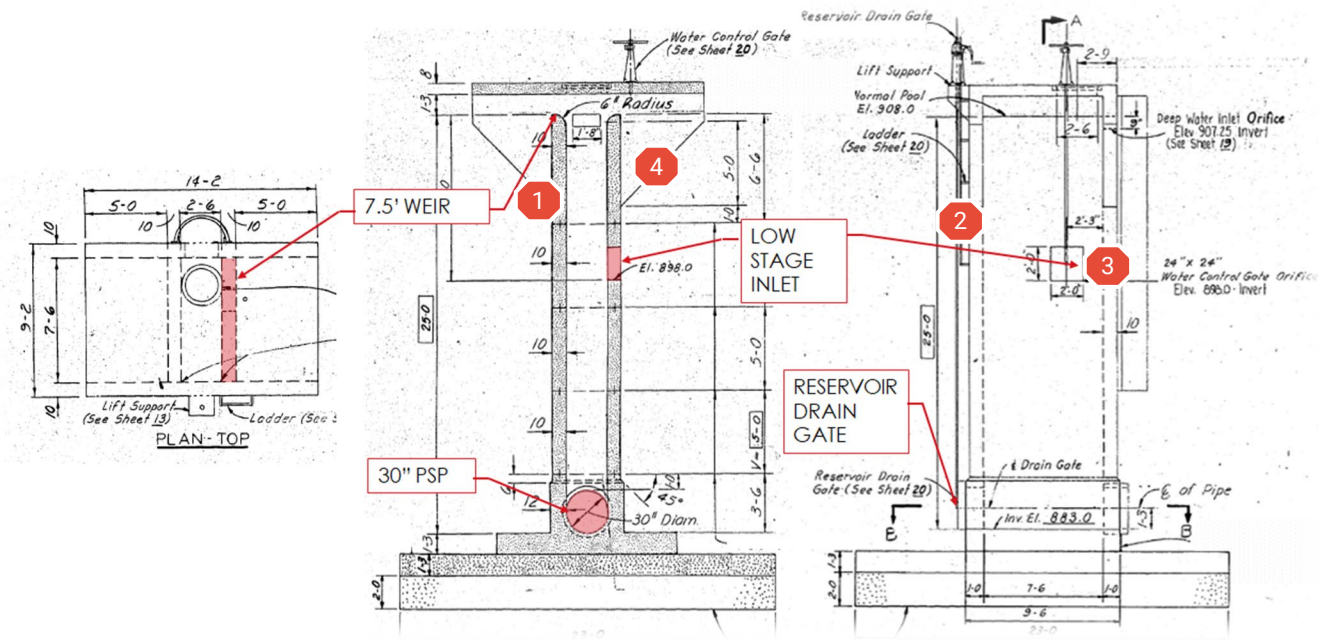
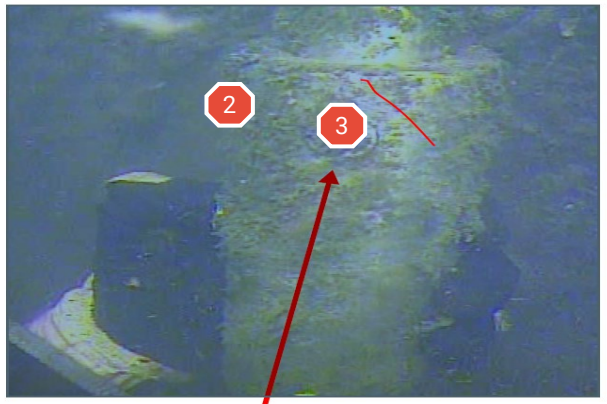
Existing Conditions & Assessment

Existing Conditions & Assessment



1 Horizontal angle-iron anchored to the concrete via J-Bolts. Angle-iron and J-Bolt both showing evidence of heavy corrosion.

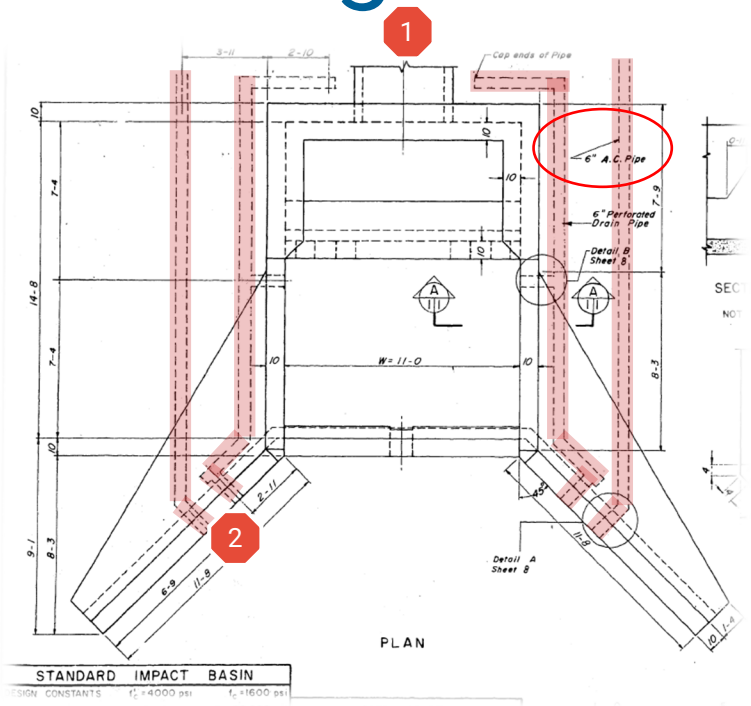


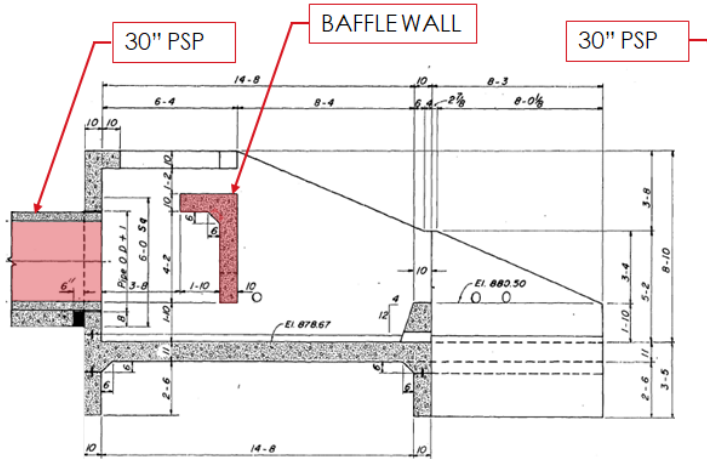
2 Stainless steel valve stem coupler showing 1 of 4 attachment pins.

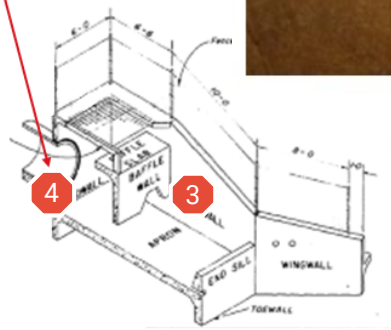
4 Corrugated steel likely used as cover/trash barrier for overflow opening. Showing extreme corrosion and section loss.

3 Wild life gate guides showing heavy corrosion. Guide off set anchors also showing heavy corrosion.

Existing Conditions & Assessment







1

2

3

4

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Condition Matrixing

Dam ID	Gate(s)	Low-Stage Trash Rack	High-Stage Trash Racks	OCS Structure	PSP Outlet	PSP Interior	Safety[1]	Notes
Phase 1 Inspections								
M-7[2]	P	P	F	P	F	F[3]	U	LL gate is leaking; WL gate is inoperable but is not emergency since LL gate is operable.
H-21	P	N/A	P	P/FO	F	F	U	Gate is intact but has heavy corrosion. OCS has high submergence and high "clog-ability".
H-22	P	P	S/F	P	F	F/P	U	Successful rehabilitation of gate is not likely.
TM-1	S/F	P	P	F/P	F	F	U	Cracks and exposed reinforcement in slab. Wildlife gate is in satisfactory condition.
TM-2	F/P	P	P	P	P	P[3]	U	Poorly constructed overall. Low-level gate is in fair condition
Y-14	P	P	S/F	F/P	F	F/P[3]	U	Gate stem bent. Gate has heavy corrosion.
Y-15	P	N/A	P	P/FO	F	P[3]	U	Longitudinal cracks in PSP. OCS has high submergence and high "clog-ability".
Phase 2 Inspections								
M-11[2]	P	N/A	F	F	F	F/P	U	Interior inspection was postponed due to high water.
H-3	P	F	F	P	S/F	P	U	Low-stage trash rack was replaced.
H-25	P	P	F	P	F	F/P	U	Gate was sealed but had more corrosion than most.
N-1	P	P	S/F	P	P	F	U	Leaking gate.
Inverness	S	N/A	F/P	F/P	F	F	S	Most of OCS was fair but the joints were poor.
Y-3	P	P	F/P	P	F/P	P	U	Leaking gate. High-stage trash rack members were fair, but the hardware was poor.
Y-16	F	F/P	F	P	P	F/P[3]	U	Gate replacement is recommended, but the gate was in better condition than most.

Satisfactory/Fair

Satisfactory

Fair

Fair/Poor

Poor/Functionally Obsolete

Unsatisfactory

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Scope Recommendations Common to all Site

Riser	Impact/Stilling Basin(s)	Embankment	Spillway
○ Full in-kind replacement or Upgrades of riser structure (OCS) ○ Updated wildlife gate, corrosions resistant trash rack ○ Access and Safety Improvement (ex: access ladder and safety railings) ○ Reduce likelihood of platform and valve inundation ○ Addition of public caution signage	○ Replacing impact basin baffle block ○ Replace top slab extension ○ concrete point-repairs and riprap replenishment ○ Replace animal guards ○ Replenish Riprap Apron	○ Slope Refurbishment ○ Create buffer zone between toe of dam and encroaching tree line per maintenance standards	Lining Principal Spillway Pipe (PSP)

Project Delivery

Project Scope

Remove unwanted vegetation from dam limits

Y-15 Dam, pre and post removal of unwanted vegetation (2023)

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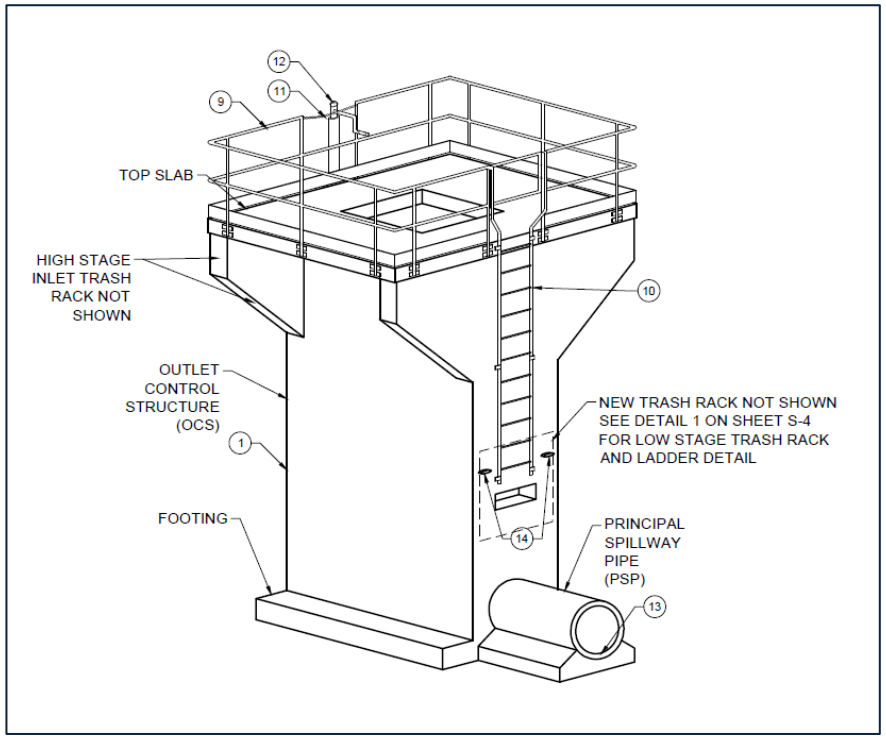
Project Delivery

Project Scope

Replace or repair outlet control structures



H-22 Dam Outlet Control Structure, Structural Inspection Report (2019) and Design Drawings (2023), Stantec

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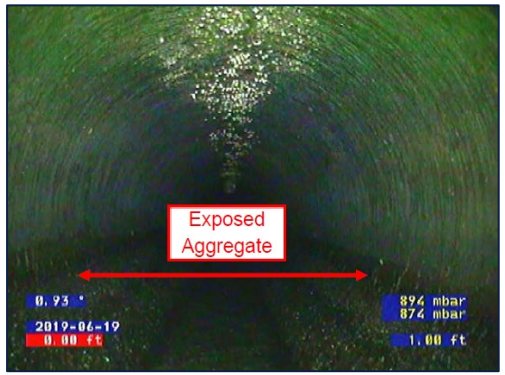
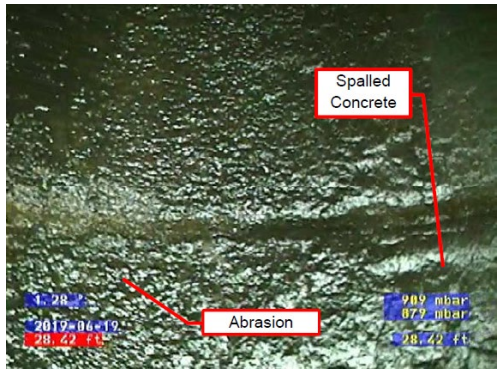
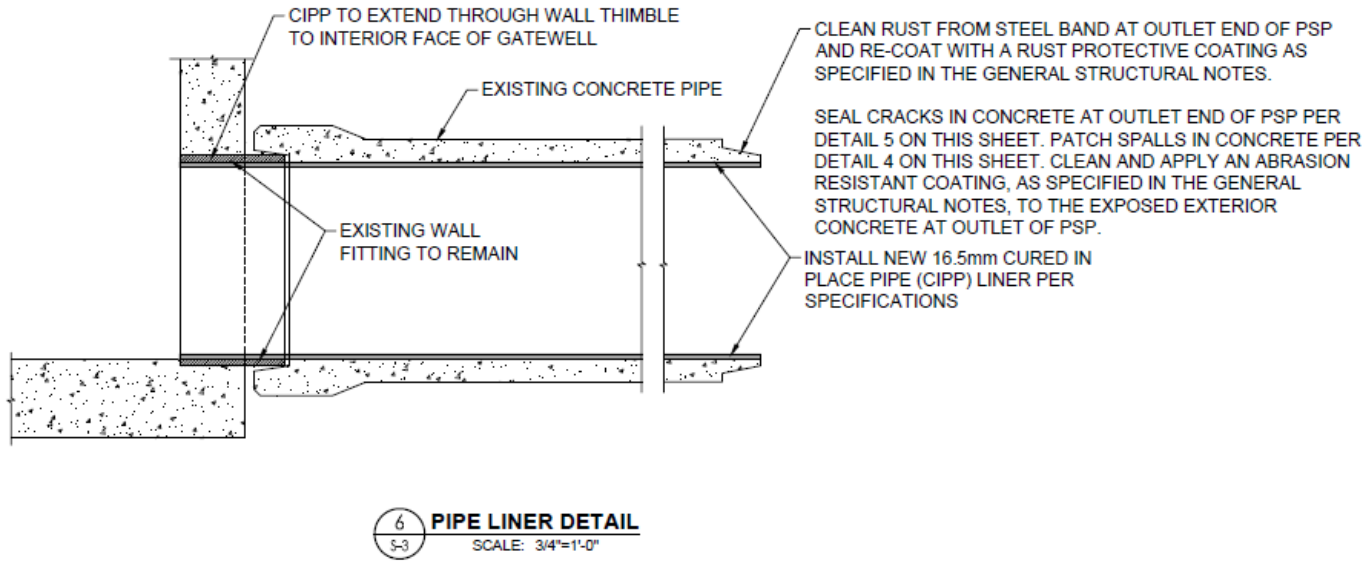
Project Delivery

Project Scope

Line principal spillway pipes (Cast in Place Pipe lining)







H-22 Dam CCTV Inspection conducted by GCDWR (2019), Annotations by Stantec (2019)

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Project Scoping Process

Short-listing and contingency planning

Ranking Based On Condition Matrix

2	N-1	Replace Gate, Repair Structure, Add Remote Actuator
	TM-1	Replace Gate, Repair Structure
	Y-3	Replace Gate, Repair Structure, Add Platform, Line PSP
	Y-14	Replace Gate, Repair Structure, Add Platform, Line PSP
	Y-16	Replace Gate, Repair Structure, Line PSP
3	M-11	Replace Gate, Repair Structure, Add Remote Actuator, Line PSP
4	H-21	Replace Structure
	TM-2	Replace Structure, Line PSP, Replace PSP Impact Basin
	Y-15	Replace Structure, Line PSP
	Y-17	Replace Structure, Line PSP

Ranking Based on Level-of-Effort & Costs

1	H-21	Replace Structure
2	Y-15	Replace Structure; Line PSP
3	TM-2	Replace Structure; Line PSP; Replace PSP Impact Basin
4	Y-17	Replace Structure; Line PSP
5	M-11	Replace Structure, or Replace Gate, Add Remote Actuator, and Repair Structure; Line PSP
6	H-22	Replace Gate, Repair Structure; Add Platform; Line PSP
7	Y-14	Replace Gate; Repair Structure; Add Platform; Line PSP
8	N-1	Replace Gate; Repair Structure; Add Remote Actuator
9	Y-3	Replace Gate; Repair Structure; Add Platform; Line PSP
10	M-7	Replace Gates; Repair Structure; Add Platform

Ranking Based on Compliance & Risk Drivers

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Order	Site	Critical Task(s)
1	H-21	In-operable Gate Valve
2	H-22	In-operable Gate Valve
3	Y-15	In-operable Gate Valve
4	Y-14	Dysfunctional Gate Valve

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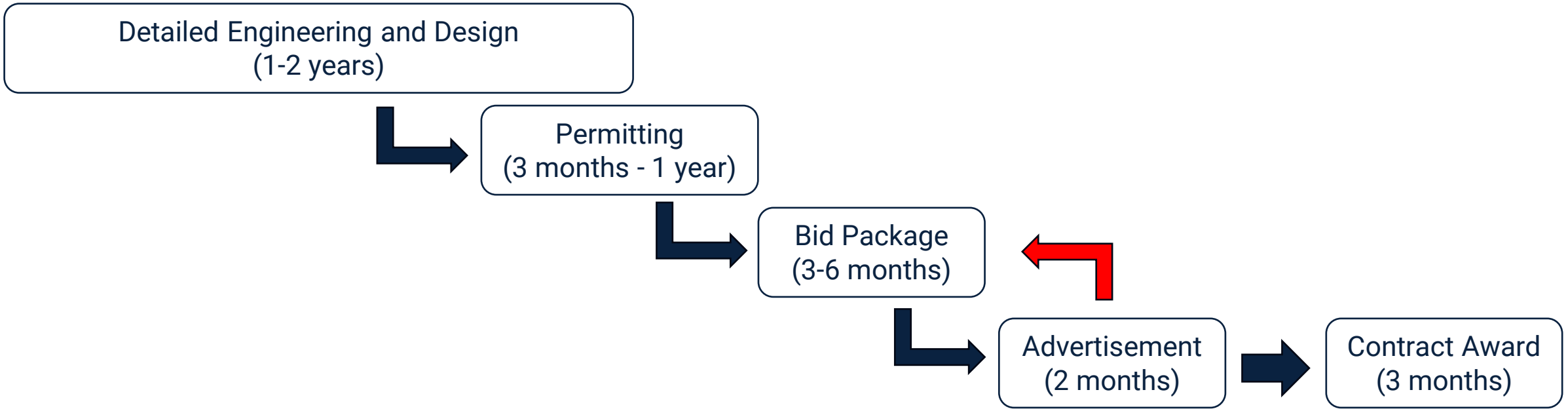
Project Delivery

Project Development Timeline



Total timeframe between 1 – 3.5 years from finalization of scoping until award of contract

- Challenge meeting fund allocation deadline

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Project Delivery

Project Development Timeline

Crashing schedule as much possible to meet ARPA deadlines

- Portions of project delivery timeline that could be shortened
  - Detailed Design (w/ buy-in from Engineer)
    - Weigh risks of accelerated design schedule
  - Specifications & Bid Package Development
    - Perform during detailed design
- Aspects out of direct control
    - Permitting
    - Regulatory entities approval and coordination (NRCS, GA DNR/Safe Dams)
    - Land acquisition and easements
    - Project advertisement and contract administrative timelines

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Project Delivery

Initial Project Development Strategies

Goal: Increase Bid Response

Sites Bid Together Under Single Project
H-3 Dam
H-22 Dam
H-25 Dam
Inverness Dam
M-7 Dam
N-1 Dam
TM-1 Dam
Y-3 Dam
Y-17 Dam
H-21 Dam

Goal: Decrease Design Time

Sites Designed By Stantec
H-3 Dam
H-22 Dam
H-25 Dam
Inverness Dam
M-7 Dam
N-1 Dam
TM-1 Dam
Y-3 Dam
Y-17 Dam

Sites Designed By FNI
Y-15 Dam
H-21 Dam

Sites Designed By Dewberry
Y-14 Dam

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Project Delivery

Initial ARPA Projects (2021 Assumptions)

Project	Initial Engineer's Estimate
Y-15 Dam Outlet Control Structure Replacement	~$800**K**
Combined Dams Outlet Control Structure Maintenance	~5.0**M**
TM-2 Dam Outlet Control Structure Replacement	~$1.0**M**
Rhodes Jordan Dam Siphon Construction	~400**K**

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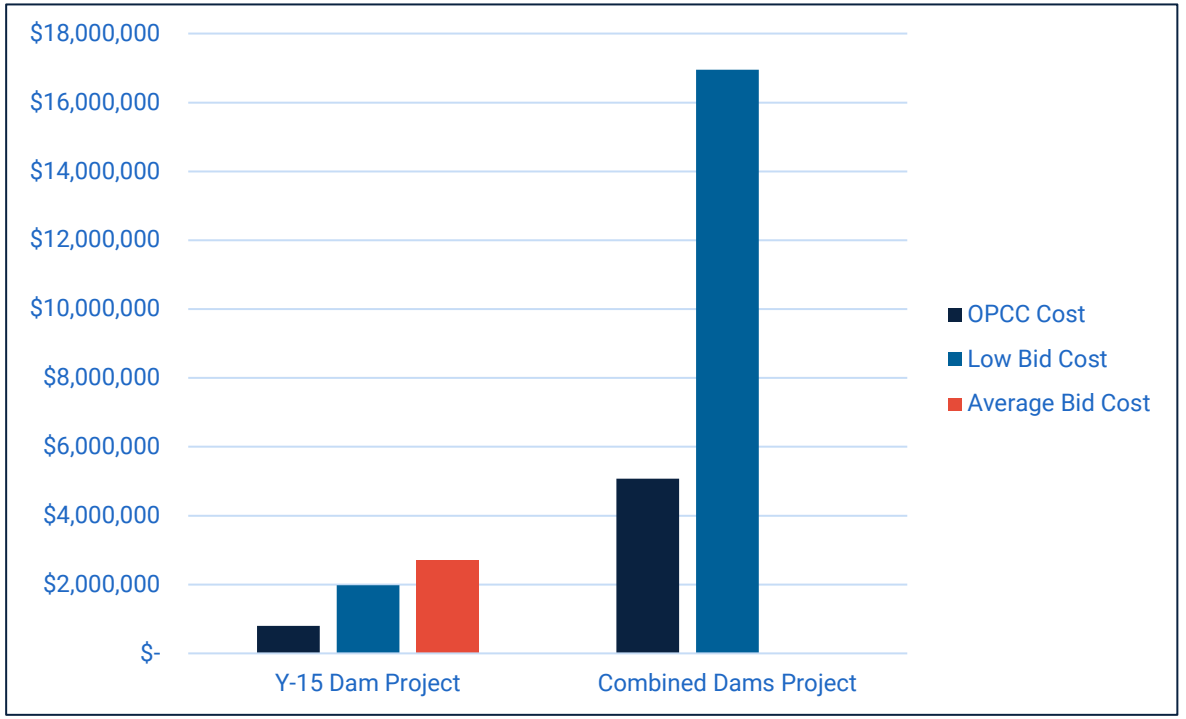
Project Delivery

Initial Price Feedback

Y-15 Project Bids: May 2023

Combined Dams Project Bids: August 2023

- Large cost increases observed from data utilized in cost estimate preparation (pre COVID era costs)
- Only 1 Bid received Combined Dams



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Project Delivery

Bid Comparison

Bid Item	Initial Estimate Unit Price	Average Bid Unit Price
Full Lake Lowering/Dewatering	~$100**K** (lump sum)	~$500**K** (lump sum)
Partial Lake Lowering/Dewatering	~$5**K** (lump sum)	~$130**K** (lump sum)
Mobilization	~$40**K** (per site)	~$160**K** (per site)
CIPP Lining	~$300 (linear foot)	~$1000 (linear foot)

Price increases observed across the board

- Observed prices from projects ~3 years ago outdated

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Project Delivery

Direct Feedback

Feedback from Combined Dams Project	Project Delivery Update
Contractor Schedule Constraints	Break project portfolio into smaller groups
Perceived risk in water control portion of projects	Ease project schedule constraints
Request for greater breakdown of project costs	Revise bid schedule strategies

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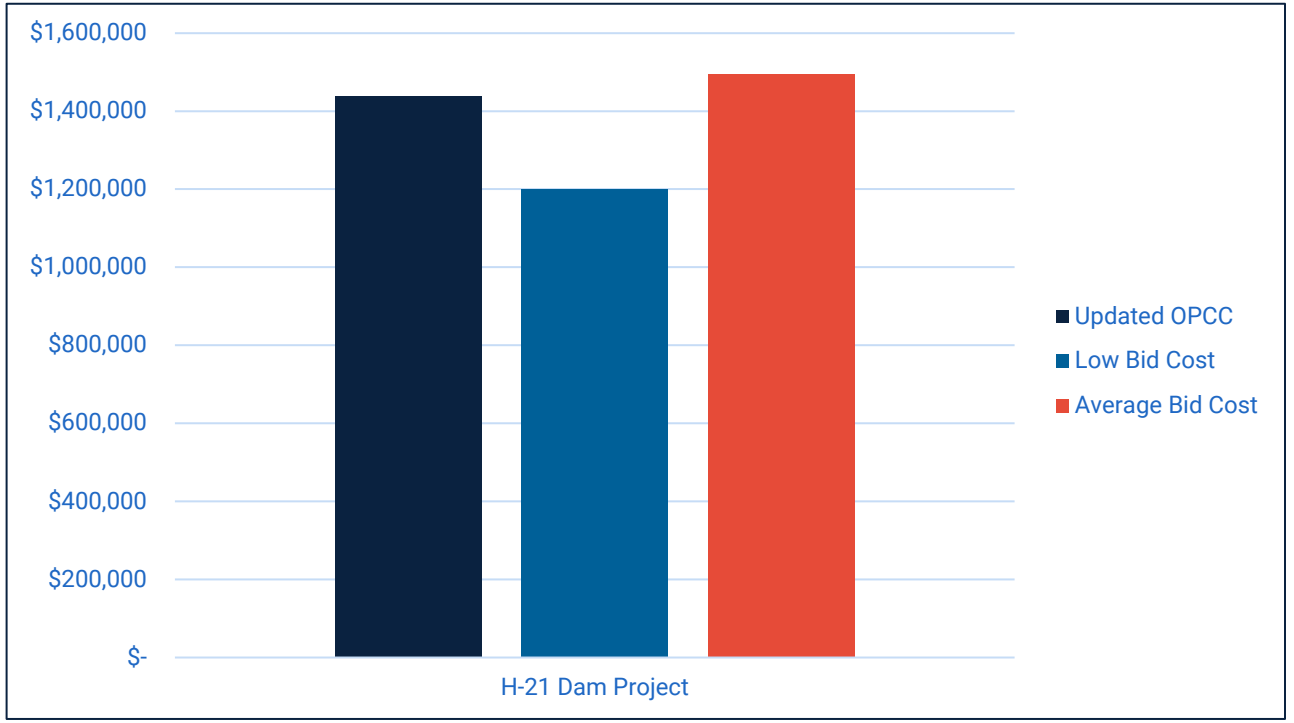
Current Status

Revised OPCC Comparison

H-21 Project Bids: January 2024

- Slightly better price
- Increased bid response



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Current Status

Revised ARPA Projects (Current Plan)

Project	Current Contract/Estimate
Y-15 Dam Outlet Control Structure Replacement	Finalized contract $2.0**M**
H-21 Dam Outlet Control Structure Maintenance	Finalized contract $1.2**M**
H-3, H-22, and H-25 Dams Outlet Control Structure Maintenance	Contract to be finalized July 2024
Y-14 Dam Spillway Maintenance	Currently Out for Bid

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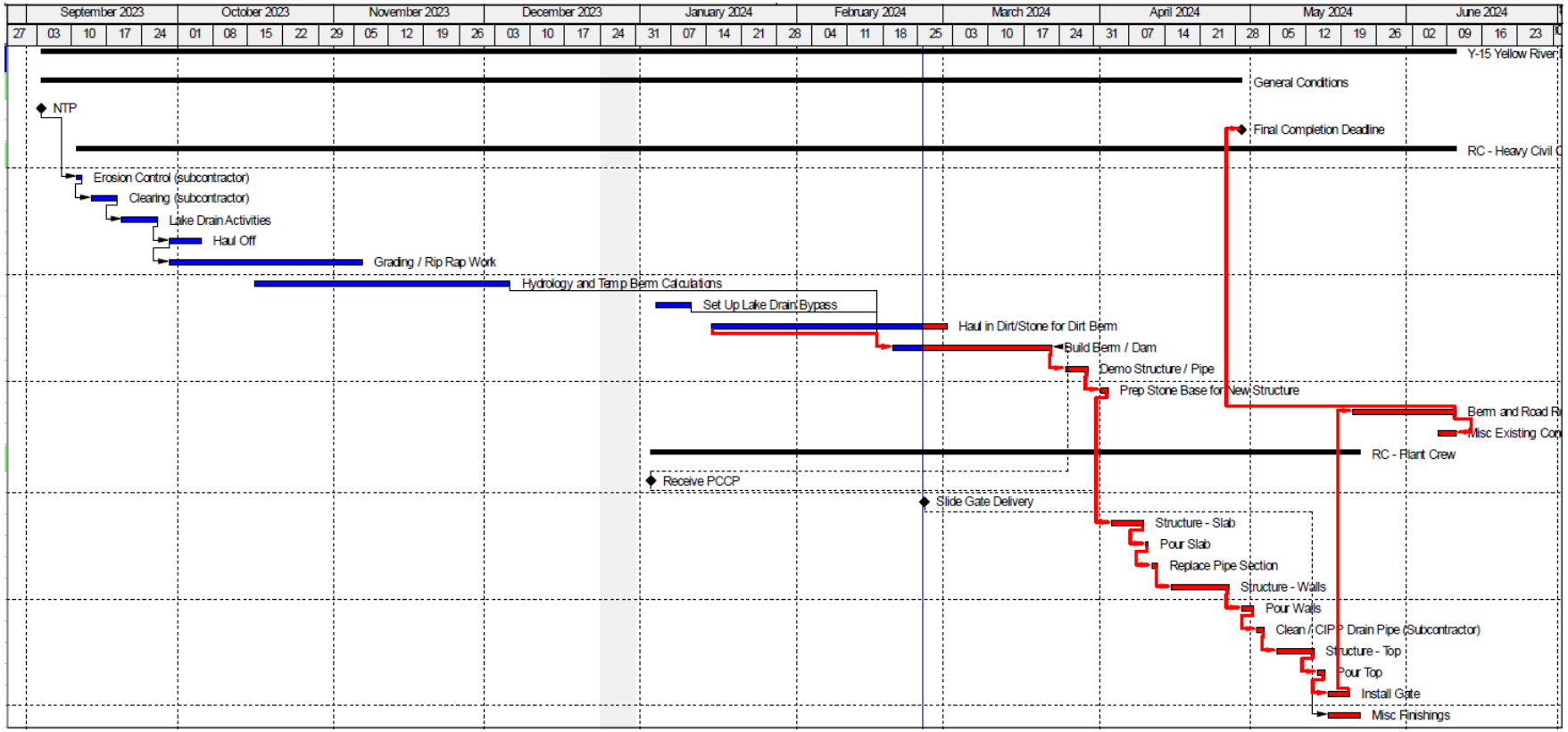
Current Status

Construction Schedules

Individual project timeframes under 1 year

- Understand potential for material procurement delays



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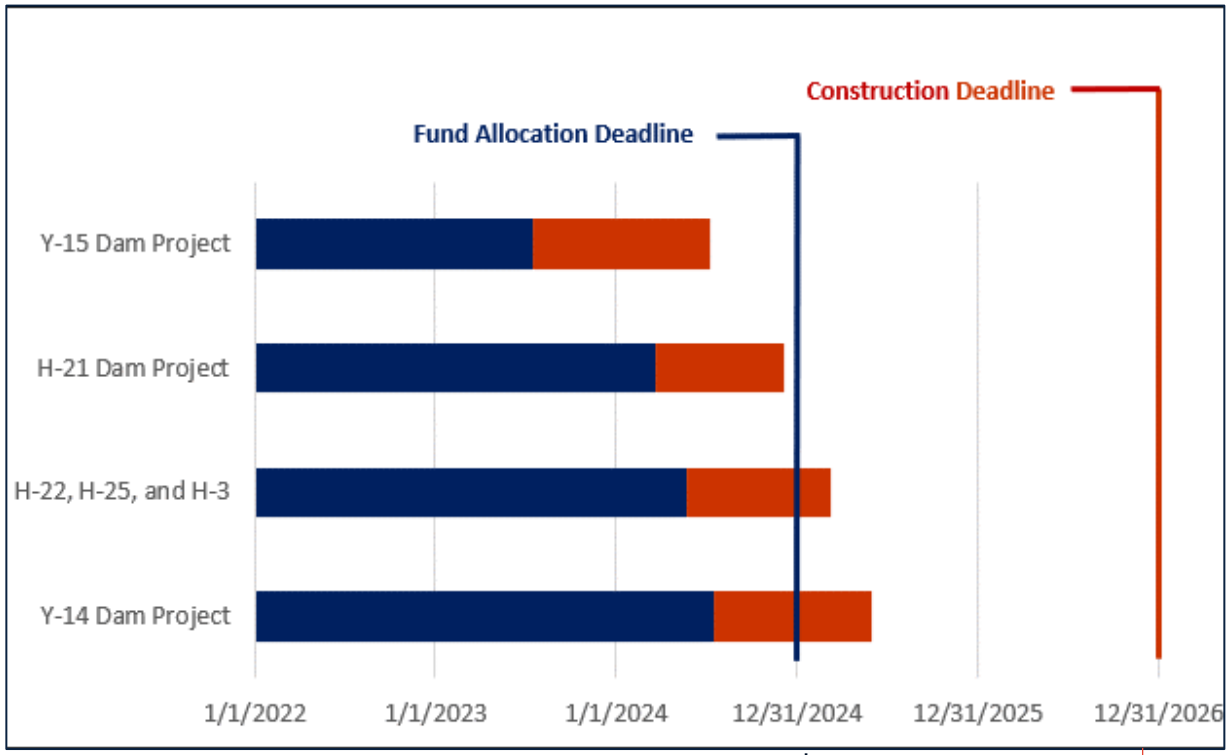
Current Status

Project Schedules



Fund Allocation Deadline

Construction Completion Deadline

Gwinnett County DWR on track to utilize full amount of ARPA grant money allocated for dams projects

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Conclusions

Lessons learned for successful utilization of grant funds:

- Maintain capability and knowledge base necessary to obtain grant funds
- Know the current needs of your stormwater systems before you are under grant schedule constraints
- Understand the challenges presented by grant utilization criteria
- Be ready to expedite portions of project delivery
- Be flexible with project delivery strategies
- Utilize all available feedback to improve project delivery processes

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Thank You!

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Engineer V, Engineering and Construction Stormwater Group

Mr. Grimes is a civil engineering professional with over 13 years experience in the analysis, design, and operation of dams and stormwater systems. He holds a bachelor's degree in civil engineering from Georgia Tech and a master's degree in environmental engineering from the Hamburg Technical University.

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Brandon Harris, PE

Gwinnett County - Department of Water Resources
Dams Program Manager - Stormwater Technical Services

Mr. Harris is a civil engineering professional with over 15 years experience in project management, H&H modeling, CFD, statistical data analysis, stormwater infrastructure design, inspection of dams, emergency response, and program management of stormwater municipal assets. He holds a bachelor's degree in Civil & Environmental Engineering from Georgia Tech.

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