

ARROWHEAD LAKE COMMUNITY ASSOCIATION



**INCREASING CONVEYANCE CAPACITY AT
NORTH ARROWHEAD LAKE DAM
NOVEMBER 4, 2023**



NORTH ARROWHEAD LAKE - MAIN EMBANKMENT



OWNERSHIP OF THE DAM

North Arrowhead Lake was constructed in 1970 as a recreational structure by the All-American Realty Co. who owned numerous dams in the area.

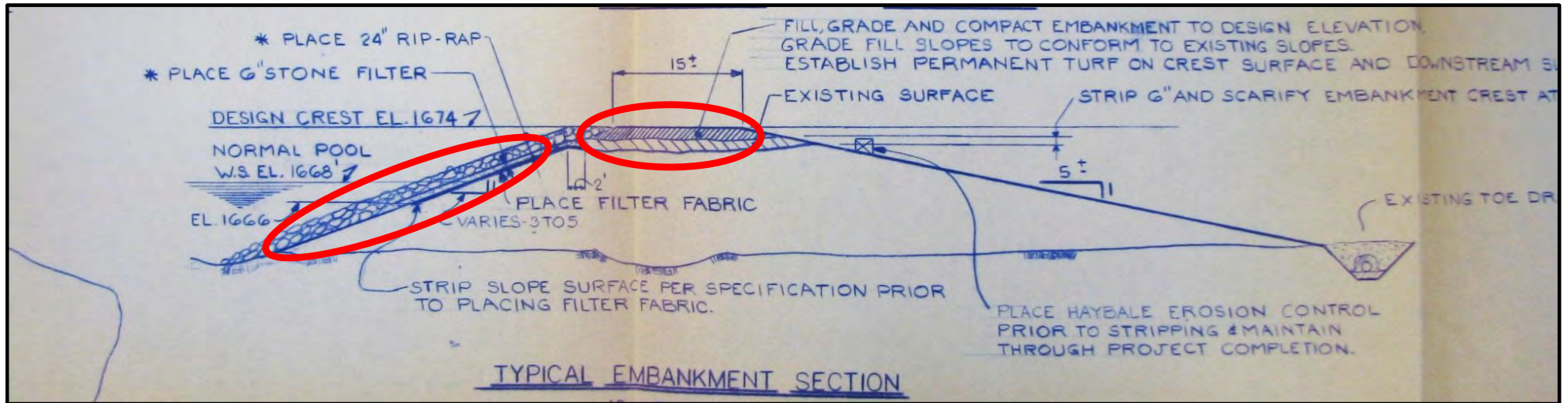
In 1982 All-American Realty Co. filed for bankruptcy.

Ownership was transferred to the Association on August 6, 1984.



Photograph of upstream face of main embankment from 1985 inspection

1987 IMPROVEMENTS



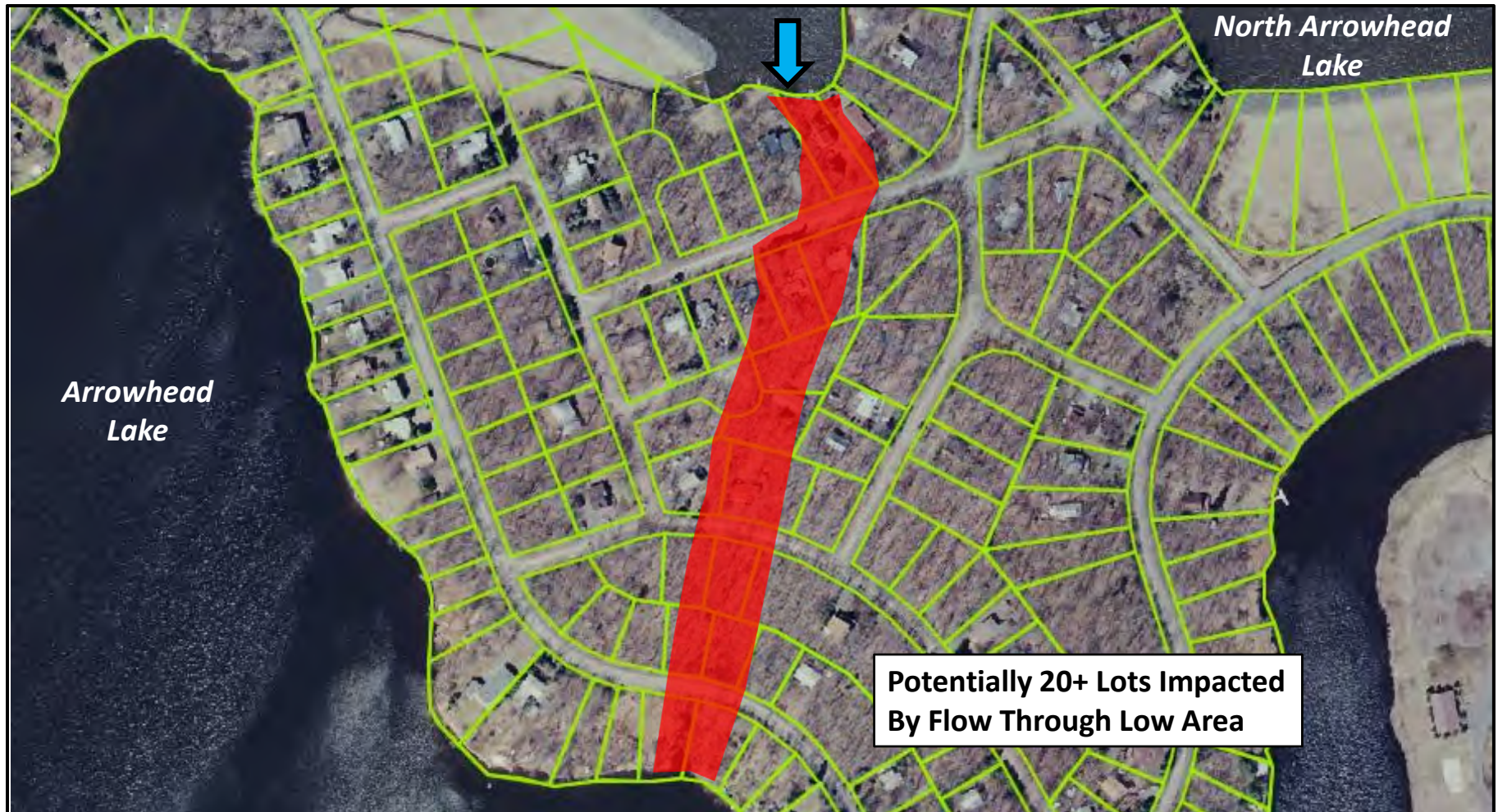
2008 REPLACEMENT OF LOW-LEVEL OUTLET WORKS



NATURAL LOW AREA



LOW AREAS AT LOTS 12, 13, 14 AND 15



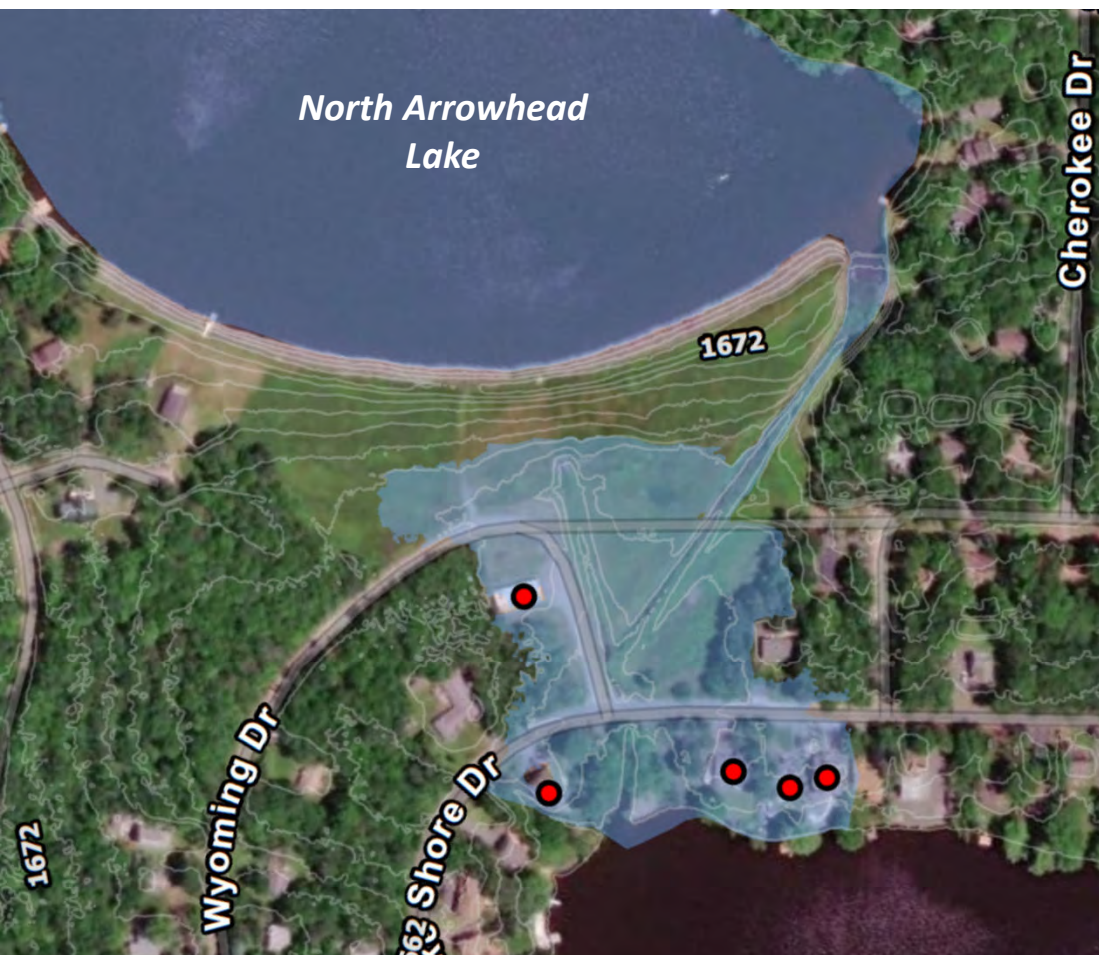
CLASSIFICATION OF DAMS - HAZARD POTENTIAL CATEGORY

CATEGORY	POPULATION AT RISK	ECONOMIC LOSS
1 HIGH	Substantial - Numerous homes, businesses or schools	Excessive - Residential, Commercial or agricultural damage or substantial public inconvenience
2	Few – Small number of homes or small businesses	Appreciable – Limited residential, commercial or agricultural damage or moderate public inconvenience
3	None expected – No permanent structures for human habitation or employment	Significant damage to private or public property and short duration public inconvenience
4 LOW	None expected – No permanent structures for human habitation or employment	Minimal damage to private or public property and no significant public inconvenience



DOWNSTREAM INUNDATION AREA

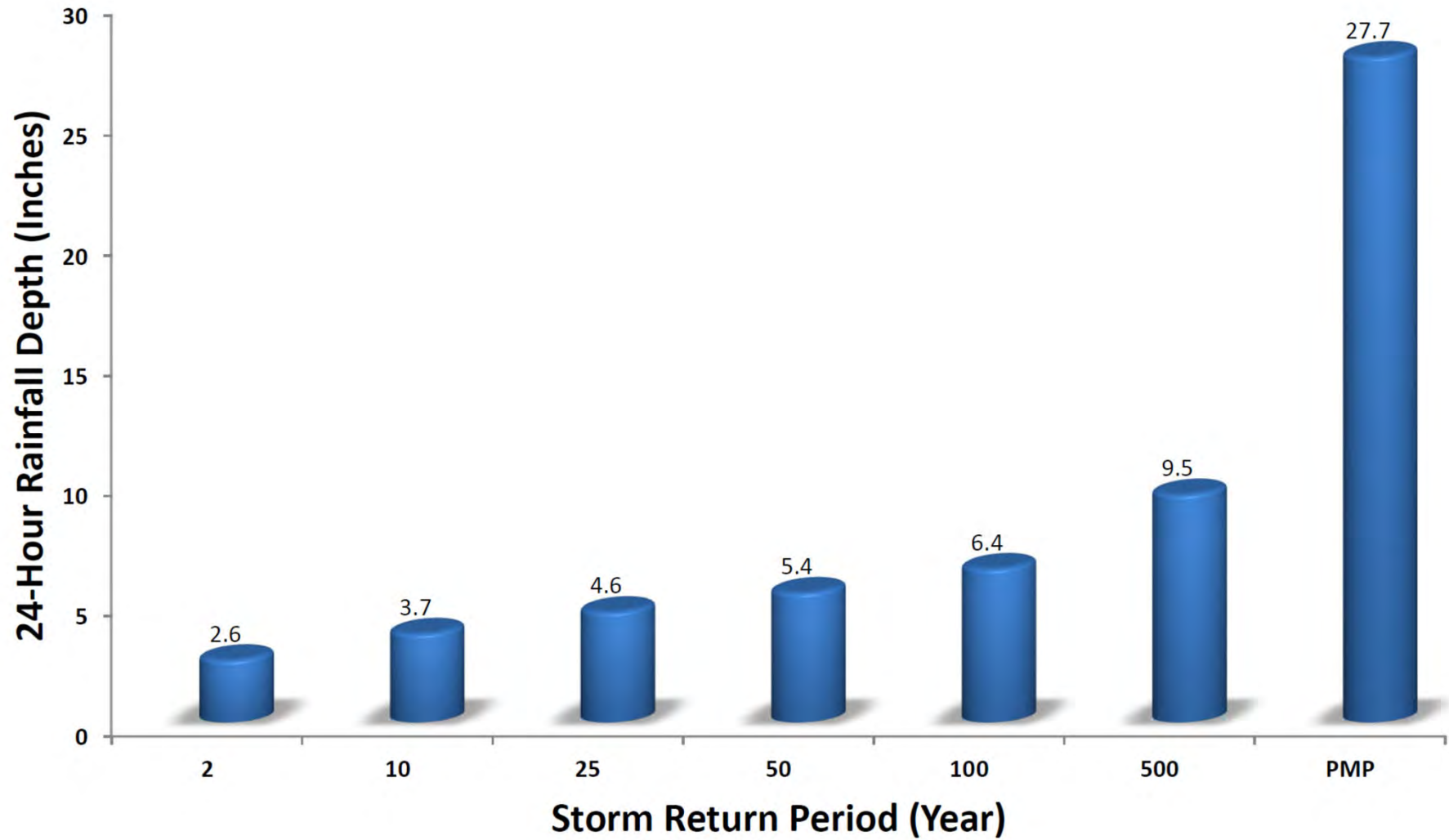
MAIN EMBANKMENT



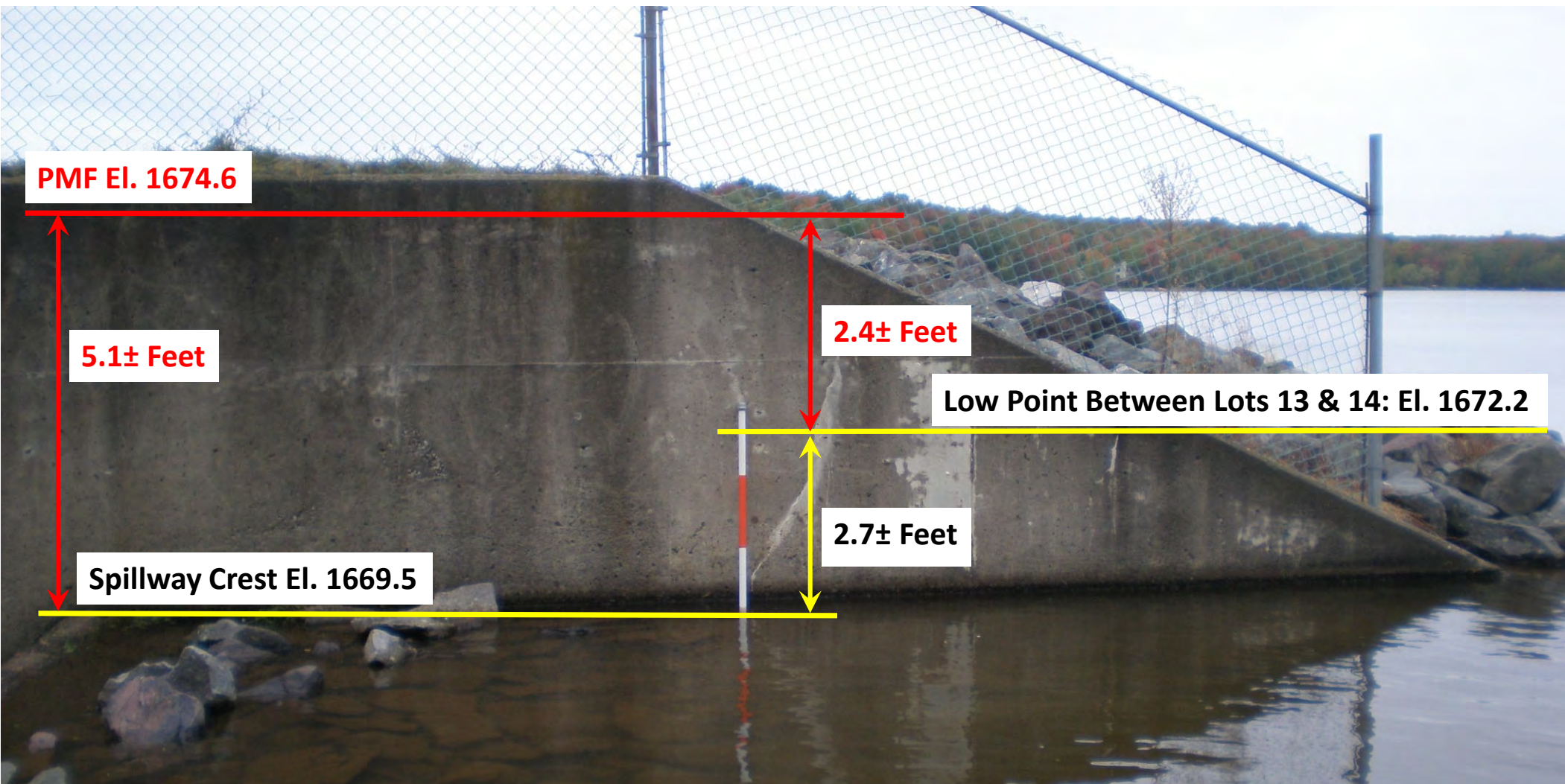
DIKE EMBANKMENT



PROBABLE MAXIMUM PRECIPITATION (PMP)



PERFORMANCE OF EXISTING DAM



INCREASE CONVEYANCE CAPACITY WITH LABYRINTH SPILLWAY



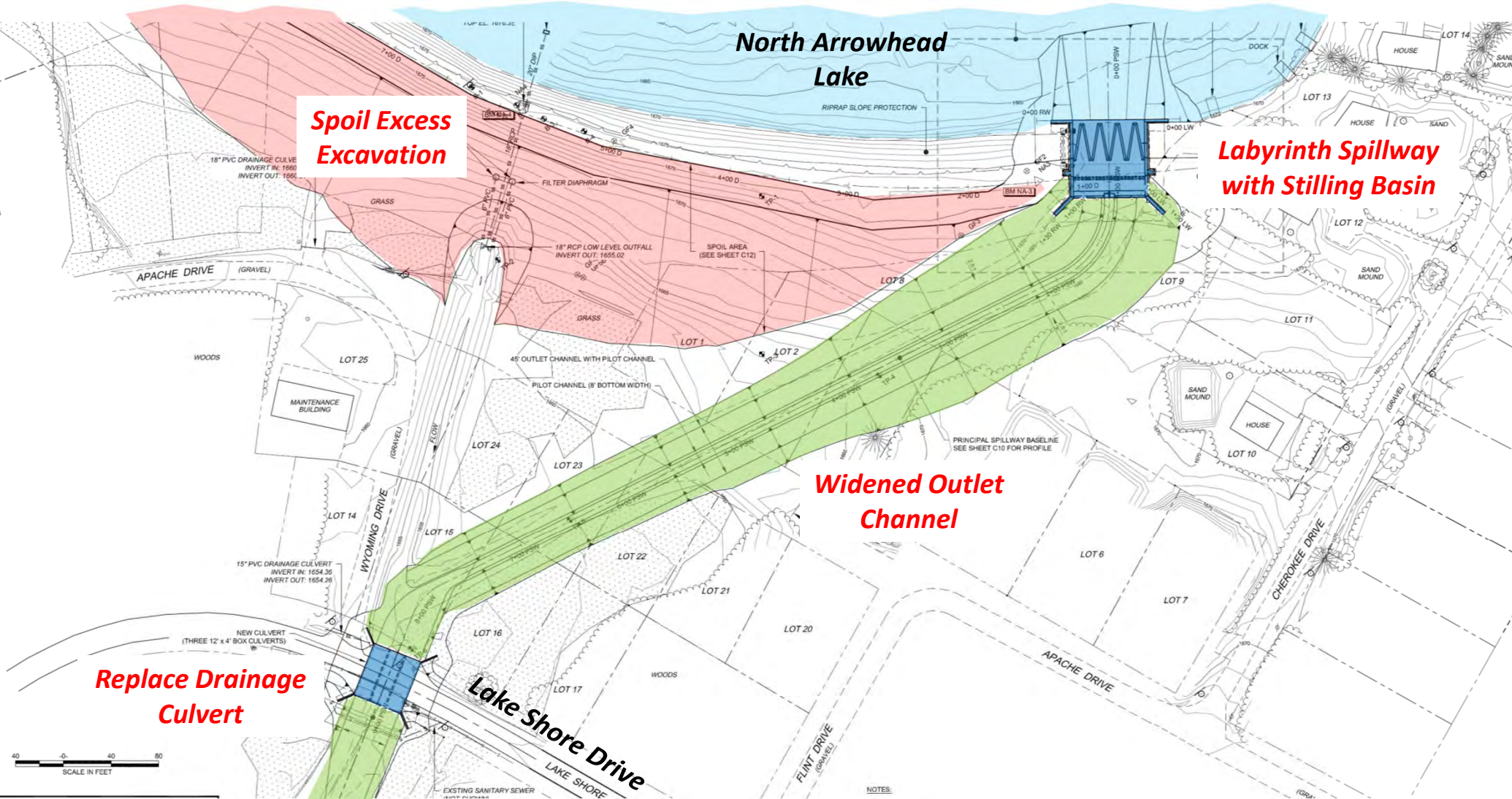
Lake Scranton Dam, Lackawanna County, PA

INCREASE CONVEYANCE CAPACITY WITH LABYRINTH SPILLWAY

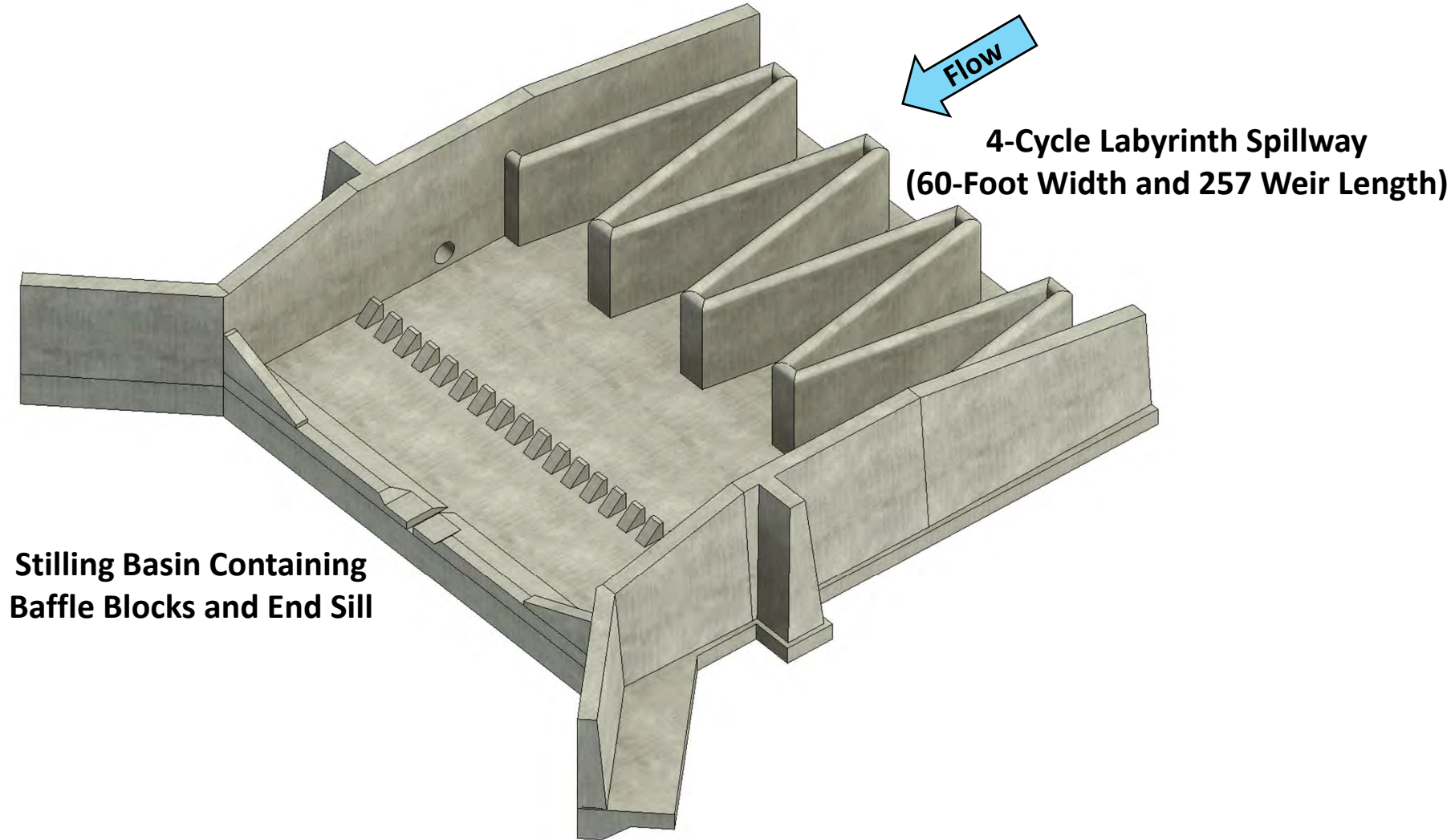


Lake Scranton Dam, Lackawanna County, PA

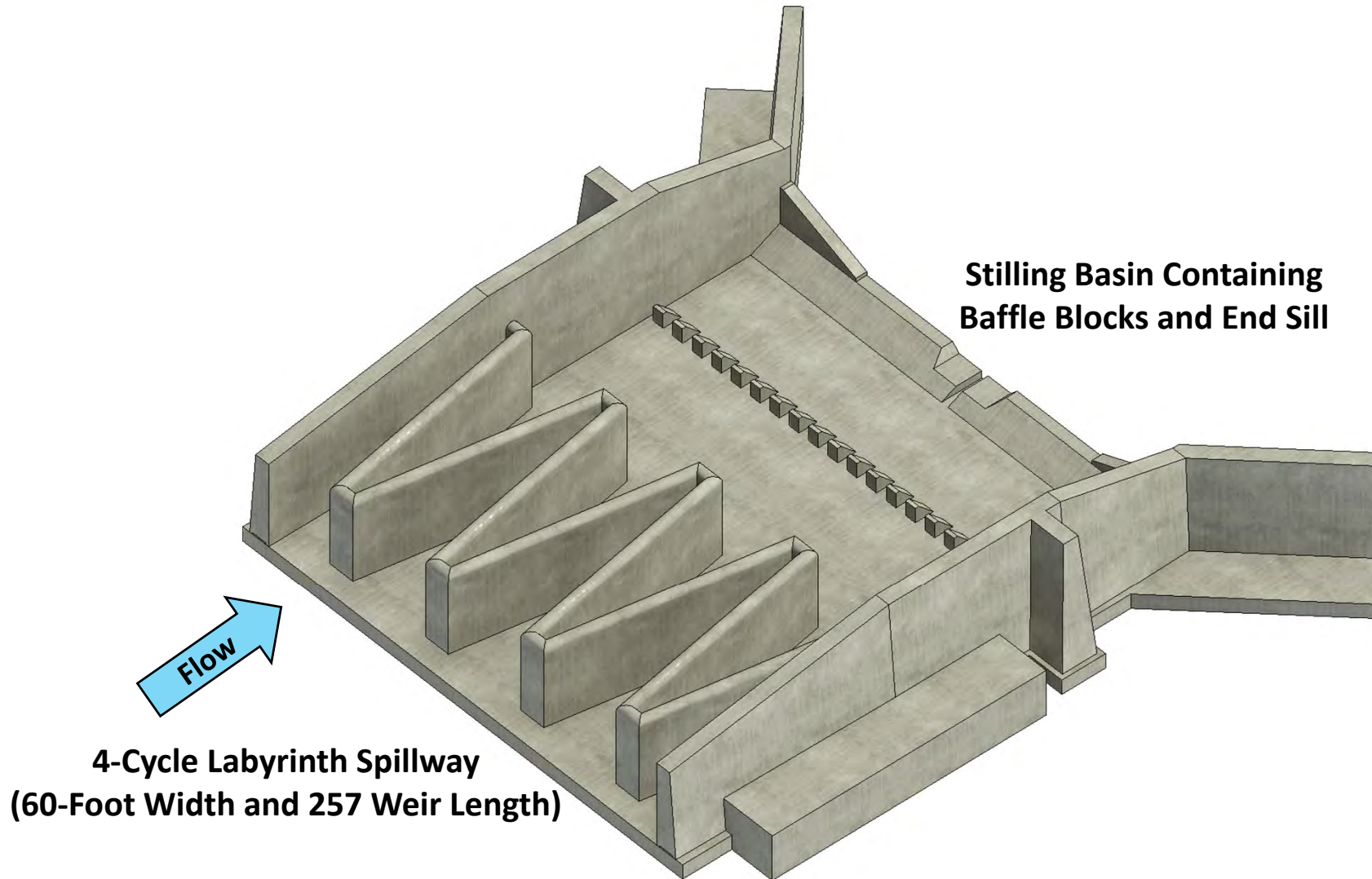
PROPOSED IMPROVEMENTS



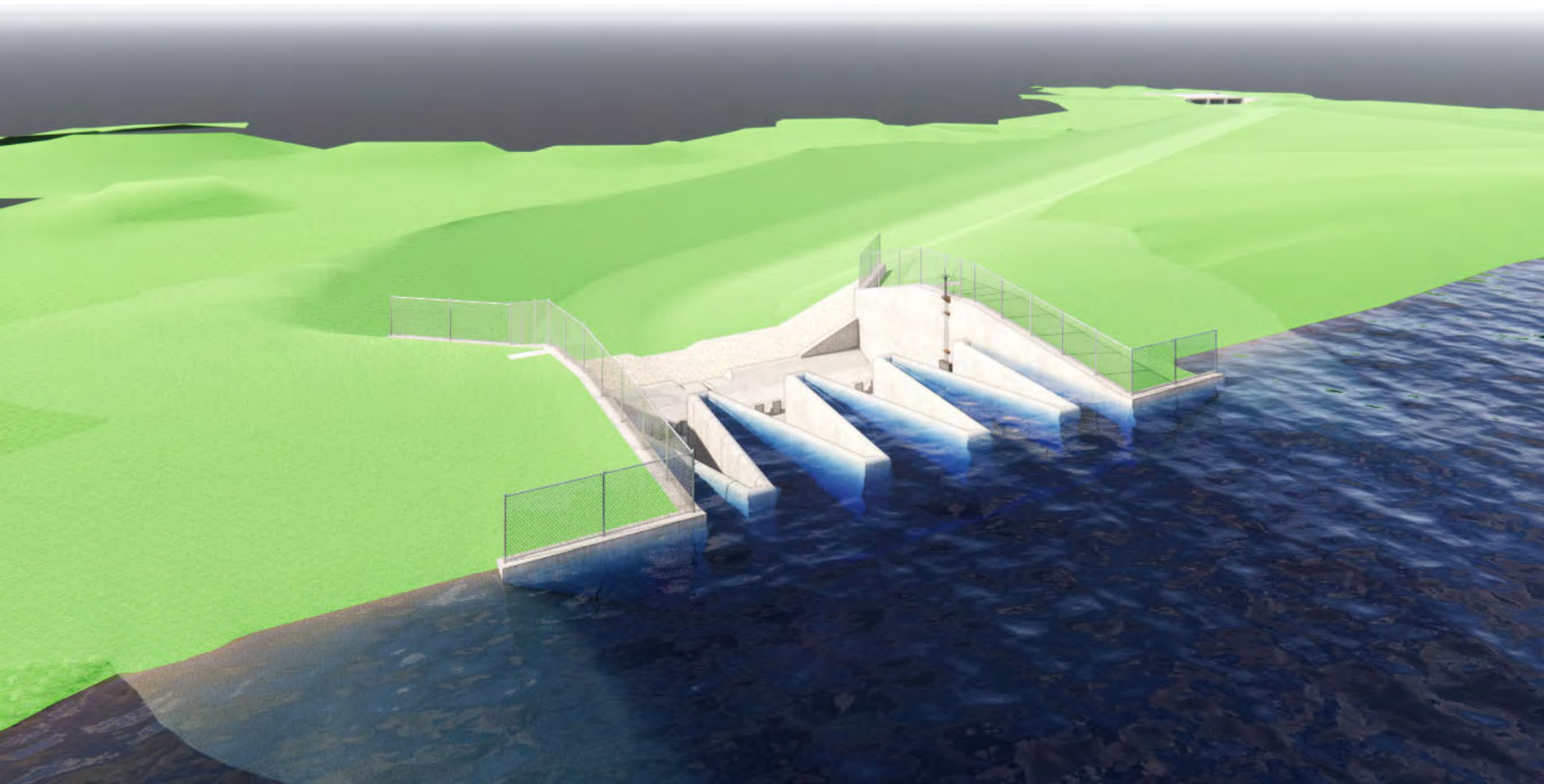
LABYRINTH SPILLWAY AND STILLING BASIN



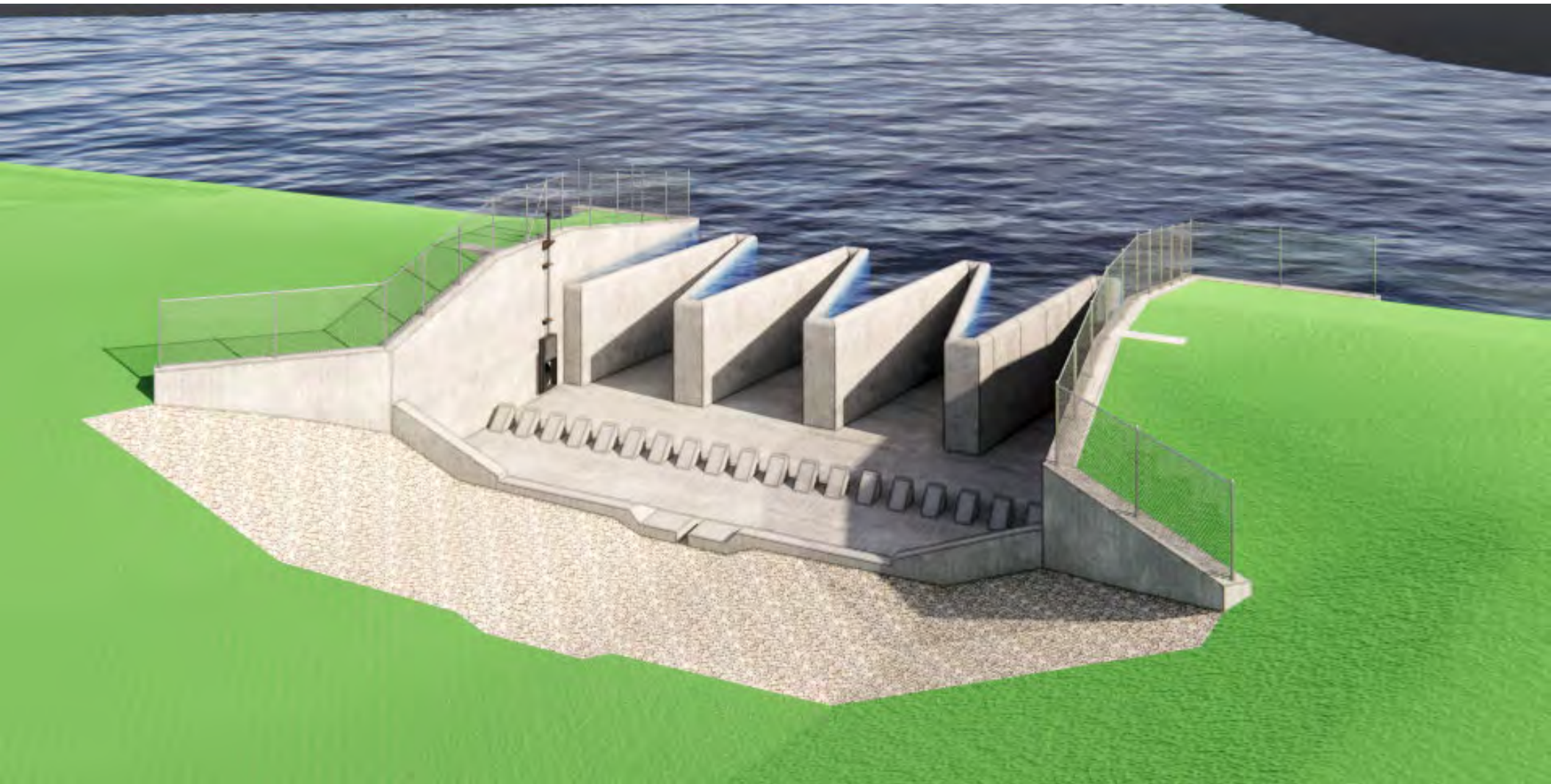
LABYRINTH SPILLWAY AND STILLING BASIN



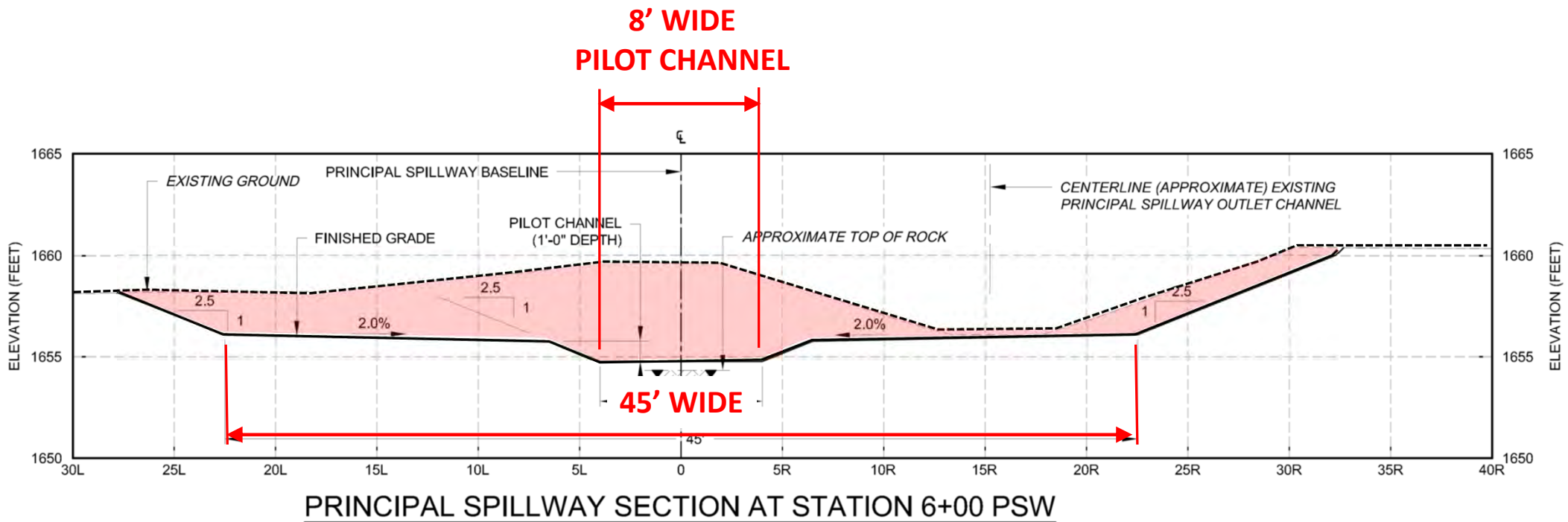
LABYRINTH SPILLWAY AND STILLING BASIN



LABYRINTH SPILLWAY AND STILLING BASIN



PRINCIPAL SPILLWAY OUTLET CHANNEL



PRINCIPAL SPILLWAY OUTLET CHANNEL



Lyman Run Dam, Potter County, PA

PRINCIPAL SPILLWAY OUTLET CHANNEL



Lyman Run Dam, Potter County, PA

DRAINAGE CULVERT UNDER LAKE SHORE DRIVE



Replace Two 39"x56" CMP Arch Culverts with Three 12' x 4' Concrete Box Culverts

SPOIL EXCESS EXCAVATION



ESTIMATE OF PROBABLE CONSTRUCTION COSTS

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Amount
Mobilization & Demobilization					\$265,482
1.	Mobilization & Demobilization				
	a. General Mob/Demob (~7% of Contract Price)	1	LS	XXX	\$206,482
	b. Bonds & Insurances (~2% of Contract Price)	1	LS	XXX	\$59,000
Pre-Construction Activities and Establishment of Site Access					\$68,900
2.	Establishment of Site Access and Demolition Activities				
	a. Clearing and Grubbing	0.10	AC	12,000.00	\$1,200
	b. Individual Tree Removal	13	EA	700.00	\$9,100
	c. Aggregate for Access Road (Temporary Construction Road)	325	CY	50.00	\$16,250
	d. Geotextile for Access Road (Temporary Construction Road)	1,950	SY	3.00	\$5,850
	e. Traffic Control Signage, Flagmen, Etc.	1	LS	2,500.00	\$2,500
	f. Relocate Private Dock (Lot 12)	1	LS	5,000.00	\$5,000
	g. Temporary Stream Crossing (Off of Wyoming Drive)	1	EA	4,000.00	\$4,000
3.	Field Surveys				
	a. Construction Stakeout, Quantity Verification, As-Builts, Etc.	1	LS	25,000.00	\$25,000
Erosion Control and Management of Water					\$501,500
4.	Miscellaneous Erosion Control Measures				
	a. Rock Construction Entrance (Assume 1)	1	EA	4,000.00	\$4,000
	b. Compost Filter Sock (Assumed Length)	1,500	LF	5.00	\$7,500
	c. Sediment Traps (Assume 2)	2	EA	45,000.00	\$90,000
5.	Management of Water				
	a. Temporary Cofferdam (Assume Port-a-Dam) & Water Diversion	1	LS	250,000.00	\$250,000
	b. Dewatering of Work Area (i.e., Spillway Foundation)	1	LS	150,000.00	\$150,000
Labyrinth Spillway and Outlet Channel Improvements					\$2,054,841
6.	Demolition Activities				
	a. Strip and Salvage Riprap from Dam Embankment	400	CY	10.00	\$4,000
	b. Strip Organic Material (Assume 6" Depth)	1,315	CY	10.00	\$13,150
	c. Demolish Existing Concrete Spillway	1	LS	10,000.00	\$10,000
7.	Concrete Labyrinth Spillway, Approach and Discharge Channels				
	a. Excavation (Soil)	11,255	CY	10.00	\$112,550
	b. Excavation (Rock - Assume 20% of Total Excavation)	3,200	CY	50.00	\$160,000
	c. Earth Backfill Around Structures (Approved Fill)	4,570	CY	15.00	\$68,550
	d. Cast-in-Place Concrete (Slabs)	420	CY	500.00	\$210,000
	e. Cast-in-Place Concrete (Walls)	460	CY	1,000.00	\$460,000
	f. Ductile Iron Pipe Encasement	45	CY	550.00	\$24,750
	g. 30" Ductile Iron Pipe	45	LF	200.00	\$9,000
	h. Steel Reinforcement (at 150 lbs per cy of concrete)	138,750	LBS	2.00	\$277,500
	i. Foundation Preparation	600	SY	50.00	\$30,000
	j. Allowance for Over-Excavation & Concrete Backfill	1	LS	50,000.00	\$50,000
	k. Foundation Anchors	11	EA	2,500.00	\$27,500
	l. Topsoil Placement (Assume 6" Thickness)	1,140	CY	45.00	\$51,300
	m. Riprap Scour Protection	370	CY	110.00	\$40,700
	n. Handrail / Fencing (Left and Right Spillway Training Walls)	200	LF	60.00	\$12,000
	o. Low-Level Dewatering Gate & Trash Rack	1	LS	70,000.00	\$70,000
8.	Spoil Excess Material (Assume on Downstream Embankment)				
	a. Strip Topsoil (Assume 6" Thickness)	1,900	CY	10.00	\$19,000
	b. Spoil Excess Material	9,994	CY	10.00	\$99,941
	c. Topsoil Placement (Assume 6" Thickness)	1,900	LF	45.00	\$85,500
	d. Raise Observation Ports & Piezometer Casings	1	LS	2,500.00	\$2,500

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Amount
9.	Drainage Improvements				
	a. Triple Cell Box Culvert	46	LF	3,000.00	\$138,000
	b. Box Culvert Wingwalls	4	EA	7,500.00	\$30,000
	c. Guide Rail at Box Culvert	120	LF	50.00	\$6,000
	d. Riprap Outlet Protection	90	CY	110.00	\$9,900
	e. Asphalt Pavement at Box Culvert	180	SY	50.00	\$8,000
	f. Utility Relocations (Sanitary Sewer)	1	LS	25,000.00	\$25,000
Miscellaneous Activities					\$24,500
10.	Removal of Temporary Facilities				
	a. Compost Filter Sock	1,500	LF	1.00	\$1,500
	b. Sediment Traps	2	EA	500.00	\$1,000
	c. Gravel Access/Construction Roads	325	CY	10.00	\$3,250
11.	Site Stabilization				
	a. Seed and Mulch Disturbed Areas	5	AC	3,750.00	\$18,750
Out-of-Scope Items					\$300,000
12.	Grout Curtain at Labyrinth Spillway				Allowance of \$100,000 to \$200,000
13.	Dual Aggregate Toe Drain (Assume 650' LF)				Allowance of \$80,000 to \$100,000
Total Construction Cost (Items Nos. 1 through 13, inclusive):					\$3,215,223
Contingency (Assume 20%):					\$643,000
Estimated Construction Costs for Labyrinth Spillway and Outfall Channel Improvements:					\$3,858,223
Estimate of Engineering Costs					\$410,000
12.	Bid and Construction Phase Services				
	a. Bid Phase Services	1	LS	30,000.00	\$30,000
	b. Construction Phase Services (assume 6 months of onsite observation)	1	LS	380,000.00	\$380,000
Estimated Costs (Construction and Associated Engineering):					\$4,268,223

Estimated Construction Cost: \$3.2 Million to \$3.9 Million
(Excludes Bidding and Construction Observation Costs)

NEXT STEPS

Currently in Final Design Phase

Hold Pre-Application Meeting with Reviewing Agencies

Submit Permit Applications in Early 2024

Dedicate 2024 for Permit Reviews

Construction Could Begin in 2025 Pending Permit Review Time

QUESTIONS

