

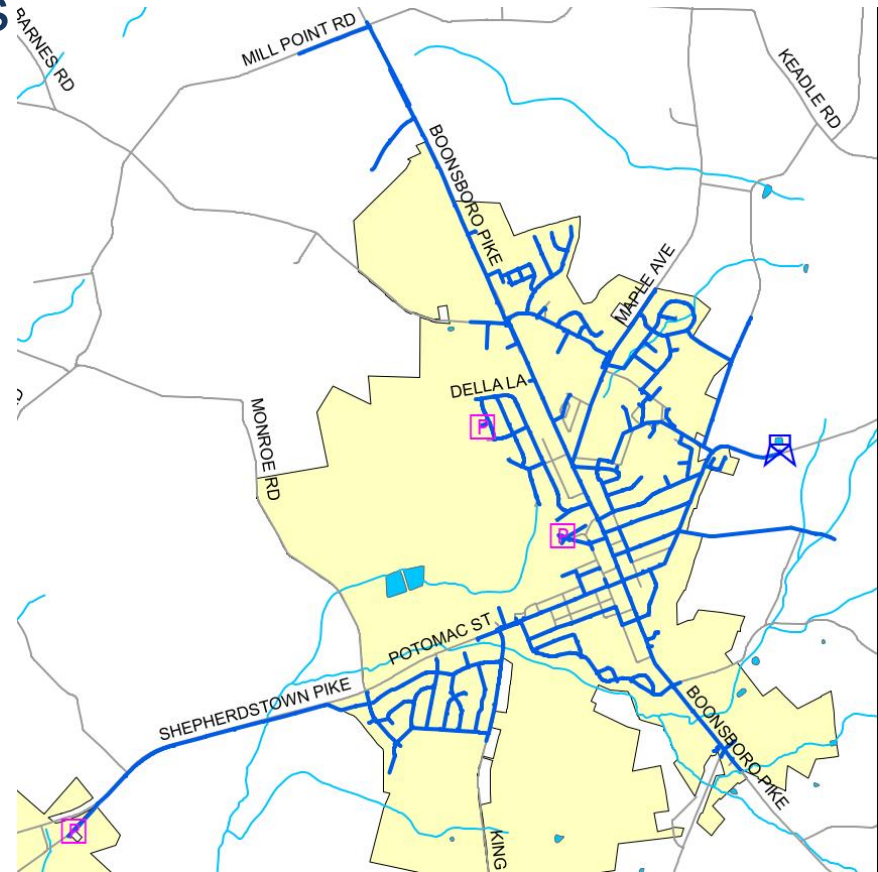
Town of Boonsboro Reservoir Replacement Preliminary Engineering Report

December 15, 2021



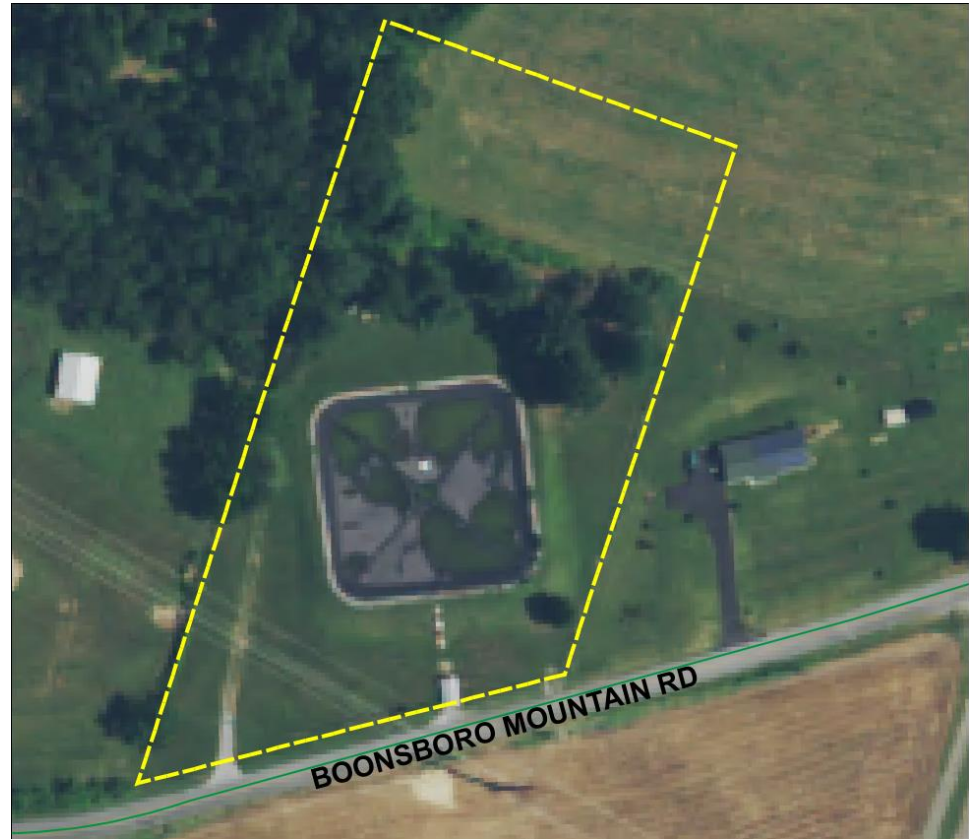
Introduction

- Town is experiencing significant water loss
- Partial losses can be attributed to existing reservoir
- WRA has evaluated reservoir placement options based on the Town's below requirements
 - Redundancy
 - Continuity of service



Existing Site

- Town is currently served by a 1.5 MG earthen dam reservoir
- Reservoir is connected to Town by 1,500 feet of 12" transmission main
- North side of site has room for new construction
- Other sites considered



Alternatives Considered

1. 1.0 MG AWWA D115 post-tensioned precast concrete tanks
 - Single structure with redundant 0.5 MG basins
2. Two 0.5 MG AWWA D110 prestressed concrete tanks
3. Two 0.5 MG AWWA D103-19 bolted steel tanks
4. 1.0 MG elevated spheroid tank
5. Concentric circular tanks



Evaluation Parameters

Criteria	Description	Weight
Redundant Design	Tanks function independently of each other	0.10
Constructability	Ease of construction	0.10
Construction Costs	Cost of construction	0.10
O&M Access Difficulty	Accessibility for maintenance	0.10
O&M Lifetime Costs	Lifetime cost for operations and maintenance	0.20
Aesthetics	Visual Appeal	0.05
Impact to residents	Daily effect on residents' lives	0.15
Easement Acquisition	Additional private easements required	0.10
Environmental Impact	Impact to site and surrounding	0.10

Weighted Criteria Points = (Assigned Grade) * (Percent Fraction for each subcategory) * 10/3

Cost Analysis

Alternative	Cost
Multi-Basin Post-Tensioned Concrete Tank	\$3,356,000
Two 0.5 MG Prestressed Concrete Tanks	\$2,881,000
Two 0.5 MG Bolted Steel Tanks	\$1,909,000
Elevated Spheroid Tank	\$4,297,000
Concentric Circular Tank	\$4,076,000

Overall Recommendations

	Redundant Design	Constructability	Cost of Construction	O&M Access Difficulty	O&M Lifetime Costs	Aesthetics	Impact to residents	Easement Acquisition	Environmental Impact	
	10%	10%	10%	10%	20%	5%	15%	10%	10%	
Description	Assigned Rank (1=Least Favorable, 3=Most Favorable)									
1.0 MG Split Tank	2	3	2	3	3	2	3	1	2	
Two 0.5 MG Concrete	3	3	2	3	3	2	3	1	2	
Two 0.5 MG Steel	3	3	3	3	1	2	3	1	2	
Elevated Tank	1	1	1	1	1	2	3	3	2	
Concentric Circular Tank	1	2	1	1	3	2	3	1	2	
Description	Weighted Criteria Points									Total (Max. 10)
1.0 MG Split Tank	0.67	1.00	0.67	1.00	2.00	0.33	1.50	0.33	0.67	8.17
Two 0.5 MG Concrete	1.00	1.00	0.67	1.00	2.00	0.33	1.50	0.33	0.67	8.50
Two 0.5 MG Steel	1.00	1.00	1.00	1.00	0.67	0.33	1.50	0.33	0.67	7.50
Elevated Tank	0.33	0.33	0.33	0.33	0.67	0.33	1.50	1.00	0.67	5.50
Concentric Circular Tank	0.33	0.67	0.33	0.33	2.00	0.33	1.50	0.33	0.67	6.50

- Concrete tanks have a long life span with low maintenance costs
- Concrete tanks can be buried, allowing hydraulic optimization
- Two circular tanks allow for more placement options around the site
- Two 0.5 MG D110 tanks provide the most engineering freedom at the best lifetime value



Questions?