McMillin Reservoir Replacement
A Discussion of Elements

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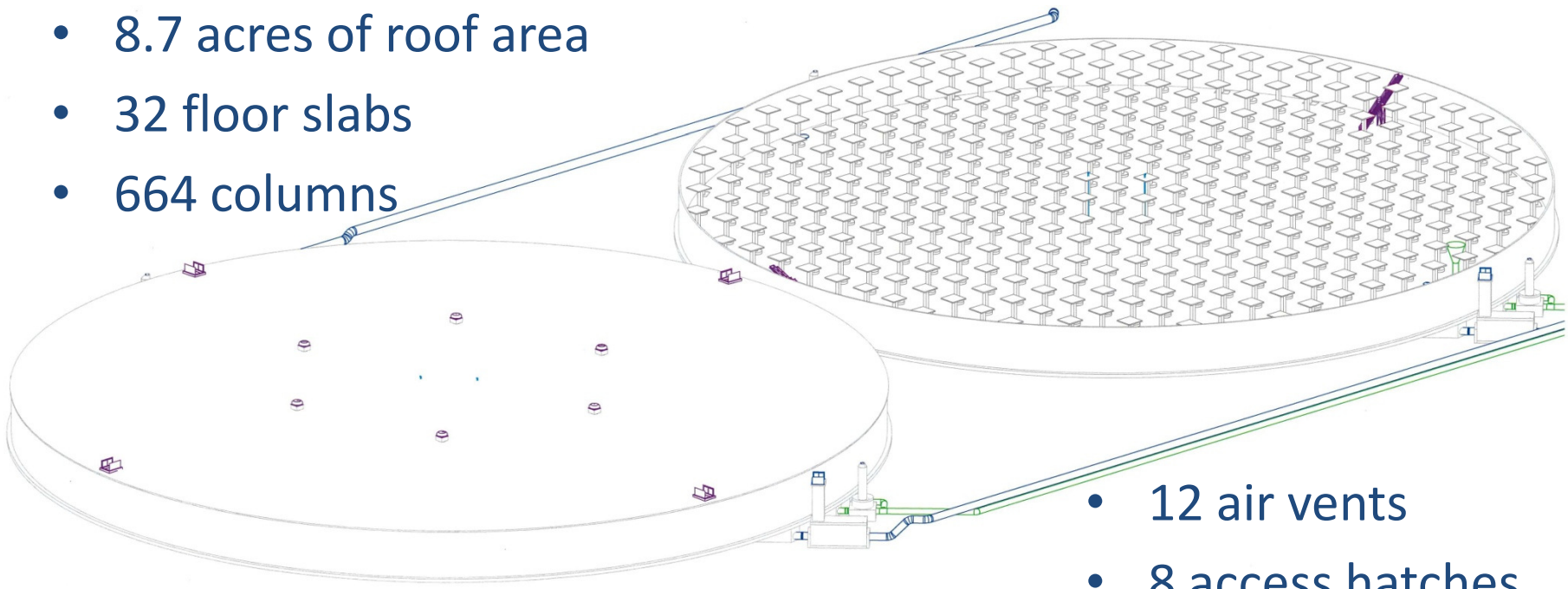
Project Overview

- Largest Diameter Prestressed Tanks in the world.
- 490 feet in diameter
- 8.7 acres of roof area
- 32 floor slabs
- 664 columns



- 12 air vents
- 8 access hatches
- 48 sampling ports

Project Overview

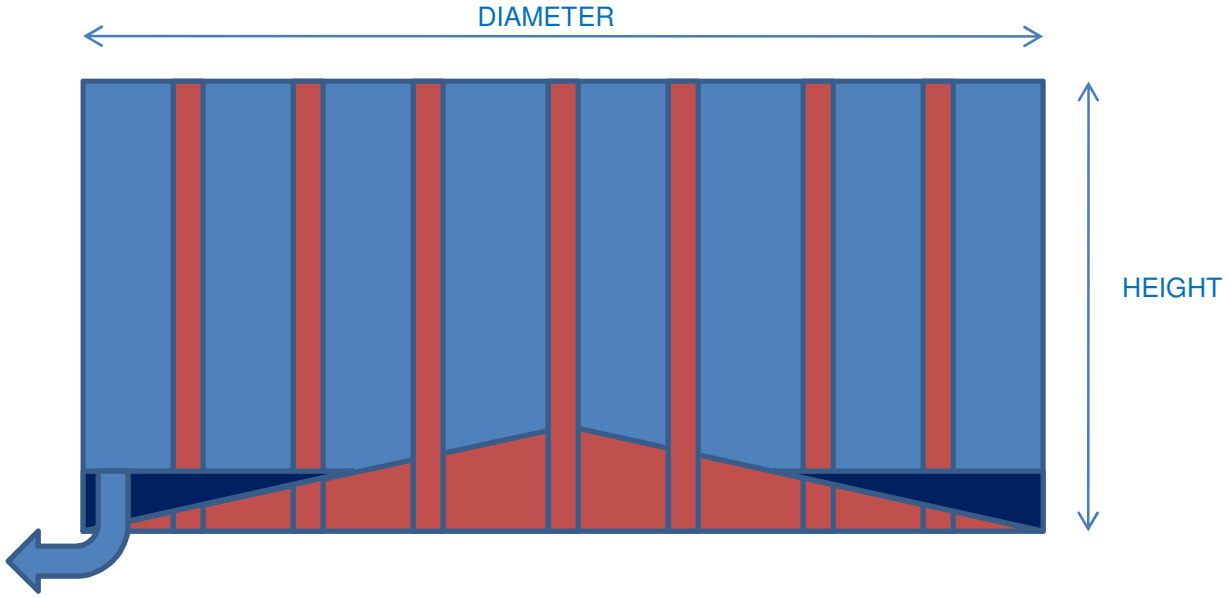
- 30-inch thick walls

- 300 miles of strand

- 3.5 miles of water-tight joints

Actual Volumes

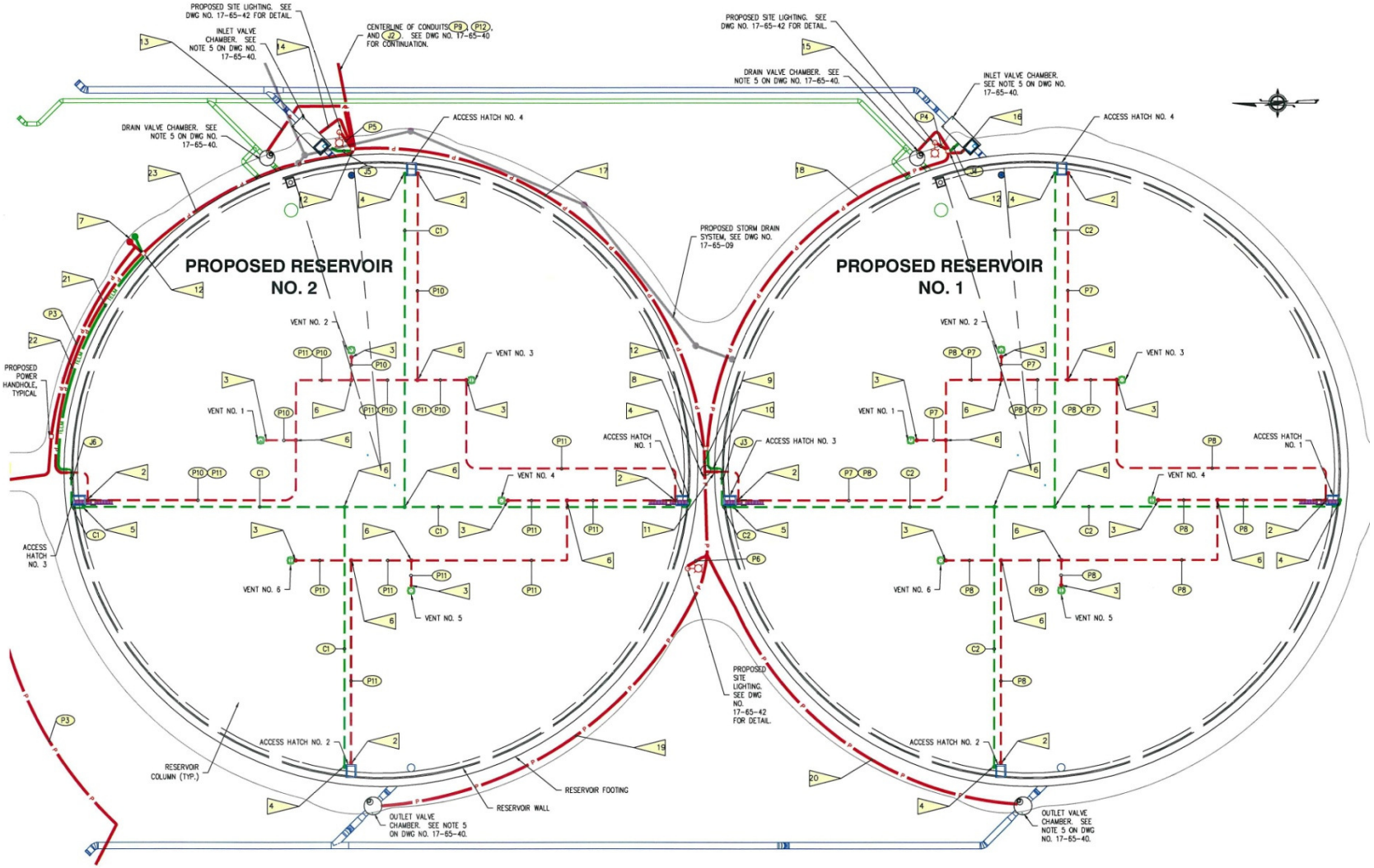
- **Nominal Volume = 35.7 MG** (height x diameter)
- Floor Slope of 1.5% = 44 inches of elevation gain
- Lost Volume due to columns, footings, and floor slope = 1.9 MG
- Lost Volume due to outlet elevation = 0.2 MG
- Total Usable Volume = 33.6 MG (or 94%)



Design Elements

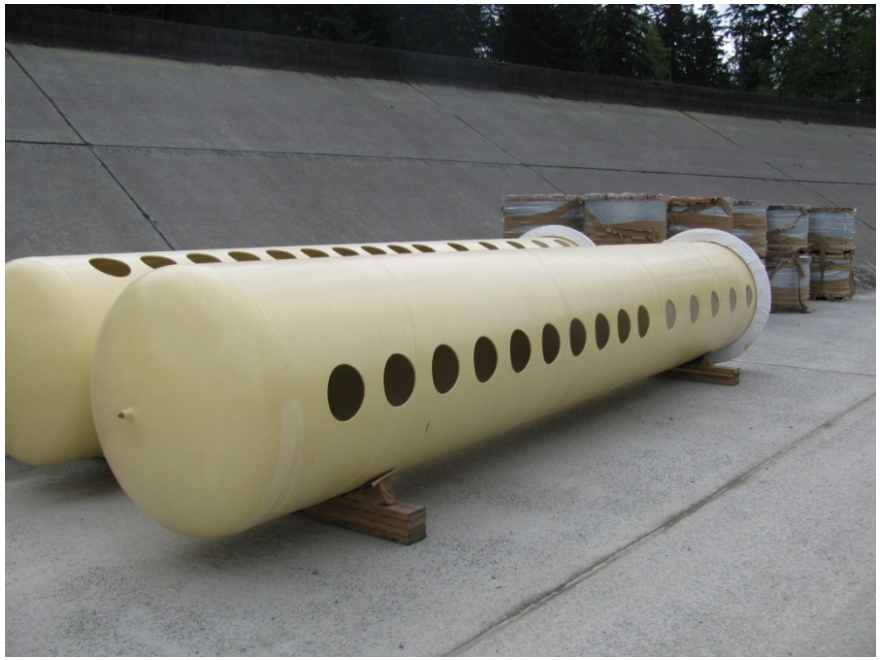
- Each Tank is Identical to Facilitate Construction, Inspection, and Maintenance
  - Inlet, outlet, and drain piping configurations
  - Locations of air vents, ports, and access hatches
  - Alignment of imbedded electrical and telemetry conduits

Design Elements



Design Elements

- Minimal Water Quality Short Circuiting Improvements Required
  - Separate inlet and outlet
  - Inlet orifice design
  - High volume turnover
- Roof finish
  - No hot mop and pea gravel
  - No membrane
  - No paint



Design Elements

- Consistent Column Height to Facilitate Construction
  - Equal floor and ceiling slopes
- Air Vents
  - Sized for full pipe rupture
  - Lightweight and removable

Structural Elements

- AWWA D110
- Prestressed
- Post Tensioned
- Type 1

Structural Elements

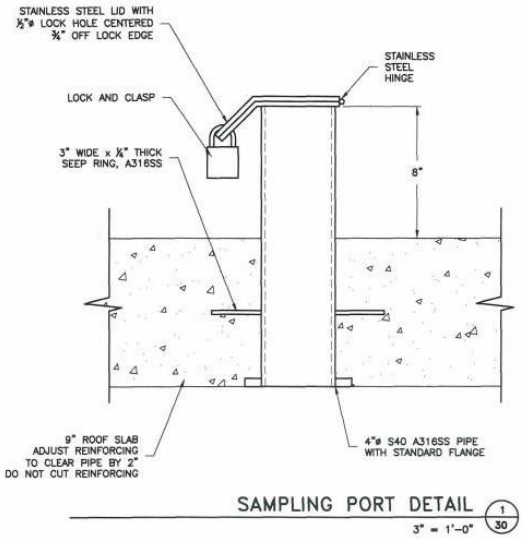
- Rebar Design
  - Uniform design to facilitate construction & inspection
- Wall Thickness
  - Thickness dictated by bearing pad requirements
- Landings and Stairs
  - Stainless steel vs. fiberglass
  - Landing deflections

O&M Elements

- Column Footings – Round vs. Square

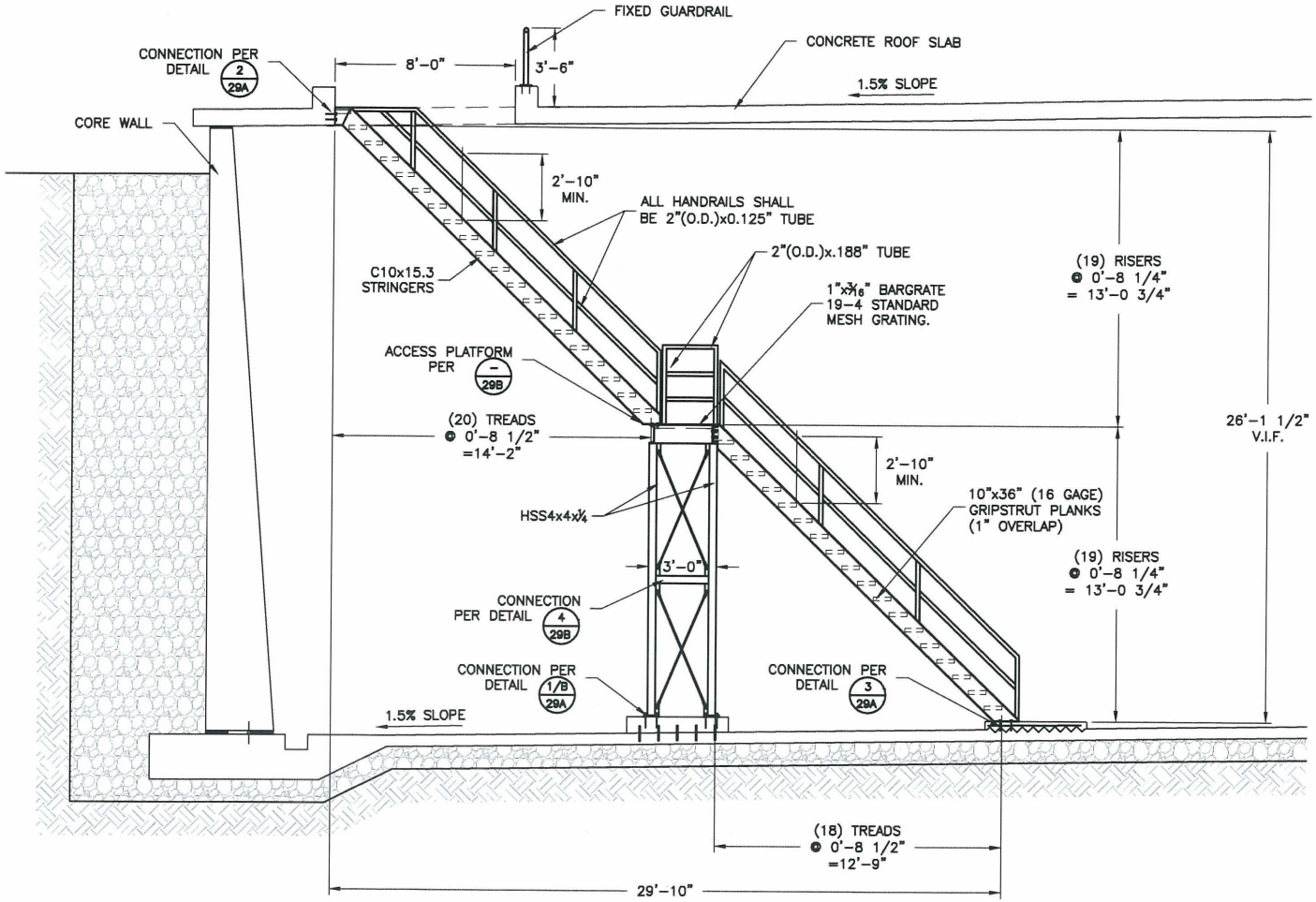
O&M Elements

- Wash-down System
  - Full & Permanent vs. Partial & Flexible
  - Floor wash-down trough (does not neck-down around column footings)
  - Drop connection inside tanks for hoses
- Railings Around Outlets & Drains
- Sampling Ports



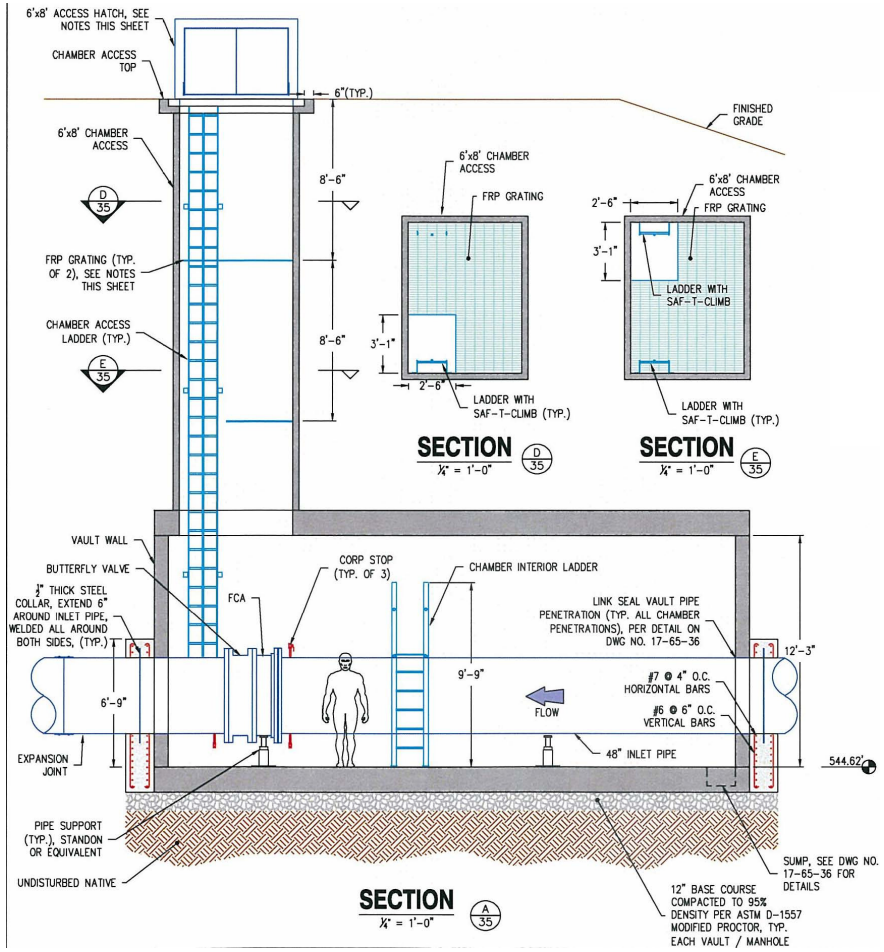
O&M Elements

- Ladders vs. Stairways TANKS



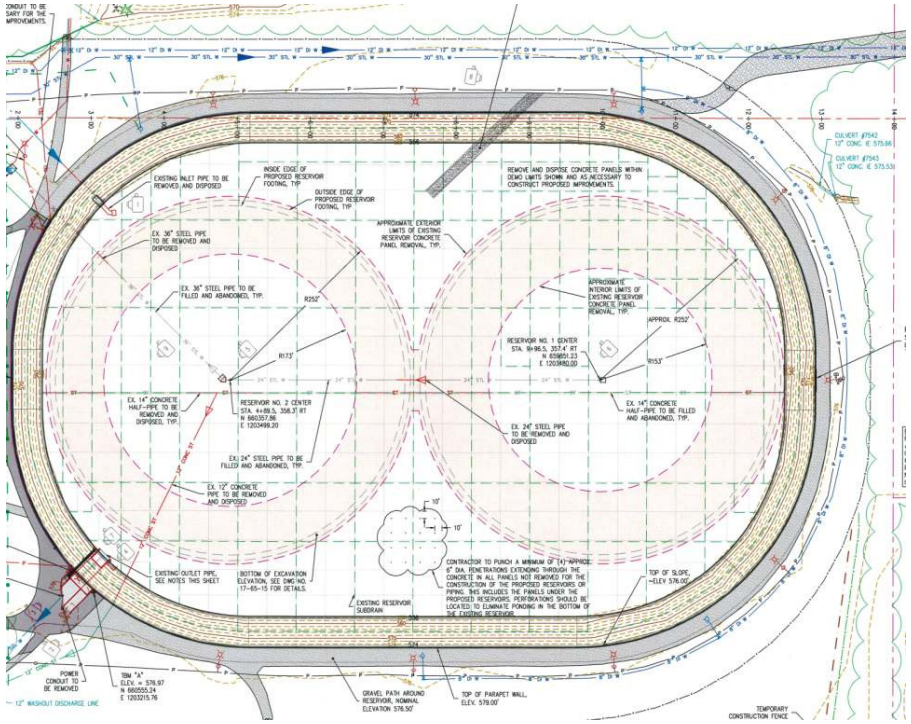
O&M Elements

- Ladders vs. Stairways VAULTS



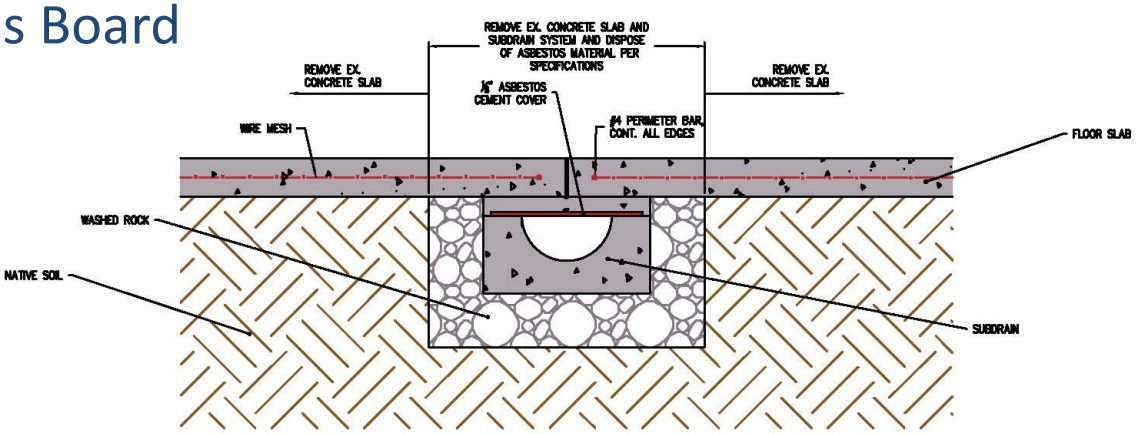
Construction Elements

- Responsive Bid Requirements
- Partial Removal of Existing Concrete Slab



Construction Elements

- Water Quality in Adjacent Reservoir
  - Water misting fence/curtain
  - Access to construction site
  - Backfill tanks once they are in service
- Concrete Slab Pour Sequence
  - Ensure no pour is constrained on more than two sides
- Removal of Asbestos Board



EXISTING RESERVOIR SUBDRAIN DEMOLITION DETAILS
1" = 1'-0"

Future Elements

- Construction of third identical tank
- Complete backfilling of tanks over time
- Optimize wash down system

Questions?

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