Pasadena

PHASE I
Non-Potable Project

April 12, 2016

Presenter
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Presentation Overview

Phase I Overview

- Customers
- Facilities
- Hydraulics

Design Challenges

- Pipeline
- Appurtenances
Phase I Overview - Customers

Brookside GC: 550 AFY
Brookside Park: 110 AFY
Rose Bowl Stadium: 15 AFY
Art Center College: 30 AFY
Phase I Overview – Facilities Map
Phase I Overview – Facilities Summary

- 20,000 LF of 20-inch and 24-inch Pipeline
- Pressure Reducing Station
- 400,000-gallon Storage Tank
Phase I Overview – Hydraulics

Pressure ranging from <10 psi to 330 psi
Phase I Overview - Hydraulics

- Source Elev. 1666 ft
- Rose Bowl El. +-800’
- Phase I Tank El. = 1050’
- Future Tank El. = 1434’

Pipe Velocities:
- 30-inch: 3.8 ft/s
- 24-inch: 6.0 ft/s
- 20-inch: 8.6 ft/s

Cost Savings @ $20/in/ft = $1.6 - $4M
Presentation Overview

Phase I Overview

- Customers
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Design Challenges

- Pipeline
- Appurtenances
Design Challenges – Pipeline

Considerations for Material, Wall T and Joints

- Pressure
- External loading
- Installation quality (pipe zone compaction)
- Seismic recommendations
- Pipeline geometry outside the street areas
- Clearance to water mains

Recommendations

- Steel (high pressure areas), min. 0.25” t
- Steel or Ductile Iron (Lower Pressure Areas)
- Fully restrained pipeline
  - Welded joints for steel
  - Restrained push-on joints for DIP
Design Challenges – Hillside Installation

CHALLENGES
- Steep Slopes (3:1 H:V)
- Narrow Ridgeline
- Erosion
- Access for maintenance

SOLUTIONS
- Confirm Constructability
- Concrete Anchor Blocks @ 100’
- Specify Barricades Ea. Side
- Erosion Control Mat + Hydroseed
- No Appurtenances
Valve Selection
- AWWA valves up to 250 psi
- ANSI-rated HP BFVs

Careful Locating/Spacing
- AWWA 150B BFV = $4k
- AWWA 250B BFV = $5k
- ANSI HP BFV = $18k
- Plug Valves = $20k +

Other Considerations
- Joint/Flange Type
- Actuator Design
- Valve bypass for filling
- Materials
- Manufacturers

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<th>VALVE ID</th>
<th>Wg</th>
<th>STATION/LOCATION</th>
<th>VALVE TYPE</th>
<th>FUNCTION</th>
<th>DESIGN OPERATING PRESSURE* (PSI)</th>
<th>VALVE PRESSURE CLASS OR PRESSURE RATING</th>
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Design Challenges – Blowoffs

- **Type (wharf hydrant or sump)**
  - Isolation Valve Type
    - AWWA GV < 250 psi
    - **Plug Valve > 250 psi**
  - Location
    - Close to major drainage feature
    - Spacing – duration to drain
  - Cavitation Considerations
Design Challenges – CAV’s

- Pressure Ratings/Isolation Valve Specs
- Sizing/locating
  - Air Release at high points
  - Normal Filling/Draining
  - Surge
  - Gravity Flow/Rupture (AWWA M51 vs. largest outlet)
- Redundancy
  - Dual CAV’s at key locations
  - Standpipe at upstream tank
- Engineer’s calculations backed up by ARI (manf) calcs