Making the Old New Again
Retrofitting an 87-Year-Old Lift Station to Meet the Requirements of Fort Wayne’s LTCP

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OVERVIEW

• Overview of the 87-Year-Old Lift Station
• Project Background
• Design Goals and Limitations
• Overview of Proposed Design
• Design Challenges and Solutions
• Final Design Overview and Construction Status
OVERVIEW OF THE 87-YEAR-OLD LIFT STATION

• Morton Street Lift Station - Location and Role in City’s Collection System
  • Originally constructed in 1931
  • Expanded in 1987
OVERVIEW OF THE 87-YEAR-OLD LIFT STATION
OVERVIEW OF THE 87-YEAR-OLD LIFT STATION

- Morton Street Lift Station – Dry Weather Station
  - (2) 3.5 MGD pumps
  - Wet well/dry well configuration
OVERVIEW OF THE 87-YEAR-OLD LIFT STATION

• Morton Street Lift Station – Wet Weather Station
  • (4) 150 hp vertical mixed flow pumps
  • 120 MGD total capacity
OVERVIEW OF THE 87-YEAR-OLD LIFT STATION

• Morton Street Lift Station - Existing Operation
PROJECT BACKGROUND

• Consent Decree and Long Term Control Plan Requirements
  • 2008 Fort Wayne entered into a US EPA Consent Decree and developed a Long Term Control Plan (LTCP)
    – Elimination of overflows at the Morton St. station during a typical year.
DESIGN GOALS AND LIMITATIONS

• Previously Identified Design Limitations
  • Use existing site and infrastructure to save cost
  • Use existing permitted CSO outfall and limit disturbance to ACE Levee
  • Route typical year flows to wet weather storage ponds and excess discharges to existing CSO
  • Construction must be phased to allow continual operation of both pump stations during construction
  • Start-up and testing considerations to maintain permit compliance (no dry weather discharges)
OVERVIEW OF PROPOSED DESIGN
DESIGN CHALLENGES AND SOLUTIONS

- Pump Discharge Design Challenges
  - Limited site space for pipe and valving
  - Two different discharge locations
  - Significant head difference in discharge locations
DESIGN CHALLENGES AND SOLUTIONS

- Pump Discharge Design Solution
DESIGN CHALLENGES AND SOLUTIONS

• Pump Selection Challenges
  • Vertical suction vs. submersible
  • Low voltage vs. medium voltage
  • Variable head conditions
  • Existing wet well constraints
DESIGN CHALLENGES AND SOLUTIONS

- Pump Selection Solutions
  - 5 new low voltage 500 hp submersible pumps
  - 5 new 500 hp variable frequency drives
DESIGN CHALLENGES AND SOLUTIONS

- Pump Selection Solutions
- Design confirmation through Physical modeling
DESIGN CHALLENGES AND SOLUTIONS

• Pump Selection Solutions
  • Design confirmation through Physical modeling
DESIGN CHALLENGES AND SOLUTIONS

• Electrical Design Challenges
  • Low voltage vs. medium voltage
  • Available space and phasing requirements
  • Heat loading in electrical room
  • Additional egress requirements
DESIGN CHALLENGES AND SOLUTIONS

• Electrical Design Solutions
  • Low voltage equipment to minimize footprint
  • Strategic layout to maintain existing equipment during construction
  • Proposed phasing plan included in design
  • HVAC upgrade plan for existing building
  • Modifications to existing building to meet code requirements
DESIGN CHALLENGES AND SOLUTIONS

• Electrical Design Solutions
DESIGN CHALLENGES AND SOLUTIONS

• Structural Design Challenges
  • New openings and loads on wet well top
    – Evaluated removing entire wet well slab
  • New openings and loads on electrical room floor
  • New electrical room openings for doors and HVAC

• Structural Design Solutions
  • Structural beams along new hatch openings
  • Structural beams below electrical equipment pads
  • Structural details for masonry openings in existing building
DESIGN CHALLENGES AND SOLUTIONS

• Construction Phasing Challenges
  • Must keep at least 3 pumps in operation during wet season
  • Must keep at least 2 pumps in operation during dry season
  • Dry weather station must be in continual operation
  • No dry weather discharges to river, including testing
DESIGN CHALLENGES AND SOLUTIONS

• Construction Phasing Solutions
  • Proposed phasing plan included in design
  • Header and valving design to allow for phasing
  • Electrical equipment layout to accommodate phasing
  • Temporary test pipe loop included in design
FINAL DESIGN OVERVIEW AND CONSTRUCTION STATUS
THANK YOU!

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