City of Nogales, Arizona

Pena Blanca Highlands Force Main Repair at Potrero Creek

September 15, 2016

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IBWC Citizens Forum
Project Purpose and Overview

Project Purpose
- Repair the flood damaged 10-inch force main in Potrero Creek

Project Issues
- State Permitting-ADEQ-Scour, Lateral Migration, Design
- Federal Permitting-404 permit
- Construction Method-Open Trench, HDD, Boring, Microtunneling
- Funding-Significant for CON budget, other types available??
- Schedule- ASAP, the existing temporary fix could fail with the next flood…realistically 4-6 months minimum from today earliest

Project Status
- Geotech completed for river hydraulics studies
- Stantec has completed river hydraulics and design alternatives (Open Trench vs HDD)
- CON has new photo-topo of site
- Stantec has completed preliminary JD determination

Next Steps
- Contract for 100% documents and permitting with Stantec
- Secure Funding
- Obtain necessary State & Federal permits
- Bid & Build
Project location

Gravity Line

Force Main
Pena Blanca Collection Route
History of Failed Force Main

• Originally designed by Cella Barr and Associates in 1992

• Designed to handle the capacity of the master planned community with one lift station and one 10-inch force main and one 12-inch gravity line. Both lines flow into the IOI and to the NIWWTP.

• Service area for collection system includes 70 homes and one elementary school

• Failed during a flood event in 2014

• Temporary repair failed again soon after
Federal, State and Flood Control District Permitting

Federal USACE 404
- Preliminary JD Established
- Impaired Waters for E.Coli
- ~ 0.7 acre disturbed for Open Trench Alternative

ADEQ Construction Authorization
- Design Report
- Scour analysis (completed)
- Bed Degradation may have stabilized
- Lateral migration analysis (completed)

Flood Control District
- Bank Stabilization on east bank
- Demonstrate no rise in floodway WSEL
Jack and Bore Technology

- **Jack and Bore** is a method of horizontal boring sewer construction. Construction crews drill a hole underground horizontally between two points without disturbing the surface between sending and receiving pits.
Microtunneling

Microtunneling is a process that uses a remotely controlled Microtunnel Boring Machine (MTBM) combined with the pipe jacking technique to directly install product pipelines underground in a single pass.
Evaluation of Construction Alternatives: Open Cut
Evaluation of Construction Alternatives

- Open Cut Trench with Dewatering
Evaluation of Construction Alternatives

- Open Cut Trench with Shoring
Evaluation of Construction Alternatives HDD
Evaluation of Construction Alternatives

- Horizontal Directional Drilling
Federal 404 Permitting

The basic premise of the program is that no discharge of dredged or fill material may be permitted if: 1) a practicable alternative exists that is less damaging to the aquatic environment or 2) the nation’s waters would be significantly degraded. In other words, when you apply for a permit, you must first show that steps have been taken to avoid impacts to wetlands, streams and other aquatic resources; that potential impacts have been minimized; and that compensation will be provided for all remaining unavoidable impacts.

Nationwide 12 for utilities most likely applies here

PCN required due to impaired waters status from E.Coli
JD Limits

[Map image showing JD Limits]
Evaluation of Construction Alternatives Open Trench Repair

- A 404 PCN be will be required by the Corps as well as 401 certification from ADEQ
- The maximum 22-foot excavation depth will require either an extensive engineered shoring or trench box protective system
- Will require vegetation removal
- A comprehensive dewatering plan will be required
- Concern about flash flooding during construction
- Time to design, permit, construct estimated to be up to 16.5 months
Evaluation of Construction Alternatives
Horizontal Directional Drilling (HDD)

- 404 and 401 permit are not needed
- Additional geotechnical investigation is necessary
- Dewatering is not required
- Minimal or no vegetation removal
- Concern about flash flooding potential during construction is minimal
- Time to design, permit, construct estimated to be up to 8 months
## Comparison of Construction Alternatives

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>ITEM DESCRIPTION</th>
<th>Design Cost</th>
<th>Permit Related Costs</th>
<th>Construction Cost</th>
<th>Total Project Cost</th>
<th>Design Time (months)</th>
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<th>Construction Time (months)</th>
<th>Total Project Time (months)</th>
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<td>Alternative #1 - HDD Method</td>
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Questions or Comments?