LITTLE HUNTING CREEK SEWER REPLACEMENT

MVCCA Environment & Recreation Committee

September 4, 2019
Agenda

• Project Location and Background
• Site Study and Alternatives Analysis
• Design
• Construction
Project Background

- Sanitary Sewer Crossing 800 LF of Little Hunting Creek
- 12” Cast Iron Pipe
- Constructed in 1961
- Extends from west end Woodland Lane to the east by Thomas J Stockton Parkway
- Serves approximately 480 residences
Condition Assessment of Sewer

- Site visit
- Review of available information
  - Review maintenance history and records
  - Review of pipe video
- Plan and Profile Survey
Sewer Pipe Profile

- Approximate sewer sag profile
- Probable original pipe alignment

Profile View

© Arcadis 2017
## Alternatives Analysis

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Pro’s</th>
<th>Con’s</th>
<th>Viable</th>
<th>Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Bursting</td>
<td>Utilizes the existing alignment along a known easement. Employs technology suitable for older cast iron pipe.</td>
<td>Does not allow for the pipe to be adequately corrected in profile – pipe could still have sags.</td>
<td>No</td>
<td>Recommend no further evaluation.</td>
</tr>
<tr>
<td>Cured in Place Pipe Lining</td>
<td>Utilizes the existing alignment along a known easement. Employs a rehabilitation method suitable for a pipe of this diameter and material.</td>
<td>Does not allow for the pipe to be adequately corrected in profile – pipe could still have sags.</td>
<td>No</td>
<td>Recommend no further evaluation.</td>
</tr>
<tr>
<td>New Pump Station</td>
<td>Eliminates need for work in the creek. Provides abandonment of the old line.</td>
<td>New pumping station will need to be maintained. Requires constructing a new small force main as described in sub-alternatives. Requires building pump station within HOA property.</td>
<td>Yes</td>
<td>May require flow metering to confirm flow and flow peaking quantities. Need to consider effects of flow to the downstream pump station.</td>
</tr>
<tr>
<td>New 6-inch Force Main Inside the Existing 12-inch Pipe</td>
<td>Minimizes extensive permitting. Uses existing easement. Eliminates creek crossing construction work</td>
<td>Requires cleaning existing pipe prior to pulling smaller pipe through. Need to determine if sag slopes are too steep to accommodate HDPE pipe.</td>
<td>Yes</td>
<td>Re-CCTV existing pipe with elevation readings to make sure pipe can act as a good conduit for a smaller pipe inside.</td>
</tr>
<tr>
<td>Tie-Into Existing 30-inch” DIP Force Main on West Side of Creek</td>
<td>Reduces length of force main construction. Eliminates creek crossing construction work.</td>
<td>Risk of 30° pipe integrity issues to accommodate pipe tapping.</td>
<td>Yes</td>
<td>Investigate pipe integrity. If early phase of construction finds pipe is not suitable, direct contractor to alternative options.</td>
</tr>
<tr>
<td>New Pump Station for a New Force Main on West Side of Street, Tie-In where Existing Force Main becomes a Gravity Sewer</td>
<td>Eliminates creek crossing construction work.</td>
<td>Requires community disruption along a significant distance.</td>
<td>No</td>
<td>Cost out linear footage of pipe and street repairs.</td>
</tr>
<tr>
<td>Jack and Bore</td>
<td>Minimizes any work in the creek Creates options for realignment and depth of alignment.</td>
<td>Too long of a reach for most contracting methods.</td>
<td>No</td>
<td>No further evaluation.</td>
</tr>
<tr>
<td>Horizontal Directional Drilling</td>
<td>Creates options for realignment and depth of alignment. Minimizes any work in the creek.</td>
<td>In order to achieve sufficient long-term bedding/stability, a deeper profile may be necessary that creates a siphon condition. Entire 789' has to be fused ahead of time. HDD permit is more stringent.</td>
<td>No</td>
<td>Will need to know more about the bed of the creek to determine depth of drilling Should be explored and costed out as a viable alternative for comparison.</td>
</tr>
<tr>
<td>Open Cut Pipe Replacement with Dam</td>
<td>Allows best assessment of bedding of pipe during construction. Reduces the amount of on-shore work in proximity of residences. Provides a long life expectancy.</td>
<td>Requires significant detailed permitting. Requires coffer-damming and related impacts in the creek. May require restoration of impacted wetlands.</td>
<td>Yes</td>
<td>Requires exploring permitting challenges Should be explored and costed-out as a viable alternative for comparison.</td>
</tr>
<tr>
<td>Do Nothing</td>
<td>Eliminates construction in the creek. No disruption to the community.</td>
<td>Continued maintenance for cleaning and inspection. Asset remains in poor condition and stays on the high-risk list.</td>
<td>No</td>
<td>Will be developed only as a baseline alternative for cost comparison.</td>
</tr>
</tbody>
</table>
## Criteria Matrix: Open Cut with Pipe Replacement

### Alternative 3: Open Cut Method with Cofferdam

| Criteria          | Weight | Rating | Score | Comments                                                        |
|-------------------|--------|--------|-------|                                                               |
| Homeowner Disturbance | 35%    | 4      | 1.40  | Short term disruption. No long term disturbance to residence. |
| Maintenance       | 15%    | 4      | 0.60  | Minimal to no maintenance for 30+ years.                      |
| Capital Cost      | 10%    | 2      | 0.20  | Approximately $2.1 million.                                   |
| Permits           | 25%    | 2      | 0.50  | Extensive permitting could take between 6 - 18 months.         |
| Easements         | 10%    | 3      | 0.30  | One easement for relocation of new pipe, all other are temporary construction easements. |
| Schedule          | 5%     | 3      | 0.15  | Expected project construction duration 8 months.              |
| **Summary**       | **100%** | **3.15** |       |                                                               |

Weight x Rating = Score  
Rating 1 (poor) - 5 (very good)  
Weight percentage is relative importance to Fairfax County
Conceptual Replacement Design Layout
Key Design Investigations

- Wetlands Delineation
- Vegetation Survey
- Geotechnical Investigation
- Field Survey
Development of Design Plans and Specification

- Alignment
- Pipe support
- Construction: dam, dewatering, trench support
  - Specialty contractor
- Contract documents
Permitting

• Goals
  – Provide appropriate solution and meet basic design criteria
  – Environmental stewardship

• Process
  – Early engagement
  – Permit development
  – Permit submissions
  – Review by agencies
  – Approval
# Permitting

<table>
<thead>
<tr>
<th>Regulatory Entity</th>
<th>Permit</th>
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<tbody>
<tr>
<td>Virginia Department of Environmental Quality (DEQ)</td>
<td>Virginia Pollutant Discharge Elimination System (VPDES), CWA Sec. 404/401, VSMP-Stormwater Pollution Prevention Plan</td>
</tr>
<tr>
<td>Virginia Marine Resource Commission (VMRC)</td>
<td></td>
</tr>
<tr>
<td>United States Army Corps of Engineers (USACE)</td>
<td>CWA Sec. 404/401, Nationwide Permit #6</td>
</tr>
<tr>
<td>DEQ, VMRC, USACE</td>
<td>Tidal Water Joint Permit Application</td>
</tr>
<tr>
<td>VDOT</td>
<td>Various</td>
</tr>
<tr>
<td>Fairfax County</td>
<td>Compliance with Chesapeake Bay Preservation Ordinance</td>
</tr>
<tr>
<td></td>
<td>DPWES Land Development Site and Building Permits</td>
</tr>
<tr>
<td>Virginia Department of Environmental Quality (DEQ)</td>
<td>Certificate to Construct (CTC)</td>
</tr>
<tr>
<td>United States Army Corps of Engineers</td>
<td>Nationwide Permit #12</td>
</tr>
</tbody>
</table>
Design Schedule

- **Design**: December 2017 – April 2019
- **Easements**
  - All easements recorded as of 8/2/19
- **Permits**
  - With easements recorded can JPA process is proceeding
Construction Considerations

• Creek construction
  – Cofferdam, pile supported pipe, underwater construction inside cofferdam

• Minimize impact to the park and boat ramp

• Schedule will minimize interference with recreational creek activities and consider time of year restrictions
  – Channel crossing to be completed “off season” to maximize recreational boating in creek
  – Time of year restriction February 15 – June 30
Pre-Qualified Contractors

• Due to specialized marine related work, contractors for the project have been pre-qualified.

• Pre-Qualified Marine Contractors
  – Corman Kokosing Construction Company
  – Garney Companies, Inc.
  – McLean Contracting Company
Construction Schedule

• Bid delayed by easements, permits
• Bid - February 2020
• Construction: April 2020 – March 2021
  – Creek construction July 2020-February 2021
• Construction Costs: $1.2 – 1.6 million dollars
Questions/Comments