

City of Raleigh
Engineering
Services
Department



Stormwater Management



Dorothea Drive
Culvert Replacement
Nov. 1, 2017

Introductions



City of Raleigh Staff

- Todd Rall, Engineering Services
- Veronica High, PE, Engineering Services
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- Marc Horstman, PE, Project Manager
- Miranda Smalling, EI, Civil Designer



Overview



- ✓ Project Goals
- ✓ Recommended Drainage Improvements
- ✓ Permitting
- ✓ Construction Expectations and Challenges
- ✓ Proposed Schedule
- ✓ Easement Acquisition Process
- ✓ Questions & Answers
- ✓ Break Out Sessions

History of the culvert



- The age of the structure is unknown but estimated to be constructed in the early 1900's.
- Water and Sewer mains have penetrated the culvert reducing its capacity and creating the opportunity for blockage during larger storms.
- Several sinkholes have developed over the years.
- Stream flow around the culvert instead of through the culvert observed as far back as 2011.
- Most recently repaired due to a sinkhole by City of Raleigh Public Utilities in 2015.
- New sink holes observed in the past year.

Project Goals



- Replace older failing culvert.
- Improve the flow capacity of the culvert to reduce flooding and road overtopping for at least the 10-year storm event.
- Ensure that the design incorporates the desired City roadway section and accommodates future development of upstream property including the possibility of a greenway trail or sidewalks.
- Provide for pedestrian and vehicular safety near headwalls.
- Stabilize eroding stream banks and ensure long term stability of the upstream and downstream channels.
- Minimize impacts to adjacent properties during and after construction.
- Minimize environmental impacts.

Intruding Utility Lines



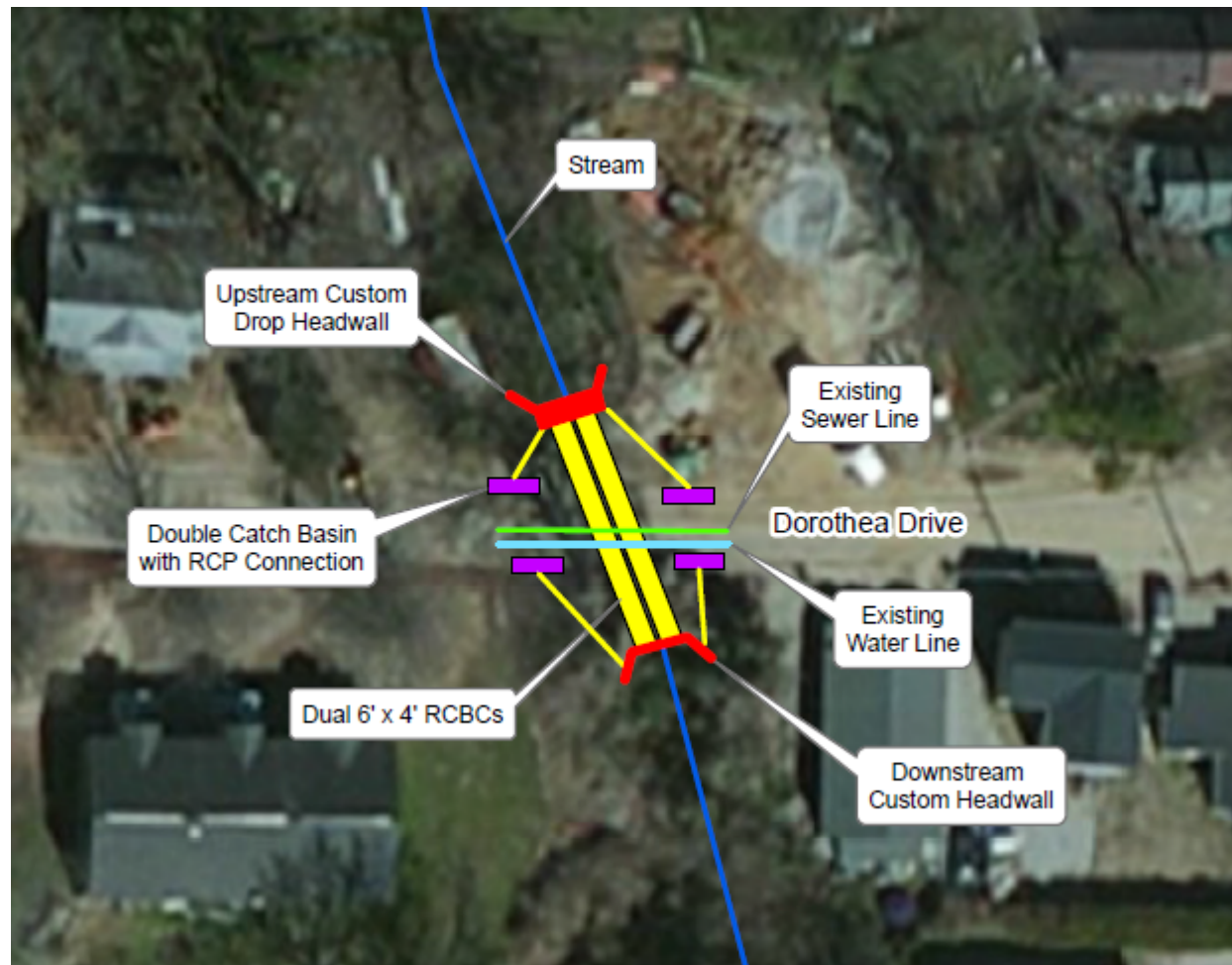
Previous Repairs



Flow Around & Under Culvert



Recommended Improvements

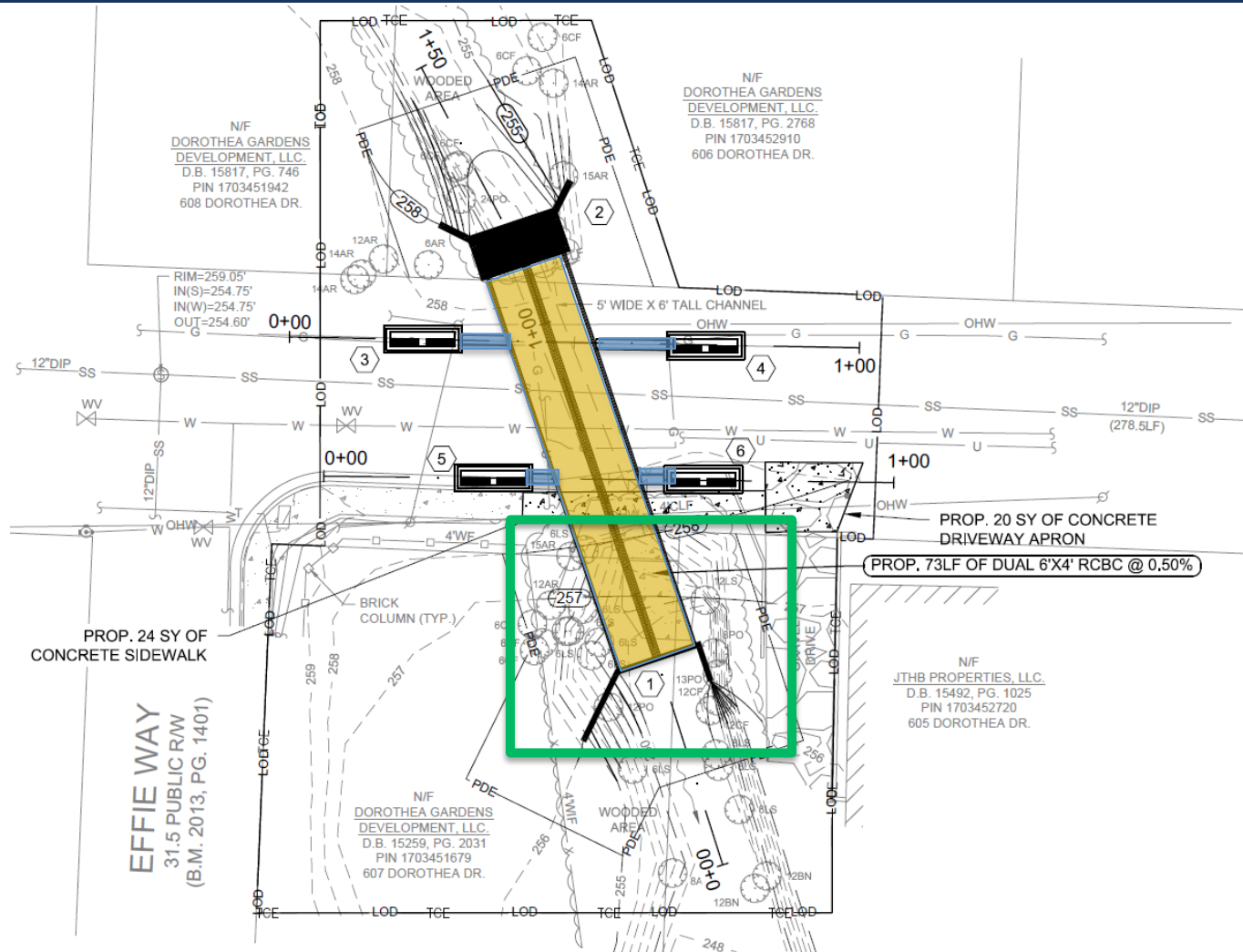


Recommended Improvements



- Install wider box culverts under the existing utilities to improve flow.
- Extend the culvert ends to provide for future sidewalks.
- Construct an extended downstream headwall to protect the eroding bank on the southeast side.
- Make improvements to the street section to capture and convey runoff to the new culvert.

Recommended Improvements



Culvert Upsizing (6'X5' Box Culvert to a dual 6' X 4' RCBC)

Roadway Section and Condition



Street view facing West

Roadway Section and Condition



Street view facing East

Construction Examples



Prior to Culvert Installation

Construction Examples



Culvert Installation

Construction Examples



Culvert Installation

Recommended Improvements



Double Catch Basins

Construction Examples



Road Closed

Dorothea Drive Road Closure



Schedule



Task	Date
Complete 70% Design Plans	November 2017
Acquire Easements	January – March 2018
Secure Environmental Permits	April 2018
Finalize Design Plans	May 2018
Relocate Private Utilities	January – April 2018
Prepare Project For Bid	July 2018
Council Approval of Bid	August 2018
Begin Construction	September 2018

Easement Acquisition Process



- Easement Definition:
 - Right granted from a property owner to another for a specific use of a portion of the owner's land.
 - Utility operators (gas, electric, sewer, etc.) often have easements for the purpose of installing and maintaining the utility lines and structures.
 - As with most utility easements, storm drainage easements are permanent and run with the land (i.e. survive any sale of the property).
 - Generally requires the property owner to give up certain rights, such as building permanent structures within the easement to allow for proper function of the system and maintenance access.

Private Property Easements



- Construction and Permanent Easements will be required from 4 property owners.
- Raleigh's Real Estate Office will work with owners to acquire the necessary easements for construction and future maintenance.
- Easement acquisition typically takes 3 to 4 months or longer depending on cooperation of property owners.
- The City anticipates owners granting easements.

Questions?



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