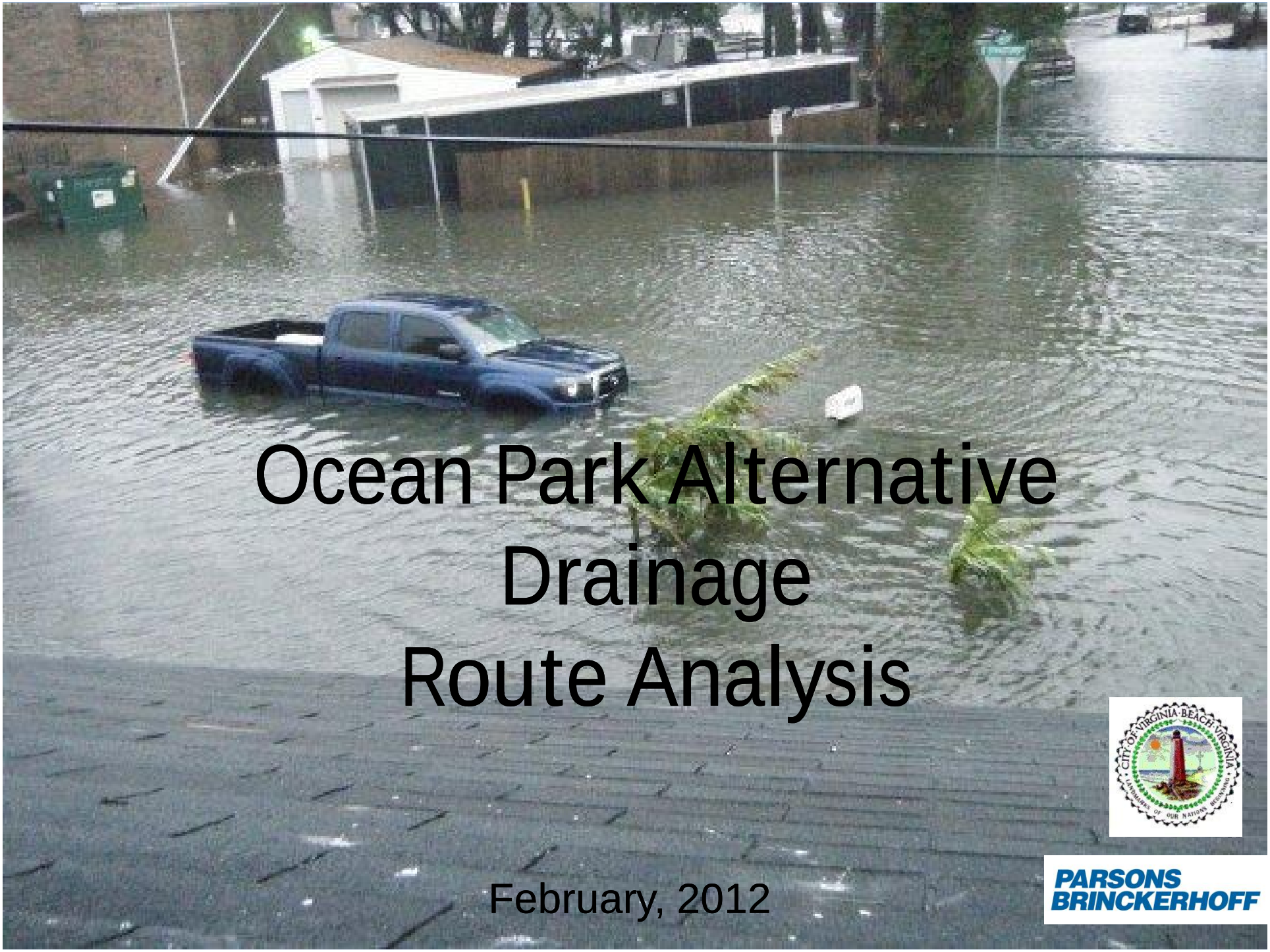
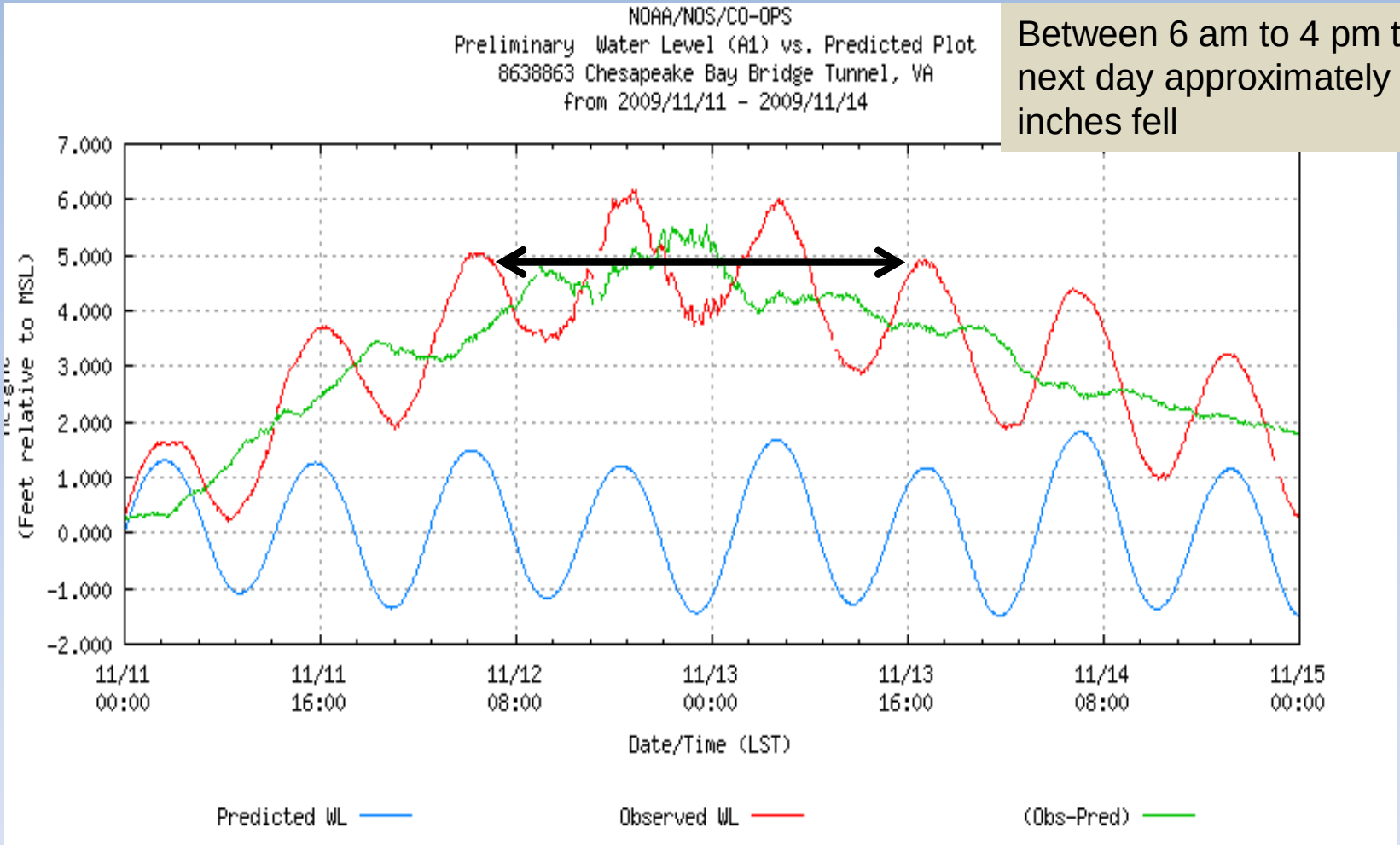


Ocean Park Alternative Drainage Route Analysis

February, 2012

PARSONS BRINCKERHOFF

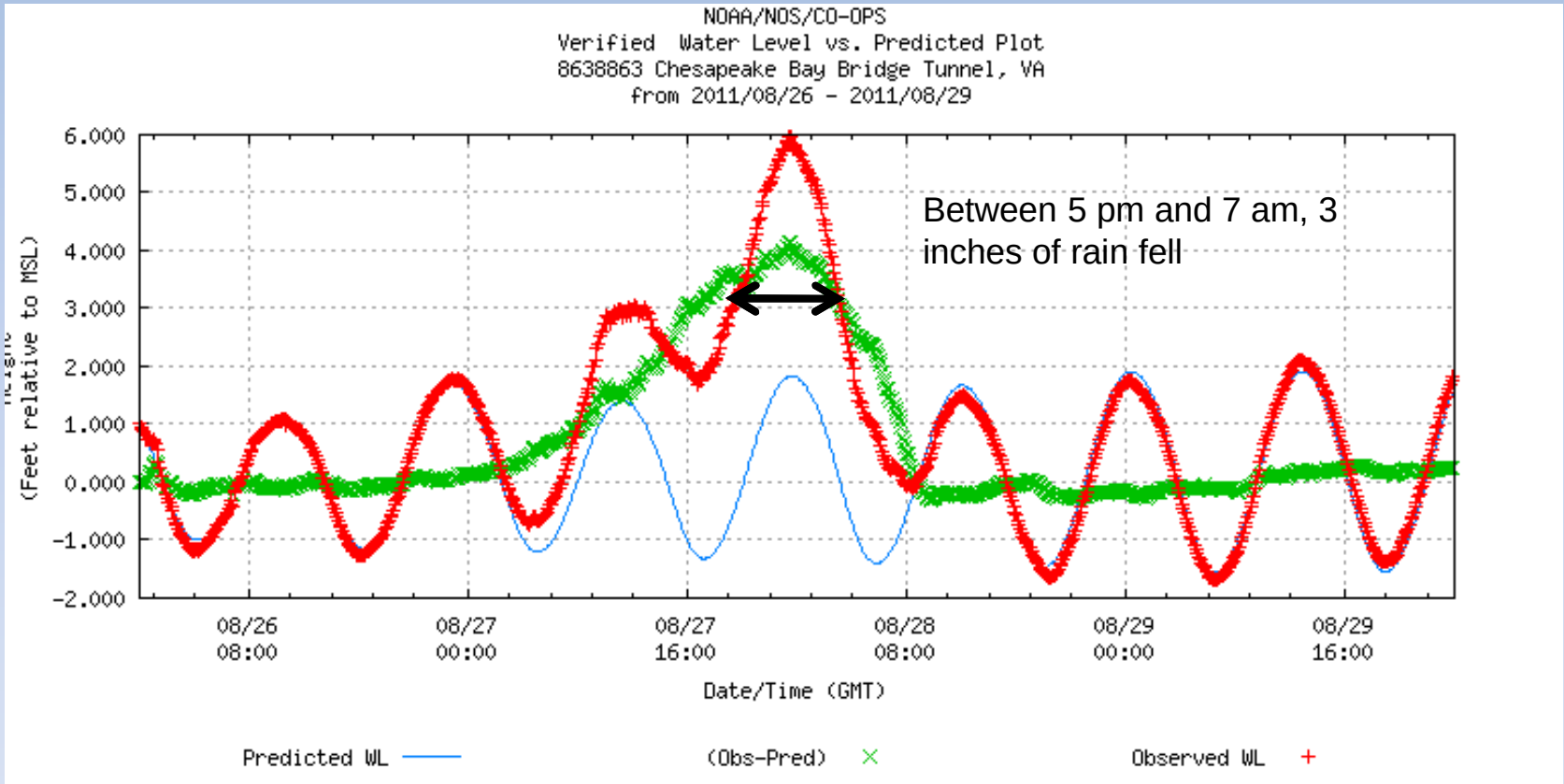
November 11 – 14, 2009



Between 6 am to 4 pm the next day approximately 7.5 inches fell

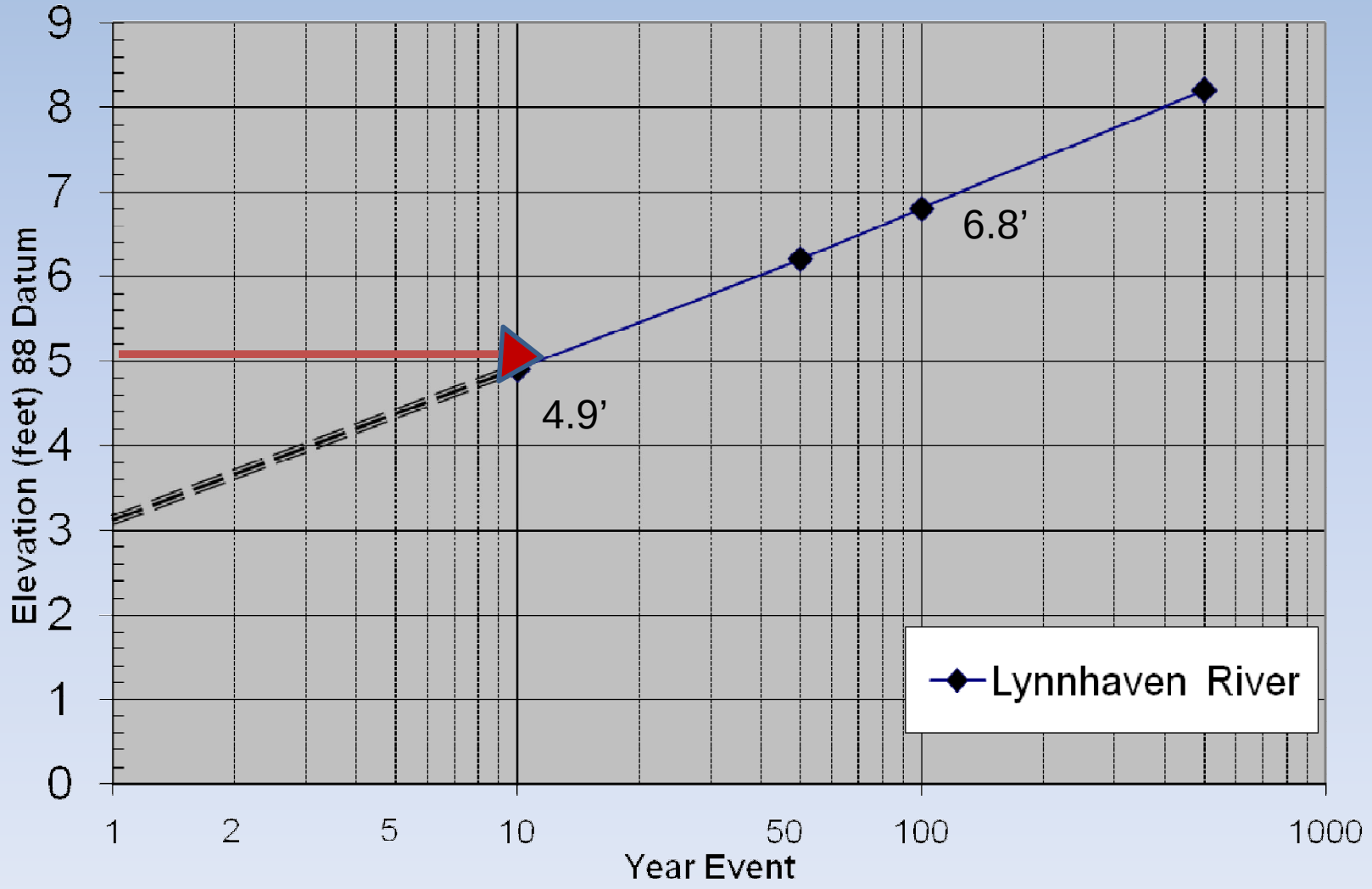
Chesapeake Bay Bridge Tunnel NOAA Tide Gage

Hurricane Irene

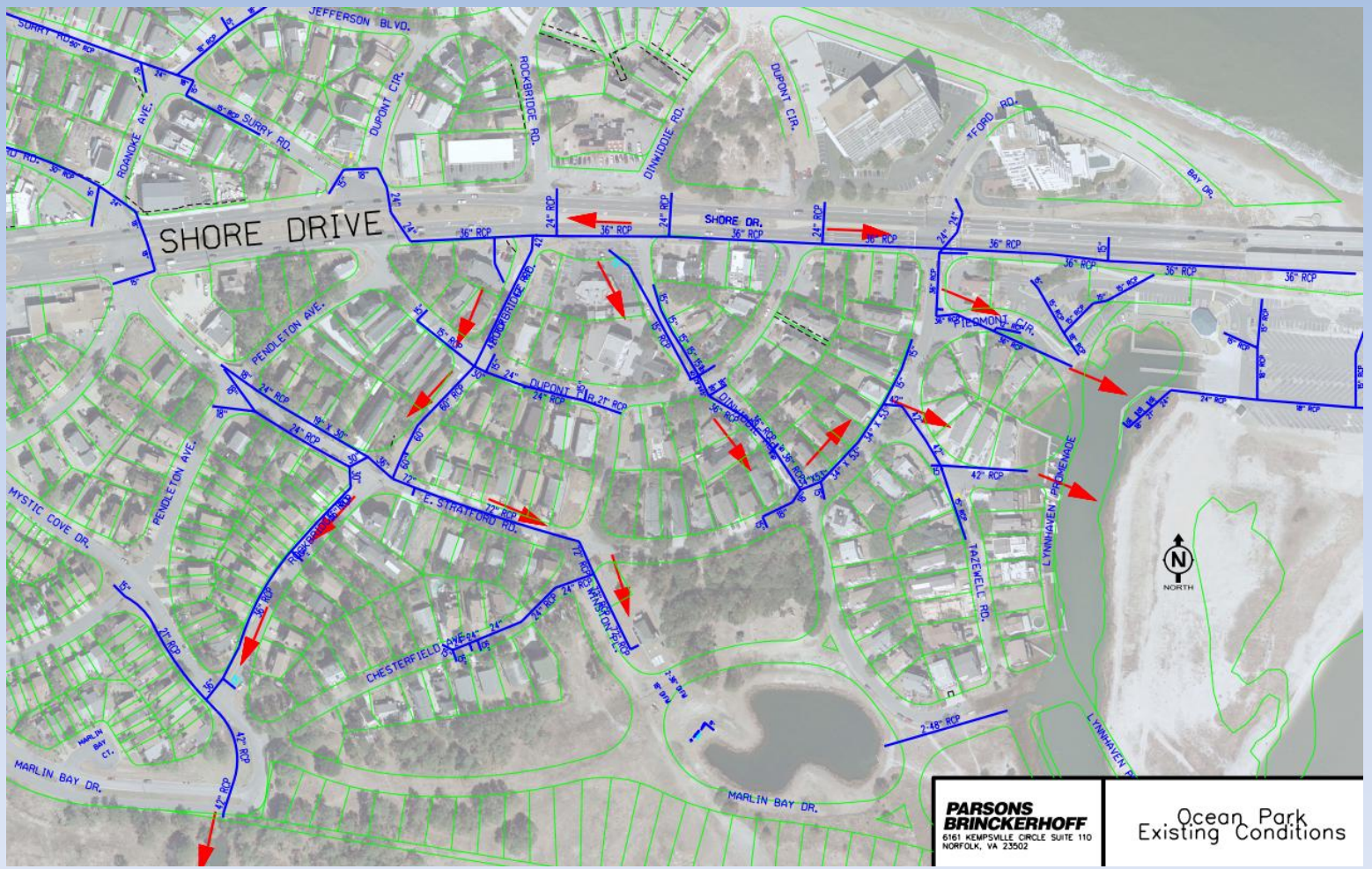


Chesapeake Bay Bridge Tunnel NOAA Tide Gage

Tidal Flood Frequency Curve based on FEMA Flood Insurance Study City of Virginia Beach (Revised May 4, 2009)



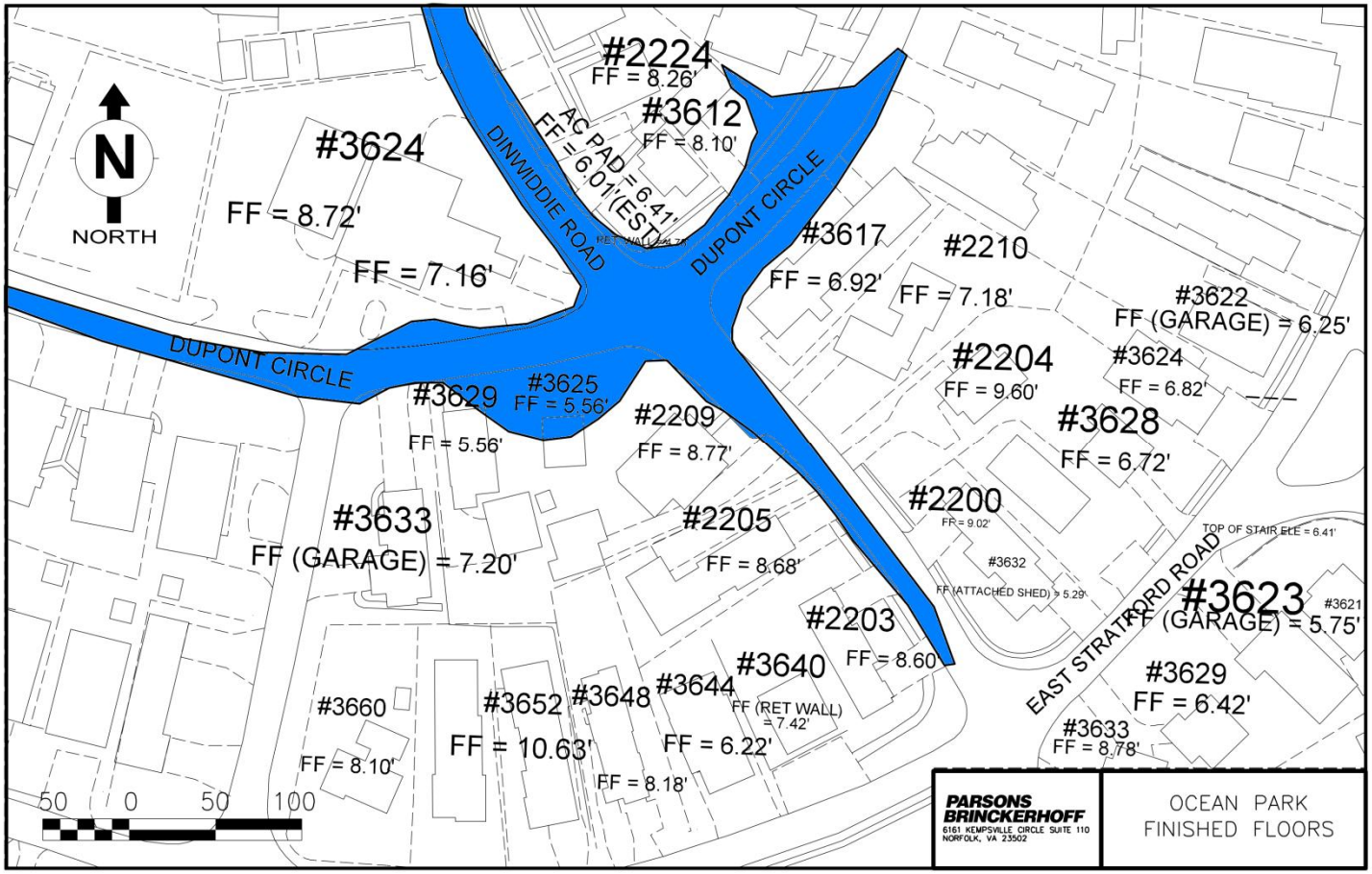
Focus: Ocean Park South of Shore Drive



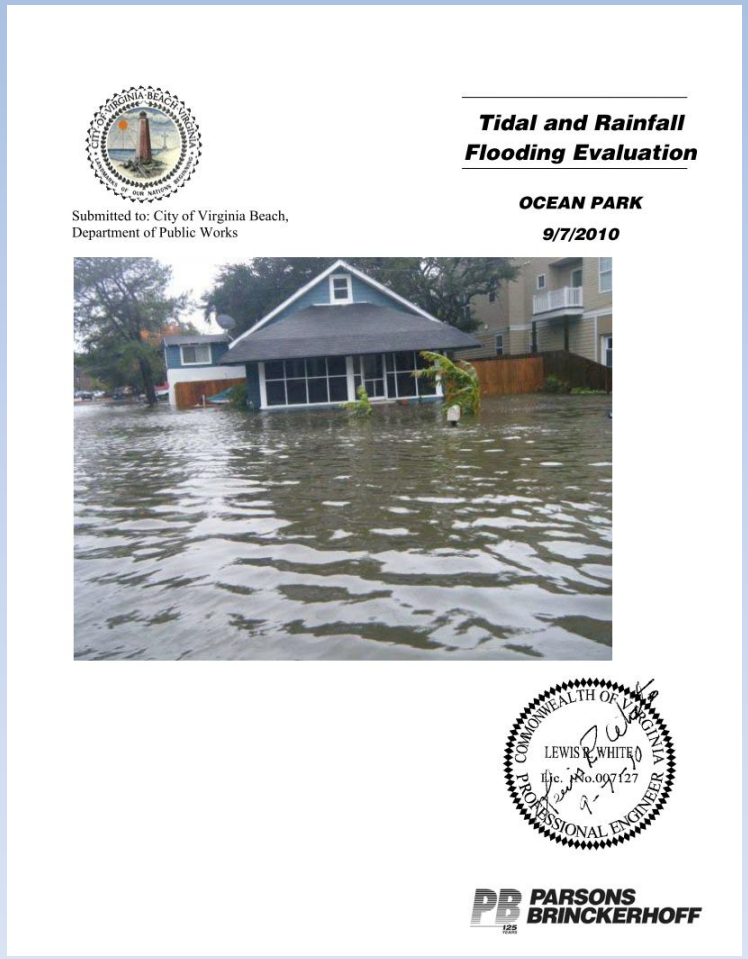
Some ground elevations in Ocean Park are BELOW 4 FEET (NAVD 88)* – CANNOT PREVENT OVERLAND FLOW

NAVD88 is a vertical control datum in the USA . All ground elevations are in NAVD88 unless otherwise stated

Finished Floors in the Flood Prone Area



2010 Flooding Evaluation Report



Tidal and Rainfall Flooding Evaluation

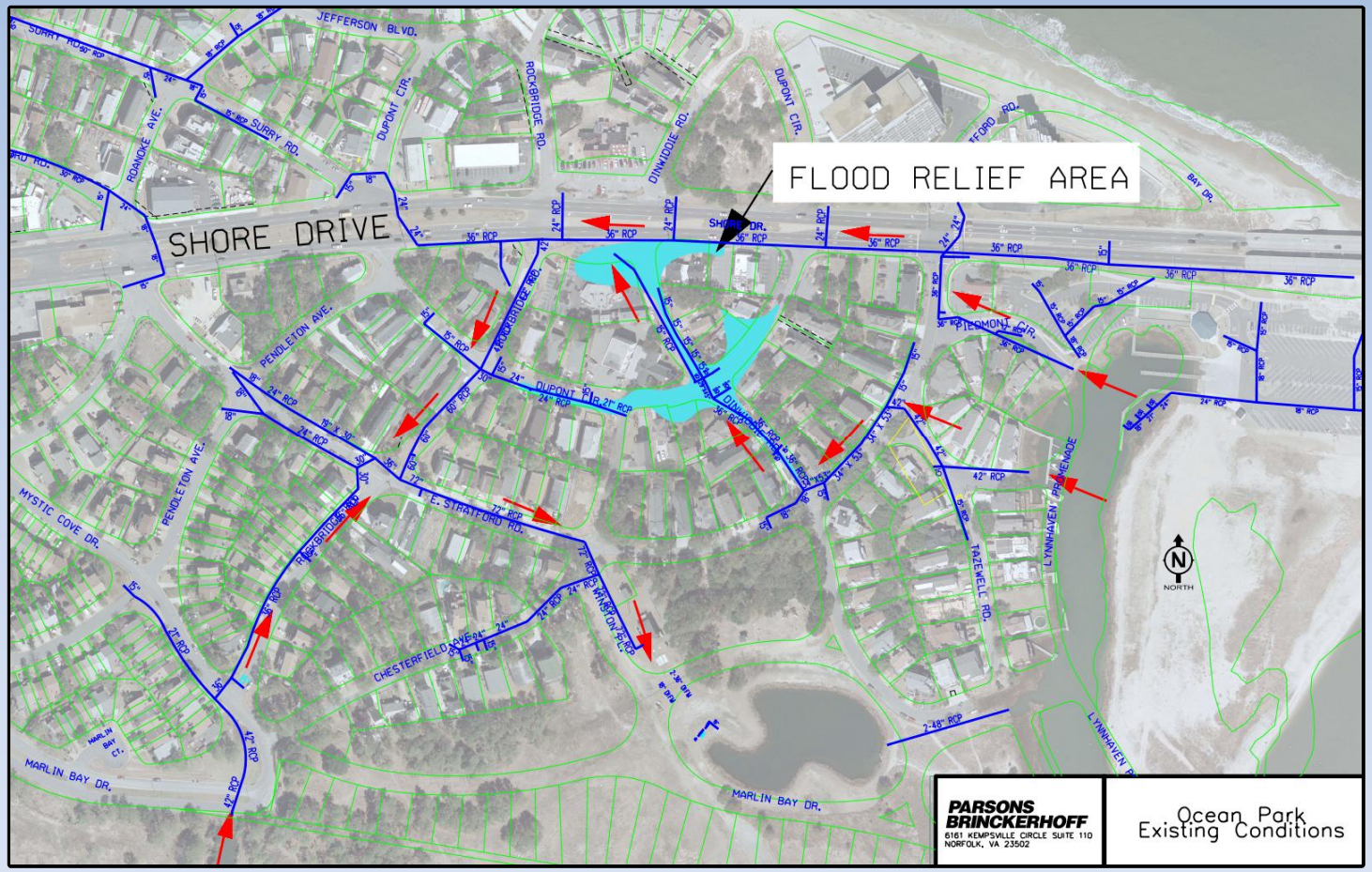
OCEAN PARK

9/7/2010

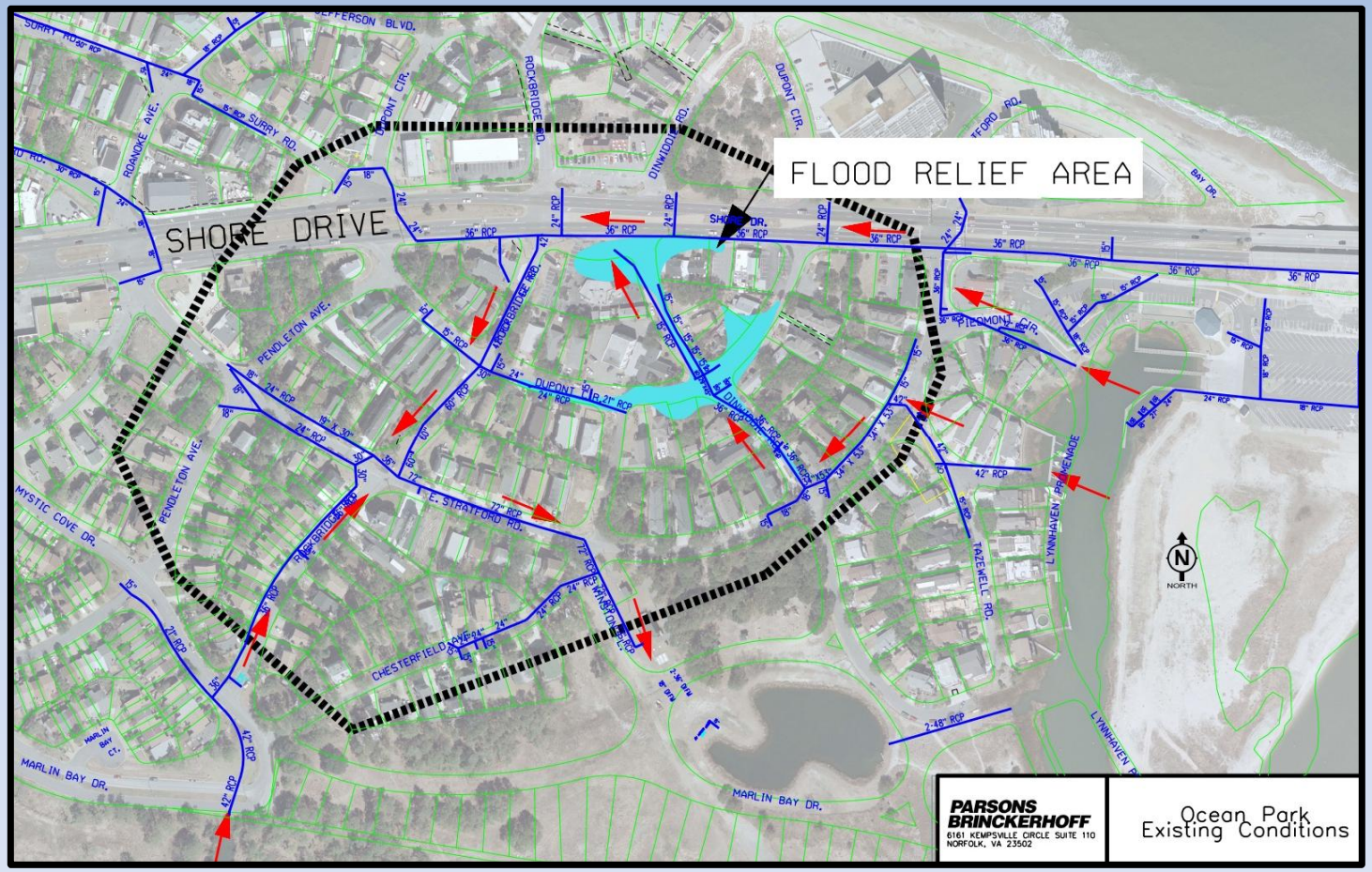
Submitted to: City of Virginia Beach,
Department of Public Works

PB PARSONS BRINCKERHOFF

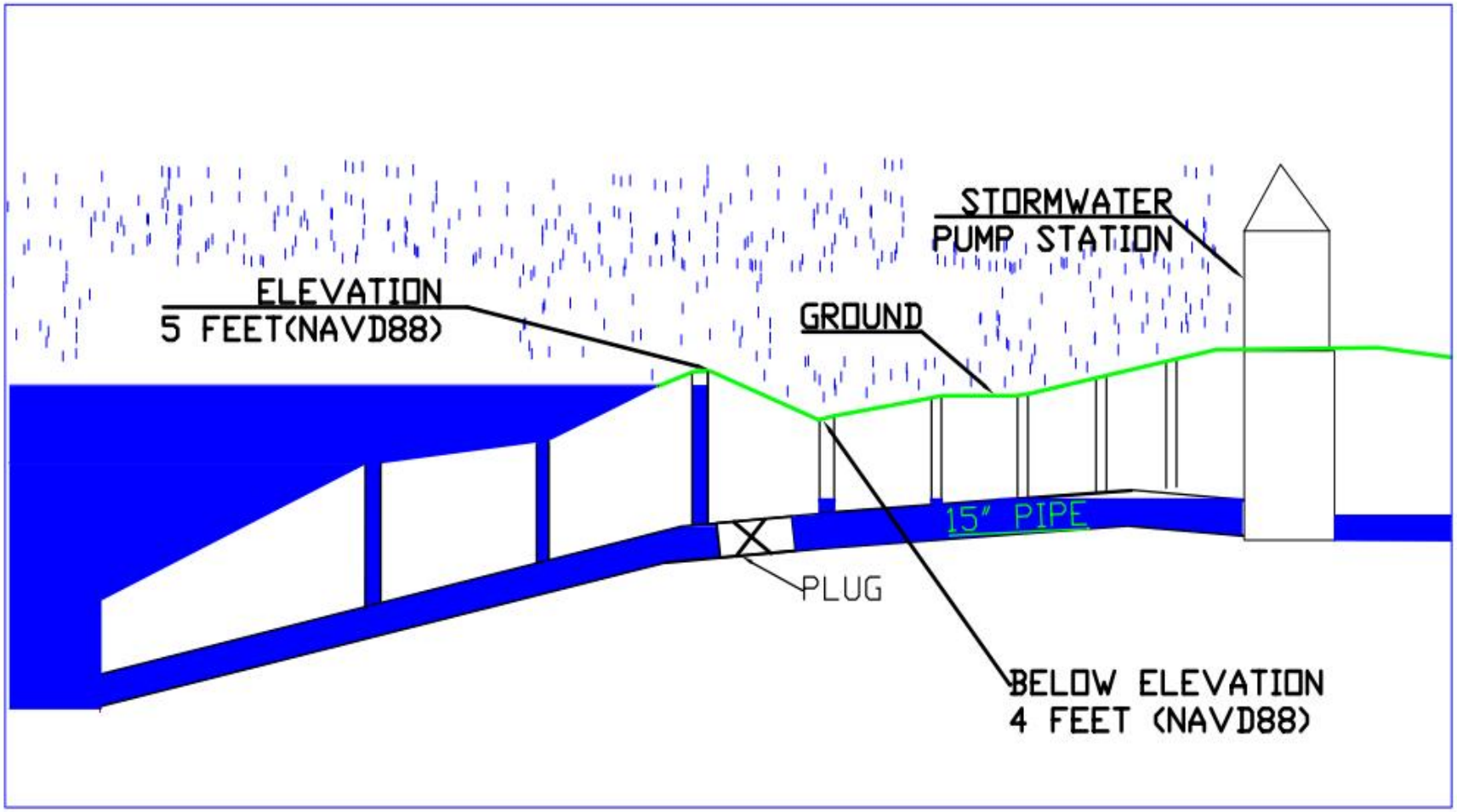
Tidal Inflows



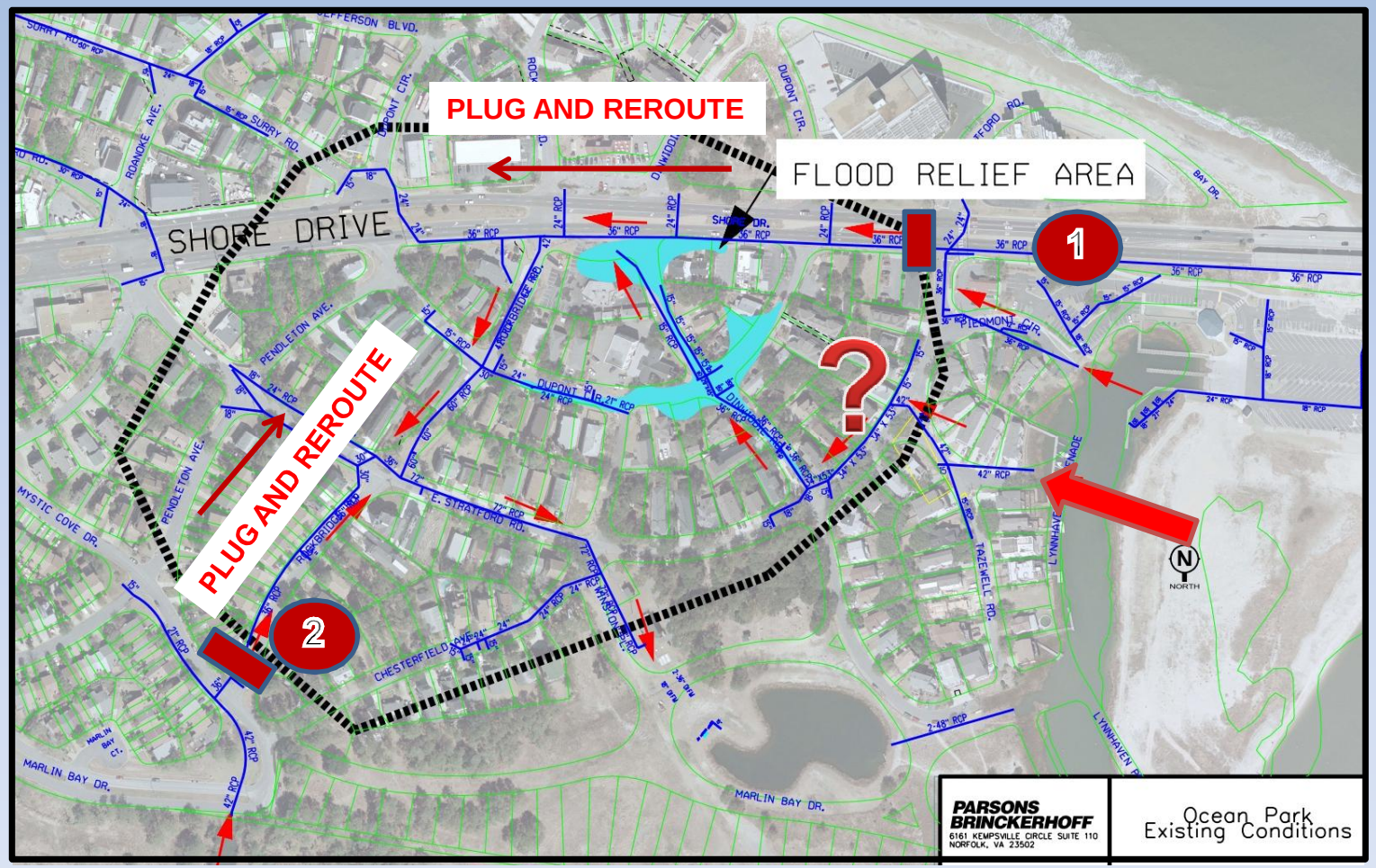
Ocean Park South of Shore Drive Drainage Area Isolation Plan



Ocean Park South of Shore Drive Drainage Area Isolation Plan



Ocean Park South of Shore Drive Drainage Area Isolation Plan

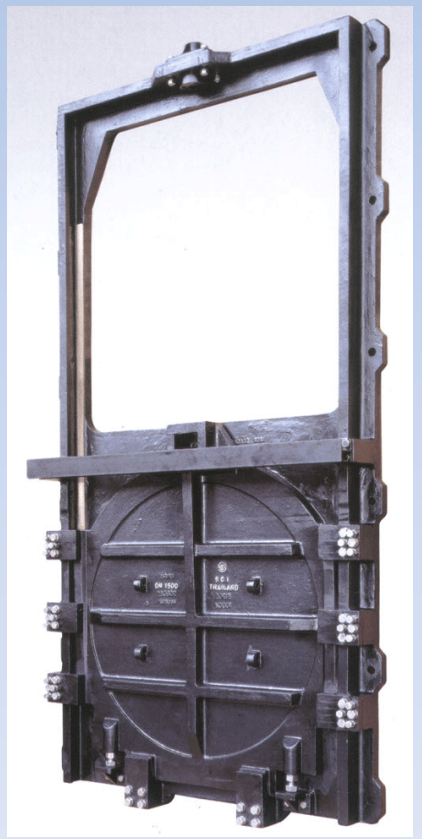


LIVE OAKS EVERYWHERE

TIDE VALVES AND GATES

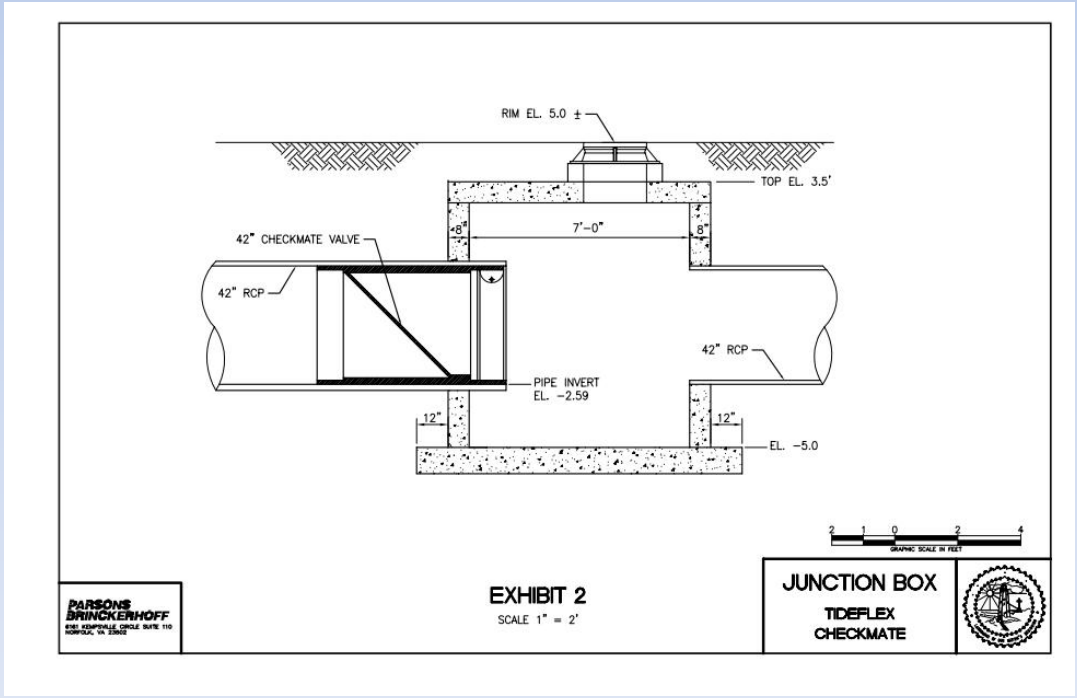
TIDE VALVE

TIDE GATE

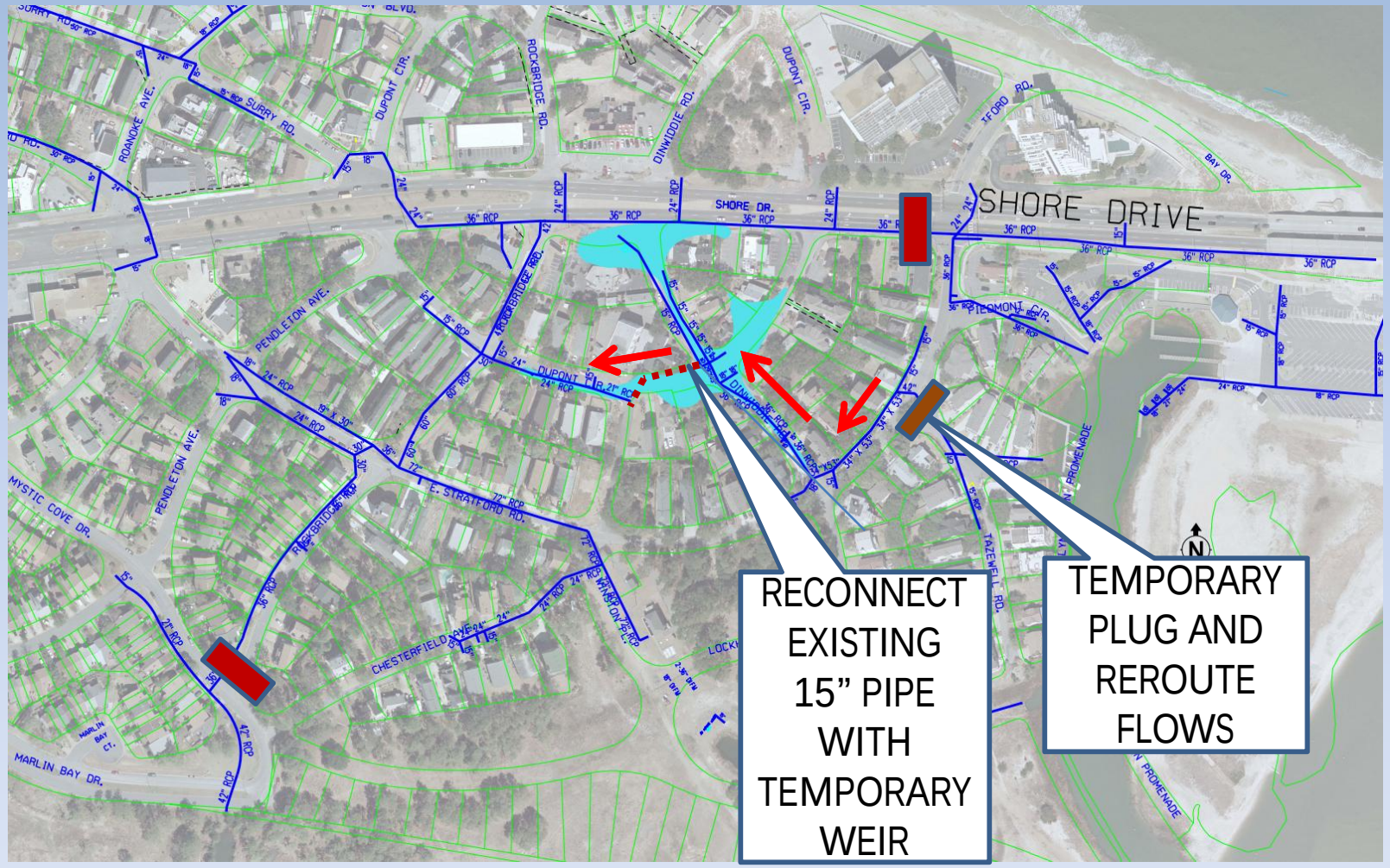


TIDEFLEX CHECKMATE VALVE

- Sand Accumulation
- Maintenance Issues
- Max Elevation 5.0 Feet (NAVD88)



IMMINENT ACTION PLAN – IN PROGRESS



IMMINENT ACTION PLAN (TEMPORARY)

- PROVIDES RELIEF FROM TIDES UP TO APPROXIMATELY 5 FEET (NAVD88) OR 5.9 FEET (MSL)
- PROVIDES DRAINAGE FOR MOST STORMS
- INTENSE PERIODS OF RAINFALL WILL RESULT IN TEMPORARY FLOODING
  - APPROXIMATELY 6-9 INCHES IN LOW LYING AREAS
  - DEPENDS ON INTENSITY AND LENGTH OF STORM

ALTERNATIVE CONSIDERATIONS

- ALTERNATE ROUTE ANALYSIS
- FEASIBILITY AND COST
- IMPACT TO THE NEIGHBORHOOD
- CONSIDERATION FOR TREES IN THE AREA

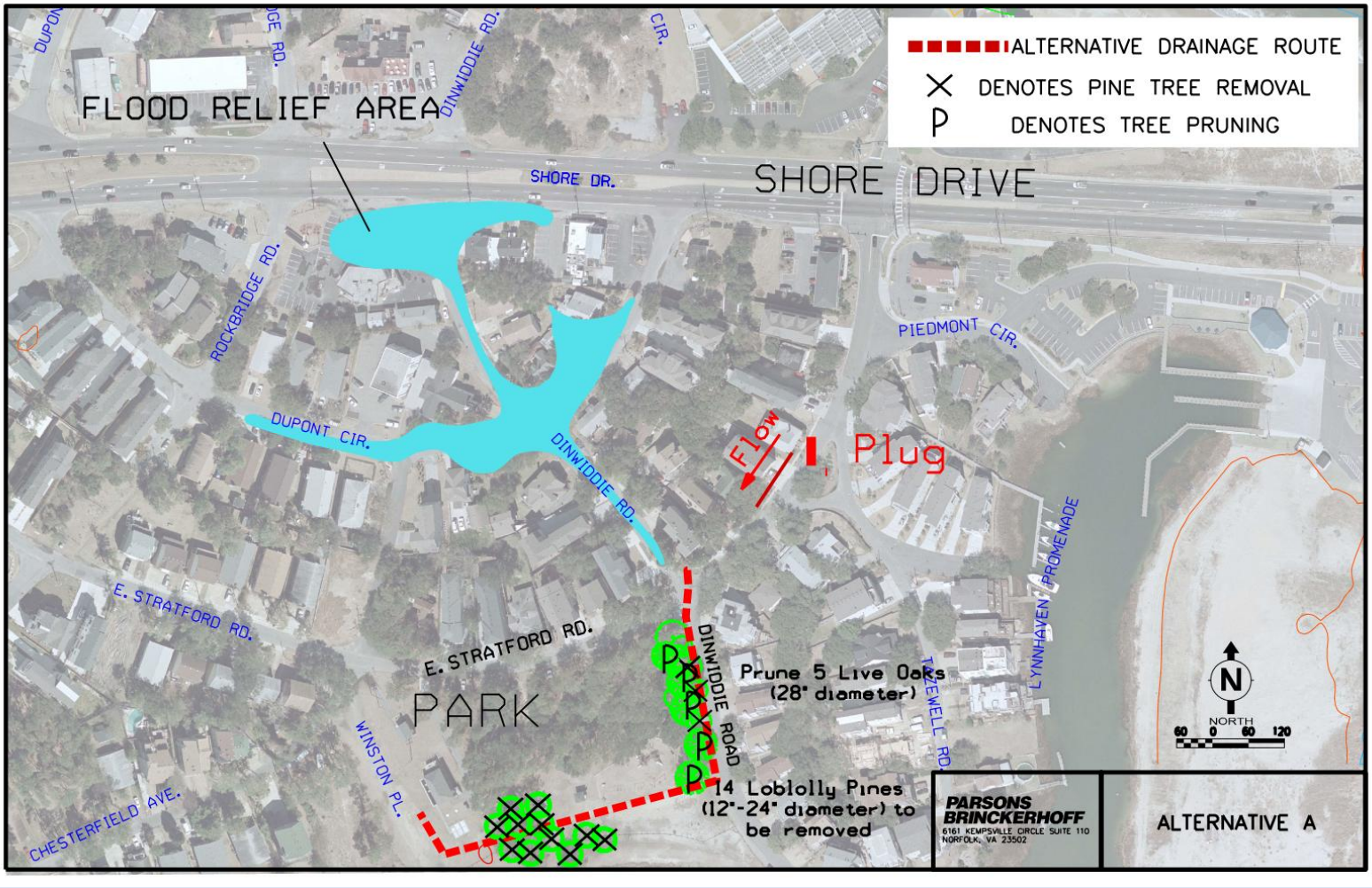
ALTERNATIVES

- A – Reroute flows along Dinwiddie Road and through the park
- B –Reroute along East Stratford Road
- C – Install additional parallel 18” along Dupont Circle from Dinwiddie Road to intersection of Chesterfield and Dinwiddie Road

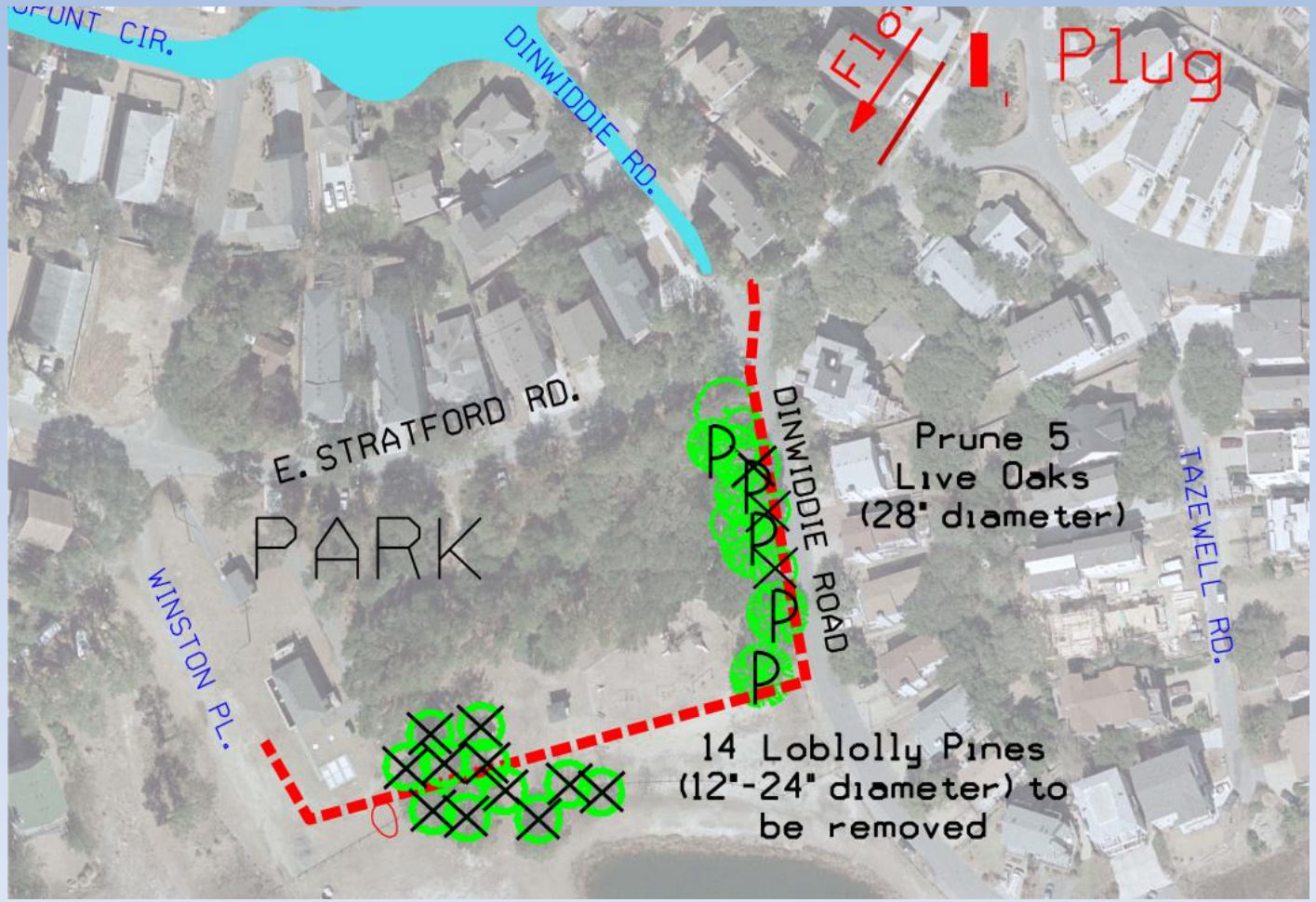
REGARDLESS OF THE ALTERNATIVE, TIDAL RELIEF IS ONLY GOOD UP TO AN ELEVATION OF 5.0 FEET NAVD88 (OR 5.9 FEET MSL).

ALTERNATIVE A

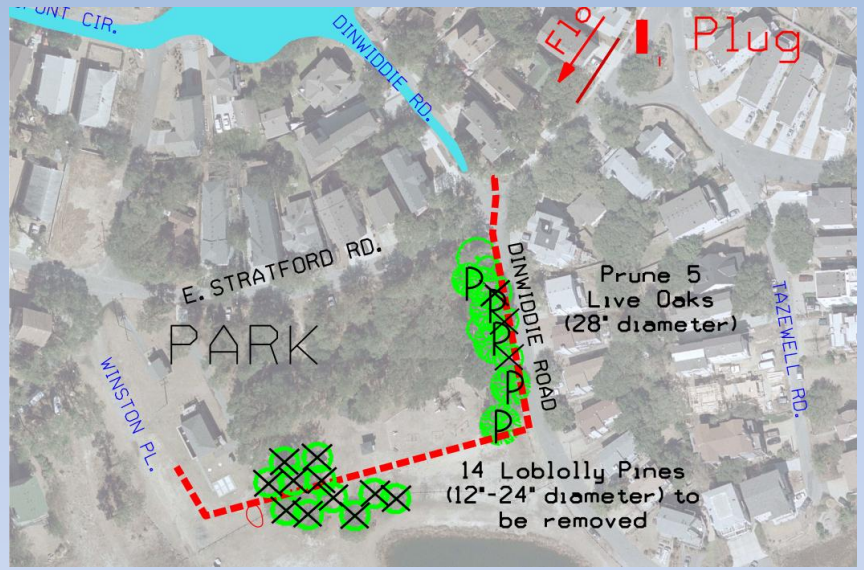
Reroute along Dinwiddie Road and through the park



Alternative A

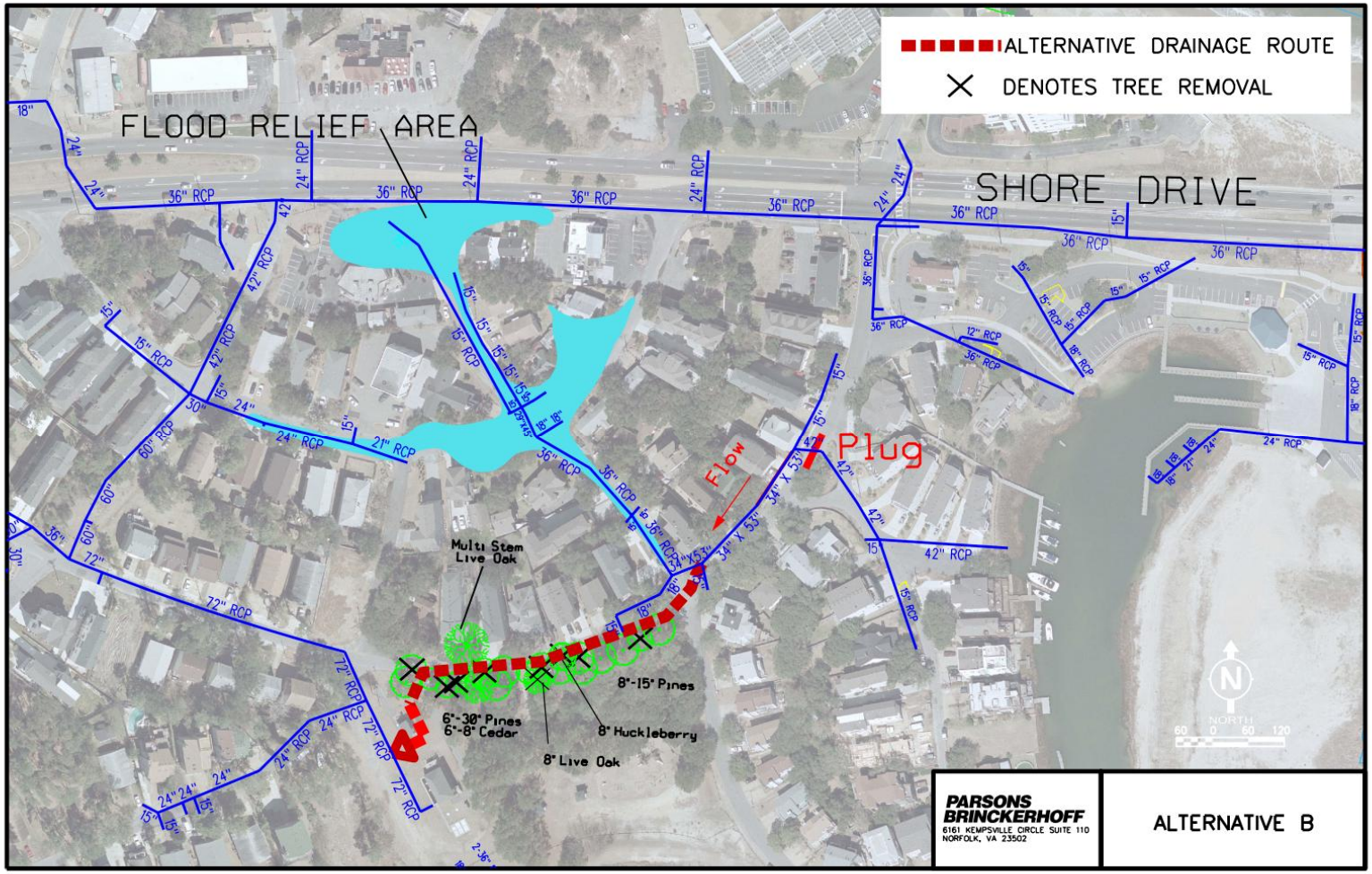


Alternative A

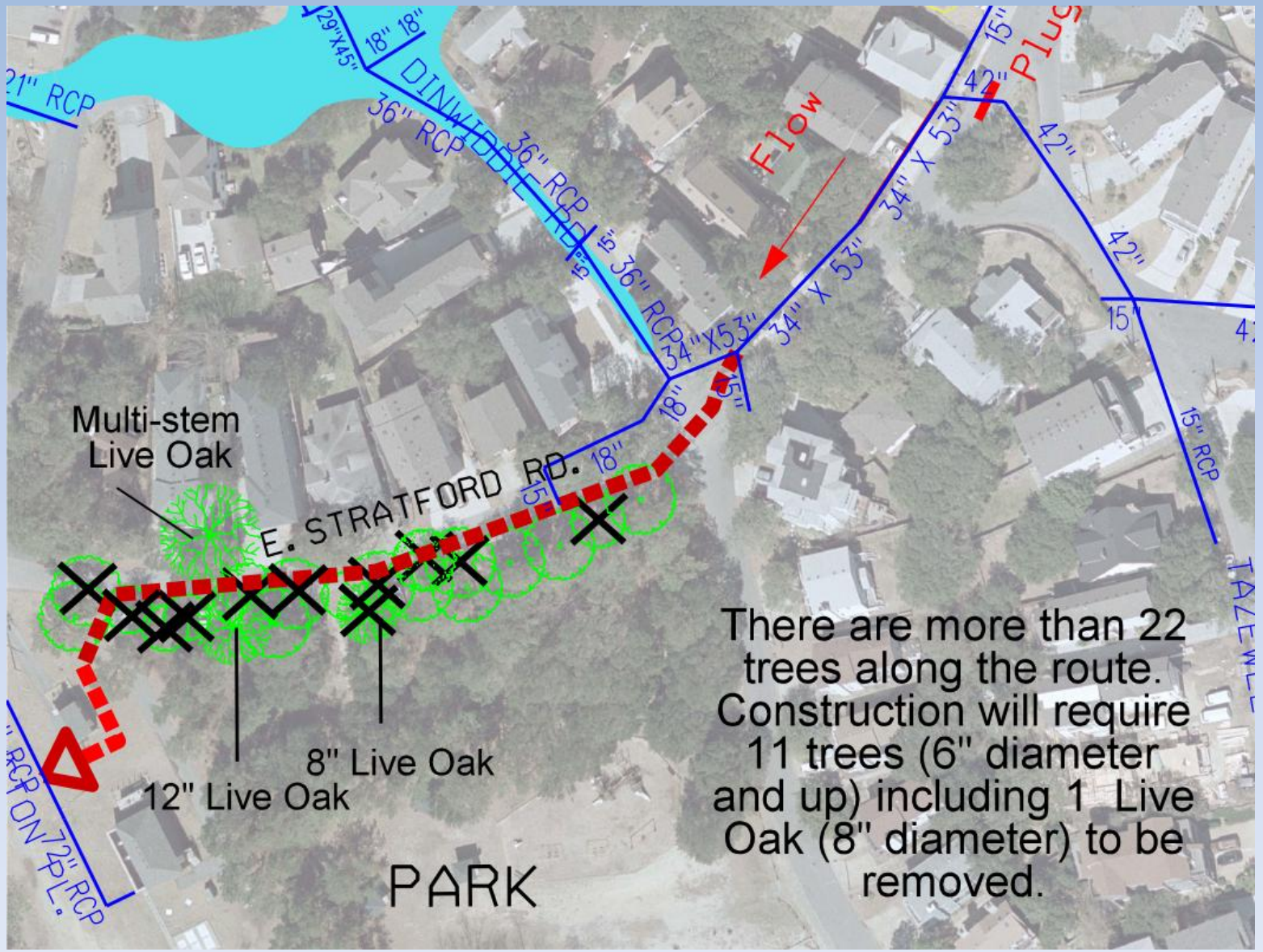


Pros	Cons
• Meets city standard for drainage in this area • Only Dinwiddie Road south of East Stratford is disturbed	• Pruning of 5 Live Oaks and removal of 14 large pines. • Construction through the park Duration: 8 months • $$$

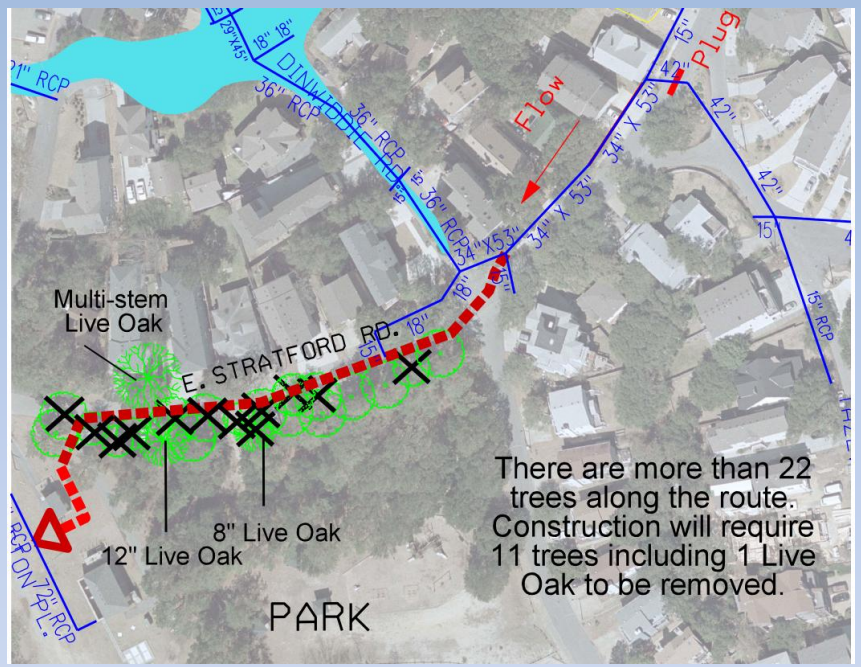
ALTERNATIVE B
Reroute westward on East Stratford Road



Alternative B



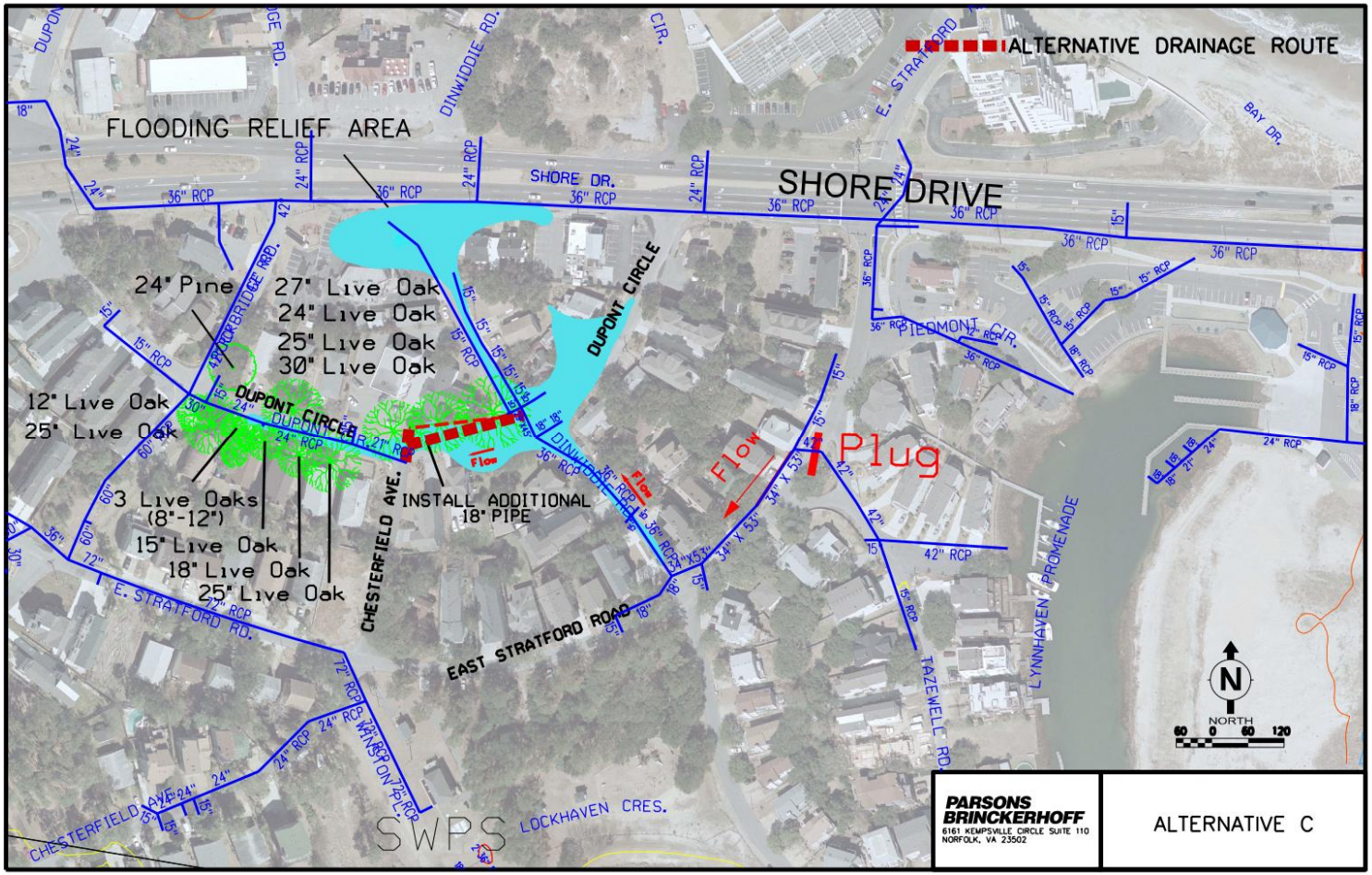
Alternative B



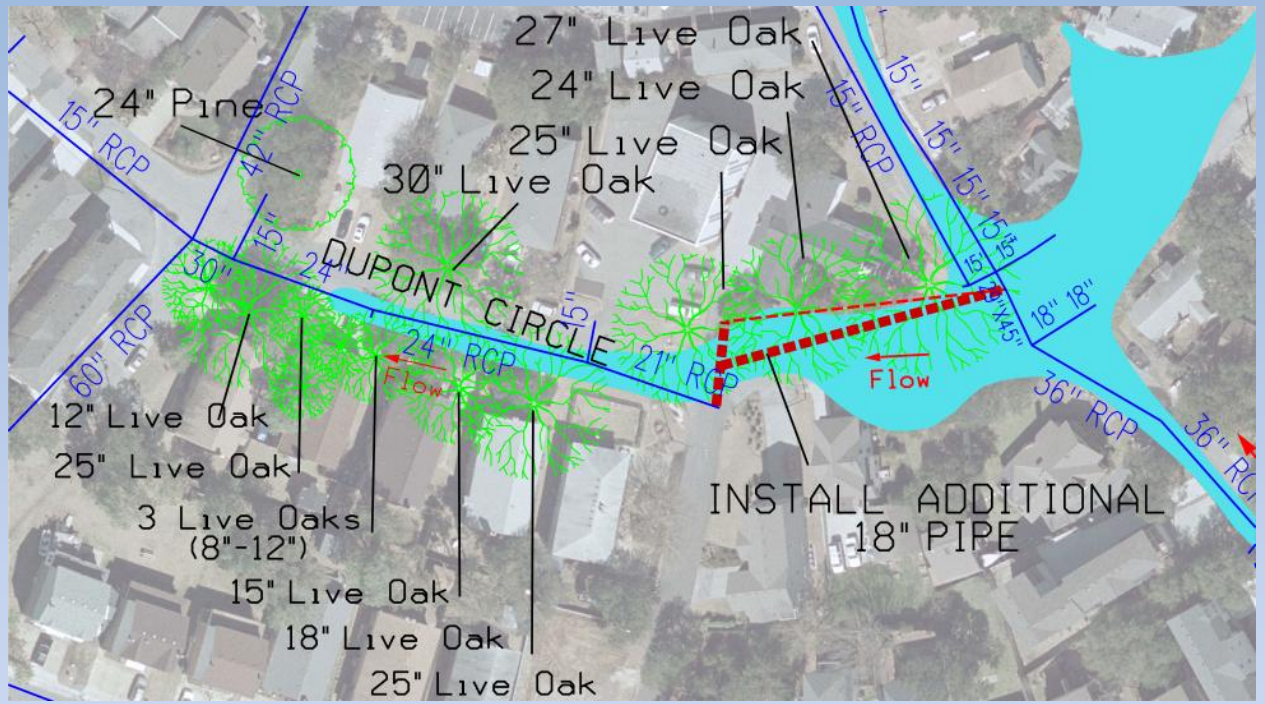
Pros	Cons
• Meets city standard for drainage in this area	• Removal of 1 Live Oak and 10 other trees (6” diameter and up) • Construction along East Stratford Road (8 months) • $$$$

ALTERNATIVE C

Reroute westward on Dupont Circle with additional pipe

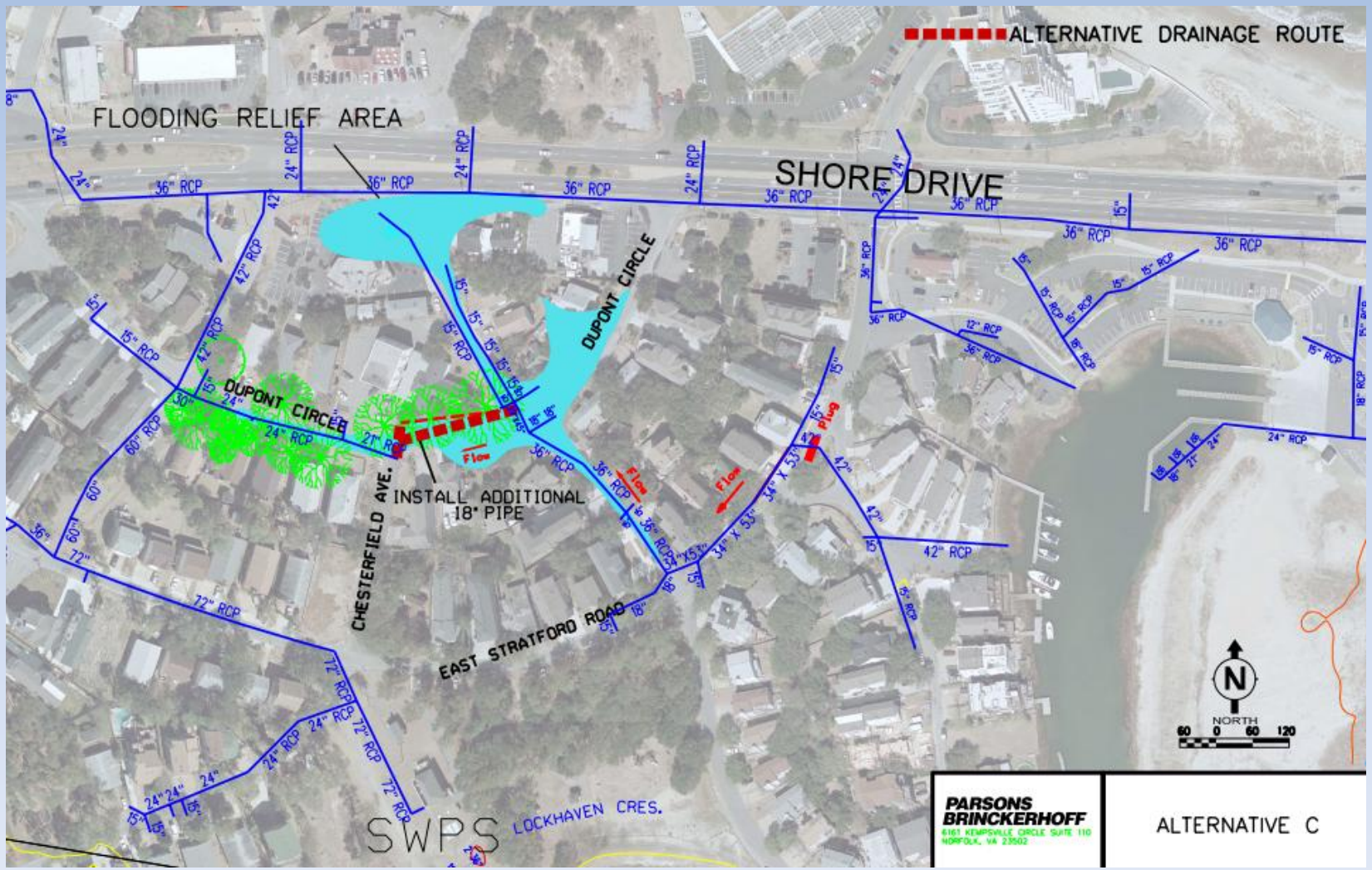


Alternative C

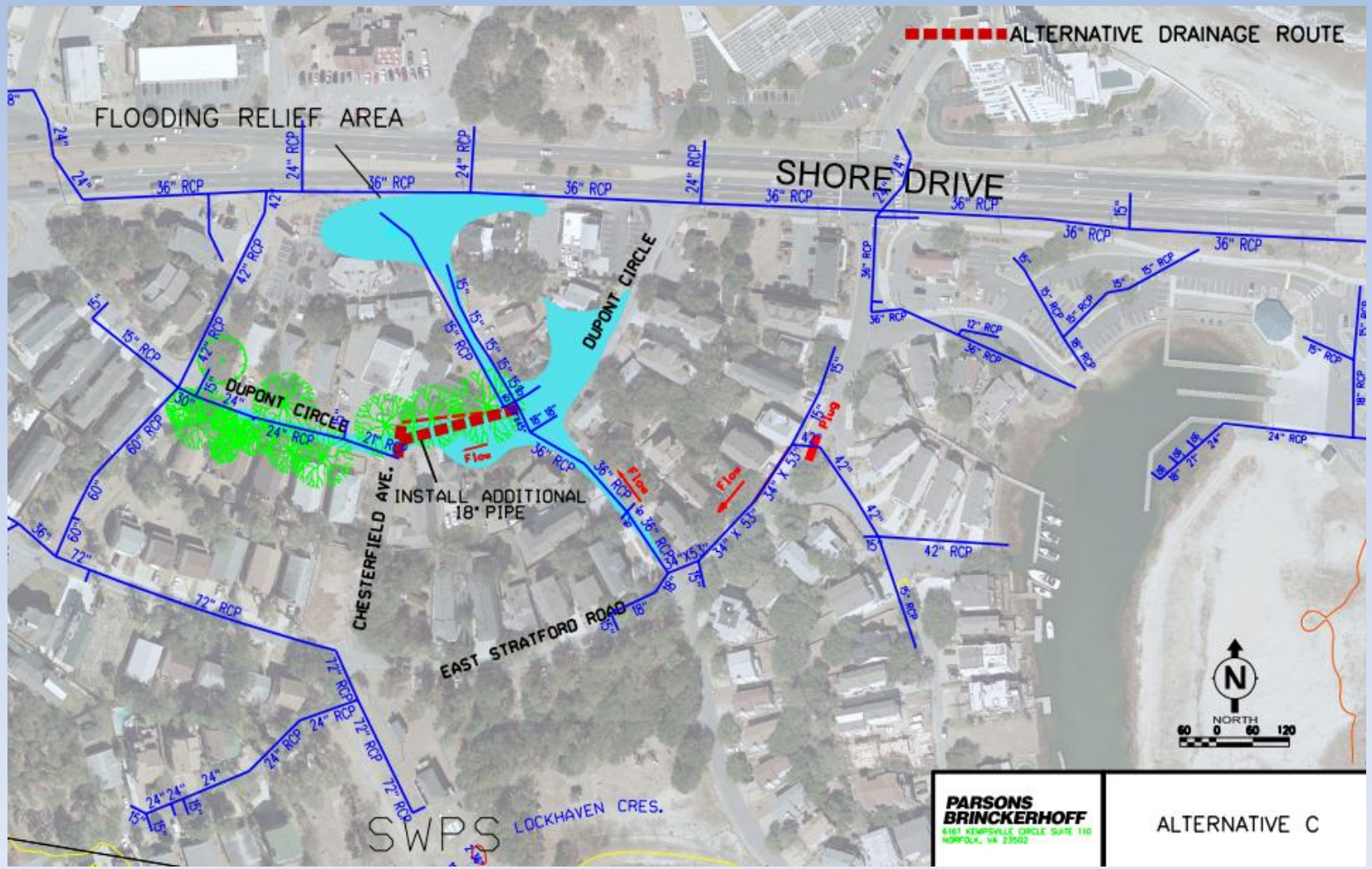


Pros	Cons
• Provides drainage relief for rainfall intensities up to 2" of rain in 1 hour • No tree removals • Least Costly of 3 alternatives • Shorter construction duration (4 months)	• Flooding will occur during rainstorms with intensities more than 2 in/hour regardless of tidal levels

APPROXIMATE AREA OF FLOODING FOR ALTERNATIVE C LARGE STORMS WITH LARGE INTENSITIES 2-6 IN/HOUR (FLOOD DEPTH 2-6 INCHES)



APPROXIMATE AREA OF FLOODING FOR ALTERNATIVE C FOR HURRICANE IRENE: 2.5 INCHES DEPTH FOR 4 HOURS



SUMMARY

IMMINENT ACTIONS

- INSTALL TEMPORARY PLUG AT INTERSECTION OF TAZEWELL AND EAST STRATFORD ROAD
- INSTALL TEMPORARY WEIR
- RECONNECT ABANDONED 15” PIPE TO PUMP STATION

ALTERNATIVES

- A – INSTALL ADDITIONAL PIPE THROUGH PARK
- B – INSTALL ADDITIONAL PIPE WESTWARD ON EAST STRATFORD ROAD
- C- INSTALL ADDITIONAL 18” PIPE WESTWARD ON DUPONT CIRCLE

PROVIDES PROTECTION FOR TIDES UP TO ELEVATION OF 5.0 FEET (NAVD88 OR 5.9 MSL)

Alternatives A-C Pros and Cons

Alternative	Pros	Cons
A Reroute additional pipe along Dinwiddie Road and through the park	• Provides drainage for large storms with intensities 3 to 6 in/hour • Only Dinwiddie Road south of East Stratford is disturbed	• Pruning of 5 Live Oaks and removal of 14 Pines • Construction in park and along Dinwiddie Road (8 months) • $434,000
B Reroute westward on East Stratford Road	• Provides drainage for large storms with intensities 3 to 6 in/hour	• Removal of 1 Live Oak and 10 other trees (6" diameter and up) • Construction along East Stratford Road (8 months) • $454,000
C Reroute additional 18" parallel pipe	• Provides drainage for large storms with intensities 1 to 2 in/hour • Construction does not damage trees • Construction along Dupont Circle (4 months) • Least Costly ($150,000)	• May experience some flooding during very intense rainstorms with intensities greater than 2 in/hour.

NOTE: REGARDLESS OF THE ALTERNATIVE, TIDAL RELIEF IS ONLY GOOD FOR A TIDAL ELEVATION OF UP TO 5.0 FEET NAVD88 (5.9 FEET M.S.L.)