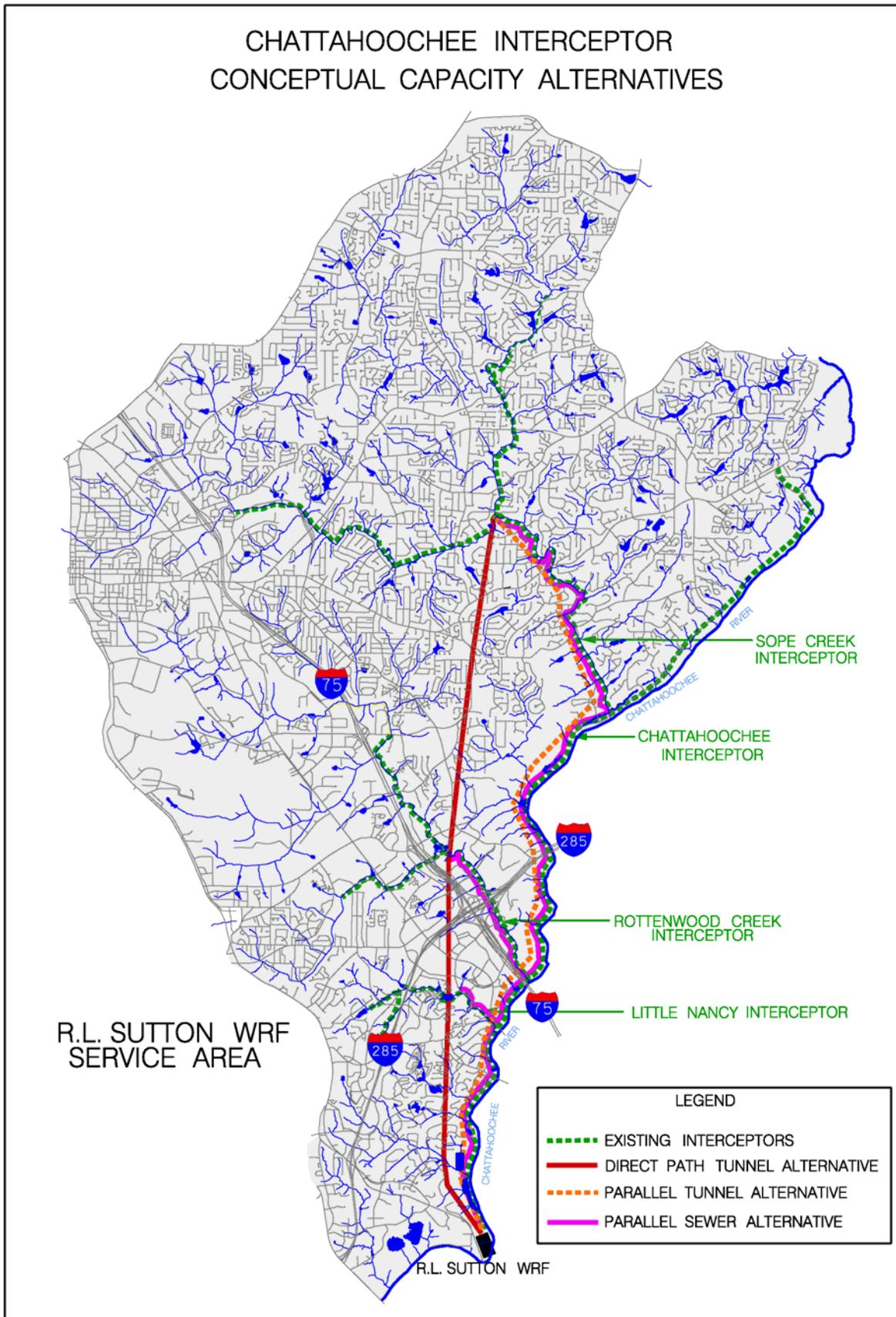


# CHATTAHOOCHEE TUNNEL PHOTOGRAPHICAL HISTORY



# CAPACITY ALTERNATIVES CONSIDERED



# Sewer Interceptors in Chattahoochee River National Recreation Area Required Additional Capacity



Existing 42" line along Sope Creek at Mill Ruins, without Tunnel would have to be replaced with a 90" line.



Existing 60" line in CRNRA at Cochran Shoals Fitness Area, without Tunnel would have to be replaced with a 108" line.

## Photographs of Conventional Sewer Construction

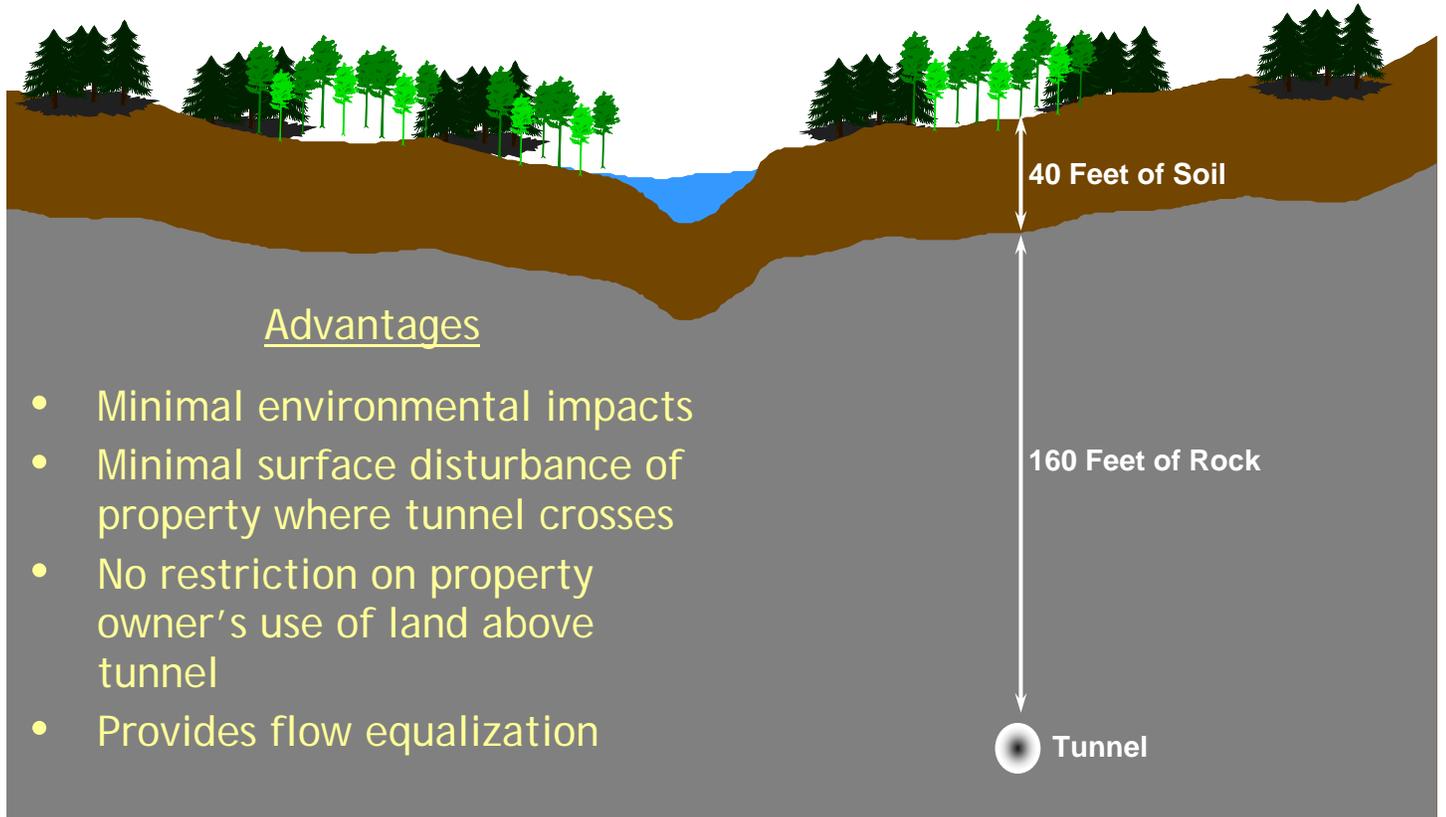


42" sewer line construction at creek crossing.



Sewer line construction in neighborhood.

# Deep Tunnel Concept

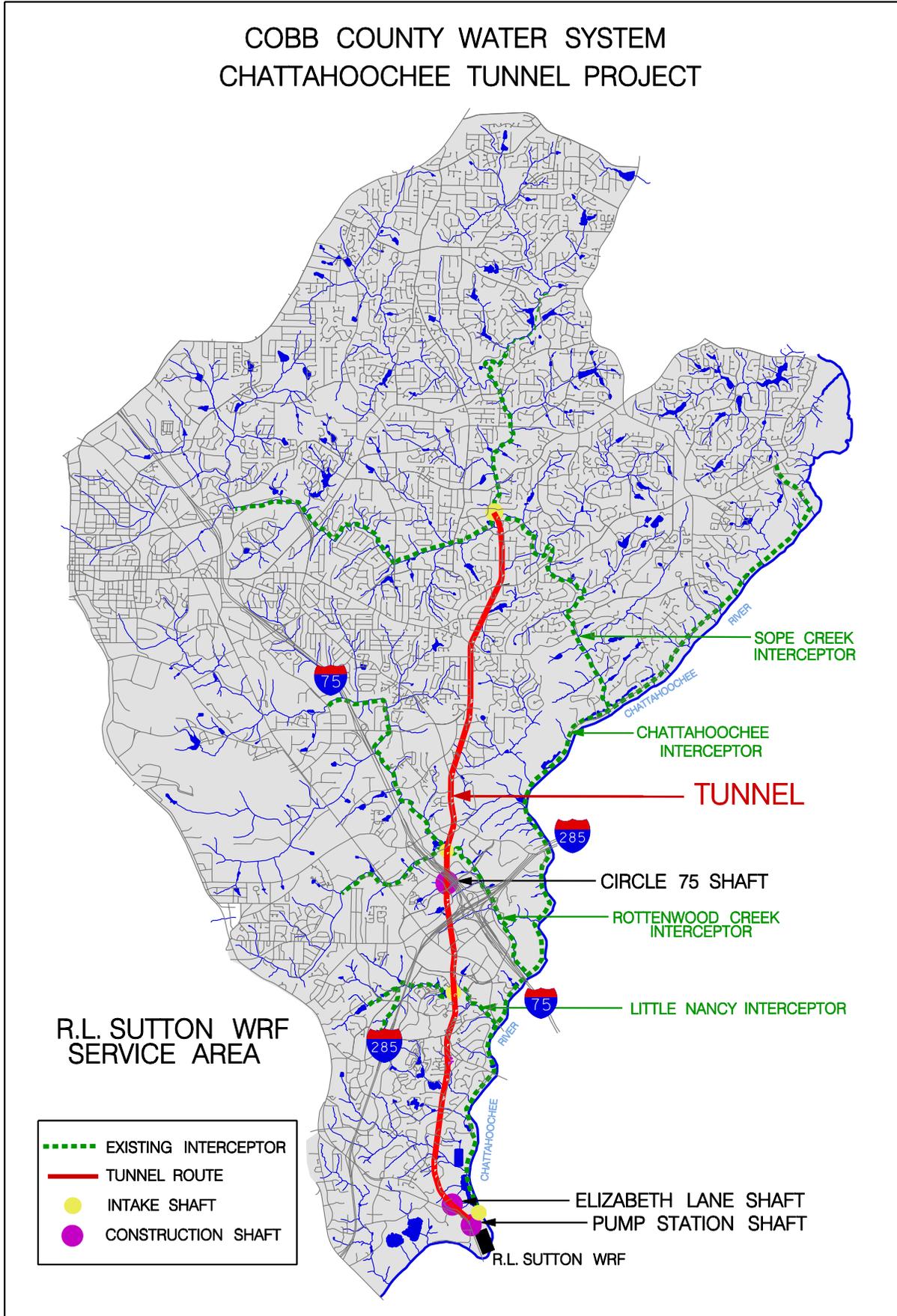


## Advantages

- Minimal environmental impacts
- Minimal surface disturbance of property where tunnel crosses
- No restriction on property owner's use of land above tunnel
- Provides flow equalization

# Tunnel Alignment Selected

## COBB COUNTY WATER SYSTEM CHATTAHOOCHEE TUNNEL PROJECT



# Tunnel Construction Photographs



Excavation of Pump Station Shaft, which is 100 feet wide.



Looking down Elizabeth Lane Shaft, which is 32 feet wide and 180 feet deep.



Bottom of Elizabeth Lane Shaft.

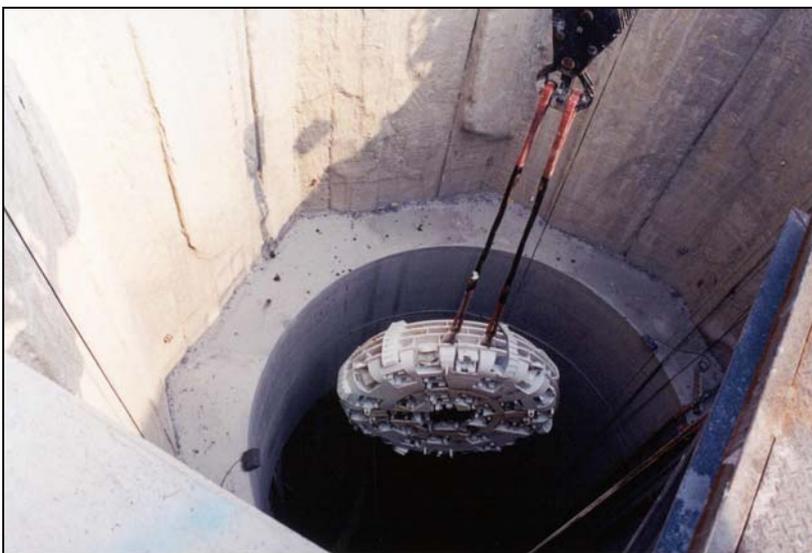
# TBM Installation



Starter tunnel was excavated by drill and blasting to make room to install tunnel boring machine underground.



Tunnel boring machine (TBM) assembled at factory prior to shipping to site.

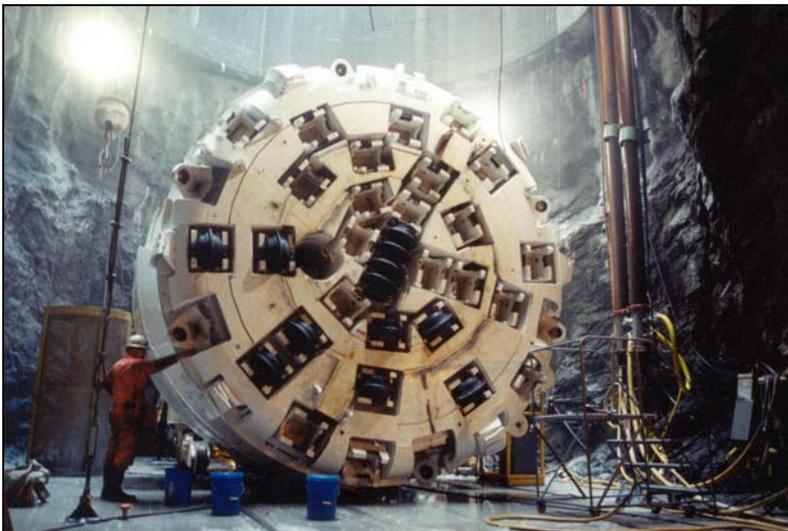


Installing TBM – Lowering cutterhead weighing 77 tons down shaft.

# TBM Installation



Installing TBM –  
Lowering main  
beam weighing 47  
tons down shaft.



Installing TBM –  
Cutterhead at bottom  
of shaft. Cutterhead  
contains 39 cutters,  
each weighing 400  
pounds.



Installing TBM –  
Looking down on  
TBM at bottom of  
shaft.

# Tunnel Photographs



Transition from starter tunnel to TBM tunnel.



TBM (bored) section of tunnel.



TBM tunnel, looking at back of TBM.

## Completed Mining in Fall 2002



South Drive hole through into Circle 75 shaft.



South Drive TBM crew after hole through.



End of North Drive under Indian Hills.

# Raised Bore Intake Shaft Construction Photographs



Installation of raised bore cutter.



Raised bore construction with rock cuttings falling into tunnel.



Completed intake shaft.

## Intake Construction at Surface



Raised bore machine at Indian Hills pulls raise bore cutter to surface.



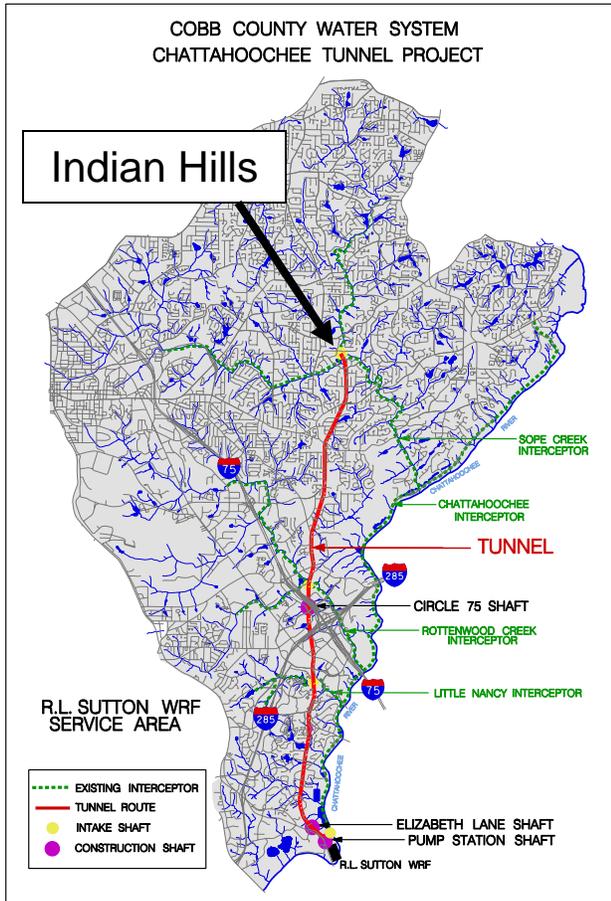
Intake structure at surface, which drops wastewater from existing sewer into tunnel.



Intake structure at surface, which drops wastewater from existing sewer into tunnel.

# Indian Hills Intake Shaft Construction and Post-Construction Photographs

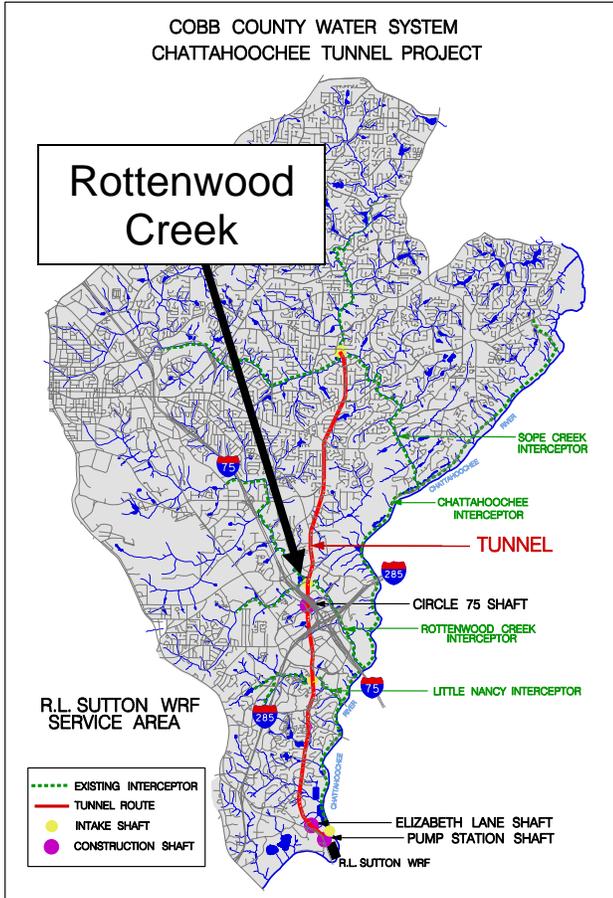
*Construction Photographs*



*Post-Construction Aerial*



# Rottenwood Creek Intake Shaft Construction and Post-Construction Photographs



Construction Photographs



Post-Construction Aerial

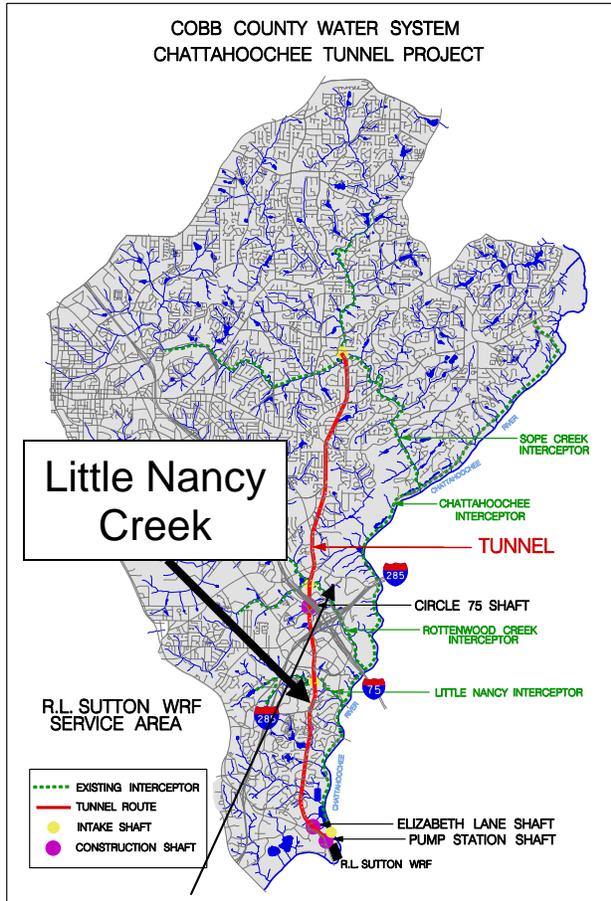


Post-Construction Photograph



# Little Nancy Creek Intake Shaft Construction and Post-Construction Photographs

*During Construction*



*Post-Construction Aerial*



*Post-Construction Photograph*



# Tunnel Concrete Lining Operation



Concrete car transport concrete from shaft to concrete forms in tunnel shaft.



Concrete forms – Concrete is poured behind forms.



Lined section of tunnel.