



**Special Town Council Meeting**  
**August 2023 Work Session**  
**August 15, 2023 | 4:30 PM**  
**Apex Town Hall | 73 Hunter Street, Apex, NC**

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- 1. Call to Order | Pledge of Allegiance**  
*Mayor, Jacques K. Gilbert*
- 2. Big Branch Force Main (BB2) Update**  
*Michael Deaton, Director, Water Resources Department*
- 3. Long-Range Water and Sewer Capacity Discussion**  
*Michael Deaton, Director, Water Resources Department*
- 4. Q & A**
- 5. Adjournment**

**ANNOUNCEMENTS**

Members of the public can access and view the meeting on the Town's YouTube Channel <https://www.youtube.com/c/TownofApexGov> or attend in-person.

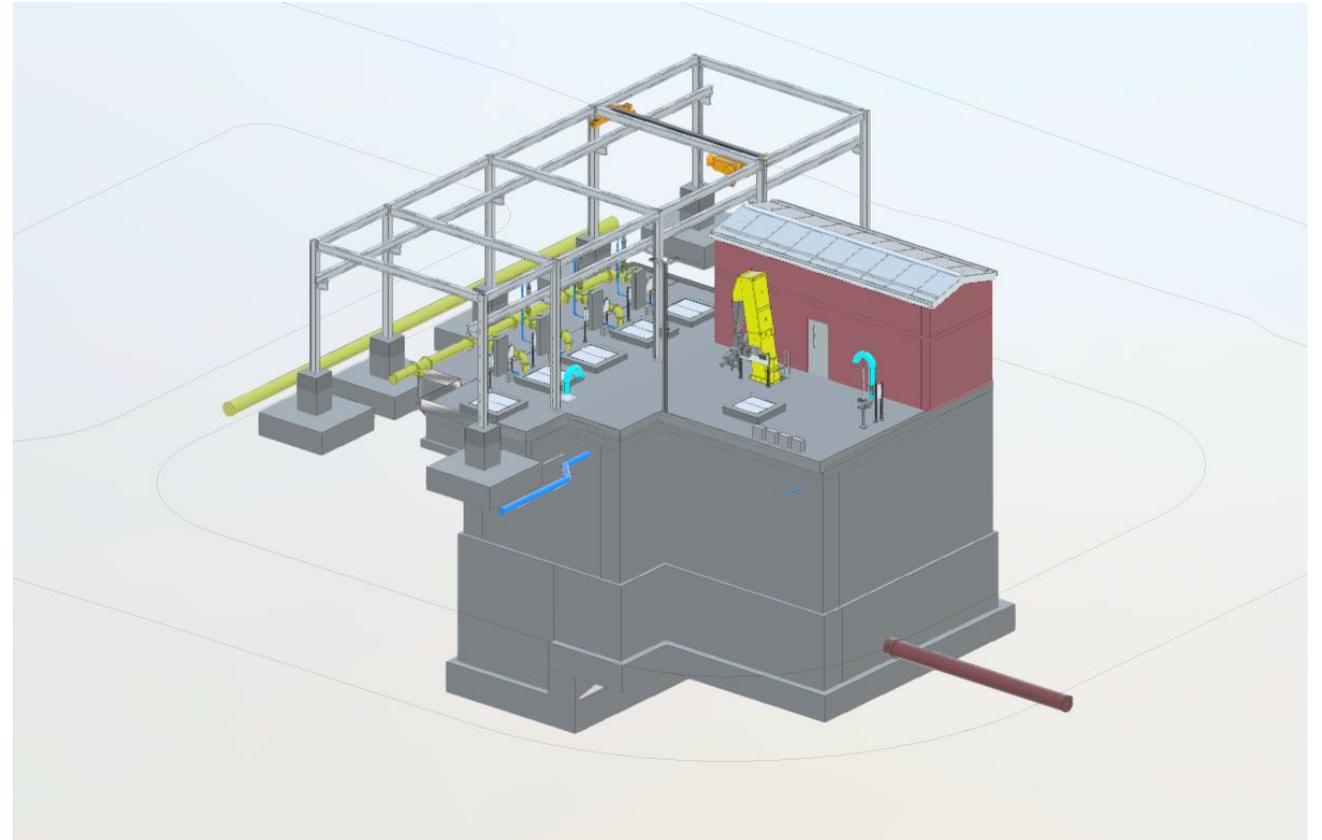
**Accommodation Statement:** Anyone needing special accommodations to attend this meeting and/or if this information is needed in an alternative format, please contact the Town Clerk's Office. The Town Clerk is located at 73 Hunter Street in Apex Town Hall on the 2nd Floor, (email) [allen.coleman@apexnc.org](mailto:allen.coleman@apexnc.org) or (phone) 919-249-1260.



# Big Branch 2 Pump Station and Pipeline Project Town Council Work Session

# Agenda

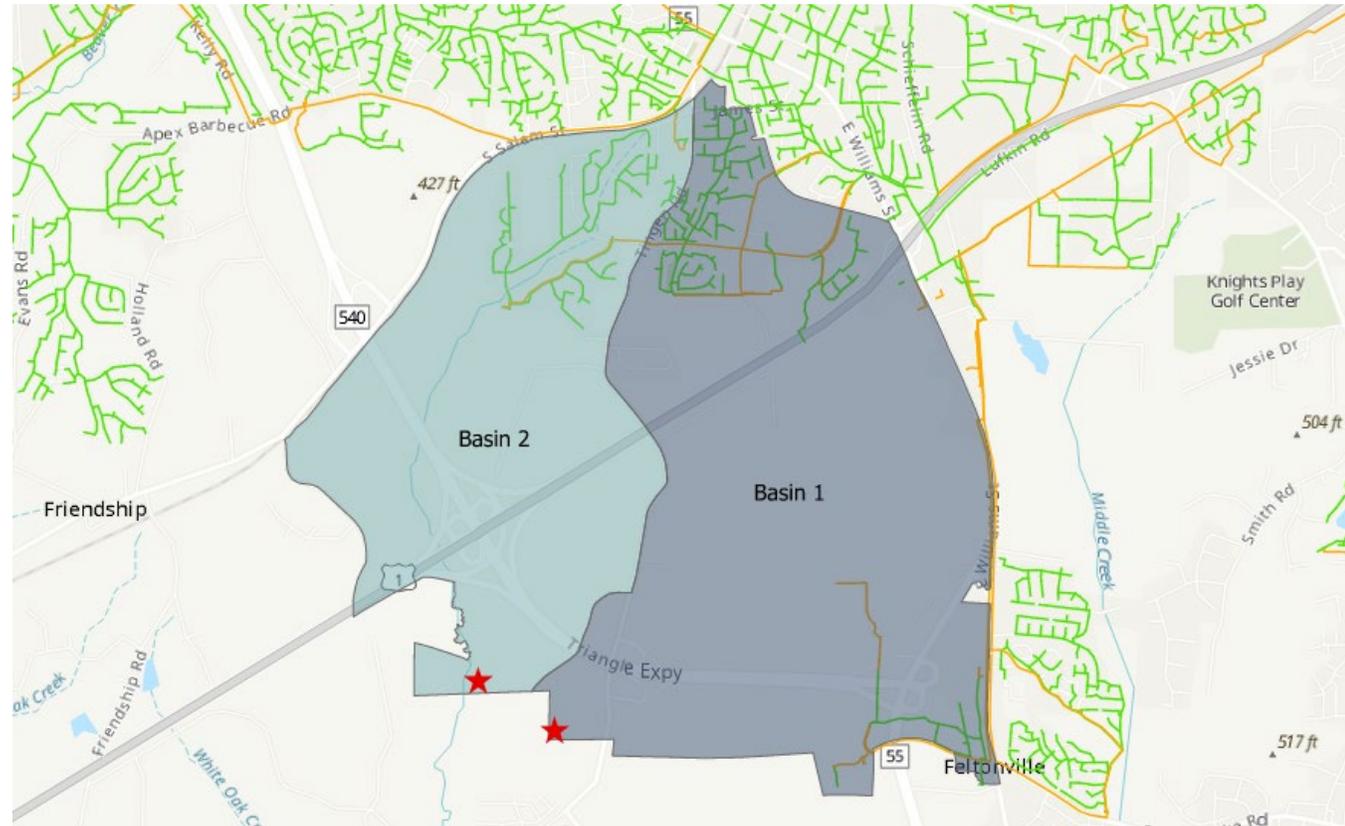
- Project History
- PER Study
- Pump Station Design Update
- Force Main Design Update
- Communications
- Q&A



# Project History

# Project History – Purpose

- Need for regional sewer solution for the Big Branch Basin
  - **Avoids a inter basin transfer (IBT)**
    - The Town is heavily invested in Western Wake WRF
  - **Economic development potential**
  - **Eliminate older, less-reliable pump stations per the Town's master plan**



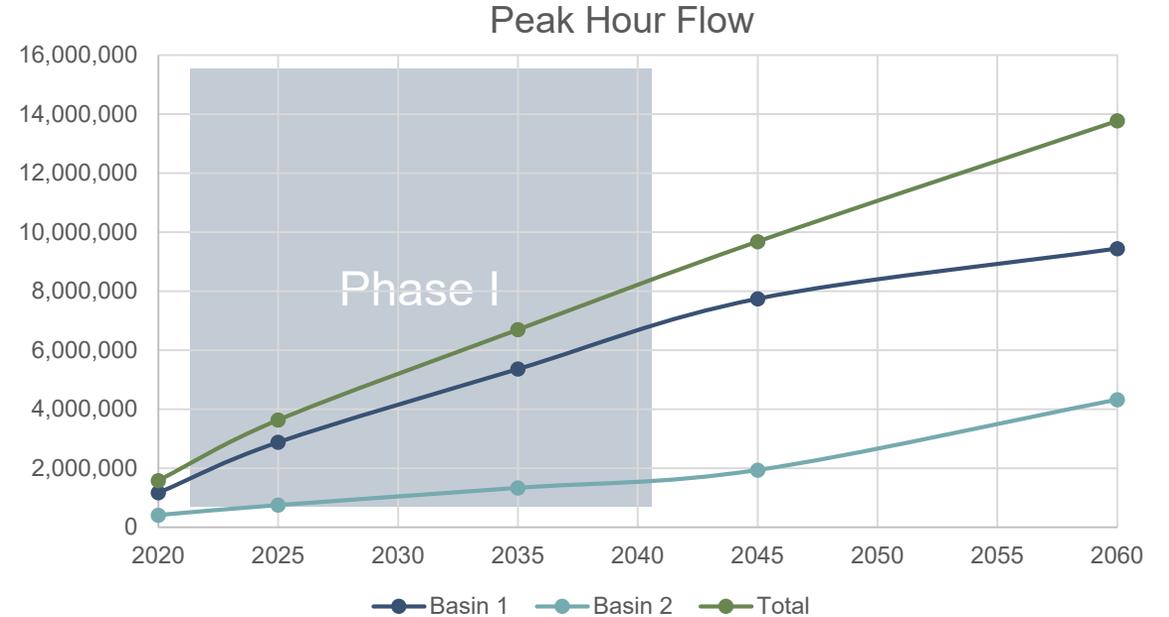
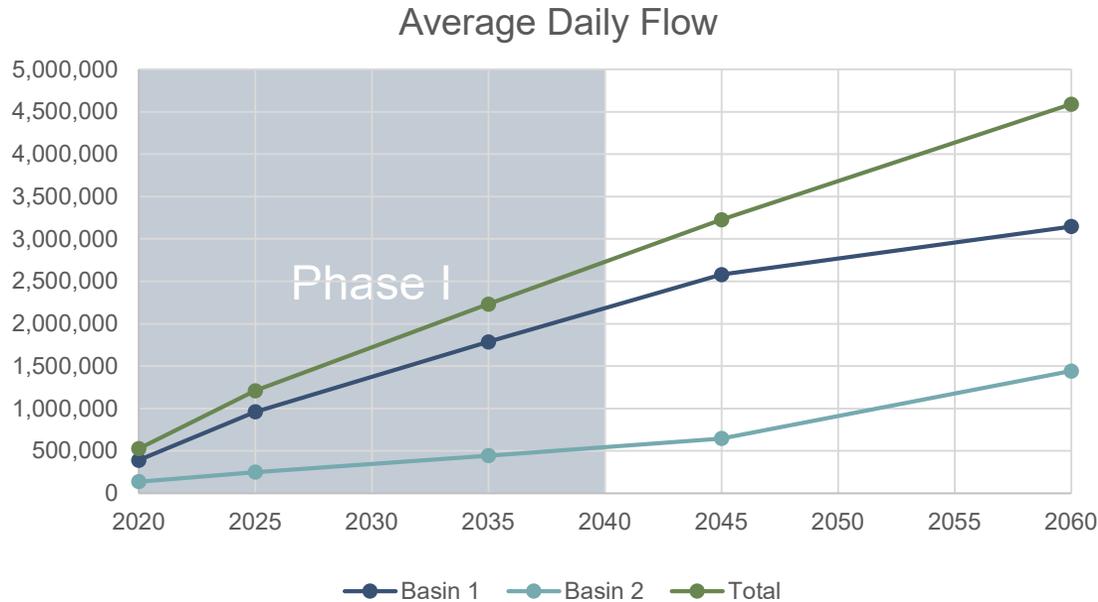
Big Branch Service Area

# Project History – Preliminary Design Timeline



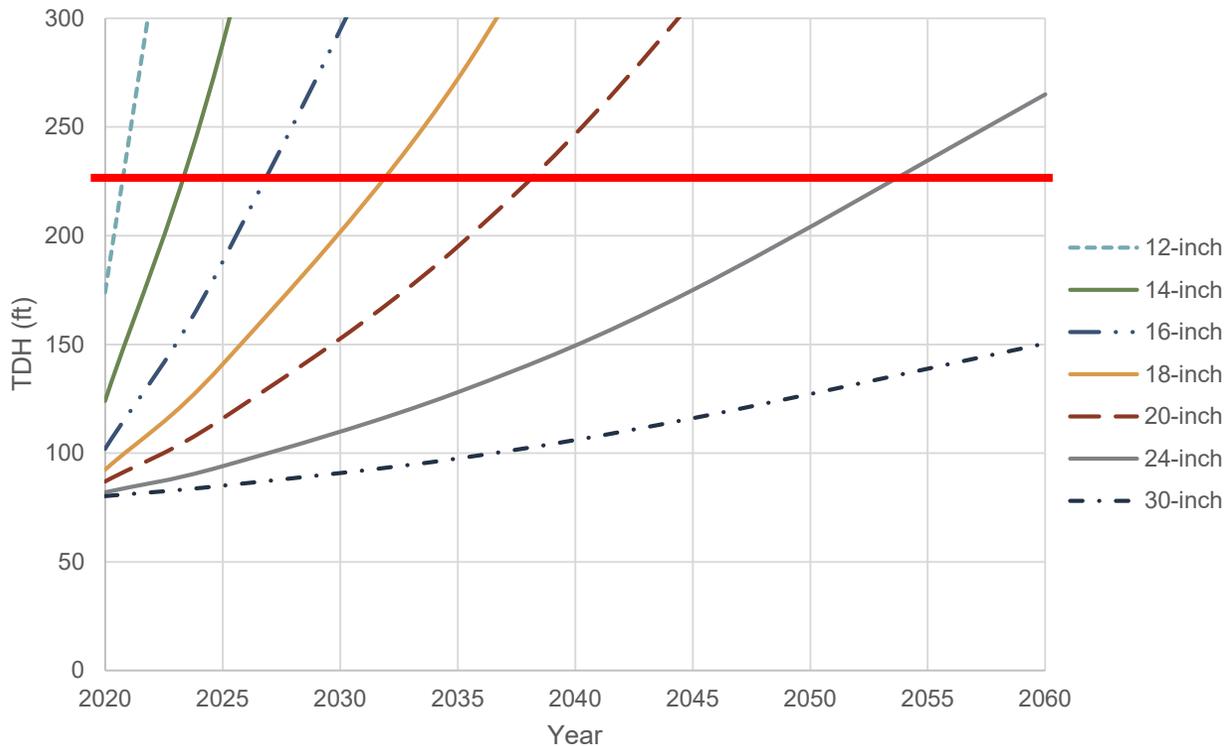
# Pump Station PER Study

# Flow Projections

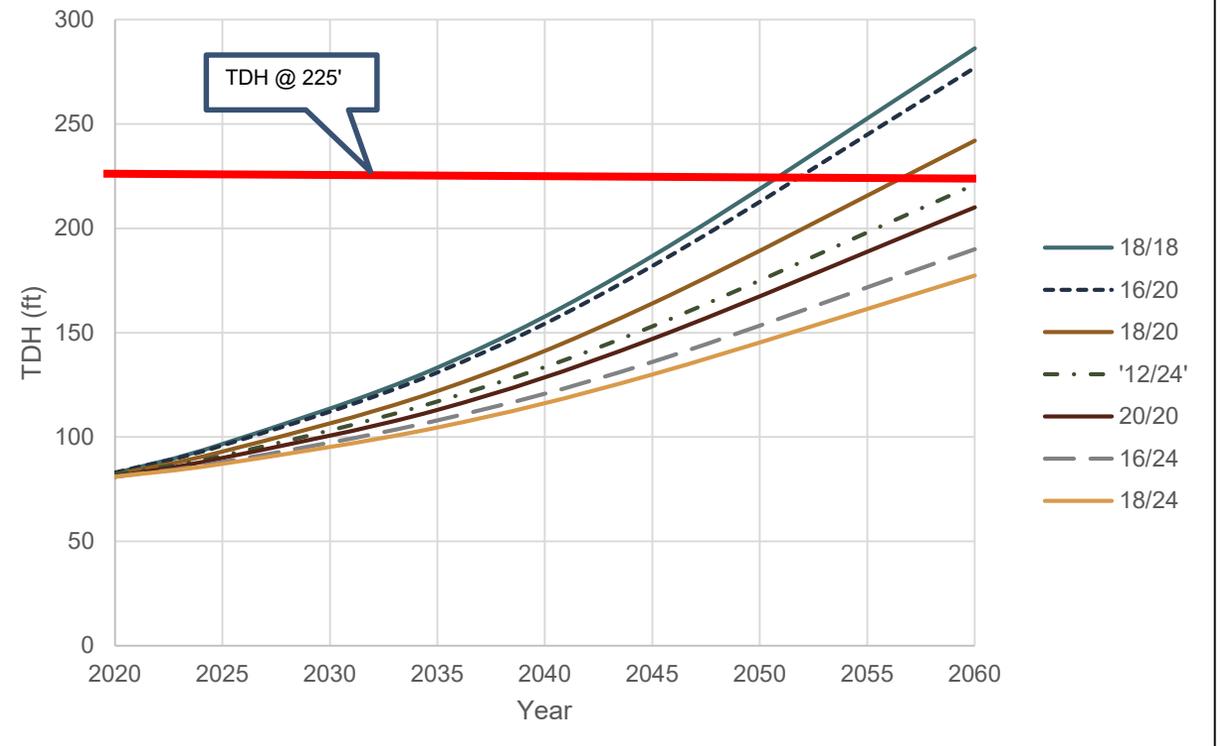


Basin	Phase I		Buildout	
	Average Day	Peak Hour	Average Day	Peak Hour
BB1	2.2 MGD	6.5 MGD	3.2 MGD	9.4 MGD
BB2	0.5 MGD	1.5 MGD	1.4 MGD	4.3 MGD
<b>Total</b>	<b>2.7 MGD</b>	<b>8.0 MGD</b>	<b>4.6 MGD</b>	<b>13.7 MGD</b>

# Force Main Sizing & Hydraulics



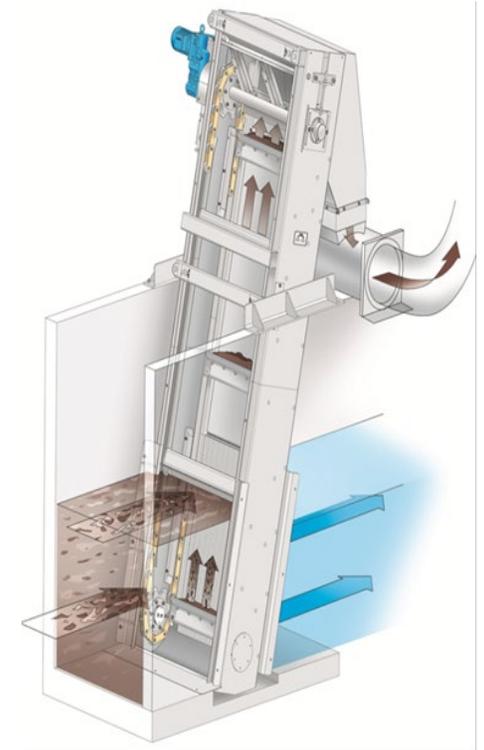
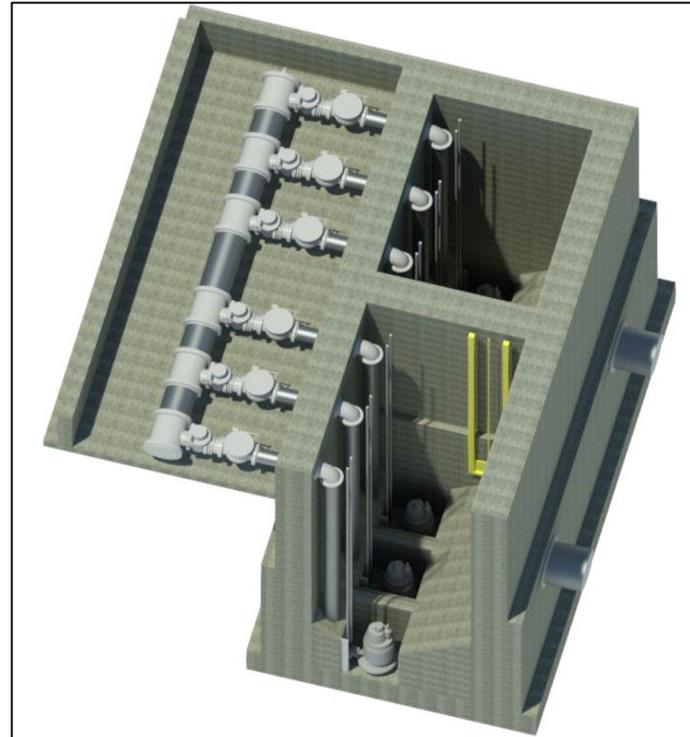
Single Force Main  
System Head Conditions



Parallel Force Main  
System Head Conditions

# Pump Station Arrangement & Appurtenances Recommendations

- Wet Well Type
  - Confined Inlet
- Pump Type
  - Submersible
- Channel Arrangement
  - Primary Channel – Multi-rake Mechanical Screen
  - Bypass Channel – Channel Grinder



# Pump Station Recommendations (cont.)

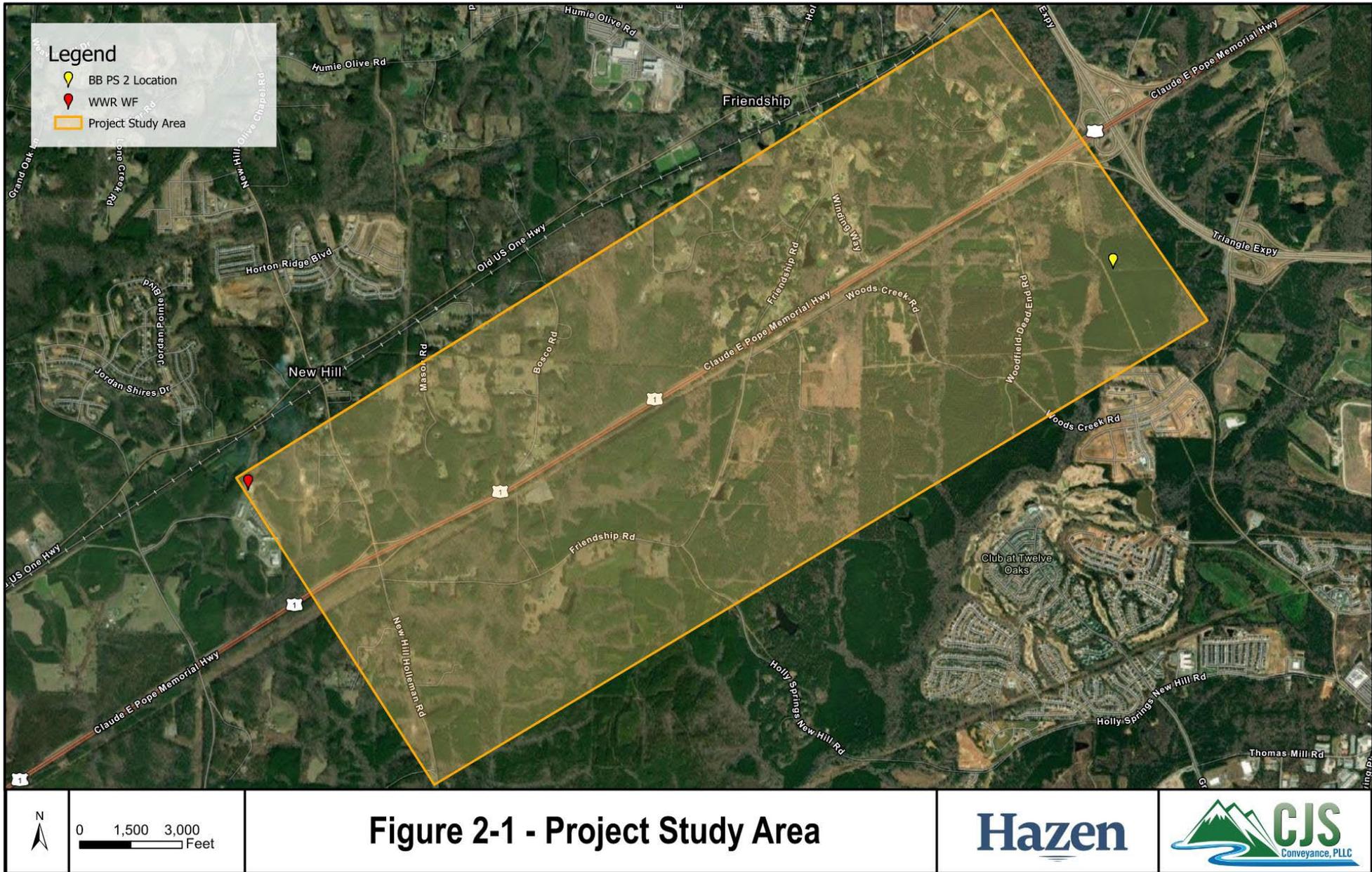
- Odor Control
  - Vapor Phase (For Onsite Odors)
    - *Dry Media Adsorber*
  - Liquid Phase (For Force Main Air Release Valves)
    - *Bioxide*
- Electrical Generator
- VFDs
  - w/ bypass starters
  - Housed in electrical building



# Pipeline PER Study

# General Force Main Routing Process

1. Identify Begin and End Points Required by Project
2. Identify the Routing Study Area
3. Identify Critical Features within Study Area
  - Areas that could support routing
  - Areas where routing is undesirable/not allowed
4. Develop Multiple Routes for Consideration
5. Assess Developed Routes to Determine Most Suitable Option

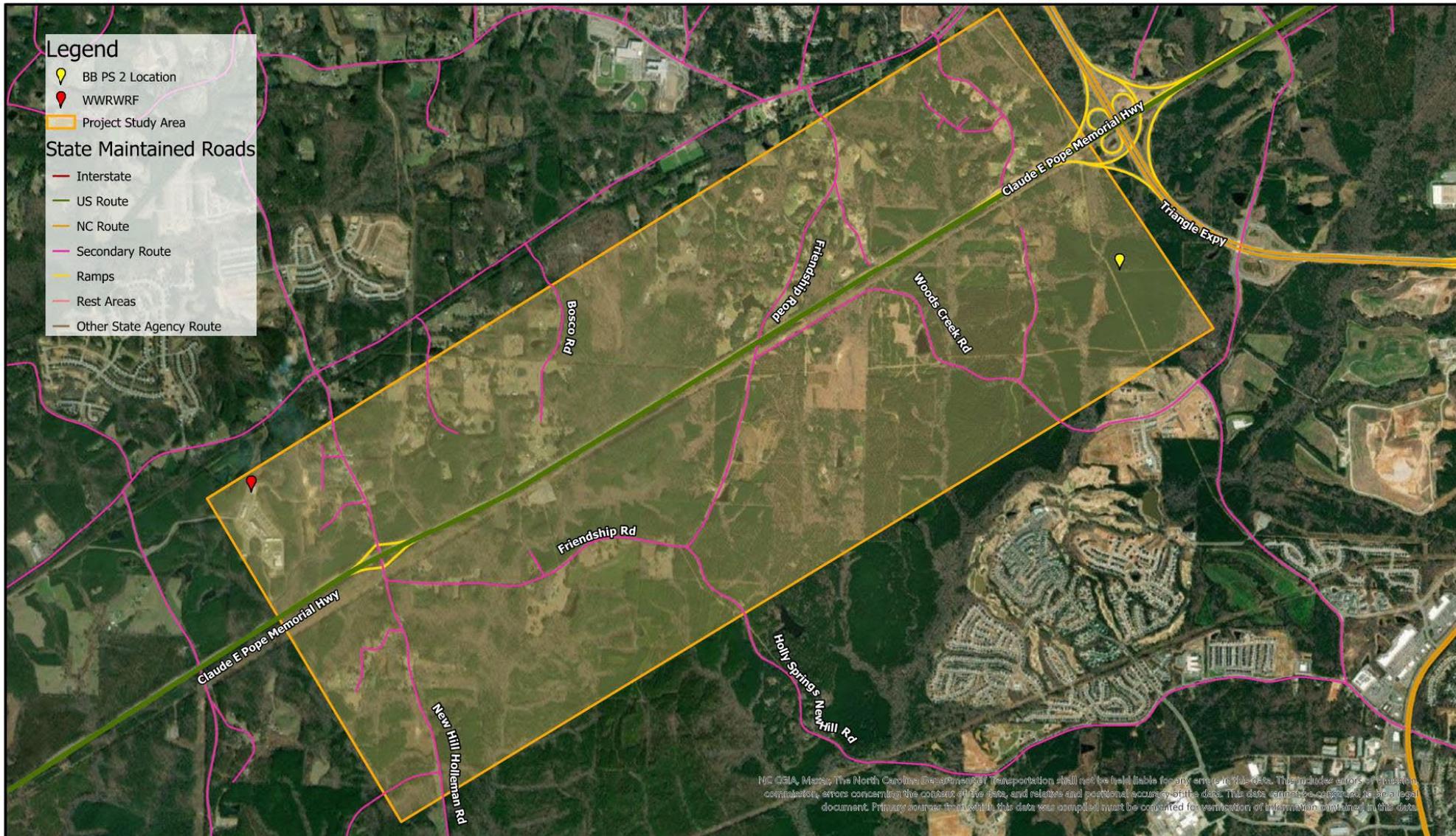


# Considerations for Development of Force Main Routes

- Municipal Boundary
  - North of US 1 is predominantly Town of Apex and Wake County
  - South of US 1 is predominantly Town of Holly Springs and Wake County
- Out of Jurisdiction Coordination Complexity
- Avoid Bisecting Parcels
- Approved and Pending Developments
- Minimize Environmental Impacts
- Utilize Existing Road/Easement Corridors Where Possible

# Road / Easement Routing Considerations

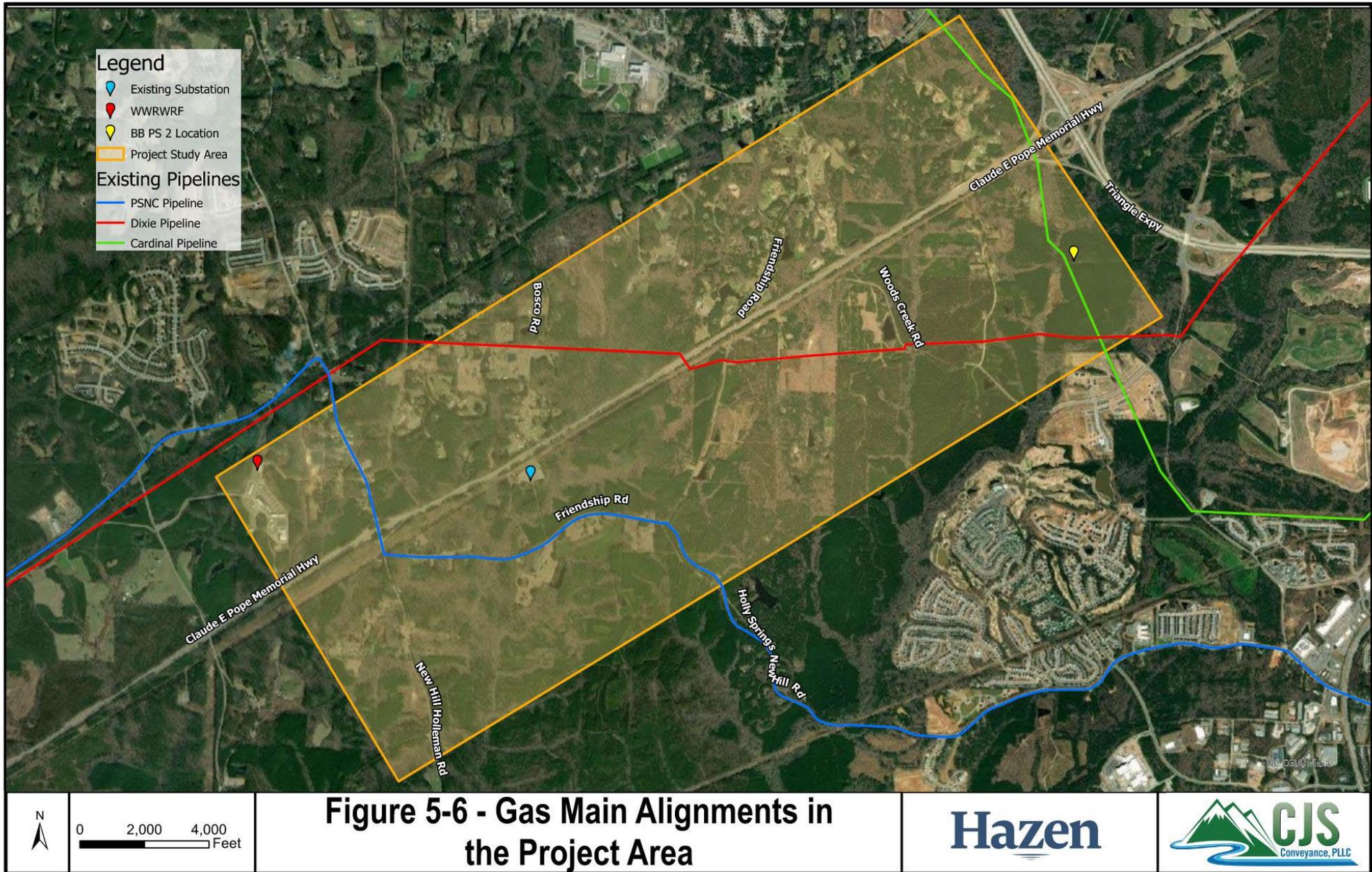
- Secondary Road Encroachment is Possible
- Encroachment in US 1 Not Allowed (controlled access)
- Parallel Installation in Gas Easements Not Allowed
- Parallel Installation in Duke Transmission Easements Not Allowed

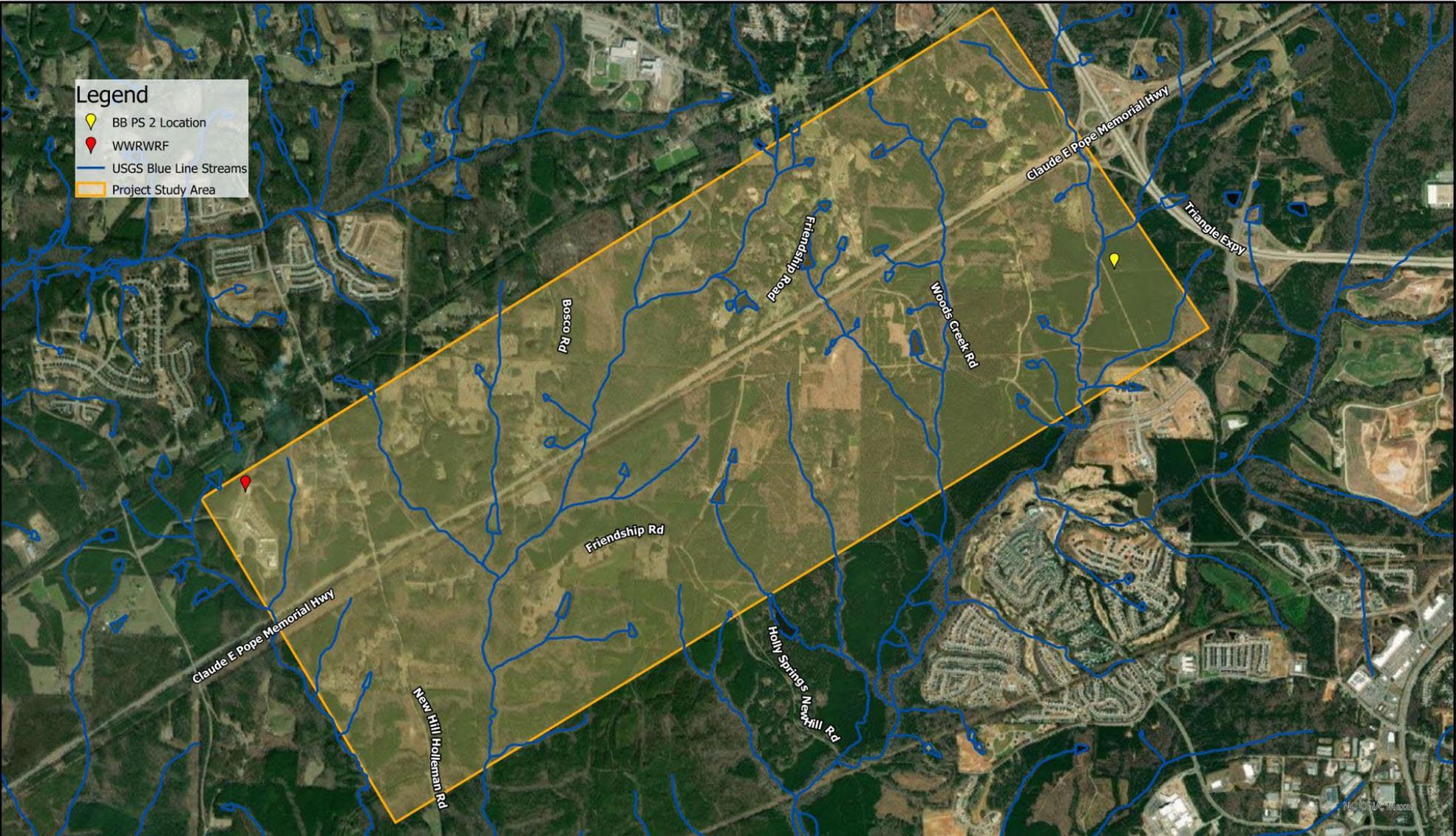


**Figure 5-3- NCDOT Maintained Roads in Project Area**

**Hazen**







**Legend**

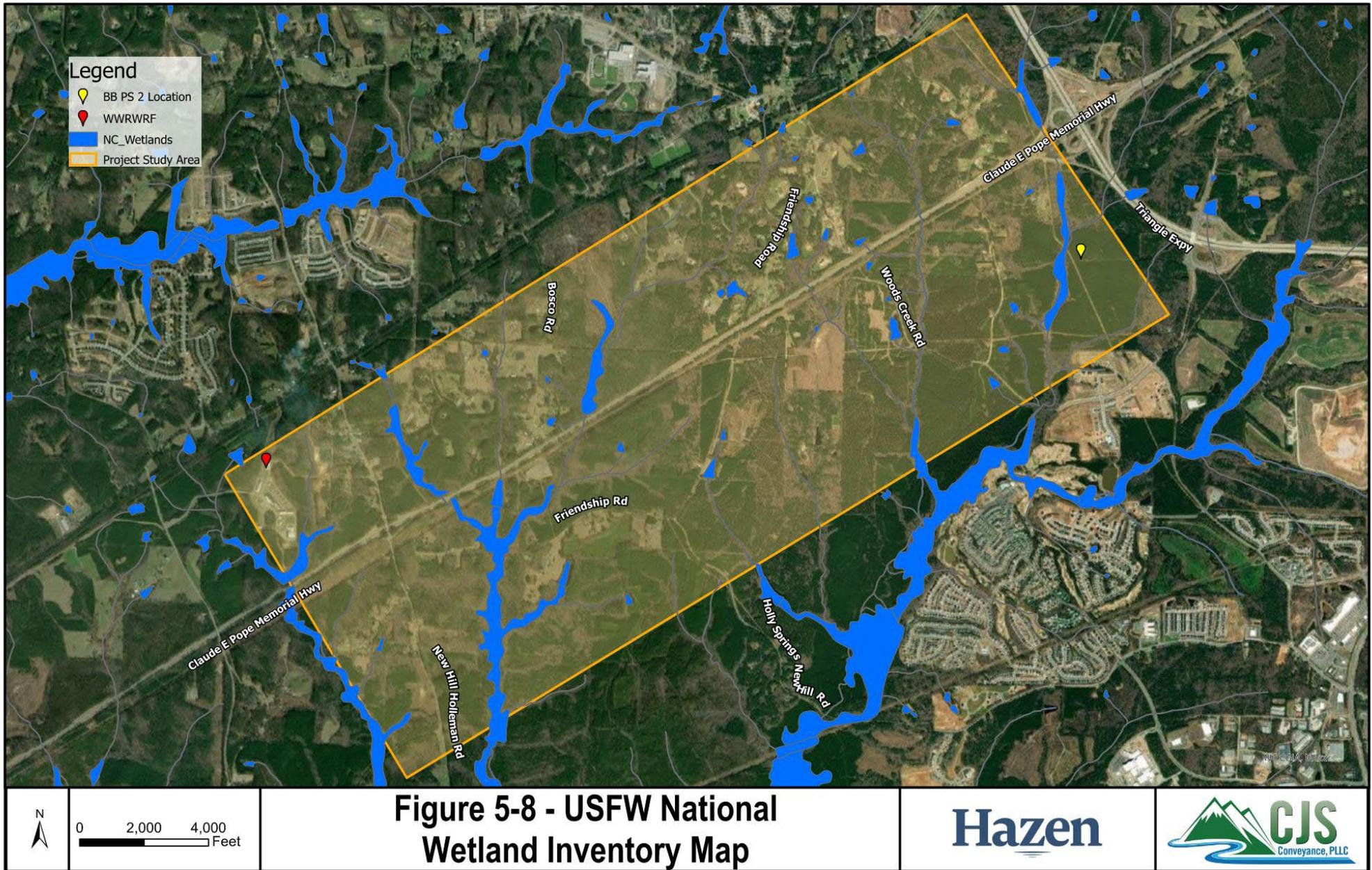
- ◆ BB PS 2 Location
- ◆ WWRWRF
- USGS Blue Line Streams
- Project Study Area

N

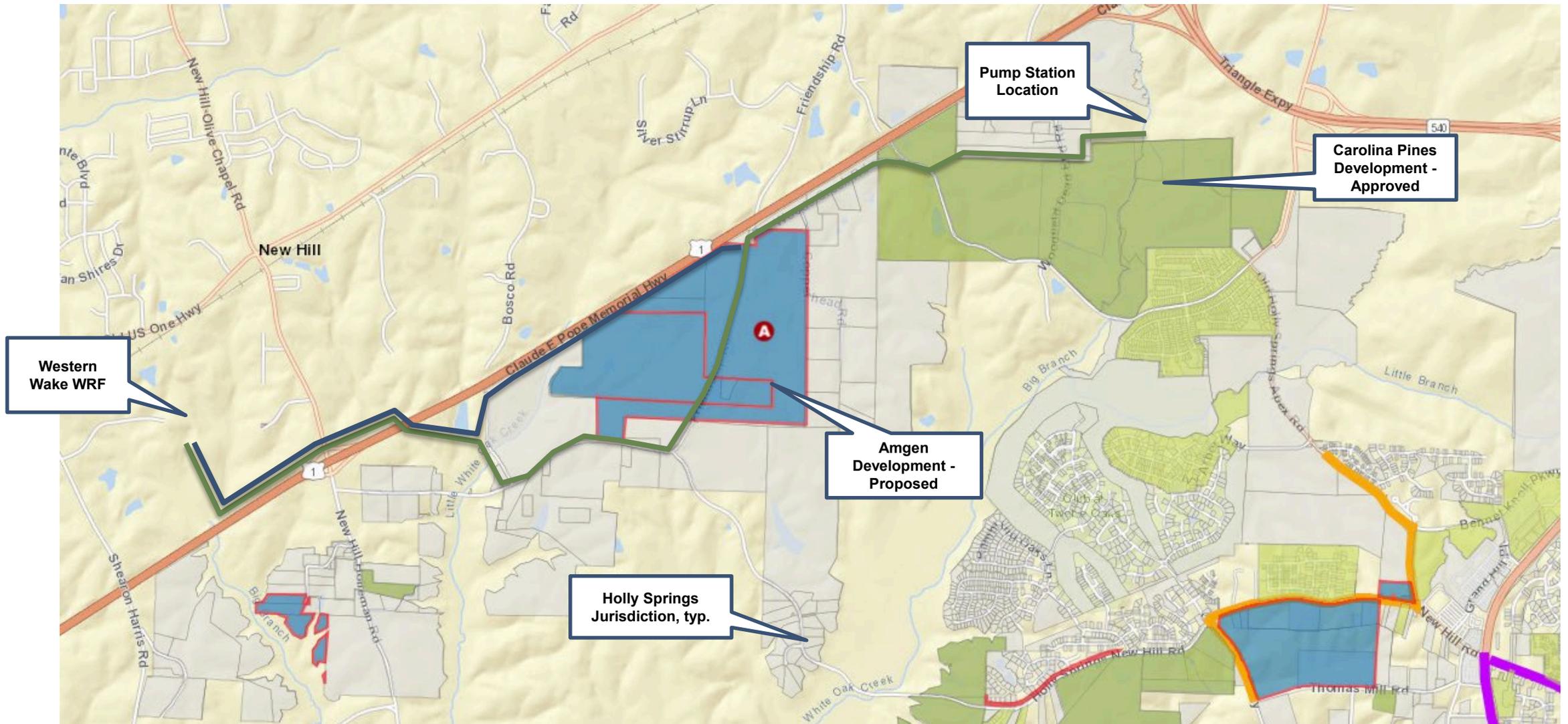
0 2,000 4,000 Feet

**Figure 5-7 - Blue Line Streams in the Project Area**

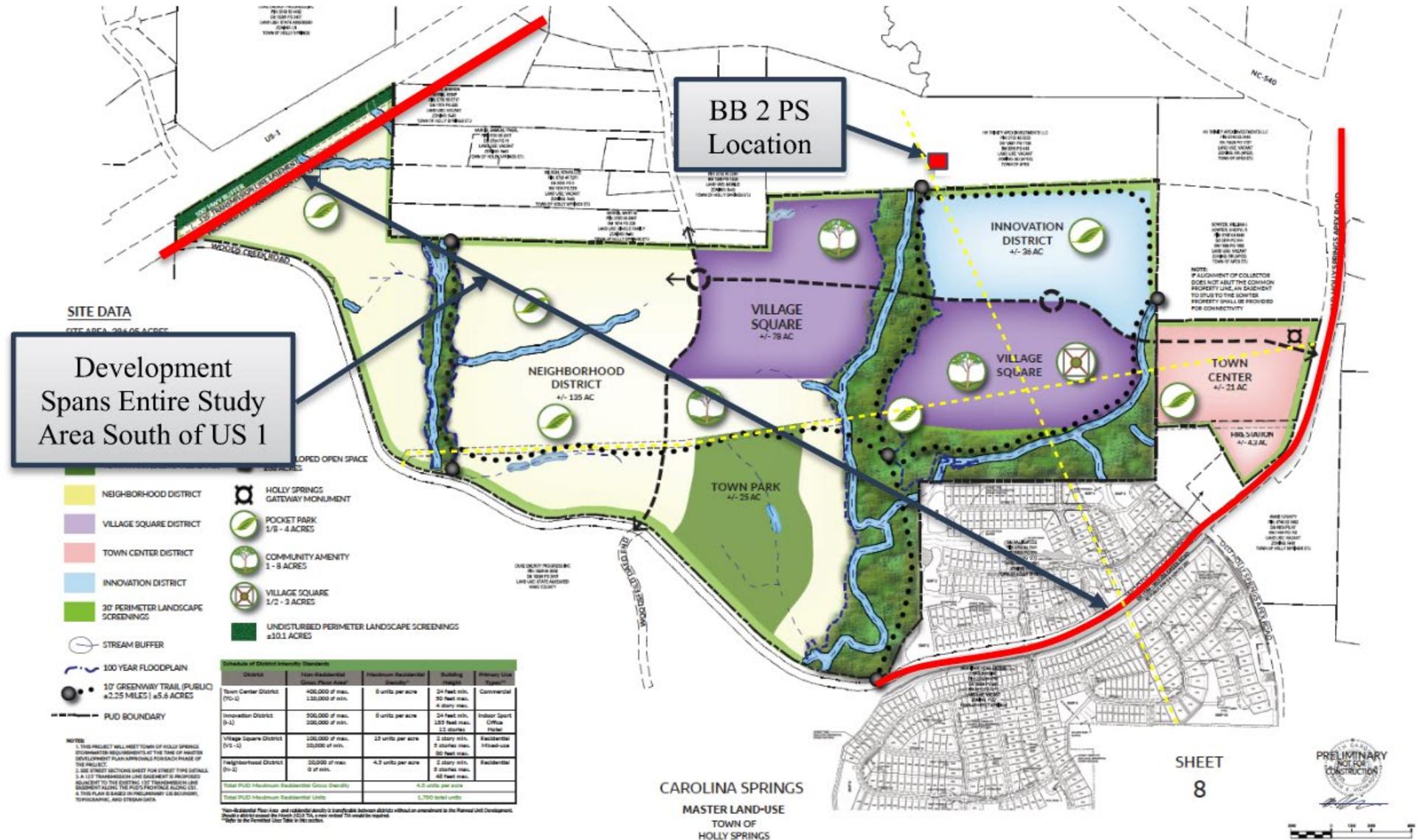


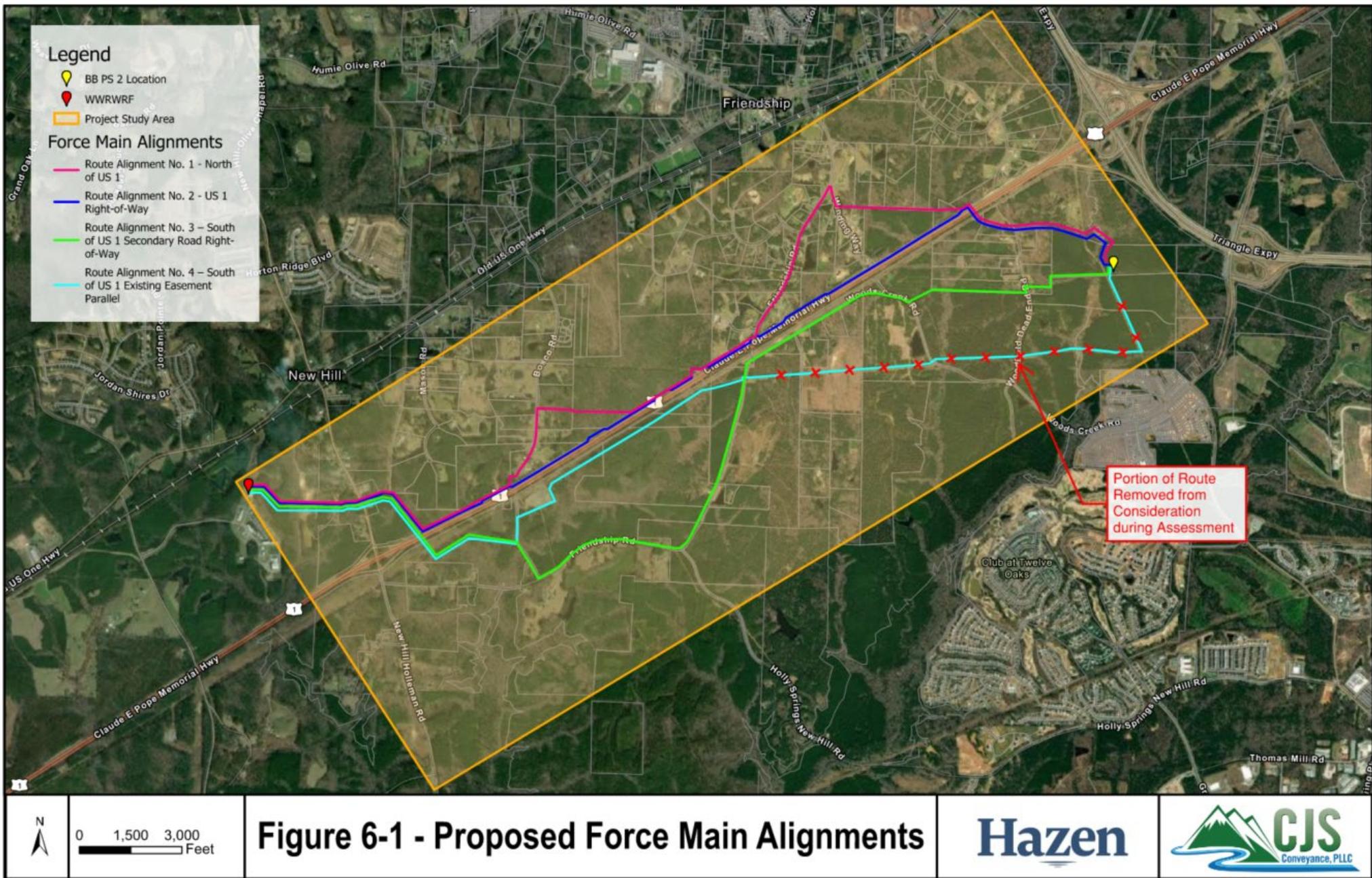


# Holly Springs Proposed Development South of US 1



# Holly Springs Development – North End of Study Area





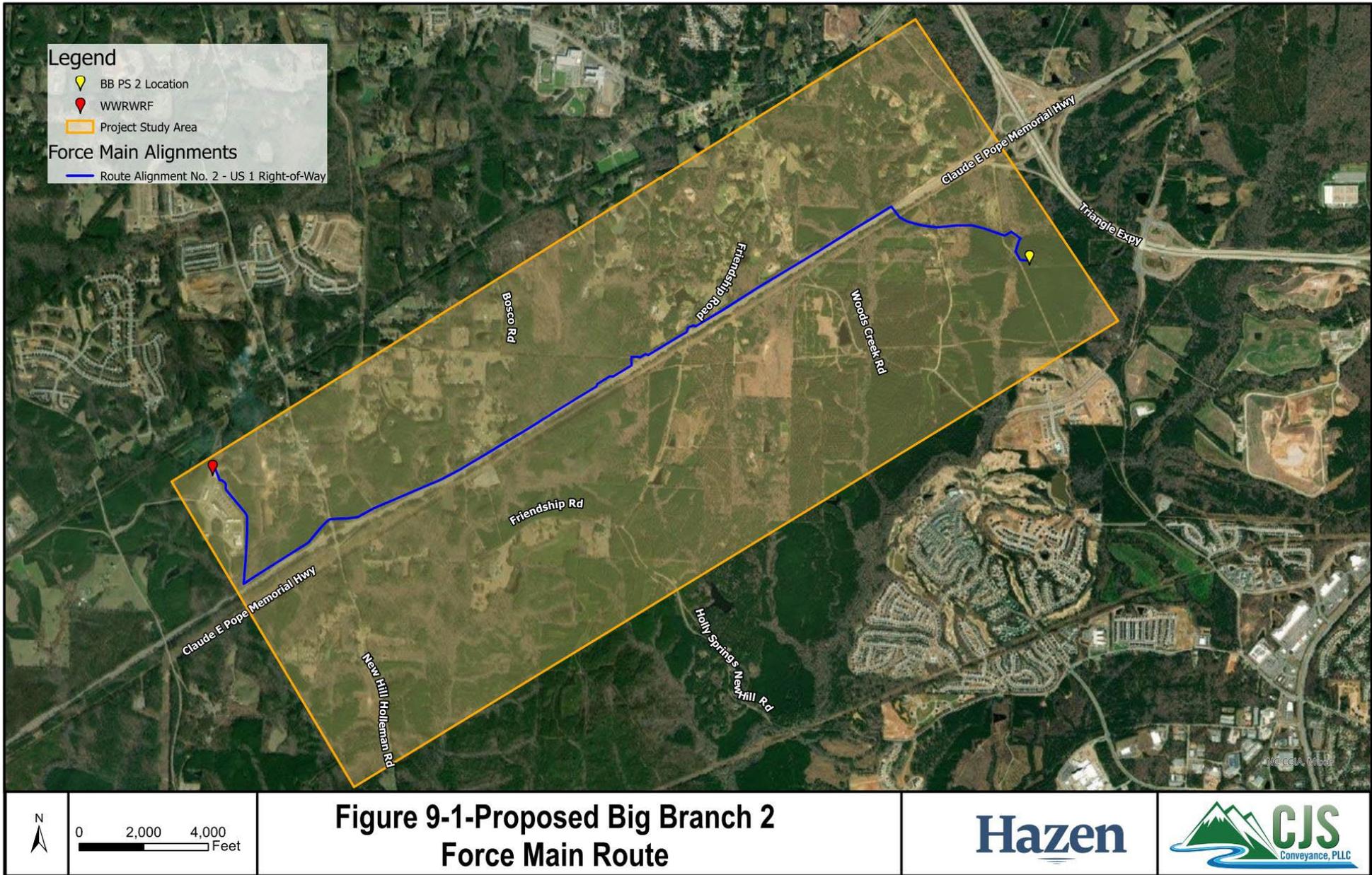
**Figure 6-1 - Proposed Force Main Alignments**

**Hazen**



# Force Main Alignment Option Highlights

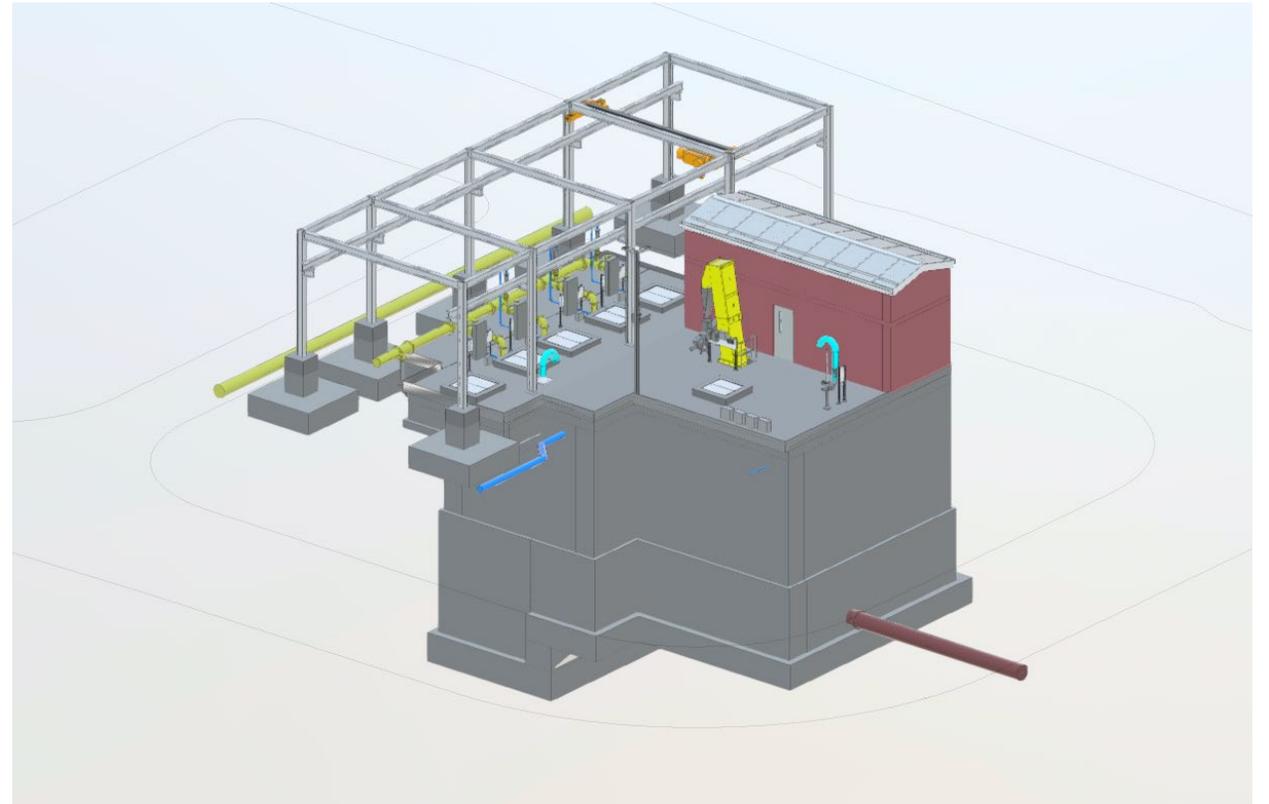
- **Alignment 1**
  - Predominantly on West Side of US-1
  - Uses a Mix of Roadways, Cross-Country and Adjacency to US-1 Right-of-Way
  - Entirely Within the Town of Apex
- **Alignment 2**
  - Adjacent to US 1 Right-of-Way Corridor
  - No Impact to Carolina Springs / Avoids Holly Springs Impacts
- **Alignment 3**
  - Maximizes Parallel of Existing Roadways
  - Impacts Holly Springs, perimeter of Carolina Springs
- **Alignment 4**
  - Maximized Parallel of Existing Easements
  - Most impact to Holly Springs parcels
  - Crosses Carolina Springs, Proposed School Parcels, and Amgen



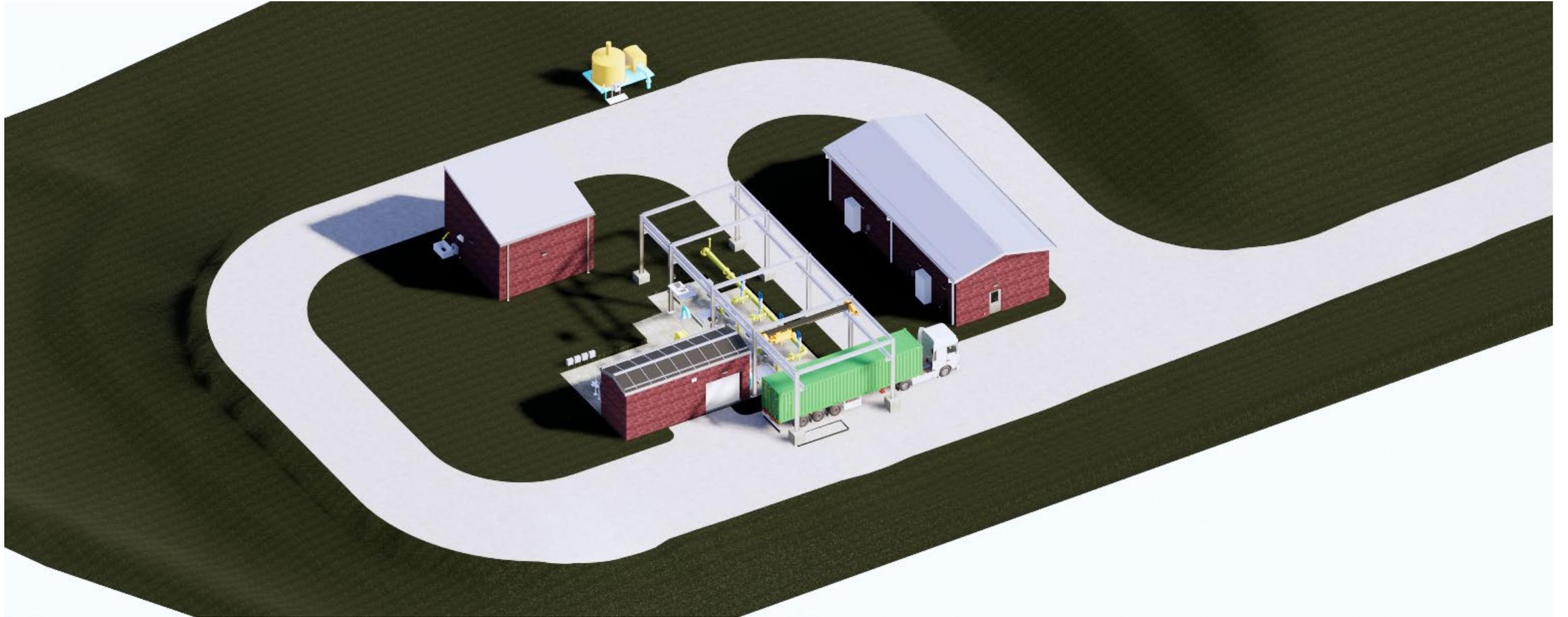
# Pump Station Design Update

# Final Design Pump Station Arrangement & Appurtenances

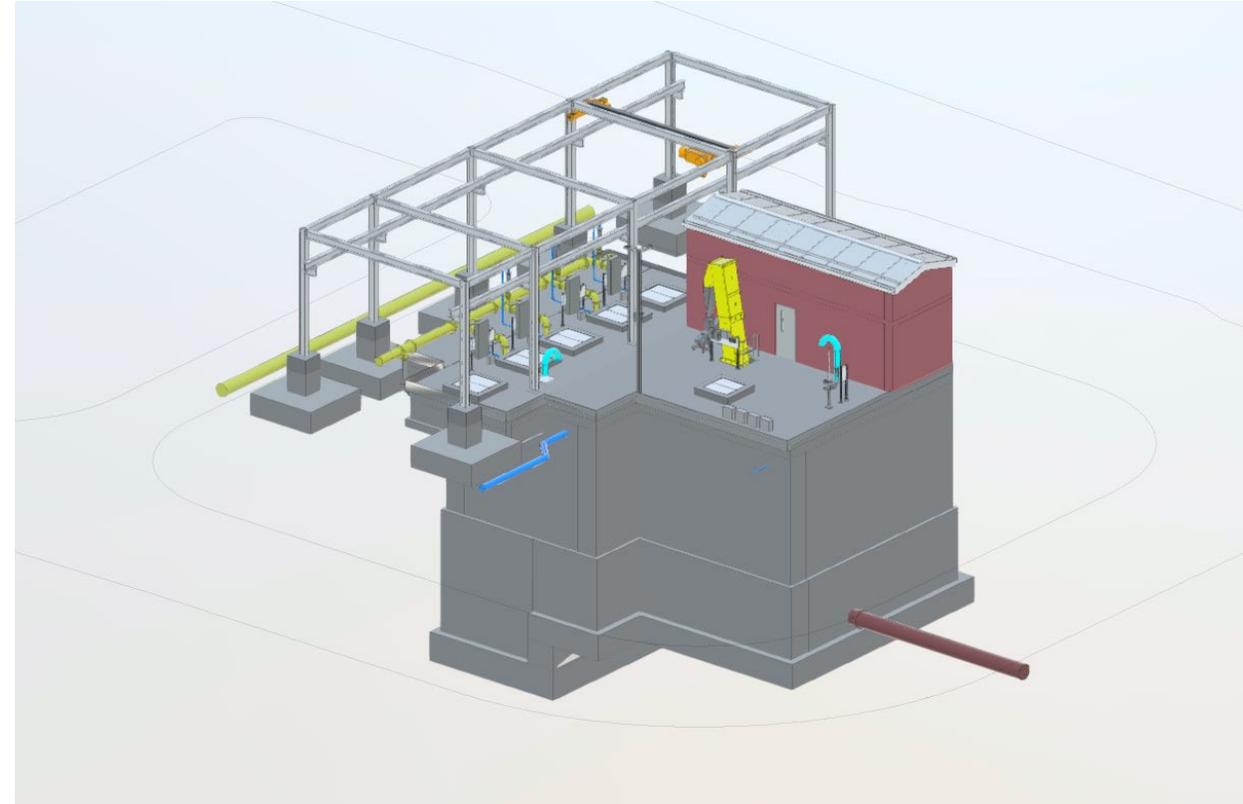
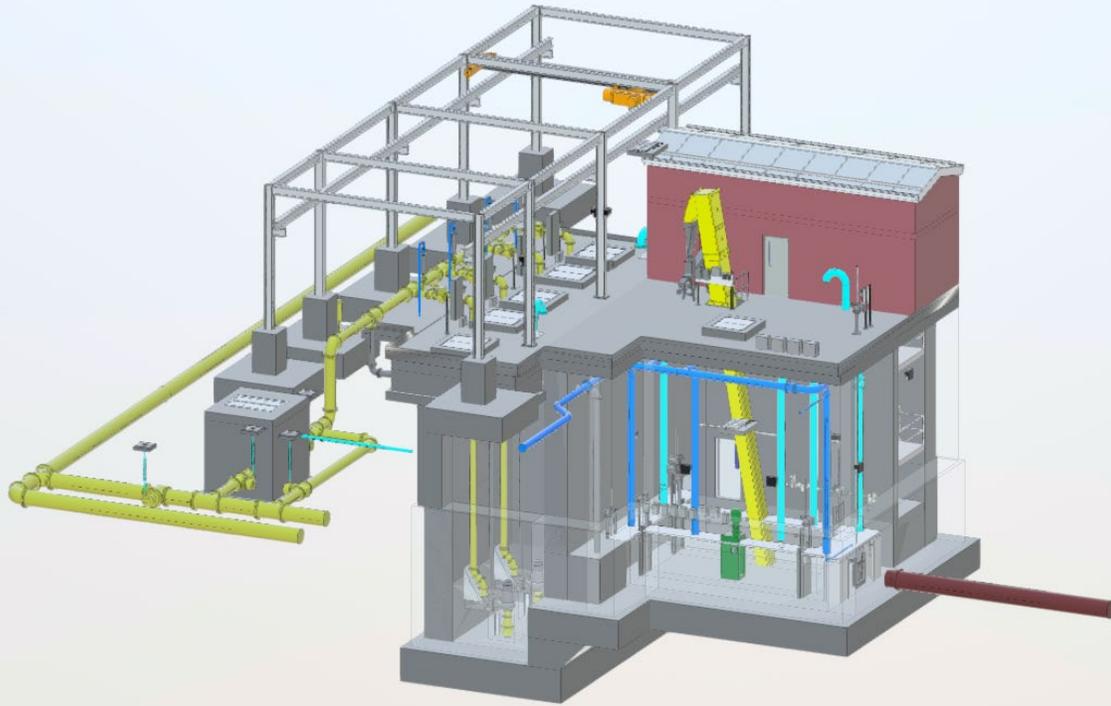
- 4.3 MGD Firm Capacity
  - Four (4) 135 HP submersible pumps
    - *Three Duty/One Standby*
- Odor Control
  - Dry media (carbon) adsorption system (vapor phase treatment)
  - Bioxide chemical feed system (liquid phase treatment)
- Pump Protection
  - Primary Channel – Multi-rake Mechanical Screen
  - Bypass Channel – Channel Grinder
- Backup Power
  - 800 kW standby generator



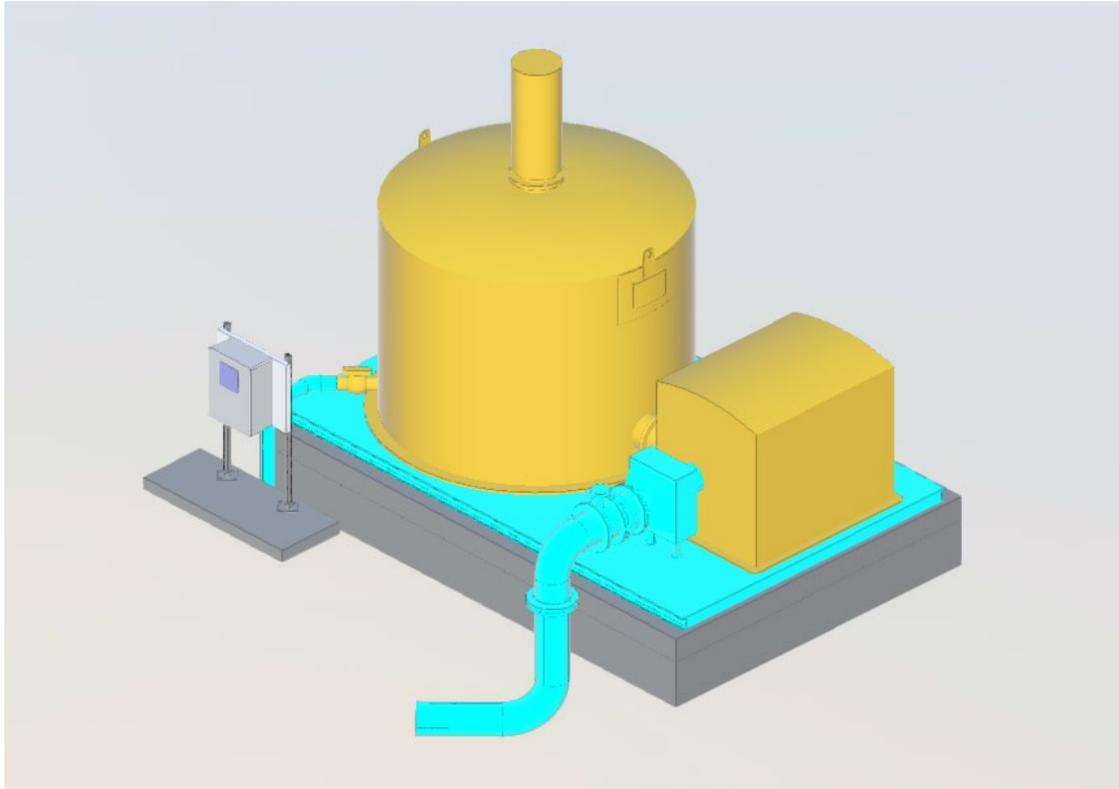
# Site Overview



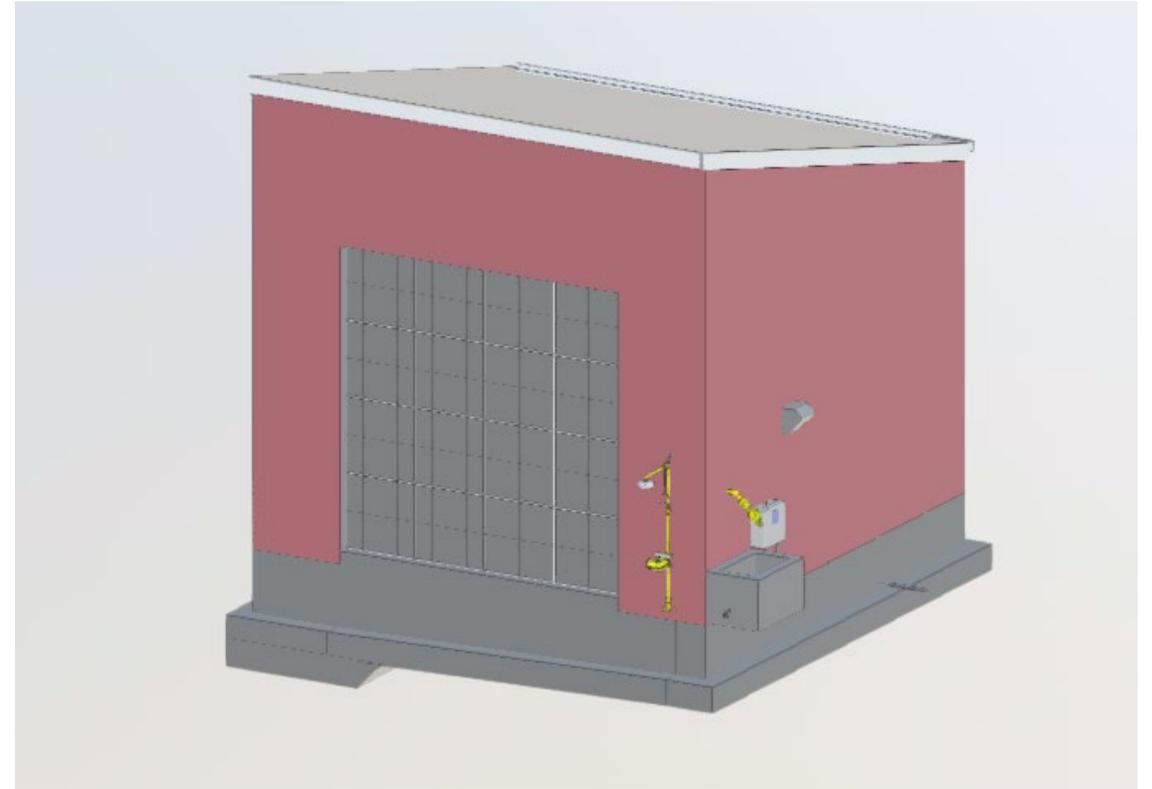
# Pump Station Design Update



# Odor Control Measures

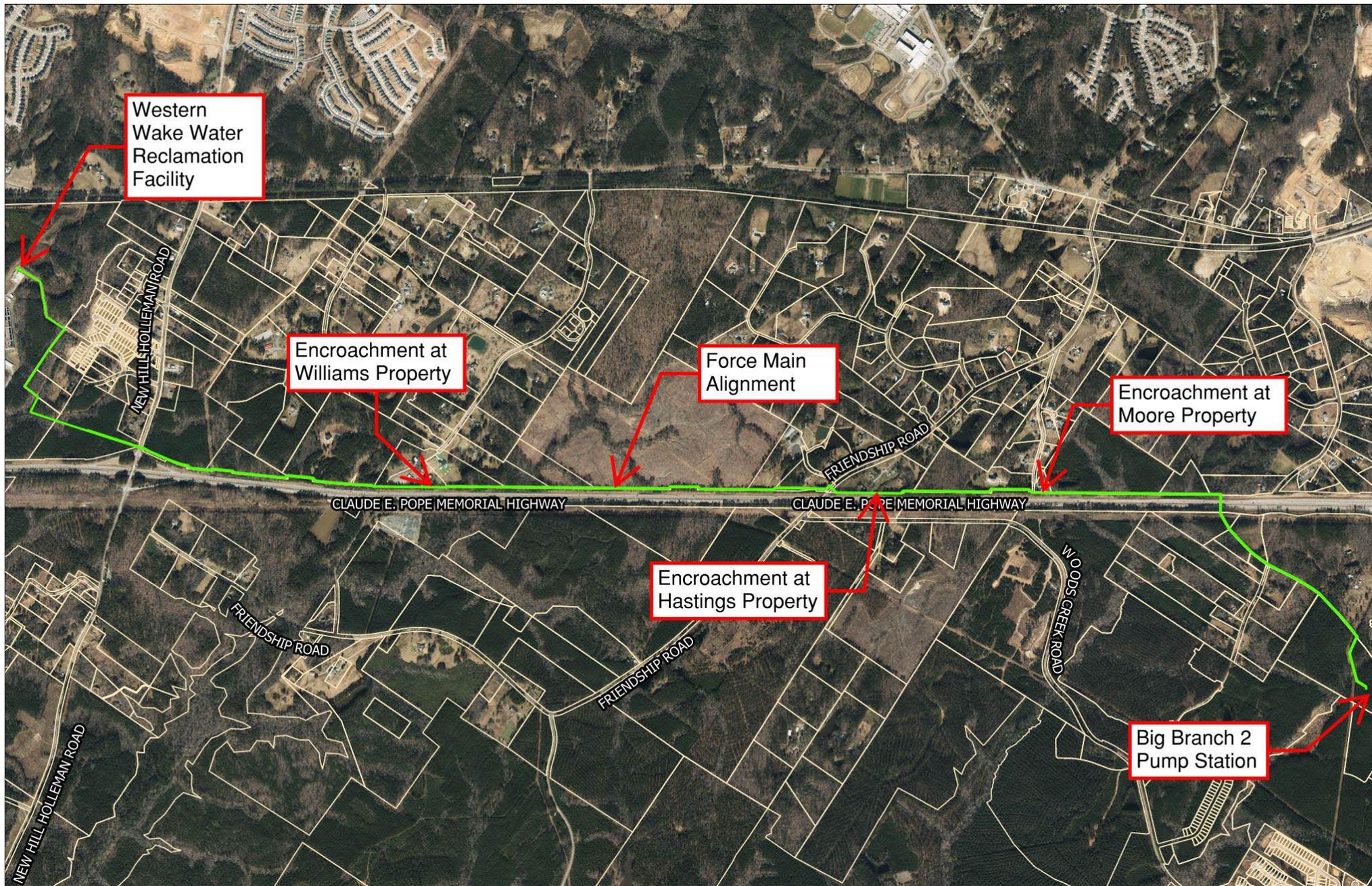


Vapor Phase Treatment  
Carbon Scrubber



Liquid Phase Treatment  
Chemical Tank Facility (Bioxide)

# Force Main Design Update



Western  
Wake Water  
Reclamation  
Facility

Encroachment at  
Williams Property

Force Main  
Alignment

Encroachment at  
Moore Property

Encroachment at  
Hastings Property

Big Branch 2  
Pump Station

# Evolution of NCDOT US 1 Encroachment

1. Initial Design – All Outside of R/W per NCDOT Policy
2. Requested Installation Into R/W at Constrained Locations
  - *Request Denied, Subsequent Appeal Denied*
3. Meeting w/ NCDOT and Veridea to Request Encroachments
  - *Request approved for encroachments at Moore, Hastings, and Williams properties*
4. Request for Expanded Encroachments at Williams, Olive, and Hastings
  - *Request denied*

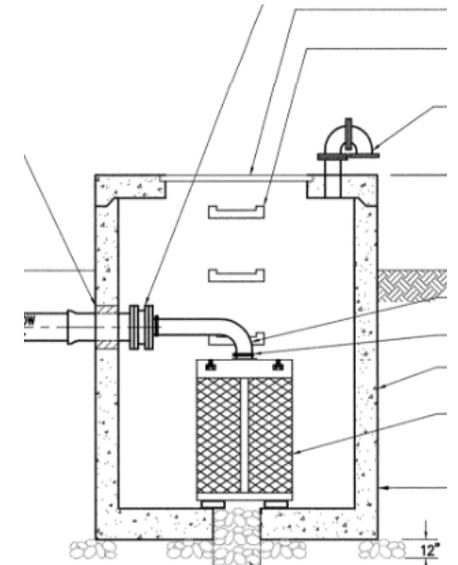
# Evolution of NCDOT US 1 Encroachment

1. Initial Design – All Outside of R/W per NCDOT Policy
2. Requested Installation Into R/W at Constrained Locations
  - *Request Denied, Subsequent Appeal Denied*
3. Meeting w/ NCDOT
  - *Request approved*

<u>Approved Encroachments</u>	
Hastings Property	- 992 Linear Feet
Moore Property	- 296 Linear Feet
Williams Property	- 1,115 Linear Feet
4. Request for Expanded Encroachments at Williams, Olive, and Hastings
  - *Request denied*

# Force Main Odor Control

- Provisions for Odor Control will be Provided at All Air Release Valves
- Provide Options for Exterior or Interior Odor Control
- Size is Dependent Upon Anticipated Exhaust Rate



# Communications

# Communication

- Town Website
- Property Owner Coordination
- Neighborhood Meetings
- Weekly Updates

The screenshot shows the Apex North Carolina website. The header includes the Apex logo and navigation links: GOVERNMENT, SERVICES, DOING BUSINESS, OUR COMMUNITY, and HOW DO I... A search bar on the right contains the text "I'm looking for...". The main content area features a green sidebar with navigation options: "Bidding and Requests for Qualifications", "Capital Improvement Projects", and "Big Branch Pump Station and Force Main". The main content area displays the breadcrumb "Home > Government > Town Departments > Water Resources > Utilities Engineering > Big Branch Pump Station and Force Main" and the page title "Big Branch Pump Station and Force Main". Below the title is a link to "Weekly Summary of Activities". The "Project Overview" section describes the project's goals and progress. A "CONTACT US" sidebar on the right lists Mike Deaton, PE, Water Resources Director, with contact information: (919) 249-3413, Email Mike, 105-B Upchurch Street, Apex, NC 27502, and a Staff Directory link. A "Related Information" section lists links to PER Executive Summary, Project Schedule, 60% Design Plans - Force Main, 90% Design Plans - Force Main, and 90% Design Plans - Pump Station. A "CHAT NOW" button is visible in the bottom right corner.

**APEX**  
NORTH CAROLINA

GOVERNMENT | SERVICES | DOING BUSINESS | OUR COMMUNITY | HOW DO I...

I'm looking for...

Bidding and Requests for Qualifications

Capital Improvement Projects

Big Branch Pump Station and Force Main

Home > Government > Town Departments > Water Resources > Utilities Engineering > Big Branch Pump Station and Force Main

## Big Branch Pump Station and Force Main

- [Weekly Summary of Activities](#)

### Project Overview

In 2021, the Town of Apex funded a study to determine a regional sewer solution to serve over 3,700 acres of undeveloped and partially developed land known as the Big Branch basin. The project had two main goals - determine the most cost-effective way to provide the service and meet State-mandated Interbasin Transfer certificate requirements. The study recommended creation of two regional pump stations and a force main alignment that followed along the US-1 corridor.

In 2022, Apex began designing of one of the two recommended regional pump stations (Big Branch #2 Wastewater Pump Station and Force Main). The Big Branch basin (shown on the map below) is partially developed and is served by four smaller pump stations. As development occurs, these pump stations will be replaced with gravity sewer to the two recommended Big Branch pump stations.

The Town of Apex ongoing design project includes:

- One wastewater pumping station with a capacity of 1.44 MGD
- 4.9 miles of dual 20-inch wastewater force mains along the US-1 corridor, from Big Branch 2 (BB2) pump station to the Western Wake Regional Water Reclamation Facility

## CONTACT US

**Mike Deaton, PE**  
Water Resources Director

(919) 249-3413  
[Email Mike](#)

105-B Upchurch Street  
Apex, NC 27502

[Staff Directory](#)

### Related Information

- [PER Executive Summary](#)
- [Project Schedule](#)
- [60% Design Plans - Force Main](#)
- [90% Design Plans - Force Main](#)
- [90% Design Plans - Pump Station](#)

 **CHAT NOW**

# Q&A





# **Town of Apex Long Range Water Resources Plan (LRWRP)**

**Town Council Work Session**

**August 15, 2023**



# Agenda

- . What is a Long Range Water Resources Plan?
- . Why does the Town of Apex need one?
- . What types of data were evaluated?
- . What were the results?
- . What are the Town of Apex's future capacity needs?
- . Questions

# What is a Long Range Water Resources Plan?

- Gain an updated understanding of the Town's customer water use and wastewater flows
- Develop strategies to meet future water and wastewater capacity requirements
- Identify tactical steps to advance the Town's LRWRP



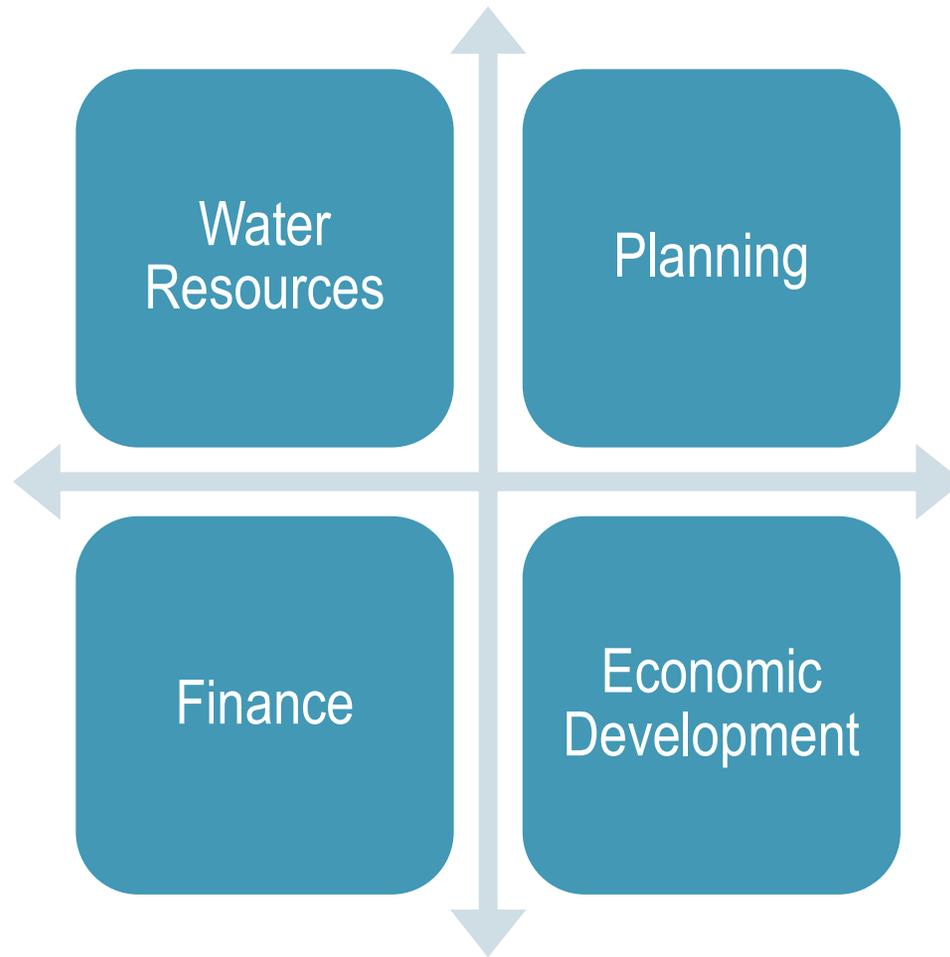
# Why does the Town of Apex need a LRWRP?

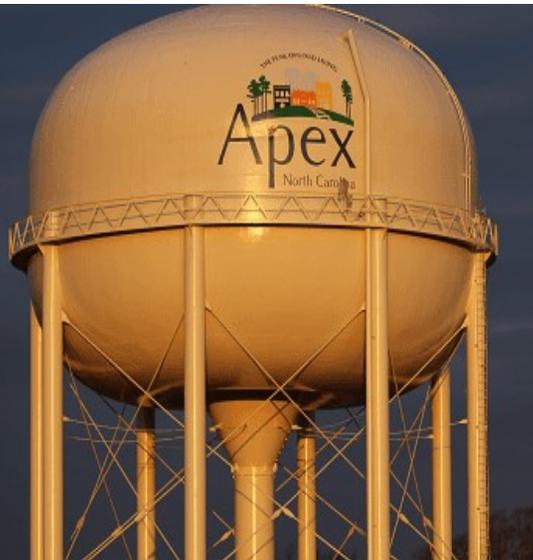
- Assurance that capacity will be available to meet growth needs
    - Water supply – Jordan Lake
    - Water treatment
    - Wastewater treatment
    - Interlocal agreements
    - Regional partnerships
  - Ability to effectively plan financing to meet those needs
- 

# LRWRP Project Approach



# Collaboration





## Data analysis included:

- Water distribution and wastewater collection systems
  - Existing facilities
  - Capital Improvement Plan
  - GIS
- Water and Wastewater Operations
  - Geospatial water meter data
  - CAWTF demands
  - MCWRF and WWRF flows
- Land Use Planning
  - Advance Apex
  - CAMPO CommunityViz
  - Planning Staff – near term growth perspective

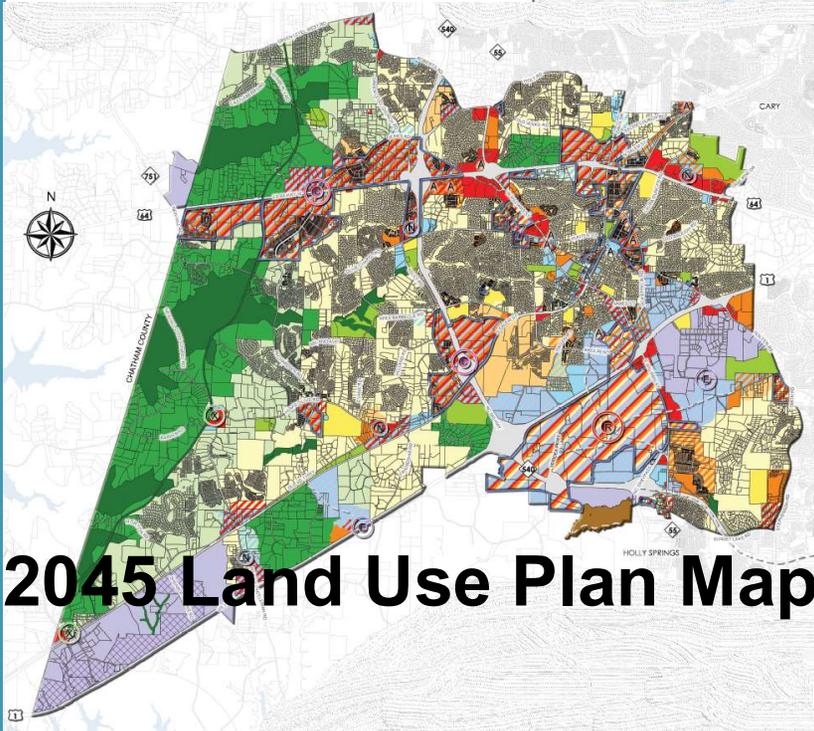
## Takeaways from recent history (2016 to 2021)

- Water demand is increasing at a lower rate than population is
  - Population + 55%    Residential demand + 50%    Finished water supply + 34%
  - Residential per capita water use continues to decrease, down 4.2%
  - Annualized growth rate = 9.1%
- Single family residential is the primary driver of increased demand
- Flows are increasing primarily in the western service areas
- Little change in irrigation demand
- New development is more water efficient than older development was

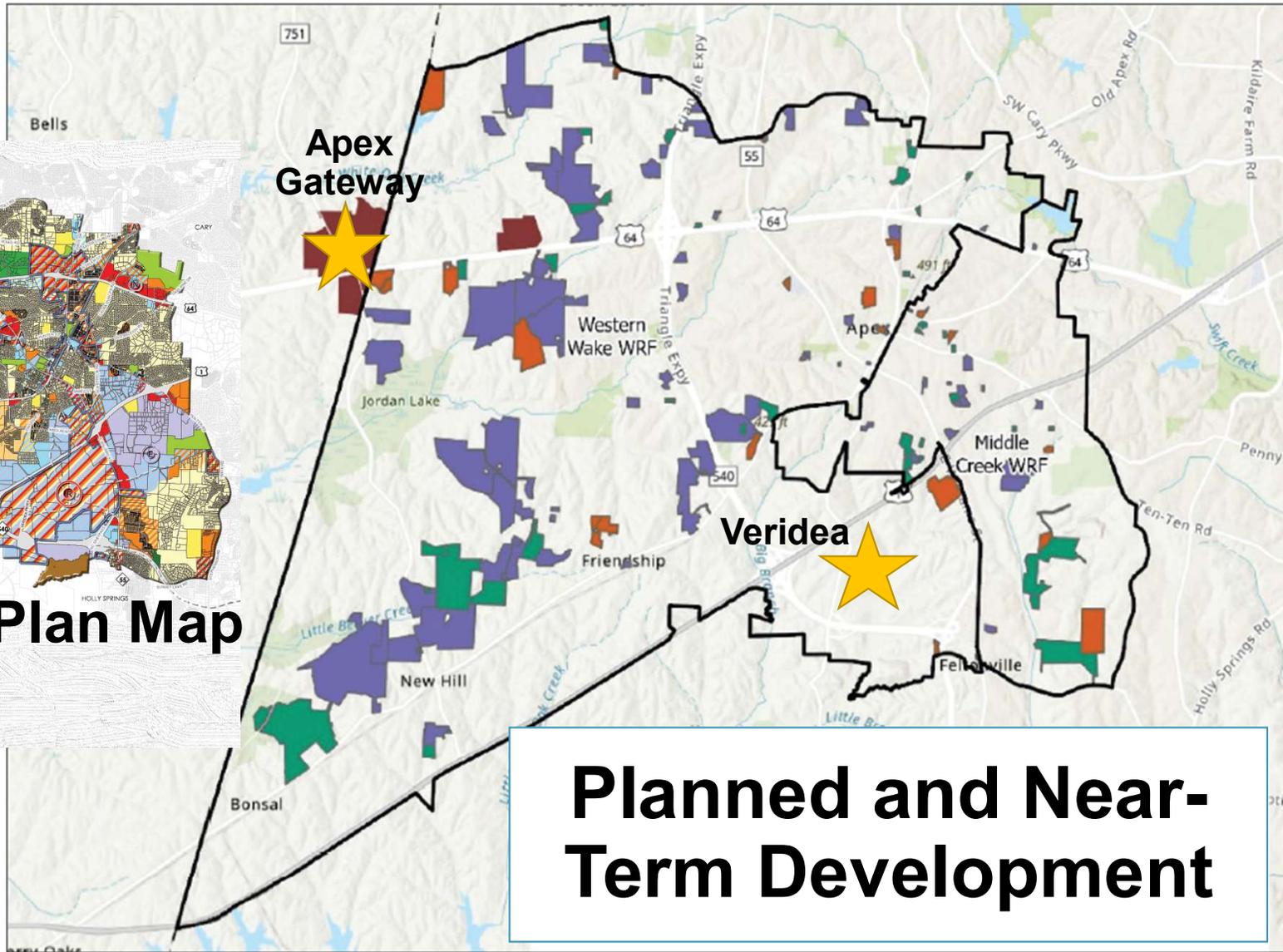
# Forecast Method Overview

Three datasets to capture future growth



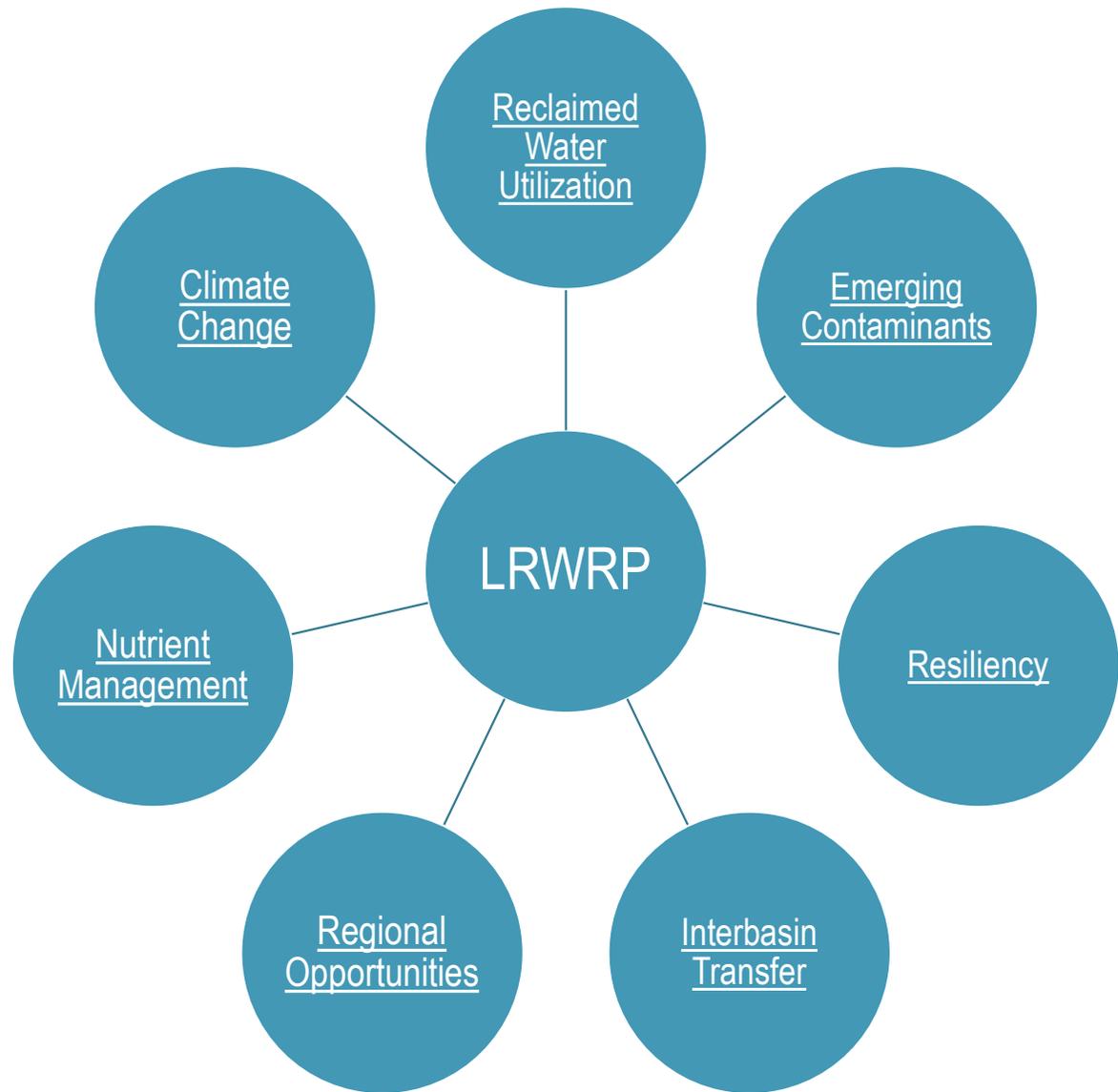


**2045 Land Use Plan Map**



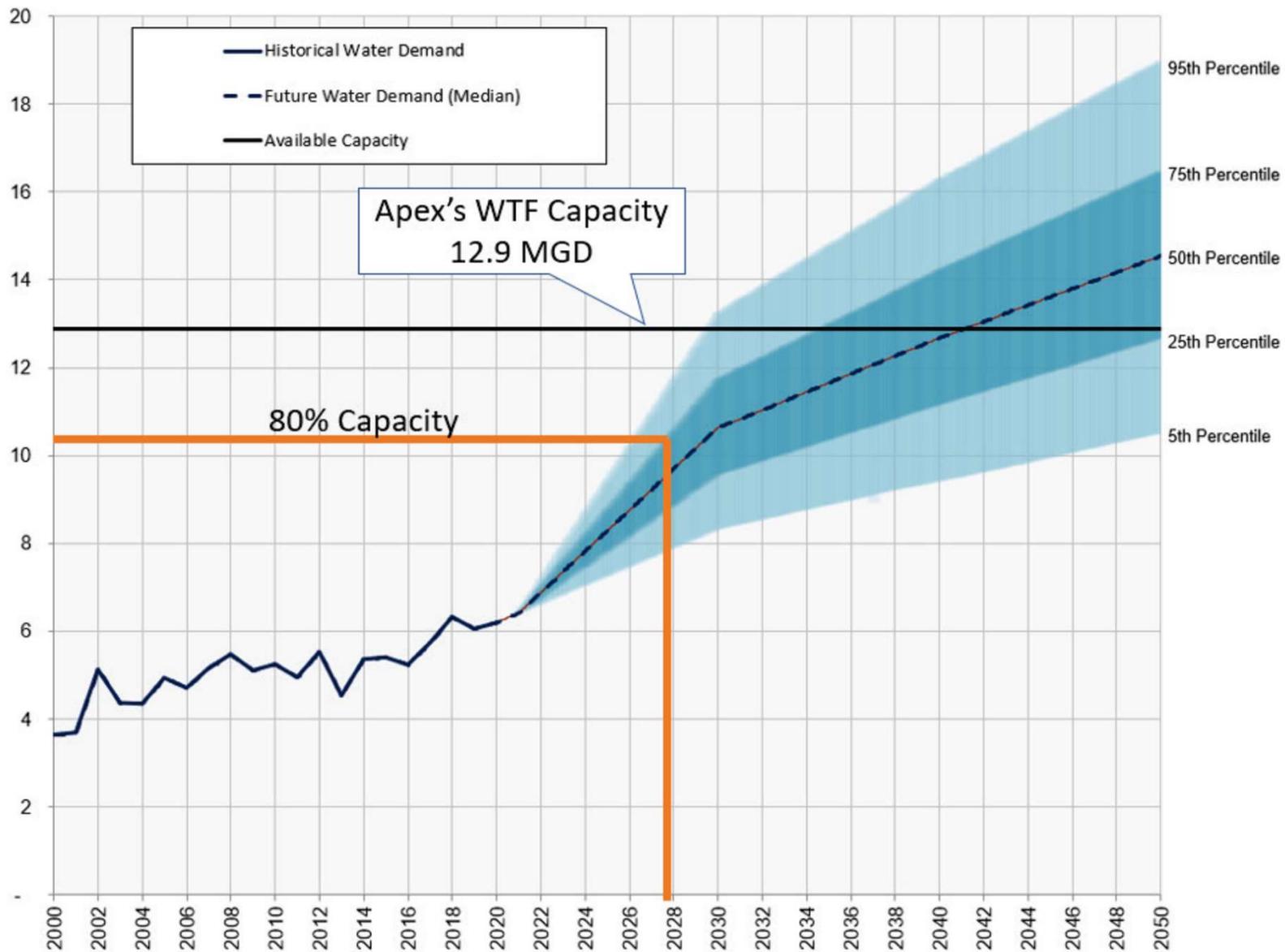
**Planned and Near-Term Development**

# Qualitative Considerations

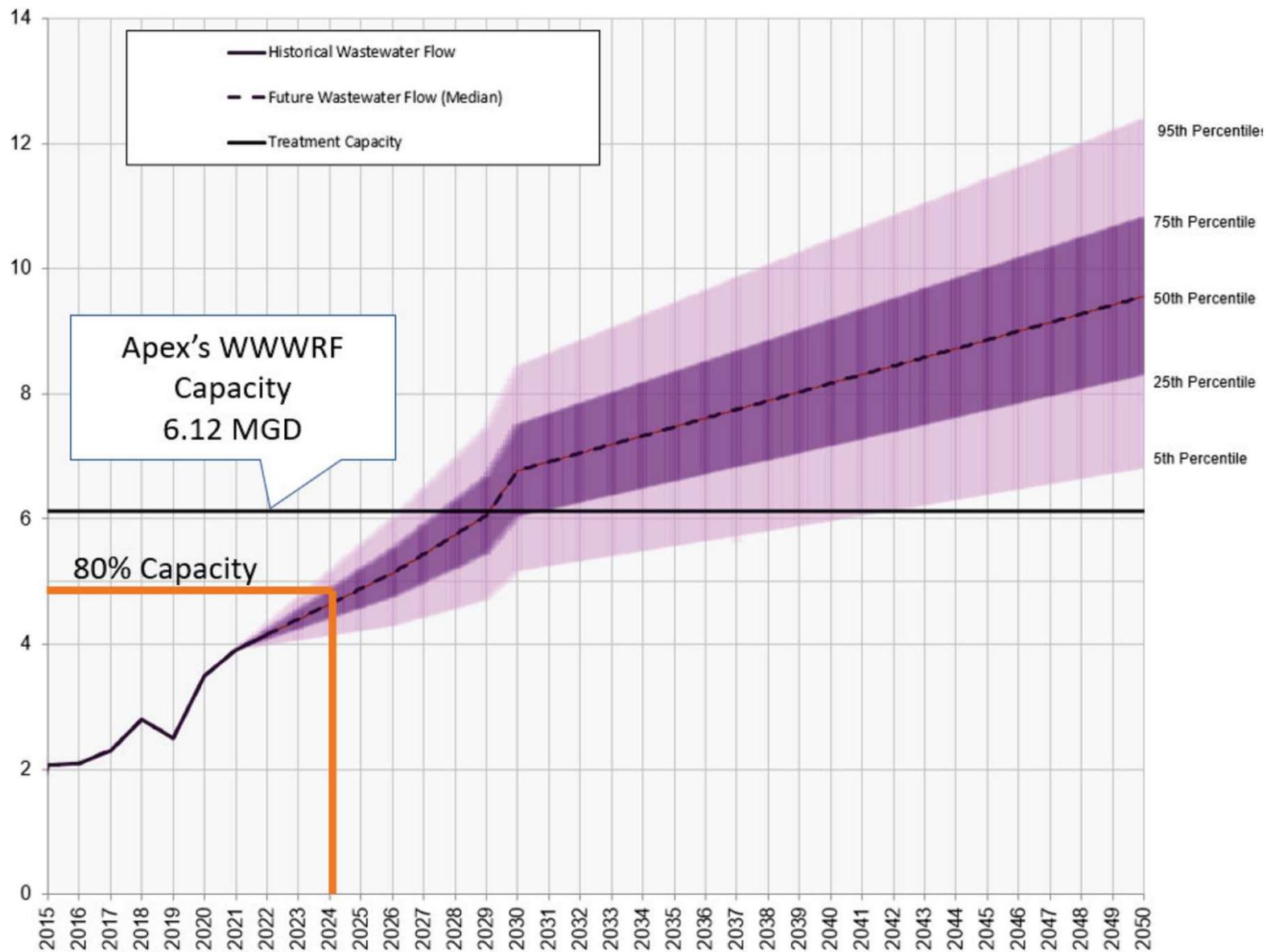


# Results

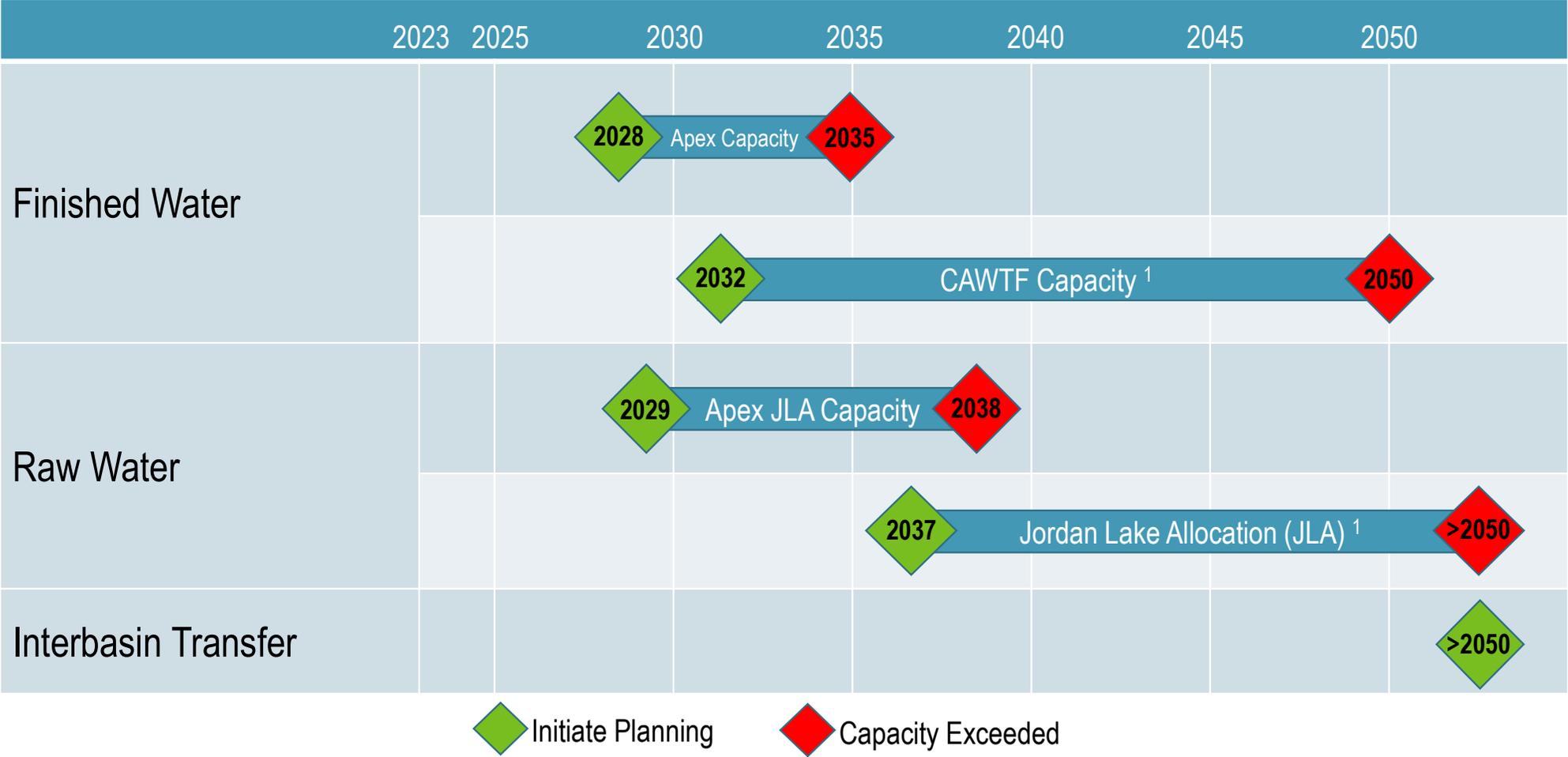
# CAWTF Finished Water Maximum Day Demand (MGD)



# Western Wake WRF Max. Month Average Daily Flow (MGD)

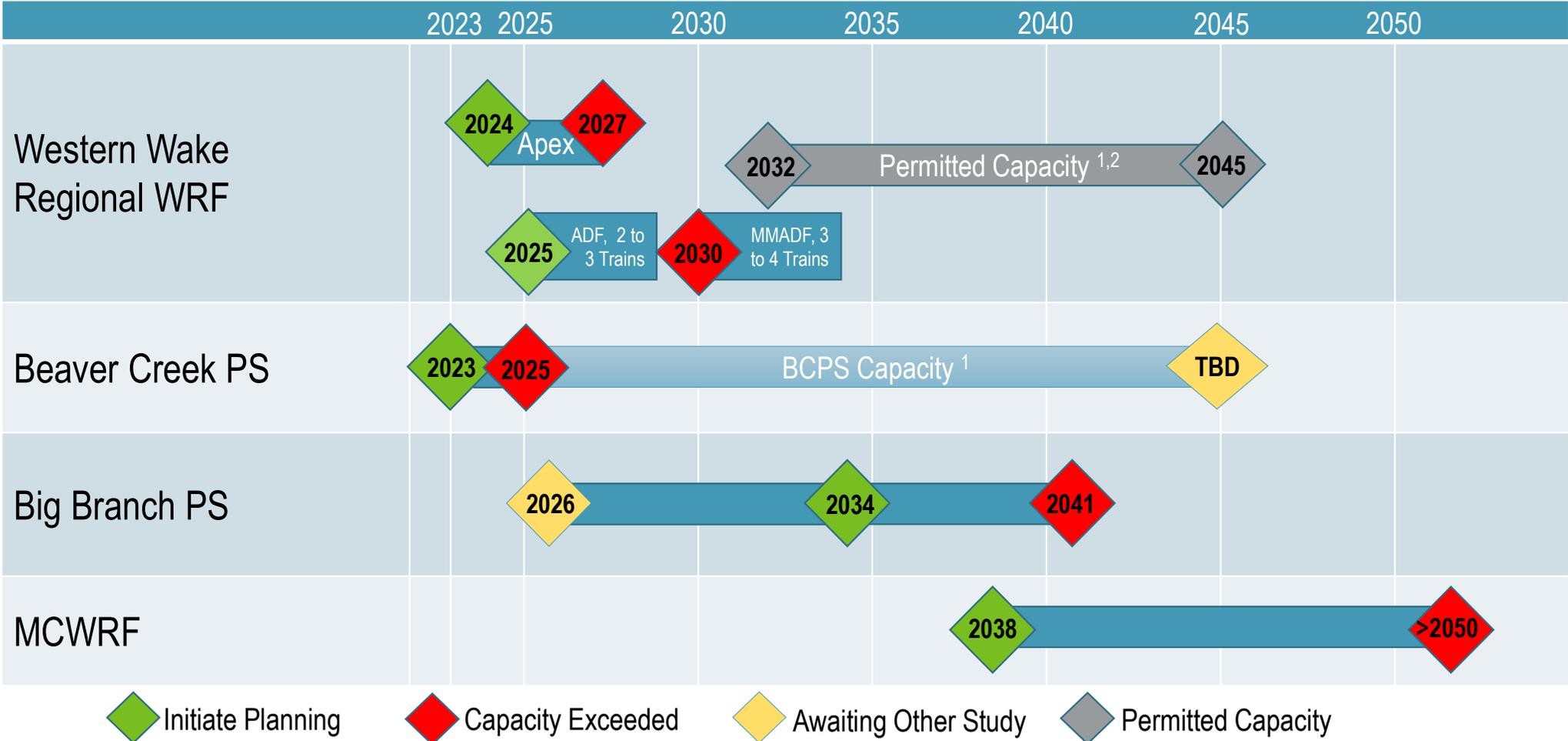


# Water Capacity Planning Timeline (75<sup>th</sup> %ile forecast basis)



<sup>1</sup> Forecast based upon 2023 Apex and 2018 Cary forecast results, 75th Percentile

# Wastewater Capacity Planning Timeline (75<sup>th</sup> %ile forecast basis)



<sup>1</sup> Forecast based upon 2023 Apex and 2018 Cary forecast results, 75th Percentile

<sup>2</sup> Dates based on permitted capacity, not operational performance targets

# Key LRWRP Takeaways:

- It is time for Apex to initiate water and wastewater capacity allocation conversations with Cary
  - 2023: Beaver Creek PS (2025)
  - 2024: Western Wake WRF (2027)
  - 2027: CAWTF Finished Water (2035)
  - 2029: Raw Water Allocation (2038)
- Interbasin Transfer is adequate > 2050



**Questions?**

