

# WATER & SEWER SYSTEMS ASSET INVENTORY AND ASSESSMENT

NC DEPARTMENT OF ENVIRONMENTAL QUALITY

Project Numbers: AIA-D-ARP-0134  
AIA-W-ARP-0204

Board Presentation



Presented by:

Bob Miller PE, Principal/Raleigh Office Manager





# Aging Infrastructure Across the U.S.

- Our entire nation is experiencing a crisis of infrastructure
- 2025 grades of U.S. Infrastructure by the American Society of Civil Engineers
  - Overall – C
  - Wastewater – D+
  - Water – C-
- North Carolina Department of Environmental Quality (DEQ) Programs
- Asset Inventory and Assessment (AIA)



# SGWASA AIA Scope of Work: Water & Sewer Systems



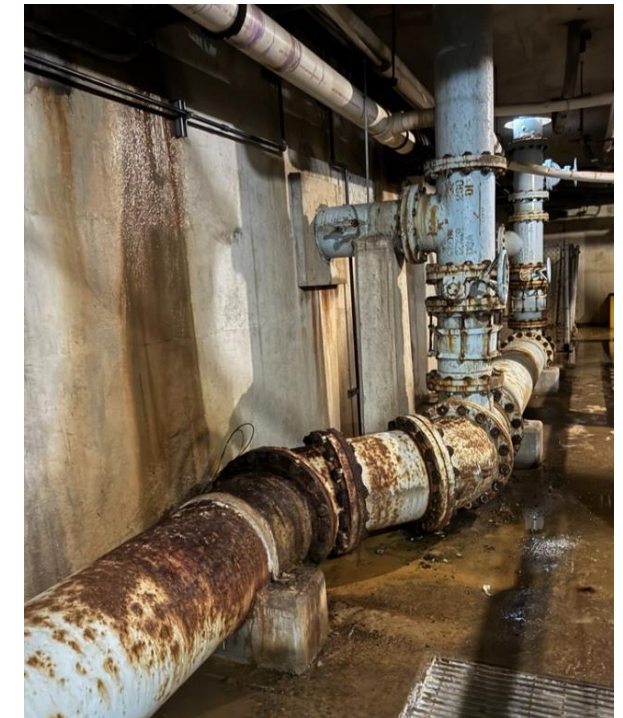
| <u>Task</u> | <u>Description</u>                                                    |
|-------------|-----------------------------------------------------------------------|
| 1           | Asset Inventory and Condition Assessment                              |
| 2           | Update Hydraulic Models of Water System and Sewer System              |
| 3           | Conduct Lift Station Drawdown Testing                                 |
| 4           | Prepare Opinions of Probable Costs: Water & Sewer System Improvements |
| 5           | Update 10-Year Capital Improvements Plan                              |
| 6           | Prepare Asset Management Plan, Summary of Findings, Final Report      |

# Inventory & Assessment

- Scoring Matrix – Risk Ratings

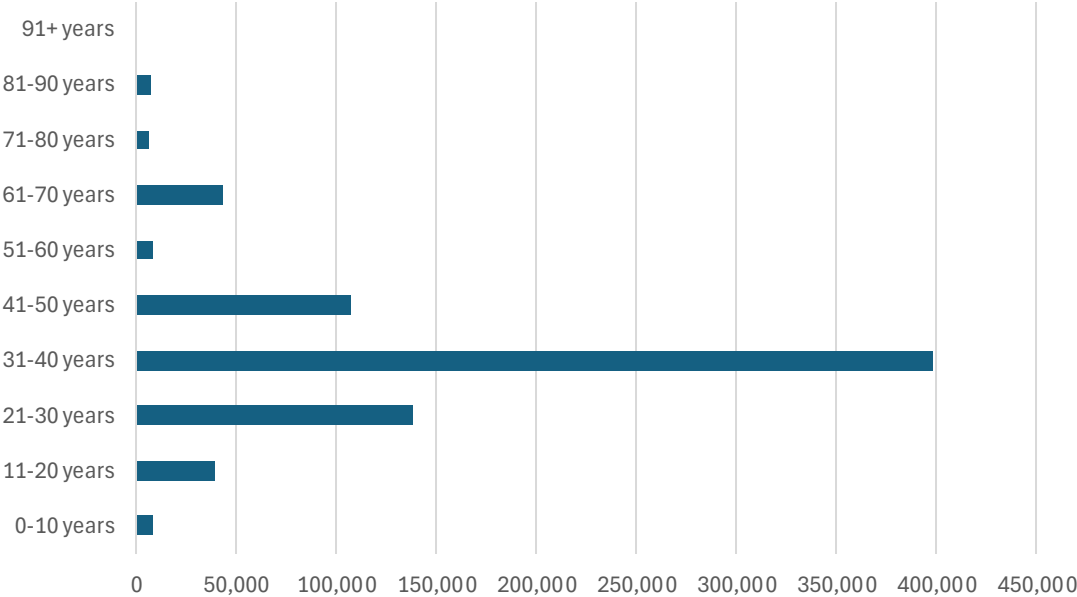
|                              | LIKELIHOOD OF FAILURE (LoF) |    |    |    |    |
|------------------------------|-----------------------------|----|----|----|----|
| CONSEQUENCE OF FAILURE (CoF) | 5                           | 10 | 15 | 20 | 25 |
|                              | 4                           | 8  | 12 | 16 | 20 |
|                              | 3                           | 6  | 9  | 12 | 15 |
|                              | 2                           | 4  | 6  | 8  | 10 |
|                              | 1                           | 2  | 3  | 4  | 5  |

| Risk Rating | Recommended Action                                                         |
|-------------|----------------------------------------------------------------------------|
| 1-3         | Requires Normal preventative maintenance (PM)                              |
| 4-9         | Requires monitoring, normal PM, and minor corrective maintenance (CM)      |
| 10-12       | Requires further condition inspection, normal PM, and major CM             |
| 15-16       | Requires major rehabilitation and replacement (R&R) in the next 1-10 years |
| 20-25       | Requires immediate work and/or complete R&R within the next few years      |

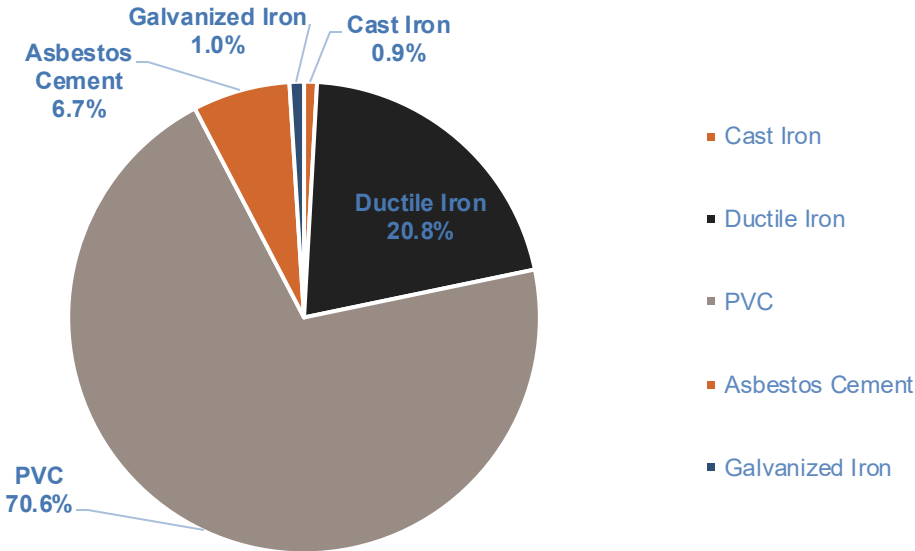


# SGWASA Water System

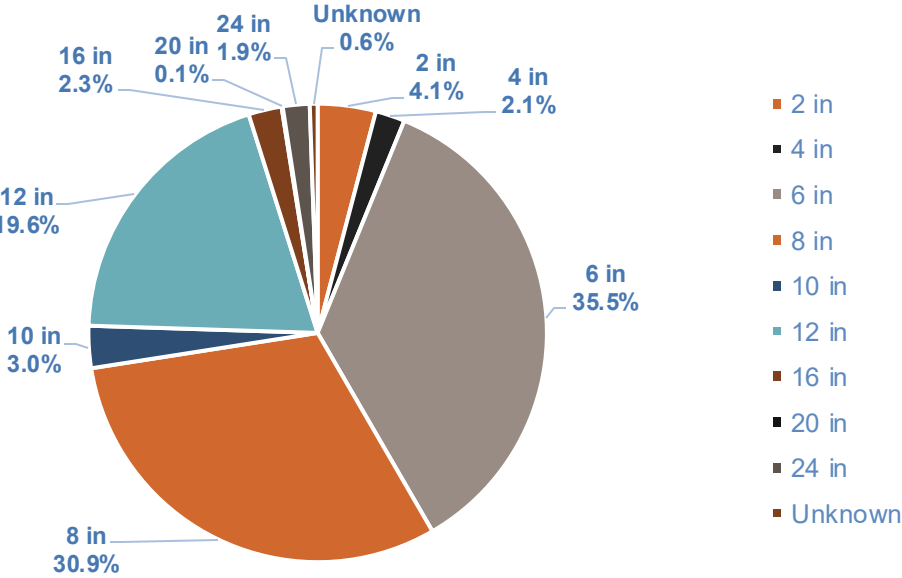
Age Distribution (Linear Feet)



Material Distribution (Linear Feet)

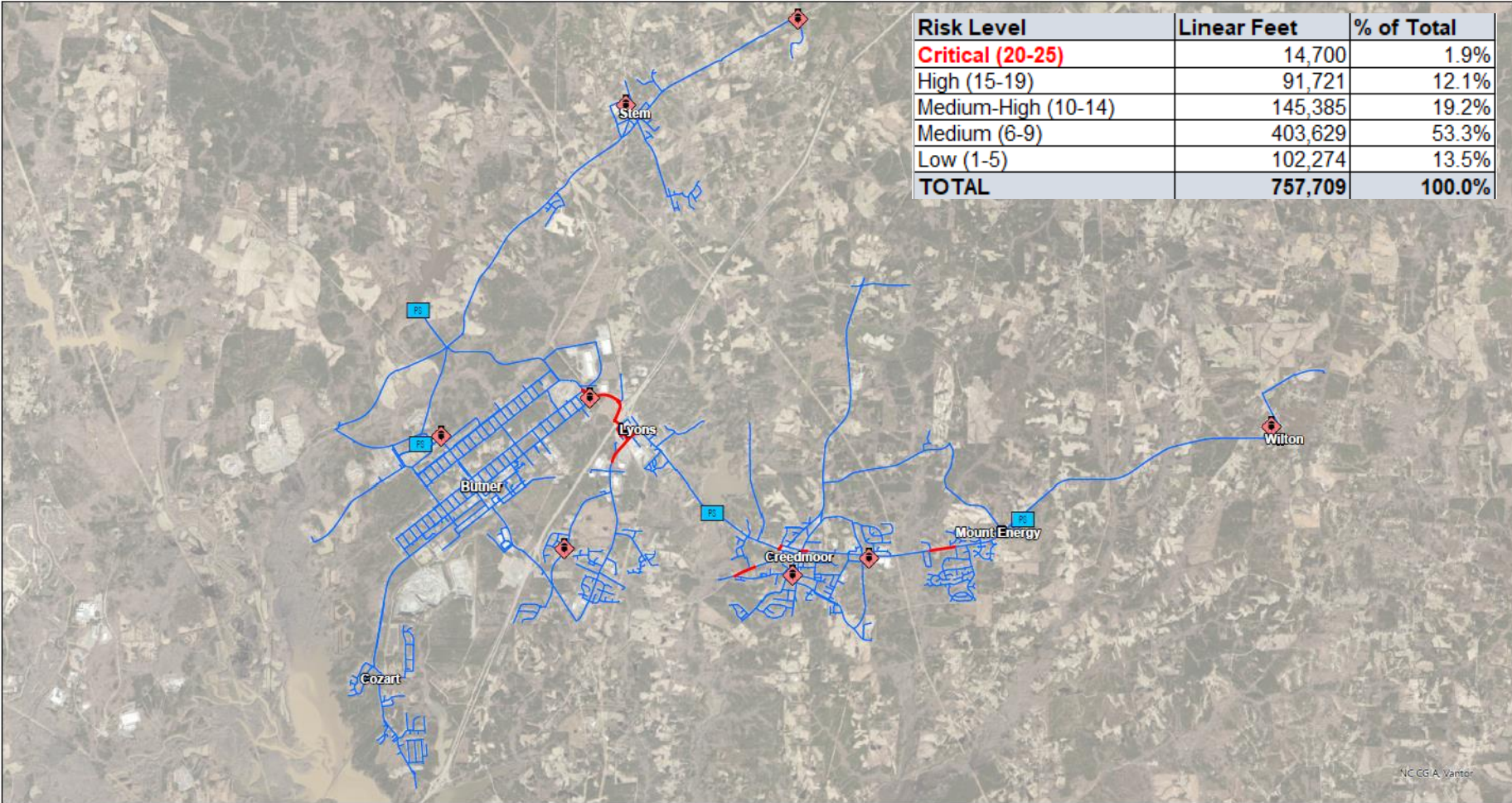


Diameter Distribution (Linear Feet)



Age, material, and size based on best available information

# SGWASA Water Line Risk Levels



**Legend**

- Tank
- RR < 20
- RR > 20
- Booster Pump Station

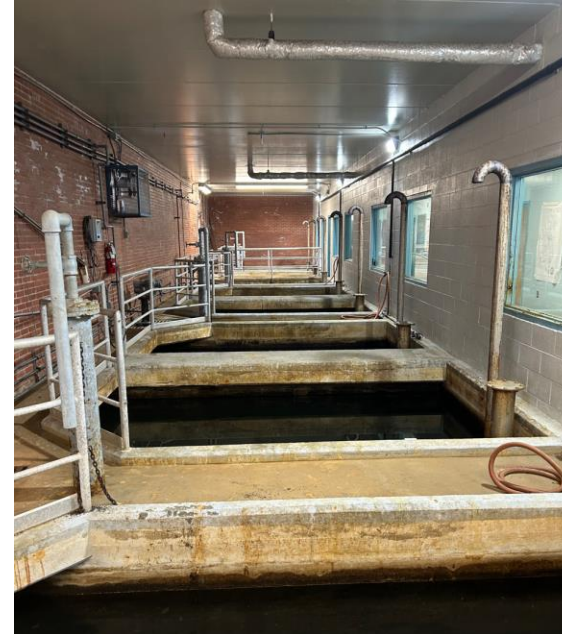
Existing Water System  
**SOUTHERN GRANVILLE WATER AND SEWER AUTHORITY**  
Granville County, North Carolina

1 inch equals 7,500 ft

McGill  
1240 FIVE OAKS RD  
HARRIS, NC 28047  
800.333.2274  
www.mcgonline.com

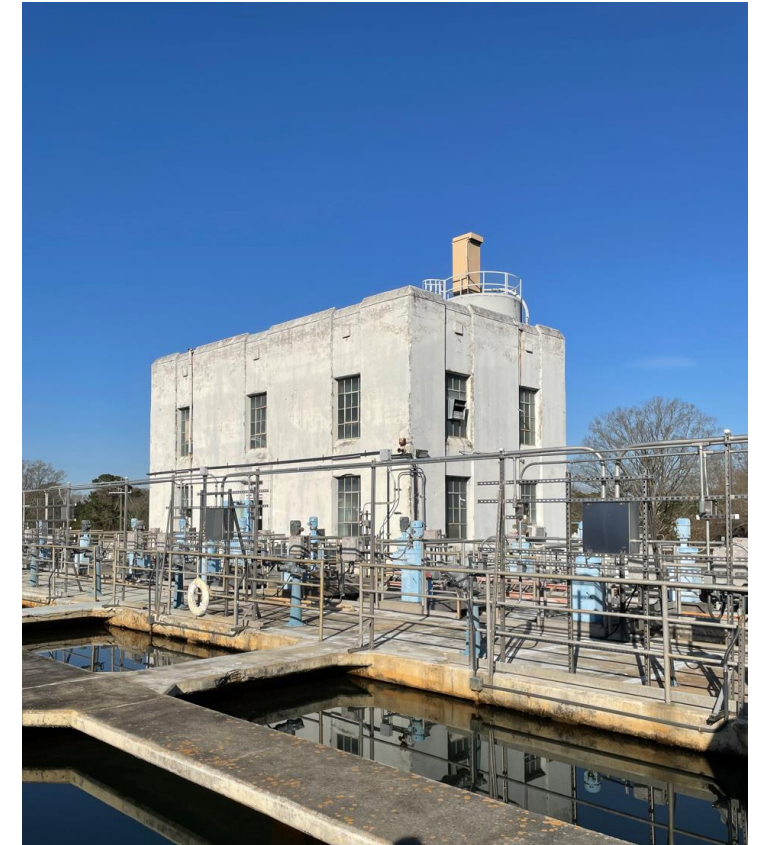
# SGWASA WTP – Inventory and Assessment

| Asset                                             | Condition Rating | Criticality Rating | Risk Rating |
|---------------------------------------------------|------------------|--------------------|-------------|
| Raw Water Intake                                  | 3                | 4                  | 12          |
| Raw Water Pump No. 1                              | 2                | 4                  | 8           |
| Raw Water Pump No. 2                              | 2                | 4                  | 8           |
| Raw Water Pump No. 3                              | 5                | 4                  | 20          |
| Potassium Permanganate Feed System (Raw Water PS) | 3                | 2                  | 6           |
| Backup Generator (Raw Water PS)                   | 9                | 3                  | 3           |
| Raw Water Reservoir (10.96 MG)                    | 2                | 2                  | 4           |
| Intermediate Raw Water Pump No. 1                 | 2                | 3                  | 6           |
| Intermediate Raw Water Pump No. 2                 | 2                | 3                  | 6           |
| Raw Water Flow Meter                              | 2                | 2                  | 4           |
| Flash Mixer (1)                                   | 3                | 3                  | 9           |
| Flocculators (23)                                 | 4                | 3                  | 12          |
| Sedimentation Basins (5)                          | 3                | 3                  | 9           |
| Sedimentation Basin Sludge Removal Equipment      | 3                | 1                  | 3           |
| Sedimentation Basin Plate Settlers                | 2                | 2                  | 4           |
| Filters (5) - Underdrains                         | 2                | 4                  | 8           |
| Filters (5) - Media                               | 3                | 4                  | 12          |
| Air Scour Blowers                                 | 2                | 2                  | 4           |
| Filter Control Panels                             | 2                | 2                  | 4           |
| Filter Gallery Piping                             | 4                | 5                  | 20          |
| Filter Valves and Actuators                       | 3                | 3                  | 9           |
| Disinfection Contact Basin                        | 2                | 3                  | 6           |
| Clearwell - 2 MG                                  | 4                | 5                  | 20          |
| High Service Pump No. 1                           | 3                | 3                  | 6           |
| High Service Pump No. 2                           | 2                | 3                  | 6           |
| High Service Pump No. 3                           | 2                | 3                  | 6           |
| High Service Pump No. 4                           | 2                | 3                  | 6           |
| EQ Lagoon                                         | 2                | 2                  | 4           |

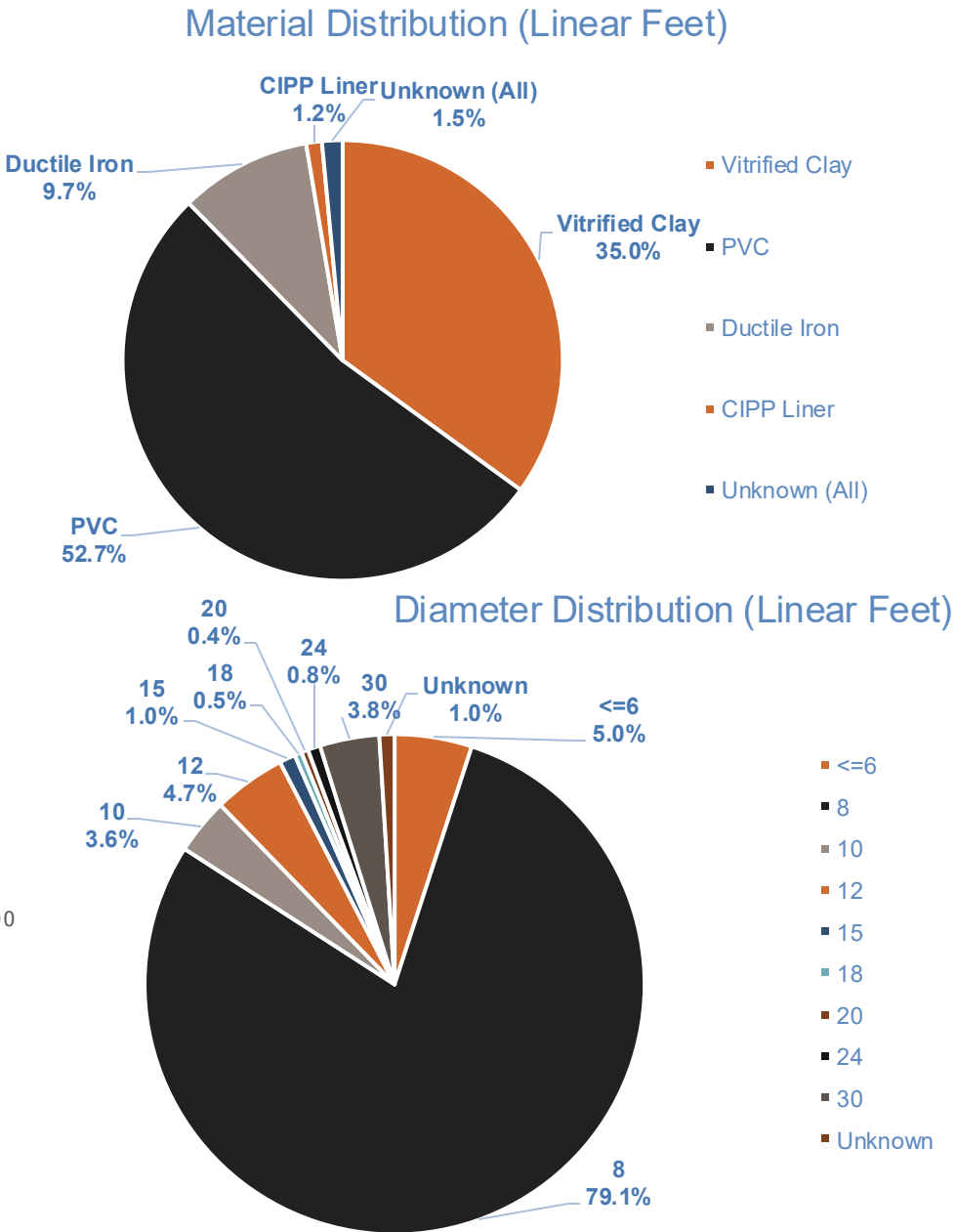
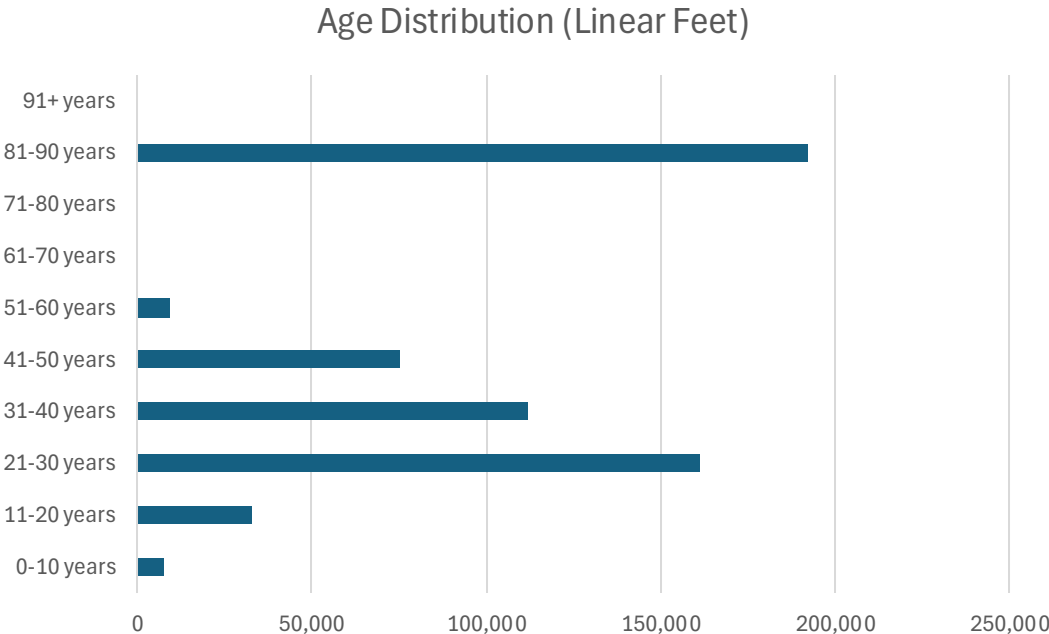


# SGWASA Water System Capital Improvements Projects

| Proposed Project                                                               | Estimated Project Cost |
|--------------------------------------------------------------------------------|------------------------|
| WTP Critical Components Replacements – Clear well and Chlorine Contact Chamber | \$6,322,000            |
| WTP Critical Components Replacements – Major Components                        | \$6,508,000            |
| WTP Critical Components Replacements – Flocculators                            | \$1,136,000            |
| WTP New Raw Water Intake Structure                                             | \$6,684,000            |
| Mount Energy Booster Pump Station – Pump Replacement                           | \$341,000              |
| Mount Energy Booster Pump Station – Chemical System                            | \$412,000              |
| Stem Tank Booster Pump Station – Chemical Systems                              | \$721,000              |
| Wilton Tank Booster Pump Station – Chemical Systems                            | \$744,000              |
| Granville High Booster Pump Station – Chemical Systems                         | \$419,000              |
| Annual Water Line and Hydrant Replacements                                     | \$15,387,000           |
| Lead Service Line Program                                                      | \$255,000              |
| <b>TOTAL</b>                                                                   | <b>\$38,929,000</b>    |



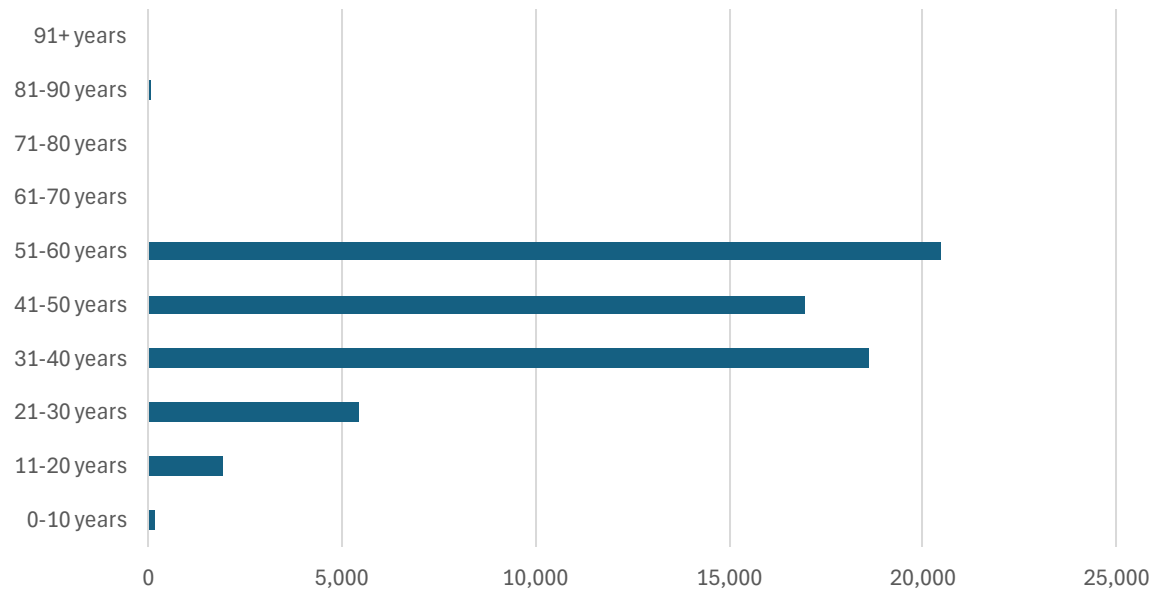
# SGWASA Gravity Sewer System



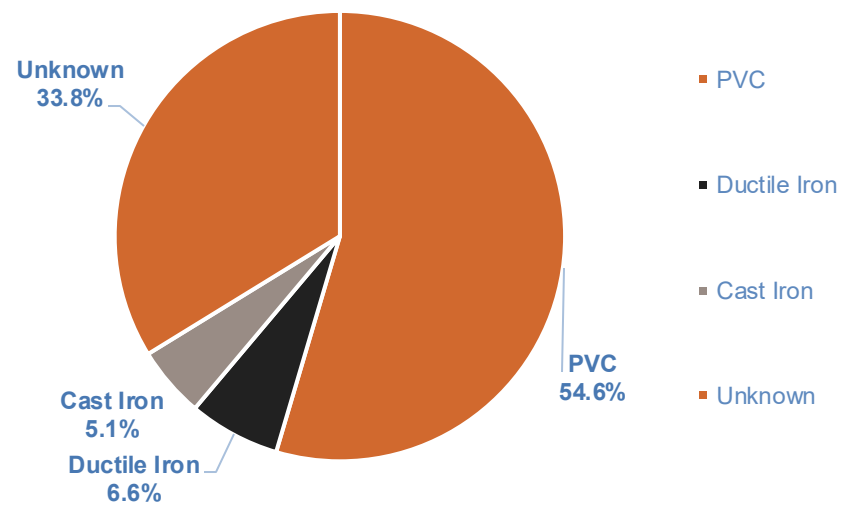
Age, material, and size based on best available information

# SGWASA Sewer Force Mains

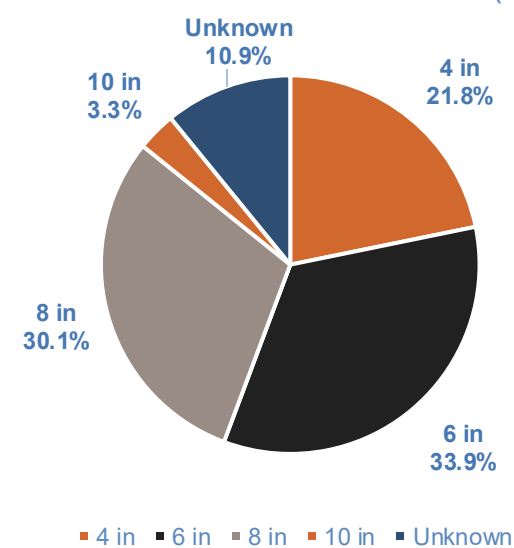
Age Distribution (Linear Feet)



Material Distribution (Linear Feet)

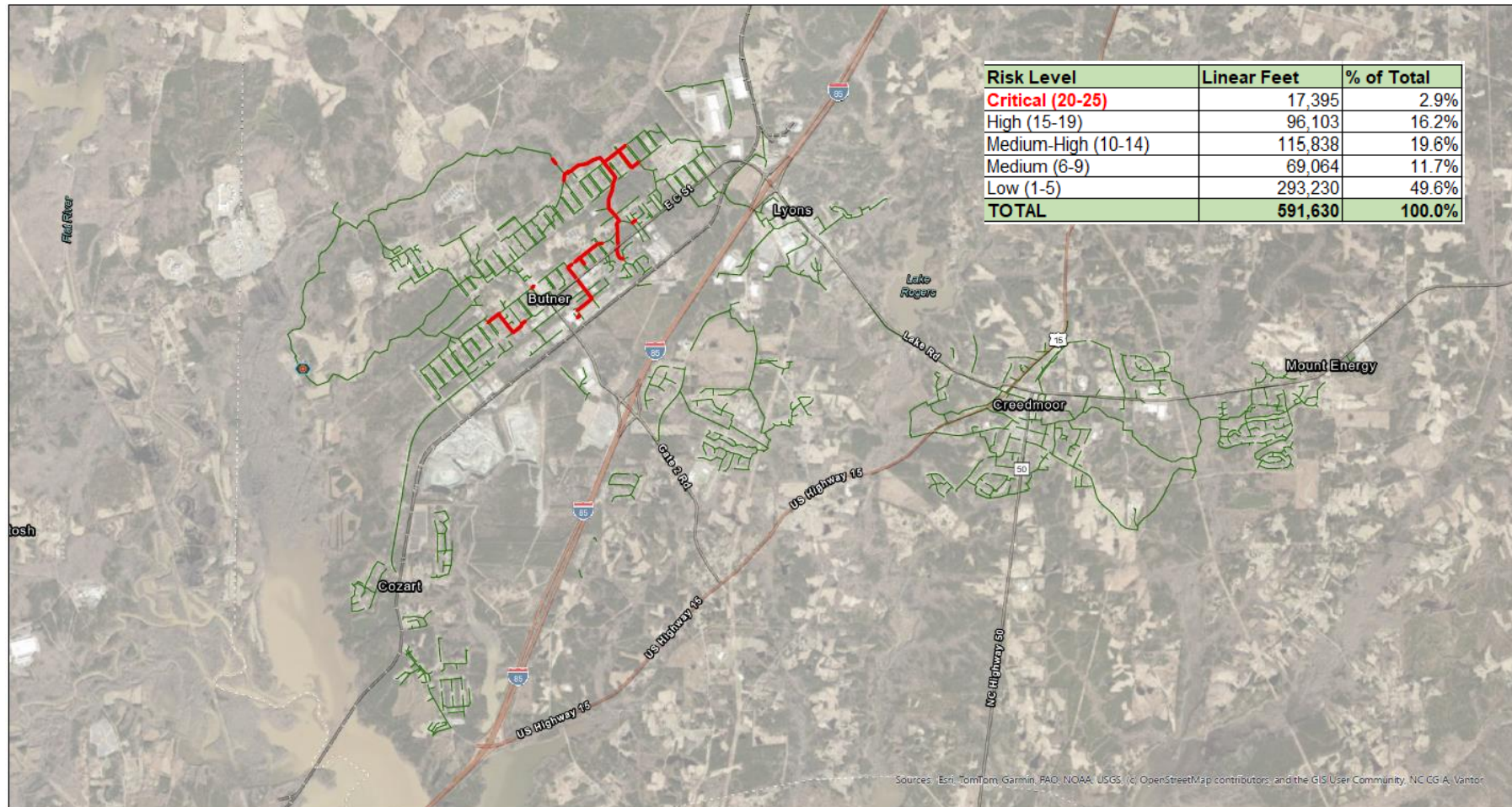


Diameter Distribution (Linear Feet)



Age, material, and size based on best available information

# SGWASA Sewer Lines Risk Levels



## Legend

- SWR\_WWTP
- RR
- <20
- >20

Existing Sewer System  
**SOUTHERN GRANVILLE WATER AND SEWER AUTHORITY**  
Granville County, North Carolina



# SGWASA Lift Station Risk Levels

| Lift Station ID      | Condition | Condition Rating | Criticality Rating | Risk Rating |
|----------------------|-----------|------------------|--------------------|-------------|
| Butner #2            | FAIR      | 2                | 3                  | 6           |
| Butner #5            | POOR      | 4                | 2                  | 8           |
| Butner Business Park | GOOD      | 1                | 1                  | 1           |
| Cedar Creek          | FAIR      | 2                | 1                  | 2           |
| Coley Park           | GOOD      | 2                | 1                  | 2           |
| Gate #1              | GOOD      | 1                | 3                  | 3           |
| Granville Forest     | FAIR      | 2                | 1                  | 2           |
| Granville Oaks       | GOOD      | 1                | 3                  | 3           |
| Mt Energy            | FAIR      | 2                | 4                  | 8           |
| Robertson Creek      | GOOD      | 1                | 4                  | 4           |
| Southerby's          | VERY POOR | 5                | 2                  | 10          |



# SGWASA WWTP – Inventory and Assessment

| Asset                                       | Condition | Risk Rating | Asset                              | Condition | Risk Rating |
|---------------------------------------------|-----------|-------------|------------------------------------|-----------|-------------|
| Influent pumps (4)                          | FAIR      | 4           | Clarifier #1                       | GOOD      | 4           |
| Influent pumps (3)                          | FAIR      | 4           | Clarifier #2                       | GOOD      | 4           |
| Emergency Generator #1                      | GOOD      | 2           | Clarifier #3                       | POOR      | 20          |
| Emergency Generator #2                      | GOOD      | 2           | Denitrification Filters (4)        | GOOD      | 4           |
| Mechanical Bar Screens (2)                  | FAIR      | 9           | Denitrification Filters (4)        | GOOD      | 4           |
| Grit Chambers (2)                           | GOOD      | 4           | Denitrification filter pumps (3)   | GOOD      | 4           |
| Grit Pumps (2)                              | GOOD      | 4           | Denitrification backwash pumps (2) | GOOD      | 4           |
| Equalization Tanks (2 tanks each is 2.5 MG) | GOOD      | 2           | RAS Bunker                         | FAIR      | 6           |
| Concrete BNR Basins (3 trains)              | FAIR      | 4           | Waste pumps (2)                    | GOOD      | 4           |
| Caustic Feed Metering Pumps (3)             | NEW       | 4           | Scum Pumps (2)                     | GOOD      | 4           |
| Oxidation Ditches (2)                       | FAIR      | 6           | Chlorine Contact Chamber           | GOOD      | 4           |
| Oxidation Ditch (smaller one)               | GOOD      | 6           | Chlorine Contact sampling station  | FAIR      | 4           |
| Oxidation Ditch Blowers (3)                 | GOOD      | 4           | Effluent flow meter station        | GOOD      | 2           |
| MCC for Oxidation Ditch Blowers             | GOOD      | 4           | First stage sludge digesters (5)   | VERY POOR | 20          |
| Oxidation Ditch Splitter Box                | GOOD      | 4           | Second Stage Digesters (4)         | POOR      | 9           |
| Recycle Pumps                               | GOOD      | 4           | Sludge Feed Pumps                  | FAIR      | 4           |

# SGWASA Sewer System Capital Improvements Projects

| Proposed Project                                                         | Estimated Project Cost |
|--------------------------------------------------------------------------|------------------------|
| WWTP Clarifier #3 Rehabilitation                                         | \$2,443,000            |
| WWTP Second Stage Sludge Digesters Rehabilitation                        | \$1,709,000            |
| Mt Energy Lift Station Rehabilitation                                    | \$1,919,000            |
| Robinson Creek Lift Station Rehabilitation                               | \$1,364,000            |
| 18 <sup>th</sup> & E G Streets (C-3-A) Sewer Replacements                | \$3,051,000            |
| 19 <sup>th</sup> and 20 <sup>th</sup> Streets (C-3-B) Sewer Replacements | \$2,391,000            |
| 21 <sup>st</sup> & W F Streets (C-3-C) Sewer Replacements                | \$1,970,000            |
| 22 <sup>nd</sup> & 23 <sup>rd</sup> Street (C-3-D) Sewer Replacements    | \$2,030,000            |
| 24 <sup>th</sup> & E Streets (C-3-E) Sewer Replacements                  | \$2,534,000            |
| 27 <sup>th</sup> & 28 <sup>th</sup> Streets (C-11-A) Sewer Replacements  | \$2,374,000            |
| D & 31st Streets (C-11-B) Sewer Replacements                             | \$1,665,000            |
| Hawley School Rd & HWY 56 (A-13) Sewer Replacements                      | \$801,000              |
| Hillsboro Street & S Elm Street (A-11) Sewer Replacements                | \$1,240,000            |
| Cozart St & E Lyon Street (A-10) Sewer Replacements                      | \$1,594,000            |
| 5 <sup>th</sup> & 6 <sup>th</sup> Streets (B-1-A) Sewer Replacements     | \$3,860,000            |
| 7 <sup>th</sup> & 8 <sup>th</sup> Streets (B-1-B) Sewer Replacements     | \$3,709,000            |
| 12 <sup>th</sup> & 13 <sup>th</sup> Streets (A-1) Sewer Replacements     | \$2,626,000            |
| <b>TOTAL</b>                                                             | <b>\$37,280,000</b>    |



# Capital Improvement Planning

- **Viability Needs**
  - Aging Equipment
  - Out of Date Technology
  - Operational Issues
- **Efficiency Needs**
- **Growth Needs**
  - Capacity Assurance
  - Capacity Expansion
- **Regulatory Needs**
  - Permitting Changes
  - Monitoring Changes

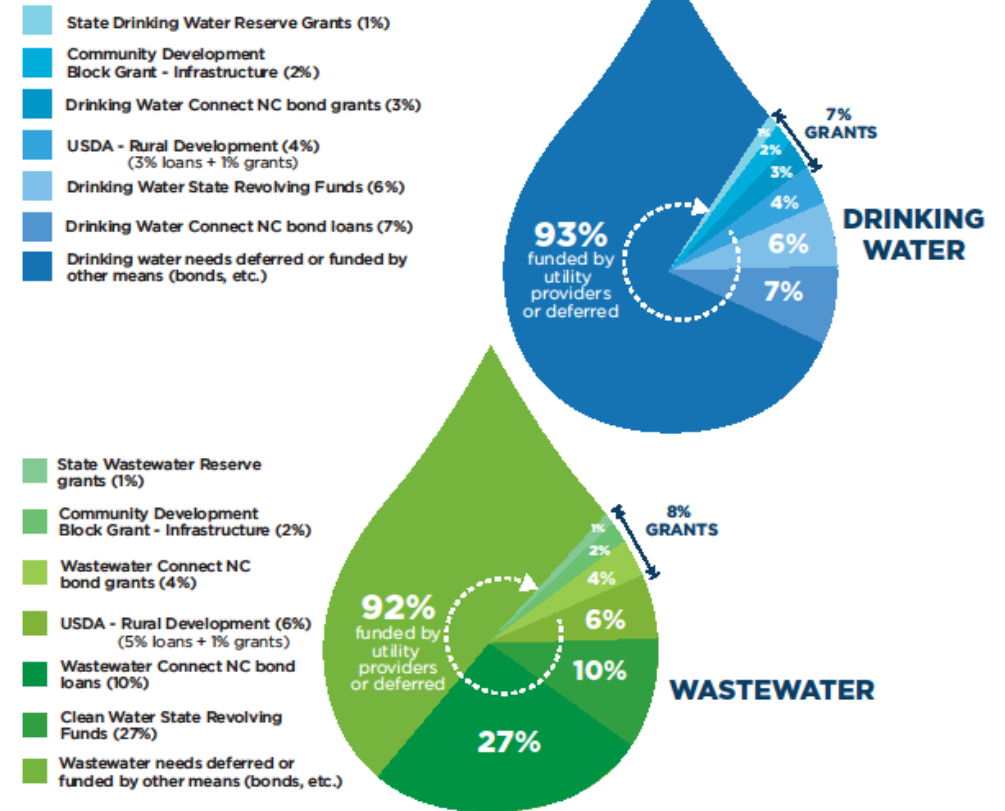


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# Availability of Funding Sources

## Estimated Drinking Water and Wastewater INFRASTRUCTURE NEEDS and FUNDING SOURCES





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# Questions

