# 2 – Taking an asset inventory



MISSISSIPPI
Water and Pollution Control
Operators Association

# Objectives

- Understand why an asset inventory is important
- Understand the basic steps required to undertake an asset inventory
- Understand how to store data collected in the asset management inventory
- Understand some of the steps necessary to convert data into information for use by yourself and the governing board

# Why worry about an asset inventory?

- You can’t plan for what you need until you know what you have
- It provides a chance to evaluate the condition of the system’s assets
- Aside from using the inventory to develop the asset management plan, the inventory can form the long range plan and financial management strategies
- Most governing boards have no idea of the breadth and number of assets (as well as their costs) that are involved with a drinking water system or for any underground utility (i.e., wastewater, underground electric, gas).

# Where can the information be obtained for an asset inventory?

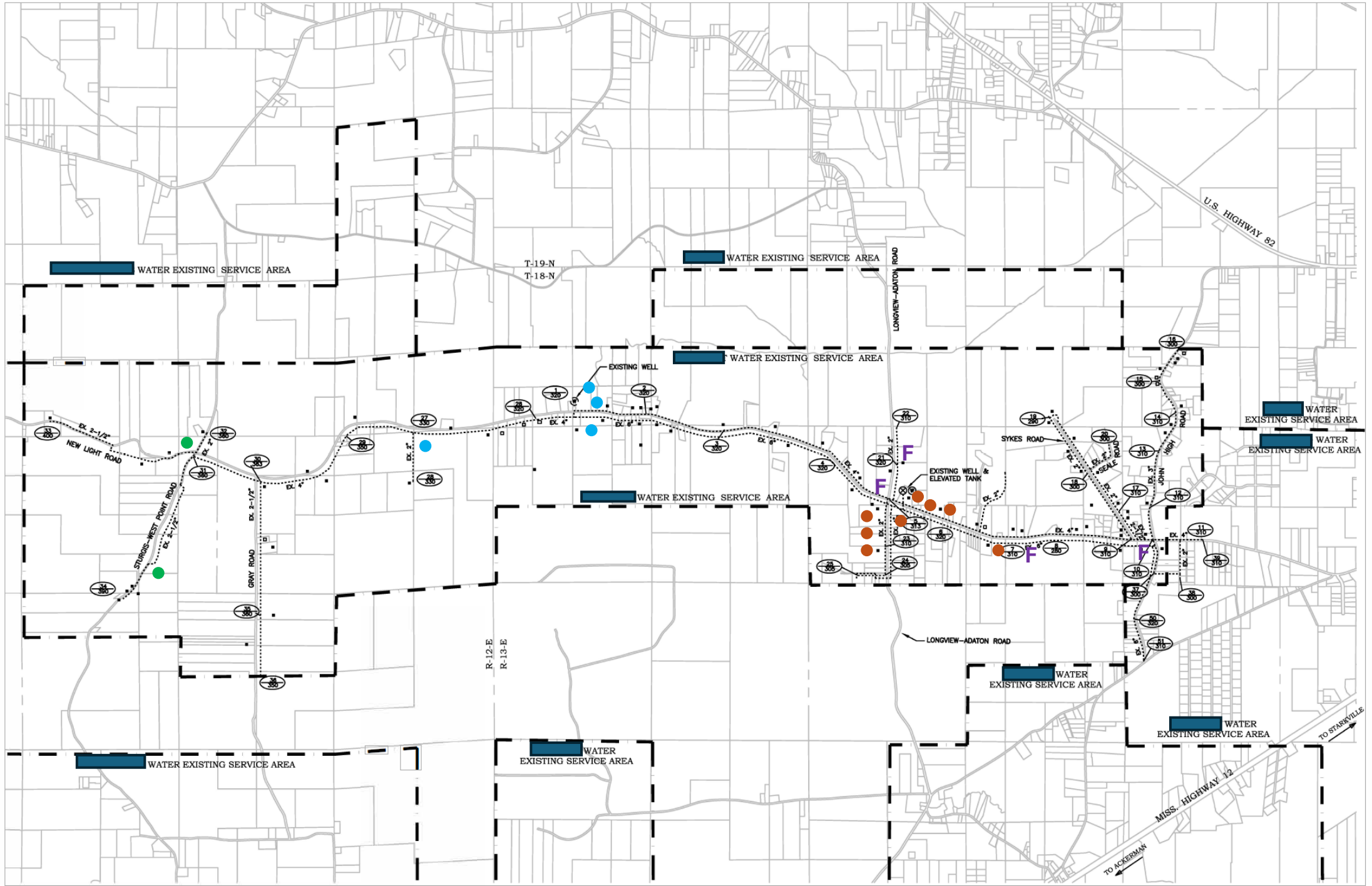
- Consulting engineer
  - As-built maps
  - Hydrology study
  - Future system needs
- Billing system
  - Connection addresses
  - Meter numbers (hopefully)
  - Types of service
- Financial records
  - Purchase amounts and dates
  - Expected life “suggestions”
- Maintenance and repair records
  - Frequency of maintenance
  - Insight into asset condition
  - Meter changeout program
  - Problem equipment
- Meter reader
- Maintenance personnel
- MSDH and MDEQ

# What assets should you be focused on?

- Some systems have set dollar thresholds ($500 or $3,000)
- Other systems have focused on the operational aspects of the system

- Tank(s)
- Well(s)
- Pump(s)
- Electrical components
- Chlorinators
- Chemical feeders
- Clarifiers
- Clear well
- Other treatment equipment
- Valves
- Fire hydrants
- **Meters and accompanying equipment**
- Personnel (especially operator and clerk)

# This is data


WATER EXISTING SERVICE AREA
T-19-N
T-18-N
U.S. HIGHWAY 82
LONGVIEW-ADATON ROAD
EXISTING WELL
EXISTING WELL & ELEVATED TANK
NEW LIGHT ROAD
STURGIS-WEST POINT ROAD
GRAY ROAD
SYKES ROAD
SEALE ROAD
JOHN HIGH ROAD
R-12-E
R-13-E
MISS. HIGHWAY 12
TO STARKVILLE
TO ACKERMAN

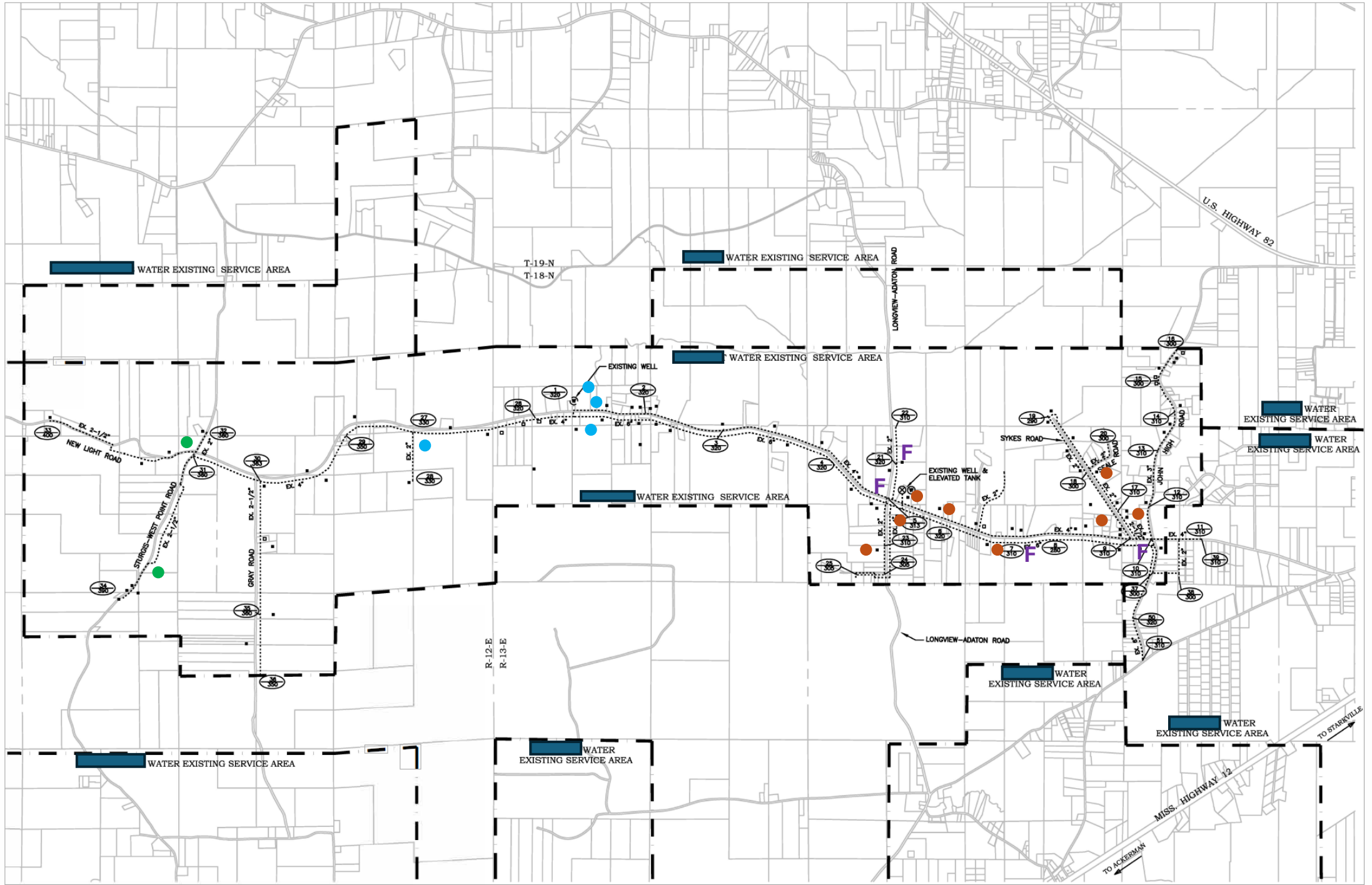
Condition: Existing with Existing Well

| Pipe No. | Node #1 | Node #2 | Service Conns. | Flow Rate (GPM) | Pipe Length (FT) | Pipe Dia. (INCH) | Head Loss (FT) | Velo-city (FPS) | Node 1 Static (PSI) | Node 1 Dynam (PSI) | Node 1 Elev. (FT) | Node 2 Static (PSI) | Node 2 Dynam (PSI) | Node 2 Elev. (FT) | Road Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-1 | J-16 | J-15 | 26 | -47.82 | 1208.19 | 3.00 | -10.90 | -0.46 | 78.87 | 20.34 | 300 | 78.87 | 25.06 | 300 | |
| P-10 | J-19 | J-18 | 10 | -4.41 | 2202.40 | 2.00 | -1.73 | 0.77 | 83.20 | 64.04 | 290 | 78.87 | 60.45 | 300 | |
| P-11 | J-10 | J-64 | 0 | -79.97 | 219.31 | 6.00 | -0.18 | -0.27 | 74.53 | 69.13 | 310 | 74.53 | 69.21 | 310 | |
| P-12 | J-31 | J-34 | 10 | 30.01 | 5719.90 | 2.50 | 52.89 | 0.17 | 52.87 | 31.82 | 360 | 39.87 | ***-4.10*** | 390 | |
| P-13 | J-29 | J-30 | 9 | 55.03 | 4257.53 | 4.00 | 12.27 | -0.48 | 57.20 | 43.32 | 350 | 51.57 | 32.37 | 363 | |
| P-14 | J-55 | J-7 | 9 | 103.65 | 3885.01 | 6.00 | 5.02 | -0.39 | 72.37 | 71.26 | 315 | 74.53 | 71.25 | 310 | |
| P-15 | J-57 | J-56 | 10 | -30.01 | 1589.82 | 4.00 | -1.49 | 0.00 | 76.70 | 73.48 | 305 | 76.70 | 74.12 | 305 | |
| P-16 | J-20 | J-61 | 8 | -27.12 | 1231.89 | 2.00 | -28.00 | 0.39 | 78.87 | 48.00 | 300 | 78.87 | 60.13 | 300 | |
| P-17 | J-59 | J-58 | 7 | -25.56 | 2394.84 | 2.00 | -48.78 | -0.14 | 74.10 | 46.15 | 311 | 73.67 | 66.86 | 312 | |
| P-18 | T-2 | J-55 | 0 | 184.25 | 680.15 | 6.00 | 2.55 | 0.14 | 69.77 | 69.77 | 321 | 72.37 | 71.26 | 315 | |
| P-19 | J-38 | J-65 | 0 | 0.00 | 470.76 | 2.00 | 0.00 | 0.00 | 78.87 | 68.37 | 300 | 78.87 | 68.37 | 300 | |
| P-2 | J-39 | J-11 | 1 | -12.26 | 795.07 | 4.00 | -0.14 | 0.00 | 74.53 | 63.46 | 310 | 74.53 | 63.52 | 310 | |
| P-20 | J-63 | J-50 | 1 | 12.26 | 2621.81 | 6.00 | 0.07 | 0.20 | 74.10 | 68.81 | 311 | 70.20 | 64.88 | 320 | |
| P-21 | J-26 | J-27 | 4 | 69.32 | 4129.61 | 4.00 | 18.25 | -0.32 | 70.20 | 66.87 | 320 | 65.87 | 54.62 | 330 | |
| P-22 | J-68 | J-31 | 0 | -30.01 | 159.86 | 2.00 | -4.38 | 0.24 | 52.87 | 29.92 | 360 | 52.87 | 31.82 | 360 | |
| P-23 | J-30 | J-31 | 0 | 41.86 | 2453.32 | 4.00 | 4.26 | 0.18 | 51.57 | 32.37 | 363 | 52.87 | 31.82 | 360 | |
| P-24 | J-27 | J-29 | 6 | 60.03 | 1801.07 | ***4.00*** | 6.10 | 2.26 | 65.87 | 54.62 | 330 | ***57.20*** | ***43.32*** | 350 | |
| P-25 | J-1 | J-26 | 3 | 71.52 | 1345.79 | 4.00 | 6.30 | 0.60 | 70.20 | 69.60 | 320 | 70.20 | 66.87 | 320 | |
| P-26 | J-66 | J-4 | 5 | -23.06 | 2668.49 | 6.00 | -0.21 | 0.50 | 73.23 | 71.96 | 313 | 70.20 | 69.02 | 320 | |
| P-27 | J-67 | J-66 | 0 | 61.10 | 218.40 | 6.00 | 0.11 | 0.78 | 73.23 | 72.01 | 313 | 73.23 | 71.96 | 313 | |
| P-28 | J-53 | J-5 | 0 | -73.84 | 200.88 | 4.00 | -1.00 | 1.53 | 73.23 | 71.19 | 313 | 73.23 | 71.62 | 313 | |
| P-29 | J-55 | J-67 | 0 | 76.10 | 374.56 | 6.00 | 0.27 | -0.30 | 72.37 | 71.26 | 315 | 73.23 | 72.01 | 313 | |
| P-3 | J-35 | J-30 | 5 | -22.13 | 6594.12 | 2.50 | -34.69 | -0.29 | 52.87 | ***18.63*** | 360 | 51.57 | 32.37 | 363 | |
| P-30 | J-58 | J-53 | 9 | -61.35 | 3118.87 | 4.00 | -10.99 | 0.54 | 73.67 | 66.86 | 312 | 73.23 | 71.19 | 313 | |
| P-31 | J-19 | J-60 | 0 | 0.00 | 201.28 | 2.00 | 0.00 | 0.38 | 83.20 | 64.04 | 290 | 83.20 | 64.04 | 290 | |
| P-32 | J-61 | J-19 | 5 | 3.09 | 2431.57 | 2.00 | 0.99 | 0.37 | 78.87 | 60.13 | 300 | 83.20 | 64.04 | 290 | |
| P-33 | J-9 | J-58 | 13 | -43.35 | 5190.02 | 4.00 | -9.61 | 0.87 | 74.53 | 63.56 | 310 | 73.67 | 66.86 | 312 | |
| P-34 | J-62 | J-9 | 0 | -19.44 | 205.50 | 4.00 | -0.09 | 1.21 | 74.53 | 63.52 | 310 | 74.53 | 63.56 | 310 | |
| P-35 | J-11 | J-62 | 0 | 1.15 | 1407.75 | 4.00 | 0.00 | 2.44 | 74.53 | 63.52 | 310 | 74.53 | 63.52 | 310 | |
| P-36 | J-64 | J-37 | 0 | 15.15 | 1020.51 | 2.00 | 7.89 | 1.36 | 74.53 | 69.21 | 310 | 78.87 | 70.12 | 300 | |
| P-37 | J-63 | J-64 | 0 | 82.15 | 98.31 | 6.00 | 0.08 | 1.12 | 74.10 | 68.81 | 311 | 74.53 | 69.21 | 310 | |
| P-38 | J-65 | J-11 | 6 | 5.15 | 1133.49 | 2.00 | 1.19 | 2.92 | 78.87 | 68.37 | 300 | 74.53 | 63.52 | 310 | |
| P-39 | J-2 | J-100 | 9 | -22.68 | 2575.57 | 4.00 | -1.44 | 0.52 | 70.20 | 69.08 | 320 | 70.20 | 69.70 | 320 | |
| P-4 | J-32 | J-68 | 3 | -18.02 | 770.65 | 2.00 | -8.21 | 0.52 | 52.87 | 26.36 | 360 | 52.87 | 29.92 | 360 | |
| P-40 | J-3 | J-2 | 6 | -15.18 | 2737.33 | 4.00 | -0.73 | 0.31 | 70.20 | 68.76 | 320 | 70.20 | 69.08 | 320 | |
| P-41 | J-4 | J-1 | 14 | -32.56 | 8751.49 | 6.00 | -1.32 | 0.56 | 70.20 | 69.02 | 320 | 70.20 | 69.60 | 320 | |
| P-42 | J-21 | J-53 | 0 | -27.12 | 870.48 | 2.00 | -19.78 | 0.84 | 74.53 | 63.91 | 310 | 73.23 | 71.19 | 313 | |
| P-43 | J-23 | J-66 | 0 | -30.01 | 1481.11 | 2.00 | -40.60 | 0.38 | 74.53 | 55.67 | 310 | 73.23 | 71.96 | 313 | |
| P-44 | J-24 | J-23 | 5 | -30.01 | 926.54 | 2.00 | -25.40 | 2.26 | 76.70 | 46.83 | 305 | 74.53 | 55.67 | 310 | |
| P-45 | J-5 | J-3 | 10 | -7.18 | 6179.55 | 4.00 | -0.41 | 0.78 | 73.23 | 71.62 | 313 | 70.20 | 68.76 | 320 | |
| P-46 | J-66 | J-5 | 0 | 71.67 | 168.76 | 4.00 | 0.79 | 0.34 | 73.23 | 71.96 | 313 | 73.23 | 71.62 | 313 | |
| P-47 | J-18 | J-9 | 8 | -13.41 | 2782.73 | 2.00 | -17.17 | 0.21 | 78.87 | 60.45 | 300 | 74.53 | 63.56 | 310 | |
| P-48 | J-17 | J-62 | 4 | -18.59 | 1129.20 | 2.50 | -4.30 | 0.00 | 74.53 | 61.66 | 310 | 74.53 | 63.52 | 310 | |
| P-49 | J-15 | J-14 | 15 | -60.84 | 1443.02 | 3.00 | -20.33 | -0.29 | 78.87 | 25.06 | 300 | 74.53 | 29.54 | 310 | |
| P-5 | J-33 | J-68 | 7 | -25.56 | 5531.81 | 2.50 | -38.01 | 0.55 | 35.53 | ***-3.88*** | 400 | 52.87 | 29.92 | 360 | |
| P-50 | J-14 | J-13 | 12 | -70.06 | 1643.53 | 3.00 | -30.07 | -0.62 | 74.53 | 29.54 | 310 | 74.53 | 42.57 | 310 | |
| P-51 | J-13 | J-12 | 10 | -77.21 | 1701.53 | 3.00 | -37.27 | 0.46 | 74.53 | 42.57 | 310 | 74.53 | 58.72 | 310 | |
| P-52 | J-12 | J-10 | 4 | -79.97 | 1028.41 | 3.00 | -24.04 | 0.12 | 74.53 | 58.72 | 310 | 74.53 | 69.13 | 310 | |
| P-53 | J-37 | J-65 | 7 | 11.65 | 851.11 | 2.00 | 4.05 | 0.20 | 78.87 | 70.12 | 300 | 78.87 | 68.37 | 300 | |
| P-54 | J-50 | J-51 | 0 | 0.00 | 1455.88 | 6.00 | 0.00 | -0.01 | 70.20 | 64.88 | 320 | 74.53 | 69.22 | 310 | |

# It’s your job to turn that data into information for yourself and for the governing board

# Example 1 – Water Association (valves/fire hydrants added)

- 2” valve
- 4” valve
- 6” valve
- F Fire hydrant



## Asset Mgt Concepts

- Flow rate number (+ or -) indicate flow direction
- Diameter and length of pipe in each segment
- Elevation – look at minimum and maximum, particularly for future growth
- Static pressure and head loss indicate adequate pressure to customer

Condition: Existing with Existing Well

| Pipe No. | Node #1 | Node #2 | Service Conns. | Flow Rate (GPM) | Pipe Length (FT) | Pipe Dia. (INCH) | Head Loss (FT) | Velo-city (FPS) | Node 1 Static (PSI) | Node 1 Dynam (PSI) | Node 1 Elev. (FT) | Node 2 Static (PSI) | Node 2 Dynam (PSI) | Node 2 Elev. (FT) | Road Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-1 | J-16 | J-15 | 26 | -47.82 | 1208.19 | 3.00 | -10.90 | -0.46 | 78.87 | 20.34 | 300 | 78.87 | 25.06 | 300 | |
| P-10 | J-19 | J-18 | 10 | -4.41 | 2202.40 | 2.00 | -1.73 | 0.77 | 83.20 | 64.04 | 290 | 78.87 | 60.45 | 300 | |
| P-11 | J-10 | J-64 | 0 | -79.97 | 219.31 | 6.00 | -0.18 | -0.27 | 74.53 | 69.13 | 310 | 74.53 | 69.21 | 310 | |
| P-12 | J-31 | J-34 | 10 | 30.01 | 5719.90 | 2.50 | 52.89 | 0.17 | 52.87 | 31.82 | 360 | 39.87 | ***-4.10*** | 390 | |
| P-13 | J-29 | J-30 | 9 | 55.03 | 4257.53 | 4.00 | 12.27 | -0.48 | 57.20 | 43.32 | 350 | 51.57 | 32.37 | 363 | |
| P-14 | J-55 | J-7 | 9 | 103.65 | 3885.01 | 6.00 | 5.02 | -0.39 | 72.37 | 71.26 | 315 | 74.53 | 71.25 | 310 | |
| P-15 | J-57 | J-56 | 10 | -30.01 | 1589.82 | 4.00 | -1.49 | 0.00 | 76.70 | 73.48 | 305 | 76.70 | 74.12 | 305 | |
| P-16 | J-20 | J-61 | 8 | -27.12 | 1231.89 | 2.00 | -28.00 | 0.39 | 78.87 | 48.00 | 300 | 78.87 | 60.13 | 300 | |
| P-17 | J-59 | J-58 | 7 | -25.56 | 2394.84 | 2.00 | -48.78 | -0.14 | 74.10 | 46.15 | 311 | 73.67 | 66.86 | 312 | |
| P-18 | T-2 | J-55 | 0 | 184.25 | 680.15 | 6.00 | 2.55 | 0.14 | 69.77 | 69.77 | 321 | 72.37 | 71.26 | 315 | |
| P-19 | J-38 | J-65 | 0 | 0.00 | 470.76 | 2.00 | 0.00 | 0.00 | 78.87 | 68.37 | 300 | 78.87 | 68.37 | 300 | |
| P-2 | J-39 | J-11 | 1 | -12.26 | 795.07 | 4.00 | -0.14 | 0.00 | 74.53 | 63.46 | 310 | 74.53 | 63.52 | 310 | |
| P-20 | J-63 | J-50 | 1 | 12.26 | 2621.81 | 6.00 | 0.07 | 0.20 | 74.10 | 68.81 | 311 | 70.20 | 64.88 | 320 | |
| P-21 | J-26 | J-27 | 4 | 69.32 | 4129.61 | 4.00 | 18.25 | -0.32 | 70.20 | 66.87 | 320 | 65.87 | 54.62 | 330 | |
| P-22 | J-68 | J-31 | 0 | -30.01 | 159.86 | 2.00 | -4.38 | 0.24 | 52.87 | 29.92 | 360 | 52.87 | 31.82 | 360 | |
| P-23 | J-30 | J-31 | 0 | 41.86 | 2453.32 | 4.00 | 4.26 | 0.18 | 51.57 | 32.37 | 363 | 52.87 | 31.82 | 360 | |
| P-24 | J-27 | J-29 | 6 | 60.03 | 1801.07 | 4.00 | 6.10 | 2.26 | 65.87 | 54.62 | 330 | 57.20 | 43.32 | 350 | |
| P-25 | J-1 | J-26 | 3 | 71.52 | 1345.79 | 4.00 | 6.30 | 0.60 | 70.20 | 69.60 | 320 | 70.20 | 66.87 | 320 | |
| P-26 | J-66 | J-4 | 5 | -23.06 | 2668.49 | 6.00 | -0.21 | 0.50 | 73.23 | 71.96 | 313 | 70.20 | 69.02 | 320 | |
| P-27 | J-67 | J-66 | 0 | 61.10 | 218.40 | 6.00 | 0.11 | 0.78 | 73.23 | 72.01 | 313 | 73.23 | 71.96 | 313 | |
| P-28 | J-53 | J-5 | 0 | -73.84 | 200.88 | 4.00 | -1.00 | 1.53 | 73.23 | 71.19 | 313 | 73.23 | 71.62 | 313 | |
| P-29 | J-55 | J-67 | 0 | 76.10 | 374.56 | 6.00 | 0.27 | -0.30 | 72.37 | 71.26 | 315 | 73.23 | 72.01 | 313 | |
| P-3 | J-35 | J-30 | 5 | -22.13 | 6594.12 | 2.50 | -34.69 | -0.29 | 52.87 | ***18.63*** | 360 | 51.57 | 32.37 | 363 | |
| P-30 | J-58 | J-53 | 9 | -61.35 | 3118.87 | 4.00 | -10.99 | 0.54 | 73.67 | 66.86 | 312 | 73.23 | 71.19 | 313 | |
| P-31 | J-19 | J-60 | 0 | 0.00 | 201.28 | 2.00 | 0.00 | 0.38 | 83.20 | 64.04 | 290 | 83.20 | 64.04 | 290 | |
| P-32 | J-61 | J-19 | 5 | 3.09 | 2431.57 | 2.00 | 0.99 | 0.37 | 78.87 | 60.13 | 300 | 83.20 | 64.04 | 290 | |
| P-33 | J-9 | J-58 | 13 | -43.35 | 5190.02 | 4.00 | -9.61 | 0.87 | 74.53 | 63.56 | 310 | 73.67 | 66.86 | 312 | |
| P-34 | J-62 | J-9 | 0 | -19.44 | 205.50 | 4.00 | -0.09 | 1.21 | 74.53 | 63.52 | 310 | 74.53 | 63.56 | 310 | |
| P-35 | J-11 | J-62 | 0 | 1.15 | 1407.75 | 4.00 | 0.00 | 2.44 | 74.53 | 63.52 | 310 | 74.53 | 63.52 | 310 | |
| P-36 | J-64 | J-37 | 0 | 15.15 | 1020.51 | 2.00 | 7.89 | 1.36 | 74.53 | 69.21 | 310 | 78.87 | 70.12 | 300 | |
| P-37 | J-63 | J-64 | 0 | 82.15 | 98.31 | 6.00 | 0.08 | 1.12 | 74.10 | 68.81 | 311 | 74.53 | 69.21 | 310 | |
| P-38 | J-65 | J-11 | 6 | 5.15 | 1133.49 | 2.00 | 1.19 | 2.92 | 78.87 | 68.37 | 300 | 74.53 | 63.52 | 310 | |
| P-39 | J-2 | J-100 | 9 | -22.68 | 2575.57 | 4.00 | -1.44 | 0.52 | 70.20 | 69.08 | 320 | 70.20 | 69.70 | 320 | |
| P-4 | J-32 | J-68 | 3 | -18.02 | 770.65 | 2.00 | -8.21 | 0.52 | 52.87 | 26.36 | 360 | 52.87 | 29.92 | 360 | |
| P-40 | J-3 | J-2 | 6 | -15.18 | 2737.33 | 4.00 | -0.73 | 0.31 | 70.20 | 68.76 | 320 | 70.20 | 69.08 | 320 | |
| P-41 | J-4 | J-1 | 14 | -32.56 | 8751.49 | 6.00 | -1.32 | 0.56 | 70.20 | 69.02 | 320 | 70.20 | 69.60 | 320 | |
| P-42 | J-21 | J-53 | 0 | -27.12 | 870.48 | 2.00 | -19.78 | 0.84 | 74.53 | 63.91 | 310 | 73.23 | 71.19 | 313 | |
| P-43 | J-23 | J-66 | 0 | -30.01 | 1481.11 | 2.00 | -40.60 | 0.38 | 74.53 | 55.67 | 310 | 73.23 | 71.96 | 313 | |
| P-44 | J-24 | J-23 | 5 | -30.01 | 926.54 | 2.00 | -25.40 | 2.26 | 76.70 | 46.83 | 305 | 74.53 | 55.67 | 310 | |
| P-45 | J-5 | J-3 | 10 | -7.18 | 6179.55 | 4.00 | -0.41 | 0.78 | 73.23 | 71.62 | 313 | 70.20 | 68.76 | 320 | |
| P-46 | J-66 | J-5 | 0 | 71.67 | 168.76 | 4.00 | 0.79 | 0.34 | 73.23 | 71.96 | 313 | 73.23 | 71.62 | 313 | |
| P-47 | J-18 | J-9 | 8 | -13.41 | 2782.73 | 2.00 | -17.17 | 0.21 | 78.87 | 60.45 | 300 | 74.53 | 63.56 | 310 | |
| P-48 | J-17 | J-62 | 4 | -18.59 | 1129.20 | 2.50 | -4.30 | 0.00 | 74.53 | 61.66 | 310 | 74.53 | 63.52 | 310 | |
| P-49 | J-15 | J-14 | 15 | -60.84 | 1443.02 | 3.00 | -20.33 | -0.29 | 78.87 | 25.06 | 300 | 74.53 | 29.54 | 310 | |
| P-5 | J-33 | J-68 | 7 | -25.56 | 5531.81 | 2.50 | -38.01 | 0.55 | 35.53 | ***-3.88*** | 400 | 52.87 | 29.92 | 360 | |
| P-50 | J-14 | J-13 | 12 | -70.06 | 1643.53 | 3.00 | -30.07 | -0.62 | 74.53 | 29.54 | 310 | 74.53 | 42.57 | 310 | |
| P-51 | J-13 | J-12 | 10 | -77.21 | 1701.53 | 3.00 | -37.27 | 0.46 | 74.53 | 42.57 | 310 | 74.53 | 58.72 | 310 | |
| P-52 | J-12 | J-10 | 4 | -79.97 | 1028.41 | 3.00 | -24.04 | 0.12 | 74.53 | 58.72 | 310 | 74.53 | 69.13 | 310 | |
| P-53 | J-37 | J-65 | 7 | 11.65 | 851.11 | 2.00 | 4.05 | 0.20 | 78.87 | 70.12 | 300 | 78.87 | 68.37 | 300 | |
| P-54 | J-50 | J-51 | 0 | 0.00 | 1455.88 | 6.00 | 0.00 | -0.01 | 70.20 | 64.88 | 320 | 74.53 | 69.22 | 310 | |

# Hydrology Study Information

- Convert hydrology study pdf to Excel (Barefield can do this for you) and let Excel tell you what you have – at least as far as the hydrology study goes in detail

| | | | | | |
|---|---|---|---|---|---|
| Connections | 307 | Ft of Pipe | 118,053.42 | | |
| | | Miles of Pipe | 22.36 | | |
| | | | | | |
| | | Max Elevation | 400 | | |
| | | Min Elevation | 280 | | |
| | | | | | |
| | | Pipe | | | |
| | | 2.00 | inches | 24,944 | feet |
| | | 2.50 | inches | 18,975 | feet |
| | | 3.00 | inches | 7,025 | feet |
| | | 4.00 | inches | 40,495 | feet |
| | | 6.00 | inches | 26,614 | feet |

# Example 1 Assets – Water Association
## ≈ 250 active customers

| Description | Quantity |
|---|---|
| Connections/Meters | 307 |
| Pipe – 2” | 24,944 feet (4.72 miles) |
| Pipe – 2.5” | 18,975 feet (3.59 miles) |
| Pipe – 3” | 7,025 feet (1.33 miles) |
| Pipe – 4” | 40,495 feet (7.67 miles) |
| Pipe – 6 “ | 26,614 feet (5.04 miles) |
| Valves – 2” | 4 |
| Valves – 3” | 0 |
| Valves – 4” | 2 |
| Valves – 6” | 8 |
| Fire hydrants | 4 |

Important note: Elevation increases from 280 feet at the elevated tank to 400 feet at the westernmost point of the system.

Well 1
- 1,781 feet deep, 8” casing (1978)
- Chlorinator: Hydro 25 ppd @ 20 ppd
- Chemical: LMI Solution pump for AquaMag
- Storage: Hydropneumatic tank – 8,000 gallons

Well 2
- 1,775 feet deep, 10” casing (2004)
- Chlorinator: Hydro 50 ppd @ 31 ppd
- Chemical: LMI Solution pump for AquaMag
- Storage: Elevated Steel tank, 161 feet, 150k gallons

Buildings
- 40’ x 60’ steel building
- Concrete block chlorine/treatment shed
- 20’ x 20’ steel building

HAWK Scada System
Contract operator/maintenance & repair company
Contract meter reader
Billing company

# Master Data Sheet Information

- The MDS gives you a great deal of information
- If it's wrong, get it fixed (abandoned wells, incorrect treatment, etc.)

**Well Data:**

| Well # | Location | Yr. Const. | Capacity | Pressure | Casing | Screen | Depth | Status |
|---|---|---|---|---|---|---|---|---|
| 01 | New Light Rd. | 1978 | 200 | | 8" | 61'-6" | 1781' | Active |
| 02 | New Light Rd. | 2004 | 300 | 76 psi | 10" | 80'-6" | 1775' | Active |

**Treatment:**

| | |
|---|---|
| Chorine | Well 01- Hydro 25 ppd @ 20 ppd, Well 02-Hydro 50 ppd @ 31 ppd |
| Chemical Feeders | LMI Solution Pump for Aqua Mag(Seq).(both wells) |

| Storage: | Location | Material | Capacity | Comments |
|---|---|---|---|---|
| | Well 01 | Steel | 8,000 gallons | Hydropneumatic |
| | Well 02 | Steel | 150,000 gallons | Elevated Tank HWL 161'0" HR 28' |

**Notes :**

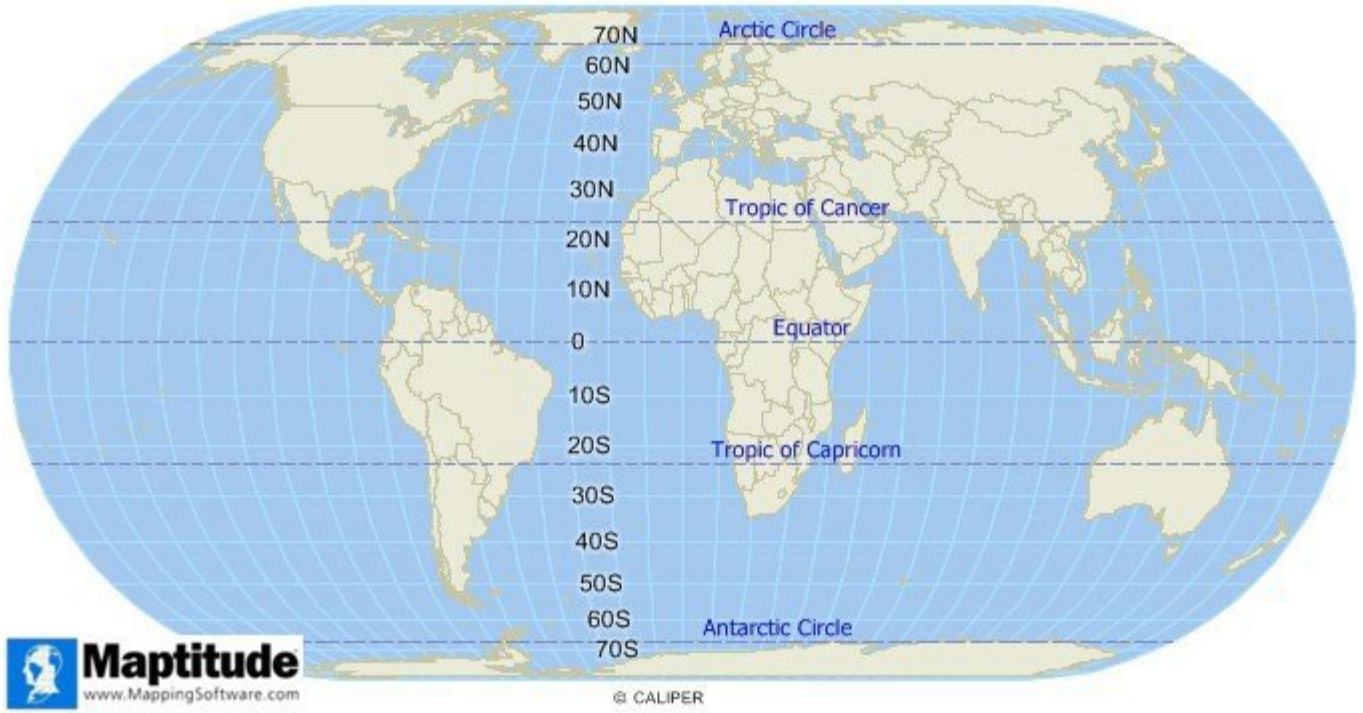
No large users identified during survey.
No Low pressure areas identified during survey.
No cross connection devices installed to date that require testing.
Emergency Tie-in with xxxxxxx W/A (to serve xxxxxxx W/A).
Well 01 surge tank installed new 2007.
Elevated tank installed 2003.

# Asset Management Inventory

- Connections:  307 (*not current meters*)
- Pipe
  - 2”  24,944 feet
  - 2.5”  18,975 feet
  - 3”  7,025 feet
  - 4”  40,495 feet
  - 6”  26,614 feet
- Well 1: 8” casing, 1,781 feet deep, Hydro 25 ppd@20 ppd, LMI Solution pump (AquaMag)
- Tanks
  - 8,000 gallon hydropneumatic
  - 150,000 elevated steel (161 feet tall)
- Well 2: 10” casing; 1,775 feet deep; Hydro 50 ppd @ 31 ppd; LMI Solution pump (AquaMag)
- Valves
  - 2”  4
  - 4”  2
  - 8”  8
- Fire hydrants: 4
- Buildings
  - 40’ x 60’
  - 20’ x 20’
  - Block chlorine/treatment shed

# Understanding Latitude

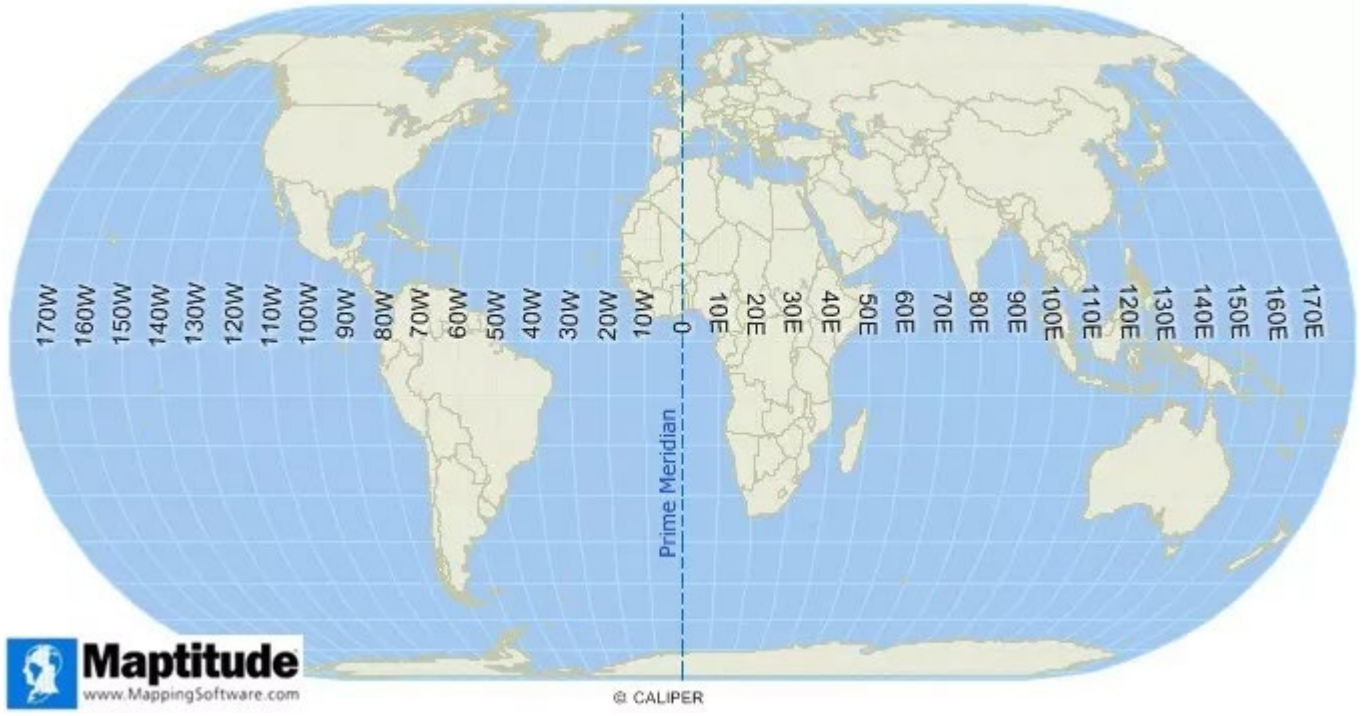
In geography, **latitude** is the distance on the earth's surface, north or south of the Equator, expressed in angular measurements from 0° at the Equator to 90° (North or South). Southern latitudes can also be expressed as negative number where -90° is at the South Pole. Lines of latitude run parallel to the Equator.




**Latitude measures the distance north (or south) from the equator**

# Understanding Longitude

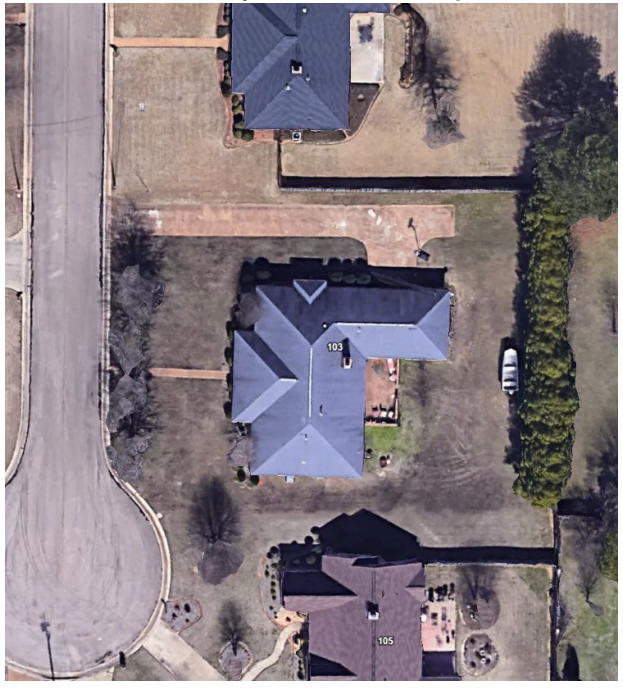
In geography, **longitude** is the distance on the earth's surface, east or west of a defined meridian, usually the meridian of Greenwich, England (0° Longitude), expressed in angular measurements from 180° West (or -180°) to 180° East.



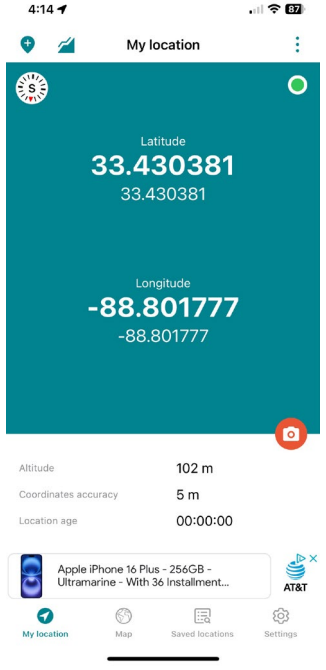

**Longitude measures the distance west (or east) from the Prime Meridian of Greenwich, England**

# Latitude and Longitude together

- Latitude and longitude are used together to specify a precise location
- Mississippi's longitude runs from approximately 88 degrees west (-88) to 92 degrees west (-92)
- Mississippi's latitude runs from approximately 30 degrees north to 35 degrees north
- My office in my home in Starkville has coordinates of 33.430381 degrees latitude and -88.801777 degrees longitude (within an error of 5 meters). No other place on earth has these coordinates.



- The latitude/ longitude for my location was determined by the free GPSCoordinates app on my iPhone.
- One degree of latitude or longitude is about 69 miles
- One millionth of a degree (measured on the app) is about 0.36432 feet




# So what's the point?

- There are several providers who can either map your system or assist you in mapping the system
- But if you can't afford this now, you can still record the location of the system's assets using your phone and an Excel spreadsheet
- Recording these locations can (1) help you to find the asset in the future and (2) be imported into a GPS database when you have the resources
- These are the locations for meters on my cul de sac. It took about 5 minutes to find the meters and record the lat/long
- A free phone app is accurate to within 5 meters (about 16 feet or 803 $ft^2$). A $600 handheld GPS unit can be accurate to within 6 feet (113 $ft^2$)

| Customer | Meter Location |
|---|---|
| Customer 1 | Lat 33.430706, Long -88.801947 |
| Customer 2 | Lat 33.430295, Long -88.801917 |
| Customer 3 | Lat 33.430204, Long -88.801819 |
| Customer 4 | Lat 33.430101, Long -88.801904 |
| Customer 5 | Lat 33.430433, Long -88.801721 |
| Customer 6 | Lat 33.430391, Long -88.801149 |
| Customer 7 | Lat 33.430848, Long -88.801136 |

| | A | B | C | D |
|---|---|---|---|---|
| 1 | **Description** | **Customer (if applicable)** | **Latitude** | **Longitude** |
| 2 | | | | |
| 3 | Meter | Customer 1 | 33.430706 | -88.801947 |
| 4 | Meter | Customer 2 | 33.430295 | -88.801917 |
| 5 | Meter | Customer 3 | 33.430204 | -88.801819 |
| 6 | Meter | Customer 4 | 33.430101 | -88.801904 |
| 7 | Meter | Customer 5 | 33.430433 | -88.801721 |
| 8 | Meter | Customer 6 | 33.430391 | -88.801149 |
| 9 | Meter | Customer 7 | 33.430848 | -88.801136 |

# GPS Assistance Providers

- Communities Unlimited (typically serve systems with populations less than 10,000 people)
- MS 811
- MS Rural Water Association
- Various for-profit providers
- Keys
  - Get references!!
  - Get examples of their work!!
  - Make sure that they do it the way that you want it done!!

# Turning your data into useful information

- Once you have begun to accumulate data, the next step is to figure out how to store it to be useful and to turn it into information
- The most basic way to store information is on paper
  - Look at the document “System Inventory Worksheet.docx” on the course website
- Other methods of storing data and turning it into information include using a spreadsheet (most common) or customized database

# Storing the data on paper – a good way to begin

- This example is the “System Inventory Worksheet.docx” on the course website
- Good way to begin to conceptualize your data
- There are some issues
  - Difficult to manipulate data
  - Very minimal sortability
  - Difficult to modify the worksheet to capture additional features

| System Inventory Worksheet | | | | | | |
|---|---|---|---|---|---|---|
| Date Worksheet Completed/Updated: | | | | | Page: | |
| Asset | Expected Useful Life | Condition | Service History | Age | Adjusted Useful Life | Remaining Useful Life |
| | | | | | | |
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# Storing the data on paper – a good way to begin

- A first step might be to begin the asset inventory on paper (or at least provide paper to field personnel to record assets)
- Then convert the data on paper to a spreadsheet

| System Inventory Worksheet | | | | | | |
|---|---|---|---|---|---|---|
| **Date Worksheet Completed/Updated:** | | | | | **Page:** | |
| **Asset** | **Expected Useful Life** | **Condition** | **Service History** | **Age** | **Adjusted Useful Life** | **Remaining Useful Life** |
| Line 23 – 2" line on west side Longview-Adaton Road heading to Morris Road – 964 ft | | | | | | |
| Tank 2 paint | | | | | | |
| Well #1 | | | | | | |
| 4" valve – southeast corner of New Light Road and Gray Road | | | | | | |
| SCADA system | | | | | | |
| 40'x60' meeting and storage building | | | | | | |
| 2" and 2½" lines on Gray Road and past Gray Road on New Light Road (18,777 feet; P-3, P-4, P-5, P-12, P-22) | | | | | | |
| Fire hydrants (4) | | | | | | |
| Well #2 Chlorinator | | | | | | |
| Well #1 pressure tank | | | | | | |

# Utilizing a spreadsheet for the asset inventory

- A spreadsheet – even if you don't know a lot about using one – provides a simple method of entering data
- If the spreadsheet is set up "correctly", a form could be printed for manual data entry in the field
- A spreadsheet's layout can be changed and manipulated easily



| System Inventory Worksheet | | | | Date: | | 4/3/2025 |
|---|---|---|---|---|---|---|
| Asset | Expected Useful Life | Condition | Service History | Age | Adjusted Useful Life | Remaining Useful Life |
| Line 23 – 2" line on west side Longview-Adaton Road heading to Morris Road – 964 ft | | | | | | |
| Tank 2 paint | | | | | | |
| Well #1 | | | | | | |
| 4" valve – southeast corner of New Light Road and Gray Road | | | | | | |
| SCADA system | | | | | | |
| 40'x60' meeting and storage building | | | | | | |
| 2" and 2½" lines on Gray Road and past Gray Road on New Light Road (18,777 feet; P-3, P-4, P-5, P-12, P-22) | | | | | | |
| Fire hydrants (4) | | | | | | |
| Well #2 Chlorinator | | | | | | |
| Well #1 pressure tank | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# Manipulating a spreadsheet

- Spreadsheets can be easily manipulated and relatively easily sorted
- Print settings will need to be readjusted
- But specific columns and rows can be printed for informational purposes
- A spreadsheet can be imported into any type of database with ease

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | System Inventory Worksheet | | | | | | Date: | | 4/3/2025 |
| 2 | System Category | Asset | Latitude | Longitude | Expected Useful Life | Condition | Service History | Age | Adjusted Useful Life | Remaining Useful Life |
| 3 | Dist | Line 23 – 2" line on west side Longview-Adaton Road heading to Morris Road – 964 ft | 33.430706 | -88.801947 | | | | | | |
| 4 | Dist | 4" valve – southeast corner of New Light Road and Gray Road | 33.430101 | -88.801904 | | | | | | |
| 5 | Dist | 2" and 2½" lines on Gray Road and past Gray Road on New Light Road (18,777 feet; P-3, P-4, P-5, P-12, P-22) | 33.430848 | -88.801136 | | | | | | |
| 6 | Misc | 40'x60' meeting and storage building | 33.430391 | -88.801149 | | | | | | |
| 7 | Safety | Fire hydrants (4) | 33.430706 | -88.801947 | | | | | | |
| 8 | Storage | Tank 2 paint | 33.430295 | -88.801917 | | | | | | |
| 9 | Storage | Well #1 pressure tank | 33.430204 | -88.801819 | | | | | | |
| 10 | Supply | Well #1 | 33.430204 | -88.801819 | | | | | | |
| 11 | Treatment | SCADA system | 33.430433 | -88.801721 | | | | | | |
| 12 | Treatment | Well #2 Chlorinator | 33.430295 | -88.801917 | | | | | | |

**See 2 – Asset Inventory in Comprehensive Asset Management Spreadsheet**

# Database programs/platforms to store and manipulate data

- There are a number of other specialized (to some extent) programs to store and manipulate data
- CUP$$ - a relatively comprehensive asset management database developed by EPA. Doesn't seem to be supported any longer, but files can still be accessed. Relatively cumbersome.
- Access, OpenOffice Base, SQLite, Google Sheets - database programs that can be customized to fit your situation. Learning curve is usually pretty steep. Also, entering data is easier than obtaining information
- Hire or contract with an IT professional that can integrate an asset management system with GIS, human resources, etc. This is expensive and make sure that the person gets what you need instead of what s/he wants to provide you