

# Water System Asset Management Small System Case Study

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Millersburg Area Authority, Millersburg, PA

By:

Jere Troutman

# Jere Troutman -- Background

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- Retired as Manager of Millersburg Area Authority in 2015
- Currently serving as DEP Outreach Assistance Provider – assist small water systems with developing Asset Management Plans

# Description of Water System

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- Millersburg Area Authority is a Municipal Water and Sewer Authority, located in Dauphin County, Pennsylvania.
- The water company was originated in 1890 as a privately owned company, and was purchased by the Authority in 1948.

# Then (1971)

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- Serve 1200 Customers (0.250 MGD)
- 3 Functional Wells (0.300 MGD)
- 6 Springs (surface water impacted) (0 to 0.6 MGD)
- Treatment Plant – Disinfection only (0.300 MGD)
- 1 MG Open Concrete Reservoir
- 14 Miles – Mains (8 miles >75 years )
- Incomplete System Map
- 62% Unaccounted-For Water
- Declining Rate Structure – some < Production Cost
- No Budget or Capital Improvements Plan

# By 2016

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- Served 2000 Customers (0.340 MGD)
- 9 Wells, 6 Springs & Surface Intake (1.4 MGD)
- Filter Plant (1 MGD)
- 3 Standpipes (2.5 MG)
- 28 Miles of Mains
  - by 2016: <1 mile > 75 years
- GIS / Mapping
- 10% Unaccounted-For Water
- One Rate per 1,000 Gallons
- Budgets, 20 year Capital Improvement Plan

# Geographic Information System (GIS)- Based Asset Management

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- Initial intent was to establish a standard mapping system
- Discussed with our engineer & reviewed current mapping/records
- Recommended ESRI Arc View version 3.2 GIS
- Currently use ESRI version Arc 10.1

# Geographic Information System (GIS)

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Developed by: Gannett Fleming / GEO Decisions  
ESRI ARC – View Software

- Initiated in 1998
- Seamless Base Mapping of our Water & Sewer Systems
- Added Themes (Layers) from our County GIS
  - Aerial Photos
  - Tax Parcels & Related Data

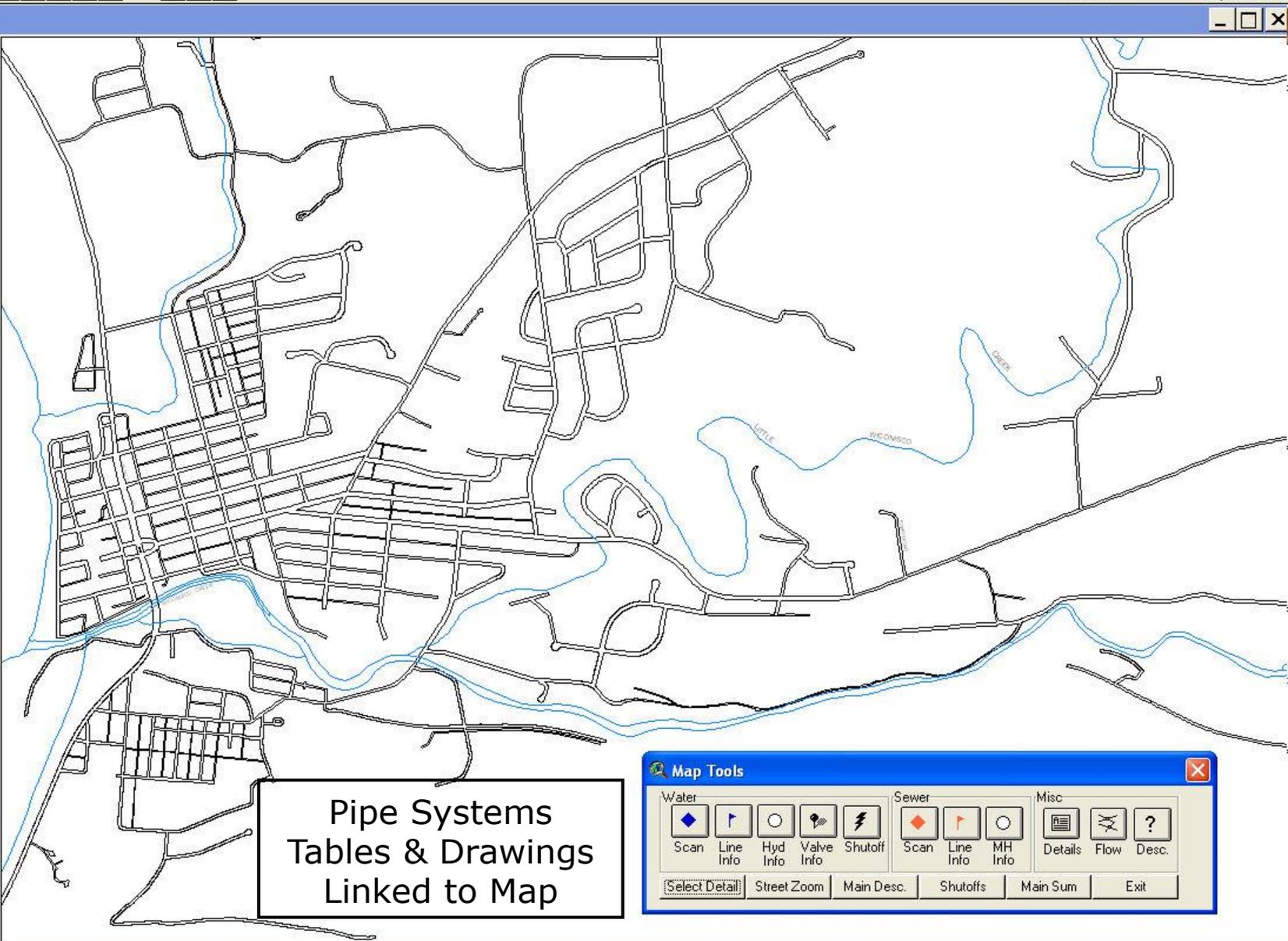
# Geographic Information System (GIS)

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- Incorporated > 3,000 Scans, linked to specific features or areas
    - Detailed Construction Drawings up to 24" x 36"
    - Record of Every Main in the System
    - Record of Every Main Line Valve in the System
    - Record of Every Fire Hydrant in the System
    - Individual Property Water Service Line Reports
    - Water Supply Well Report Sheets
- Select a feature to display a scan and, if desired, print the scan



- View1
- Municipal Boundary
  - Nodes.shp
  - Pipes.shp
  - Waterparcels.shp
  - Sewerparcels.shp
  - Tax Parcels
  - Details
  - Centerlines
  - Hydrants
  - Bldg
  - Manholes
  - Springs
  - Pump
  - Sewer
  - Valves
    - AIR RELEASE VAI
    - AIR VALVE
    - AIR/METER BOX
    - B.O. VALVE
    - END CAP VALVE
    - GATE VALVE
    - HOLDING TANK
    - VALVE
    - VALVE CHAMBER
    - VALVE IN M.H.
  - Misc
  - Valves and Labels
  - Wells



Map Tools

Water					Sewer			Misc		
Scan	Line Info	Hyd Info	Valve Info	Shutoff	Scan	Line Info	MH Info	Details	Flow	Desc.
[Select Detail]	Street Zoom	Main Desc.	Shutoffs	Main Sum	Exit					

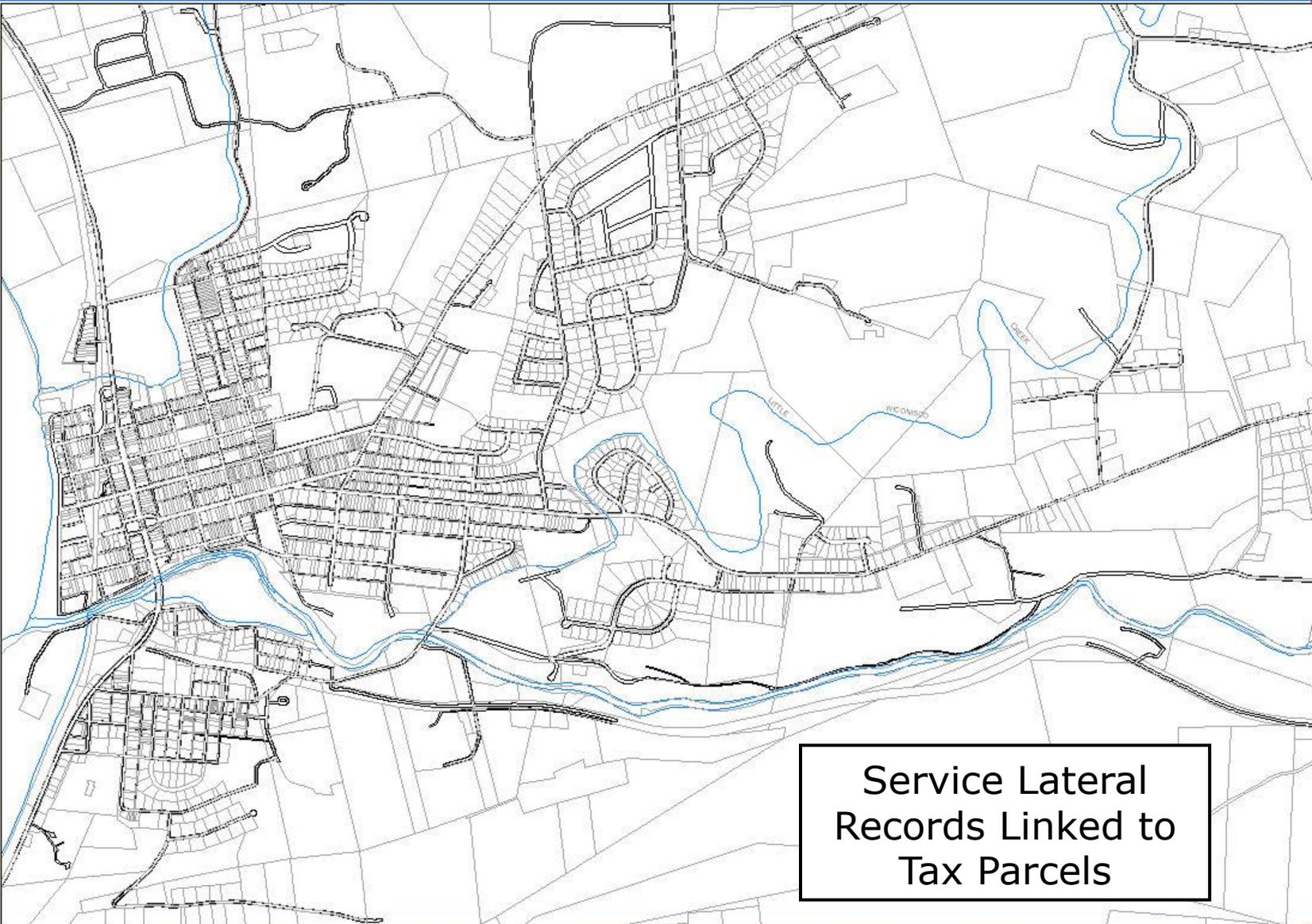
# Geographic Information System (GIS)

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- Can display identification of mains, valves, hydrants, wells & other related facilities with:
  - Descriptions
  - I.D. #'s
  - Historic Information i.e. :
    - Maintenance Performed
    - Repairs Made
    - Installation Date



- Municipal Boundary
- Nodes.shp
- Pipes.shp
- Waterparcels.shp
- Sewerparcels.shp
- Tax Parcels
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  - END CAP VALVE
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  - HOLDING TANK
  - VALVE
  - VALVE CHAMBER
  - VALVE IN M.H.
- Misc
- Valves and Labels
- Wells



Service Lateral  
Records Linked to  
Tax Parcels



- Wells
- Water
- Streams
- River
- Pdotofl
- Other Roads
- PA. Traffic Routes
- Private Other Roac
- Township Roads
- U.S. Traffic Routes
- Streets.shp
- Streets.shp
- Contour\_05ft.shp
- Contour\_10ft.shp
- Contour\_20ft.shp
- 45002180p.as.sid
- 45002190p.as.sid
- 45002200p.as.sid
- 44002180p.as.sid
- 44002190p.as.sid
- 44002200p.as.sid
- 47002200p.as.sid
- 47002210p.as.sid
- 48002190p.as.sid
- 47002180p.as.sid
- 47002190p.as.sid
- 46002180p.as.sid
- 46002210p.as.sid
- 46002200p.as.sid



Orthophoto Map Overlay

# Geographic Information System (GIS)

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- Incorporated water distribution system model – flow and pressure data
- Available to our operators at their respective facilities

# Water Main Condition Rating

Rating	Pipe Condition Description			Score
1	Excellent			6
2	Good			7 to 8
3	Fair			9 to 14
4	Poor			15 to 17
5	Severe Problems			18

	<u>1 Point</u>	<u>2 Points</u>	<u>3 Points</u>
Age	<31 Years	31 to 75 Years	>75 Years
Tuberculation	Minor	Moderate	Severe
Exterior Corrosion	Minor	Moderate	Severe
Water Quality Problems	Minor	Moderate	Severe
Pipe Breaks	Minor	Moderate	Severe
Accessibility for Repairs (Degree of Difficulty)	Minor	Moderate	Severe

# Water Main Condition Rating

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## Example

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			<u>Score</u>
Age	32 years	=	2 Points
Tuberculation	Severe	=	3 Points
Water Quality Problems	Severe	=	3 Points
Pipe Breaks	Moderate	=	2 Points
Accessibility for Repairs	Moderate	=	2 Points
	Total	=	12 Points

12 Points is a *Fair* condition with a rating of 3.

# Water Main Condition Rating

Column N

Column P

RATING: (Total Score of 6) = 1 = **Excellent**; (7 to 8) = 2 = **Good**:  
 (9 to 14) = 3 = **Fair** (15 to 17) = 4 = **Poor**; (18) = 5 = **Severe Problems**

RATING	POINTS (1 Minor; 2= Moderate; 3=Severe Problems)						TOTAL SCORE	Rating Date	Age	Age
	Age	Tuberculation	Exterior Corrosion	Wr.Quality Problems	Pipe Breaks	Ease of Repairs			(Years)	(Rating)
1	1	1	1	1	1	1	6	2016	25	1
1	1	1	1	1	1	1	6	2016	20	1
2	2	1	1	1	2	1	8	2016	35	2
2	2	1	1	1	1	1	7	2016	33	2
2	2	1	1	1	1	1	7	2016	33	2
3	3	2	1	1	2	3	12	2016	84	3
1	1	1	1	1	1	1	6	2016	6	1
1	1	1	1	1	1	1	6	2016	30	1

# Budgeting – Annual & Long Term

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- Budgeting/Rate Committee – Board Members & Manager
- Various Funds Established for Long Term Capital Improvements and Maintenance Needs
- Projects are prioritized based on need, and other project scheduling (i.e. Township road projects)

# Water Department Budget

Special Project/Capital Improvm't Fund (2016-2018)

	Budgeted 2016	Budgeted 2017	Budgeted 2018
.			
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Cash Balance from prev. year....	\$365,000	\$385,000	\$460,000
Projected Income.....	\$665,000	\$685,000	\$705,000
Disbursements			
O & M Expenses.....	\$425,000	\$450,000	\$475,000
Projects.....	\$220,000	\$160,000	\$ 55,000
Balance	\$385,000	\$460,000	\$635,000

# Water Department Budget

## Breakdown of Balance (2016-2018)

<u>Breakdown of Balance</u>	Budgeted 2016	Budgeted 2017	Budgeted 2018
Standpipe Maintenance Fund.....	\$ 0	\$ 50,000	\$100,000
Equipment Replacement Fund....	\$ 2,000	\$ 9,000	\$ 18,000
Special Plant Maintenance Fund...	\$130,000	\$170,000	\$210,000
Water Meter Replacement Fund..	\$ 35,000	\$ 35,000	\$ 35,000
Capacity Expansion Fund(Tap Fees)	\$ 71,000	\$ 74,000	\$ 76,000
Special Projects and Capital Improvements .....	\$147,000	\$122,000	\$196,000
Total	\$385,000	\$460,000	\$635,000

# Projects

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## 2016

- Repaint Cloverly Acres Standpipe..... \$ 220,000

## 2017

- Rising Sun Booster Station Upgrade..... \$ 120,000
- Continue Water Meter Replacement..... \$ 40,000

## 2018

- Replace Water Plant Turbidimeters..... \$ 15,000
- Continue Water Meter Replacement..... \$ 40,000

# Water Department – 2018

Rate Committee: B. Margerum, M. Riland, N. McCarron

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Income..... \$705,000

## Expenses

Operation Maint. Admin..... \$473,000 ..... 67%

Standpipe Maint. Fund..... \$ 50,000

Projects Fund/Meter Repl..... \$135,000

Eqpt / Vehicle Repl Fund..... \$ 7,000

Special Plant Maint. Fund..... \$ 40,000

\$232,000 ..... 33%

Total Expenses..... \$705,000

# Projected Water & Sewer Rates

	<u>2016</u>	<u>2017</u>	<u>2018</u>
Water Rate/1000 Gal.	\$ 6.05	\$ 6.25	\$ 6.45
Sewer Rate/1000 Gal.	\$ 7.60	\$ 8.00	\$ 8.40
Average Water	\$24.20	\$25.00	\$25.80
Average Sewer	\$30.40	\$32.00	\$33.60
Monthly Total	\$54.60	\$57.00	\$59.40
	<u>x 12</u>	<u>x 12</u>	<u>x 12</u>
Annual Total	\$655.20	\$684.00	\$712.80

- MAA sends quarterly bills to 1/3 of the customers each month
- Average billing is based on usage 12,000 gallons per quarter (4,000 gal per month)

# Summary

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- Millersburg System Sustainability
  - Long-term Capital Improvement Plan
  - Projected budgeting to accommodate the plan
  - Establishment of Accounts for major maintenance projects and Capital Improvements Projects
  - Members of governing board assist in Planning/Budgeting
  - Document Benefits of Asset Management

