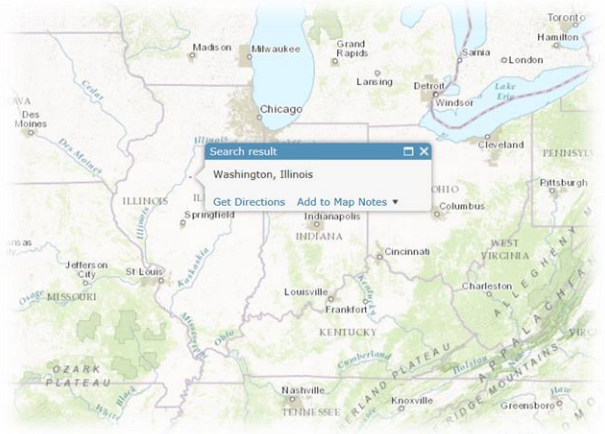
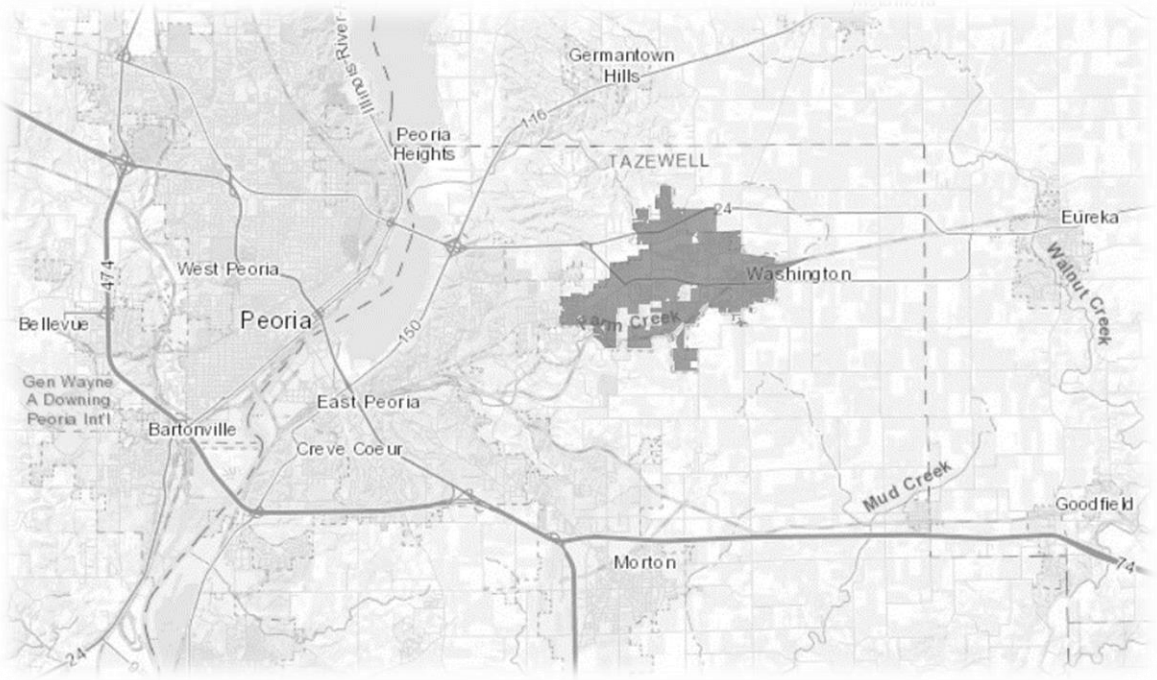
Infrastructure Operations and Planning with GIS

Improving workflows and understanding the built world

at the City of Washington, IL



Storm Water Detention Basin Inventory

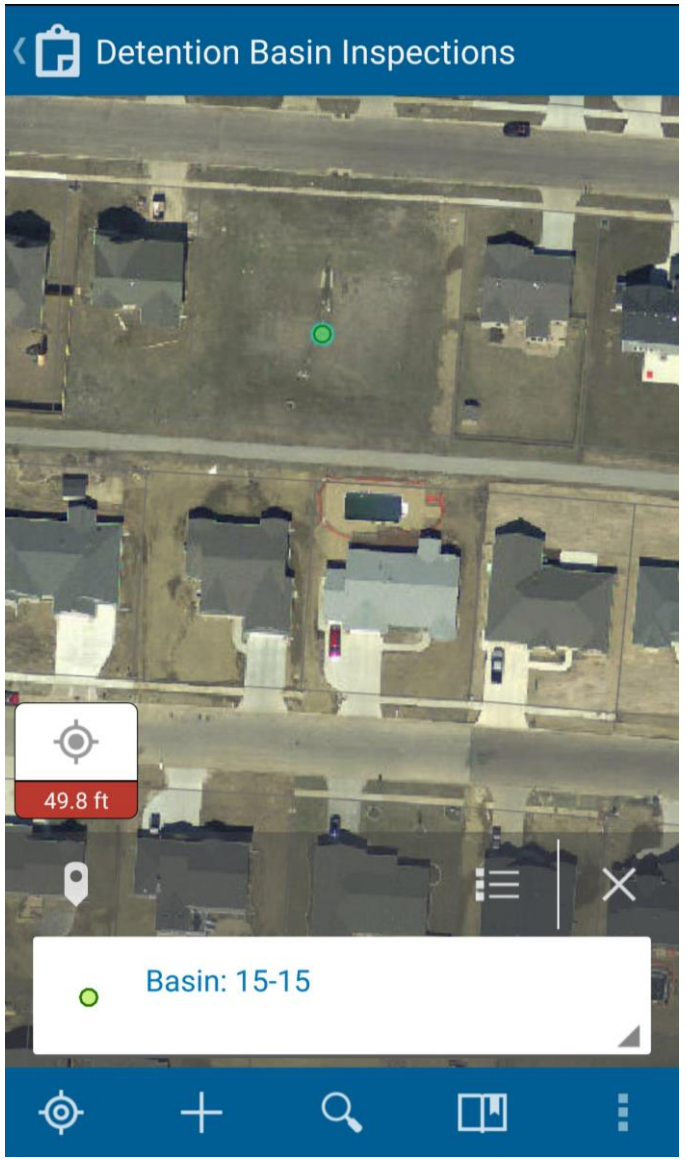


- Population 16,851
- 8.182 square miles
- 122 Storm Water Detention Basins
- Challenge was to update inventory, document maintenance, and provide basis for requesting maintenance on non-city basins

Storm Water Detention Basin Inventory

Using Collector for ArcGIS

- Ease of Use
- Ease of Access
- Related Records
- Polygons to Point Locations

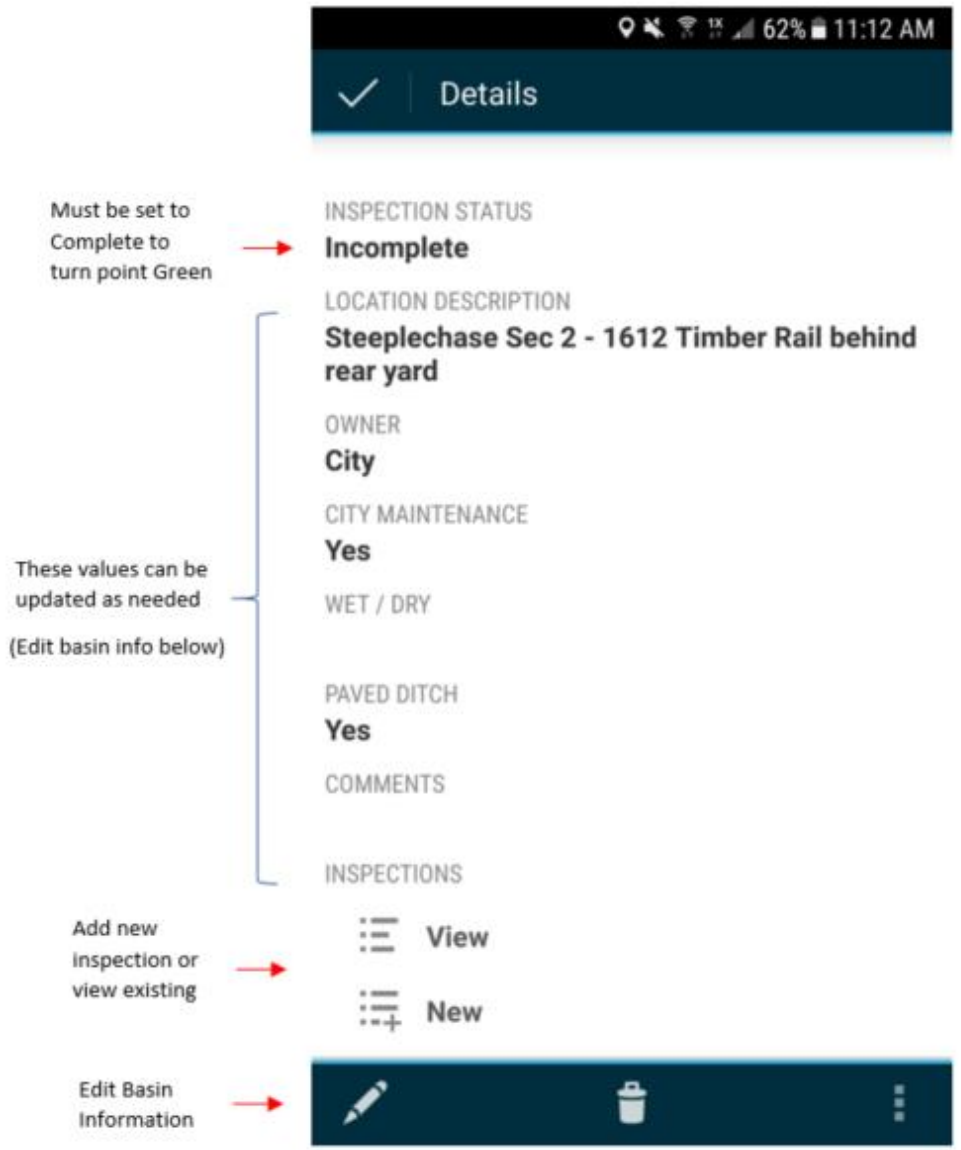


Storm Water Detention Basin Inventory

Using Collector for ArcGIS

Collector in Action –

Select Basin from Map

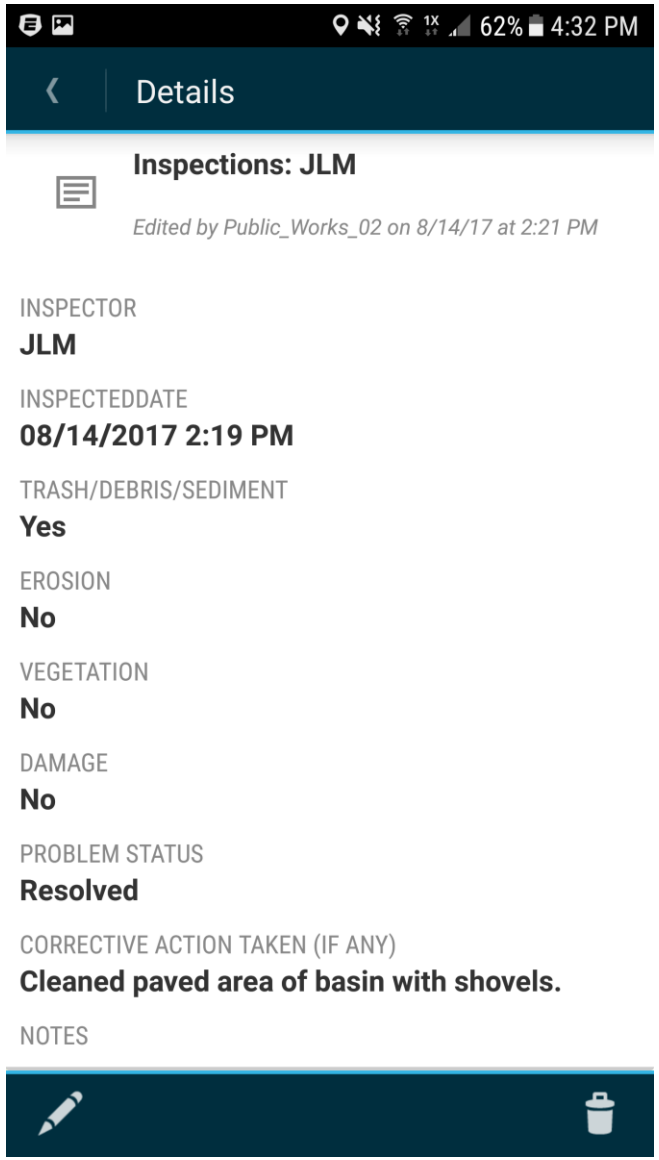


Storm Water Detention Basin Inventory

Using Collector for ArcGIS

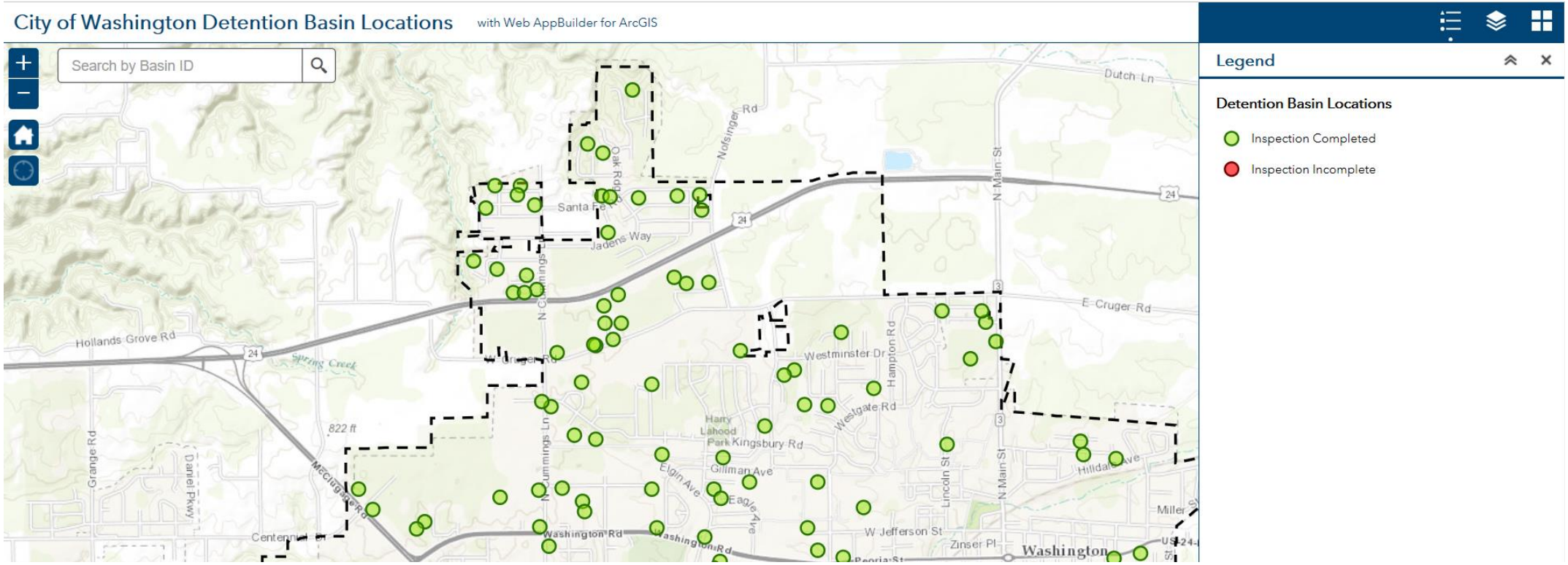
Collector in Action –

Fill Out Inspection Form



Web Application

- Viewing progress and documentation
- [Web App]



What's Next – Mailings and Other Inspections

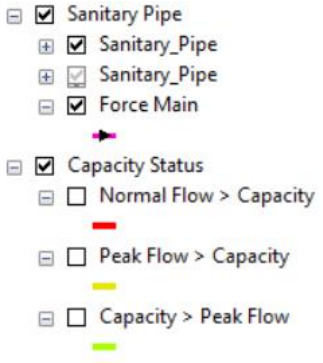
- Used ArcGIS Pro to Join Feature Service Layers and Export to Excel
- Excel Contains Information to be used in Mail Merge
- Information will be mailed to owners where privately owned and maintained basins need attention.
- Completed in less than one month (!)

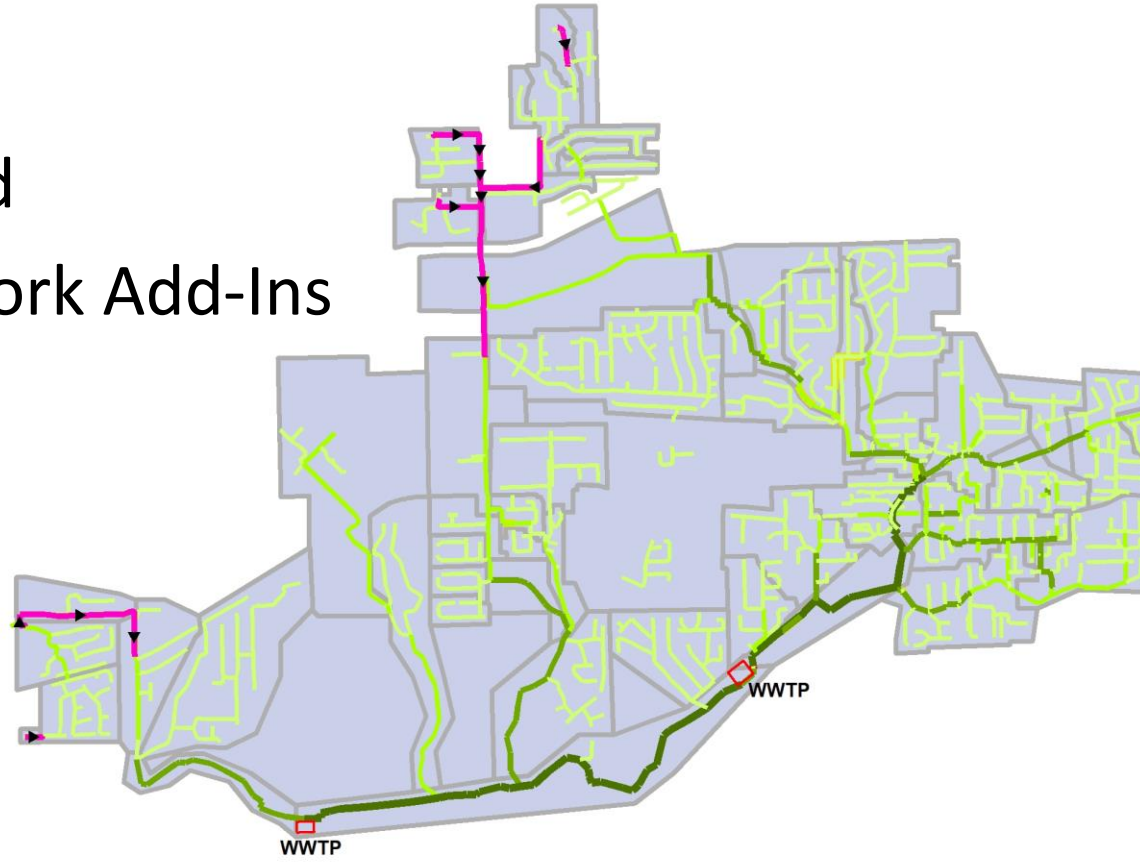
- Next? Hydrant Flows Recorded During Flushing, Pavement Ratings, NPDES Outfalls.

Bring it on.

Modeling Sanitary Sewer Capacity

- Challenge was to model pipe capacity and the effects of potential upstream inputs to system
- Data was spatially in good shape
- Geometric Network capabilities utilized
- Attribute Assistant, Water Utility Network Add-Ins



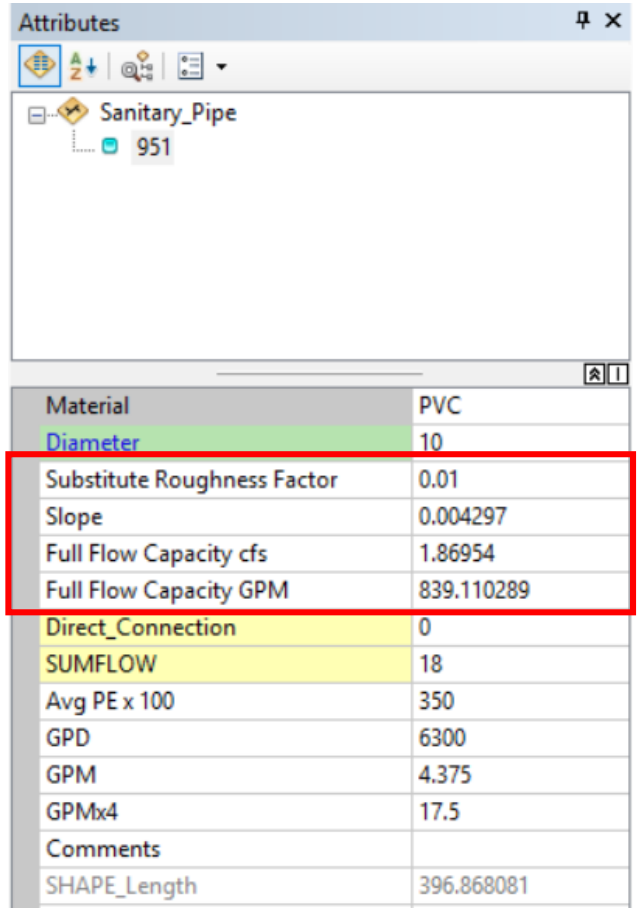


Determining Capacity

- Diameter, Material, Slope inputs into additional equations:
- Area, Circumference , Hyd Rad, CFS
- Values calculated/updated with AA

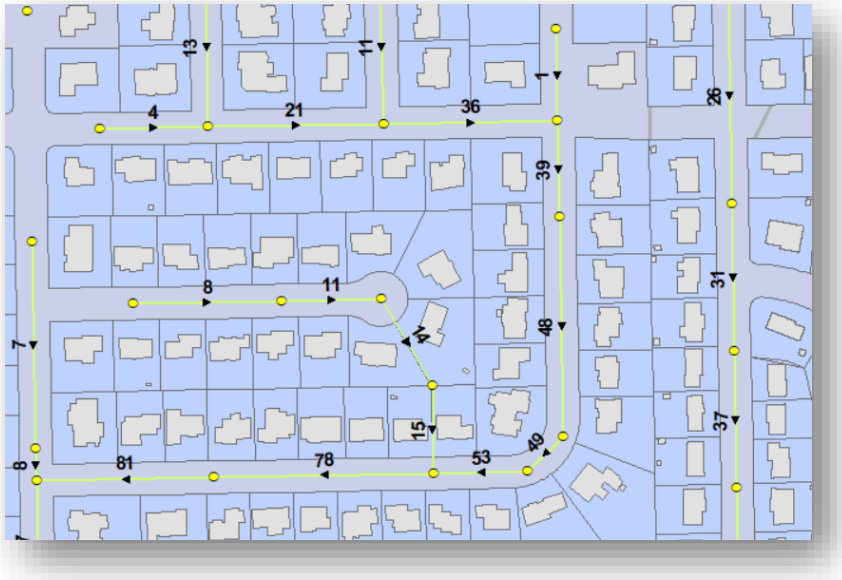
DynamicValue

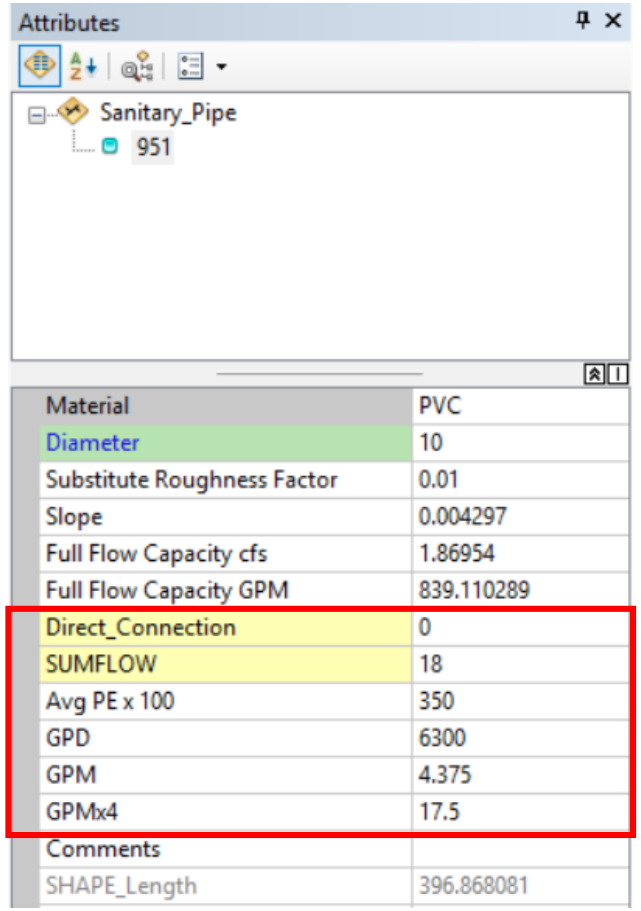
Table Name	Field Name	Value Method	Val
Sanitary_Pipe	Slope*	EXPRESSION	IIF([USMH_Elev] > 0 AND [DSMH_Elev] > 0, ([USMH_Elev] - [DSM
Sanitary_Pipe	Pipe_Area	EXPRESSION	([Dia]/24)^2*3.1456
Sanitary_Pipe	Pipe_Circum	EXPRESSION	3.1456*([Dia] /12)
Sanitary_Pipe	Hyd_Rad	EXPRESSION	[Pipe_Area] / [Pipe_Circum]
Sanitary_Pipe	FullFlowCapac_cfs	EXPRESSION	(1.486/ [SubRoughnessFactor])* ([Pipe_Area]) * ([Hyd_Rad] ^0.
Sanitary_Pipe	GPD	EXPRESSION	[SUMFLOW] * 350
Sanitary_Pipe	GPM	EXPRESSION	[GPD] / 1440
Sanitary_Pipe	GPMx4	EXPRESSION	[GPM] * 4
Sanitary_Pipe	FullFlowCapacGPM	EXPRESSION	[FullFlowCapac_cfs]*448.832566



Determining Flow

- Each connection was considered an average 3.5 PE (350gpd)
- Upstream tracing allowed for a connections to be totalled at each segment along the system
- Connection totals controlled est. loading





Demo

Output Example

What's Next?

- In Progress: Fine-Tuning Number of Connections
- In Progress: Converting Connections into P.E. Values
- Possibly: Handling Network Loops
- Possibly: Invert Measurements
- Possibly: Accounting for Bends, Age Etc.
- Likely: ArcGIS Pro & the Utility Network…

Takeaways

- This scenario was a first-pass, designed as a way to look at the bigger picture and determine usability.

- Requirements: Clean and Populated Data, ArcMap (Advanced Lic.), Geometric Network, Add-Ins

- While there are other programs out there, you can sudo-model systems in-house with your data

Questions?

Thanks!

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