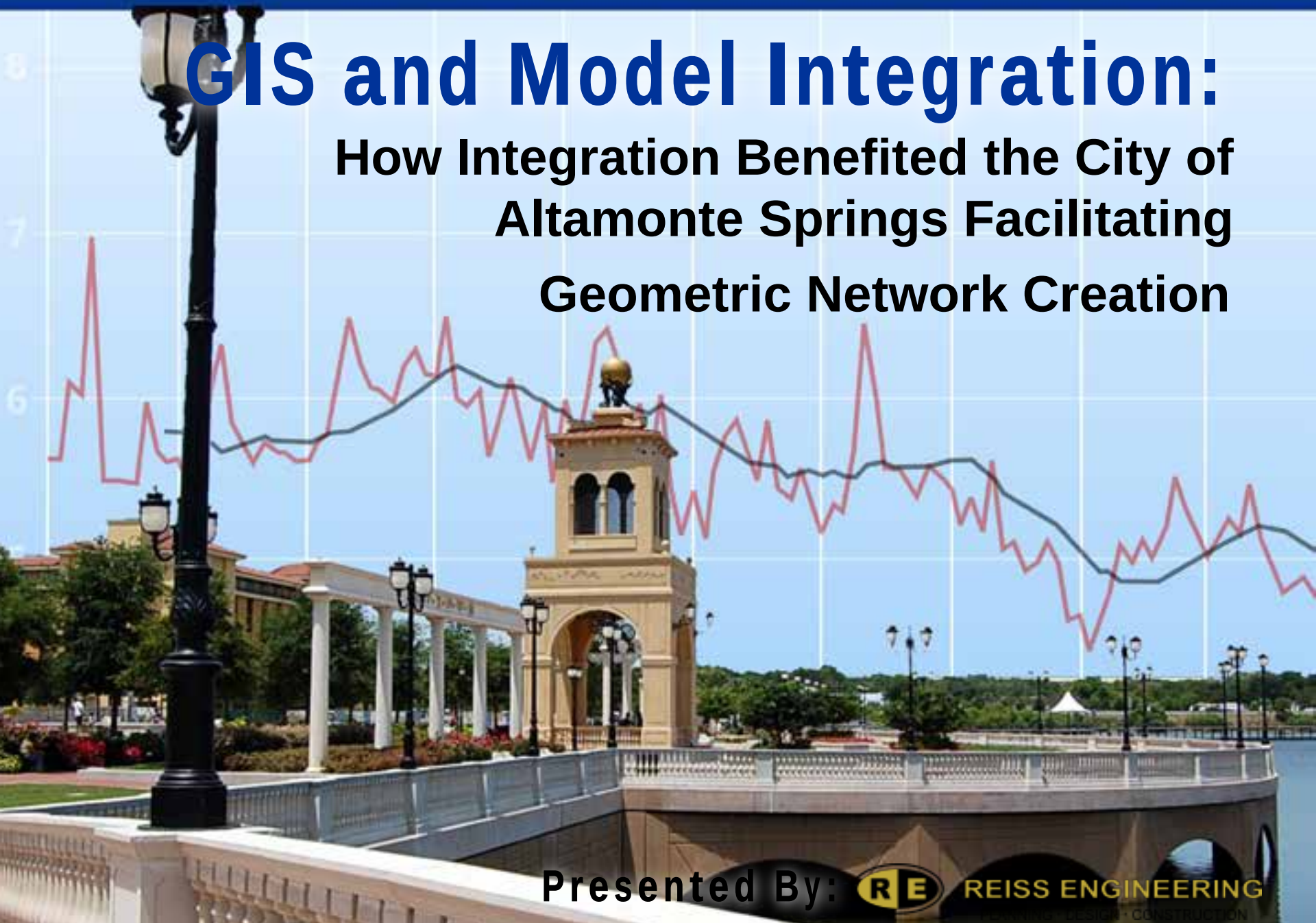
CITY OF ALTAMONTE SPRINGS

# GIS and Model Integration:

## How Integration Benefited the City of Altamonte Springs Facilitating Geometric Network Creation



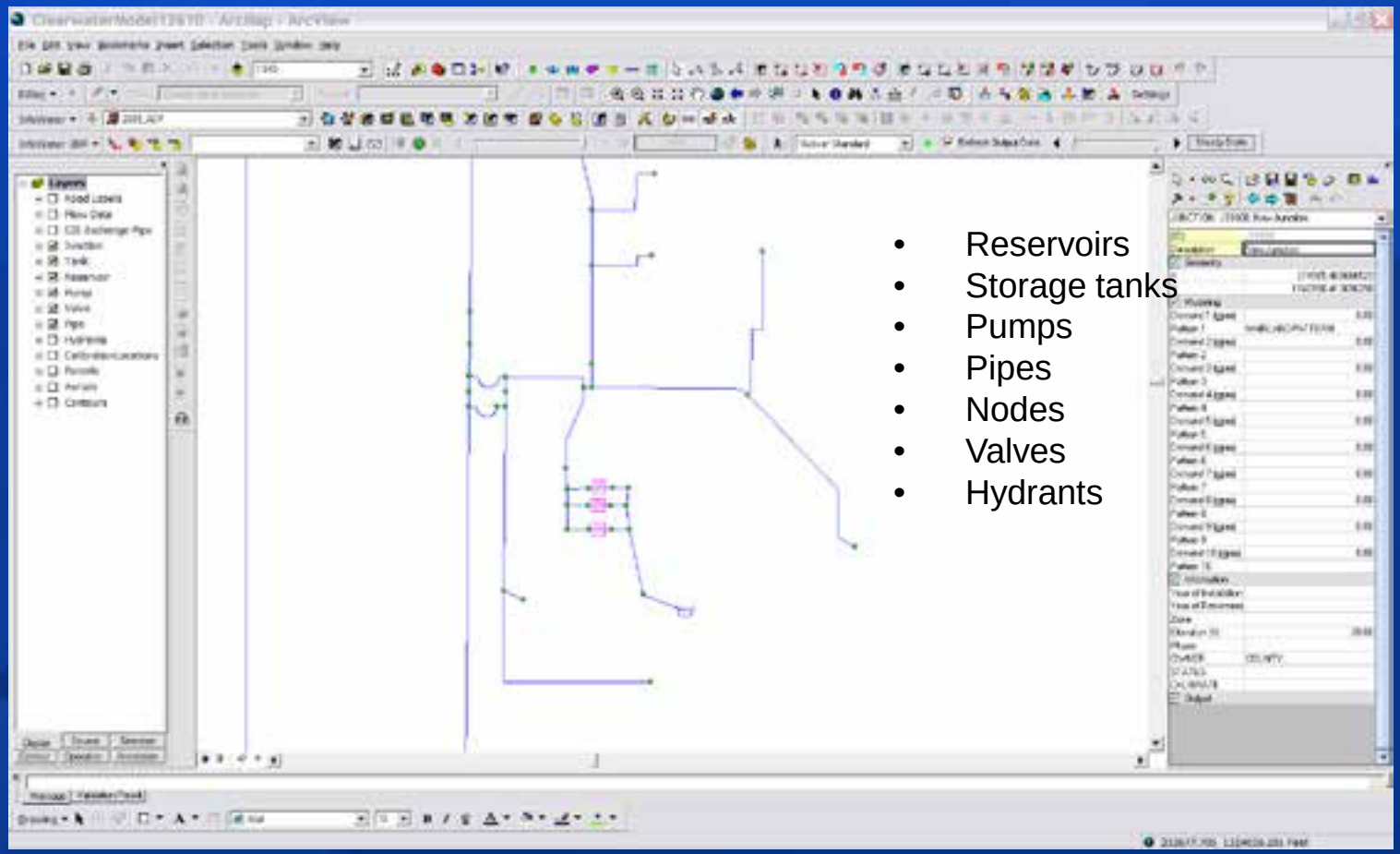
Presented By: REISS ENGINEERING

# Presentation Agenda

1. What is Model Integration?
2. Why Model Integration?
3. Steps Taken
4. Results
5. Challenges
6. Summary

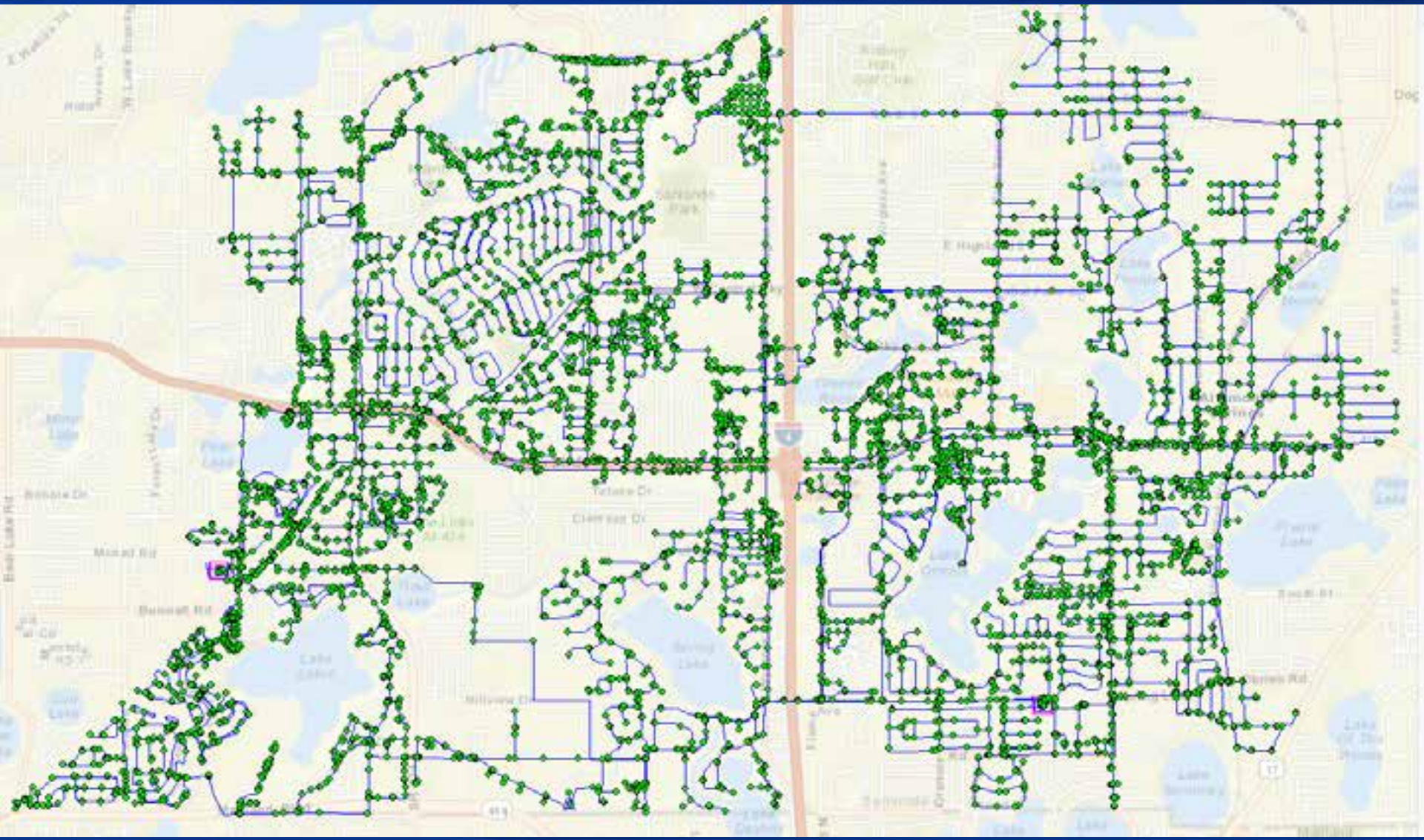
# What is Hydraulic Model Integration?

## Computer Simulation



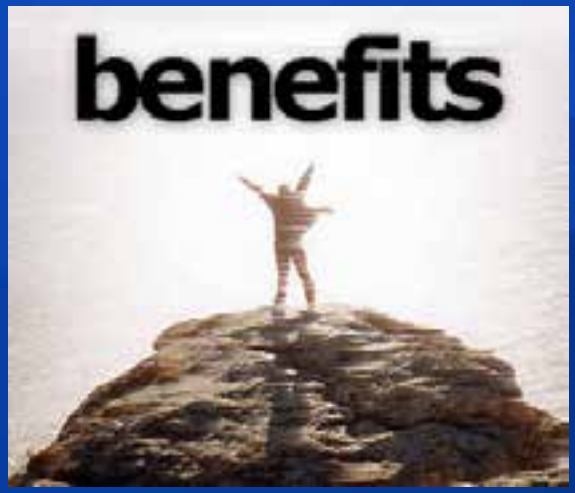
- Reservoirs
- Storage tanks
- Pumps
- Pipes
- Nodes
- Valves
- Hydrants

# Model Construction: Pipe and Junctions



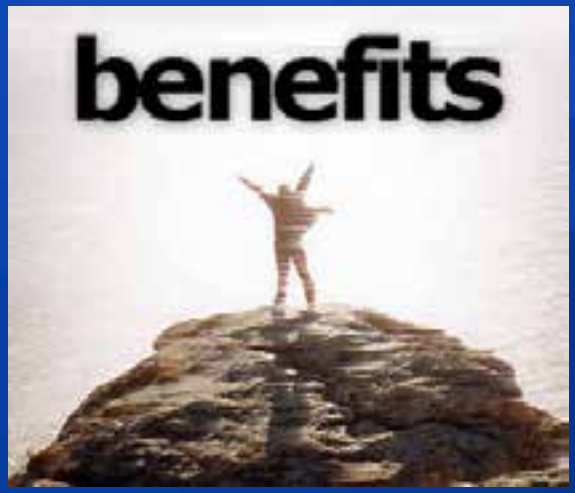
# Why Modeling Integration?

- Facilitated Geometric Network Creation
- More Reliable Information
  - Planning and Operations
- Reduced Response Time
- Better Accessibility Model Inputs/Outputs to:
  - GIS Tools
  - GIS Model Functionality
- Map Accuracy



# Why Modeling

- Pressure and Velocity Optimization
- Water Quality Predictions
- Fire Hydrant Flow
- Water Age
- Operational What Ifs
- Auto Flushing Flows & Locations
- Source Identification
- Pump/Tank Operations Optimization
- Pipe Sizing

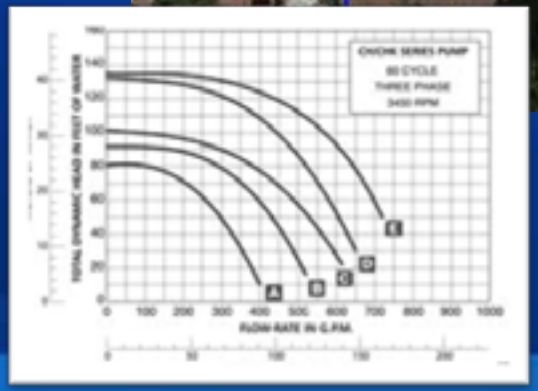


# Steps Taken For Model Integration

- GIS Data Collection
- GIS Integration
- Pre / Post Processing
- Water Demand Allocation
- Scenario Development
- Model to GIS Data Adoption

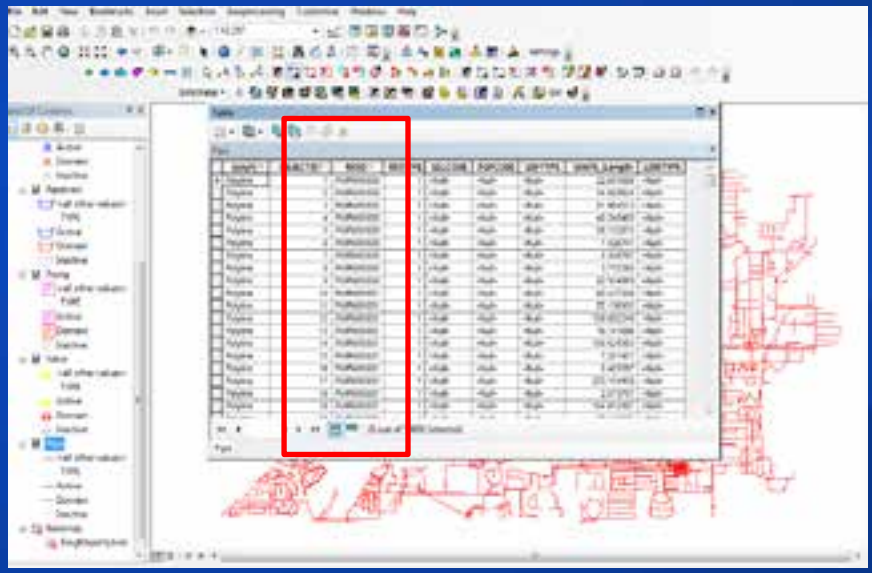
# Data Collection

- City's GIS data is used as a basis
- As-built drawings
- Pump data
- Digital elevation data
- City Staff input



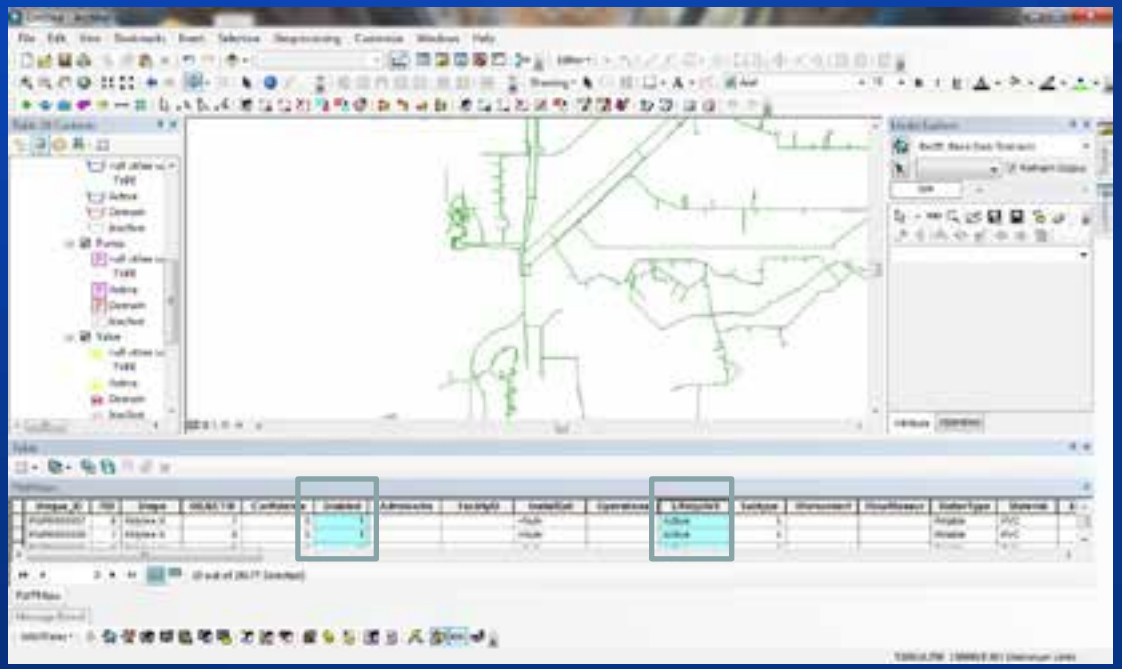
# Pre-Processing

- Unique IDs for all GIS elements are created
  - No overlaps will occur
  - Allows GIS data and model elements to be linked
- Tools used to generate unique IDs:
  - Counter
  - Field Calculator

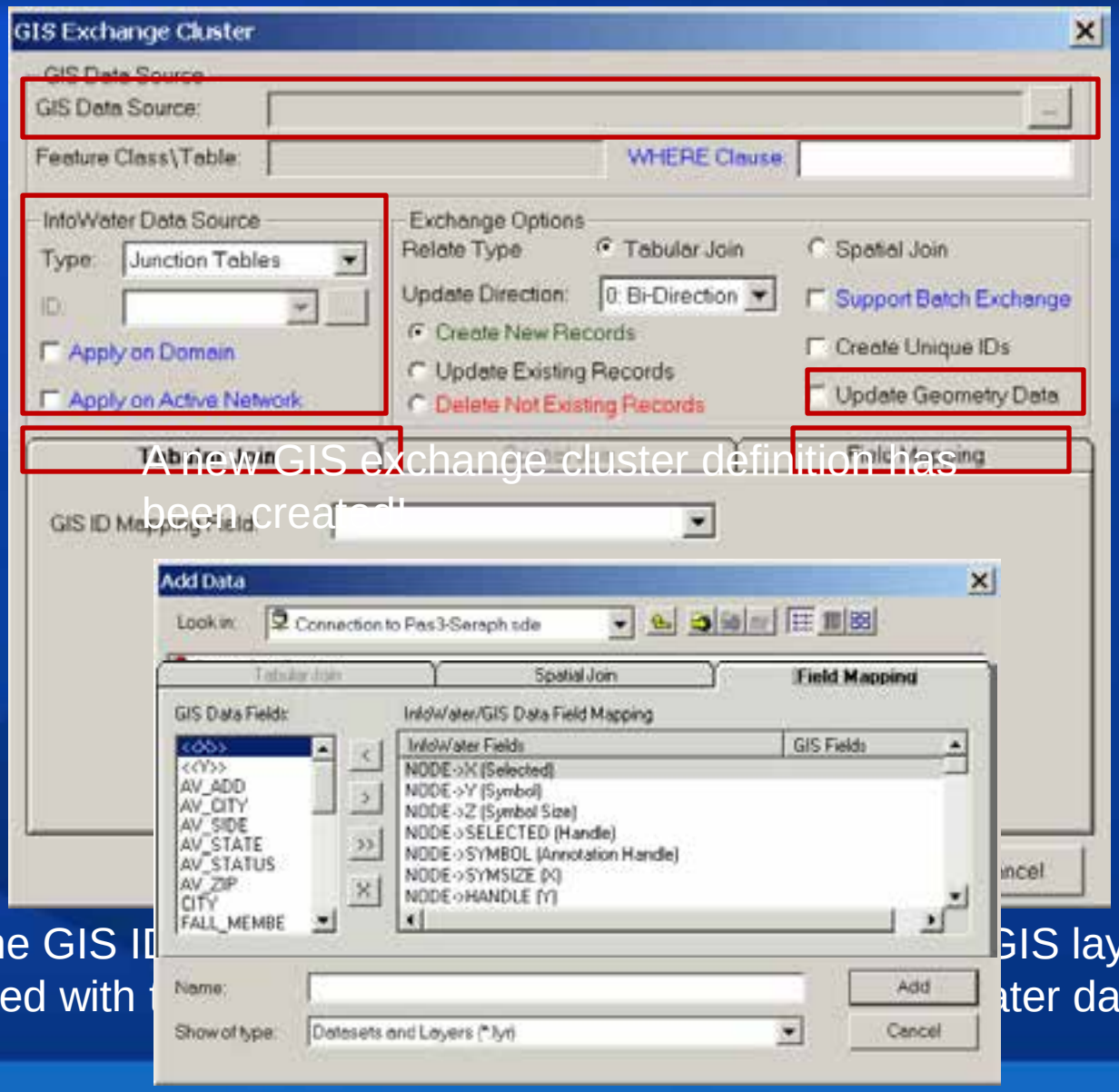


# Pre-Processing

- Active elements designation for use in simulations:
  - Enabled field
  - Lifecycle Status



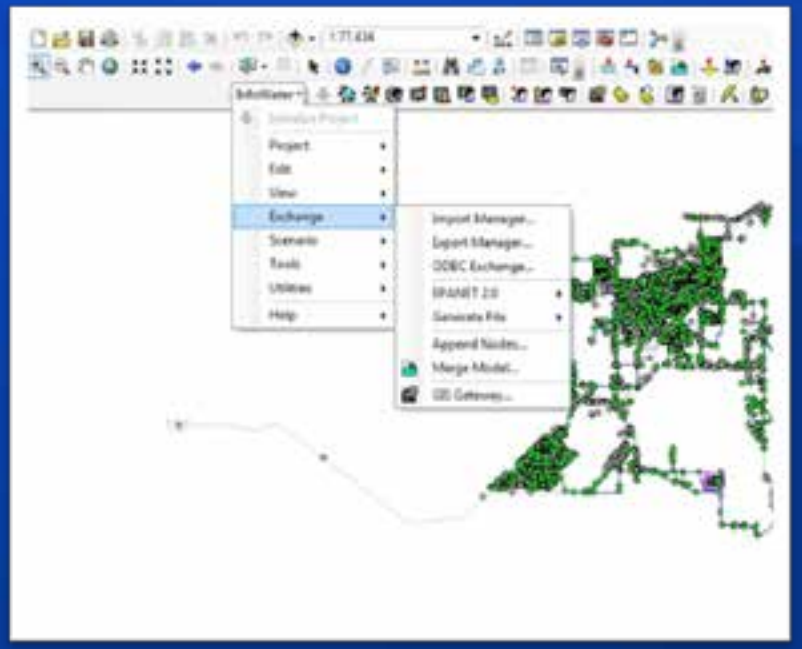
# Example: An element being added from/to GIS




Use the GIS ID … GIS layer will be matched with … ater data table.

# Pre-Processing

- GIS Exchange:
  - Enables GIS integration by Establishing a link between the GIS data and model elements.
  - Enables communication
  - Allows “exchange” of Geo database information to and from the hydraulic model via tabular join.
  - Exchange Clusters are used



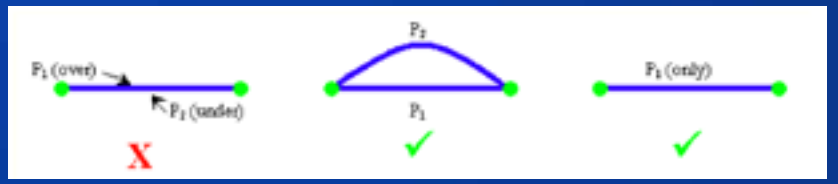
# Post Processing

- Network fixes are necessary to connect info to model simulations:

Locate/Fix Nodes in Close Proximity

Locate/Fix Pipe-Split Candidates

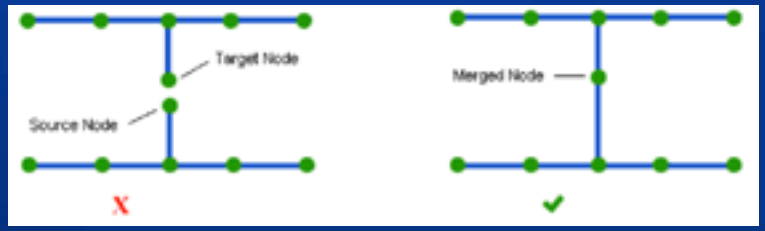
Locate Parallel Pipes




Trace Upstream/Downstream Network



Merge Nodes

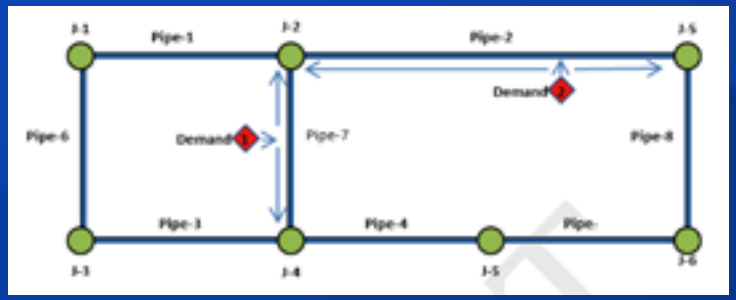


# Other Steps Taken for Model Integration

- Some Tools used to obtain missing information from Exchanged GIS elements:
  - Elevations
  - Info water elevation tool
  - Digital elevation topographic data
- Pipe Lengths
  - GIS auto processing tools
- WTP components
  - Overlaying geo referenced as built drawings

# Demands

- Existing Demands:
- If insufficient water billing data use:
- Information address fields
- Google Earth Pro
- Demands are allocated
- Spot checked for validity
- Future Demands:
- Based on existing demand locations
- Adjustment factors were used



# Scenario Development

- The model was simulated in five scenarios:
  - Average Daily Flow
  - Maximum Daily Flow
  - Maximum Daily Flow + Fire Flow (residential and commercial)
  - Peak Hour Flow
  - Extended Period Simulation
- System Operations:
  - Based on existing operations.

# Challenges

- Exchange from Model back to Geo database
- Domain information being reconnected from GIS to model and vice versa.
- Connection conflicts
- Making sure that during pre and post processing the city GIS rules are being followed

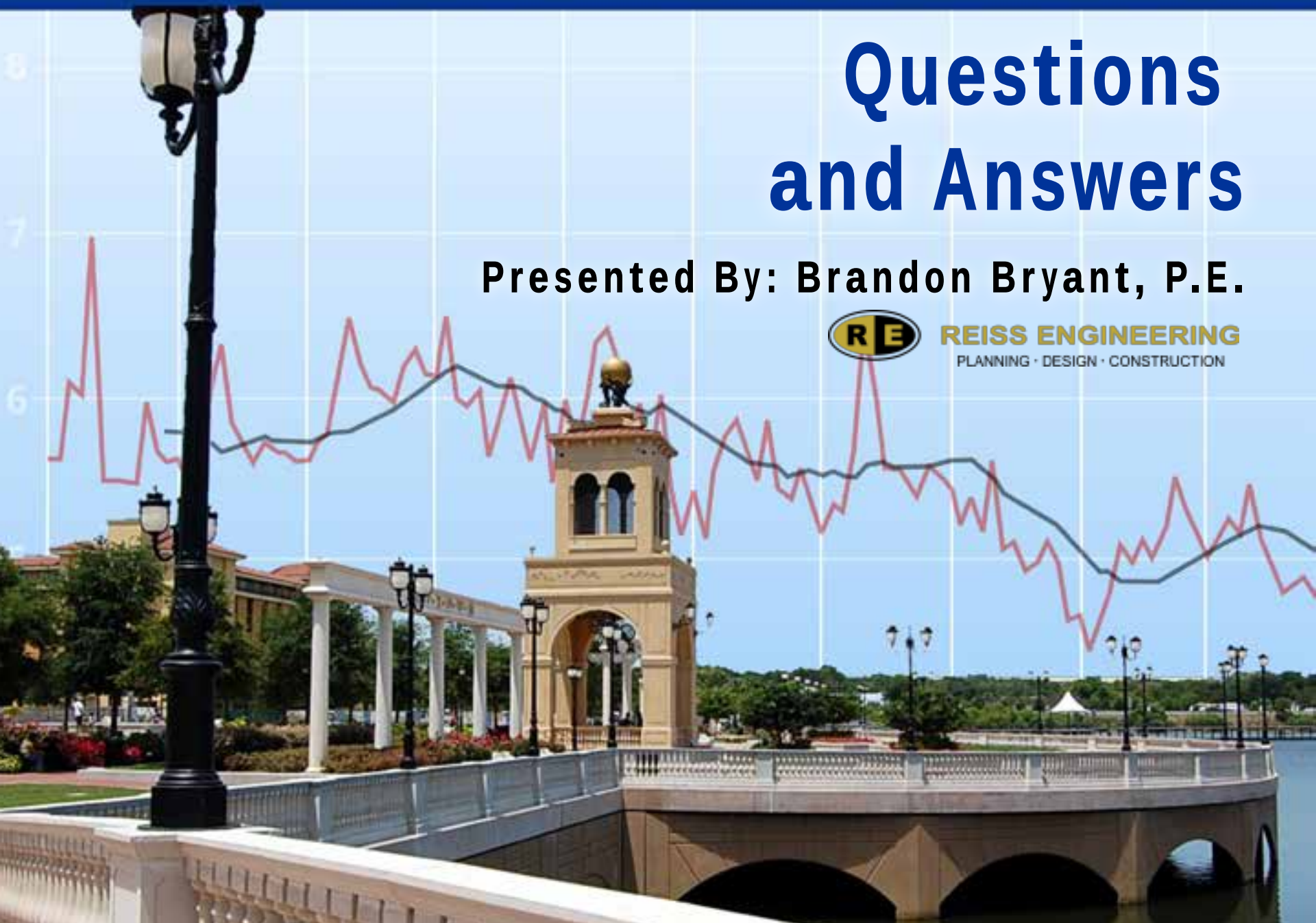
# Summary

- GIS Exchange facilitates an effective synchronization of data between the Model and the Geometric Network
- More Reliable Information in the Geo database
- An effective geometrically connected network can better meet the City's piping infrastructure planning, operation and maintenance.
- Better Accessibility Model Inputs/Outputs to:
- GIS Tools
- GIS Model Functionality
- Map Accuracy

THANK YOU!

# Questions and Answers

Presented By: Brandon Bryant, P.E.



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