



# Enabling Success in Enterprise Asset Management

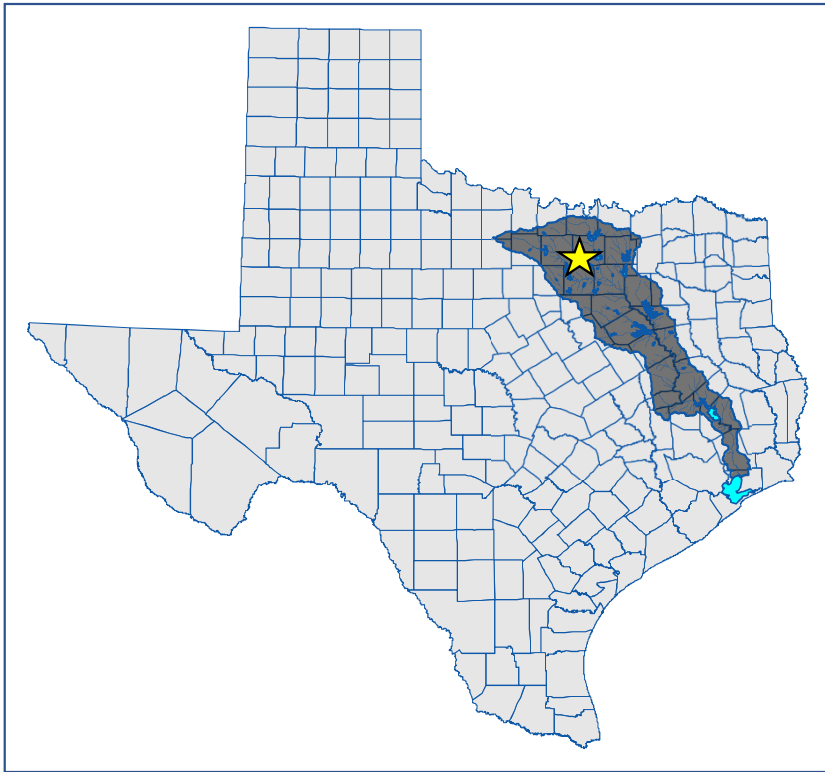
A Case Study for Developing and Integrating GIS and CMMS for a Large WWTP

Presented By:

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# Trinity River Authority



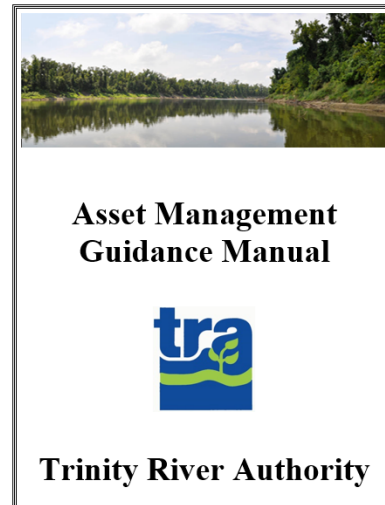
- Located in Texas
- Conservation and Reclamation District
- 5 Wastewater Treatment Facilities
- 4 Water Treatment Facilities

**Central Regional Wastewater System  
(CRWS)  
162 MGD AADF Facility**

# Asset Management Program

- The Institute of Asset Management (IAM) conceptual model
  - Organization's strategic plan and goals should be incorporated into the asset management program
- Ten Attributes of Effectively Managed Utilities

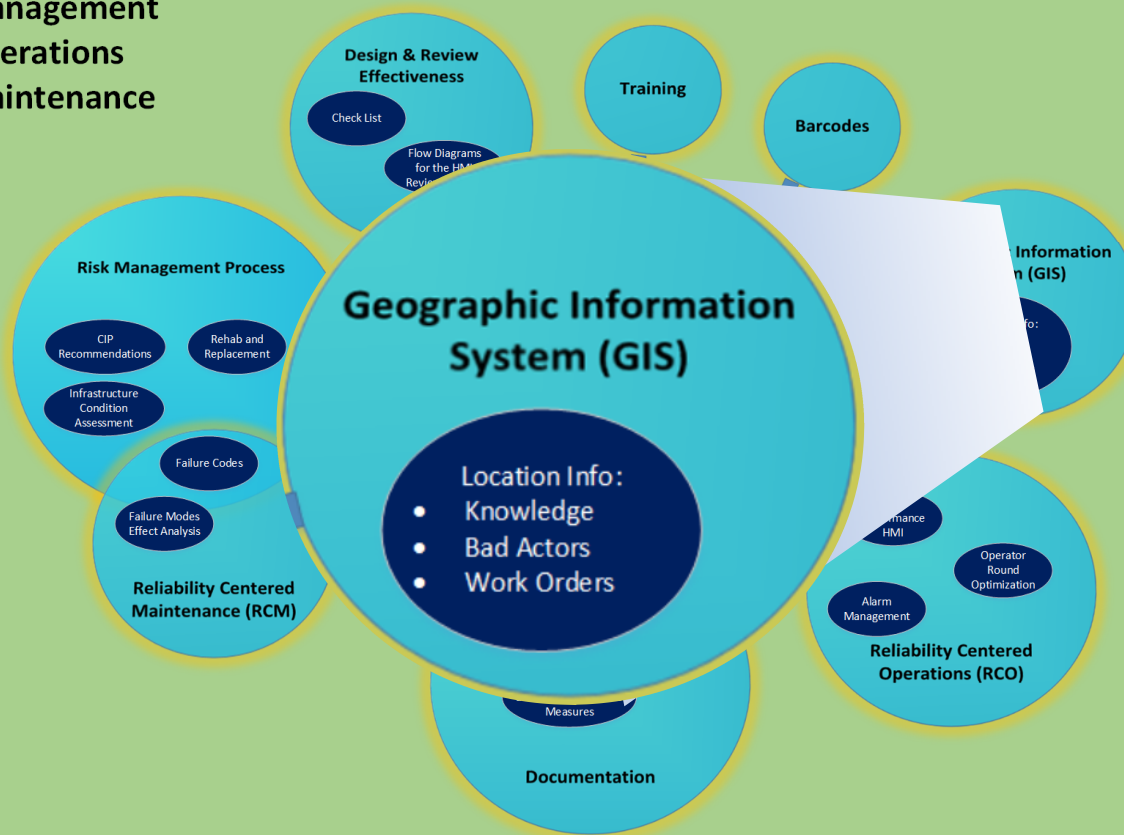
TRA's Strategic Plan	Ten Attributes of Effectively Managed Utilities
Customer Service Excellence	Customer Satisfaction
Human Capital Development	Employee and Leadership Development
Efficient and Effective Operations	Operational Optimization



# Linking Asset Management to GIS

## FILLING NEEDS OF TRAs

- Management
- Operations
- Maintenance





# Project Workflow



# Vision



Workshops to determine  
vision for GIS

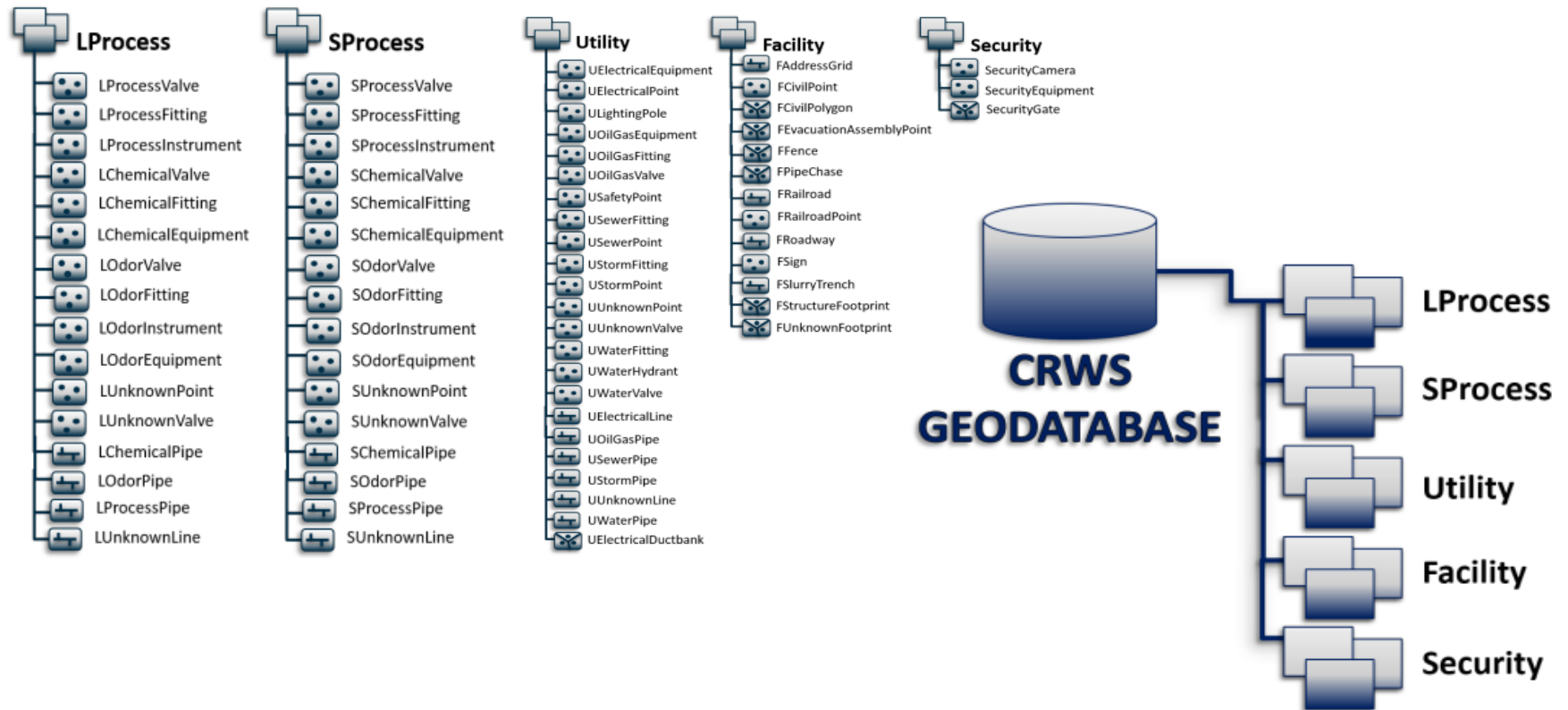
Met with key staff  
and departments

Short Vision Statement	
To provide a reliable map that is a window to our plant data.	
Long Vision Statement	
A good map:	Provide an overall map for daily functionality, with the ability to visualize our asset and maintenance data.
	Depict good relative positional accuracy (horizontal and vertical) to support proper identification of assets in the field, and provide access to surveyed coordinates to facilitate location of buried assets.
A good window:	Provide asset life cycle and operational status data as well as views of asset nameplate and criticality data.
	Depict open and historical work orders with views of work details, status and assigned staff, and depict current operational observations related to the assets.
	Further support asset identification and troubleshooting by providing map-based access to electrical drawings, CAD files and surveys, and provide a map of project boundaries and links between project data and the assets installed under the project.
Connect the assets to support hydraulic and process modeling.	

# Business Requirements

Ranking	Business Requirement
1	Rapid and reliable access to asset record information
2	Overall CRWS Plant map with footprints and piping
3	Locating plant features
4	Identifying plant features
5	Map-based viewing of asset status throughout the plant
6	Map-based viewing of project boundaries and information associated with active projects and affected assets
7	Map-based access to condition assessment scoring data
8	Map-based access to as-built drawings
9	Map-based access to electrical drawings (one-line diagrams)
10	Hydraulic modeling capability
11	Asset isolation tracing to determine impacts on plant system

# Database Design



# GIS to CMMS Integration

- Sync Tool synchronizes common data stored and managed by CMMS and GIS.

Feature and Function	Tool A	Tool B
Create Records in GIS from Maximo Records	✓	✓
Support for Maximo Classifications and Specification Records	✓	✓
Support for Default Values	✓	✓
Support Value List Translation	✓	✓
Support Calculated Values	✓	✓
Scheduled Synchronization	✓	✓
Support Reading from ArcGIS Server Map Services	✓	✓



## GGEOWORX SYNC CONFIGURATION SPECIFICATION FOR CRWS TREATMENT PLANT



Prepared for:



July 17, 2017

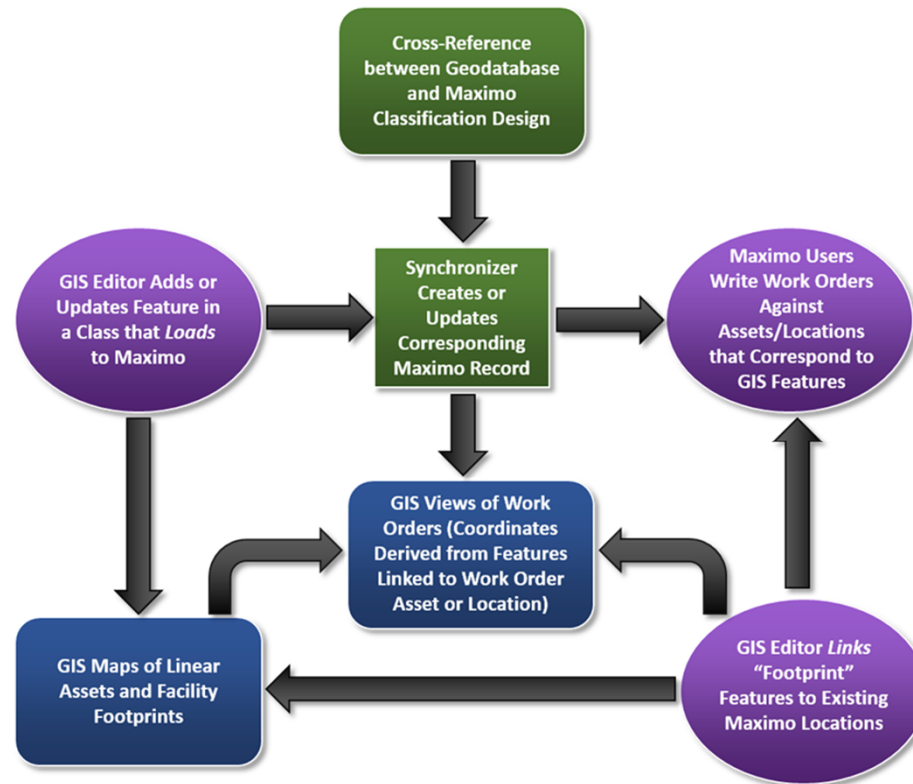
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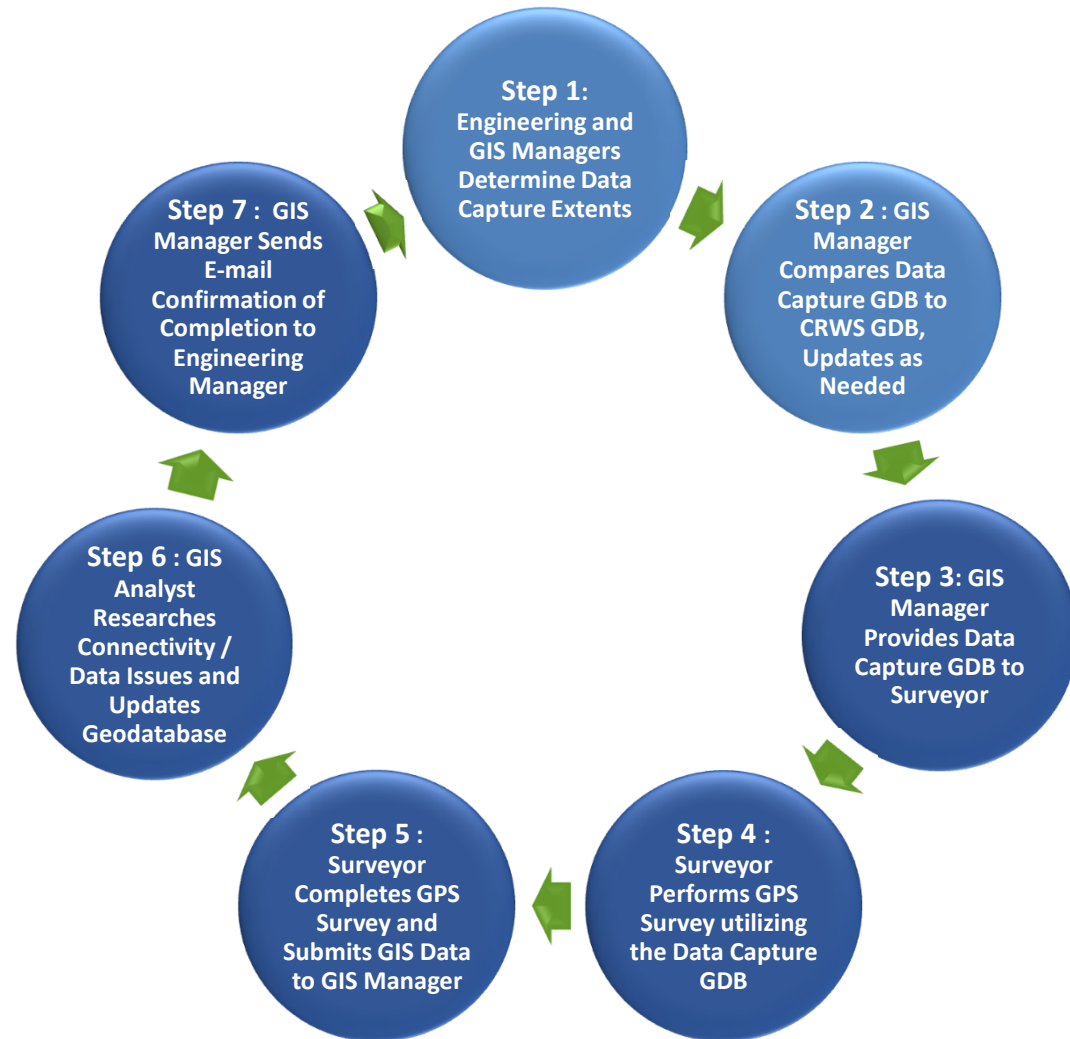


# Link Between GIS & CMMS



*Data integration relies on cross-reference between the geodatabase design and the Maximo data design (including classification structures).*

# Data Collection



# Data Collection

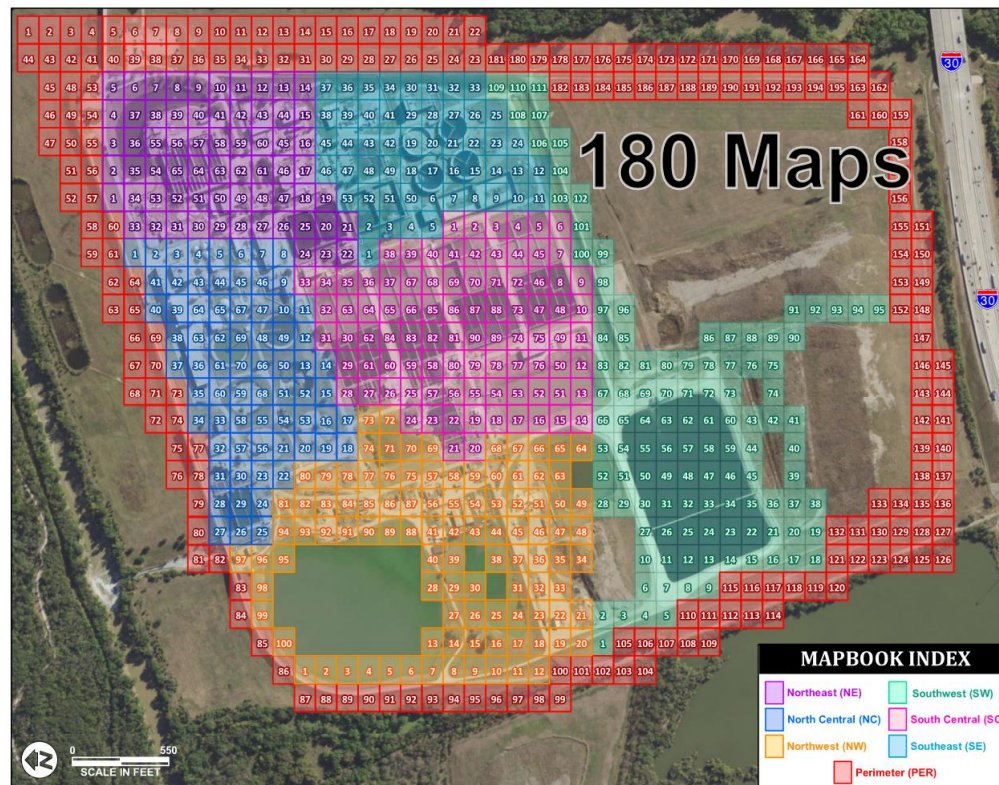
## *How asset data was collected:*

- Stripped down geodatabase
- Surveyor and field engineer populated preliminary data
- Photo captured





# Data Collection



3,600 assets surveyed  
9/2016 – 1/2017

# Post Process

## *Populate and QC Asset Data*

- Type of Asset
- Size
- Material
- Access
- Project Name & Date of Installation
- Link to Record Drawings
- Create Geometric Networks

Types of Assets	No. of Assets
ULightingPole	374
USafetyPoint	22
UWaterHydrant	224
UWaterValve	596
UWaterFitting	2886
UWaterPipe	3341
UElectricalEquipment	532
UElectricalPoint	350
UElectricalLine	403
USewerFitting	791
USewerPoint	288
USewerPipe	959
UStormFitting	11
UStormPoint	130
UStormPipe	528
LProcessValve	248
LProcessInstrument	412
LProcessFitting	1160
LProcessPipe	825
SProcessValve	10
SProcessInstrument	4
SProcessFitting	197
SProcessPipe	123



# Post Process

## UWaterValve

**SUBTYPE DESCRIPTION:** Plant Service Water

**PROCESS ABBREVIATION:** W3 - Plant Service Water

**VALVE TYPE:** Gate Valve

**VALVE STRUCTURE TYPE:** Valve Box

**ACTUATOR TYPE:** Manual

**DIAMETER:** 4"

**SPATIAL SOURCE:** Field Surveyed

**SURVEYOR:** SPOONER AND ASSOCIATES

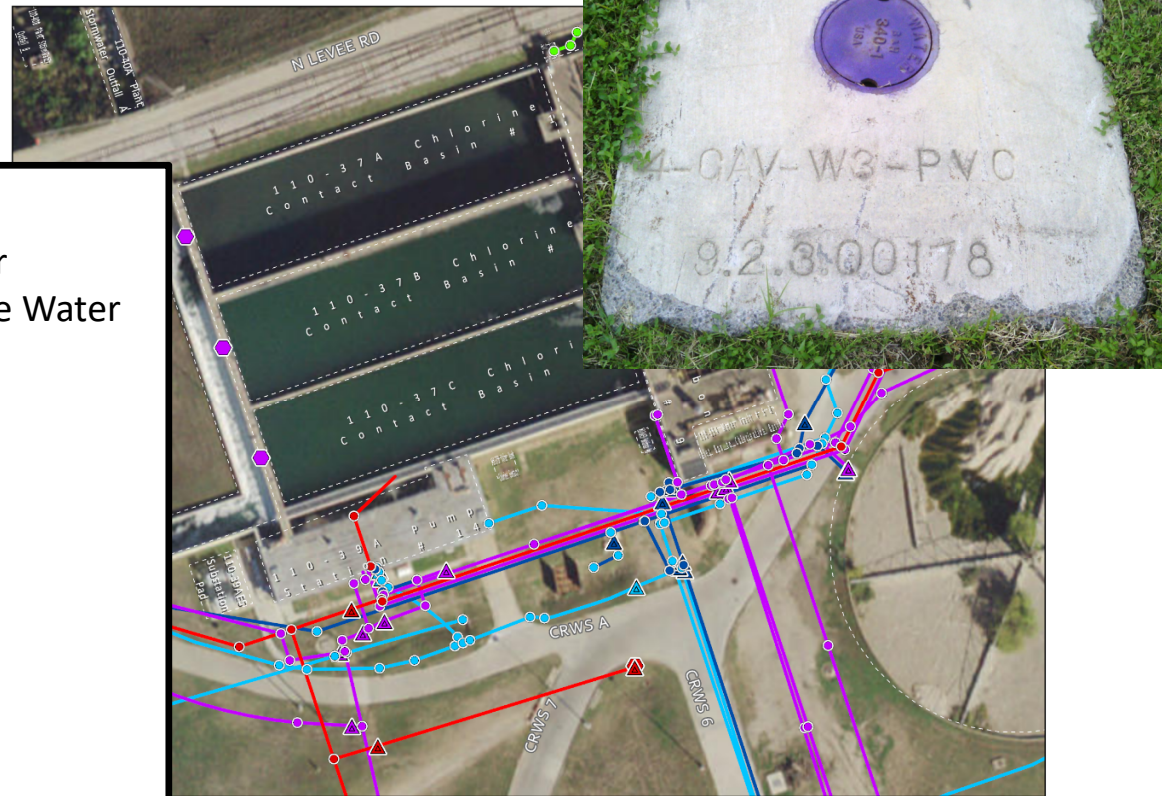
**SURVEY DATE:** 12/09/2016

**EASTING:** 2449060.84109

**NORTHING:** 6968886.031063

**ELEVATION:** 425.5843

**LIFECYCLESTATUS:** ACTIVE





# GIS to CMMS Integration



## TRINITY RIVER AUTHORITY CRWS TREATMENT PLANT GABI GEODATABASE FEATURES

### LEGEND

#### Utilities

- Water Fitting
- Water Hydrant
- Water Valve
- Water Pipe
- Storm Point
- Storm Fitting
- Storm Pipe
- Sewer Point
- Sewer Fitting
- Sewer Line
- Oil/Gas Valve
- Oil/Gas Fitting
- Oil/Gas Line
- + Lighting Pole
- Electrical Point
- Electrical Equipment
- Electrical Line
- + Safety Point
- GABI Pilot Area

#### Liquids Processing

- Process Fitting
- Process Valve
- Process Meter
- Process Pipe
- Chemical Fitting
- Chemical Valve
- Chemical Pipe
- Odor Fitting
- Odor Equipment
- Odor Pipe

#### Solids Processing

- Process Valve
- Process Fitting
- Process Pipe
- Chemical Fitting
- Chemical Pipe
- Security Equipment
- Security Camera
- Railroad Station



UWaterValve  
 ASSET NUM:  
 UWV000000722  
 (W3, 6-inch, Manual, Gate Valve)

## GIS ATTRIBUTES

OBJECTID	192
GIS SYMBOL ROTATION	
ENABLED	True
MXSITEID	110
MXCREATIONSTATE	
ASSET NUM	UWV000000722
MXLOCATION	
TRA PROCESS CODE	923 - Plant Service Water_Nonpotable, Chlorin
PROCESS ABBREV	W3 - Plant Service Water (Nonpotable, from pl
SUBTYPE DESC	Plant Service Water
VALVEDIAMETER	6"
VALVETYPE	Gate Valve
VALVESTRUCTTYPE	Valve Box
ACTUATORTYPE	Manual
INSTALL_DATE	8/31/2013, 6:00 PM
PROJECT NAME	PS14 Phase II Service & Potable Water Loop D
SPATIAL SOURCE	Field Surveyed
ATTRIBUTE SOURCE	Record Drawing
COMMENTS	

Asset: UWV0000007

Plant Service Water\_W3\_923 - Plant Service Water\_Nonpot

Site: 110

Classification: UTILITY \ UWATERVALVE

Class Description: Water Valve

Specifications

Filter

1 - 10 of 11

Attribute	Description	Data Type	Alphanumeric Value	Numeric Value	Unit of Measure	Table Value
UWATER_VALVE_TYP	Process	ALN	Plant Service Water			
PROCESS_ABBR	Process Appreviation	ALN	W3			
PROCESS_CODE	Process Code	ALN	923 - Plant Service Water_Nonpotable, Chlorinated_Un-chlo			
UWATER_VALVE_VALVETYPE	Type	ALN	Gate Valve			
UWATER_VALVE_DIAM	Diameter	ALN	6		IN	
UWATER_VALVE_ACTUATORTYPE	Actuator Type	ALN	Manual			
UWATER_VALVE_STRUCTTYPE	Structure Type	ALN	Valve Box			
PROJECT_NAME	Project	ALN	PS14 Phase II Service & Potable Water Loop Design W1, W			
GIS_ATT_SOURCE	ATT Data Source	ALN	Record Drawing			
GIS_SPT_SOURCE	SPT Data Source	ALN				





Maximo Workorders: Scott Hampton

Work Order: 2249591    Valve Stuck

Location: >>> >>>

Asset: UWW0000000 >> GIS UTILITY DATASET, Water Valve, Un...own, W2, Nonpo

Configuration Item: >>>

Equipment Identifier: >>>

Parent WO: >>>

Site: 110

Class: WORKORDE

Work Type: CM

GL Account: >>>

Meter Readings: >>>

Storeroom Material Status: >>>

Direct Issue Material Status: >>>

Work Package Material Status: >>>

Attachments >>

Status: WAPPR

Status Date: 12/5/17 10:08 AM

Inherit Status Changes? ☒

Accepts Charges? ☒

Is Task? ☐

Under Flow Control? ☐

Suspend Flow Control? ☐

Flow Action: >>>

Flow Action Assist? ☐

Call-In? ☐

## CMMS WORK ORDERS

Work Order Number	2249591
Work Description	Valve Stuck
Work Type	CM
Failure Class	
Problem Code	
Location Code	
Location Description	
Asset Number	UWW000000006
Asset Description	GIS UTILITY DATASET, Water Valve, U
Work Group	110-152
Lead Person ID	FLUARYW
Lead Person Name	Scott Hampton
Supervisor Person ID	Scott Hampton
Supervisor Person Name	
Work Order Status	WAPPR
Status Date	12/5/2017, 4:08 AM
Reported Date	12/5/2017, 4:08 AM
Scheduled Start	
Actual Start Date and Time	
Scheduled Finish	
Actual Finish Date and Time	
Site ID	110
Asset X Coordinate	2,449,305.15
Asset Y Coordinate	6,968,345.09
Location X Coordinate	
Location Y Coordinate	
Priority	4.00
In History?	



# Lessons Learned

- Start with latest as-builts
- Collaborate
- QC Process
- Prioritize Assets for Data Collection
- Duplicate Assets (GIS/CMMS)
- Streamlined Data Capture through GIS Tools



# Results

- System that aligns with TRA's Strategic Plan
- Assets that can be viewed in maps and accurately located in the field
- Optimized workflow and maintenance
- Training tool for new employees
- Process to create new assets in CMMS
- Taking this approach and lessons learned to other plants at TRA



# Acknowledgements

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