



REAL TIME AS-BUILT FOR DATA COLLECTION

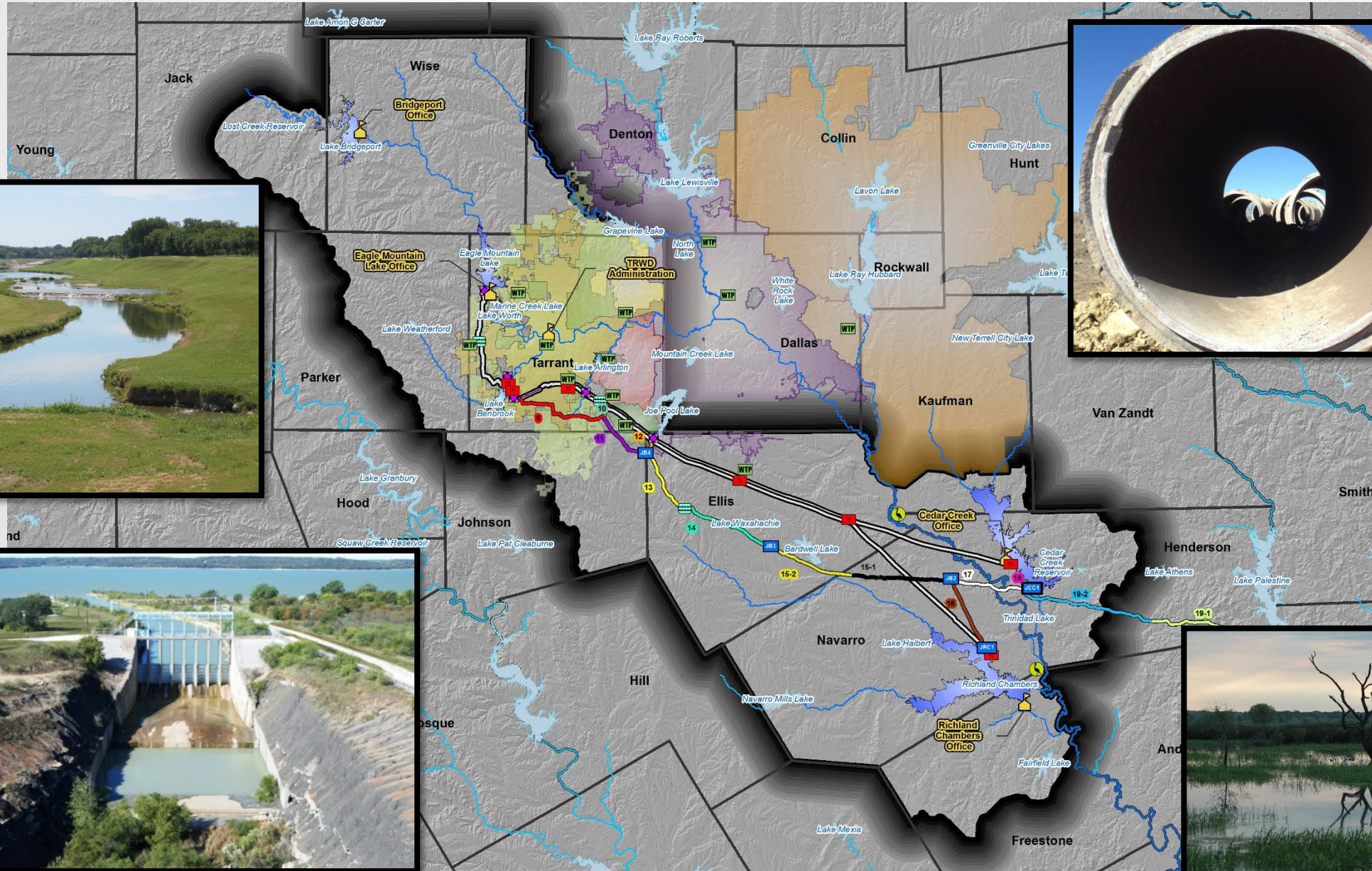
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OVERVIEW

- About TRWD
- Program Objectives
- Program History
- Program Approach
- Program Process
- GIS Application
- RTAB Success



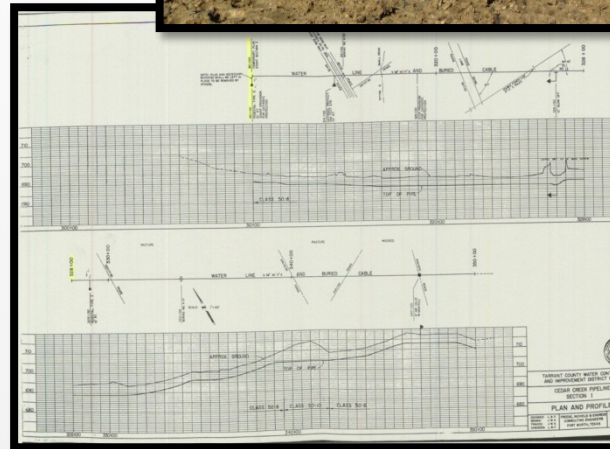
ABOUT TRWD



PROGRAM OBJECTIVES

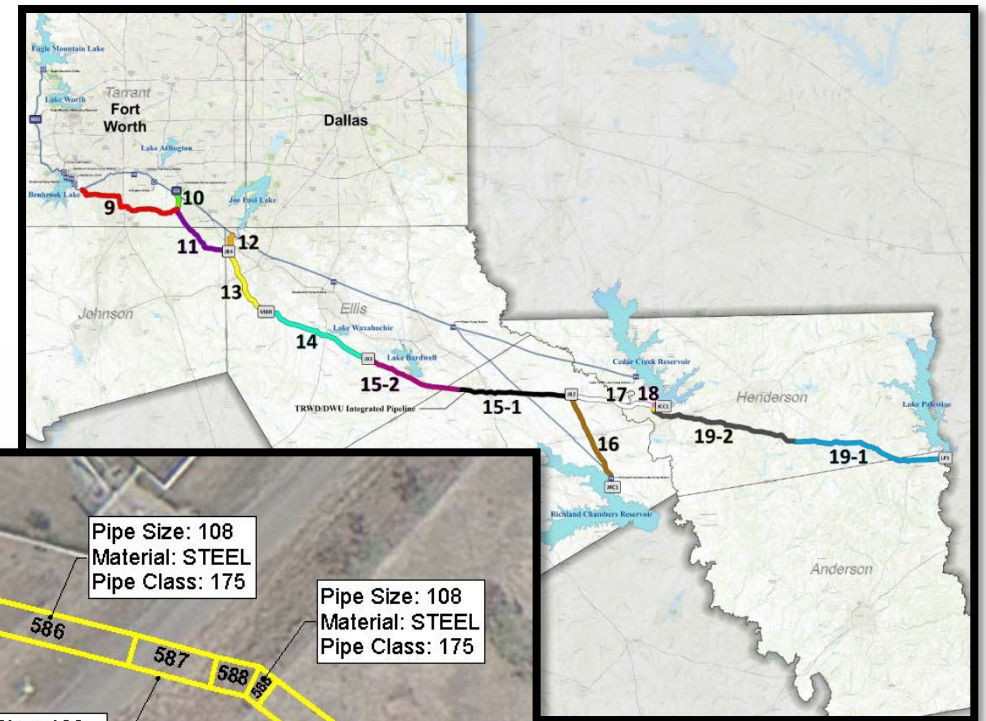
- Collect Survey Grade Data
- Provide Real Time Access
- Support Development of As Builts
- Streamline Processes
- Visualize and Utilize Data

**“Achieving Survey Quality
Data of Pipeline “As-Built” in
Real Time”**



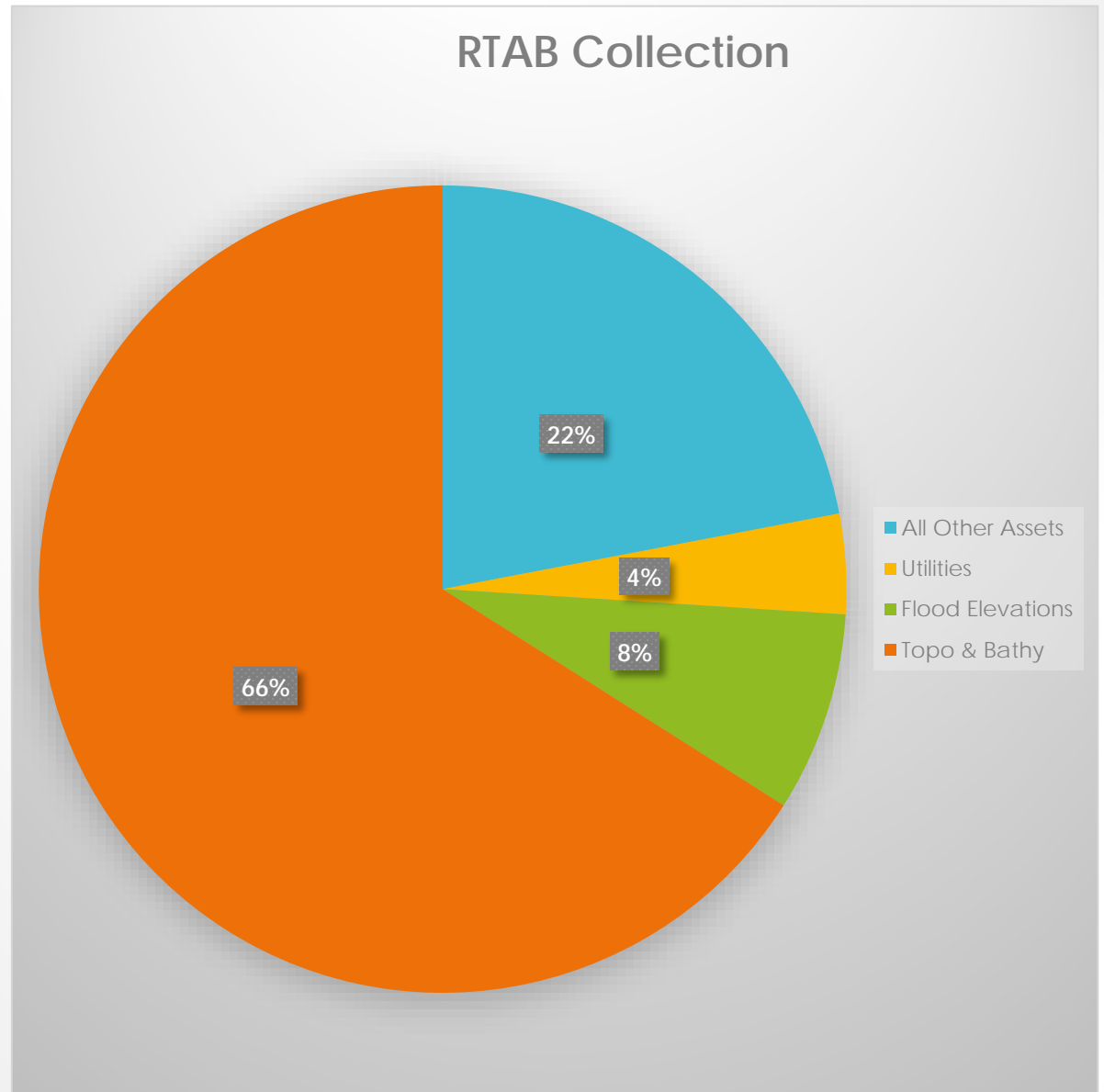
PROGRAM HISTORY

- Originally developed for the Integrated Pipeline Project (IPL) to provide Real Time data collection of IPL Construction
- First Iteration of RTAB was developed and piloted in 2013
- To date over 15,000 locations/assets have been collected along the IPL
- IPL data stats (2013 – Present):
 - Pipes ~7,600+ (approximately 60-70 miles)
 - Manways & Valves ~500+
 - Other Assets ~7000
- Decision Support Incorporates:
 - Design data
 - Pipe Manufacturer – Laysheet Data
 - RTAB Field Collection

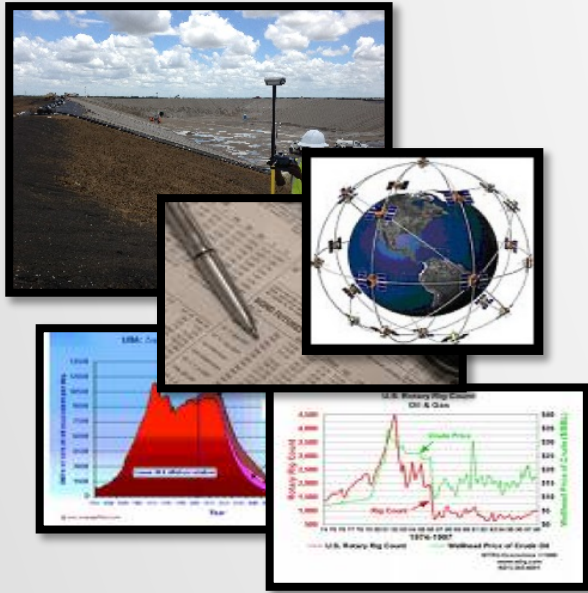


PROGRAM HISTORY

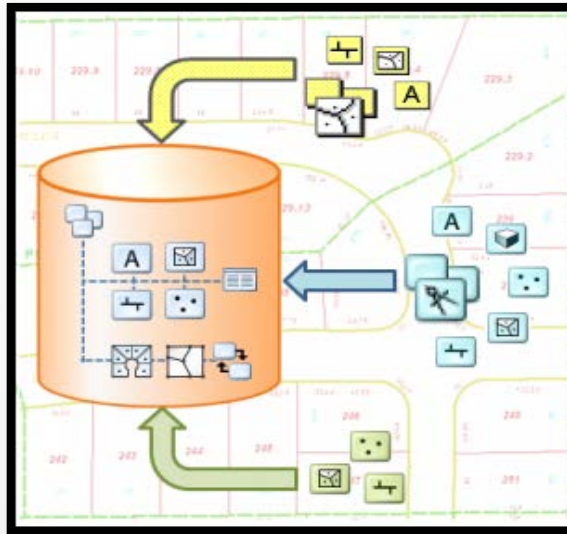
- Second Iteration of RTAB deployed in Sept. 2015 and was developed to support all TRWD Field Collection Projects
- Transitioned from a simple Windows Listener to a robust Web Application
- To date over 87,000 assets/location have been collected total (IPL + TRWD)



PROGRAM APPROACH



Spatial Data
Acquisition



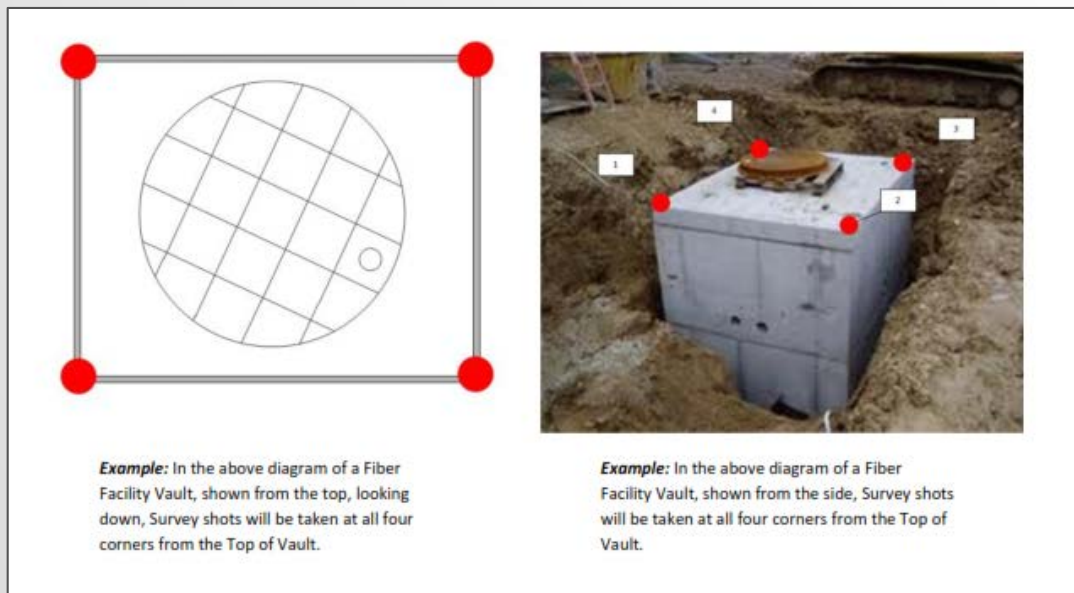
Data Storage and
Management



Data Delivery

PROGRAM PROCESS

- Field Collection
- Data Dictionary
 - Data dictionary for each “functional unit”.
 - Directly matches enterprise GIS geodatabase.
- Standard Operating Procedure (SOP) Document
 - Detailed instructions on how to collect an asset as well as the features being collected.



Joints	
FACILITY:	ROUTEID:
SECTION 15-1 ▼	151
ROW_STATION:	RECEIVER:
0.0 ▶	TRIMBLE ▼
NOTES:	PIPE_PIECE_NUMBER:
test	1200
CATHODIC_WIRES:	
NO ▼	
EMBEDMENT_TYPE:	
CONCRETE ENCASEMENT ▼	
CONNECTION_TYPE:	ISOLATED:
WELDED ▼	NO ▼
DEFECTION:	PIPE_SIZE:
YES ▼	108
RTK:Float H:0.11sft V:0.18sft	
Esc	Store
Next	Options

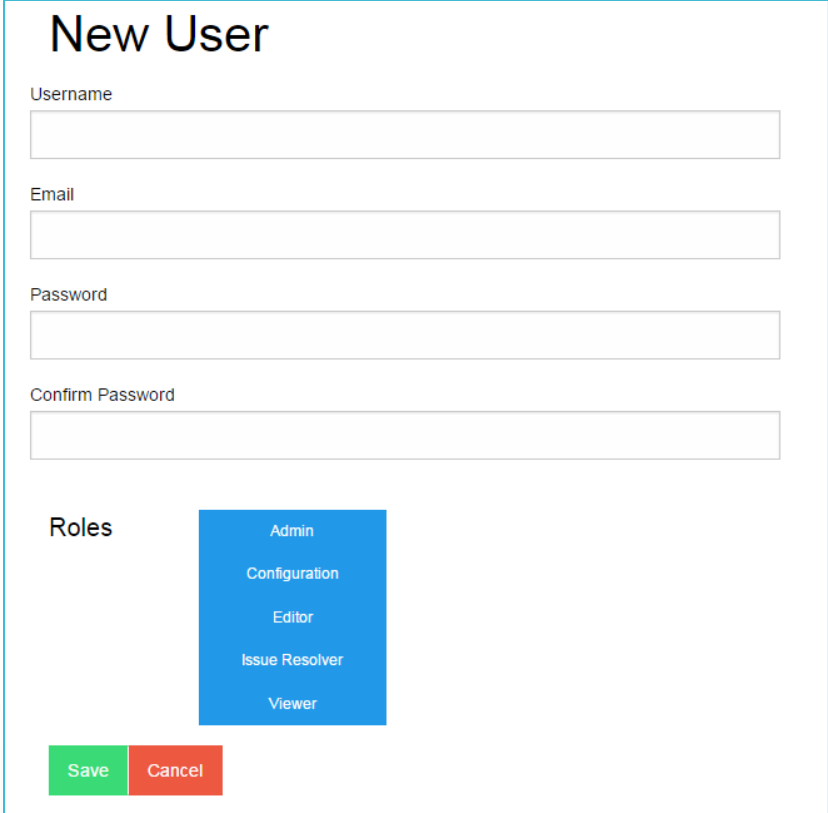
PROGRAM PROCESS

- Job files are exported in the field as a CSV file.
- Cloud synchronization exchanges the CSV file to a secure server.
- CSV file is automatically processed into the enterprise geodatabase using the custom RTAB application.



PROGRAM PROCESS

- RTAB Application
 - Web-based application for GPS data import and processing
 - The custom import tool includes a “listener” that executes when a file is synchronized with the server
 - Project configurations define GIS feature destinations
 - Keywords are used to parse the CSV files
 - The import tool supports file checking and error logging
 - Role-based user management



The screenshot shows a web form titled "New User". It contains four text input fields for "Username", "Email", "Password", and "Confirm Password". Below the fields is a "Roles" section with a blue button containing the text "Admin", "Configuration", "Editor", "Issue Resolver", and "Viewer". At the bottom of the form are two buttons: a green "Save" button and a red "Cancel" button.

PROGRAM PROCESS

- RTAB Application
 - When the listener detects a new CSV file, it parses the data into the correct feature class based on project configurations.

The screenshot displays the RTAB application dashboard. At the top, a dark blue navigation bar contains the text 'RTAB' on the left and 'Dashboard', 'Configuration', and 'Maintenance' with a dropdown arrow on the right. Below the navigation bar, the main content area features a title 'Dashboard Monitoring 7 projects.' and a green status indicator 'Monitor Online' with a checkmark. The dashboard is organized into seven project monitoring cards arranged in two rows. Each card includes a project name, its last activity timestamp, and a gear icon for configuration. The projects and their last activity times are: IPL (no timestamp), Flood (8/23/2016 9:22:48 AM), FloodwayReser... (8/23/2016 9:37:05 AM), Land (8/23/2016 7:49:57 AM), Other (no timestamp), Pipeline (no timestamp), and Utilities (9/2/2016 10:39:01 AM).

Project Name	Last Activity
IPL	
Flood	8/23/2016 9:22:48 AM
FloodwayReser...	8/23/2016 9:37:05 AM
Land	8/23/2016 7:49:57 AM
Other	
Pipeline	
Utilities	9/2/2016 10:39:01 AM

PROGRAM PROCESS

- RTAB Application
- Support for multiple project configurations
- Projects can be customized for each user group
- Individual projects can be deactivated

Project Configuration

Project Name Inactive? No

Safe Name

Northing Field Easting Field Elevation Field

Emails for Bad Record Notification (semi-colon seperated)

ArcGIS Token Configuration

Token URL

Token Username Token Password Timeout

PROGRAM PROCESS

- RTAB Application
 - ArcGIS Server REST Endpoints
 - Supports point and polyline feature classes

ArcGIS Server Endpoint Configuration

[Add New Endpoint](#)

	Location	Keyword	Line Id	Status
Edit	https://gismaps.trwd.com/arcgis/rest/services/RTAB_Feature_Service/FeatureServer/0	Anode Beds		Active
Edit	https://gismaps.trwd.com/arcgis/rest/services/RTAB_Feature_Service/FeatureServer/1	Change of Embedments		Active
Edit	https://gismaps.trwd.com/arcgis/rest/services/RTAB_Feature_Service/FeatureServer/2	Conduits		Active
Edit	https://gismaps.trwd.com/arcgis/rest/services/RTAB_Feature_Service/FeatureServer/3	Cathodic Protection Wires		Active

PROGRAM PROCESS

- Data delivery uses CSV file format
- Data collection controlled with Trimble data dictionaries
 - Target feature class
 - Attribute fields
 - Valid value domain lists
- File format and content validation
- Example file
 - 1,6769842.042,2576977.195,412.121, Joints, Joints:FACILITY, SECTION 15-1, Joints:ROUTEID, 151, Joints:ROW_STATION, 0, Joints:RECEIVER, TRIMBLE, Joints:NOTES, 79+70.63, Joints:PIPE_PIECE_NUMBER, 148, Joints:CATHODIC_WIRES, NO, Joints:EMBEDMENT_TYPE, GRANULAR, Joints:CONNECTION_TYPE, WELDED, Joints:ISOLATED, NO, Joints:DEFELECTION, NO, Joints:PIPE_SIZE, 108, Joints:COLLECTED_BY, ym, Joints:COLLECTED_DATE, 2014-10-08

PROGRAM PROCESS

- Data Delivery

- **1**,6769842.042,2576977.195,412.121, Joints, Joints:FACILITY, SECTION 15-1, Joints:ROUTEID, 151, Joints:ROW_STATION, 0, Joints:RECEIVER, TRIMBLE, Joints:NOTES, 79+70.63, Joints:PIPE_PIECE_NUMBER, 148, Joints:CATHODIC_WIRES, NO, Joints:EMBEDMENT_TYPE, GRANULAR, Joints:CONNECTION_TYPE, WELDED, Joints:ISOLATED, NO, Joints:DEFLECTION, NO, Joints:PIPE_SIZE, 108, Joints:COLLECTED_BY, ym, Joints:COLLECTED_DATE, 2014-10-08

PROGRAM PROCESS

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PROGRAM PROCESS

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PROGRAM PROCESS

- Field data uploaded to cloud based file sharing site
- Import utility detects new file
- File validation is performed and then processed
- Results documented in processing log

View Activity Logs

Log Filter Controls +

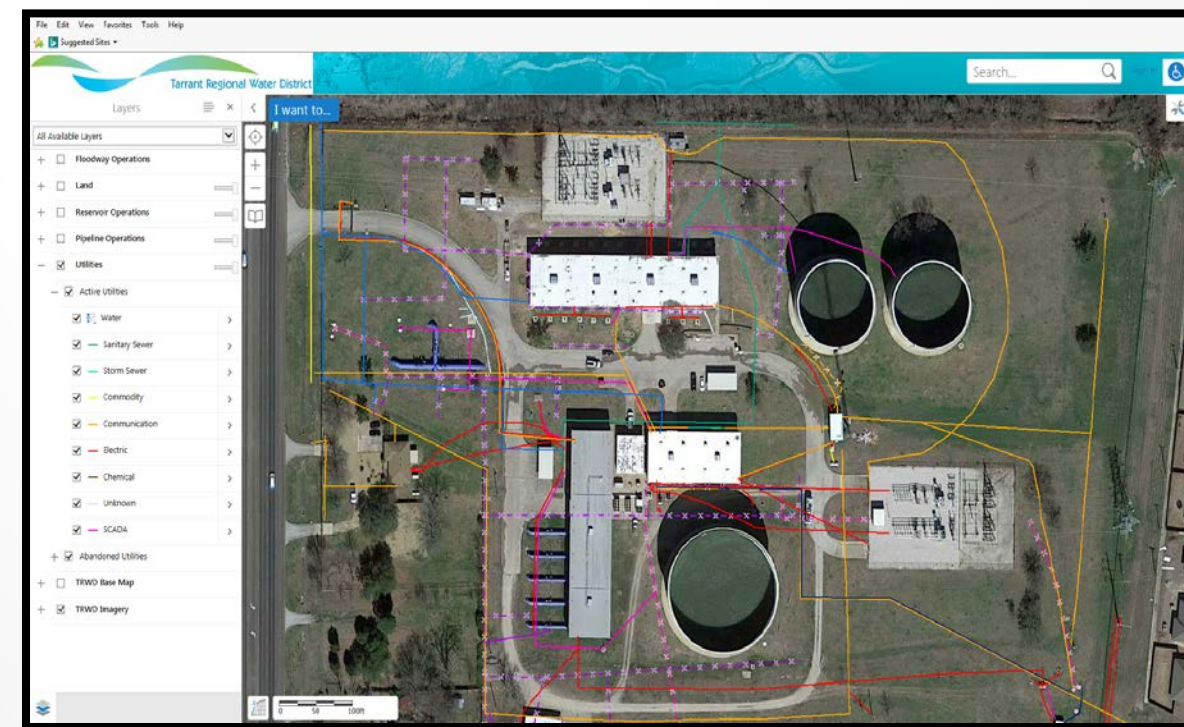
Id Date Title Project Type Message Data Search:

Id	Date	Project	Type	Message
25705	10/6/2016 6:56 PM	Utilities	Status	Successfully sent point to ESRI
25704	10/6/2016 6:56 PM		Log	Completed with 4 successful records.
25703	10/6/2016 6:56 PM		Log	ESRI Response: { "addResults": [{ "objectId": 3697, "success": true }] }
25702	10/6/2016 6:56 PM	Utilities	Status	Successfully sent point to ESRI
25701	10/6/2016 6:56 PM		Log	ESRI Response: { "addResults": [{ "objectId": 3696, "success": true }] }
25700	10/6/2016 6:56 PM		Log	Record: 004,6880049.874,2410411.961,557.122,Utilities_Commodity,Utilities_Commodity:Collected_By,BP,Utilities_Inch,Utilities_Commodity:Depth_Buried,27ft,Utilities_Commodity>Date_Installed,2016-10-06,Utilities_Commodity:Not_replaced,Utilities_Commodity:Permit_Number,0,Utilities_Commodity:Company_Name,Atmos,Utilities_Commodity:Ty Gas,Utilities_Commodity:Pipe_Material,Unknown,Utilities_Commodity:Operational_Area,Pipeline,Utilities_Commodity:grade GPS RTK,Utilities_Commodity:Trench_Type,Direct Bury,Utilities_Commodity:Cover_Type,Soil,Utilities_Comm
25699	10/6/2016 6:56 PM	Utilities	Status	Successfully sent point to ESRI
				Point: features=[{"geometry": {"x": 2410411.961, "y": 6880049.874}, "attributes": {"NORTHING": "6880049.874",

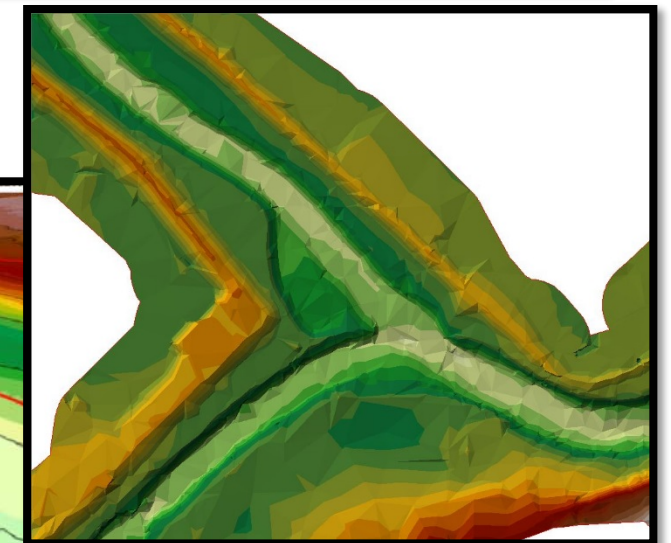
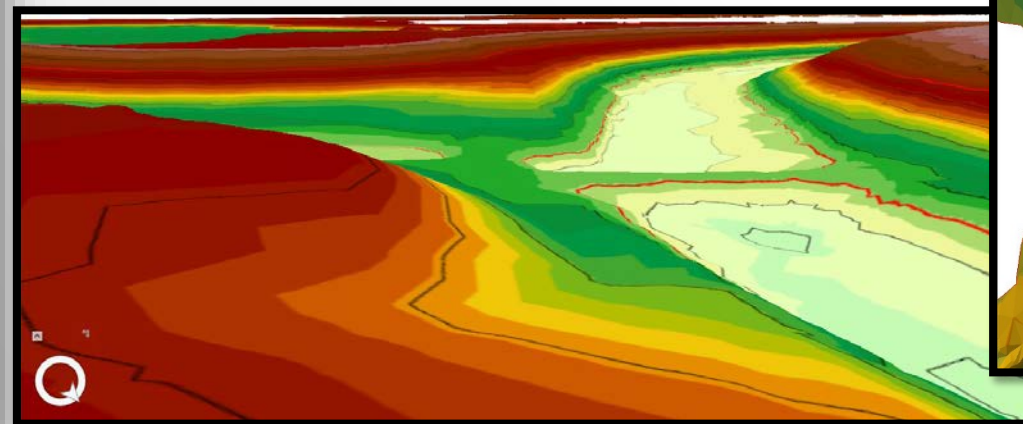
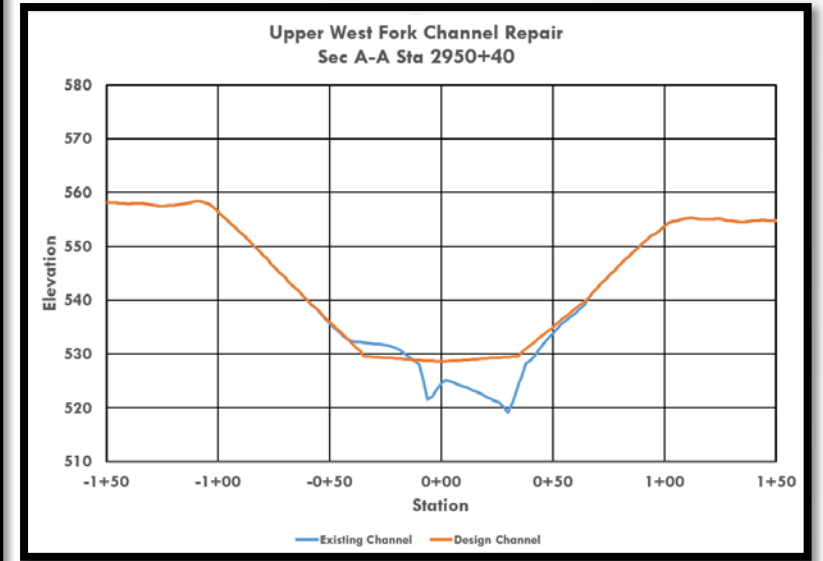
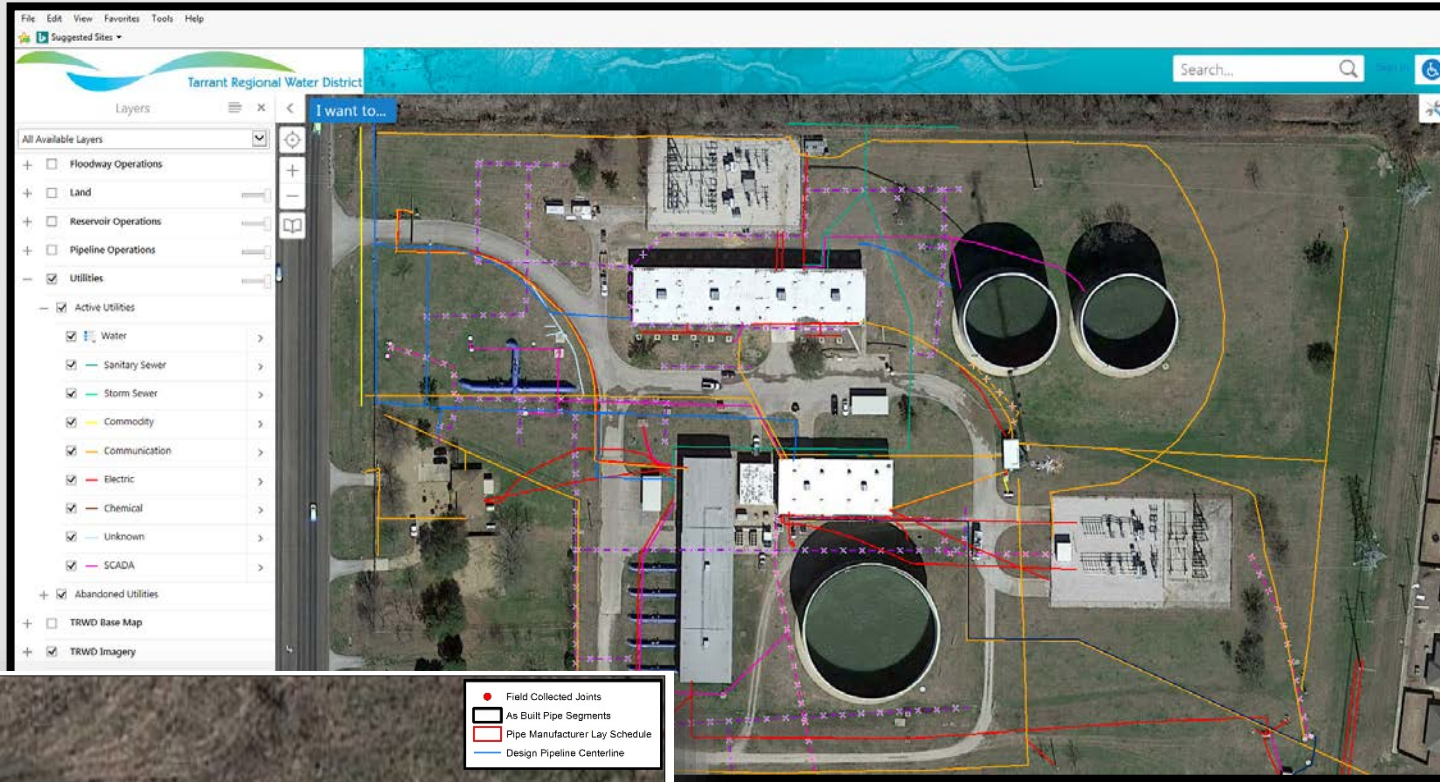
Showing 1 to 10 of 3,308 entries First Previous Next Last

PROGRAM PROCESS

- Data is imported into the enterprise geodatabase
 - The data is available to be viewed immediately
 - ArcMap, TRWD Organizational AGOL, TRWD Secure Web Mapping Applications



GIS APPLICATION



PROGRAM SUMMARY & SUCCESS

- A simple solution to a complex problem.
- Utilization of industry leading Esri software.
- TRWD Geospatial Services turns spatial data into information that is used to make key operational decisions.
- American Council of Engineering Companies (ACEC)
 - 2016 Engineering Excellence Award, Survey and Mapping Category



QUESTIONS?

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