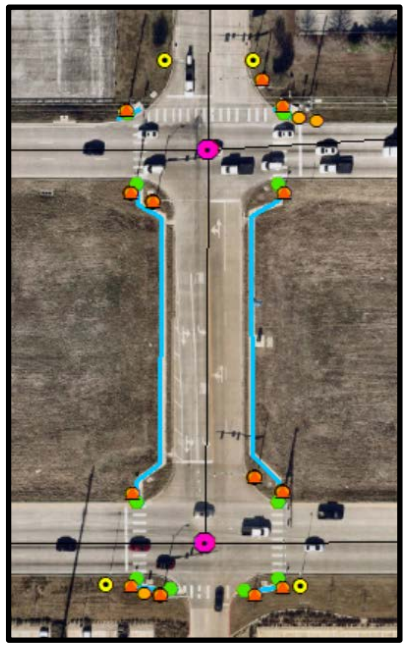
FORT WORTH®

Asset Inventory Strategies for Transportation and Public Works Infrastructure



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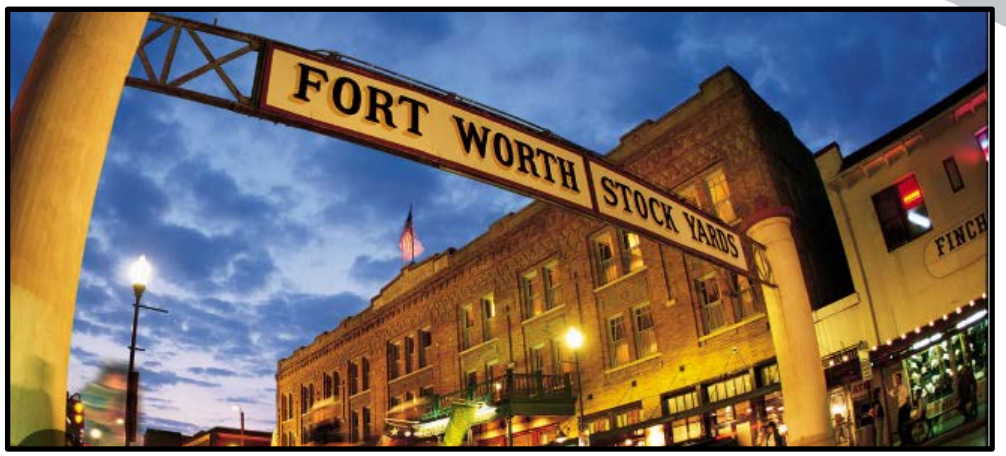
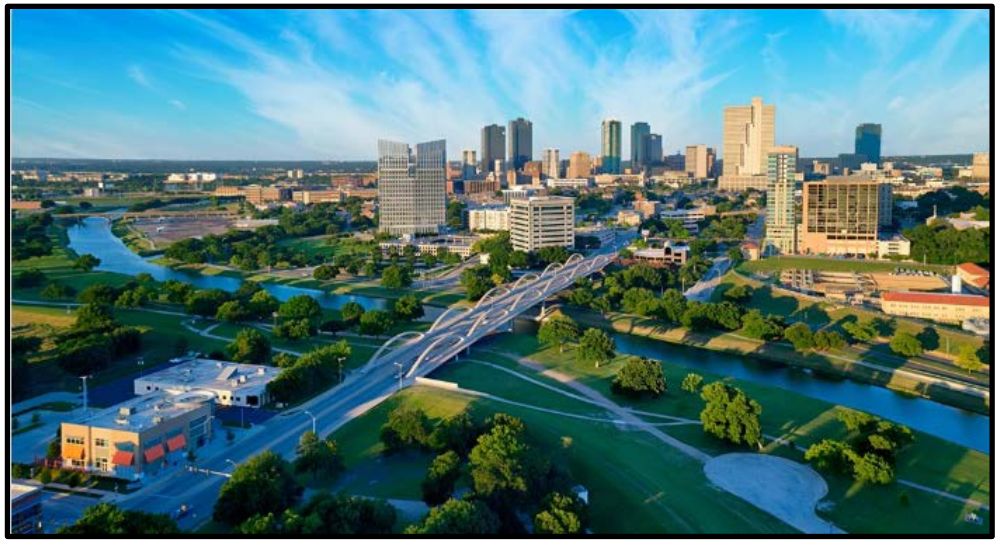
City of Fort Worth

Transportation Public Works

City of Fort Worth

- Population: 954,457
- 12th Largest in Nation by Population
- Geographic Area: +- 350 sq miles
- 19th Largest Geographically
  - New York City
  - San Diego
  - Chicago
  - Philadelphia
  - Austin





TPW Asset Management Data - Inventory

Streets

Bridges
- 437 Assets
- 0 Attributes
- 437 Data Elements

Curb & Gutters
- 300,138 Assets
- 23 Attributes
- 6,894,388 Data Elements

End of Road Barricades
- 1,112 Assets
- 22 Attributes
- 24,288 Data Elements

Guardrails
- 166 Assets
- 19 Attributes
- 3,54 Data Elements

Pavement
- 34,612 Assets
- 83 Attributes
- 2,810,380 Data Elements

Traffic Management

Poles
- 121,336 Assets
- 14 Attributes
- 1,698,704 Data Elements

Sidewalks
- 50,768 Assets
- 15 Attributes
- 701,865 Data Elements

Signs
- 129,385 Assets
- 30 Attributes
- 3,842,820 Data Elements

Signal Intersections
- 958 Assets
- 9 Attributes
- 8,577 Data Elements

Street Lights
- 65,347 Assets
- 33 Attributes
- 2,129,127 Data Elements

Traffic Signals
- 4,814 Assets
- 38 Attributes
- 179,550 Data Elements

Stormwater

Channel Features
- 17,860 Assets
- 10 Attributes
- 178,600 Data Elements

Inlet
- 39,803 Assets
- 41 Attributes
- 1,631,431 Data Elements

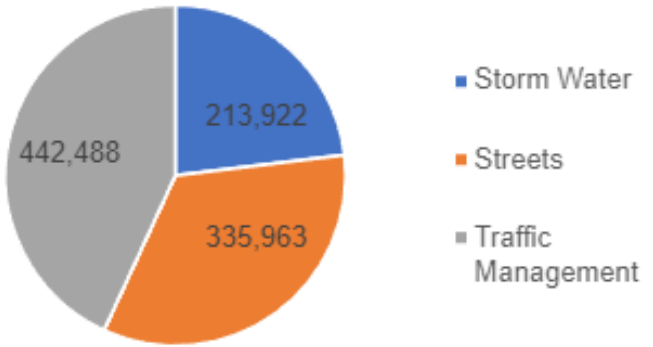
Manhole
- 10,295 Assets
- 31 Attributes
- 319,145 Data Elements

Channels
- 15,890 Assets
- 17 Attributes
- 270,521 Data Elements

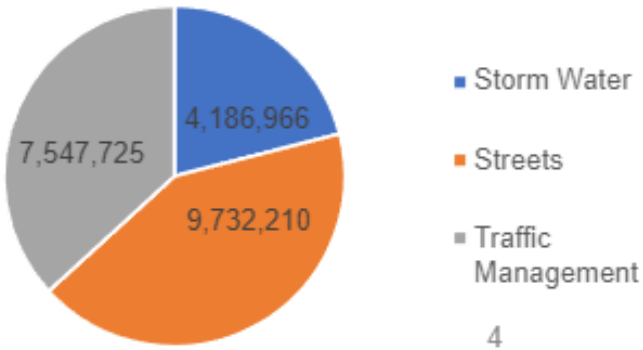
Pipes
- 70,392 Assets
- 17 Attributes
- 1,196,664 Data Elements

Pipe Features
- 38,784 Assets
- 7 Attributes
- 271,509 Data Elements

Assets in Inventory – 992,373



Data Elements - 20,512,839



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TPW Assets – Data Attributes Examples

Standard Attributes		Traffic Signals		Signs		Ramps		Sidewalks		Striping		Poles
Street		MountType		MUTCDCODE		Type		Material		Type		SupportDescription
Condition		Class		SignText		LandingArea		Width		Color		PoleType
Owner		FlasherType		SignFaceDirection		DetectableWarning		Length		RaisedPavementMarkers		
MaintainedBy		PedHeadCount		LED		Placement				FlexCurb		
AssetID				PedActivated						FlexPole		
Install_Date				MetroSign						Width		
Install_Year										Length		
Photo_Hyperlink												
Plan_Hyperlink												

Table

Assets.DBO.Street_Lights

OBJECTID *	STREET	CONDITION	OVERHEADWIRE	FIXTURETYPE	ARM	ARMLENGTH	INSTALL_DATE	OWNER	MAINTAINEDBY	INSTALL_YEAR	WATTAGE	BULB_TYPE
1	Ryan Ave	Good	No	Other	No	NO ARM	1/1/1900	Fort Worth	Fort Worth	1900	UNKNOWN	NON - LED
2	RYAN AVE	Good	No	Tear Drop	Yes	<8	1/1/1900	Fort Worth	Fort Worth	1900	175	NON - LED
3	Ryan Ave	Good	No	Other	No	NO ARM	1/1/1900	Fort Worth	Fort Worth	1900	UNKNOWN	NON - LED

Asset Inventory Need(s)

- Rapid development = enormous amount of new assets
- New asset data entry backlog
  - New development, capital projects, maintenance, etc.
- Transportation specific assets = relative short asset lifecycle
- Asset Condition (e.g. Pavement Condition Index)
- Asset data drives budget prioritization, resource allocation, and capital programming

Asset Inventory Project Pipeline

1. Pre-Survey Data Evaluation
2. Pre-Survey Setup
3. Data Collection
4. Pilot Area
5. Data Deliverable Strategy
6. QA/QC Process
7. Database Upload

Existing Asset Database
New Asset Discovery
Existing Asset Updates
Data Link

Pre-Survey Data Evaluation

- Internal Evaluation
  - Evaluate value and previous need for data fields/attributes

- Evaluation & Discussion with Business Owners
  - Identify value-added data fields/attributes
  - Discuss/eliminate no-low usage data fields
  - *What data attributes are worth paying for to survey?*

- Understand Survey Methodology & Technology
  - Survey contractor equipment, capabilities, and limitations

OBJECTID	76806
STREET	E 1st St
CONDITION	Good
OVERHEADWIRE	No
FIXTURETYPE	Cobra
ARM	Yes
ARMLENGTH	>=8
INSTALL_DATE	1/1/1900
OWNER	Fort Worth
MAINTAINEDBY	Fort Worth
INSTALL_YEAR	1900
WATTAGE	UNKNOWN
BULB_TYPE	NON - LED
CREATED_USER	HOFFMAJU
CREATED_DATE	10/20/2022 10:43:13 PM
LAST_EDITED_USER	HOFFMAJU
LAST_EDITED_DATE	10/24/2022 2:40:41 AM
ASSET_ID	STL0074645
LIFECYCLE	Active
PREVIOUS_WATTAGE	UNKNOWN

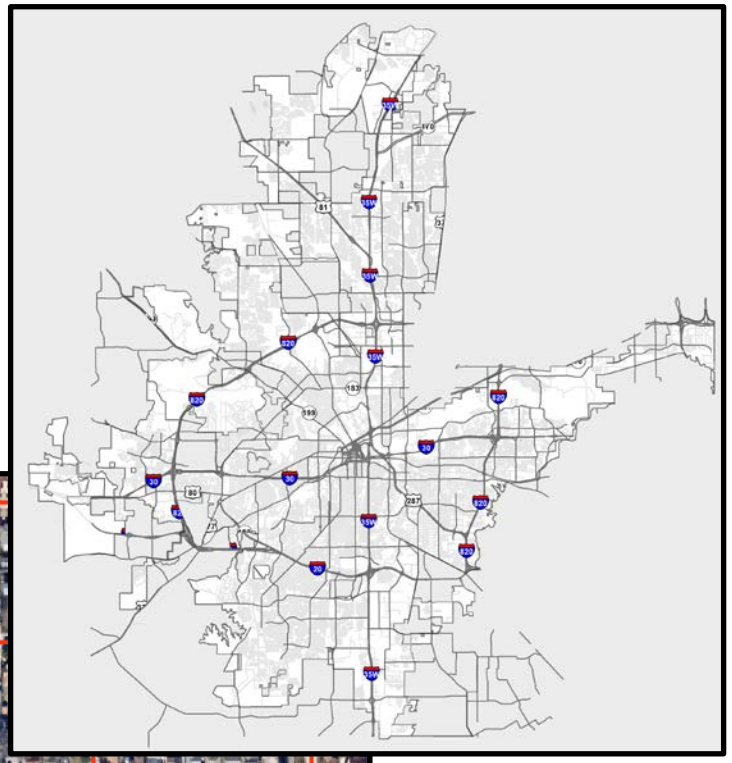
Pre-Survey Data Setup

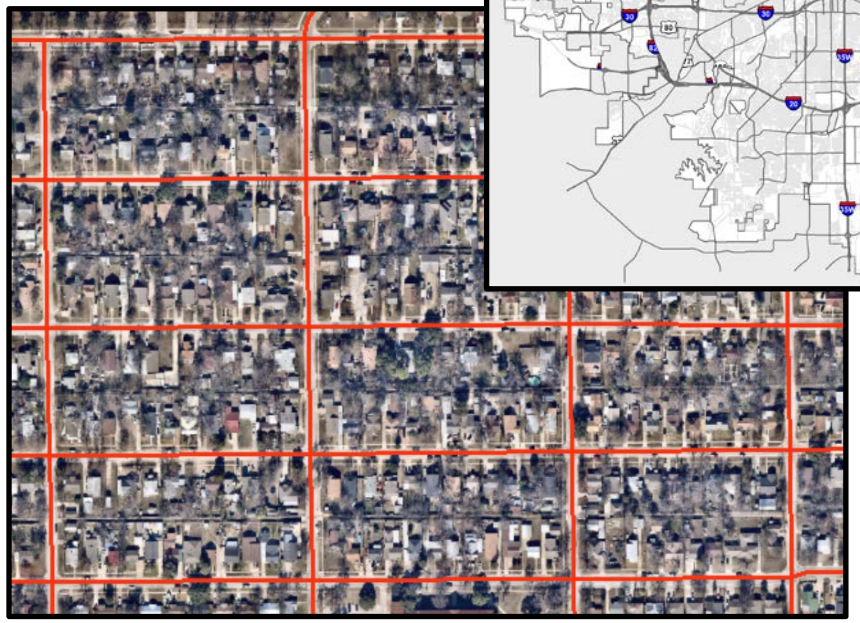
Data Interpretation (provide to contractor)

1. Current asset feature classes
   - Data formatting, field properties, domains, etc.

2. Data Dictionary & Field Guides

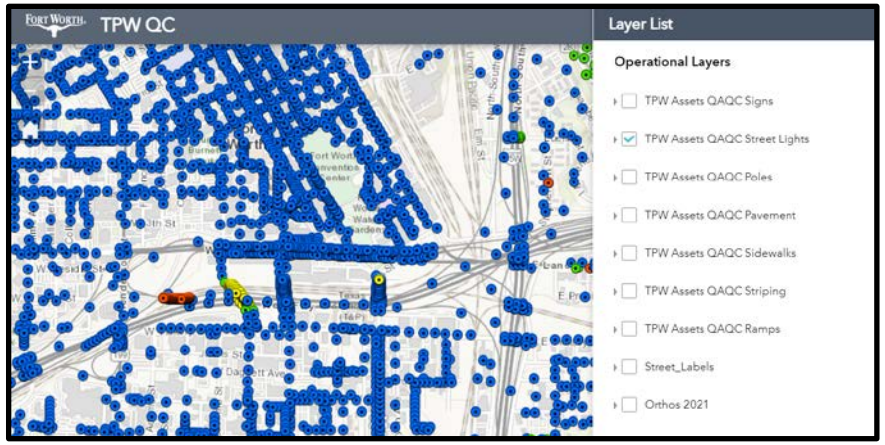
3. Applicable Feature Classes
   - Street Centerlines
   - Geographic Boundaries
   - Data Deliverables Facilitation
   - Latest Aerial Imagery

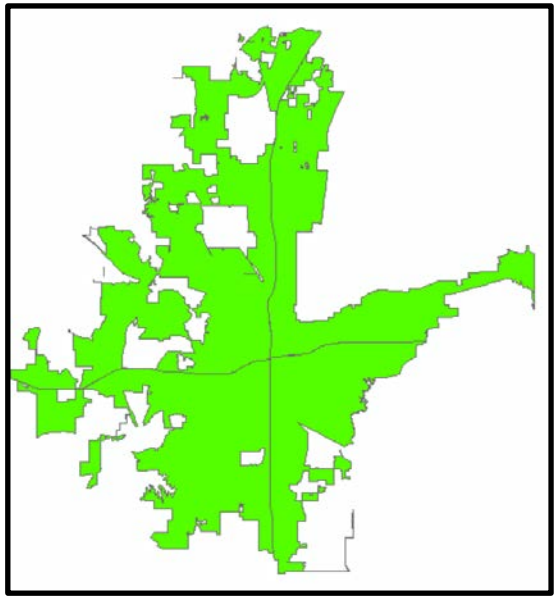




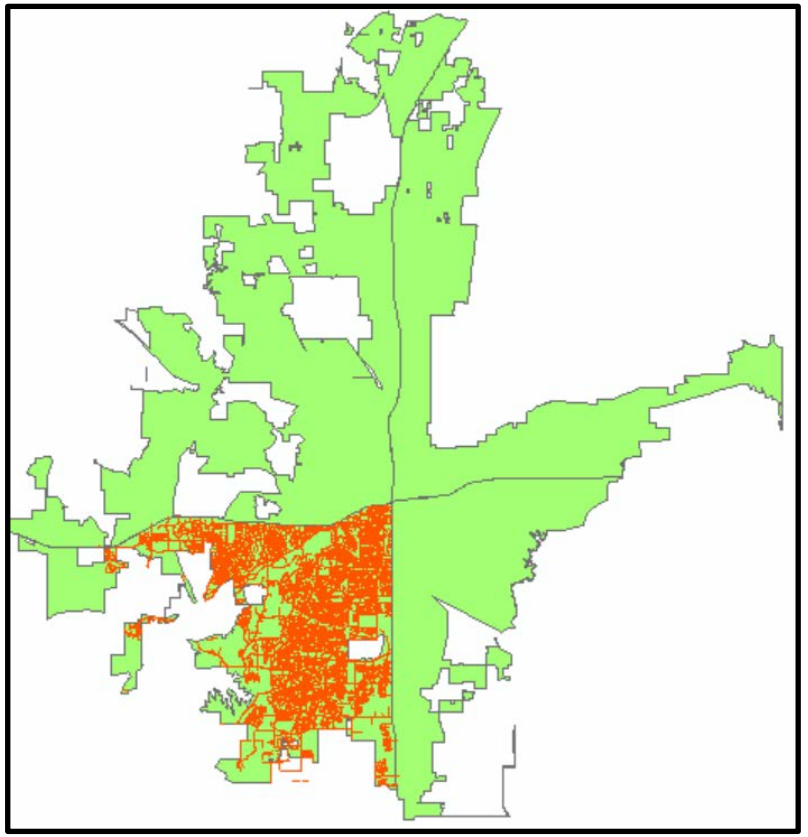
Data Transfer Strategy

1. Database Replication (or not)?
   - No replication. Geodatabase(s) back and forth
   - Copy/paste/import features and data field attributes
2. Create QA/QC feature classes
   - Landing spot for data deliverables
   - Duplicate data fields and field properties
   - Facilitate QA/QC evaluation prior to database upload
3. Pilot Area
   - Select small geographic area for initial data collection
   - Evaluate data deliverable (for each asset type)
     - Data field compatibility (e.g. formatting, field properties)
     - Verify data interpretation





Data Transfer Strategy (continued)

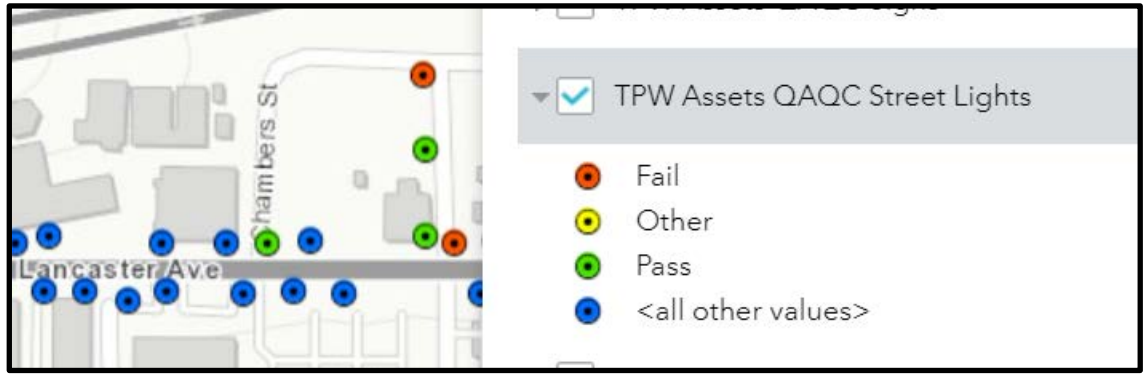


1. Data Deliverable Setup
   - Data Delivered by Location
   - Geographic Bounds

2. Adaptive Deliveries
   - Single quadrant delivery at beginning
   - Data quality increases = size of deliverable increases

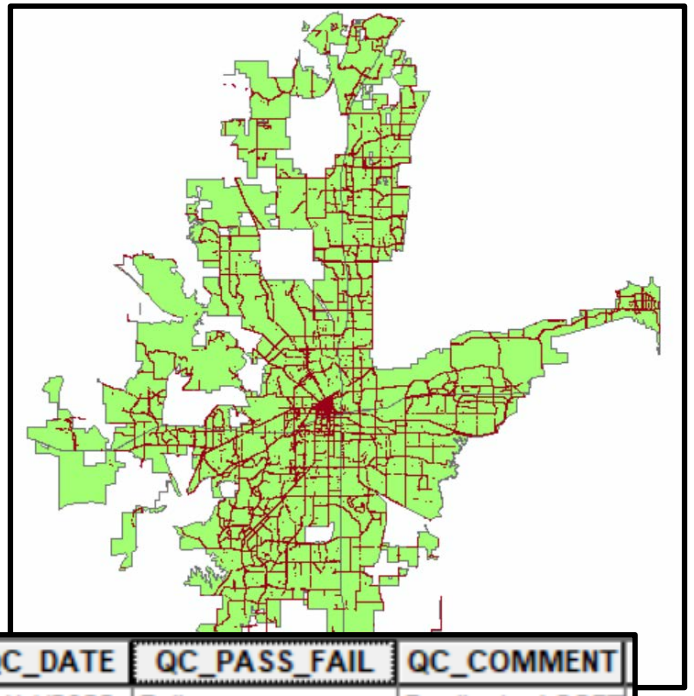
Data QA/QC Process

1. Establish QC Team
   - GIS/Asset Management personnel
   - Involve asset domain experts
2. Establish Where?
   - ArcMap/ArcPro for GIS users
   - Create map viewer for non-GIS users
   - QA/QC asset feature classes
3. QC Team Management
   - Prevent data editing conflicts
   - Enable symbology to monitor QC completion



Data QA/QC Process (continued)

1. Establish QC Checklist
   - ASSET_ID link verification
   - Verify asset interpretation
   - Domain value match
   - Relational fields check
     - The value in Field A dictates value in Field B
     - ARM = 'NO' then ARM_LENGTH = 'NO ARM'
2. Subset QC Analysis
   1. Verify specific domain values
   2. Strategic use of QC personnel
3. Build QC Findings Report
   1. Detail QC findings
   2. Provide corrective actions



QC_PERSON	QC_DATE	QC_PASS_FAIL	QC_COMMENT
CC	11/14/2022	Fail	Duplicate ASSET
CC	11/14/2022	Fail	Duplicate ASSET
CC	11/14/2022	Fail	Missing Length
CC	11/14/2022	Fail	Missing Length
CC	11/14/2022	Fail	Duplicate ASSET
CC	11/14/2022	Fail	Duplicate ASSET
CC	11/14/2022	Fail	Missing Length ,
CC	11/14/2022	Fail	Missing Length ,
CC	11/14/2022	Fail	Missing Length ,
CC	11/14/2022	Fail	Missing Length ,

Data QA/QC Process (continued)

1. QC Expectations & Metrics
   - Pilot Area: 50% minimum coverage
   - Quadrants: 10-15% minimum coverage
   - Adaptive by data quality
   - Adaptive by number of iterations
   - Achieve 80-90% 'Pass' rate

QC Results

Asset	Evaluations	Total Number	Total QC	QC Percent	Total Pass	Pass Percent	Total Fail	Fail Percent	Total Other	Other Percent
Signs	4	149080	13249	8.89%	1318	9.95%	11814	89.17%	116	0.88%
Poles	4	139716	4921	3.52%	4245	86.26%	400	8.13%	280	5.69%
Striping	4	48779	12427	25.48%	1867	15.02%	10548	84.88%	9	0.07%
Streetlights	4	70958	9065	12.78%	7626	84.13%	1002	11.05%	436	4.81%
Sidewalks	1	1674	937	55%	33	4%	890	95%	16	1%
Ramps	1	762	689	90%	371	53%	306	44%	12	3%

1. Minimum (2) Pilot Evaluations
2. Significant Fail Percent = Existing Asset_ID link
3. Typical Deliverable Timeline: Pilot(s) – (1) Quadrant – (2) Quadrant – Entire City
4. Not all data delivered for some assets

Database Upload

Step 1: Spatial Join

- ASSET_ID existing feature class – join – QA/QC feature class

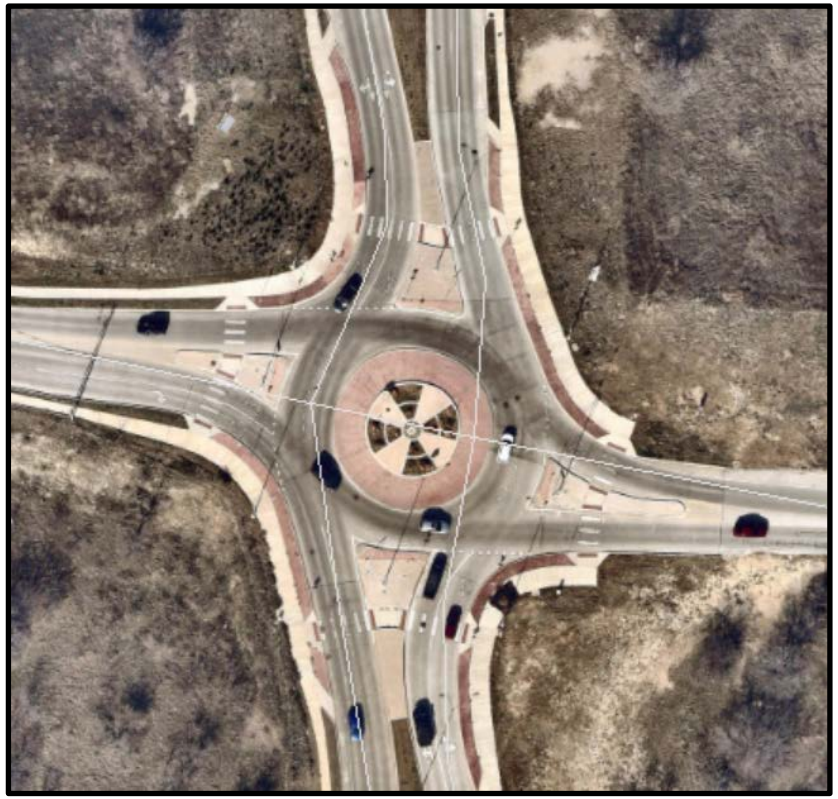
Step 2: Field Calculator

- Calculate/override values from QA/QC feature class
- Only fields collected in survey

- Step 3: New Assets (ASSET_ID = <null>)
  - Select All <null> values
  - Copy/Paste in existing asset feature class
  - Ensure field properties/data formatting matches

Key Points & Recommendations

1. Pre-Survey: Determine Value-Added Data Fields/Attributes
2. Pre-Survey: Setup Contractor for Success
3. Pilot Area Implementation
4. Rigorous QC Process
   - Human capital
   - Effective QC findings report to contractor
5. Existing Database Complexities
   - Linking existing ASSET_ID
   - Verifying new assets



Questions?

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