



**SURVEYORS REPORT (SPECIFIC PURPOSE SURVEY)**  
**City of Lake Worth Citywide Power Pole Inventory Collection**  
**RFQ-18-303 - Task Work Order NO.1**  
**City of Lake Worth, Palm Beach County, FL**

**Prepared by**  
**Wantman Group, Inc.**

**Objective:**

The City of Lake Worth is located in Palm Beach County, Florida, and spans approximately 6.5 square miles. Lake Worth Electric Utilities provides electric service to the city's 40,000 residents and nearly 12,000 homes through its city maintained electric distribution and service network. Over the course of many years, various utility agency owners (UAO's) expanded their own service networks by adding attachments to city-owned utility and power poles. This was done, in many instances, without the UAO obtaining the necessary city permits or paying required fees.

The primary objective of the project was to identify UAO attachments on Lake Worth Electric Utilities power and utility poles located throughout the city, with the specific objective of quantifying pole attachments by UAO. The scope of work included collection or verification of pole locations, physical observation and documentation of pole attachment conditions, determining the number of attachments per pole, the owner of each attachment on each pole, and providing the necessary utility records research and UAO coordination to support these efforts. WGI took a four-phased approach to achieve the project objective:

- 1) Utility record research
- 2) Field data collection (Terrestrial Mobile Lidar)
- 3) Data extraction and conditions documentation
- 4) Quality Control - facility owner verification

**Project Approach**

*Planning and Initial Project Setup*

The basis of the project was the city's Electric Distribution ESRI ArcGIS File Geodatabase, containing approximately 12,000 utility, power, and light poles. In order to ensure all poles with non-city owned attachments in the city were collected and accounted for in the project, the city was divided into eight separate collection zones. The city's file geodatabase was parsed to only include power poles, and a separate geodatabase was created for each collection zone to allow for multiple user data extraction and simultaneous attribute data table updates. Collection zones were determined based on density of facilities, collection routes/data gathering methodology, city priority areas, and safety. A field data dictionary of new attributes was then developed to facilitate collection of pole attributes required to achieve project objectives:

- Number of Attachments
- Attachment owner
- Status of Pole (Existing, New Pole, Removed)
- Picture ID (photo of pole with attachments)
- Comments

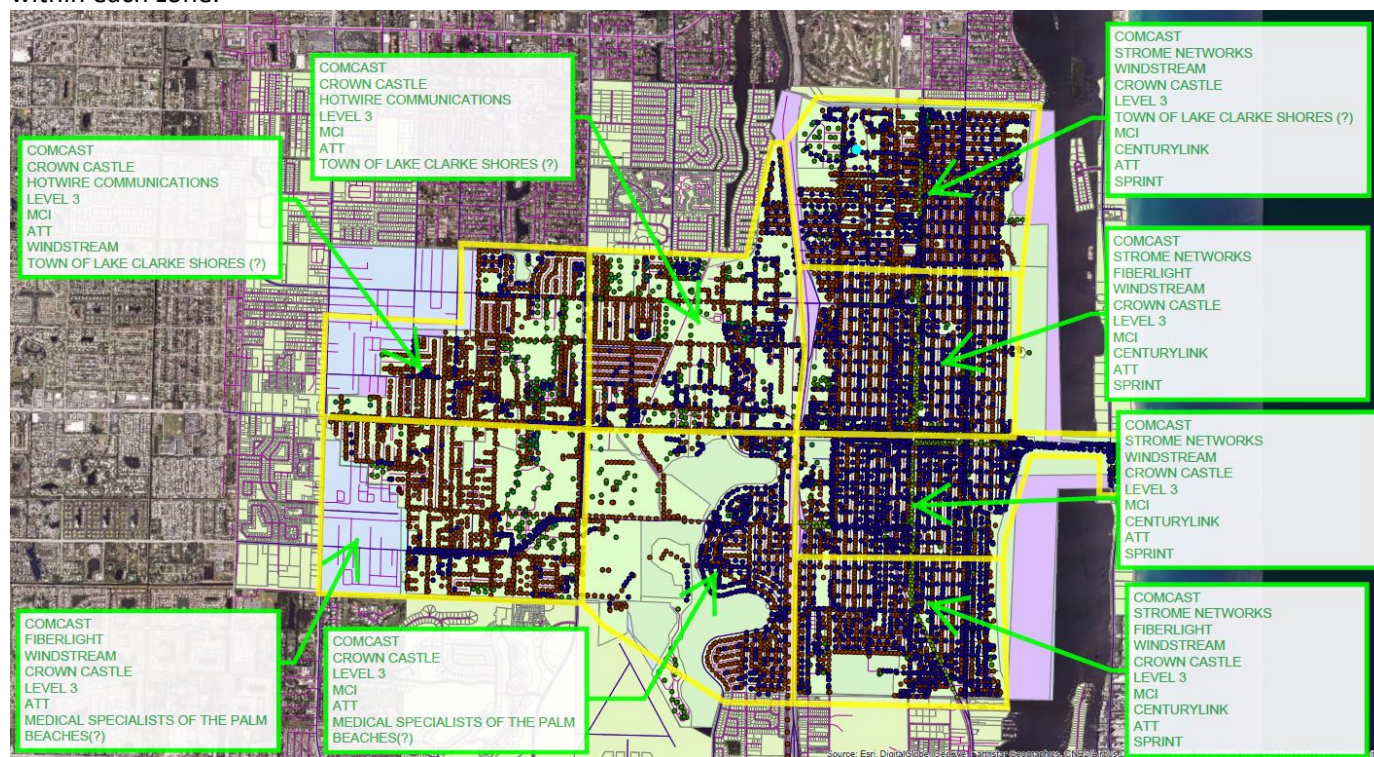
## Utility Records Research:

Sunshine 811 provides all participating utility owners within a given project area. A Sunshine 811 design ticket was obtained for each collection zone, with a singular focus on aerial facilities. UAO's as identified in the design ticket were then transcribed into the matrix below, clearly articulating which UAO's maintain facilities in each collection zone and identifying the contact person for each UAO.

UTILITY AGENCY OWNER	Response	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Comments
COMCAST-WPB Contact: TONY SPRINGSTEEL Day: (561) 804 0973 Alt: (772) 321 3425 Utility Type: CABLE TV	NO	✓	✓	✓	✓	✓	✓	✓	✓	
A T & T/ DISTRIBUTION Contact: DINO FARRUGGIO Day: (561) 997 - 0240 Utility Type: TELEPHONE	NO	✓	✓	✓	✓	✓	✓	✓	✓	
LEVEL 3 COMMUNICATIONS NETWORK RELATIONS Day: (877) 366 - 8344 x2 Contact: FIBER OPTIC	YES	✓	✓	✓	✓	✓	✓	✓	✓	
CROWN CASTLE FIBER Contact: DANNY HASKETT Day: (786) 610 - 7073 Alt: (786) 246 - 7827 Utility Type: FIBER	YES									Not in Lake Worth Limits
TOWN OF LAKE CLARKE SHORES Contact: DAMON GAMMONS Day: (561) 964 - 1515 x1113 Utility Type: UNKNOWN	NO	✓						✓	✓	
MCI Contact: DEAN BOYERS Day: (469) 886 - 4238 Utility Type: COMMUNICATIONS / FIBER OPTIC	NO	✓	✓	✓	✓	✓		✓	✓	
FIBERLIGHT LLC. Contact: TROY GAETA Day: (678) 824 - 6630 Alt: (954) 213 - 3367 Utility Type: FIBER OPTICS	NO		✓		✓		✓			
MEDICAL SPECIALISTS OF THE PALM BEACHES Contact: BRAD MARTIN Day: (561) 649 - 7000 x1126 Alt: (561) 436 - 8706 Utility Type: FIBER	NO					✓	✓			
WINDSTREAM COMMUNICATIONS Contact: LOCATE DESK Day: (800) 289 - 1901 Utility Type: FIBER OPTIC	NO	✓	✓	✓	✓		✓			
HOTWIRE COMMUNICATIONS Contact: WALTER DAVILA Day: (954) 699 - 0900 Utility Type: FIBER, TELEPHONE, CATV, COAX	NO							✓	✓	

WGI then made utility contacts with each UAO representative identified in the matrix. Utility records, as required to support the project objective, were then requested from each contact at each UAO. These records included design plans, record drawings, utility atlas plans, permit plans, marked city road atlas sheets, and the like. The records were

correlated to each collection zone in order to provide field and office technicians with anticipated UAO facilities within each zone.



### Field Data Collection

A Leica Pegasus 2 Terrestrial Mobile LIDAR Sensor, a portable survey grade mobile mapping system, was deployed to each collection zone. The TML unit is built on the ESRI ArcGIS platform. All accessible RW and utility easements were scanned and approximately 260 miles of 3D point cloud data with corresponding Google Earth-style Street view digital imagery was collected.

### Post processing of field collected LiDAR and Imagery

Initial TML trajectories were processed using NovAtel Inertial Explorer. Raw Global Satellite Navigation (GNSS) observations, Inertial Measurement Unit (IMU) observations, and speed sensor observations were processed to derive initial trajectory positions at this stage of the post-processing workflow of the project. Leica Pegasus Auto P was then used to link high dynamic camera images, point cloud data, and spherical imagery to the post-processed trajectory positions. Point clouds and imagery were reviewed by WGI's technical staff to ensure proper exposure of imagery and correct correlation of imagery and point cloud data to their respective trajectories and positions.

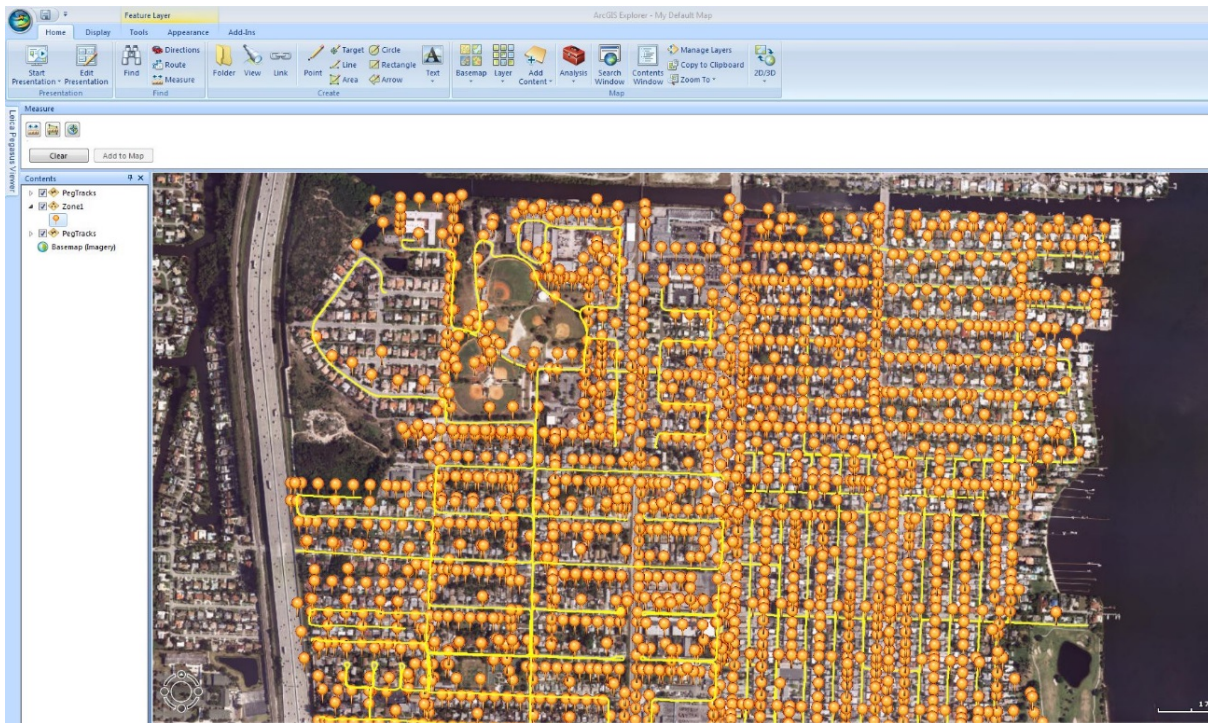
### Office Data Extraction:

Utility poles lying within the projects limits that were identifiable in the final point clouds and imagery were viewed using ArcGIS Explorer with Leica Pegasus Viewer Add-In, and attributes of the poles were populated using ArcMap Desktop 10.3.1. Still frame photos were retrieved from the Pegasus Viewer street view imagery of each individual pole and its attachments. The following steps detail the means by which attribute data was collected and stored in the geodatabase:

- Identify Pole Location/Owner:** The Lake Worth geodatabase was reviewed along with the field collected pole locations from the Leica Pegasus imagery. Pole locations as per WGI's field collection were correlated to the Lake Worth ESRI file geodatabase. It was determined that many Lake Worth owned poles have been removed, and many poles have since been constructed since the database was developed. Poles that no



longer exist were removed from the geodatabase. New poles as identified in WGI's field collection were added to the file geodatabase. Approximately 1,600 poles were removed, while approximately 240 poles were added.



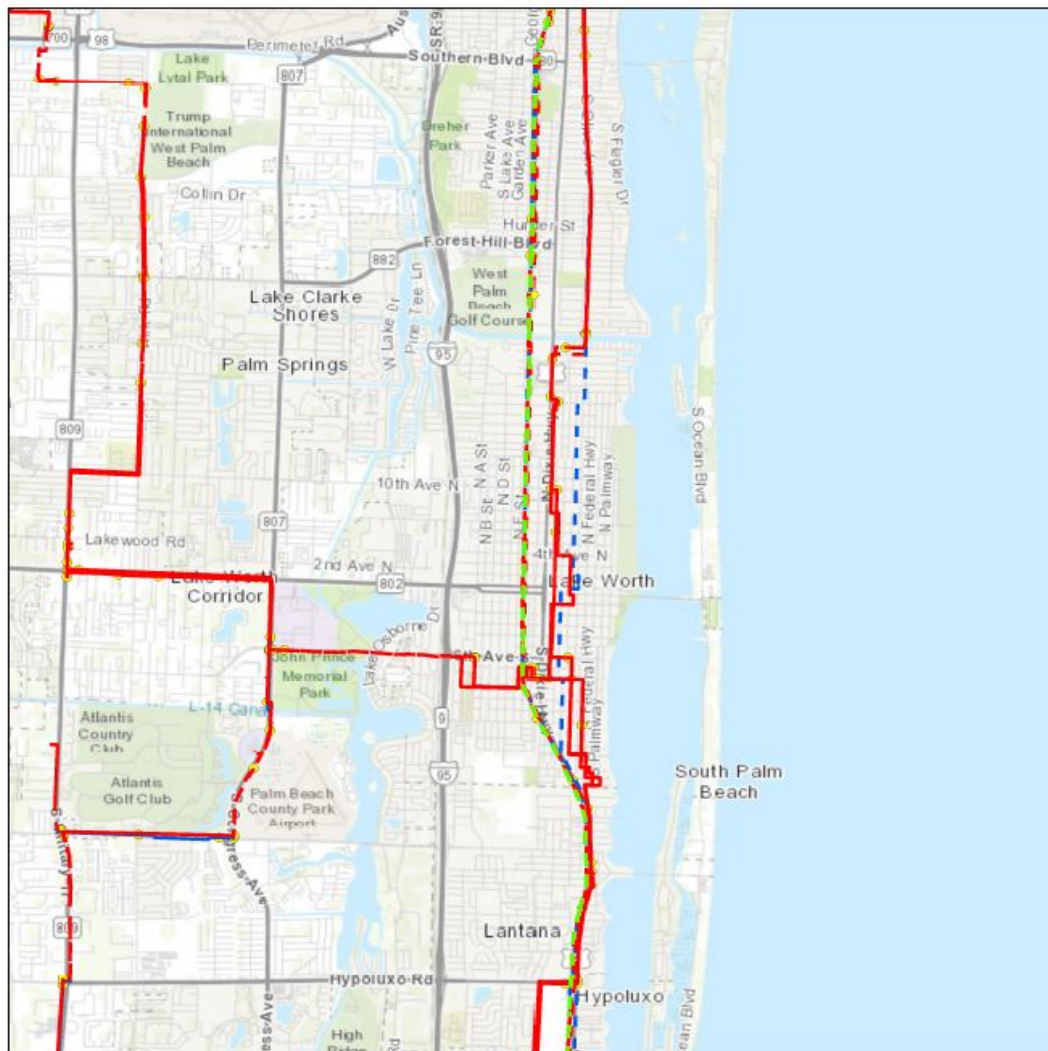
Zone 1 Tracks from Leica Pegasus Mobile Mapper (yellow lines) and Zone 1 shapefile of poles in ArcGIS Explorer.

- **Identify number/type of attachments:** Before populating of data attributes could begin in the file geodatabase, our utility staff briefed our GIS technicians on how specific attachments are determined. The photos below highlight some examples of cable television and telecommunications attachments. Clear direction was provided as to the difference between Lake Worth Electric Utilities facilities and the telecommunications/cable television attachments that were the focus of the project. Additionally, what constitutes a separate attachment was also a focus. In each of the examples below, three separate attachments are depicted.



- Identify Utility Agency Owners and respective attachments:** Review the UAO provided record information vis-a-vis field observations, photographs, and additional field evidence. Where UAO provided information was insufficient to make a determination, WGI coordinated directly with UAO representatives to confirm facility ownership. WGI did not receive response from Comcast and AT&T but their presence was field verified to be throughout the project limits. WGI received response from Level 3 and the markups provided were compared to what was determined in the field.

### CenturyLink and Level 3 Network



May 24, 2018

1:72,224

#### CTL National UG

— CTL National Owned Underground Routes

#### Level 3 Facilities

— Aerial

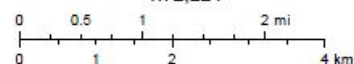
— Underground

#### Non Level 3 Facilities

— Aerial

— Underground

◆ Splice-Point



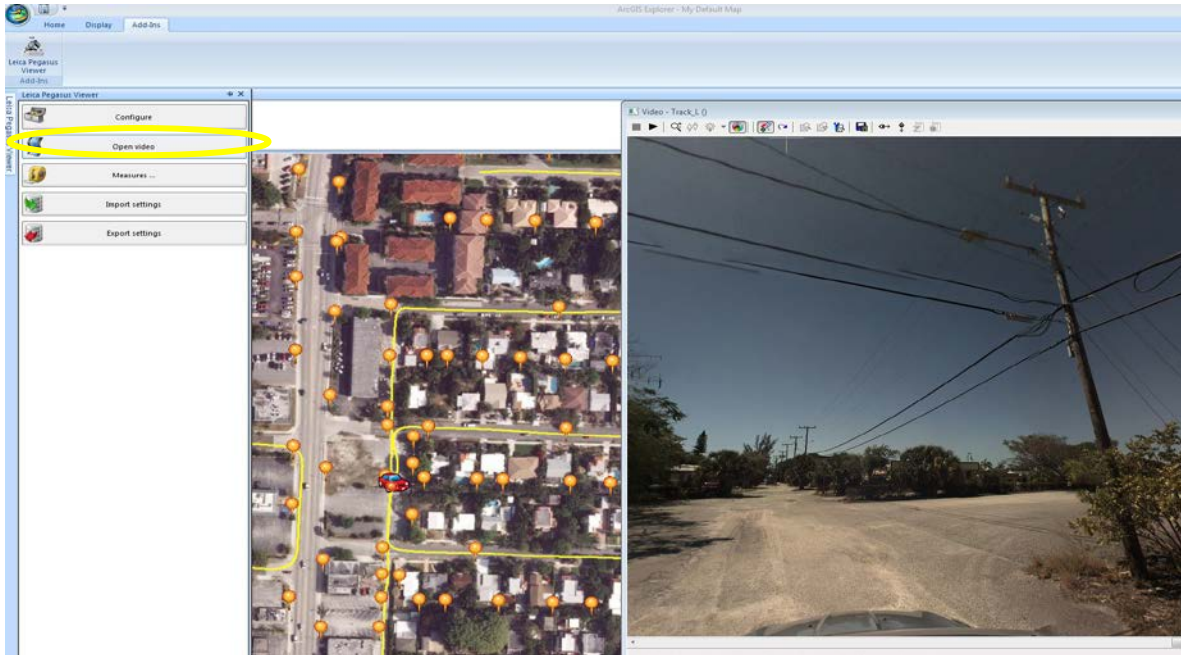
Level 3 Data is Highly Confidential and Proprietary.  
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, UGG, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

WGI received marked plans and utility distribution atlas from Level 3 Communications and Century Link. Century Link indicated that no aerial facilities were present in any collection zone, and they were not



included in field deployment. Level 3 Aerial lines (Red) were verified in the field by observing identification plates, drop shields, and other identifiers indicating ownership.

- **Extract digital photo of pole(s) and create separate folder of photos:**



Street view of Leica Pegasus imagery at corresponding pole from Zone 1 trajectory. ESRI ArcMap was used to review and obtain pole imagery at specific pole locations along each trajectory. The photo is extracted at its relative position along the TML collection trajectory, as depicted in the corresponding imagery on the right. Attachments are clearly identified and catalogued in the file geodatabase, and the photo is stored in a discrete and correlated location.

- ***Final QC in Office and Field visit obscured poles / identify additional field evidence:*** Upon initial extraction of all poles collected during the initial TML deployment, it was determined that approximately 200 poles per zone were obscured in the collection or inaccessible. Reasonable effort was made to coordinate with private property owners to secure access where poles are placed in controlled access (fences, yards, gated communities, and the like). Once areas of TML obscurity were determined, field crews were deployed with Google Earth KMZ files per zone of each missing pole, the accurate location, and the corresponding pole ID number in GIS. Attributes and photos were collected of each pole and provided to technicians to attribute in the file geodatabase. Once all poles were visited, pole locations were back checked against the Lake Worth file geodatabase, UAO provided record information, imagery, and confirmed attachments pre the field investigation.

Constant utility coordination was made with the UAO's throughout the project cycle. AT&T, Comcast and Level 3 were verified to be within the project limits. Responses were received from Crown Castle, but their presence in Lake Worth was beyond the limits of this project. Field verification of Level 3 areas from the received markups was the final step of the QC process. Fiber optic markers were examined and most Level 3 locations were confirmed, but many of their marked Aerial areas were not accurate in the field.

## **Deliverables**

One merged geodatabase of all collection zones, a corresponding Microsoft Excel spreadsheet detailing the pole ID, and attachment attributes from the geodatabase, and a corresponding folder of photos divided by zone.

## **Summary:**

WGI's final Lake Worth Pole Inventory geodatabase reflected 10,211 existing poles, 235 new poles added to the Lake Worth Database, 1,617 poles no longer present to be removed and 50 poles that were not accessible/obscured after field visits (in restricted areas, obscured by trees). **WGI's investigation yielded a 99.6% inclusion rate for all poles in the Lake Worth Electric Utility Network.** The poles that could not be confirmed after field visits are attributed as N (No) in the 'Visited' field in the final file geodatabase. The final number of utility poles present in the City of Lake Worth is 12,113 poles. AT&T has confirmed presence on 5,955 City of Lake Worth utility poles, with 6,494 total attachments. Comcast has confirmed presence on 7,213 City of Lake Worth utility poles, with 7,479 total attachments. Level 3 has confirmed presence on 448 City of Lake Worth utility poles, with 448 total attachments.

## **Issues and Concerns:**

Due to lack of response from several UAO's (Fiberlight, Strome Networks, Windstream, MCI, Century Link, Sprint, Lake Clark Shores, Hotwire), utility poles predetermined to have certain attachments in different zones are not reflected in the geodatabase. Most of these areas have poles with multiple attachments, but ownership could not be determined accurately. Locations of poles with 3 or more attachments were field visited with the intent of finding new UAO attachments. However, due to the amount of poles within the limits and no UAO markups, these could not be verified with complete certainty. Some of the aforementioned UAO's may also be potential leasees of Comcast, AT&T and/or Level 3, but this also cannot be confirmed.

In the provided City of Lake Worth geodatabase, approximately 216 utility poles are shown as not Lake Worth owned. WGI did not confirm the status of utility poles not owned by the City of Lake Worth.

## **Certification:**

(1) This survey meets all applicable requirements of the Florida Standards of Practice as contained in Chapter 5J-17 of Florida's Administrative Code, pursuant to section 472.027 of the Florida Statutes. (2) This report is not valid without the signature and the original raised seal of the Florida Surveyor and Mapper in responsible charge. (3) Additions or deletions to this data by anyone other than the signing party are prohibited without written consent of the signing party. (4) This report stands together with the digital submittal for FPID 435546-1-32-01, digitally signed and sealed under rule 5J-17.0062 FAC, and neither is complete or valid without the other. (5) Quality Control (QC) was conducted on this project and found to meet specifications.

Professional Surveyor and Mapper in Responsible Charge:

**Samuel T. Hall**

**Florida Professional Surveyor and Mapper**

**License Number 6644**

For the Firm of:

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