2013 Esri International User Conference
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Mapping Electrical Panels and Capacity

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TOBYHANNA ARMY DEPOT

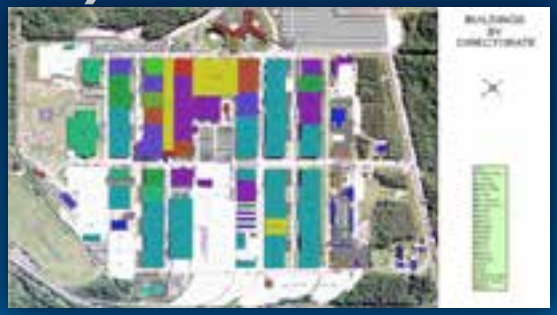
Excellence in Electronics

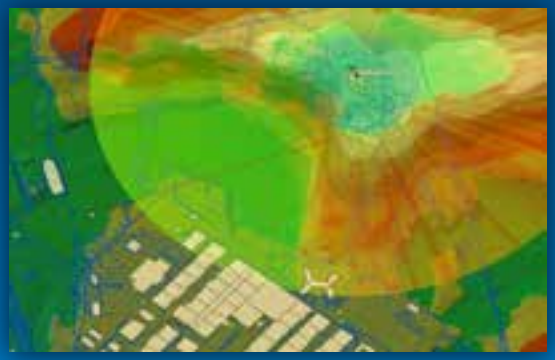
Dewberry

CTC Concurrent Technologies Corporation

"Providing World-Class Services for World-Class Competitiveness"

Tobyhanna Army Depot
History (60 years this year)





Brief History of Tobyhanna Army Depot

- The Army first used the Tobyhanna site as an artillery training camp in 1912.
- It was used as a training camp for recruits from Yale (artillery training), West Point Cadets, a temporary shelter facility for the homeless during the great depression, and later for anti-aircraft artillery training during WWII, a storage and support facility, ambulance training, POW camp (briefly) and finally – Signal Depot.
- Today Tobyhanna Army Depot's mission is total sustainment – design, manufacture, repair and overhaul, of hundreds of electronic systems including electro-optics, radio and radar systems, night vision and anti-intrusion devices, airborne surveillance equipment, navigational instruments, navigational instruments…, and is DOD's recognized leader in automated test equipment, systems integration and downsizing of electronics systems. *

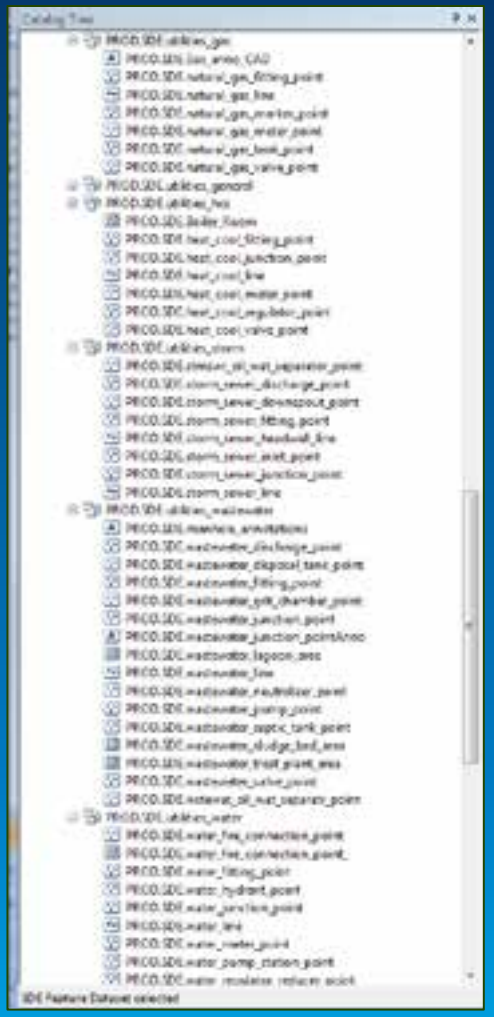
Tobyhanna is the largest Full Service Electronics Depot in DOD

GIS at Tobyhanna – since 1997

SPATIAL DATA STANDARDS FOR
FACILITIES INFRASTRUCTURE AND THE ENVIRONMENT

SDSFIE Compliance

- Buildings
- **Roads**
- Sidewalks
- **Fence Lines**
- Interior Rooms
- **Personnel Doors**
- Cargo Doors
- **Fire Extinguishers**
- AED's
- **Evacuation Routes**
- Curbs
- **Duct Bank Lines**
- Emergency Exits
- **Eye Wash Locations**
- Concrete Slabs
- Wetlands
- **Streams**
- Lakes
- **Guard Rails**
- Parking Lots
- Fire Hydrants
- Driveways

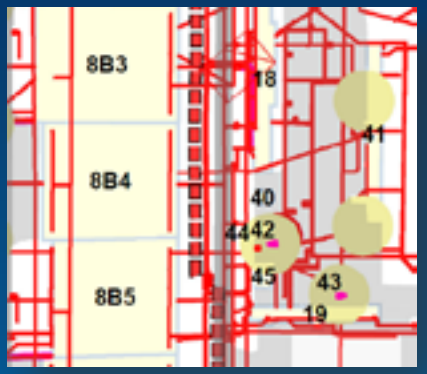


List of layers for Utility data sets

Electric Systems

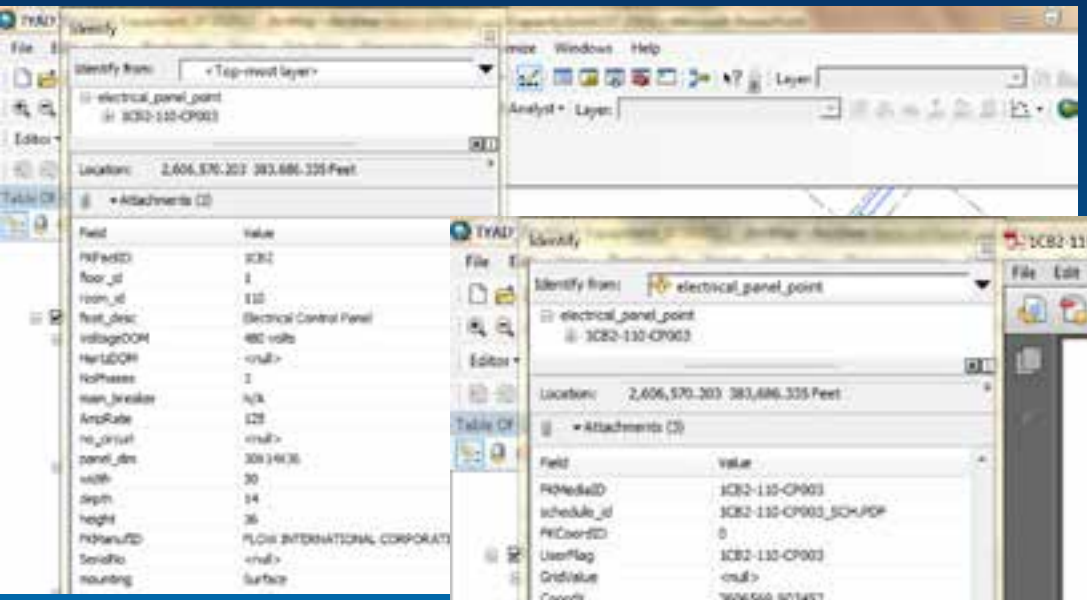
What information did we start with?

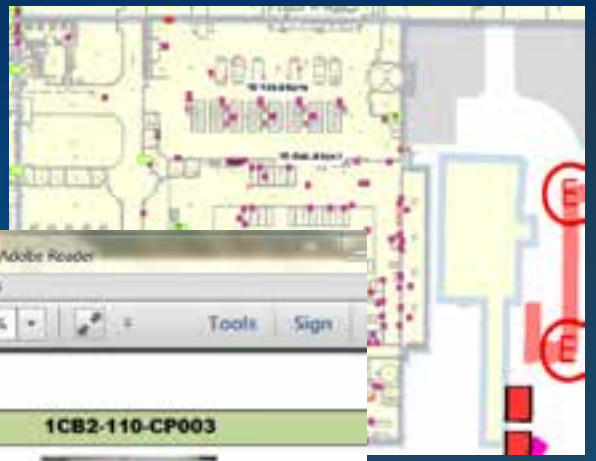
- Transformers
- Substations
- Underground and above-ground (exterior) lines and (some) associated data for specific (more recent) projects.
  - The GIS data stopped at the building walls.
  - The rest was in years and years of historic and archived files, upon which hundreds of projects had been developed within the buildings by our primary tenant – AMC. These (mainly) industrial engineers had for years been pulling new equipment, new electric lines and very complex circuitry throughout the very complex building interiors –
  - What were once warehouses – now are industrial workspaces, customized, specialized, and undocumented.

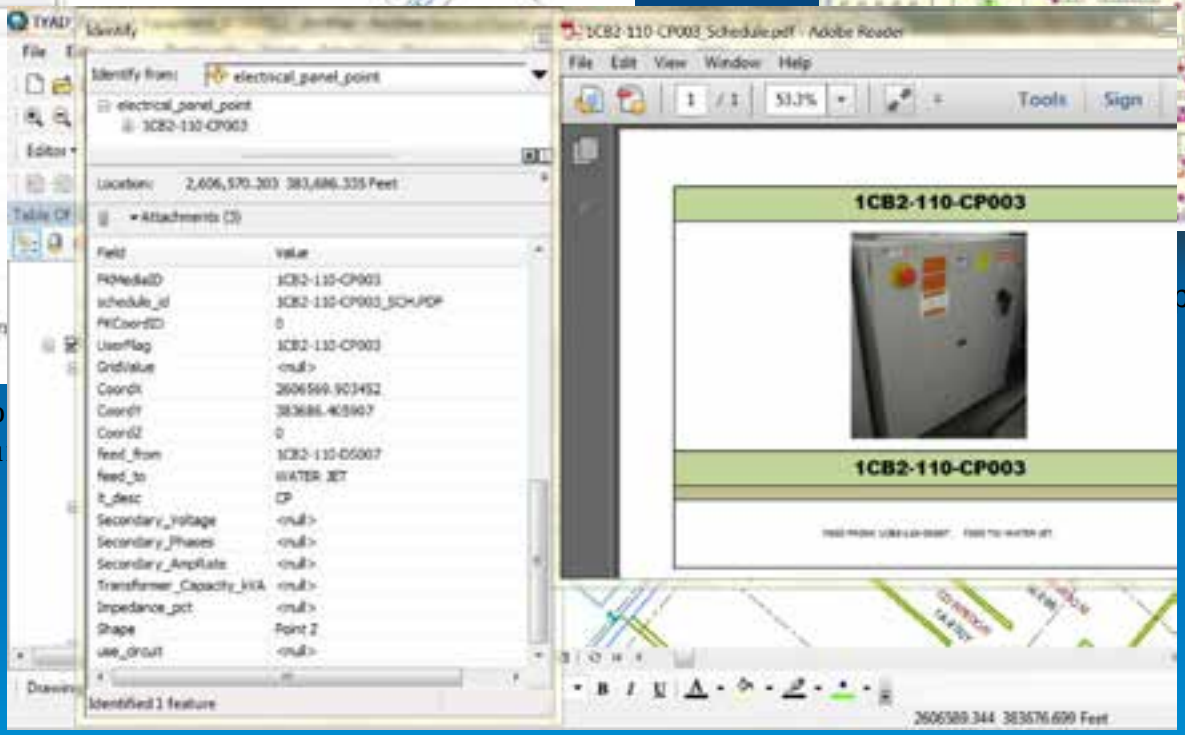


ØLots of data
ØSome incorrect
ØLots missing *(data)*
ØPiles of project-specific, archived CAD files.
ØLots of missing *(CAD files)*

Examples of Electrical Data







Basemapped exterio
manholes, above grou

pacity Planning

Data includes amperage, voltage, attachments to what equipment And full panel is included as attachment.

OUTLINE

- Electric Utilities Data Collection
- Need a Better Way
- New Solution – Mobile
- Application Review
- Data Management
- Data Delivery
- Report Creation
- Communications

Electric Utilities Data Collection

- Where
  - Tobyhanna Army Depot
  - Industrial Complex
  - Challenging Indoor Environment

Electric Utilities Data Collection

- How
  - Personnel
    - GIS Analysts
    - Electricians
  - Paper forms and printed CAD maps
  - Data manually keyed in the office
  - Management Nightmare
    - Electrical Equipment Location Maps
    - Location Dimension Marking Maps
    - Data Collection Forms

=

Need a Better Way

- Improving efficiencies – save Govt $$
- Requirements
  - No GPS
  - Disconnected Editing
  - Mobile
  - Long battery life
  - Prefer Touch Screen over stylus

New Solution – Mobile

- Windows Mobile
  - Pros: Easy to use, out-of-the-box
  - Cons: Windows OS, short battery life
- Android
  - Pros: Flexibility, Open Platform, ease of app publishing, Low Cost, good battery life
  - Cons: development required
- iOS
  - Pros: good battery life
  - Cons: development required, Closed Platform, hurdles to app publishing

Hardware

- Support 8-hour workday
  - Long battery life
  - Light-weight
- User-friendly (electricians)
- Durability

ASUS Android

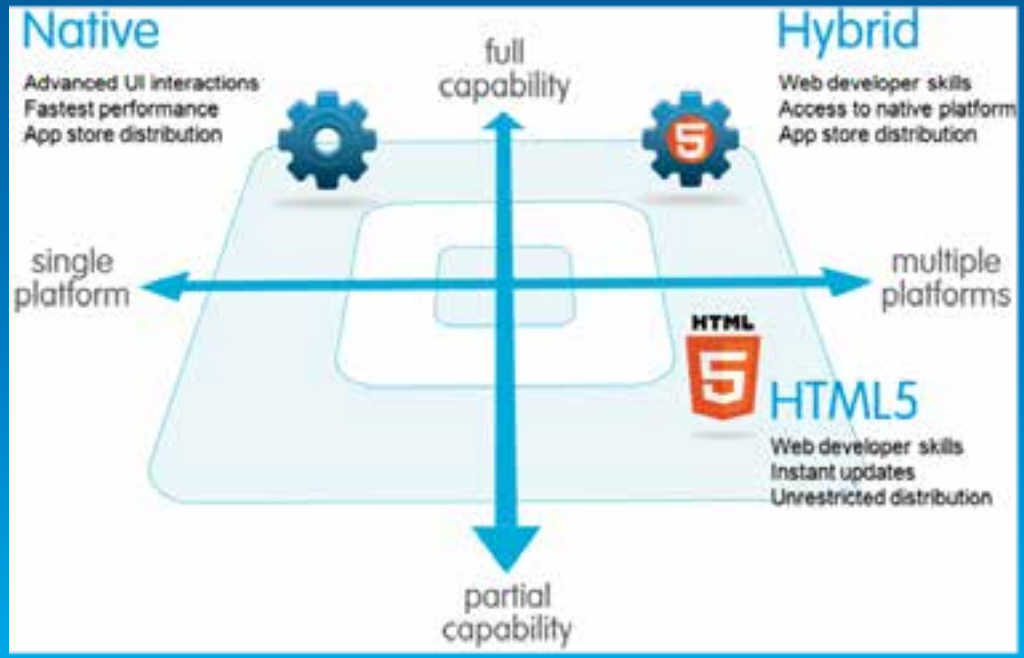
iPAD

Trimble Yuma

Panasonic Tough book

Native App vs. Hybrid App

- Native App
  - Assembled computer program that is OS specific
  - Fast performance
  - Examples: PowerPoint, Angry Birds.
- Hybrid App
  - HTML-based app
  - Cross-platform



Development Environment

- Esri Software Development Kit (SDK)
- Android OS
- JAVA programming Language
- SDSFIE Specifications required
- Camera Capabilities

- Requirements:
  - Disconnected editing
  - Photo integration
  - Esri platform (client is Esri shop)
  - Attachment storage

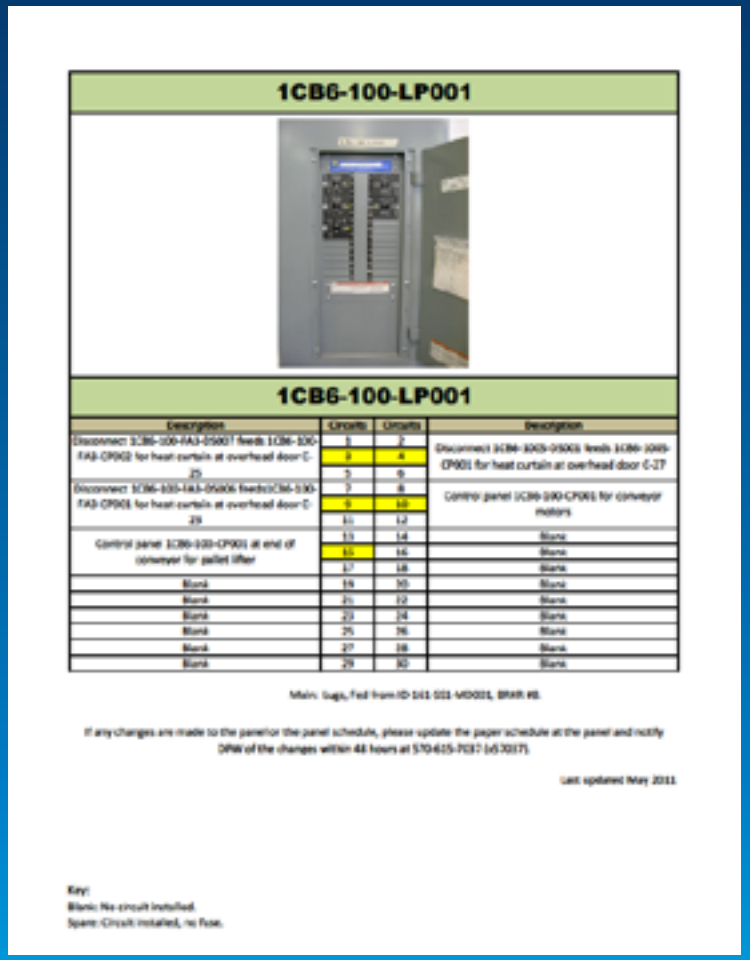
Esri Android SDK

- Esri designed the SDK to use web services available from ArcGIS for Server and ArcGIS Online. Users of the platform can access dynamic, tiled, and image map services; overlay graphics; search and identify features; locate addresses; collect and update data; and perform GIS analysis. Developers and Esri partners can also use the SDK to create custom mapping applications for both internal and external use. ArcGIS Runtime SDK for Android is delivered via an Eclipse plug-in and contains

  - Native Java libraries
  - Integrated documentation, sample applications, and templates
  - Conceptual and reference guide help
  - Community resources including code galleries, forums, and blogs

Report Creation

Electrical Panel Schedules are Generated from the Circuit Tracing Related Table



1CB6-100-LP001

1CB6-100-LP001

Description	Circuits	Circuits	Description
Disconnect 1CB6-100-FA3-01007 feeds 1CB6-100-FA3-CP002 for heat curtain at overhead door C-23	1	2	Disconnect 1CB6-1003-01003 feeds 1CB6-1003-CP001 for heat curtain at overhead door C-27
	3	4	
	5	6	
Disconnect 1CB6-103-FA3-05006 feeds1CB6-100-FA3-CP001 for heat curtain at overhead door C-29	7	8	Control panel 1CB6-100-CP001 for conveyor motors
	9	10	
	11	12	
Control panel 1CB6-103-CP001 at end of conveyor for pallet lifter	13	14	Blank
	15	16	Blank
	17	18	Blank
Blank	19	20	Blank
Blank	21	22	Blank
Blank	23	24	Blank
Blank	25	26	Blank
Blank	27	28	Blank
Blank	29	30	Blank

Main: Lugs, Fed from ID 161 101 MD001, BRKR #8.

If any changes are made to the panel or the panel schedule, please update the paper schedule at the panel and notify DPW of the changes within 48 hours at 570-615-7037 (x57037).

Last updated May 2011

Key:
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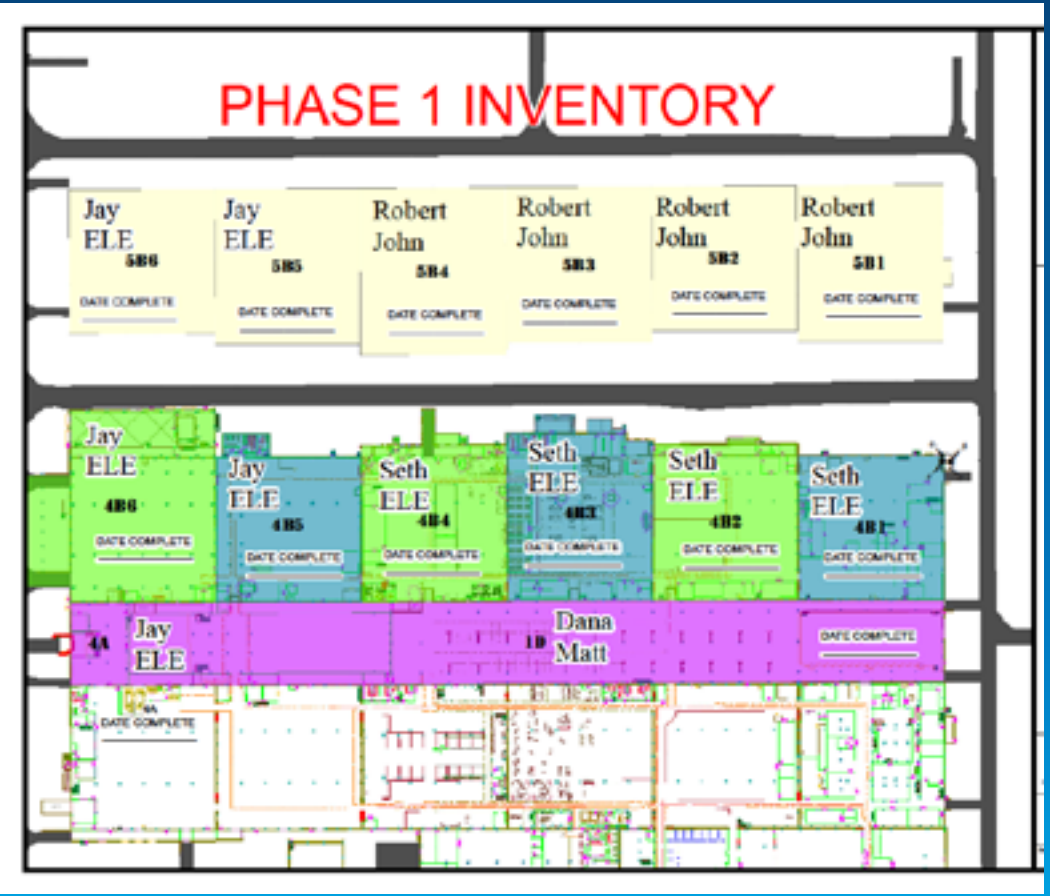
Spare: Circuit installed, no fuse.

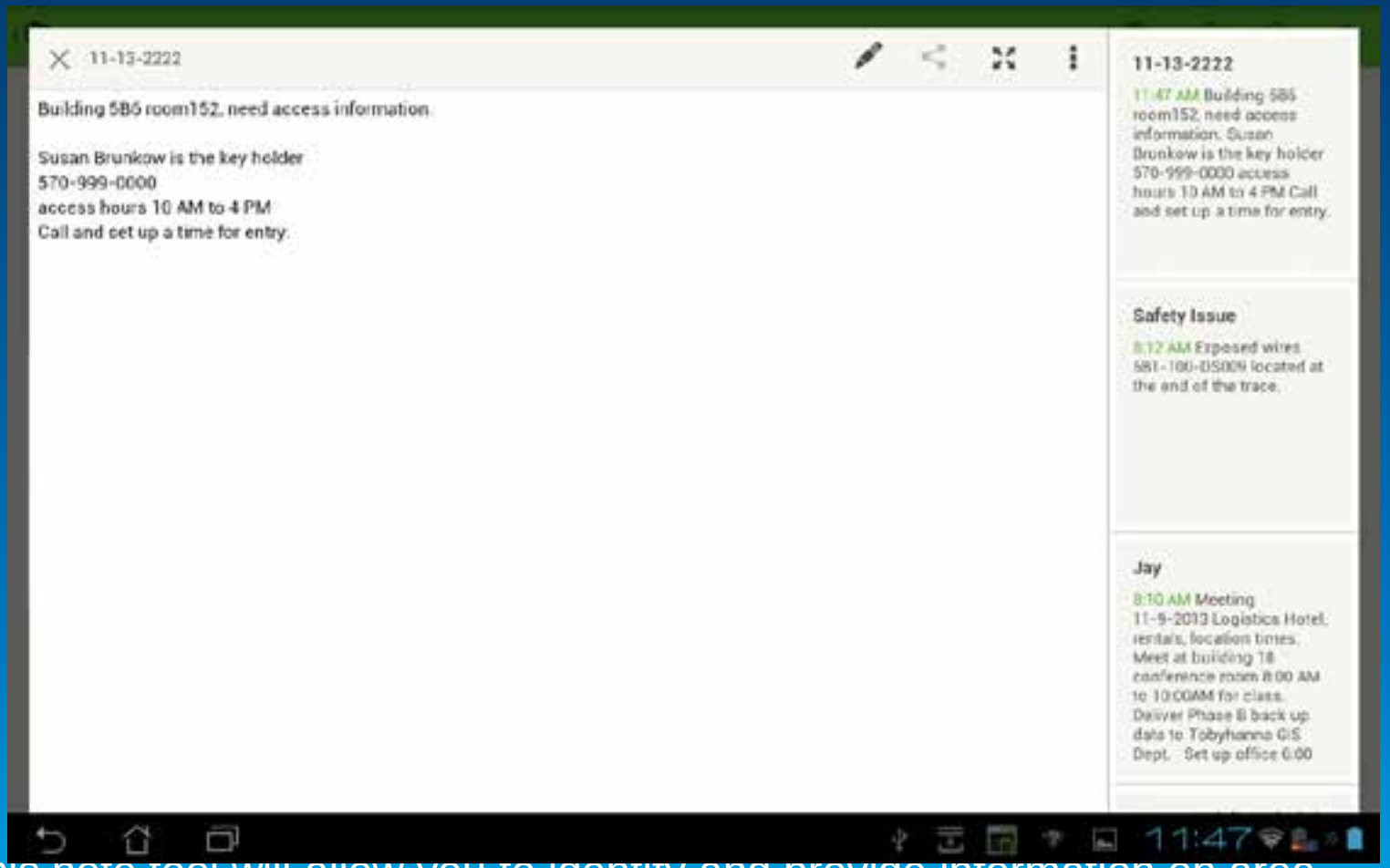
Electric Utilities Data Collection

- How
  - Organization Of Data Collection



Communication

- Evernote

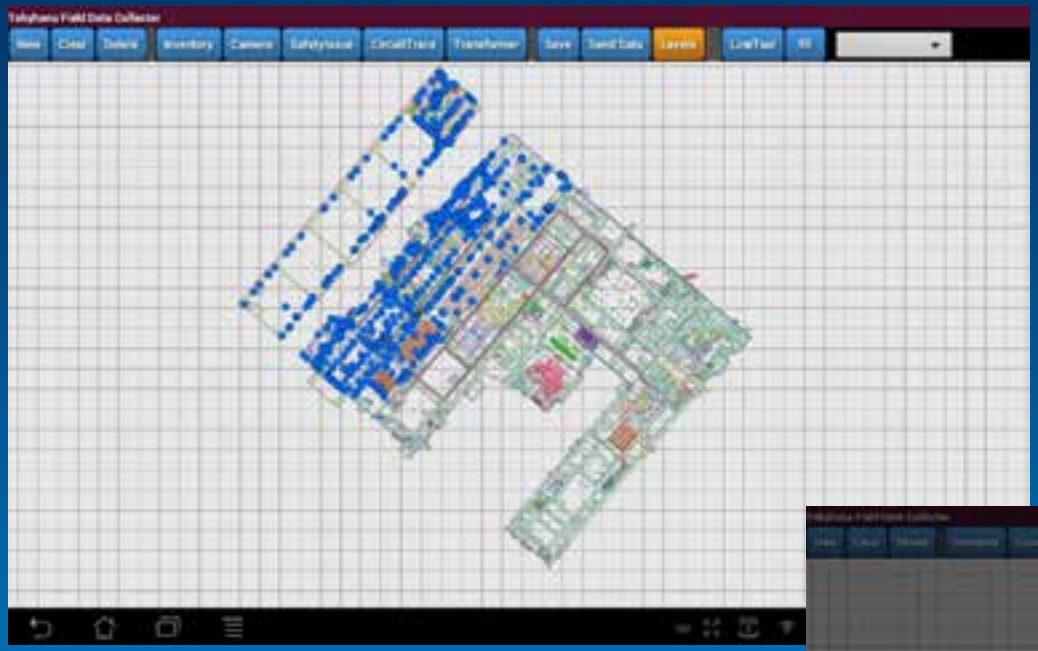


This note tool will allow you to identify and provide information on area locations of issues that need to be followed up on.

Base maps – CAD conversion

- Indoor Infrastructure as reference for data collection
- Converted CAD to shape file, built mobile cache

Application Review - Demo/slide captures



This is the Field Data Collector interface

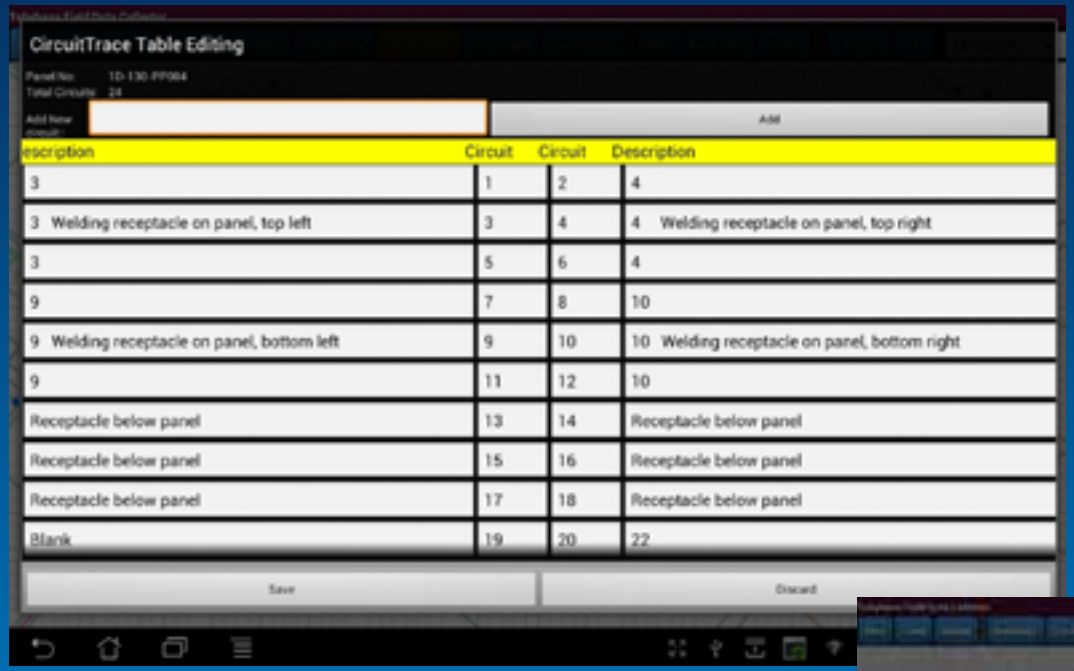
Layer Visibility
Used to turn layers on and off.

Application Review - Demo/slide captures

Inventory Data Collection

Photo Collection Tool

Application Review - Demo/slide captures



Circuit Tracing Editing

Circuit Single Trace Editing

Application Review - Demo/slide captures

Transformer Table Editing

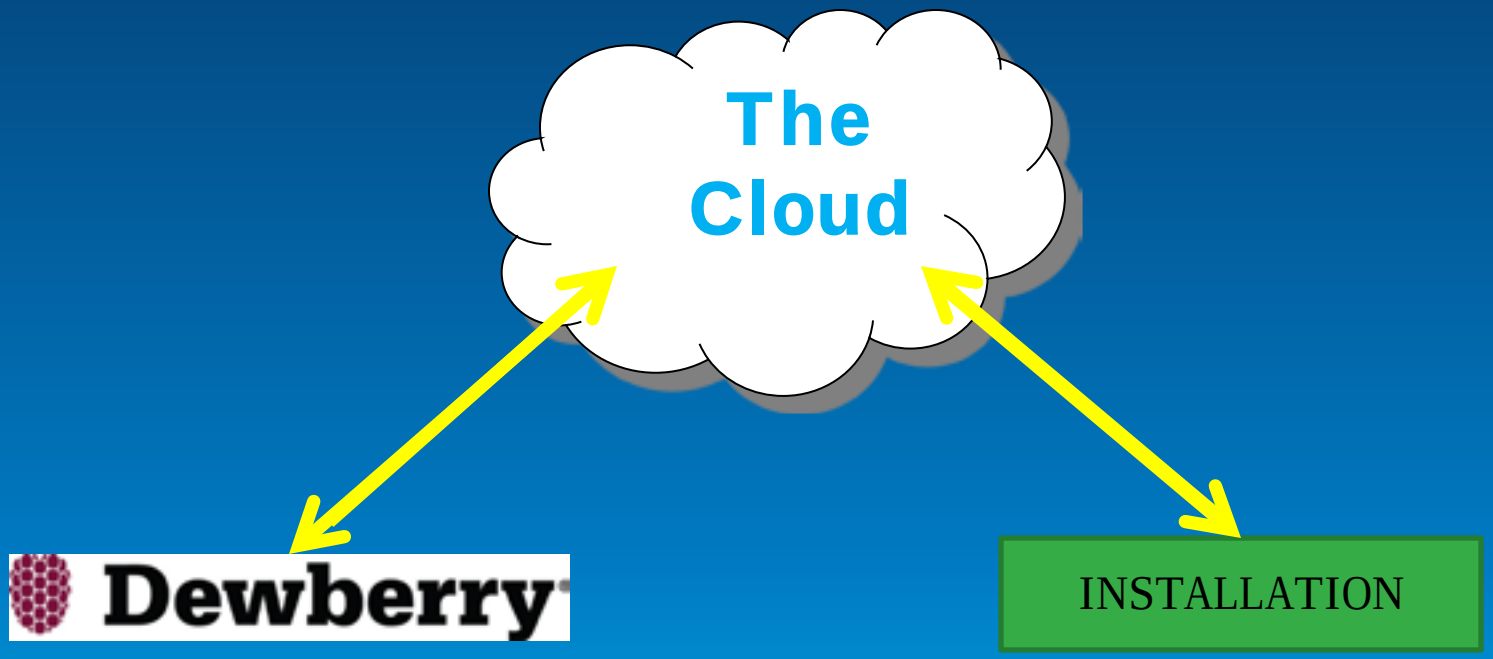
Safety Issue Table Editing

Training

- Training was prepared and presented to the Electricians.

Data Management

- Disconnected work – synchronizing



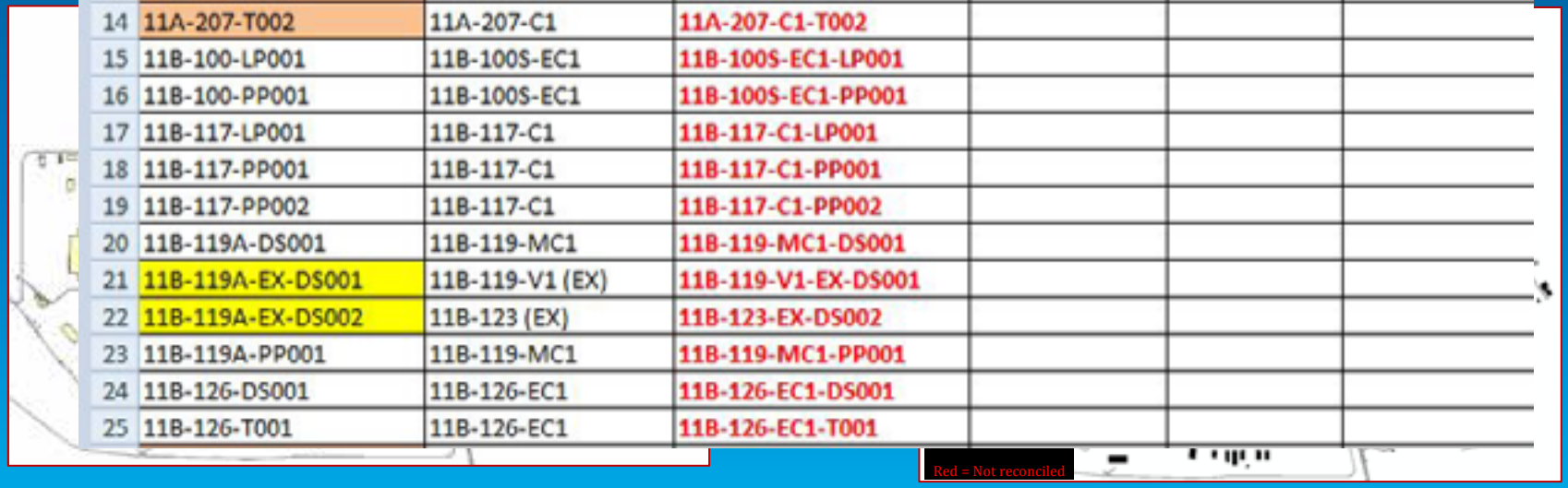
Data Management

- Photo Management
  - Photos taken and stored in folder
  - Attached in SDE Attachments with Panel Schedule
  - Not automated
- **Data import QA/QC**
  - **Database files created**
  - **File GeoDatabase created (Staging Database)**
  - **QA/QC conducted**
  - **Staging Database synchronized with SDE Database for Final Delivery**

QA/QC process

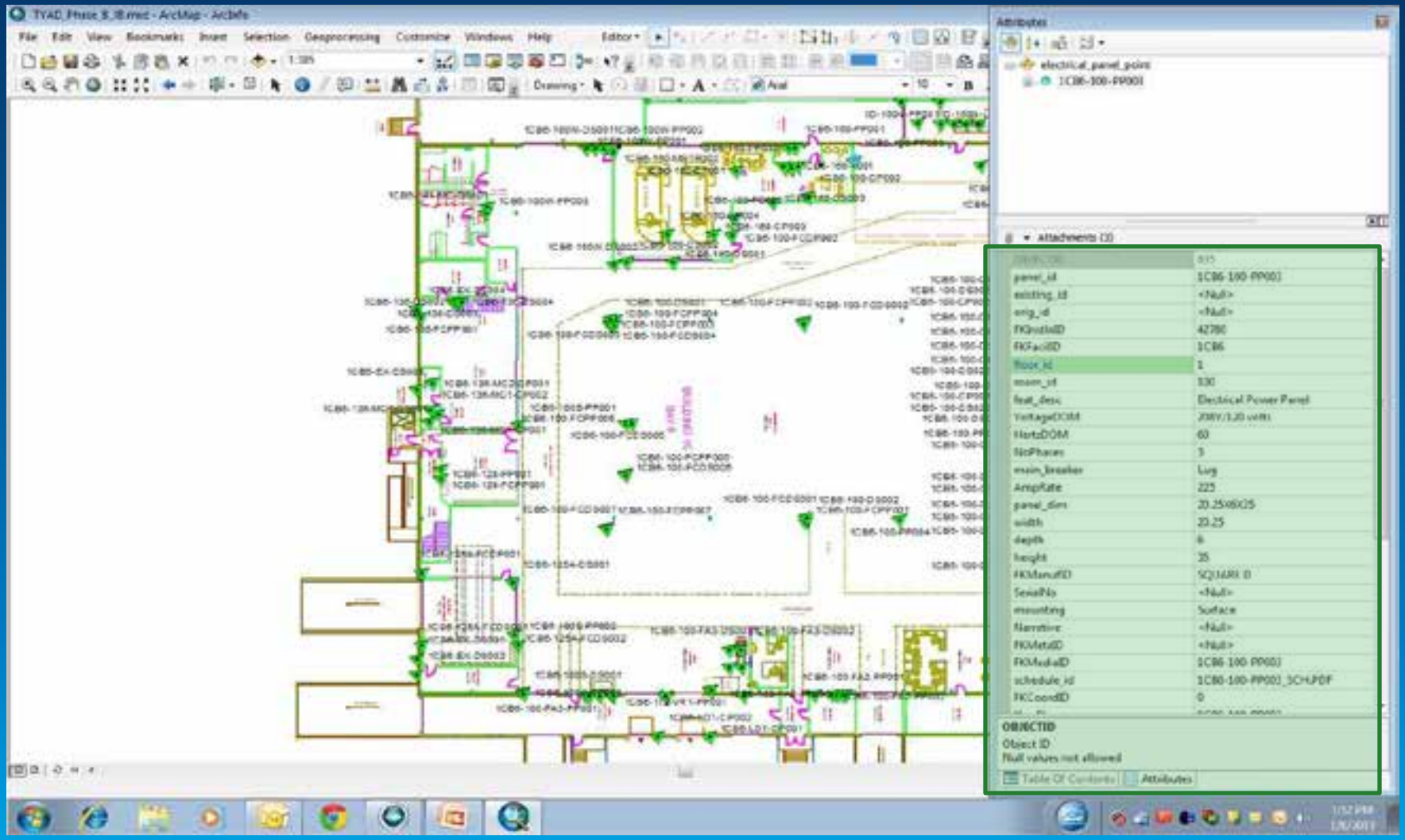
Dewberry Phase B QC of Panel IDs(COPY)

	A	B	C	D	E	
1	CURRENT PANEL #	CURRENT RM #	Actual New Number	Correction Made	Data Base Corr	Comments
2	11A-110-PP001	11A-120A	11A-120A-PP001			
3	11A-120NW-HP001	11A-100CN	11A-100CN-HP001			
4	11A-120NW-HP002	11A-100NW	11A-100NW-HP002			
5	11A-120NW-PP001	11A-100NW	11A-100NW-PP001			
6	11A-120NW-PP002	11A-100NW	11A-100NW-PP002			
7	11A-207-DS001	11A-207-C1	11A-207-C1-DS001			
8	11A-207-DS002	11A-207-C1	11A-207-C1-DS002			
9	11A-207-DS003	11A-207-C1	11A-207-C1-DS003			
10	11A-207-DS004	11A-207-C1	11A-207-C1-DS004			
11	11A-207-DS005	11A-207-C1	11A-207-C1-DS005			
12	11A-207-PP001	11A-207-C1	11A-207-C1-PP001			
13	11A-207-T001	11A-207-C1	11A-207-C1-T001			
14	11A-207-T002	11A-207-C1	11A-207-C1-T002			
15	11B-100-LP001	11B-100S-EC1	11B-100S-EC1-LP001			
16	11B-100-PP001	11B-100S-EC1	11B-100S-EC1-PP001			
17	11B-117-LP001	11B-117-C1	11B-117-C1-LP001			
18	11B-117-PP001	11B-117-C1	11B-117-C1-PP001			
19	11B-117-PP002	11B-117-C1	11B-117-C1-PP002			
20	11B-119A-DS001	11B-119-MC1	11B-119-MC1-DS001			
21	11B-119A-EX-DS001	11B-119-V1 (EX)	11B-119-V1-EX-DS001			
22	11B-119A-EX-DS002	11B-123 (EX)	11B-123-EX-DS002			
23	11B-119A-PP001	11B-119-MC1	11B-119-MC1-PP001			
24	11B-126-DS001	11B-126-EC1	11B-126-EC1-DS001			
25	11B-126-T001	11B-126-EC1	11B-126-EC1-T001			



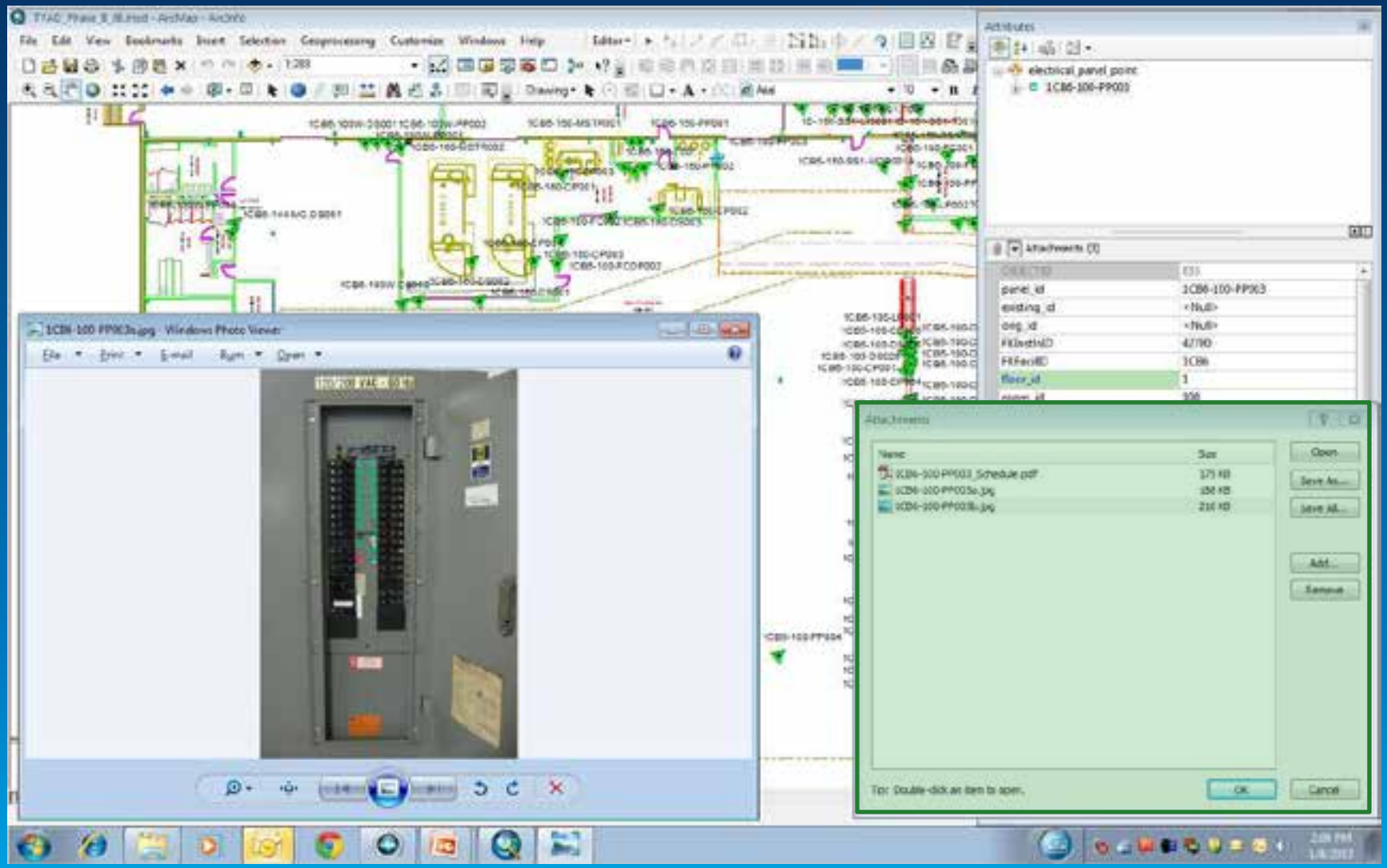
Red = Not reconciled

Data Delivery



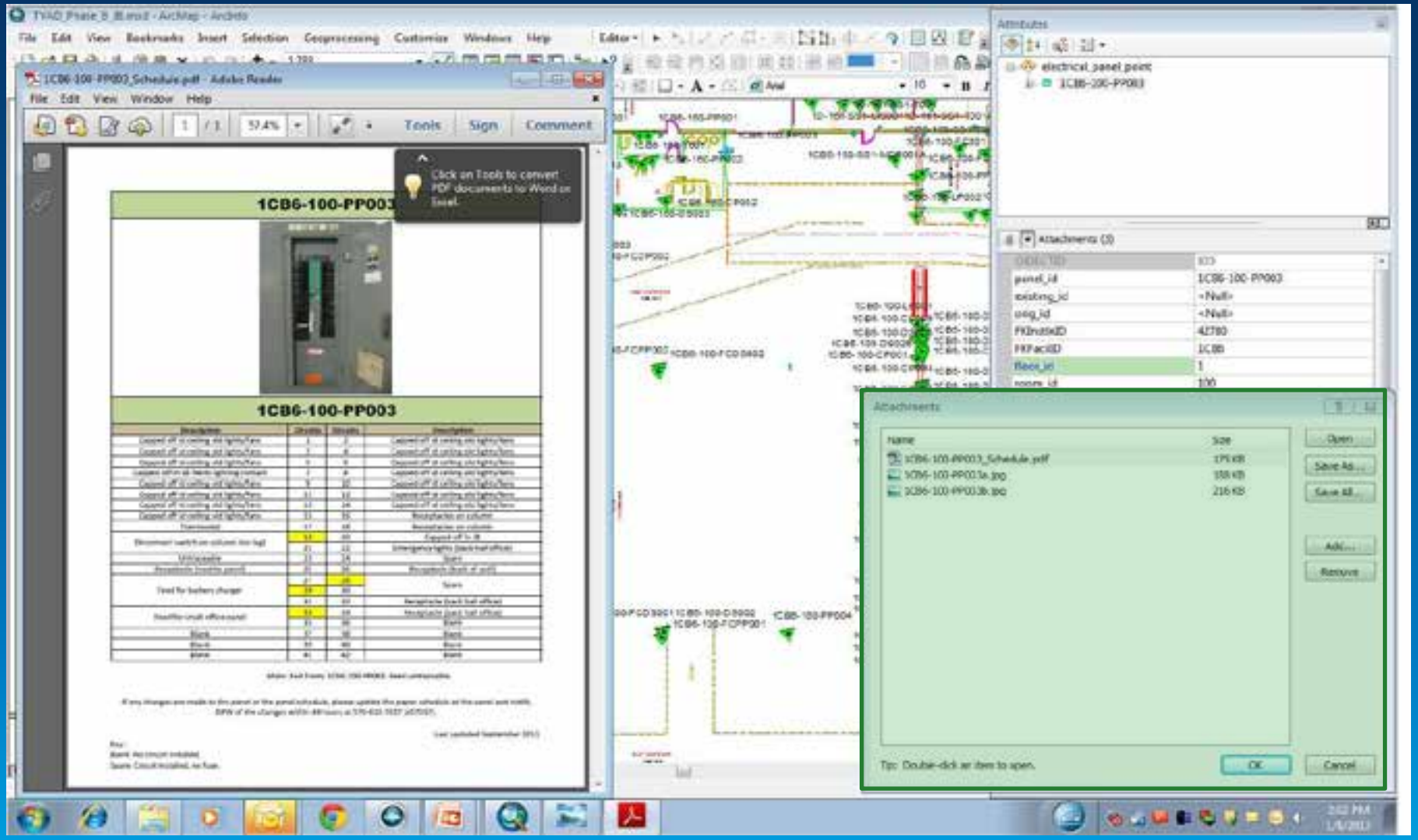
Attributes

Data Delivery



Attachments include Photos

Data Delivery



Attachments include Panel Schedule

Report Creation

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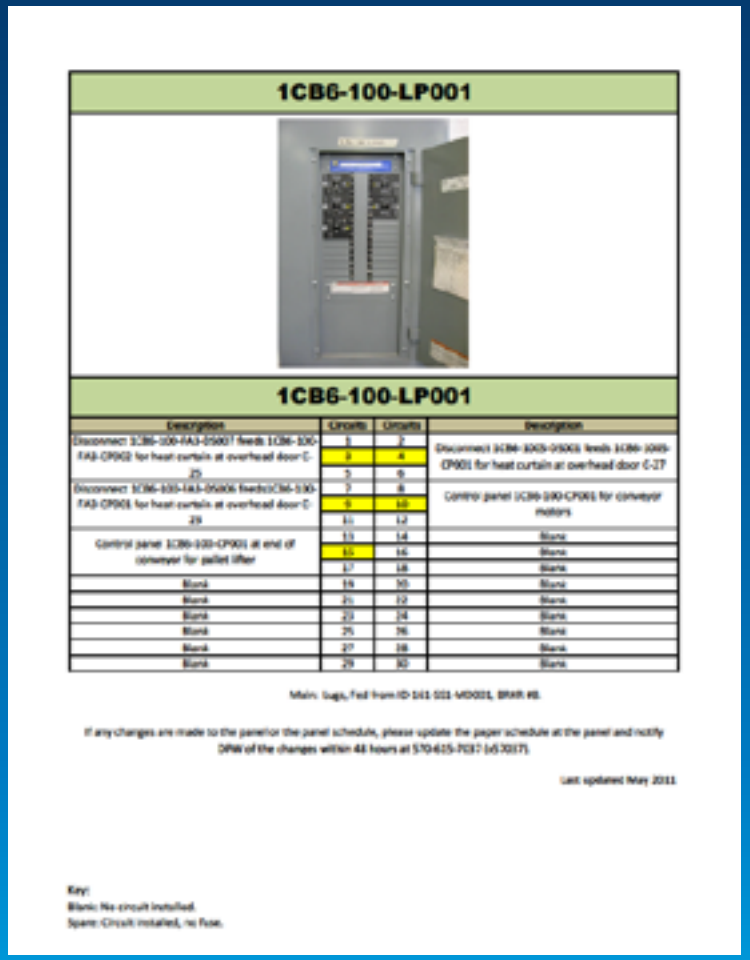

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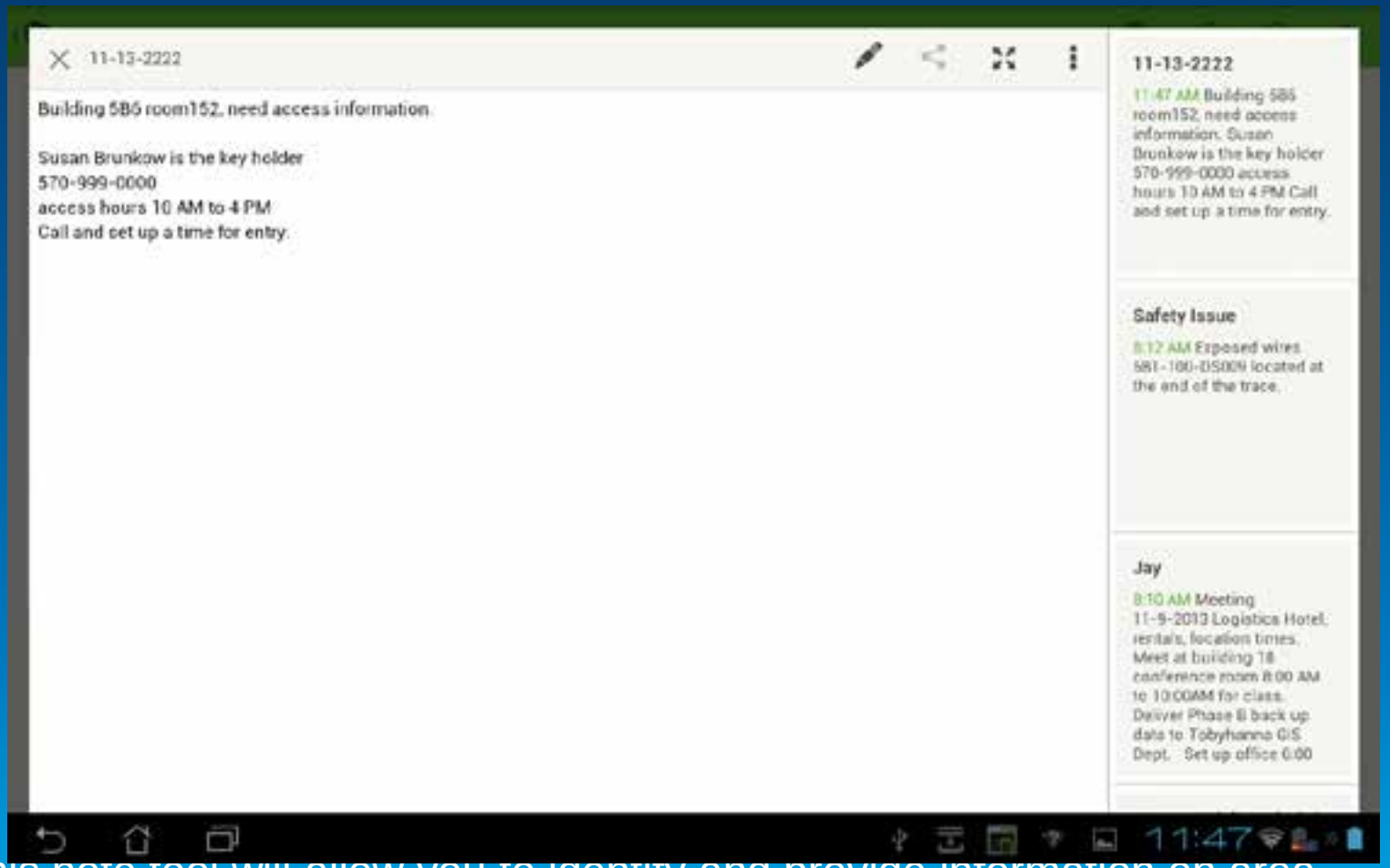

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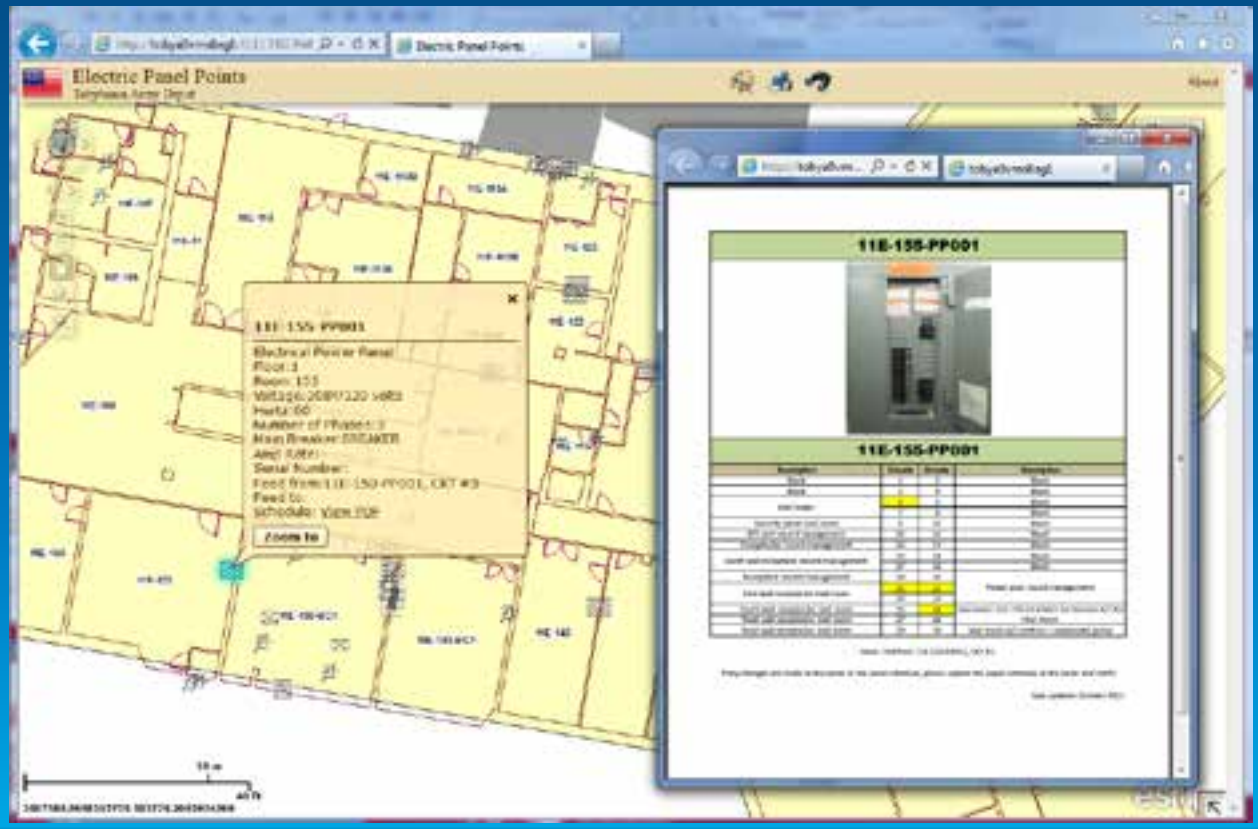
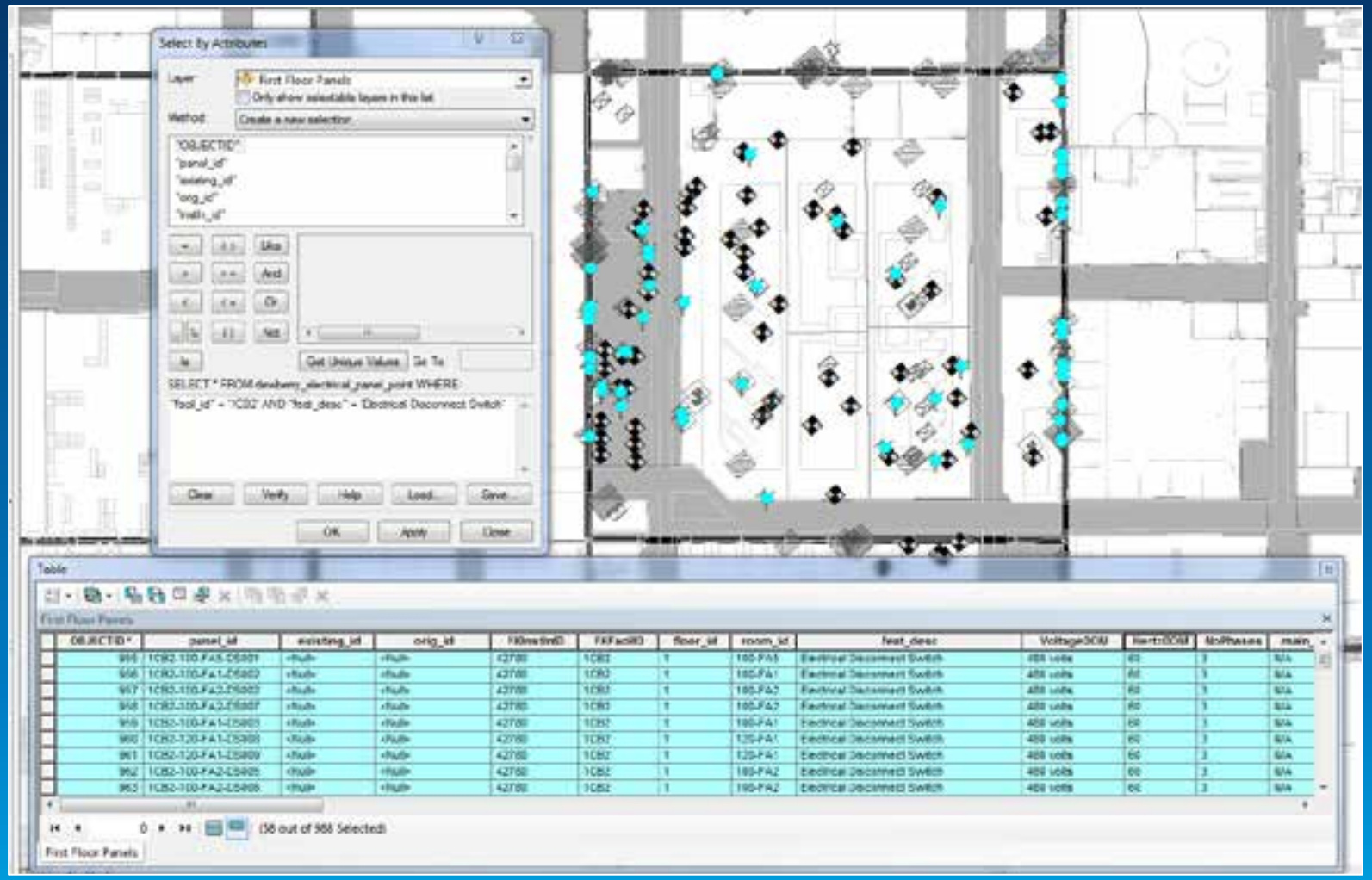
Map Application

- Web based via Intranet; does not require any GIS software to be installed individual machines.
- User-friendly controls and interface.
- Allow users to make notes/mark-ups and then print their own maps.

ØELECTRICAL PANELS



GIS Attribute Query



How many electrical disconnect switches are in Building 1CB2?

Answer: 58

Dewberry Contacts

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  - Kathleen Cullinane Searfoss – Installation IGI&S Manager
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  - Jason Hollister – Assistant GIS Developer
    - jason.b.hollister.ctr@mail.mil x5-6986
  - Ethan Harner – CAD/GIS Technician
    - ethan.d.harner.ctr@mail.mil x5-9578

- Technologies Used
  - ArcGIS Mobile for Android (SDK)
  - ESRI GIS software
  - AutoCAD
  - SQL Server
  - Adobe Flex Viewer