MOBILE MAPPING

GeoSmart Asia – Locate 18

ESP Associates, P.A.

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ABOUT ESP

- Founded in 1986 (28 Years of Experience with DOT's)
- ESP has 14 offices throughout the US
- 37 States, Canada, and Australia
- 400 employees
- ENR 500 (#299)
- Began Mobile Mapping in 2010

MOBILE LIDAR / ASSET MGT.

- Improve efficiency by capturing the most possible data at traffic speeds in a single pass
- Fully synched and georeference the data from multiple sensors
- Capture data that is relevant for GIS and Survey applications
- Extract intelligent information by automated means to the fullest extent possible
- Efficiently manage terabytes of data
  – Get it to a level that the client is comfortable
- Value Added Data – Collect Once use Many
- Safe Work Zone – NO ONE IN THE ROADWAY!

TRIMBLE MX 2, MX 7 AND MX 8 SYSTEMS

TRIMBLE MX 8 MOBILE SYSTEM

MX 8 SYSTEM

Trimble MX8 Components

- 2 - VQ 250 Lasers
- 6 – 5 megapixel cameras
- 1 - Applanix POS LV420 IMU
- 2 – Trimble GNSS GPS Receivers
- 1 – DMI unit

MX 8 SYSTEM

RIEGL VMX-1HA

RIEGL VMX-1HA

- Riegl VMX-1HA
- Applanix POS LV 610 Inertial Measurement System (IMU)
- 2 Riegl VUX-1HA lasers 1 million points per sec X 2 (2,000,000/sec)
- 4 Riegl 5mp cameras
- 1 Flir Ladybug 5 30 mp camera
- 1 Nikon D-800 36 mp DSLR (High Res Photos)

MX 8 SYSTEM UPGRADES

Trimble MX8 Upgrades

- Detachable Hy-Rail system
- Dalsa Spyder Pavement Imaging Camera
- High Intensity Light Bar
- IR Illuminator
- Ladybug5

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MOBILE LIDAR / ASSET MGT.

Data Asset Extraction

- Sign / Pole Inventory
- Infrastructure Inventory
- Bridge Clearances
- Lane Markings
- Walls
- Bulkheads
- Utility lines
- Oblique LiDAR and Photo

Pavement DTM Details

Hydroplane Detection

Roadway Cross Sections

Asbuilt – Existing Condition

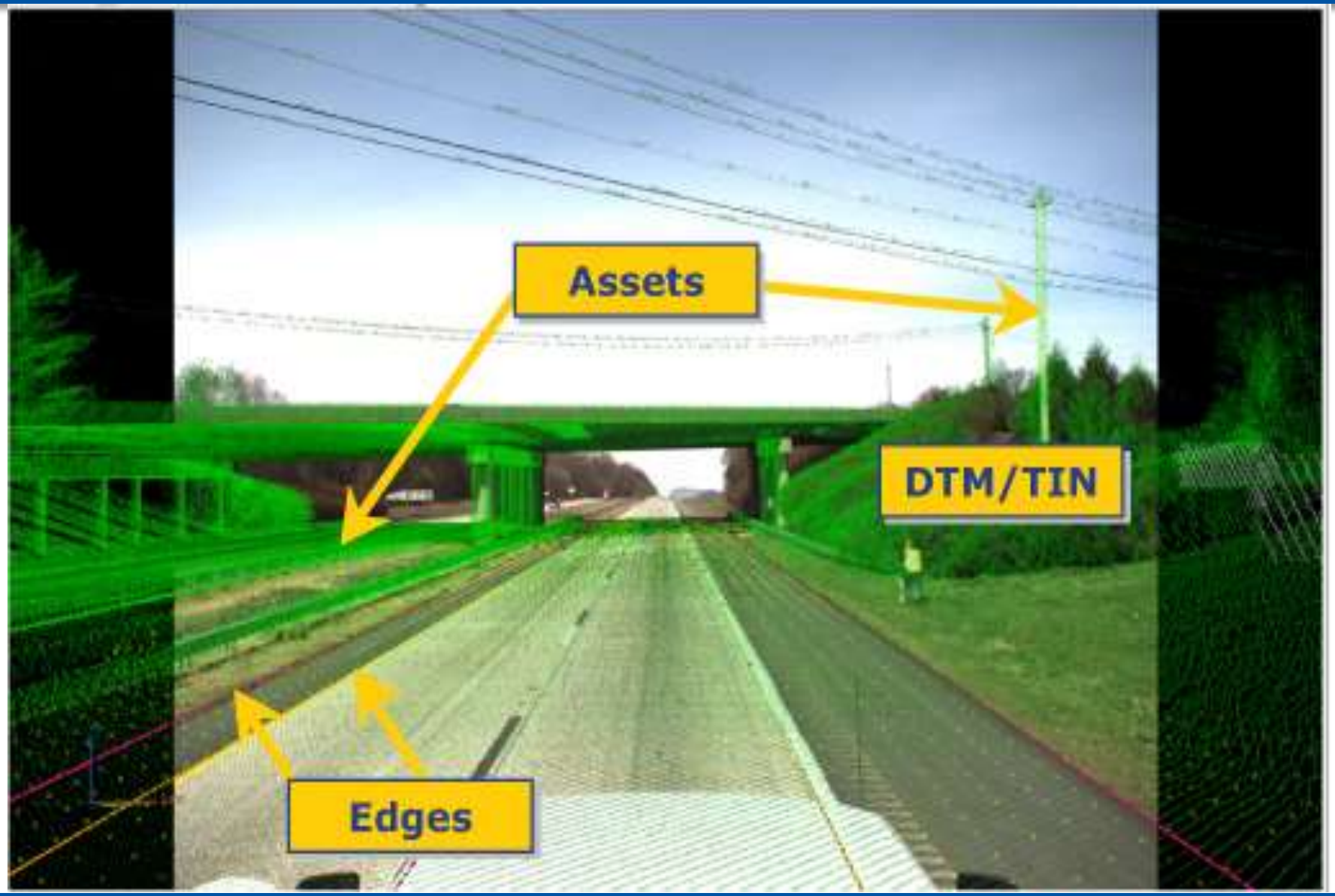
Floodplain Mapping and Risk Analysis

Storm Inventory

Hi-Rail Surveys

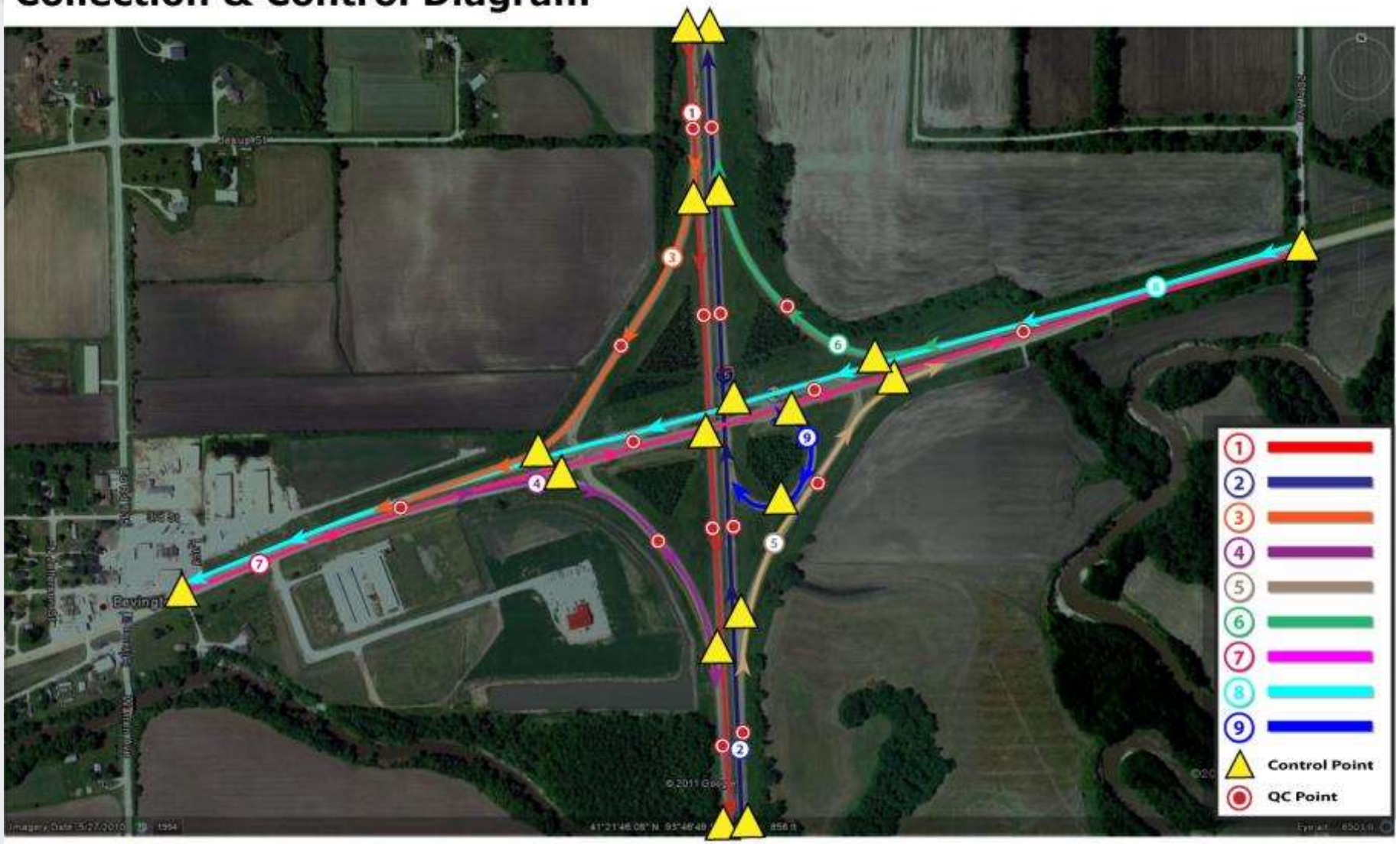
SUE designation location

LIDAR / PHOTOS = PRODUCTION

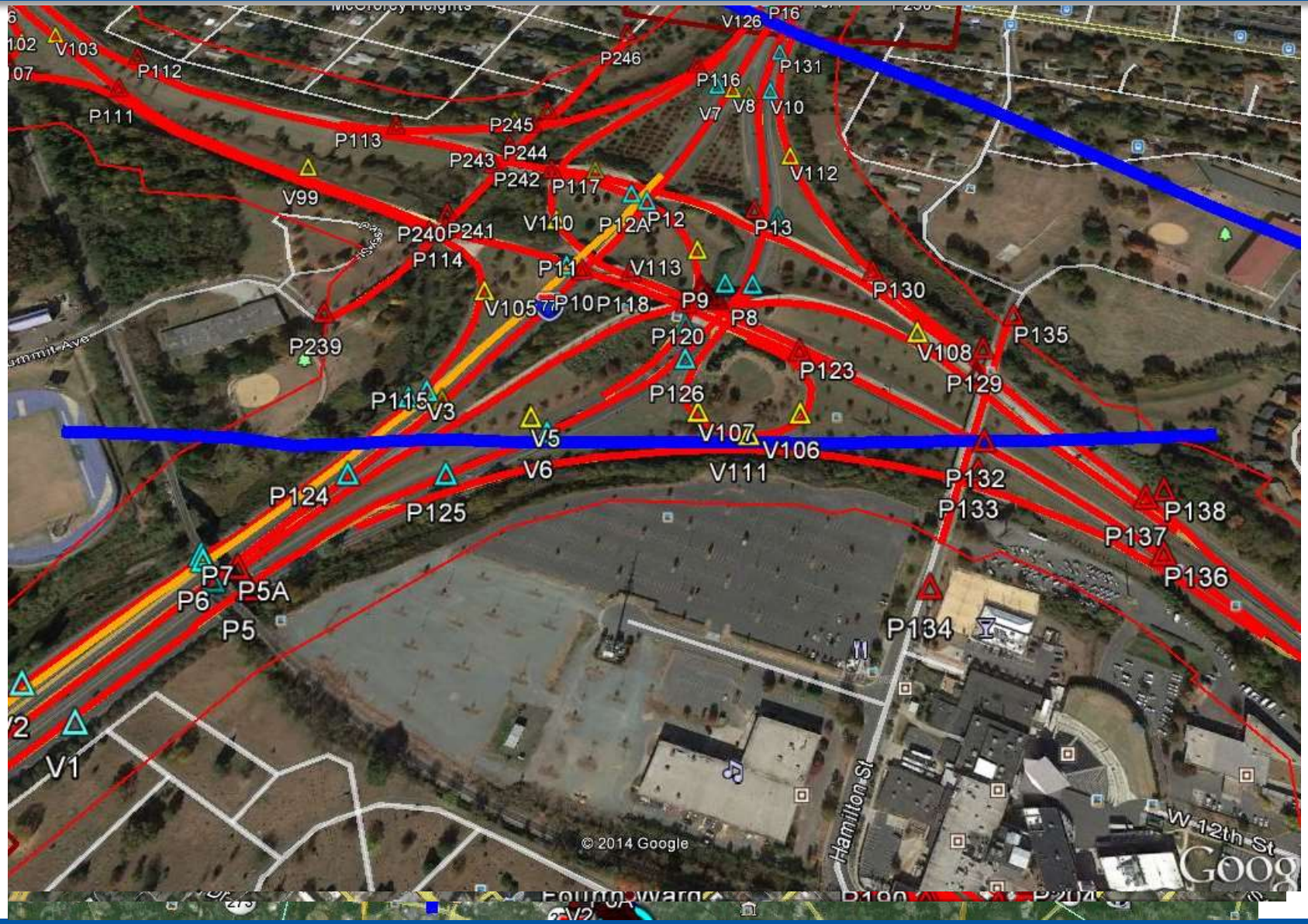


TYPICAL CONTROL LAYOUT

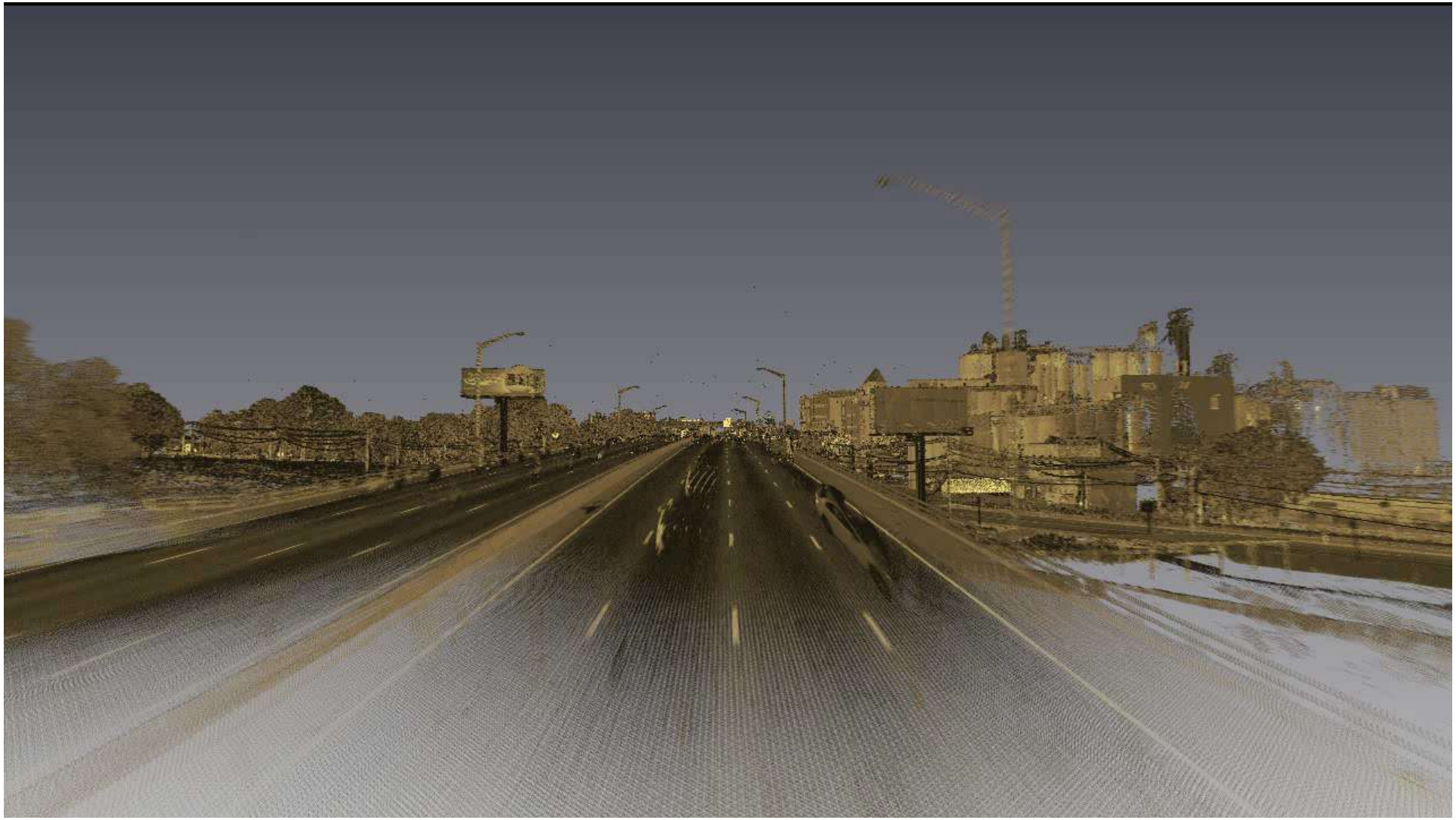
Collection & Control Diagram



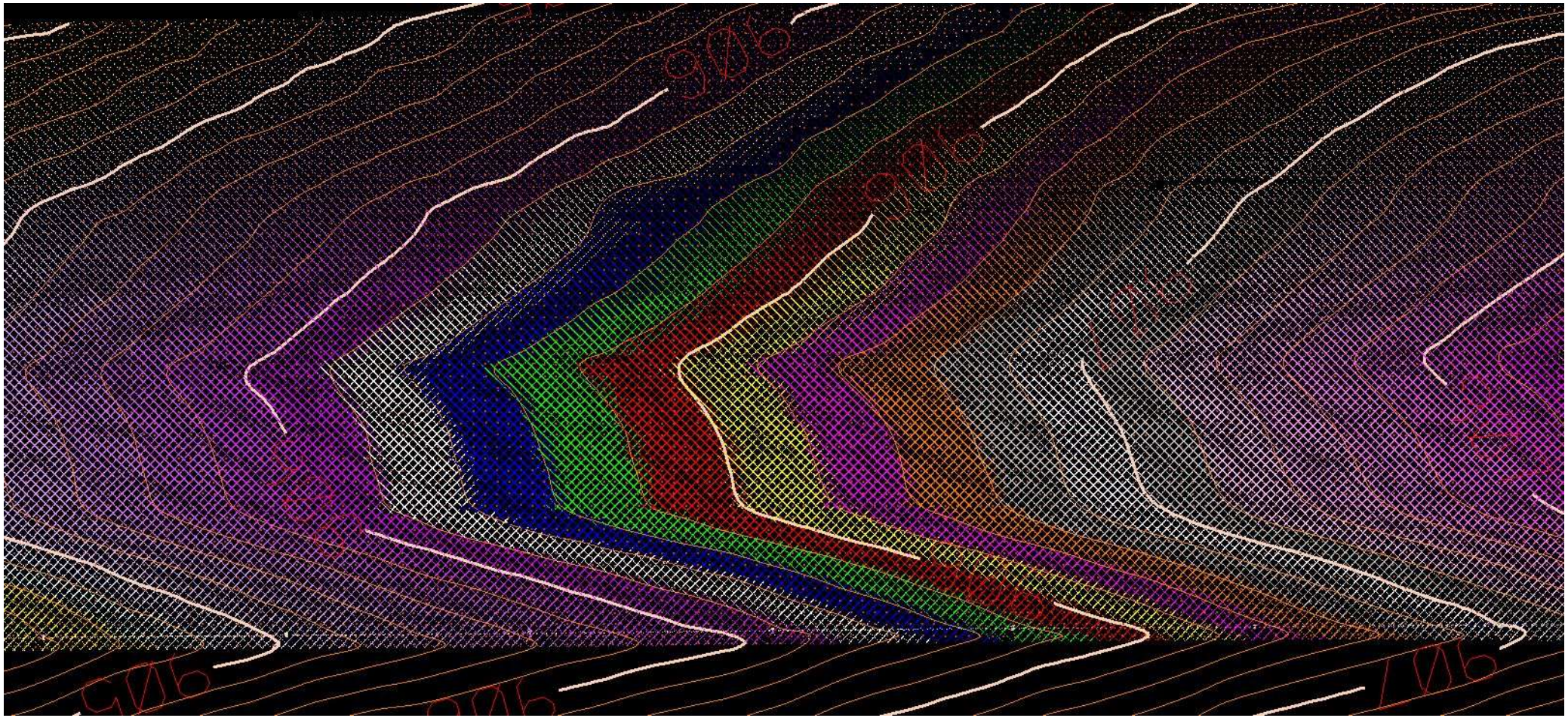
I 77 - I 277 – I 485 – I 85 MOBILE MAPPING



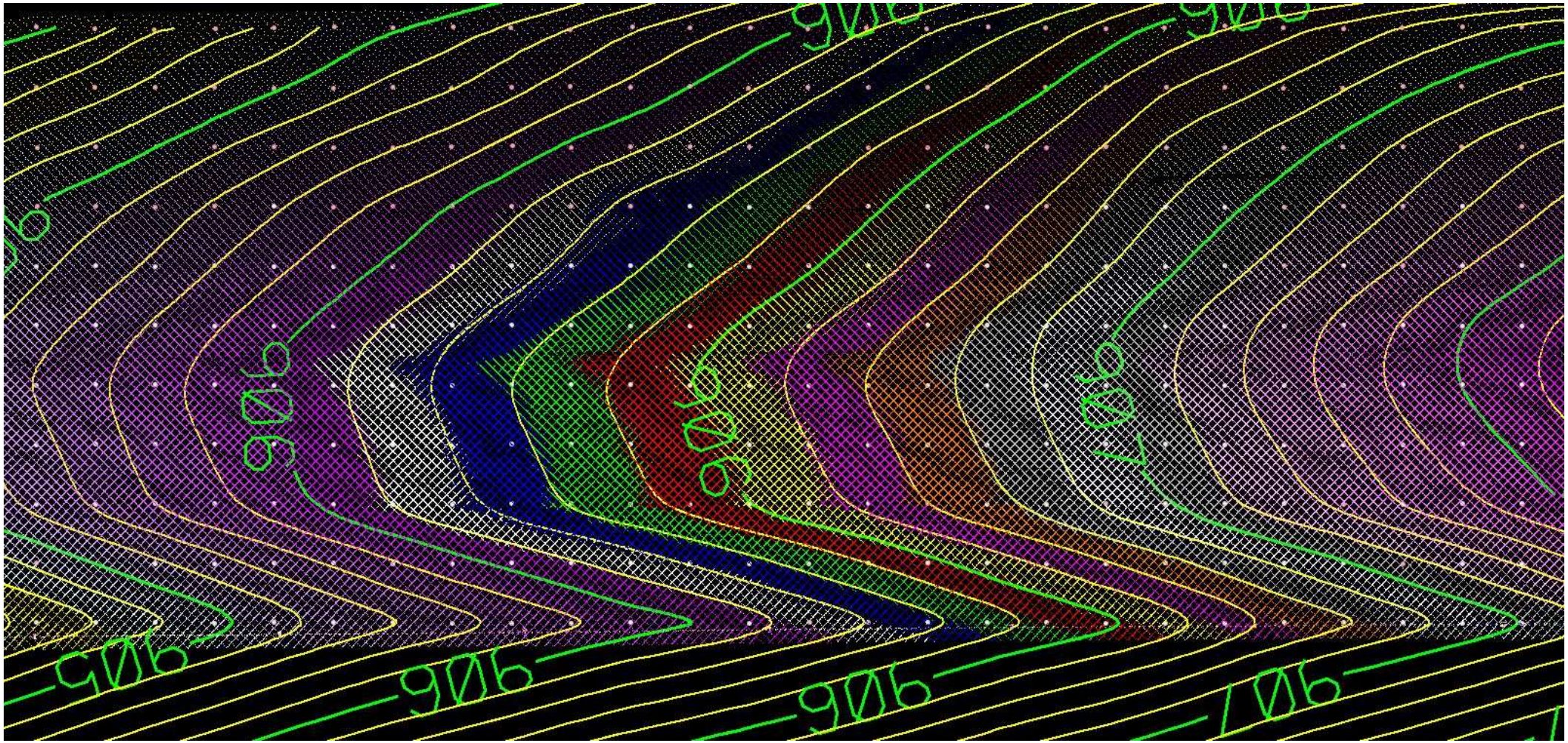
I 77 - I 277 – I 485 – I 85 MOBILE MAPPING



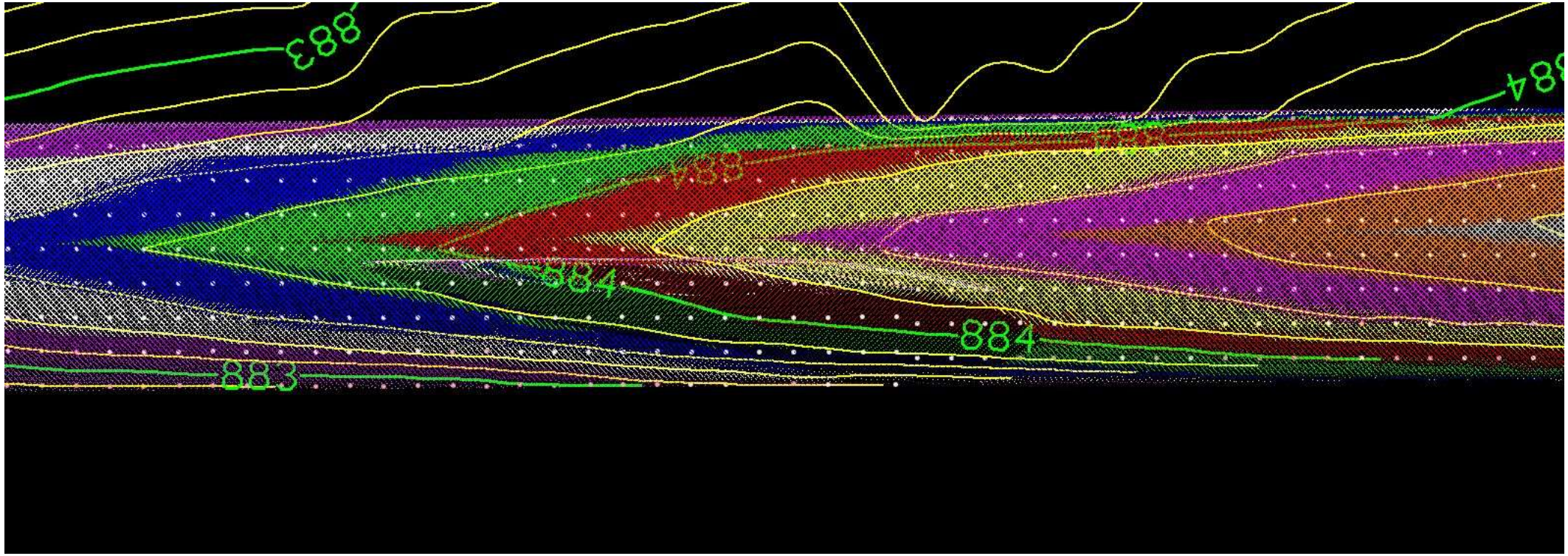
PAVEMENT DTM / DETAILS



APPLICATION: PAVEMENT CROSS SECTIONS



APPLICATION: PAVEMENT CROSS SECTIONS



EAGLE P3 PROJECT

Eagle P3 Commuter Rail

Denver, CO

1.5 days on site for the scanning. 200 hours for survey control (every 2500')

Conventional survey estimated at approx. 3000 hours

Scanning was complete in 18 hours

Extraction is on going (Still mining the datat)

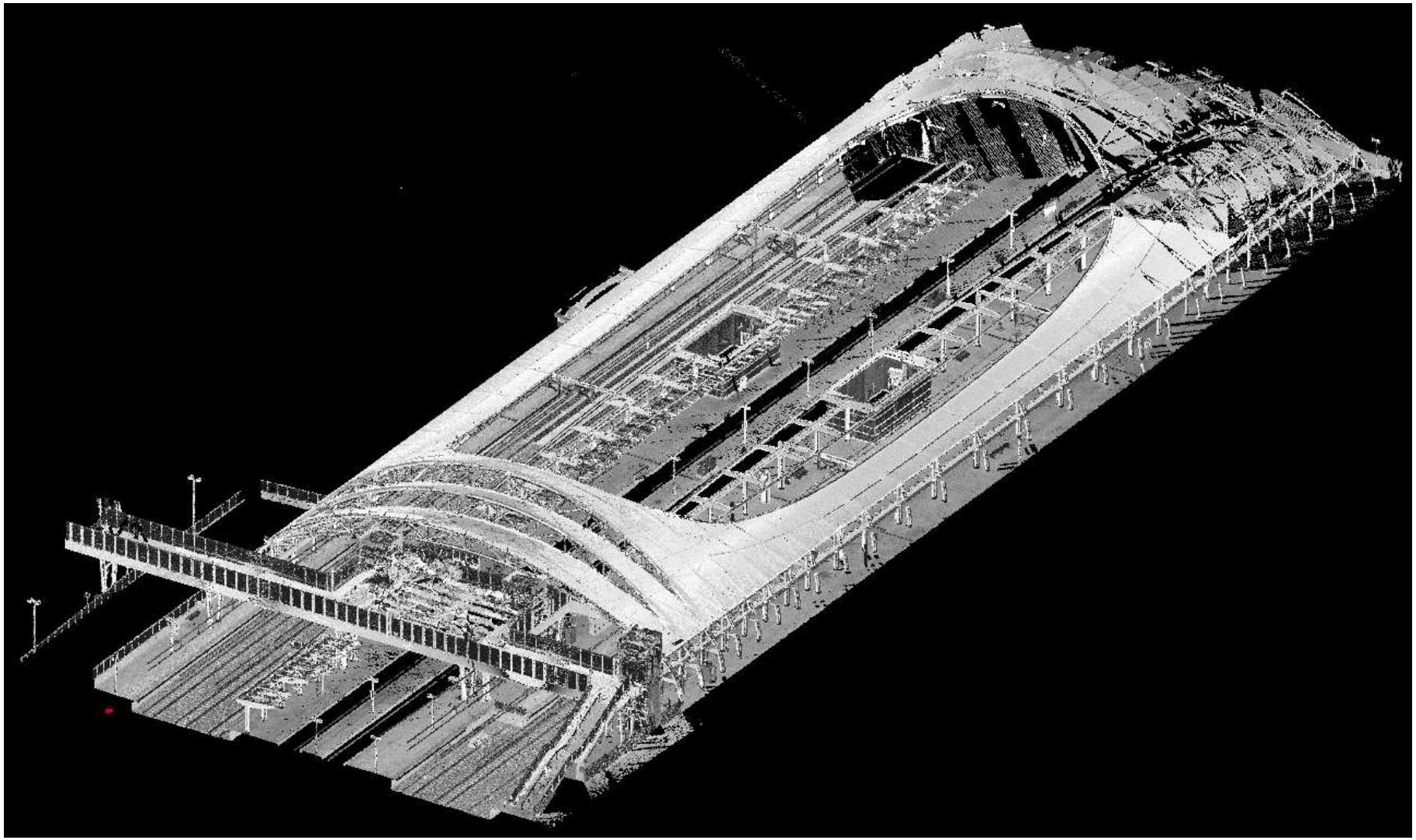
No additional software was needed for the design team

Scan data is transferred via external hard drives. 23 mile project equaled 500 GB (1/2 TB) of data

Additional tasks can be identified at a later date with no re-mobilization to the site. Example: Bridge clearance heights.

DENVER CO LIGHT RAIL PROJECT

DENVER CO LIGHT RAIL PROJECT



EAGLE P3 PROJECT

Eagle P3 Commuter Rail - Denver, CO

At Grade Crossing

EAGLE P3 PROJECT

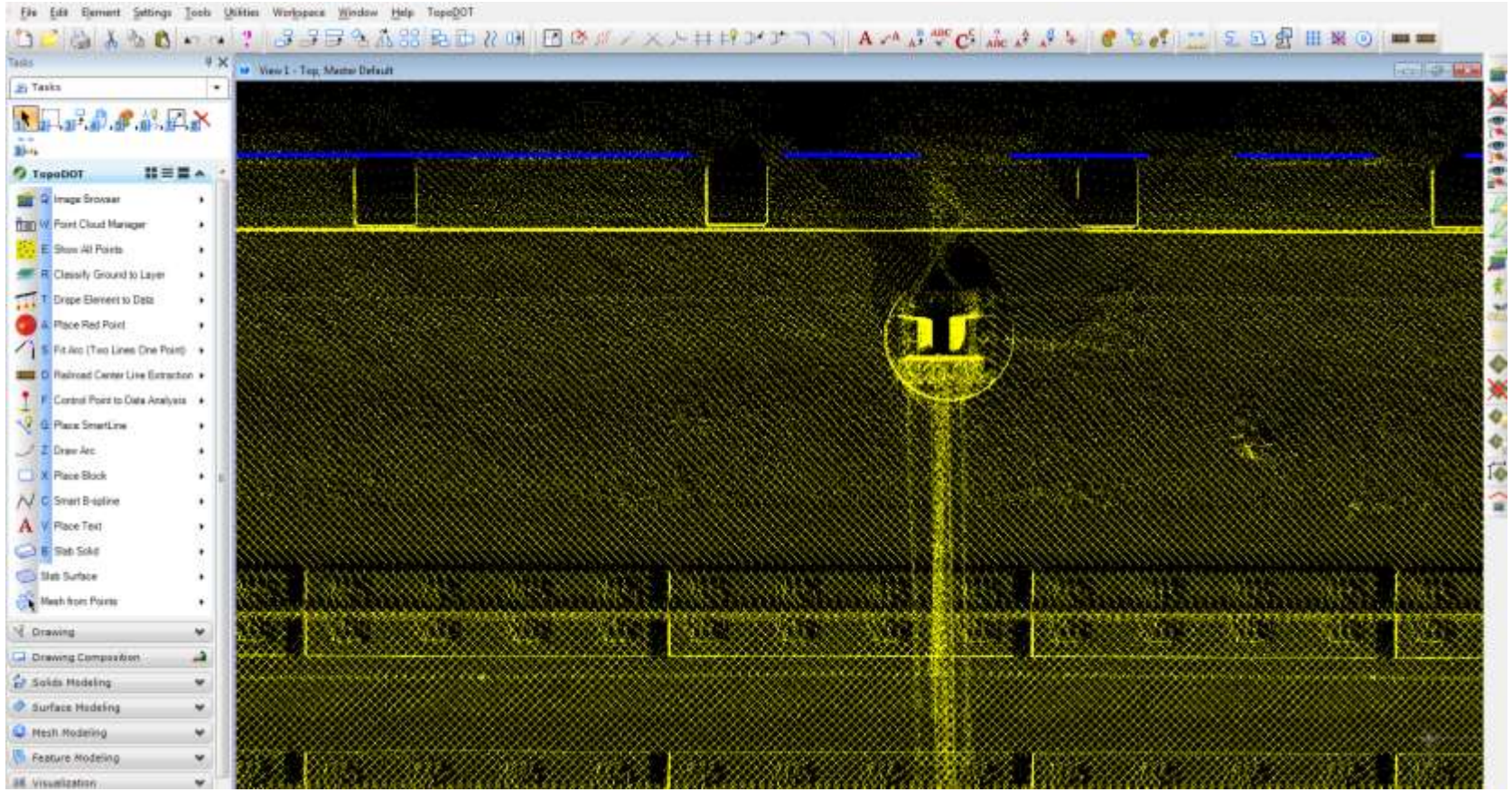
Eagle P3 Commuter Rail - Denver, CO

Georeferenced Photos

EAGLE P3 PROJECT

Eagle P3 Commuter Rail - Denver, CO

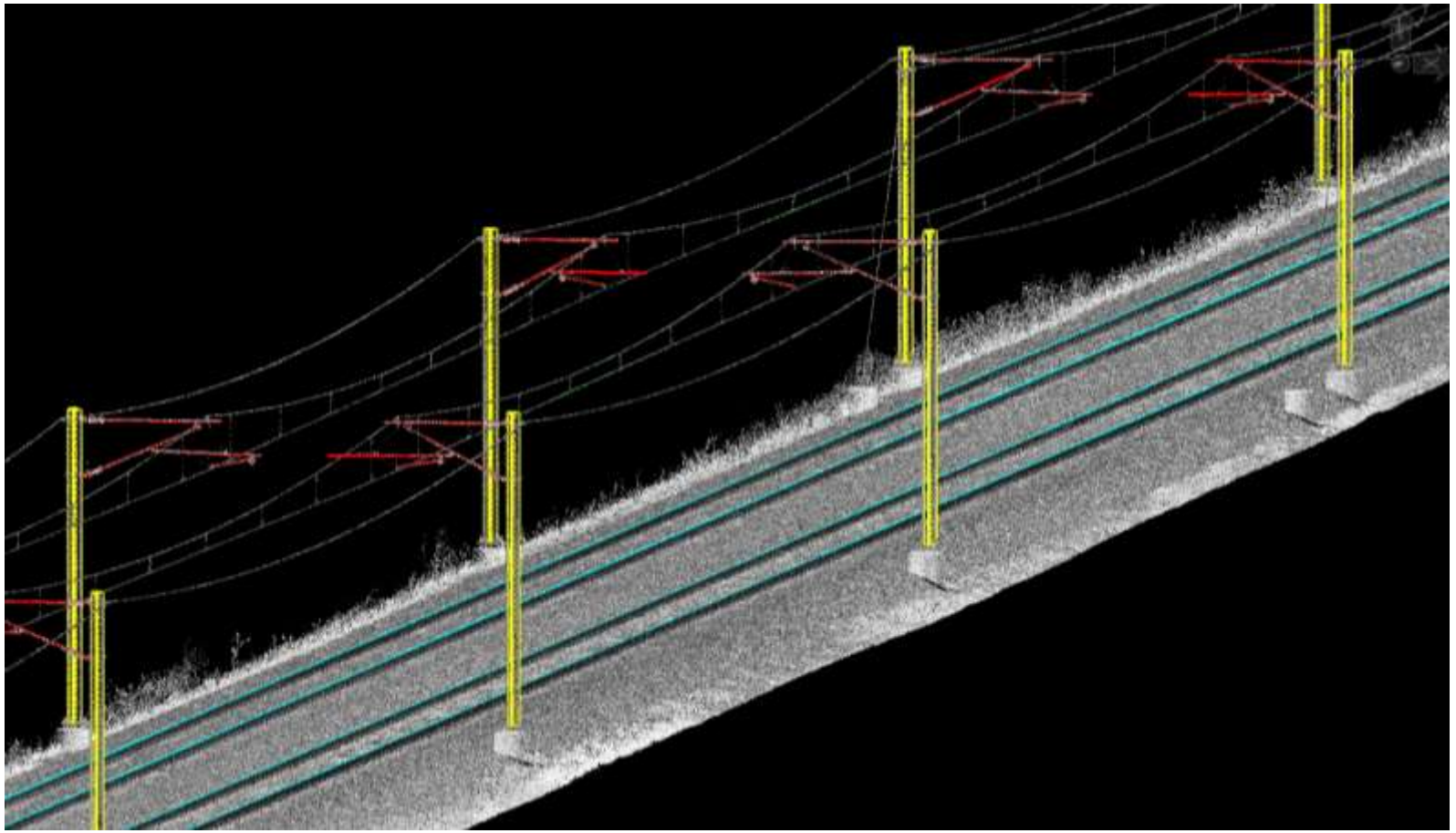
Encroachments



EAGLE P3 PROJECT

Eagle P3 Commuter Rail - Denver, CO

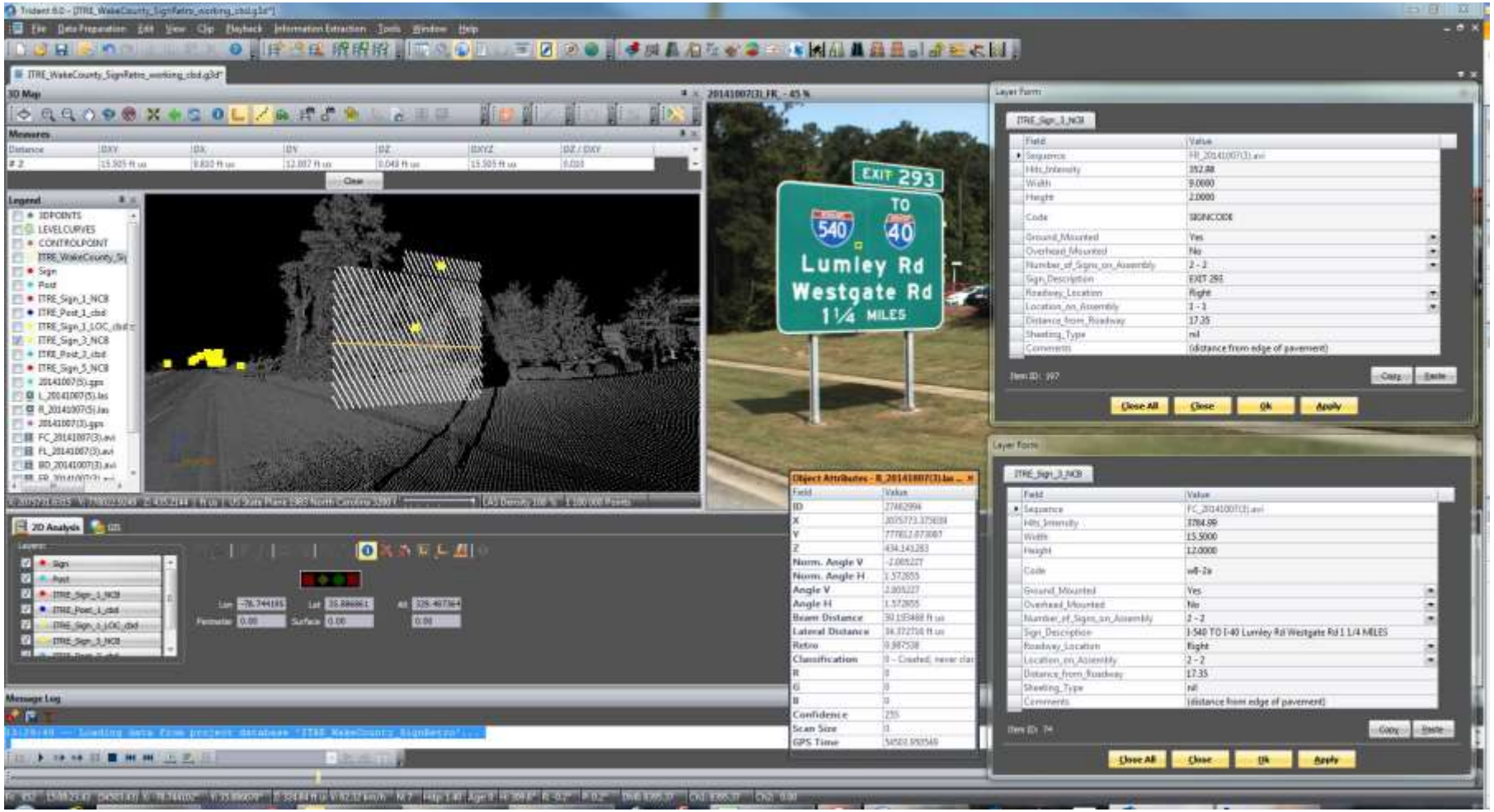
Rail Extraction



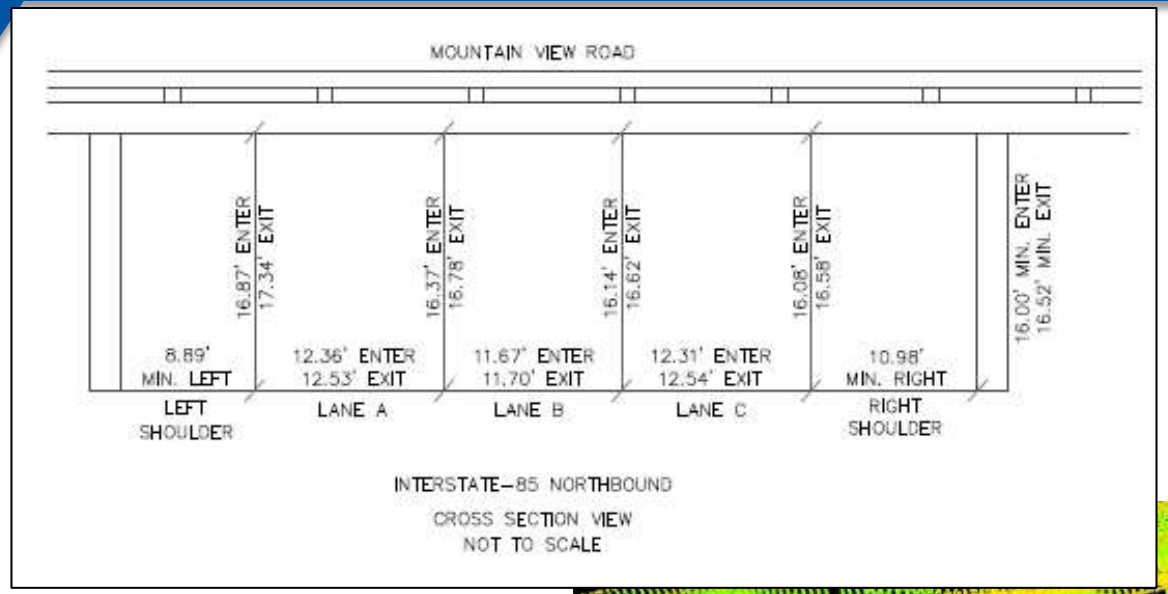
ASBUILT – MODEL

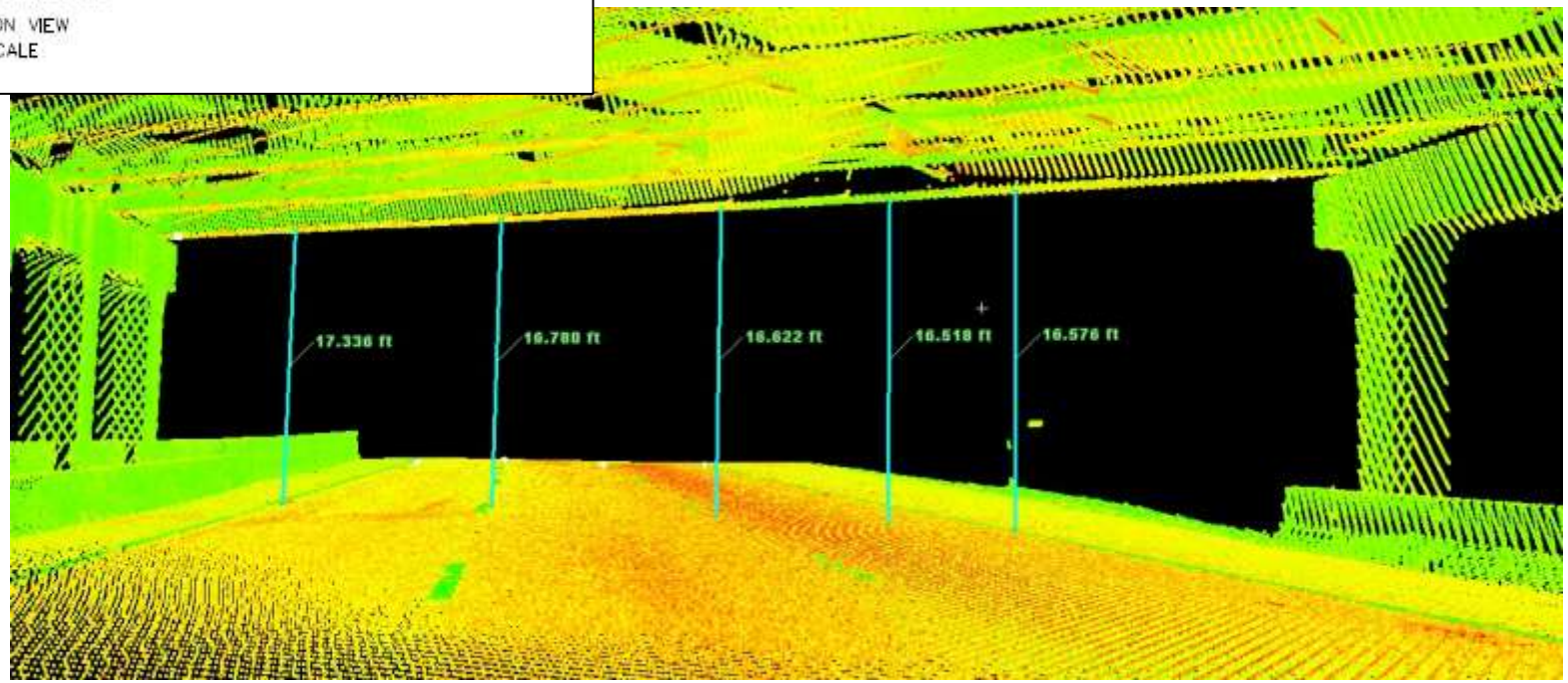
ASSET EXTRACTION – SIGN INVENTORY

Extraction of Assets using Photogrammetry only or LiDAR only or both simultaneously

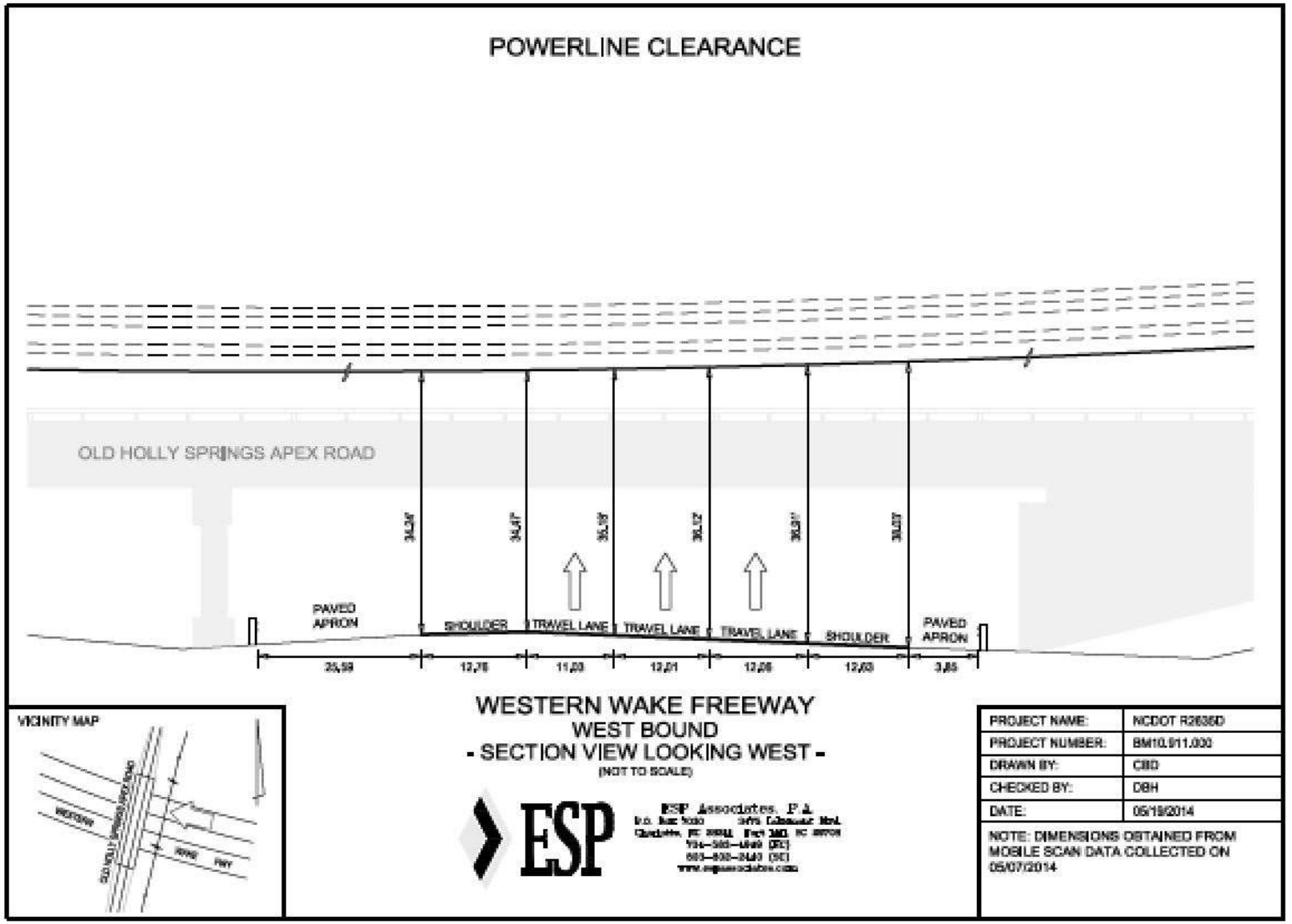


APPLICATION: BRIDGE CLEARANCES

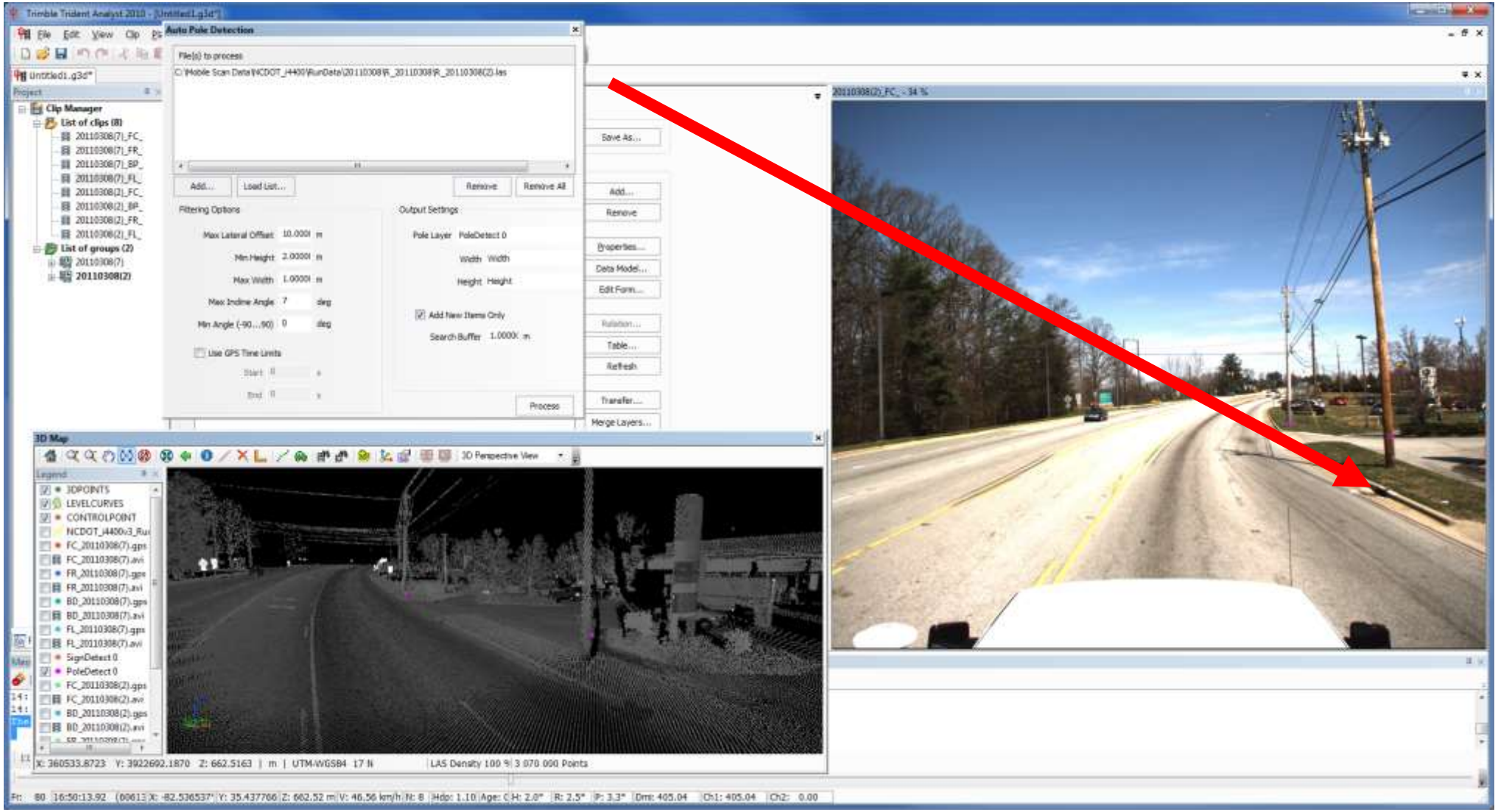




APPLICATION: POWERLINE CLEARANCES



INFRASTRUCTURE ASSETS MAPPING



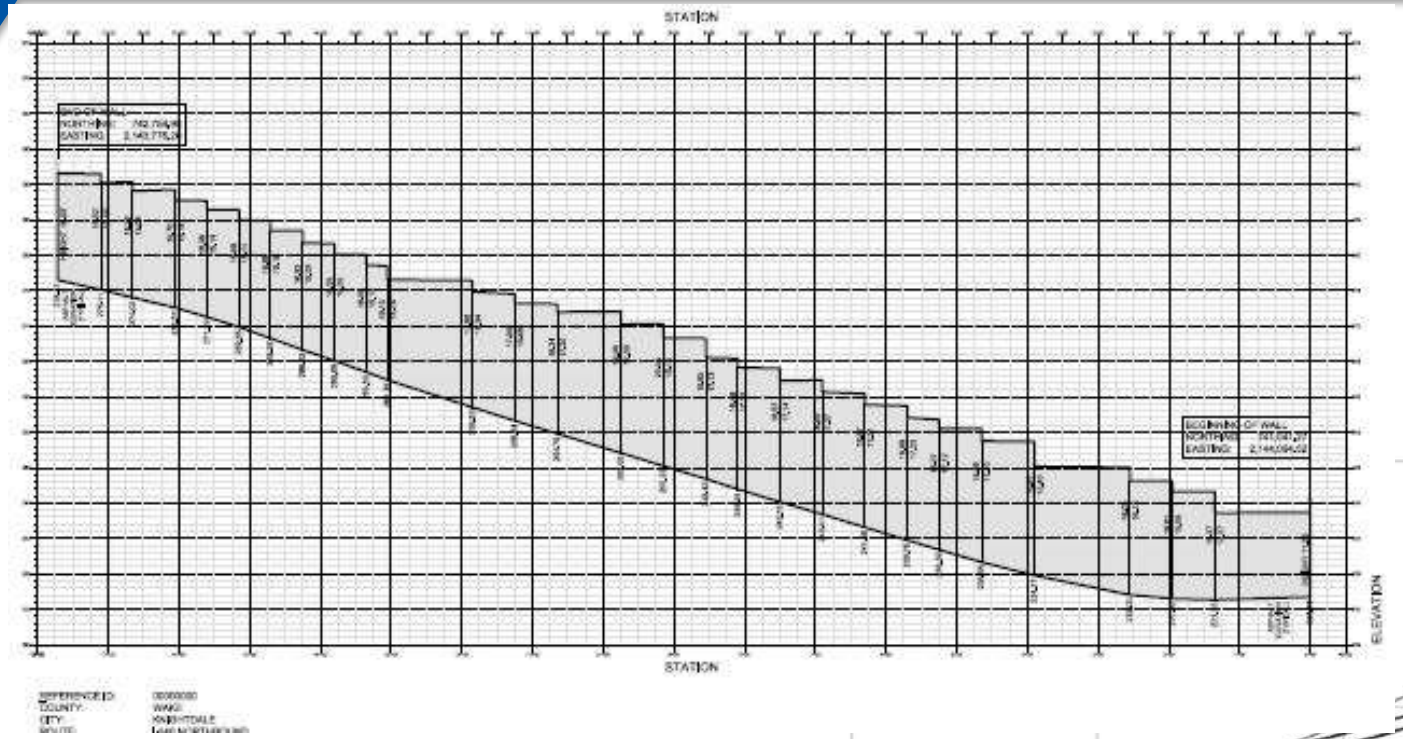
"STRUCTURE-LEVEL" DATA FOR RISK ASSESSMENTS

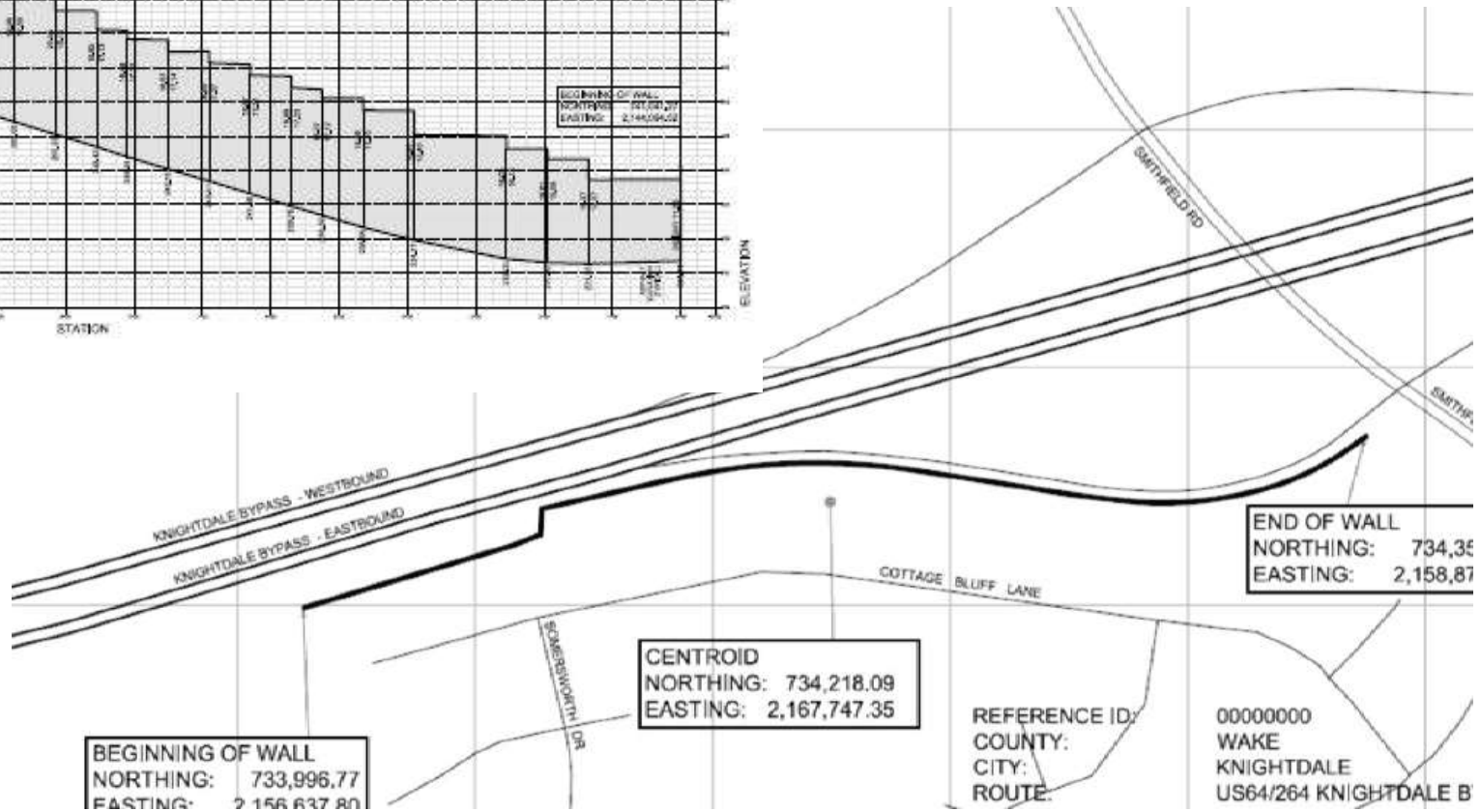
Pioneer in Efficient FFE Collection Methods

APPLICATION: TUNNELS

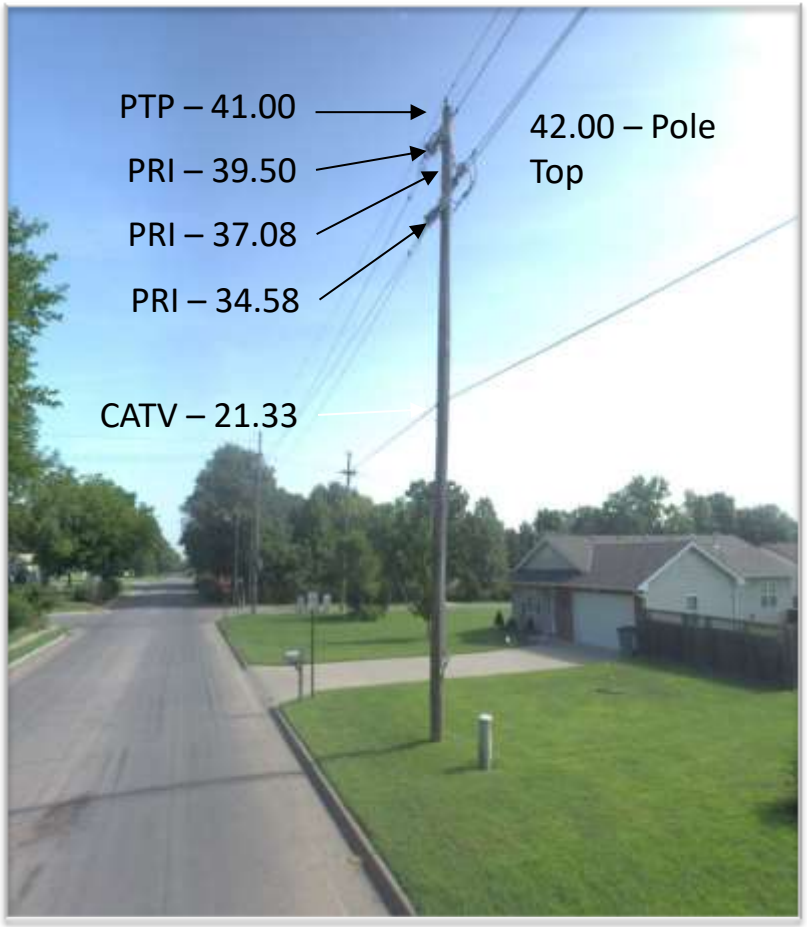
NOISE RETAINING WALLS

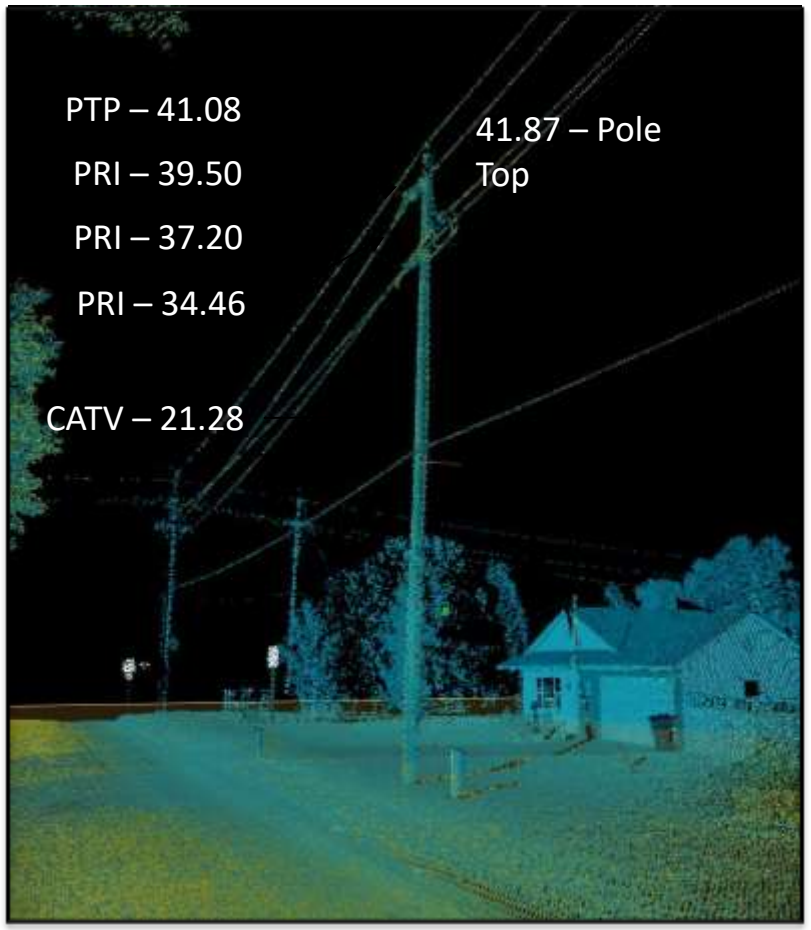
NOISE RETAINING WALLS



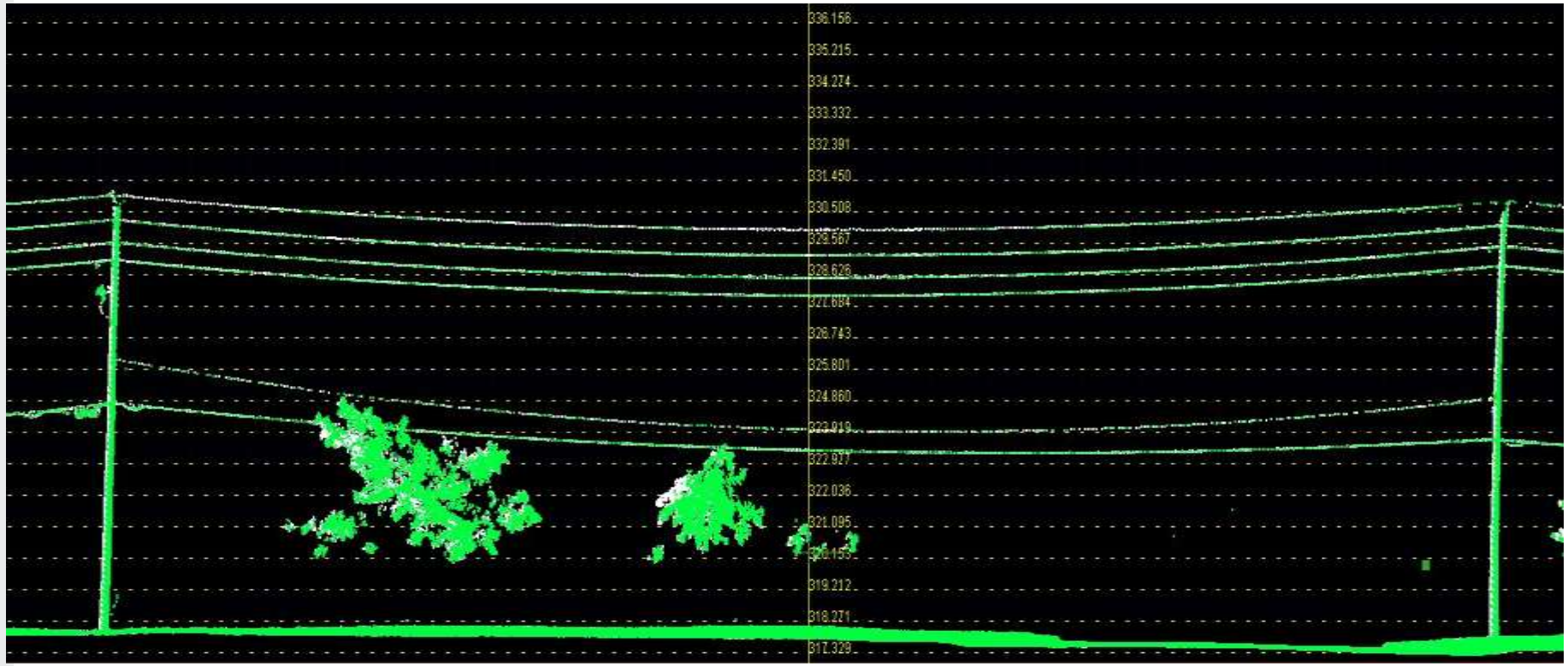


Utility Extraction





MID-SPAN CLEARANCES



ACCURACIES

Scalable

- Function of the GNSS, Control, Surface, Foliage
- Function of the project – be practical

MX8 – Max control < 1 cm (200 – 500 m)

Control at 1200 – 1500 m spacing = 2 cm

Kinematic GPS = 5 – 7 cm or more*

- more of a function of the Base Station

DELIVERABLES

CAD or GIS Product

- Main Production Tool = Trident Trident
  - MicroStation
  - TopoDOT
  - AutoCAD
  - ArcGIS
- ESP Analyst
- TIN or DTM surfaces
- Contours
- Cross Sections
- Databases
- Shapefiles
- Standard Forms

THANK YOU
QUESTIONS?

ESP
ESP Associates, P.A.