Inception to Completion: The Project Design Workflow

Southwest User Group

April 10, 2018

Broomfield, CO

City of Las Cruces®

PEOPLE HELPING PEOPLE

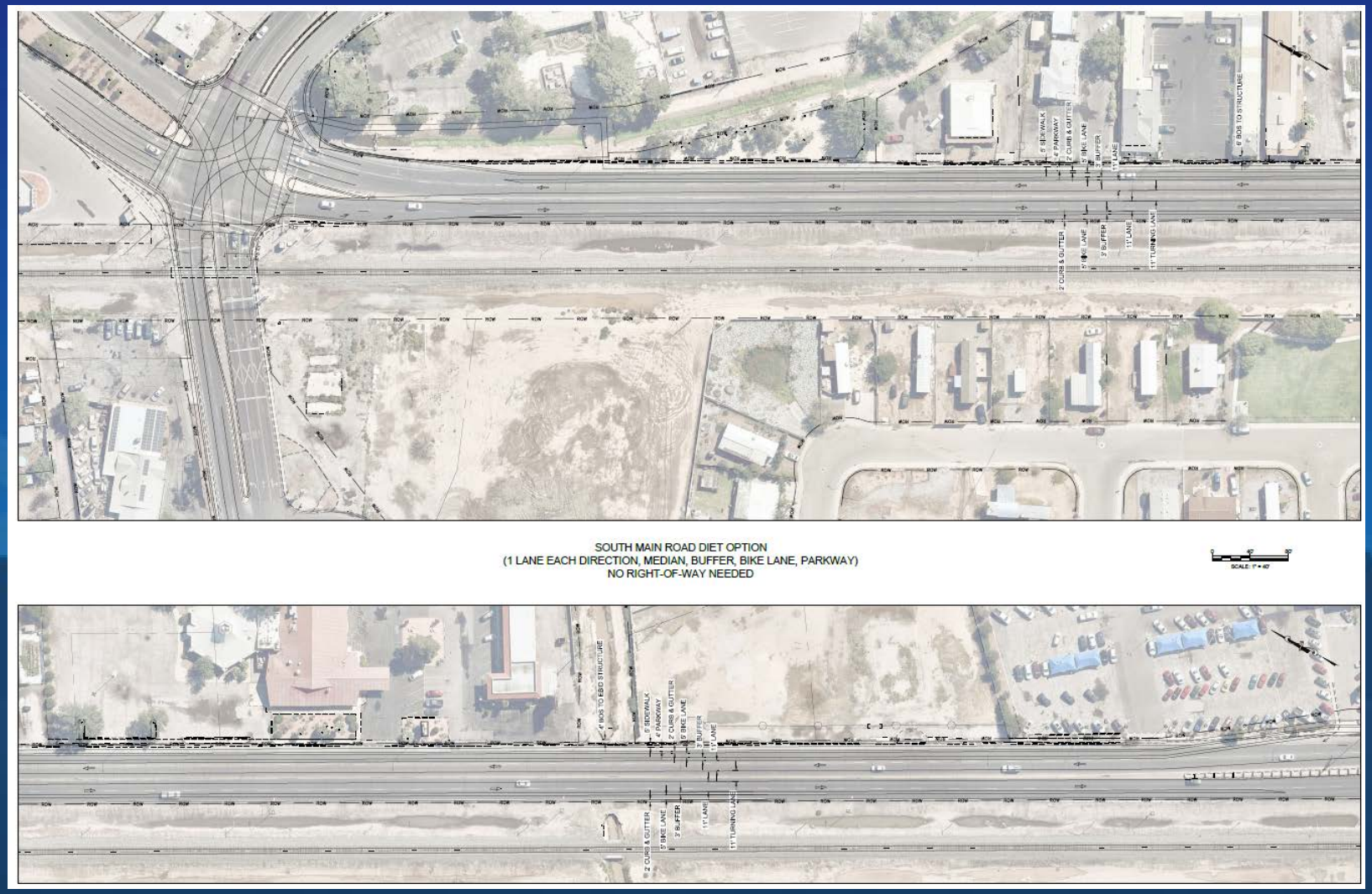
- Tools
  - Trimble GPS
    - Survey grade (S6)
    - Mapping grade (6000)
  - Trimble V10 imaging rover
  - Trimble Business Center
  - AutoDesk Civil 3D/Raster Design
  - GeoExpress

- GIS
  - ArcGIS Enterprise
  - SDE on a SQLServer platform
  - nearmap imagery
  - Parcel Fabric

What is Inception Through Completion?

- Initial concept basemap
- Survey
- Engineering Design
- Construction Documents
- Construction
- As-built Documents

Proposed Road Diet



Basemap

- Base Tables
  - Parcel Ownership Table
  - Research Table (GIS, Book/Page, Ownership, Care-of, Address, etc)
- Title
  - Parcels/Ownership—Accuracy; Currency
  - ROW/Ownership—Agreements; Historic; Takes
  - Gaps and overlaps
    - Seniority of title--RR, EBID vs private parcels

Basemap, cont.

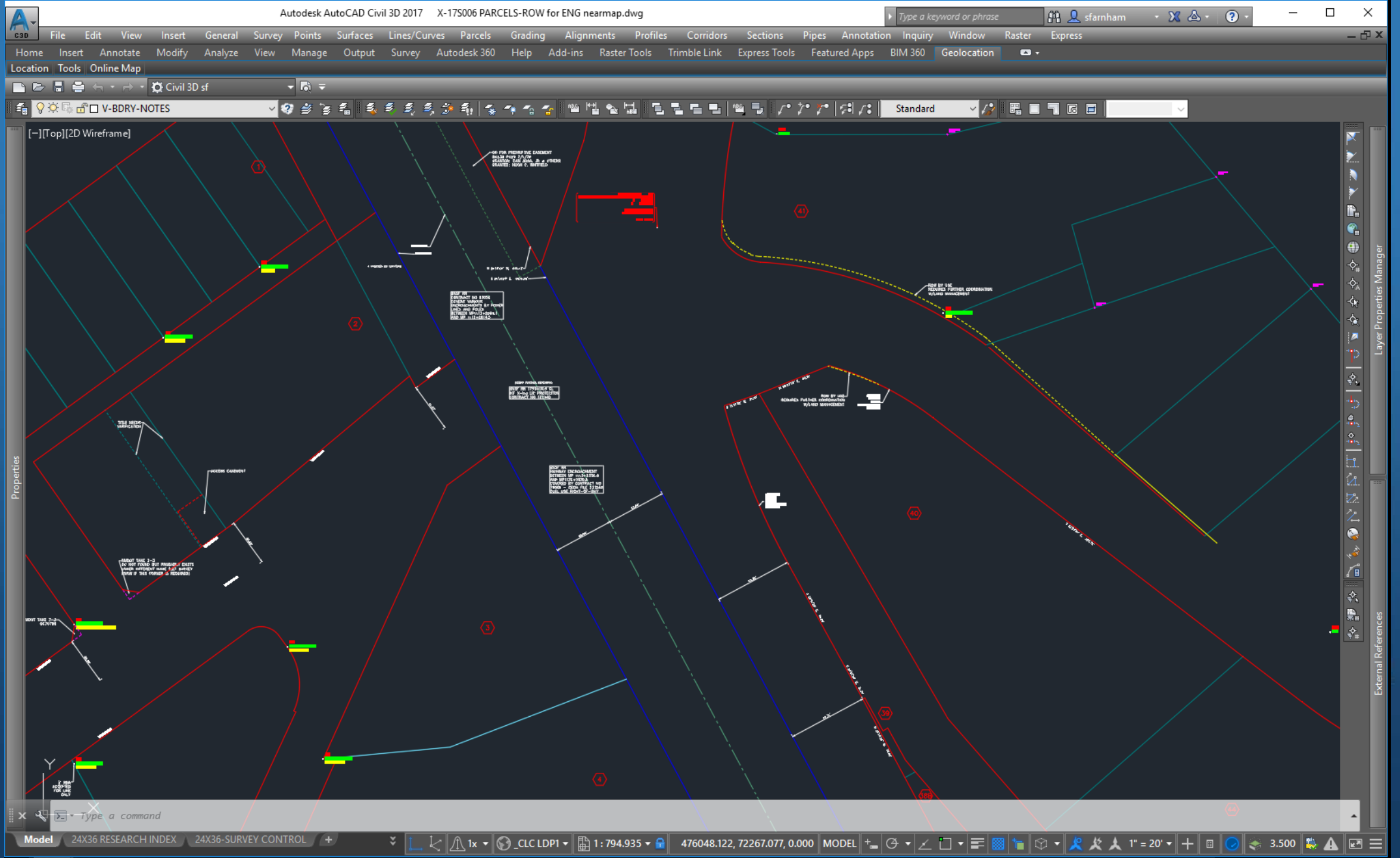
- Aerial Imagery
  - Registration to local projection—Low Distortion Projection
- Topography—2 ft contours—possible 3D surface
- Utilities
  - City-owned—Gas, Water, Sewer, Storm, Fiber Optics
  - Private—Electricity, Telephone, Cable/FO, Water, Gas
- Basemap becomes basis for survey planning
- Early transfer to design engineers for Conceptual or Preliminary Design

Single Data Source

- SDE → Civil 3D
  - Surveys for engineering design start by creating a basemap by importing Nearmap tiles and bringing in water, sewer, gas, stormsewer, parcel data from SDE
  - Informational only currently; need a workflow that informs the GIS data
- Issues
  - Need 3D; right now, very little elevation data
  - All GIS data still needs to be verified during design
  - Works well from GIS into Civil 3D, TBC, KML/KMZ, but not the other direction

Survey

- “Field to Finish” workflows
- GIS = “Get It Surveyed”
  - Accuracy
  - Apparent; Approximate (up to 1 foot); Fixed (authoritative)
- GIS provides more global look that can point out missing field data
- Data needs to flow both ways
- What constitutes survey-grade authoritative data?
  - Pins/Property Corners
  - Property/ROW lines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External References
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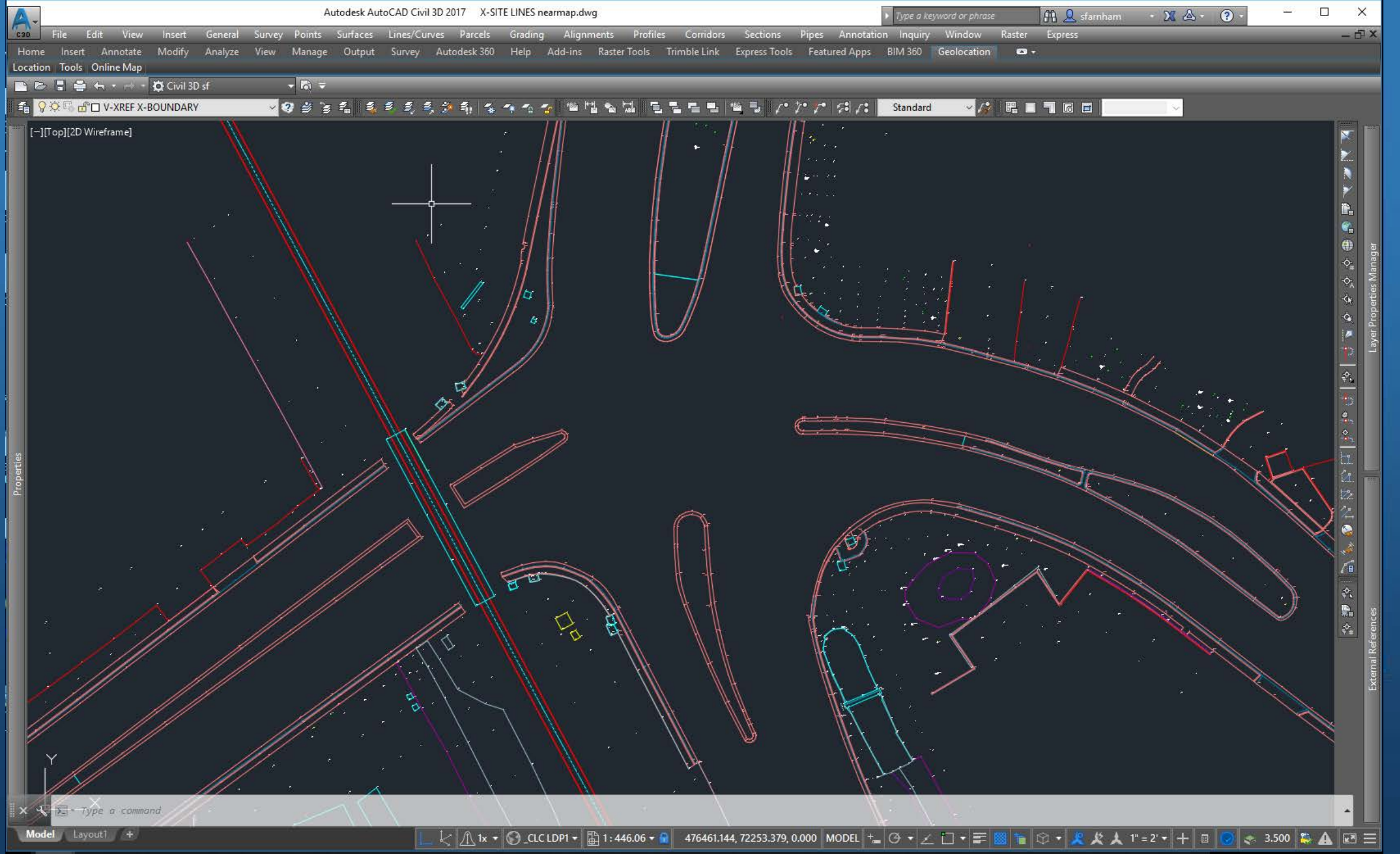
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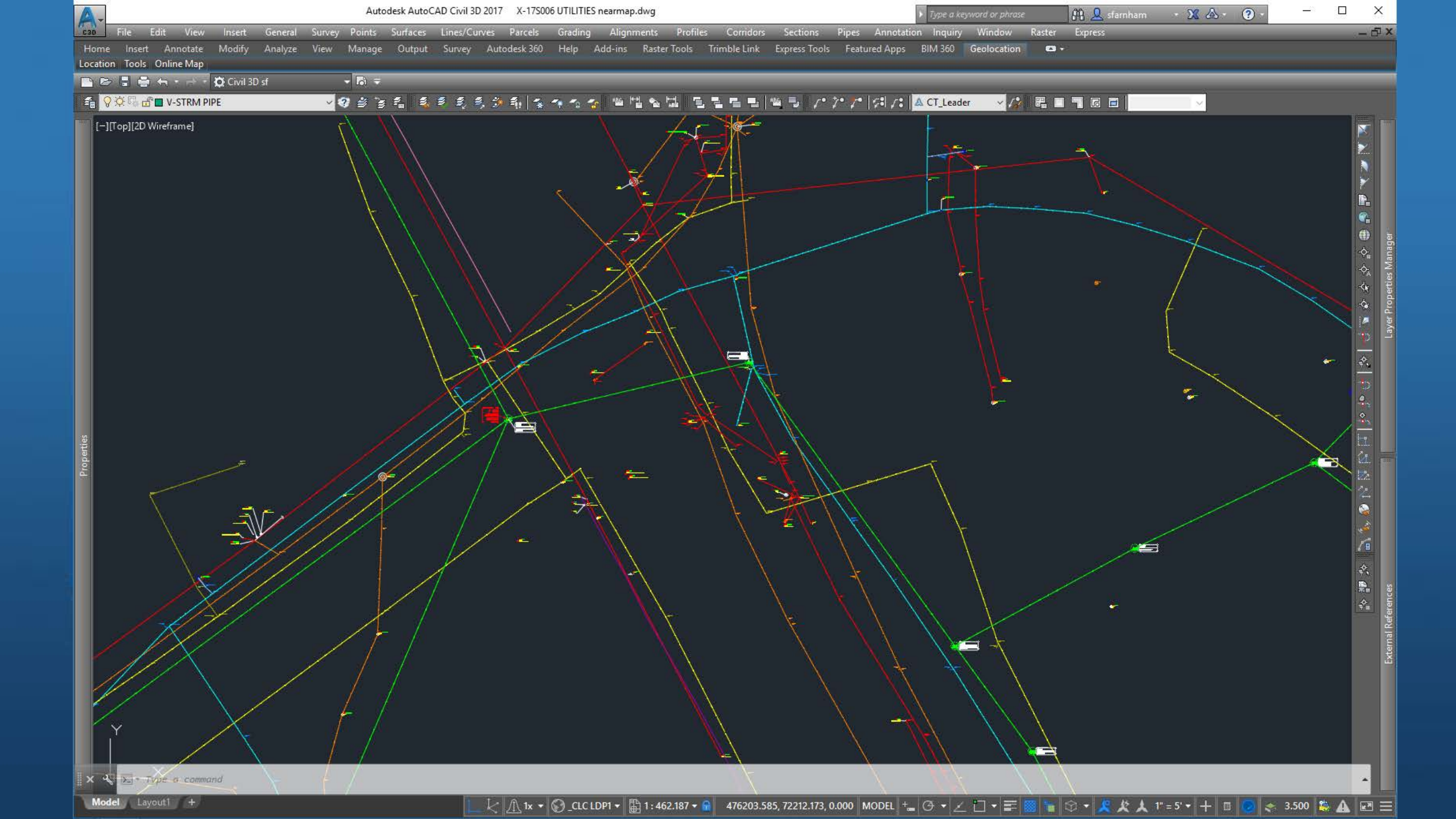
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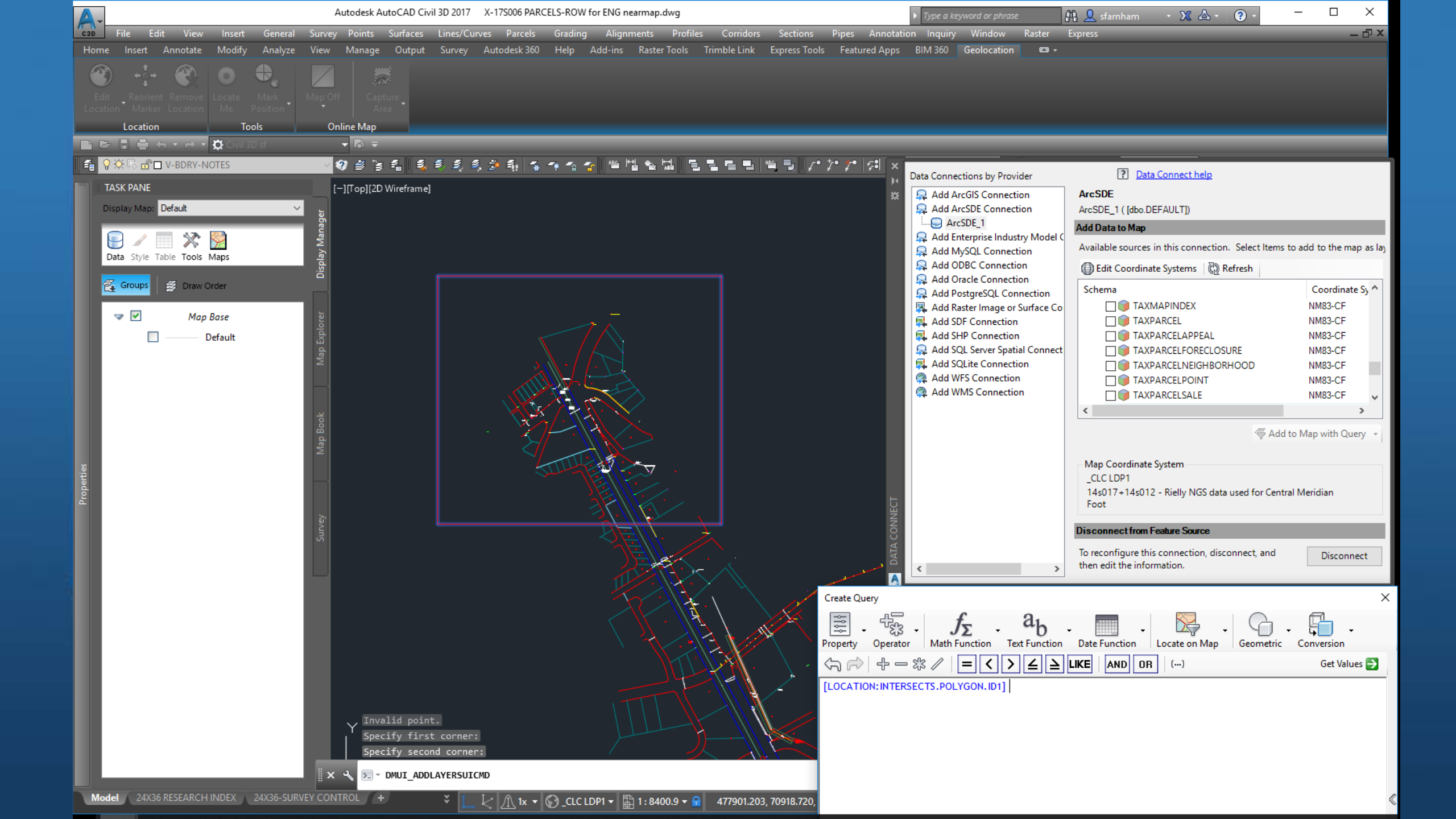
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Add SHP Connection
Add SQL Server Spatial Connect
Add SQLite Connection
Add WFS Connection
Add WMS Connection
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TAXPARCELFORECLOSURE NM83-CF
TAXPARCELNEIGHBORHOOD NM83-CF
TAXPARCELPOINT NM83-CF
TAXPARCELSALE NM83-CF
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Foot
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To reconfigure this connection, disconnect, and then edit the information.
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Math Function
Text Function
Date Function
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Geometric
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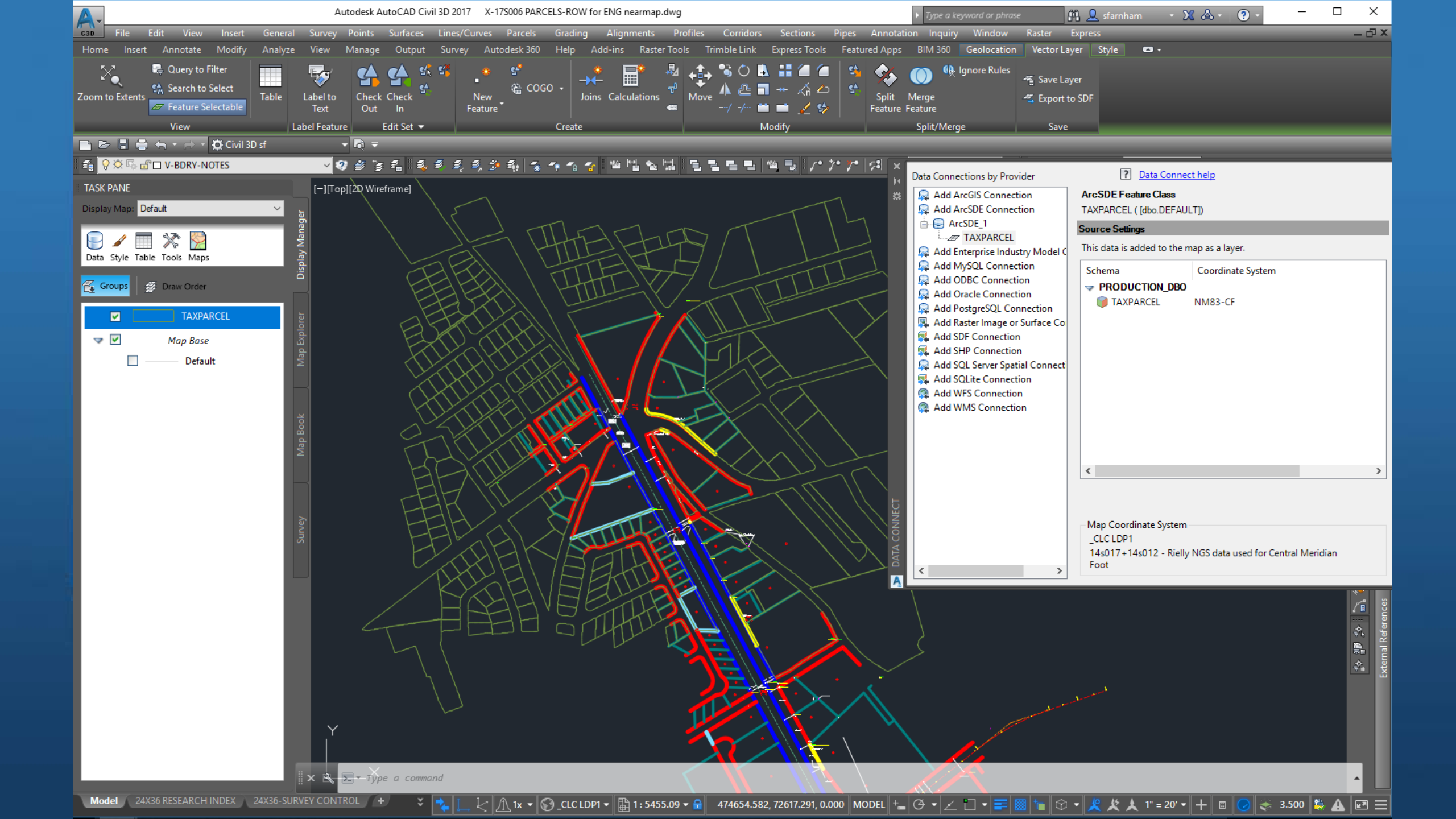
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Check Out
Check In
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Calculations
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Split Feature
Merge Feature
Ignore Rules
Save Layer
Export to SDF
View
Label Feature
Edit Set
Create
Modify
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Add MySQL Connection
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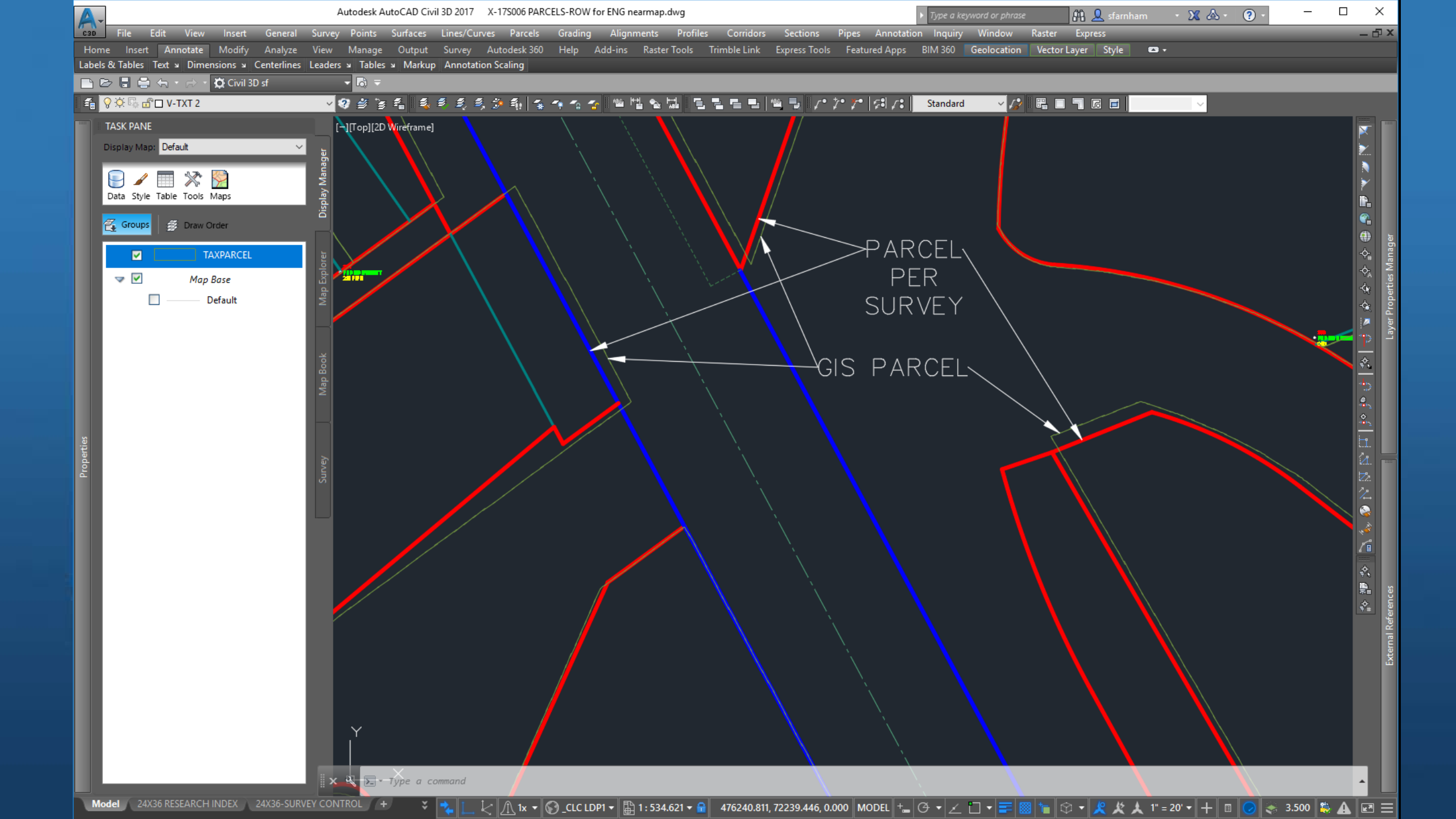
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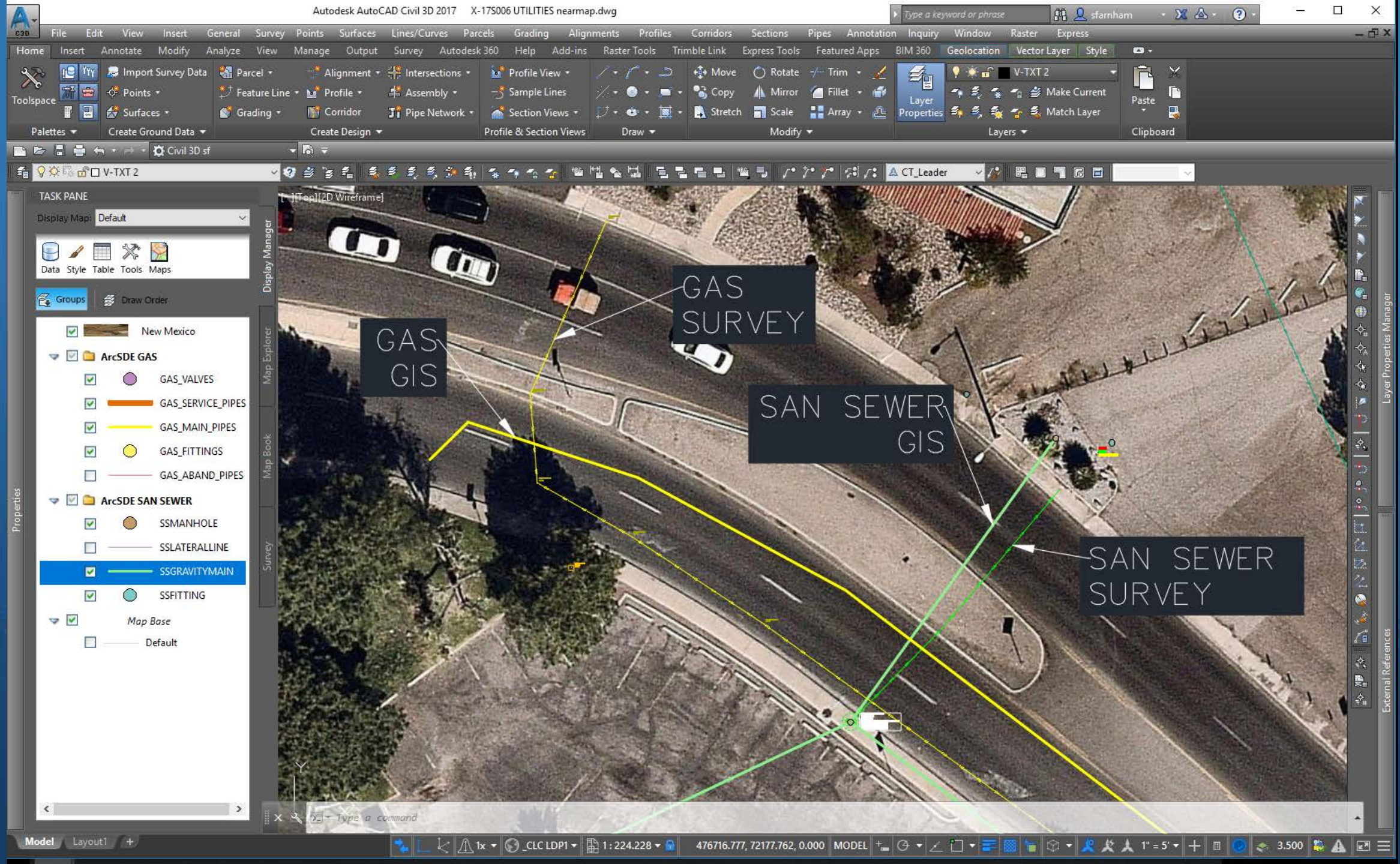
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SSLATERALLINE
SSGRAVITYMAIN
SSFITTING
Map Base
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GAS GIS
GAS SURVEY
SAN SEWER GIS
SAN SEWER SURVEY
Model
Layout1

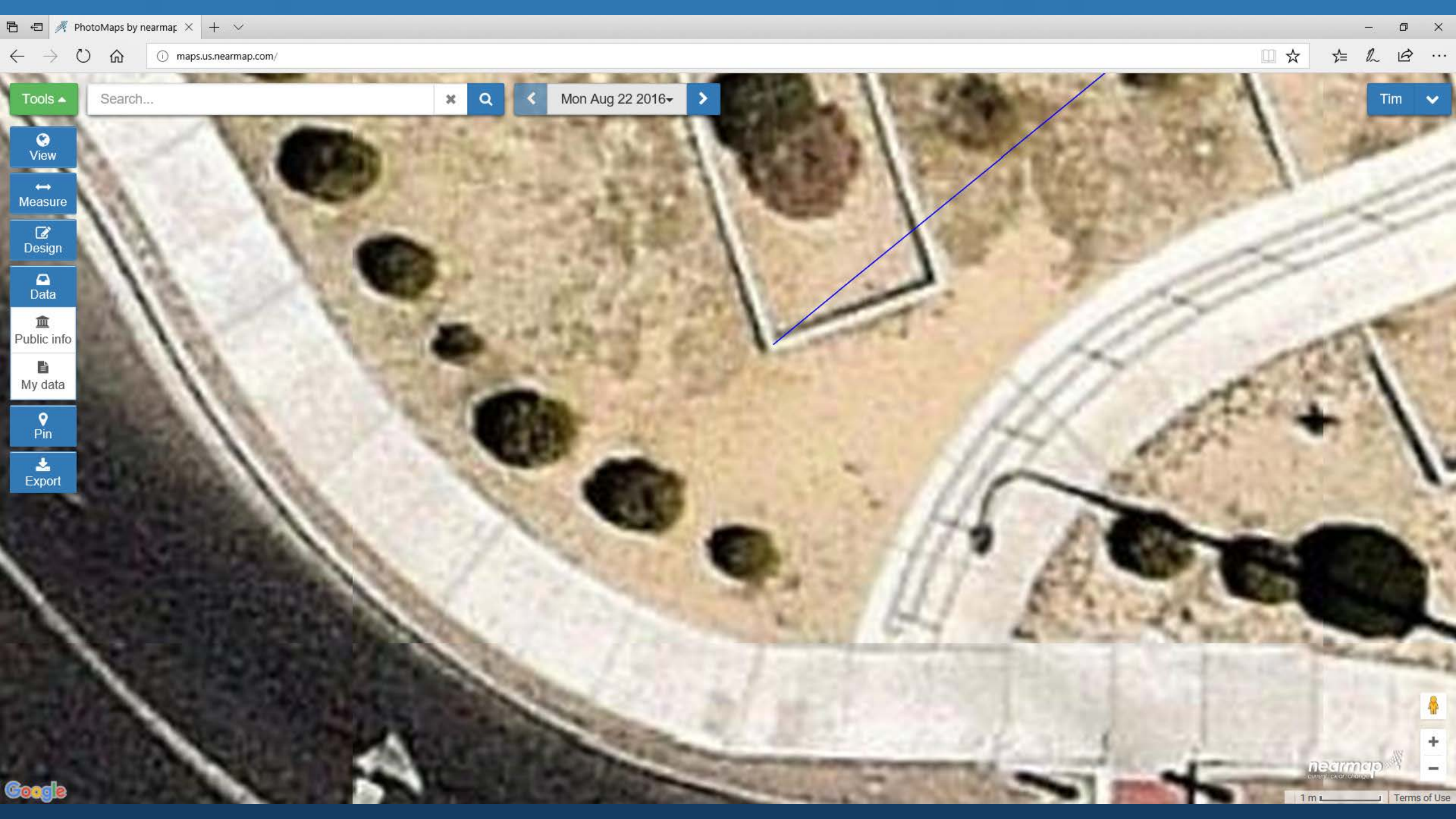
Problems with Existing Workflow

- As-builts
  - Typically, marked-up set of construction documents
  - Reliable?
- Silos of information
  - 5,000 survey control and parcel boundary points shot each year, none used to inform cadastral mapping yet
    - CSV files, project folders, CAD files
  - Final project data does not currently inform GIS data

Imagery Issues

- Imagery not survey grade throughout city
- Up to two foot variation in precision
  - If you are two feet off on 3 inch resolution, you notice
- WGS84 v NAD83 transformations
- Transformation issues: Autodesk, ESRI, Trimble, Google Earth
  - 3mo working with Autodesk → C3D currently does not have complete transformation tools to create survey grade registration (ESRI does)
- Ground control for next flight


CITY OF L S CRUCES
CITY HALL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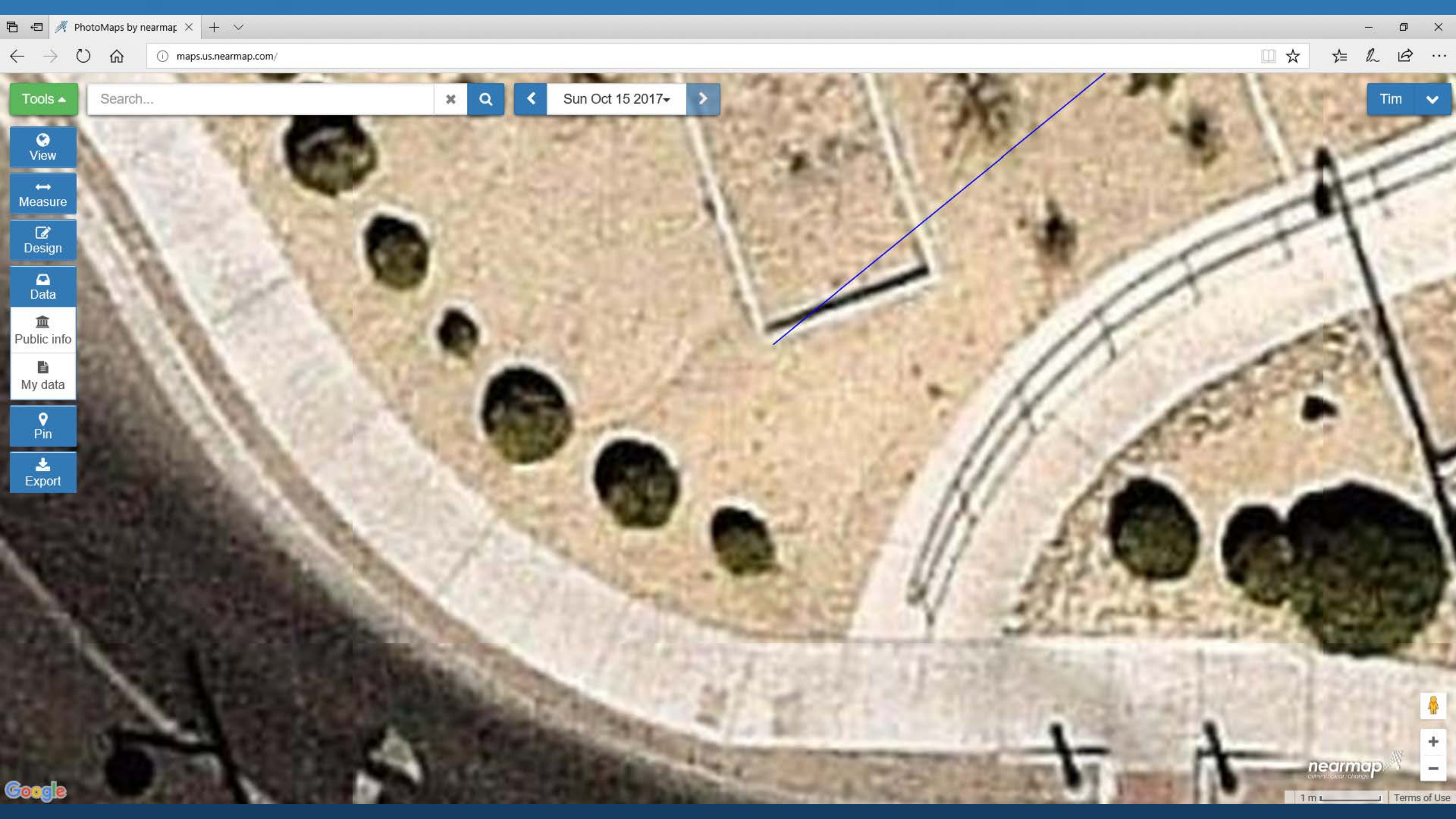
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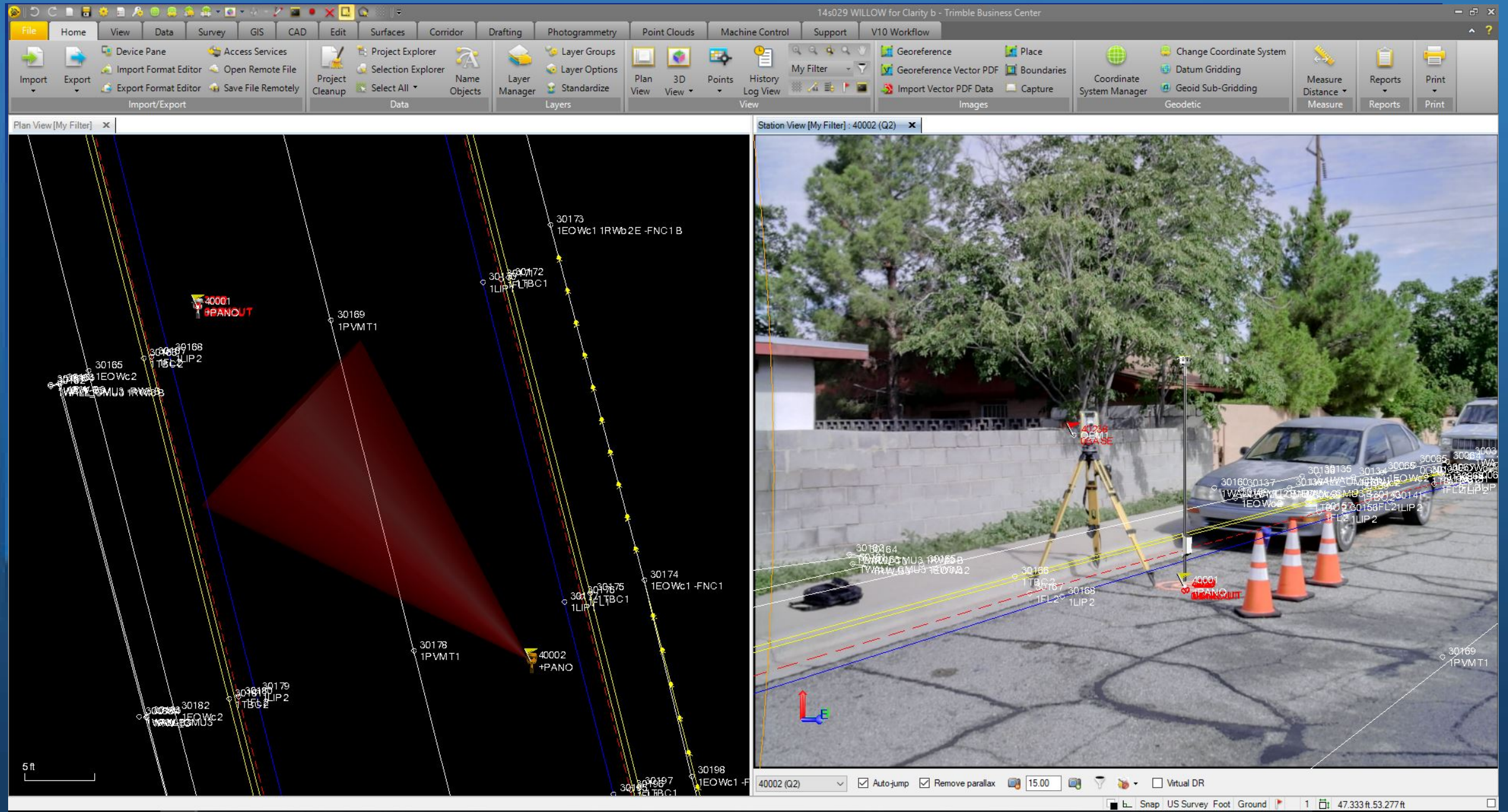
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Export
Device Pane
Import Format Editor
Export Format Editor
Access Services
Open Remote File
Save File Remotely
Import/Export
Project Cleanup
Project Explorer
Selection Explorer
Select All
Name Objects
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Layer Manager
Layer Groups
Layer Options
Standardize
Layers
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3D View
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History Log View
My Filter
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Import Vector PDF Data
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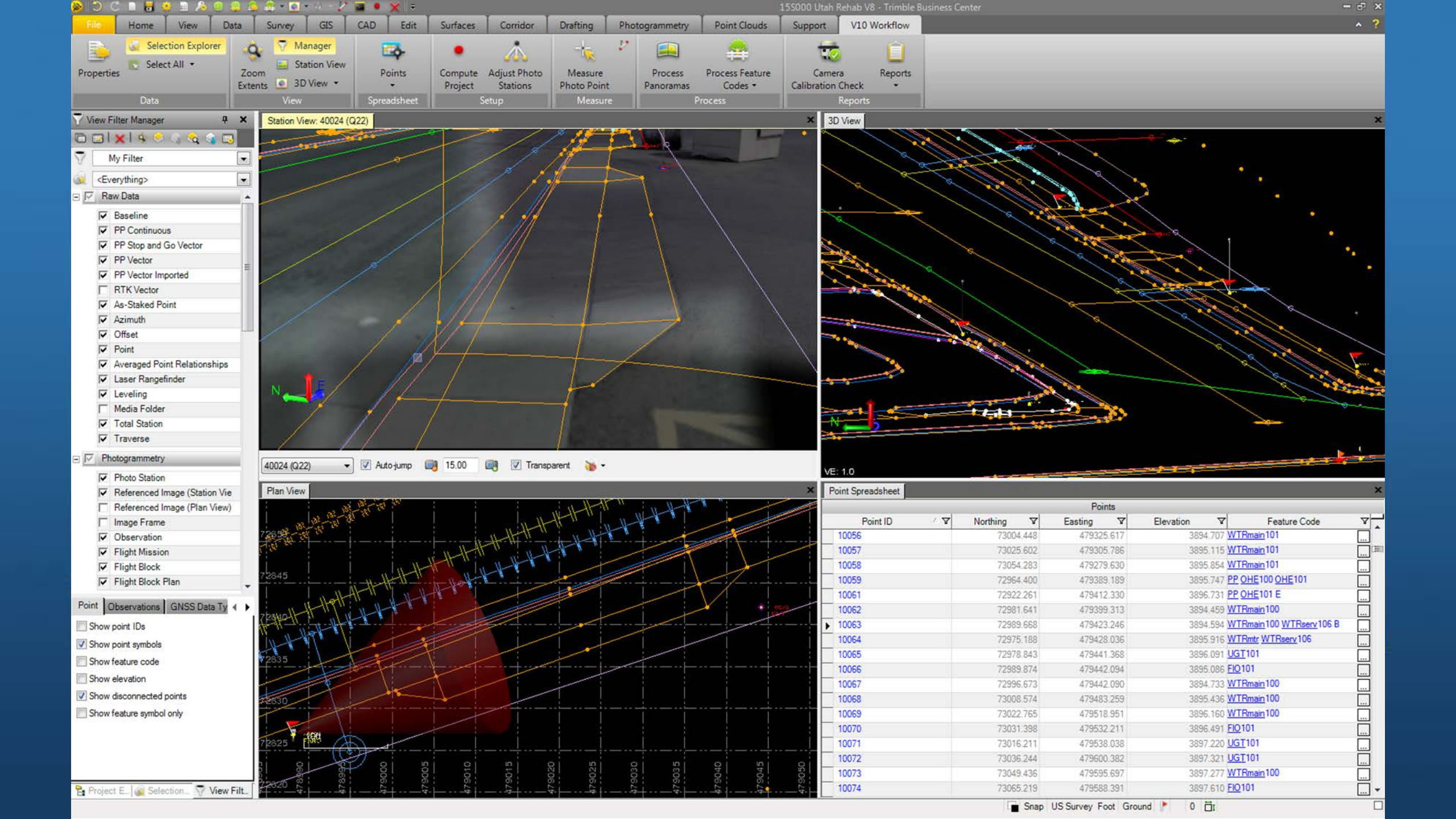
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Measure Photo Point
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Process Feature Codes
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My Filter
<Everything>
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PP Stop and Go Vector
PP Vector
PP Vector Imported
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Leveling
Media Folder
Total Station
Traverse
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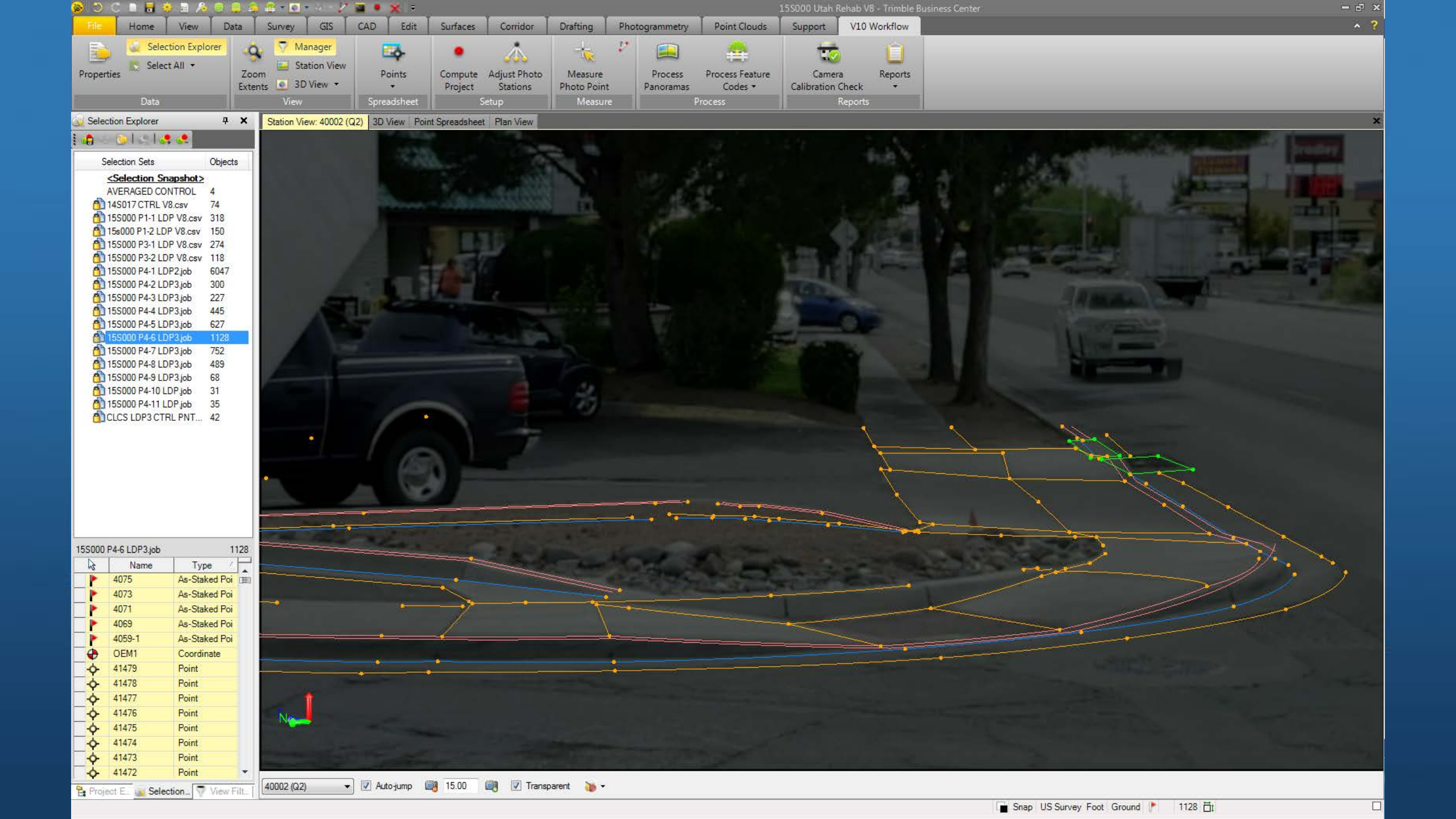
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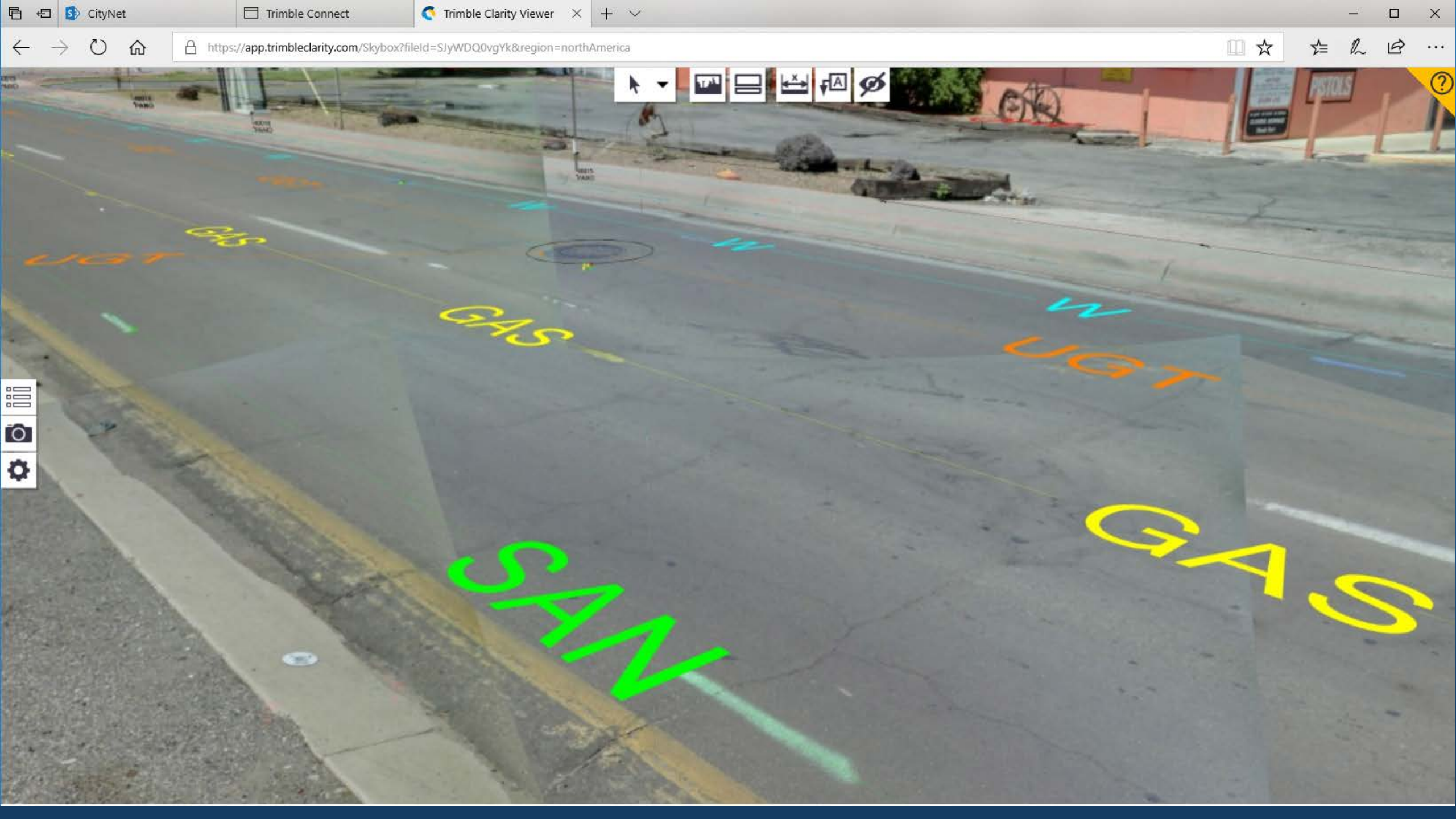
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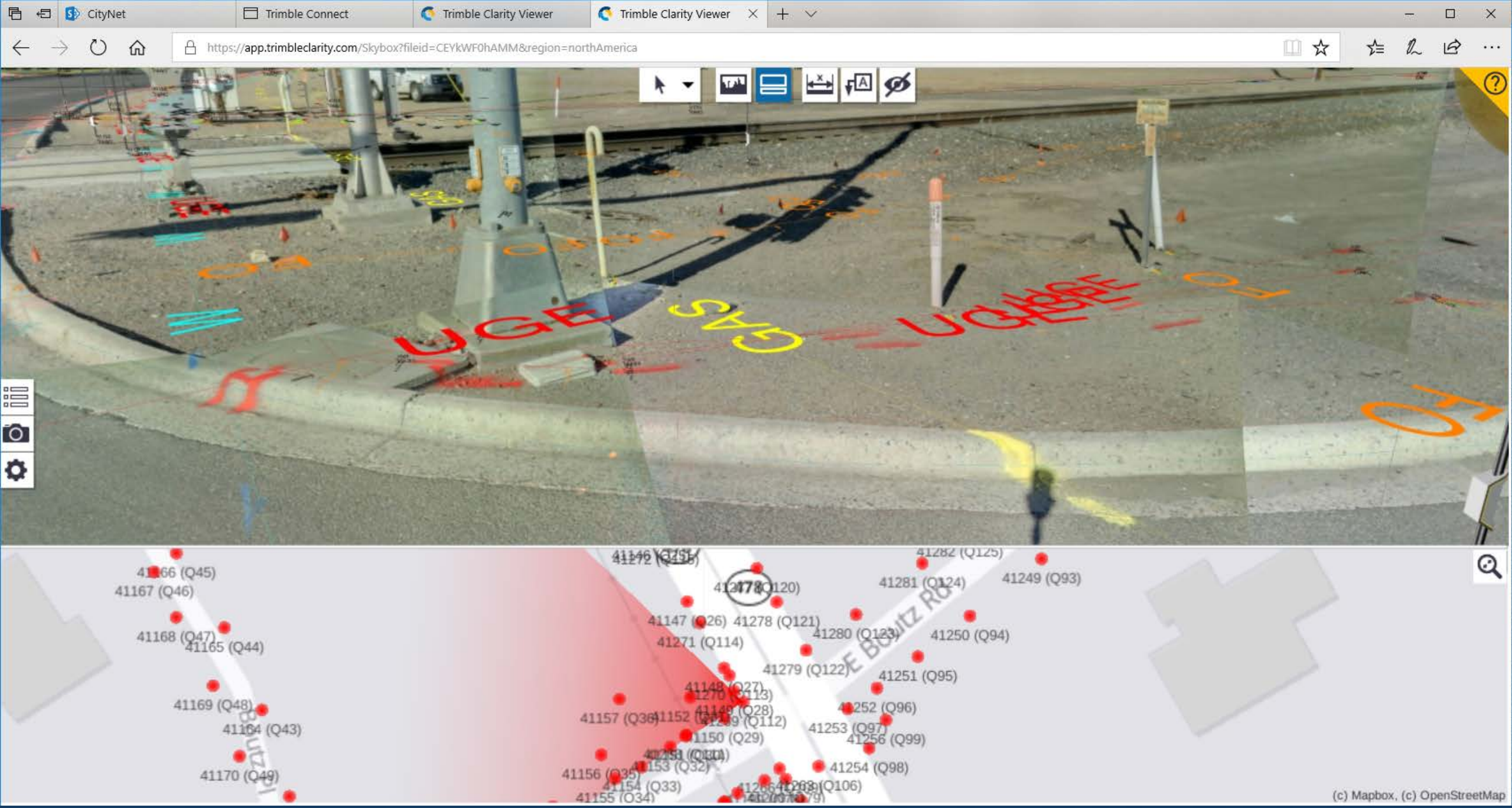
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(c) Mapbox, (c) OpenStreetMap

CityNet | Trimble Connect | Trimble Clarity Viewer | Trimble Clarity Viewer | Trimble Clarity Viewer

https://app.trimbleclarity.com/Skybox?fileid=FjioIFFII20&region=northAmerica

Issues

- Can’t have data transfer be a burden on the design process
- “GIS-centric” v. “CAD-centric” thinking (e.g., layers, projections, points, attributes)
- Very complex system—software and workflow—and easily broken
- Software updates disrupt our processes—test before upgrading

What have we learned?

- Leverage staff
  - Limited resources
  - Surveyors, GIS Technicians, Engineering Techs in all departments all contribute
  - Standardize processes/Training
- Develop data
  - Understand each others data/QAQC
- Leadership
  - Different departments have different priorities
  - Buy-in from Directors?

Contacts

Scott Farnham, PE, PS

City Surveyor

Public Works/Project Development

575-528-3118

sfarnham@las-cruces.org

Timothy Pitts, PhD

Planning & Neighborhood Services Administrator

Community Development

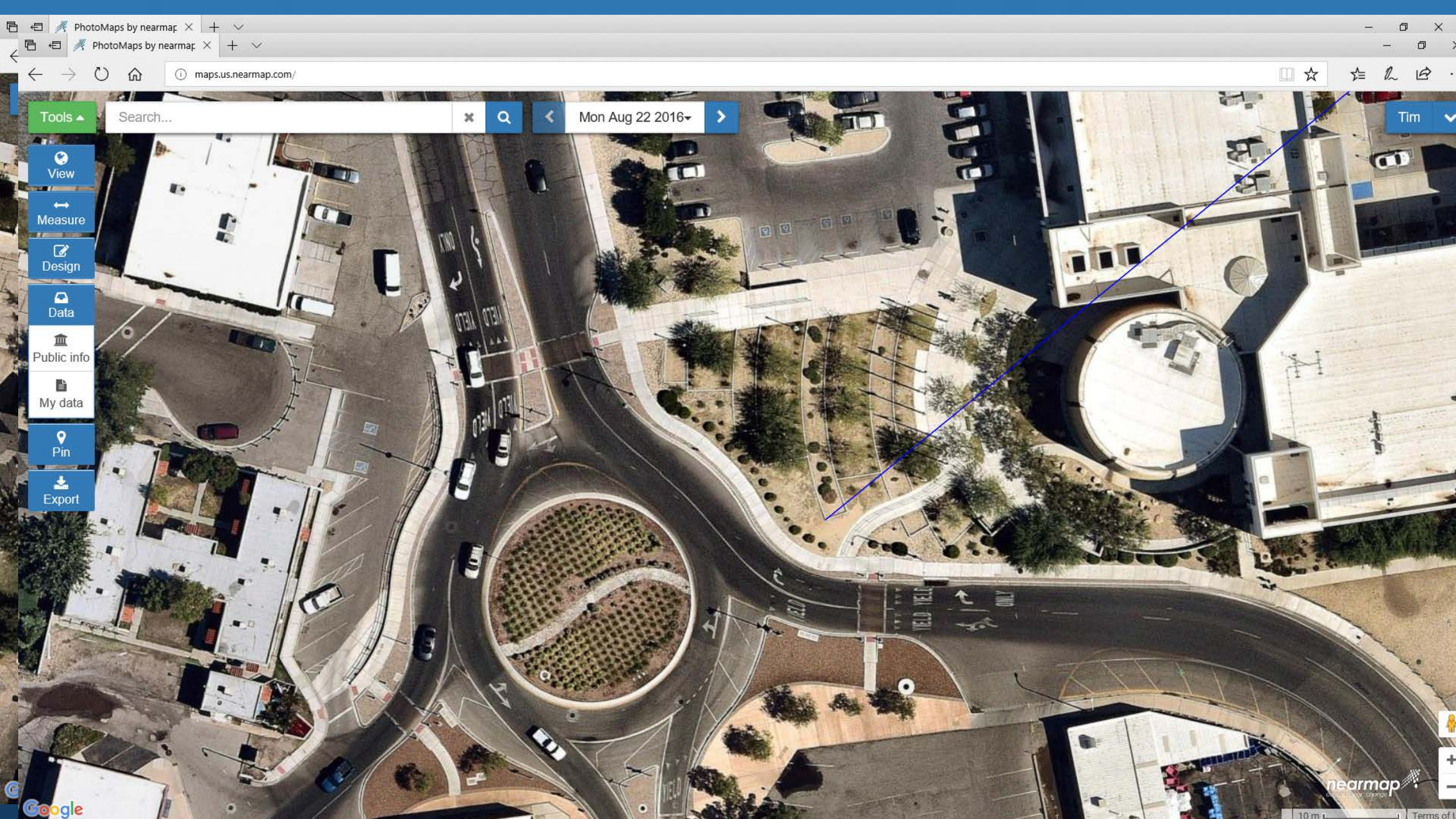
575-528-3089

tpitts@las-cruces.org

City of Las Cruces®

PEOPLE HELPING PEOPLE

- The City of Las Cruces is developing a true and cost-effective survey-grade GIS database. We have developed an iterative process to leverage both mapping grade and survey grade data collection within various City department workflows. The GIS database is used to share the geospatial data across software platforms. This allows us to use the same data in land master planning, conceptual/preliminary design, and final engineering by increasing accuracy at each stage of project development.


PhotoMaps by nearmap
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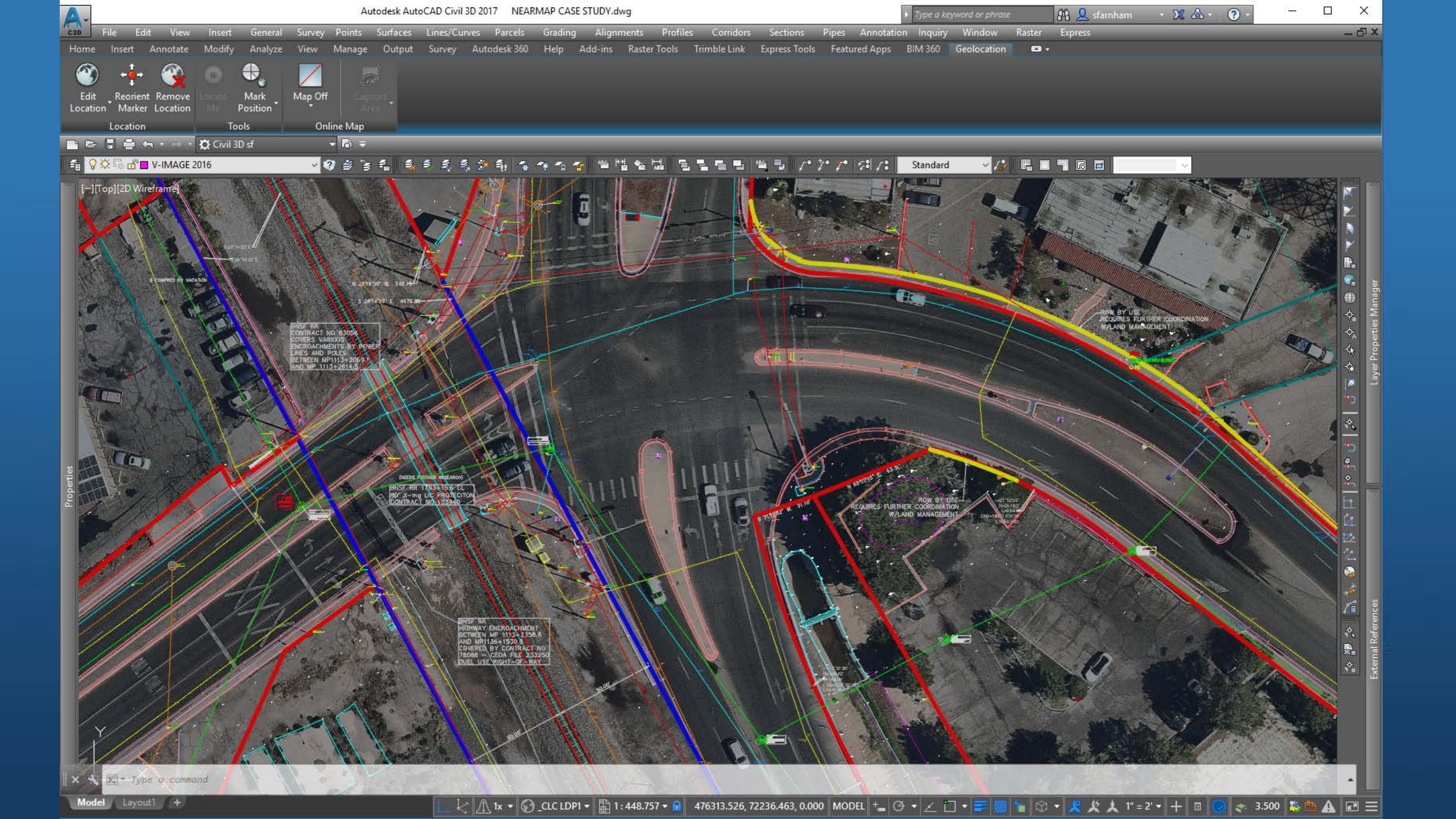
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1 : 448.757
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1" = 2'
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