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Photogrammetry Startup with the AEC Collection and Autodesk Construction Cloud

Hayes Johnson
BIM/VDC Manager

About Me

- BIM/VDC Manager for BL Harbert Domestic Division
- Manage 3D Coordination, BIM Utilization throughout Project, & Reality Capture Initiative
- Mechanical Engineer by Degree & spent beginning of career in Automotive Manufacturing
  - Comfortability and aptitude for viewing/creating assets in 3D came from this experience.

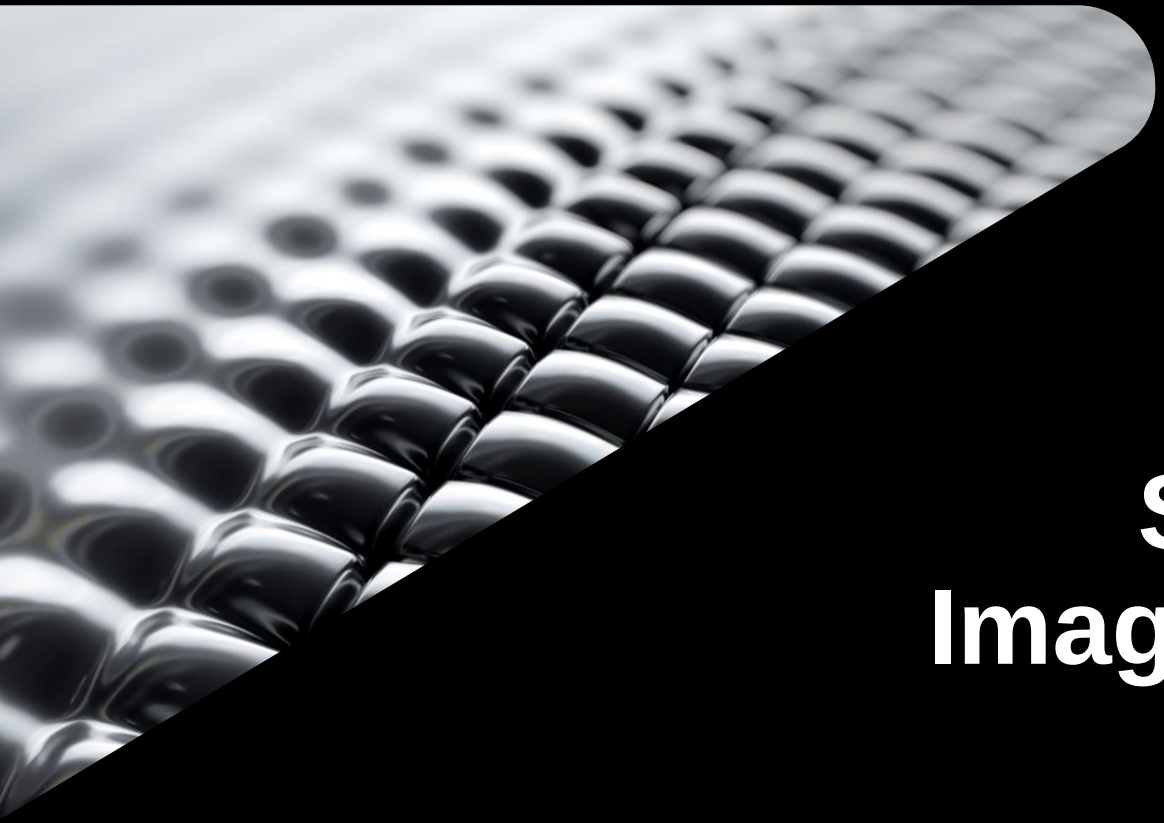
Purpose of the Session:

An inclusive standalone resource for organizations wanting to use Autodesk products to determine how photogrammetry can be utilized to improve current business practices.

Lessons learned setting up to fly drones and capture images for photogrammetry

Technical instruction on products available to process photogrammetry and create & share deliverables

Lessons learned on evaluating business cases and seeking support from ops & mgmt to start a program



Building Foundations: Setting Up for Image Acquisition

Steps to first Photogrammetry Capture

Get Certifi

- Register on FAA websi
- Complete online or in-pe training program
- Practice flying
- Take and pass exam

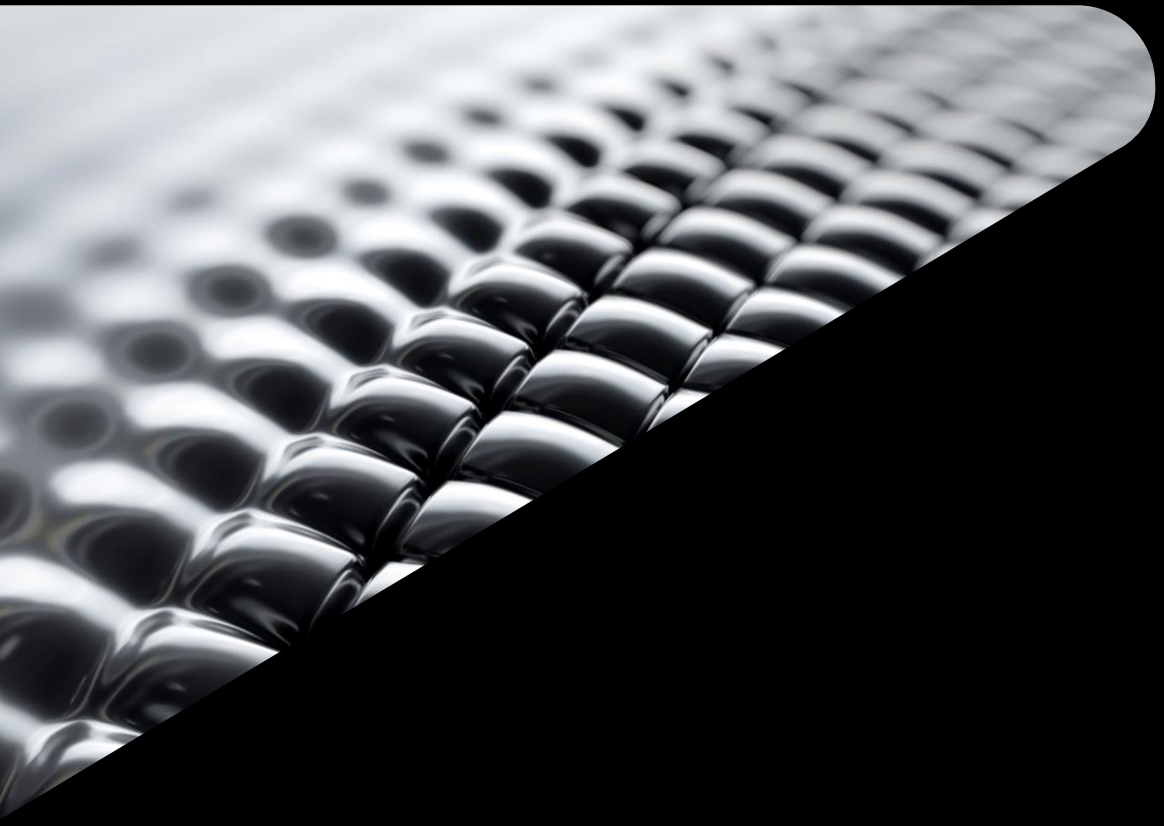
- st for intended application?
- Register and insure drone once acquired

- Overlap required?
- Best Gimbal Angle?
- Ground Control necessary?
- How many batteries needed?

Fly

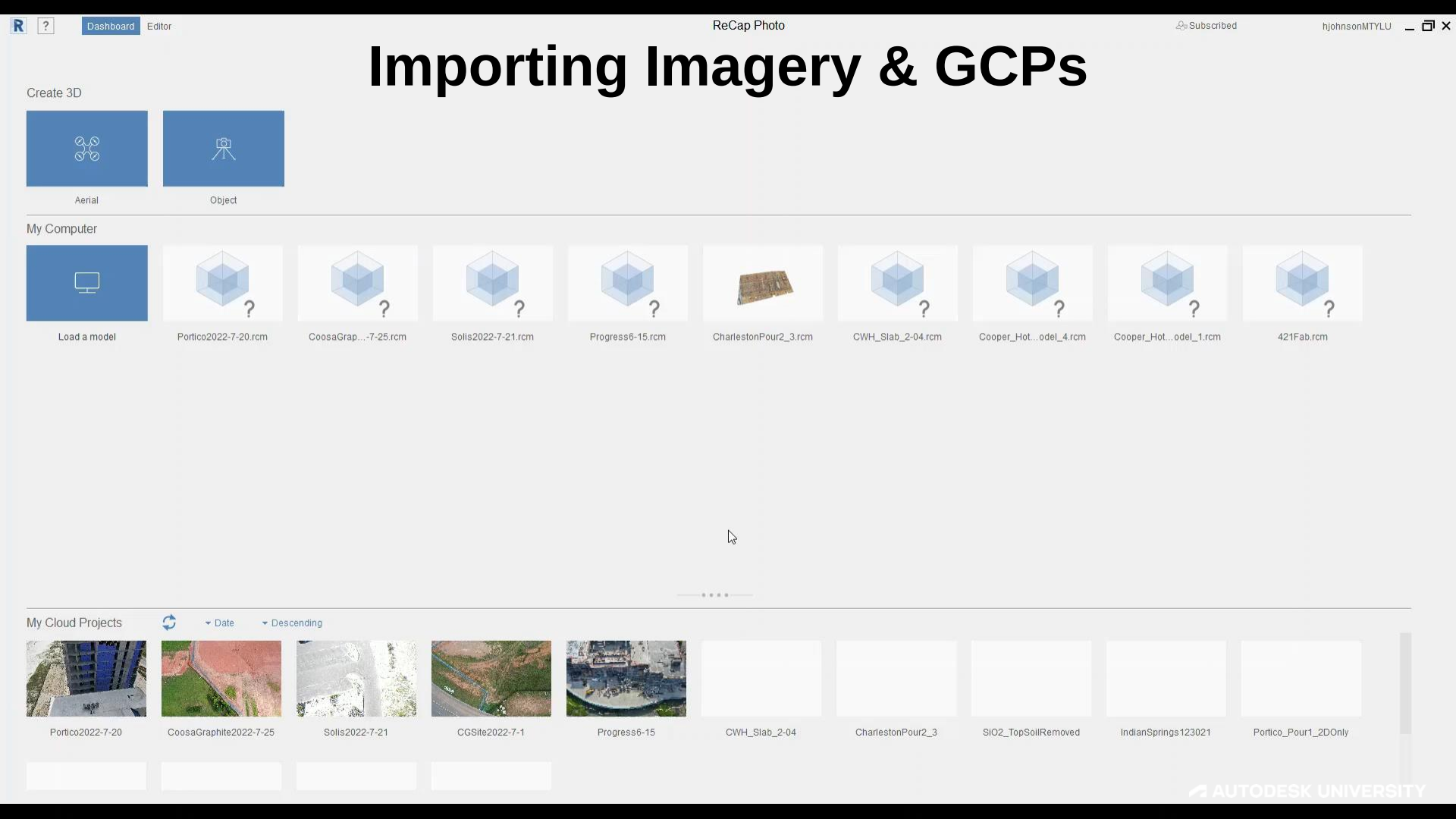
- Pick site & application
- Coordinate with stakeholders
- Get authorization
- Ensure no severe weather
- Find time in own schedule

DRONE SERVICES

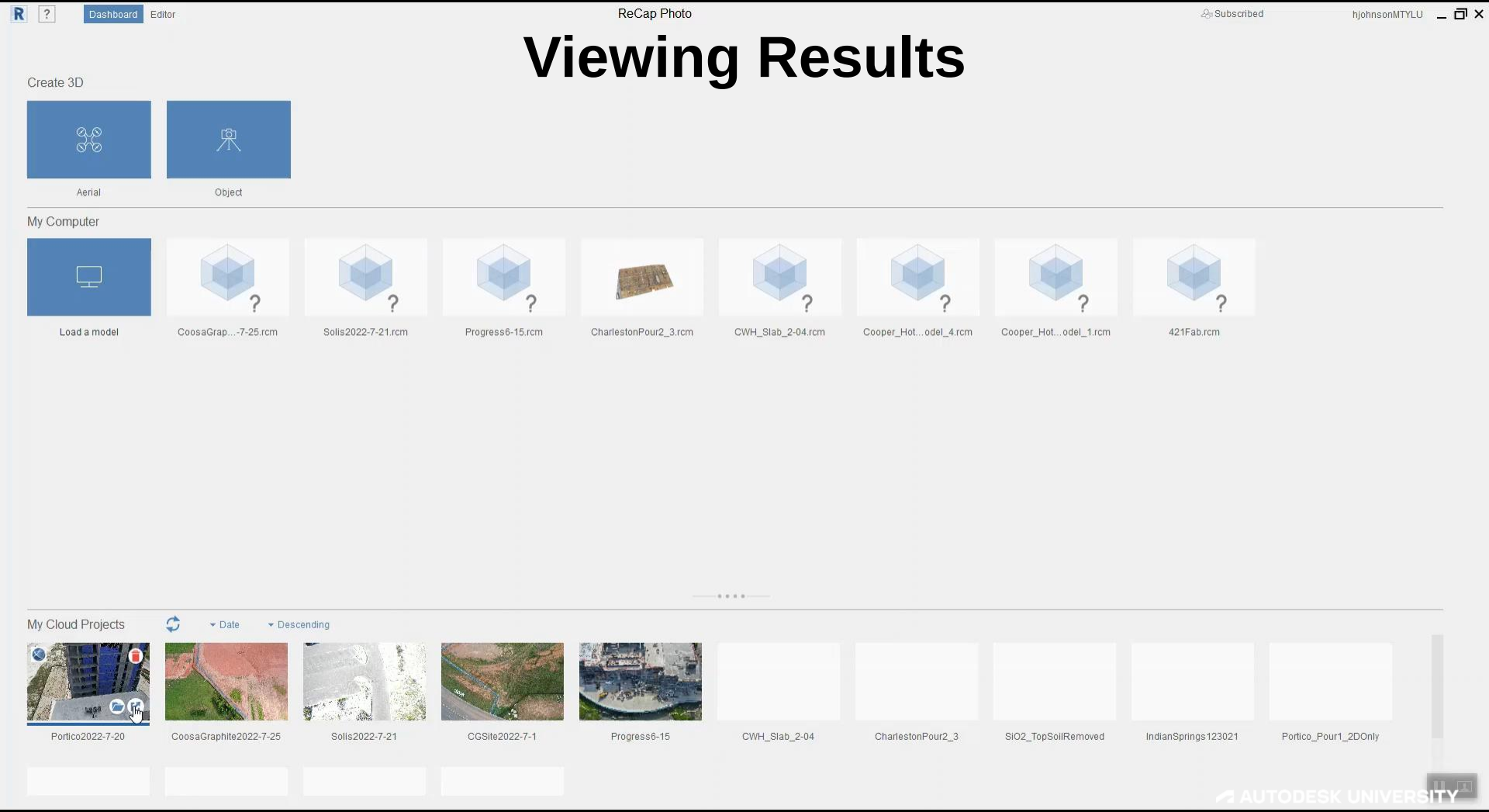


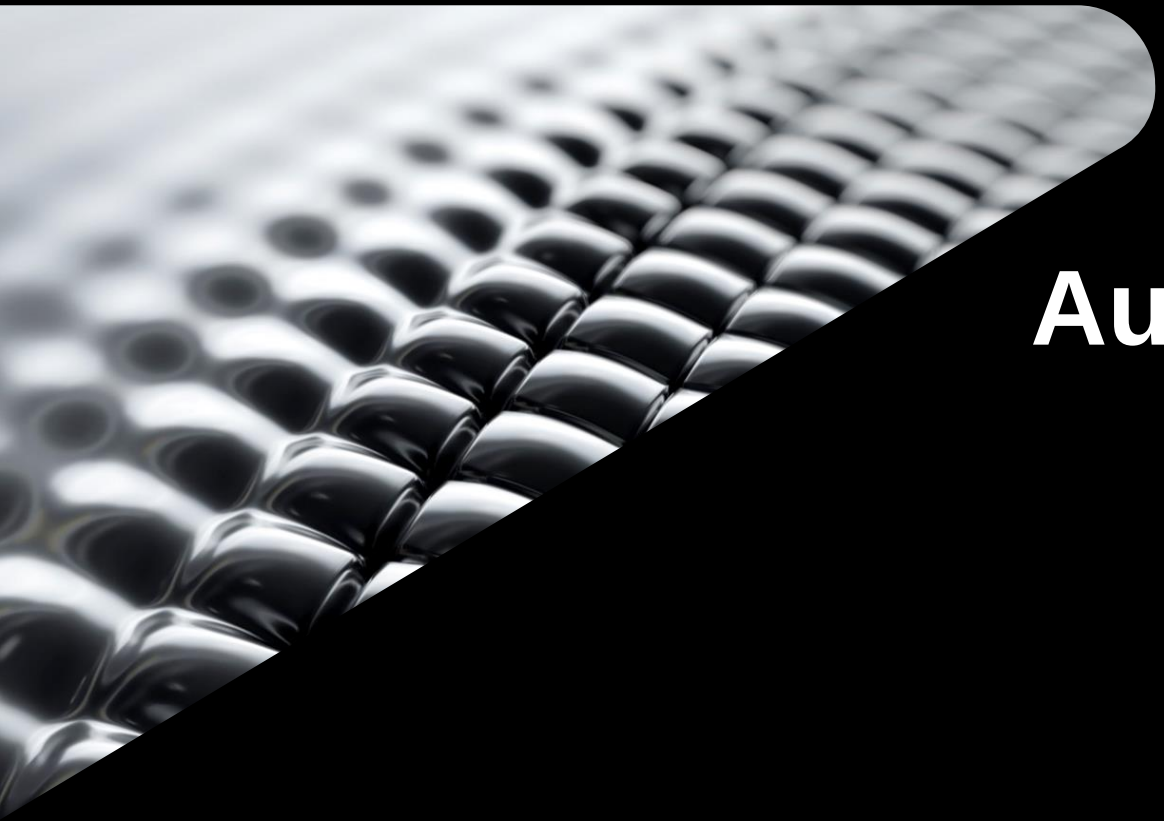
Processing Imagery: ReCap Photo

Importing Imagery & GCPs



Viewing Results

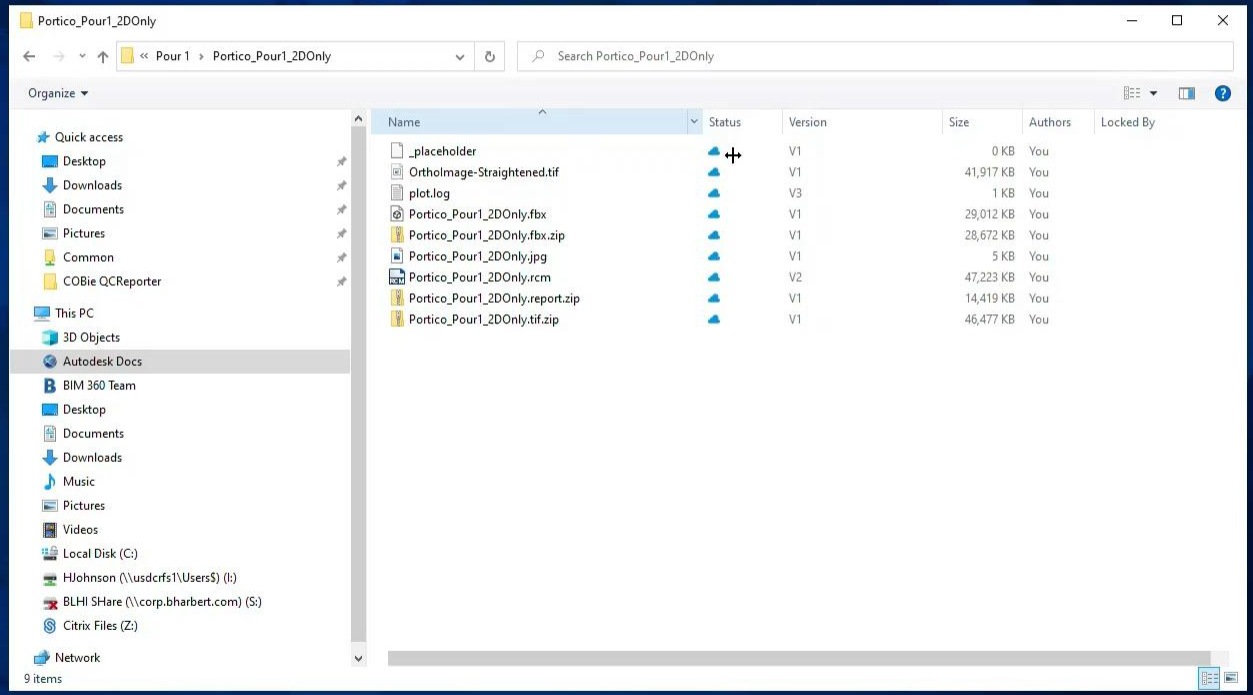


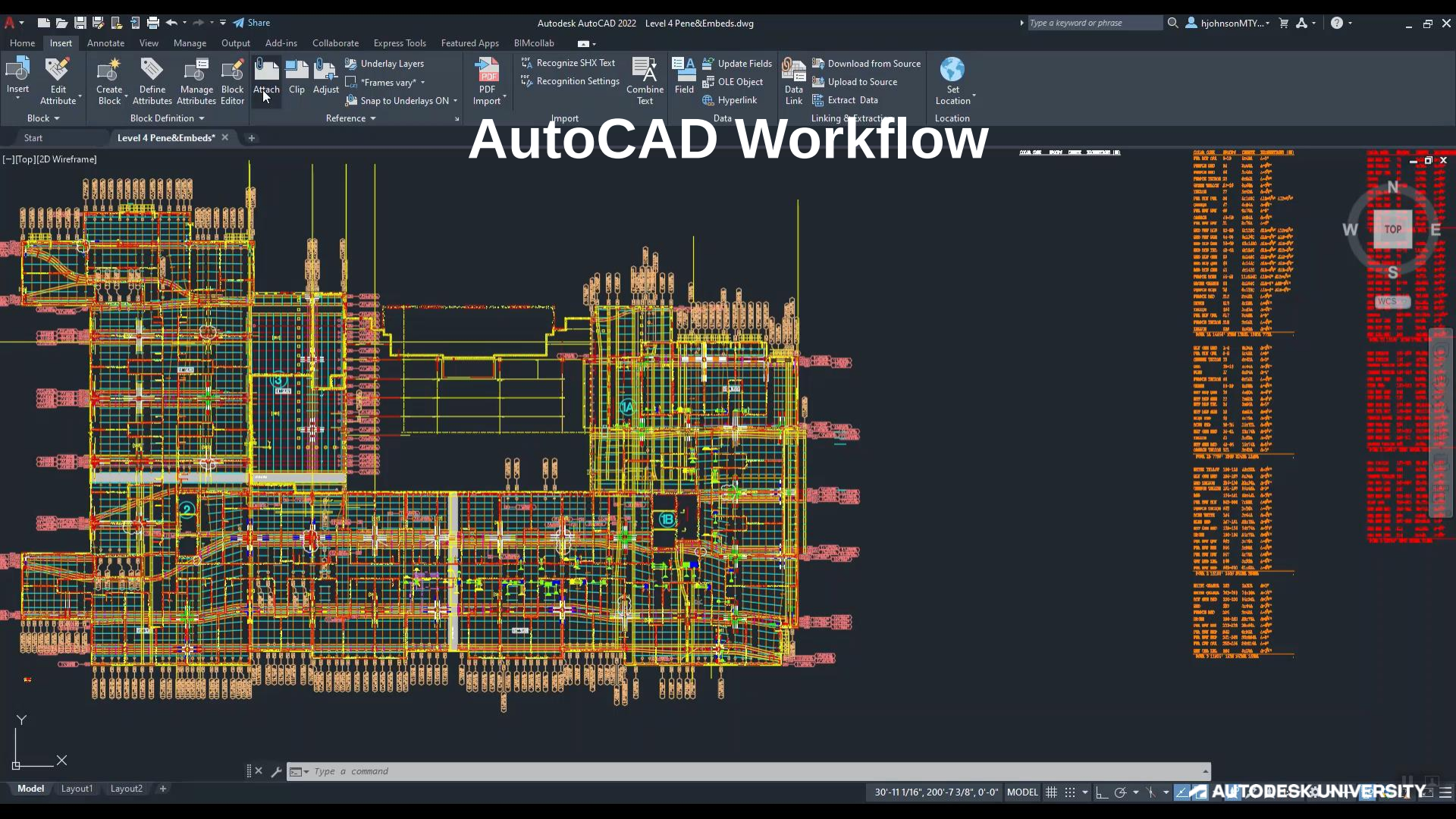


AutoCAD for 2D QA/QC & As-Builting


Ortho – Photo
(aka orthoimage aka geotiff)

Extracting GeoTiff




Autodesk AutoCAD 2022 Level 4 Pene&Embeds.dwg
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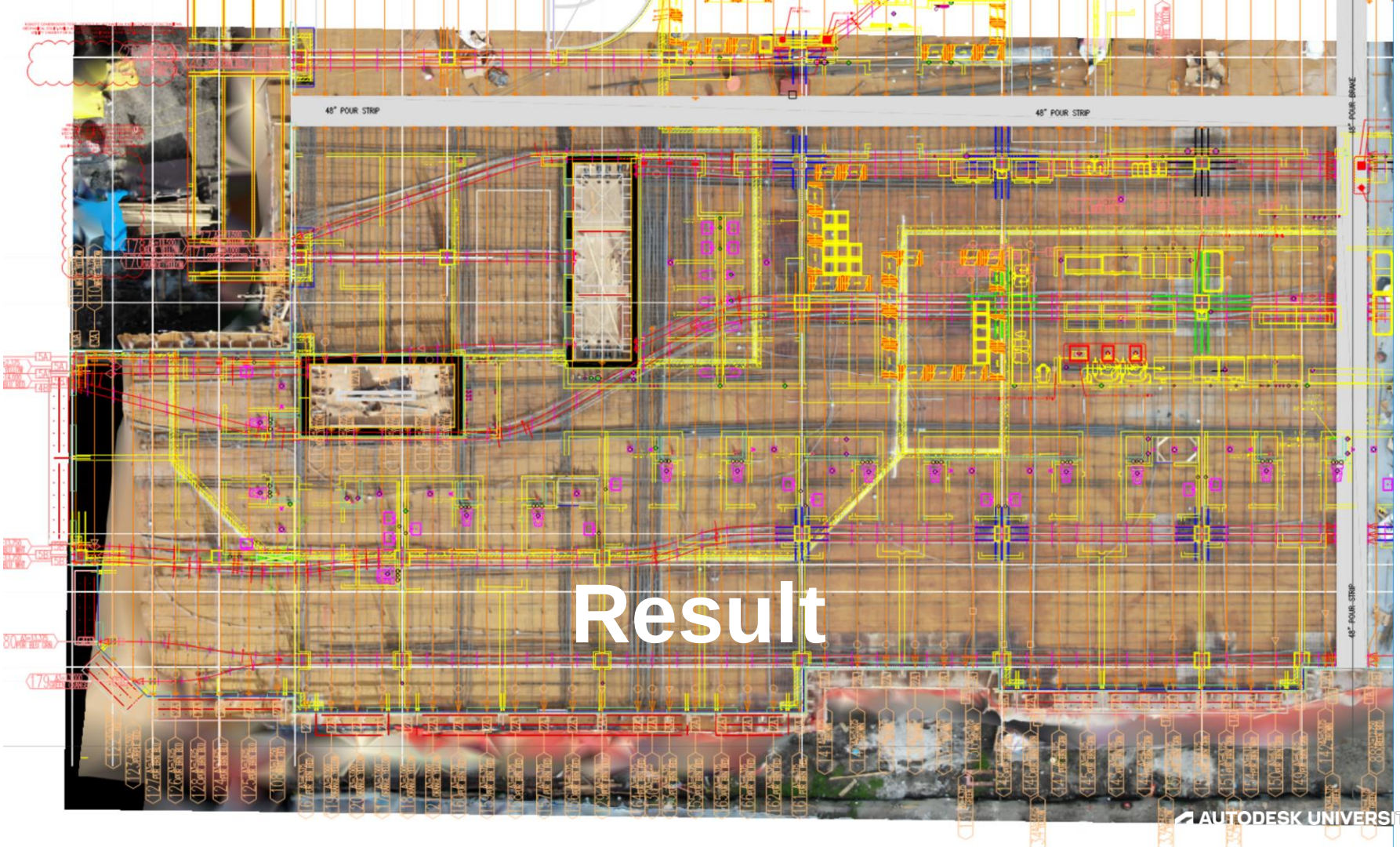
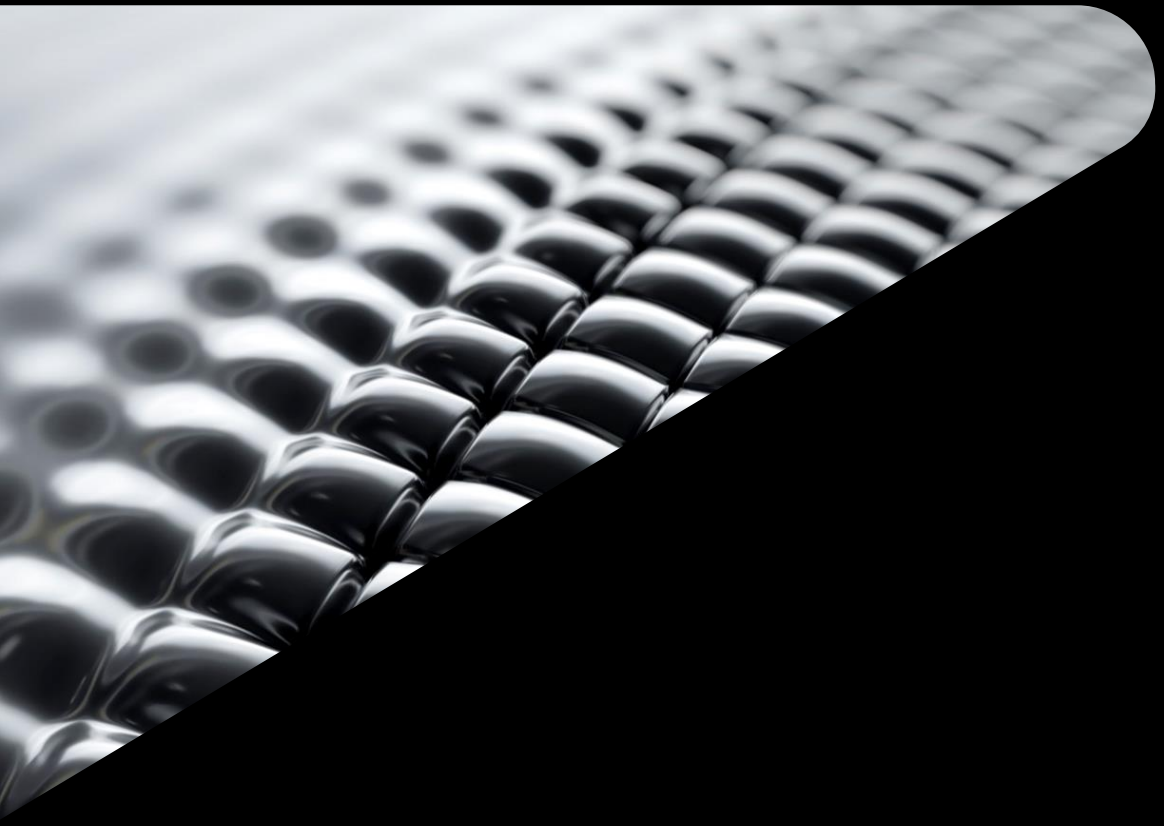
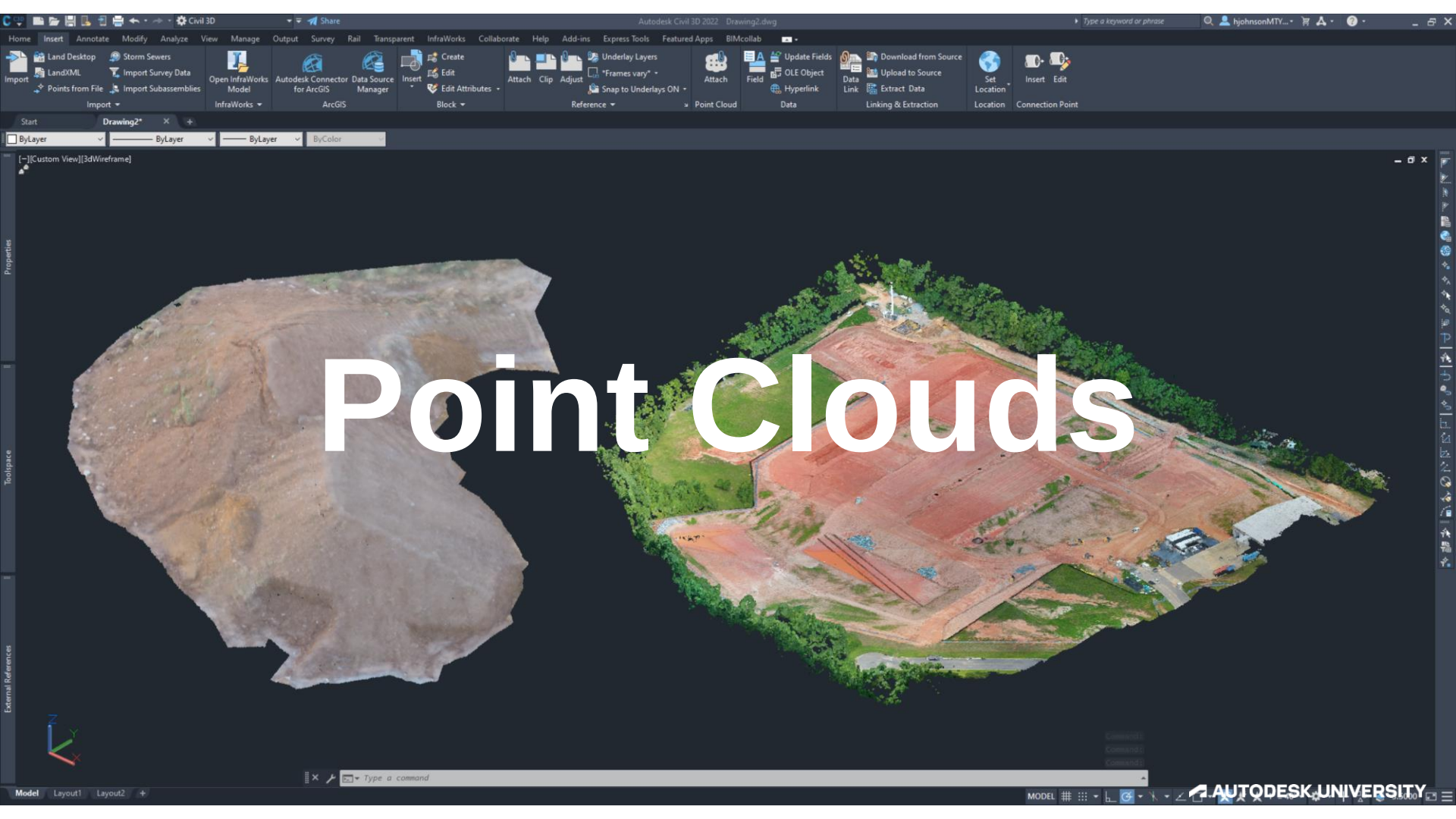




Civil 3D for Sitework Analysis


Point Clouds
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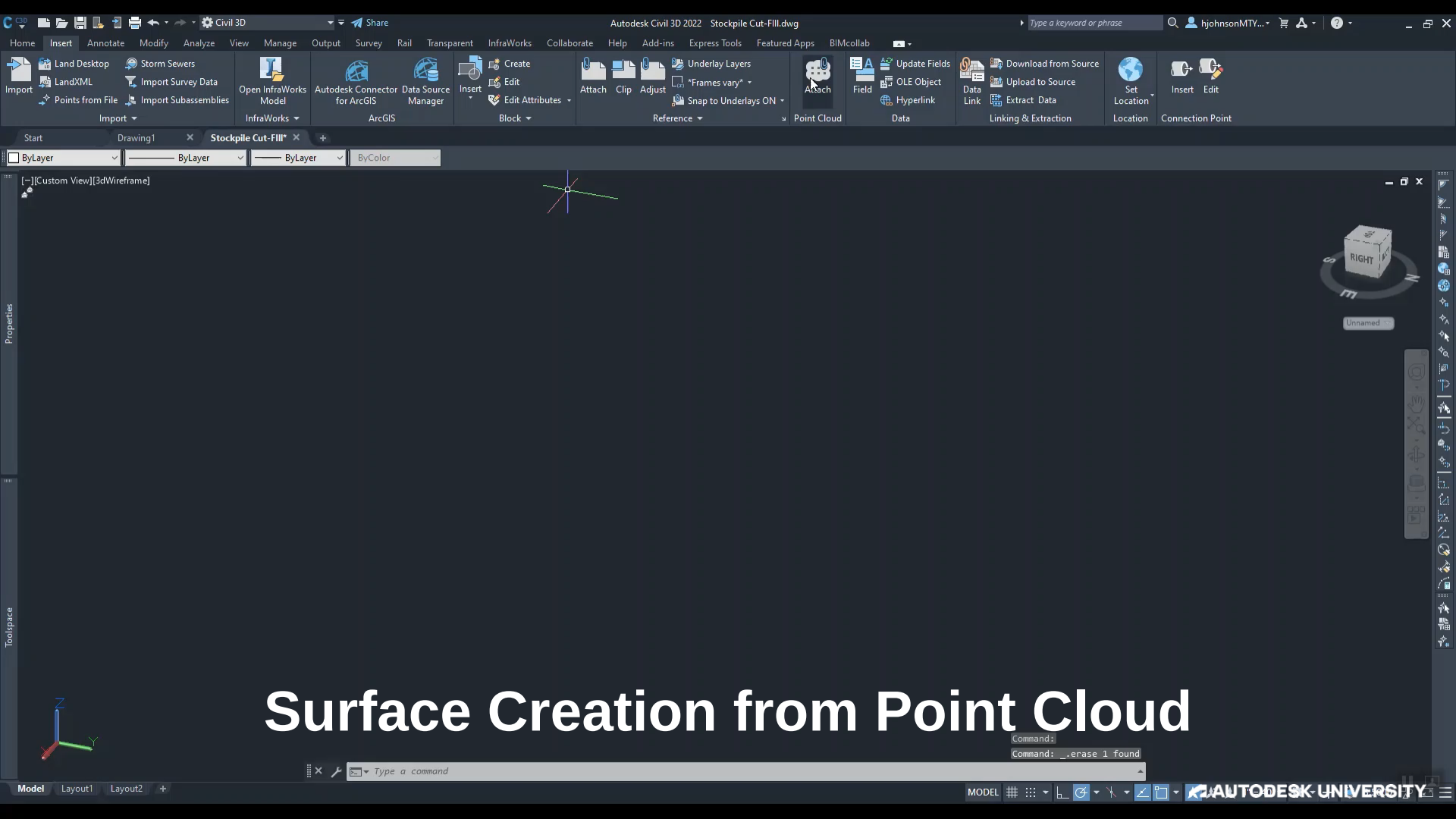
Civil 3D
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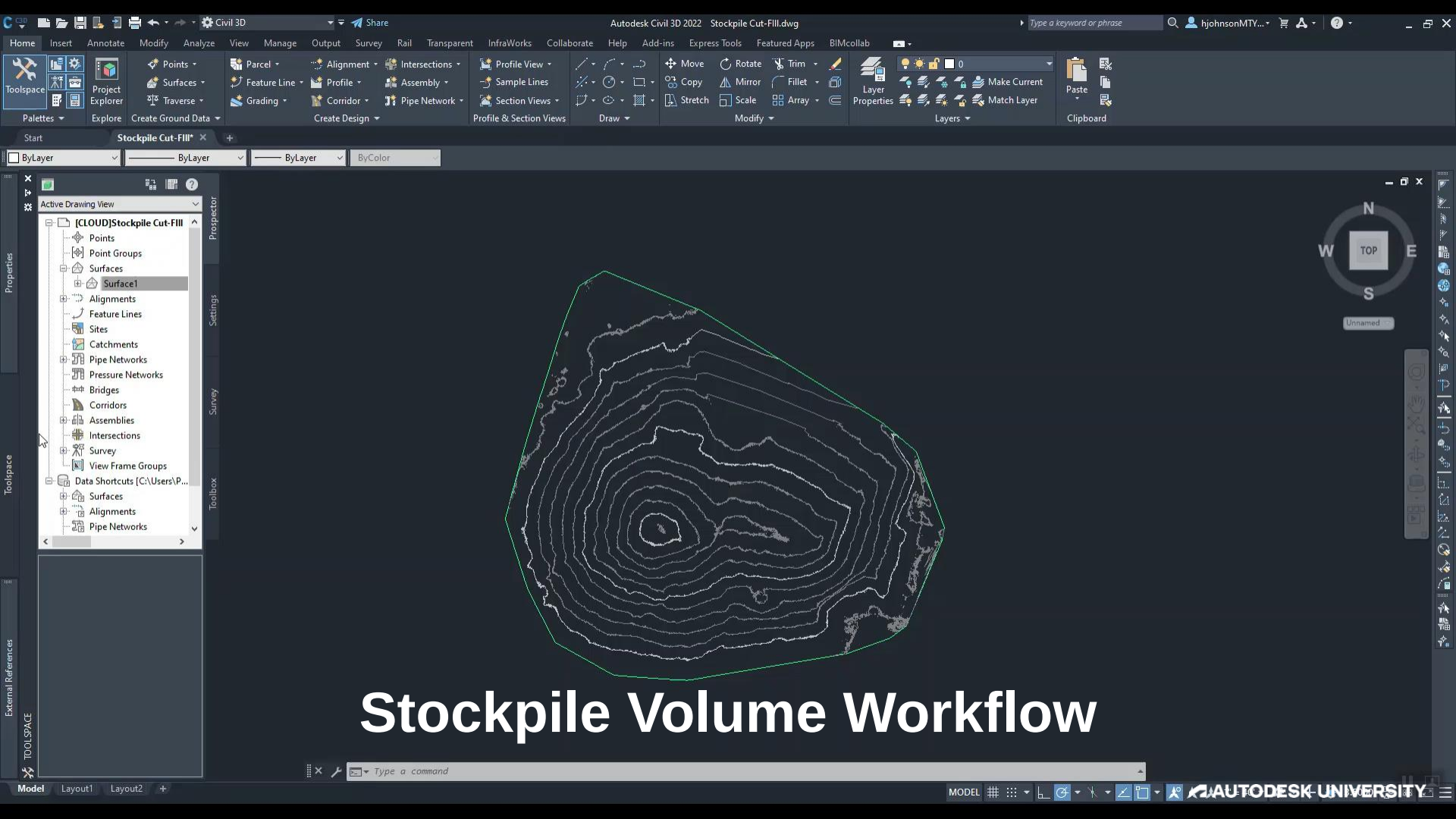
Stockpile Analysis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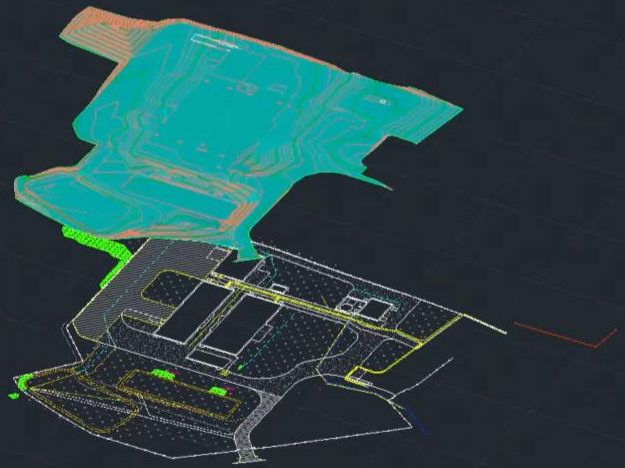
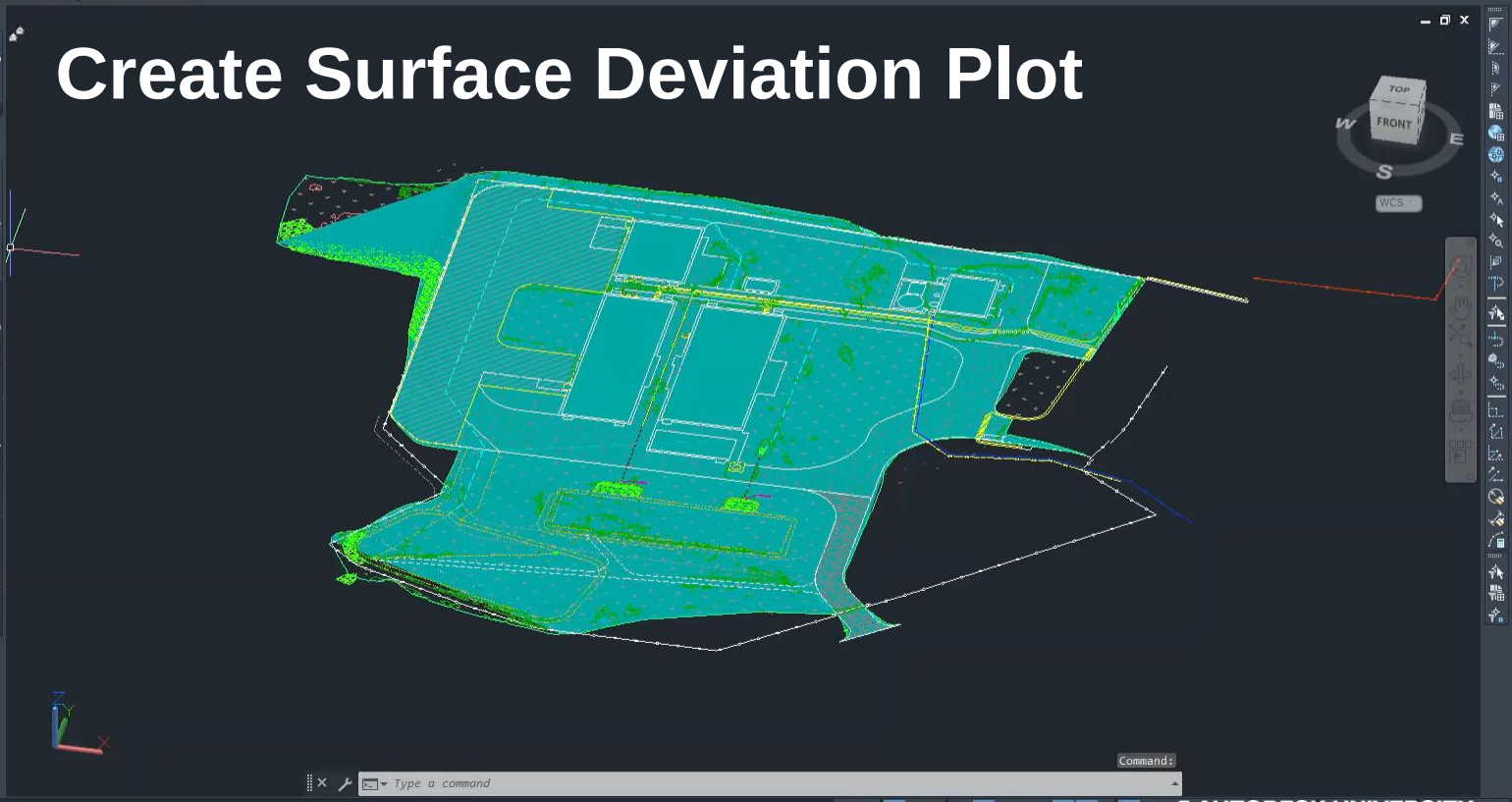
Site Deviation Analysis

Create Surface Volume using Data Shortcut



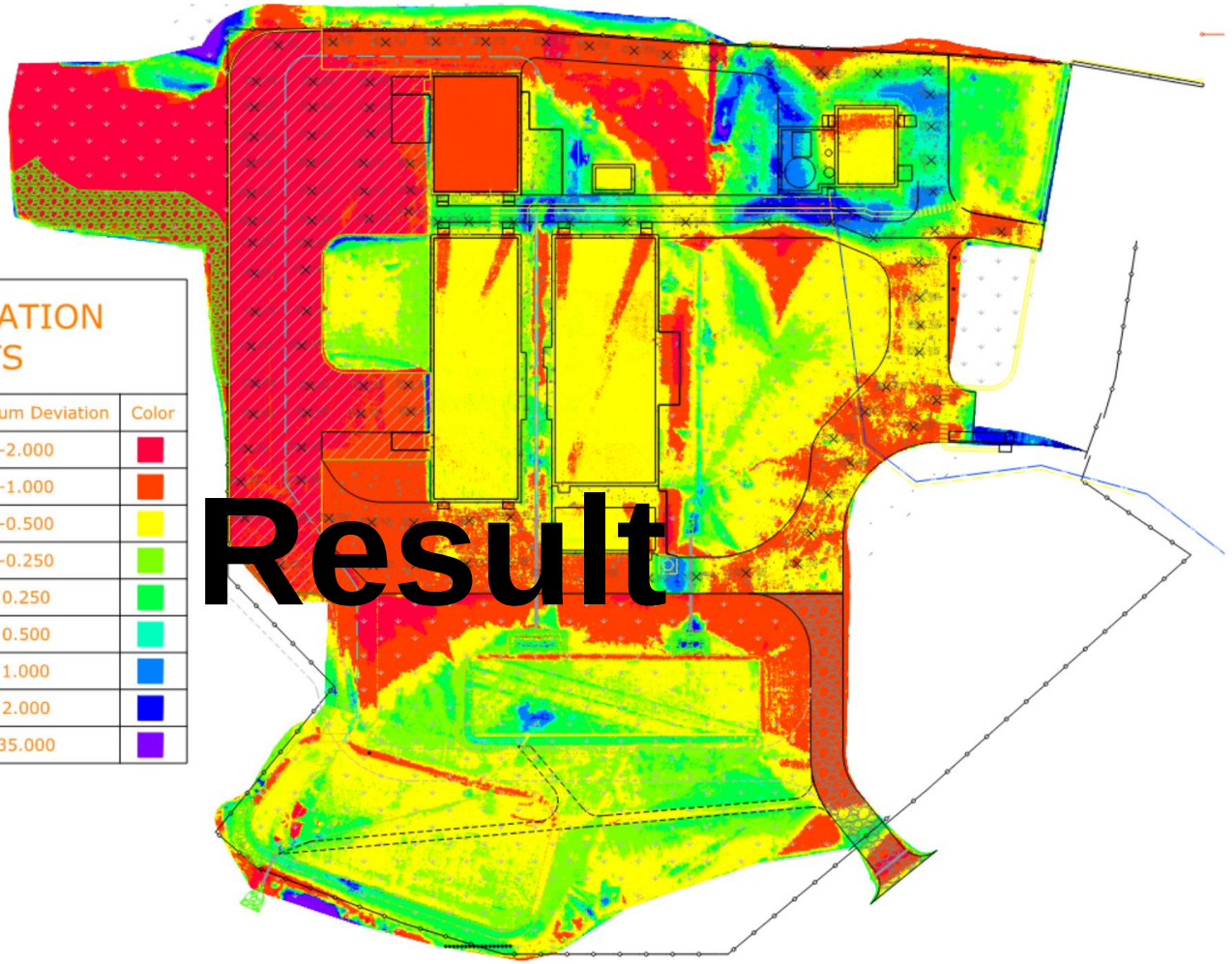
Create Surface Deviation Plot

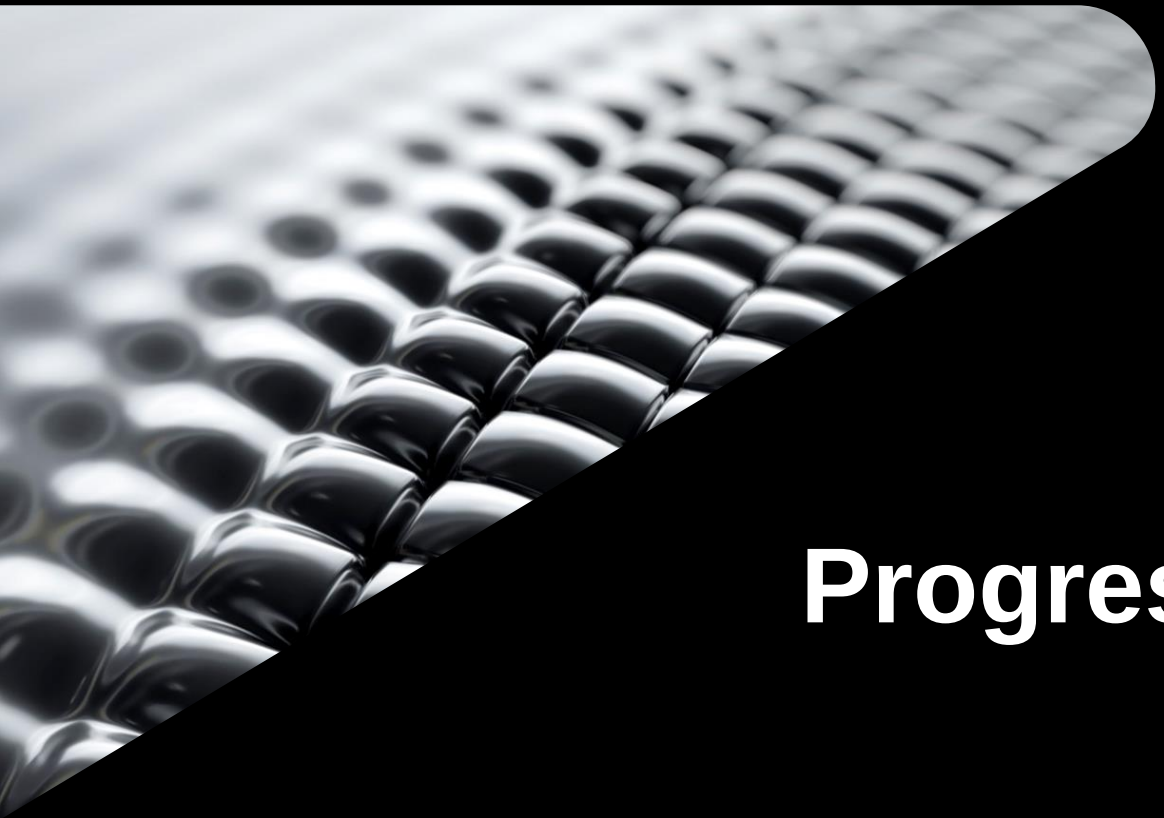


Result

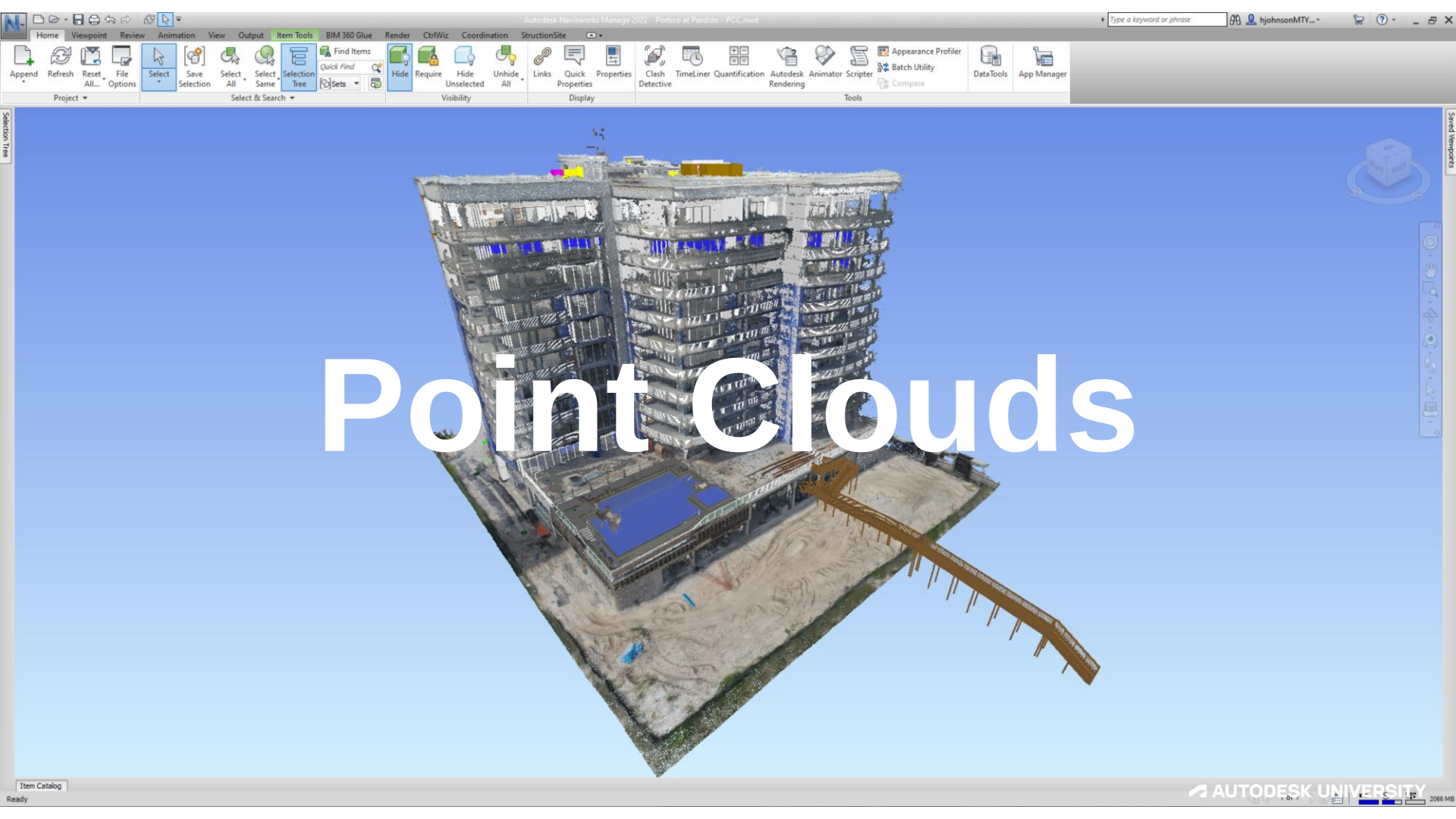
SURFACE DEVIATION GRADIENTS

Number	Minimum Deviation	Maximum Deviation	Color
1	-25.000	-2.000	
2	-2.000	-1.000	
3	-1.000	-0.500	
4	-0.500	-0.250	
5	-0.250	0.250	
6	0.250	0.500	
7	0.500	1.000	
8	1.000	2.000	
9	2.000	35.000	





Navisworks: 3D QA/QC & Progress Monitoring


Point Clouds

4D Progress Check

Takeaways on 3D/4D Usage

Hard to See

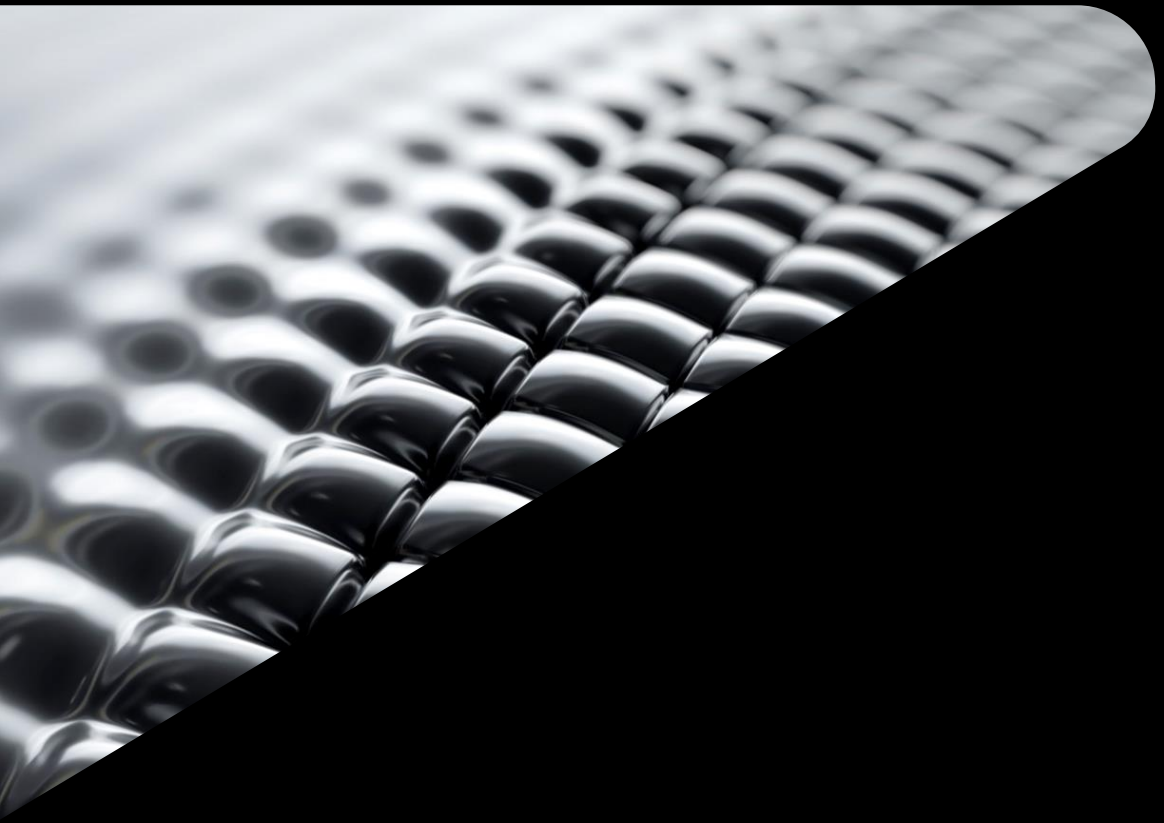
- Point of 4D for this job was to break wall into separate layers to track each activity
- Detail of which layer is currently active hard to see with point cloud overlaid
- Project team preferred just looking at 2D drone image next to 4D schedule

Logistics Not Right

- Plan was to leverage project manager as pilot for job (only one with Part 107)
- Due to busy schedule, PM didn’t have much time to fly for high-quality point cloud
- When he did have time, it was raining, or tower crane was operating

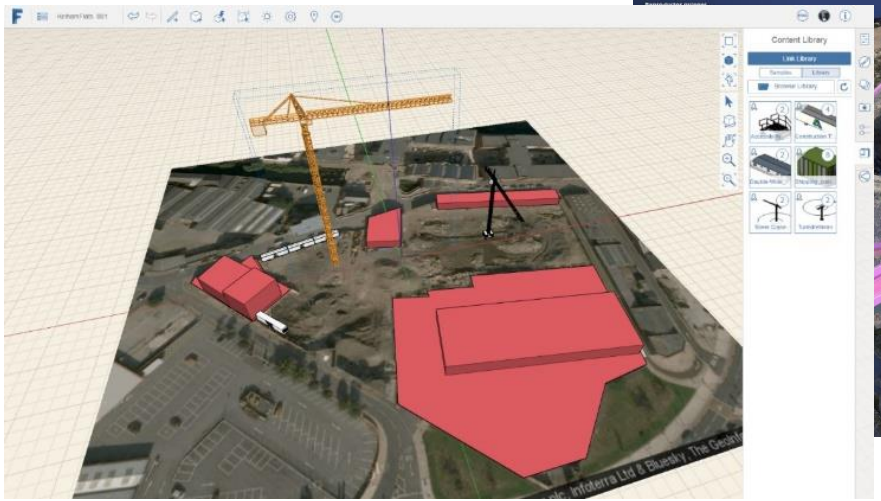
Overkill for Job

- Job not big enough for project team to see benefit of staying after hours or using weekends to make this process work
- No budget to hire additional personnel to try to make it more successful



Logistics Planning

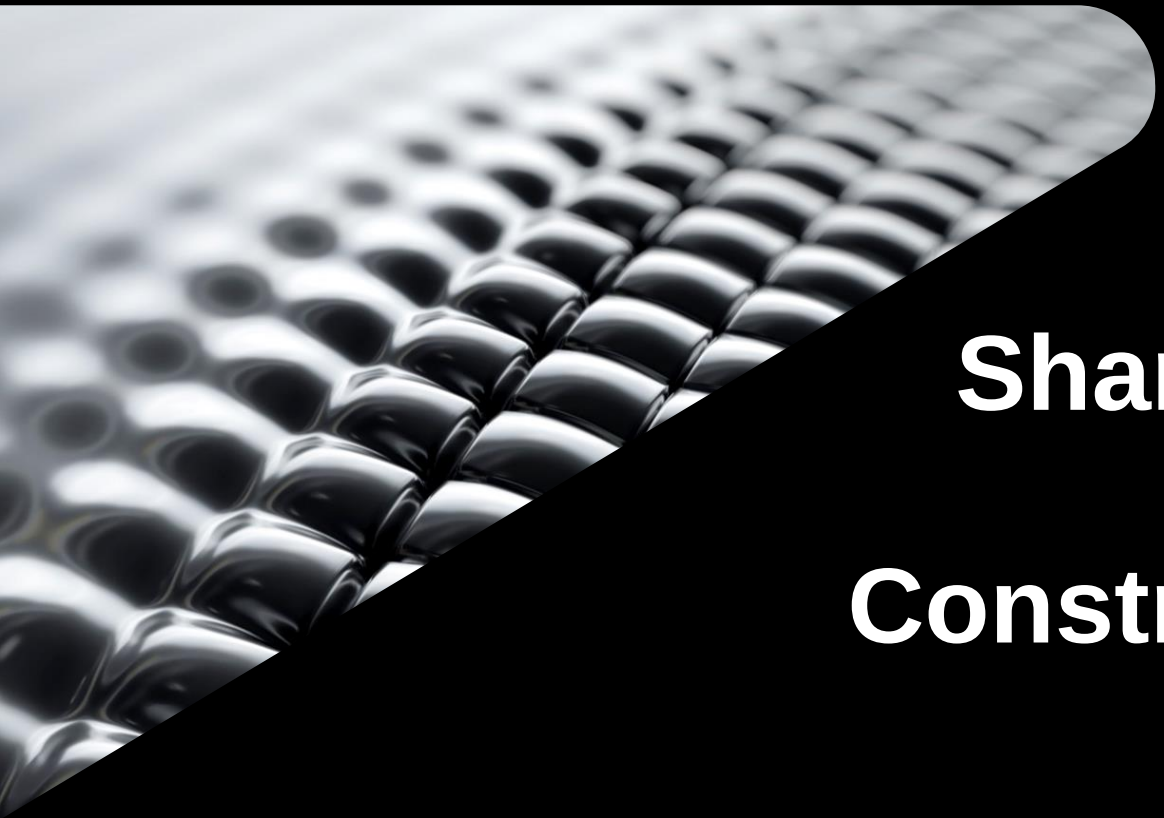
Options in AEC Collection



FormIt

Infraworks

And Navisworks is always an option too



Share your Work: Autodesk Construction Cloud

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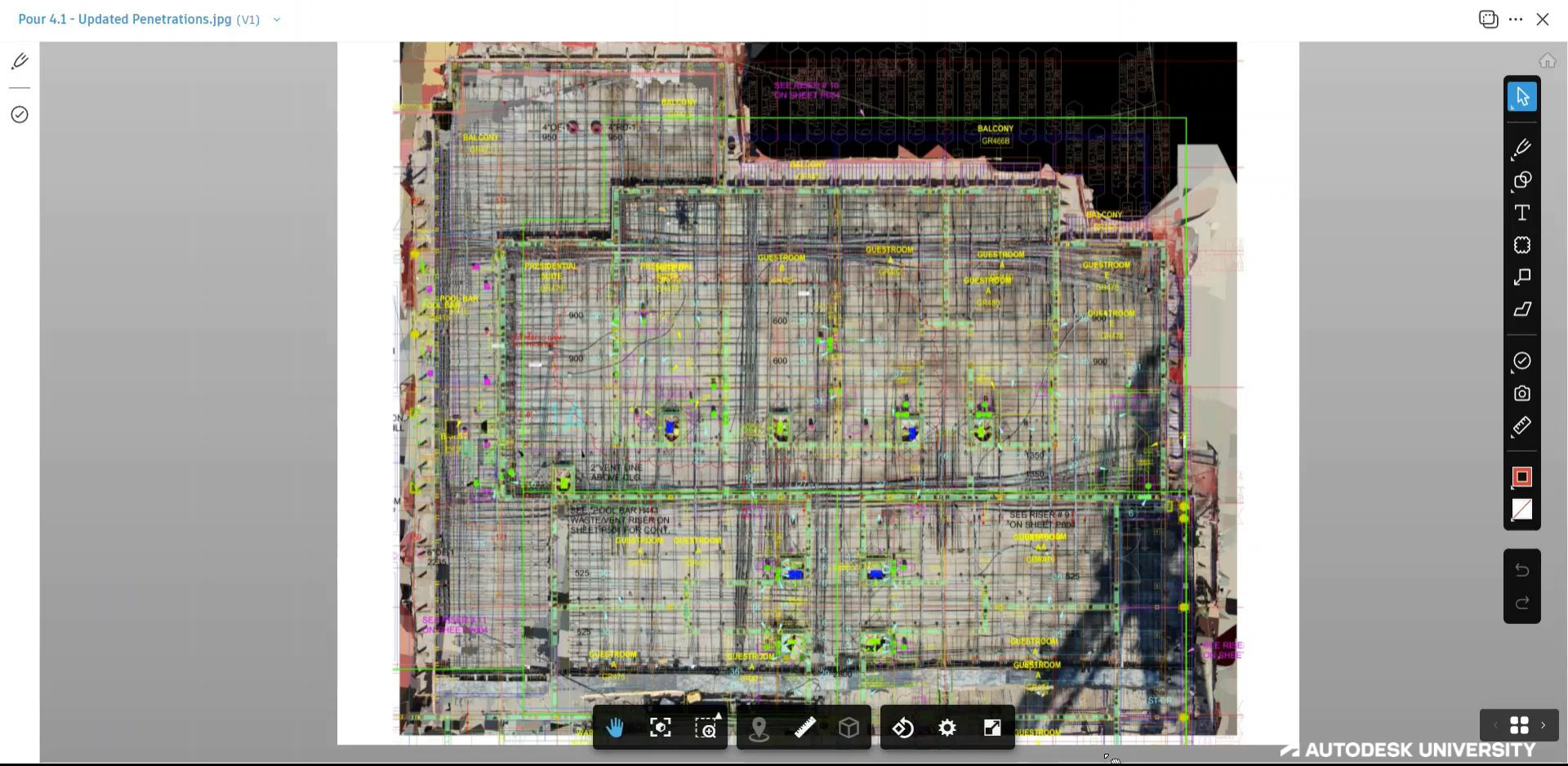
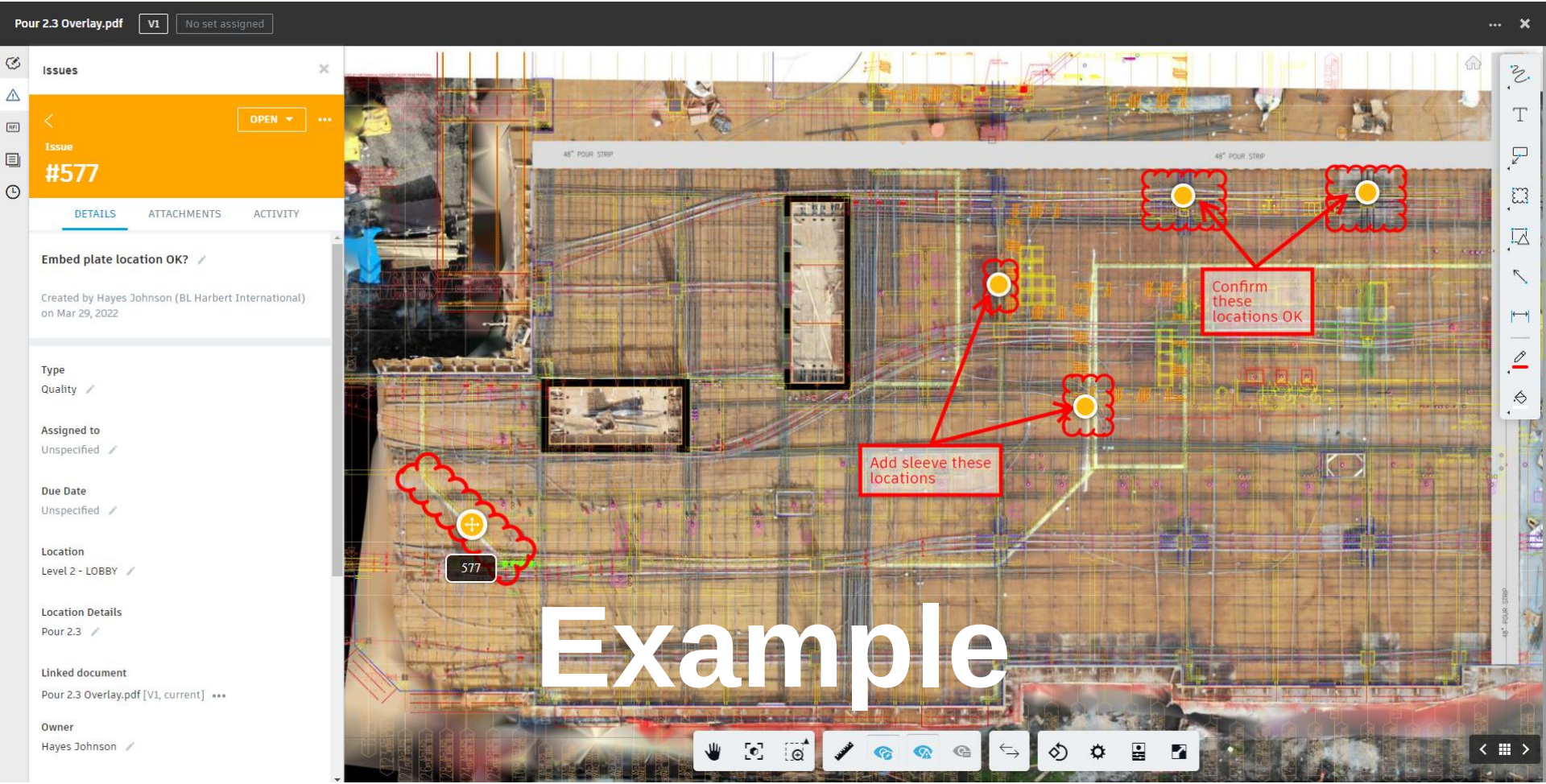
2D Markups and Issues

Adding Markups and Issues in 2D





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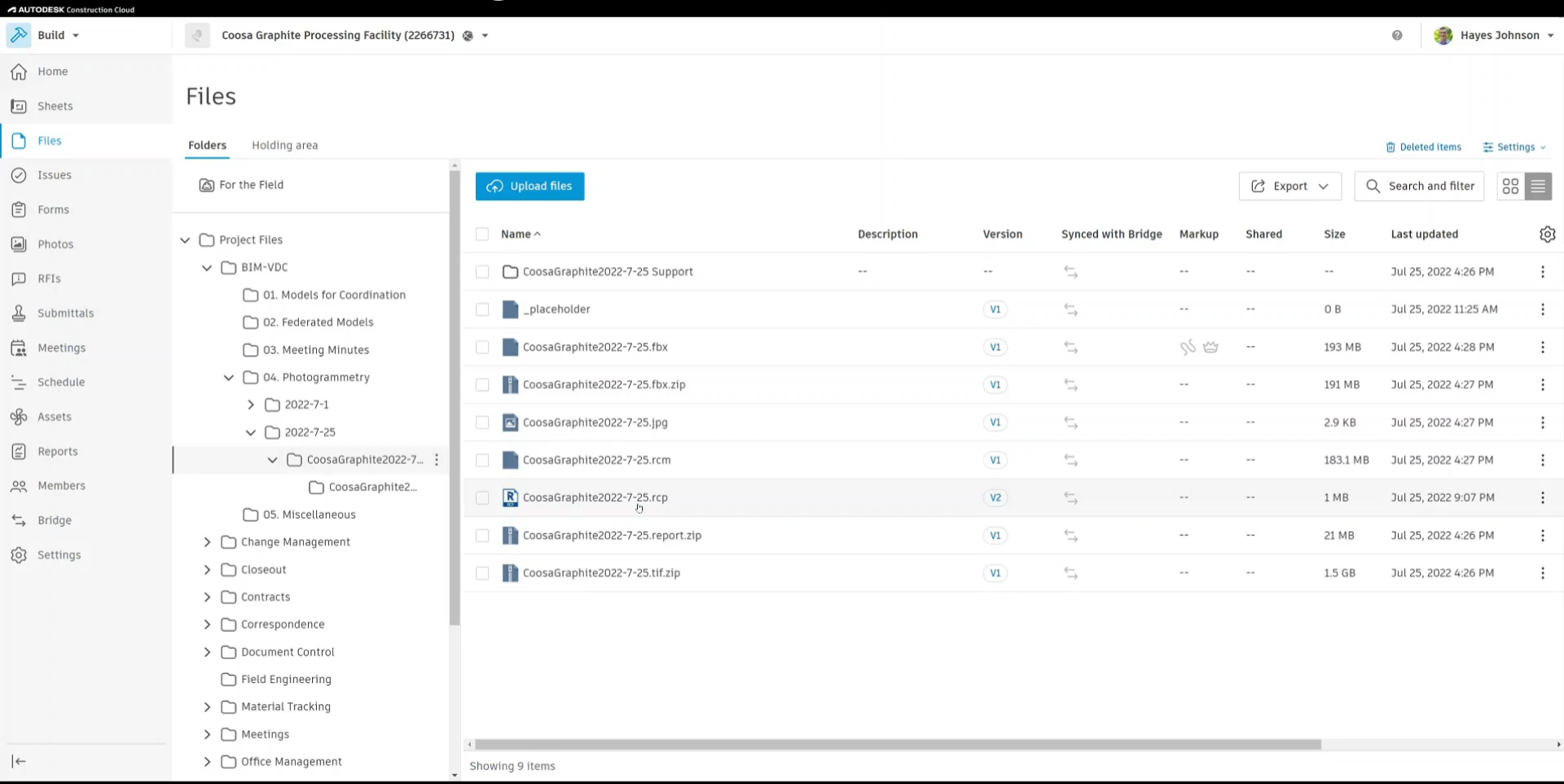
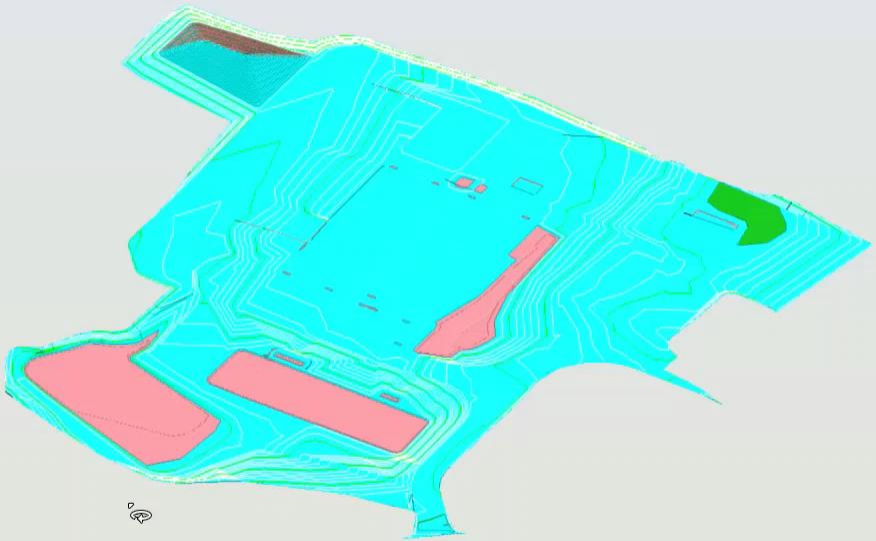
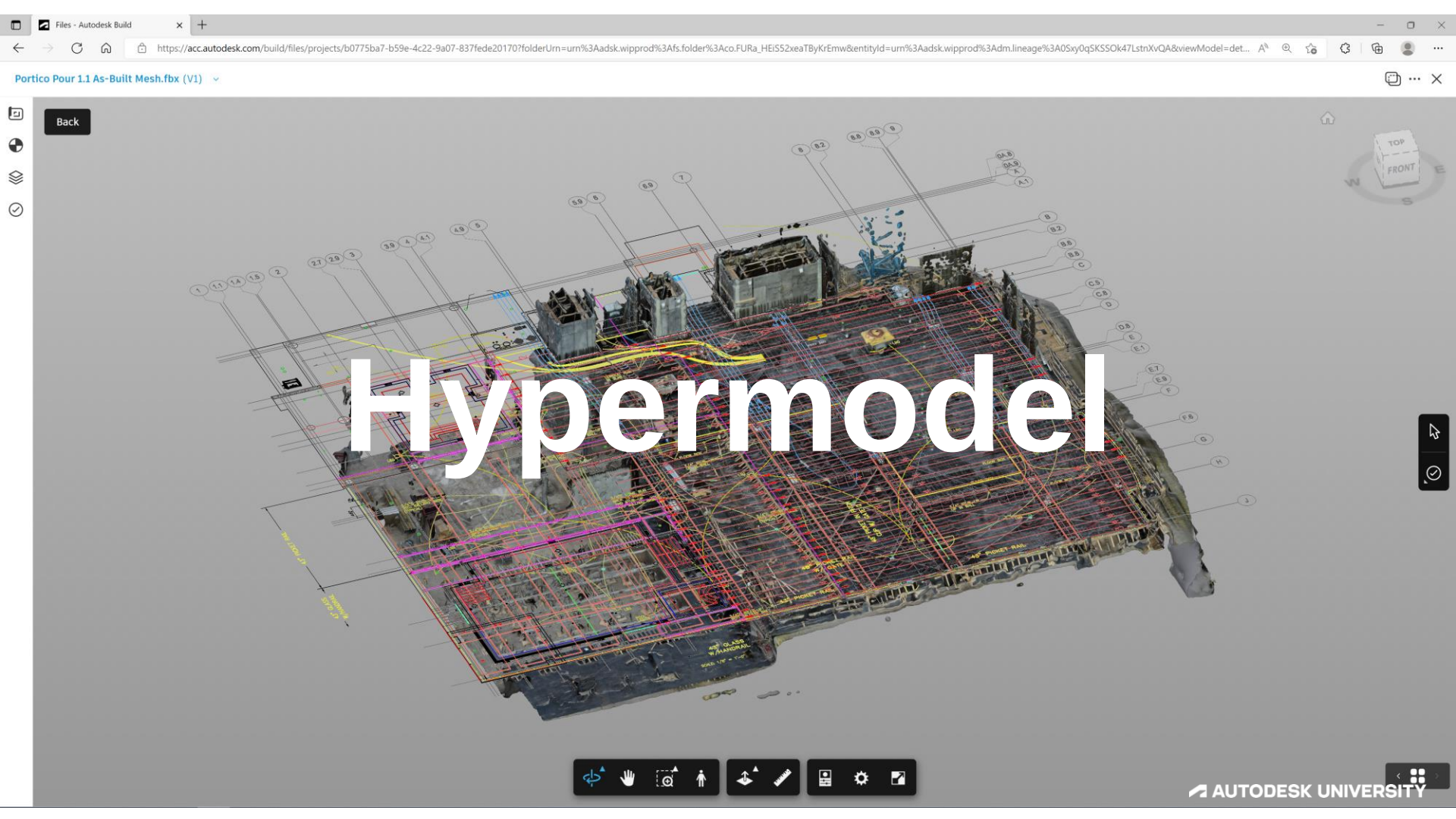
Viewing and Interacting w/ 3D Content

Viewing Point Clouds and Meshes



Civil 3D Surface Inspection

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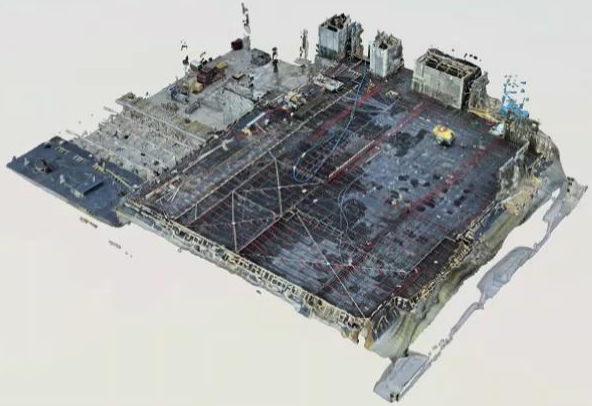
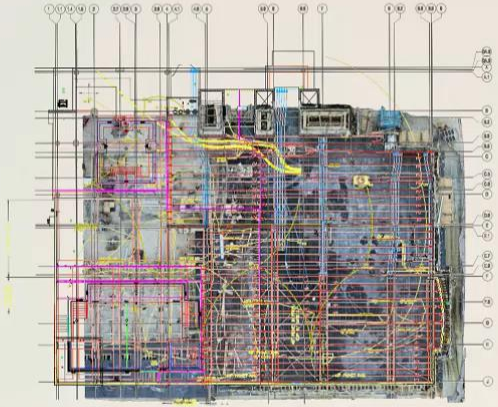
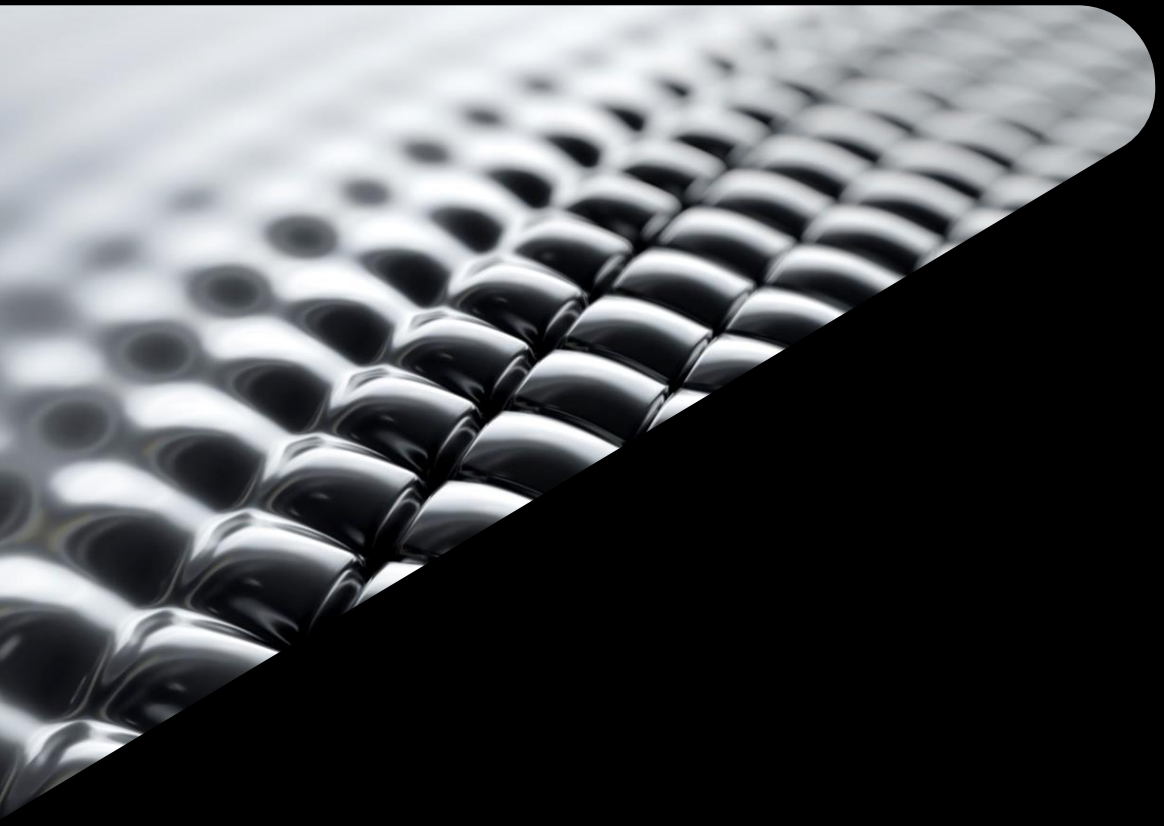
Hypermodel Alignment



2D/3D Flipback



Align 2D drawing



Starting Up

Three Keys to Starting Up

Seize Opportunities

- Project teams aren't going to come to you more than likely
- Go after opportunities to evaluate potential uses within your organization – HARD
- Get with pre-con to see what may be coming down the pipe, especially if project types are diverse

Find what works for you

- All contractors operate at least a little bit differently
- Need to determine what works for your particular company
- Accept failure if a potential usage doesn't take off – and learn from it

Share right stuff w/ right people

- Using content from your own projects shows buy-off from project teams
- Share in a way that's visible to everyone critical
- Quantify and explain in layman's terms the benefits

Next Steps

2 Options for Growing/Scaling:

1) Use AEC Collection and ACC

- Little to no additional cost if already using AEC and ACC for BIM and Project Management
- Will need to grow VDC manpower as needs for processing and analysis on jobs increases
  - Comes with additional hardware as well

2) Use 3rd Party Photogrammetry Platform

- Additional cost for software
- Purpose-built analysis features are generally faster more user-friendly to learn
- Most are browser-based platforms
  - Workload can be democratized to more diverse group of personnel
    - On standard hardware

Both require an investment - the lessons learned in this session are intended to help go get that investment


Questions
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