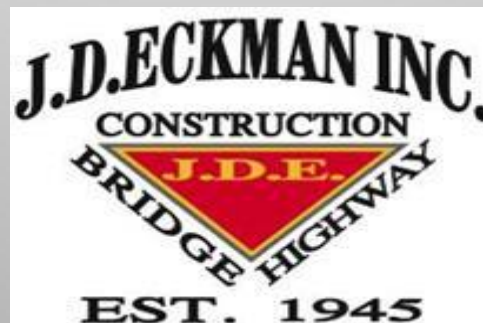


Point Cloud Survey and Bridge Erection at Lititz Pike over AMTRAK

Joseph W. Rovnan, Jr. PE



Point Cloud Survey and Bridge Erection at Lititz Pike over AMTRAK

Lititz Pike Project

- ” Location – East Side of Lancaster Train Station, North Side of Lancaster
- ” Realigning Lititz Pike (Rt 222) With Duke Street
- ” Over Philadelphia/Harrisburg AMTRAK Main Line
- ” New 175 foot, 6 Steel Girder Span
- ” Erection Issues – Overhead Electric, Frequent Passenger Trains, Freight Sidings, 150% Factor of Safety on all Picks
- ” 4 Hour Window Friday Night
- ” 5 Hour Window Saturday Night

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(In memory of Chris Bunting's Drone)



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Point Cloud Survey Instrument
Leica ScanStation C10

“300M Range

“1mm Resolution Throughout
Entire Range (Lower
Resolution was Used)

“Ability to Zoom In for
Higher Resolution

“Produces 3-D Point Cloud

“Shape Library Available



Point Cloud Survey and Bridge Erection at Lititz Pike over AMTRAK

Point Cloud Survey Instrument
Leica ScanStation C10

“Service by Print-O-Stat

“1 Surveyor and Myself

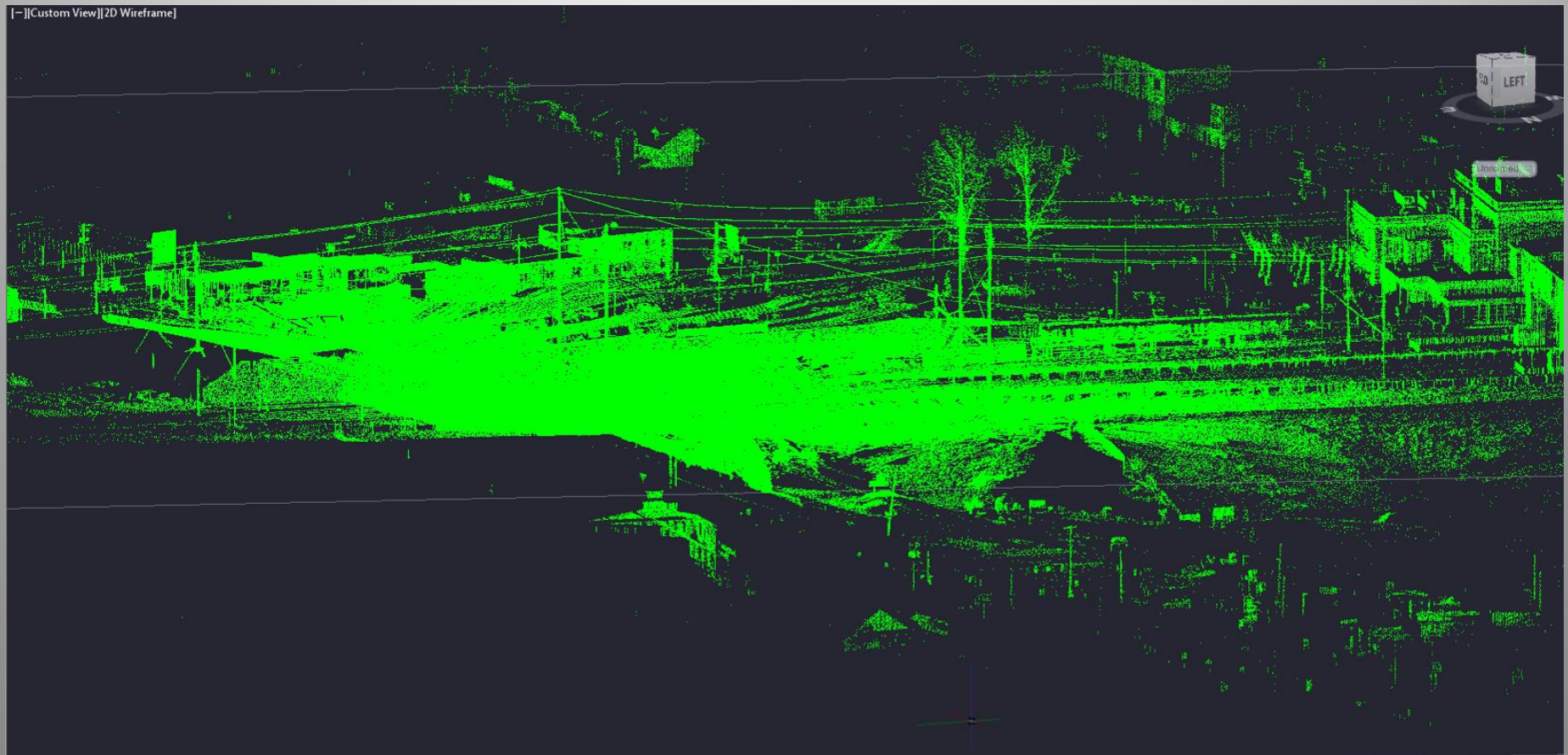
“3 Survey Locations and 2
Control Points

“10 Minute Setup and 10
Minute Scan per Location

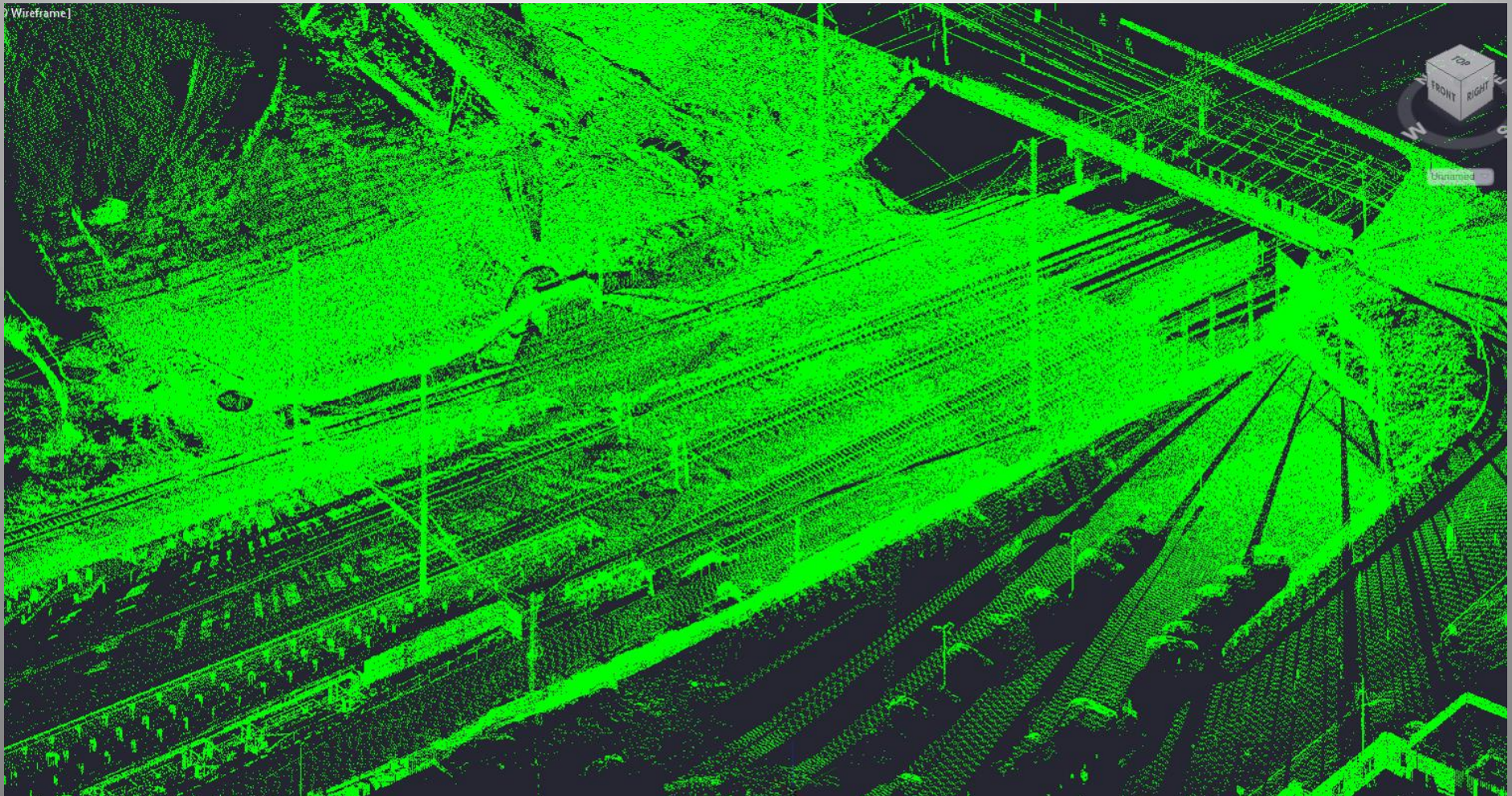
“Print-O-Stat Reduced Data
and Produced Point Cloud



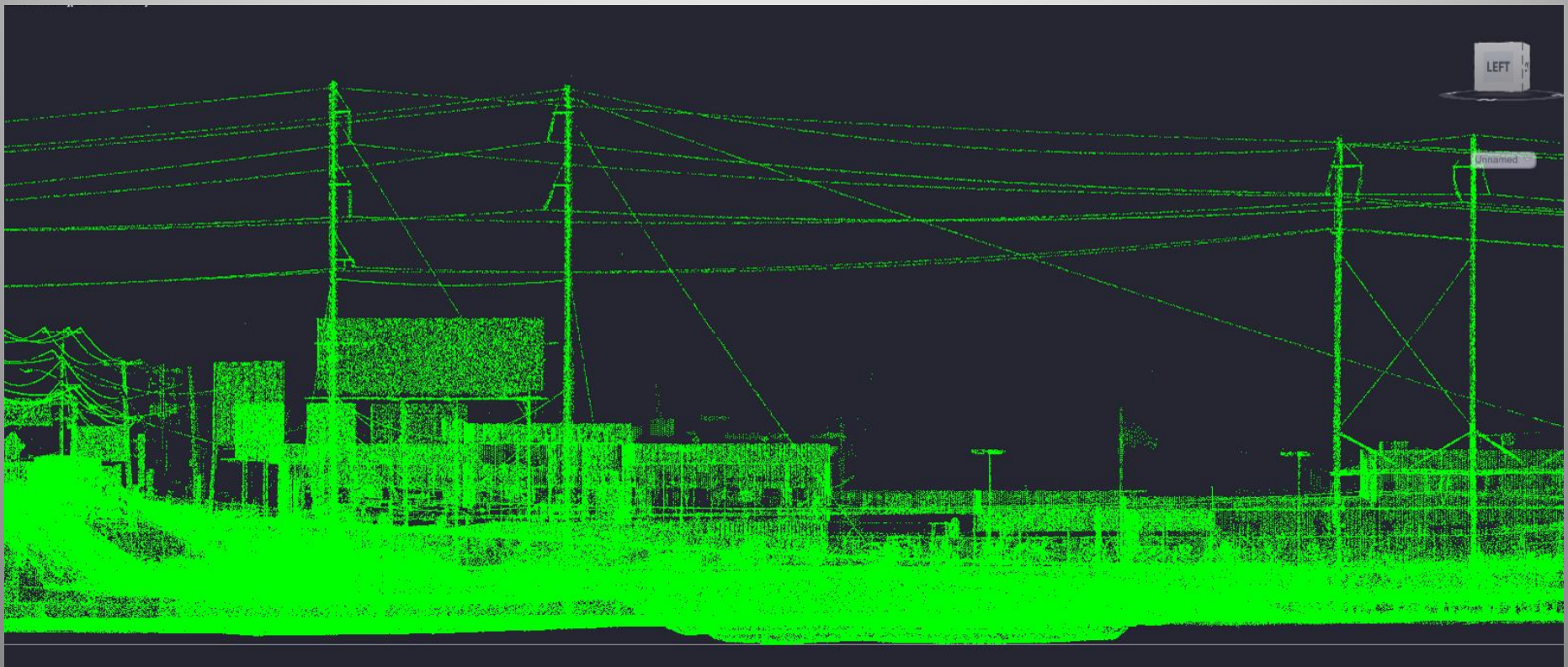
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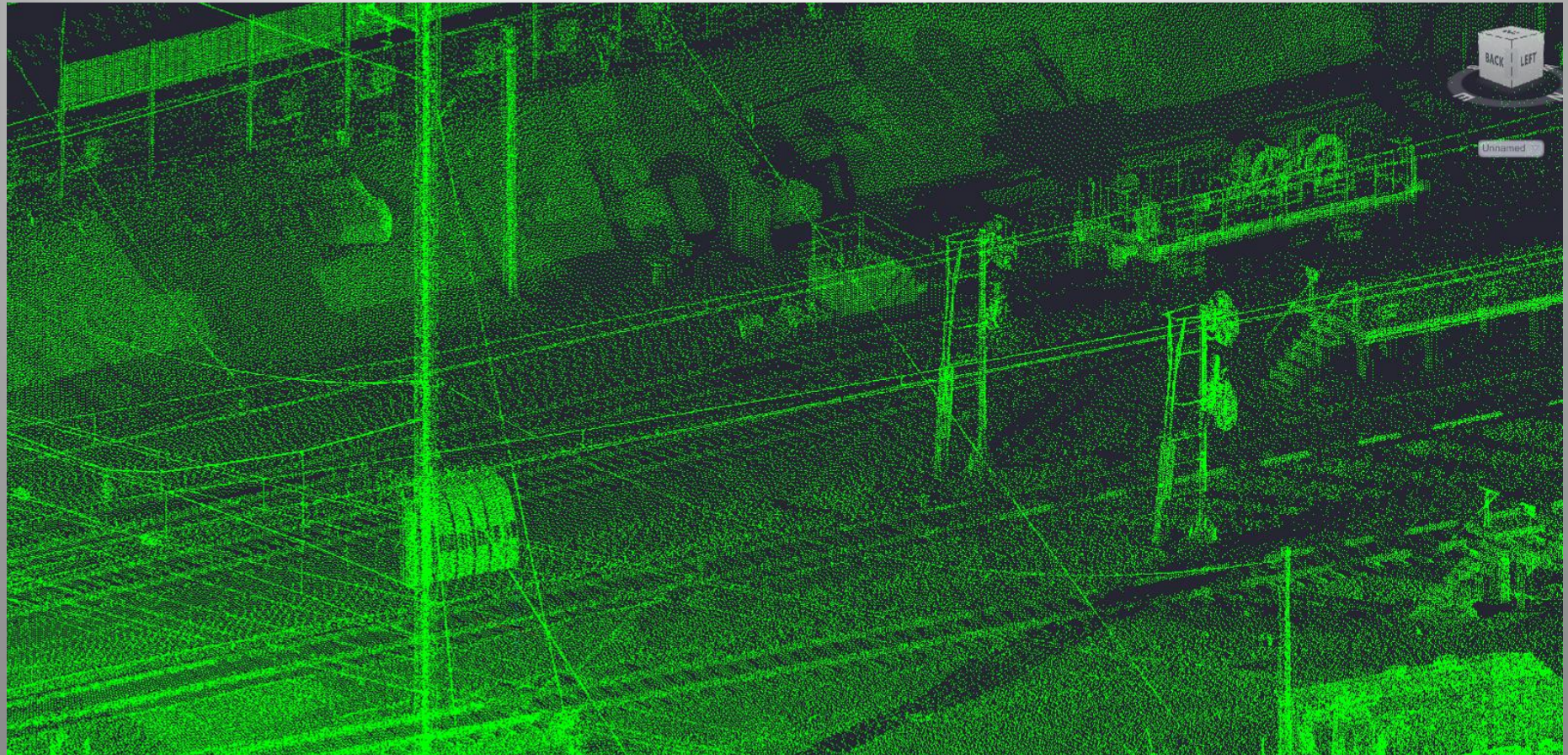
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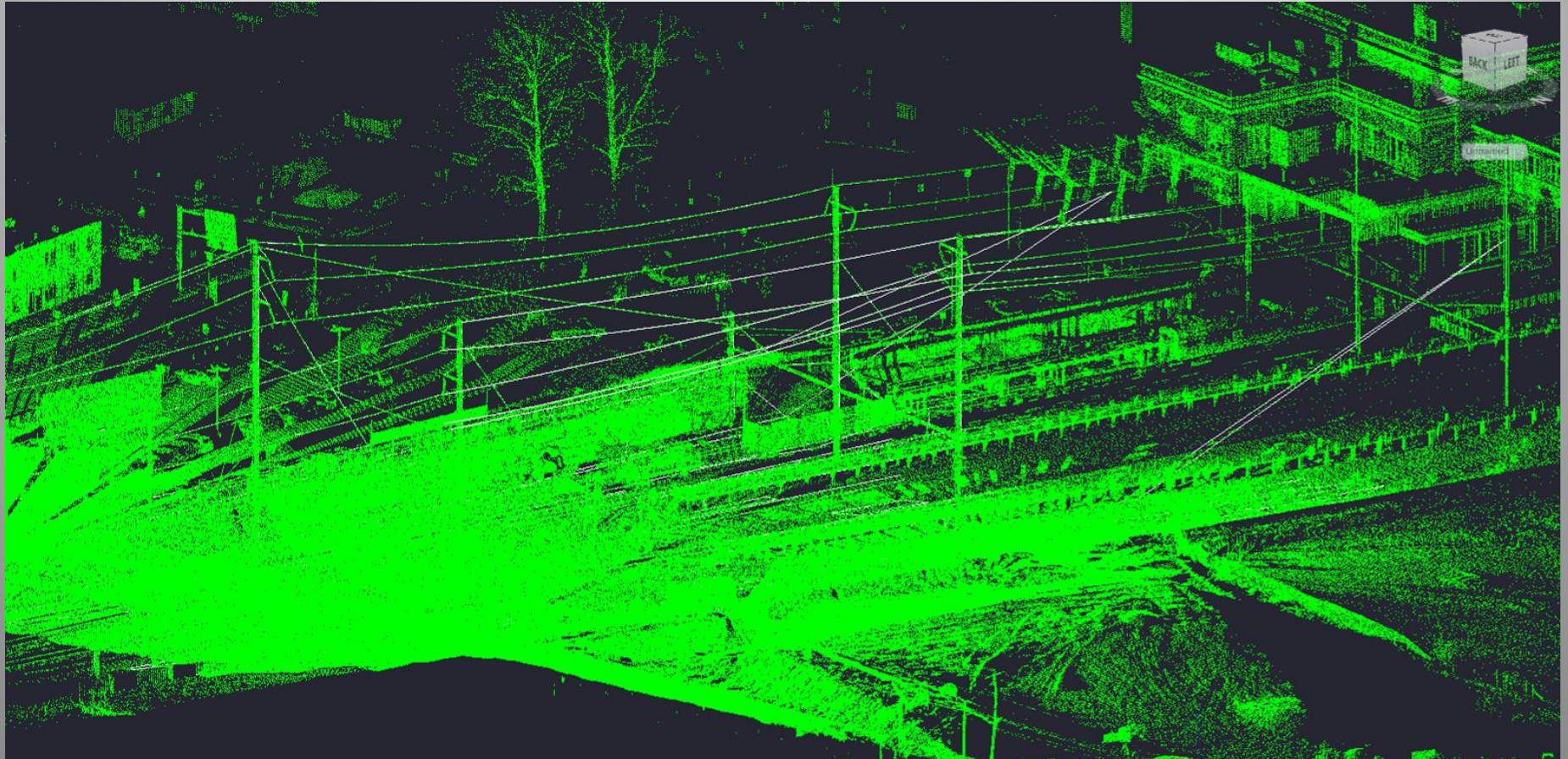
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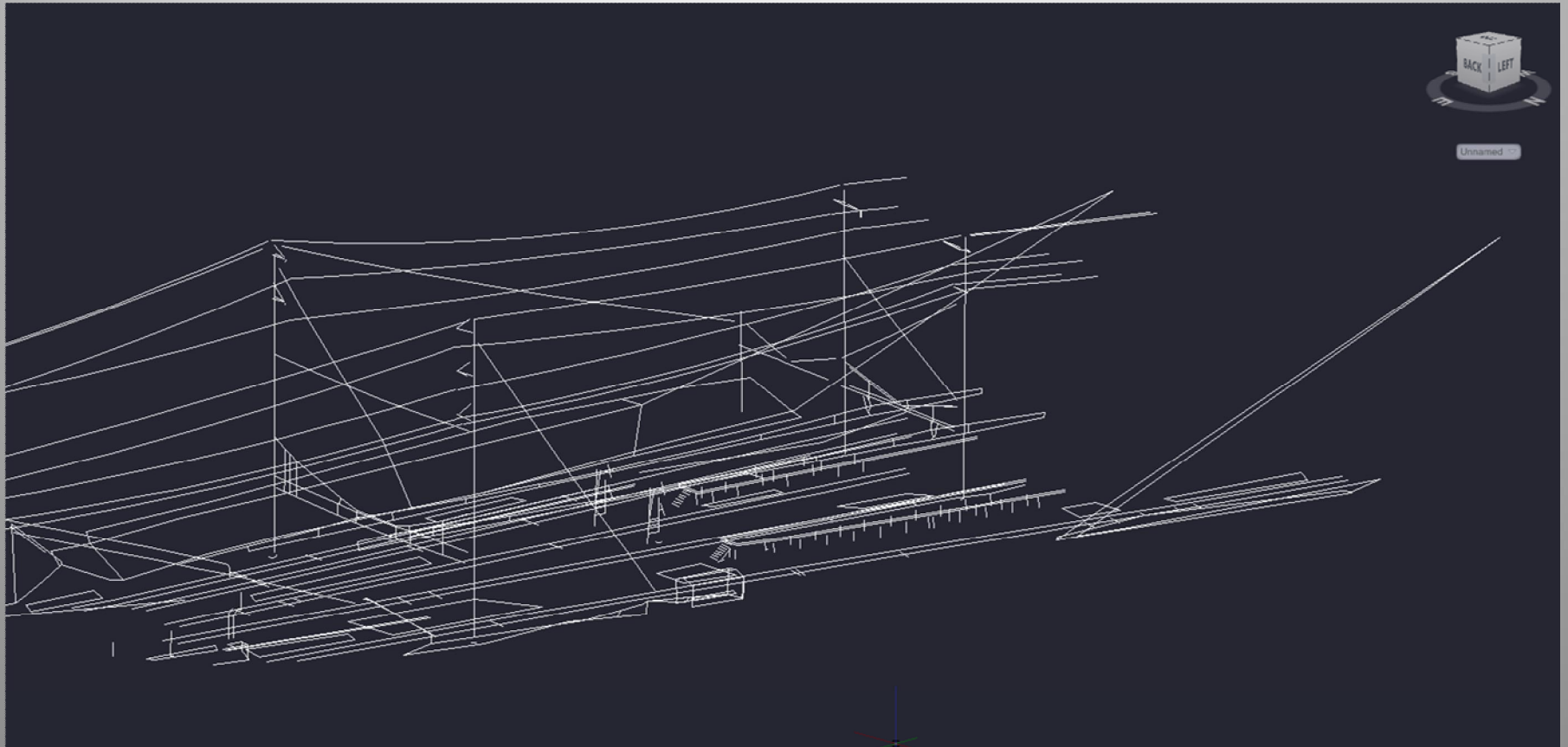
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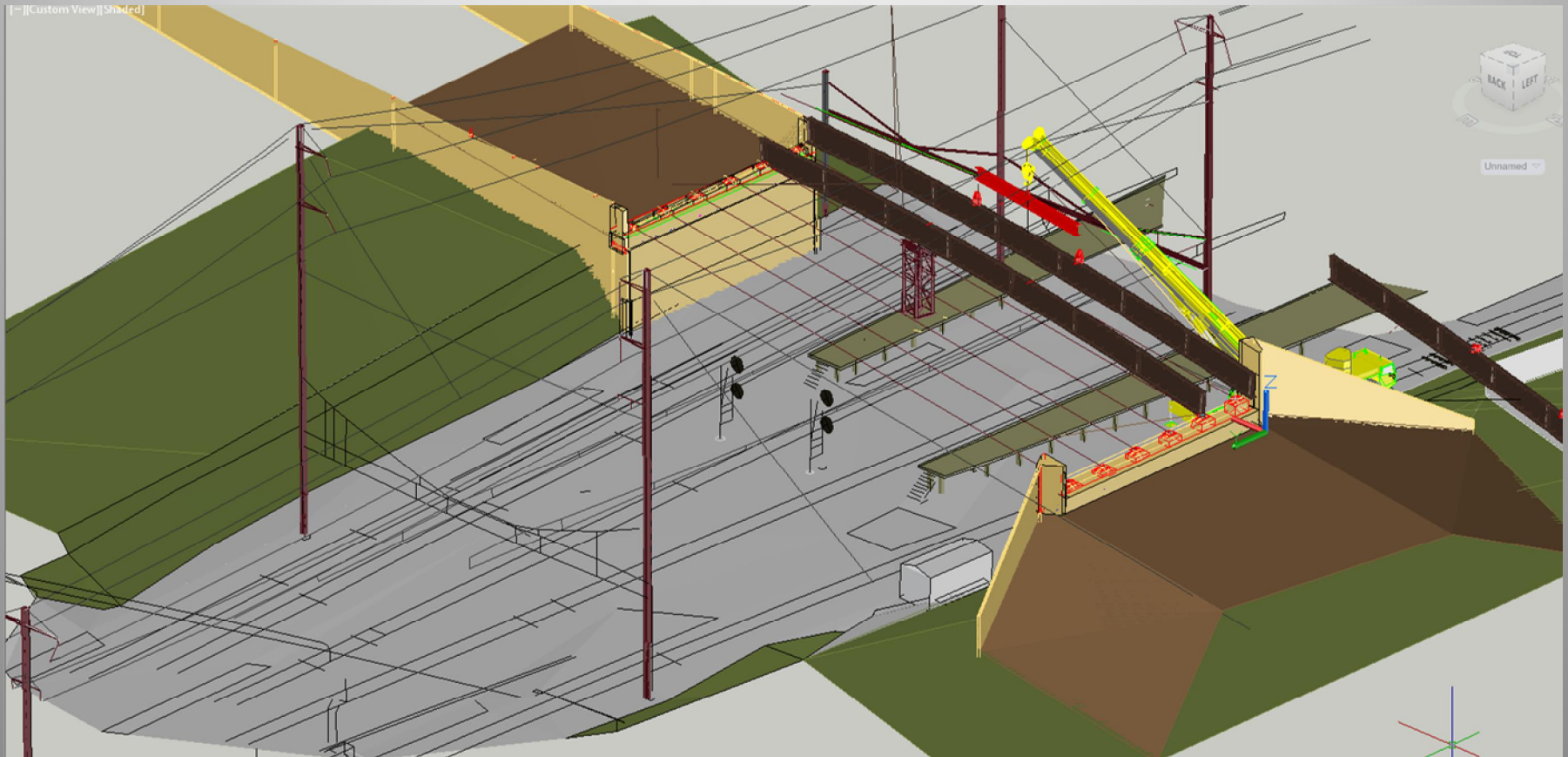
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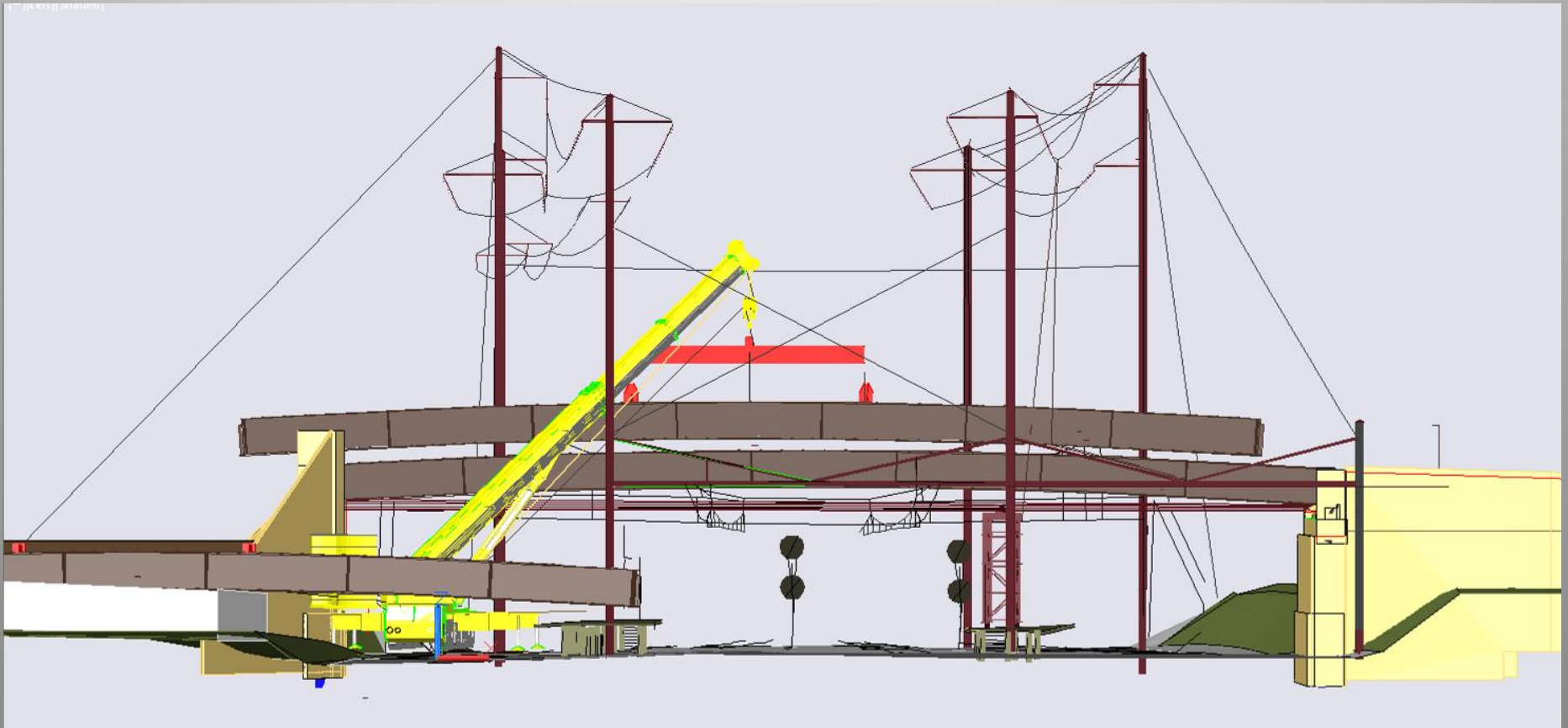
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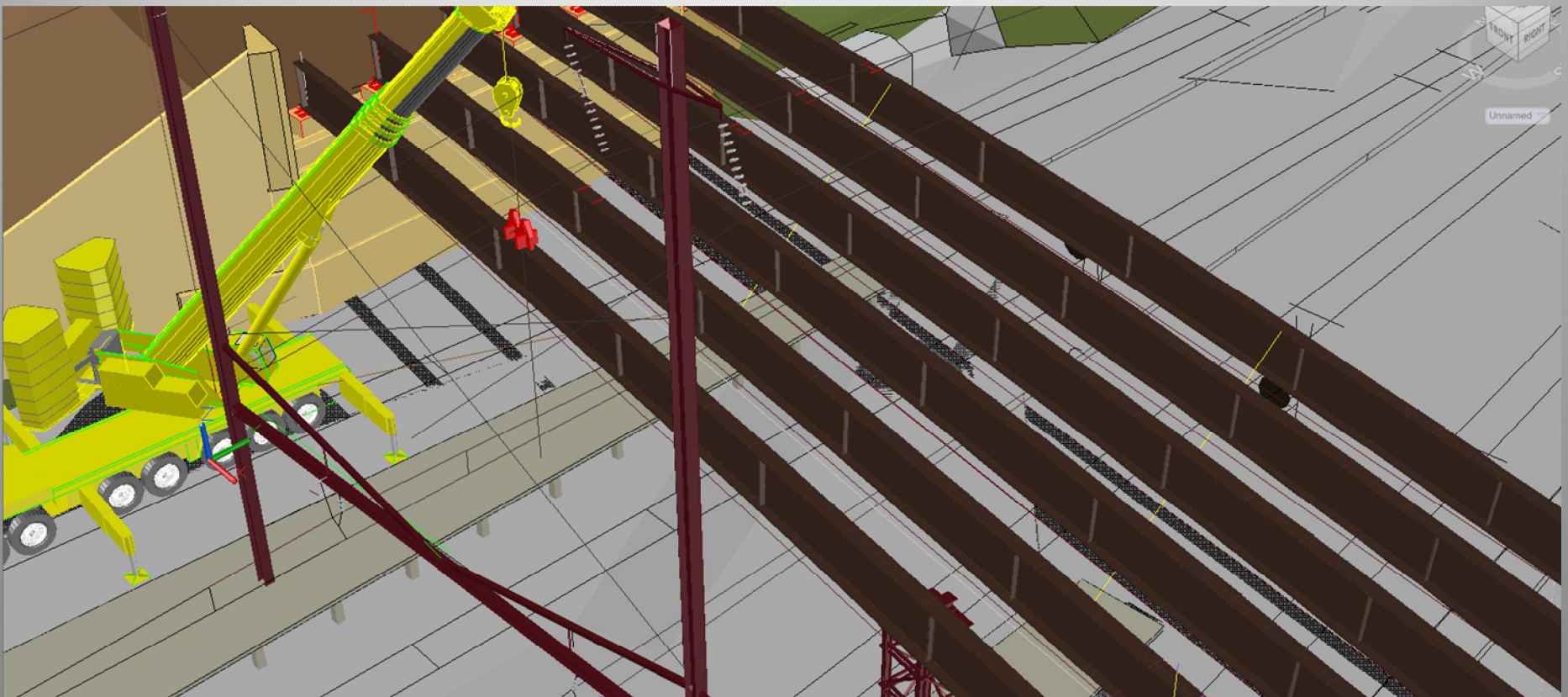
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Why 3-D?

“Expensive and Time Consuming

“Not as Expensive as Field Work Gone Bad!

“Tight Clearances both On Ground and Overhead

“Short Night Weekend Windows

“Ultimately Used 500 Ton, 240 Ton, and 300 Ton
Cranes to Erect the bridge

“Clearance to Overhead Wires for 500 Ton Crane
was 12 Inches, Clearance to Ground Obstructions
was also 12 inches

Point Cloud Survey and Bridge Erection at Lititz Pike over AMTRAK

Erection Sequence:

- “500T Crane Picks Up and Transfers 1st Girder to Secondary Cranes Which Set 1st Girder
- “Hold while 500T Crane drops Lift Beam and Picks and Sets 3 Barriers and Attaches Stability Brace
- “Stabilize Ends, Let 1st Girder Go, 500T Crane Picks Up Lift Beam and 2nd Girder and Transfers Girder to Secondary Cranes which Set 2nd Girder & Hold
- “ 500T Crane Drops Lift Beam, Installs 2 X-Frames, and Removes Stability Brace and Barriers
- “ 500T Crane Picks Up Lift Beam, 3rd Girder, Etc...

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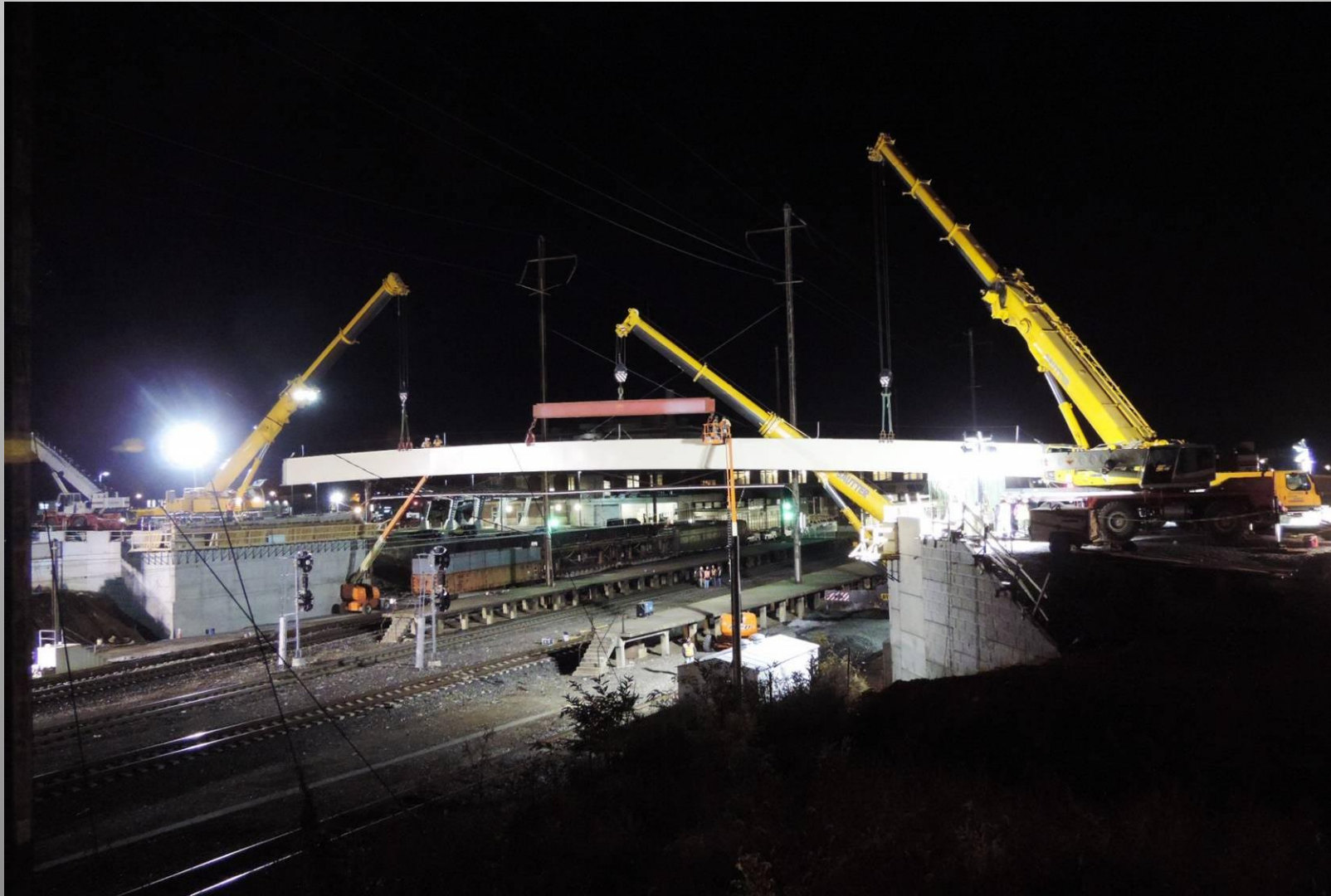
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Conclusions:

Plusses:

“Entire Area was Mapped in Three Dimensions

“With Correct Crane Models, All Clearances were Known

“Good Assurance the Erection Plan Would Work

Minuses:

“Cost

“Time Required to Generate a 3-D Model

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Questions?