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Digital Twins from the Air Down

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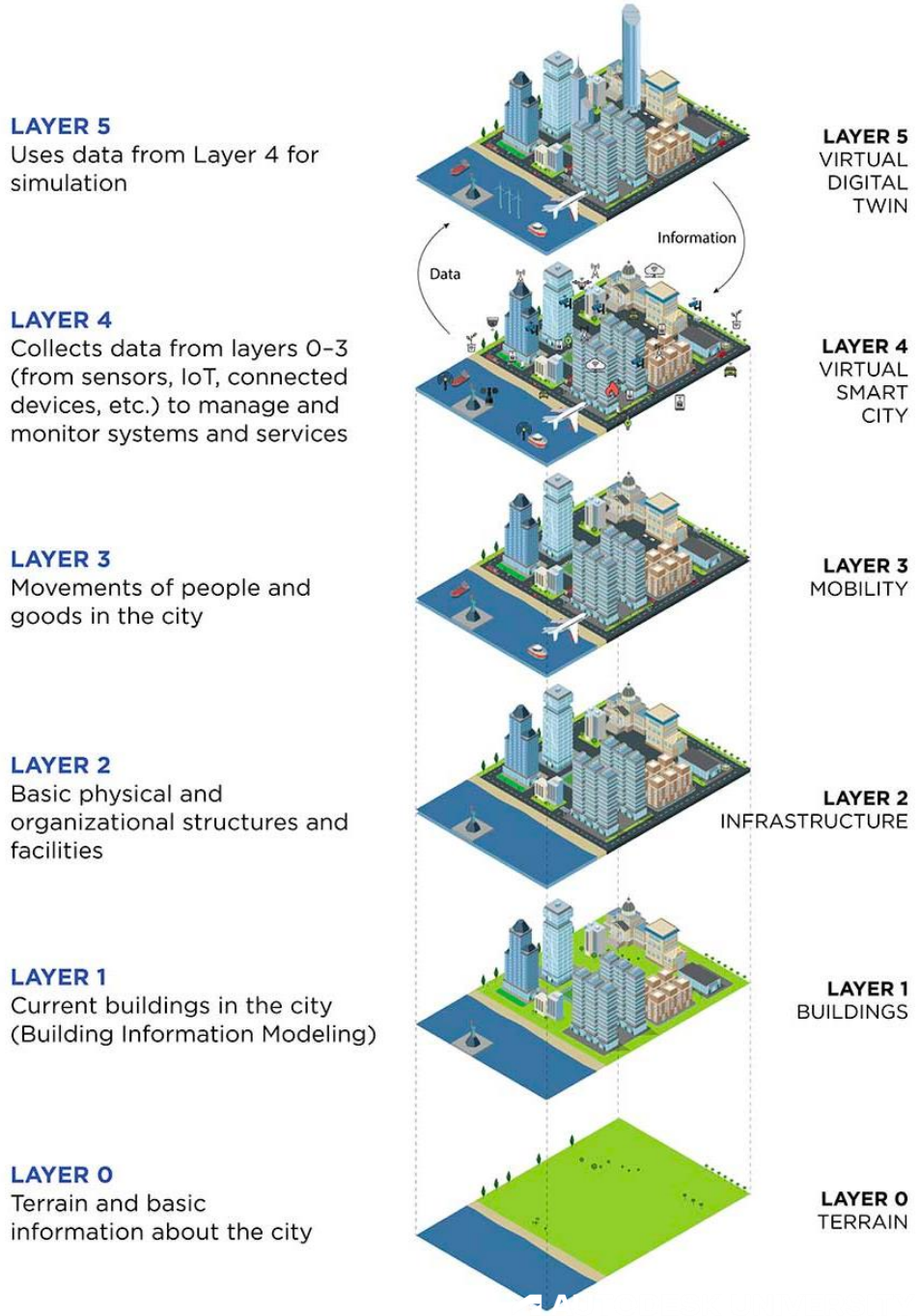
What is a Digital Twin

Simple Definition: A Digital Twin is a virtual model of a real world object.

- Data is at the core of all digital twin model creation.
- Digital Twins offer a means to improve business processes, reduce risk, optimize operational efficiencies, and enhance decision making with automation.
- More and more work can be done all digitally, and by supporting digital twins, we support more modern and efficient workflows.

Layers of a Digital Twin

- Digital Twins have various levels of detail and assets.
- Layer detail depends on the goal of the models.
- Digital Twin data comes from a variety of sources.



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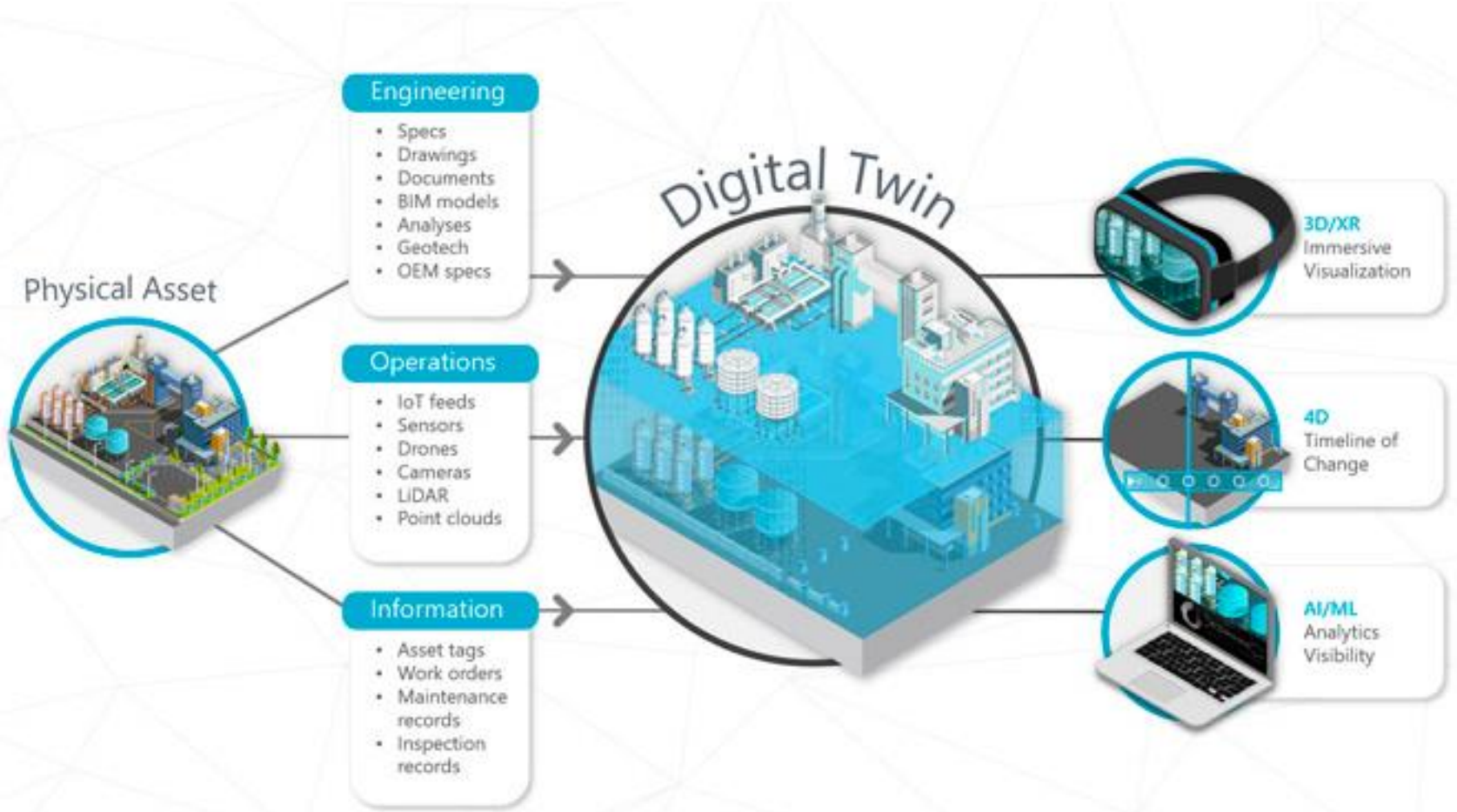
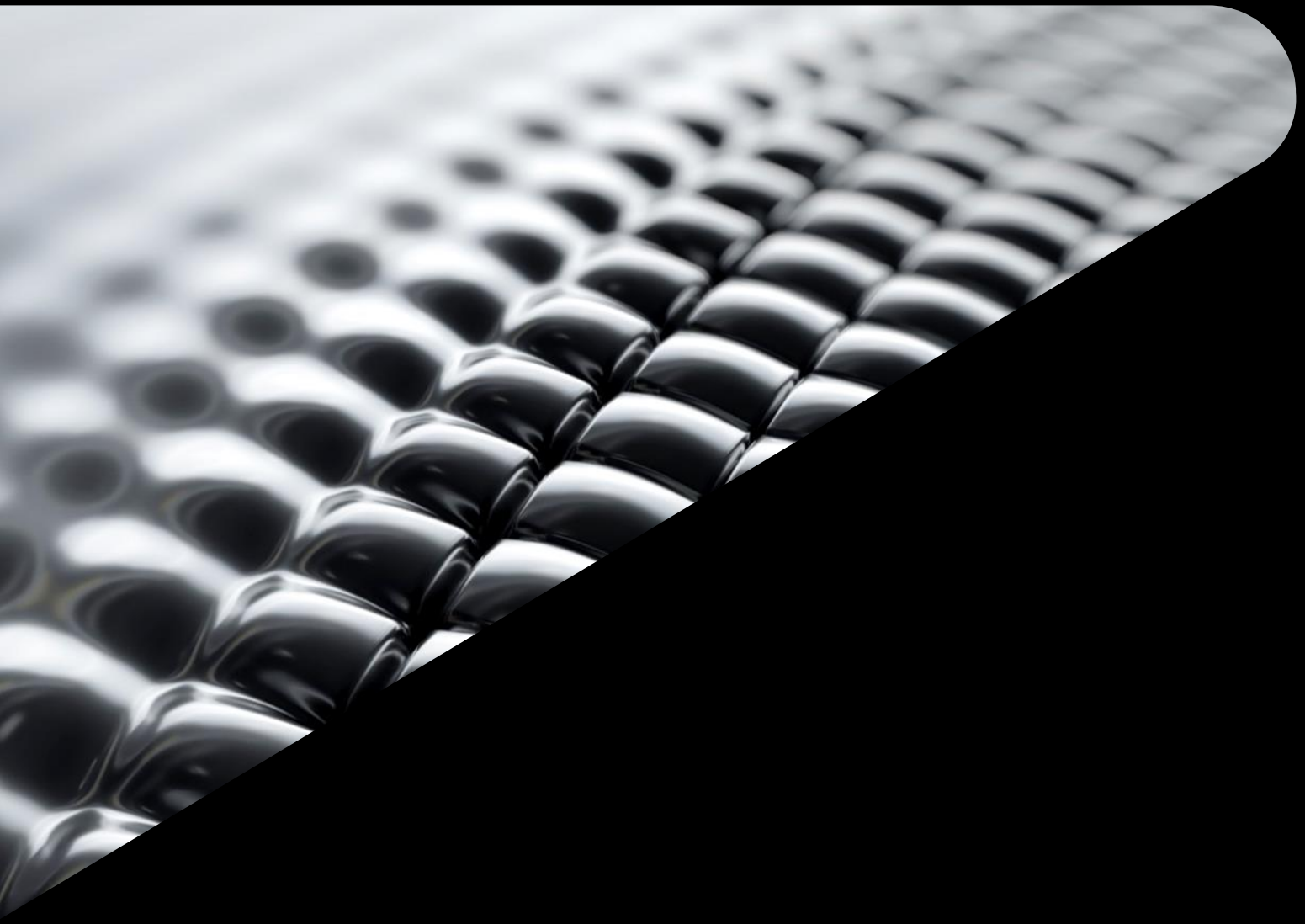
Digital Twin Value

- The value of a Digital Twin can be beneficial at every phase of an asset's lifecycle. It can provide context for design and permitting, help to manage progress and compliance during construction, and monitor and predict behavior throughout the operations and maintenance phase.





Our Source of Truth

Subtitle

VERTICAL

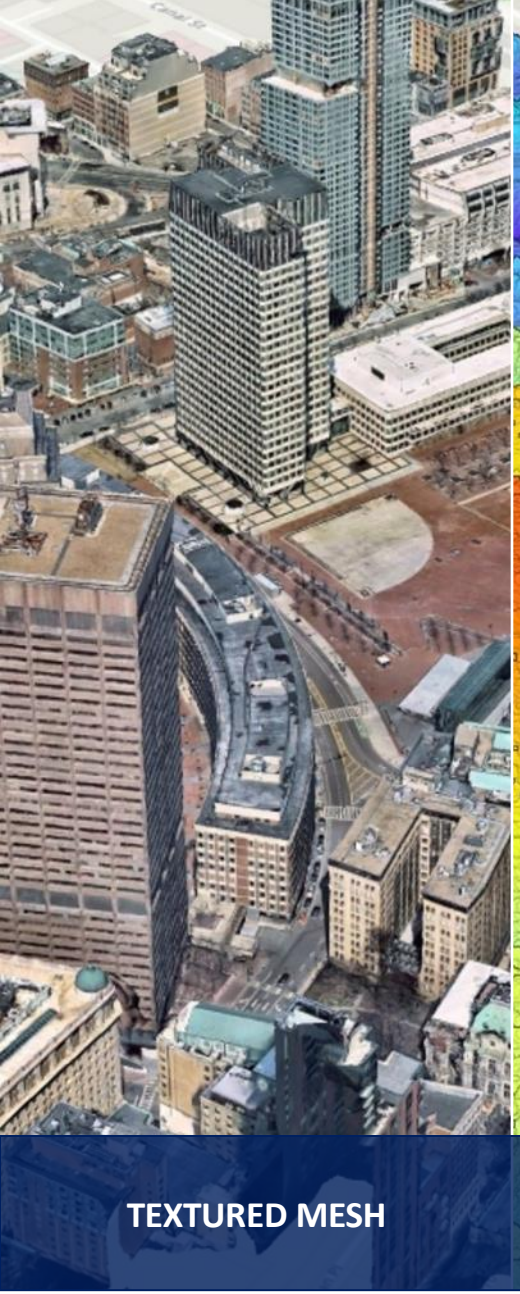
PANORAMA

OBLIQUE

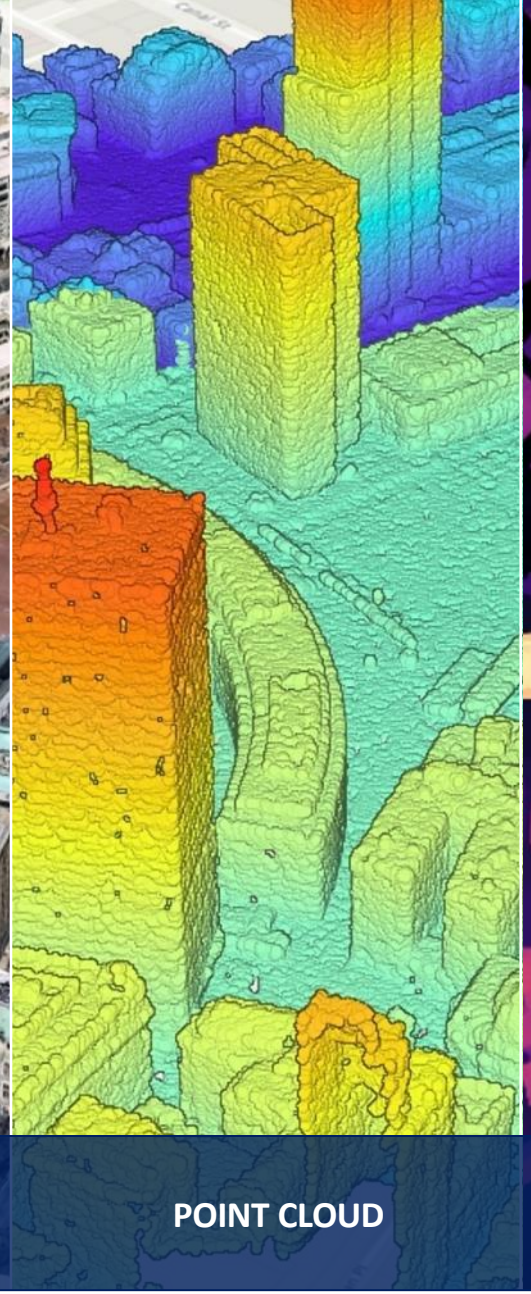
NEARMAP 3D

NEARMAP AI

NEARMAP IMPACTRESPONSE

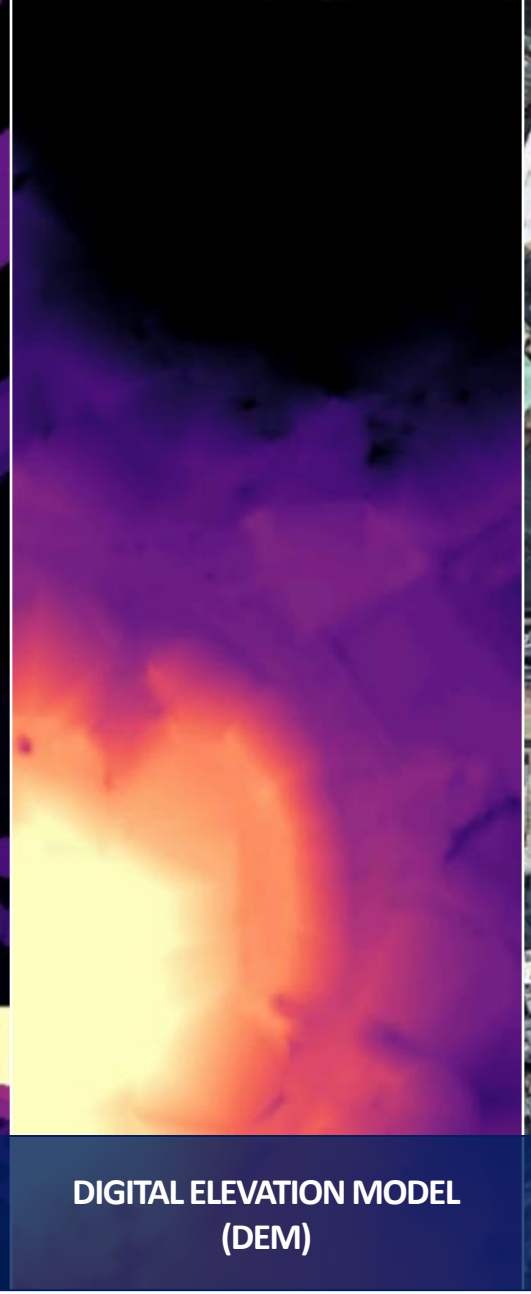


TEXTURED MESH



POINT CLOUD

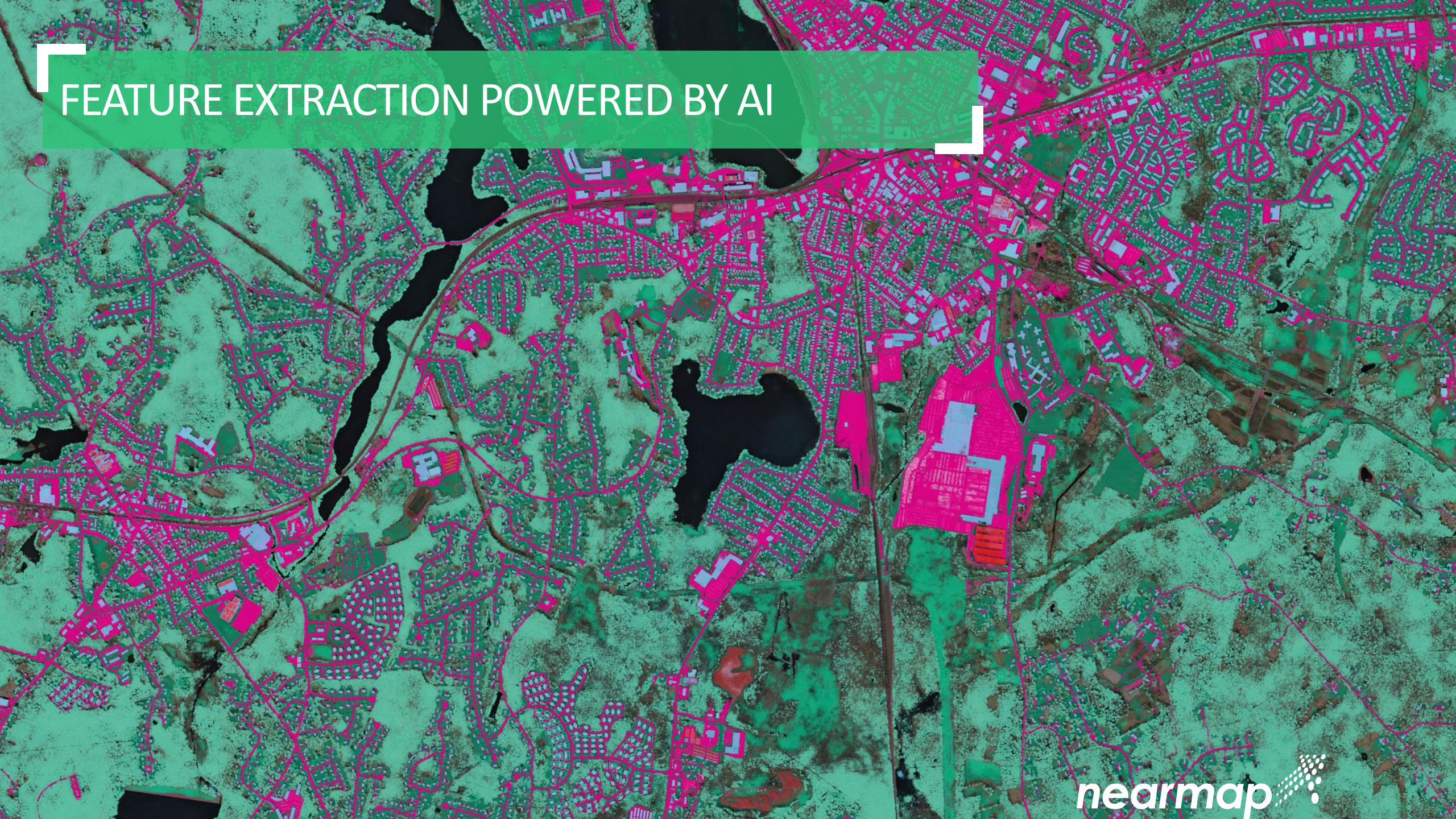
DIGITAL SURFACE MODEL (DSM)



DIGITAL ELEVATION MODEL (DEM)

TRUE ORTHO

FEATURE EXTRACTION POWERED BY AI



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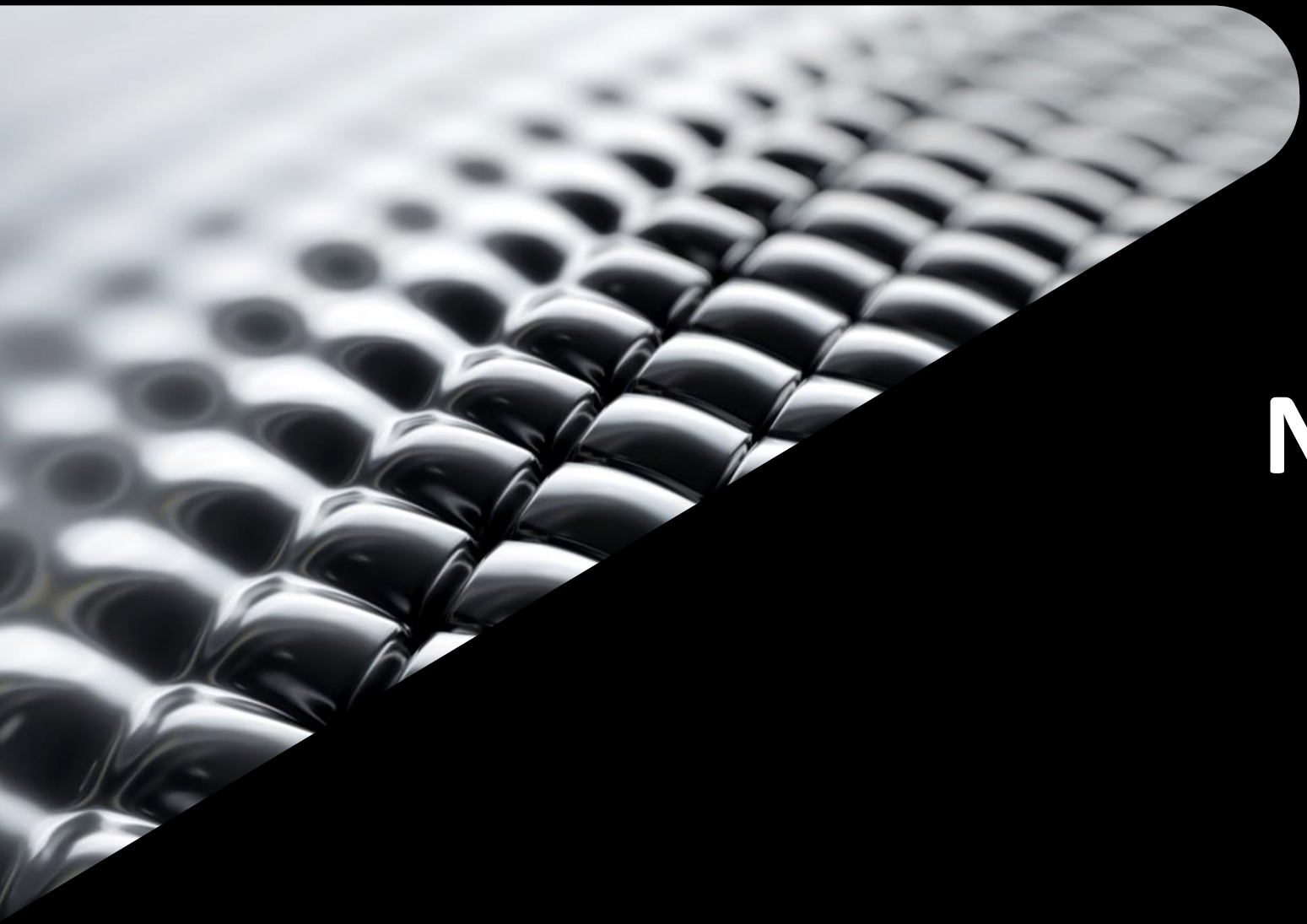

Nearmap Digital Twin Options

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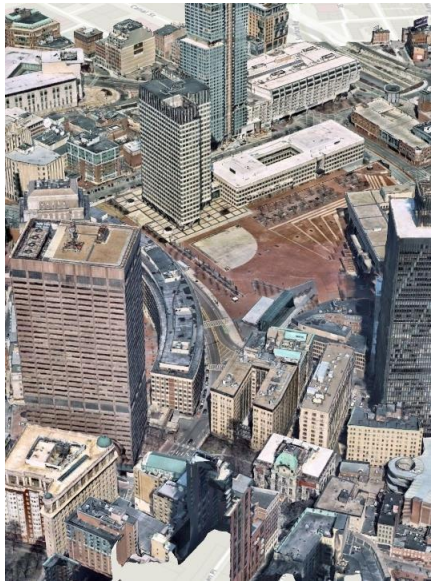
How does Nearmap enable digital twins



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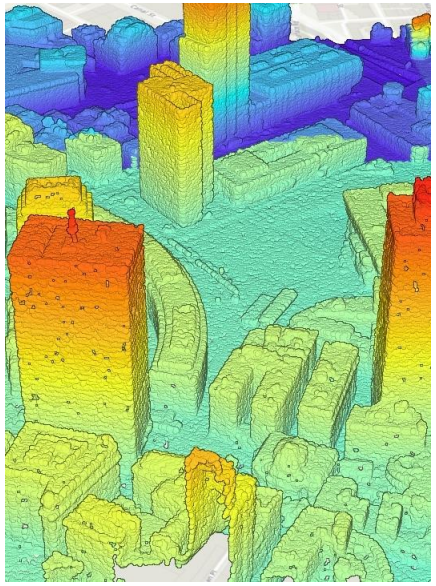
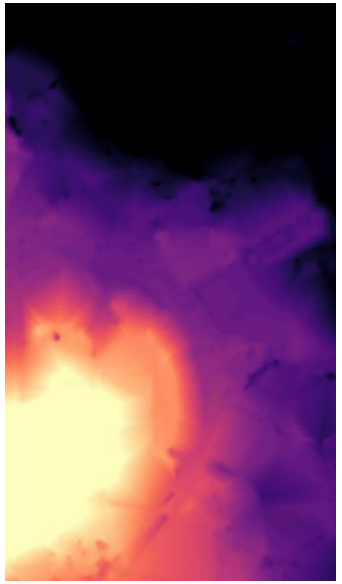


POINT CLOUD

DIGITAL SURFACE MODEL



DIGITAL ELEVATION MODEL

TRUE ORTHO

AI-BASED FEATURE EXTRACTION

1

- HIGH RESOLUTION 3D MESH & POINT CLOUD

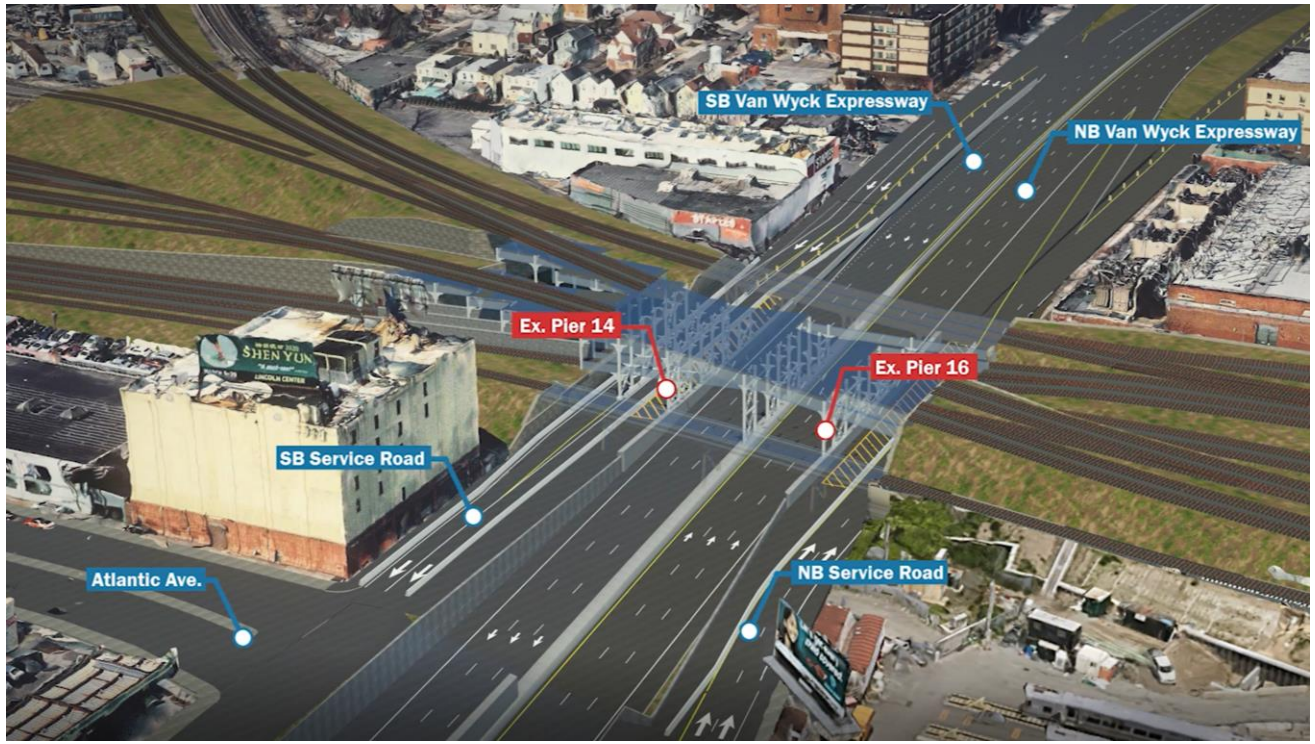
2

- FOUNDATIONAL DATA TO “GROW” A DIGITAL TWIN

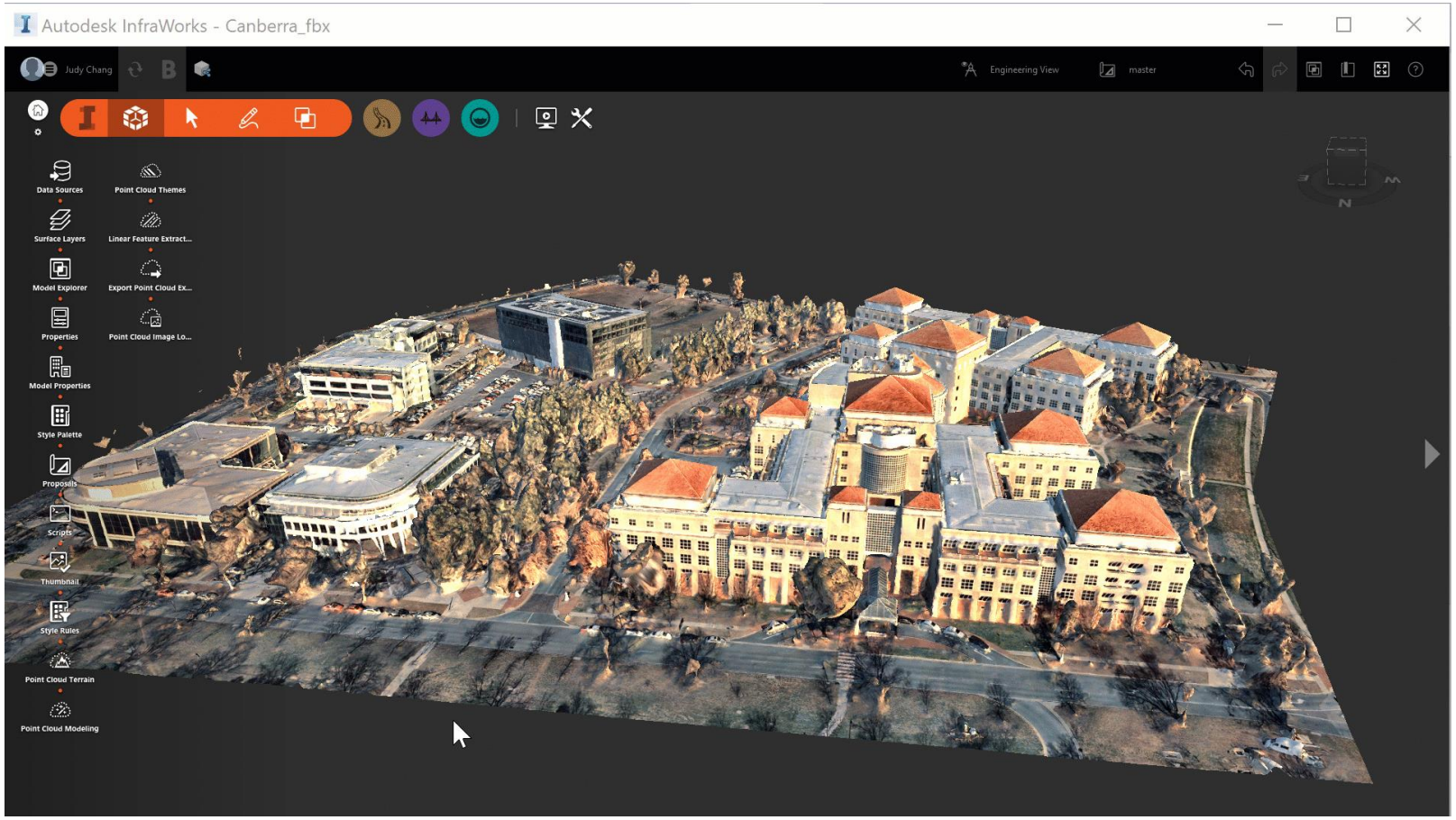
Digital Twin with Mesh and Point Cloud

A Digital Twin Basemap using Nearmap Mesh or Point Cloud created through photogrammetry as a basemap to give context to proposed features.

- Minimal processing work required.
- True representation of the build environment.
- Can struggle at street level.

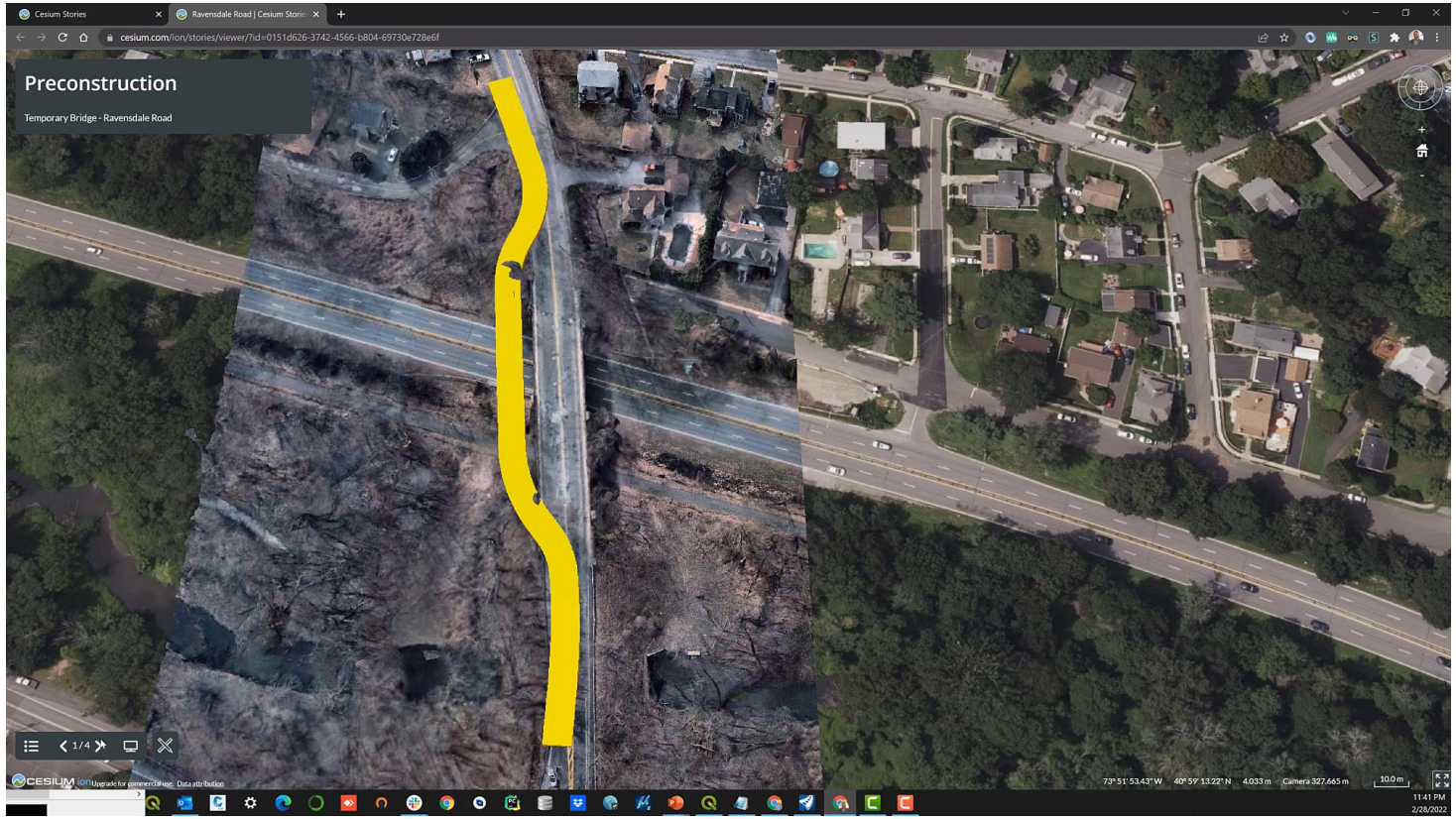


Digital Twin with Mesh and Point Cloud



- Mesh is not quite accurate enough to be a replacement as a digital twin assset
- Mesh gives context to Digital twin assets of proposed design data and asset tracking context.

Phased Construction Digital Assets



- Provide context for proposed temporary design.
- Ease of coordination with stakeholders.
- Project Tracking and review purposes.

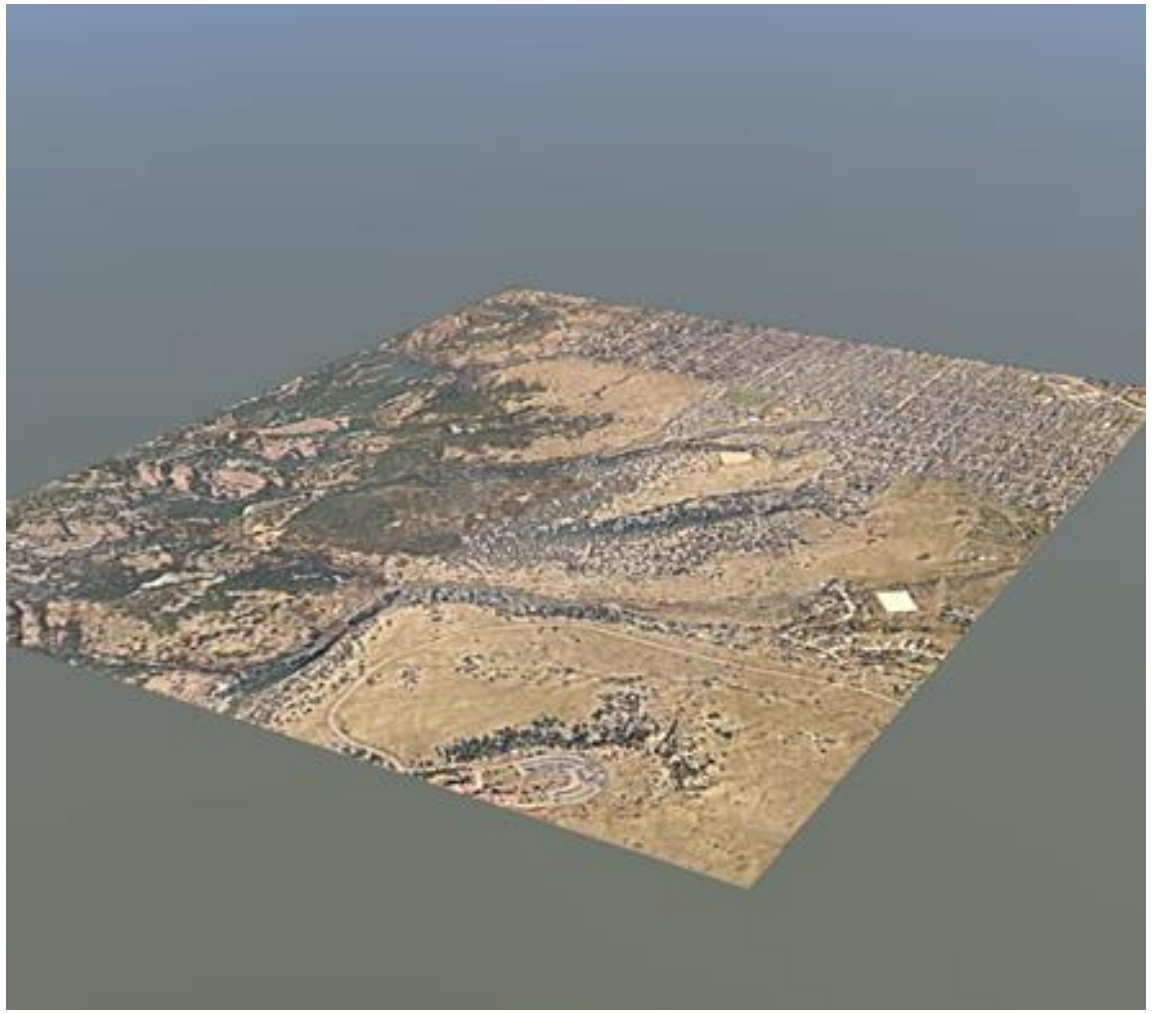
Digital twin Created through Vector AI

A digital twin basemap using Vector AI as its core component to rebuild low level of detail 3D assets.

- Extra processing steps required.
- Lower level of detail, representative.
- High fidelity at street level.

Digital twin Created through Vector AI

First Steps



Digital twin Created through Vector AI

How to leverage Vector AI

CONSTRUCTION SITES

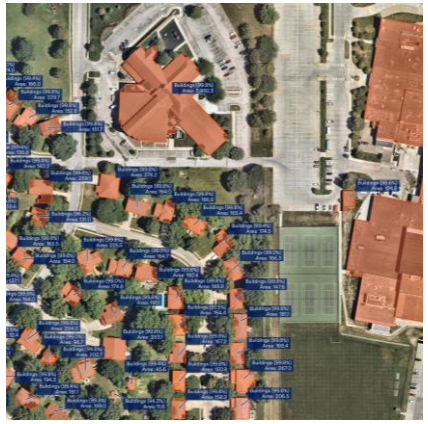
- Active or stalled construction, at any phase
- Cleared ground, excavation works, foundation/slab down, frame up, or roof rafters
- Residential and commercial

SURFACES

- Lawn Grass
- Water Body
- Asphalt
- Concrete Slab
- Dirt/Sand/Gravel

VEGETATION

- Medium & High Vegetation – Tree Canopy (>2m)
- Low Vegetation (0.5m-2m)
- Very Low Vegetation (<0.5m)



BUILDING FOOTPRINTS

- Residential, commercial and industrial buildings
- Detects roof of a permanent structure
- House, unit, commercial buildings, garage, large garden, shed, carport

IMPERVIOUS SURFACE

- Building Footprints, Asphalt, Concrete
  - Separate layers
- Other features upon request
- Not yet available with MB Visualization

Digital twin Created through Vector AI

LOD 200 Buildings

Nearmap uses machine learning to identify edge of building into a vector dataset.

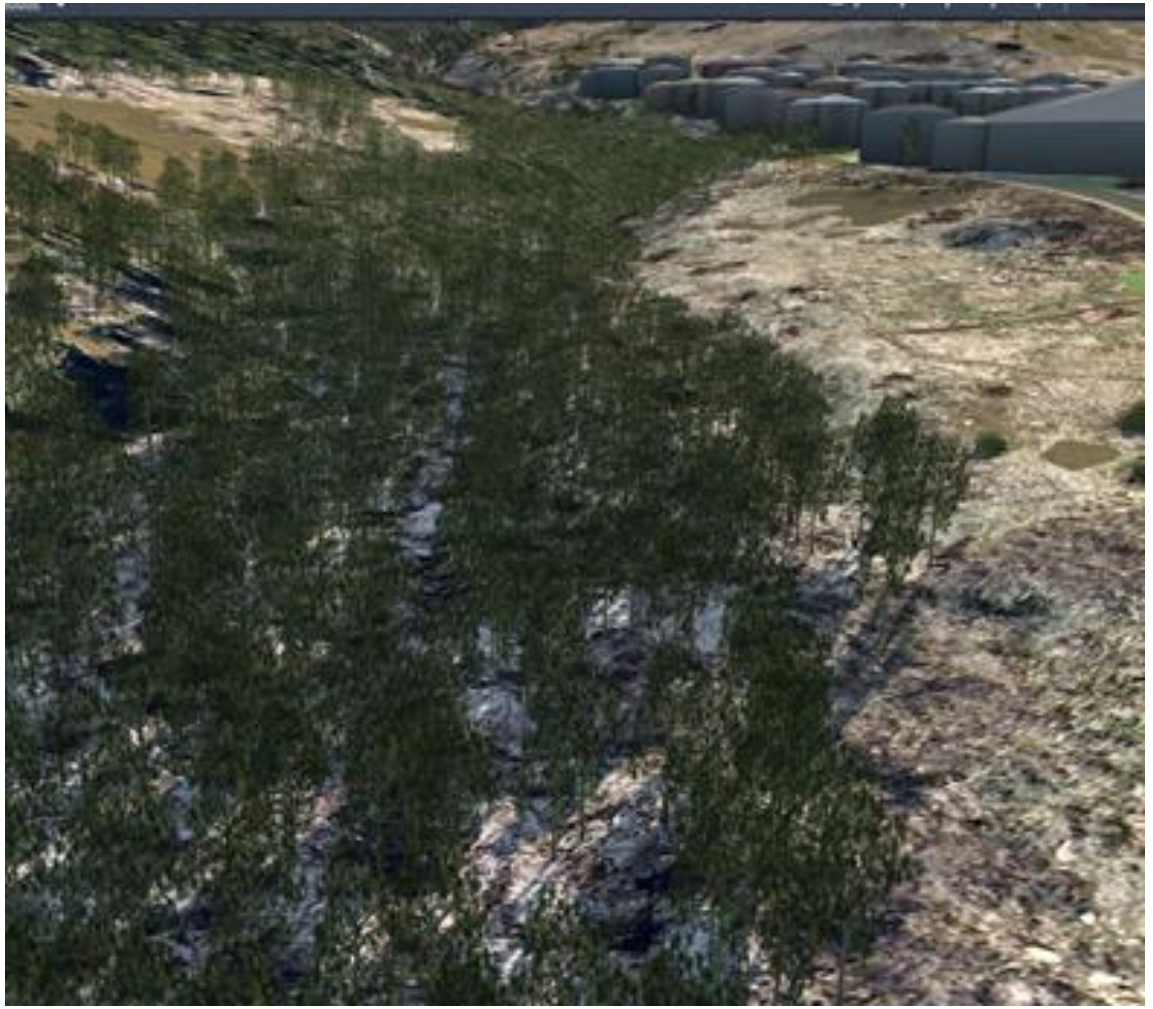
- Infraworks can load this data as a shapefile and extrude buildings up.
- Roof forms are generated by Infraworks but in specific use case DSM data can be used to create more accurate roof forms.
- High fidelity at street level.

Digital twin Created through Vector AI

Vegetation Layer

Nearmap uses machine learning to identify edge of canopy vectors.

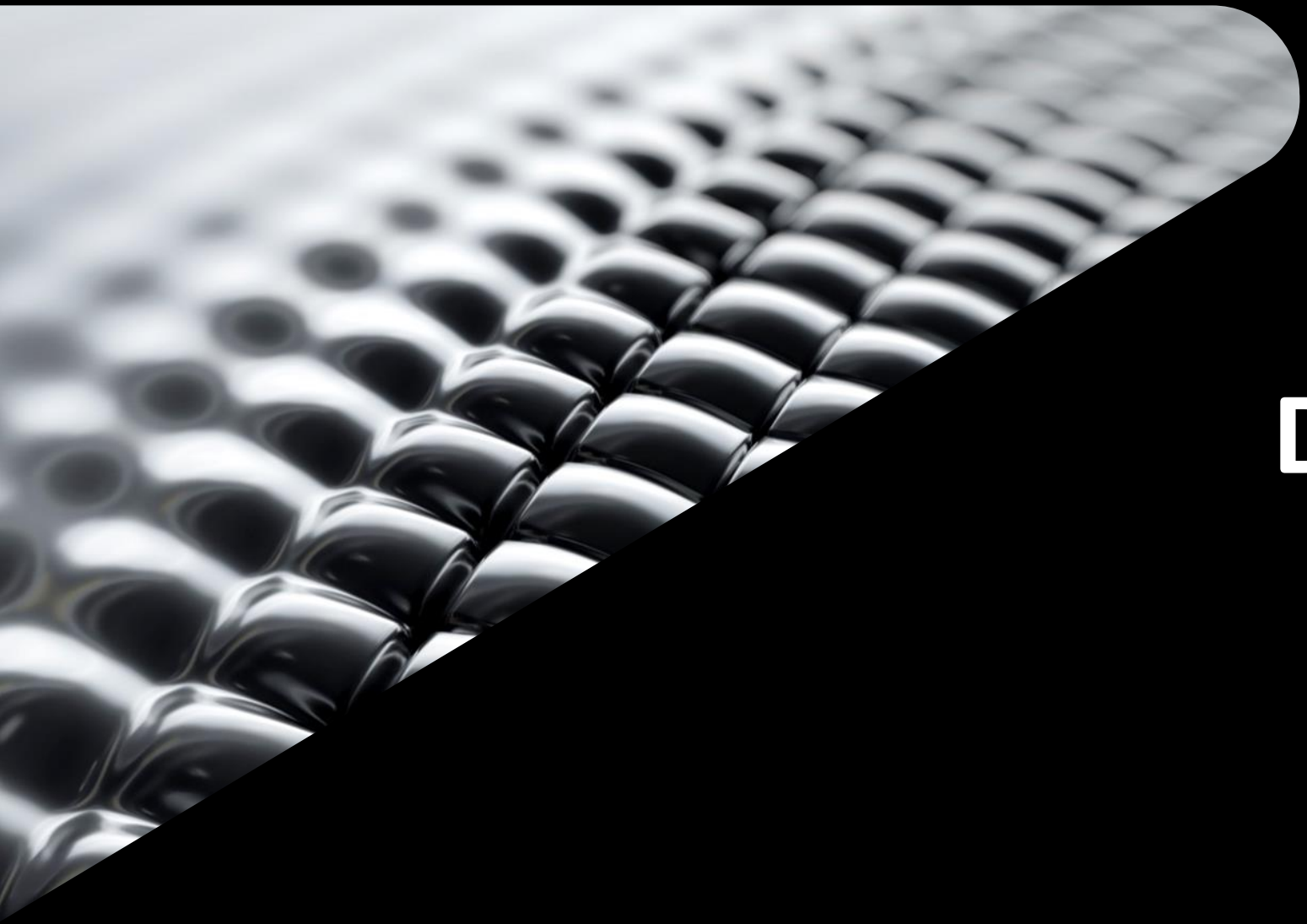
- Infraworks can use this vector boundary to drop 3D tree assets.
- Randomly spaced and sized to create a canopy type layer.
- Higher fidelity than mesh tree canopy assets from photogrammetry.



Digital twin Created through Vector AI

Roadway Layers

Digital twin Created through Vector AI



Digital Twin Use Cases

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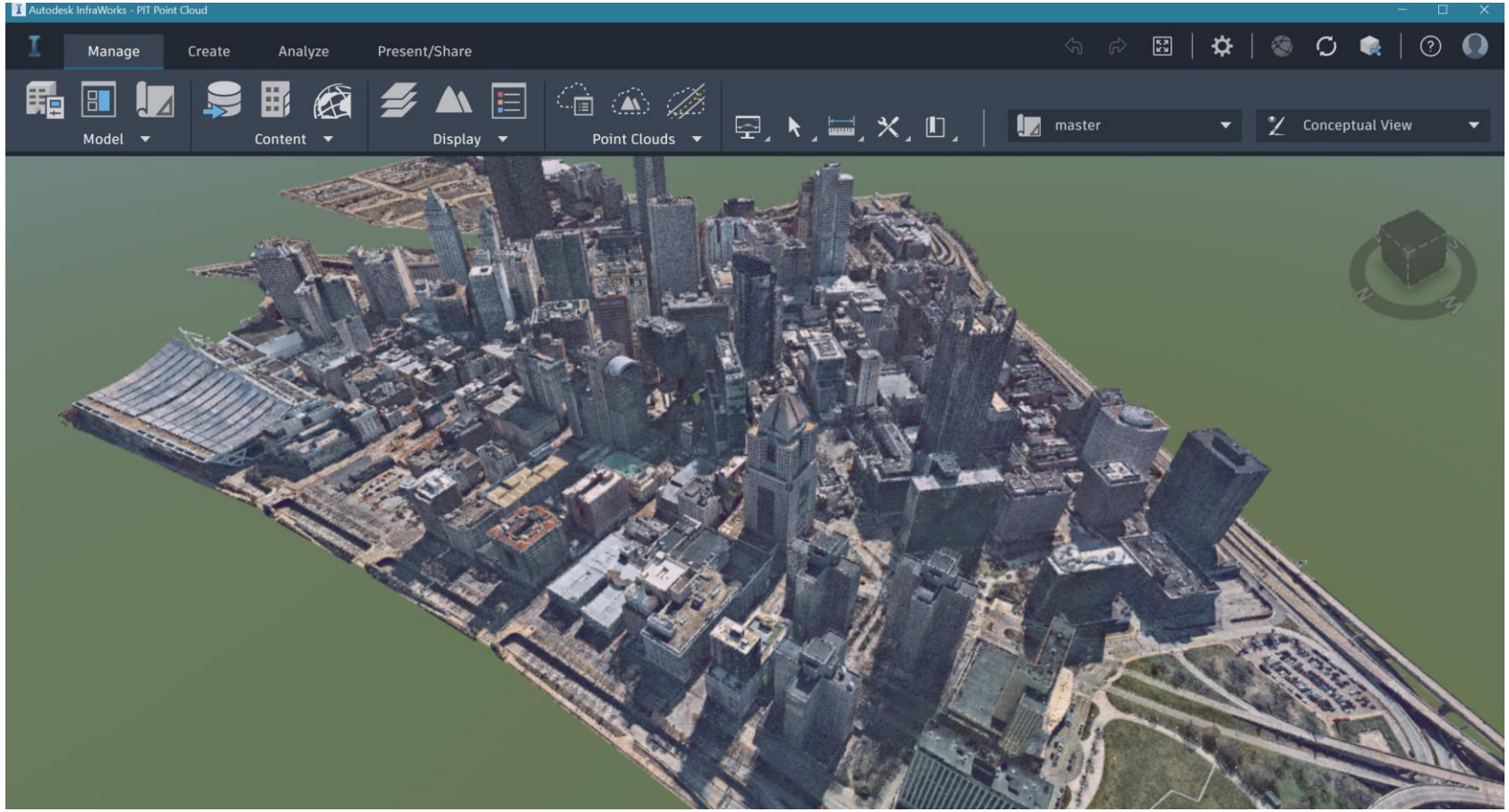
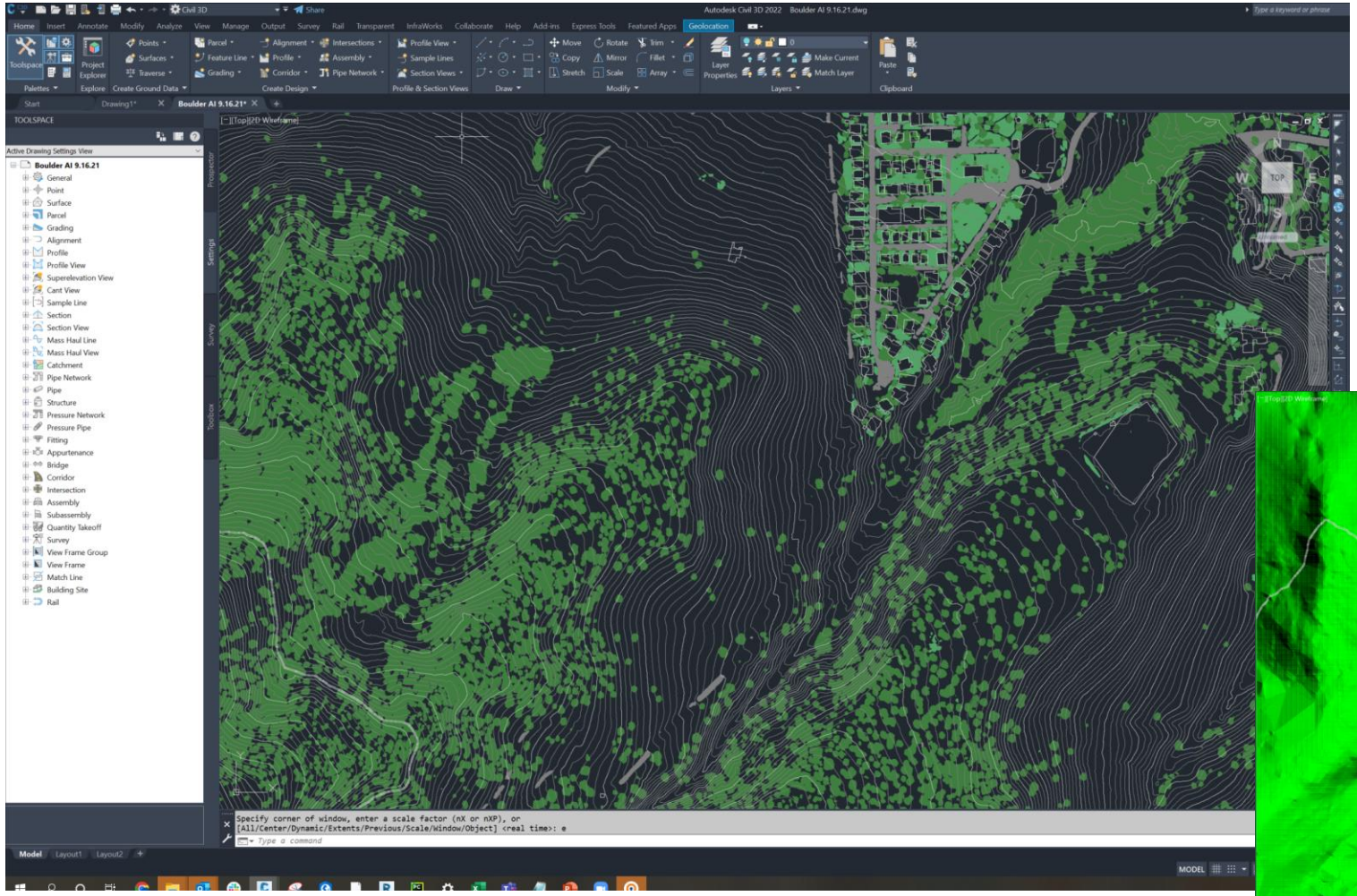
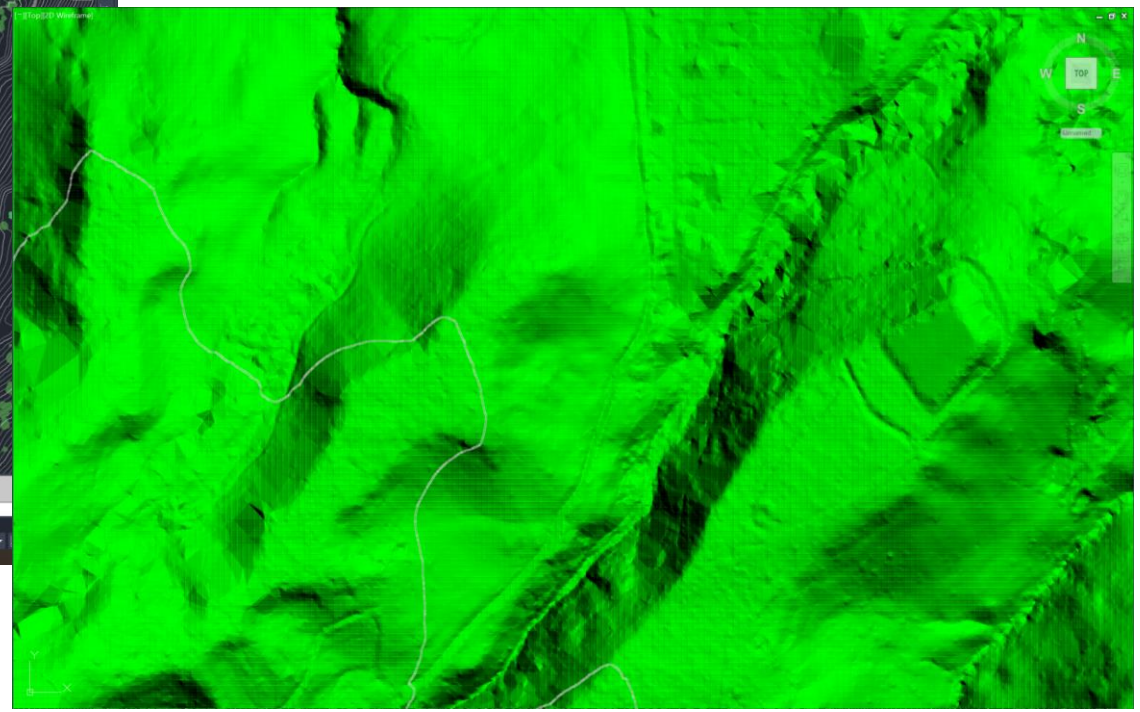
Cityscapes Imagined in 3 Dimensions

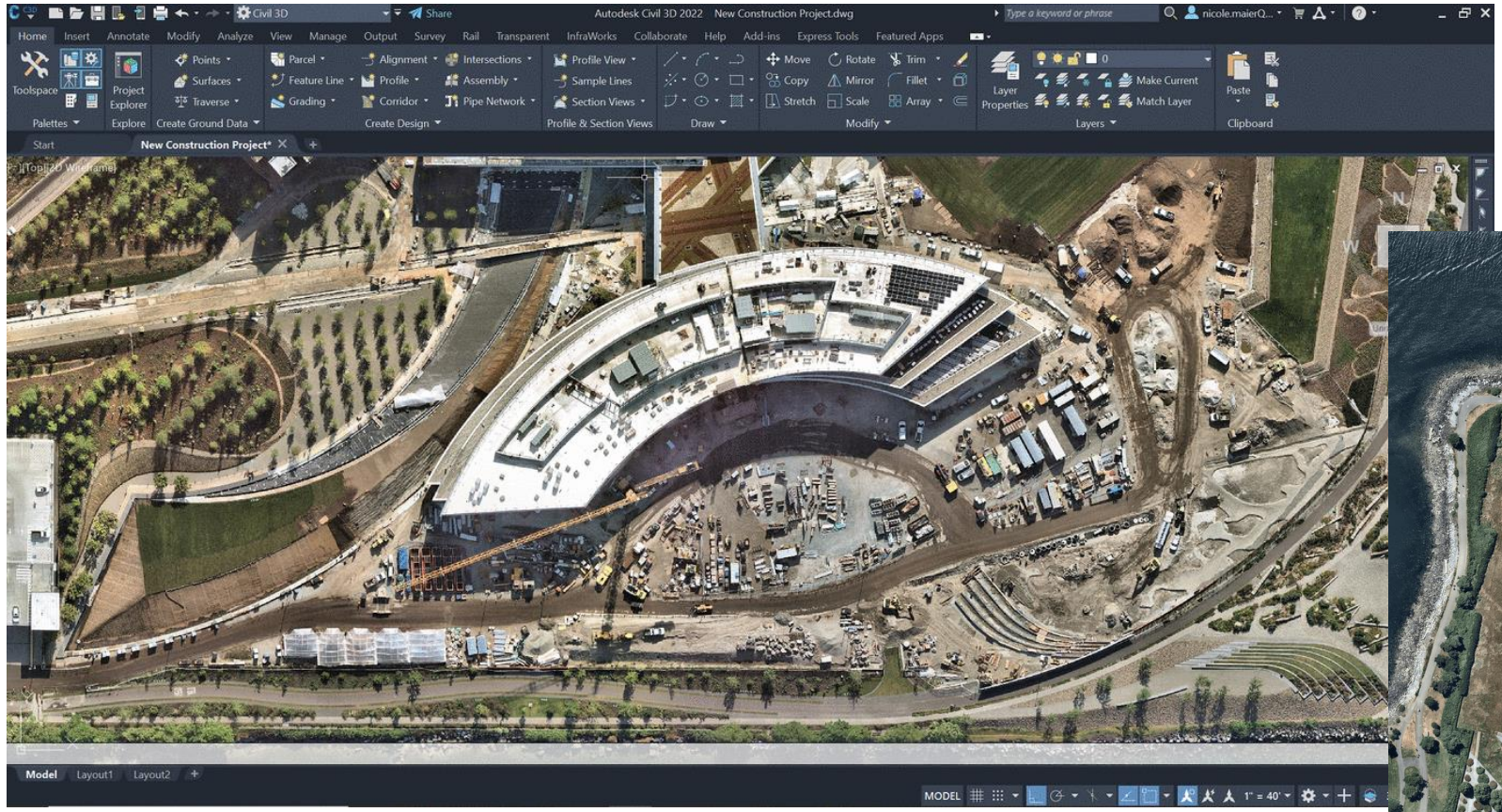






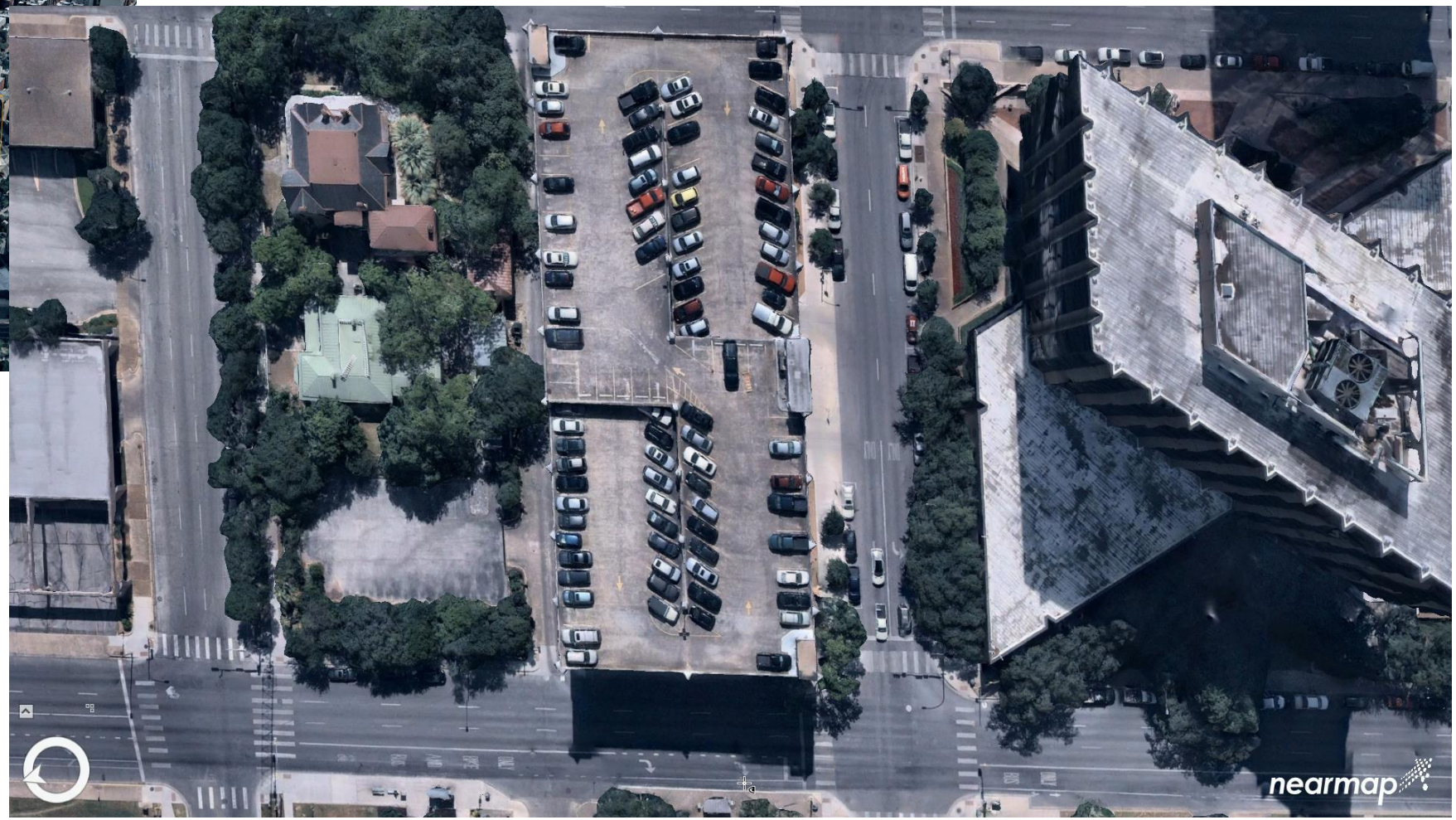
3D data inside of Civil3D

Site Monitoring and Change over time

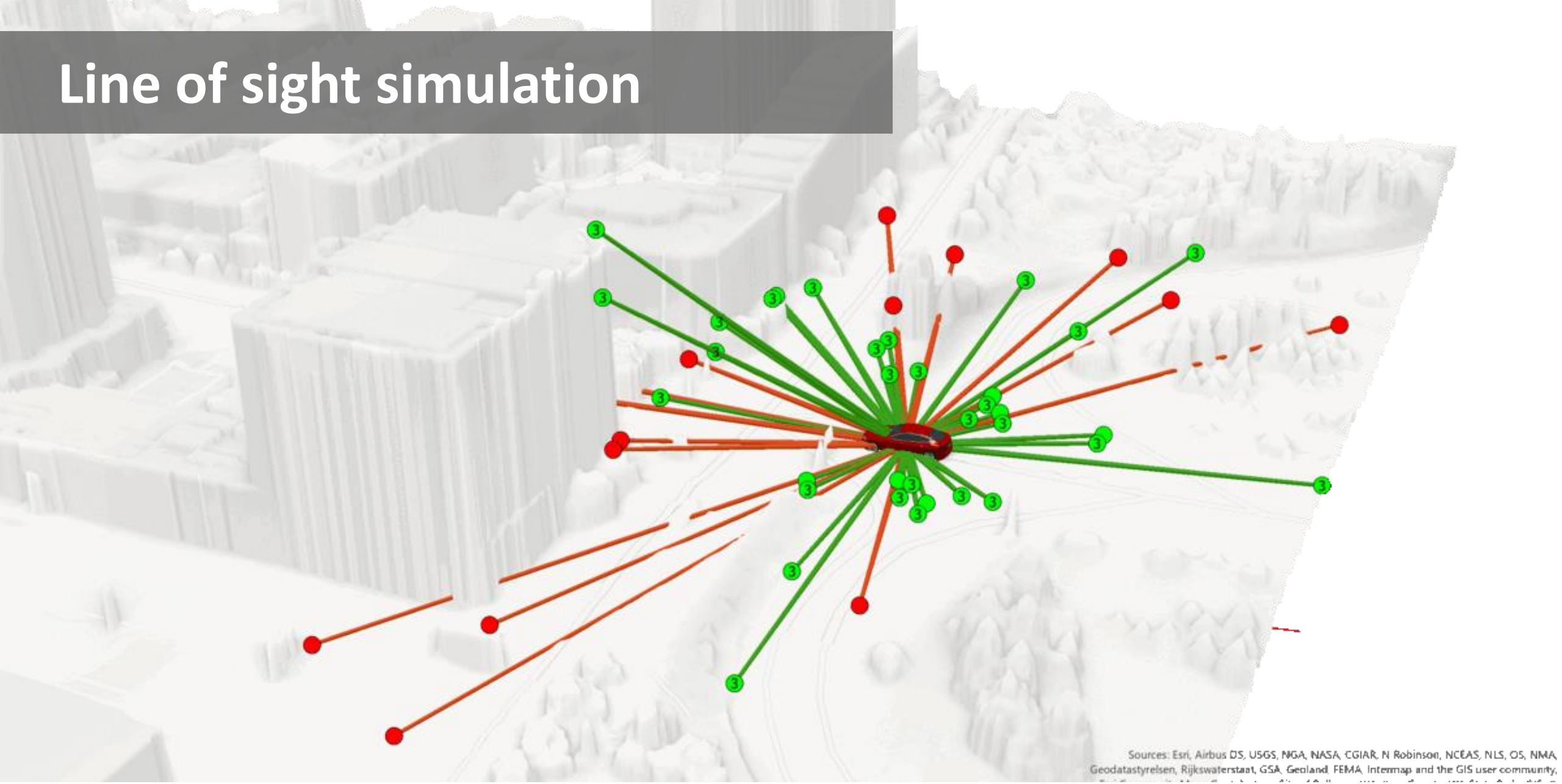


Digital Twins for Risk Assessment

Viewshed Analysis and Line of Sight



Line of sight simulation



Digital Twin Use Cases

Roadway Design

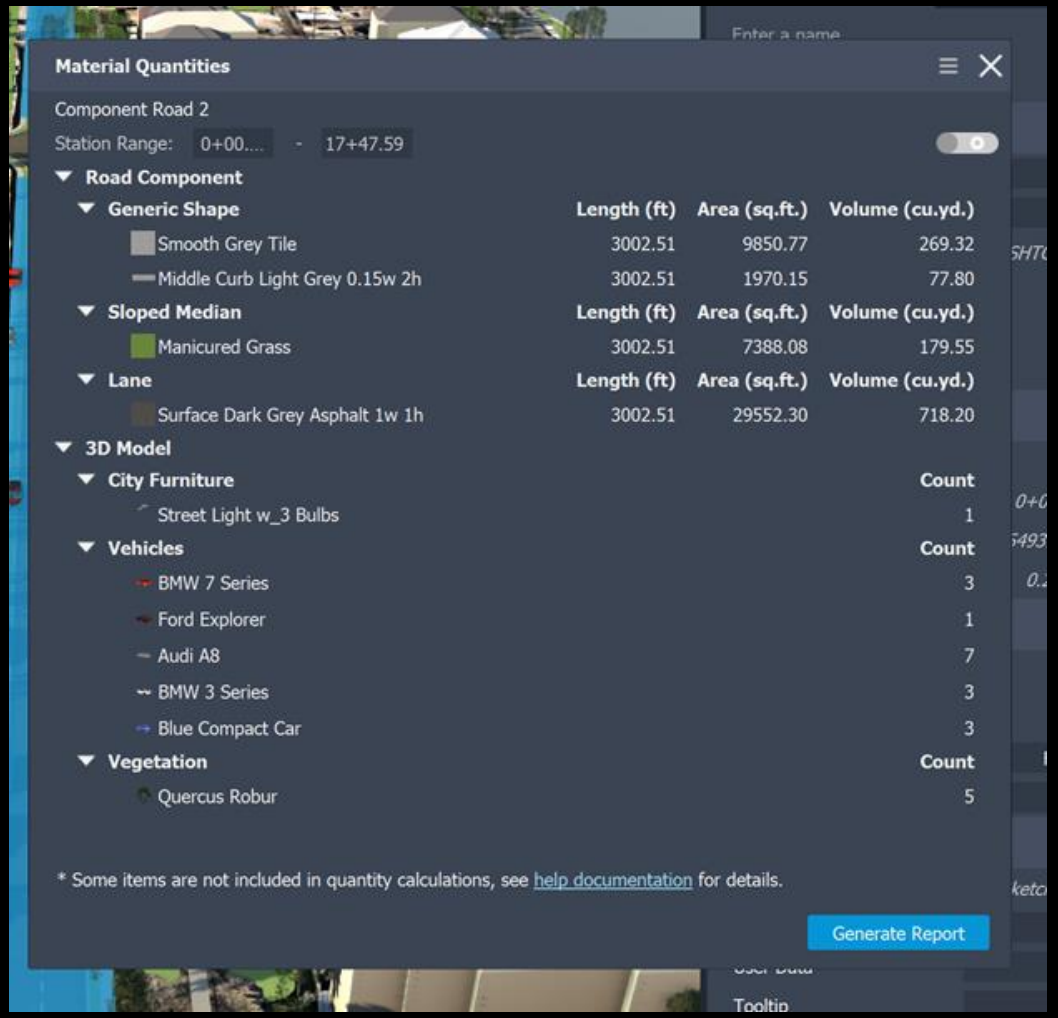
DESIGN ADVANTAGES

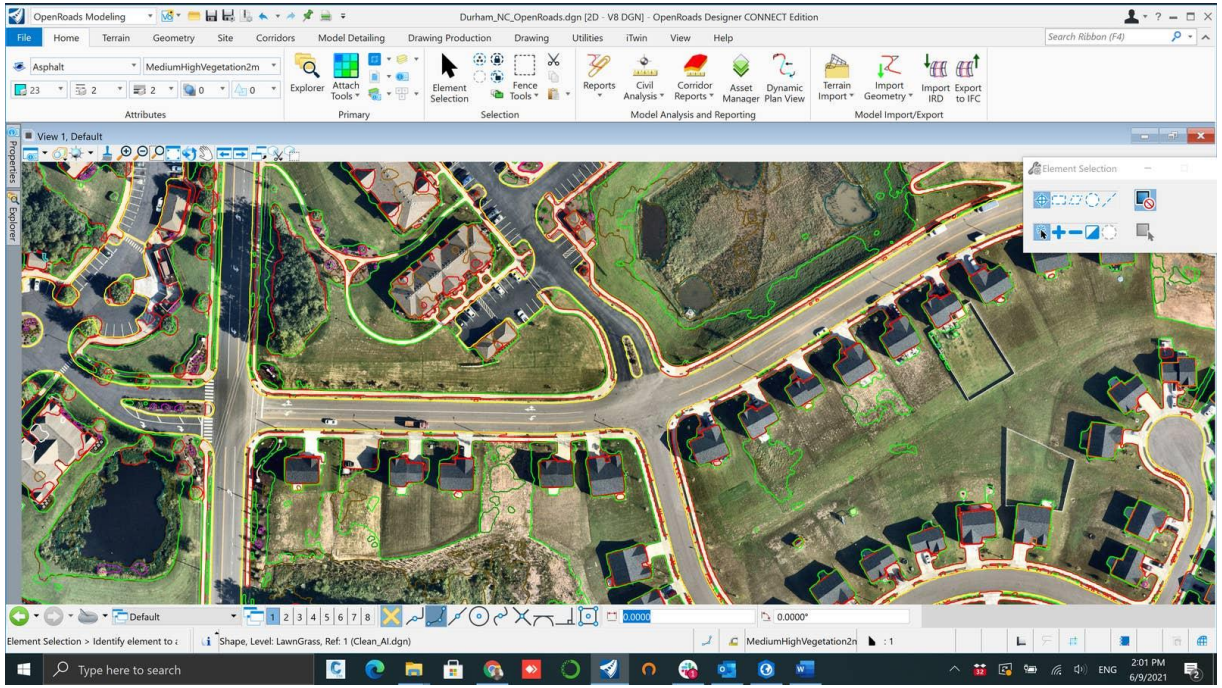
- True 3D Design environment maximizes understanding
- Impacted assets are more clearly indicated and ownership data displayed
- Greater stakeholder engagement.

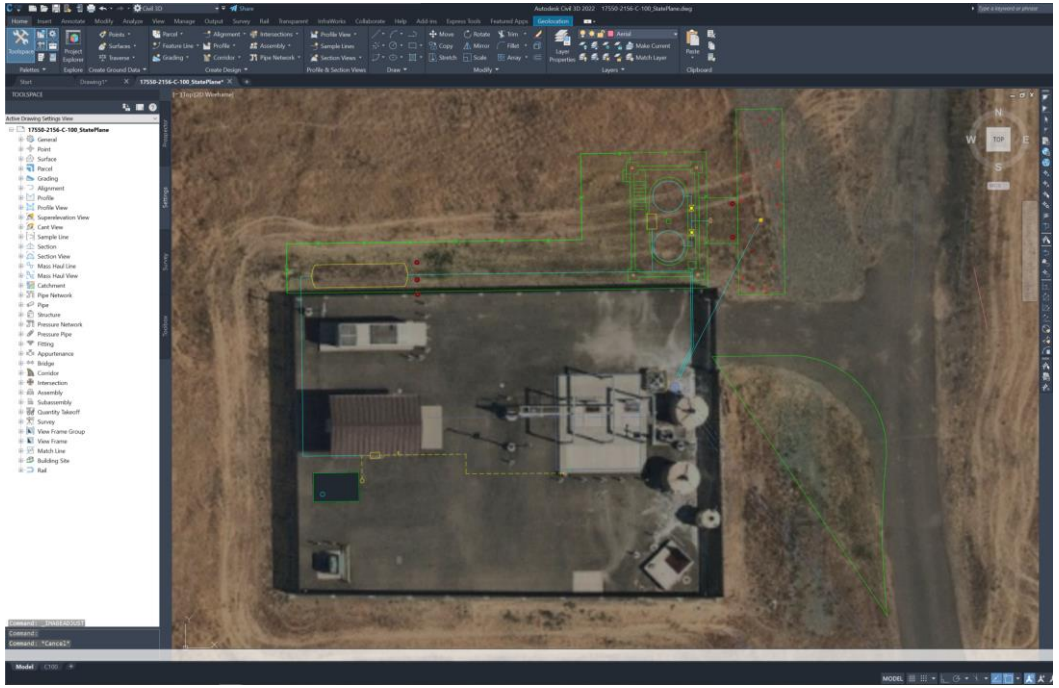
Digital Twin Use Cases

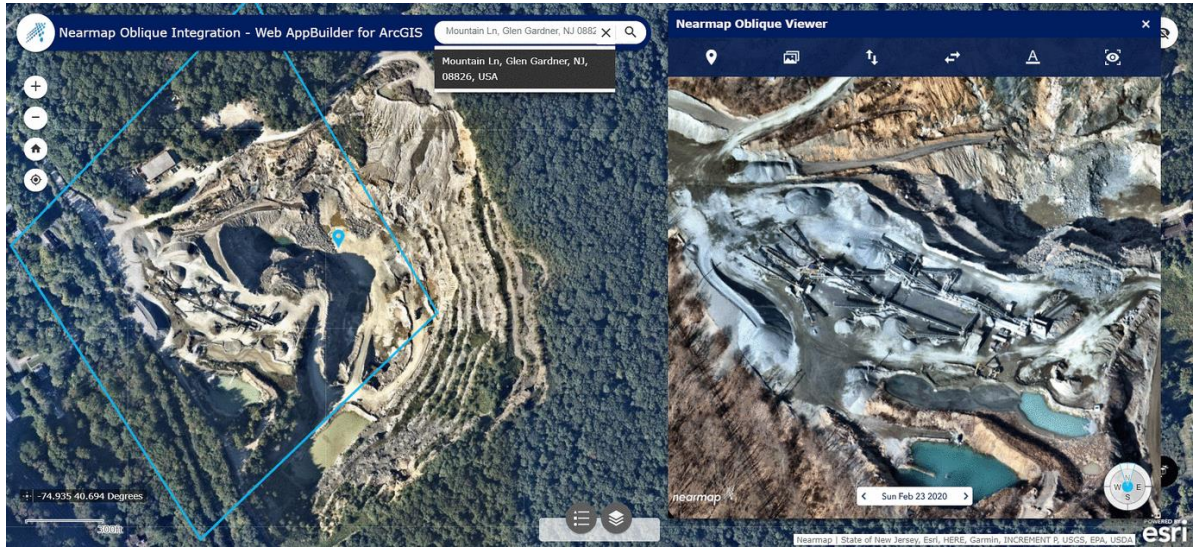
ASSET MANAGEMENT

- Built assets become easier to track when logged digitally
- Change management is easier to track by field crews
- Universal source of truth









Interoperability across platforms

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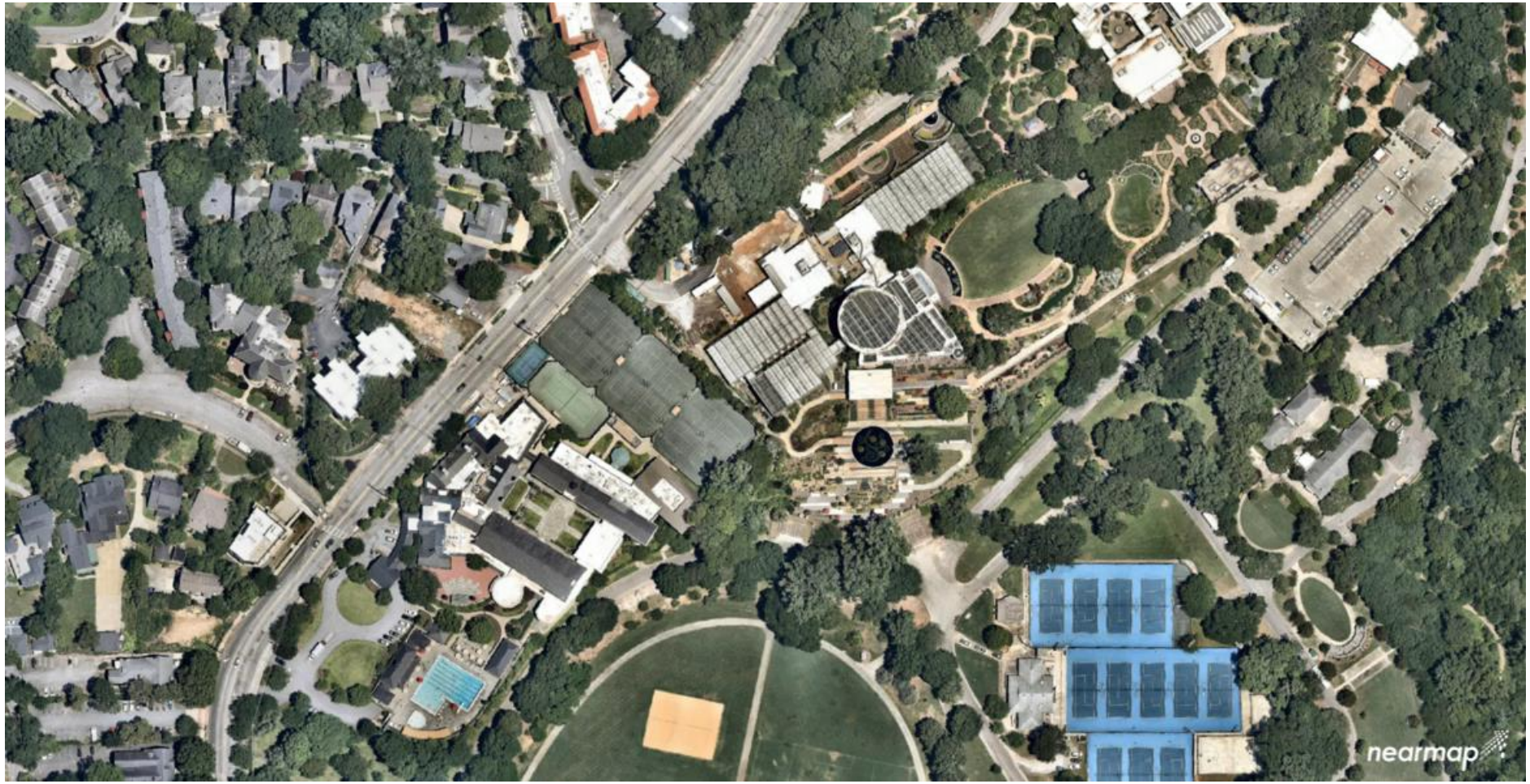
Digital Twin Foundational Context from Photogrammetry



WHY NEARMAP

HISTORICAL CONTEXT & CURRENCY

Industry leading capture program up to 3 times a year & access to years worth of imagery to better understand change over time

HIGH FIDELITY

High resolution data for accurate measurements as if you are there with 2.2"-3" resolution

REALITY CAPTURE AT SCALE

Nearmap 3D data products alongside AI based feature extraction for city wide insights

ON-DEMAND LOCATION INTELLIGENCE

Instant access to cloud hosted imagery covering 80% of US population