How Reality Capture & Drones Can Improve Project Performance

The digital transformation of construction on-site execution

Presented by

Gil Mildworth

SiteAware

Sponsored by PROCORE®

Gil Mildworth

VP Business Development
SiteAware

With 25 years in executive business roles, marketing and strategic planning in highly complex technological environments, Gil Mildworth is passionate about business value creation by innovation. Mildworth is a Talpiot graduate, and holds a master's degree in electrical engineering and a bachelor's degree in physics and mathematics.

CONSTRUCTION BUSINESS OWNER WEBINAR

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"Full-scale digitalization in nonresidential construction would, within 10 years, be capable of producing annual global cost savings of $0.7-1.2 trillion (13-21%) on Engineering and Construction"

* The Boston Consulting Group - Digital in Engineering and Construction

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Digital transformation can reduce overall projects costs by 45%

* McKinsey and Co.

”Experience in other industries shows that companies that have been quick to embrace emerging technologies and develop new platforms – the first movers – have gained a strong competitive advantage.”

* Steffen Fuchs, McKinsey and Co.

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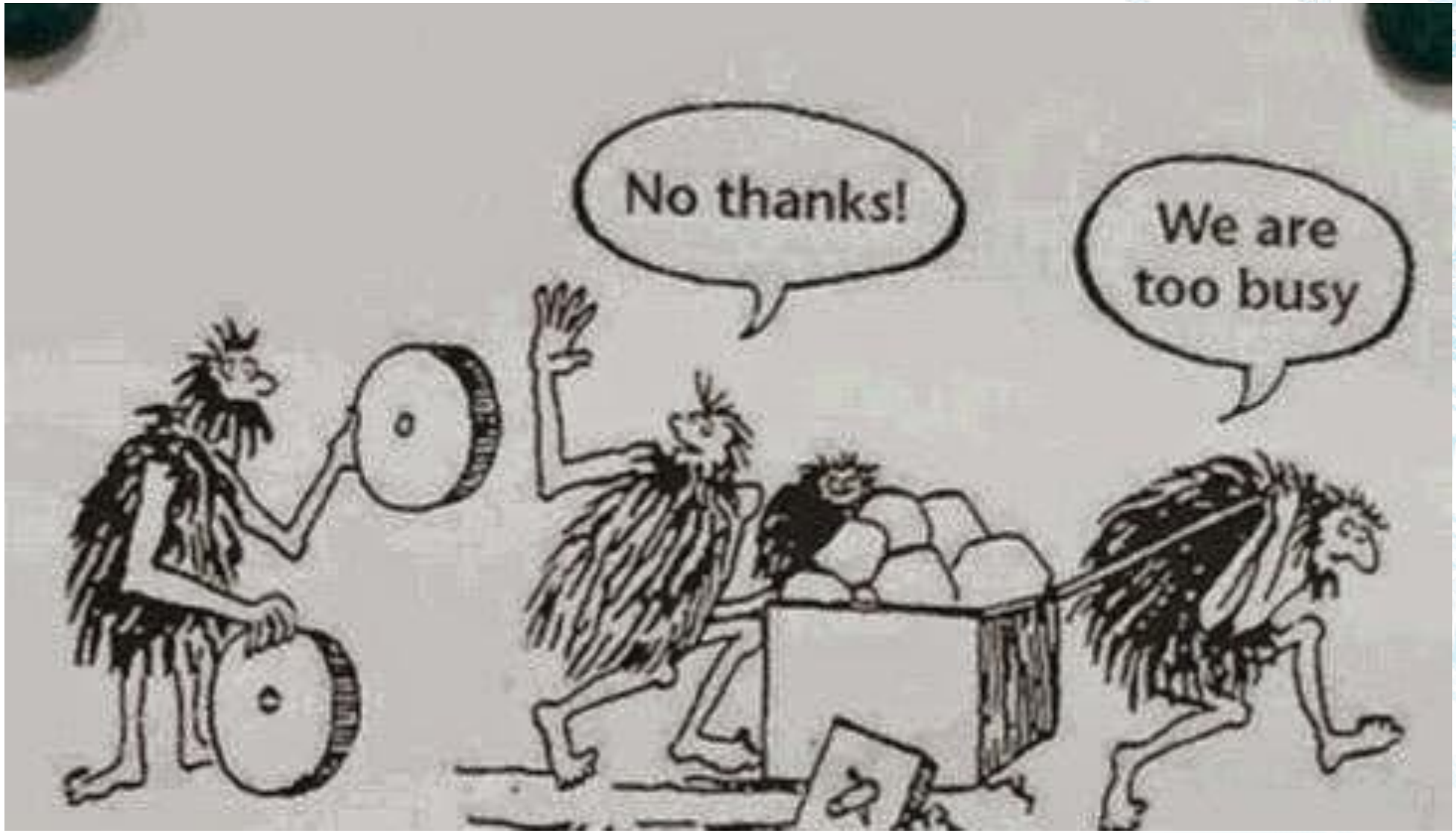
The Technology Adoption Challenge in Our Industry



SiteAware at a Glance

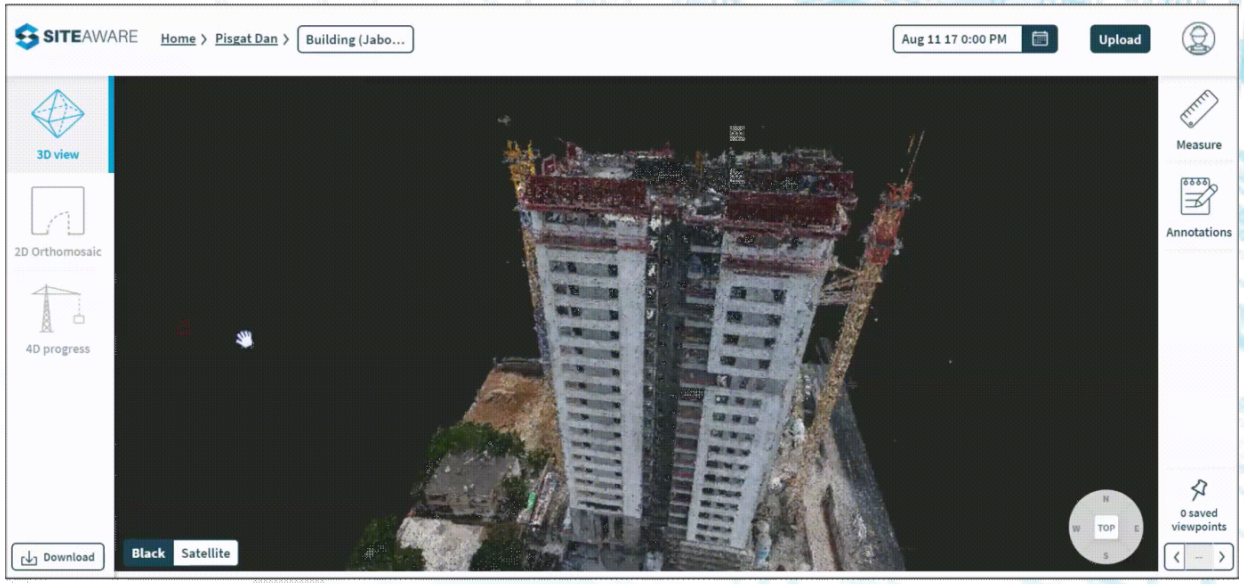
Digital Replica solutions for the construction industry improving the efficiency and quality of the on-site execution

U.S. operation in Denver, Colorado, HQ and R&D in Israel

SaaS product, launched Q2/2017

Strong IP in 3-D data analysis, sensors and autonomous vehicles

Serving top ENR customers in the U.S.



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SiteAware: Transforming Outdoor Jobsite Activities

1. Improving efficiency of project management
2. Capturing and addressing quality issues

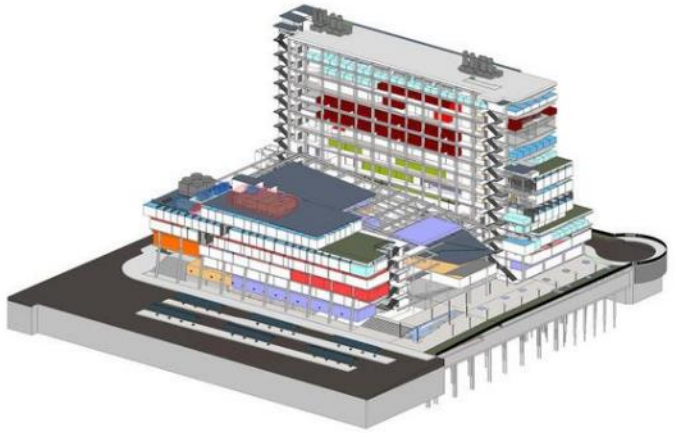
- Reduction of unnecessary costs
- Lowering delays – e.g., improving timing of activities
- Reducing reworks – e.g., early detection of errors
- Minimizing disputes – e.g., accurate documentation
- Contingency efficiency – e.g., detailed site view

The Construction Opportunity

Digital transformation can reduce overall projects costs by 45%

McKinsey and Co.

Design, planning & budgeting

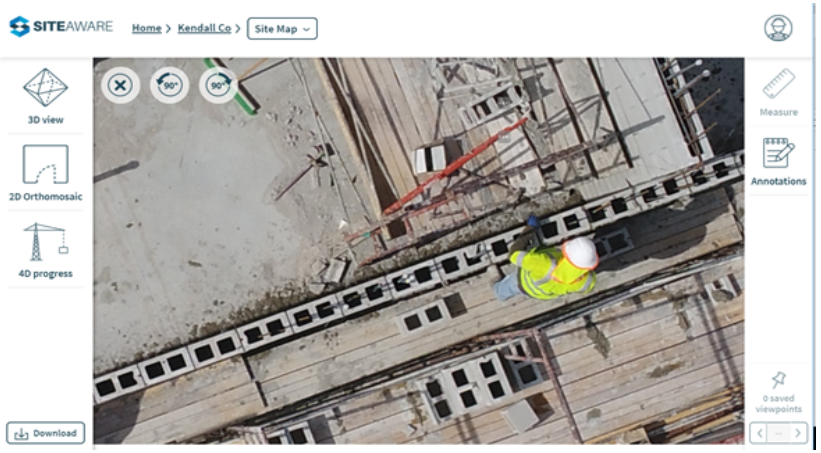


AUTODESK® REVIT®

On-site construction management

PROCORE®

On-sitevisual capture, digital replica & analytics



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Solution & Technology

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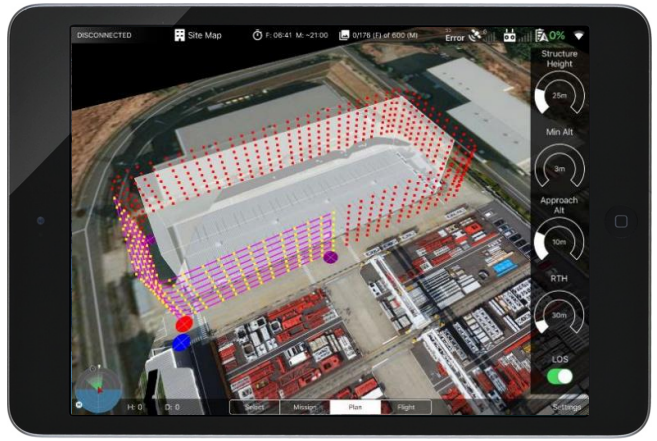
Workflow

Plan Scan Process Analyze Share

Visual data acquisition

Analytics & collaboration



SiteAware Planner app

Transforms a consumer drone

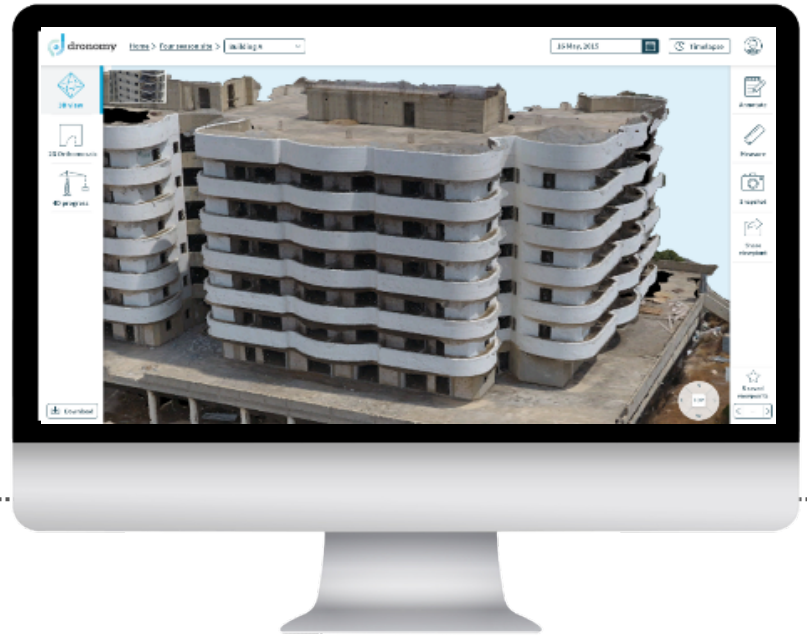
to an autonomous camera robot

Off-the-shelf drone

Upload
Process
Analyze

SiteAware Cloud

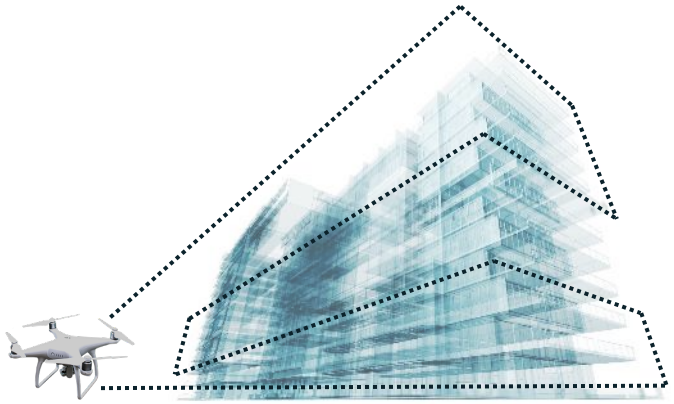
SiteAware Viewer



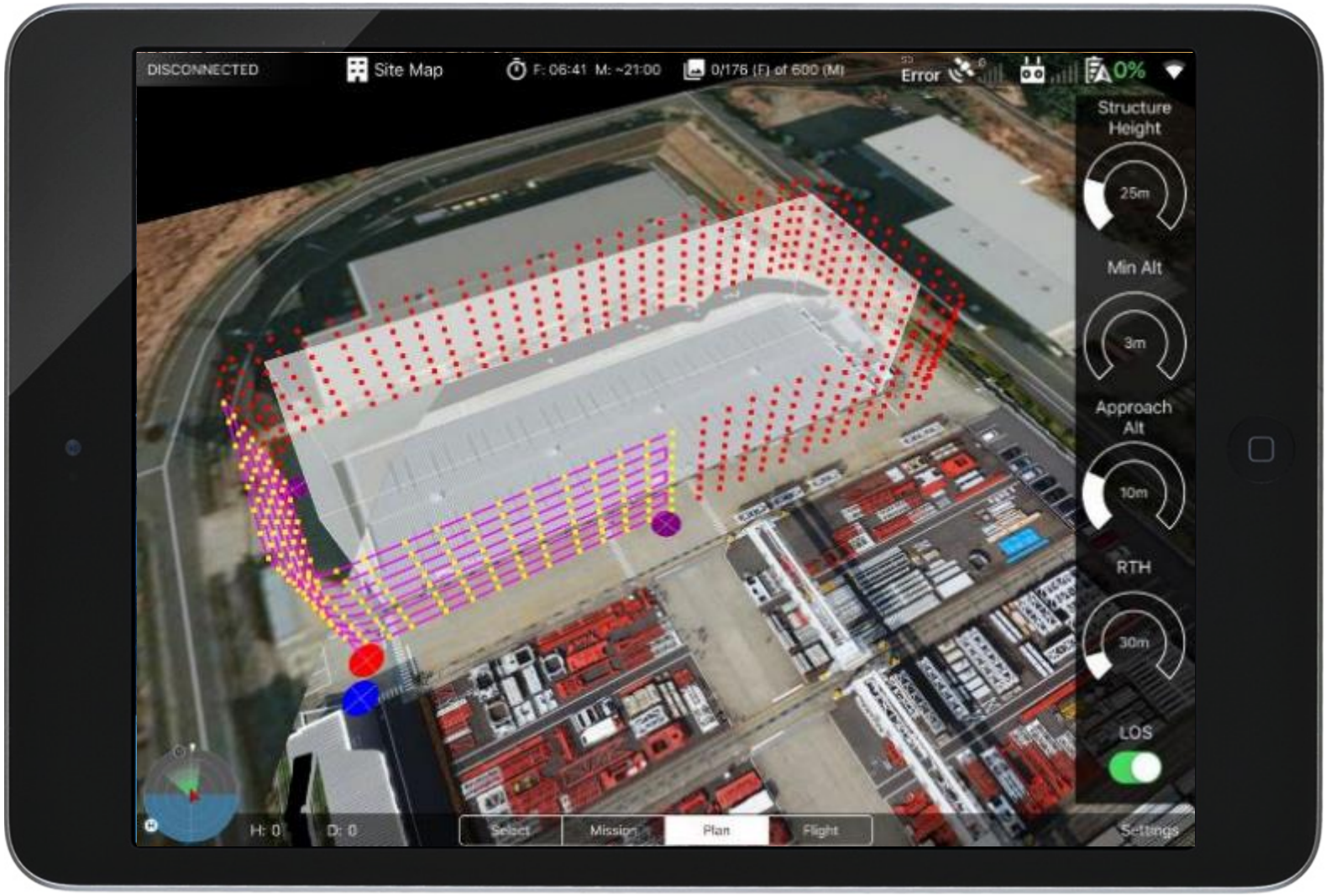
PROCORE
PlanGrid
AUTODESK.

Sharing
Integration

Autonomous Drone Operation for Vertical Structures



- Proprietary “automatic pilot”
- Transforming off-the-shelf drones to autonomous camera robots
- Flying around and close to vertical structure
- Supports inspection and modelling of high structures



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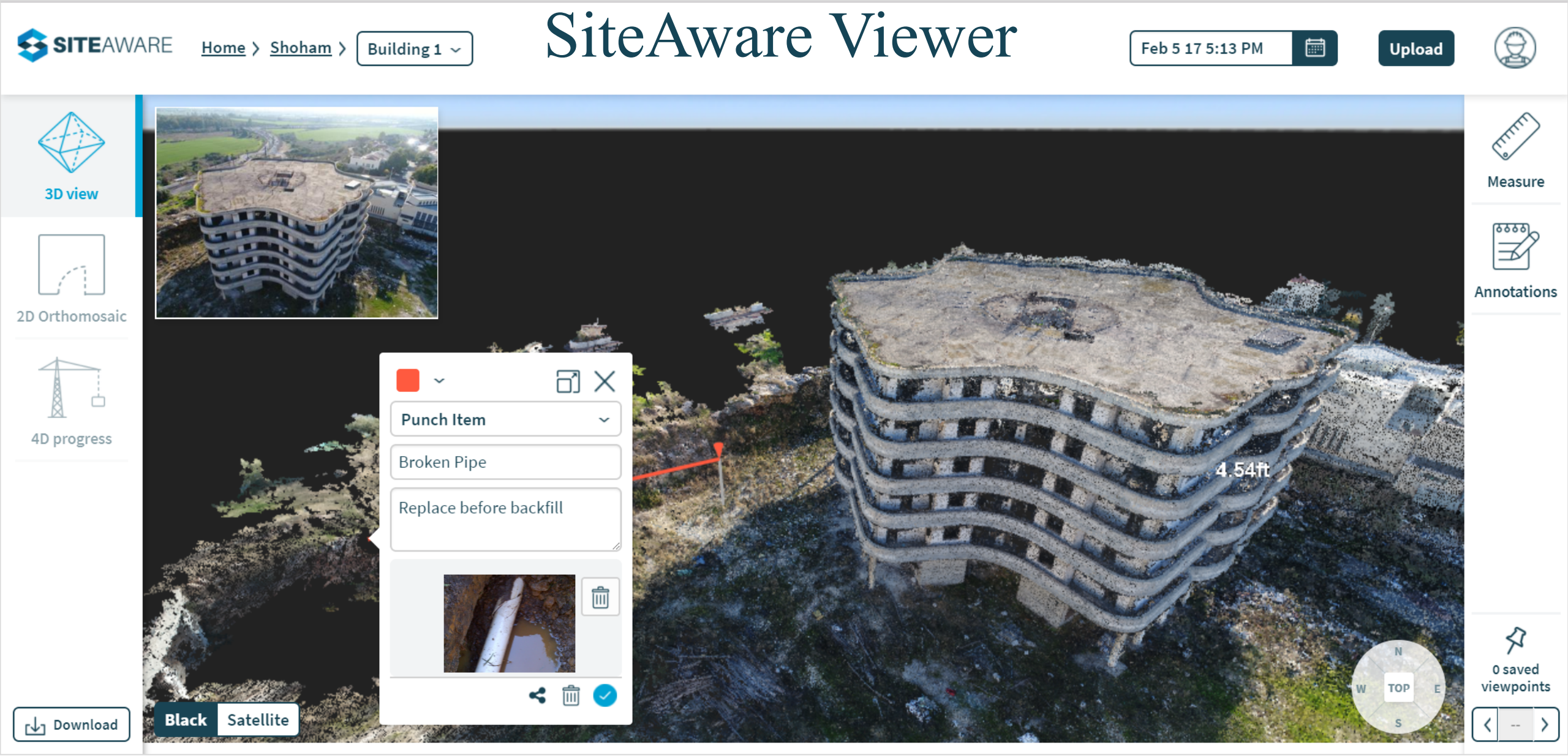
Autonomous drone scan – Low & close to structure

SiteAware Viewer



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SiteAware Viewer Key Functionality

Viewing

- 3D Models
- 2D Orthomosaic
- Original HD images

Documentation & Collaboration

- Snapshots
- Markups
- Smart 3D Annotations

PROCORE

- Album Photos
- Observations
- Punch Lists
- RFIs

Measurements

- Length
- Slope
- Area
- Volume

Analysis

- Automatic Change Detection
- Comparative Views*
- Actual vs. Planned (BIM)*

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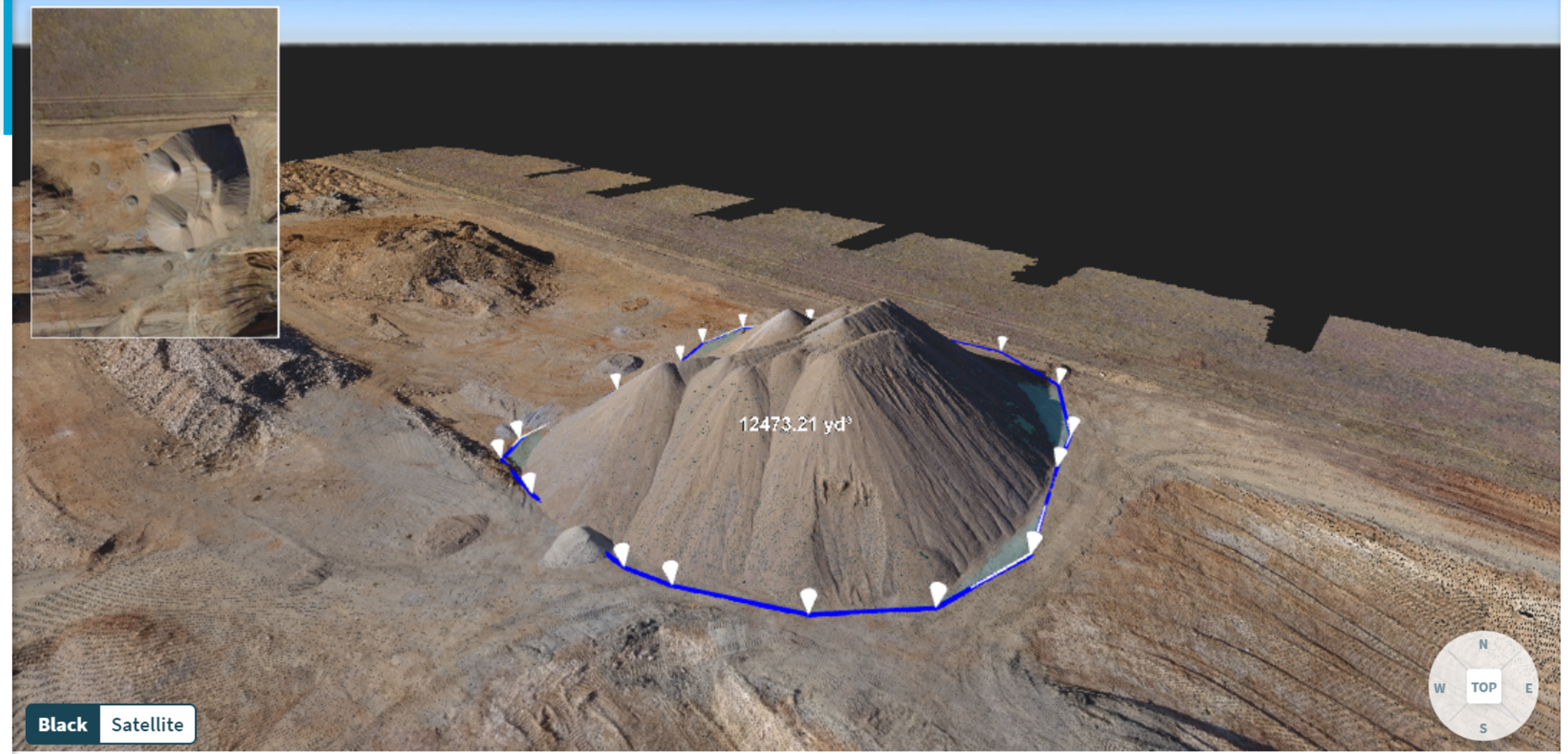
Volumetric

SITEAWARE Home > Earthworks > Site Map Nov 2 16 6:44 PM Upload

3D view

2D Orthomosaic

4D progress



Measure

Annotations

0 saved viewpoints

Download

Black Satellite

SITEAWARE PROCORE

Linear, sub-inch measurements

dronomy

Home > Longmont > Club House

4/27/2017 1:30:16

Upload

3D view

2D Orthomosaic

4D progress

Download

Snapshot

Measure

Polyline

Polygon

Clear all

Annotations

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Documentation

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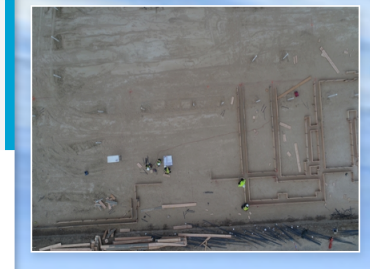
Automatic Change Detection



3D view

2D Orthomosaic

4D progress

Download

Snapshot

Measure

Annotations

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proprietary

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Automatic Change Detection

3D view

2D Orthomosaic

4D progress

Download

Snapshot

Measure

Annotations

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Automatic Change Detection

3D view

2D Orthomosaic

4D progress

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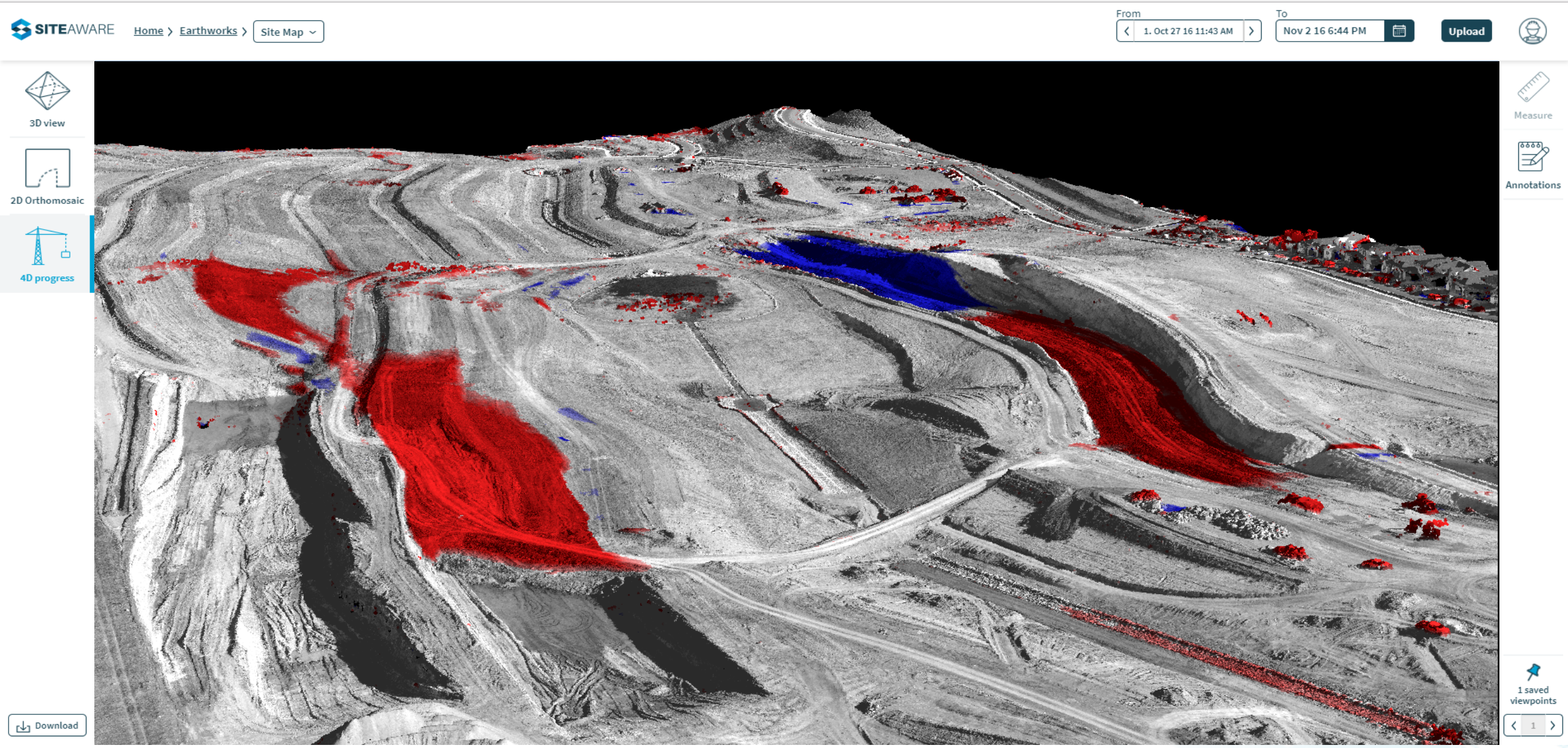
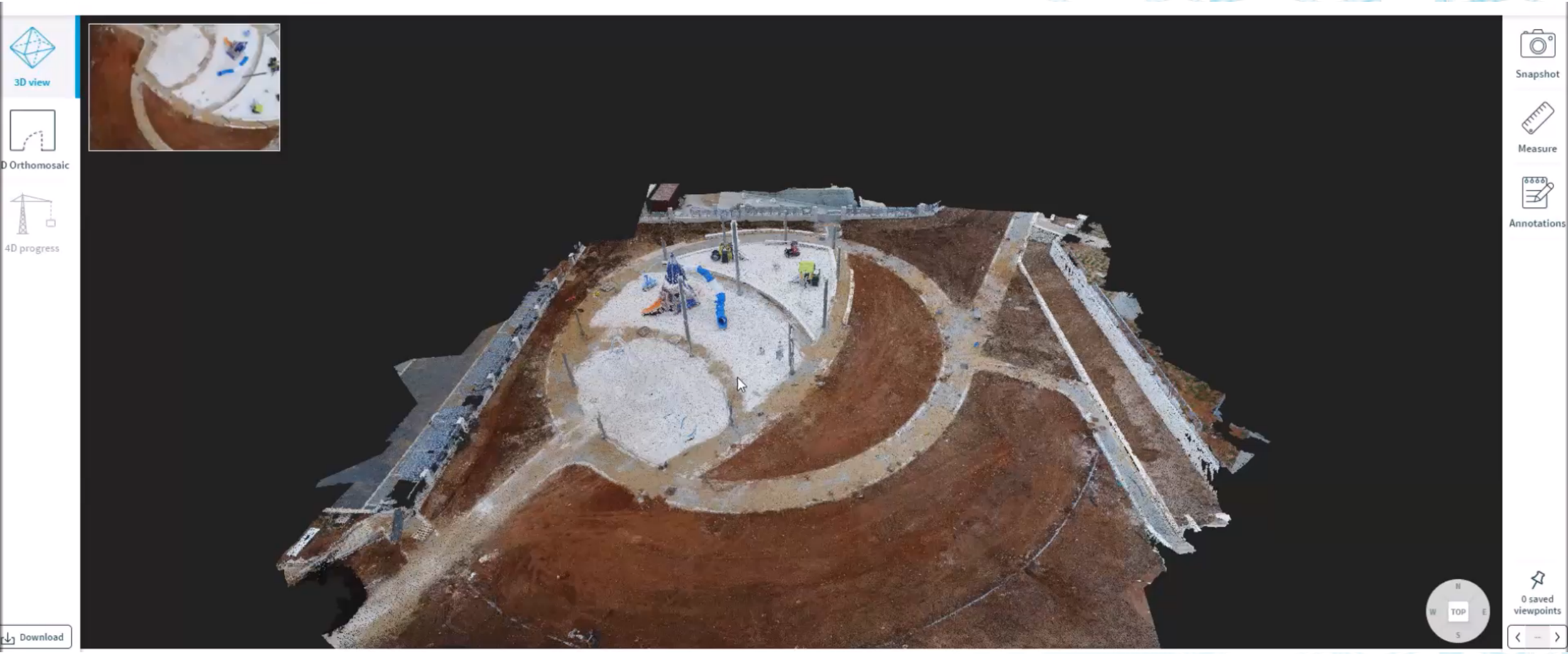
Progress Monitoring: Additions & Subtractions



Visual Analytics with Automatic Change Detection



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Side-by-Side Comparison*

3D view

2D Orthomosaic

4D progress

Snapshot

Measure

Annotations

Black | Satellite

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* Coming soon

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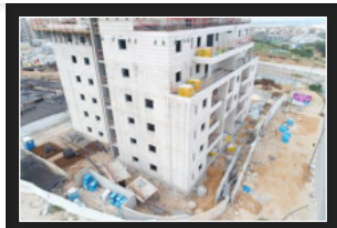
“Looking Glass” Comparison*

* Coming soon

proprietary

SITEAWARE PROCORE

Planned vs. Actual Side by Side*



3D view

2D Orthomosaic

4D progress

Snapshot

Measure

Annotations

Black Satellite

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* TBA

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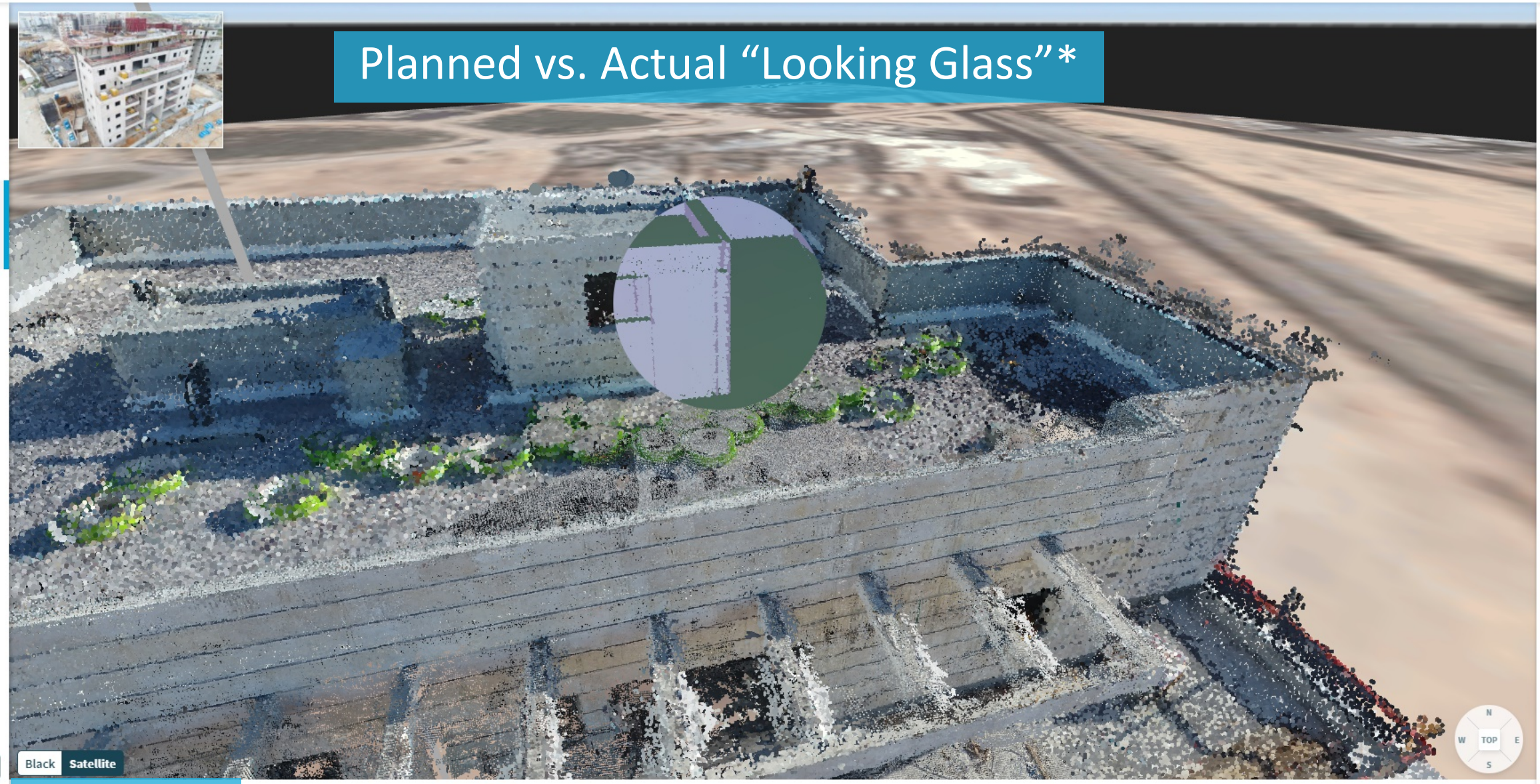
Planned vs. Actual “Looking Glass”*



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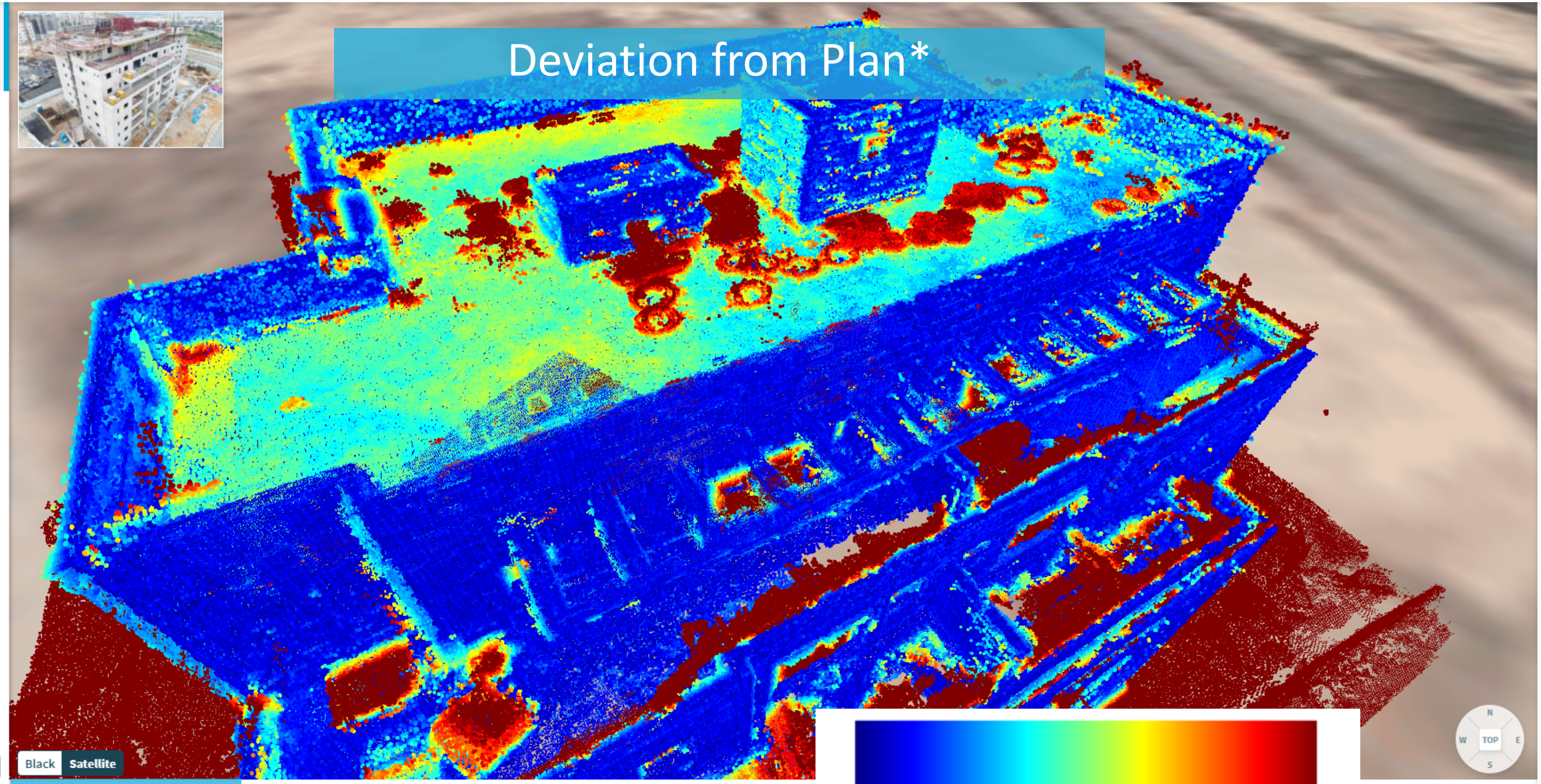
Deviation from Plan*



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SiteAware <> Procore Integration

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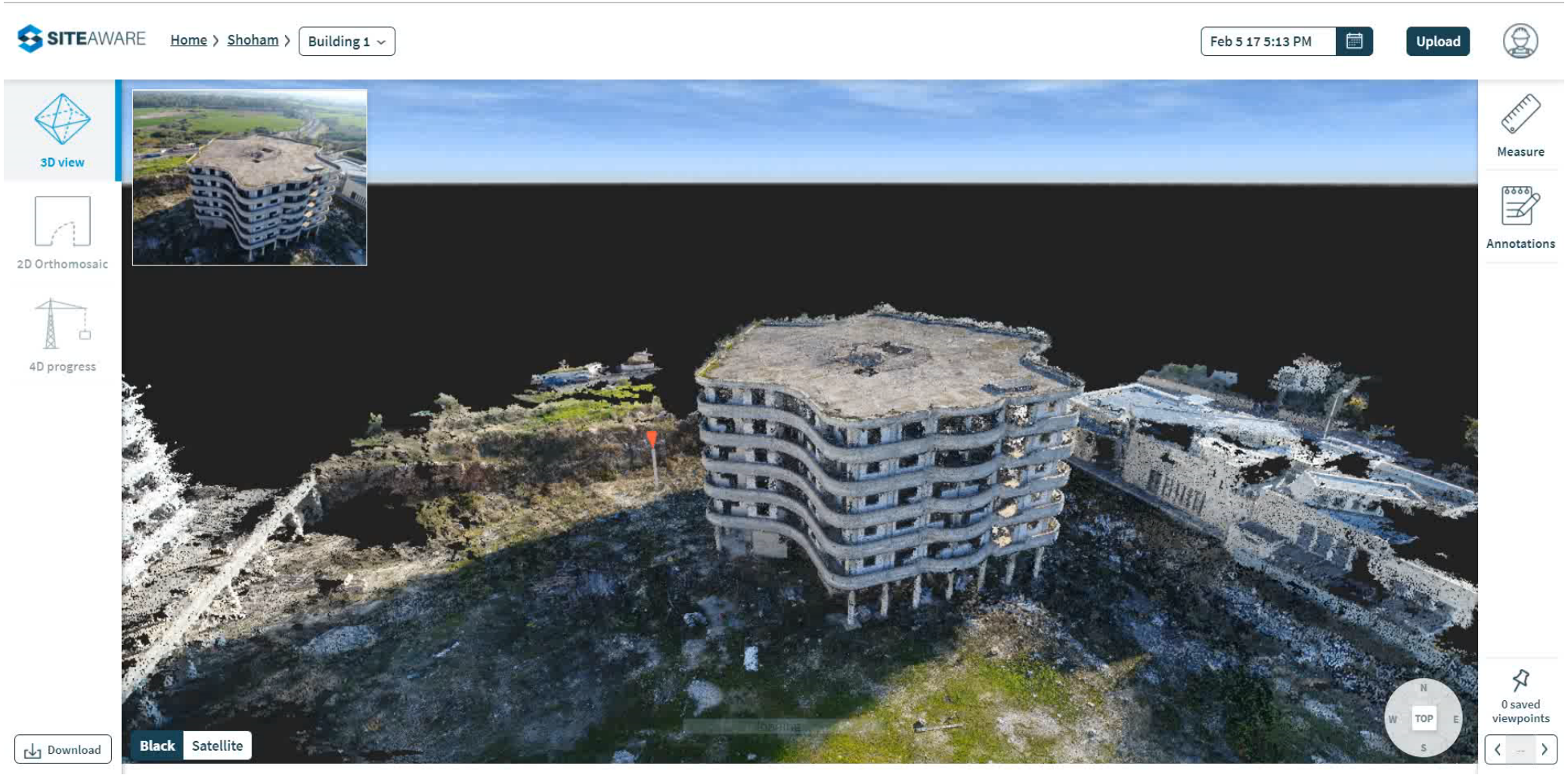
Identifying Issues in SiteAware Viewer



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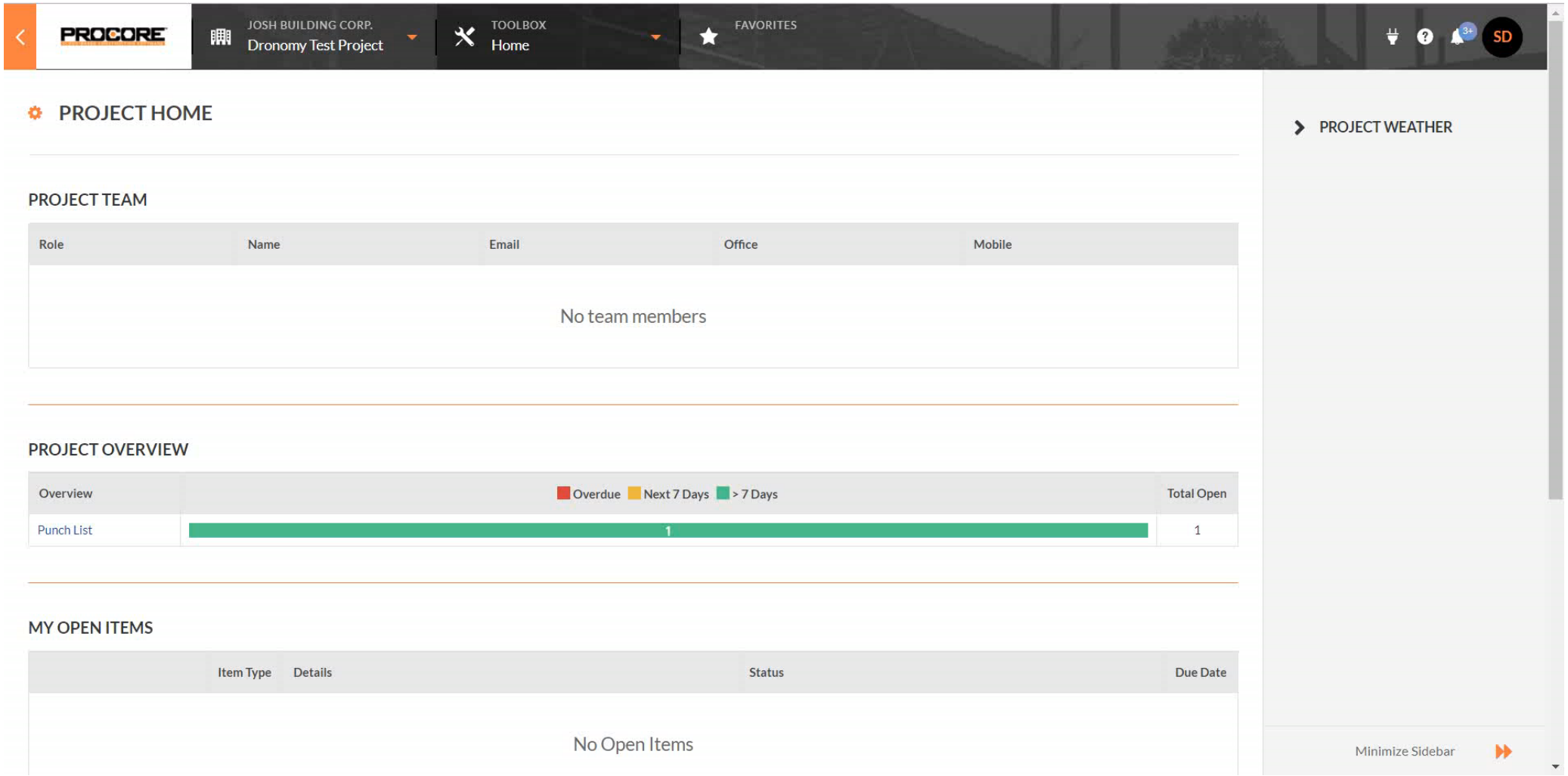
Seamless Integration into Procore (Punch Items)



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Customer Case Studies

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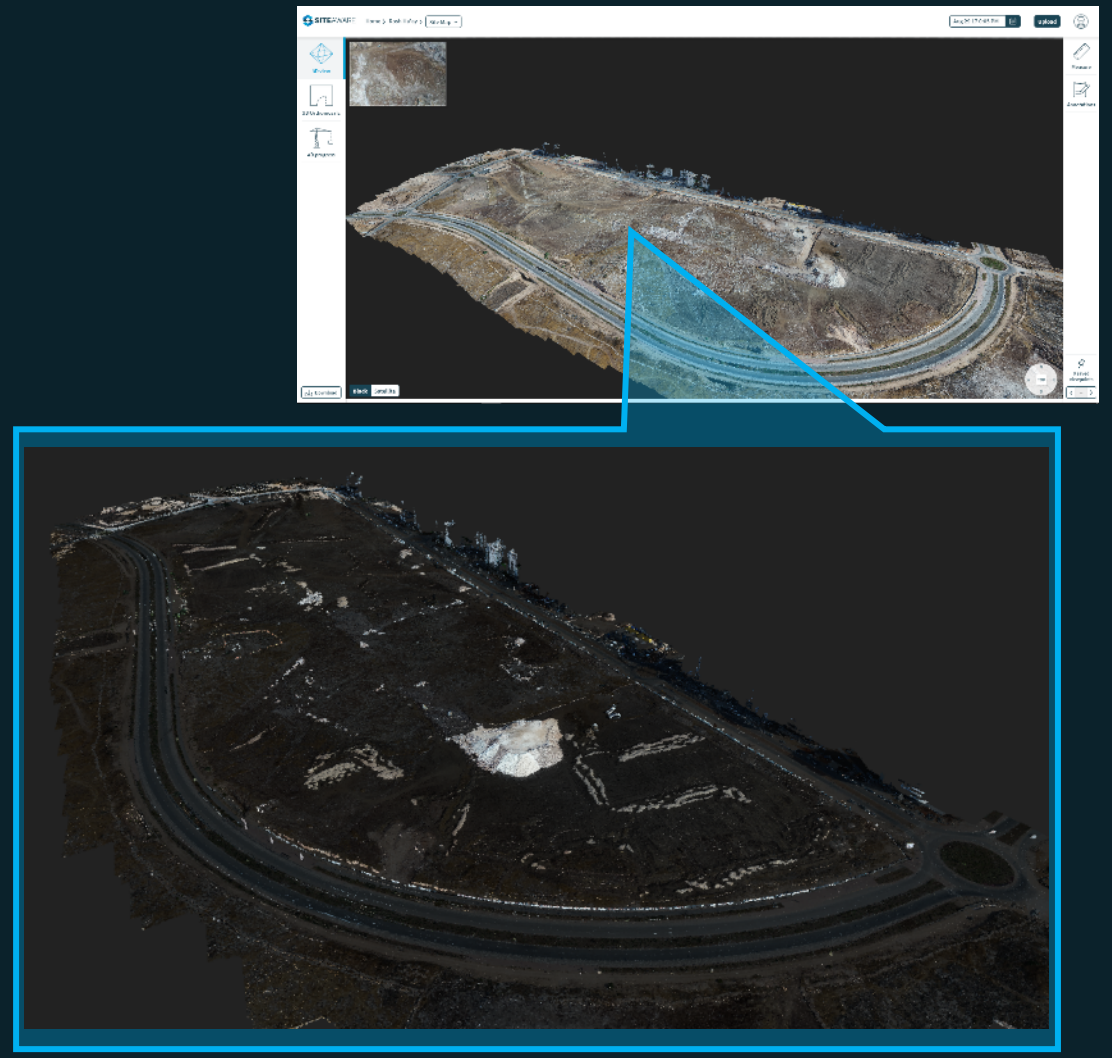
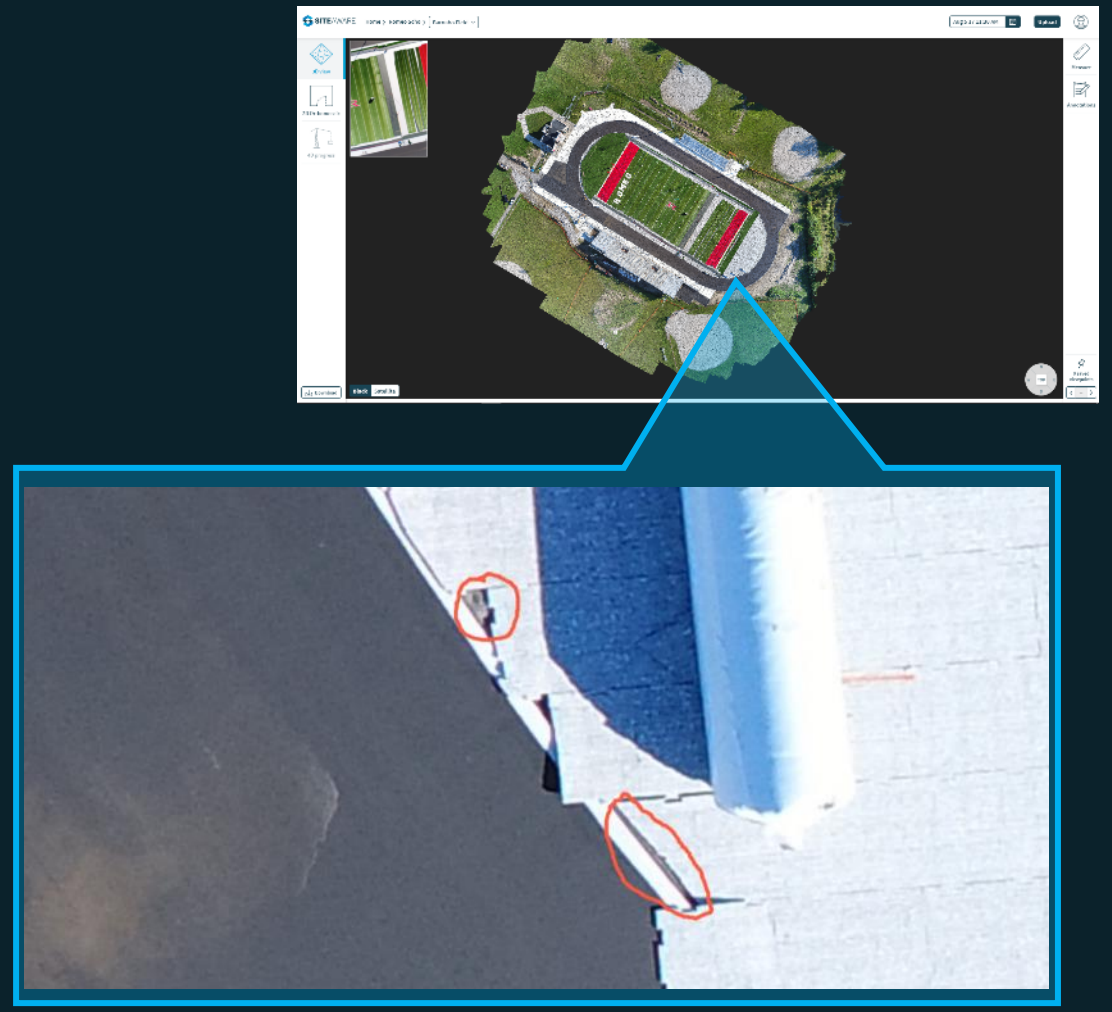
Case Study – PayApp Verification

- **Scope**
  - New residential subdivision
  - Earthworks and infrastructure
- **Case Summary**
  - During a monthly pay application review, the owner's representative identified a discrepancy in one of the milestones submitted for payment
  - Change detection was used to verify no changes were made during the relevant period
  - The owner ended up not approving the payment for milestone completion
- **Savings**
  - An advanced payment of $280,000 postponed



Case Study – Installation Documentation

- **Scope**
  - New high school athletic complex
  - New artificial turf and track, as well as spectator facilities
- **Case Summary**
  - After completion of artificial turf, the project team spotted that edges were beginning to sink
  - By accessing previous scans, the team found that the turf installer placed the sublayer in an incorrect method
  - The project team ordered the subcontractor to remove the turf in selected locations and to reinstall the sublayer
- **Savings**
  - Rework was performed in targeted areas rather than inclusively
  - Potential claims from the owner upon completion

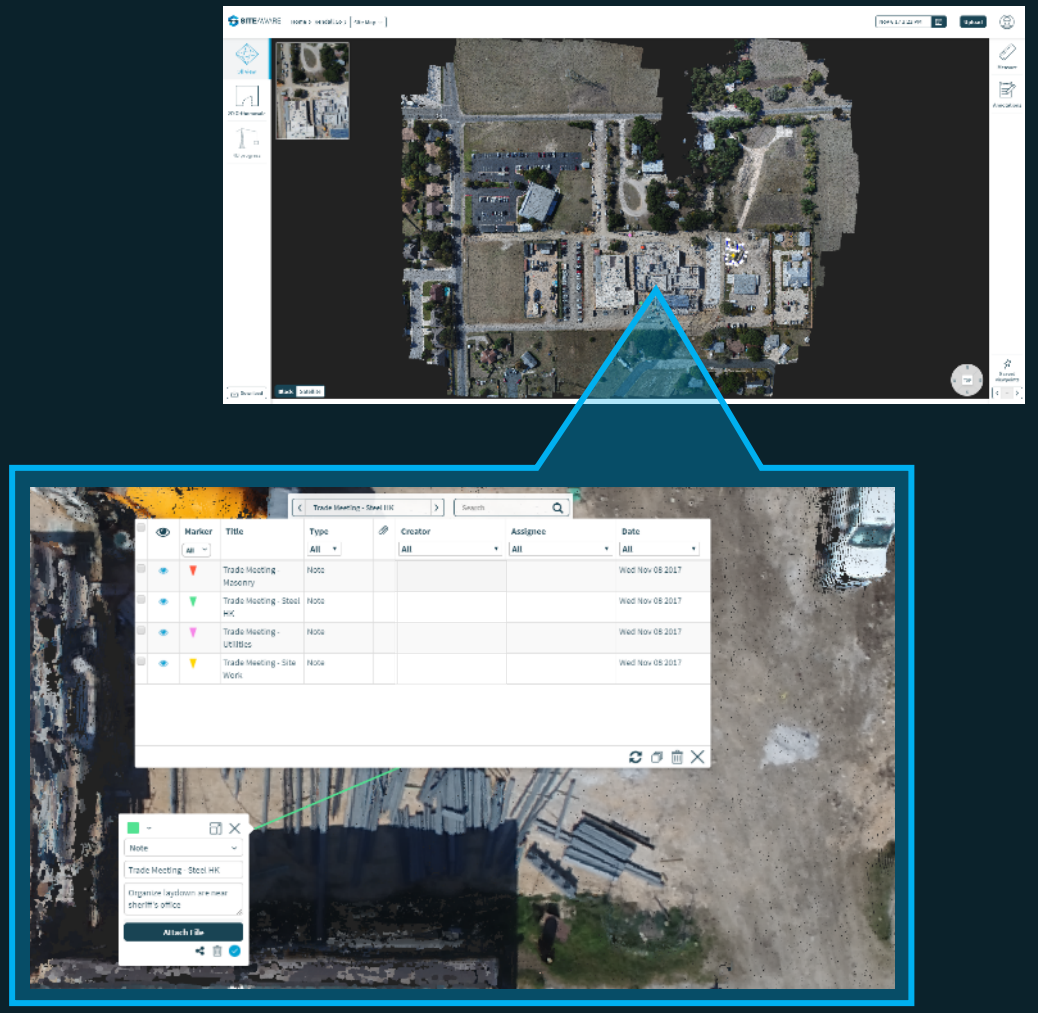


Case Study – Prevention of Rework

- **Scope**
  - New municipal facility
  - Combination of Steel and Masonry Construction
- **Case Summary**
  - A standard review of raw images by the site engineer found an error in the outline of a masonry wall to be built
  - A snapshot was taken and marked up and saved as a field observation
  - The masonry subcontractor was notified of the error and was told to hold construction until outline was verified
- **Savings**
  - 2 days labor of a masonry crew (removal of the flawed wall, repositioning in the correct location)

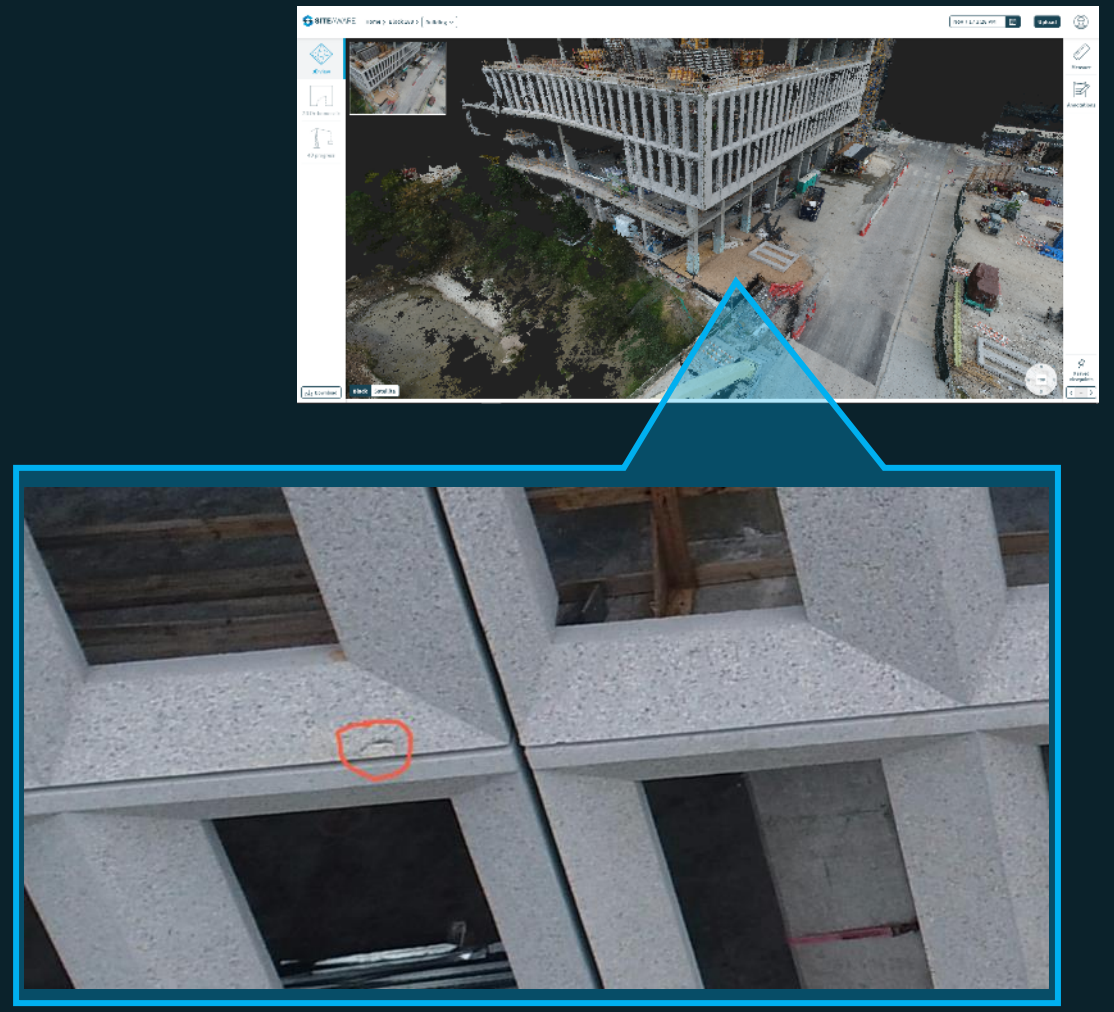
Case Study – Weekly Trade Meetings

- **Scope**
  - New institutional facility
  - Site work, structural work and underground utilities
- **Case Summary**
  - The superintendent uses visual aids from the solution to clearly communicate issues to the different subcontractors
  - The meetings agenda is translated to annotations on a 2-D/3-D model
- **Savings**
  - Superintendent’s time and effort explaining tasks in the field
  - Weekly meetings have become shorter
  - Clear communication reduces errors and idle time waiting for detailed instructions

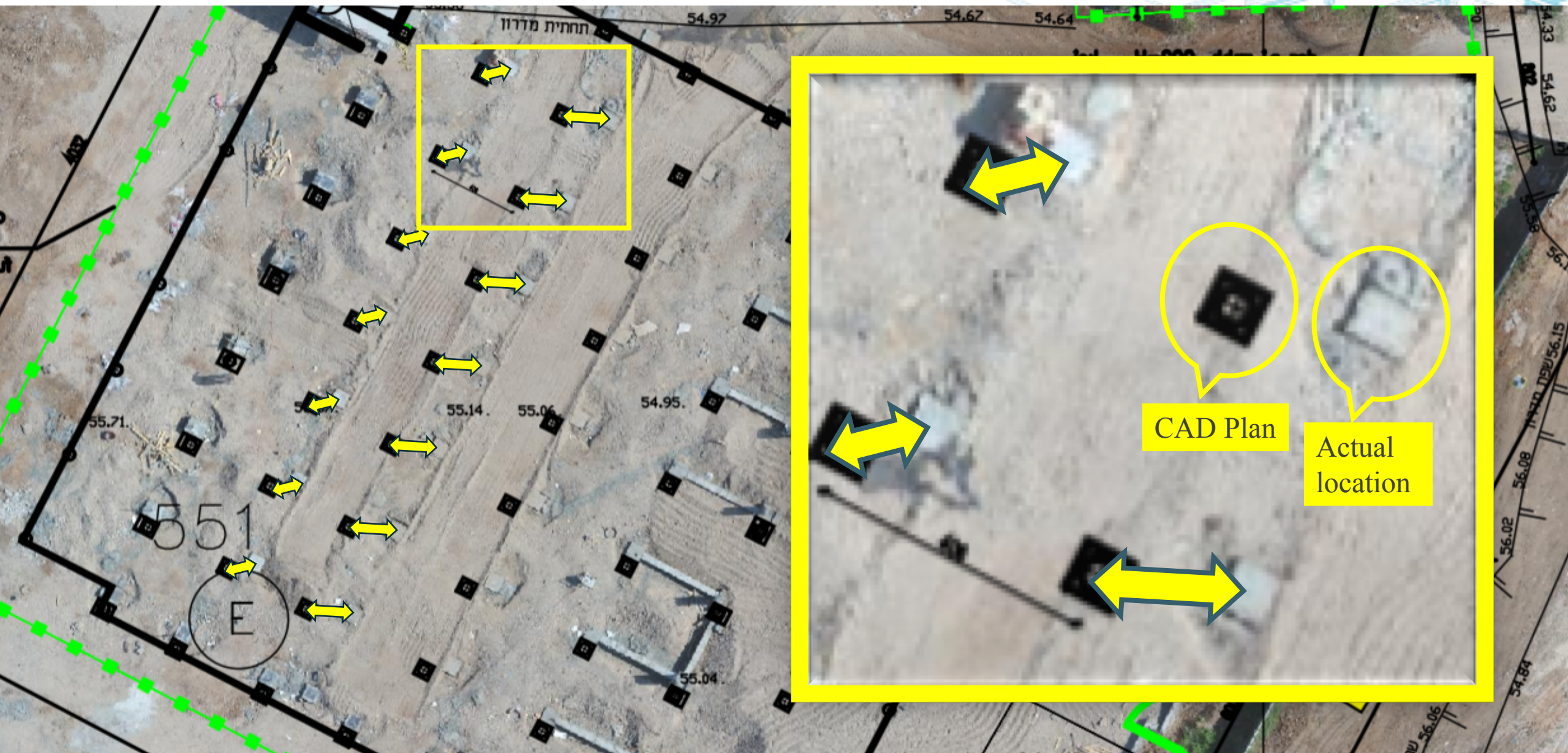


Case Study – QA/QC of Cladding

- **Scope**
  - New residential high-rise
  - Exterior insulation and finish system (EIFS) on concrete structure
- **Case Summary**
  - The VDC team was tasked in finding a safer, cost-efficient method to inspect the cladding after installation
  - Using the solution, QA/QC inspectors were able to perform this task in the office
- **Savings**
  - Rental fees of elevated work platform/ suspended platform
  - Excessive manhours performing the inspections outdoors



Quality Errors Detection: Overlay CAD on Orthomosaic



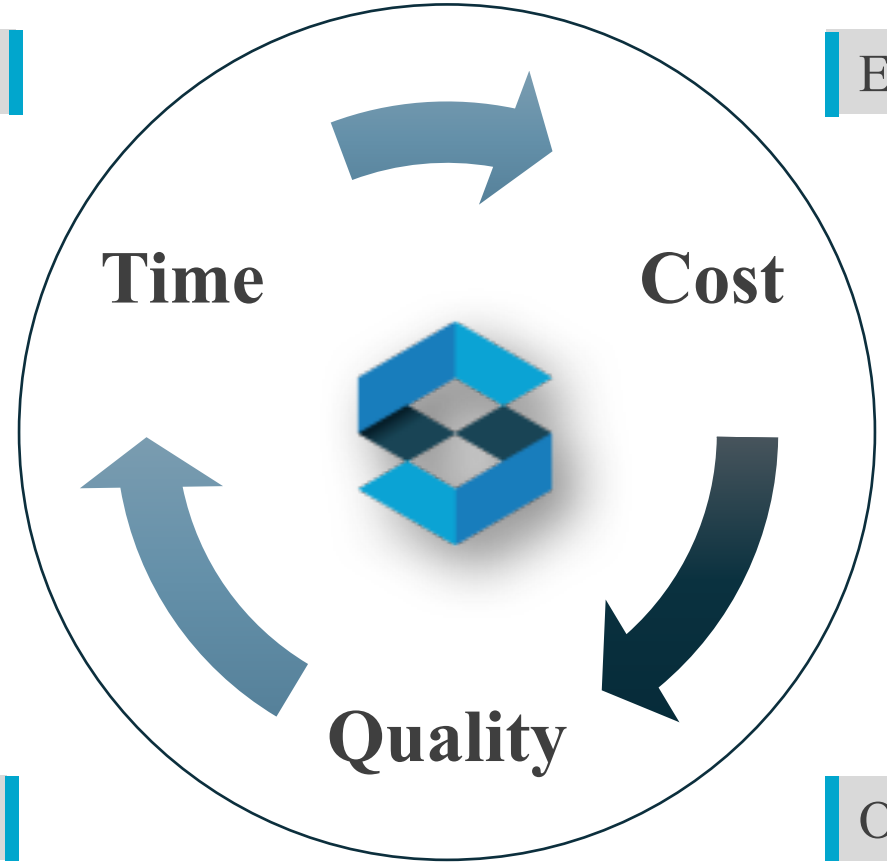
Digital Transformation of Construction

Remote progress monitoring

Simplified project management

Contextual documentation

Future litigation & maintenance



Early error identification

Objective communication

Improved workflows

Objective reporting

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Questions?

Have a question for today's presenters?
Type your question into the chat feature!

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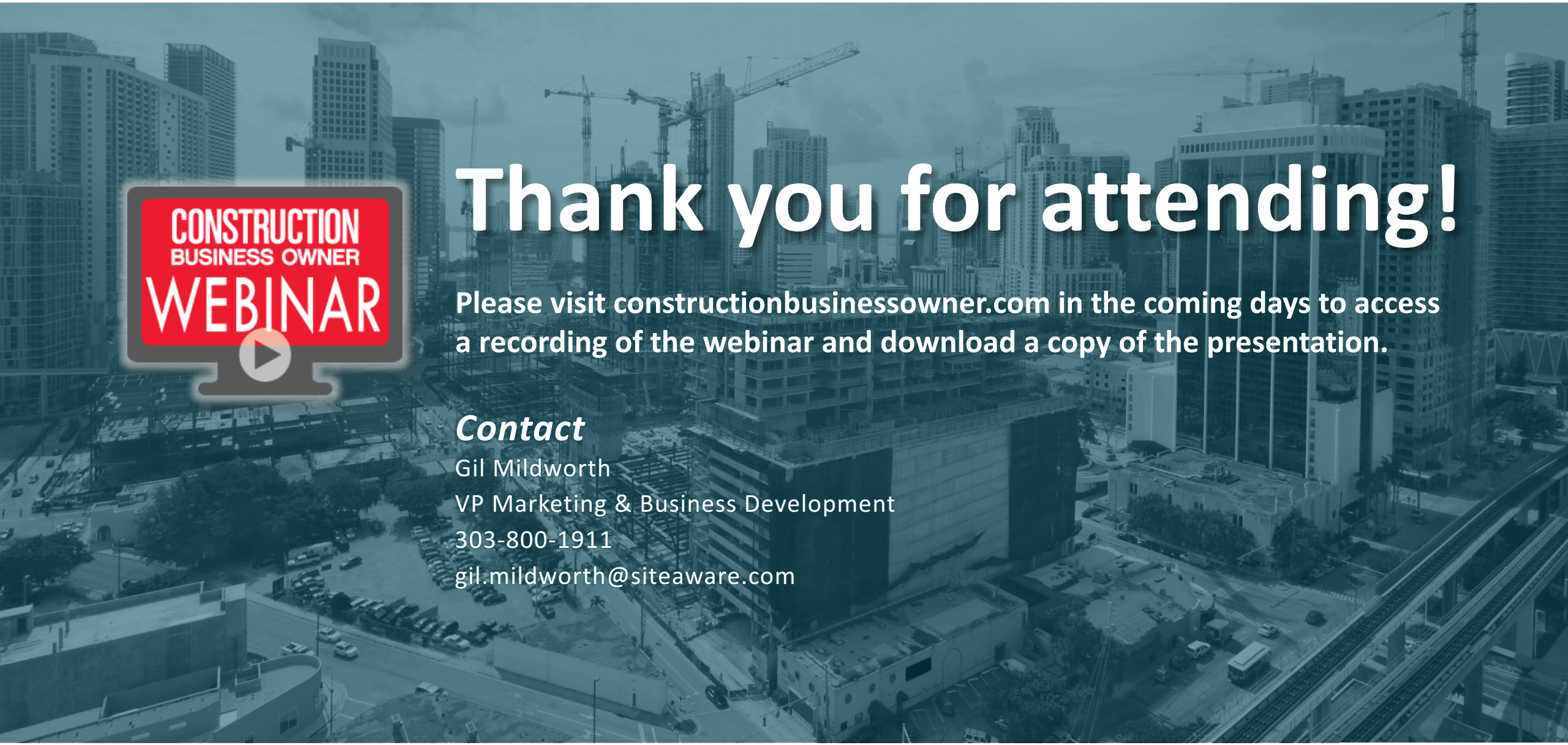

Thank you for attending!

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