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Bentley
Sustaining Infrastructure

Seminar 55, Urban-Scale Energy Modeling, Part 4

Virtual UBEM: Visualizing, Analyzing and Reporting

Learning Objectives

- Optimization by climate zone for energy efficiency of neighborhood building morphology

- Describe how UBEM can be used to make well-informed utility planning decisions.

- Recognize significance of analytical problems that can be addressed at urban scale that cannot be well addressed at the individual building level

- Recognize key structural and operating requirements for an urban-scale energy modeling platform

Outline/Agenda

- What is Reality Modeling?
- Image-based 3-D Reconstruction
- Campus
- Leveraging Building Information Modeling
- Goal – A Virtual Campus
- Integrating BIM, GIS, and Enterprise Data
- Modeling the Campus
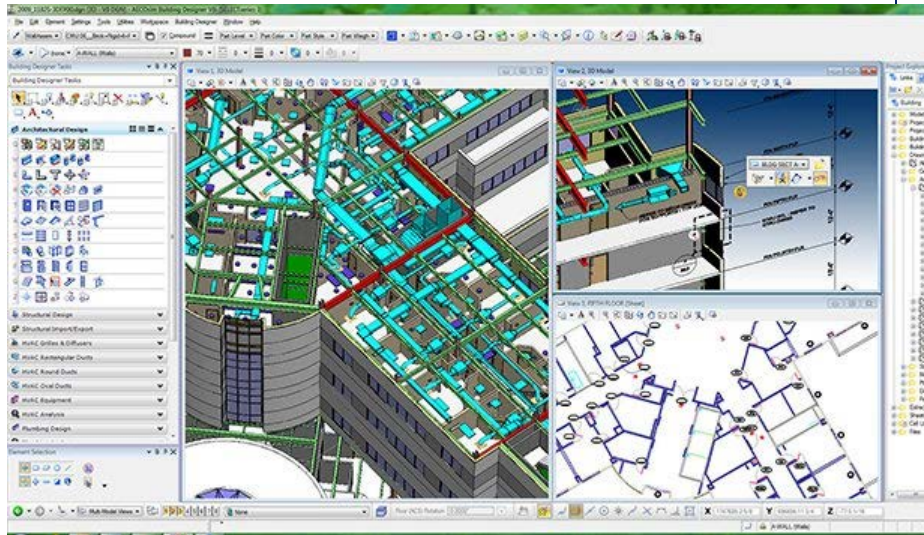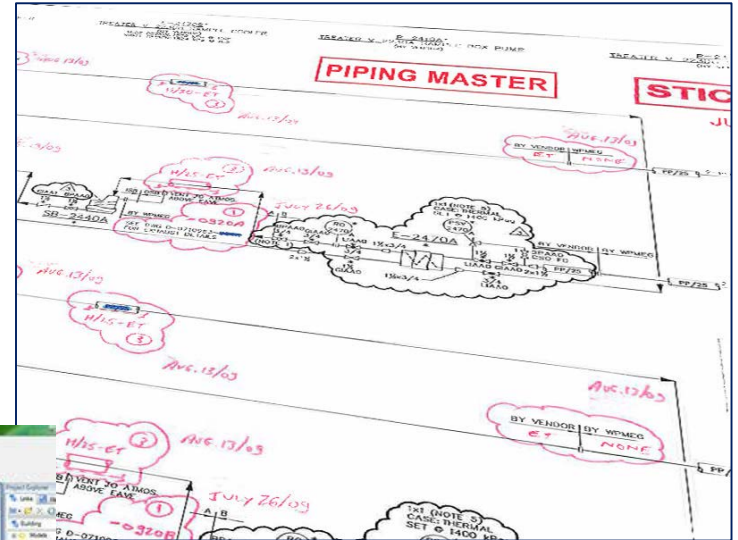- Visualize Space Utilization
- Subsurface Utilities
- Conclusions

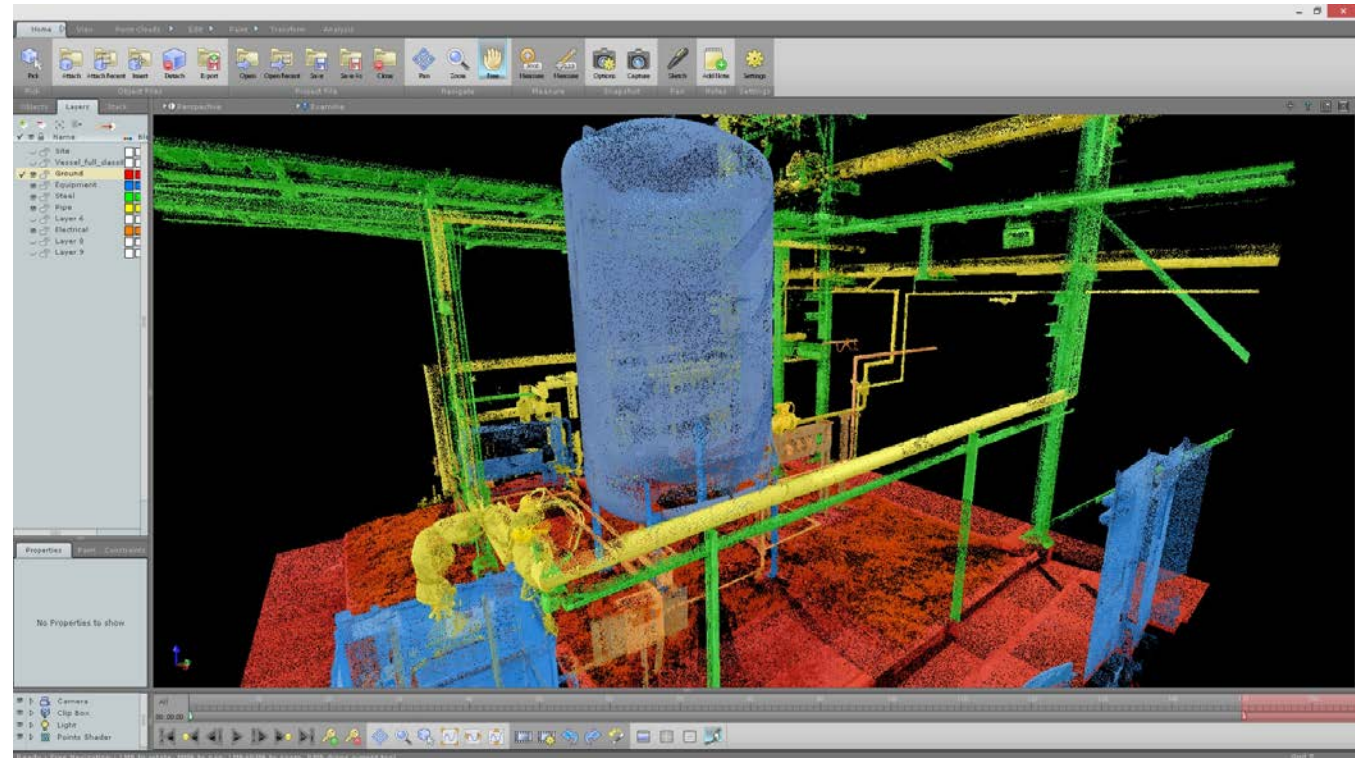# What is Reality Modeling?

- Images & video

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- As-built drawings & models

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- Point clouds

What is Reality Modeling?

- Images & video
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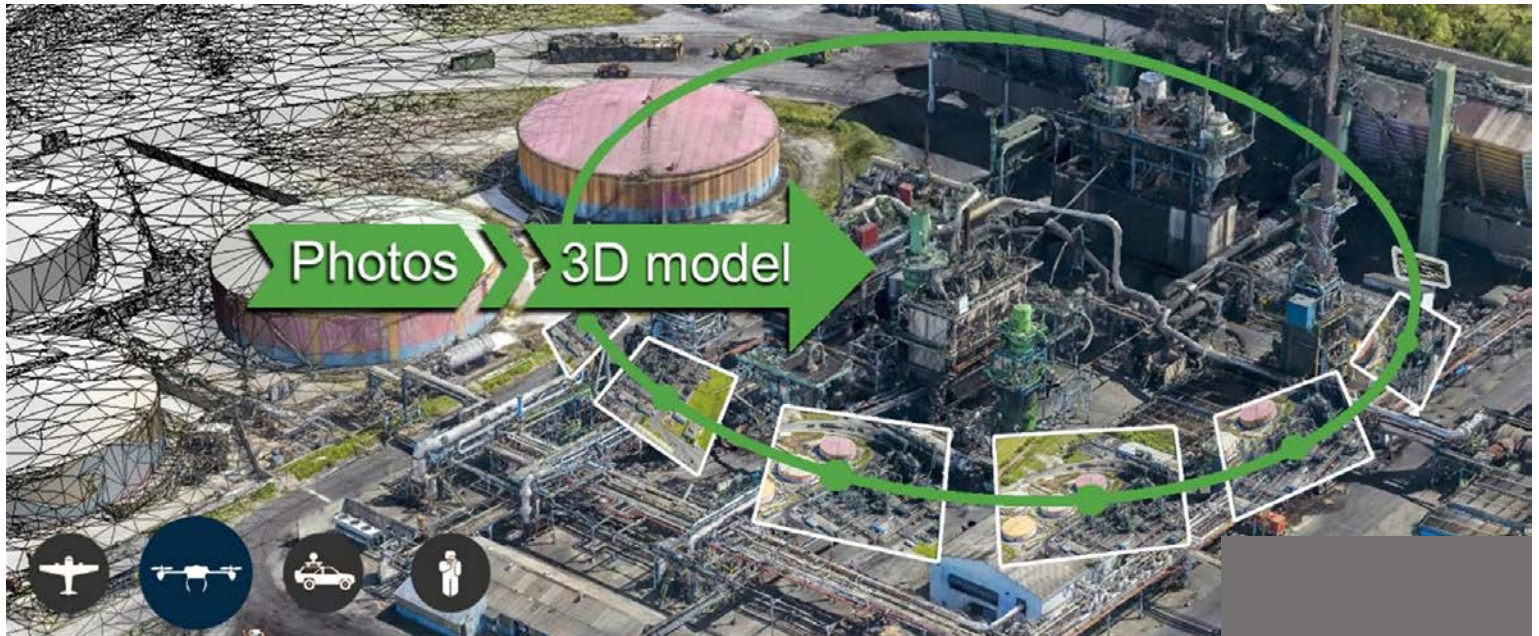- Point clouds
- Image-based 3-D reconstruction

Image-based 3-D Reconstruction

Image-based 3-D Reconstruction: Process

CAPTURE

PROCESS

Edit

CONSUME

Design

Vizualize and Animate

Extract Features

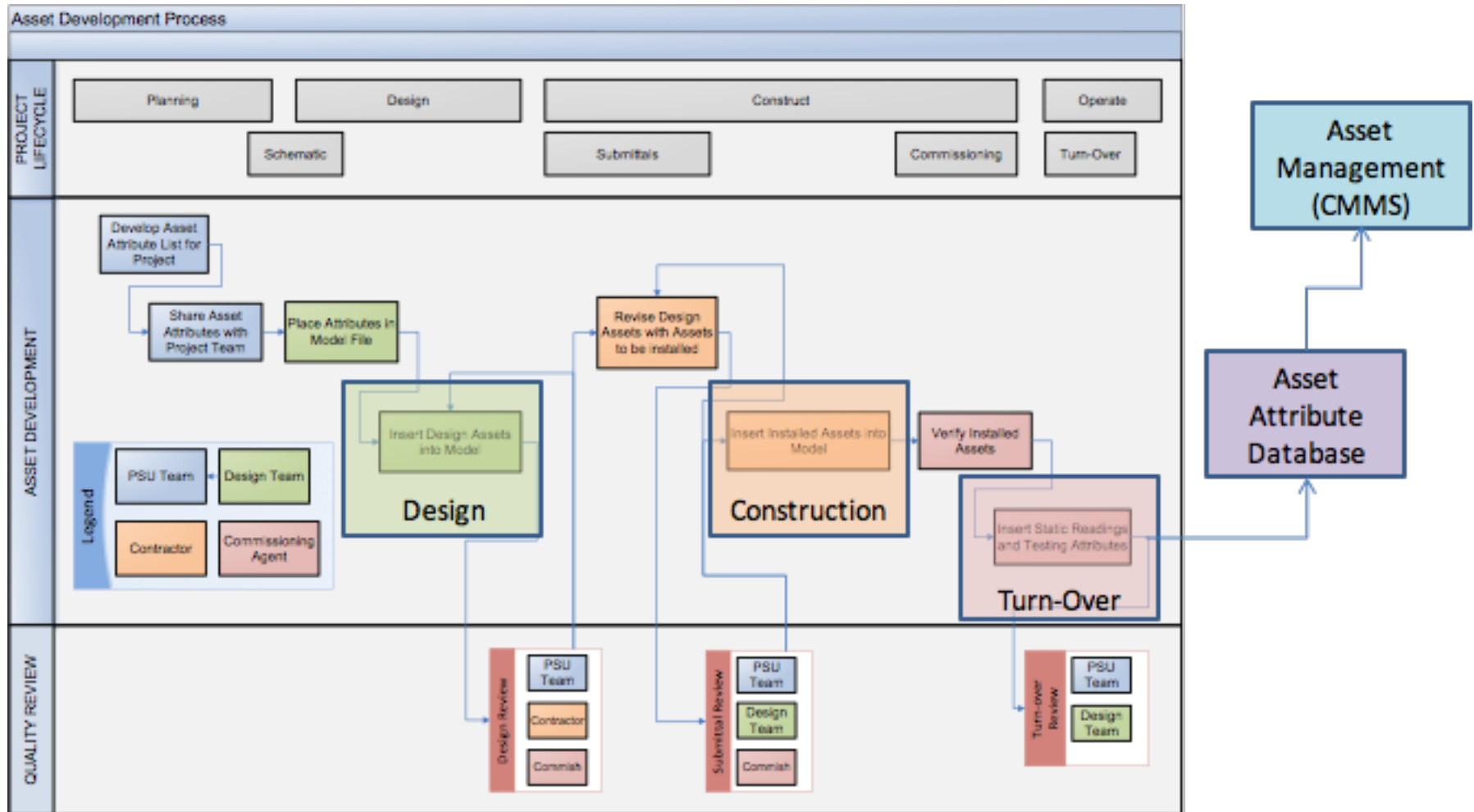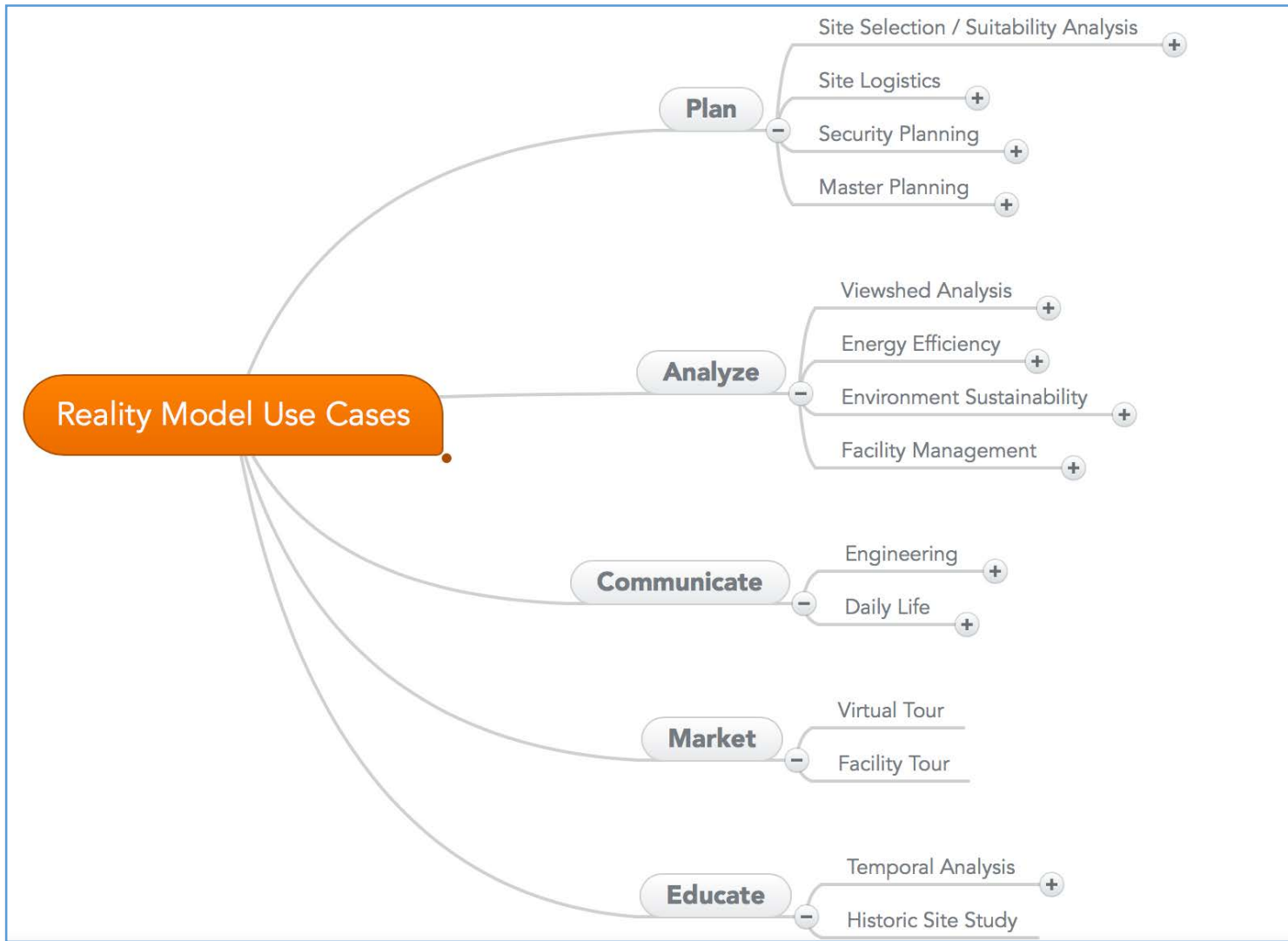Reality Model
Scalable Mesh

Campus

- **947 Buildings**
- **20.1 million ft² (2 million m²)**
- **79 Acres of roof**
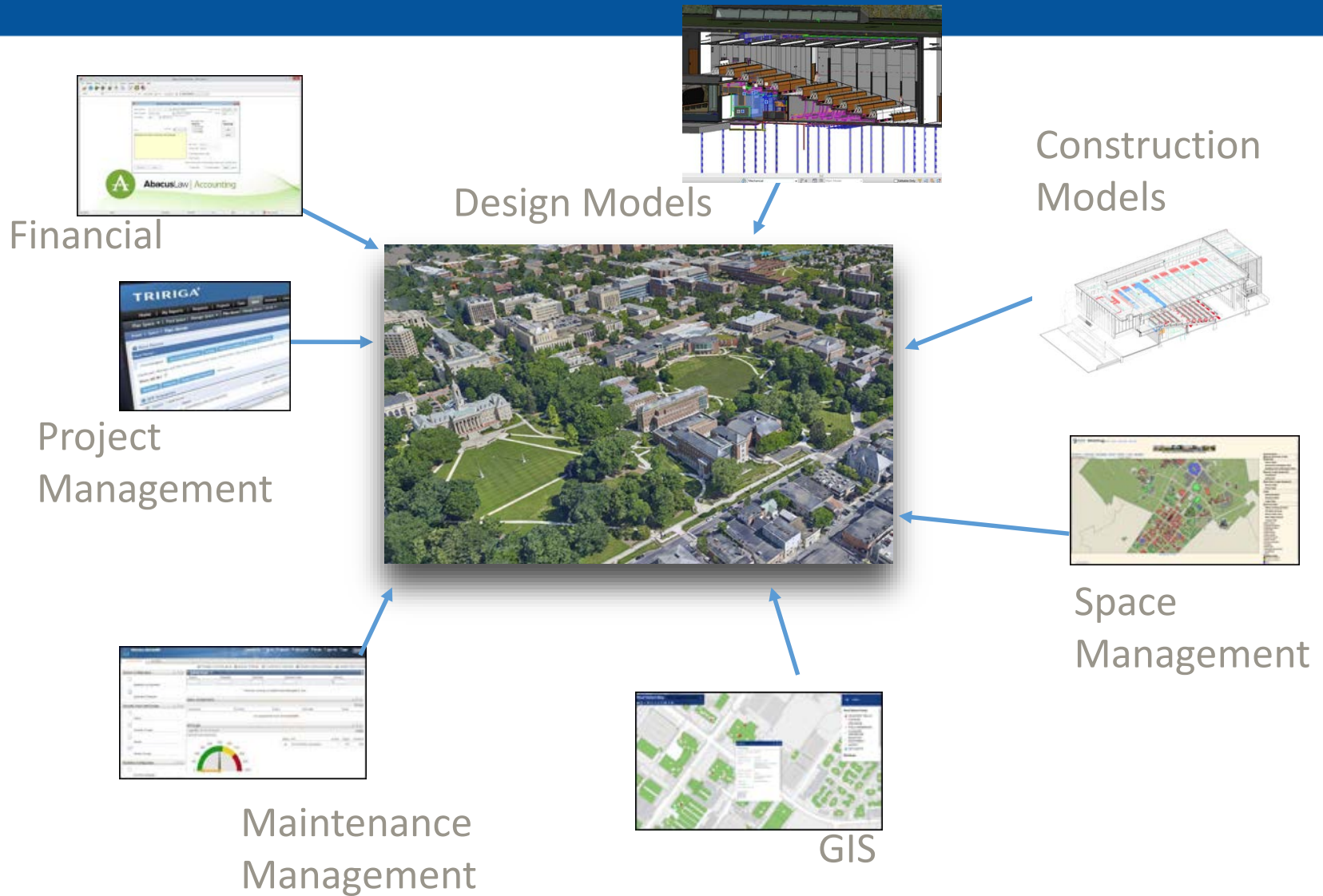- **65% of buildings over 25 years old**

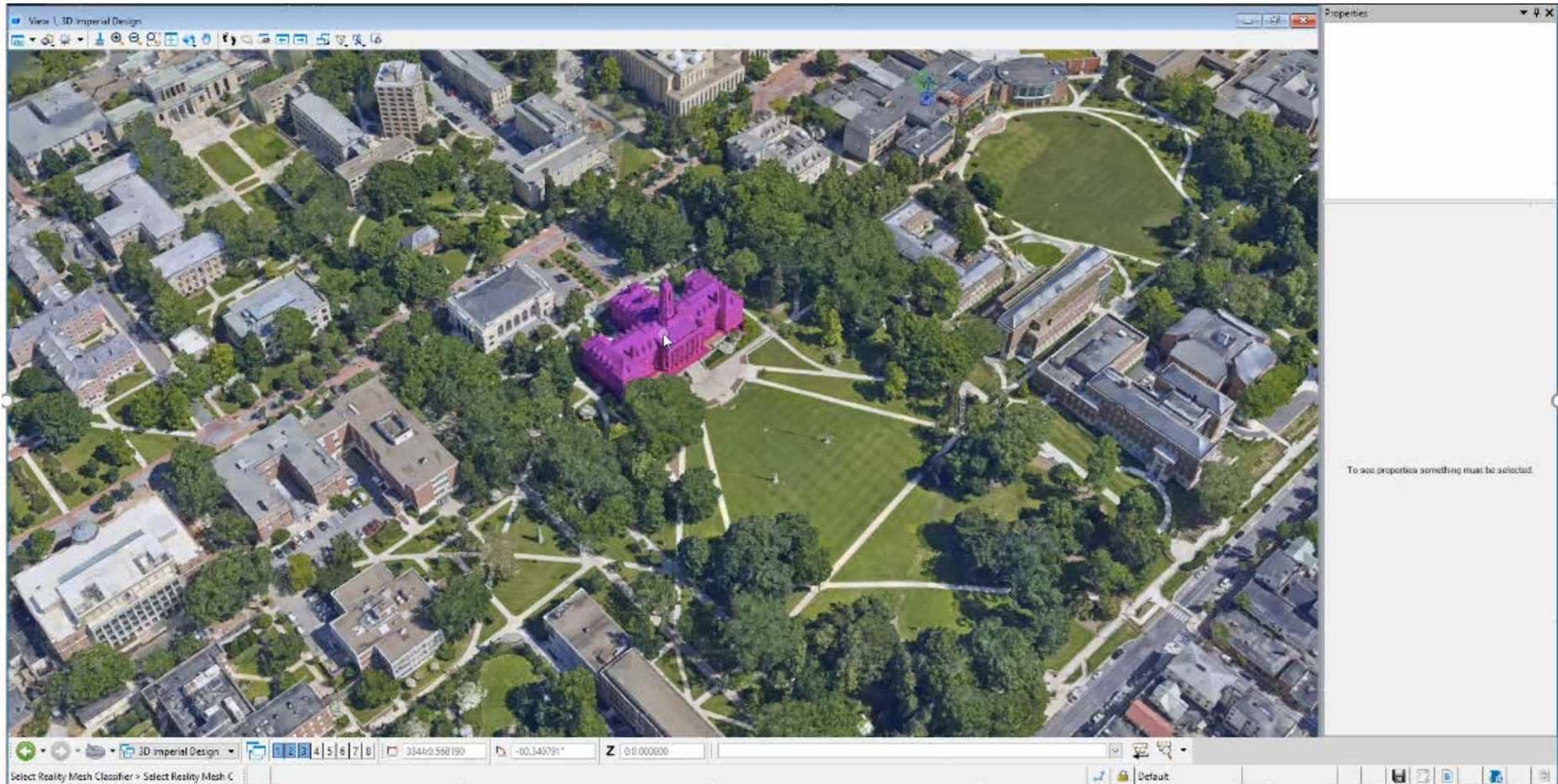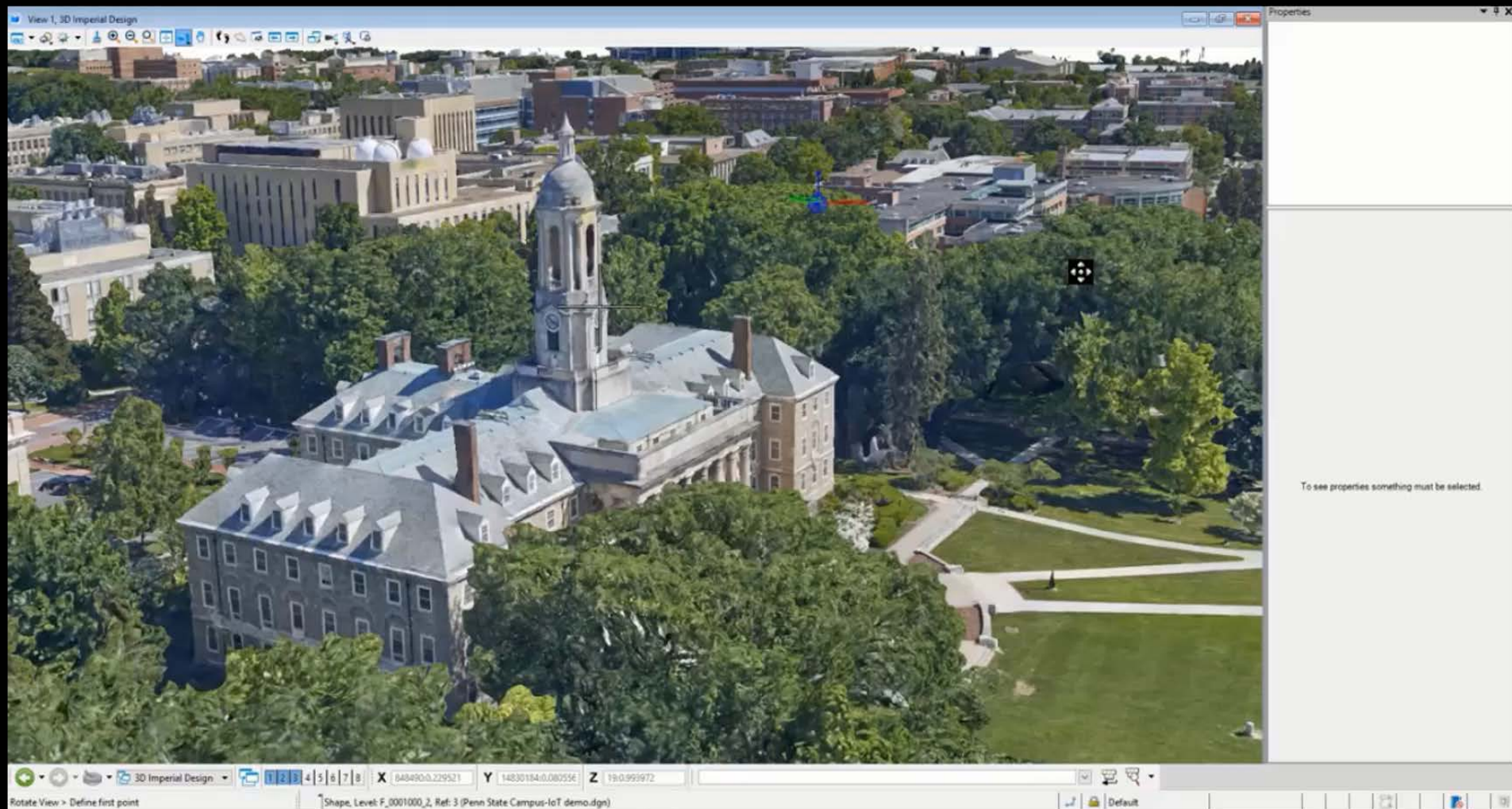# Leveraging Building Information Modeling

Goal – A Virtual Campus

Integrating BIM, GIS, and Enterprise Data

Construction Models

Design Models

Financial

Project Management

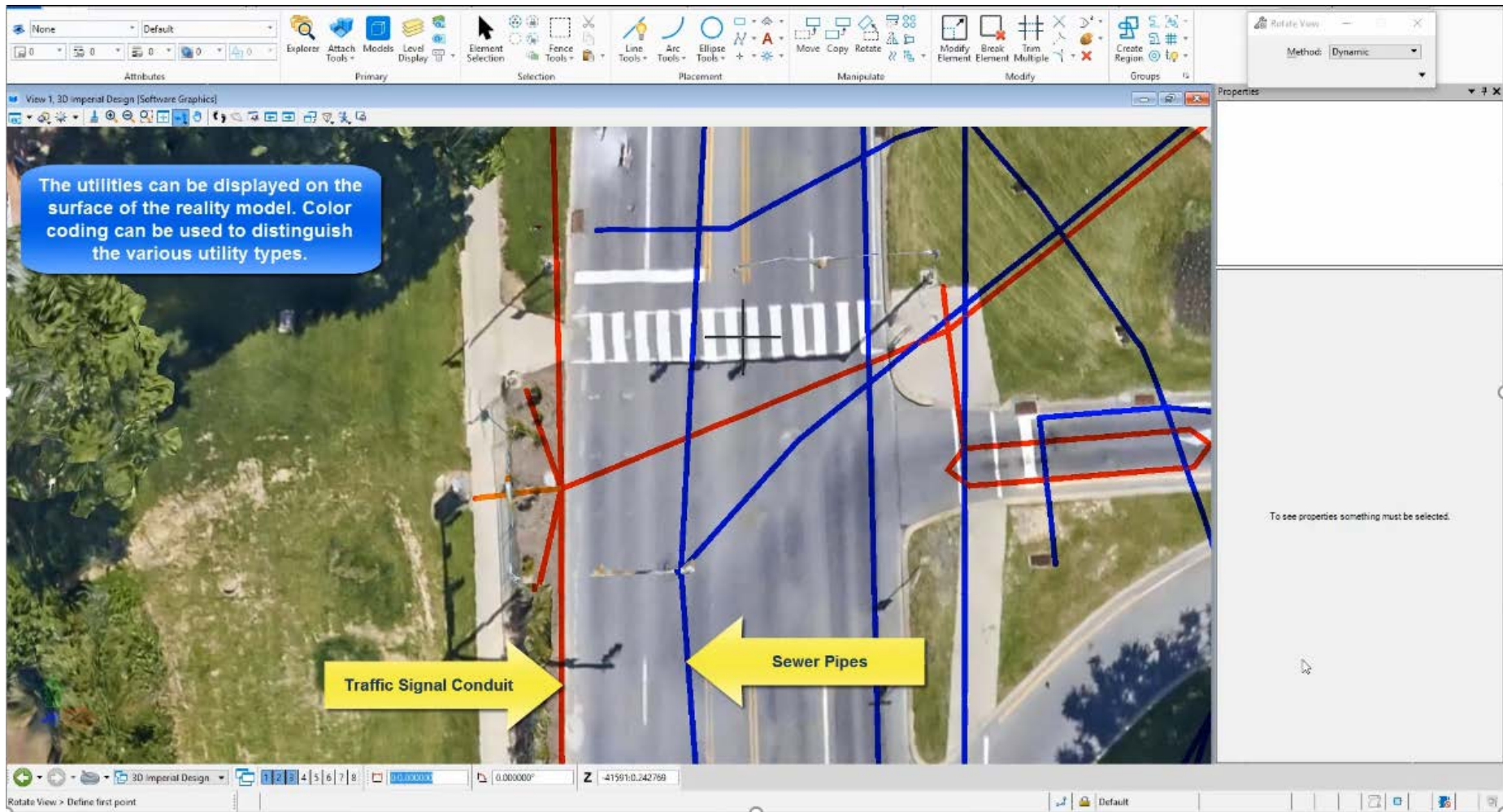Space Management

Maintenance Management

GIS

Modeling the Campus

Visualize Space Utilization

Virtual Underground Utilities

Conclusions

- Now possible to capture a 3-D model of a building, community or campus through photogrammetry

- Integrating 3-D with BIM, GIS, and enterprise data allows you to create virtual campus

- Model is then interactive and up to date

- Not just limited to BIM or individual buildings

- Powerful tool for building owners

QUESTIONS?

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