CityGML based 3D modeling with Bentley MicroStation V8i & Bentley Map V8i

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Agenda

- About Bentley Systems

- Benefits of a XML-based data scheme with 3D modeling workflows based on **MicroStation V8i** and **Bentley Map V8i**
  – The **Geospatial Administrator** as XFM Engine for the CityGML catalogue

- **A typical workflow for 3D City modeling in Bentley Map V8i**
  – Using FME as Data Exchange (Import and Export)
  – Modeling and promotion of 3D Objects to CityGML

- Opt.: 3D City Management with Bentley Geospatial Server and Oracle Spatial

- Summary & Discussion

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About Bentley Systems

Bentley's Strategy in 3D City Management

Terrain modeling &
Point cloud 3D modeling
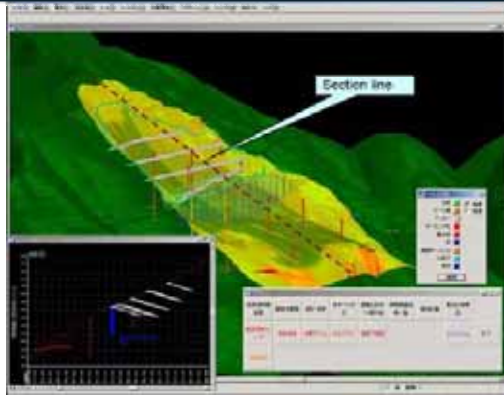
CAD Engine
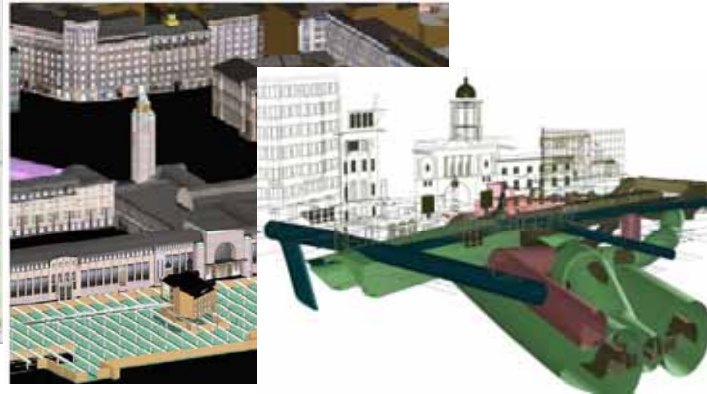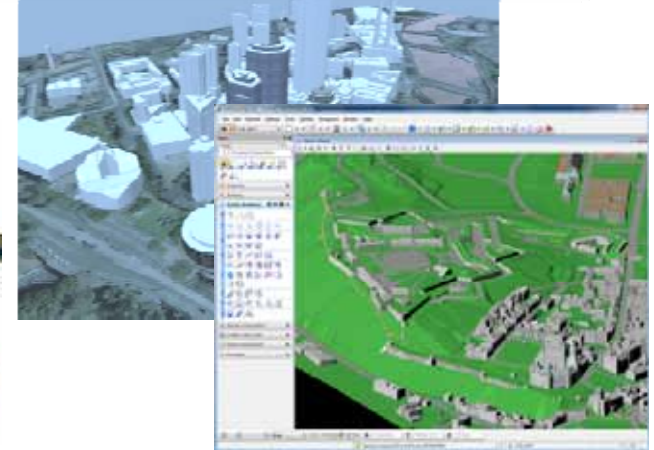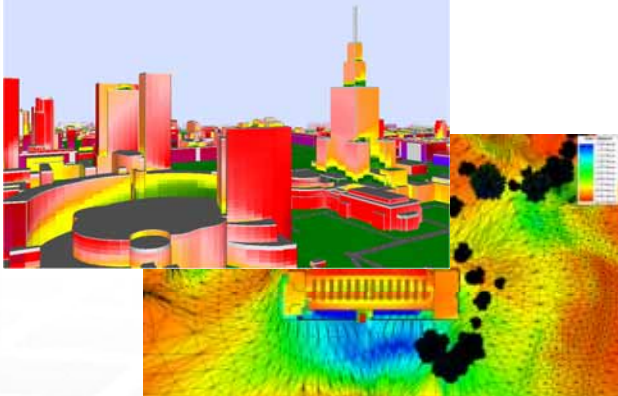Bentley MicroStation V8i

CityGML basesd modeling
FME Engine integrated

Noise simulation,
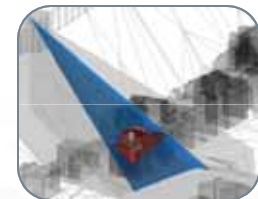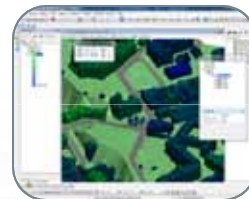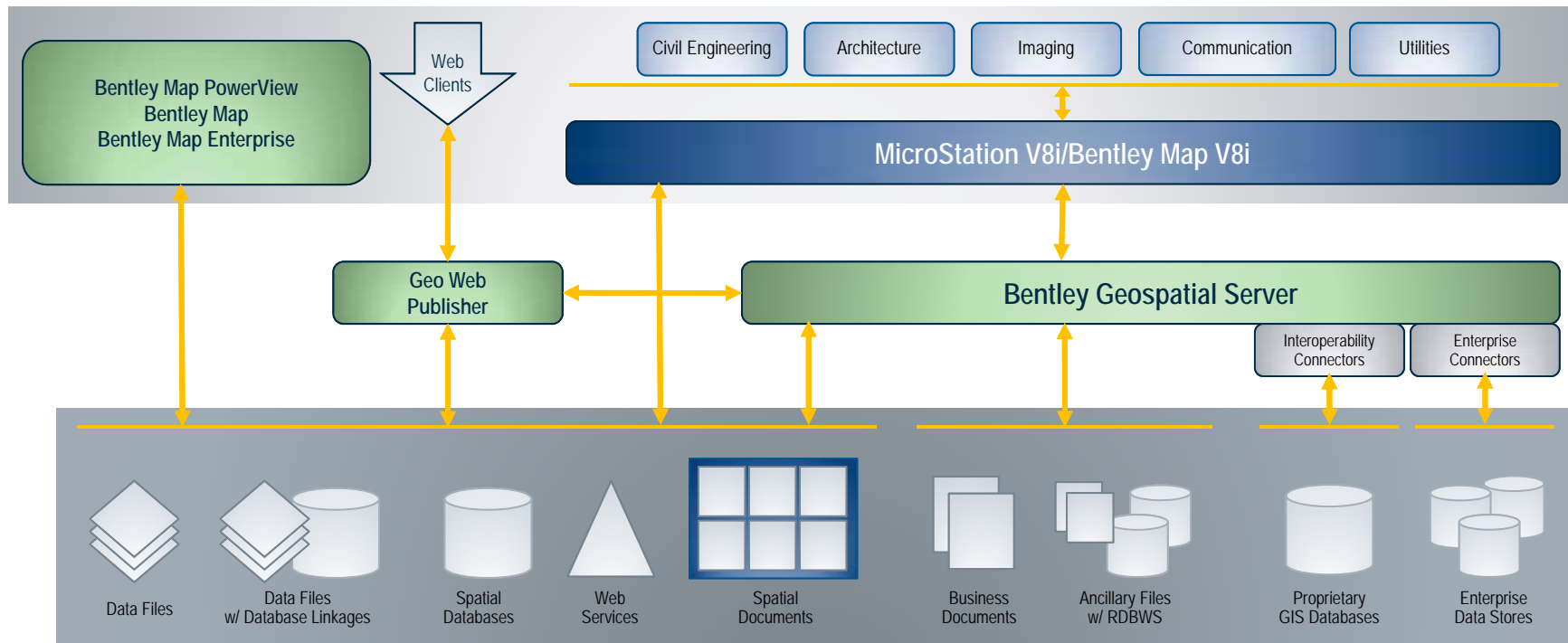Solar Analysis

3D Shadow analysis

Visualization

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Bentley 3D City Management Architecture

CIM = City Information Management

Bentley Map PowerView
Bentley Map
Bentley Map Enterprise

Web Clients

| Civil Engineering | Architecture | Imaging | Communication | Utilities |

MicroStation V8i/Bentley Map V8i

Geo Web Publisher

Bentley Geospatial Server

Interoperability Connectors · Enterprise Connectors

Data Files · Data Files w/ Database Linkages · Spatial Databases · Web Services · Spatial Documents · Business Documents · Ancillary Files w/ RDBWS · Proprietary GIS Databases · Enterprise Data Stores
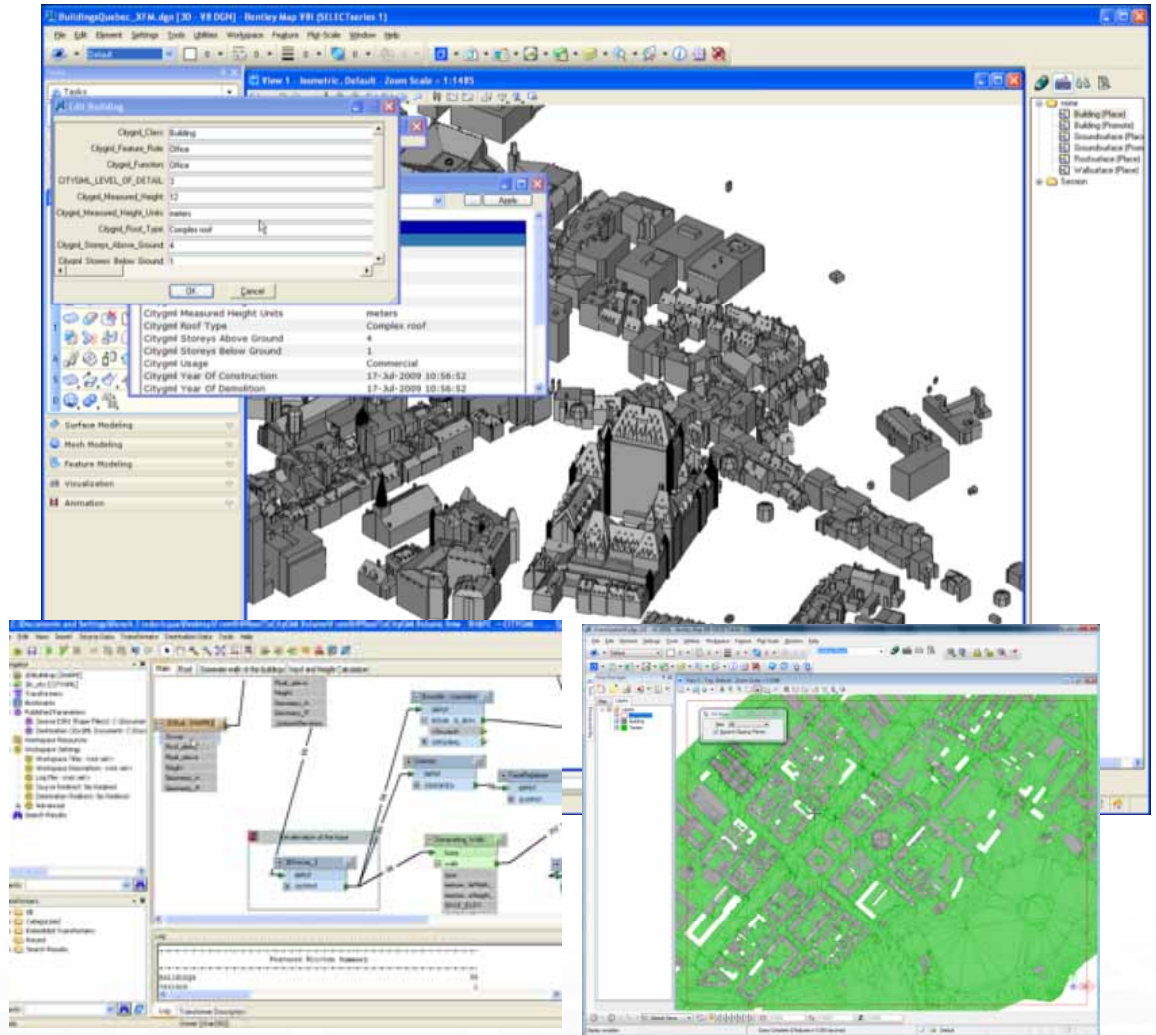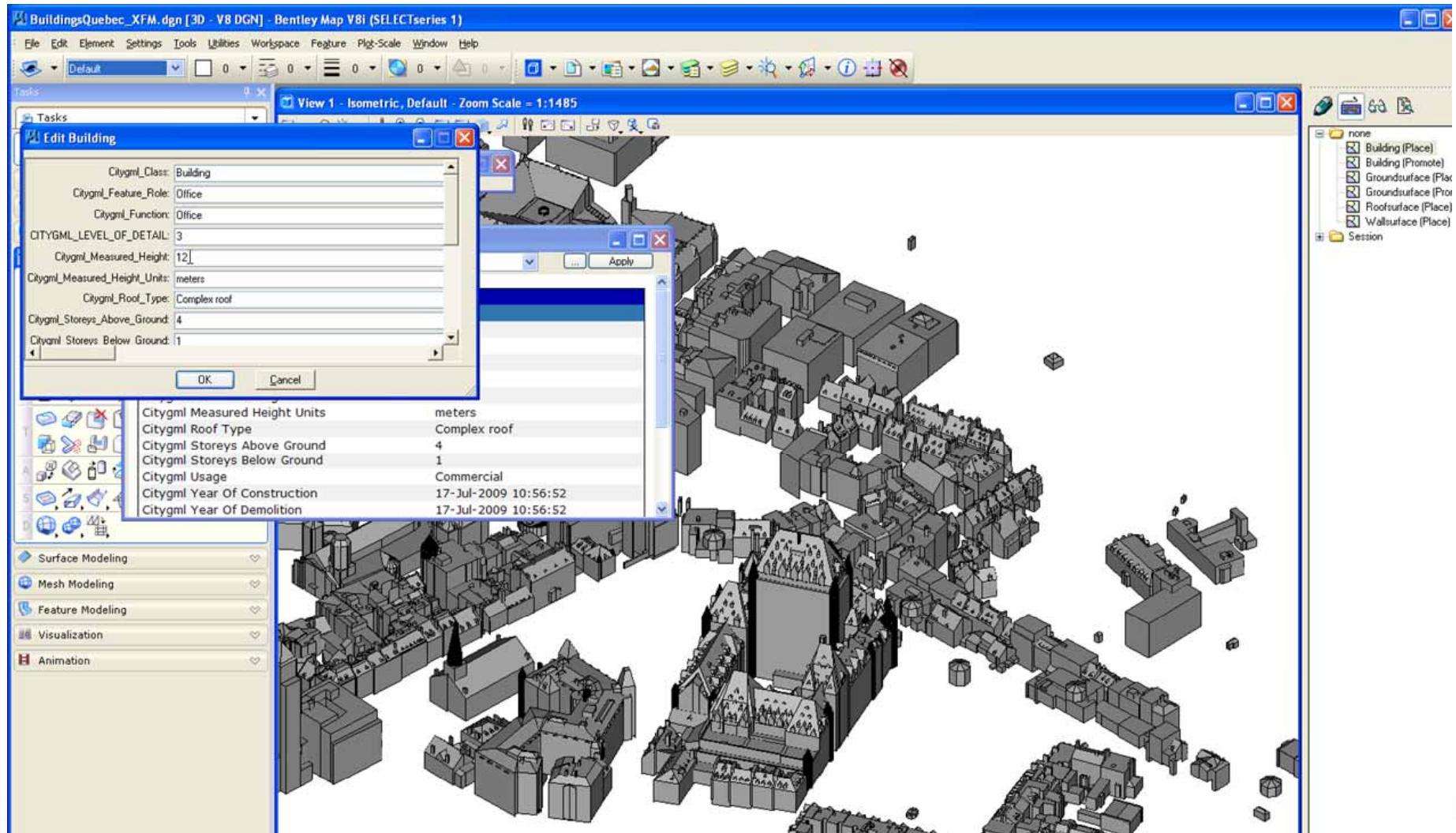
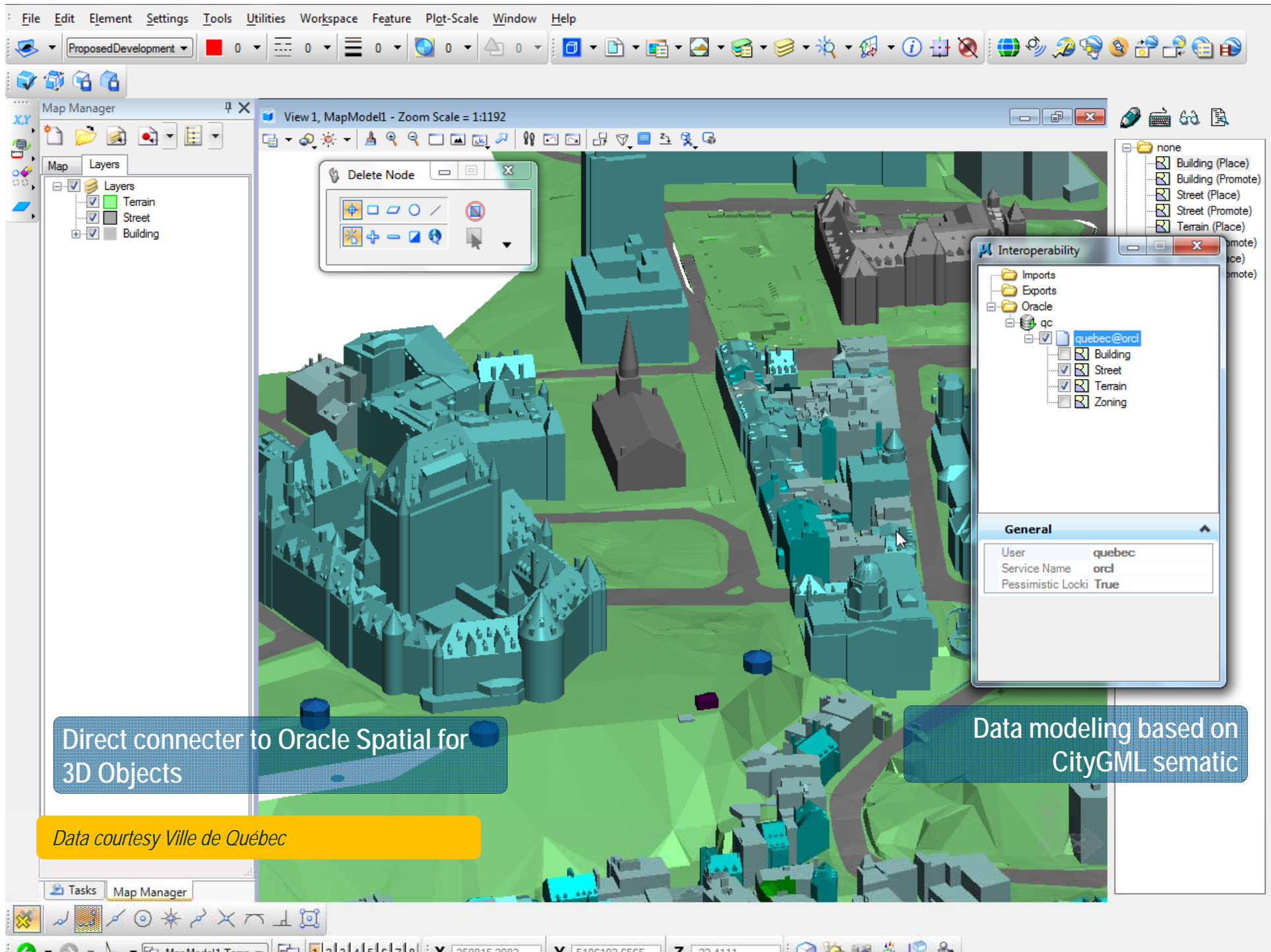**Bentley**

Bentley Map V8i Enterprise

The 3D City Management Desktop Applikation

- **Export & Import CityGML**

- Editing and Analysis of attributes

- Use of native SHP Files
  - 2D SHP to 3D LoD1

- **Integration of additional GEO-Standards (FME)**
  - NAS (EDBS)

Data provided by Quebec City, Canada
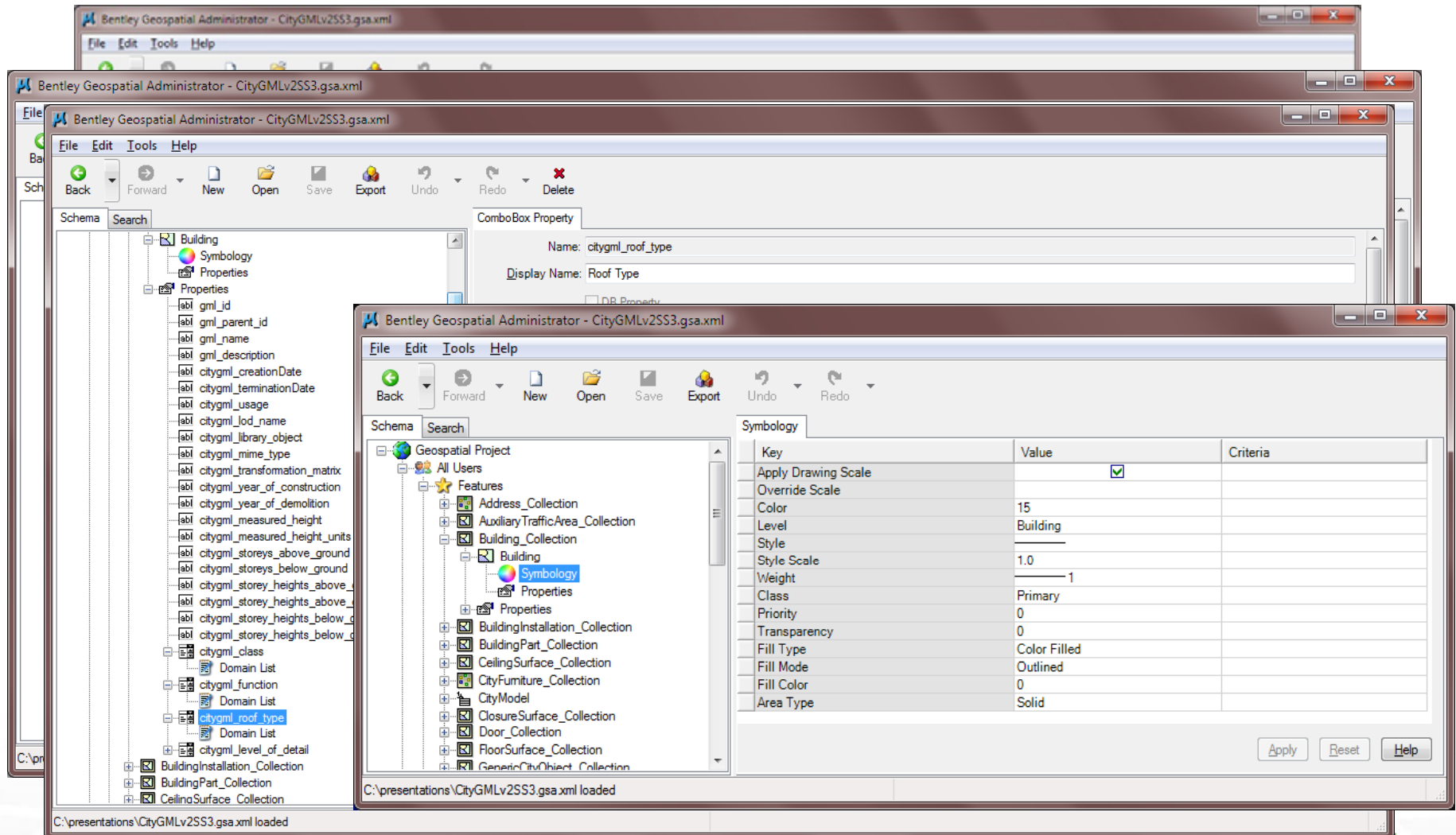
Bentley Map V8i - 3D FME Integration

Direct connecter to Oracle Spatial for 3D Objects

Data modeling based on CityGML sematic

Data courtesy Ville de Québec

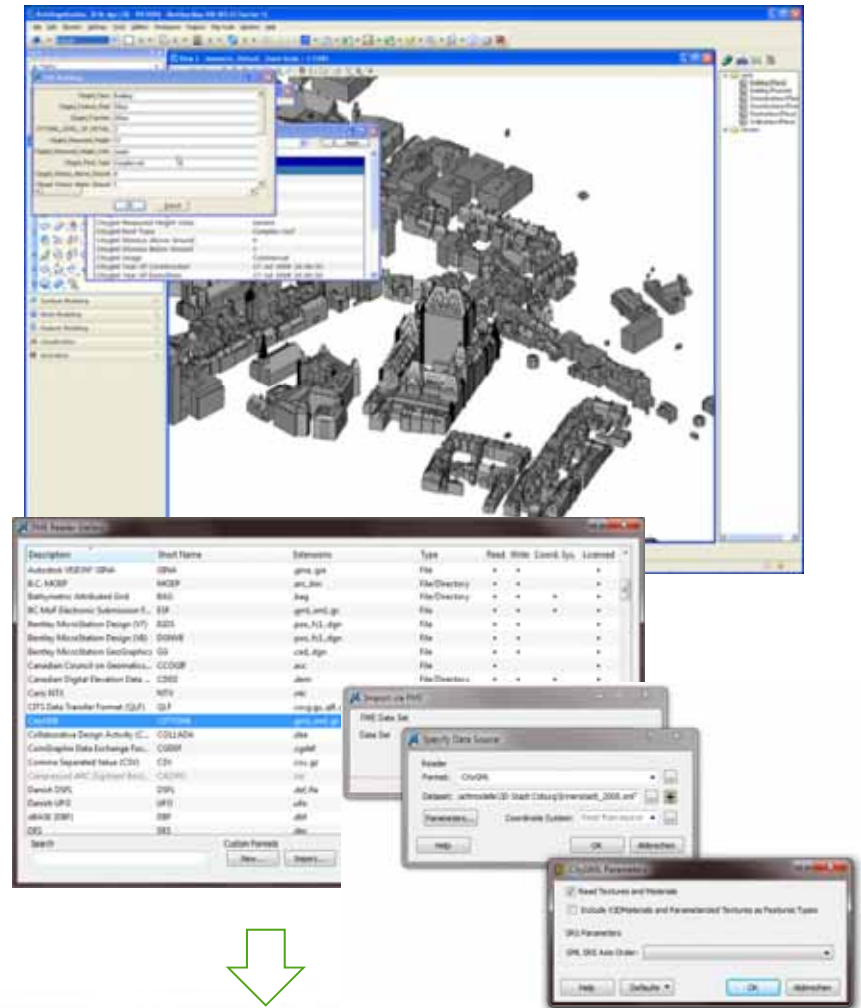# Bentley GeoSpatial Administrator V8i

Support of CityGML catalogue

Bentley Map V8i - 3D Modeling Workflow (CityGML)

Typical Workflow Scenario:

- Import of CityGML: 3D Citymodel according specification

- Viewing and editing of attributes

- 3D modeling and editing of an existing citymodel according the requirements of CityGML

- Amendment with new buildings and objects based on CAD and BIM

  - 3D Solids, 3D surfaces, meshes, 3D Polylines etc.

- Promotion of new objects to CityGML 1.0 – 2.0 specification

- Export of the expanded model according CityGML specification

Data provided by Quebec City, Canada

LIVE Presentation

Bentley Map V8i - 3D Oracle Spatial

Workflow:

- Sketch a new building in an existing urban environment
  - Using of 3D Solids

- Promote to CityGML scheme
  - According semantic definition with Bentley Geospatial Administrator

- Post to Oracle

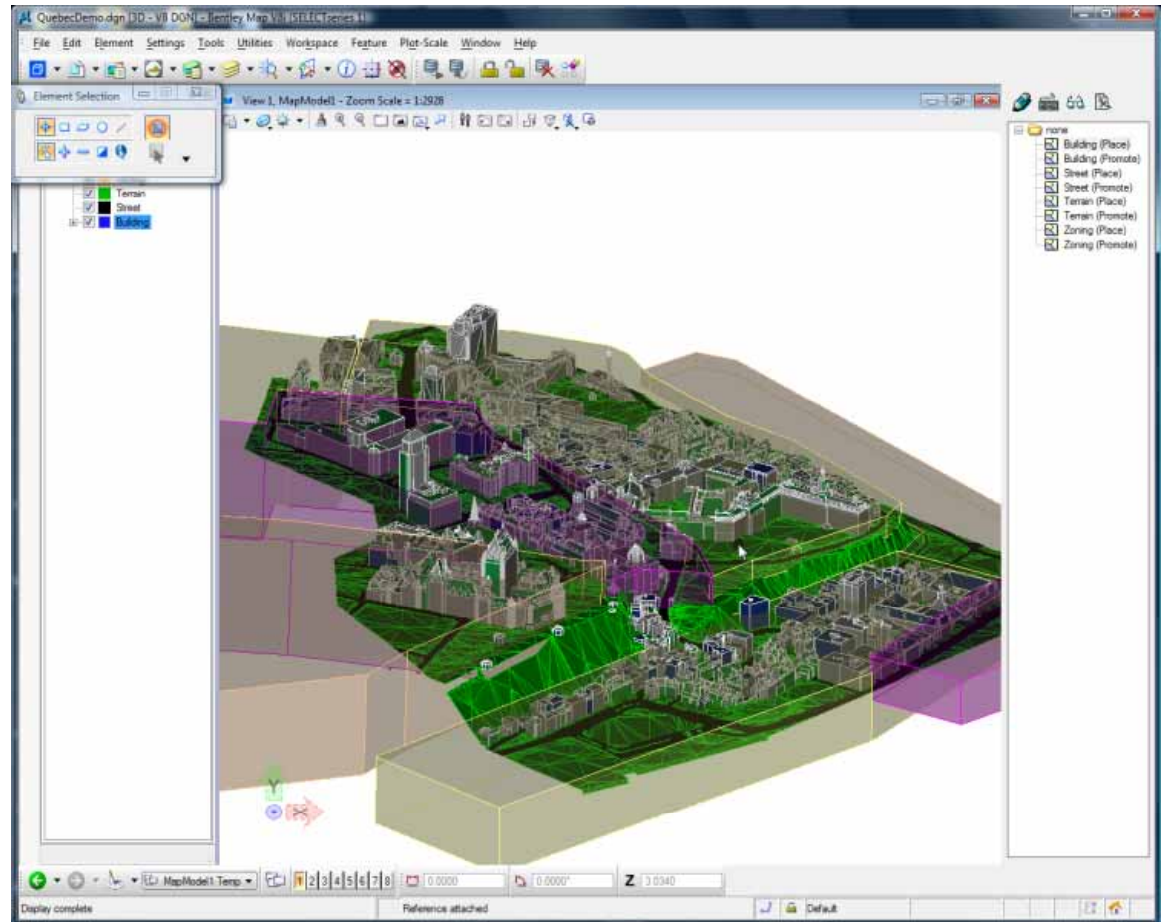- Optional:
  Modify the building
  - Post to Oracle
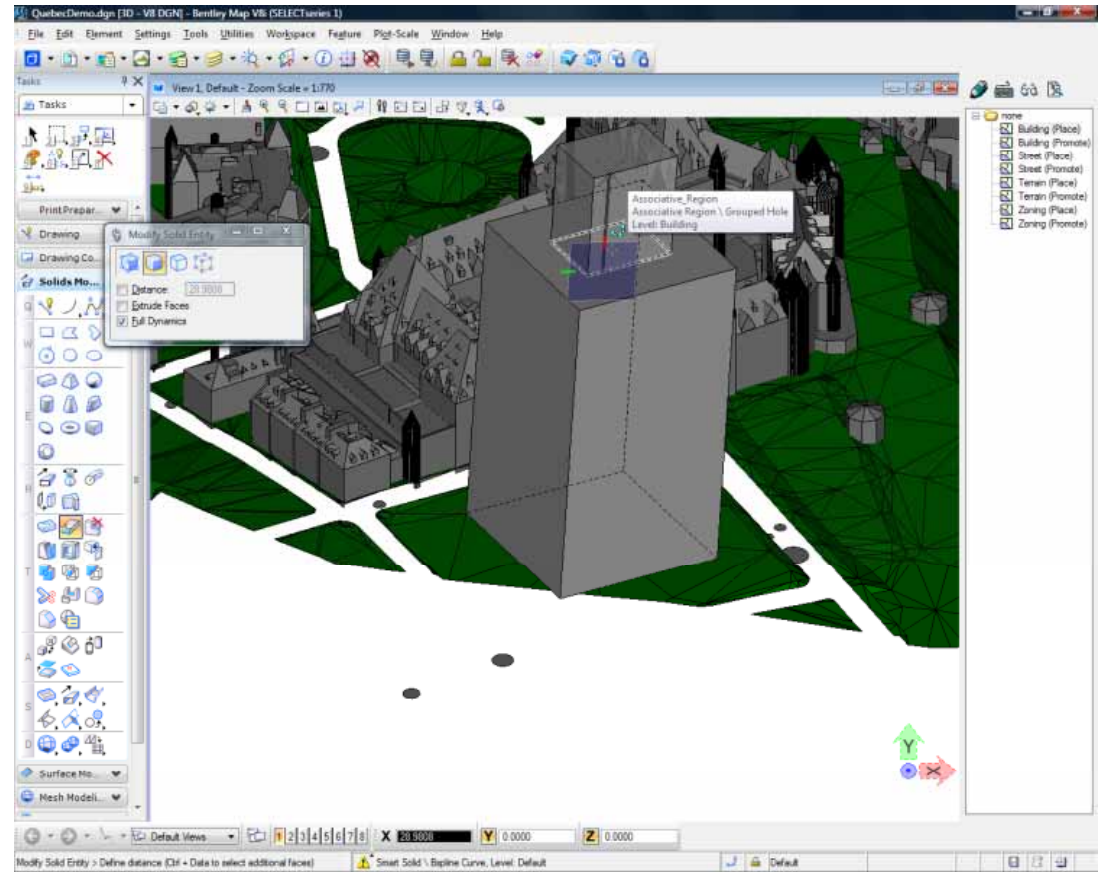
Data provided by Quebec City

Demonstration

Bentley Map 3D - CityGML Support with Oracle
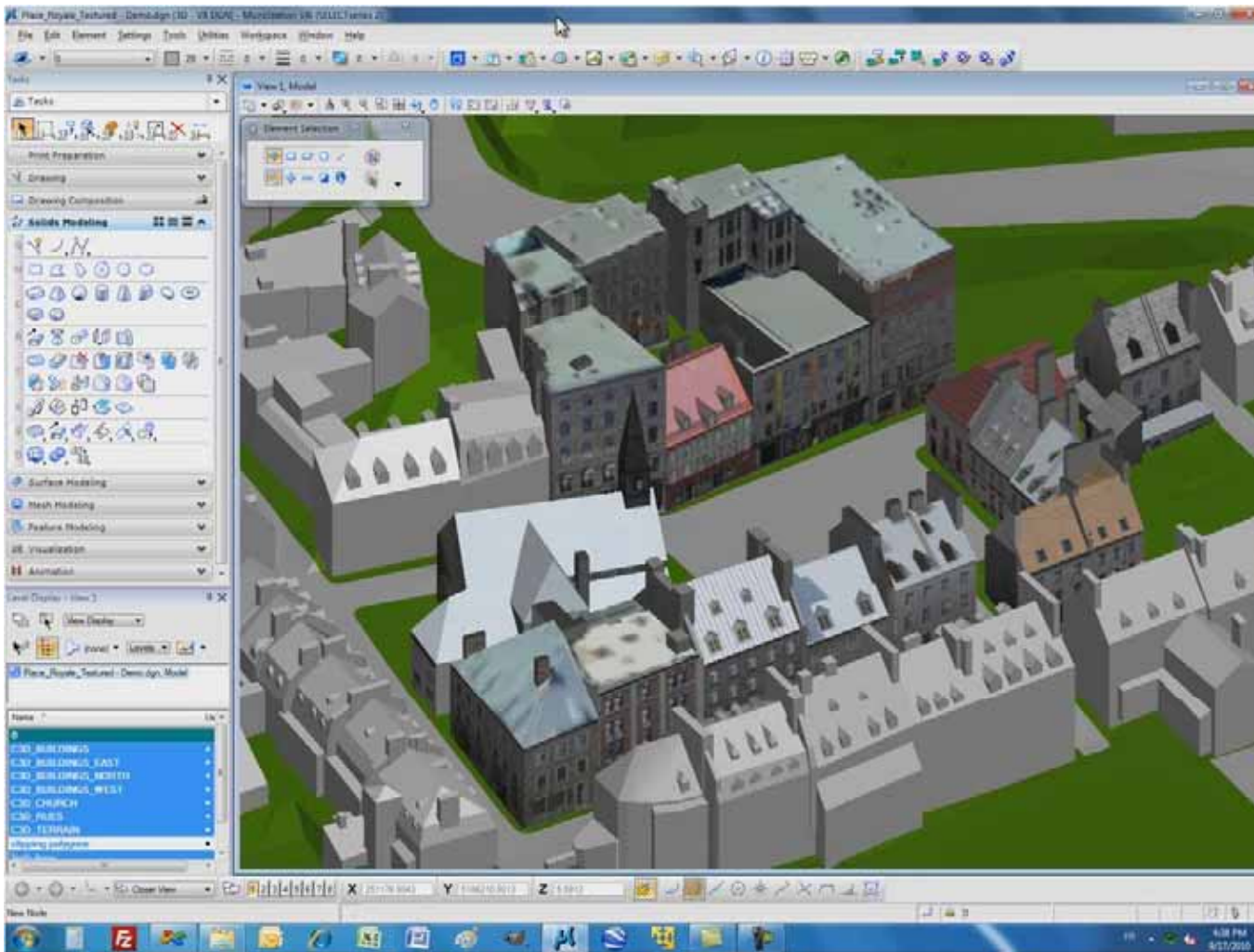
Workflow:

- Query Oracle Spatial 3D data according CityGML scheme
  - Query Buildings
  - Query streets and terrain

- Thematic mapping based on CityGML classification
  - Overlay with zoning areas and defined height limits

Data provided by Quebec City

Demonstration

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3D Texturing with Bentley Map Enterprise V8i

Demonstration

Result of 3D City Model Animation with BIM Objects

Animation

The application: Bentley Map Enterprise V8i

Capturing, Modeling and Analysis of 3D Citymodels based on Bentley MicroStation V8i

- 3D Modeling with Solids, 3D surfaces, point clouds, textures etc.

- Interoperable through FME Engine

- Optional 2 tier & 3 tier connection to Oracle Spatial & Microsoft SQL Server

- Excellent **plot tools** with direct STL Support for **3D printing**

- Monitoring and 3D Analysis of 3D citymodels

  - Production of **thematic maps in 3D**

  - Reports and queries based on attributes and semantic

  - Report generation

- **3D developer platform with API**

  - 3rd party applications, made for Government
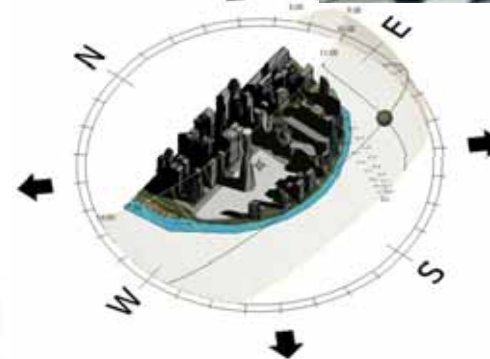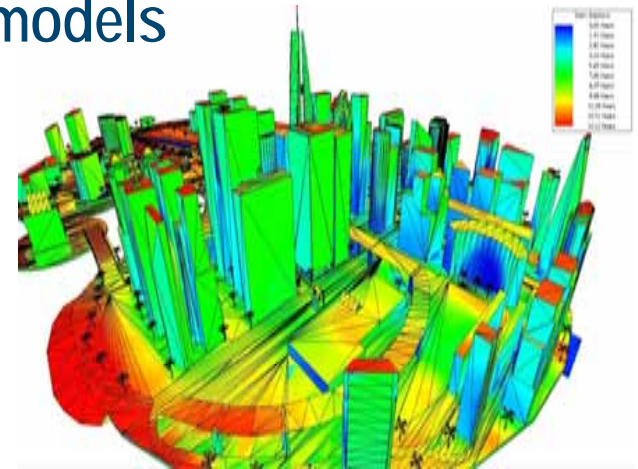
Bentley

Bentley White Paper – 3D City GIS Commitment

Questions?   Thank You!

More information:

http://www.bentley.com/en-US/Promo/Bentley+Map/

www.bentley.com/DE/3DCityGIS

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