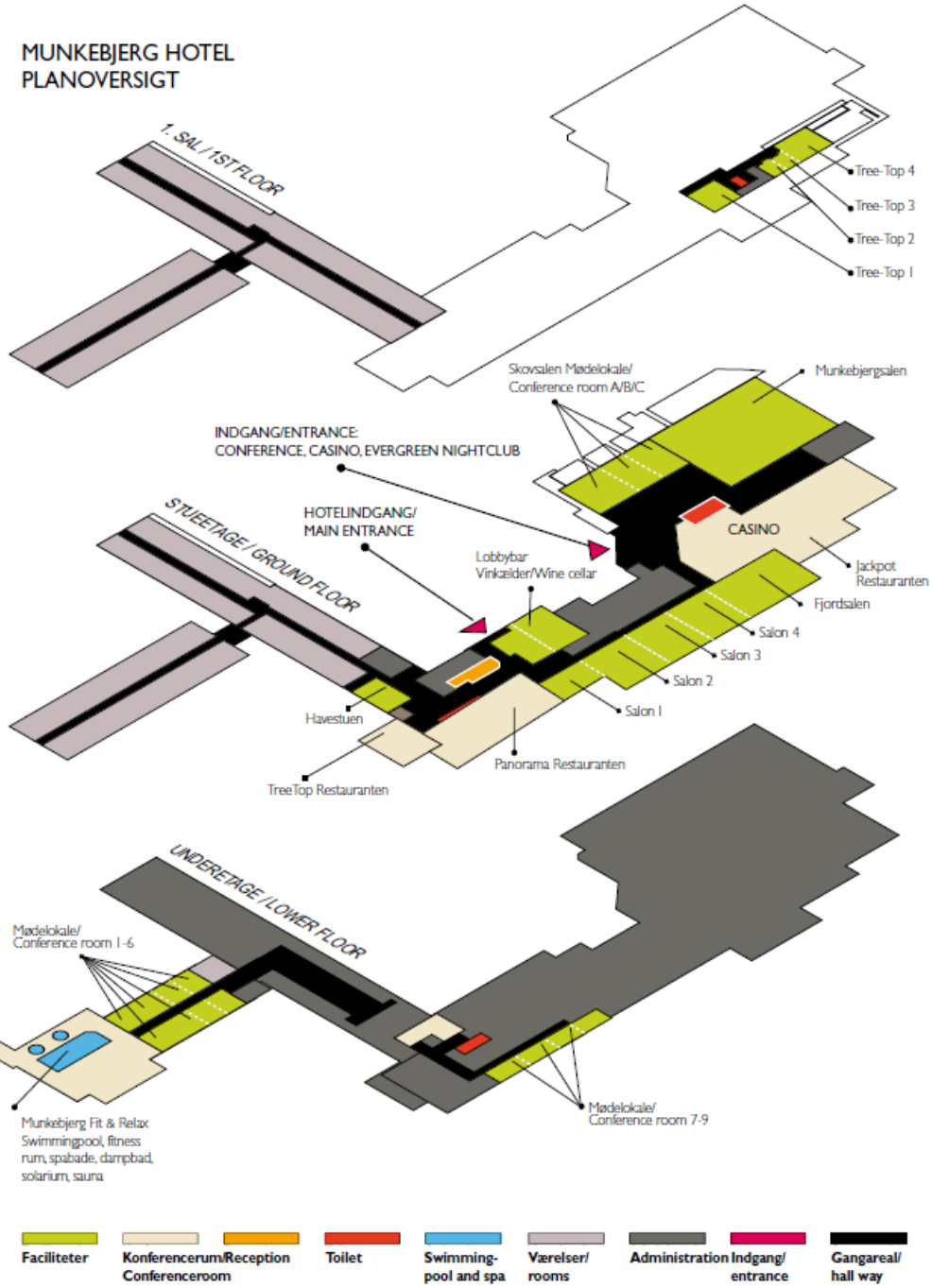
Bentley
Sustaining Infrastructure

Welcome

Iben Rue – Chairman Civil SIG

The Venue



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The Program

- Updated version available
- Check out
  - D2 Hypermodels – Mon11:30
  - A3 De Frie Data – Mon 14:30
  - B7 Rule for Plotting 3D models – Tues 13:30
  - D8 Element Templates – Tues 14:45
- Plus dag (Wed)
  - F11 in Modelokale 3+5
  - X11 in Havestuen

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Bentley Civil Update

Ian Rosam – Product Manager

Introducing the 2013 Civil team

The ‘Regular’ Faces

Joe Waxmonsky
Product Engineer
Exton, PA

Rob Nice
Application Engineer
UK

Ian Rosam
Product Manager
UK

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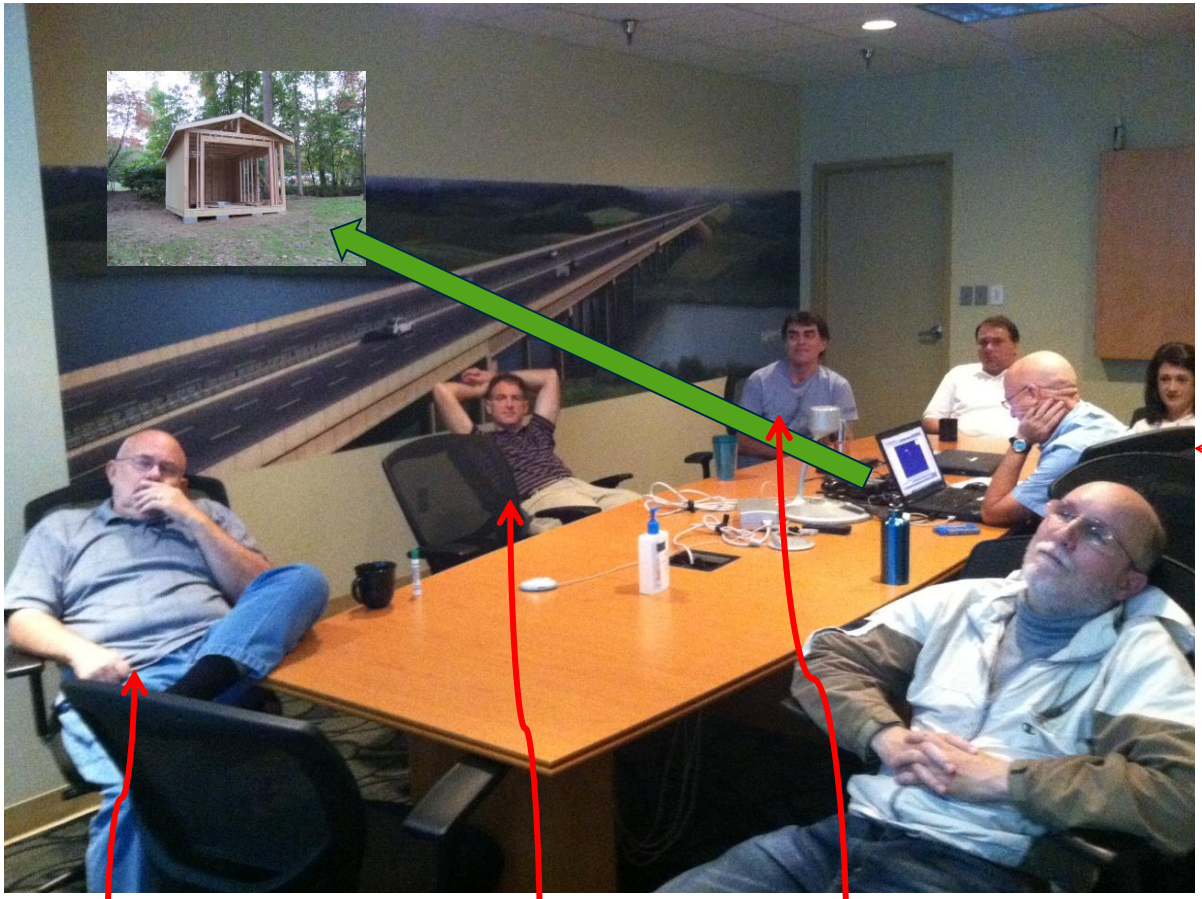
Some ‘New’ Faces

Maria Persson
Application Engineer
Stockholm

Ernst Vanbarr
Application Engineer
Hoofddorp

The ‘Absent’ Faces



Richard Bradshaw, Dennis Schaffer, Barry Mathews, Mike Wilson

Bentley Civil Update Agenda

Where have we come from?

Business Drivers and Where are we today?

Where are we going ?

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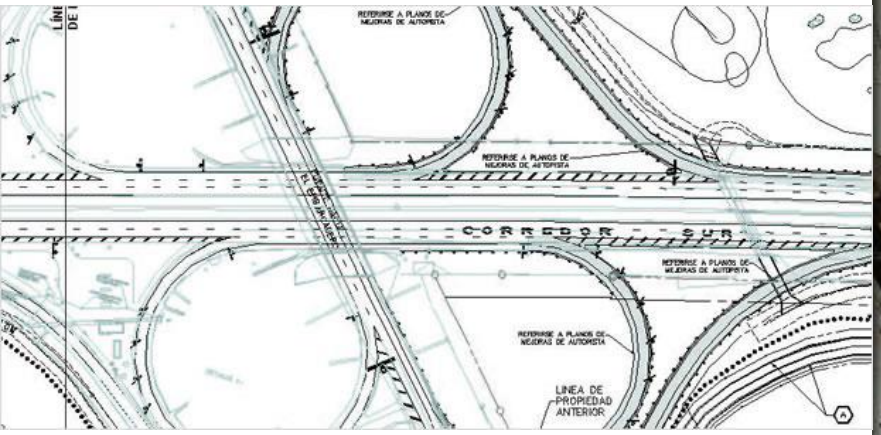
Where have we come from ?

A Look Back

Engineering technology has advanced considerably from the days of drawing boards. However, for the most part, practices and deliverables have continued to target the same thing:

2D Plans Production



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Interoperability

"Specialists in the various disciplines have been able to optimize their own in-house operations … most failures are caused by poor handoffs between disciplines."

Tommelein and Gil (1999)

Traditional Workflows

In reality, the technologies have advanced dramatically while our civil processes have been slower.

We can build models, but generally as an industry we have not made the step to using the model efficiently throughout our engineering and business workflows.

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Business drivers and where are we today ?

Bentley's mission is to provide innovative software and services for the enterprises and professionals who design, build and operate the world's infrastructure - sustaining the global economy and environment, for improved quality of life.

Bentley's Solutions

- MicroStation
- ProjectWise
- AssetWise

Bentley Products By Category

MicroStation Platform Technology and Products
MicroStation CAD software is used to design, model, visualize, document, and map projects of all shapes and sizes.

ProjectWise Project Team Collaboration
ProjectWise is a project team collaboration software platform for the design and construction of capital projects.

AssetWise Operations Management
AssetWise is an operations information modeling software platform for delivering lifecycle information management to operators of infrastructure assets.

Bridge Design and Engineering Software

Building Analysis and Design Software

Civil Construction Software

Communications Network Design Software

Electric and Gas Utility Network Analysis and Design Software

Facility Information Management Software

Geospatial Information Management and Web GIS Software

Imaging and Document Conversion Software

Land Development Software

Mapping Software

Nuclear Operations Software

Plant Conceptual Design Software

Plant Design and Engineering Software

Plant Operations Software

Rail Design and Operations Software

Road Design Software

Structural Analysis and Design Software

Transportation Operations Software

Water and Wastewater Network Analysis and Design Software

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Bentley Solutions

A solution includes:

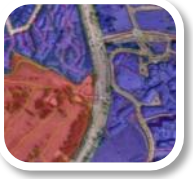
- Intra-operable software product portfolio
- Professional services and learning
- Professional communities networking


Process Manufacturing


Metals and Mining


Power Generation


Communications


Government


Buildings


Campuses


Rail and Transit


Roads


Bridges


Utilities


Water and Wastewater

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Bentley Civil / Transportation Design

InRoads

- Road, site, survey, and drainage design. InRoads is the design standard in 26 US DOTs, 6 Canadian MOTs, USACE, and numerous road organizations around the world.
  - **Power InRoads** (InRoads with built-in CAD engine and Mapping capability)

GEOPAK

- Road, site, survey, and drainage design. GEOPAK is the design standard in 18 US DOTs, 1 Canadian MOT, and the FHWA.
  - **Power GEOPAK** (GEOPAK with built in CAD engine and Mapping capability)

MXROAD

- Road, site, survey and drainage design. MXROAD is the design standard in 1 US DOT, and many road authorities throughout Europe, Asia, and the Middle East.

Power Civil for Country (20+ products)

- Power InRoads localized by country. PCfC is utilized in 20+ countries within Europe, Middle East, South Africa, Latin America, and Brazil.

Bentley Civil SELECTseries 3

OpenRoads technology extends the capabilities of information modeling.

Bentley Introduces Shared 'OpenRoads' Information Modeling Functionality in InRoads, GEOPAK, and MXROAD V8*i* (SELECTseries 3)

Final Stages of Product Convergence Deliver Benefits of Cumulative Innovations for Roadway Design

PHILADELPHIA – *Be Together: The Bentley User Conference* – May 15, 2012 – Bentley Systems, Incorporated, the leading company dedicated to providing comprehensive software solutions for *sustaining infrastructure*, today introduced at this gathering of infrastructure professionals from around the world, the shared OpenRoads information modeling functionality in its InRoads, GEOPAK, and MXROAD V8*i* (SELECTseries 3) products for roadway design. The new common code in each represents the final stages in the evolutionary convergence of functional innovations among all three products – an evolution that began with the introduction of Roadway Designer. Users of any or all of these products can now benefit from a single user experience featuring common innovations that increase the potential of information modeling in road design, construction, and operations. The new functionality, which includes immersive, on-demand visualization, design intent capture and persistence, hypermodeling, information mobility, and construction-driven engineering, can be readily applied without disruption to existing workflows due to Bentley's long-standing commitment to continuous innovation with streamlined adoption.

Bentley Systems CEO Greg Bentley said, "We have conscientiously planned for the users of InRoads, GEOPAK, and/or MXROADS to reach the adoption of OpenRoads information modeling in a continuous and nondisruptive manner. This powerful new functionality is being delivered in the SELECTseries 3 releases of these products and should be enthusiastically previewed and adopted by all users as soon as possible."

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Bentley Civil SELECTseries 3

- Released March 2013
  - SELECTseries 3 Civil (Road) products with common OpenRoads technology
    - InRoads, GEOPAK, and MXROAD
    - Power Civil for Country regionalized versions ongoing
    - Power Civil for Country translated versions ongoing

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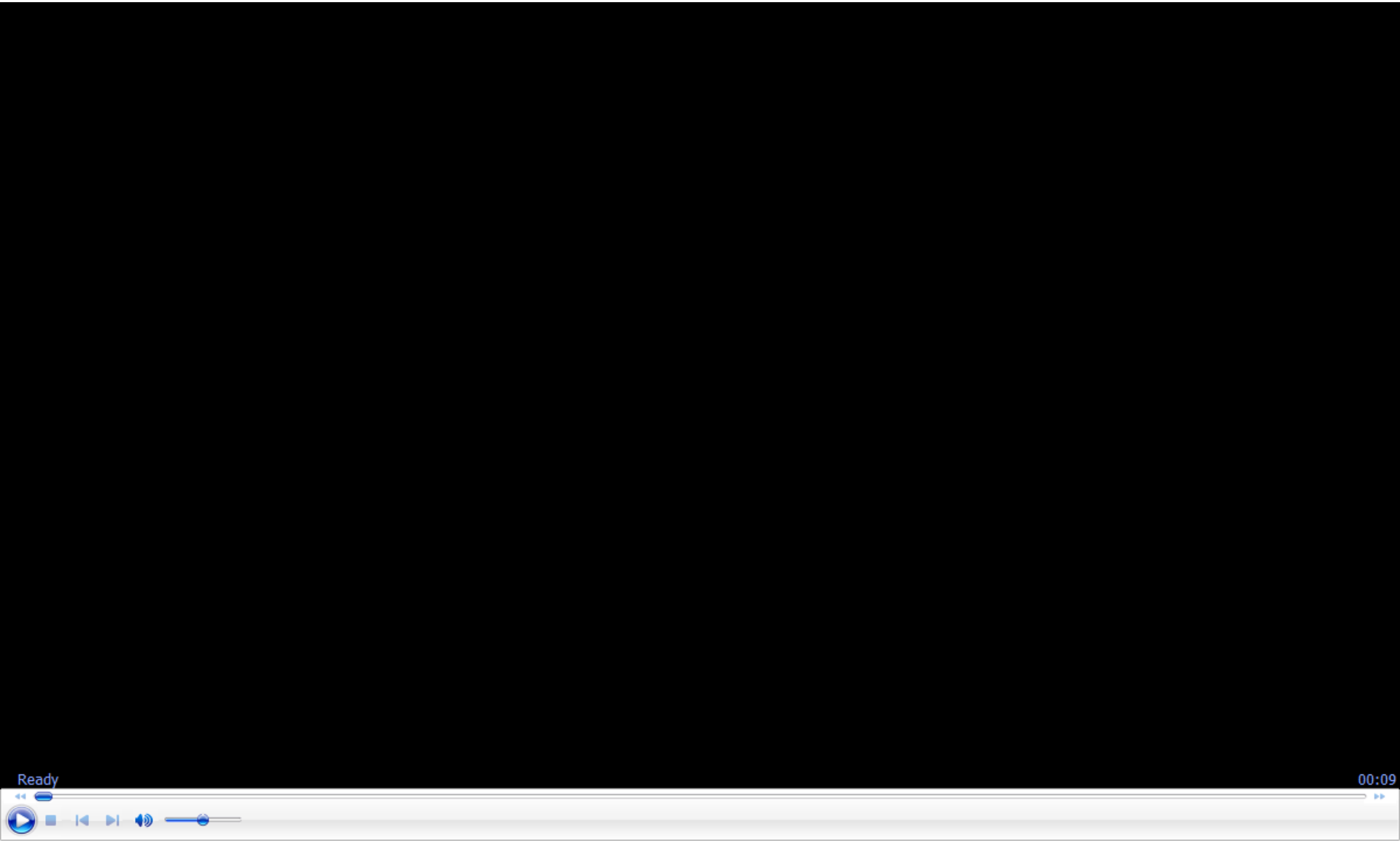
Bentley Civil SELECTseries 3



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www.bentley.com/openroads

OpenRoads technology extends the capabilities of information modeling.

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What is OpenRoads

- OpenRoads provides a common **technology** for InRoads, GEOPAK, MXROAD, and PowerCivil for “Country”.
- OpenRoads technology offers immersive interaction of
  - Survey
  - Geometry
  - Terrain modeling
  - Corridor modeling
  - Dynamic cross sections
  - Civil cells
  - Design intent
  - Design-time visualization

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OpenRoads/SS3 Differential Advantage

- Thanks to our users, our transportation and civil engineering design applications lead the industry worldwide.

- **Top 20 Transportation Designers**

- **47 of the Top 50 International Designers**
- **45 US DOTs**
- **EC's, Agencies and Municipalities Worldwide**

Bentley Sustaining Infrastructure

OpenRoads Differential Advantage

- We partner with users to grow and evolve our software.

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OpenRoads Differential Advantage

- We provide 3D Information Modeling to ensure integration between all phases of the design, with all project teams, and throughout the project life-cycle.

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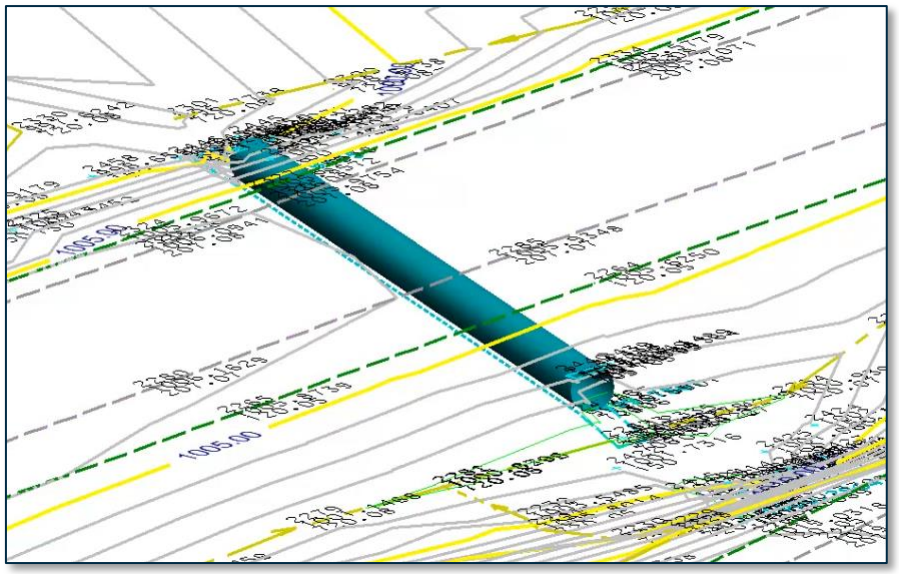
OpenRoads Technology

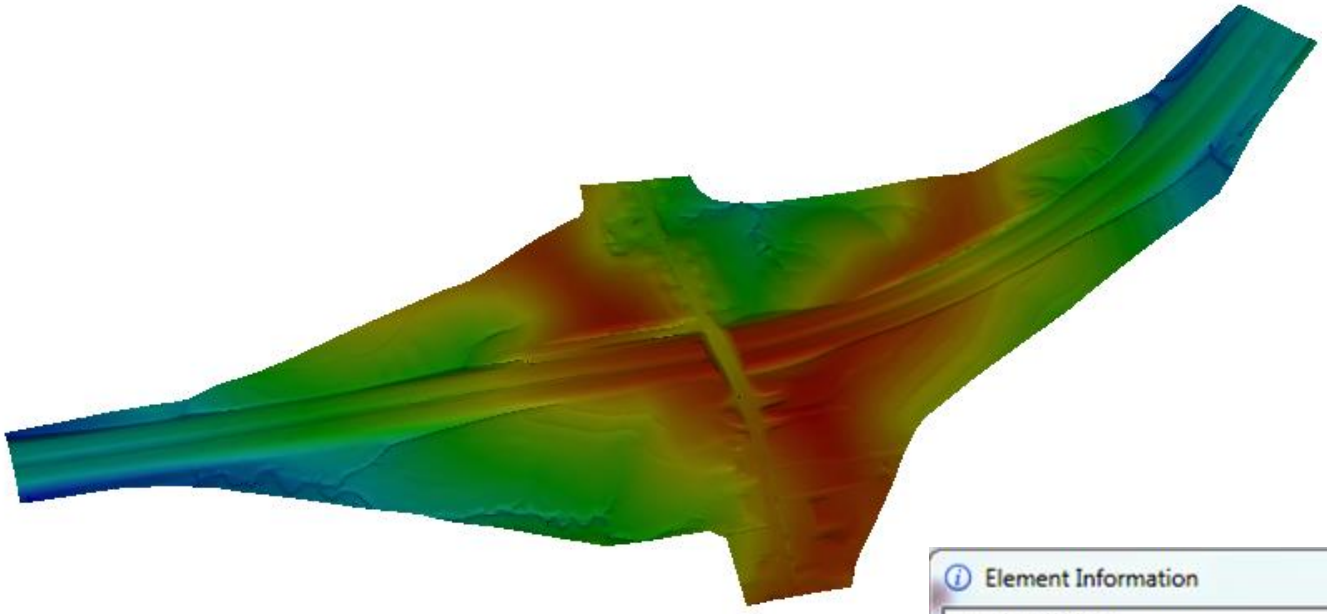
Survey (Data Acquisition)



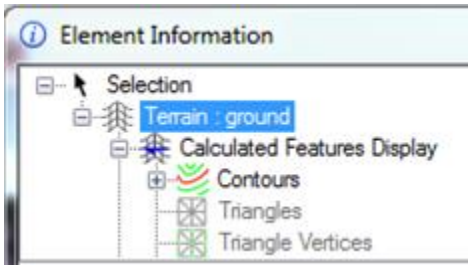
- Supports almost all civil/survey data formats
- Eliminates expensive and sometimes redundant data conversions
- Combines disparate data types
- Interactive editing
- Dynamic updates
- Automated terrain creation
- Reduces costs

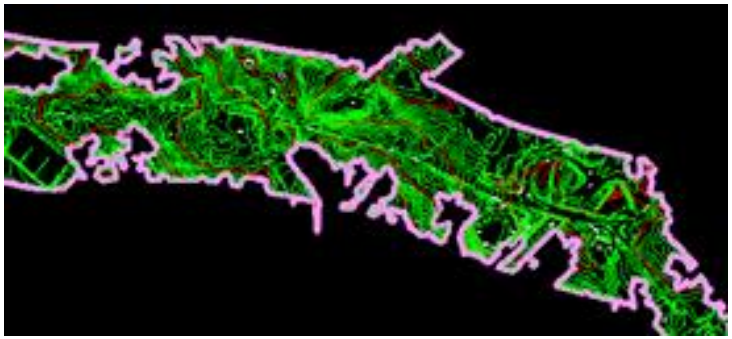
OpenRoads Technology

Terrain Model



- Native to the DGN
- Common Share over many disciplines
- Simple display management and over-rides
- Reduces costs
- Reduces errors





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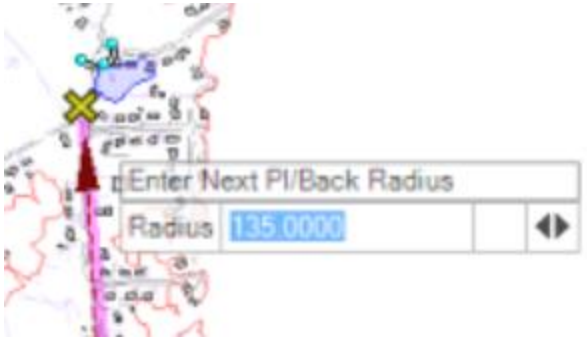
OpenRoads Technology

User Experience



- Provides context sensitive, dynamic dialog free editing
- Design with ease using manipulators that allow the user to grip an object to dynamically move and edit any aspect of the design
- Increases productivity
- Enhances user experience

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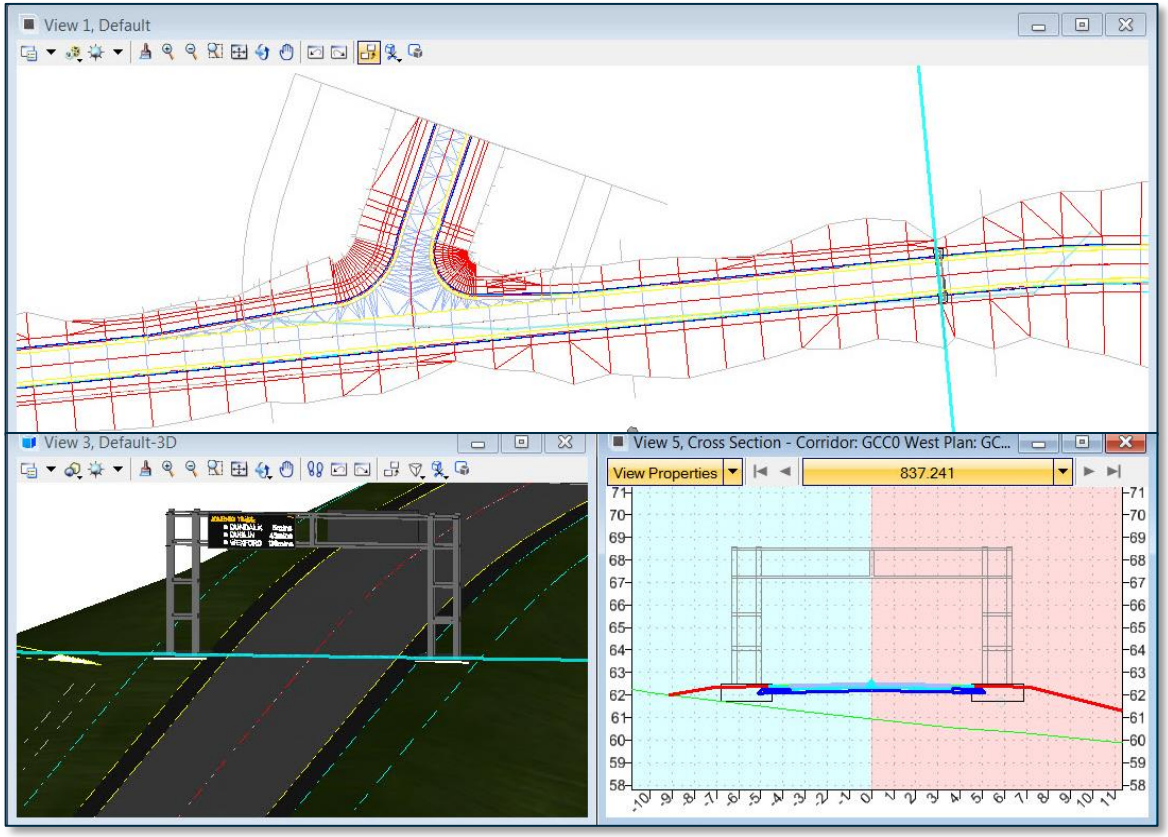
OpenRoads Technology

Design Intent



- Communicate design intent consistently with design modifications
- Assures the project is engineered, no ‘software surprises’
- Improves design quality

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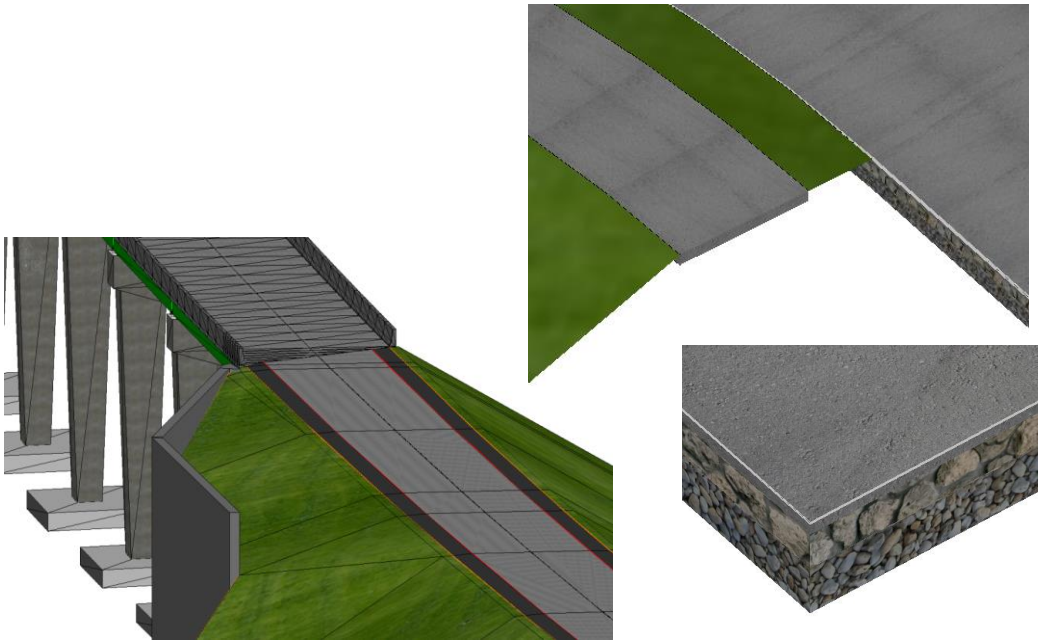
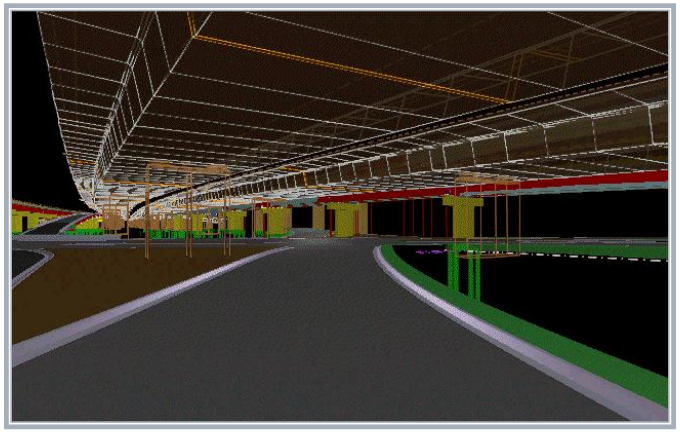
OpenRoads Technology

Immersive Modeling Parametric Design





- Combines plan, profile, and cross section workflows with 3D modeling
- Incorporates rules, relationships, & constraints into 3D modeling
- Allows Design Time
  - Visualization
  - Clash Detection
  - “Engineering Sanity”
- Dynamically updates views
- Improves quality of integrated designs

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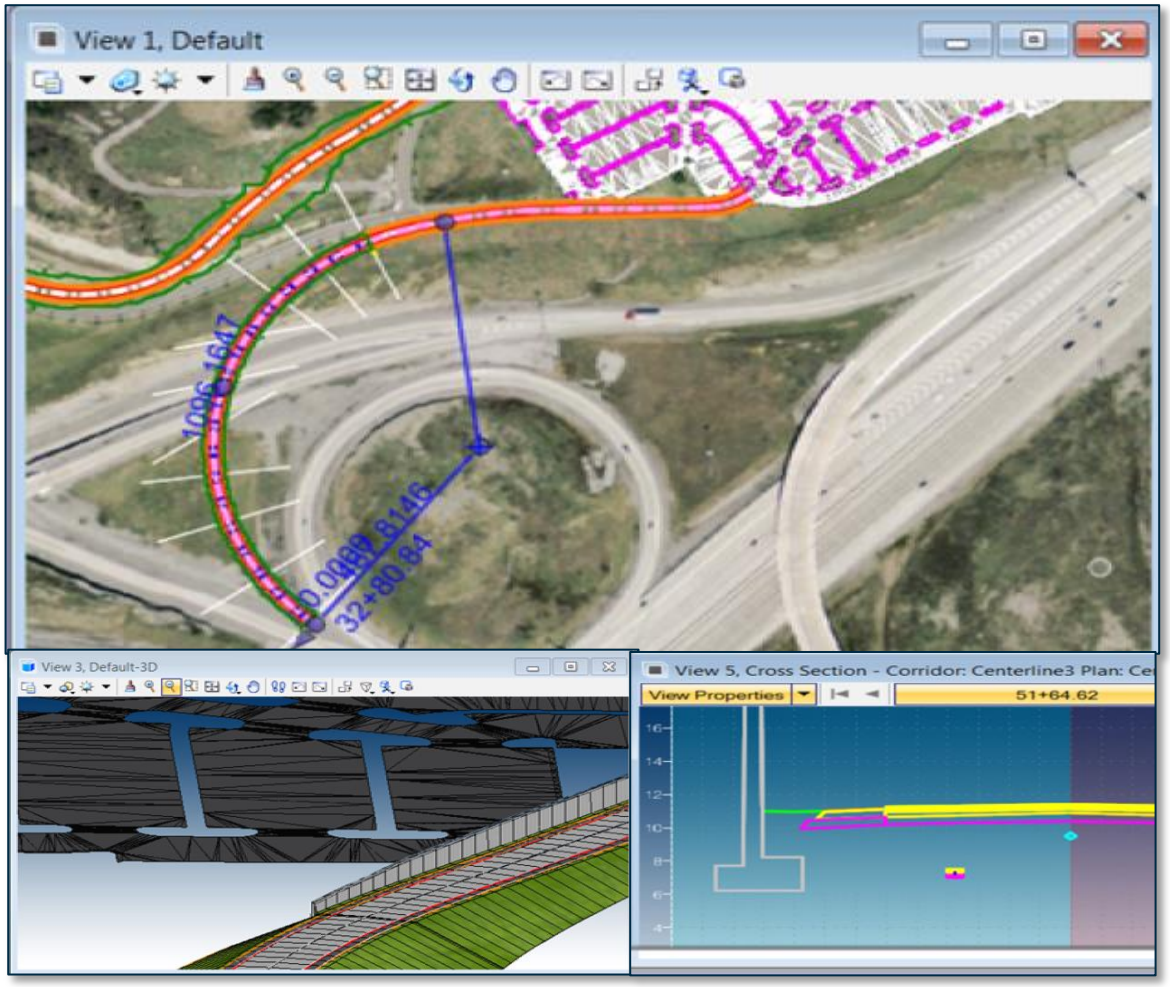
OpenRoads Technology

Dynamic Cross Sections



- Updates on the fly
- Reduces time
- Scalable
- Intelligent
- Editable
- Multiple designs
- Structures
- Any 3D element
- Reduce production time.

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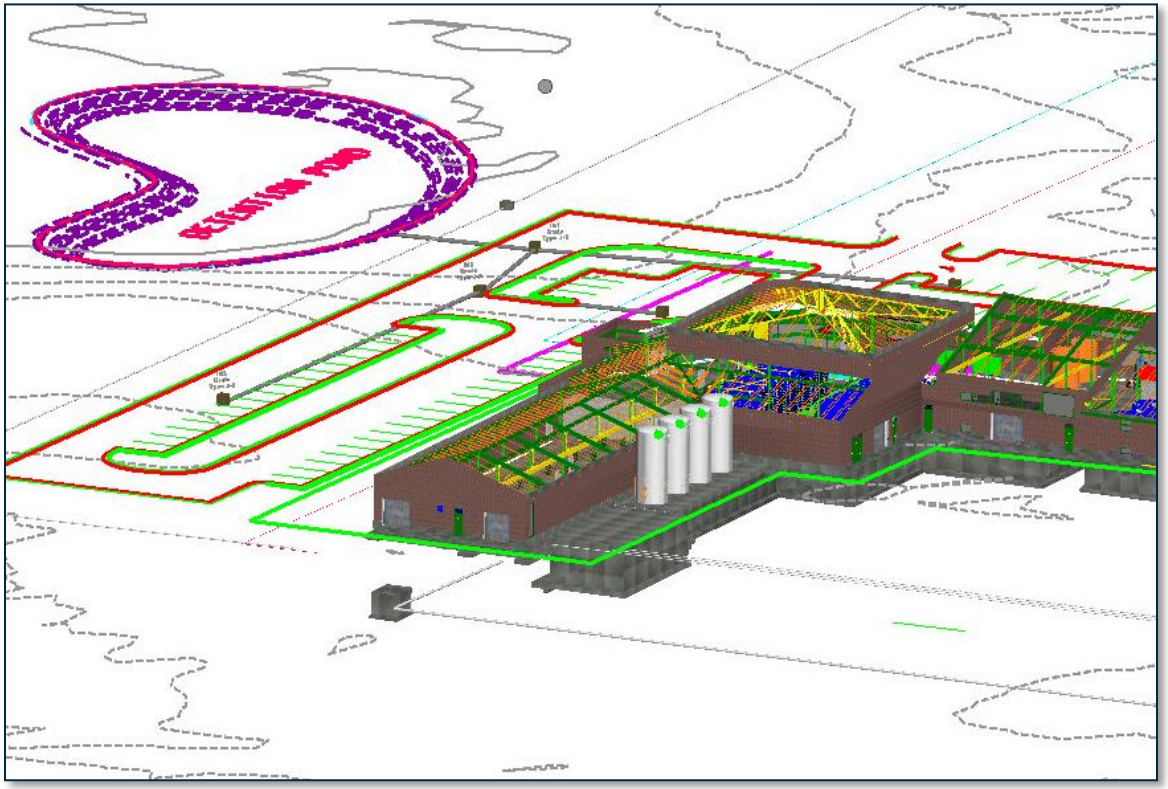
OpenRoads Technology

Integrated Corridor & Site Design



- Stores all aspects of design in model
- Establishes object relationships ensuring design modifications are correctly established with all connected elements
- Enhances productivity

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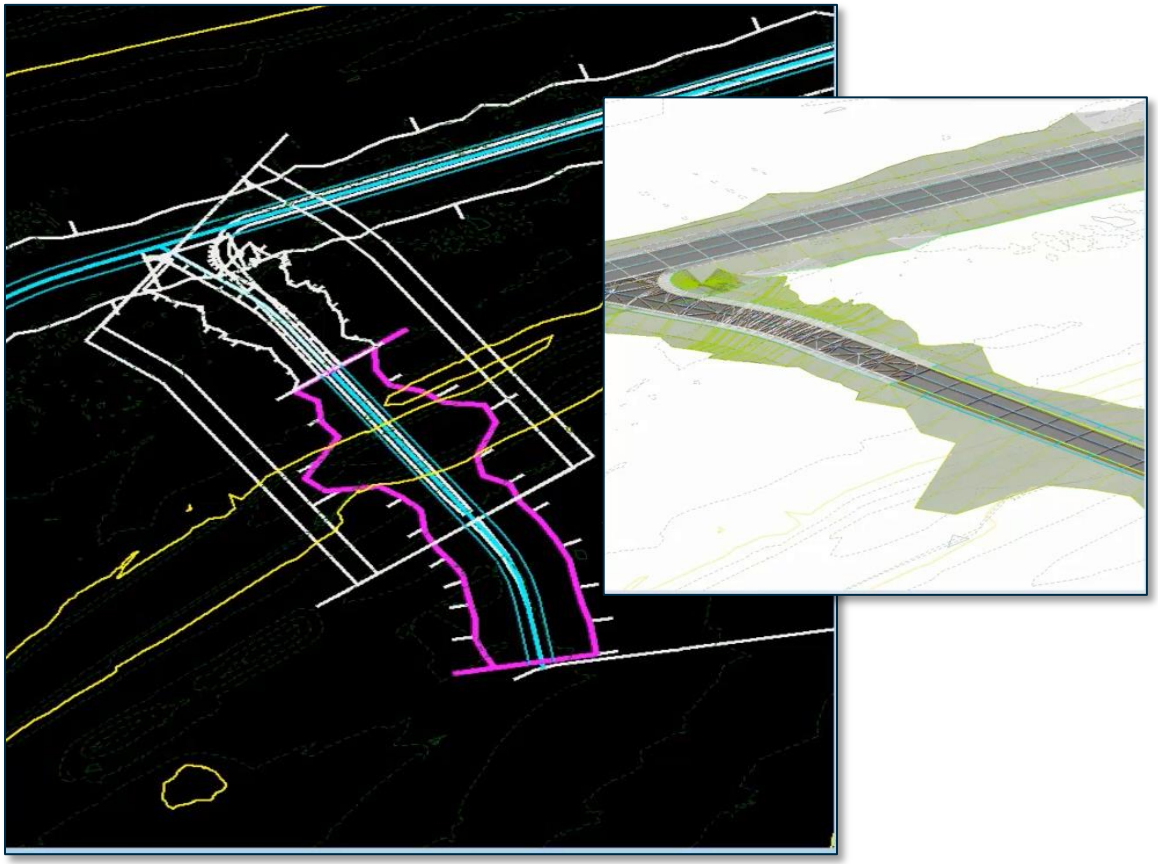
OpenRoads Technology

Civil Cells



- Dynamic civil cell functionality allows repeatable geometric modeling
- Reuse previously stored geometric layouts
- Ensures standards
- Reduces project costs

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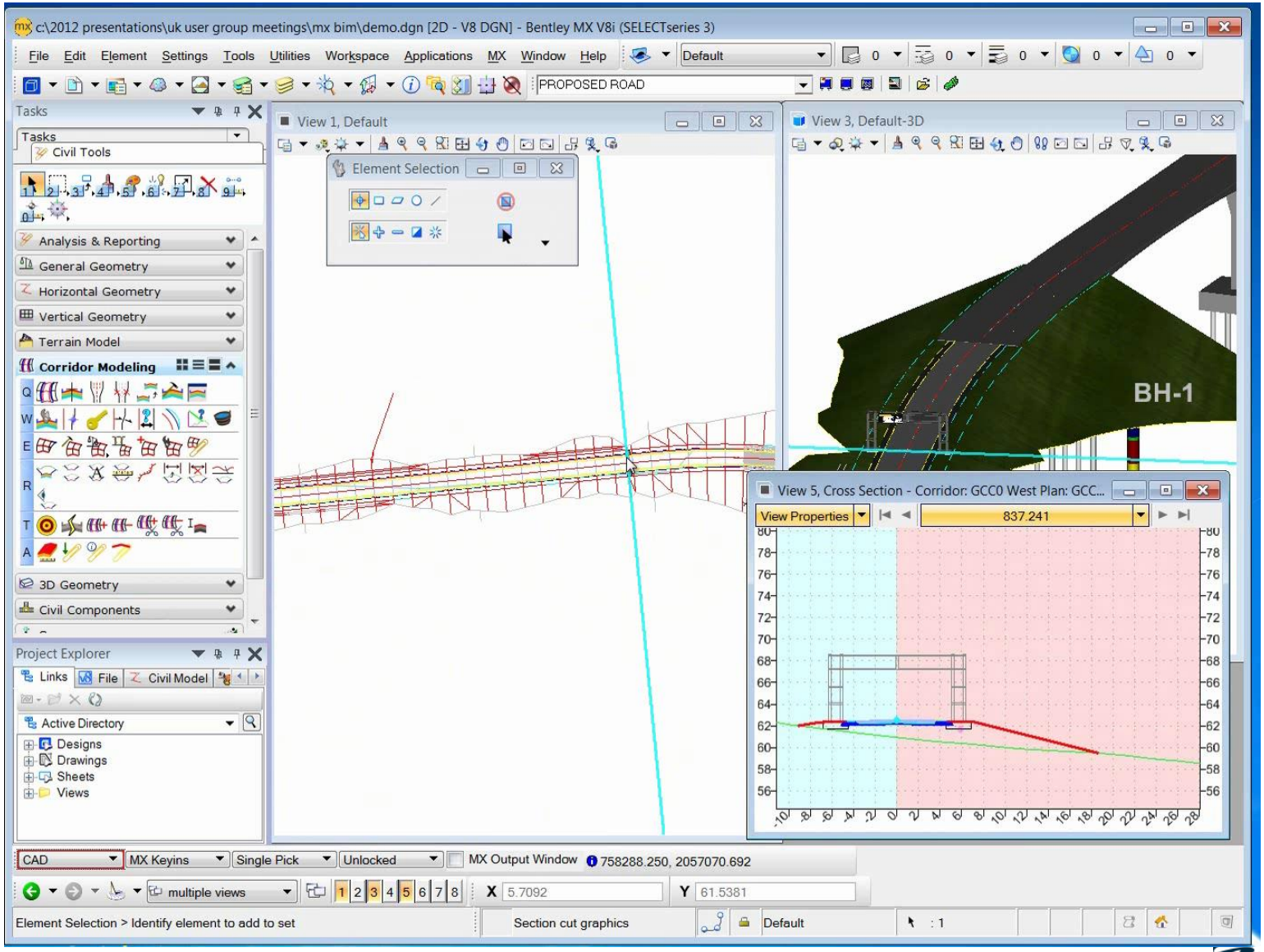
OpenRoads Technology



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Business Drivers

Business Drivers

- *Visualization*
- *Machine Control*
- *Design Review*
- *4D*
- *LIDAR / Point Clouds*
- *Alternate Contracting Pr*
- *Life Cycle Management*

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Visualization

Whether it's a feasibility study, looking at design alternatives, analyzing traffic movements or obtaining stakeholder buy-in, visualization can be an invaluable tool on just about any project.

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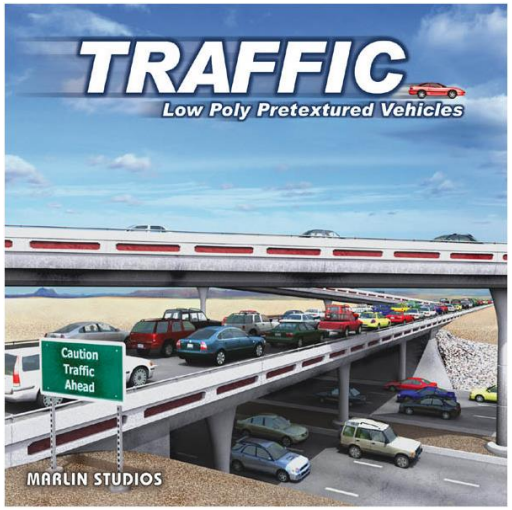
Visualization

Model Population Tools

Creates realistic models, complete with people, landscaping and traffic, not only quickly and efficiently but with improved realism.

Content Libraries

Built-in libraries of high quality models, materials, environments and lighting.



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Benefits

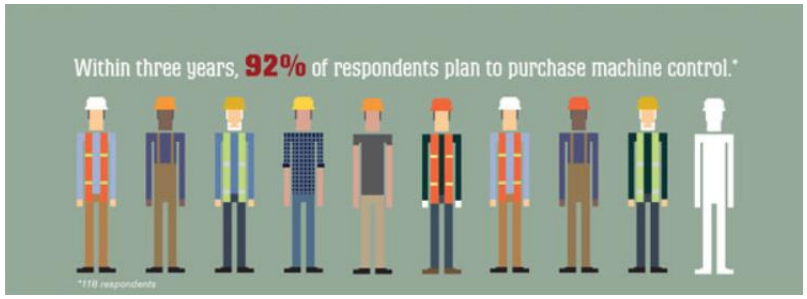
- Converts complex technical information into easily understood images or animations.
- Communicates a single, common vision
- Eliminates the need to interpret 2D drawings
- Provides a starting point for discussion
- Allows easy understanding of construction sequencing

Business Drivers

- *Visualization*
- *Machine Control*
- *Design Review*
- *4D*
- *LIDAR / Point Clouds*
- *Alternate Contracting Processe*
- *Asset Management*

Machine Control

The use of Automated Machine Guidance continues to



http://www.siteprepmag.com/articles/84673-machine-control-report-results

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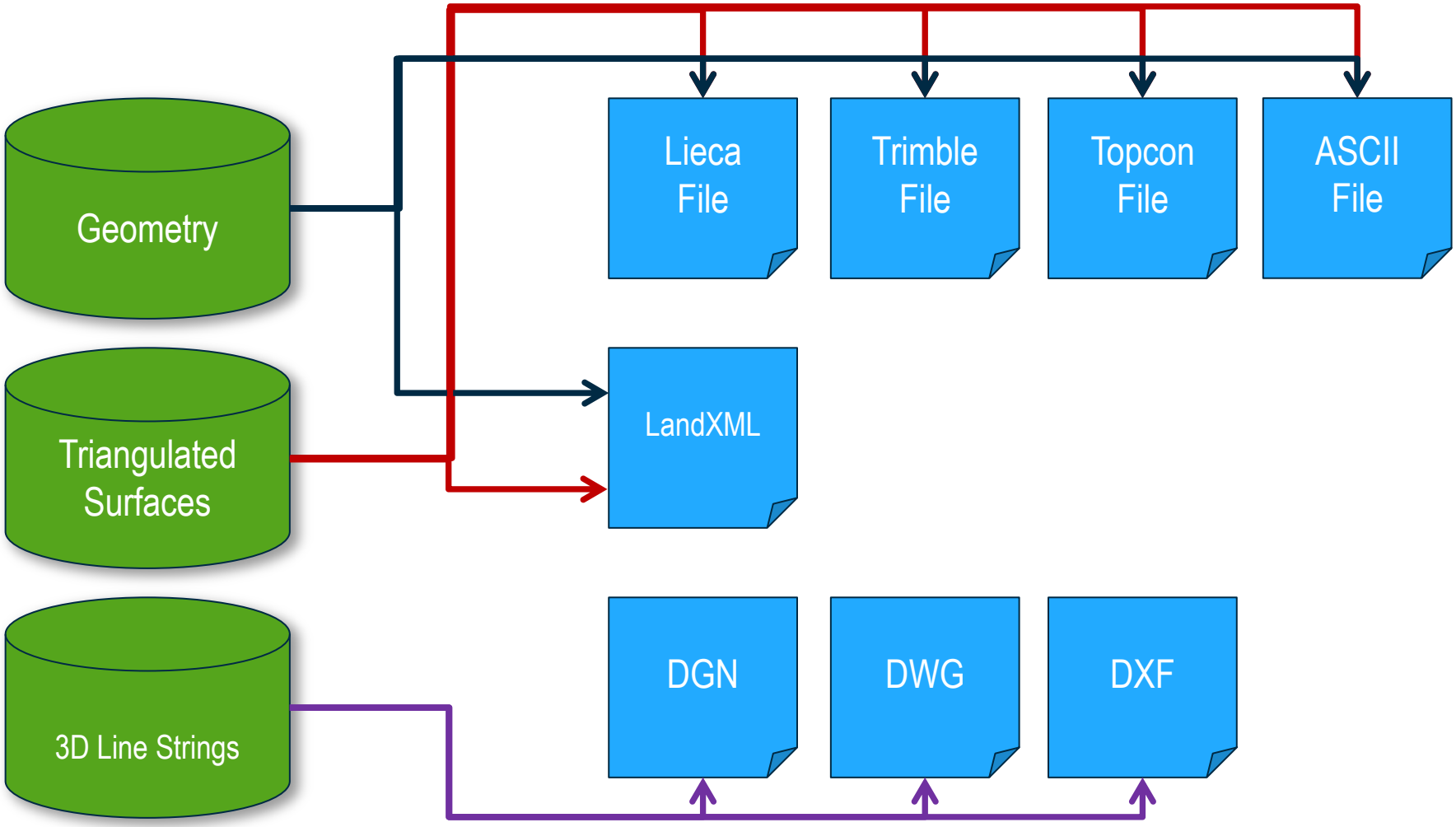
Benefits

- Productivity gains (as high as 40%)
- Less repeat work (move dirt right the first time)
- Lower costs (e.g. reduce fuel consumption)
- Greater accuracy
- Less staking
- Safety
- Et al …

OpenRoads Technology



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Challenges

- Construction companies have varying requirements
  - Most common file format is LandXML
  - Some require/prefer triangulated surfaces
  - Some require/prefer 3D line strings
  - Most require horizontal alignments
  - Profiles are required sometimes

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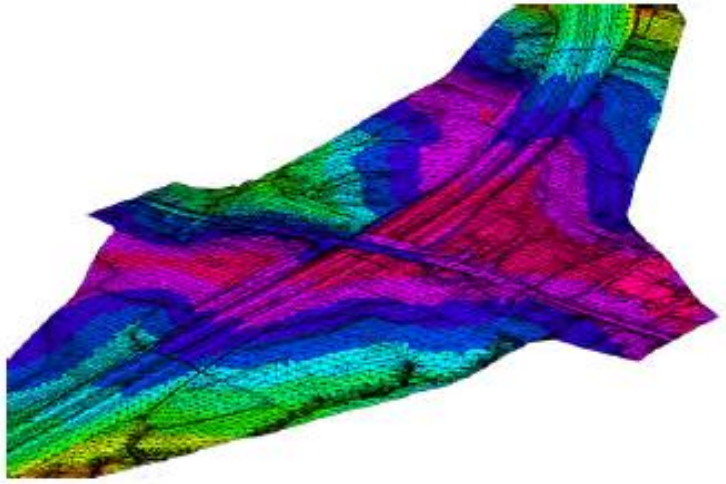
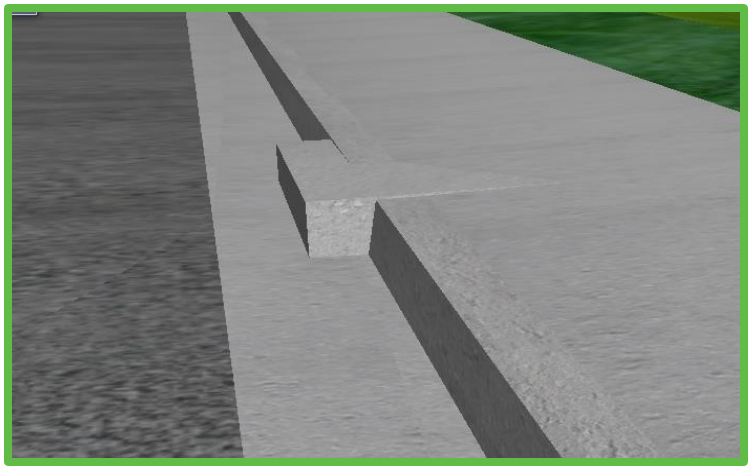
Challenges

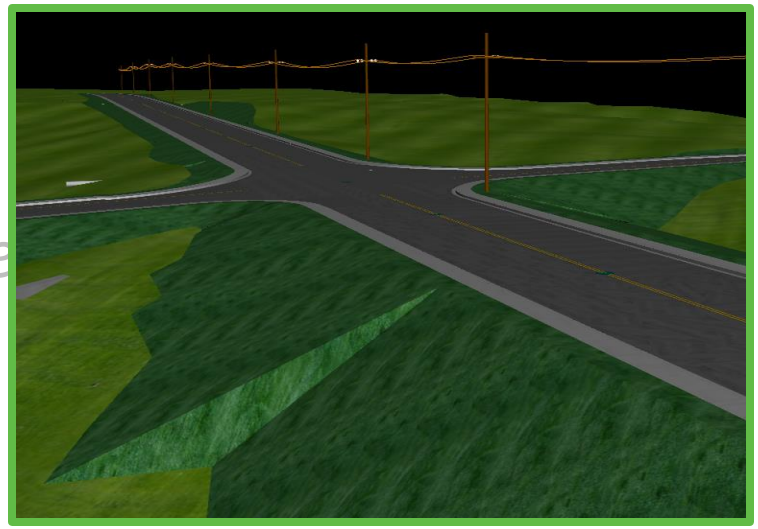
- LandXML is the Universal Format … BUT!
  - Great for existing surfaces that are static, but managing proposed surfaces that have gaps in data can be difficult.
  - Size of files can be memory prohibitive for field devices.
  - Funding currently unavailable.
- CAD file compatibility between Civil Software and Machine Control Software
- Level naming
- Etc.



Business Drivers

- *Visualization*
- *Machine Control*
- *Design Review*
- *4D*
- *LIDAR / Point Clouds*
- *Alternate Contracting Processe*
- *Asset Management*

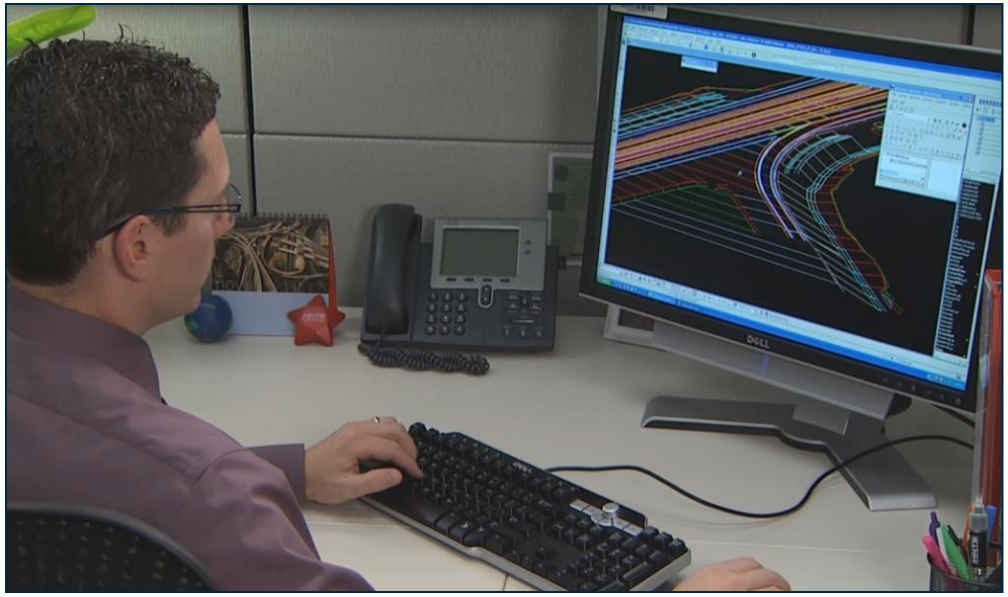




Benefits

"There are significant benefits associated with 3D design methods beyond support for AMG. The highest ranked additional benefit is detection and elimination of design errors prior to construction …"

http://ntl.bts.gov/lib/46000/46500/46557/CFIRE_02-05_Final_Report.pdf



3D Design Terrain Models for Construction Plans and GPS Control of Highway Construction Equipment

CFIRE 02-05
March 2010

National Center for Freight & Infrastructure Research & Education
Department of Civil and Environmental Engineering
College of Engineering
University of Wisconsin–Madison

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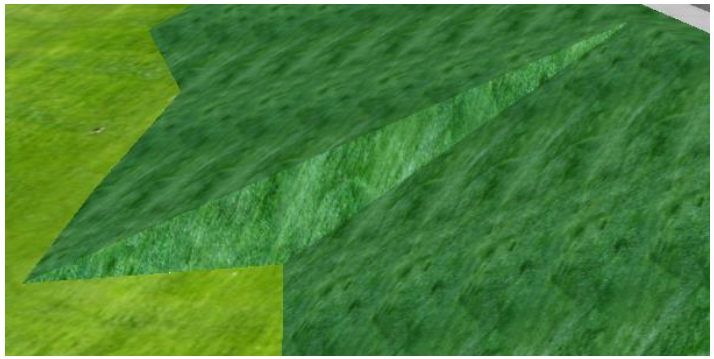
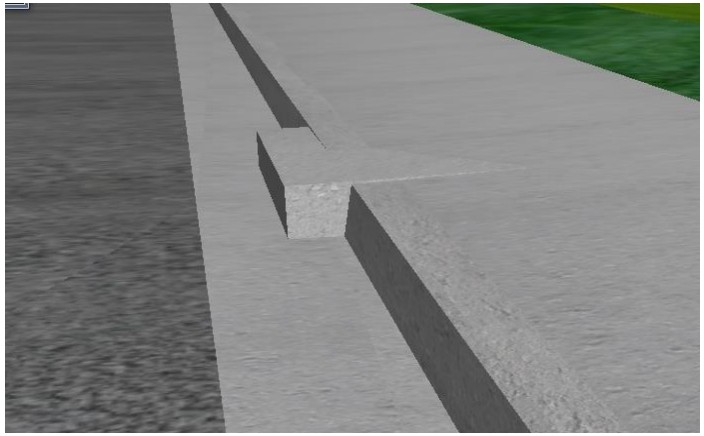
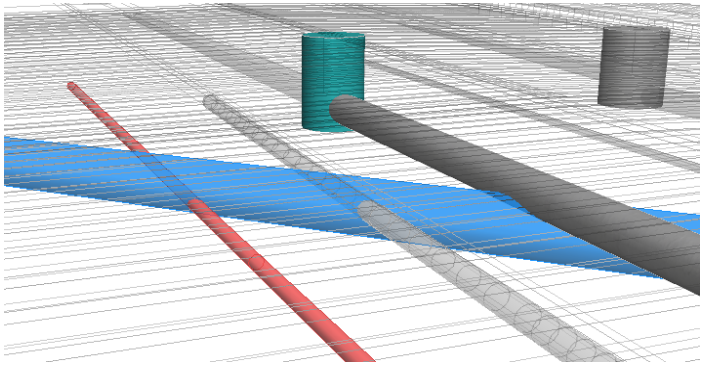
Benefits

- Review Design Alternatives
- Finds Errors and Omissions
- Improves Decision Making
- Improves Communication and Coordination Between Disciplines
- Increases Quality
- Produces Better Design
- Et al.







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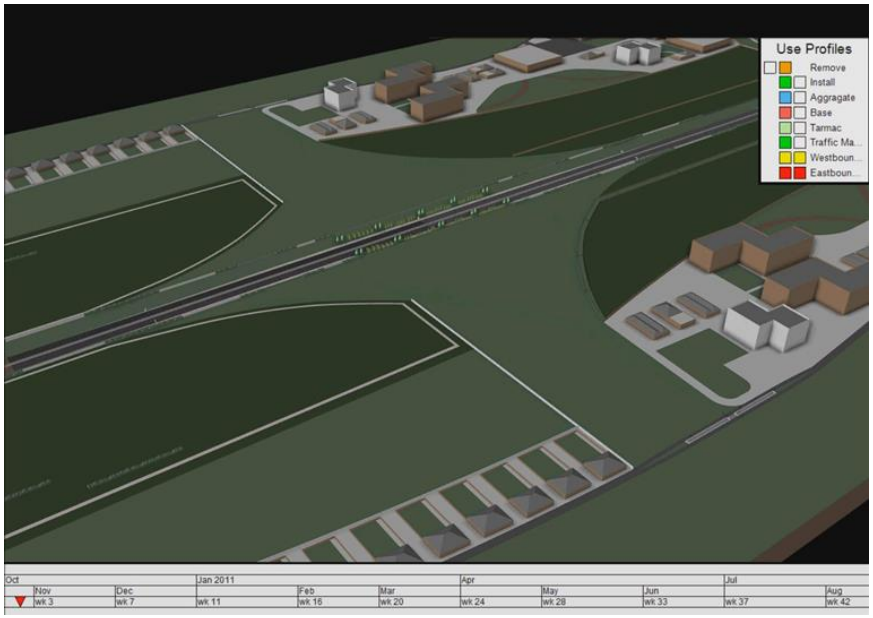
Business Drivers

- *Visualization*
- *Machine Control*
- *Design Review*
- *4D*
- *LIDAR / Point Clouds*
- *Alternate Contracting Processes*
- *Asset Management*



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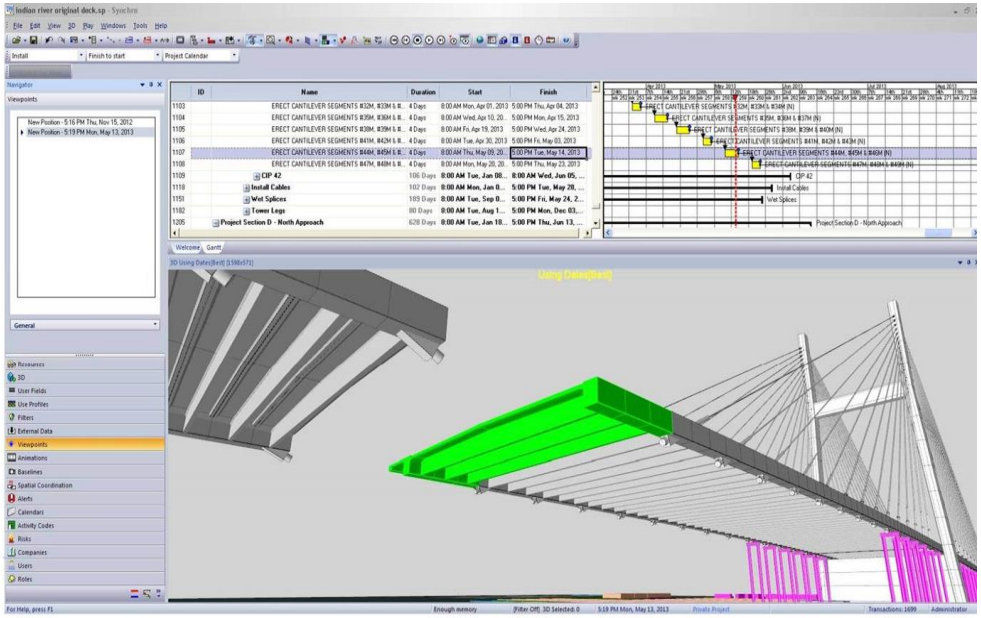
Benefits

- The ability to sequentially visualize construction design plans through time.
- Facilitates identification of constructability issues that could not have been detected using 2D plans.
  - *Equipment placement*
  - *Material fabrication*
  - *Staging*
  - *Site organization*
  - *Etc.*



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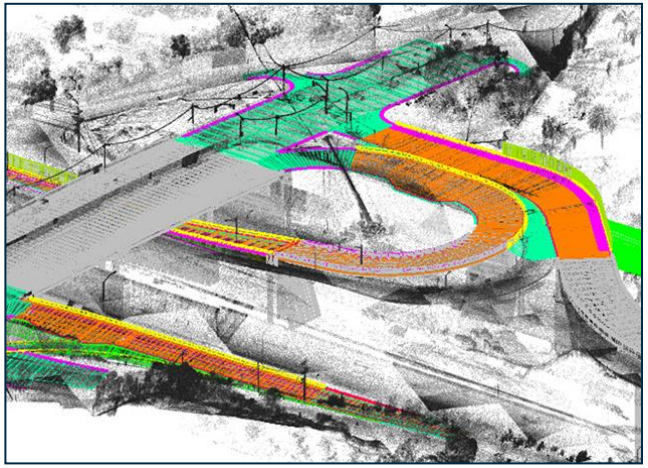
Challenges

Currently, 4D CAD is not used extensively in the transportation industry.

- *Cost*
- *Software interoperability*
- *Contract specifications*
- *Lack of agency procedures and standards*



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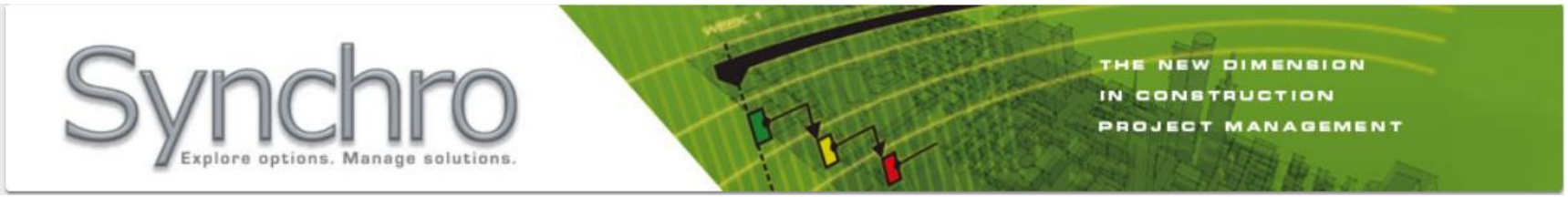
Synchro Partnership

No one does 4D better than *Synchro,* an approved Bentley Technology Software Development Partner.

As our partner, we provide direct access to the models in a DGN file format, as well as programming access to ProjectWise and Navigator.



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Bentley Sustaining Infrastructure

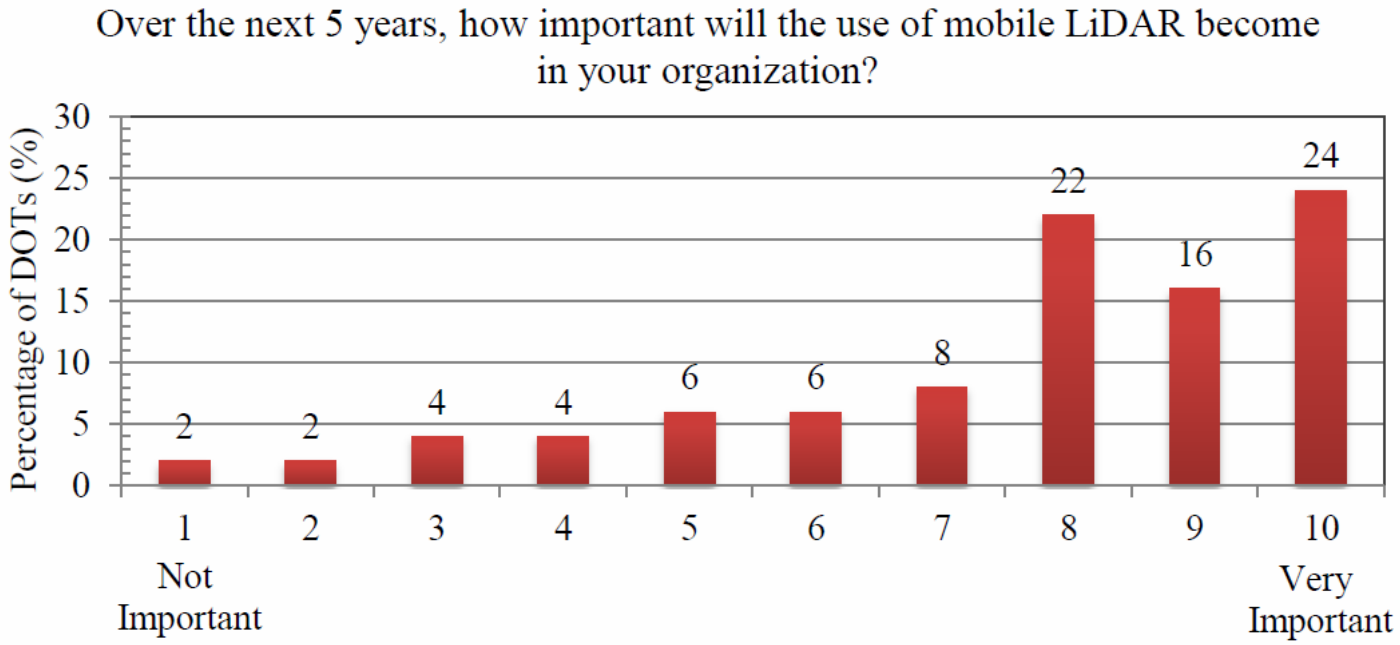
Business Drivers

- *Visualization*
- *Machine Control*
- *Map21 and Every Day Counts*
- *Design Review*
- *4D*
- *LIDAR / Point Clouds*
- *Alternate Contracting Processe*
- *Asset Management*

Bentley Sustaining Infrastructure

LIDAR / Point Clouds

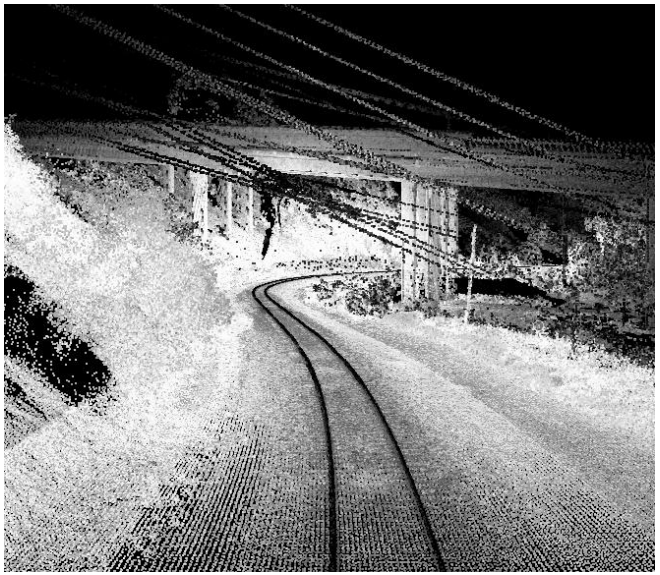
The use of LIDAR for data collection continues to grow globally.



http://web.engr.oregonstate.edu/~olsen/NCHRP/NCHRP_15_44_QuestionnairelterimReport.pdf

Benefits

- Accuracy
- Higher data density
- Fast acquisition and processing
- Minimizes human dependence
  - Safety
- Weather/Light independence
- Canopy penetration
- Cost
- Etc.



Challenges

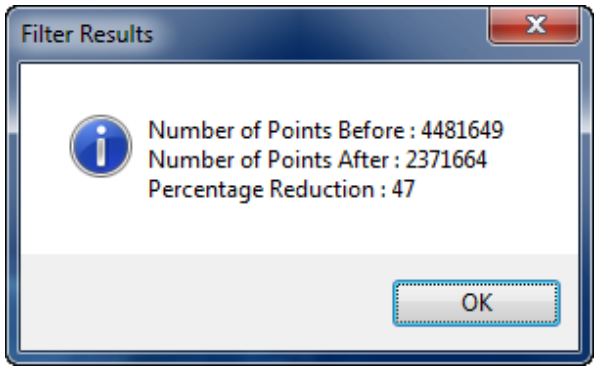
– Size of point clouds can be too large for distributed project team to share.

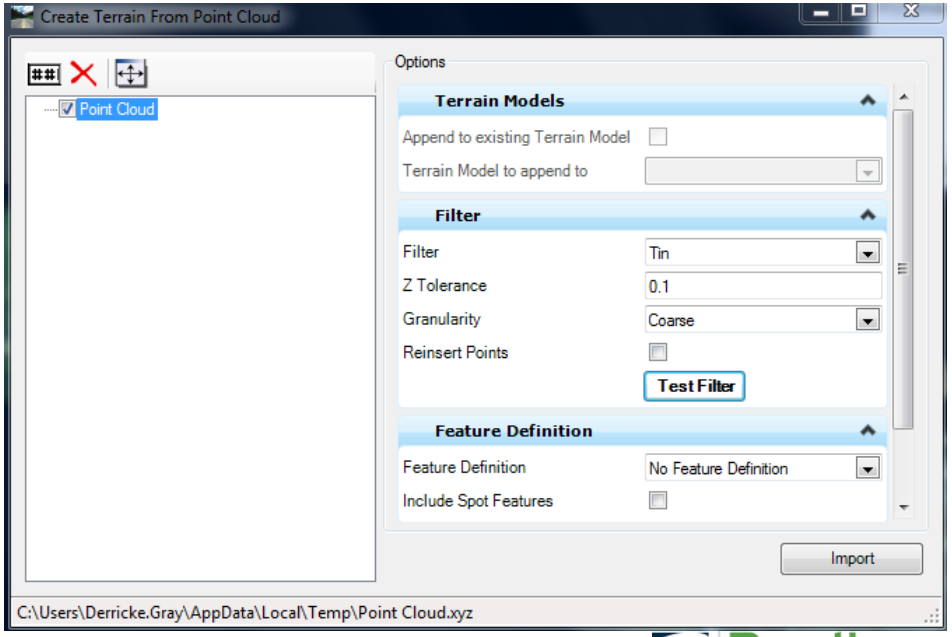
  – *Bentley's ProjectWise* and *Pointools* applications can be used to distribute only the parts of the point cloud that are needed.

Bentley Sustaining Infrastructure

Challenges

- Size of resulting terrain models
  - Clipping
  - Filtering
- Lack of knowledge and standards with regard to filtering

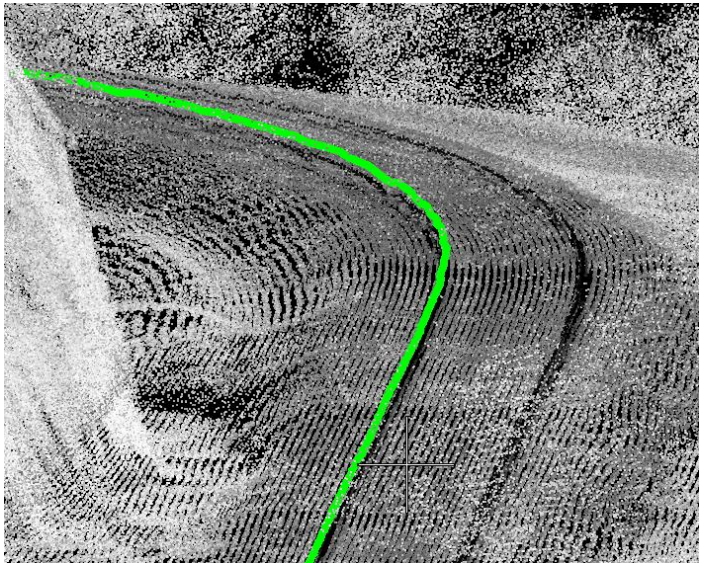


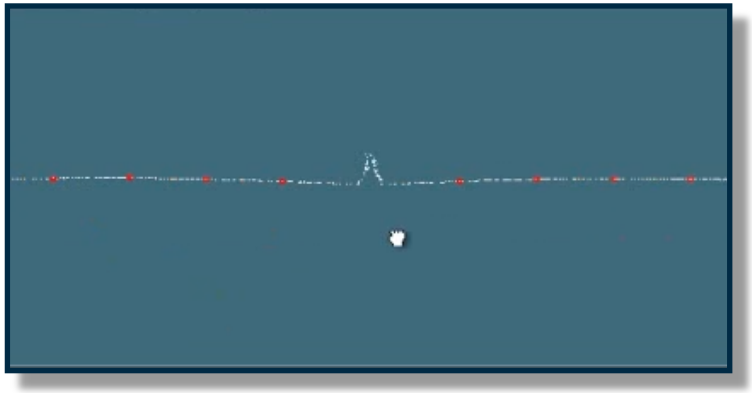


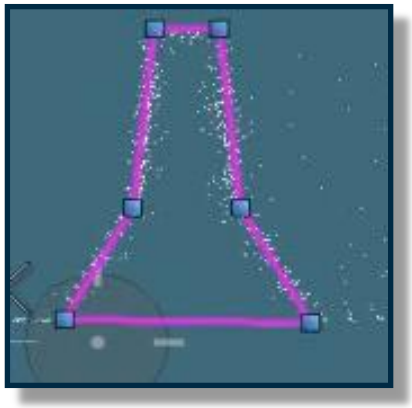
Bentley Sustaining Infrastructure

Challenges

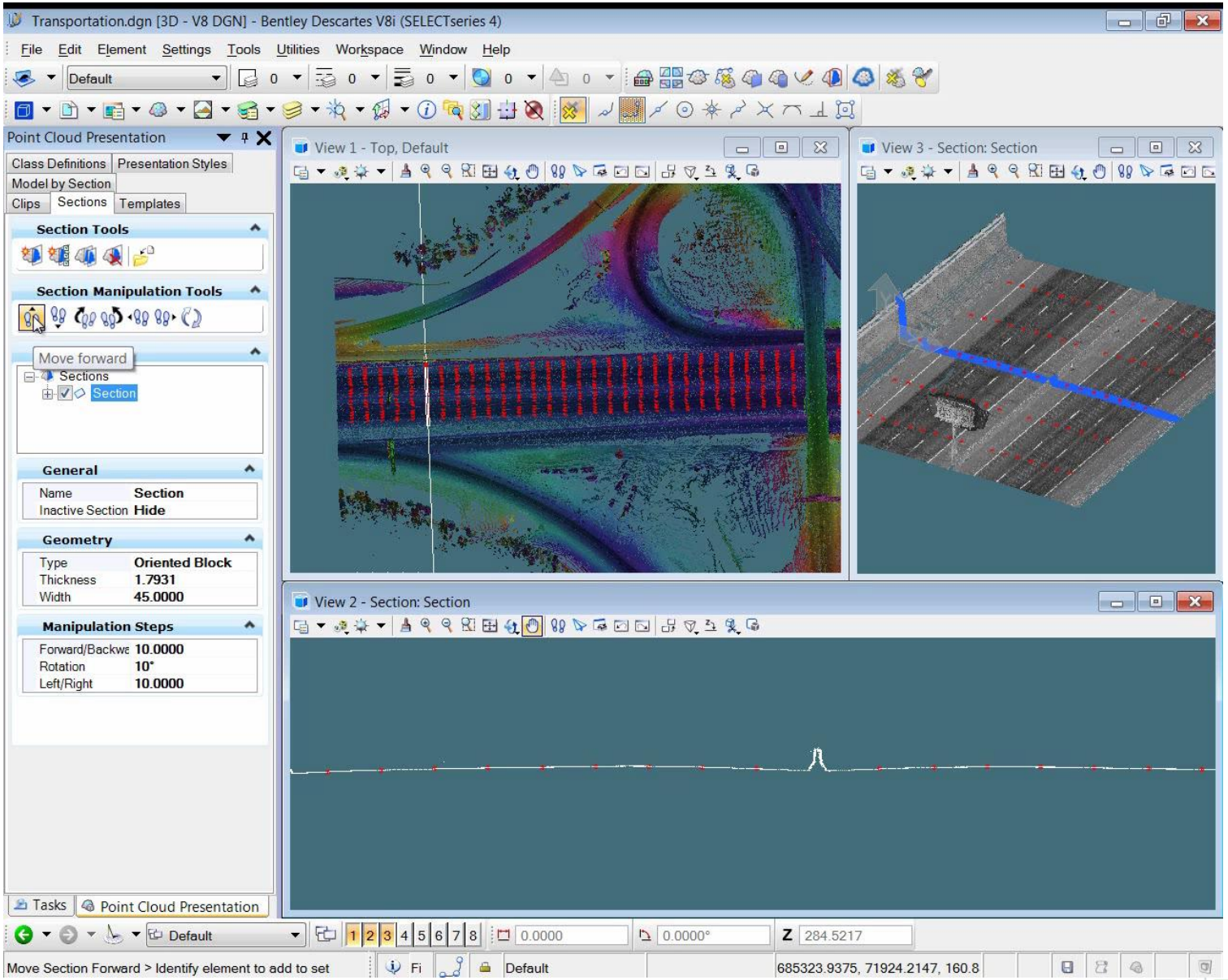
- Accurate, usable terrains require creation of 3D break lines





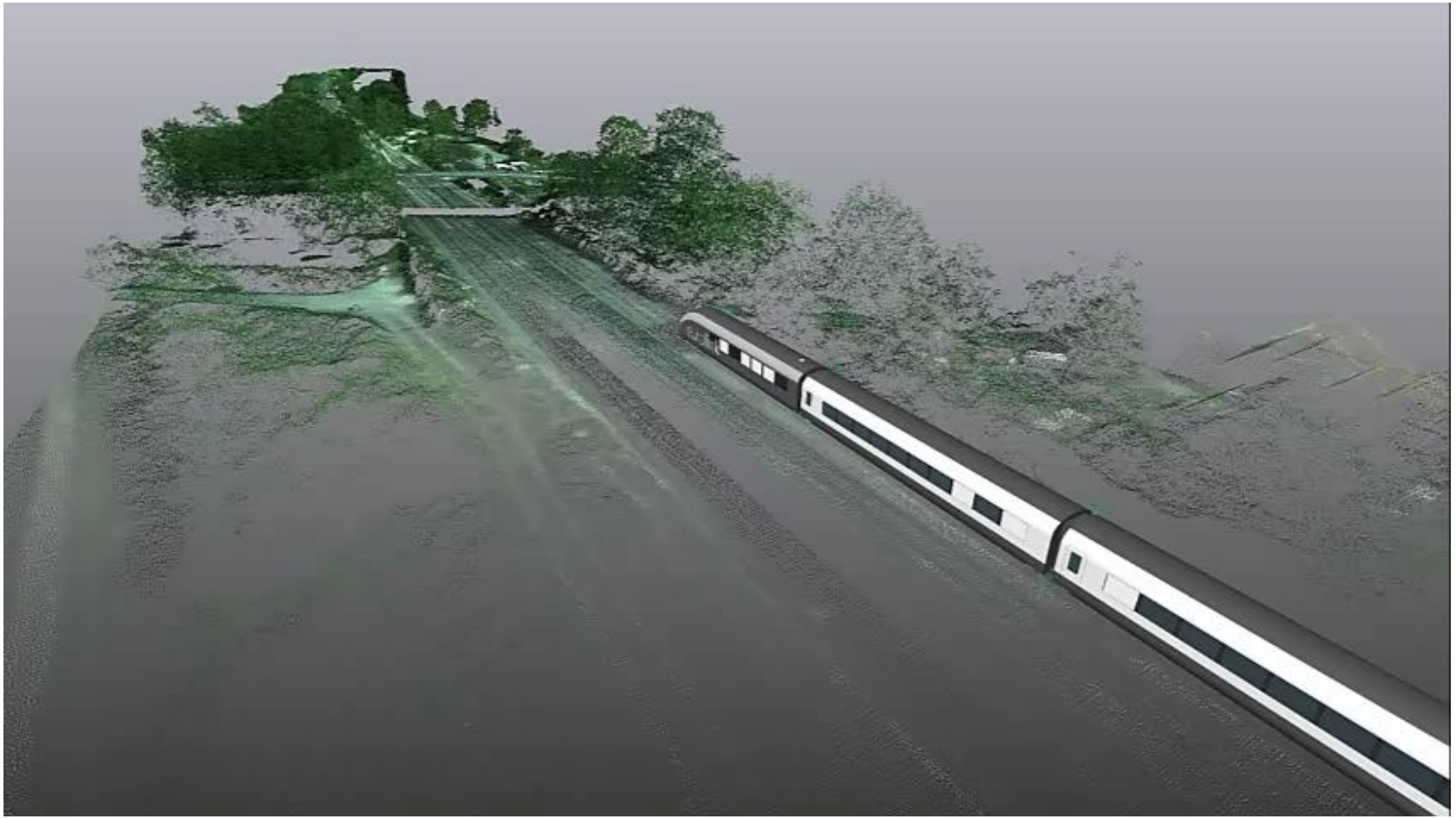


Advanced Processing: Descartes



Bentley Sustaining Infrastructure

Point-cloud Clash Detection

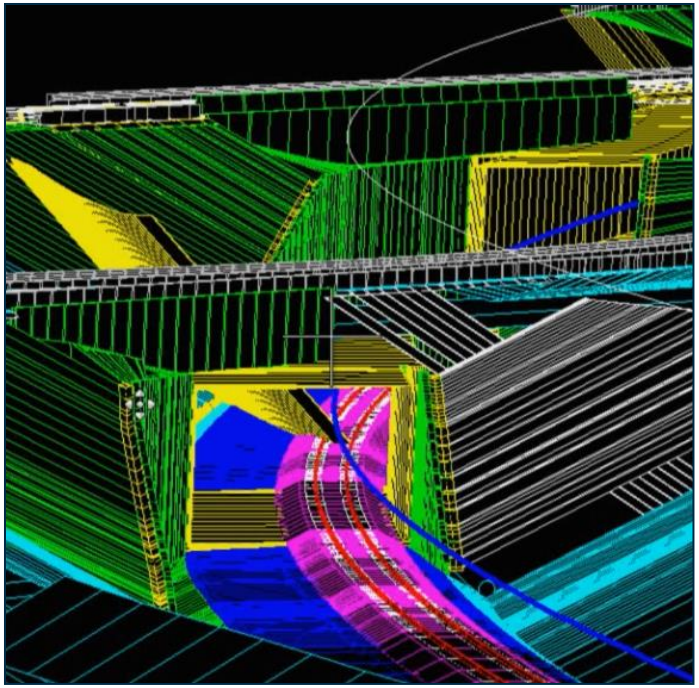


Point-cloud Differencing…

Bentley Sustaining Infrastructure

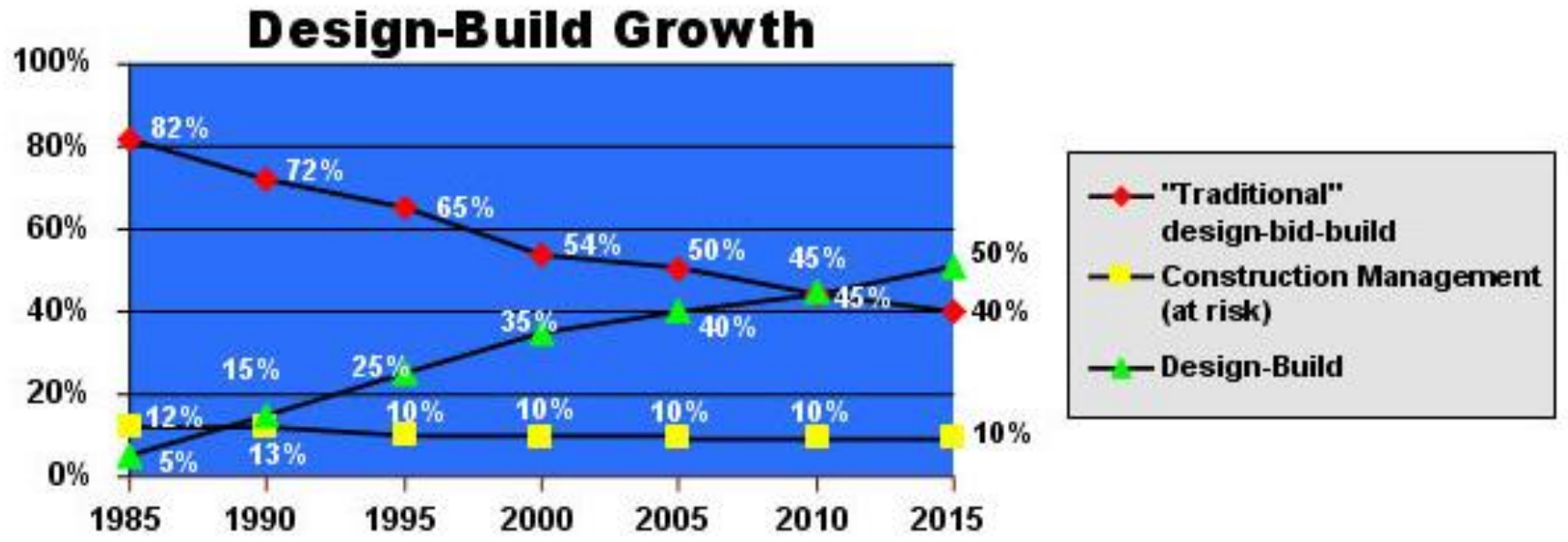
Business Drivers

- *Visualization*
- *Machine Control*
- *Design Review*
- *4D*
- *LIDAR / Point Cloud*
- *Alternate Contracting Processes*
- *Asset Management*



Alternate Contracting Processes

Alternate contracting processes have become more common including *Design Build, Construction Management General Contractor (CMGC) and Public/Private Partnerships (P3),* all of which attempt to change traditional workflows by compressing timelines, reducing errors and eliminating costly and unnecessary extra steps.



Source: Design-Build Institute of America

Bentley Sustaining Infrastructure

Business Drivers

- *Visualization*
- *Machine Control*
- *Design Review*
- *4D*
- *LIDAR / Point Clouds*
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- *Asset Management*

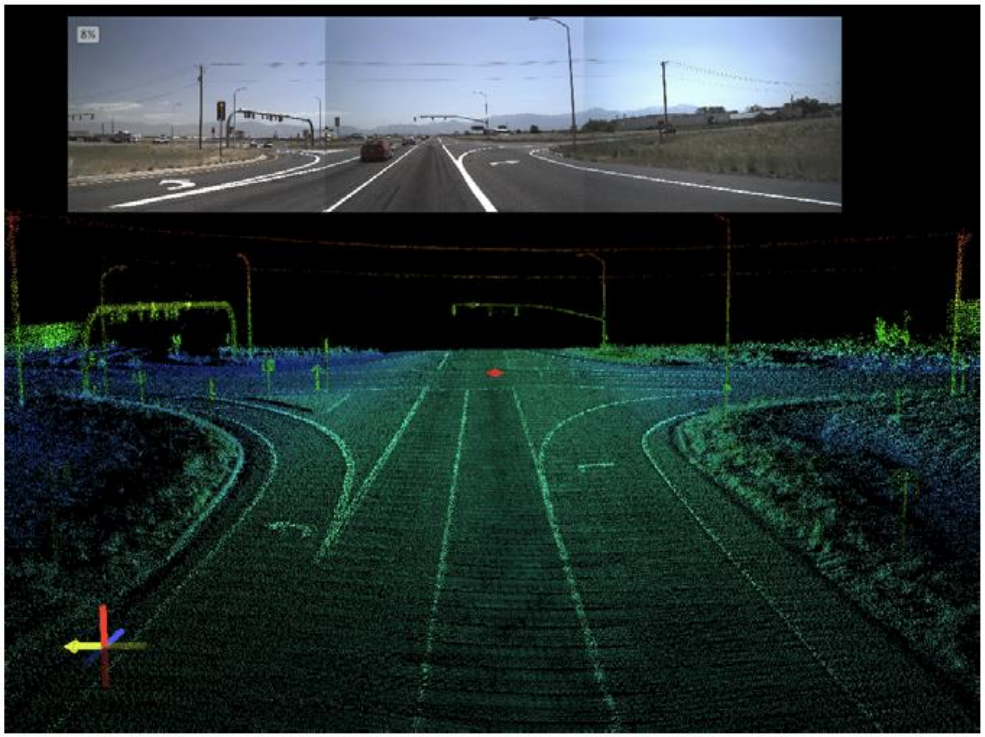
Business Drivers

- *Visualization*
- *Machine Control*
- *Design Review*
- *4D*
- *LIDAR / Point Clouds*
- *Alternate Contracting Processes*
- *Asset Management*

Bentley Sustaining Infrastructure

Asset Management

- Drainage Pipe / Culvert Inventories
- Pavement Management Systems
- Utilities into GIS Systems
- Traffic Management Systems (Signal Maintenance)
- Vertical Clearance for Permitting and Truck Routing
- Etc.



Bentley Sustaining Infrastructure

Business Drivers

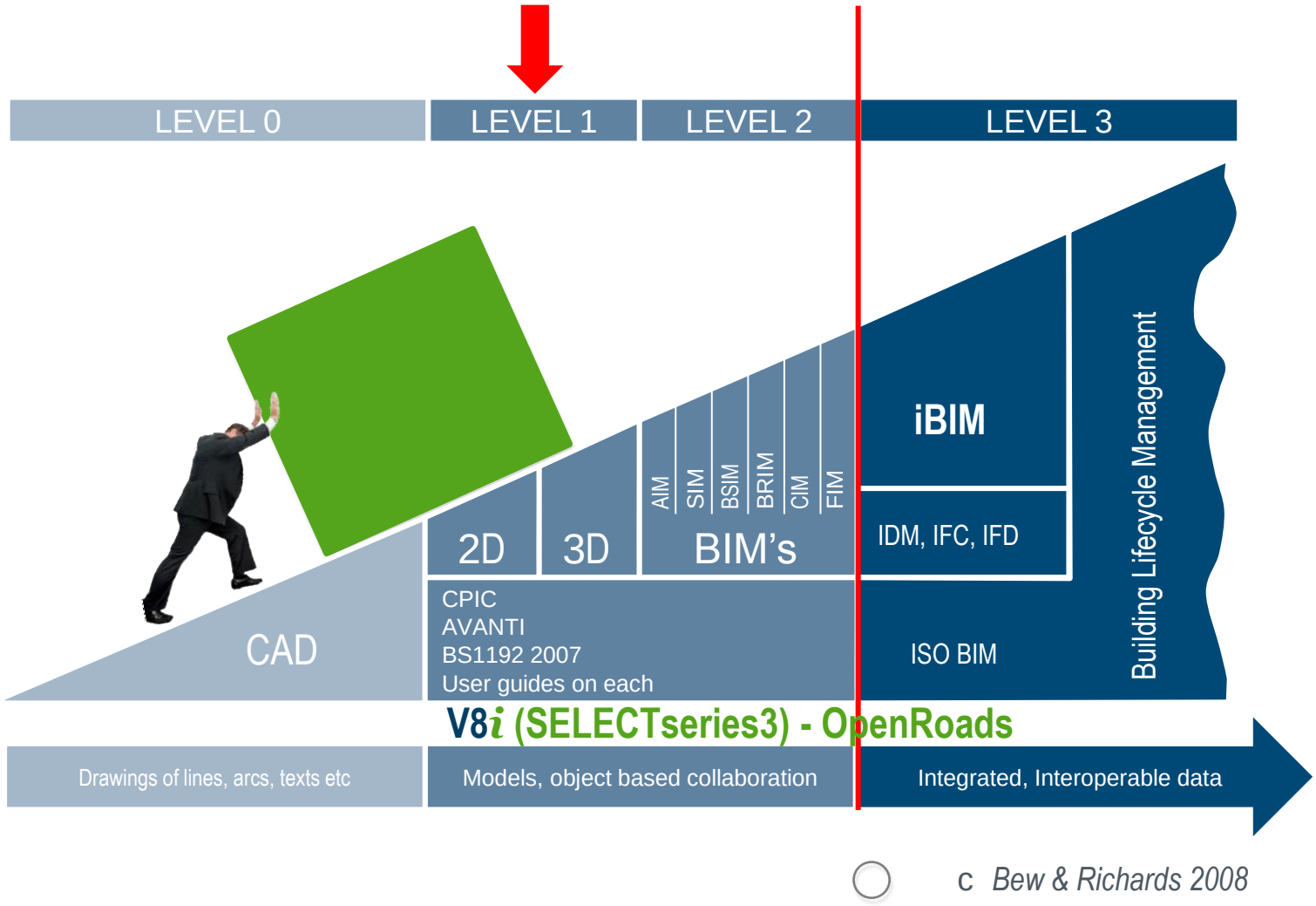
- *Visualization*
- *Machine Control*
- *Design Review*
- *4D*
- *LIDAR*
- *Alternate Contracting Processes*
- *Asset Management*

Bentley Sustaining Infrastructure

Key elements of BIM

- Culture (BS 1192)
- 2D and 3D data
- Federated data approach
- A collaborative work flow process
- Interoperability and data re-use
- Agreed data deliverables

BIM



c *Bew & Richards 2008*

Bentley Sustaining Infrastructure

Information Modeling Experience

'We've been doing BIM for 20 years – we just didn't know what to call it!'

Leif Malm, SWECO

Hallandsås "Live BIM" Railway Project
Sweco AB
Förslöv to Båstad, Sweden
View Project

NW 62nd Avenue Improvements
Foth Infrastructure & Environment, LLC
Johnston, Iowa, United States
View Project

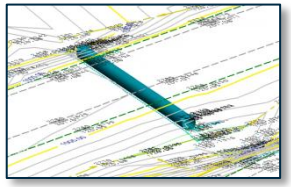
Fuller Road and Washington Avenue
Creighton Manning Engineering
Albany, New York, United States
View Project

Airport Link, Northern Busway (Windsor to Kedron) Upgrade
Parson Brinckerhoff and Arup JV
Brisbane, Australia
View Project

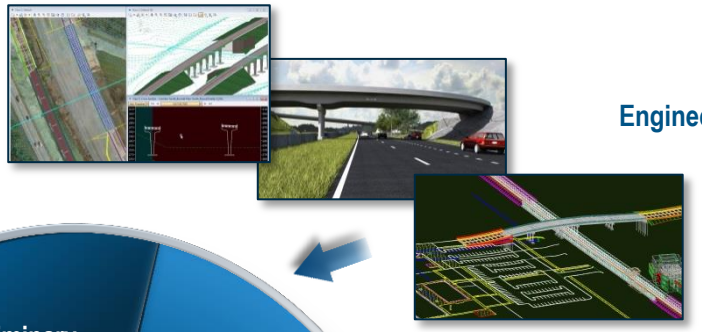
Humberto de Campos Street Extension
Sotepa Ltda.
Blumenau, Brazil
View Project

King's Cross Station Redevelopment
John McAslan + Partners
London, United Kingdom
View Project

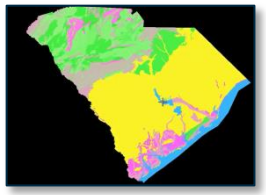
OpenRoads Technology Intelligent Model



Survey Data



Engineering Models

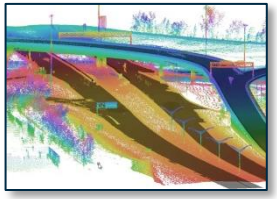


Geospatial Data

Industry Standards

OGC Open Geospatial Consortium
IAI
Open Design Alliance
FIATECH
i-model
DGN
DWG

Resurfacing



Point Clouds

Design & i-model

Automated Machine Guidance

Bentley Sustaining Infrastructure

The Bentley Advantage

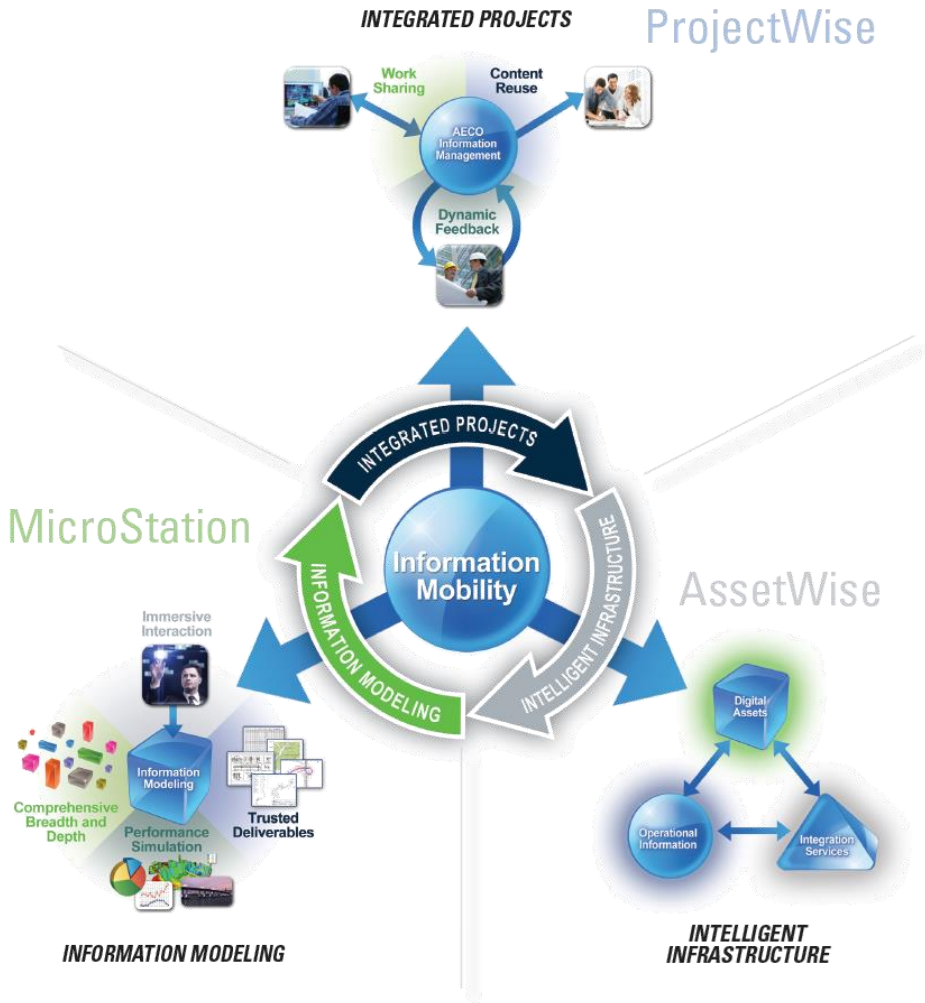
Information Modeling

through

Integrated Projects

for

Intelligent Infrastructure



Bentley Sustaining Infrastructure

Where are we going ?

Civil Technical Roadmap

- Released March 2013
  - SELECTseries 3 Civil (Road) products with common OpenRoads technology
    - InRoads, GEOPAK, and MXROAD
    - Power Civil for Country regionalized versions ongoing
    - Power Civil for Country translated versions ongoing

Bentley Sustaining Infrastructure

Civil Technical Roadmap – Short term

- Planned
  - SELECTseries 3 Maintenance Release (Road) products
  - Enhancements / Fixes for Early OpenRoads adopters
    - DTM
    - Geometry
    - Modelling
  - Install SUE (Subsurface Utilities Engineering)
  - Install Descartes

Civil Technical Roadmap

- Planned
  - SELECTseries 3 Maintenance Release (Road) products
  - **Enhancements / Fixes for Early OpenRoads adopters**
    - **DTM**
    - **Geometry**
    - **Modelling**
  - Install SUE (Subsurface Utilities Engineering)
  - Install Descartes

SELECTseries 3 Maintenance Release - DTM Enhancements

Highlights

- Graphical Filters improvements
- DTM linestring thinning

SELECTseries 3 Maintenance Release - Geometry

Highlights

- Productivity improvements
- Copy options

SELECTseries 3 Maintenance Release - Modeling

Highlights

- Corridor Colour Coding for out of sync
- Surface Templates: Create 3D linear elements S-97141

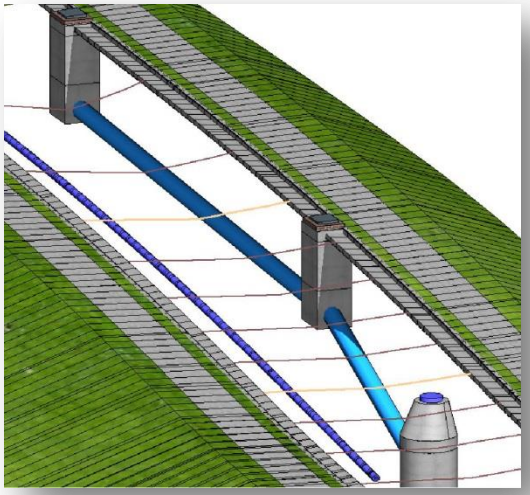
SELECTseries 3 Maintenance Release - Miscellaneous

- Import GEOMACO reports (ASC) directly into ALG
- Include Cell/Block in Cross Section Application Add in (620)
- Import InRoads ALG improvements – HA>Event points from graphics
- Evaluation>Profile>Annotate Profile>Horizontal Events behavior Change
- Added sight distance improvements to aid with European requirements
- File Fence export to native DGN
  - Export to DWG

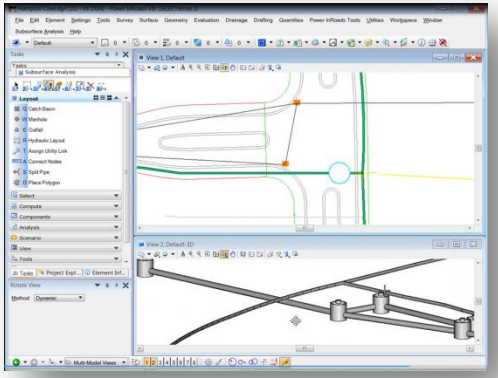
Civil Technical Roadmap

- Planned
  - SELECTseries 3 Maintenance Release (Road) products
  - Enhancements / Fixes for Early OpenRoads adopters
    - DTM
    - Geometry
    - Modelling
  - **Install SUE (Subsurface Utilities Engineering)**
  - Install Descartes

SELECTseries 3 Maintenance Release - SUE (Subsurface Utilities) – What is it?



- Consumes civil design artifacts
  - Geometry
  - Terrain Models
  - Corridors
- Provides 2D and 3D design and analysis tools for all underground utilities.
  - Storm drainage
  - Sanitary sewer
  - Force mains
  - Waterlines
  - Ducts, piping and cables of all sorts.



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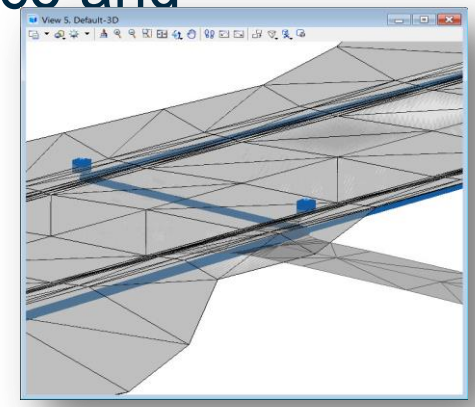
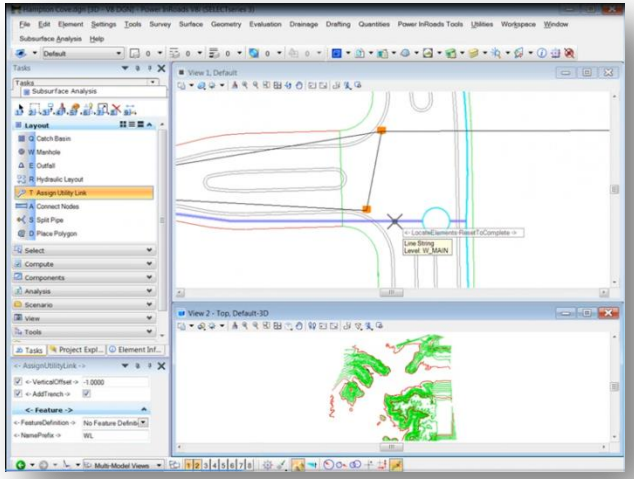
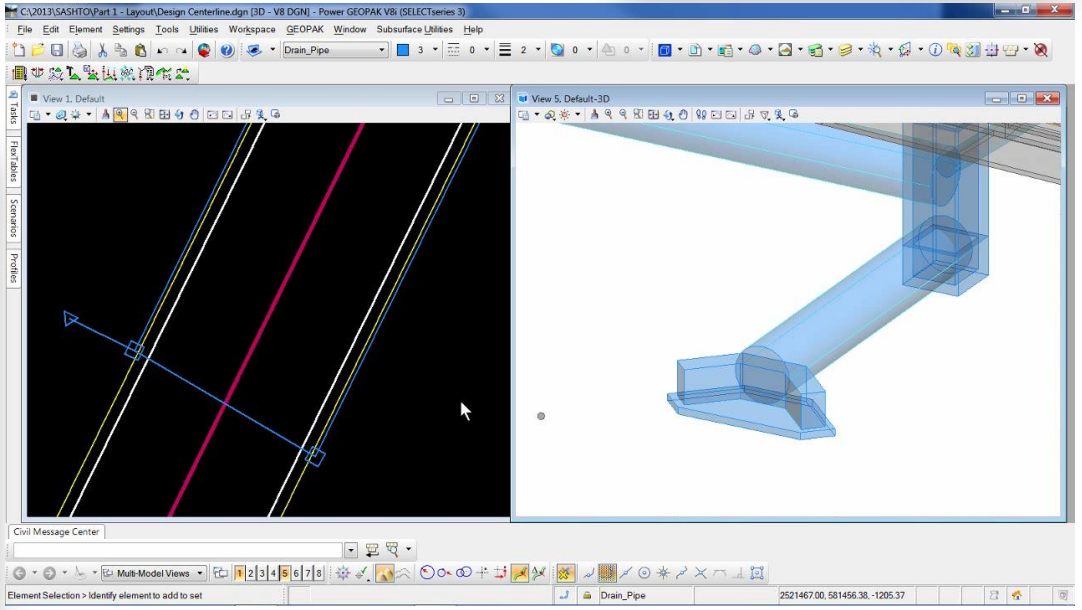
SELECTseries 3 Maintenance Release - SUE (Subsurface Utilities) – What is it?

- Powered by OpenRoads the latest civil interface and geometric data store technology.
  - Heads up and Interactive interface
  - DGN integration of utility feature objects
  - Dynamically updateable model
  - Preserve design intent
  - Includes Bentley Map







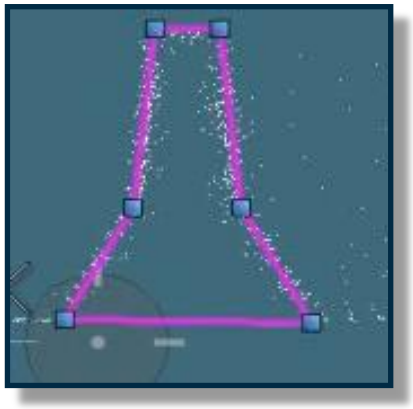
Bentley Sustaining Infrastructure

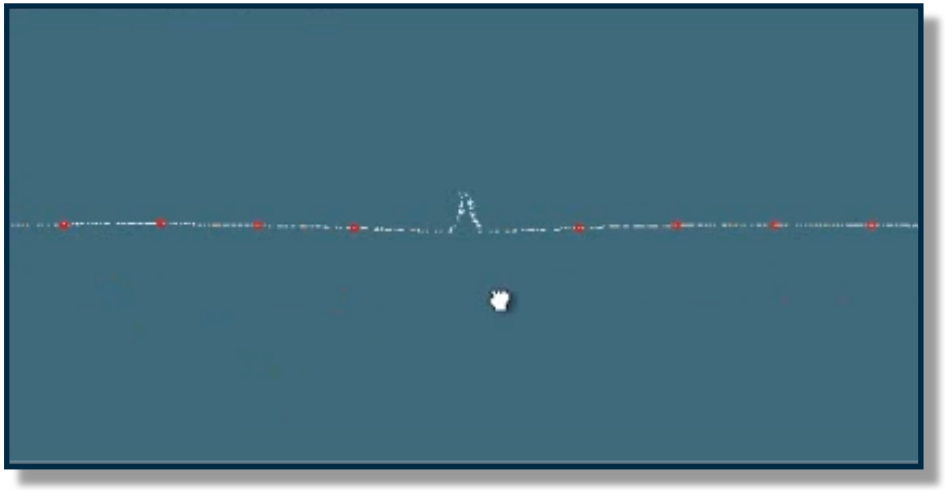
Civil Technical Roadmap

- Planned
  - SELECTseries 3 Maintenance Release (Road) products
  - Enhancements / Fixes for Early OpenRoads adopters
    - DTM
    - Geometry
    - Modelling
  - Install SUE (Subsurface Utilities Engineering)
  - **Install Descartes**

SELECTseries 3 Maintenance Release - Descarte – Why ?

- **Facilitate access to**
  - Advanced point-cloud data processing
    - Break line extraction
    - Cross section extraction for extrusion of solids
  - Manipulation of scalable digital terrain models (DTMs)
  - Advanced raster processing
  - Processing of legacy documentation
- **Note requires a Descarte License**





Bentley Sustaining Infrastructure

Civil Technical Roadmap – Short term

- Planned
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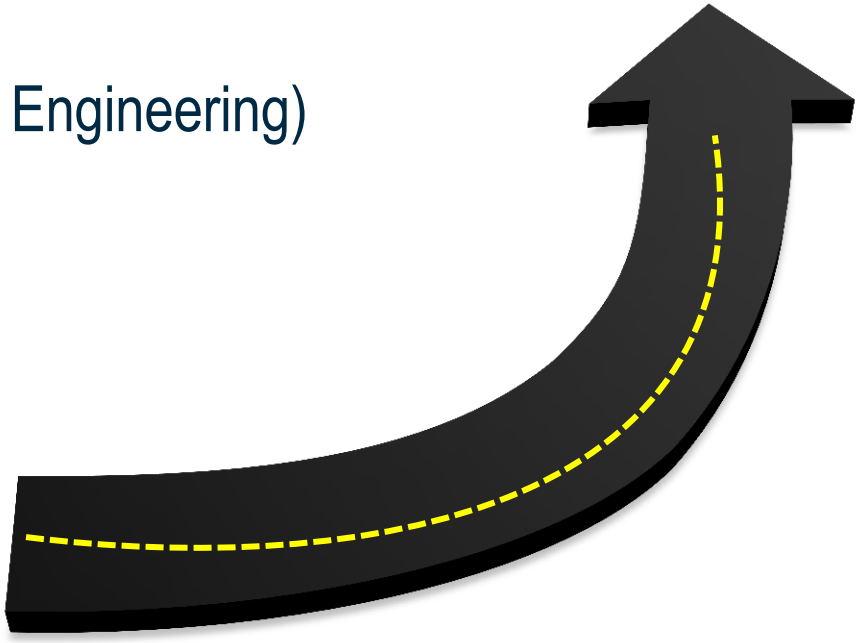
    - Modelling
  - Install SUE (Subsurface Utilities Engineering)
  - Install Descartes

No Earlier than Q2 2014



Bentley Sustaining Infrastructure

Civil Technical Roadmap – Short term

- Planned
  - SELECTseries 2 Maintenance Release (Rail) products
  - Bentley Rail Track Enhancements / Fixes
    - 100 + Defects already implemented
    - Additional ~24 Scheduled in the backlog
    - diamond crossing placement on curves
    - improvements to transitional turnout placement
    - Regionalized improvements to profile / cant annotation standards
  - Bentley Overhead Line Enhancements / Fixes
  - Adoption of latest Power Platform technology and Bentley Map

SELECTseries 2 Maintenance Release Rail products Bentley Rail Track Enhancements / Fixes "Work in Process" Enhancements

- Regression Analysis
  - Copy regression points from one alignment to another (i.e. other scenario workflow)
  - Additional annotation
  - Added Vertical minimum acceptable slewSELECTseries 2 Maintenance Release (Rail) products
  - Bentley Rail Track Enhancements / Fixes
- Turnouts
  - Additional display options (i.e. turnout as a cell)
  - XML'ed the turnout library (optional)
    - Will be used going forward

SELECTseries 2 Maintenance Release Rail products
Bentley Rail Track Enhancements / Fixes
"Work in Process" Enhancements

- Drawing Production
  - Addition Options
    - View Horizontal & Vertical Regression
    - View Stationing
    - Profile Annotation
    - Switch Height Plan
    - Various country specific add-ins (i.e. UK, Italy)
- Design Checks
  - Additional country specific checks
    - French Rail, TSI & Korea

SELECTseries 2 Maintenance Release Rail products Bentley Rail Track Enhancements / Fixes

- Lots of other small requests from various customers in various countries
  - Examples

Design Checks: French Railway Design Check Standards
Design Checks: Korean
Design Checks: TSI
Design Checks: TSI Design Checks
Design Checks: Update Danish Rail to latest standards
Design: Add support for Westrail Spiral
Design: Calculate Spirals by Ratio of Lengths
Design: Modify Vertical Alignment on horizontal change
Design: Stationing

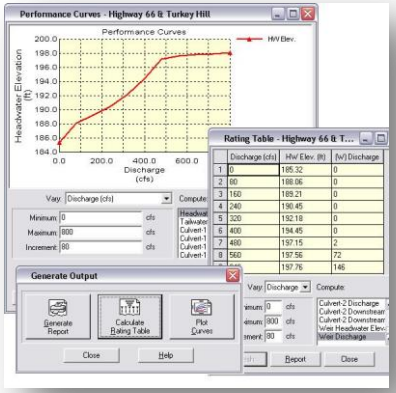
Next Major Civil Release

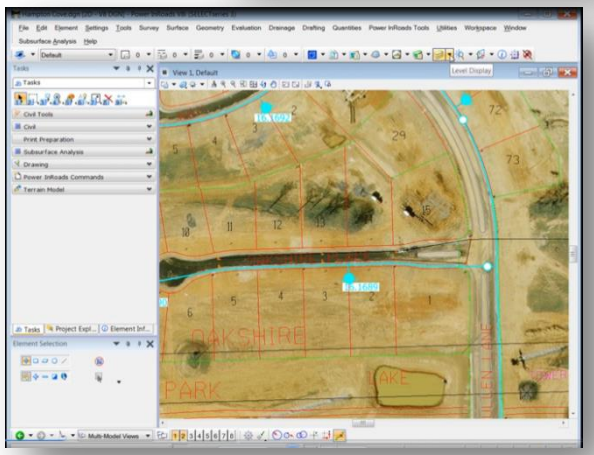
- Consolidated Civil Products based on OpenRoads technology
  - 64bit application
  - InRoads, GEOPAK, MX consolidated to **single** Road product
  - Bentley Rail Track and Overhead Line migrate to OpenRoads platform
  - Enhanced modelling tools
  - Enhanced reporting / quantity tools

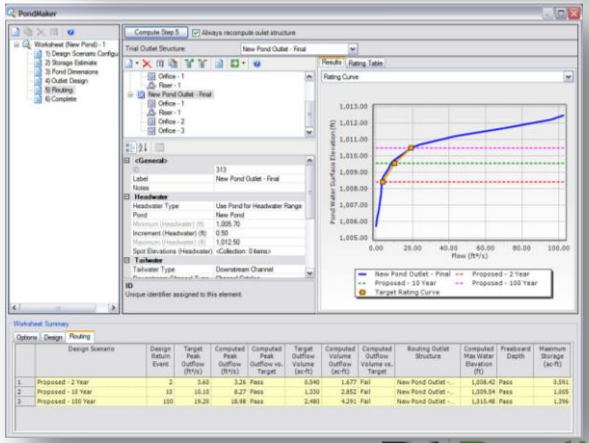
Bentley Sustaining Infrastructure

Next Major Release – Subsurface Utilities SUDA – Why?

- Add to SUE analysis capability
- Consolidate on Haestad H&H Analysis engines:
  - Industry standard with more than 25 years behind simulation engines
  - Engines for storm, water, sanitary, gas (in syndication now)
  - Conventional design with advanced dynamic wave and transient analysis
  - Well rationalized and open data models with enterprise data exchange built-in
  - Customizable and extensible
  - Feature rich application framework for mapping, modeling, and simulation







Bentley Sustaining Infrastructure

Next Major Release – Other considerations / Enhancements

- Bentley Connect
- Mobile
- Business data
- Asset data

Bentley
Sustaining Infrastructure

Thank You!