NORDIC CIVIL 2009

Bentley Software
Civil Development

Mike Wilson
Director of Development

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Bentley
Sustaining Infrastructure

Today, Tomorrow

In order to better understand where we are going tomorrow let's take a brief look at today

Today

V8i

Tomorrow

V8i

SELECTseries 1

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Today

- The V8*i* Release
  - Synchronized release across Bentley
  - GEOPAK/InRoads/MXROAD
  - November 18th, 2008

Bentley GEOPAK V8*i*

MicroStation V8*i*

Bentley InRoads V8*i*

ProjectWise V8*i*

Bentley MXROAD V8*i*

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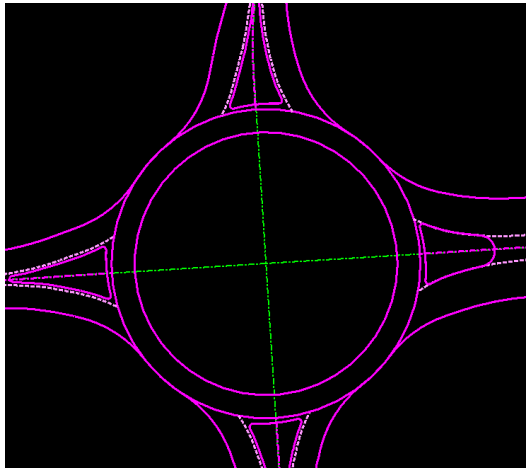
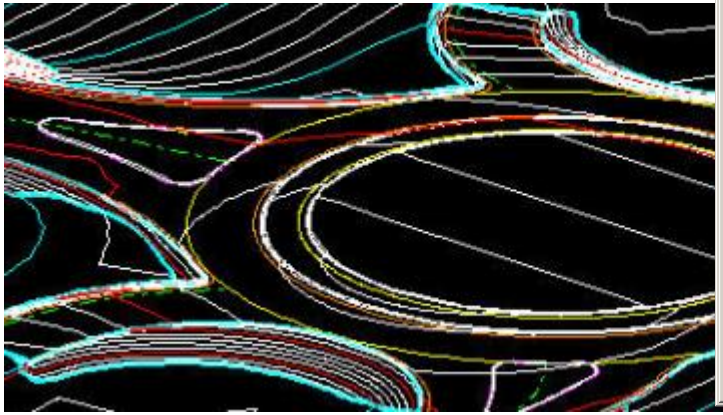
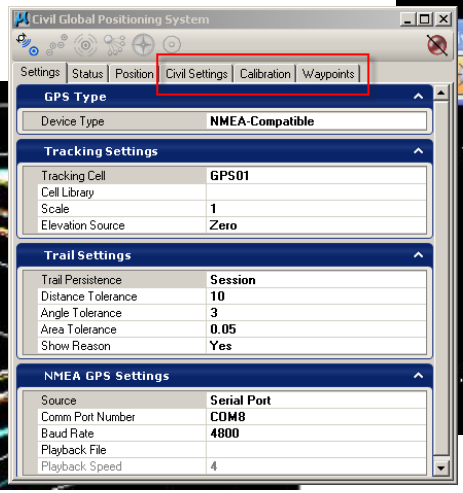
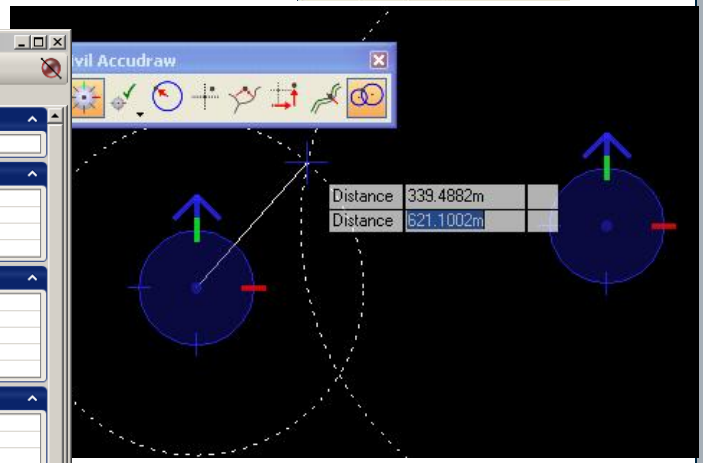
V8*i* Highlights - Civil Platform

- Roundabouts
- Civil Accudraw
  - Distance /Direction
  - Distance/Distance
  - Station/Offset
- Civil Track GPS









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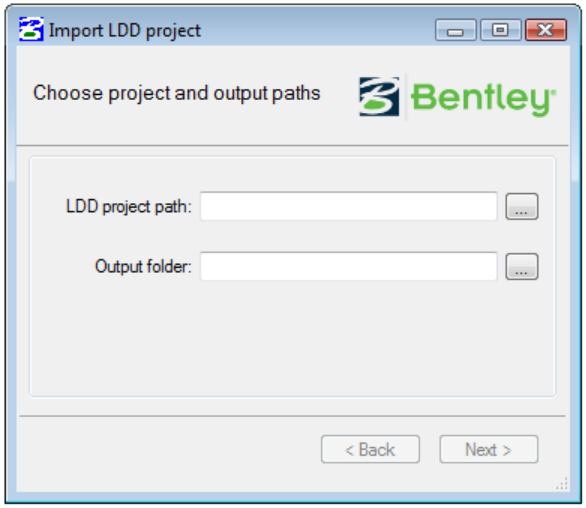
V8*i* Highlights – LDD Import

- Land Development Desktop
- Standalone program
  - UILauncher.exe
  - Located in the BIN directory
- Translates a LDD project into a LandXML file
- Import via the LandXML Import
  - InRoads
  - GEOPAK
  - MXROAD



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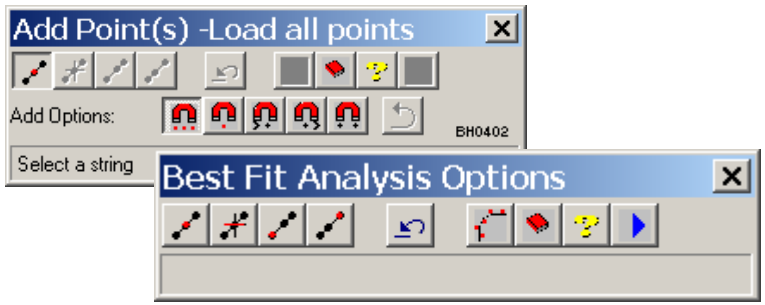
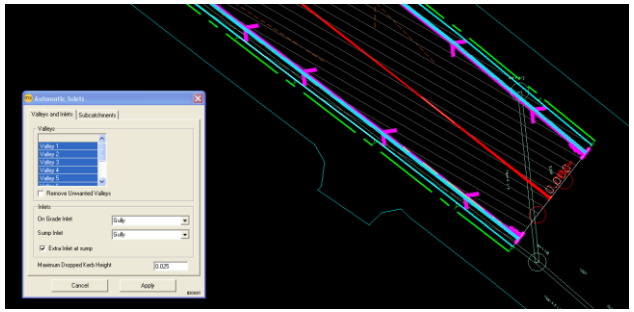
V8*i* Highlights

Bentley MXROAD V8*i*

- Integrated Civil Platform tools
- Increased model performance
- Improved UX workflows
- Innovative design solutions
  - Numerous enhancements to a variety of areas such as drainage and alignments
- Numerous fixes and minor enhancements





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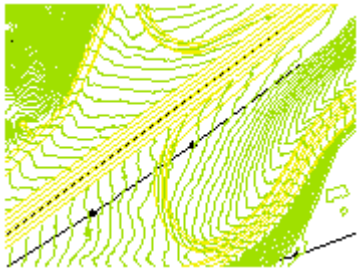
V8*i* Highlights

Bentley InRoads V8*i*



- Integrated Civil Platform Tools
- Performance in a variety of areas
  - 3GB/Features/Triangles(mesh)/Solids
- Surface Editing improvements
- Geometry UX and command improvements
- Profile and Cross Section additions
- Vertical Alignment Healing
- ProjectWise V8*i* support
- Numerous fixes and minor enhancements

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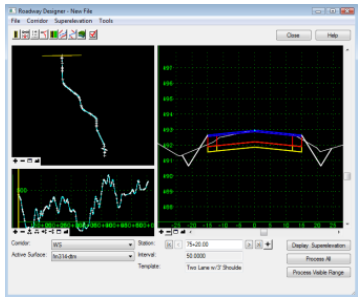
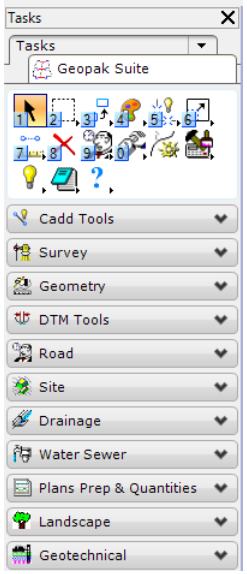
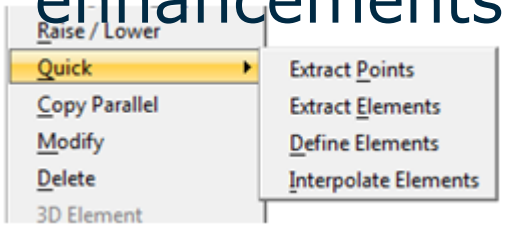
V8*i* Highlights

Bentley GEOPAK V8*i*



- Integrated Civil Platform Tools
- Task Navigation Menus
- Improvements to Plan/Profile Sheet composition
- Corridor Modeling Enhancements
- Improved Roadway Designer Integration
- MicroStation Annotation Scale support
- Site Modeler Quick Extract Tools
- Numerous fixes and minor enhancements





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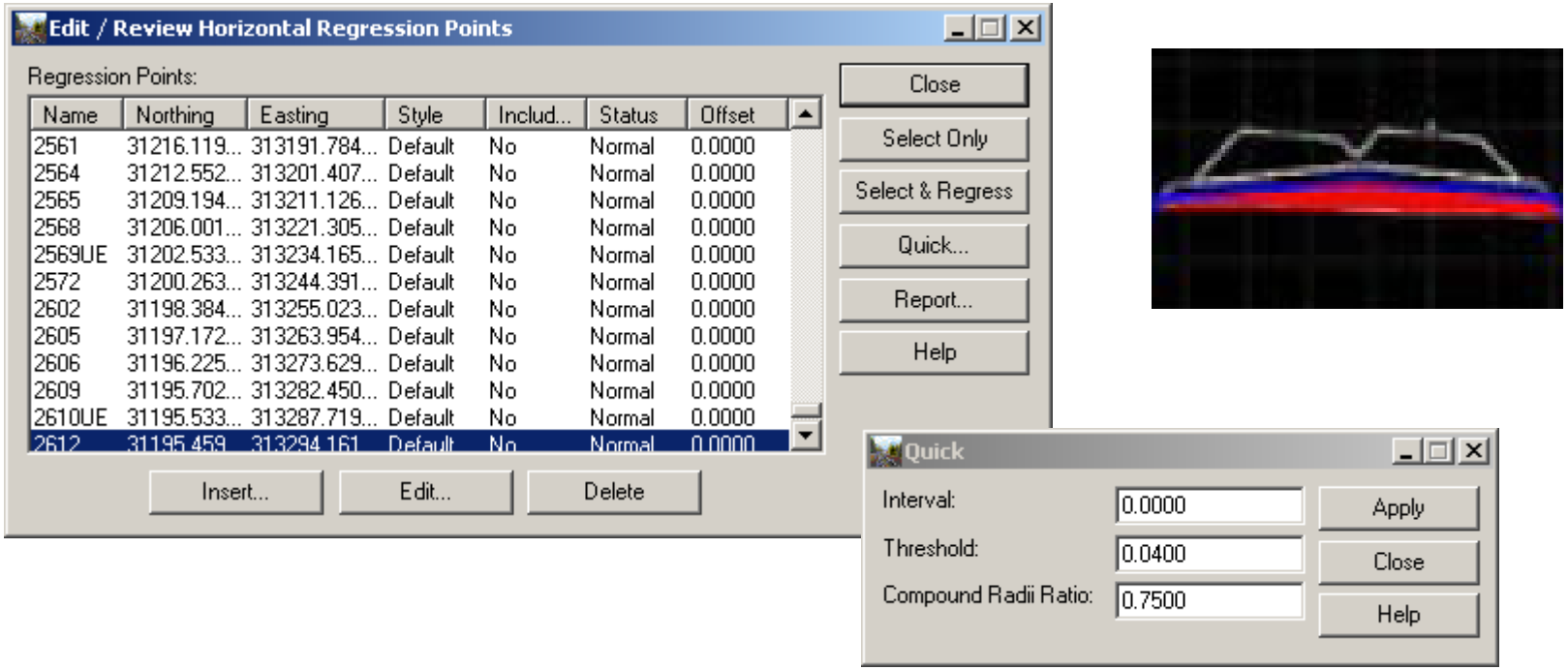
V8*i* Highlights

Bentley Rail Track V8*i*

- Quick Regression
  - A quicker / one step regression solution
- Essentially inherits all InRoads items



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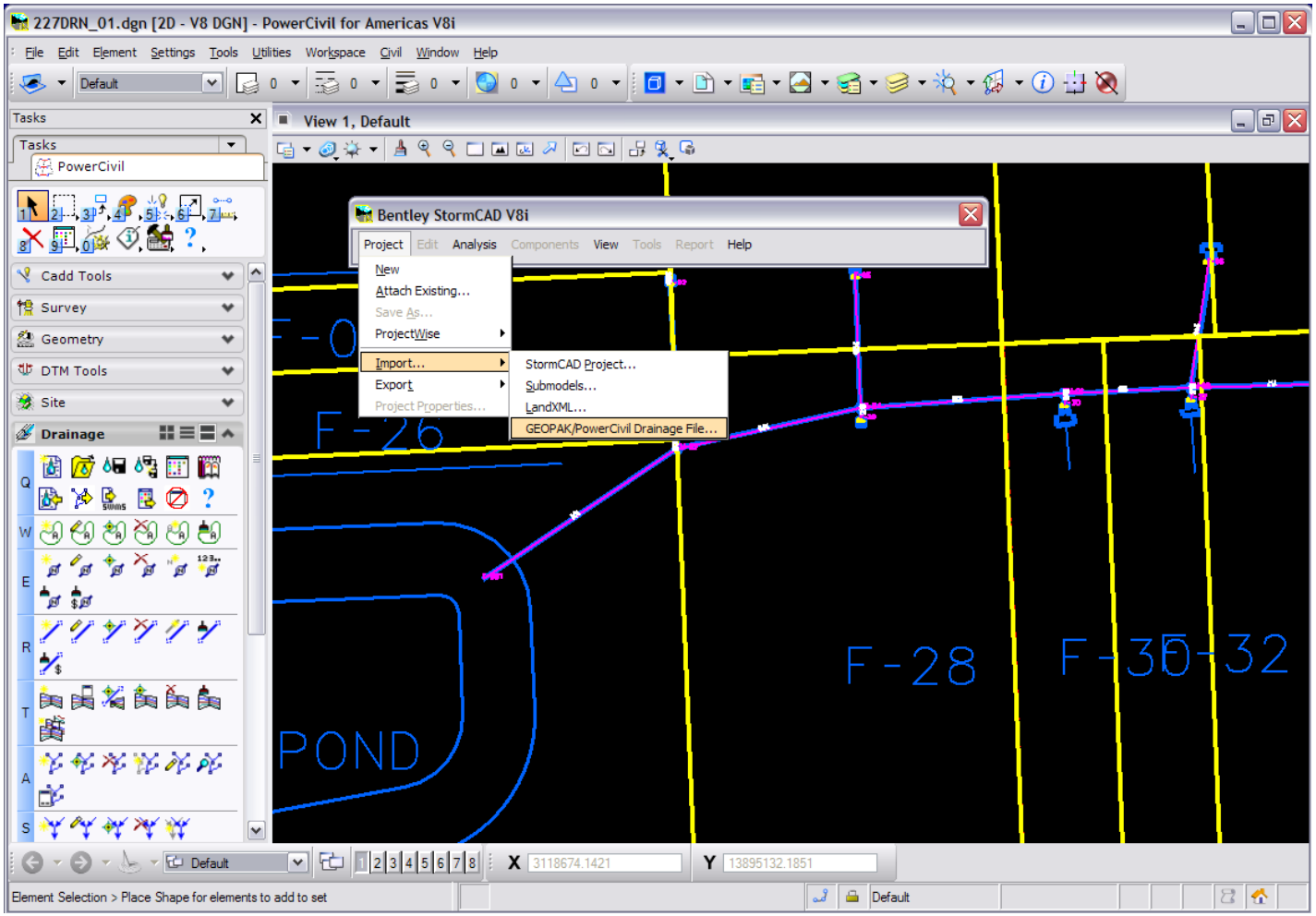
V8*i* Highlights - Haestad Integration



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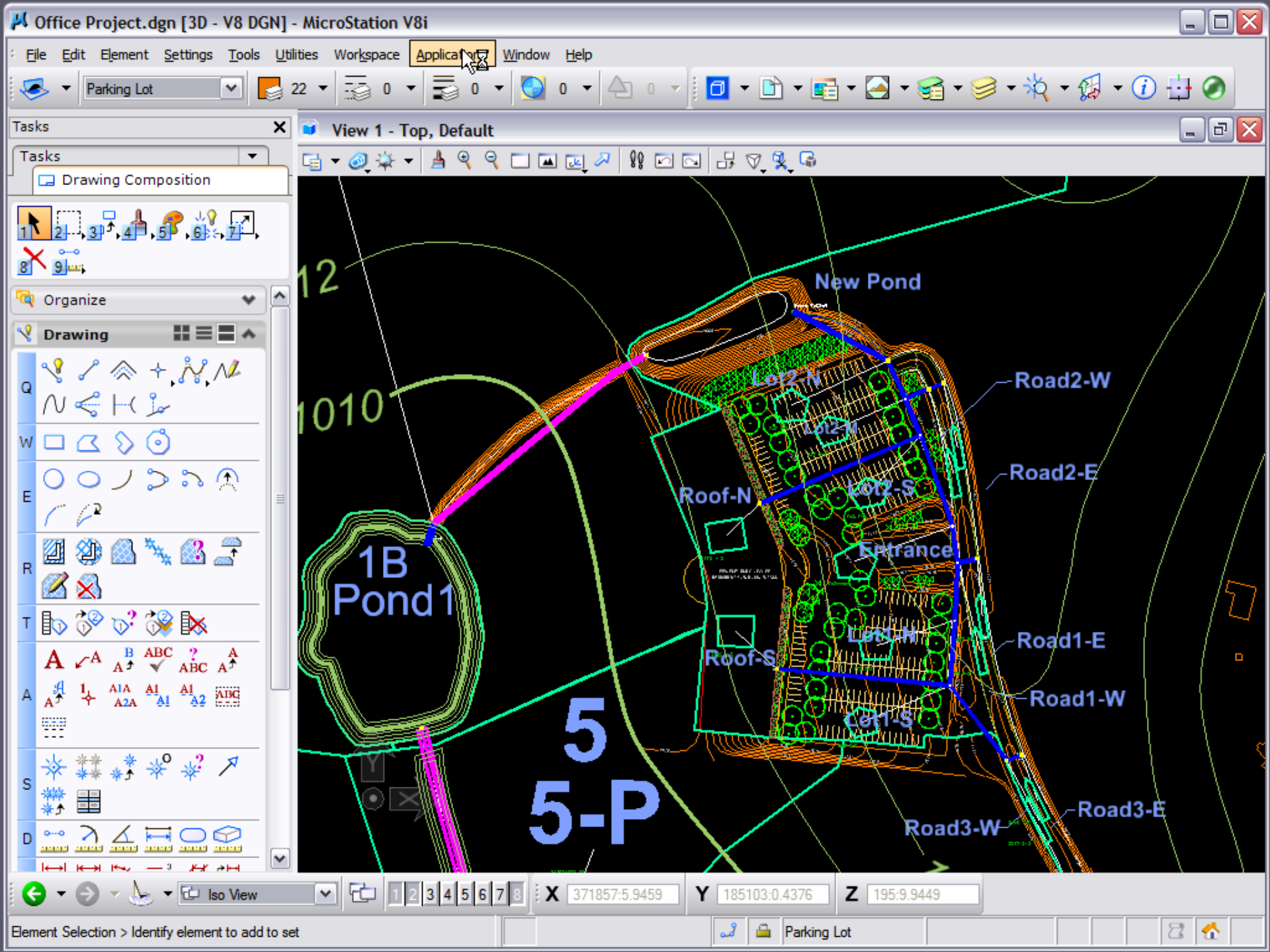
Office Project.dgn [3D - V8 DGN] - MicroStation V8i
File Edit Element Settings Tools Utilities Workspace Application Window Help
Parking Lot
Tasks
Drawing Composition
Organize
Drawing
View 1 - Top, Default
New Pond
Road2-W
Road2-E
Lot2-N
Lot2-M
Lot2-S
Roof-N
Entrance
Lot1-N
Road1-E
Roof-S
Road1-W
Lot1-S
1B
Pond1
5
5-P
Road3-E
Road3-W
Iso View
X 371857:5.9459
Y 185103:0.4376
Z 195:9.9449
Element Selection > Identify element to add to set
Parking Lot

Today

Everything discussed up to now is available today. Civil products were posted to SELECT Downloads on November 18th, 2008.

It's also important to note that we continue to fix and enhance all product lines

Let's take a deeper look at "today"

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Today

Today is not completely about fixes, enhancements, new commands, etc.

It's much, much more…

It's about evolution,
integration,
interoperability,
increased productivity,
reuse, comprehensive, reliable
and
it's about Modeling.
Let's take a look a further look at tomorrow…

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Tomorrow...

MicroStation V8i SELECTseries 1

Bentley GEOPAK V8i SELECTseries 1

Why Tomorrow?

Bentley MXROAD V8i SELECTseries 1

Bentley InRoads V8i SELECTseries 1

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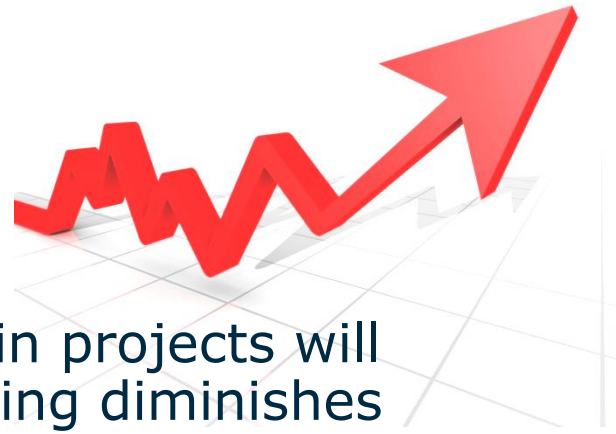
Business Trends



It's ALL about project delivery

- Design-Build and Design-Build-Maintain projects will become more the norm as public funding diminishes
- Sub-contracting by municipalities/local government to Engineering Consultants is increasing. In house review and management
- Driven by construction contractors, machine control is gaining popularity and requires a full 3D Model
- Ageing Infrastructure can't be ignored. It is about 3R Design Capabilities (Resurface, Reconstruction, Rehabilitation)

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Technology Trends

- Inevitable shift to Machine Control and Construction Automation
- Traditional Design-Bid-Build linear paper-based workflows are quickly being superseded by dynamic, real-time digitally-based best practices

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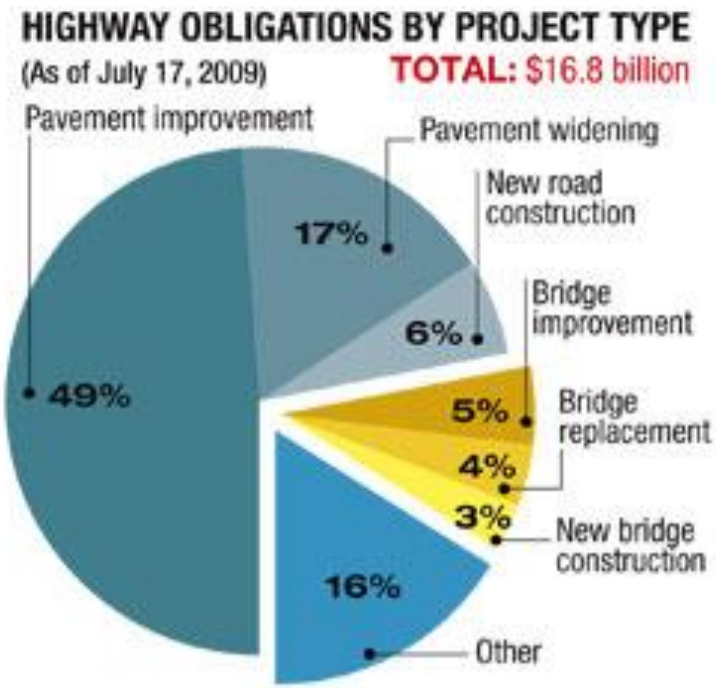
Overlay and Rehabilitation

- Makes up approximately 82% of projects currently undertaken by DOTs.



Source: GAO analysis of FHWA data
Source: Engineering News Record

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Overlay and Rehabilitation

"State highway agencies have taken the term "shovel-ready" to heart, so far devoting nearly half of the American Recovery and Reinvestment Act dollars to pavement improvements, according to a recent report from the U.S Government Accountability Office."

Source: Engineering News Record
Article: **Repaving Projects Dominate ARRA Highway Funding**
08/12/2009
By Tom Ichniowski

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Tomorrow...

MicroStation V8i SELECTseries 1

ProjectWise V8i SELECTseries 1

What makes up Tomorrow?

Bentley GEOPAK V8i SELECTseries 1

Bentley InRoads V8i SELECTseries 1

Bentley MXROAD V8i SELECTseries 1

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V8*i* (SELECTseries 1)

For V8*i* (SELECTseries 1) Bentley Map will be delivered with:

- GEOPAK Civil Engineering Suite
- InRoads Suite
- MXROAD Suite

Bentley Map™ V8*i*
SELECTseries 1

- Each of the above will include all of Bentley Map and will not require an additional license

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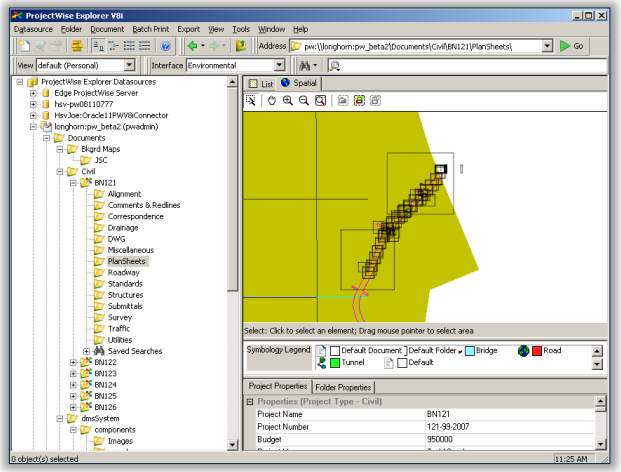
V8*i* (SELECTseries 1)

Integration of Bentley Map functionality

Powerful GIS capabilities in a Civil context

Add geospatial and GIS content and functionality to your current environment

- Geographic search by location



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V8*i* (SELECTseries 1)

Integration of Bentley Map functionality

Powerful GIS capabilities in a Civil context

- Assemble, search, view and edit geospatial/non-geospatial data from multiple sources
  - ESRI Shape files (SHP)
  - Digital Elevation Models (DEM)
  - Digital Orthophoto Quadrangle (DOQ)
  - Digital Raster Graphics (DRG)
- ***Geocoordination***

  Re-project disparate coordinate systems

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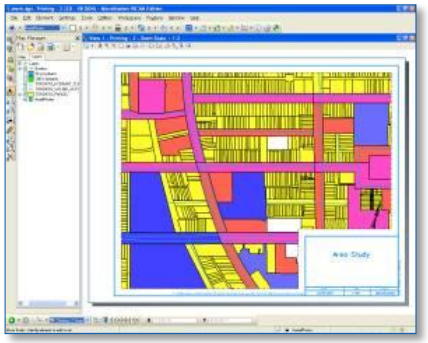
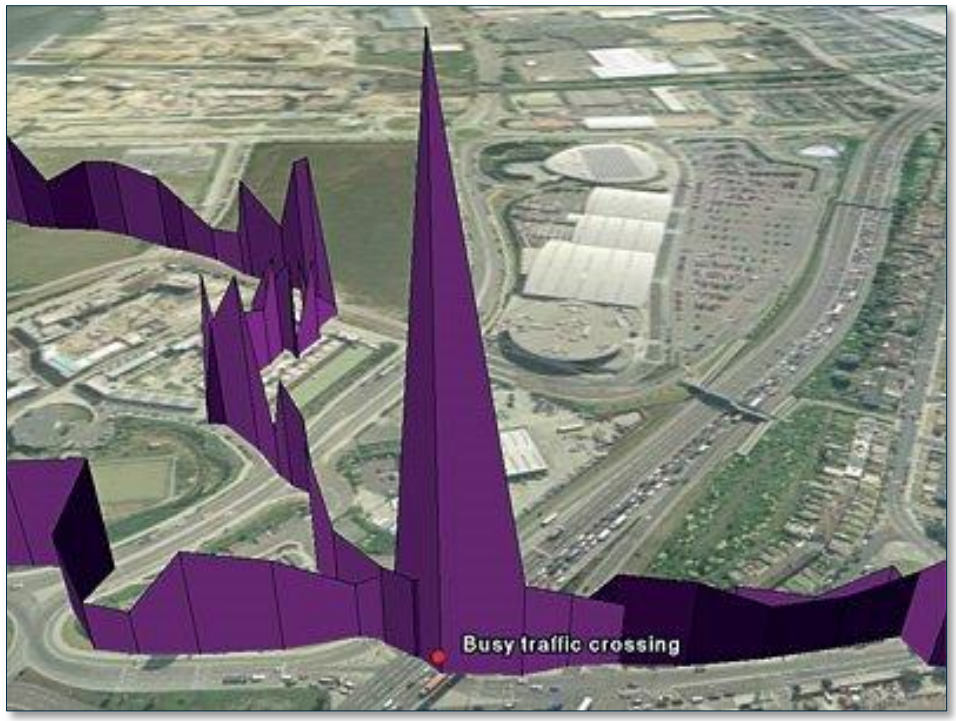
V8*i* (SELECTseries 1)

Integration of Bentley Map functionality

powerful GIS capabilities in a Civil context

- Produce thematic maps and reports
- Export design data to GIS
- *Map Manager* easy-to-use mapping





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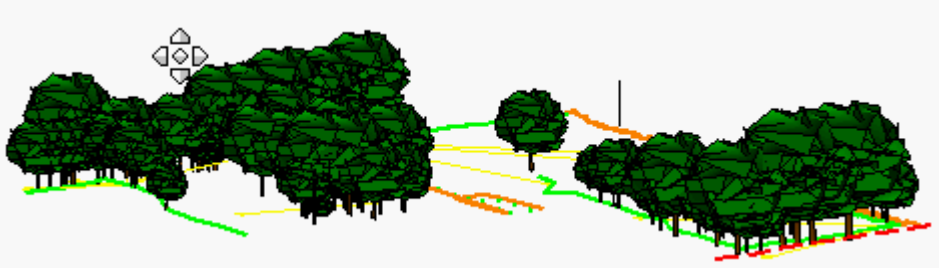
V8*i* (SELECTseries 1) – Data Acquisition

- New tools that allows a user to compile data from disparate sources into a coherent model to feed Design and collaboration processes
- Utilizes a user friendly, intuitive interface
- Dynamic and Graphically oriented import of variety of formats including:
  - Raw field survey data
  - Aerial Mapping Surface
  - LiDAR
  - Raster DEM
  - LDD, CAiCE, XML 1.2
  - In other words, data formats which are directly consumed by the design workflow.



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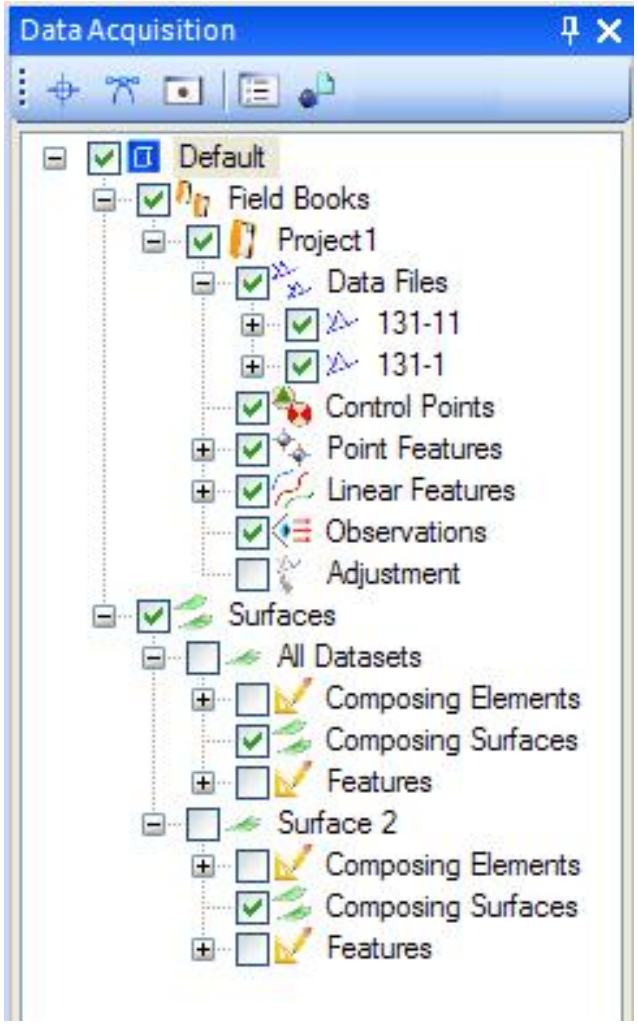
V8*i* (SELECTseries 1) – Data Acquisition

- Improved User Experience
  - More efficient
  - Quicker
  - Easier to learn
  - Windows "like"
- DGN Data Store
  - No external files
  - UNDO/REDO
- Automated Terrain Models
- Preserves Investment in Feature Tables



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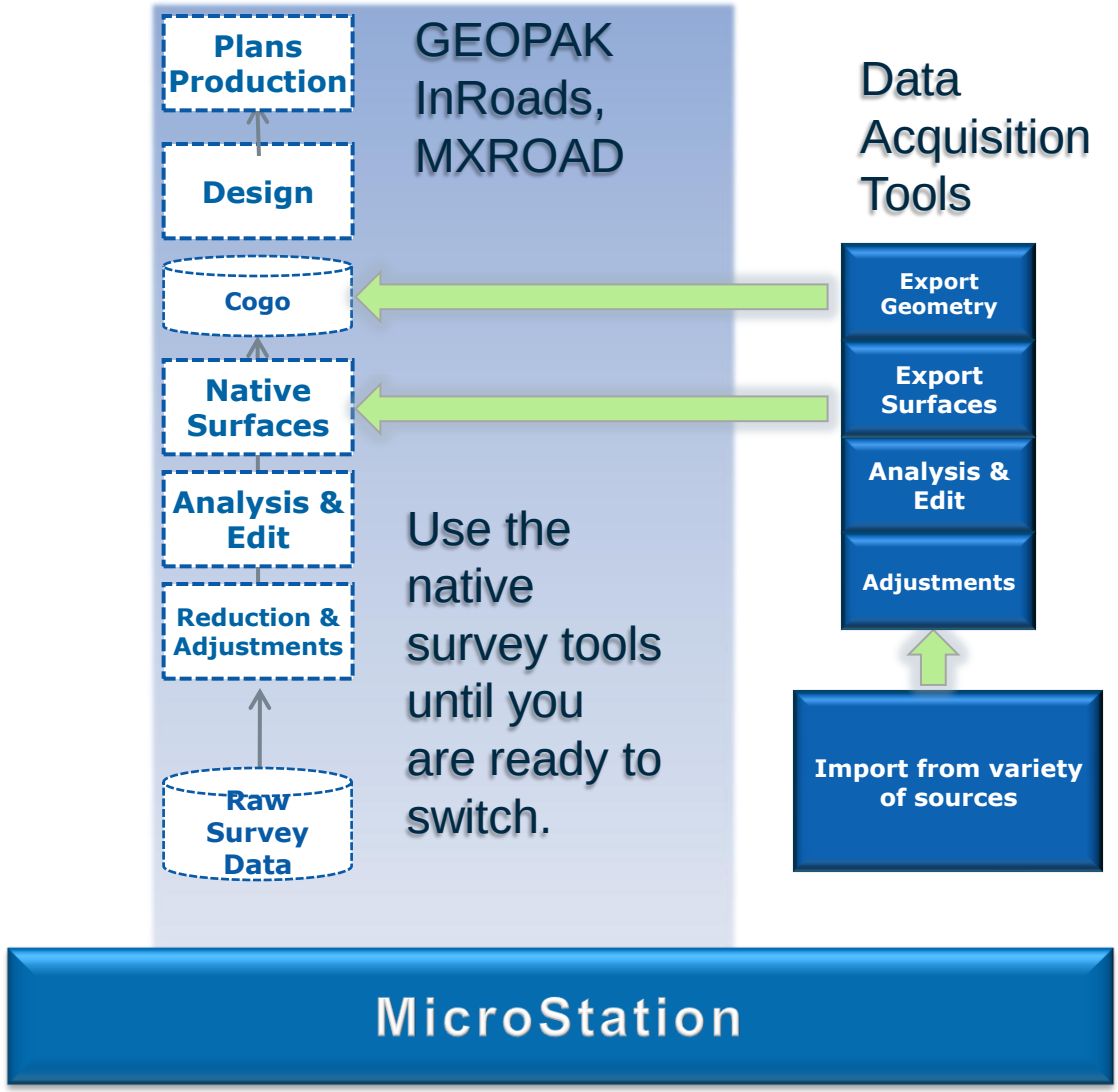
V8*i* (SELECTseries 1) – Data Acquisition

Integration



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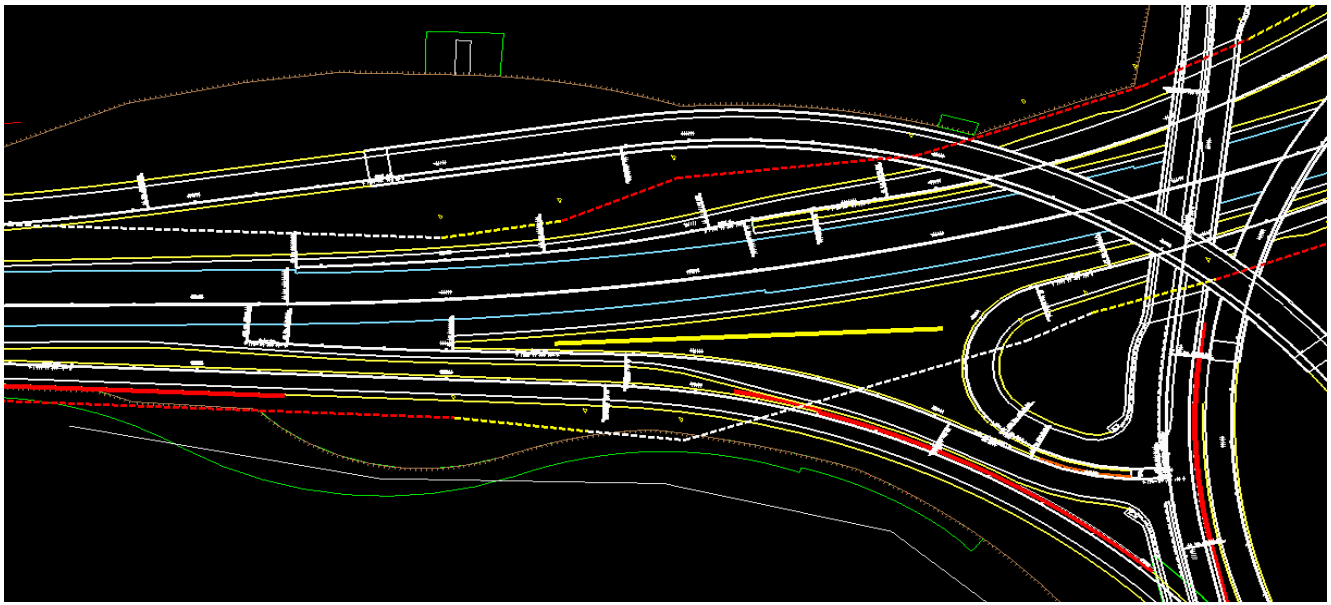
V8*i* (SELECTseries 1) – Civil Platform Geometry

- A complete set of horizontal tools for schematic and horizontal geometric design
- Provide the civil designer with state-of-the art tools
  - Integrated with Microstation
  - Better User Experience (heads up and dynamic)
  - Rules based placement and editing to maintain relationships
  - Maintain and update relationships



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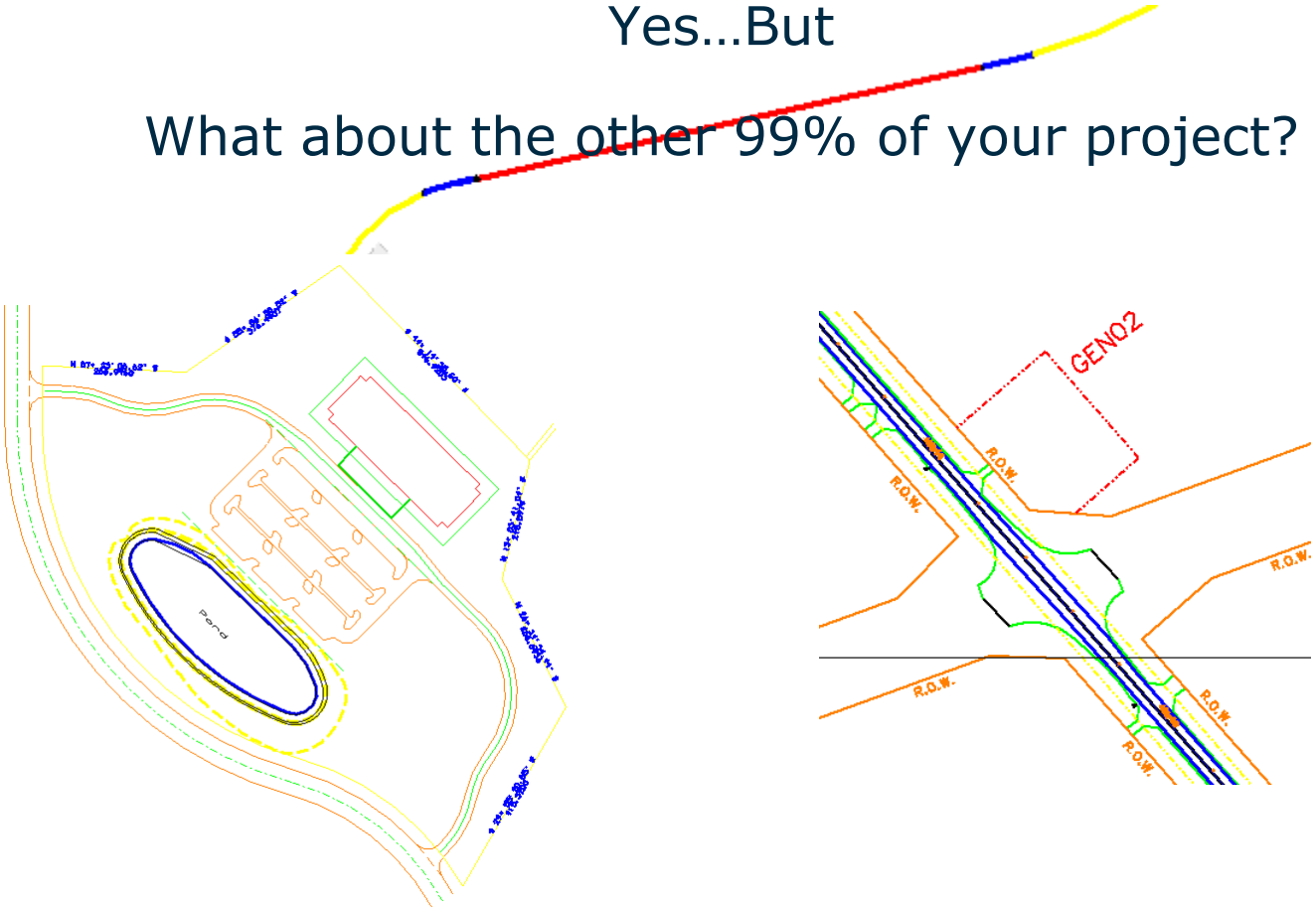
What is Geometry?

Alignments/Chains?

Yes…But

What about the other 99% of your project?



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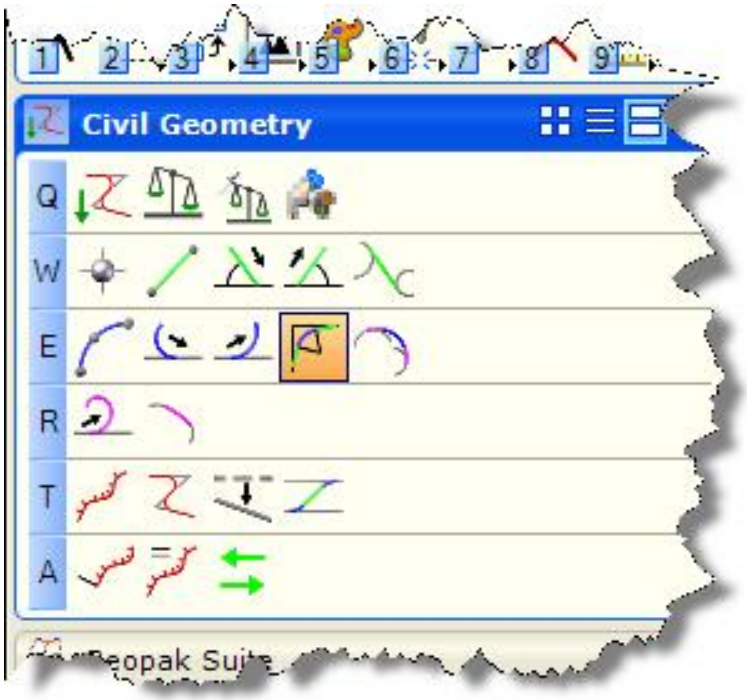
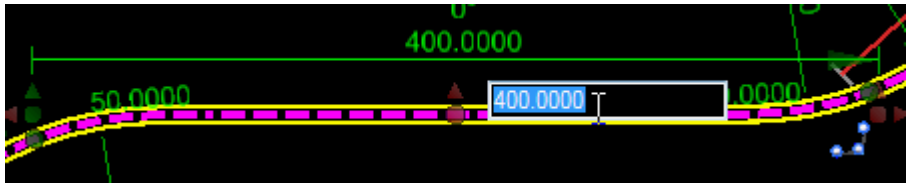
V8*i* (SELECTseries 1) – Civil Platform Geometry

- New Commands to accomplish horizontal geometric layouts
- Commands are:
  - Integrated with Microstation
  - Dynamic
  - Utilize graphical feedback
  - Create rules based elements
  - Preserve user input and relationships
  - Capture Design Intent





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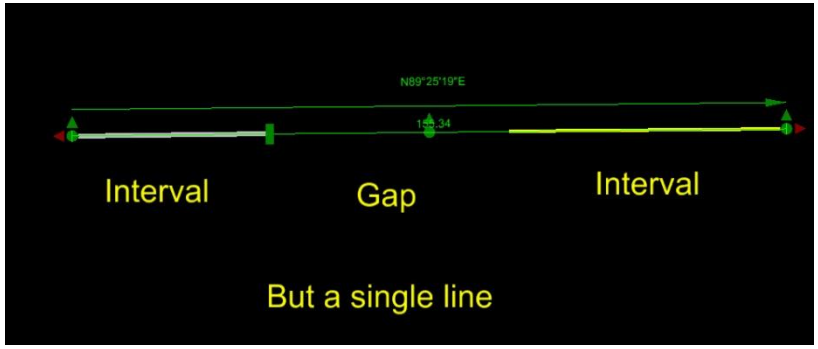
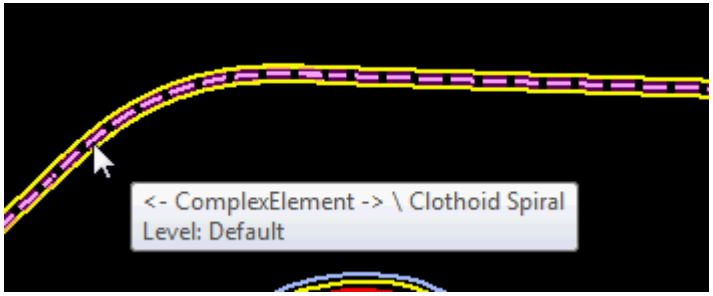
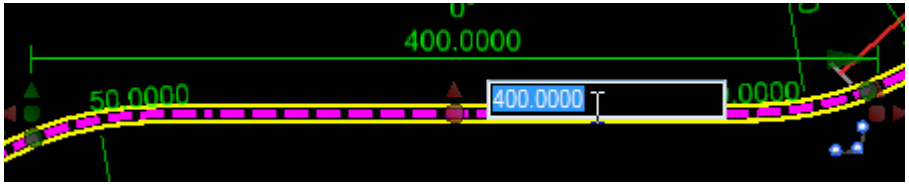
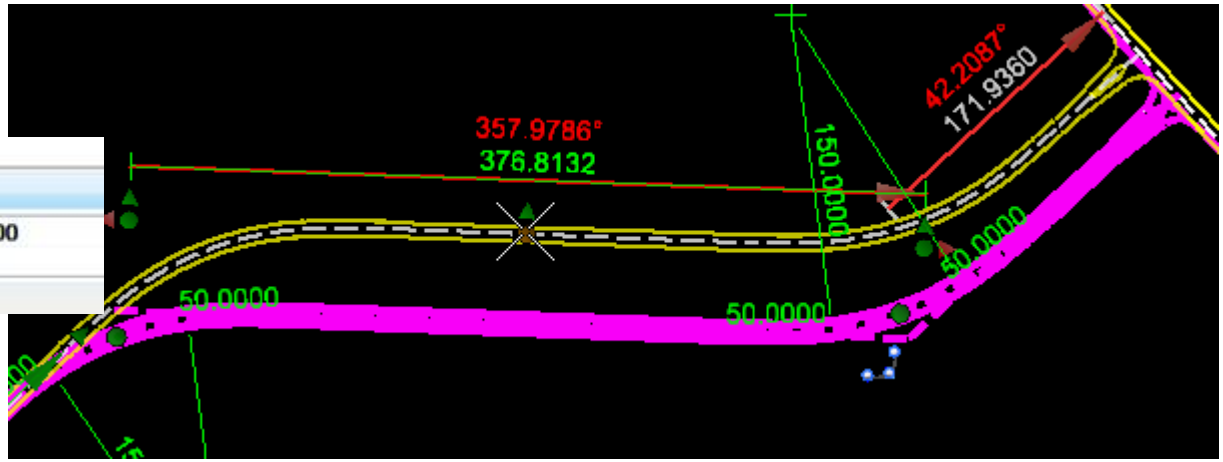
V8*i* (SELECTseries 1) – Civil Platform Geometry







Stationing	
Ahead Station	a 1+00.0000
Back Station	4+06.7566



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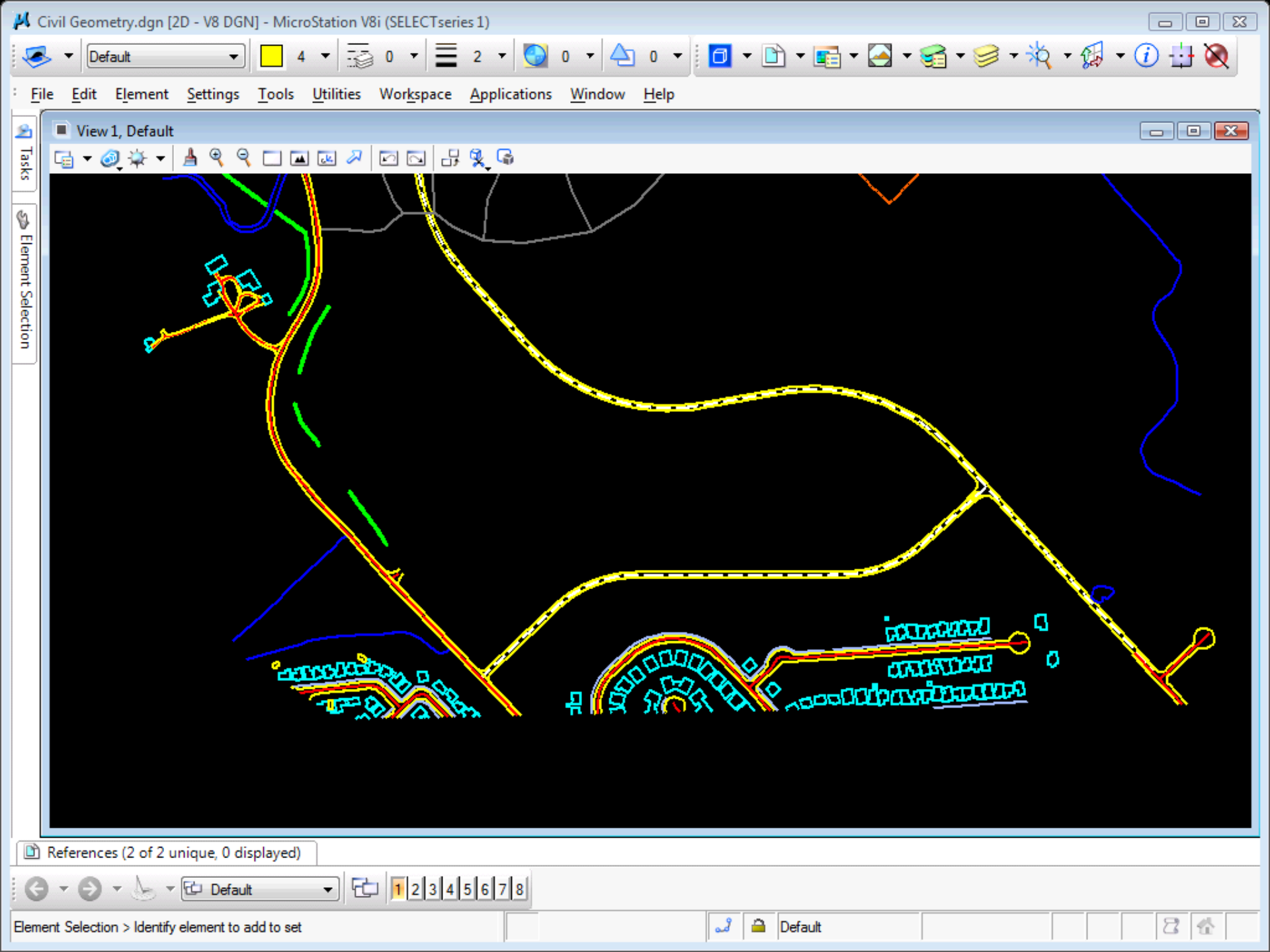
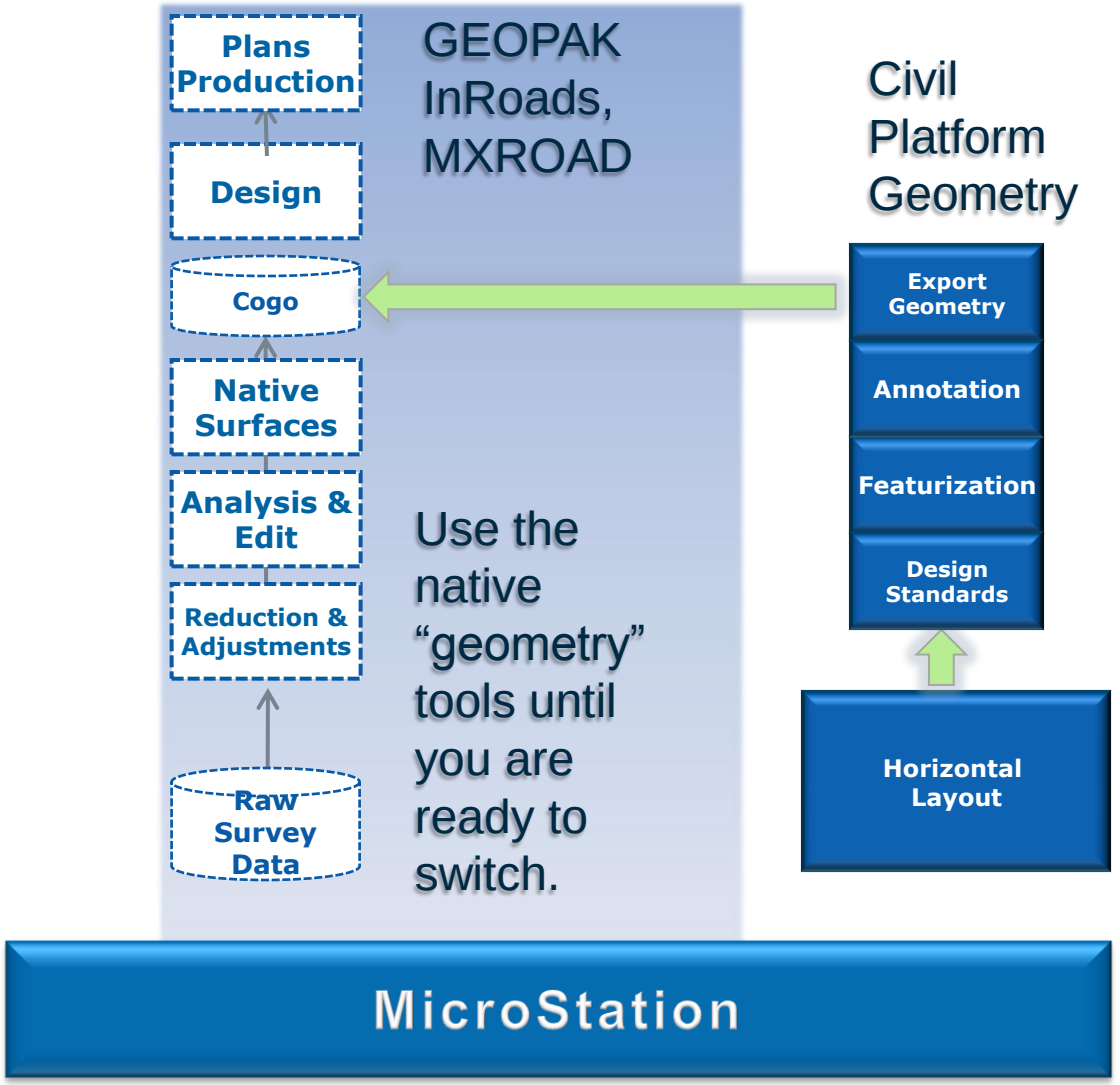

Civil Geometry.dgn [2D - V8 DGN] - MicroStation V8i (SELECTseries 1)
Default
4
0
2
0
0
File
Edit
Element
Settings
Tools
Utilities
Workspace
Applications
Window
Help
Tasks
Element Selection
View 1, Default
References (2 of 2 unique, 0 displayed)
Default
1
2
3
4
5
6
7
8
Element Selection > Identify element to add to set
Default

V8*i* (SELECTseries 1) – Civil Platform Geometry

Integration



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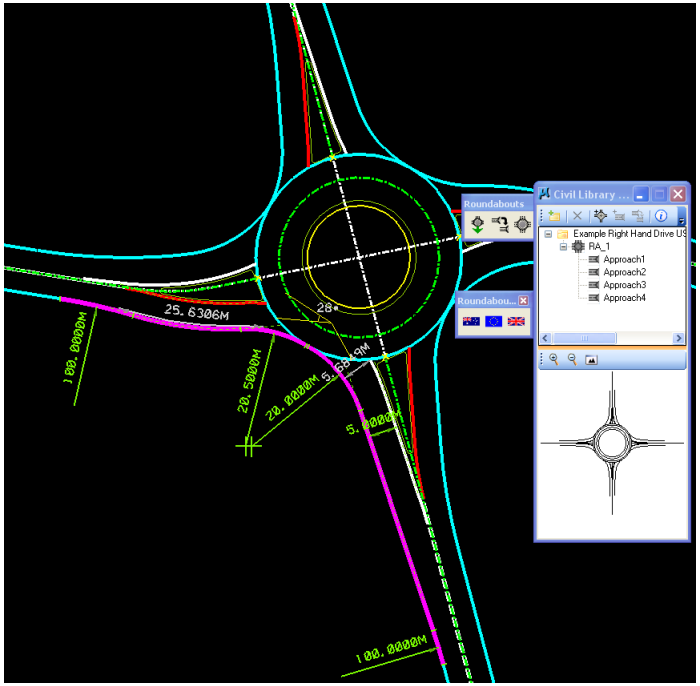
V8*i* (SELECTseries 1) – Roundabouts

- Uses Geometric Object Model
- Associative Rule Based Construction
- Automatically updates based on design values and standards
- Preserves investment in feature tables by utilizing XIN, DDB, PSS



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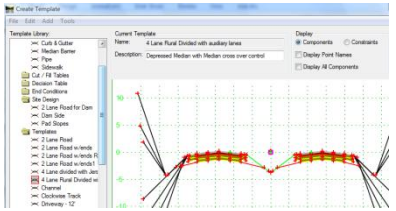
V8*i* (SELECTseries 1) – Roadway Designer



- Premiere tool for corridor modeling
  - Simply the best tool on the market
- Handles the simple design to the complex
- Interactive, Graphic, Instant Feedback
- Single effort gives the capability to all civil design packages
  - Yes, with this release Roadway Designer will integrated into MXROAD. Already in GEOPAK and InRoads.
  - Integration, Interoperability between the three
  - Very effective at generating 3D models

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V8*i* (SELECTseries 1) – Roadway Designer

- It is about 3R Design Capabilities - Resurface, Reconstruction, Rehabilitation
- Significant enhancements to our flagship roadway design tool to accommodate 3R
- Single effort gives the capability to all civil design packages
- Ultimate tool for road design generating 3D models
- Template and Component Based
- Design output is perfect for Automated Machine Guidance

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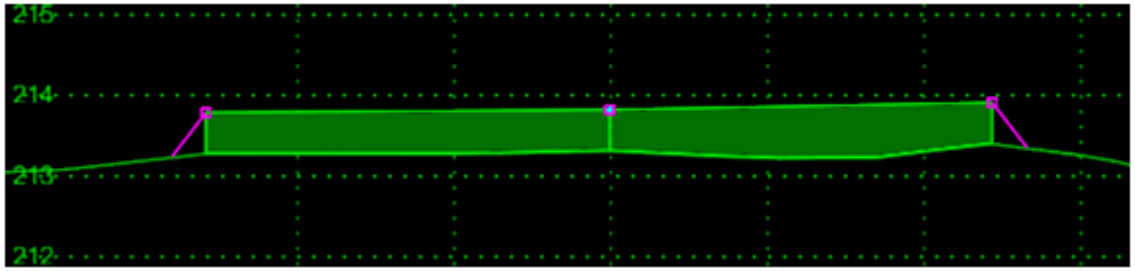
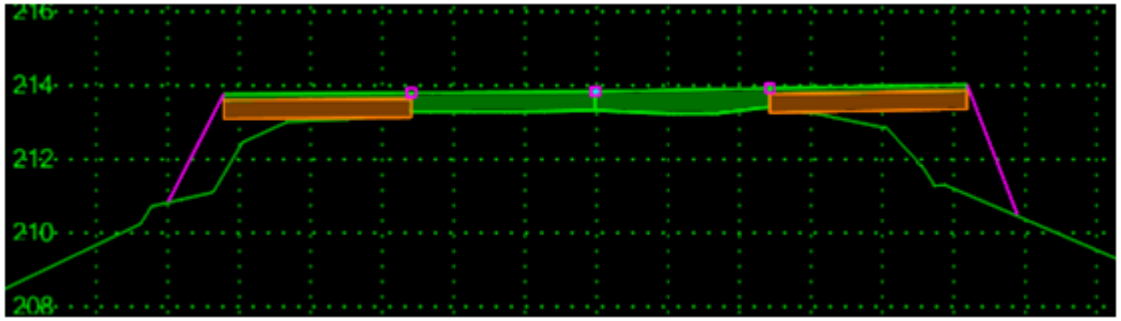
V8*i* (SELECTseries 1) – Roadway Designer

- Simple method
  - overlay
  - overlay and widening





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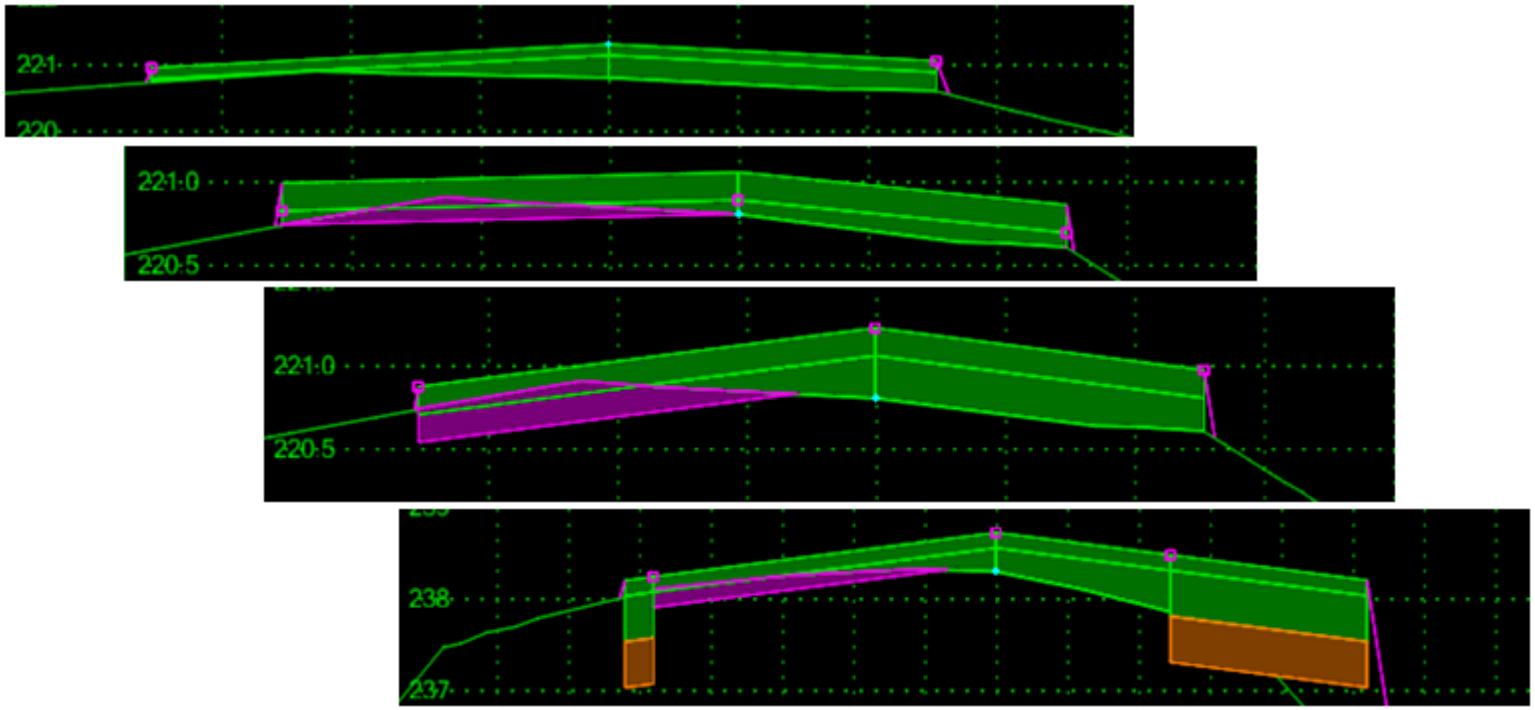
V8*i* (SELECTseries 1) – Roadway Designer

- Cross slope correction method with
  - leveling
  - grinding
  - grinding and leveling
  - grinding, leveling and widening



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Roadway Designer

V8*i* (SELECTseries 1)

- Up to this point all V8*i* (SELECTseries 1) items mentioned are integrated into all three civil design applications

Bentley InRoads V8*i* SELECTseries 1

Bentley GEOPAK V8*i* SELECTseries 1

Bentley MXROAD V8*i* SELECTseries 1

- Let's discuss a few product specific items

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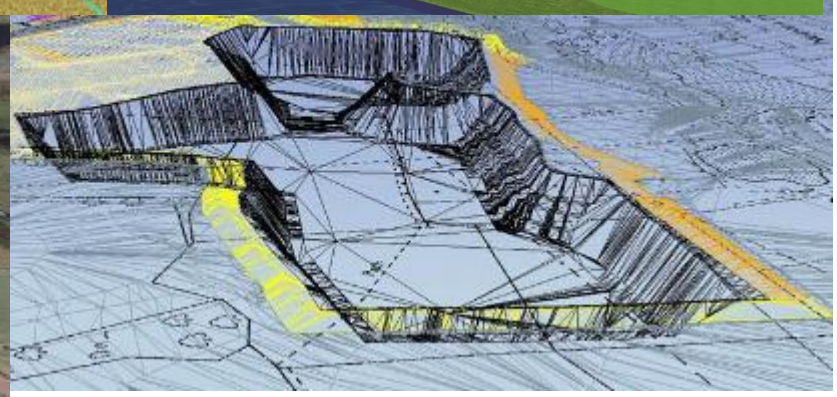
V8*i* (SELECTseries 1)

Bentley InRoads V8*i*
SELECTseries 1

- Added Site Modeler to InRoads
- Ideal for "non-linear" design situations
- Object relationships and associations



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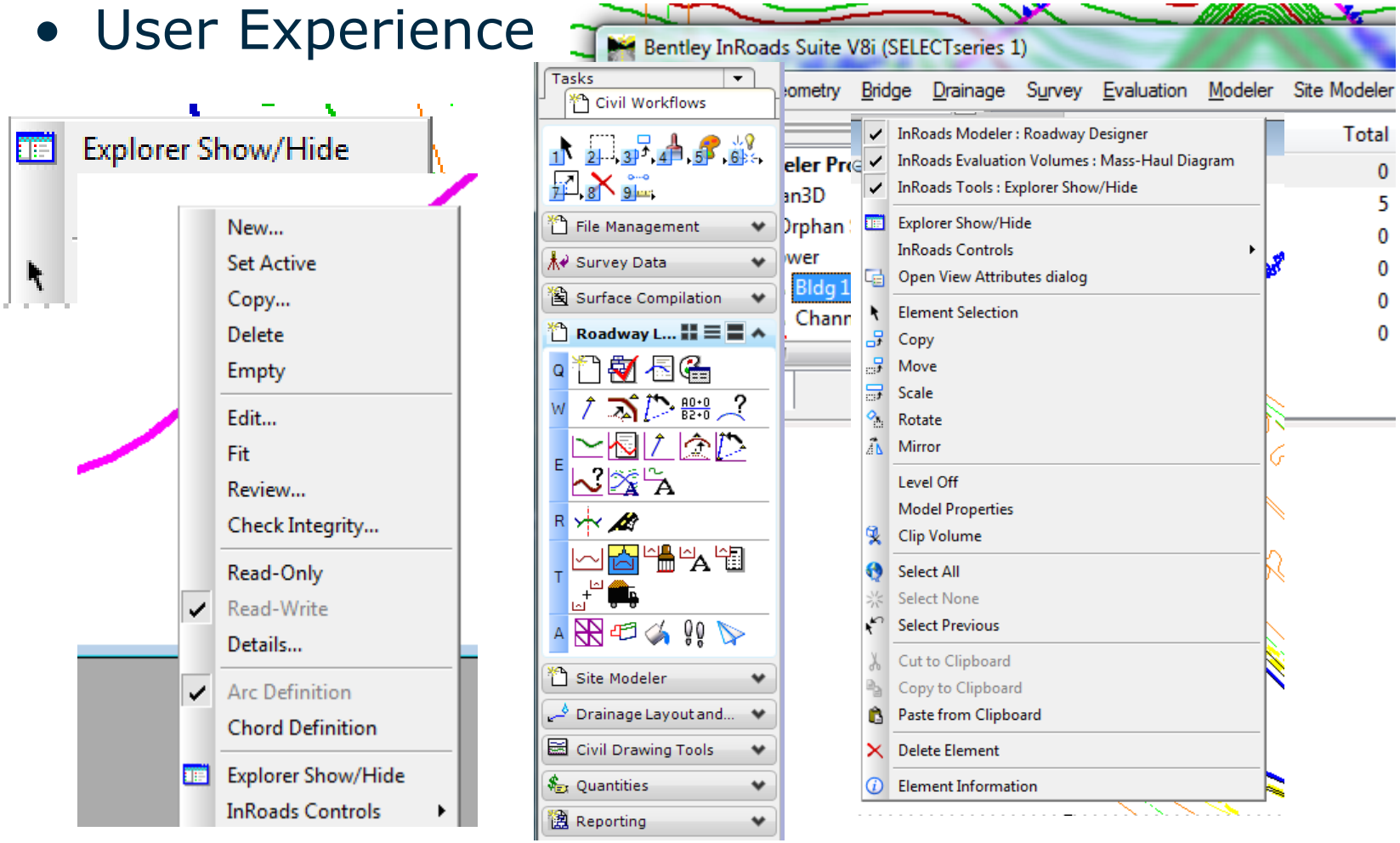
V8i (SELECTseries 1)

Bentley InRoads V8i
SELECTseries 1

- User Experience



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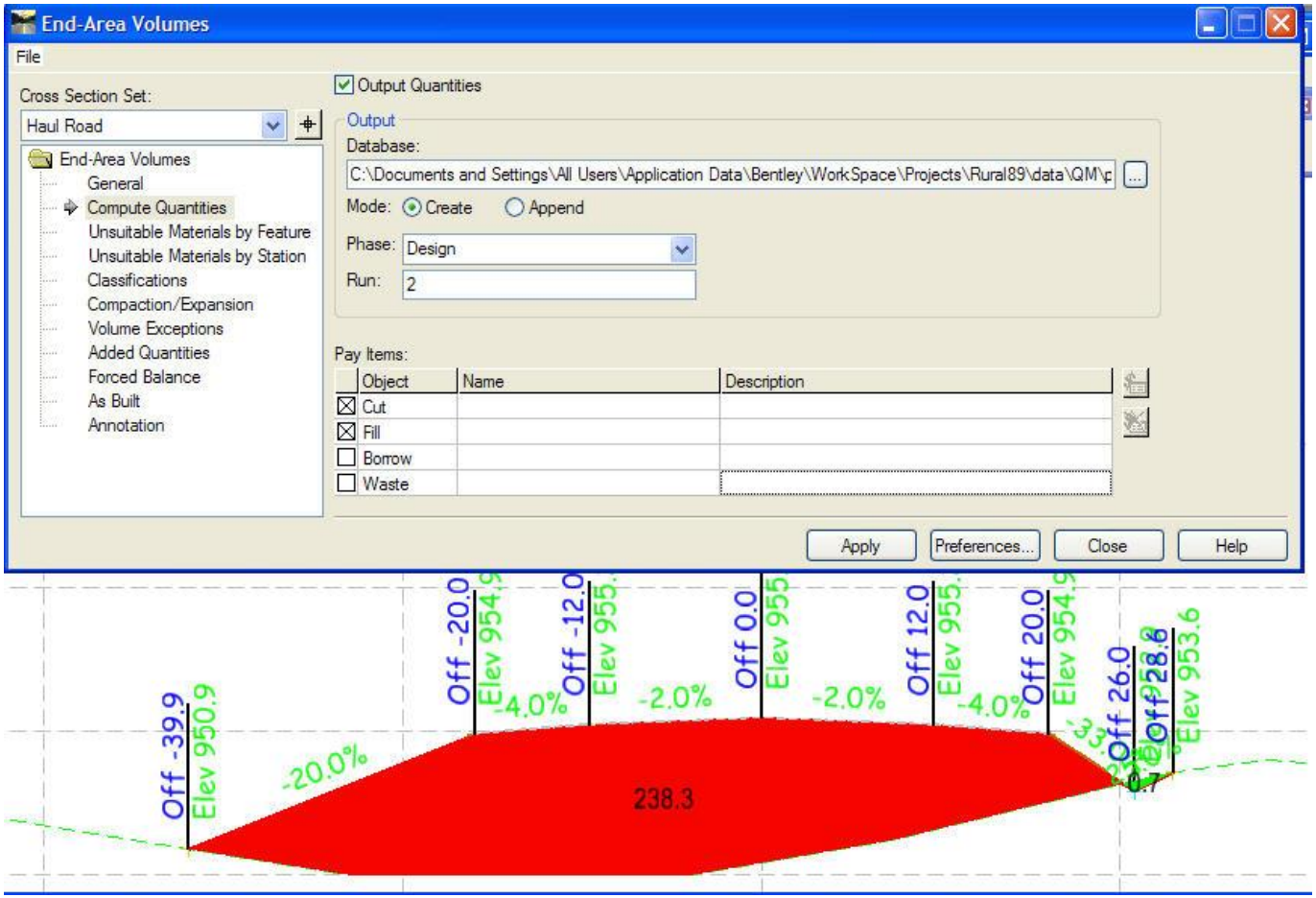
V8*i* (SELECTseries 1)

Bentley InRoads V8*i*
SELECTseries 1

Volumes to Quantity Manager



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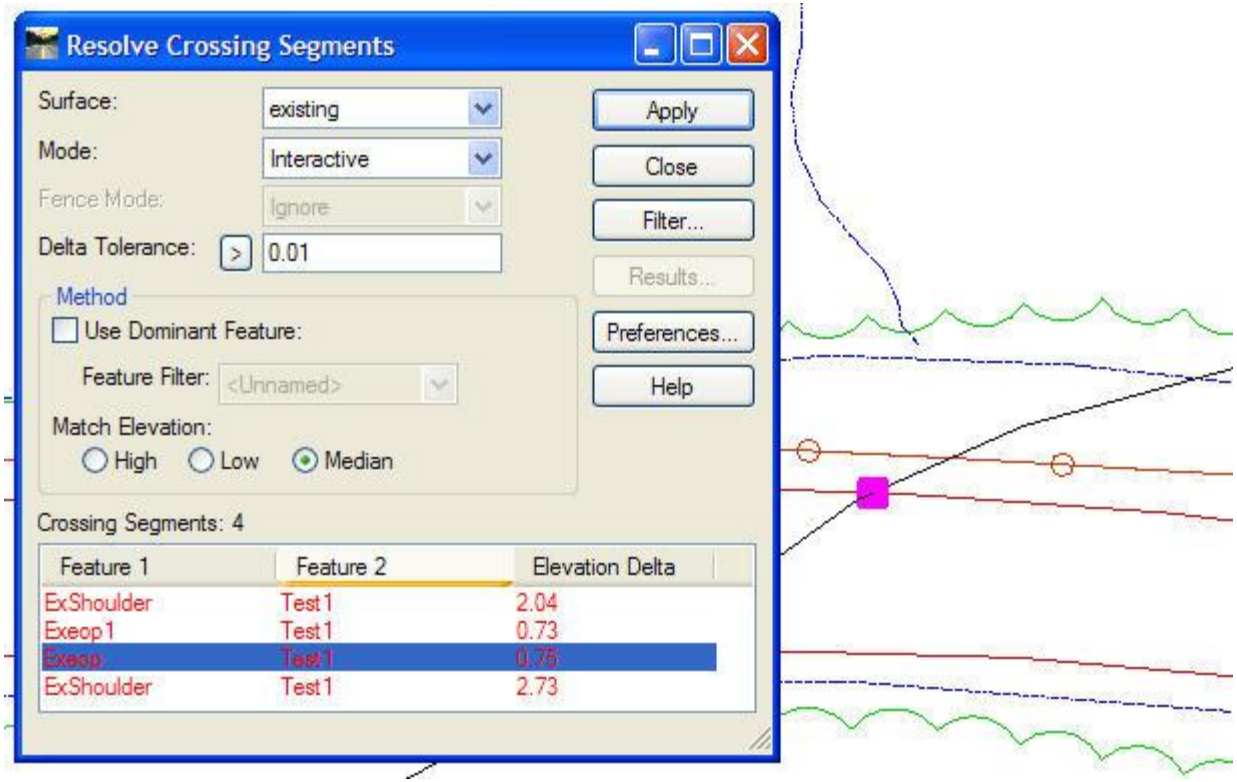
V8i (SELECTseries 1)

Bentley InRoads V8i
SELECTseries 1

- Resolve Crossing Segments



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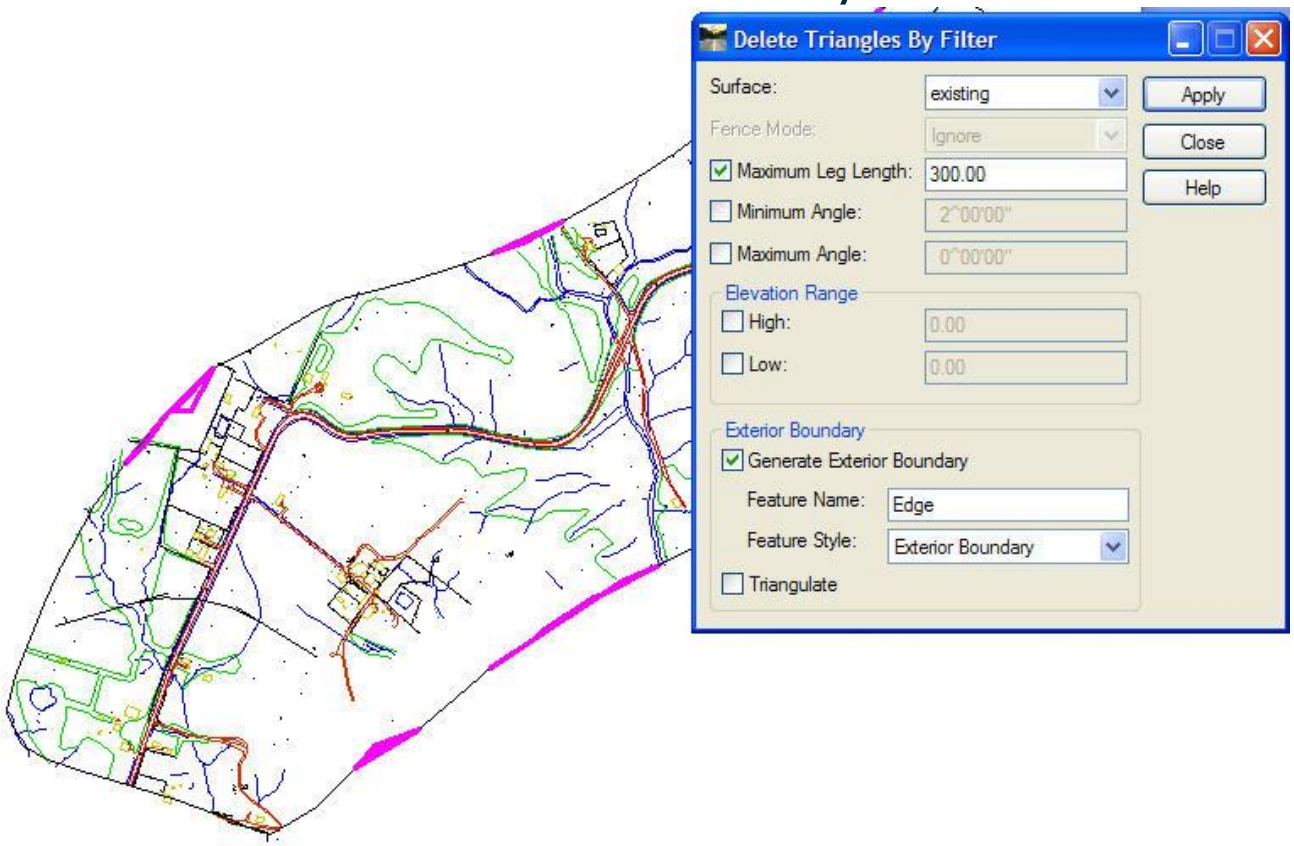
V8i (SELECTseries 1)

Bentley InRoads V8i
SELECTseries 1

- Delete Triangles by Filter
  - More options for removal
  - Creation of Exterior Boundary



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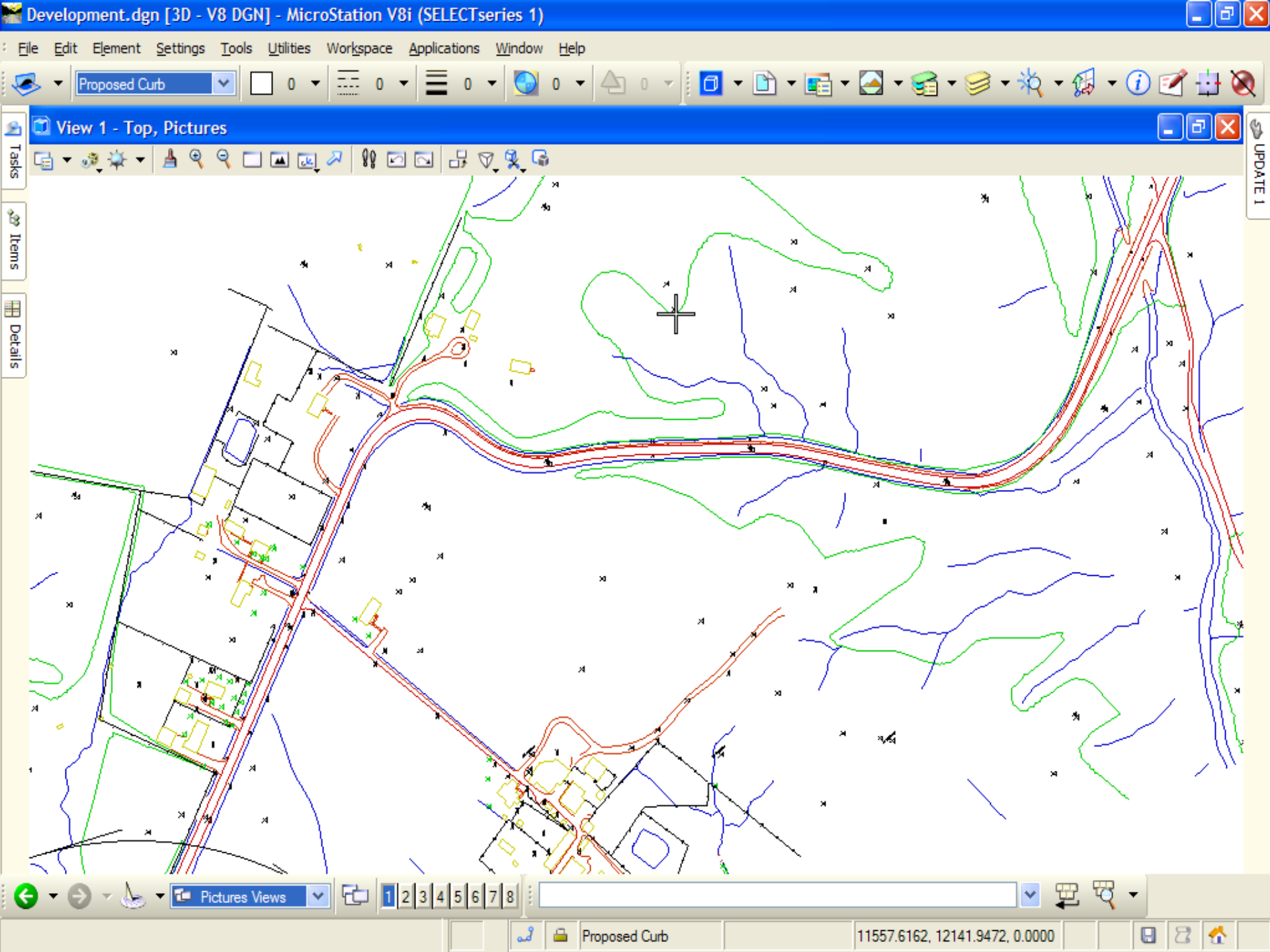
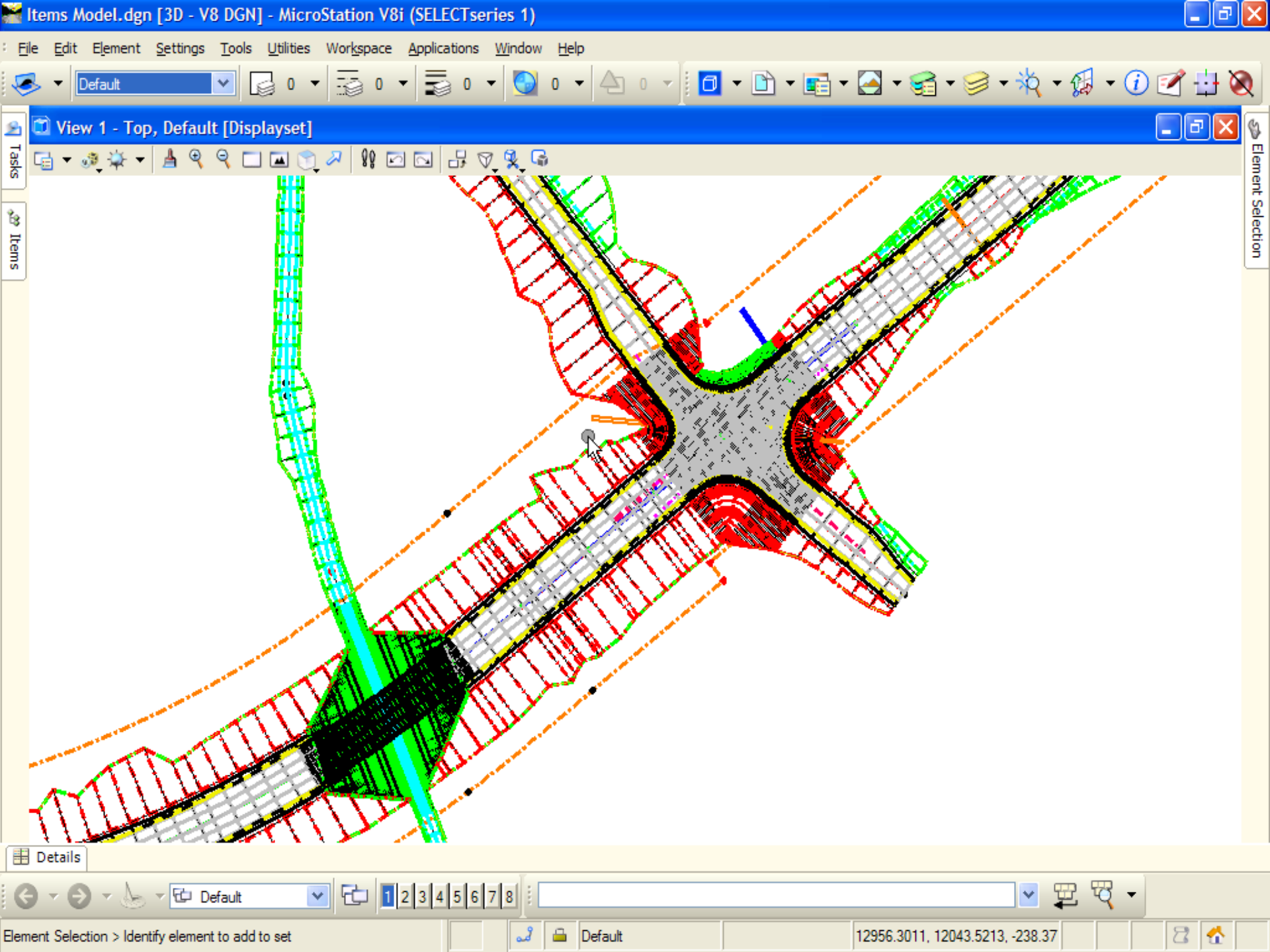
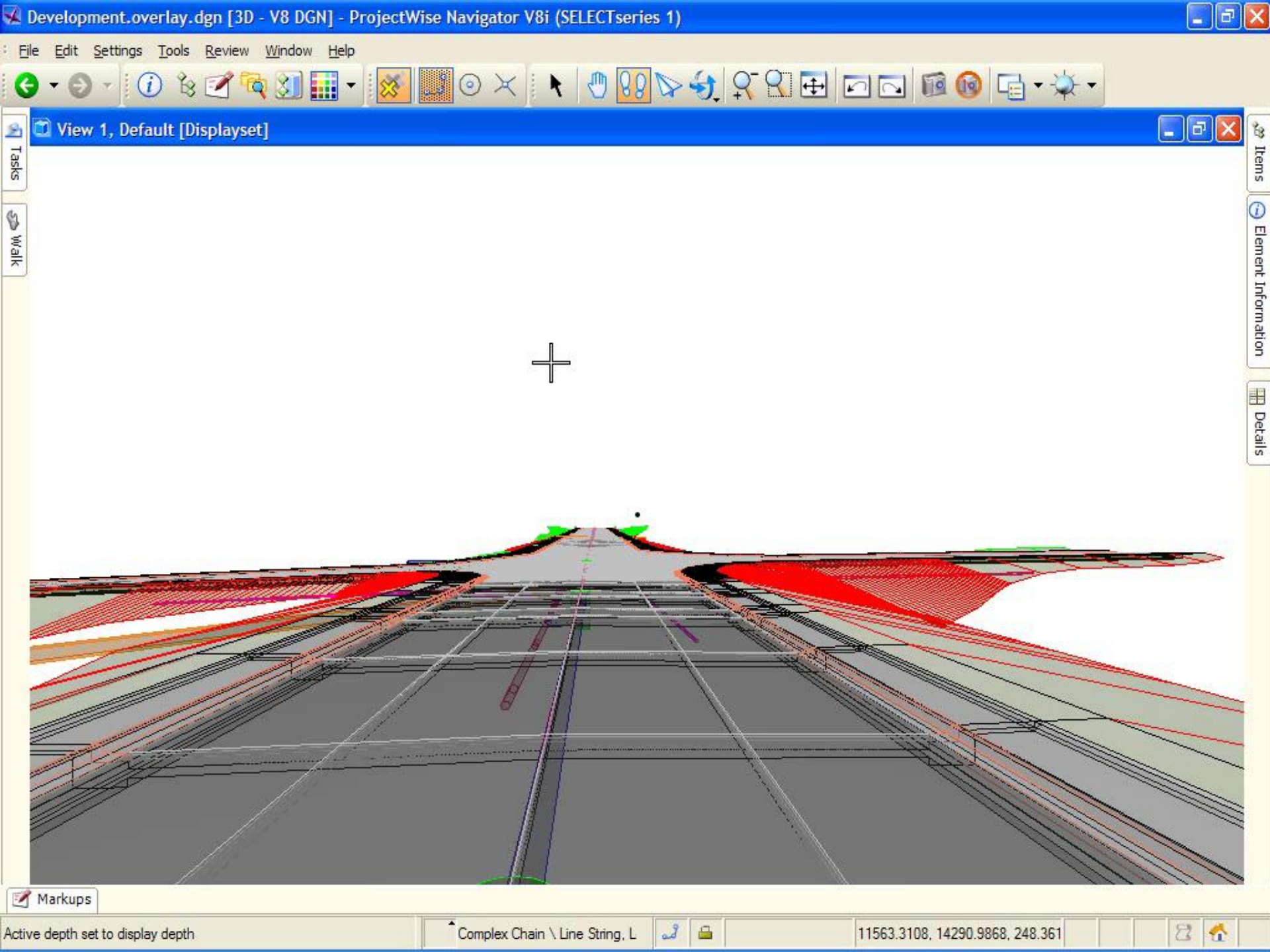

Development.dgn [3D - V8 DGN] - MicroStation V8i (SELECTseries 1)
File Edit Element Settings Tools Utilities Workspace Applications Window Help
Proposed Curb
View 1 - Top, Pictures
Tasks
Items
Details
UPDATE 1
Pictures Views
1 2 3 4 5 6 7 8
Proposed Curb
11557.6162, 12141.9472, 0.0000

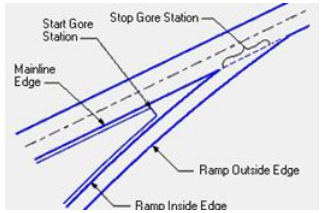

Items Model.dgn [3D - V8 DGN] - MicroStation V8i (SELECTseries 1)
File Edit Element Settings Tools Utilities Workspace Applications Window Help
Default
View 1 - Top, Default [Displayset]
Tasks
Items
Element Selection
Details
Default
1 2 3 4 5 6 7 8
Element Selection > Identify element to add to set
Default
12956.3011, 12043.5213, -238.37

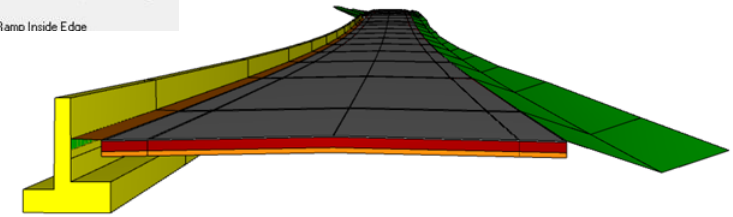

Development.overlay.dgn [3D - V8 DGN] - ProjectWise Navigator V8i (SELECTseries 1)
File
Edit
Settings
Tools
Review
Window
Help
View 1, Default [Displayset]
Tasks
Walk
Items
Element Information
Details
Markups
Active depth set to display depth
Complex Chain \ Line String, L
11563.3108, 14290.9868, 248.361

V8*i* (SELECTseries 1)

Bentley GEOPAK V8*i*
SELECTseries 1

- More Roadway Designer
  - Integration and performance improvements
  - Remember, if one gets it, they all get it
- Vertical Gore Tool
  - Aid in ramp design





- Improved Model Creation
  - Supplements AMG
- Customer requests
  - Numerous items from your requests
- Components

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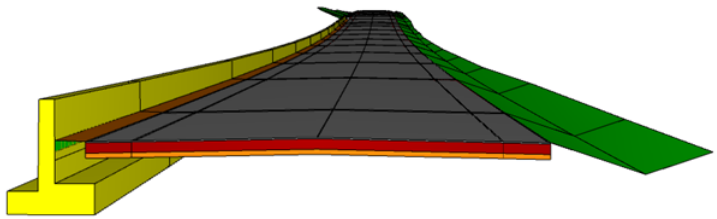
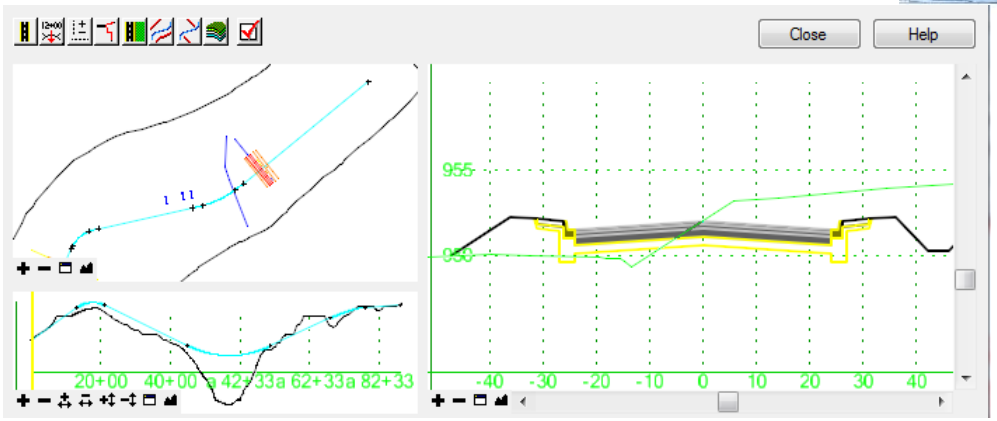
V8*i* (SELECTseries 1)

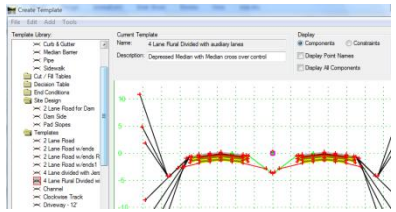
Bentley MXROAD V8*i*
SELECTseries 1

- Roadway Designer - Now in all 3!
- ProjectWise Integration - Now in all 3!





ProjectWise V8*i*
SELECTseries 1



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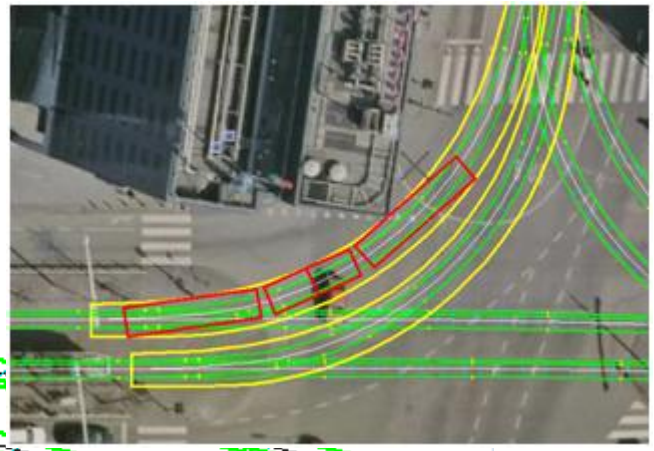
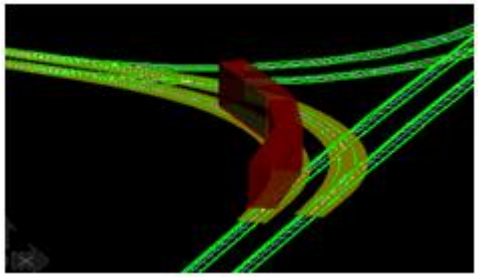
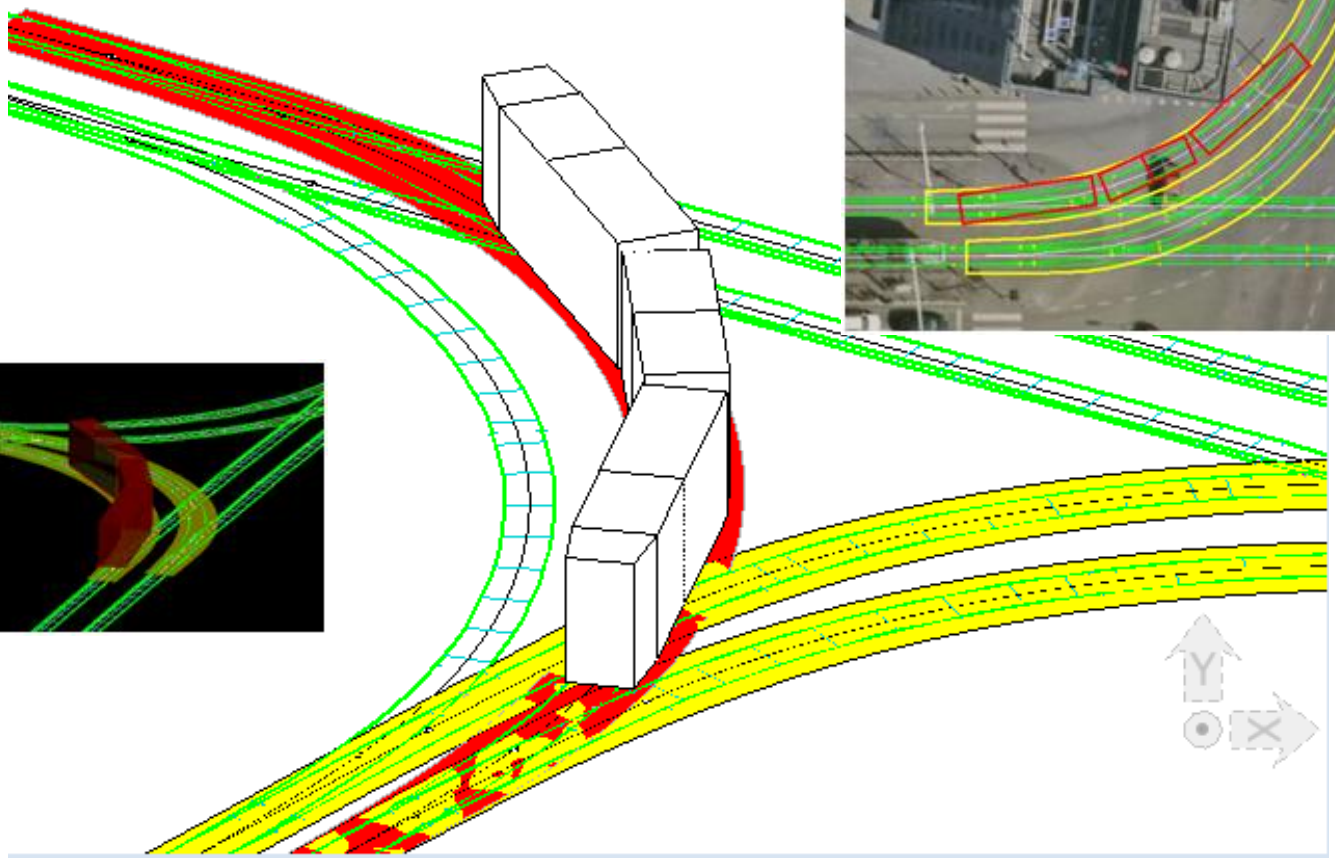
V8*i* (SELECTseries 1)

Bentley® Rail Track V8*i*
SELECTseries 1

- Swept Path Analysis







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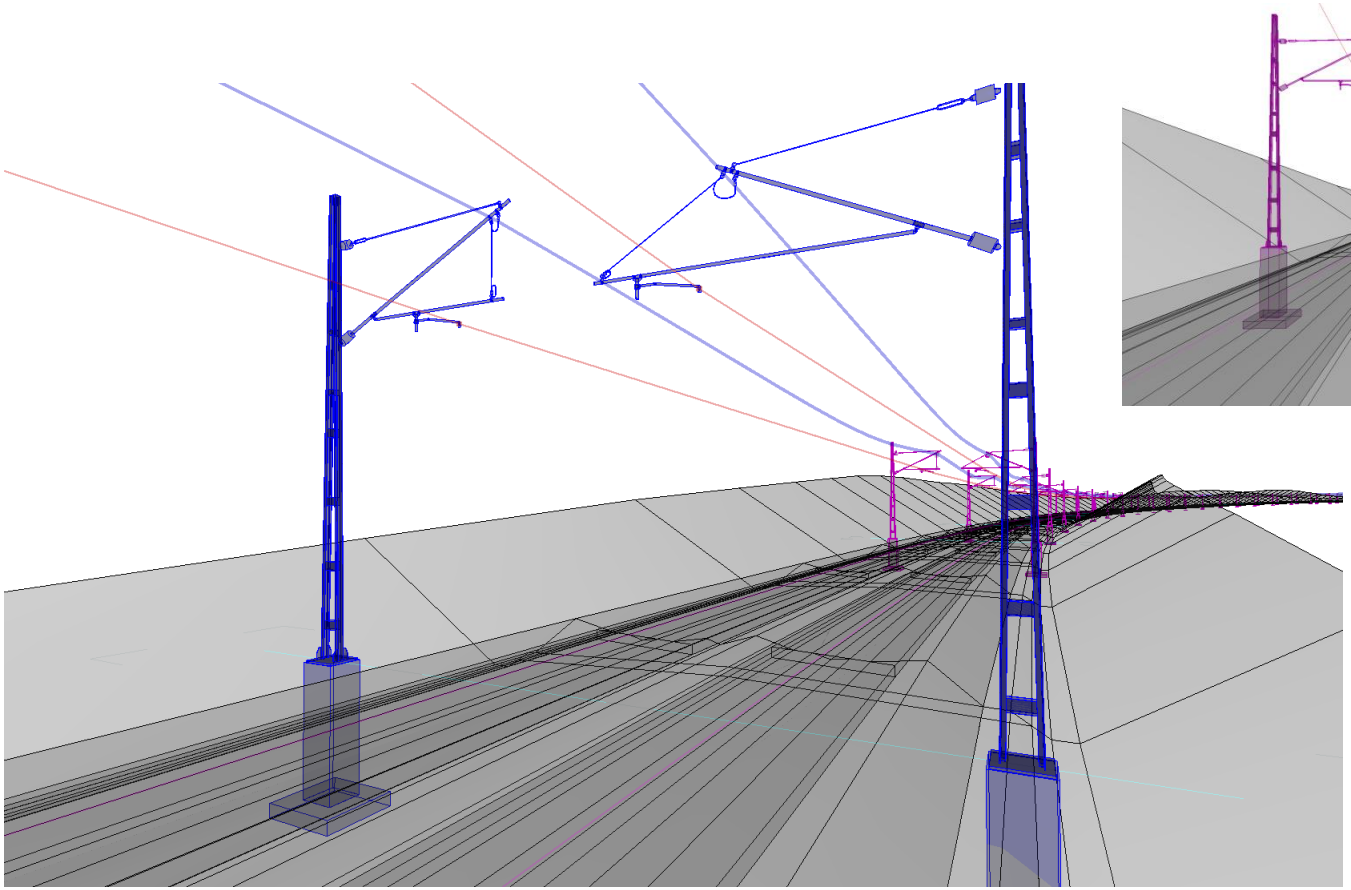
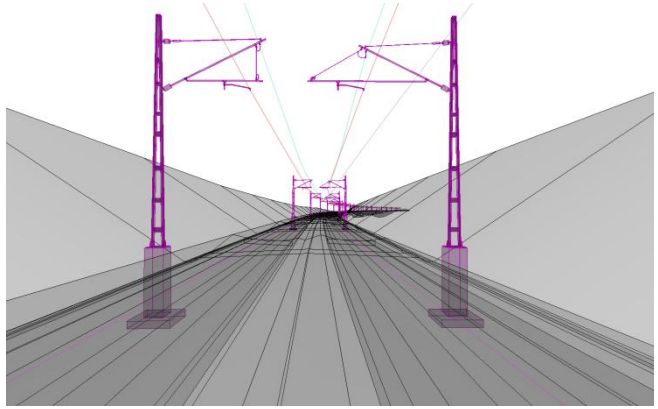
V8*i* (SELECTseries 1)

Bentley® Rail Overhead Line V8*i*
SELECTseries 1

Modeling of Overhead Line Equipment along with the track and surface





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Why Tomorrow?

So where does all this lead Bentley Civil?

Civil Engineering is more than graphics transferred to paper plans

It's about integration

It's about interoperability

It's about distributive information

It's about a complete model

It's about modeling, Civil Information Modeling!

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V8*i* (SELECTseries 1)

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November 2nd, 2009

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Civil Beta Program

Plan to provide in the next week or so.

If interested, please contact:

Mike Wilson
Mike.Wilson@Bentley.com

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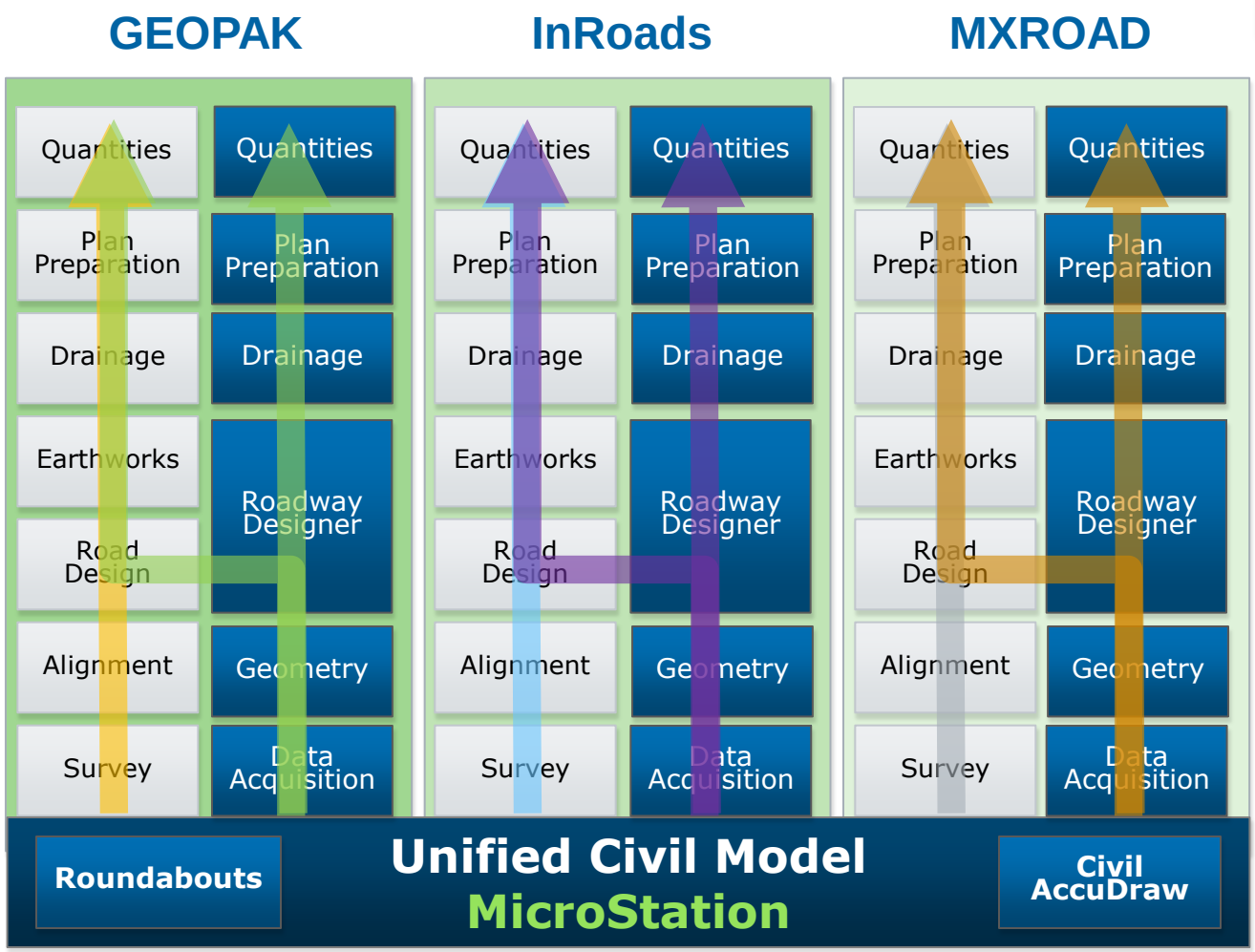
Bentley Civil Evolution

As Told Since 2004



- 20+ years of 3D Modeling and success in designing the worlds Civil infrastructure projects
- XM: Began the Evolution
- V8*i*: Began the Platform
- V8i (SELECTseries 1) : Consolidates the Modeling and Data Acquisition
- The Evolution will continue

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NORDIC CIVIL 2009

Thanks!

Mike Wilson

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Sustaining Infrastructure