Bentley®
Sustaining Infrastructure

# 3D Modeling Demonstration

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# ESS Statewide Rollouts:

3D Modeling

Engineering Content Management (ProjectWise)

 

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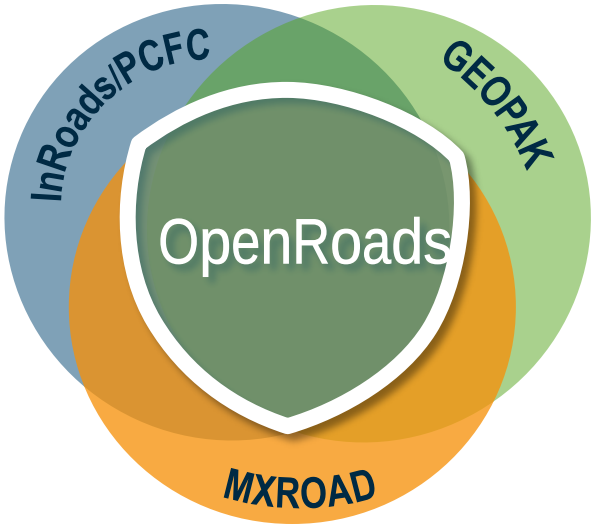
# What is *OpenRoads?*

*OpenRoads* is not a product – it is the name of the common technology for the new SELECTseries 3 releases of GEOPAK, InRoads, MXROAD, and Power Civil for Country.





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# Bentley's *OpenRoads* Technology

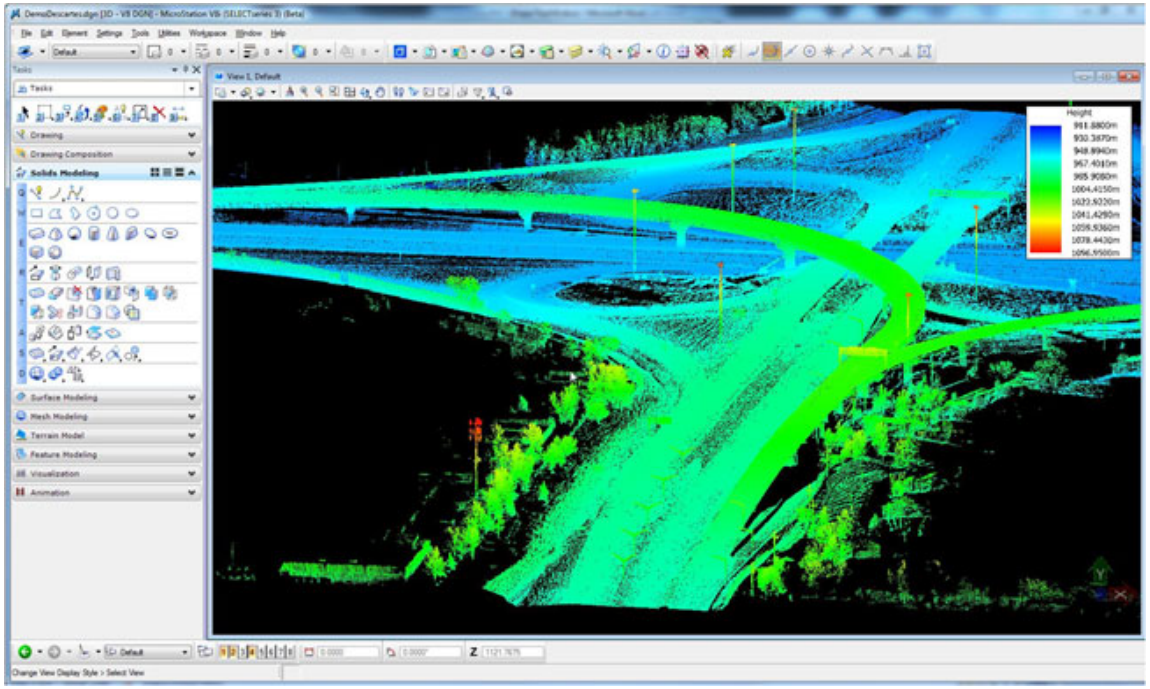
*OpenRoads* is software designed to remove any technical barriers to 3D modeling, in effect giving you the tools to be a better designer.

***"Better designers producing better projects."***

# DGN Based

- Terrain Model
  - *DGN Based*
- Geometry
  - *DGN Based*
- Modeling
  - *DGN Based*
- DGNLIB Based Standards
  - *Features*
  - *Design Standards*



**Undo / Redo!**

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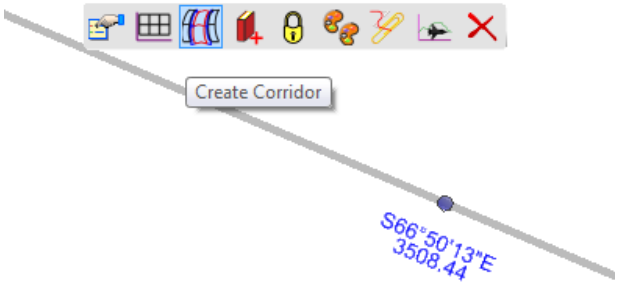
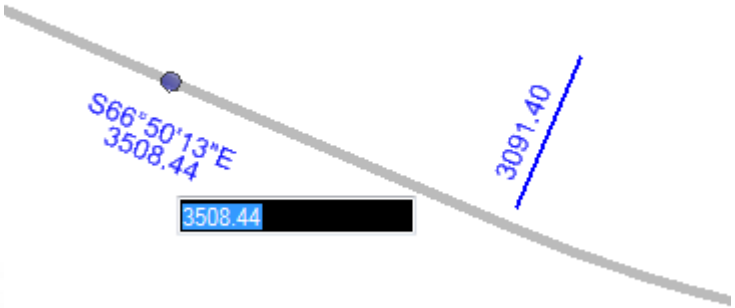
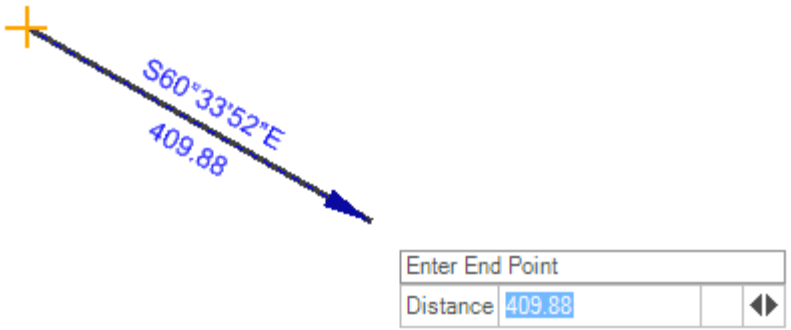
# User Experience

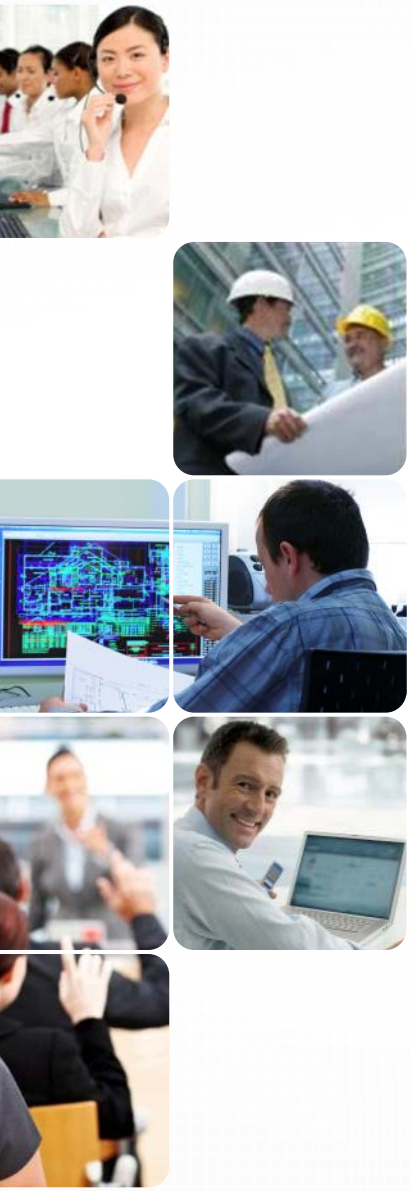
- *Graphical and Intuitive*
  - *Heads-Up Prompts*
  - *In-Place Editing*
  - *Context Toolbars*





# OpenRoads Terrain

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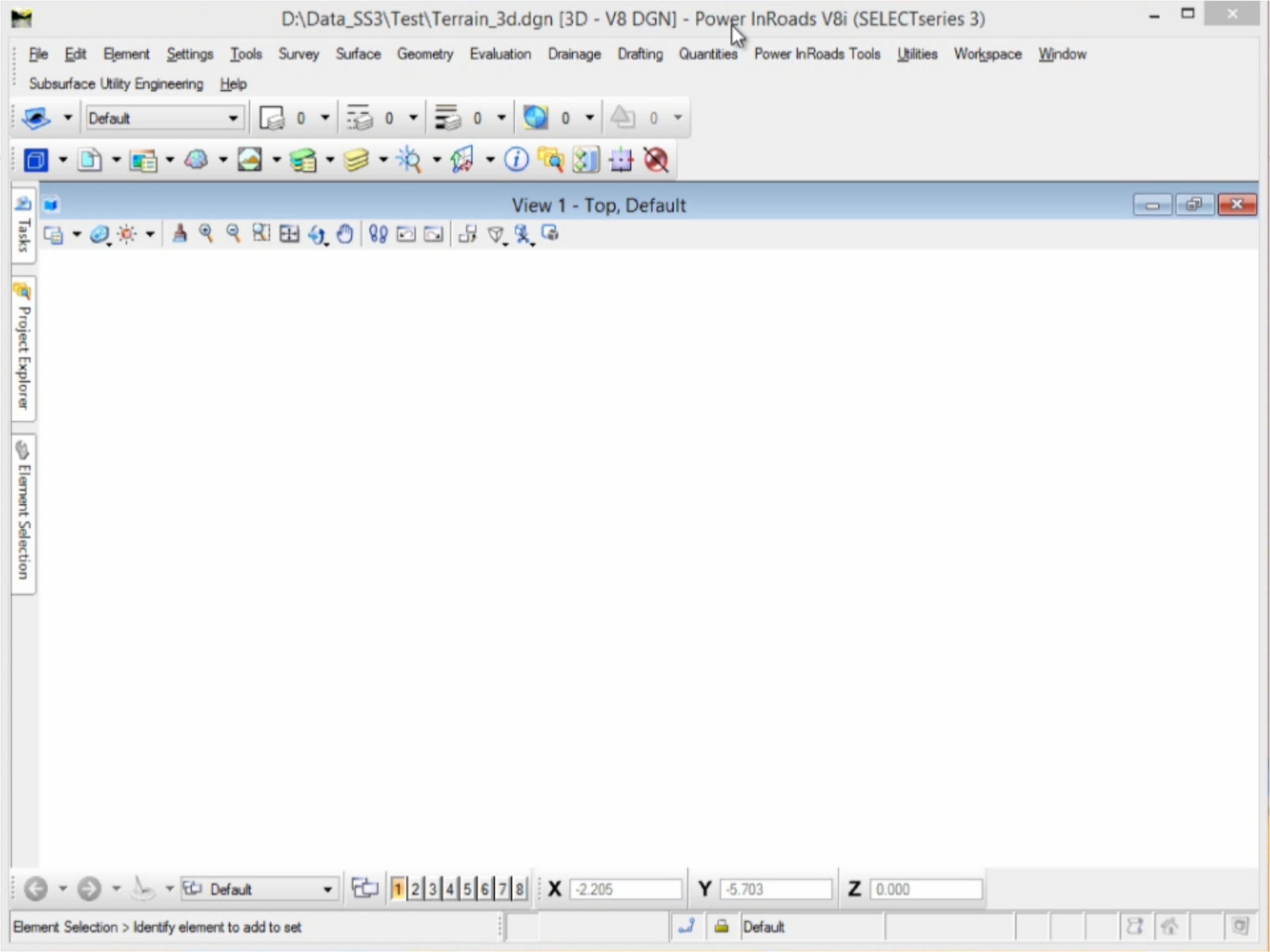
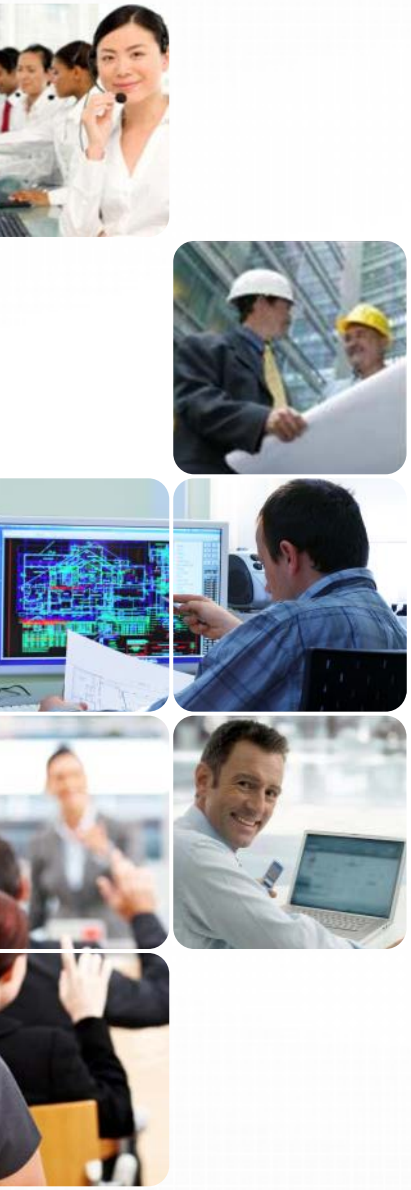

D:\Data_SS3\Test\Terrain_3d.dgn [3D - V8 DGN] - Power InRoads V8i (SELECTseries 3)
File Edit Element Settings Tools Survey Surface Geometry Evaluation Drainage Drafting Quantities Power InRoads Tools Utilities Workspace Window
Subsurface Utility Engineering Help
Default
View 1 - Top, Default
Tasks
Project Explorer
Element Selection
Default
1 2 3 4 5 6 7 8
X -2.205
Y -5.703
Z 0.000
Element Selection > Identify element to add to set
Default



# OpenRoads Horizontal Geometry

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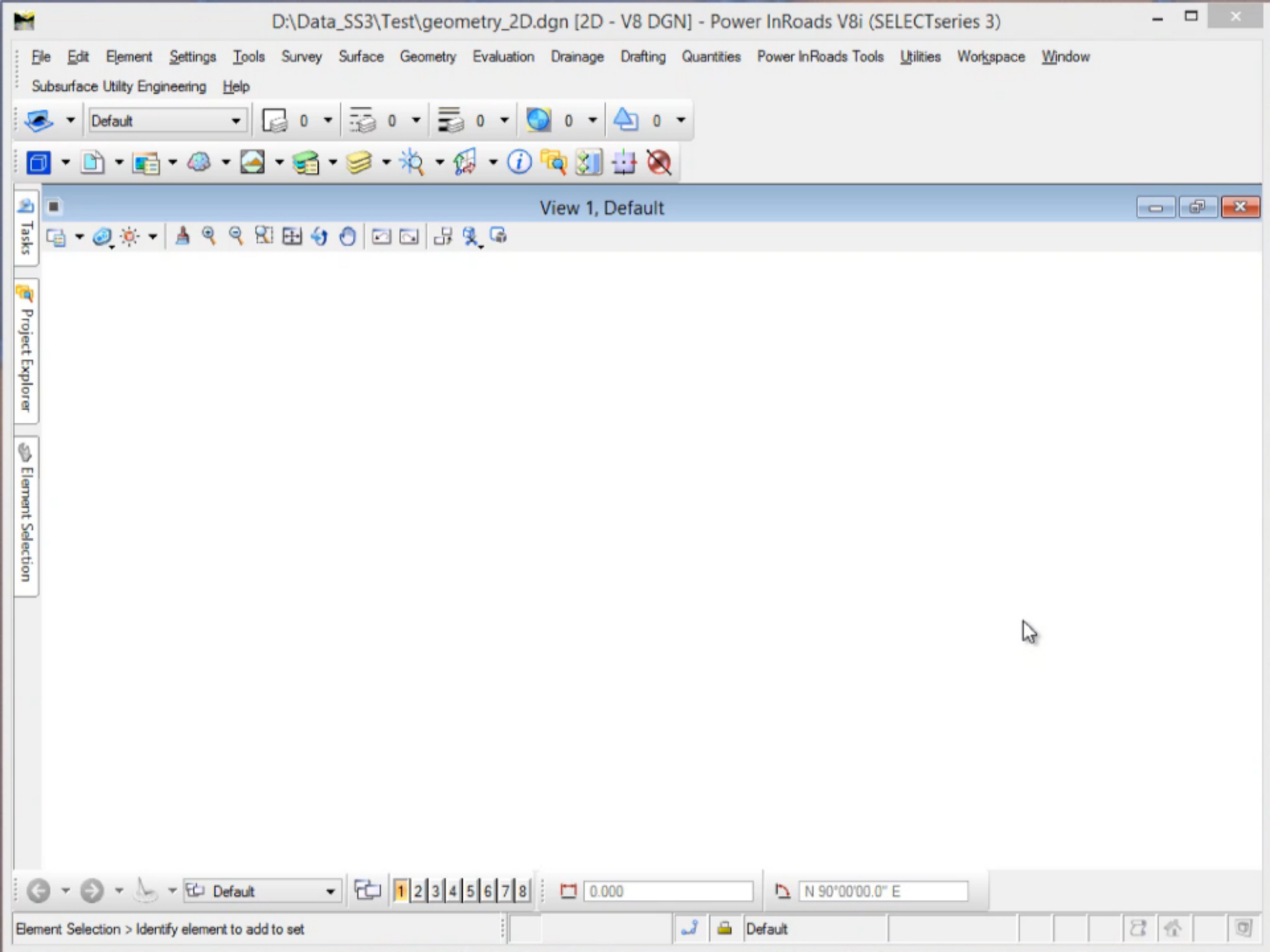
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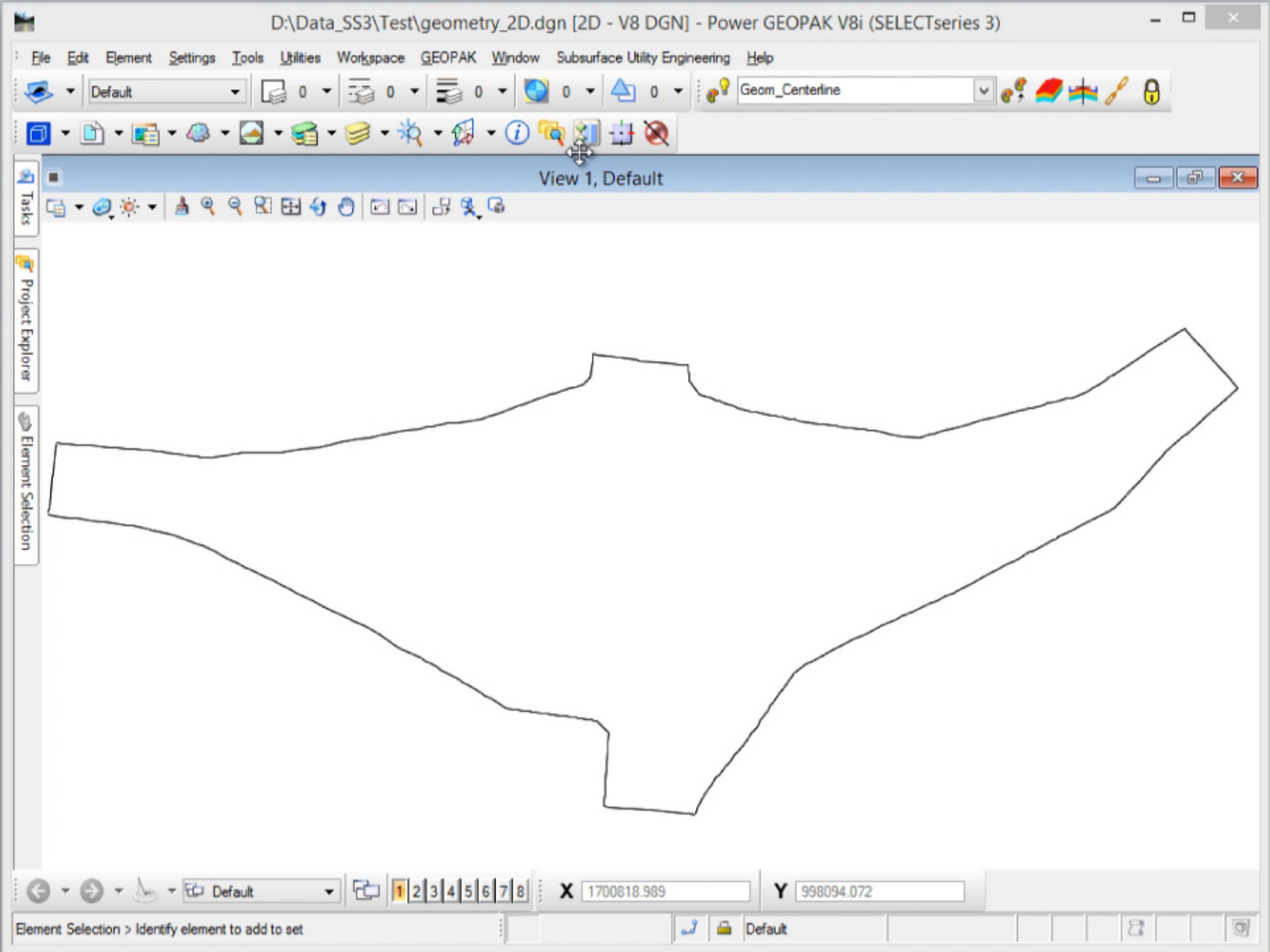
Subsurface Utility Engineering Help
Default
View 1, Default
Tasks
Project Explorer
Element Selection
Default
1 2 3 4 5 6 7 8
0.000
N 90°00'00.0" E
Element Selection > Identify element to add to set
Default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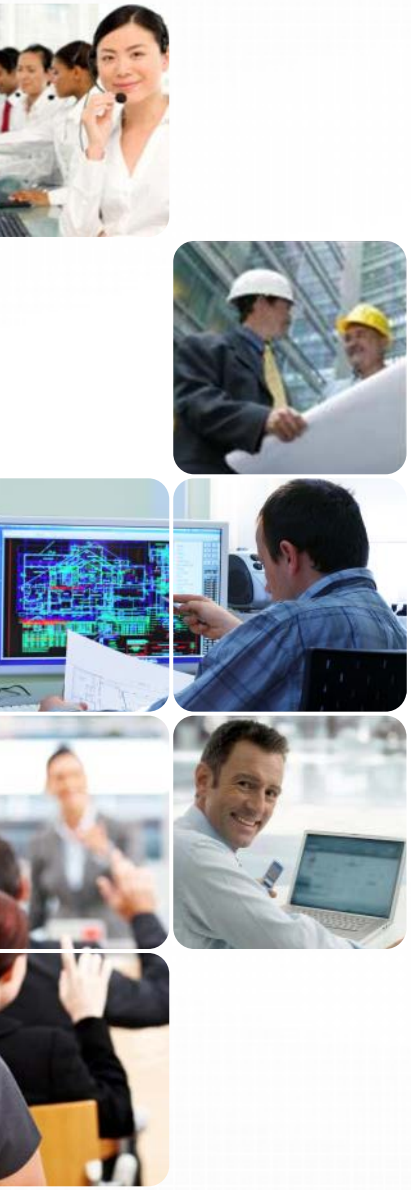
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Subsurface Utility Engineering Help
Default
Geom_Centerline
View 1, Default
Tasks
Project Explorer
Element Selection
Default
1 2 3 4 5 6 7 8
X 1700818.989
Y 998094.072
Element Selection > Identify element to add to set
Default



# Design Standards

## Horizontal and Vertical

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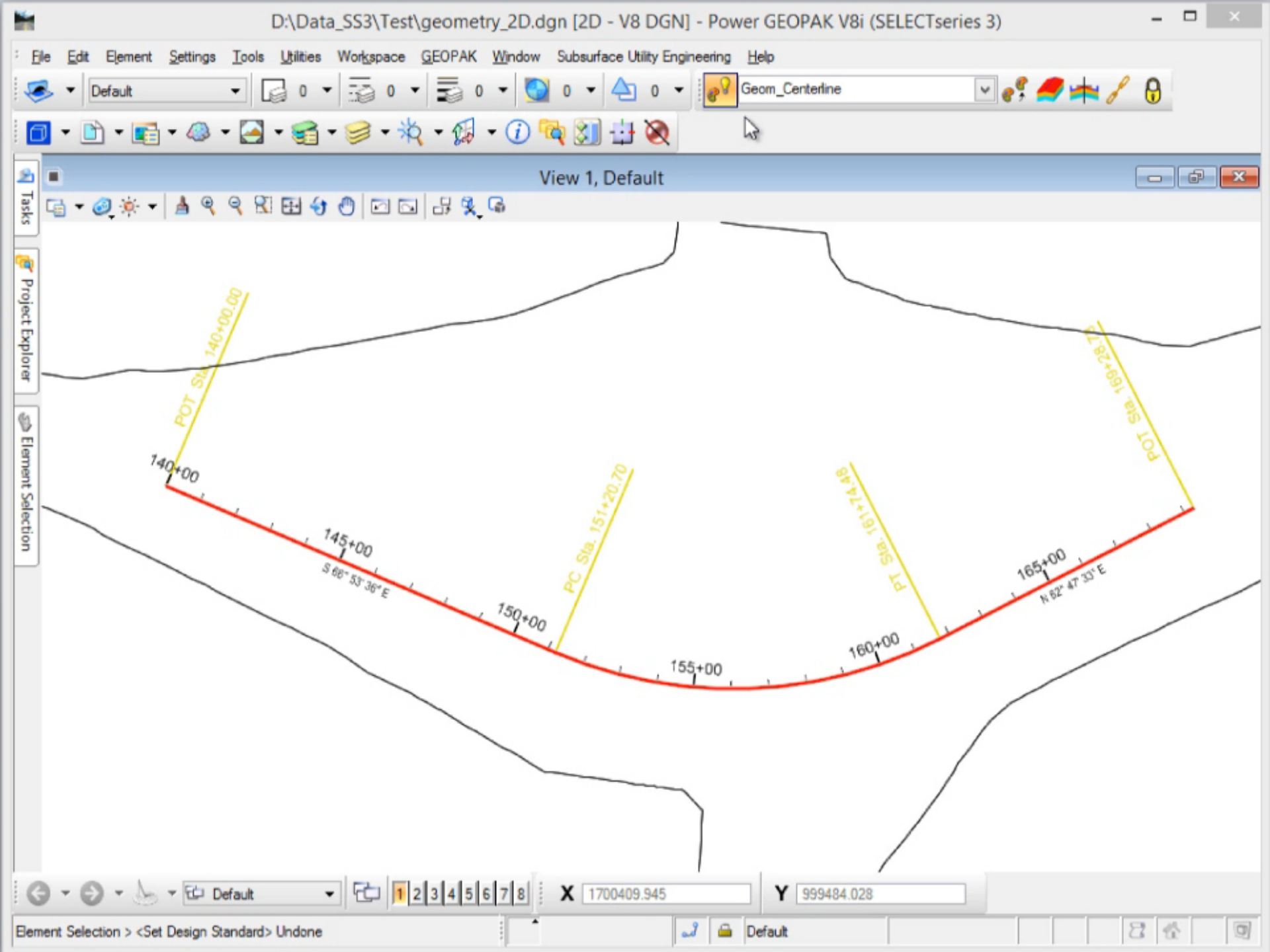
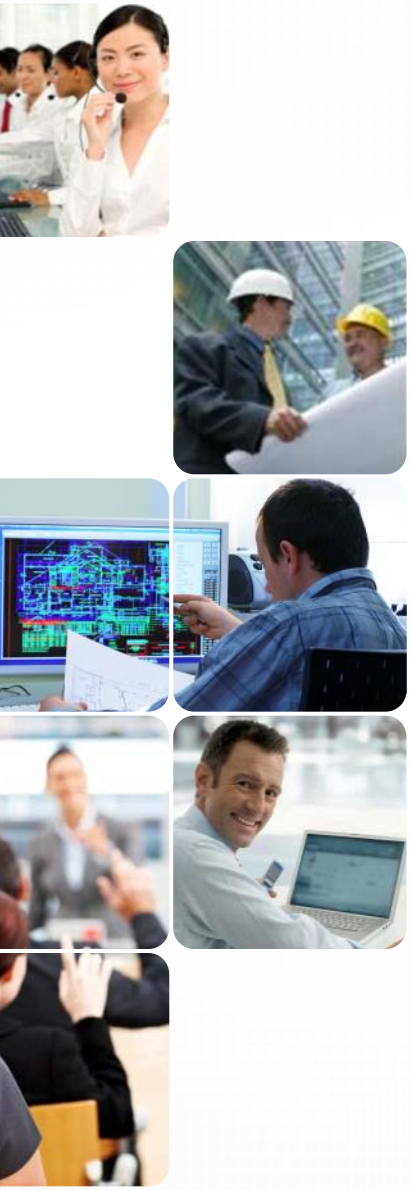

D:\Data_SS3\Test\geometry_2D.dgn [2D - V8 DGN] - Power GEOPAK V8i (SELECTseries 3)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Subsurface Utility Engineering Help
Default
Geom_Centerline
View 1, Default
Tasks
Project Explorer
Element Selection
POT Sta. 140+00.00
140+00
145+00
S 68° 53' 36" E
150+00
PC Sta. 151+20.70
155+00
PT Sta. 161+74.48
160+00
165+00
N 82° 47' 33" E
POT Sta. 169+28.72
Default
1 2 3 4 5 6 7 8
X 1700409.945
Y 999484.028
Element Selection > <Set Design Standard> Undone
Default



# OpenRoads Vertical Geometry

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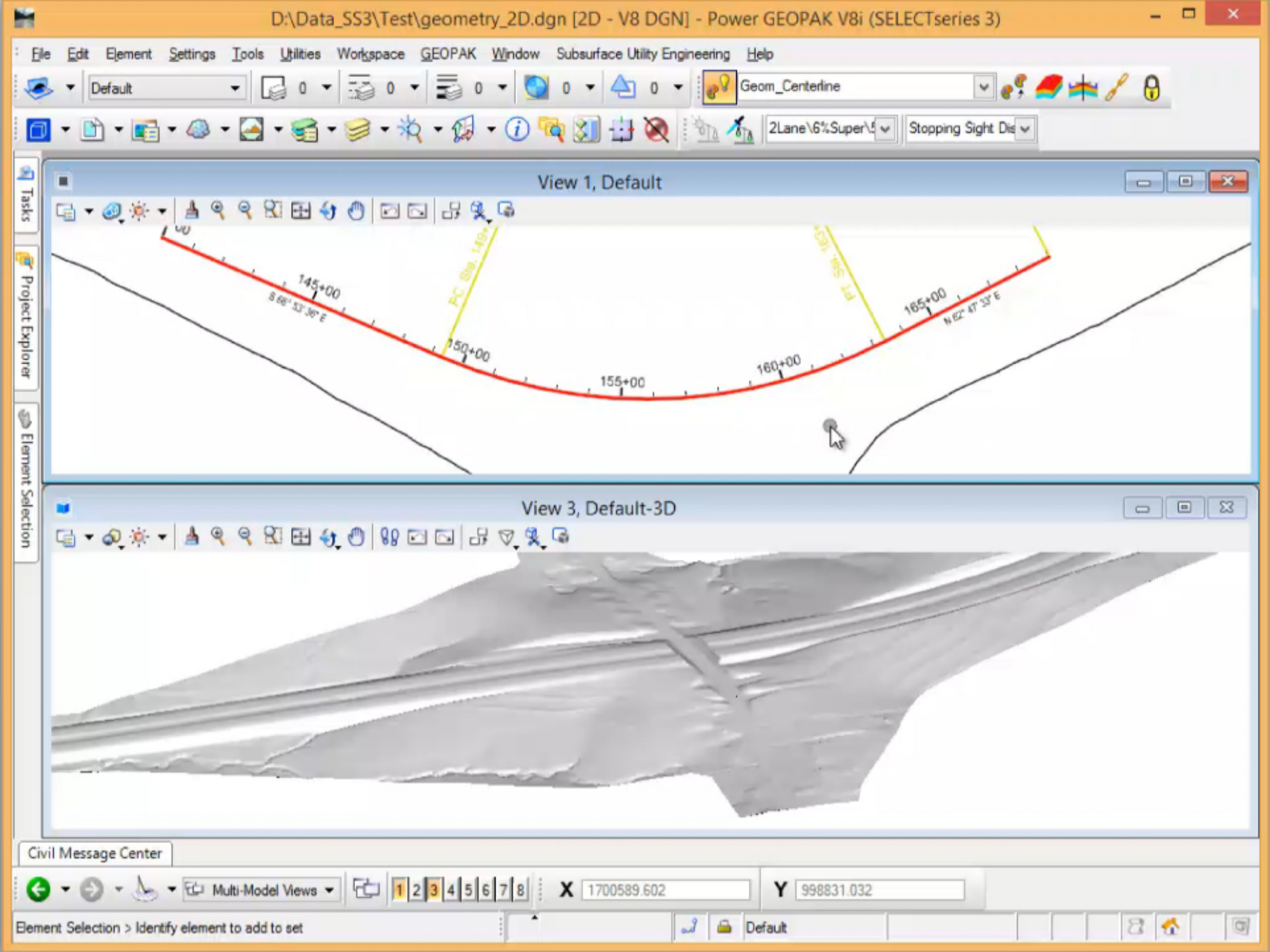
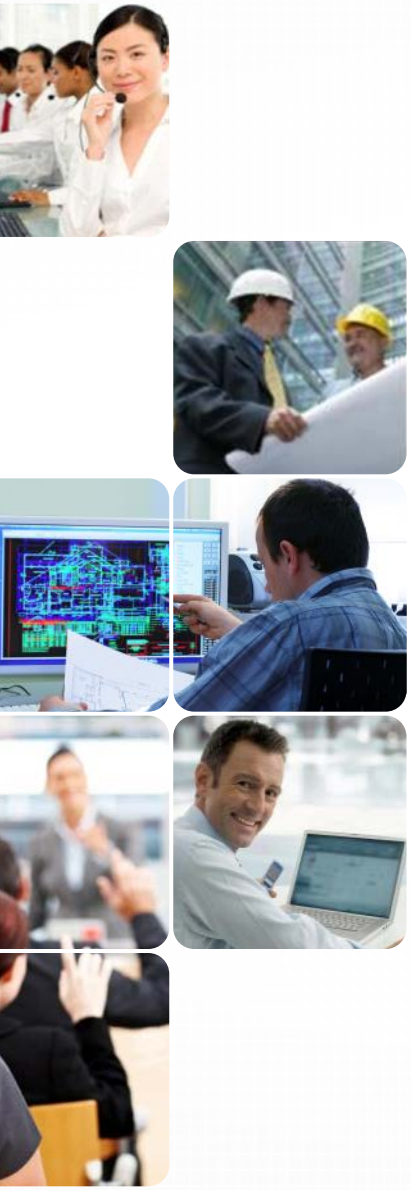

D:\Data_SS3\Test\geometry_2D.dgn [2D - V8 DGN] - Power GEOPAK V8i (SELECTseries 3)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Subsurface Utility Engineering Help
Default
Geom_Centerline
2Lane\6%Super\5
Stopping Sight Dis
Tasks
Project Explorer
Element Selection
View 1, Default
145+00
150+00
155+00
160+00
165+00
View 3, Default-3D
Civil Message Center
Multi-Model Views
1 2 3 4 5 6 7 8
X 1700589.602
Y 998831.032
Element Selection > Identify element to add to set
Default



# Corridor Modeling

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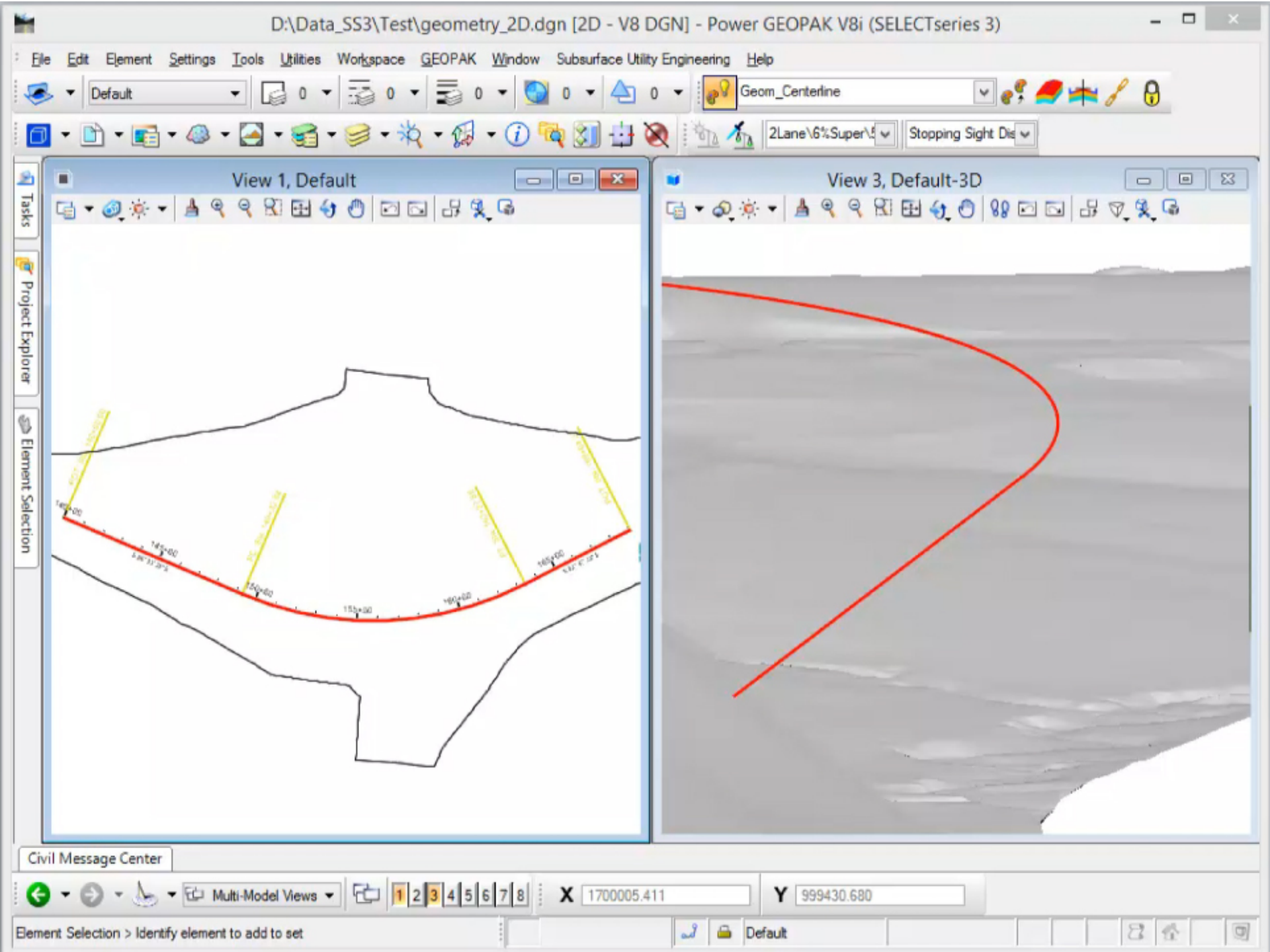
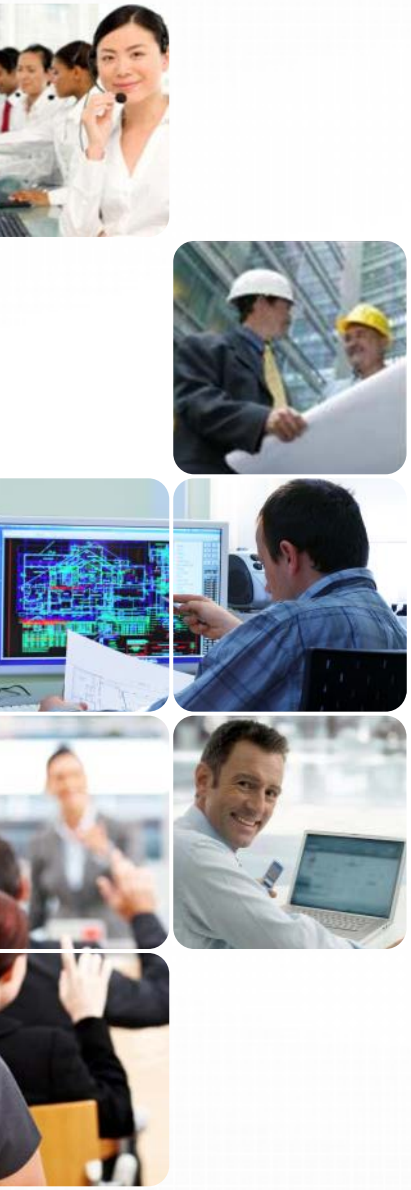

D:\Data_SS3\Test\geometry_2D.dgn [2D - V8 DGN] - Power GEOPAK V8i (SELECTseries 3)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Subsurface Utility Engineering Help
Default
Geom_Centerline
2Lane\6%Super\5
Stopping Sight Dis
View 1, Default
View 3, Default-3D
Tasks
Project Explorer
Element Selection
Civil Message Center
Multi-Model Views
1 2 3 4 5 6 7 8
X 1700005.411
Y 999430.680
Element Selection > Identify element to add to set
Default



# Parametric Design

## Enabling Automatic and Intelligent Updates

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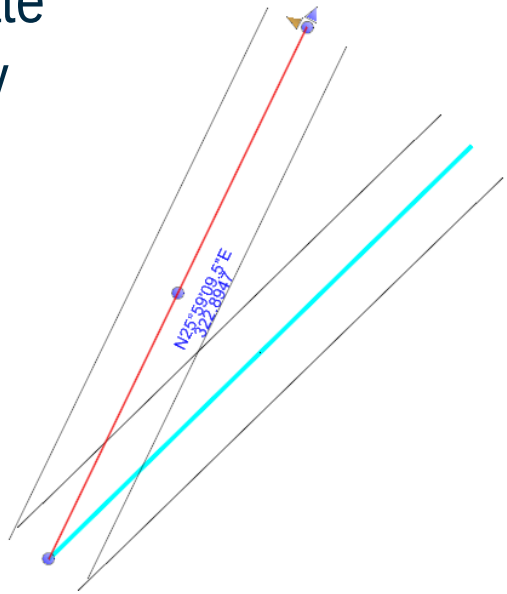
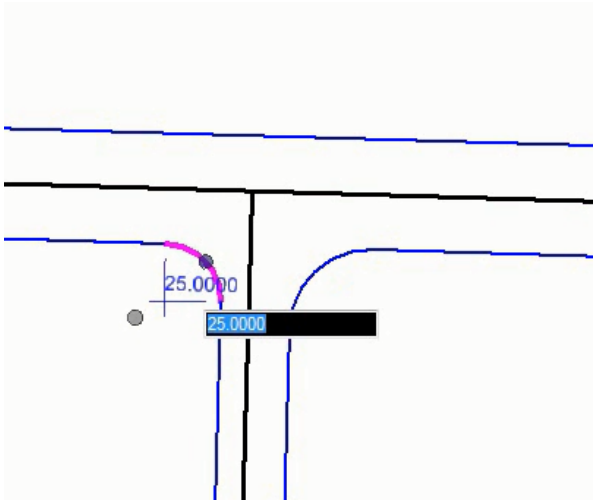
# What is *Parametric Design*?

*Parametric Design* preserves the rules and relationships creating during the design process in order to maximize the downstream benefits of automated updates.

Therefore, changing one value or parameter allows related elements to update themselves automatically yet intelligently.



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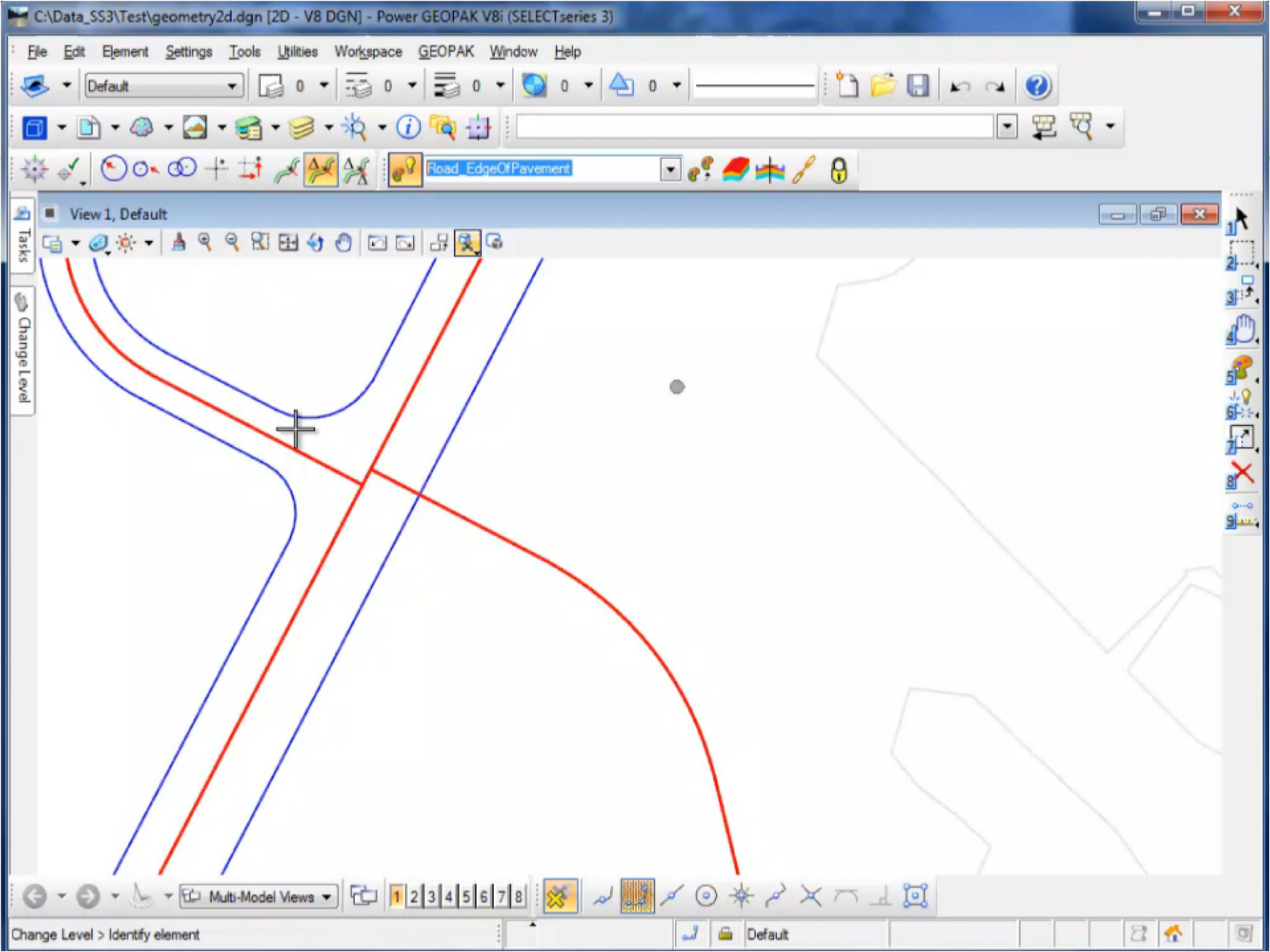
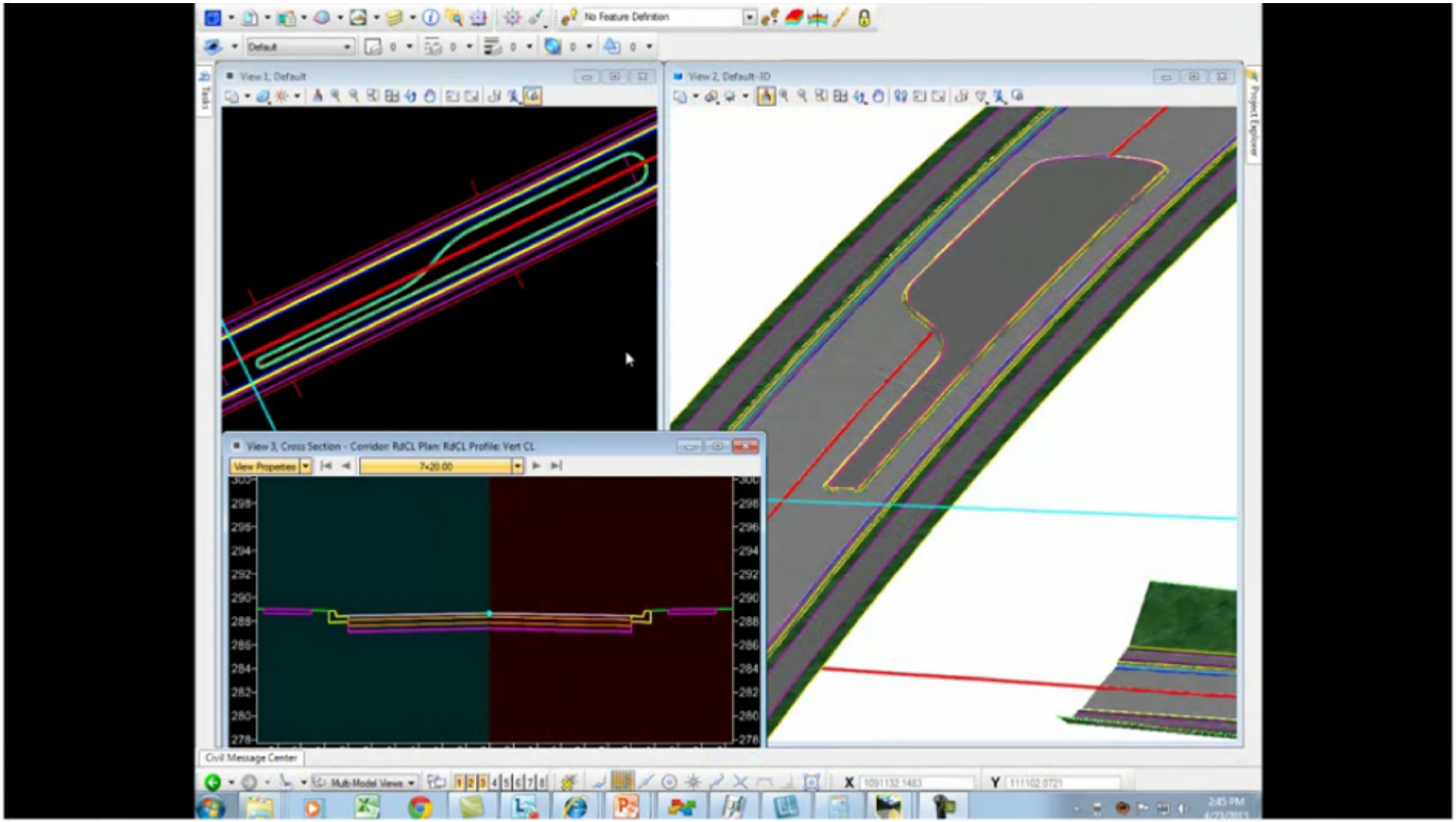

C:\Data_SS3\Test\geometry2d.dgn [2D - V8 DGN] - Power GEOPAK V8i (SELECTseries 3)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Help
Default
Road_EdgeOfPavement
View 1, Default
Tasks
Change Level
Multi-Model Views
1 2 3 4 5 6 7 8
Change Level > Identify element
Default

# What is *Parametric Design*?



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# Automatic Updates

Everyone wants software that will automatically update the design whenever a change is made in order to eliminate errors. However, if not done correctly, what most people don't realize is that automatic updates can generate just as many errors and omissions as it eliminates.

The reason for this is simple – if you are going to update a design correctly, then the software *must* remember the engineering decisions (i.e. the *design intent*) that originally went into the creation of those elements and components. If you don't, then any updates you do will involve assumptions and guessing which will obviously lead to additional errors and omissions.

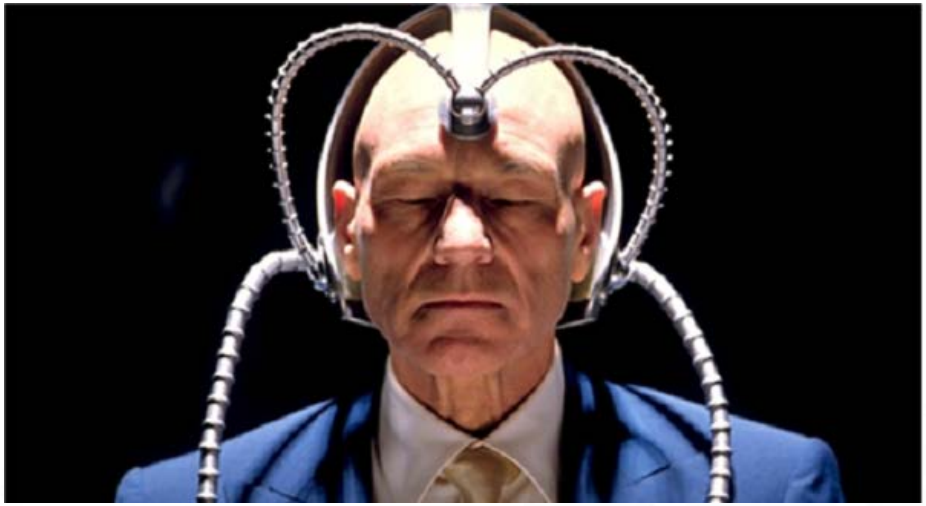
 

# How do I communicate Design Intent?

In many cases, there is nothing for you as a user to necessarily think about or consider. As you've seen, you just get the proper rules and relationships as part of the *commands* you are using.

However, as a user, there are times you need to think about what you are doing in order to 'communicate' to the software your design intent.

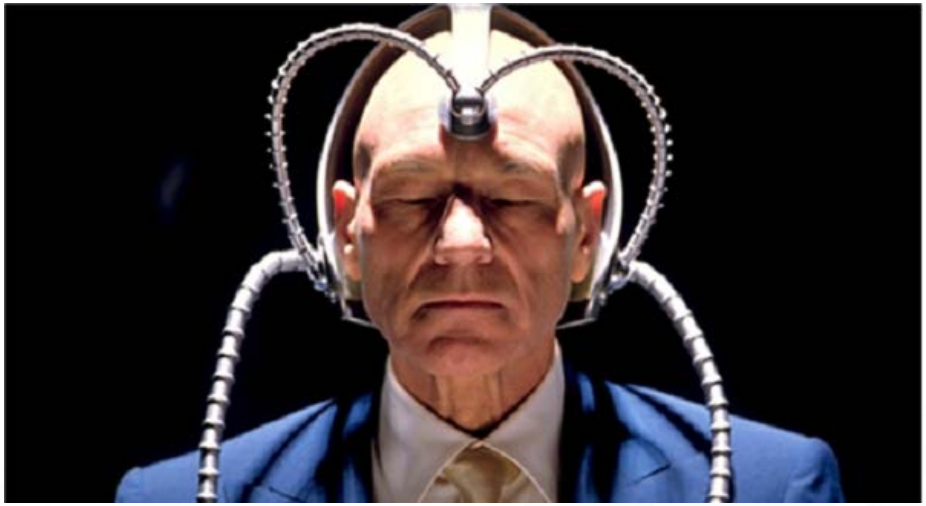
Again, this is what *OpenRoads* was designed to allow users to do.



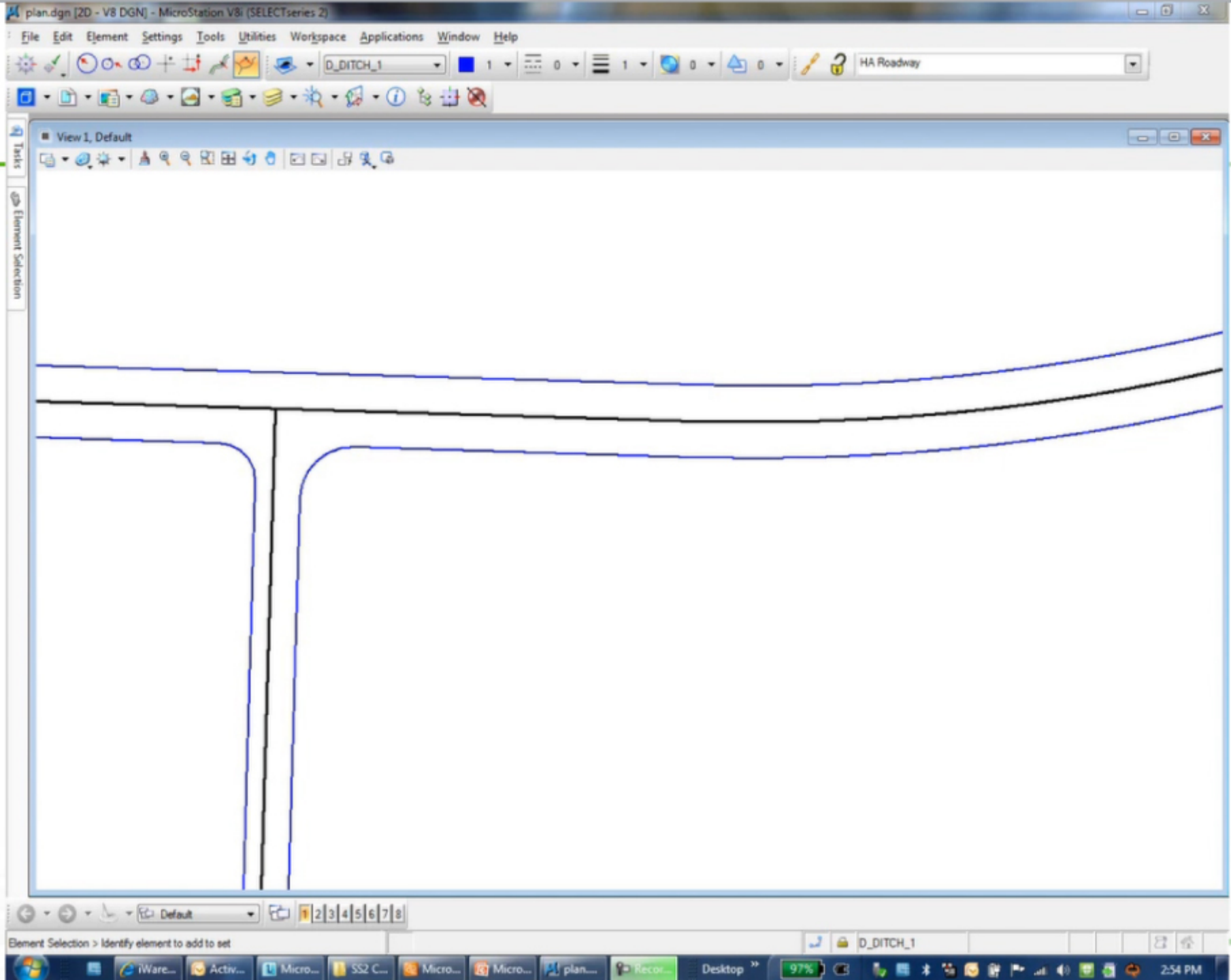
 

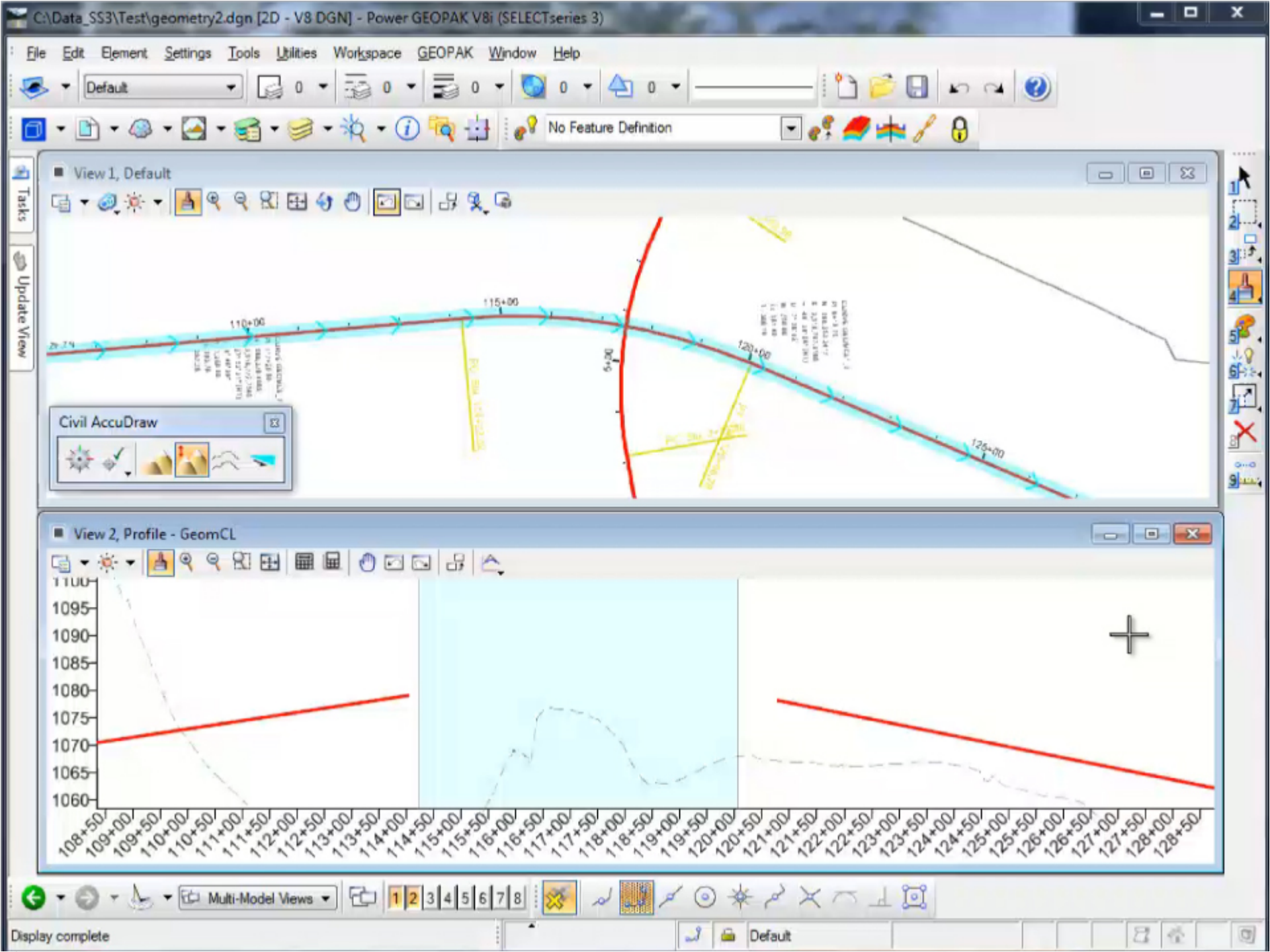
# How do I communicate Design Intent?

1. Civil AccuDraw




plan.dgn [2D - V8 DGN] - MicroStation V8i (SELECTseries 2)
File Edit Element Settings Tools Utilities Workspace Applications Window Help
D_DITCH_1
HA Roadway
View 1, Default
Tasks
Element Selection
Default
Element Selection > Identify element to add to set
D_DITCH_1
Desktop
97%
2:54 PM


C:\Data_SS3\Test\geometry2.dgn [2D - V8 DGN] - Power GEOPAK V8i (SELECTseries 3)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Help
Default
No Feature Definition
Tasks
Update View
View 1, Default
110+00
115+00
120+00
125+00
Civil AccuDraw
View 2, Profile - GeomCL
1100
1095
1090
1085
1080
1075
1070
1065
1060
108+50
109+00
109+50
110+00
110+50
111+00
111+50
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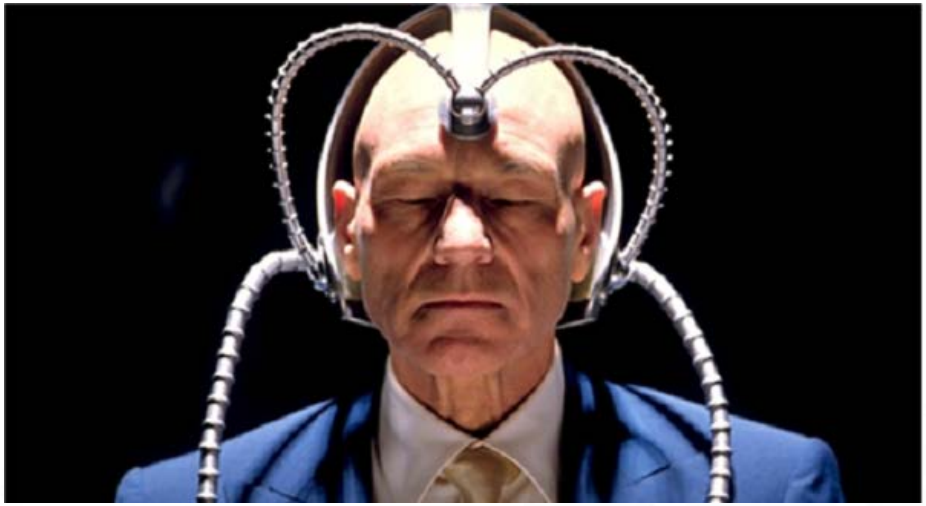
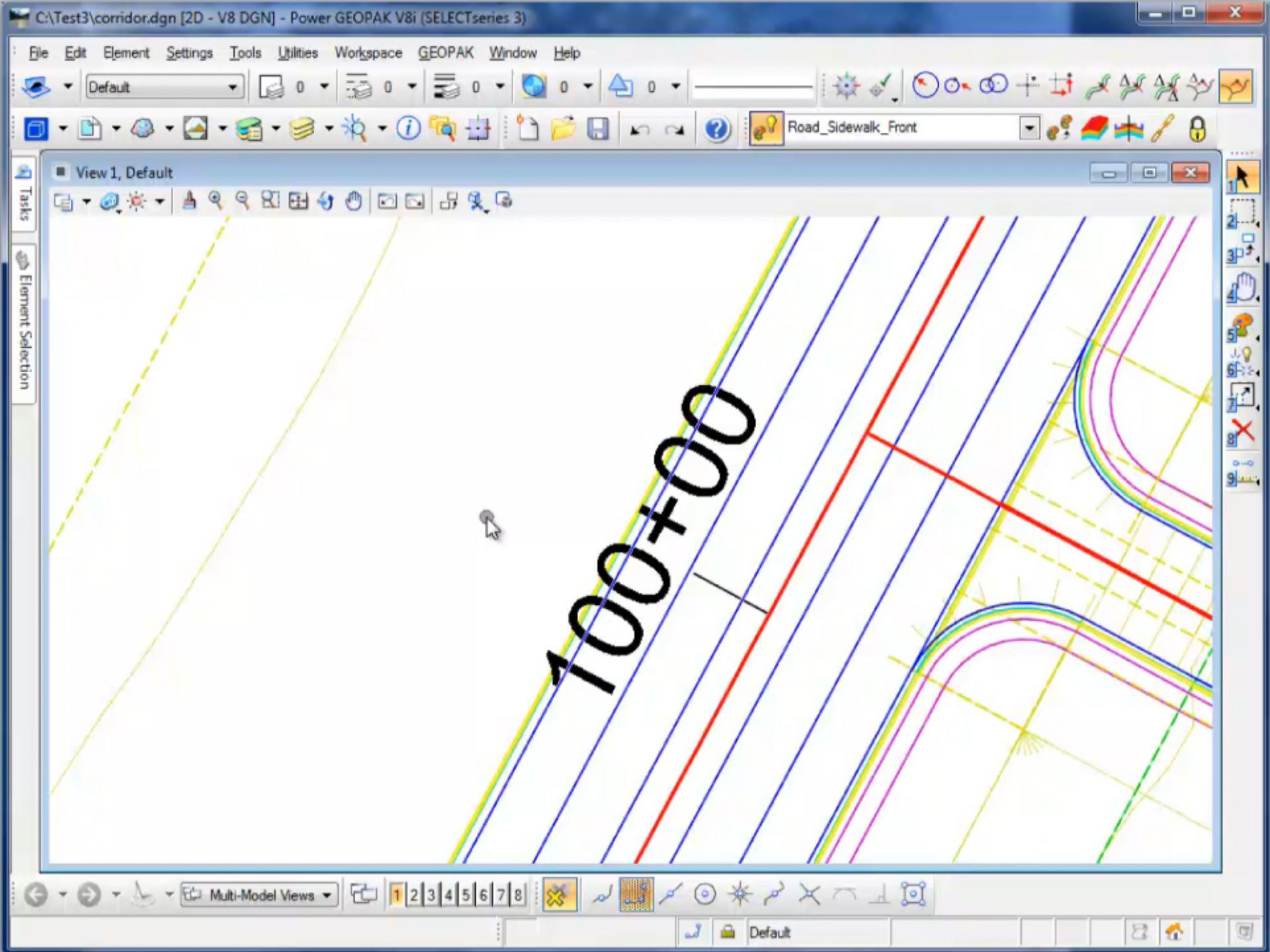
122+00
122+50
123+00
123+50
124+00
124+50
125+00
125+50
126+00
126+50
127+00
127+50
128+00
128+50
Multi-Model Views
1 2 3 4 5 6 7 8
Display complete
Default

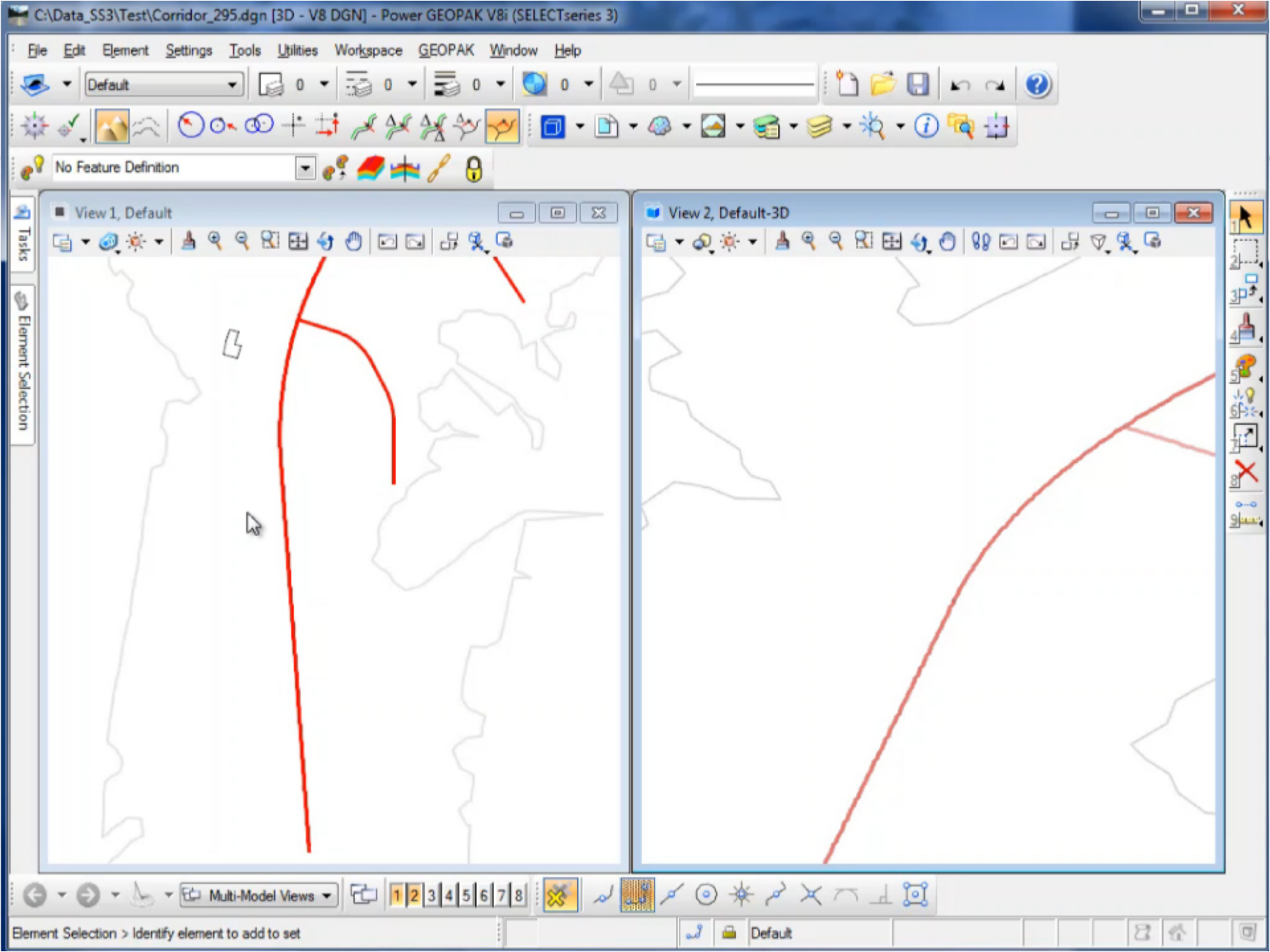
# How do I communicate Design Intent?

1. Civil AccuDraw
2. MicroStation Snaps




C:\Test3\corridor.dgn [2D - V8 DGN] - Power GEOPAK V8i (SELECTseries 3)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Help
Default
Road_Sidewalk_Front
View 1, Default
100+00
Tasks
Element Selection
Multi-Model Views
Default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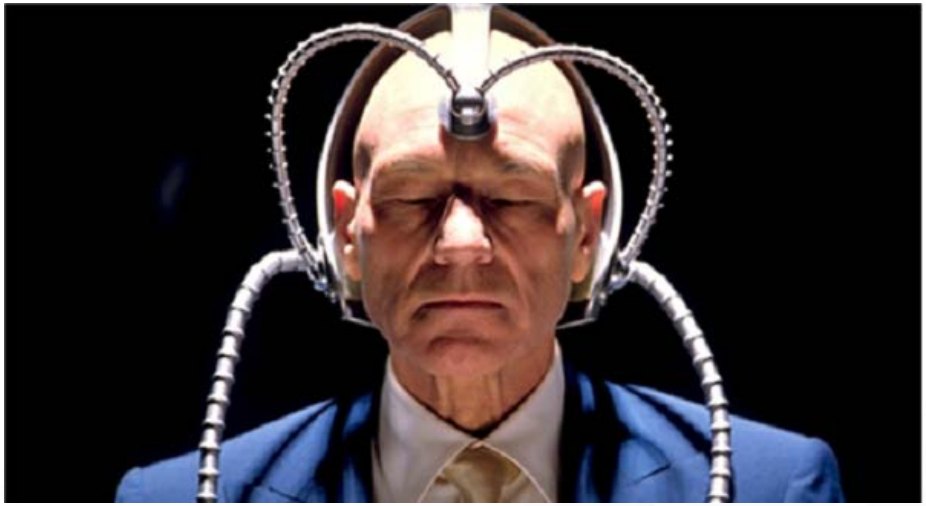
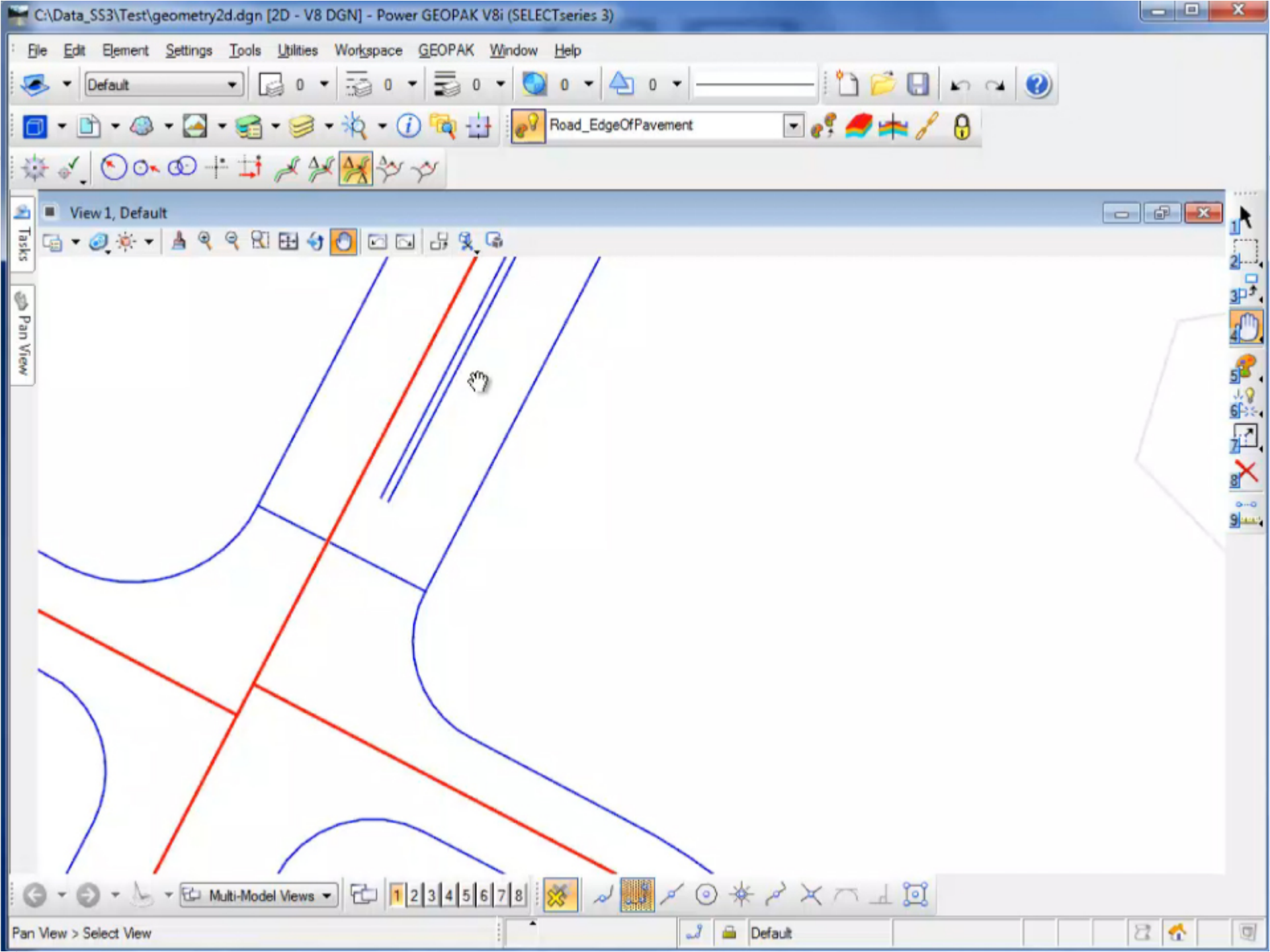
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Help
Default
No Feature Definition
View 1, Default
View 2, Default-3D
Tasks
Element Selection
Multi-Model Views
1 2 3 4 5 6 7 8
Element Selection > Identify element to add to set
Default

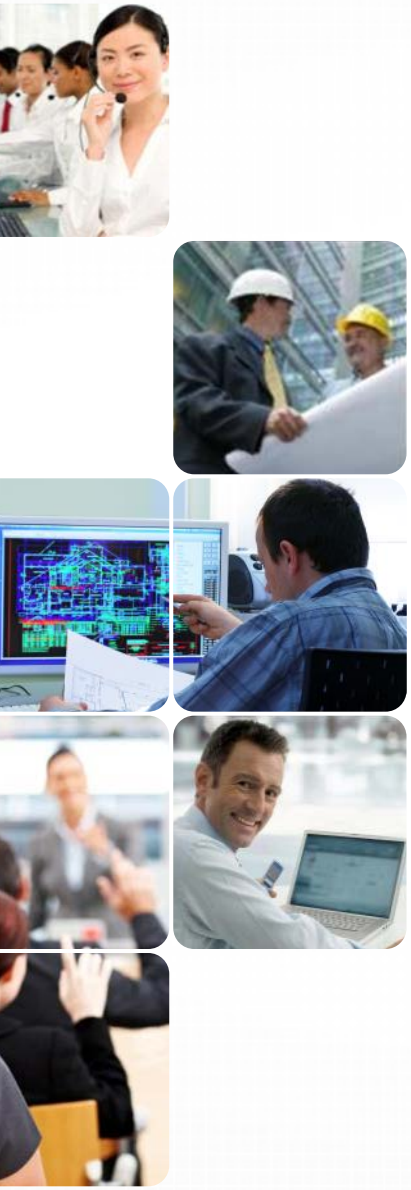
# How do I communicate Design Intent?

1. Civil AccuDraw
2. MicroStation Snaps
3. MicroStation Commands




C:\Data_SS3\Test\geometry2d.dgn [2D - V8 DGN] - Power GEOPAK V8i (SELECTseries 3)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Help
Default
Road_EdgeOfPavement
View 1, Default
Tasks
Pan View
Multi-Model Views
Pan View > Select View
Default



# Modeling is Modeling

## OpenRoads Provides the Right Tools for the Job

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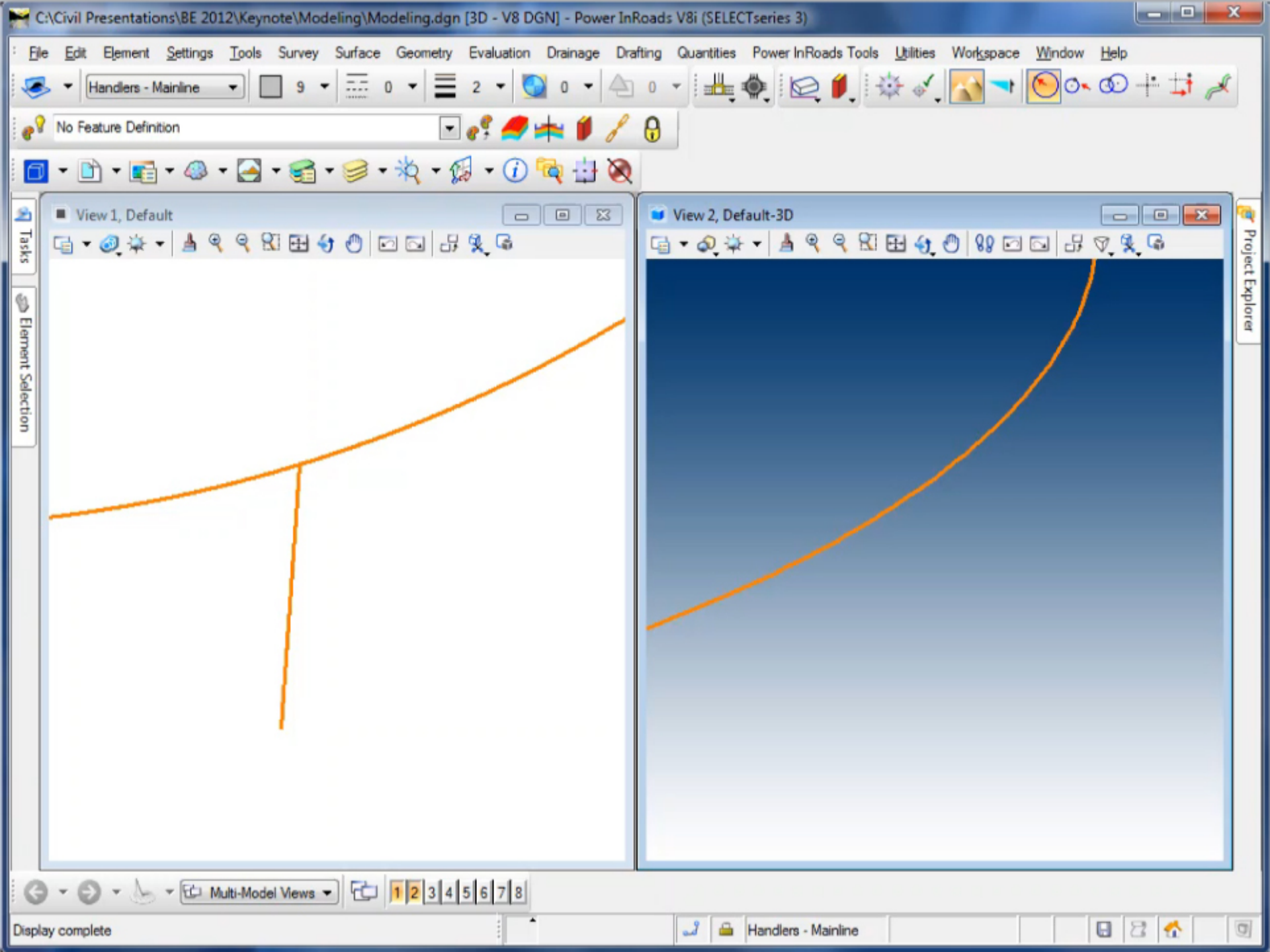
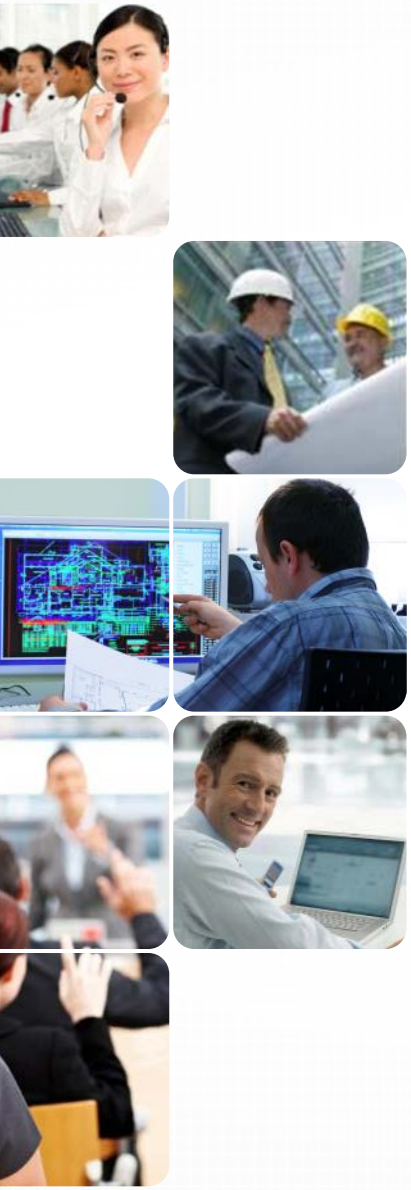

C:\Civil Presentations\BE 2012\Keynote\Modeling\Modeling.dgn [3D - V8 DGN] - Power InRoads V8i (SELECTseries 3)
File Edit Element Settings Tools Survey Surface Geometry Evaluation Drainage Drafting Quantities Power InRoads Tools Utilities Workspace Window Help
Handlers - Mainline
No Feature Definition
View 1, Default
View 2, Default-3D
Tasks
Element Selection
Project Explorer
Multi-Model Views
1 2 3 4 5 6 7 8
Display complete
Handlers - Mainline



# Eliminate Redundancy with Civil Cells

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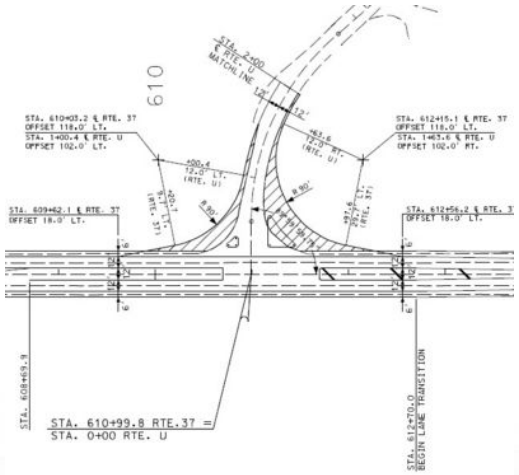
# What is a Civil Cell?

A civil cell is a mechanism that allows a user to pre-configure commonly used 2D and 3D geometric layouts while maintaining all design intelligence.

*Intersections, Medians, Roundabouts, Driveways, etc.*

These Civil Cells will then commonly be stored in DGNLib files for re-use across multiple projects.



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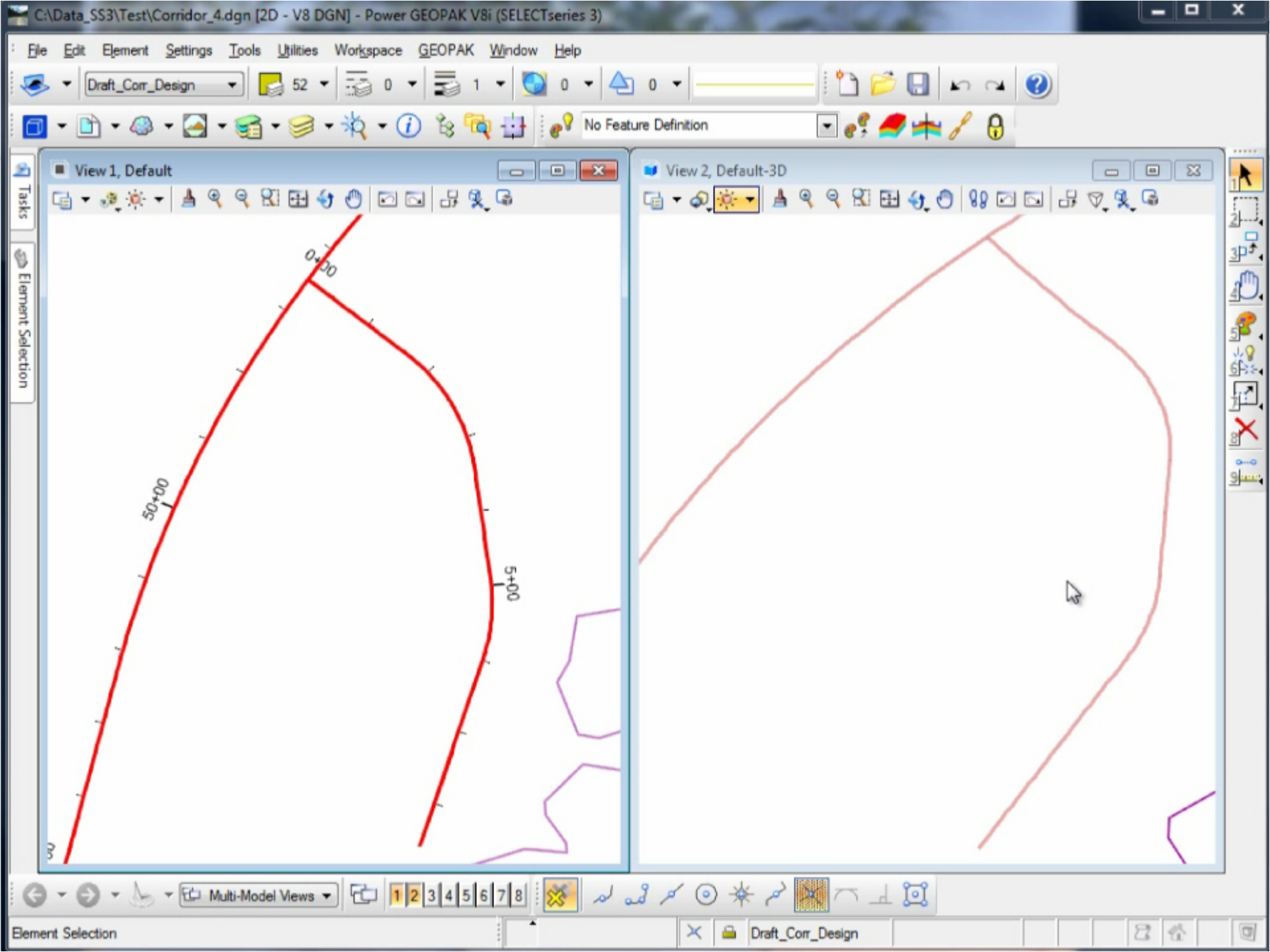
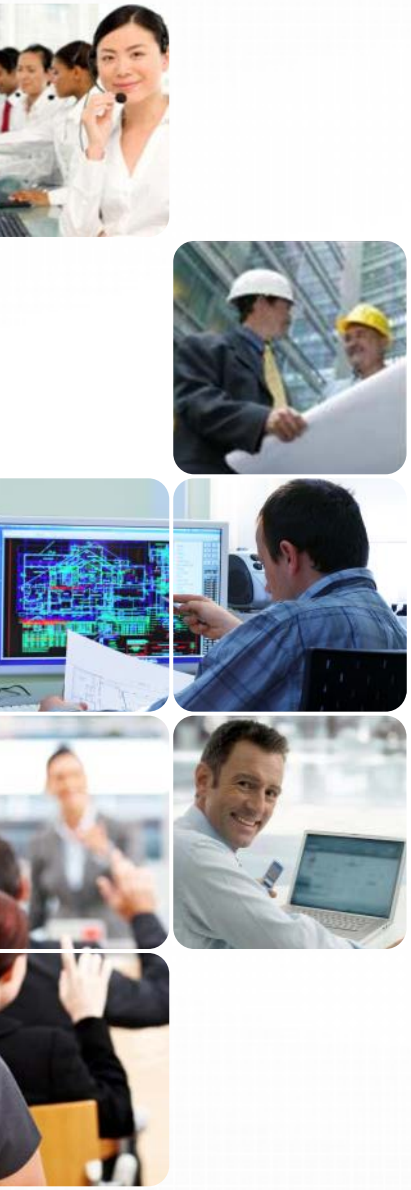

C:\Data_SS3\Test\Corridor_4.dgn [2D - V8 DGN] - Power GEOPAK V8i (SELECTseries 3)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Help
Draft_Corr_Design
No Feature Definition
View 1, Default
0+00
50+00
5+00
View 2, Default-3D
Tasks
Element Selection
Multi-Model Views
Element Selection
Draft_Corr_Design



# Construction Ready Models

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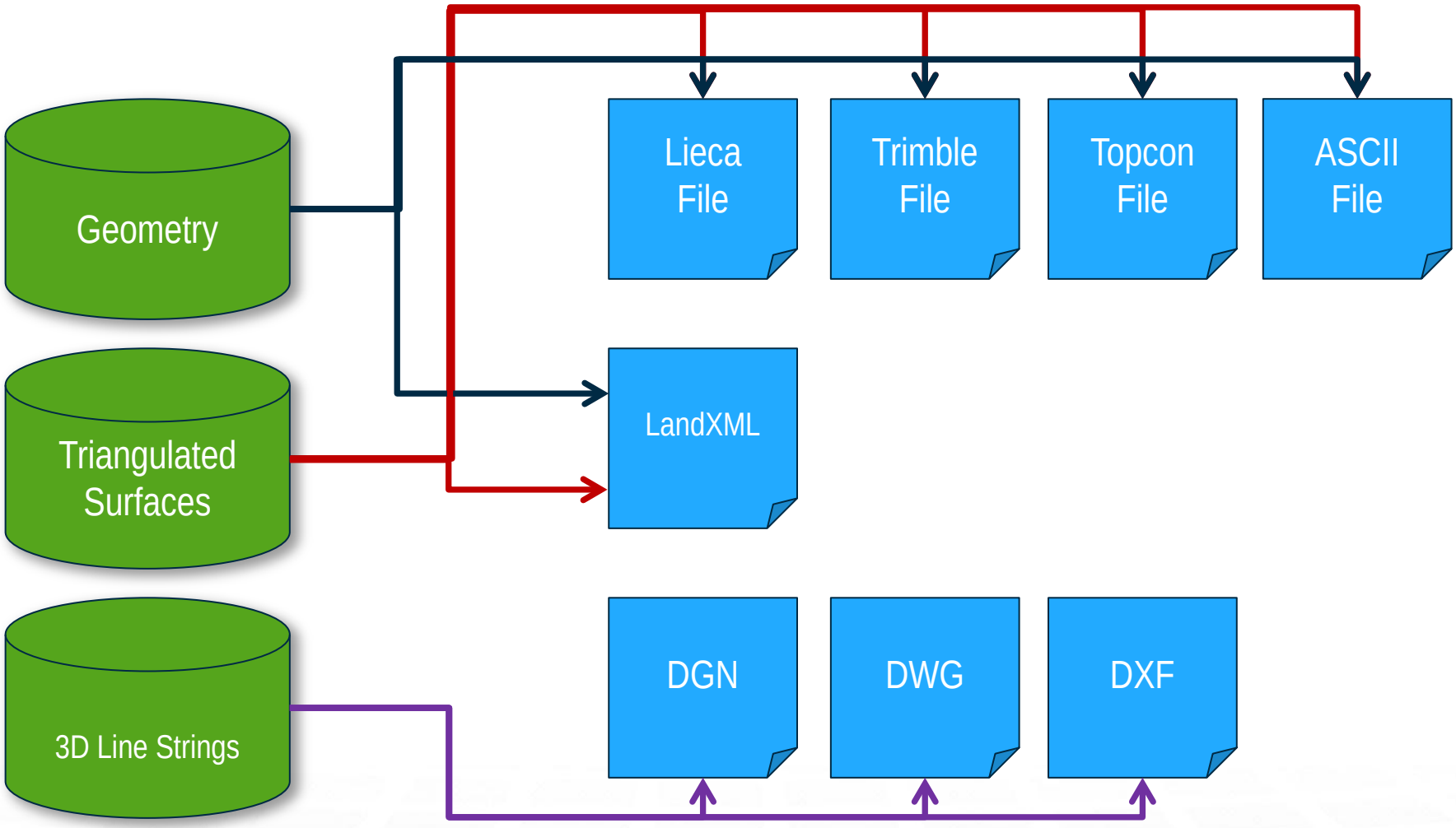
# OpenRoads Technology



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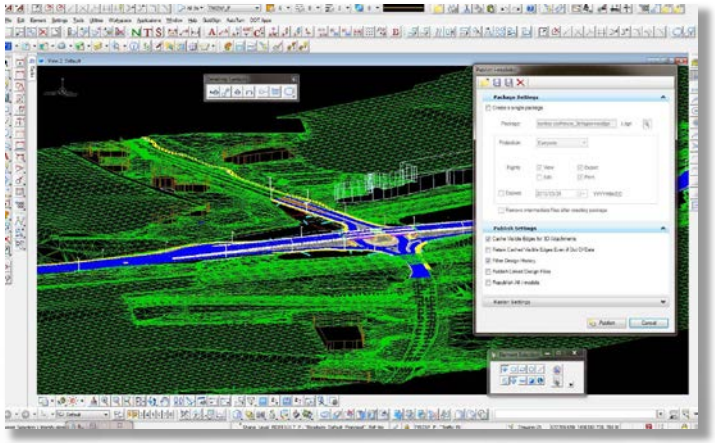
# *i*-Model

The *i*-Model, at its most basic, is a container for open infrastructure information exchange. It allows a user to publish their model so that it can be used by downstream consumers without the need for the original editing application.

- *Portable*
- *Combines disparate data into a single model*
- *Contains intelligent engineering data*
- *Protects the sanctity of the model*
- *Time persistent*
- *Etc.*



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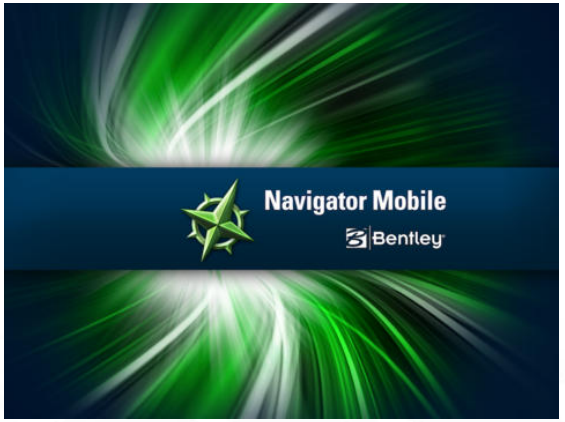
# Mobile Apps

- *View Visualized Model*
- *Sensor Enabled*
- *“Panoramic” Navigation*
- *Contains Engineering Data*
- *Markup Capabilities*
- *Clash Detection*
- *Etc.*

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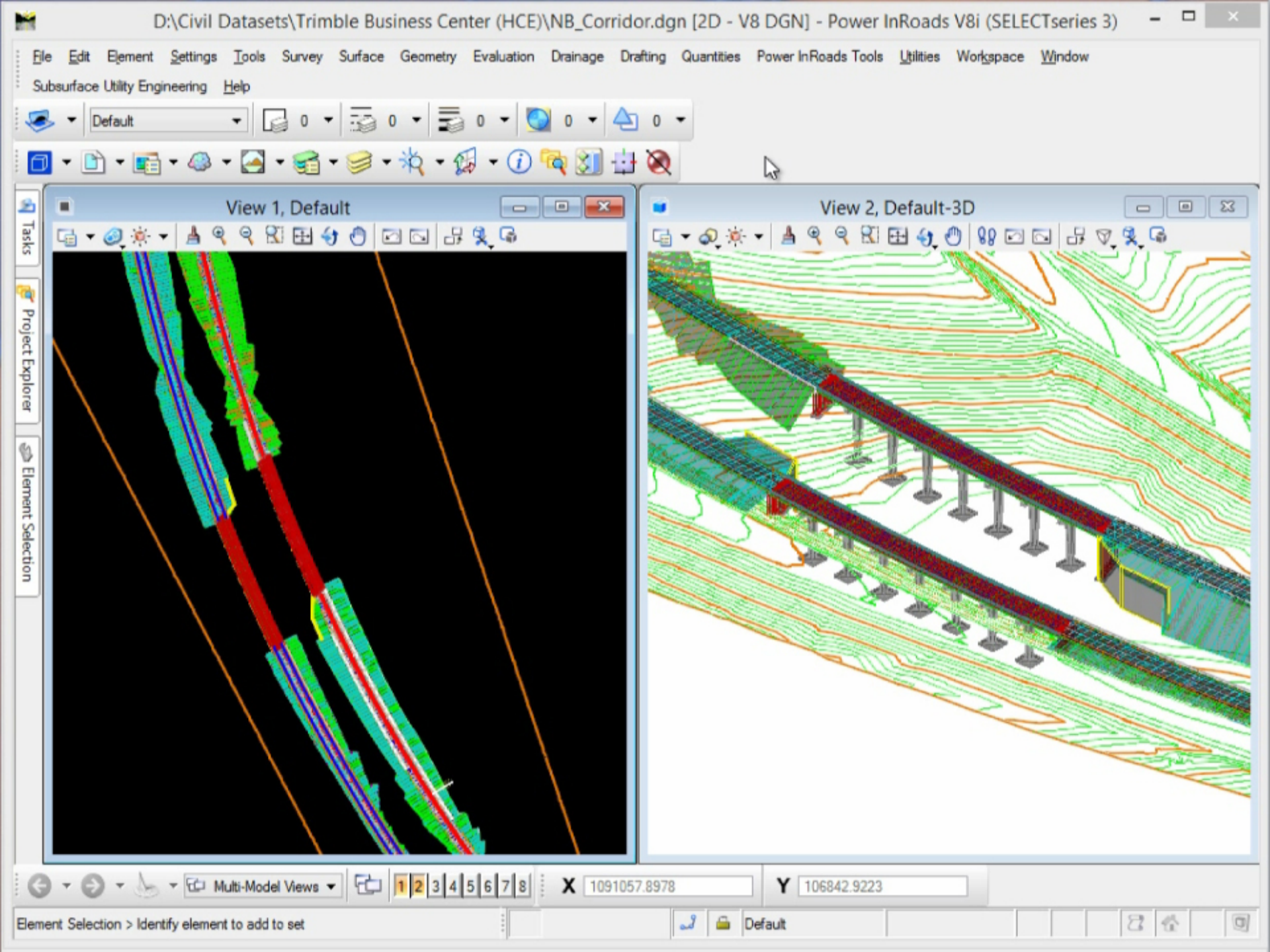
D:\Civil Datasets\Trimble Business Center (HCE)\NB_Corridor.dgn [2D - V8 DGN] - Power InRoads V8i (SELECTseries 3)
File Edit Element Settings Tools Survey Surface Geometry Evaluation Drainage Drafting Quantities Power InRoads Tools Utilities Workspace Window
Subsurface Utility Engineering Help
Default
View 1, Default
View 2, Default-3D
Tasks
Project Explorer
Element Selection
Multi-Model Views
1 2 3 4 5 6 7 8
X 1091057.8978
Y 106842.9223
Element Selection > Identify element to add to set
Default

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# Thank You!