Civil 3D for Project Managers

Presented by

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What influences the FDOT Priority List?

- Compelling Events
  - Worn Out Assets
  - Storm Damage
  - Damages from Utility Strikes
  - Cost Overruns from Unforeseen Conditions

What is our response to the FDOT Priority List?

- Projects
  - Who is the Primary Responsible Party (PRP)?

Project Manager

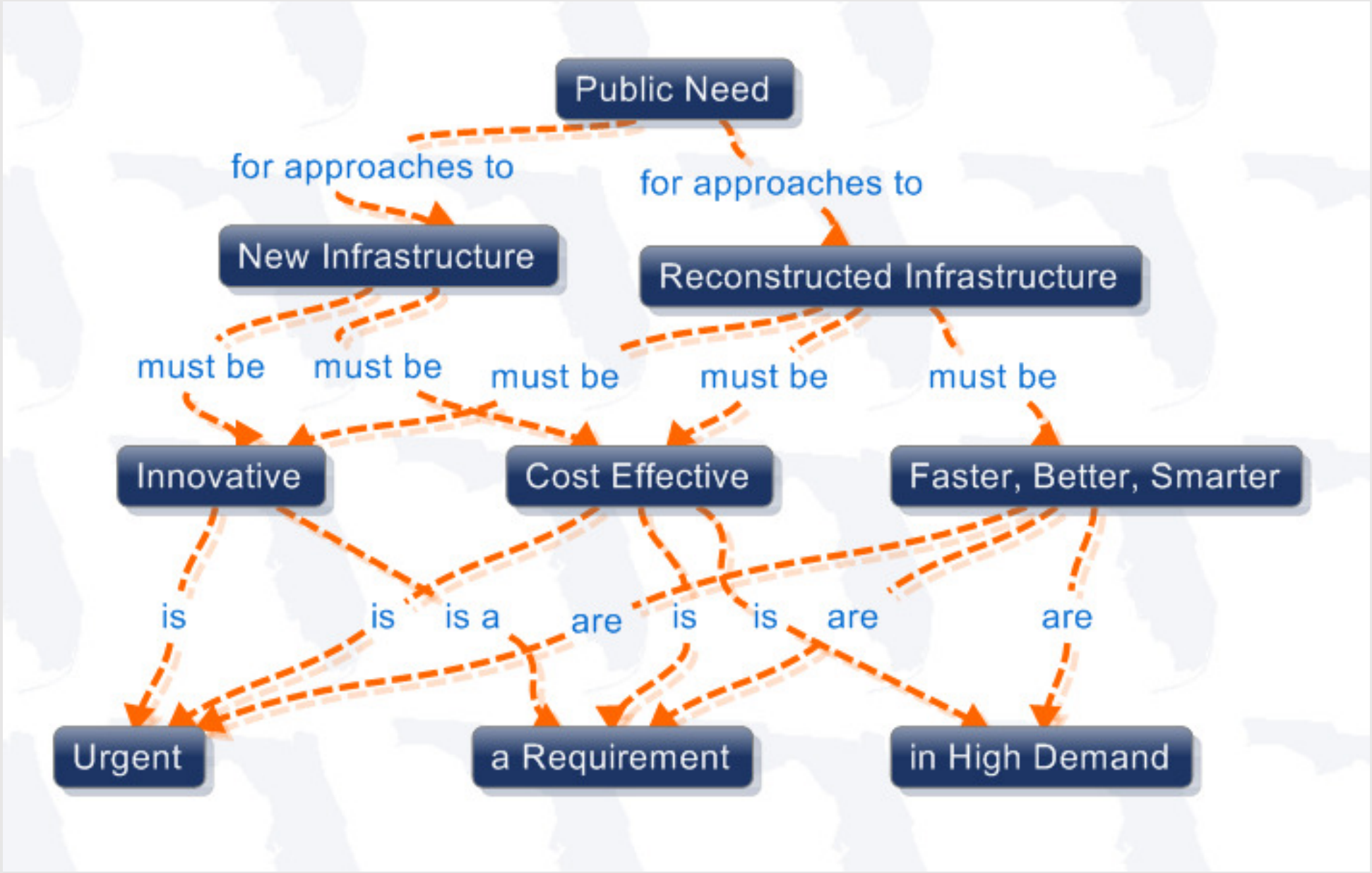
Do we have the right people in the room?

Project Managers
Engineers
Designers
CAD Techs

Need for innovative and cost-effective approaches to both new and reconstructed infrastructure is urgent.

Faster, smarter, better are in high demand....are a REQUIREMENT.

<audience nods head in agreement>



Innovative Solutions for tomorrow's transportation needs

Break it down

(Diverging Diamond Interchange)

Innovative

Break it down

[D1 youtube video]

Cost Effective

Break it down

Faster, Smarter, Better

Break it down

Faster, Smarter, Better

Faster, Smarter, Better are the Benefits of Design Automation

- Predictable Project Outcomes
- Reduced Conflicts and Changes
- Lower Project Risk

3D Printed Construction

What Project Managers Want

- Predictable Project Outcomes
- Reduced Conflicts and Changes
- Lower Project Risk

Predictable Project Outcomes

- Making the right choices
- Evaluating Many Design Scenarios
- 3D design is just as fast as 2D design when you have tools built for 3D results
- Design Automation Reduces Errors

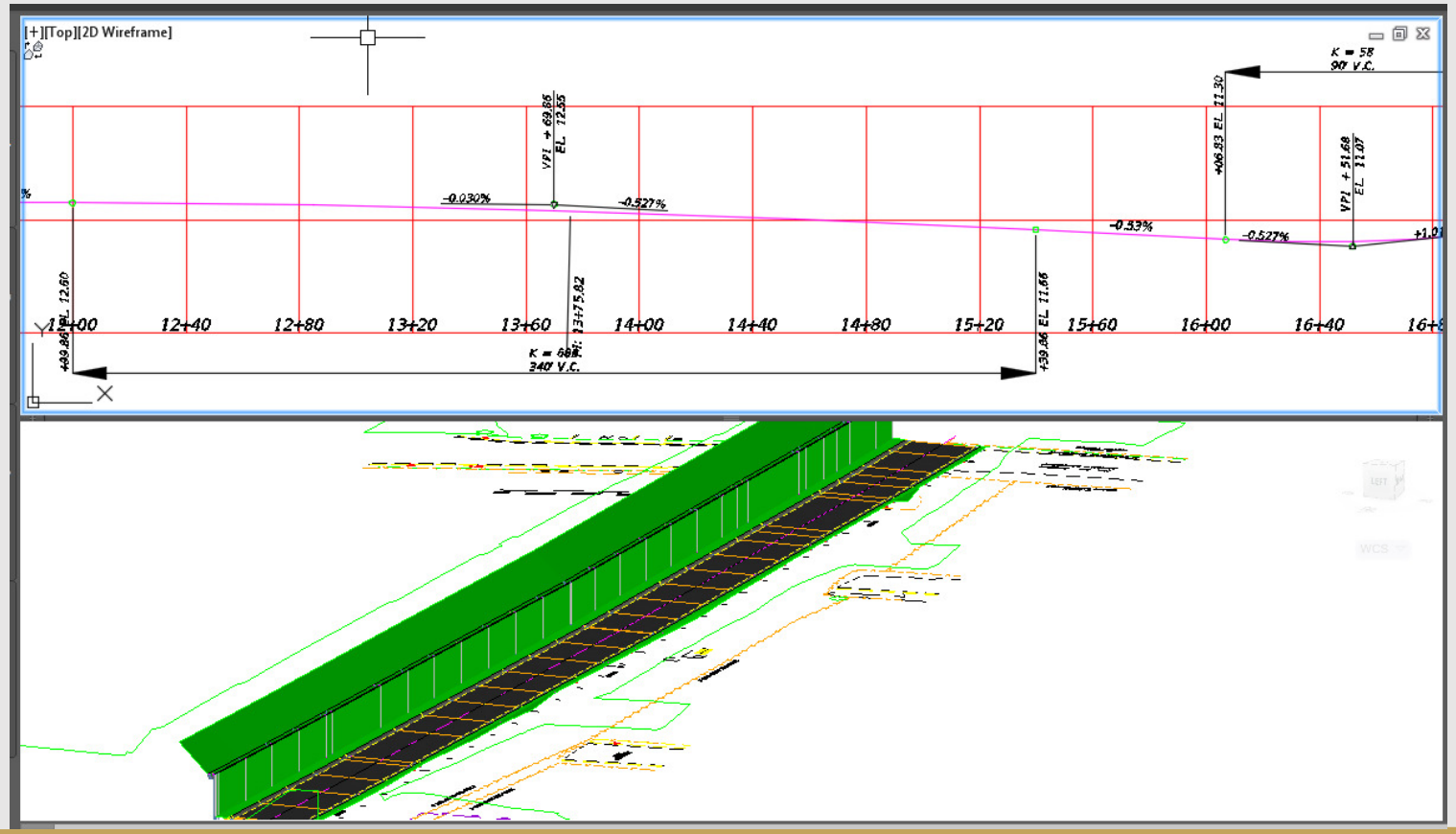
Making the right choices

- Cost
- Safety
- Schedule
- Project Performance
- Minimize RFIs

Evaluate Many Design Scenarios Confidently choose the best

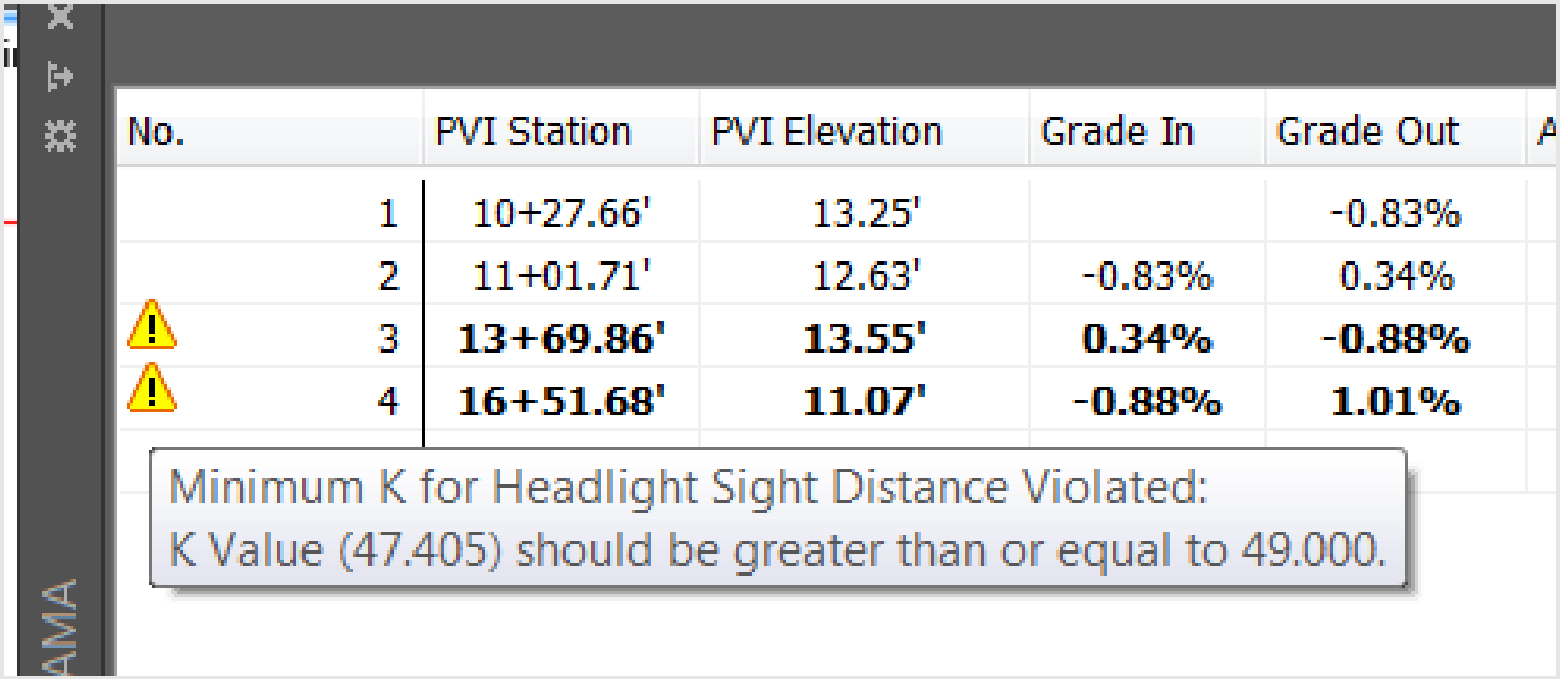
- Modeling in 3D at the conceptual design phase allows for rapid evaluation of multiple alternatives in a data rich environment with analysis tools enabling faster and better design decisions
- You still make intuitive decisions. They are now backed by data, reports, and analysis tools.
- See how your design changes affect cost. The model enables better cost estimation in the early stages of a project.

Modeling in 3D at the conceptual design phase allows for rapid evaluation of multiple alternatives in a data rich environment with analysis tools enabling faster and better design decisions

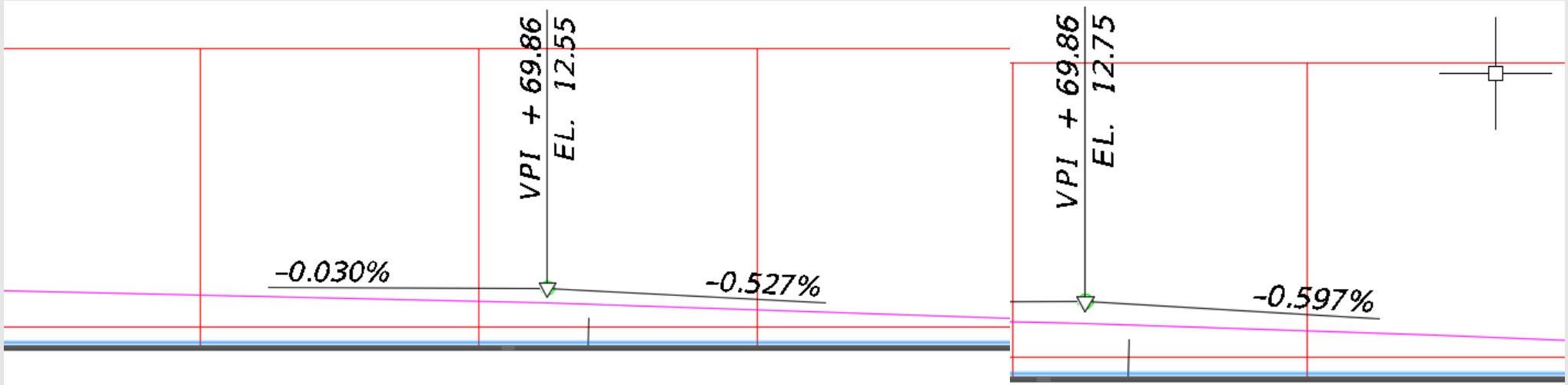


Evaluate Multiple Design Scenarios

- You still make intuitive decisions. They are now backed by data, reports, and analysis tools.



See how your design changes affect cost. The model enables easier cost estimation in the early stages of a project.



Total Volume Table

Station	Cut Area	Fill Area	Cut Vol	Fill Vol	Cum Cut Vol	Cum Fill Vol	Net Vol
12+00.00	225.08	20.48	0.00	0.00	0.00	0.00	0.00
13+00.00	229.04	13.39					
13+75.82	224.83	17.19					
14+00.00	239.21	16.86					
15+00.00	245.73	12.92	898.04	55.15	2582.91	175.68	2407.23
16+00.00	270.93	7.14	956.79	37.15	3539.70	212.83	3326.88

Raise VPI by 0.2’ ~ Δ = -60 c.y.

Volume Table

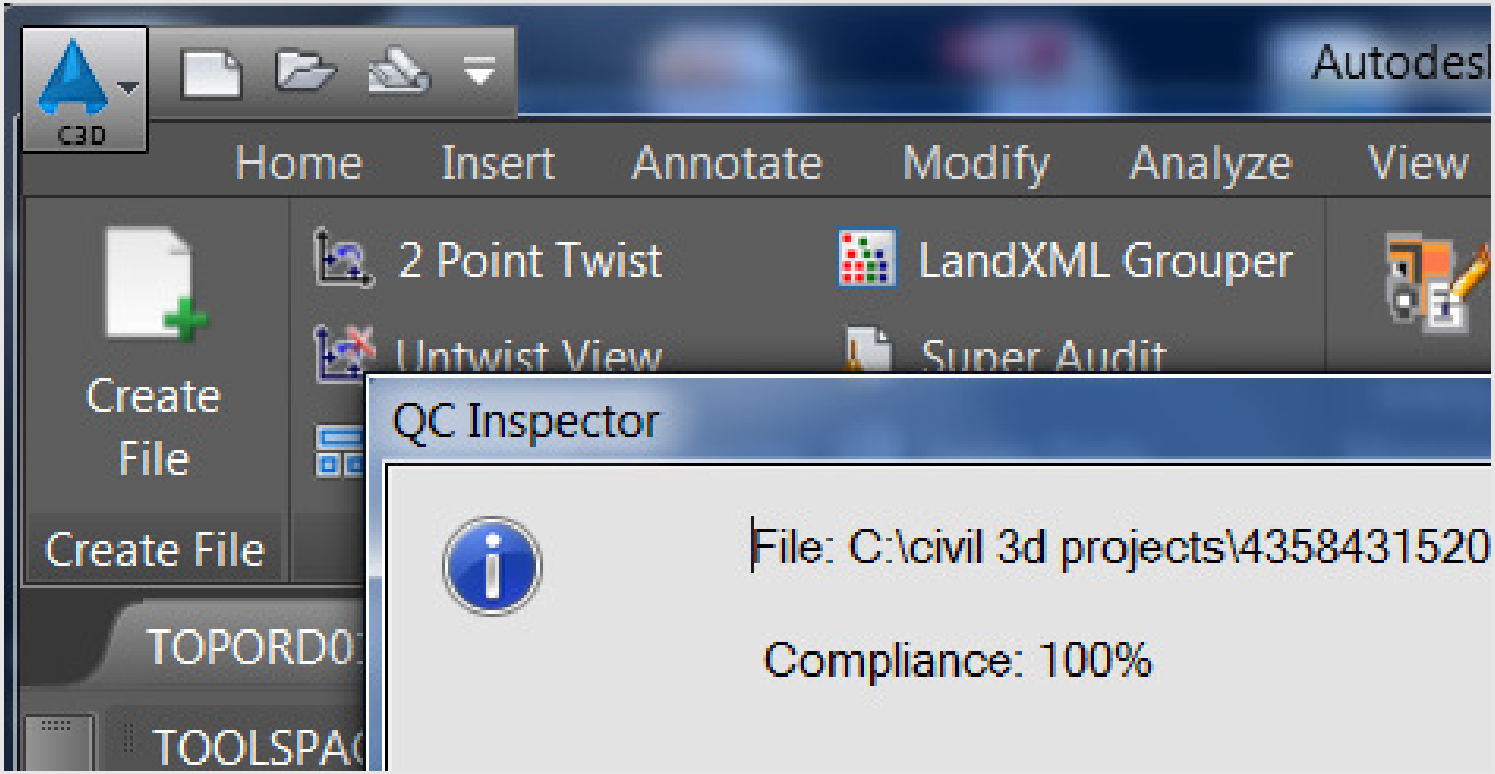
Fill Vol	Cum Cut Vol	Cum Fill Vol	Net Vol
		0.00	0.00
		65.68	763.86
		110.99	1344.67
15.66	1658.49	126.65	1531.84
57.97	2542.25	184.62	2357.63
16+00.00	269.48	7.31	947.84	38.64	3490.09	223.26	3266.83

3D design is just as

fast as 2D design when you have

tools built for 3D results

Design Audomation Reduces Errors



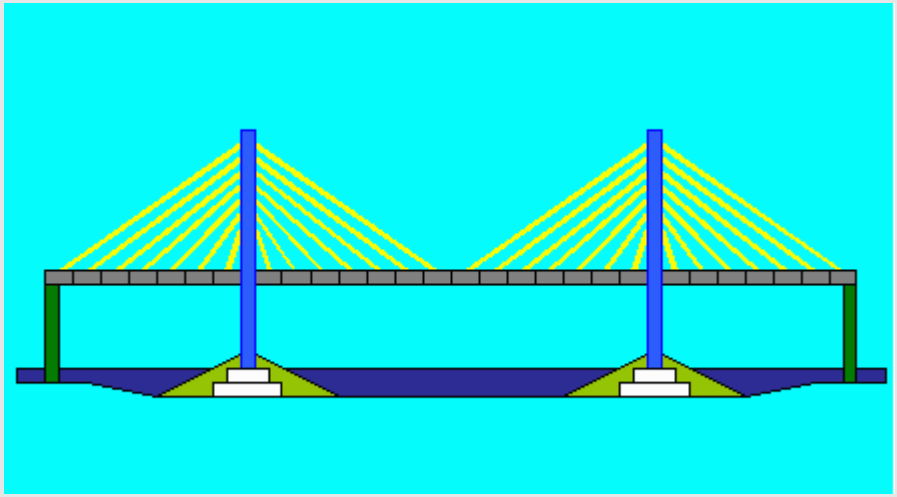
Reduced Conflicts and Changes

- Sequencing construction and coordinating site logistics are planned better when you have a model.

Infrastructure YouTube Video

Reduced Conflicts and Changes

- When you digitally simulate tasks you produce better communication and fewer conflicts with more predictable outcomes



Lower Project Risk

- When the expert CAD people are busy you want capable competent designers
- How teams work together is continuously improving.
- Having the right information in the right hands at the right time reduces risk

When the expert CAD people are busy you want capable competent designers

Lessons Learned from Pilot Projects

1. Begin with targeted training
2. Continue with on-call support
3. Put profiles and sections in the corridor model file
4. When you cheat in design you pay for it in construction

How teams work together is continuously improving.

- The collaborative processes for infrastructure projects are enabled by better technology
- Coordination Meetings rely on accurate, current data, easily extracted from a 3D model
- Analysis tools help spot problems in constructability, cost, and level of service of assets.

Having the right information in the right hands at the right time reduces risk

- Capable People
- Engaged in Improved Processes
- Enabled by Technology Tools
- Lead by Good Project Managers

AutoCAD® Civil 3D®

- Road Design
- Drainage Design
- Create and Use GIS Data
- Survey Data Processing
- Pavement Marking
- Geotech Data Processing
- Plan Production
- Compute Quantities

FDOT Civil 3D 2015 State Kit

(Not a complete list)

AutoCAD® Civil 3D®

- a high level overview of workflows used for
- roadway design and
- survey deliverables.

FDOT Civil 3D 2015 State Kit

(Not a complete list)

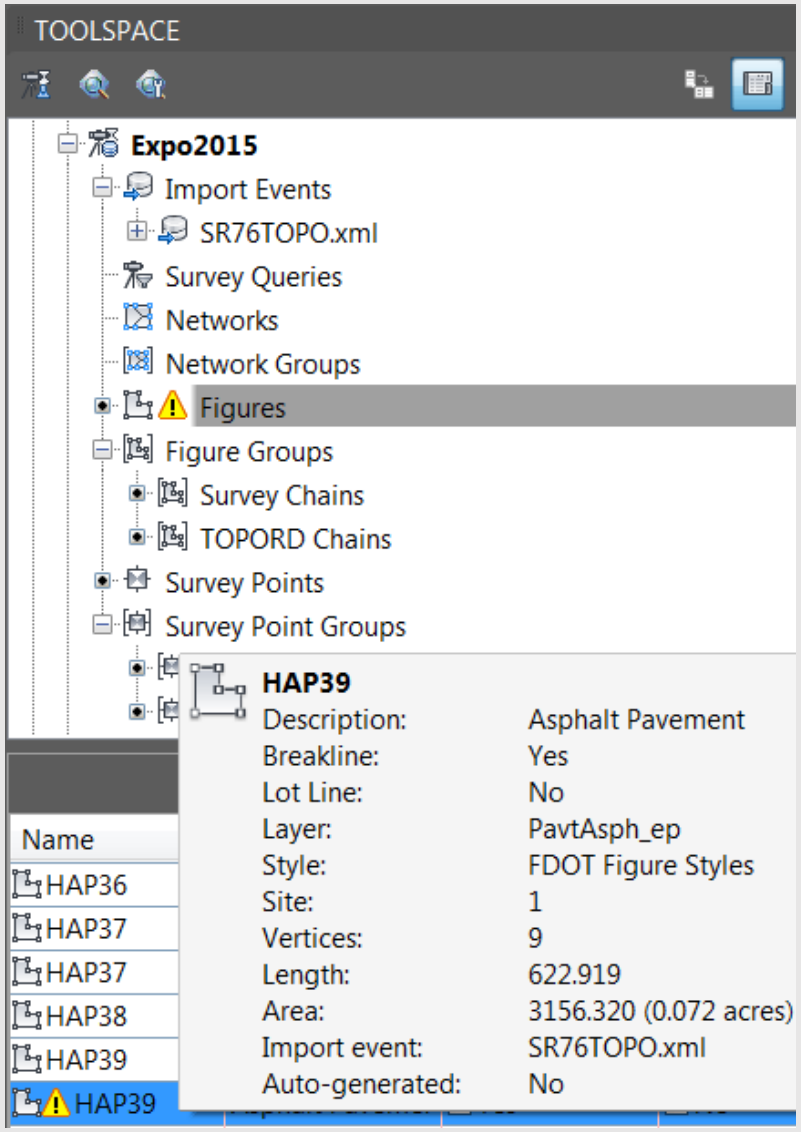
Survey Workflow

- CAiCE and EFB are used to process field data
- A LandXML file is exported from either application
- The FDOT LandXML Grouper tool is used to modify the file
- The Grouped LandXML file is imported to the Survey Database in Civil 3D

FDOT Civil 3D 2015 State Kit

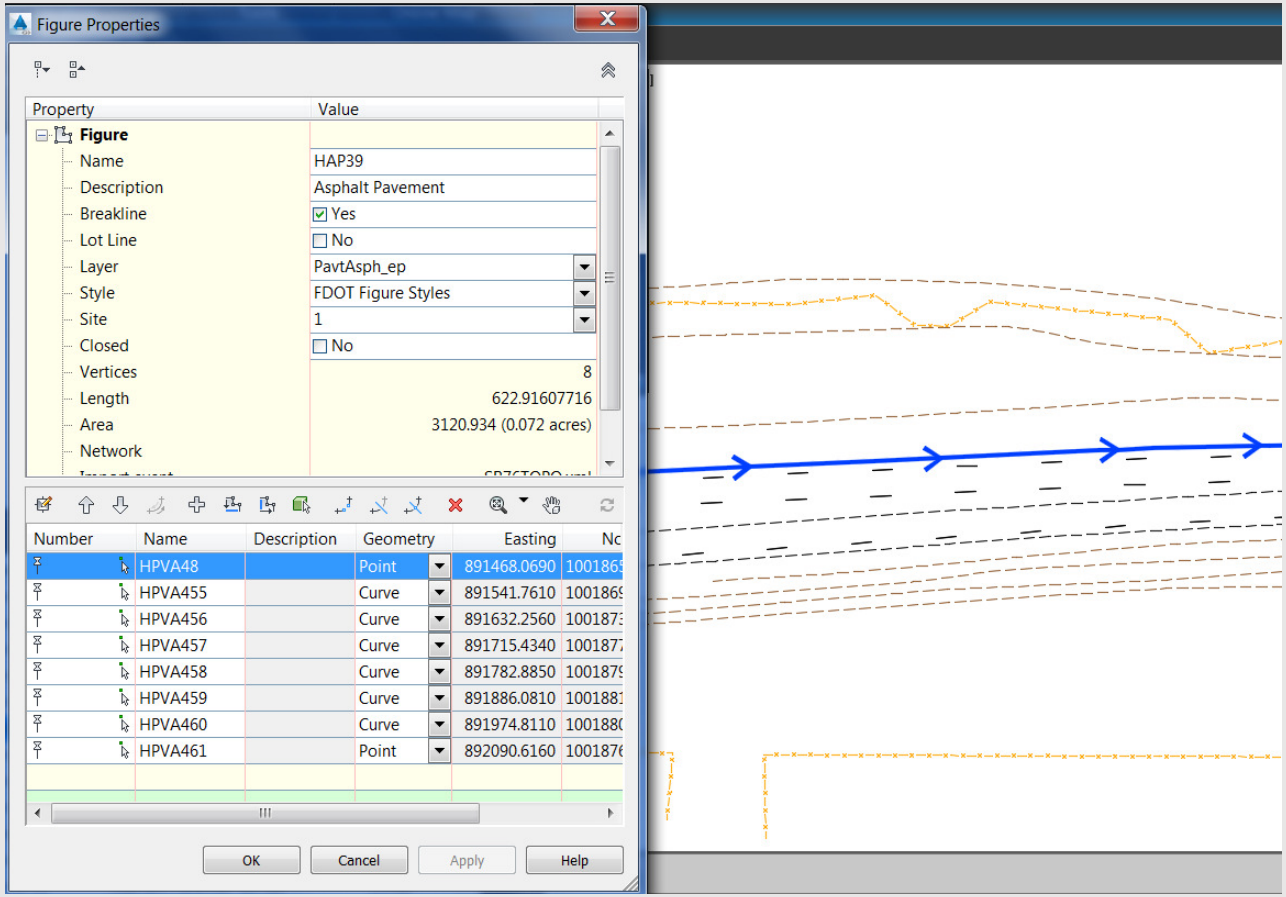
Survey Workflow

- The Survey Database in Civil 3D contains
  - Survey Point Groups
  - Figure Groups



Survey Workflow

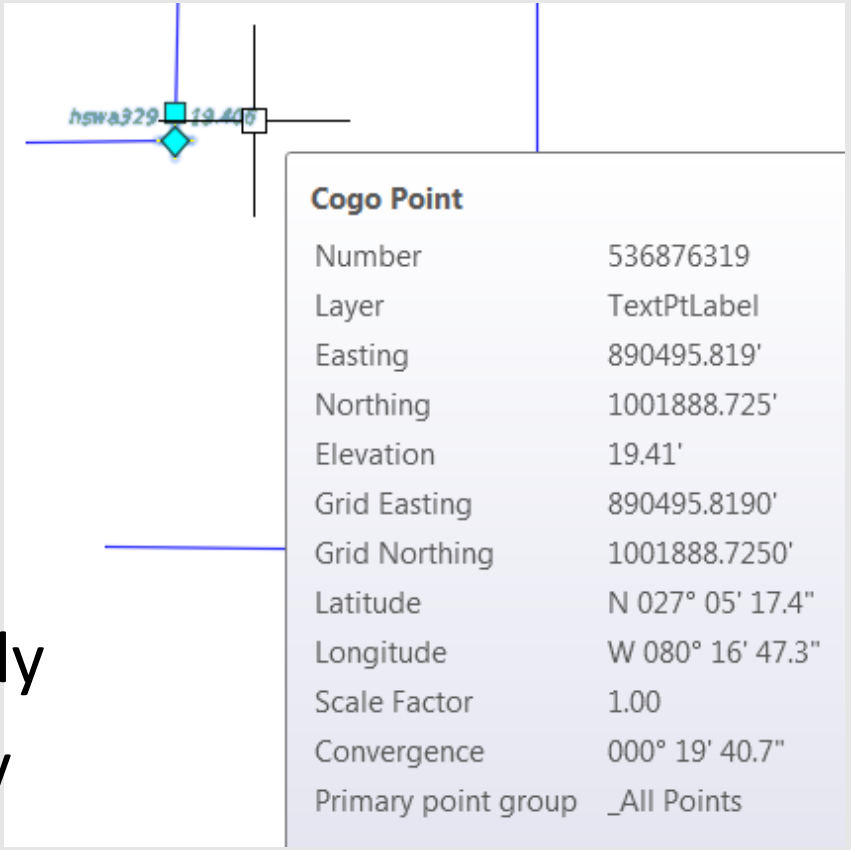
- Editing Figures interactively between the survey database and the drawing



Survey Workflow

Point Objects are smart

- Manage Data using
  - Point Groups
  - Survey Database
- Symbols on points automatically
- Connect the dots automatically

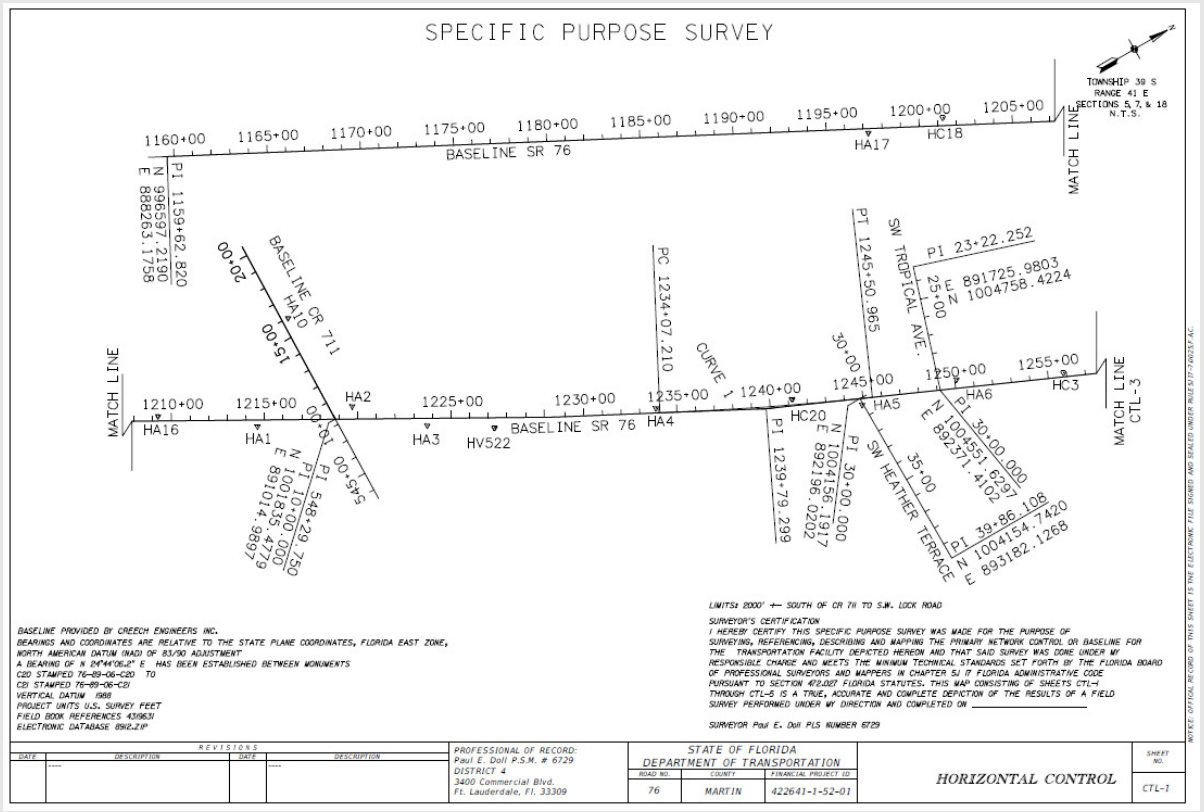


Hover over a survey point.
The tooltip displays information

Survey Workflow

The Deliverables

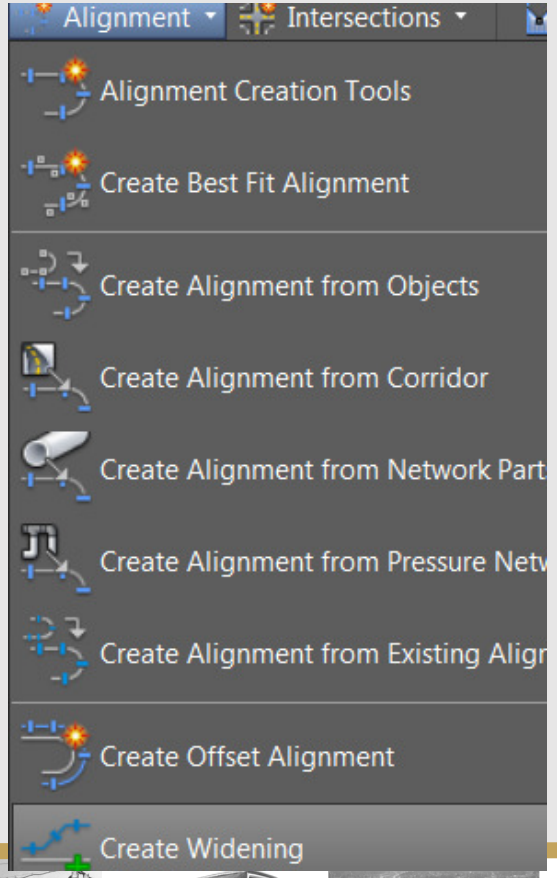
- Import Survey Point Group
- Import Figure Group
- Annotate
- Create Sheet Set
- Done

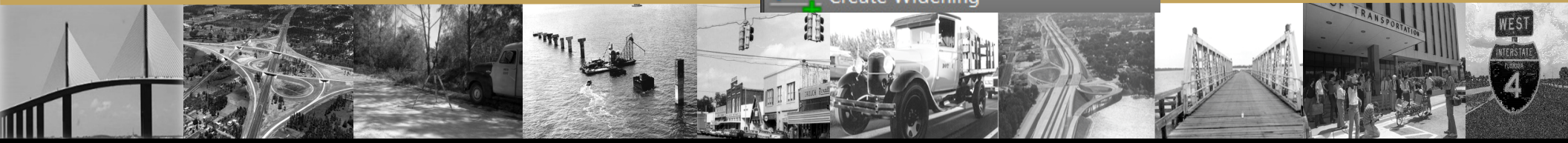


Road Design Workflow

The Benefits of Intelligent Objects over dumb CAD entities

- Alignments
- Profiles
- Cross Sections
- Corridor Models
- Terrain Models
- Plan Production Tools

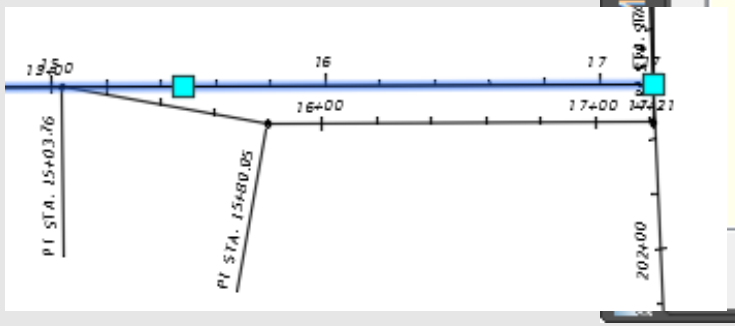


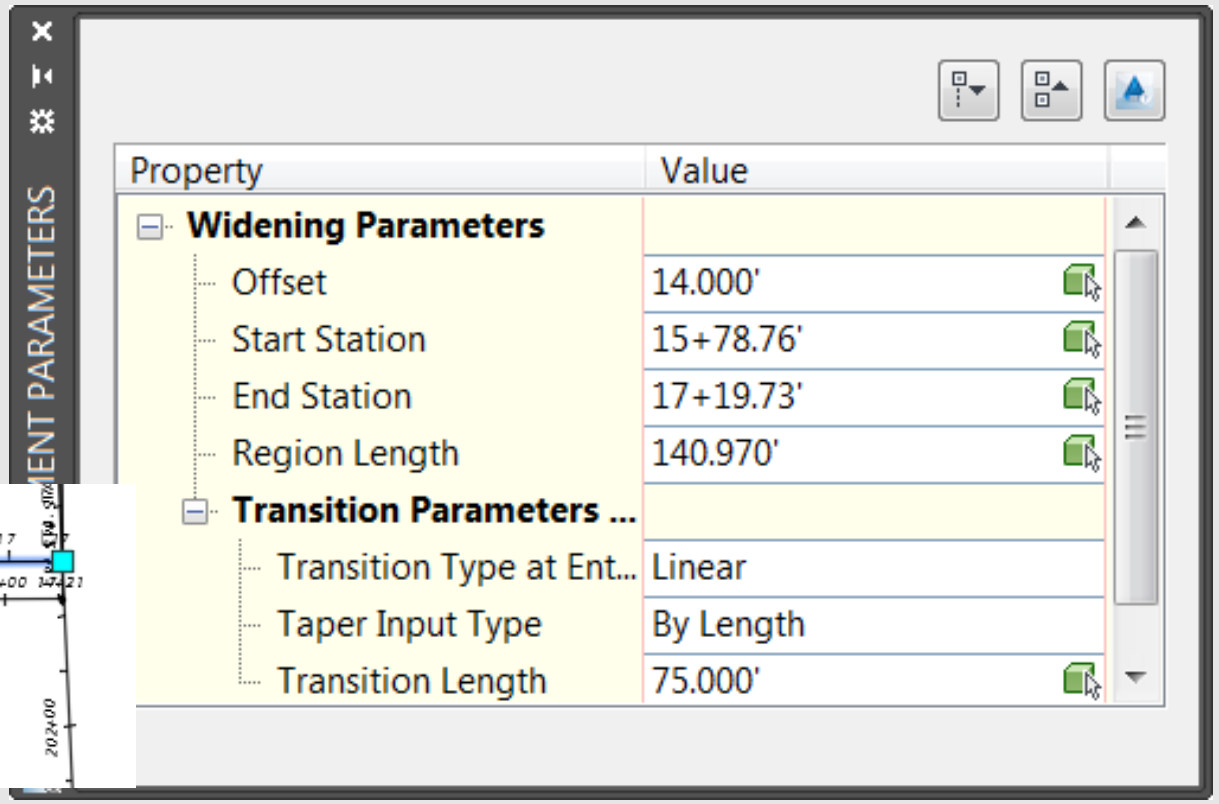


Road Design Workflow

The Benefits of Intelligent Objects over dumb CAD entities

- Alignments
  - Offsets

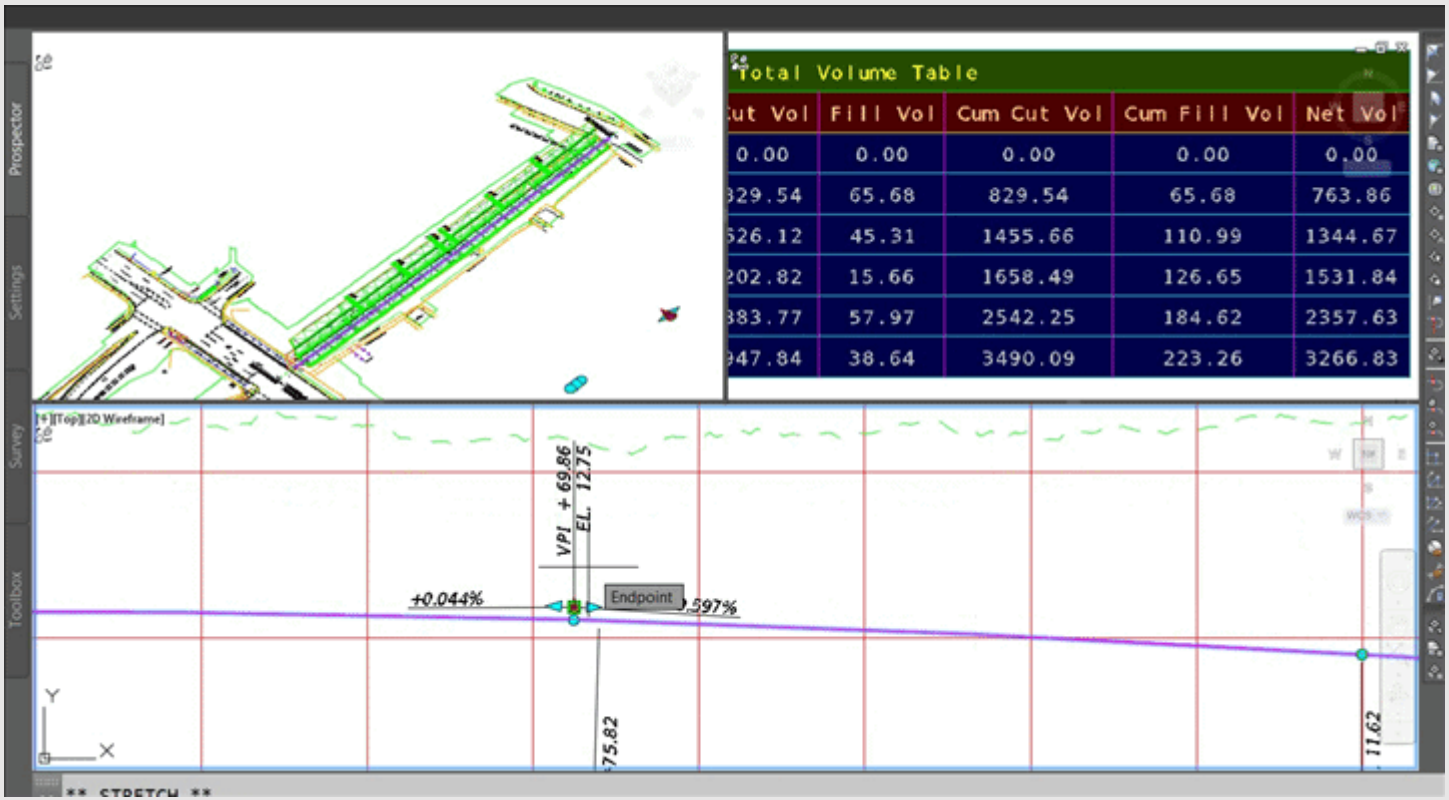




Road Design Workflow

The Benefits of Intelligent Objects over dumb CAD entities

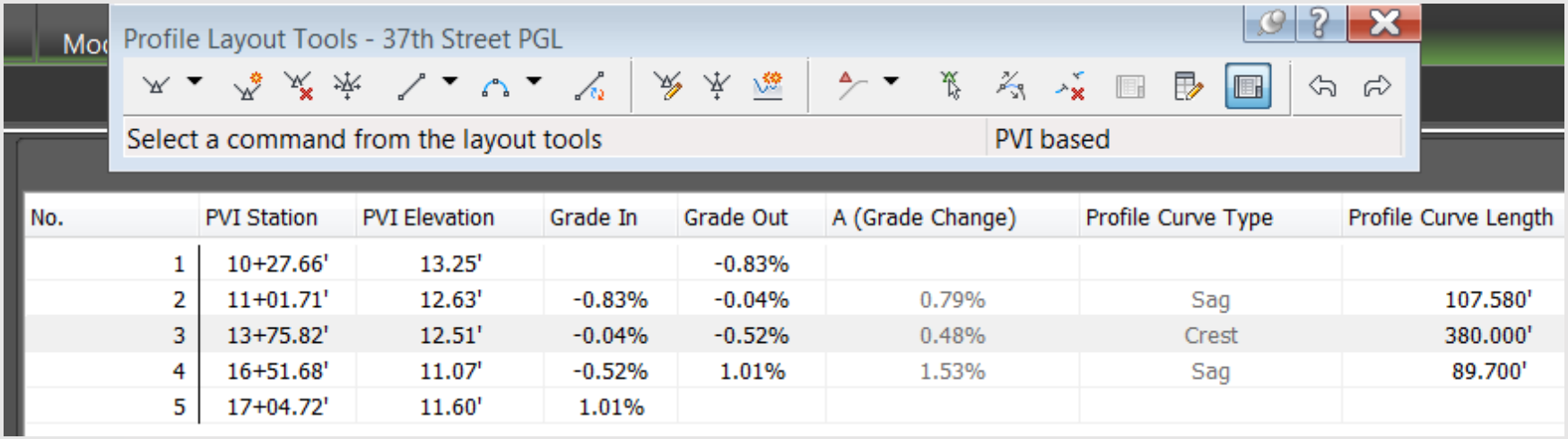
- Profiles



Road Design Workflow

The Benefits of Intelligent Objects over dumb CAD entities

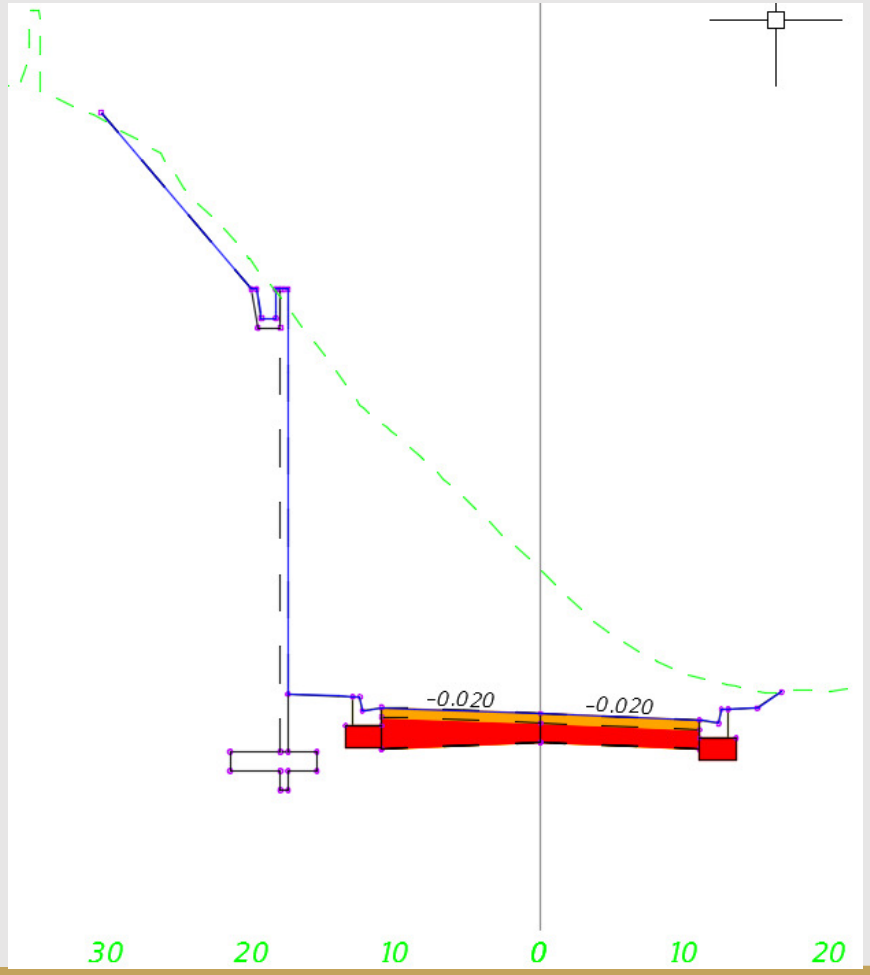
- Profiles
  - Editing Tools



No.	PVI Station	PVI Elevation	Grade In	Grade Out	A (Grade Change)	Profile Curve Type	Profile Curve Length
1	10+27.66'	13.25'		-0.83%			
2	11+01.71'	12.63'	-0.83%	-0.04%	0.79%	Sag	107.580'
3	13+75.82'	12.51'	-0.04%	-0.52%	0.48%	Crest	380.000'
4	16+51.68'	11.07'	-0.52%	1.01%	1.53%	Sag	89.700'
5	17+04.72'	11.60'	1.01%				

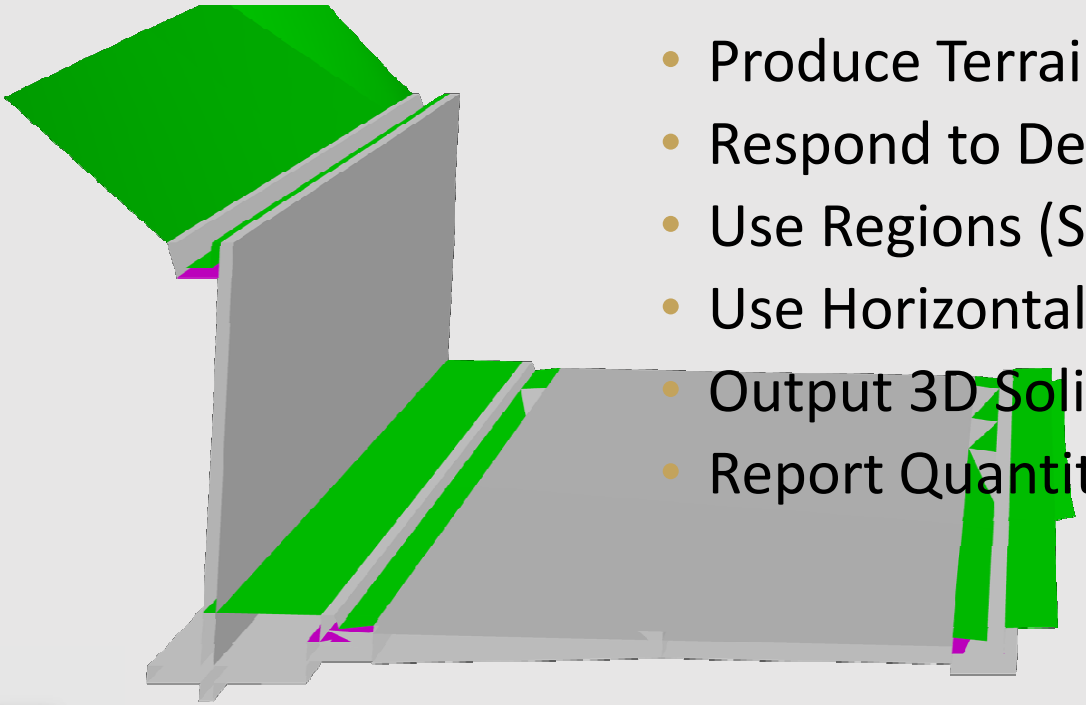
Road Design Workflow

- Cross Sections
  - Styles enhance display
  - Design Changes automatically update
  - Automation reduces errors
  - Plan Production Tools create Section Sheets fast and easy



Road Design Workflow

The Benefits of Intelligent Objects over dumb CAD entities



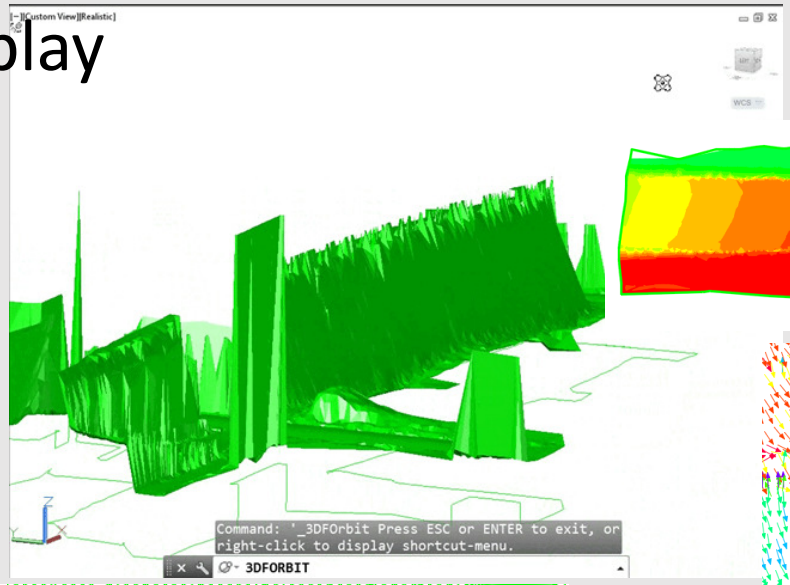
- Corridor Models
  - Produce Terrain Models
  - Respond to Design Changes
  - Use Regions (Station Ranges)
  - Use Horizontal and Vertical Targets
  - Output 3D Solids for Visualization
  - Report Quantities

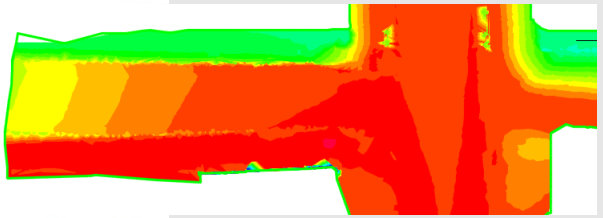
Road Design Workflow

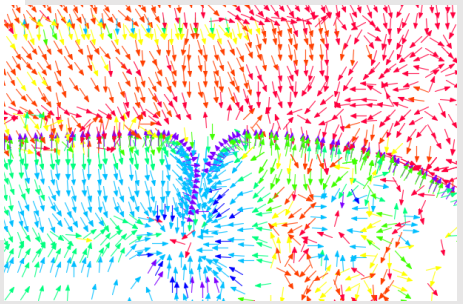
- Terrain Models
  - Most Valuable Object in Civil 3D
  - Easy to create with just Feature Lines
  - Useful as Targets
  - Shape it then Drape it
  - Surface Volumes
  - Automated Machine Guidance Equip.
  - (The list goes on)

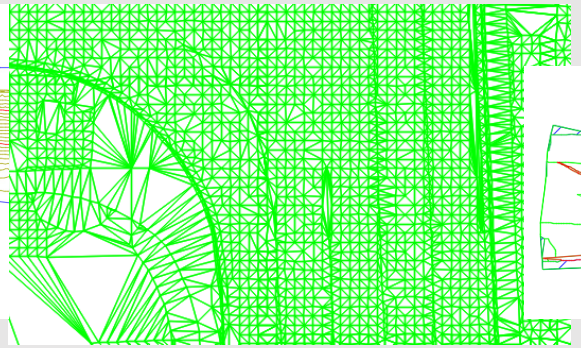
Road Design Workflow

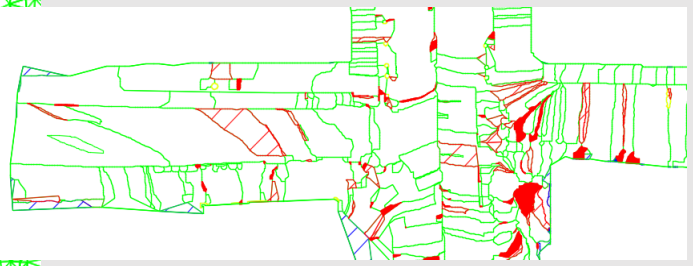
- Terrain Model Display
  - Triangles
  - Contours
  - Elevation Bands
  - Slope Arrows
  - Watershed Areas
  - 3D Solids





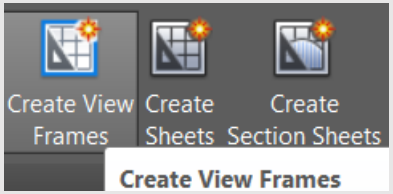


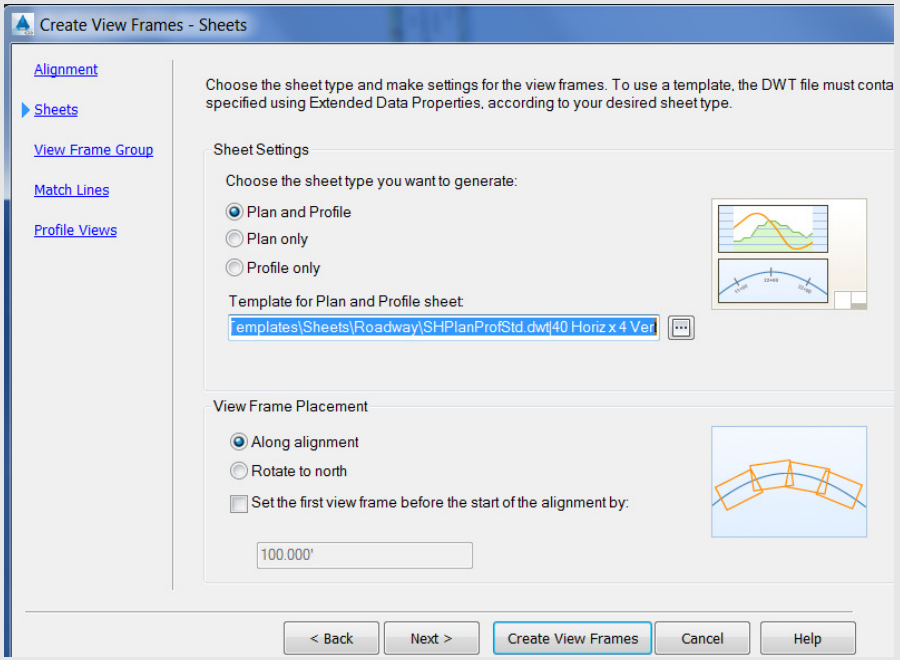




Road Design Workflow

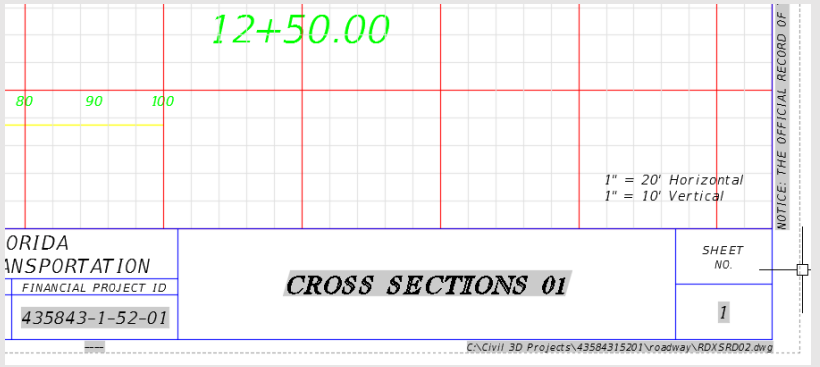
- Plan Production Tools
  - Wizards make it easy
  - View Frames
  - Match Lines
  - Create Sheets

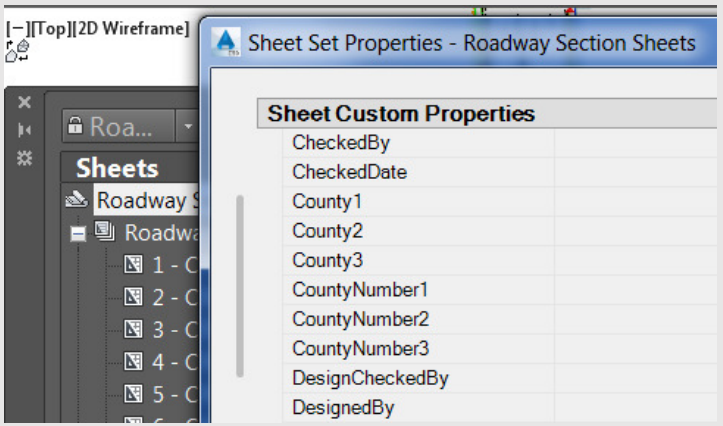




Road Design Workflow

- Plan Production Tools
  - Data References
  - Xreferences
  - Sheet Sets
  - Sheet Set Custom Properties
  - The Best Feature in AutoCAD





Who Uses Civil 3D?

MDOT

TRANSPORTATION & PUBLIC FACILITIES · STATE OF ALASKA

RI dot
Driven to get you there

WISCONSIN DEPARTMENT OF TRANSPORTATION

massDOT
Massachusetts Department of Transportation
Highway Division

FDOT

WSDOT

Caltrans

NMDOT

STATE OF OHIO DEPARTMENT OF TRANSPORTATION

FDOT Civil 3D 2015 State Kit

Message for Project Managers

- Be confident that Civil 3D is the right tool for FDOT projects
- Be aware of Lessons Learned
- Be open to change.

FDOT Civil 3D 2015 State Kit Resources

- http://www.dot.state.fl.us/ecso/main/Events.shtm
- ECSO
- Autodesk Infrastructure on YouTube
- FDOT Civil 3D 2015 State Kit Download

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