



Advancing CADD Applications Geopak to OpenRoads

Office of Project Development – Conference
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Objectives

- Provide overview of CADD software changes:
 Geopak to OpenRoads
- Discuss Model Advancements - Supplemental Design Information

OpenRoads SS4

- Version of Civil CADD Tools
- Replacing Geopak Tools
- OpenRoads Tools are Delivered with Geopak SS4 tools

MicroStation Connect Edition

- Next Major Upgrade of Bentley Software (After SS4)
- The civil-roadway tools offered with this package will be called “OpenRoads Designer”.
- Most of the Geopak tools are being abandoned in this version.

MicroStation Connect Edition

Software Comparison

Recent Past	Present	Future
MicroStation SS2	MicroStation SS4	MicroStation Connect Edition
Geopak SS2 and OpenRoads	Geopak SS4 and OpenRoads	OpenRoads Designer (No Geopak)
32 Bit Application	32 Bit Application	64 Bit Application – ability to use more memory – Faster Processing

Geopak is being abandoned, Get Ready but No Need to Panic

The NDDOT doesn't have a schedule for implementing "MicroStation Connect Edition" and "OpenRoads Designer".

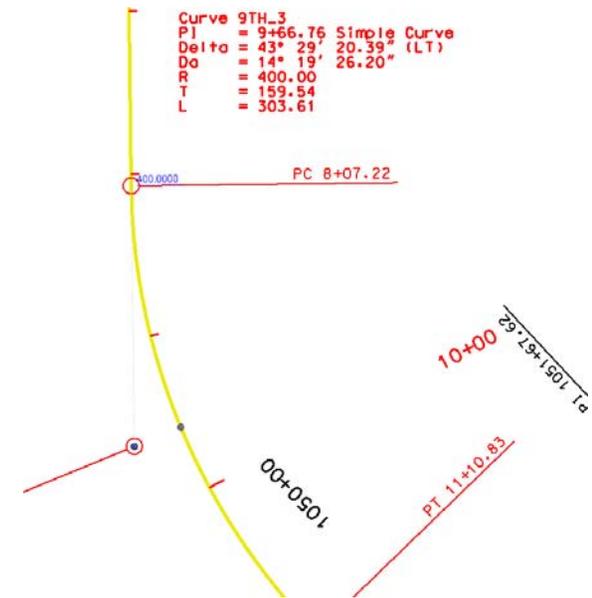
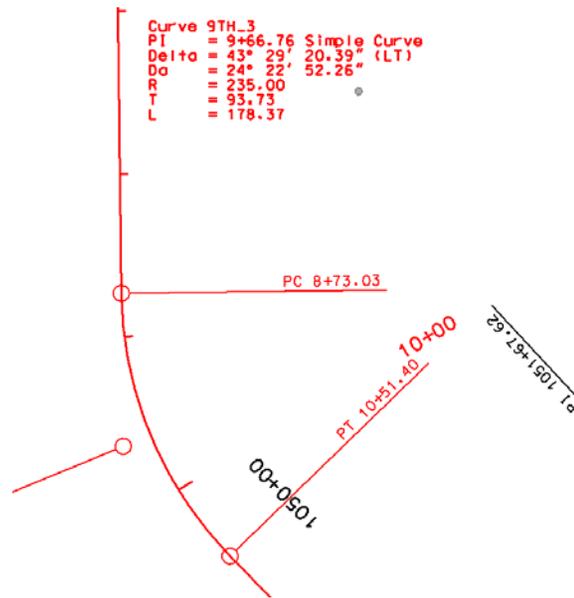
This upgrade is probably a few years away.

OpenRoads SS4 – A short overview

- Civil Geometry
- Design Standards
- Design Intent
- Civil AccuDraw
- Feature Definitions
- Civil Cells
- Design Stages

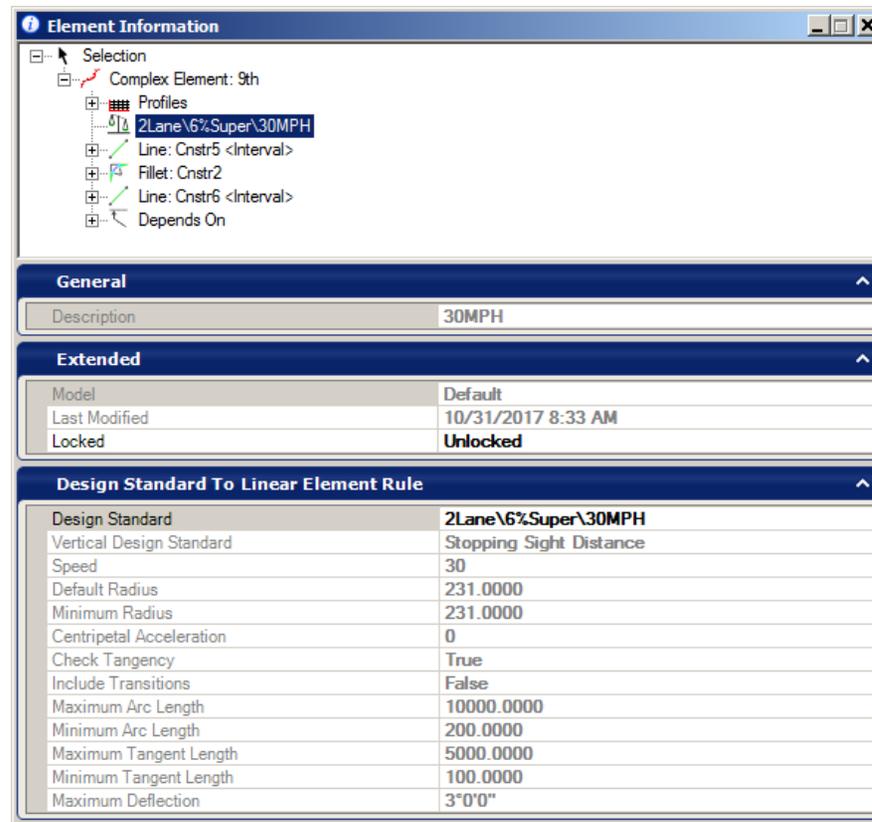
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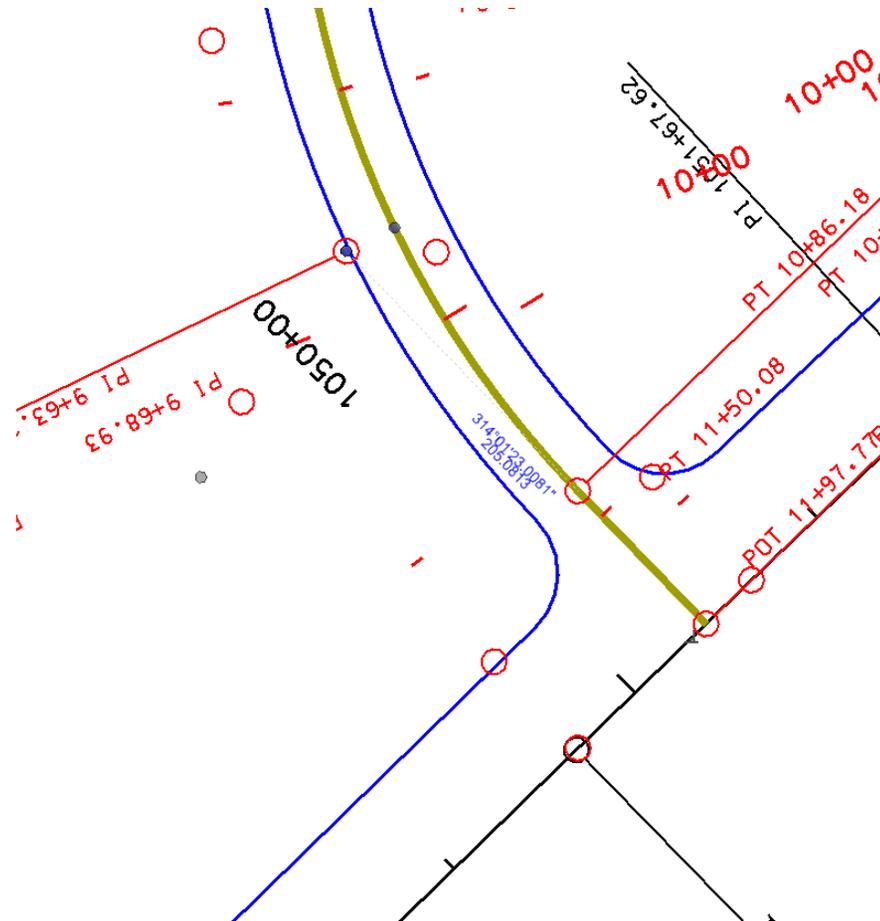
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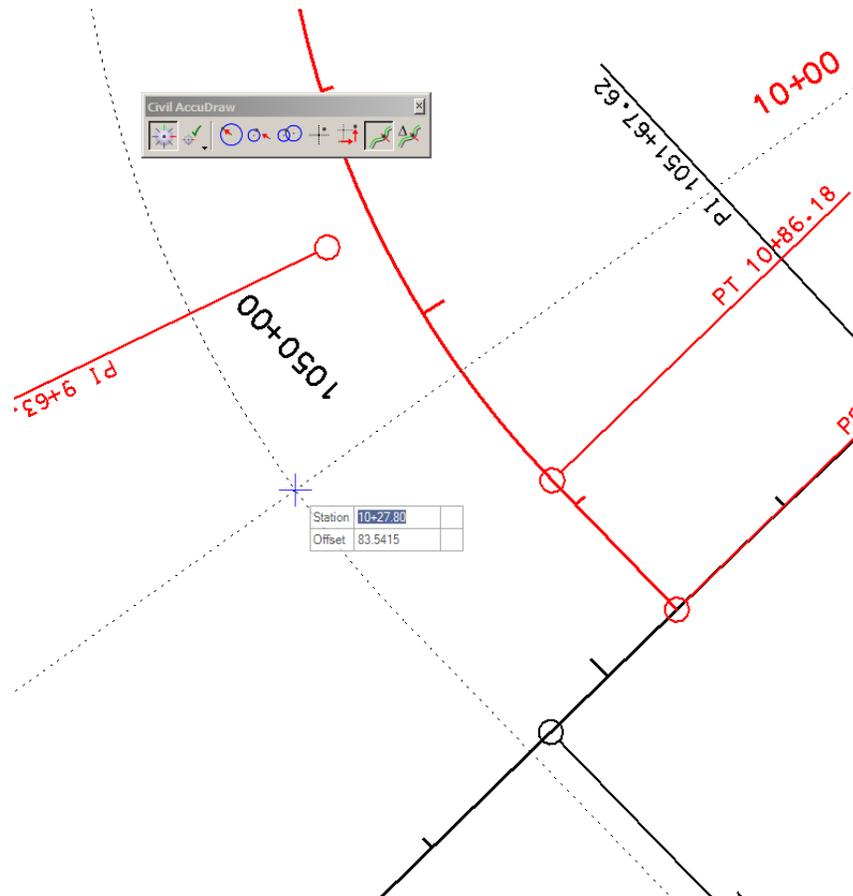
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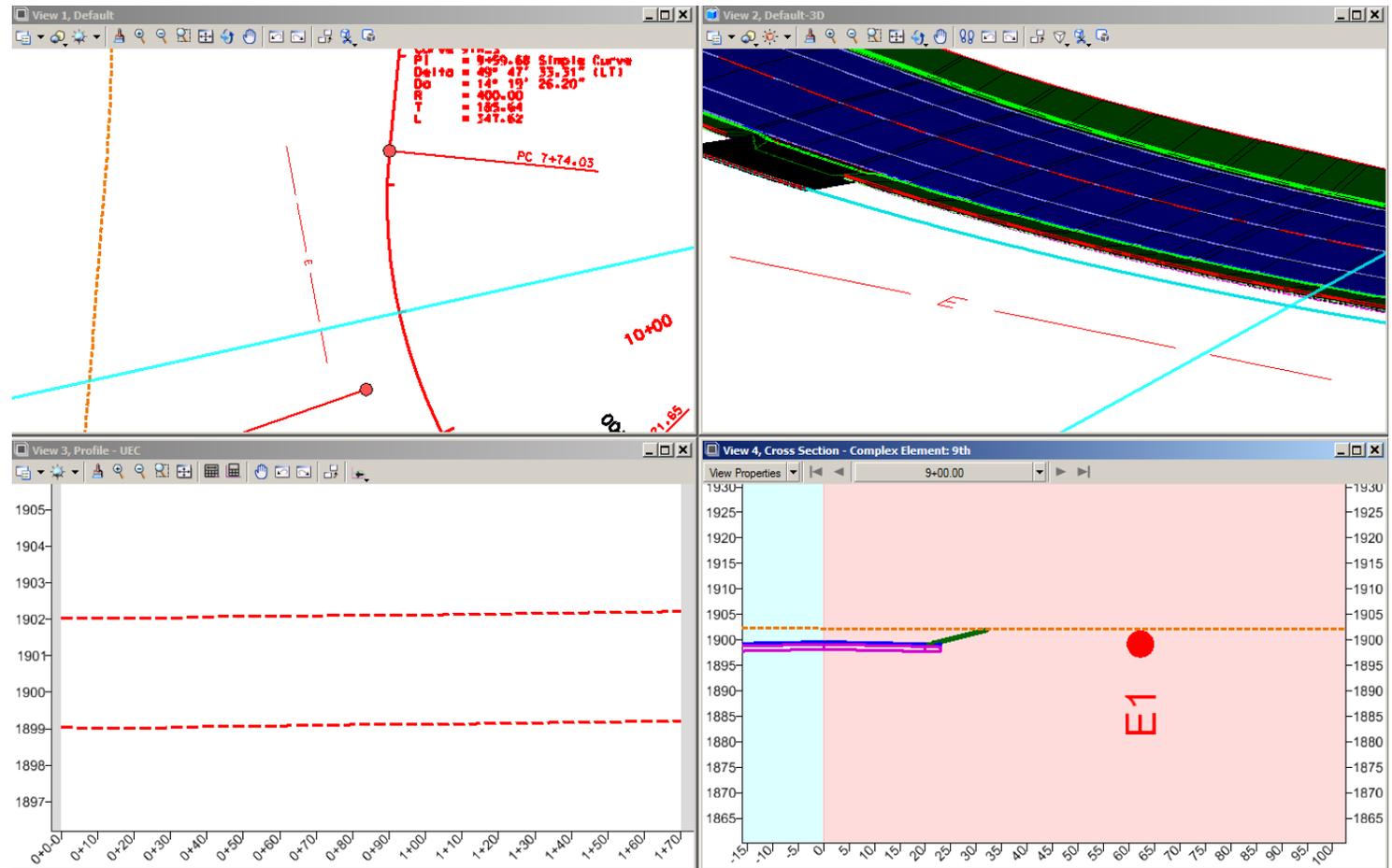
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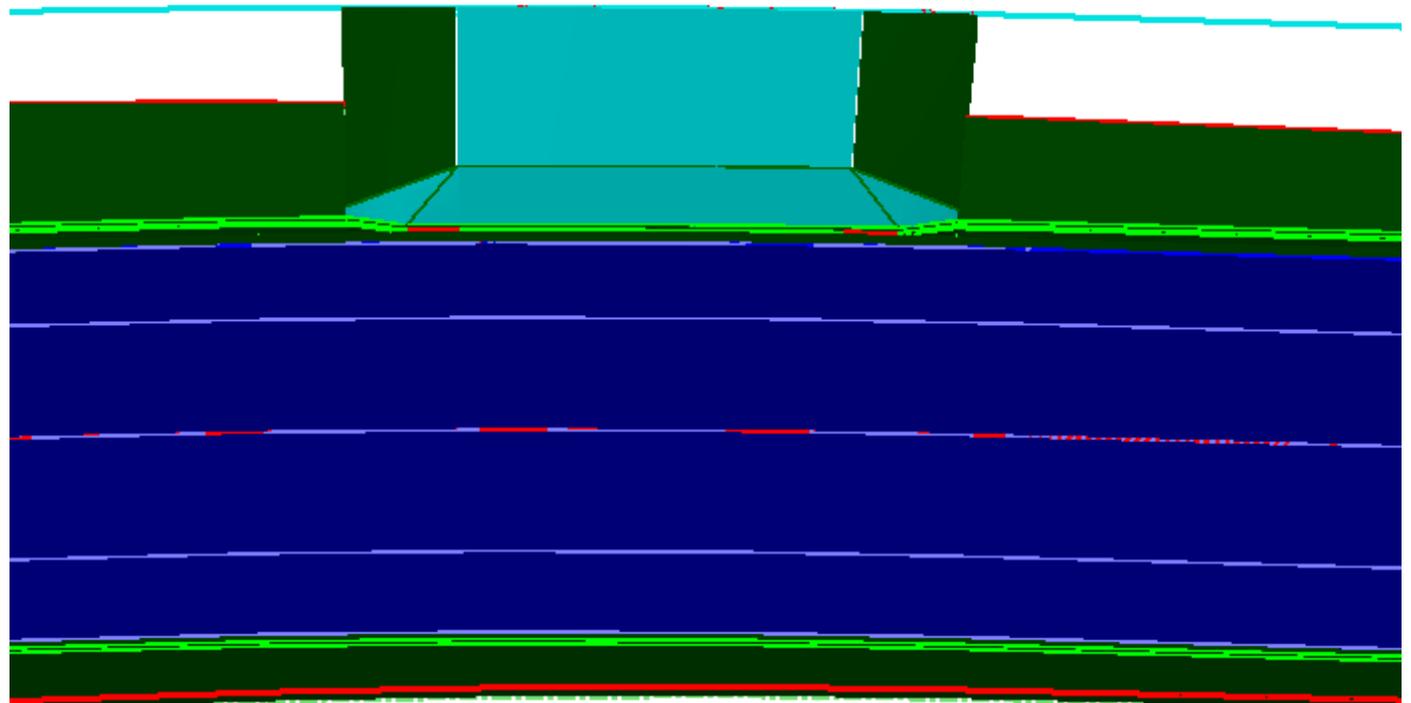
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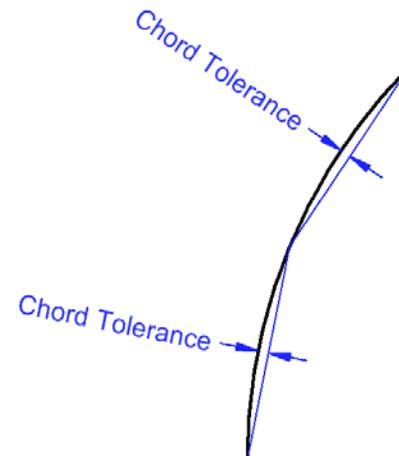
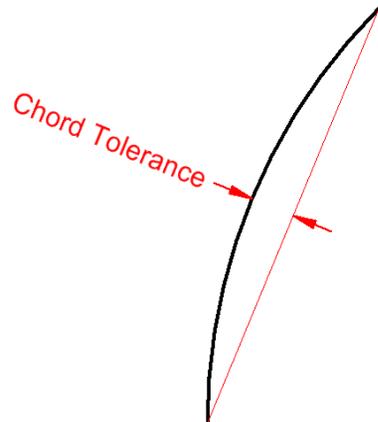
Design Stages

Change Level of Detail as Project is Advanced

Design Stage	Conceptual	Preliminary Design	Final Design	AMG
Interval Multiplier	2	1	1	1
Horizontal Cardinal points	No	No	Yes	Yes
Vertical Cardinal Points	No	No	Yes	Yes
Densify Horizontal Curves	No	No	Yes	Yes
Densify Vertical Curves	No	No	Yes	Yes
Meshes	No	No	No	Yes

Densify Curves – Chord Tolerances

- tin's, dtm's and terrains don't use curves
- Horizontal and Vertical Chord Tolerances are 0.05'
- MicroStation Configuration Variable
 - CIVIL_DEFAULT_PROFILE_STROKING = 0.05
 - CIVIL_DEFAULT_CURVE_STROKING = 0.05



Modeling Advancement

SS2 Concepts

- Corridor Modeling - A 3D model is generated first. Then cross sections are cut from the model. Cross sections cannot be created without a model.
- Cross Sections from Independent Models

SS4 Concepts (Added Capabilities)

- Models can directly incorporate solids and 3D feature styles.
- Model Referencing
- Civil Cells

Modeling Influences

Initiative

- Modeling Provides More Design Detail – Better Plans
- Modeling Assists in Construction – AMG and More

Challenges

- More Modeling Detail is Desired –Moving Target
- Modeling is addition work and cost – Cost Benefit Balance
- Increase Model Accessibility – Ease of Use

The Future of Modeling?

- Supplemental Design Data May Change to Contractual Deliverable
- Automated Machine Guidance May Change from an Option to a Requirement
- Model Information May Replace Plan Sheets

Present modeling focus is “What” and “How”. The question of “When” is to be determined.

Modeling Expectations

- Recognize Different Modeling Expectations.
 - Some Contractors haven't Adopted AMG.
 - Some Contractors are Dependent on AMG.
- Consistency in detail between projects
 - As good or better than the last project
- Communication
 - Explain Known Modeling Deficiencies
- Inclusive Training
 - All plan readers as an audience
- CADD Standards

CADD Standards – Section 4.7.7 Automated Machine guidance Deliverables

Standards added May 2017

- Remove exterior triangles that don't accurately represent surfaces.
- Provide Modeling Break Lines
- Avoid Terrain Anomalies – Bumps
- Model Major Intersections

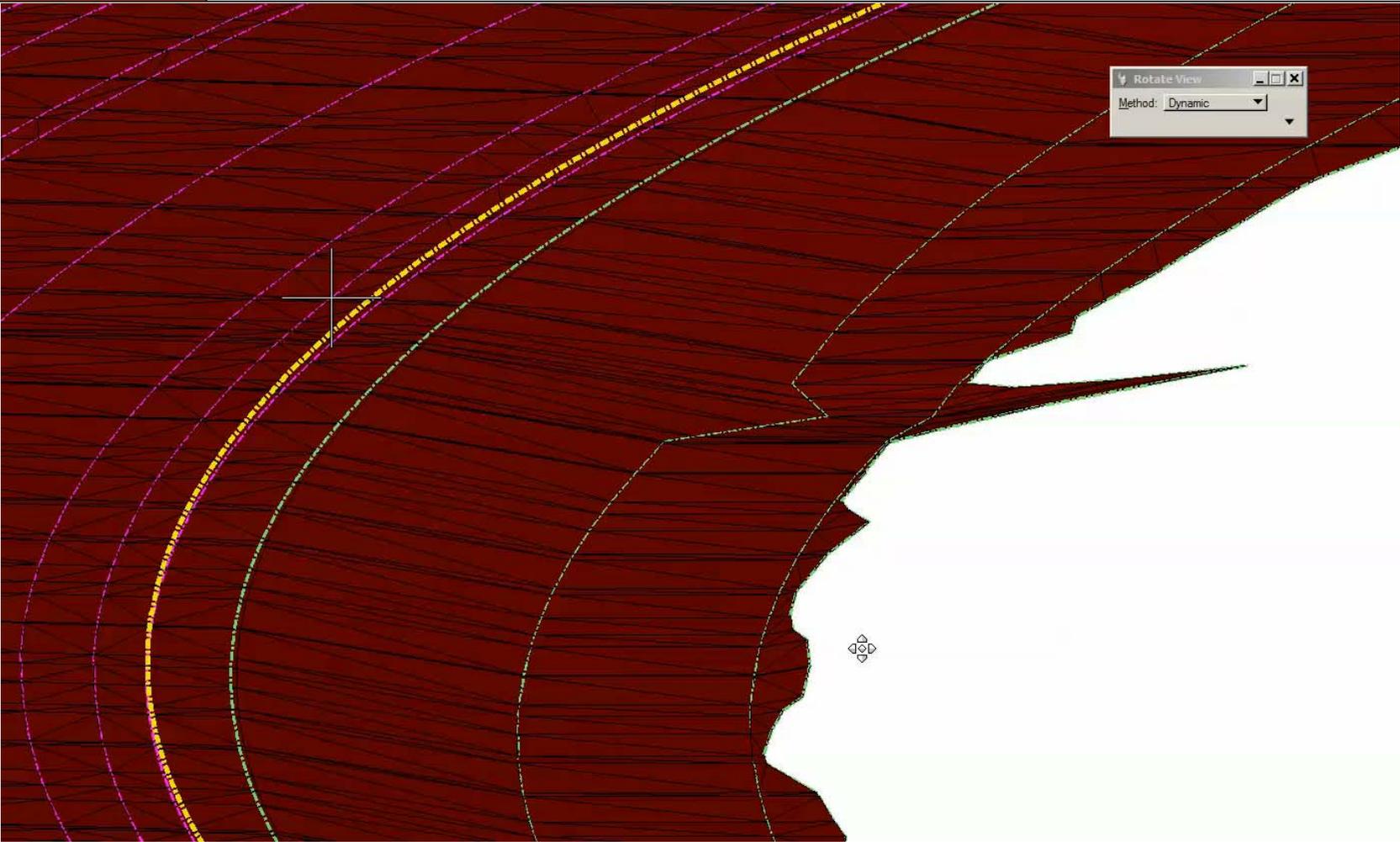
CADD Standards – Section 4.7.7 Automated Machine guidance Deliverables

Standards added September 2017

- Don't overlap models - Provide Coincident Adjoining Edges
- Models for work zone traffic control may be required (interim earthwork)
- Model gaps and voids
- Break Line Prefixes Must Match Surface Prefixes

More standards to come

[Click this link to see the video used during this presentation.](#) The link will take you to YouTube

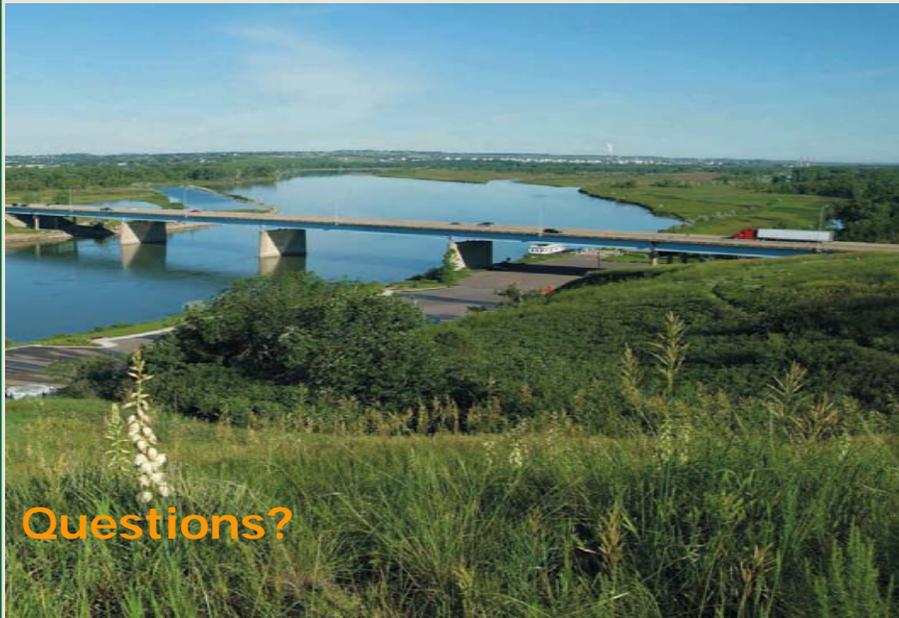


User Guides

- OpenRoads Fundamentals (How to Review Data)
 - Potential Training Guide for District User Group Training
 - Will be referenced in the CADD Standards
 - [http://www.dot.nd.gov/manuals/design/caddmanual/OpenRoads Fundamentals for Reviewers.pdf](http://www.dot.nd.gov/manuals/design/caddmanual/OpenRoads_Fundamentals_for_Reviewers.pdf)
- How to Check Supplemental Design Data
 - Will be referenced in the CADD Standards
 - [http://www.dot.nd.gov/manuals/design/caddmanual/How to check Supplemental Design Data.pdf](http://www.dot.nd.gov/manuals/design/caddmanual/How_to_check_Supplemental_Design_Data.pdf)

Requesting Contractor Input on Modeling and AMG

- Survey Questions are available
 - Some contractors were directly solicited
- Contractor Still Editing Surfaces
 - Smoother Transitions
 - Double Check by Alternate Modeling



Questions?

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