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3D Design: What Do Designers Need?

- ✓ Right-of-Way Map
- ✓ Topo Map
- ✓ 2-Foot Interval Contour Map
- ✓ Cross Sections Every 50'
- ✓ Survey Notes
- ✓ Existing Alignments
- ✓ Pipe Invert Elevations
- ✓ Pipe Sizes
- ✓ Pipe Types
- ✓ Tree Sizes
- ✓ Tree Types
- ✓ Overhead Utilities and Owners
- ✓ Underground Utilities and Owners
- ✓ Depth of Overburden
- ✓ Thalweg
- ✓ Guardrail Type
- ✓ Guardrail Condition
- ✓ Sign Types
- ✓ Sign Sizes
- ✓ Approaches
- ✓ Approach Types
- ✓ Irrigation Ditches
- ✓ Railroads
- ✓ Wetlands
- ✓ Pastures
- ✓ Springs
- ✓ Buildings
- ✓ Snow Fences
- ✓ Cattlefence
- ✓ Piers
- ✓ Fencibles
- ✓ Paper
- ✓ Straight Edge
- ✓ Triangles
- ✓ Calculator or Slide Rule
- ✓ Punch Protector
- ✓ Kitchen Sink

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What's the Deal with 3D Design?

Traditional design focused on paper

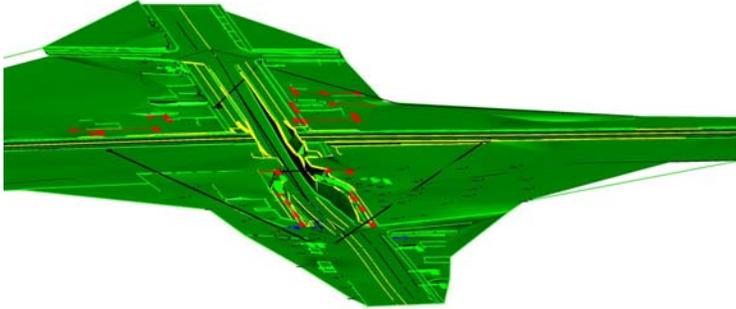
- Paper plans
- Volumes calculated by average end area measured from cross sections
- Quantities based on horizontal measurements and centerline stationing
- Final grades calculated during construction



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What's the Deal with 3D Design?

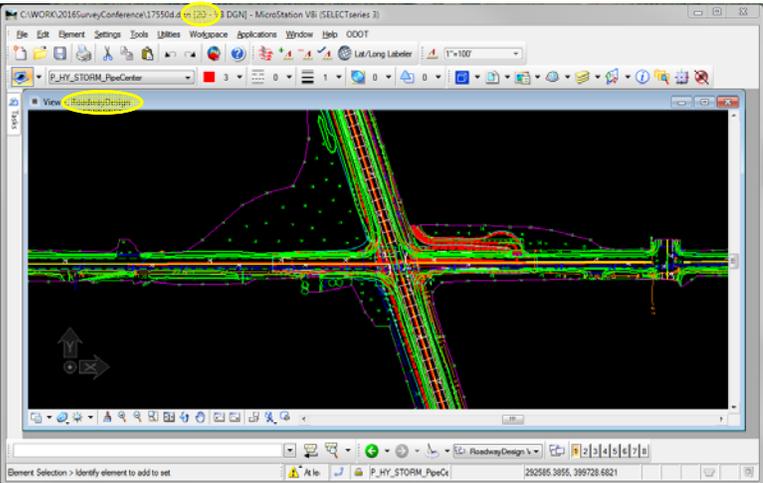
3D Survey - 1993



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What's the Deal with 3D Design?

2D Roadway Design - 2013



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What's the Deal with 3D Design?

Problems with traditional design methods

- End area volumes are inherently inaccurate
- Many items paid on true line and grade, or true surface area
- Staked grades may not match designer's intent
- Minimal support for automated construction methods

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What's the Deal with 3D Design?

How does 3D design help?

- Conflict identification
- Match-in details
- Visualization
- Analysis



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What's the Deal with 3D Design?

Design tools work in 3D, why don't designers?



- Takes too much time
- Too difficult
- Different mindset

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What Designers Need from Surveyors

The same information they've received for the last two decades

- Existing ground DTM
- Topo map/Design file
- Notes – may be embedded in DTM
- R/W map

Geospatial location is important to designers too.
Don't change the projection unless you're ready to edit all of the designer's files



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What Designers Need from Surveyors

Some new information

- Trees
 - Species
 - DBH
 - Snags
- Wider mapping areas for analysis
- Overburden depths
- Point clouds



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What Designers Need from Surveyors

Expect to see requests for:

- More complete hydraulics surveys
- Integration with other terrain data

Tolerances

- Would like to see tighter tolerances
 - About 2/3 of current standards
 - Most important at project margins

