

OpenRoads & 3D Construction Handoff

2022 ODOT Traffic – Roadway – Access Management (TRAM)
Conference

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3D Design Handoff Packages

Why?

- Bid Reference (aka eBIDS) Package
 - Reduced risk
 - Take-offs
 - Construction planning
 - Indicate level of support for automated construction methods
- Construction/Survey
 - Stakeout
 - AMG
 - Fewer delays



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Hasn't changed over time

It's your design, it's your responsibility to ensure it's built correctly.

You have the information so share it.

What's In the Bid Reference Package?

- Notification
- Alignments
- Surfaces
- Cross Sections
- NO design files



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Contents are the same no matter what software is used for design. That's why proprietary file formats are not included.

Need consistent packages to provide even playing field for bidders, whether they use AMG or not.

For some, less technologically advanced, bidders cross sections are the only information they have access to.

What's In the Bid Reference Package?

- Notification
 - Informs bidders that the project has been modeled in 3D
 - Attach checklist and file index
 - Print letter to pdf. Don't save it.



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Attach the two documents so that bidders can assess whether they need to download the package.

What's In the Bid Reference Package?

- Alignments
 - ASCII reports
 - LandXML
 - Alignment names and file names match plan sheets
 - One major alignment per file



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Gets confusing when alignment and file names don't match plans.
Multiple alignments should be OK in reports as long as they can be easily identified.

What's In the Bid Reference Package?

- Surfaces
 - Include features
 - Most AMG operations for roadway work from linestrings
 - Allow measurement of linear items
 - Names allow for meaningful cross-sections
 - Include triangles
 - Triangles useful for site work
 - Depending on software, triangle definitions ignored



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Features are critical for use in bidding and construction but triangulation on import may not match design unless additional features are added
If software imports triangle definition, it will match design (V8i products retriangulate, assuming all points are random).

What's In the Bid Reference Package?

- Cross Sections
 - Include:
 - Project ID
 - Alignment ID
 - Disclaimer
 - Point annotation for top layer
 - Legend or other method of identifying all surfaces
 - All surfaces within cross section range
 - DO NOT Include V-number



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There are still many bidders without the civil software needed to interpret alignment and surface data so accurate and informative cross sections are critical.
Failure to include disclaimer puts you in grey area with respect to license.
V-number is only for contract plans that will be archived.

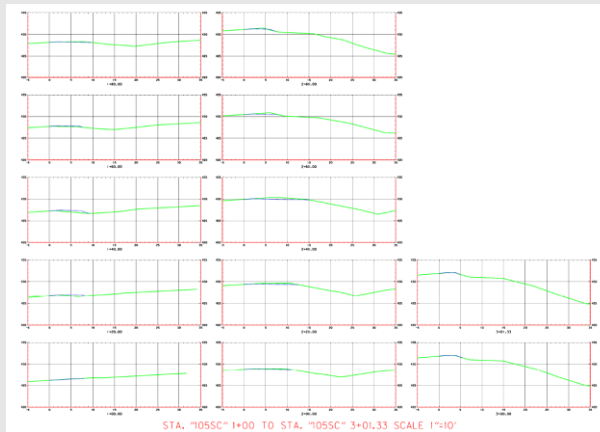
What's In the Bid Reference Package?

- Cross Sections (cont'd)
 - Use light line weight
 - Print as vector

What's In the Bid Reference Package?

- Cross Sections (cont'd)

- ✓ Alignment ID
- ✓ No V-number
- Project?
- Surfaces?
- Points?
- Purpose?

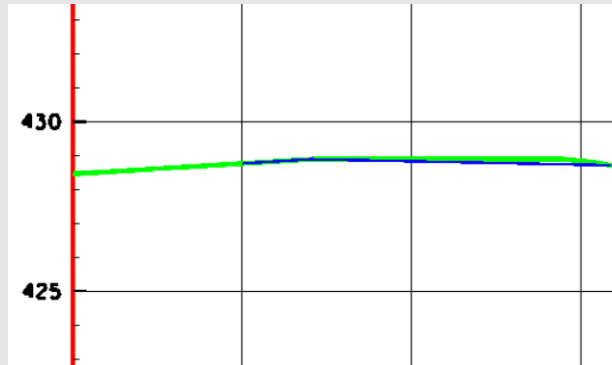


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What's In the Bid Reference Package?

Cross Sections (cont'd)

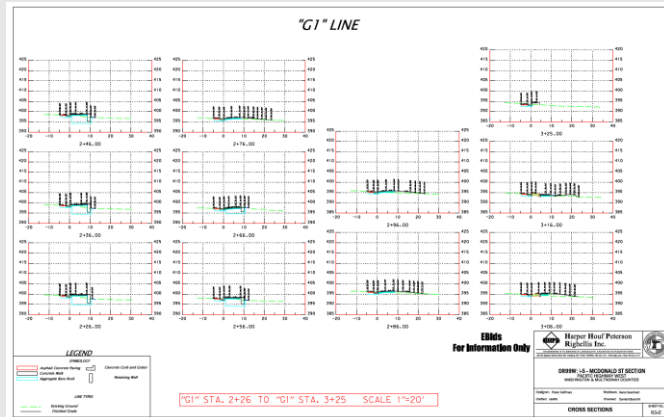
- x Light line weights
- x Rasterized



What's In the Bid Reference Package?

- Cross Sections (cont'd)

- ✓ Alignment ID
- ✓ Project
- ✓ Legend – surfaces & components
- ✓ Points annotated
- ✓ Purpose
- ✓ No V-number
- ✓ Disclaimer



- Cross Sections (cont'd)

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What's In the Construction/Survey Package?

- What the RE and contractor need to build the project
 - Might be graphics – DGN or DWG
 - Might be alignment or surface LandXML
 - Might be more cross sections
 - Might be more, or different, reports
 - Might be something else
- It's your responsibility to ensure they have what they need to build your design



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The lists in the manual are suggestions only. Construction is your client and, within reason, you will have to provide what they need.

Creating a Package in ORD

- Alignments
 - Reports
 - Alignments can be selected before or during command
 - Include or exclude, as desired, profiles
 - Invoke command from ribbon, context-sensitive menu, right-click menu or Explorer
 - LandXML
 - Alignments can be selected before or during command
 - Will include all profiles or active profile. None is not an option.
 - Invoke command from ribbon



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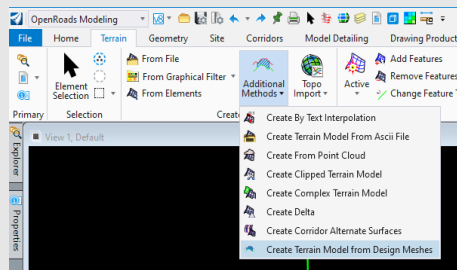
Alignment files are pretty straightforward

Creating a Package in ORD

- Design Terrain Models
 - Terrain creation is a separate process from modeling
 - ORD corridors and linear templates create features and meshes
 - ORD corridors and linear templates Do Not create terrains

Creating a Package in ORD

- Design Terrain Models (cont'd)
 - Source and terrain creation method are important
 - Terrains from meshes are triangles only

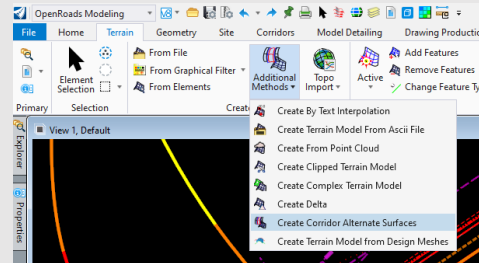


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Review terrain for triangulation. Some boundary triangles may need to be deleted and some triangle edges may need to be swapped

Creating a Package in ORD

- Design Terrain Models (cont'd)
 - Source and terrain creation method are important (cont'd)
 - Terrains created from corridor alternate surfaces will include features
 - Terrain ruled to features in corridor, not to graphics
 - Additional features may be required
 - Alternate surface assignments may not work with some points (e.g., SGSh)

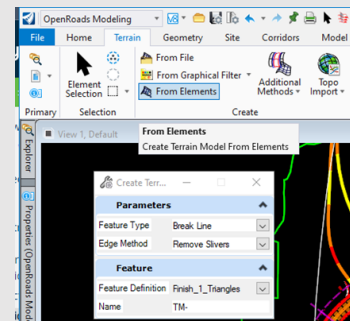


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Alternate surface assignments have always been a problem. EP is usually part of both the pavement and the base; SG shoulder is part of the base and subgrade; etc. Other tools – graphical filters and add features – can be used to incorporate more features. Additional transverse features may be needed to control triangulation.

Creating a Package in ORD

- Design Terrain Models (cont'd)
 - Source and terrain creation method are important (cont'd)
 - Terrains created from elements will include features
 - Terrain ruled to graphics
 - Select elements before or during command
 - If elements are featurized, that information will be preserved

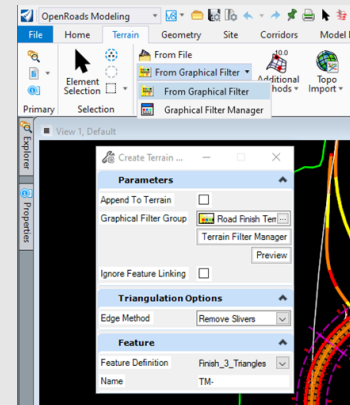


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Edits to graphic elements that maintain integrity – insert/delete vertex, extend, modify – will be reflected in terrain. Features will disappear if they are broken or element type is changed.

Creating a Package in ORD

- Design Terrain Models (cont'd)
 - Source and terrain creation method are important (cont'd)
 - Terrains created from graphical filter will include features
 - Terrain ruled to graphics
 - Can be updated easily
 - Graphical filter criteria do not include name
 - Does not respect level visibility or reference clipping/masking



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One of ORD's greatest weaknesses: it works on categories. Since symbology of design features is determined by feature definition, that's pretty much the only criteria to filter on.

Creating a Package in ORD

- Design Terrain Models (cont'd)
 - LandXML
 - Single terrain per file
 - Allows entry of project name and description
 - Invoke command from ribbon, context-sensitive menu, right-click menu or Explorer
 - Exports features only, triangles only or both

