

# *3D Delivery Requirements*



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## Overview

This presentation is focusing on producing the specific output files used by contractors for Automated Machine Guidance (AMG); specifically the geometrics files, CAD files, existing and proposed features, and the surface model files.

Topics Covered Include:

- ◆ What will be required.
- ◆ How to generate required files.

# Session Objectives

- **What information is required for AMG operators?** - Basic requirements for AMG operations.
- **How models are prepared and exported to AMG operators** – Examine how Alignment data, Proposed, Existing and Finished graded surfaces are exported to LandXML.

# What information is required for AMG operators?

- ◆ Contract Plans
  - ✓ Multiple DGN\DWG Files – See CPCH for names and content. A PDF of the Contract Plans is to be Signed and Sealed using Digital Signature.
- ◆ Existing Planimetrics (2D and 3D)
  - ✓ TOPORD.DGN – 2D & 3D existing topography
  - ✓ DREXRD.DGN – 2D & 3D existing drainage
  - ✓ UTEXRD.DGN – 2D & 3D existing utilities
- ◆ 3D Existing Surface(s)
  - ✓ GDTMRD.DGN – 3D existing surfaces triangles
  - ✓ LandXML of the existing (Ground) surface

# What information is required for AMG operators?

- ◆ Alignments
  - ✓ ALGNRD.DGN\DWG – 2D file of Alignments and stationing and LandXML file of the alignment data.
- ◆ 2D Proposed Planimetrics
  - ✓ DSGNRD. DGN\DWG – 2D proposed roadway design
  - ✓ DRPRRD. DGN\DWG – 2D proposed drainage design
  - ✓ PDPLRD. DGN\DWG – 2D proposed pond design
- ◆ 3D Proposed Surface(s)
  - ✓ AMGMRD. DGN\DWG – 3D proposed roadway model top surface (3D break lines can be together or in separate files).
  - ✓ LandXML of the Proposed (Top) surface.
- ◆ 3D Proposed Break Lines
  - ✓ AMGMRD. DGN\DWG – 3D proposed roadway break lines

# File Location and Naming

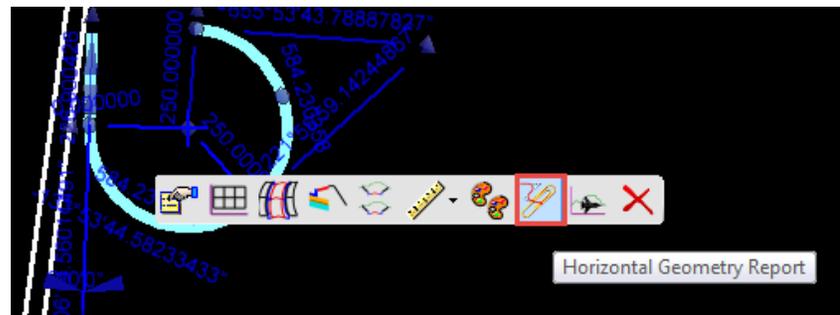
- ◆ Alignments\Profiles
- ◆ Planimetrics
  - ✓ Existing
  - ✓ Proposed
- ◆ Surfaces
- ◆ Break Lines

3D DELIVERABLES SUPPORTING AMG FOR 3D PROJECTS	
File Name (put in .3DDeliverables)	Description
<b>Alignments and Profiles</b>	
AMG-ALGNXX.xml	All alignments extracted from the .\Roadway\ALGNRD file
AMG-ALGNXX.xml	All Profiles extracted from the .\Roadway\DSPFRD or .\Roadway\CORRRD file
<b>2D Proposed Planimetrics Design</b>	
AMG-2DSGNXX.dwg/dgn	2D proposed Roadway design extracted from the .\Roadway\DSGNRD file
AMG-2DRPRXX.dwg/dgn	2D proposed Drainage design extracted from the .\Roadway\DRPRRD file
AMG-2PDPLXX.dwg/dgn	2D proposed Pond design extracted from the .\Roadway\PDPLRD file
<b>2D Existing Survey (Note these are being considered to merge into one survey file)</b>	
AMG-2TOPOXX.dwg/dgn	2D proposed existing Topography extracted from the .\Survey\TOPORD file
AMG-2DREXX.dwg/dgn	2D proposed existing Drainage extracted from the .\Survey\DREXRD file
AMG-2UTEXXX.dwg/dgn	2D proposed existing Utilities extracted from the .\Survey\UTEXRD file
<b>3D Existing Survey Surface</b>	
AMG-3SURFACEEXXX.xml	3D existing terrain to be exported from the .\Survey\GDTMRD file
<b>3D Proposed Surface</b>	
AMG-3SURFACEPRXX.xml	3D proposed finish terrain to be exported from the .\Roadway\AMGMRD file
<b>3D Proposed Break Lines</b>	
AMG-3DSGNXX.dwg/dgn	3D proposed Roadway design extracted from the .\Roadway\DSGNRD file

## Exporting Alignments

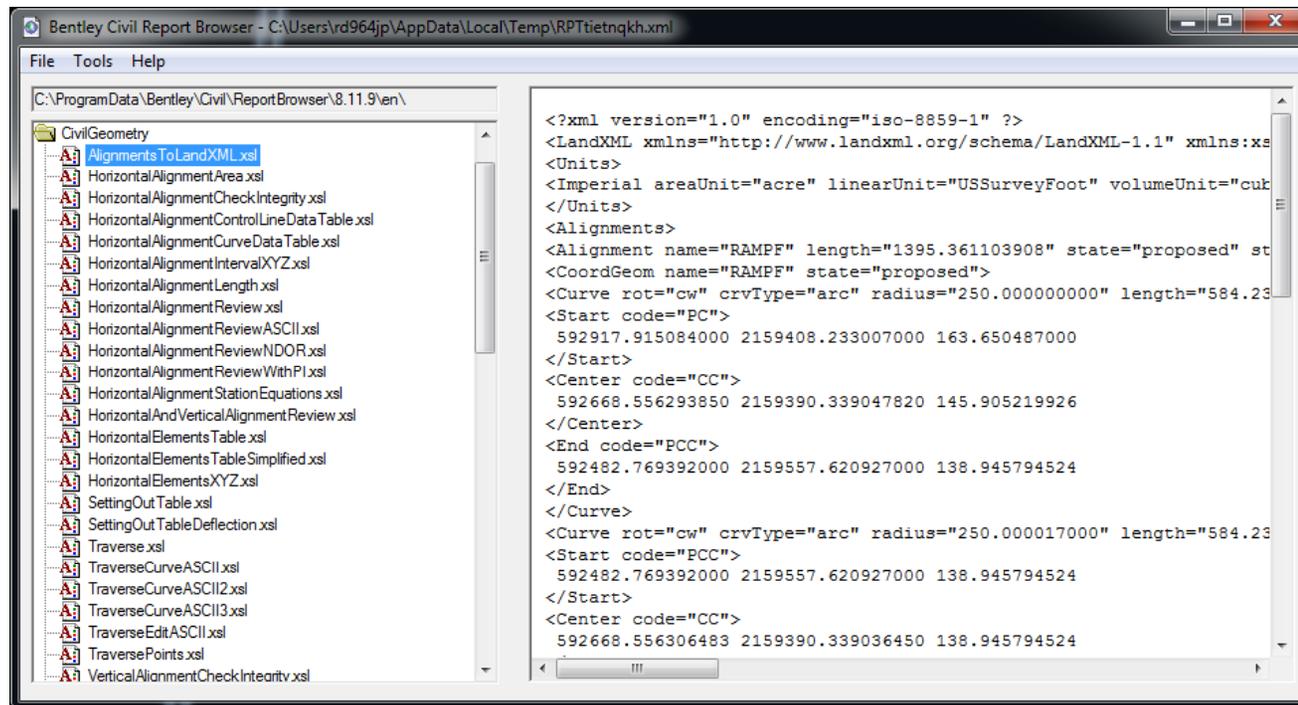
You can export alignments and profiles directly from the elements in the DGN file.

- ◆ Open the ALGNRDxx.DGN
- ◆ Select, and hover over an alignment, then choose the “Horizontal Geometry Report” from the context menu.



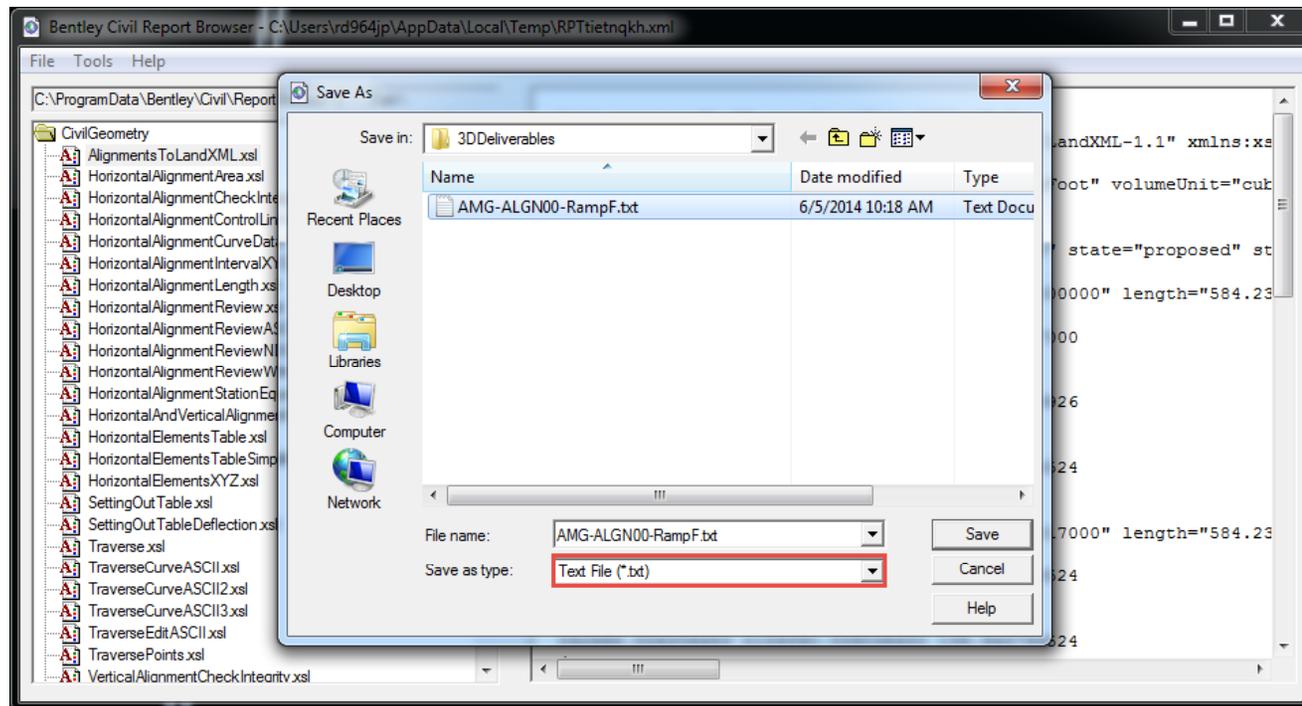
# Exporting Alignments

- ◆ In the Bentley Civil Report Browser select the “AlignmentsToLandXML.xml” report.



## Exporting Alignments

- ◆ Select “File > Save As” and navigate to the 3DDeliverables directory.
  - ✓ Choose “Text File(.txt)” as the “Save as type”. (rename extensions later)



## *2D Proposed Planimetrics*

Use MicroStation's "Save As" command to save copies of the proposed design files into the 3DDeliverables directory with AMG-2 names in DGN and DWG formats.

- ◆ AMG-2DSGNRDxx.DGN, AMG-2DSGNRDxx.DWG
- ◆ AMG-2DSGNRDxx.DGN, AMG-2DSGNRDxx.DWG
- ◆ AMG-2DSGNRDxx.DGN, AMG-2DSGNRDxx.DWG

NOTE: These steps can also be used for 2D existing survey files TOPORD, DREXRD, UTEXRD

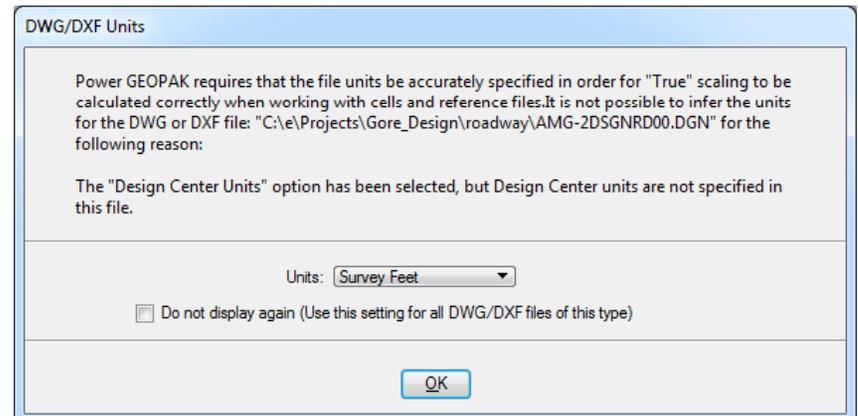
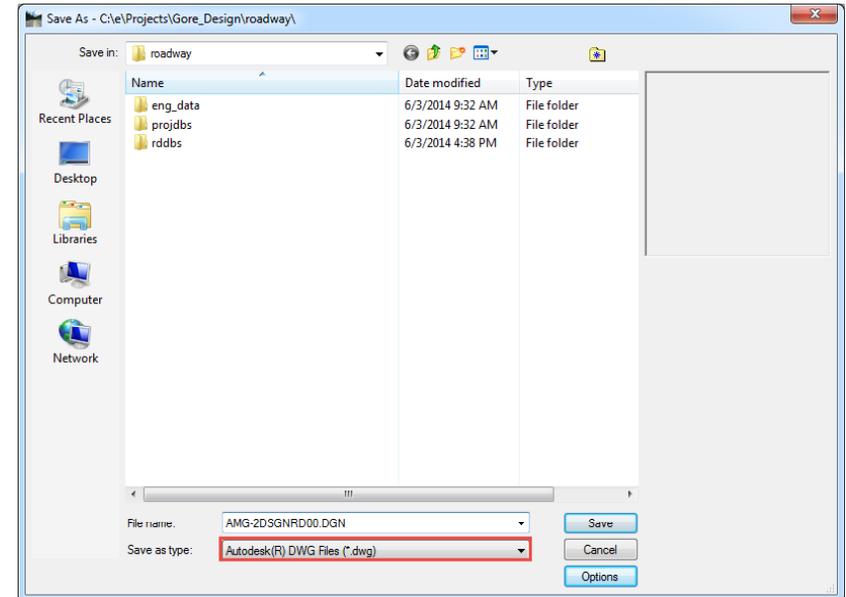
## *2D Proposed Planimetrics*

First you need to dumb down the data.

1. In the View Attributes, turn off “Construction”
2. Place a Fence around all elements in the design file
3. In the Key-in window type “ff=tempdsgnrddxx.dgn”
  - ✓ DataPoint to accept

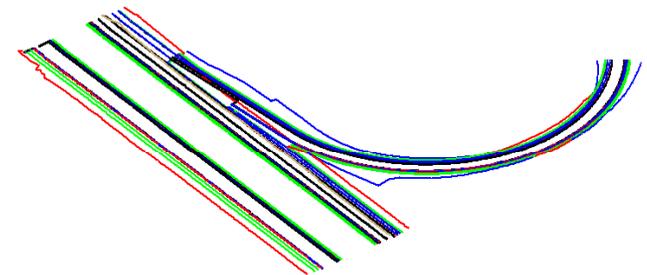
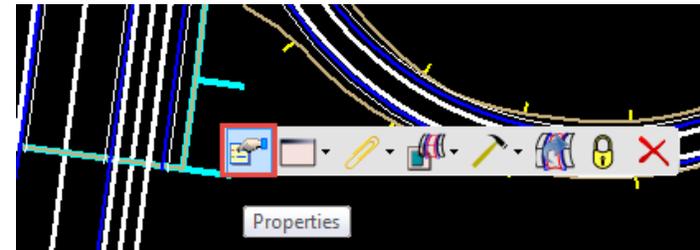
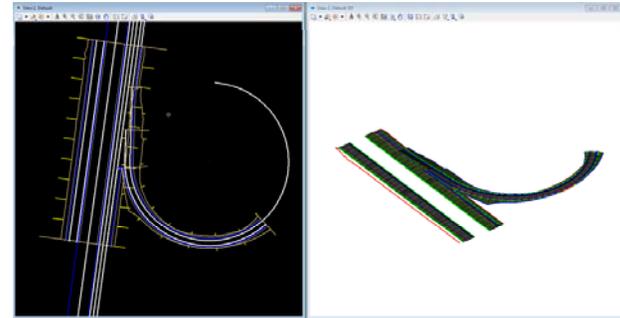
## 2D Proposed Planimetrics

4. Open the tempdsgnrddxx.dgn design file
5. Select “File > Save As” from the MicroStation menu
6. Choose DWG as the “Save as type”
7. Key in the filename & Click Save.
8. Select the Units Survey Feet & click OK.
9. Copy file to 3DDeliverables directory.



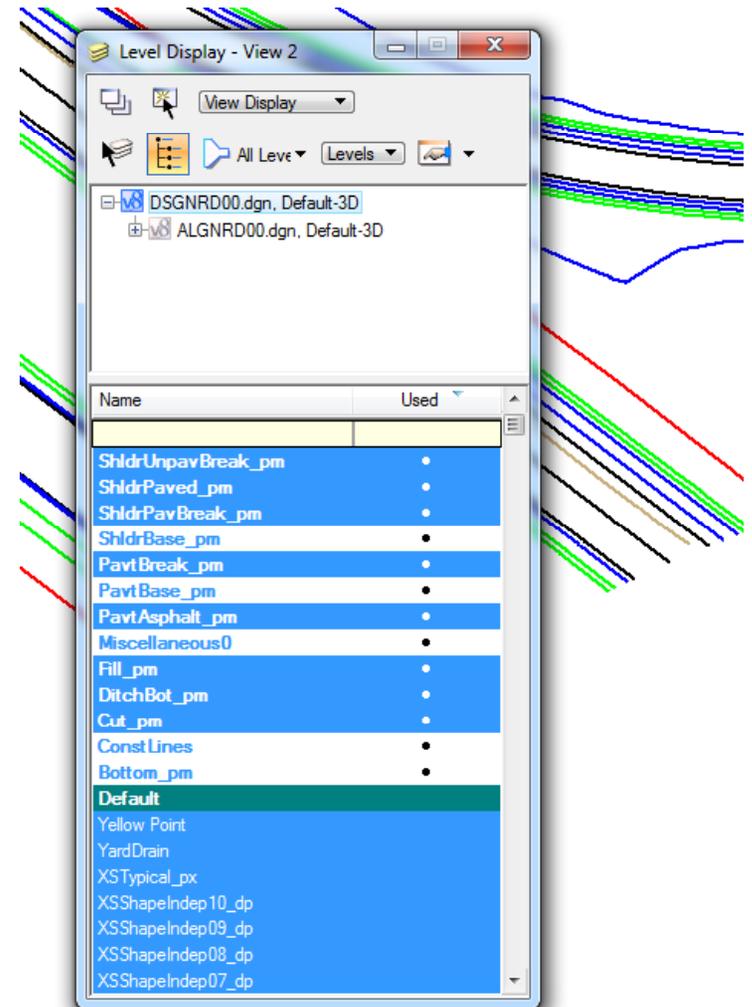
## Exporting 3D Break Lines

1. Open the DSGNRDxx.DGN file.
  - ✓ Display 2D and 3D views (F9)
2. In 2D, Select and hover over the corridor handle then select Properties from the Context menu
3. Choose the Design Stage “4 Final – Lines Only”



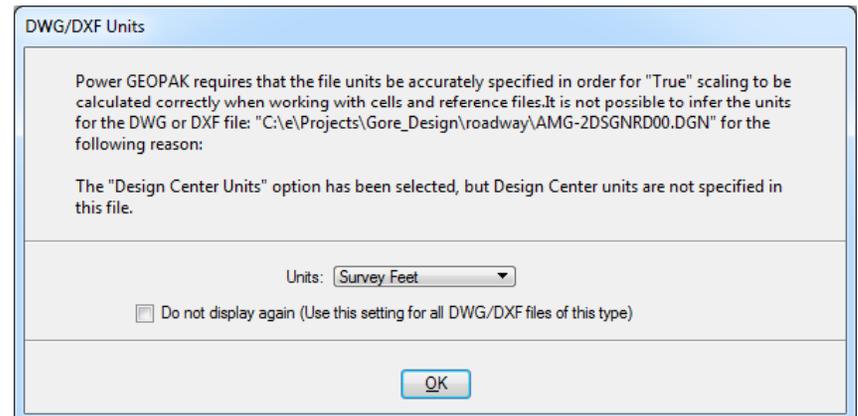
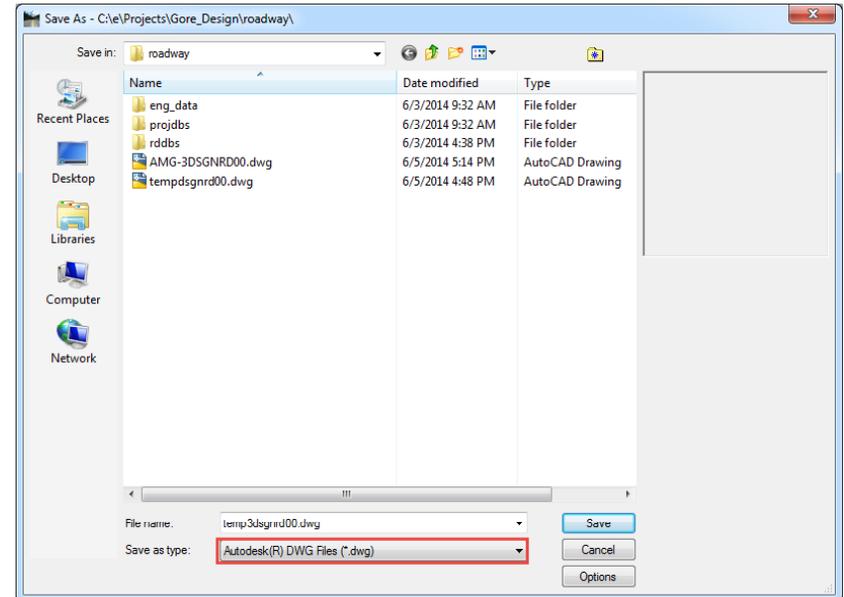
## Exporting 3D Break Lines

4. Turn off subsurface levels
5. Fence elements in 3D view
6. In the Key-in window type “ff=temp3dsgnrddxx.dgn”
  - ✓ DataPoint to accept



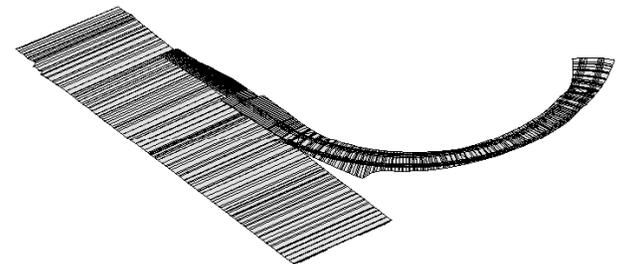
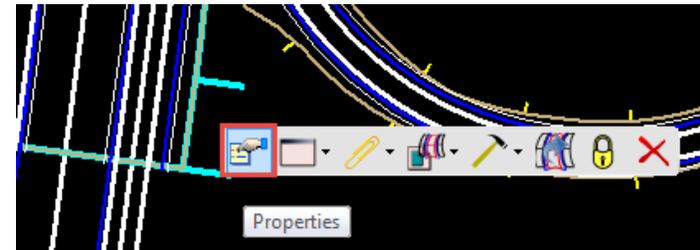
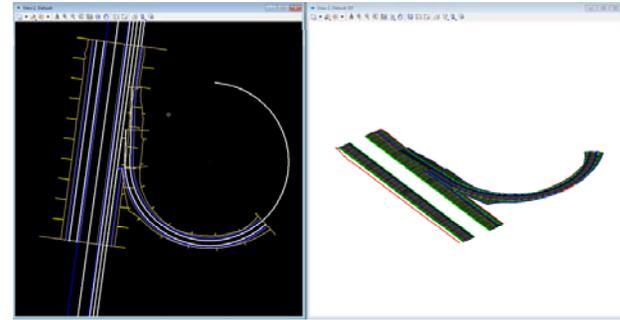
# Exporting 3D Break Lines

7. Open the temp3dsgnrddxx.dgn design file
8. Select “File > Save As” from the MicroStation menu
9. Choose DWG as the “Save as type”
10. Key in the filename & Click Save.
11. Select the Units Survey Feet & click OK.
12. Copy file to 3DDeliverables directory.



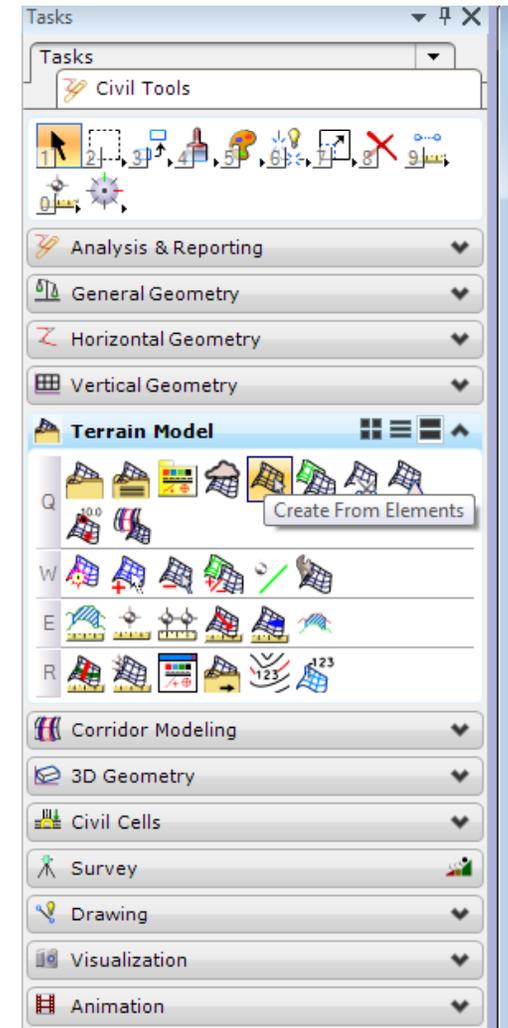
## Exporting Proposed Surface

1. Open the DSGNRDxx.DGN file.
  - ✓ Display 2D and 3D views (F9)
2. In 2D, Select and hover over the corridor handle then select Properties from the Context menu
3. Choose the Design Stage “4 Final – Lines Only”



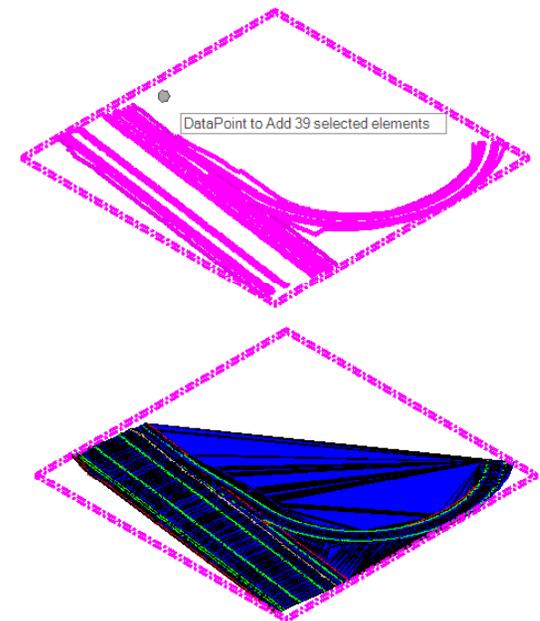
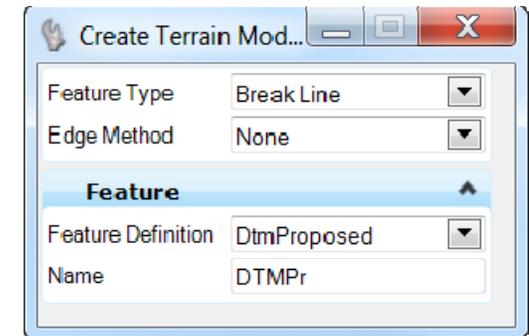
## *Exporting Proposed Surface*

4. Create a new AMGMRDxx.DGN file
5. Open AMGMRDxx.DGN file
6. Reference the TEMP3DSGNRDxx.DGN File
7. Select all elements
8. Click “Create From Elements” on the “Civil Tools > Terrain Model” task menu.



## Exporting Proposed Surface

9. Set the following in the Create Terrain Model dialog:
  - Feature Type: Break Line
  - Edge Method: None
  - Feature Definition: DTMProposed
  
10. DataPoint through prompts to accept settings.

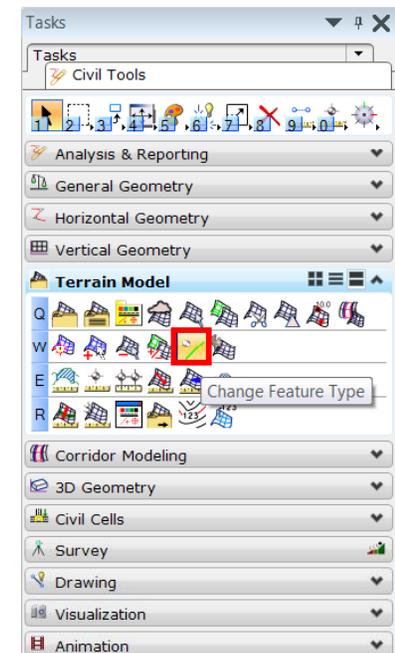
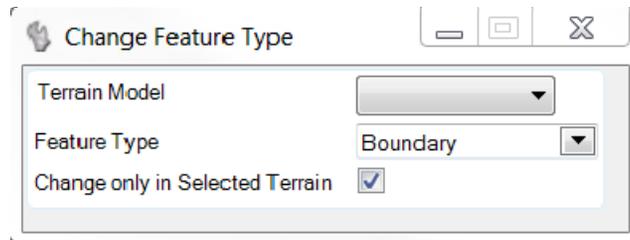
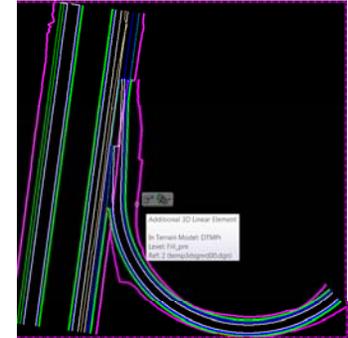


A Surface is created

- ✓ external triangles must be trimmed

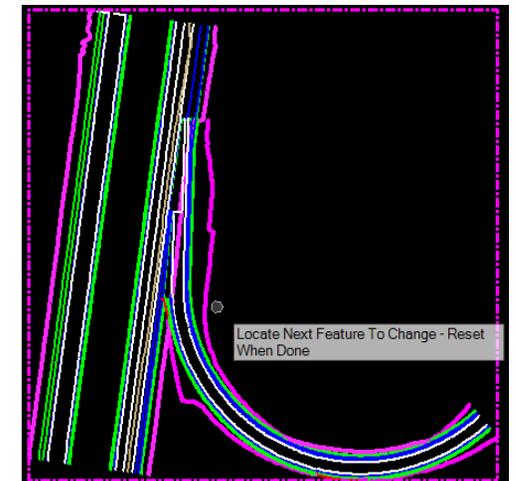
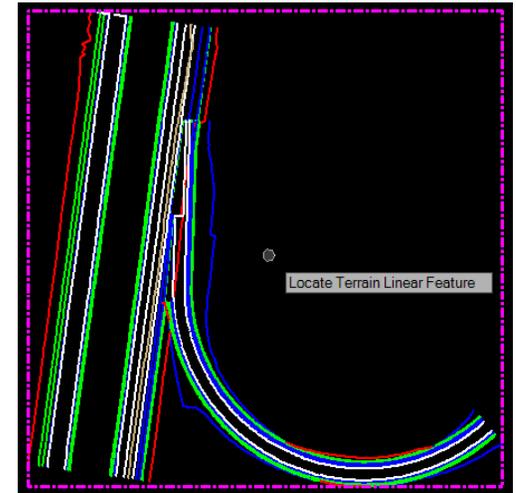
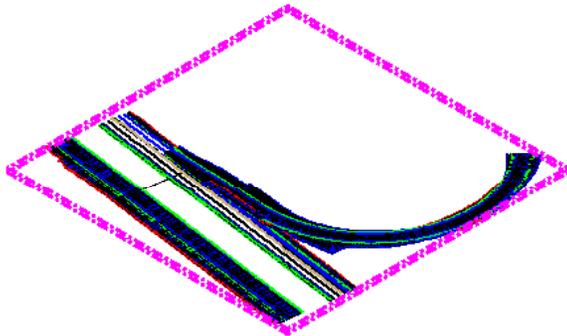
## Exporting Proposed Surface

11. Turn off the level “DTM” in the 2D view
11. Click “Change Feature Type” on the “Civil Tools > Terrain Model” task menu.
12. Set the Feature Type to Boundary



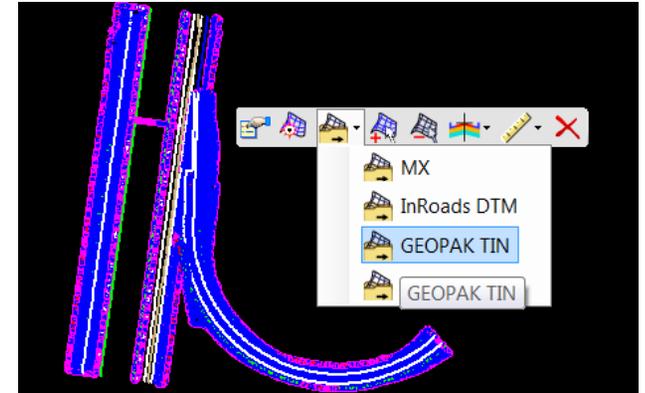
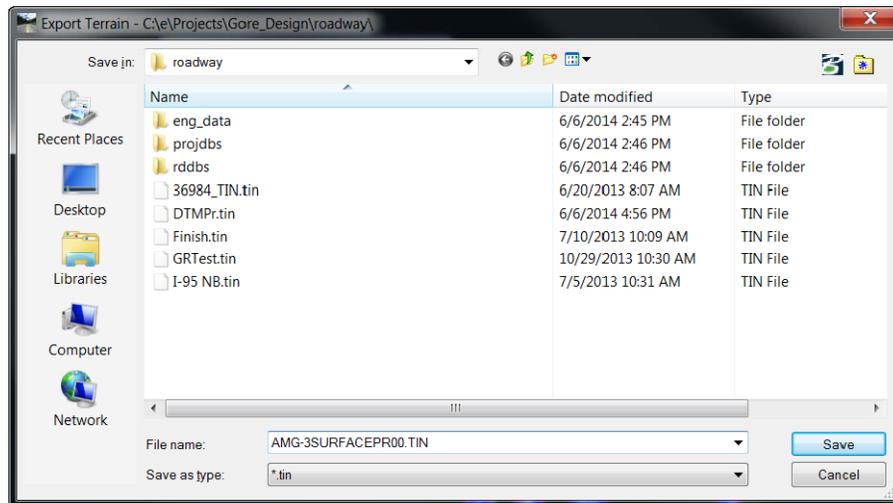
## Exporting Proposed Surface

13. When prompted to “Locate Terrain Linear Features” select the cut and fill lines defining the external limits of the surface.
14. When all have been selected click the “reset button (right-click) to apply the changes.
  - ✓ External triangles are trimmed



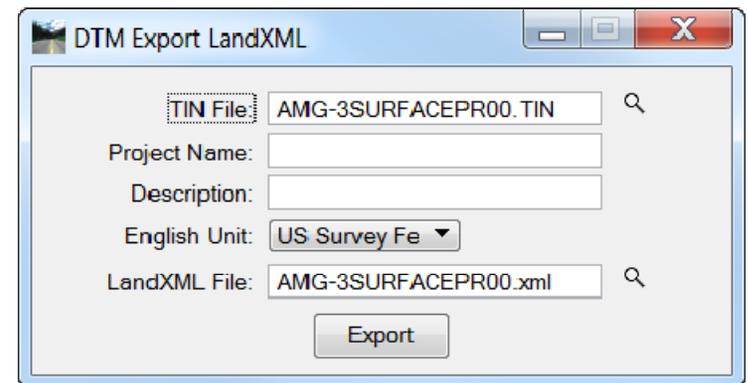
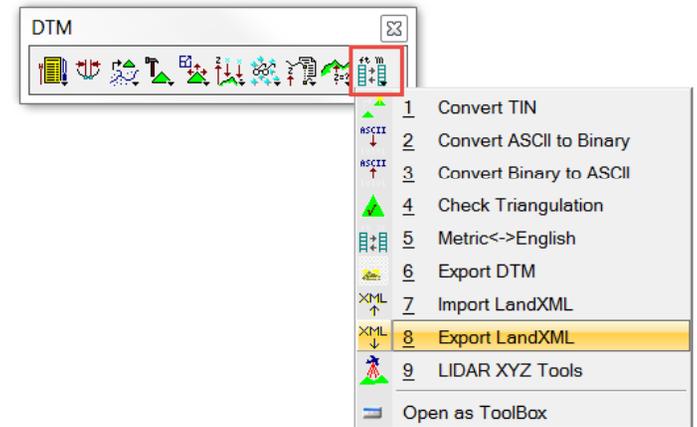
## Exporting Proposed Surface

15. Select and hover over the surface then select “Export Terrain Model > GEOPAK TIN”.
16. When prompted key in the filename “AMG-3SURFACEPRxx.TIN” and click Save.



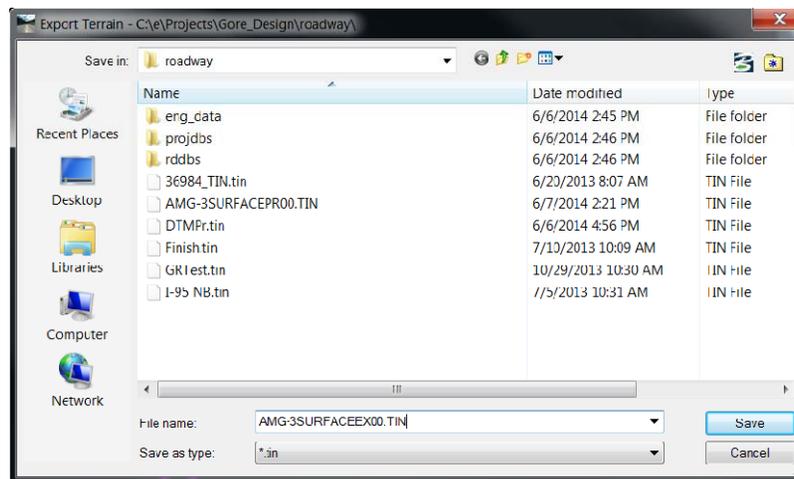
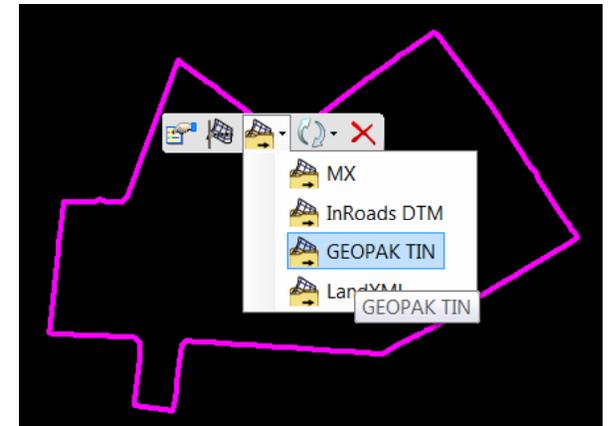
## Exporting Proposed Surface

17. From the GEOPAK DTM Toolbox select “Utilities > Export LandXML”
18. On the DTM Export LandXML dialog enter:
  - TIN File: AMG-3SURFACEPRxx.TIN
  - English Unit: US Survey Feet
  - LandXML File:AMG-3SURFACEPRxx.TIN
19. Click Export
20. Copy AMG-3SURFACEPRxx files to 3DDeliverables directory



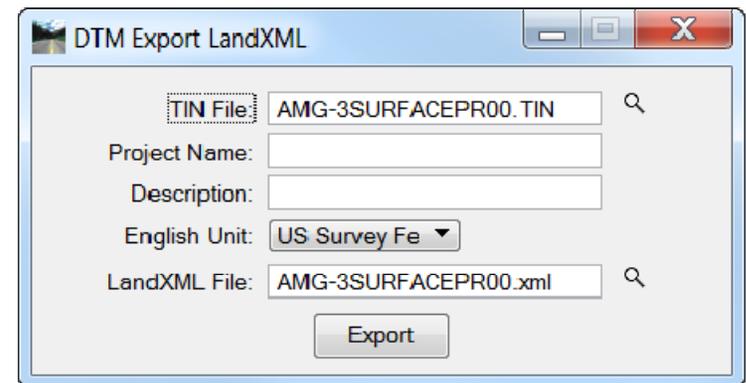
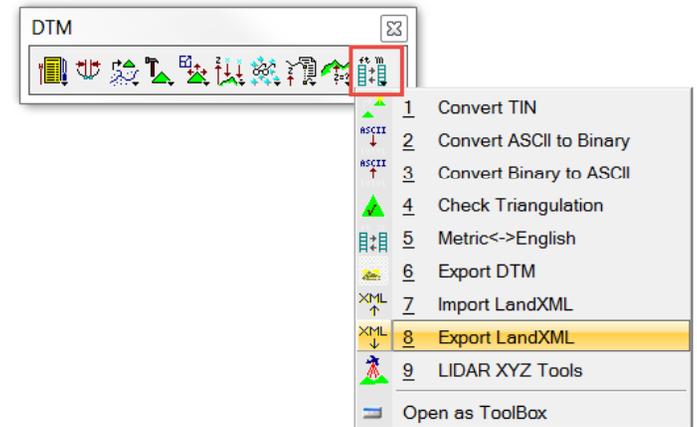
# Exporting Existing Surface

1. Open the GDTMRDxx.DGN file.
2. Select and hover over the existing surface then select “Export Terrain Model > GEOPAK TIN”.
3. When prompted key in the filename “AMG-3SURFACEEXxx.TIN” and click Save.



## Exporting Existing Surface

4. From the GEOPAK DTM Toolbox select “Utilities > Export LandXML”
5. On the DTM Export LandXML dialog enter:
  - TIN File: AMG-3SURFACEEXxx.TIN
  - English Unit: US Survey Feet
  - LandXML File:AMG-3SURFACEEXxx.TIN
6. Click Export
7. Copy AMG-3SURFACEEXxx files to 3DDeliverables directory



## *Native Design and Survey Files*

- ◆ Copy the native (DGN) proposed design and survey files to the 3DDeliverables directory.
- ◆ Rename them, placing the “AMG-” prefix before the file name.

## Contact Information

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