



Integrating the Geospatial Workplace

# New Features in TerraScan

What's New in Terrasolid v014?  
Webinar  
13 February 2014


Darrick Wagg  
GeoCue Corporation  
9668 Madison Blvd., Suite 202  
Madison, AL 35758  
+1 (256) 461-8289  
[support@geocue.com](mailto:support@geocue.com)  
[www.geocue.com](http://www.geocue.com)



Integrating the Geospatial Workplace

# Version 014.xxx

- Version 014.001 will be released next week




13Feb2014 What's New in Terrasolid v014? - Webinar 2

GeoCue Integrating the Geospatial Workplace

## 64 Bit Development

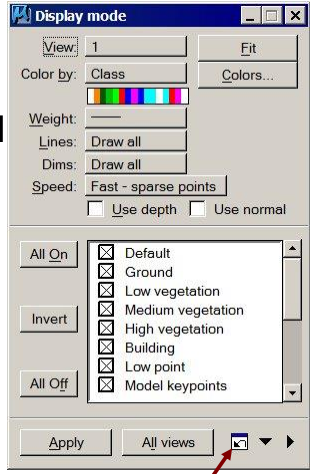
- About 40% of development effort during last year has been on converting source code to run on future 64 bit MicroStation
- Fewer new tools in release software
  
- Development of 32 bit software will stop when 64 bit MicroStation becomes available
  - Only critical bug fixes
  - Customers can continue to run 32 bit versions


 Terrasolid
13Feb2014
What's New in Terrasolid v014? - Webinar
3


GeoCue Integrating the Geospatial Workplace

## Undo for Display Mode

- **Undo** button in **Display Mode** dialog
- **Scan Undo Display** keyin command
- These revert last **Apply** or **Apply to all** action



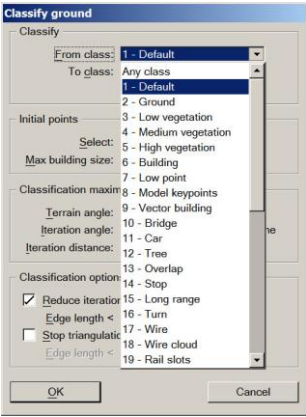
**UNDO** 

 Terrasolid
13Feb2014
What's New in Terrasolid v014? - Webinar
4

GeoCue Integrating the Geospatial Workplace

## Drop Down List Class Selection in V8i

- Works practically with a large number of classes
- V8 version class selection stays as option button
  - Large number of classes can exceed screen height

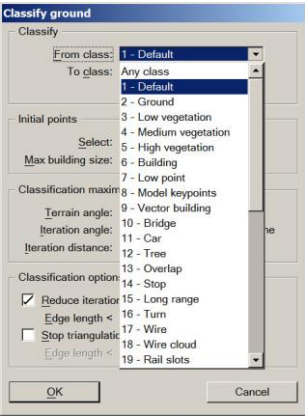


13Feb2014 What's New in Terrasolid v014? - Webinar 5

GeoCue Integrating the Geospatial Workplace

## New Keyin Commands

- **Scan Delete Inside Fence** keyin command waits for an accept click and then deletes points inside fence or inside selected shape
- **Scan Delete Outside Fence** keyin command waits for an accept click and then deletes points outside fence or outside selected shape



13Feb2014 What's New in Terrasolid v014? - Webinar 6

GeoCue Integrating the Geospatial Workplace

## Classify Outside Shapes

- **Classify / Inside shapes** macro action can now classify outside as well

**Classify inside/outside shapes**

From class: Classes 2 >>

To class: 13 - Overlap

Classify: Outside shapes

Shapes from: Active design file

Expand by: 0.00 m

Level: 10

By color :  

By weight :  

By style :  

OK
Cancel

Terrasolid
13Feb2014
What's New in Terrasolid v014? - Webinar
7

GeoCue Integrating the Geospatial Workplace

## Height from Ground & Height from TIN

**Macro step**

Action: Transform points

Line: 0-65535 0-65535 for all

Class: Any class >>

Transform: Height from ground >>


Ground: 2 - Ground >>

Inside fence only

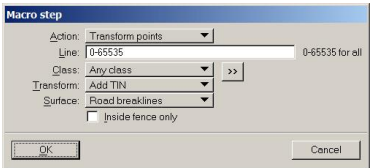
OK
Cancel

- Transformation type which can be applied in a macro
- Elevation of each point is replaced by its height above ground or above TerraModeler TIN


Terrasolid
13Feb2014
What's New in Terrasolid v014? - Webinar
8



Integrating the Geospatial Workplace

## Add TIN Transformation




- Transformation type which can be applied in a macro
- Same as **Adjust to geoid** using TerraModeler TIN
- Example use – Exaggerate road surface deformations:
  - Create TIN model from road breaklines
  - Transform points using **Height from TIN**
  - Transform points multiplying Z by 5
  - Transform points using **Add TIN**


13Feb2014
What's New in Terrasolid v014? - Webinar
9



Integrating the Geospatial Workplace

## Various Improvements

- Maximum number of cross arms in a powerline tower increased to 16 (used to be 10)
- **Find Danger Objects** accepts any linear elements on given levels as wires
- **All on** and **All off** buttons in **Read points** menu command for modifying attributes to load
- **Classify Using Brush** supports rectangle shape brush
- Vector model editing actions run faster on large buildings
- **Cut overlap / By range** runs faster.
- **Lock selected** menu command in **Define Project** for locking selected project blocks
- Convert from unix time stamps to GPS time stamps
- **Rotate view when panning** in **Place Railroad String**

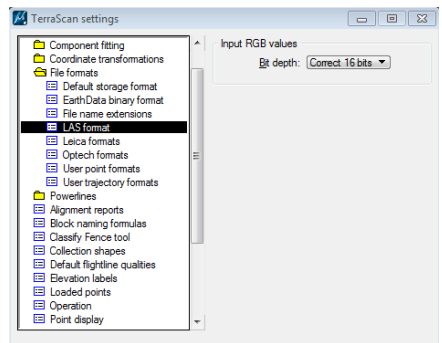

13Feb2014
What's New in Terrasolid v014? - Webinar
10

Integrating the Geospatial Workplace



## Importing Badly Stored LAS Color


- Bit depth setting in Settings / File formats / LAS format
- For reading in LAS files where RGB colors are incorrectly stored
- Set setting to "Low 12 bits" or "Low 8 bits" temporarily
- Read LAS files or import into project
- Set setting back to "Correct 16 bits"



**Terrasolid**

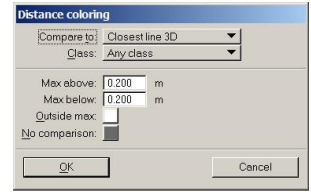
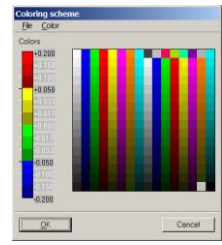
13Feb2014 What's New in Terrasolid v014? - Webinar 11

Integrating the Geospatial Workplace




## Change Detection Coloring

- Closest line 3D distance coloring option can display distance between two surfaces regardless of surface normal direction
- Can display difference:
  - On ground surface (such as tunnel floor)
  - On vertical surface (such as tunnel wall)
  - On top surface surface (such as tunnel roof)
- You need:
  - Two surveys from the same location with different line numbers assigned
  - Cut overlap done on each survey
  - Normal vectors computed

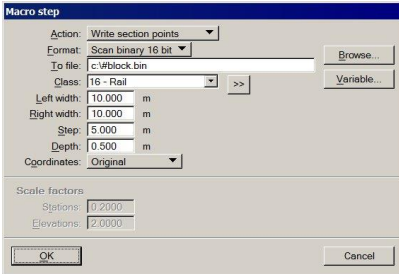
**Terrasolid**


13Feb2014 What's New in Terrasolid v014? - Webinar 12



Integrating the Geospatial Workplace

## Write Section Points & Original Coordinates

- Write section points** macro action now has a setting for output coordinate system: **Original / Station-Offset-Z**
- Original settings gives the ability to write out cross section points at regular spacing along alignment
- Example use: customer wants one point on railroad rail at about 5 m spacing

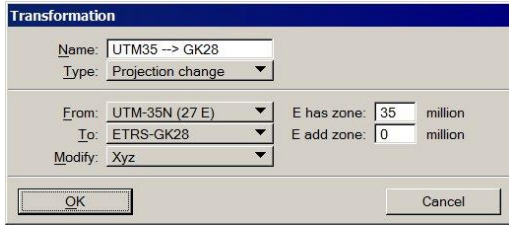




13Feb2014
What's New in Terrasolid v014? - Webinar
13



Integrating the Geospatial Workplace

## Subtract & Add Millions in Projection Change

- Projection change type transformation can now handle cases where source and/or destination system easting includes zone number as millions
- For example:
  - You have data in UTM35 with easting values such 35 542 976.62
  - You want to convert to ETRS-GK28 without millions and have values close to 500 000

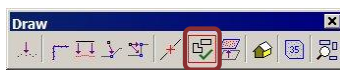



13Feb2014
What's New in Terrasolid v014? - Webinar
14


Integrating the Geospatial Workplace

## Check Footprint Polygons

- Tool for comparing building footprint vectors and building classification with each other
- Marks suspect locations by drawing polygons
- Finds places where we have a footprint polygon which is lacking laser data
- Finds points classified as building too far away from building footprint vectors
- Useful for finding:
  - Flaws in building classification
  - Places with no laser points on a roof
  - Flaws in city base map



**Check footprint polygons**

Source classes: 6 - Building >>

Create polygon for low density

Covered > 2.00 points / m2

Area > 10.0 m²

Level: Level 14 - Footprint - no points


Create polygon for missing footprint


Points > 2.00 m from footprints

Area > 10.0 m²

Level: Level 15 - Points - no footprint

OK Cancel


13Feb2014
What's New in Terrasolid v014? - Webinar
15


Integrating the Geospatial Workplace

## Inspect Elements

- Tool for systematically viewing each element
- Select elements before starting the tool
- Presents elements as a list you can traverse
- Automatically centers views showing selected element
- Take appropriate action if required

**Inspect Elements**

**View settings**

Top view: 1  Fit view

Second top view: None  Fit view

Front view: 3  Fit view

Right view: 4  Fit view

Isometric view: None  Fit view

Camera view: 7  Fit view

**Remove action**

Modifies level To: Level 20

Modifies color To: 5

OK Cancel

➔


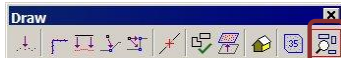
**Inspect Elements**

1	No group
2	No group
3	No group
4	No group
5	No group
6	No group
7	No group
8	No group
9	No group
10	No group
11	No group

Remove


Show location

Identify

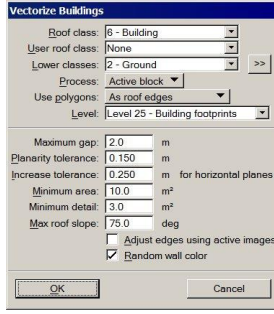
13Feb2014
What's New in Terrasolid v014? - Webinar
16

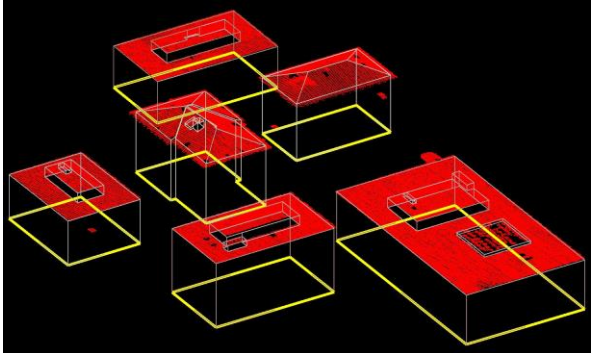




Integrating the Geospatial Workplace


## Roof Edge Polygons for Buildings

- Building vectorization can use existing polygons as roof edges
- Makes it possible to automatically produce building vector models matching existing footprint vectors
- Roof edge and walls are at the same location
  - eaves depth not supported yet



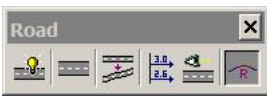




13Feb2014
What's New in Terrasolid v014? - Webinar
17



Integrating the Geospatial Workplace

## Fit Geometry Components

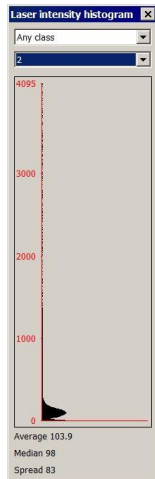
- Finds design geometry built from lines, arcs and clothoids which best match surveyed alignment of a road or a railroad
- Improved fitting
- New tools for modifying automatically generated geometry



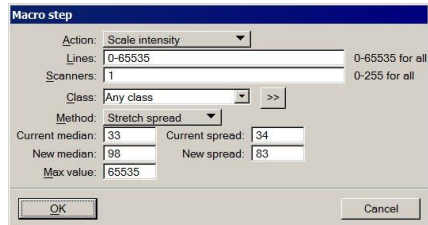

13Feb2014
What's New in Terrasolid v014? - Webinar
18



Integrating the Geospatial Workplace


## Stretch Spread in Scale Intensity



- Simple method for making intensity values from two scanners or from different data collection days similar to each other
- Use **Addon / View histogram** to see the median intensity and the intensity spread of different scanners or different days
- **Scale intensity** macro action can now modify intensity to match desired median and desired spread

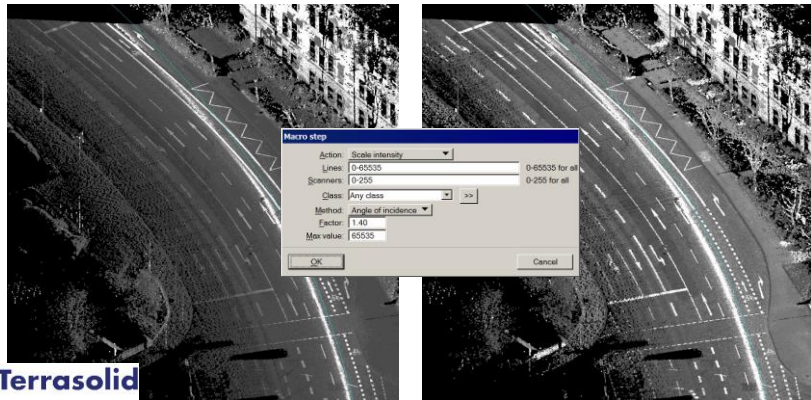


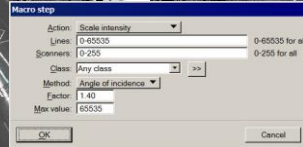

13Feb2014
What's New in TerraSolid v014? - Webinar
19



Integrating the Geospatial Workplace

## Angle of Incidence Intensity Correction


- **Scale intensity** macro action can adjust intensity based on angle of incidence
- Requires that normal vectors have been computed
- Correction only for points with planar dimension






13Feb2014
What's New in TerraSolid v014? - Webinar
20

Integrating the Geospatial Workplace



## Find Paint Lines Macro Action

- Finds linear chains of given width from points in given class(es)
- Your macro should first classify high intensity points (or bright points using **Classify / By color**)
- Macro action writes potential paint line points to text files

**Macro - paint\_mac**

File Run

Description:  Process flightlines separately  Step  
 Author:  Process scanners separately  Slave can run

FnScanClassifyIntensity(2.8,0.24000,65535,0) Add...  
 FnScanClassifyIntensity(10.8,0.24000,65535,0) Insert...  
 FnScanThinPoints("8",9.2,0.015,1,000,0) Edit...  
 FnScanFindPaint("c:\paint#bnumber.bt","8",0.12,0.20,0)

**Macro step**

Action: Find paint lines


Approx width: 0.12 m

Bright class: 8 - Model keypoints >>

Find: All lines Browse... Variable...


Output file: c:\paint#bnumber.bt

OK Cancel



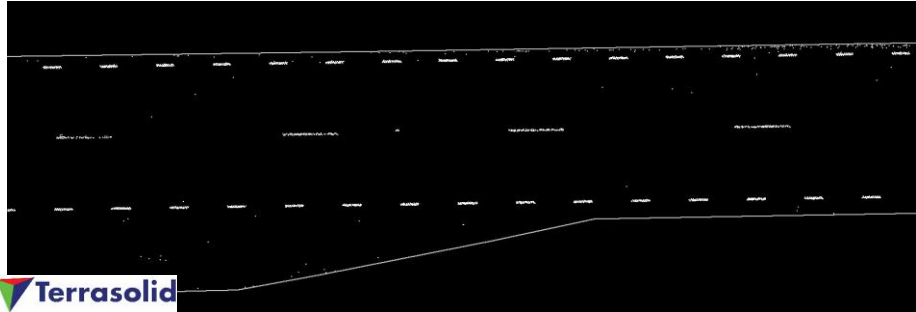

13Feb2014
What's New in TerraSolid v014? - Webinar
21

Integrating the Geospatial Workplace




## Find Paint Lines Preclassification

- There no intensity threshold that would cleanly separate paint hits from surrounding asphalt
- Classification should classify almost all hits on paint
- Classification can include some noise points on surrounding asphalt
- Consider using asphalt polygons to exclude everything outside

13Feb2014
What's New in TerraSolid v014? - Webinar
22

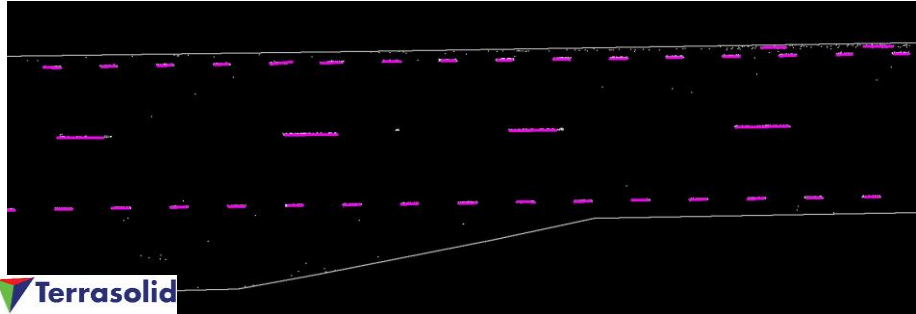

Integrating the Geospatial Workplace


## Read / Paint Lines


- Menu command for reading potential paint line points from text files and drawing those into the design file

**Read paint lines**

Min length:  m




13Feb2014
What's New in Terrasolid v014? - Webinar
23


Integrating the Geospatial Workplace

## Improved Road Crown Logic

- **Find Road Breaklines** tool has better logic for road crown
- Smoothing choices: None/Normal/Aggressive
- Creates a result only where it is reliable
  - Side slope on both sides is down
  - Slope difference between left and right side exceeds given limit
- Will not create a vector where these conditions are not true

**Road feature**

Description:

Source level:

Fit to class:  >>

Breakline type:

Result within:  m offset

Plane width:  m

Slope change >:  deg

Length >:  m

Smoothing:

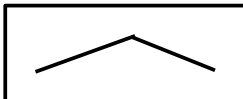
Thin Accuracy:  m

Result level:

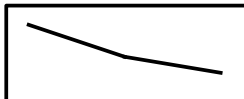
Color:

Weight:

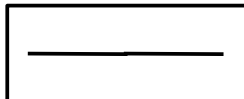
Style:




*Result*




*No result*  
*Side slope on left is up*



*No result*  
*Not enough slope change*

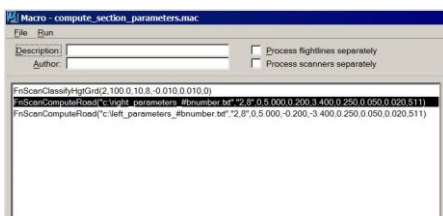

13Feb2014
What's New in Terrasolid v014? - Webinar
24

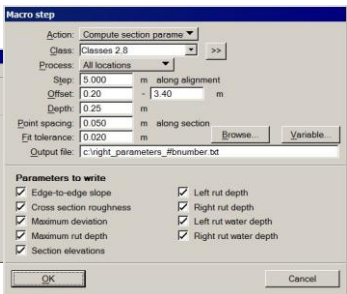
Integrating the Geospatial Workplace




## Compute Section Parameters


- Macro action for extracting information from cross sections at regular spacing along a road
- Needs high point density – use all laser points
  - Macro can classify points within +-1 cm from hard surface class
- Generates one text file for each block:
  - Multiple computers can process
  - Read to draw results into design file
  - Copy to spreadsheet for analysis





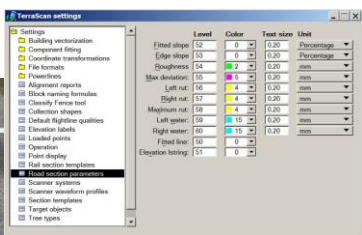
 13Feb2014What's New in TerraSolid v014? - Webinar25

Integrating the Geospatial Workplace

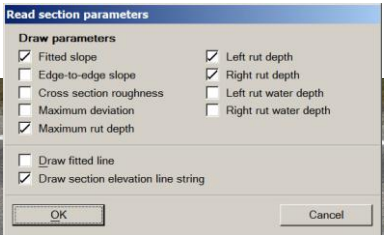



## Read / Section Parameters

- Menu command for reading section parameters from text files and for drawing those into design file
- **Road section parameters** category in **Settings** tool defines levels, colors, text size and units



Level	Color	Text size	Unit
Fitted slope	12	0	1.20 Percentage
Edge slope	13	0	1.20 Percentage
Roughness	14	8	1.20 mm
Max deviation	15	8	1.20 mm
Left rut	16	4	1.20 mm
Right rut	17	4	1.20 mm
Maximum rut	18	4	1.20 mm
Left water	19	15	1.20 mm
Right water	20	15	1.20 mm
Fitted line	21	0	
Elevation string	22	0	



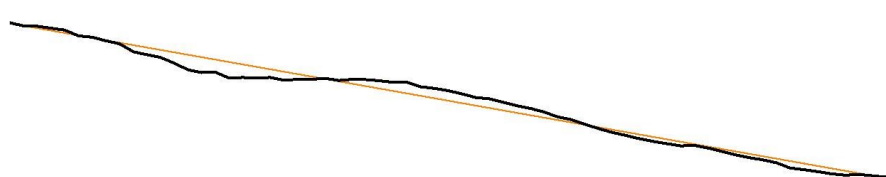
 13Feb2014What's New in TerraSolid v014? - Webinar26

GeoCue

Integrating the Geospatial Workplace

## Section Parameters: Edge-to-Edge Slope

- Slope from middle of two left most points to middle of two right most points



Terrasolid

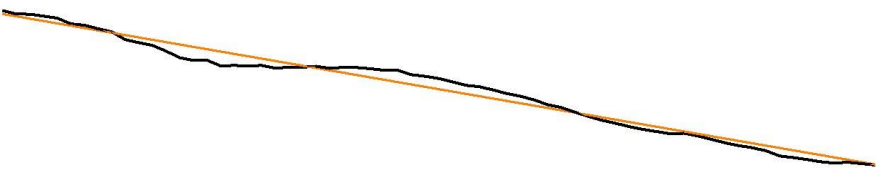
13Feb2014 What's New in Terrasolid v014? - Webinar 27

GeoCue

Integrating the Geospatial Workplace

## Section Parameters: Fitted Slope

- Slope from line fitted to all section points
- Routine excludes points from fitting until all points are within given tolerance
- Macro action always computes this – no user selection




Terrasolid

13Feb2014 What's New in Terrasolid v014? - Webinar 28

GeoCue Integrating the Geospatial Workplace

## Section Parameters: Cross Section Roughness

- Average distance of points to a line connecting left and right most points



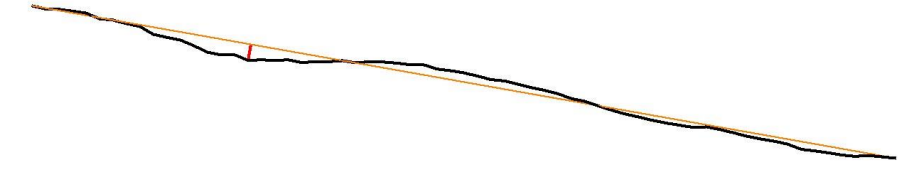
Terrasolid

13Feb2014 What's New in Terrasolid v014? - Webinar 29

GeoCue Integrating the Geospatial Workplace

## Section Parameters: Maximum Deviation

- Maximum distance from a point to a line connecting left most and right most point
- Value is positive if point is above line
- Value is negative if points is below line



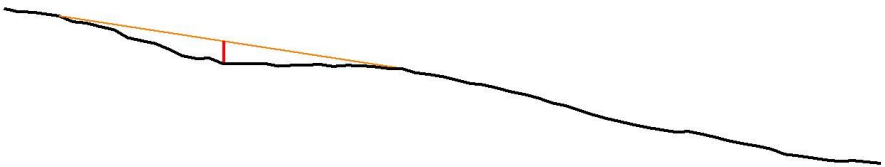
Terrasolid

13Feb2014 What's New in Terrasolid v014? - Webinar 30

GeoCue Integrating the Geospatial Workplace

## Section Parameters: Maximum Rut Depth

- Rut depth is biggest dZ from a point to a line above connecting two other points in the section



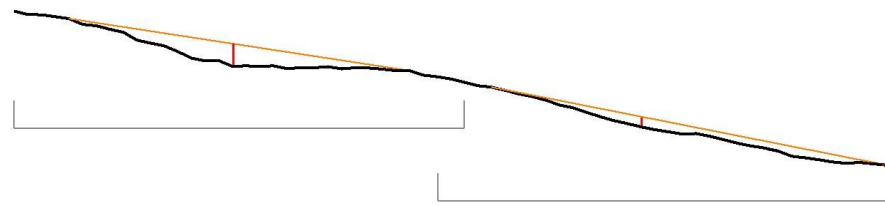
Terrasolid

13Feb2014 What's New in Terrasolid v014? - Webinar 31

GeoCue Integrating the Geospatial Workplace

## Section Parameters: Left Rut Depth & Right Rut Depth

- Left rut considers interval from left edge to first point on right side of middle
- Right rut considers interval from right edge to first point on left side of middle
- Rut depth is biggest dZ from a point to a line above connecting two other points in the interval



Terrasolid

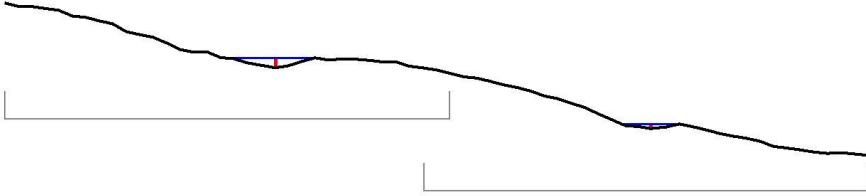
13Feb2014 What's New in Terrasolid v014? - Webinar 32



GeoCue Integrating the Geospatial Workplace

## Section Parameters: Left & Right Rut Water Depth

- Left rut water considers interval from left edge to first point on right side of middle
- Right rut water considers interval from right edge to first point on left side of middle
- Rut water depth is biggest elevation difference from point to water surface



**Terrasolid**

13Feb2014 What's New in Terrasolid v014? - Webinar 33