



**Release Notes**  
**MAGNET Software System**  
**Version 5.0 - 5.2.1**  
**May 3, 2019**

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**MAGNET V5.X Release Notes - Introduction**

Please take time to read these Release Notes. They contain information about the following:

- New Features
- Improvements
- Bug fixes

**NOTE:**

It is always recommended, before upgrading your field software, users backup their original job; and following any update to your field software, users perform in-the-field checks to ensure data integrity

# Table of Contents

<b>MAGNET Field - V5.2.1</b>	<b>5</b>
General	5
<b>MAGNET Field - V5.2</b>	<b>6</b>
General	6
<b>MAGNET Office 5.1.1</b>	<b>9</b>
General	9
<b>MAGNET Field - V 5.1</b>	<b>11</b>
General	11
Coordinate System	15
Calculate	15
Equipment	16
Exchange	17
Resolved Issues	18
<b>MAGNET Enterprise</b>	<b>23</b>
General	23
<b>MAGNET Office - V5.1</b>	<b>24</b>
General - All Office Products	24
Resolved Issues - All Office Products	28
MAGNET Layout	29
MAGNET Survey	29
MAGNET Site	31
MAGNET Construction	34
MAGNET Project	35
MAGNET Office Tools	37
MAGNET Exchange for Autodesk	38
<b>MAGNET Field - V5.0</b>	<b>39</b>
General	39
Calculate	42
Configure	43
Coordinate System	46
Equipment	47
Exchange	48
Edit	55
Job	58
Map	59
Setup	64
Survey	65
Stake	68
Reports	74
Resolved Issues	74
<b>MAGNET Office 5.0.1</b>	<b>78</b>
General	78
<b>MAGNET Office - V5.0</b>	<b>80</b>
General - All Office Products	80
MAGNET Site, Topo and Layout	88
MAGNET Site and Topo	90

MAGNET 3D Exchange	97
MAGNET Office Topo	98
MAGNET Office Site	98
MAGNET Office Resurface	106
MAGNET Office Takeoff	110
Resolved Issues - All Office Products	110
<b>MAGNET Tools - V5.0</b>	<b>112</b>
General	112
<b>MAGNET Exchange for Autodesk</b>	<b>116</b>
General	116

## MAGNET Field - V5.2.1

### **General**

The following additions/revisions have been made to MAGNET Field and MAGNET Field Layout

Unless noted, the improvements and/or revisions listed below are included in all MAGNET Field Products

#### Resolved Issues:

- Resolved an issue when opening jobs from earlier versions of MAGNET Field. MAGNET Field would show a "unable to perform recomputations" and "failed to open job!" error messages.
- Resolved an issue when Exporting Raw Data in SDR33 format. If you selected 'Use Filters', the Raw Data would not export to the file, only objects would export.
- Resolved an issue when importing \*.DGN files that had millimeters (mm) as Units. On import, MAGNET Field would crash.
- After upgrading MAGNET Field to V 5.2, 2012a Geoid was no longer available. This update includes both the 2012a & 2012b Geoid files included in the installation.

## MAGNET Field - V5.2

### **General**

The following additions/revisions have been made to MAGNET Field and MAGNET Field Layout

Unless noted, the improvements and/or revisions listed below are included in all MAGNET Field Products

### Import/Export

- Updated MaXML import/export support to V1.3
- Improved LandXML/DXF/DWG import

### New Equipment

- Added support for the Topcon HiperVR with internal cell modem

### Measurements

- GNSS
  - Added support for Prism Spacer antennas for the HiperVR and Sokkia GRX3
  - Addressed the GPS Week Rollover
- Optical
  - Improved job start time when using MAGNET Field OnBoard a Topcon OS Manual Total Station
  - Added support for the Vertical Search Offset option in the Motorized Configuration
  - Improved the Find Station workflow in Precise Measure mode

### Piping and Trenching Module

- Extended the 'Trench' code to include a Radius Attribute (VPI)
- Switched to bisector mode when building surfaces for trenches
- Dramatically improved the surface generation logic
- Added the Horizontal Deflection text label (H Deflection) to the Measure Screen

### Map

- Added support for new WMS servers in Germany, Sweden and Austria
- Improved 3D Map navigation

## Stakeout

- Added the Topo button as an option in the Stake Map customizable toolbar

## Resolved Issues

- Addressed an issue when importing \*.CLIP files. When importing the 3 elements of a road (PLT, TRV, ALZ) the cross section places it at ground level, when it should be below. In addition, when analyzing the cross section from the edit menu, at times MAGNET Field would crash.
- Addressed an issue when creating lines from points. When creating a line between two points MAGNET Field would close.
- Addressed an issue when importing \*.dgn files into MAGNET Field. At times, the file would not import in the correct position.
- Corrected an issue when exporting a LandXML file to Leica Captivate software. The chainages reported when opening the file in Leica Captivate were not correct.
- Corrected an issue when configuring MAGNET Field in French. The VA and SD would appear twice in the Backsight record, and the first set would not contain any values.
- Updated support for WMS mapping servers and now support CRS:84 and EPSG:4258.
- Corrected an issue with the 2 Distance Offset calculation. MAGNET Field would return a result even if no solution was possible.
- Addressed an issue when incrementing point numbers starting with 0xx. If you exit the Survey/Topo screen, then start Survey/Topo again, the starting point number would not be the correct incremented value.
- Addressed an issue in GNSS survey if 'prompt for antenna height' is enabled. If the height is more than 6.554m, the value was not allowed and an error message was shown.
- Corrected an issue when exporting to STAR\*NET.DAT format, a 'Not supported format' error message was shown.
- When MAGNET Field was configured for Network RTK, the routine GGA position would not provide a fixed solution if the 'Rover Position for NTRIP server' checkbox was selected.
- Corrected an issue when using a WMS mapping server from the Swedish Lantmateriet.

- Corrected an issue when connecting to a Sonar Hydrolite depth sounder. The depth was reported as N/A.
- Corrected an issue when exporting lines to DXF/DWG from MAGNET Field running on a FC500 or MAGNET Field OnBoard. The export would fail.
- Addressed an issue when using online help with certain languages. (NL, DE, ES, FR).
- Addressed an issue when MAGNET Field is configured for a Hybrid survey. The height adapter was not added to the height calculation.
- Addressed an issue with Import/Export of AutoCAD Drawings (\*.dwg/\*.dxf) when running MAGNET Field on a Tesla. The files would not import or export.
- Corrected an issue in Stake Road. When in Stake> Road, the prism constant displayed an incorrect value of 99.9.
- Corrected an issue when staking roads with all transition points selected and the station interval set to 50.00. The 50.00 increment was not used.
- Addressed an issue in the \*.FBK output format. The file would not show the raw angular observation data.
- Addressed an issue when exporting raw data to the Topcon Custom TS (\*.txt) format. the Refraction PPM value was always 0.000



## MAGNET Office 5.1.1

### General

#### MAGNET Office V5.1.1 Release Notes

Magnet Office v5.1.1 is an update to the MAGNET Office product suite and addresses issues with the Import and Export of \*.dwg files. Additional reported high priority items have also been addressed.

Note: Fixes listed are added to product configurations that include the referenced functionality.

- Corrected a crashing issue when using the Insert Perpendicular Line option.
- Corrected an issue with Extend/Trim option not working when the intersecting point is not along the selected entity reference for extending or trimming to.
- Fixed an issue with Export to Leica Roadrunner files causing a program crash.
- Corrected an issue with Data Cleanup not working with a singularly selected item.
- Modify > Extend/Trim: Fixed an issue with extending entities when the intersecting entity does not cross the extend/trim entity.
- Corrected an issue with Modify Line, Insert Point, not working on computers running Windows 7.
- Export to dwg:
  - Updated the AutoCAD tab in the Export dialog.
  - Added a new flag to the export dialog to export annotation as text. If the flag is ON, the annotation of the data exported is exported as text.
  - Reinstated option to export as 2D. A new option, "Export Point Heights" was added to optionally export point heights.
  - Fixed an issue with exporting of contours from the Survey View. Contours are exported as polylines if they are set to be displayed in the project.
  - Fixed an issue with fonts not being retained when exporting to \*.dwg.
  - Corrected an issue with the image transparency setting in Magnet Office not being retained in resulting \*.dwg file.

- Reinstated the option to export DTM as a mesh.
- Corrected an issue with Text font not retained with exporting text to \*.dwg.
- Fixed issue with contours not being exported to \*.dwg.
- Fixed issue with point marks/symbols when set to bylayer not being exported to \*.dwg.
  
- Import dwg:
  - Reinstated the unit check and override options when importing a dwg file.
  - The Explode Blocks during import setting has been set to Off as the default setting.
  - Fixed an issue with the Create Points on Linework option. When toggled off, points were still being created.
  - Reinstated elevation flag Off for points and polylines with elevation set to 0.
  - Reinstated support for retaining Multiline text font and position as defined in Acad.

## MAGNET Field - V 5.1

### **General**

The following additions/revisions have been made to MAGNET Field and MAGNET Field Layout

Unless noted, the improvements and/or revisions listed below are included in all MAGNET Field Products

### **New Features/Improvements:**

- Added a New Piping and Trenching module to MAGNET Field  
The new module was built to facilitate in-field oil and gas pipeline design and construction. This new module greatly improves the COGO, mapping, and exchange functions in MAGNET Field to simplify use for this type of work and deliver an alignment, profile and, cross-section set for 3DMC so that the pipe trench can be excavated.
  - The Piping and Trenching Module includes the following features:
    - Added Reference CL to Topo so you can get station/offset distances as related to an alignment in Survey > Topo.
    - Added the ability to create a Surface from a Road. Allow the user to select a road on the map and in the Context menu, added 'Create Surface'.
    - Added Profile view as an option for Map View. The Profile view displays the last 5 stored points, current rod location, current depth value and a dotted line is shown from the last stored point to the current rod location
    - Automatically create a trench from the surveyed points based on the Code and Attributes assigned to the Trench. The attributes include Width, Depth and Slope of the trench. Trench is included as a new Code with the Piping and Trenching module.
    - Added the ability to construct a Trench based on a string defined by Trench Codes with Attributes (width and slopes) with a profile and cross section set.
    - In Calculate > Offsets added the option to calculate the vertical intersection

point (PI).

- Added the option to show the grade in DMS when the Piping and Trenching Module is activated.
- Added a new 3D corner angle routine that shows:
  - Slope from Start to Middle
  - Grade (Slope)
  - Grade (Degrees)
  - Slope to Middle to End
  - Grade (Slope)
  - Grade (Degrees)
  - VPI Deflection Angle (Over Bend or Sag)

#### General Features/Improvements:

- Added the Cross Section view to Surfaces
- Added the Volume report in Stake > Surface (Road). Check the Create Surface option cut/fill, enter the name and when finished staking the Volume report is now available
- Updated Hybrid search so if there is a large difference between the height of the GNSS receiver and the prism, the Total Station will now turn to the X and Y position of the GNSS receiver but use the Height of the Prism. The Speed when Locating and Tracking the prism has greatly improved.
- Added support for Civil3d Point properties on import including Point Number, Full description and, Codes
  - In V5.1 MAGNET Field now Imports Point Numbers as Point Names, Full Description as Point Note and, Code/Attributes as Code/Attributes
- Added the option 'Fillet 0' to the Join Linework command
- Updated the display options for 'Display Slope As' in Configure > Display to include:
  - 1: Run (x)

- Run (X) : 1

Which represents Rise:Run and Run:Rise.

- Added an option in Edit > Layers to Select and delete all layers when there is data in the layers.
- Added support for Lat/Long format in geoTIFF. geoTIFF handles geo information (Origin Point and Scale) in Lat Long Format. Users can add images in geoTIFF format and 'Degrees' in units in the image property dialogs.
- Updated the scale bar in the 3D view to match the 2D view scale bar.
- In the Survey View, updated the Enterprise connection state to show the state (Connected/Disconnected).
- Added the option to allow users to adjust background drawings by point. Options now include: Transform by Points, Transform by Line.
- in Edit > Raw Data, added a column to show Galileo Satellites.
- Added support to create a Surface from a Road in the Main Map. The option is available in the context menu.
- Added support for CAD meshes when importing as a background drawing.
- Added the option 'Yes to All' when deleting multiple surfaces and points.
- Updated selection in the 3D view so when lines are selected, the lines are highlighted on the 3D map.
- Added support for Hybrid Surveys in X-Section Surveys.
- Moved 'Mission Planning' to the GNSS Setup page.
- Allow multiple users to use a single license/Activation. If there are multiple user accounts on a Windows device, MAGNET Field will now allow all users of the device to use the activation.
- Updated 'Stake Real-Time Road' with Ref Surfaces so if the CL Offsets is set to the default (0), the user can now bypass entering CL offset values and either extend cut/fill slopes from the edge of the reference surface or extend the outer triangles of the reference surface.
- Added Slope Distance (3D Length) to Inverse Calculations
  - Pt to Line

- Pt to List
- Pt to Curve
- Pt to Road
- Pt to Linework
- Updated the default settings when MAGNET Field is configured for Japanese language to meet the local Public Survey work in Japan.
- Added an option to show only the Quick button, Precise button or both.
- Updated BS setup so the reverse face raw data is now recorded in the data file (\*.mjf).
- Added the 2 button (Precise/Quick) feature to Set Collection.
- in Set Collection, Observations are now stored after each direction.
- In Set collection, added the ability to interrupt the set and start Topo>Sideshot, then return to Set Collection after the Sideshot(s).
- In all measurement windows, after selecting all transition points, the transition point names are show on the map.
- In Edit > Raw Data, the station names are now show with the selected point.
- Added an option 'Measure Nearest Point' for both GNSS and TS observations; and allow a range (value) to be entered. If measuring a point within that range, the 'Objects near selected point' dialog appears and points within the specified range are listed. Measuring a point beyond the specified range will not display the dialog.
- Updated the export to SIMA format to include the Road or Hz Alignment name.
- Updated exporting to DLF format to export to a single folder.
- Added the option to increment by 'Day of the Year' in an RTK session.
- Added support for the Vertical search offset in Set Collection.
- Restored the option to save the L1 PC of Network RTK/DGPS base station as a manual point.
- Added 'Reference CL' as an option for all survey routines. Custom text labels on the map also have the display option to support showing reference position.
- Added a Profile view for all survey routines.

- The Labels for Geocentric Coordinate Systems are now: Xc Yc Zc

## Coordinate System

### New Features/Improvements:

- Added support for importing and exporting custom projections
- Updated the Table of Corrections for the Czech transformations for the global transformation from ETRF to the Czech coordinate system Krovak.
- Added the option to choose the Datum transformation method in MAGNET Field:
  - From WGS84 to Local Datum
  - Local Datum to WGS84
- Added MapGEO 2015 geoid model for Brazil
- New Geoid model for Belgium (hBG18)

## Calculate

- Transform:
  - Drawing Transform: added the option in Calculate > Transform to transform a background vector image by: Matching Point/ Matching Line/Plotting Scale
  - Image Transform: added the option in Calculate > Transform a background image by: Matching Point/ Matching Line/Plotting Scale
- Added Slope Distance (3D length) to Inverse results
- Added the ability in COGO to calculate a Vertical Intersection (slope) from two lines. The lines do not have to intersect horizontally.
  - From the map, select the lines you want to calculate the vertical intersection.
  - Right click and select, Slope Intersection.
  - Magnet Field will extract the grade from each line and determine the VPI based on the end points.

- Store the point at the mean location of the two lines closes end points.
- Added the option to calculate a 3D Corner Angle that shows the following additional data:
  - Slope from Start to Middle
  - Grade(Slope)
  - Grade(Degrees)
  - Slope from Middle to End
  - Grade(Slope)
  - Grade(Degrees)
  - VPI Deflection Angle (Over Bend or Sag)
- Added the ability to Translate and Rotate Optical measured points.

## **Equipment**

### [New Features/Improvements:](#)

#### GNSS Enhancements

- Added support for the HiperVR GNSS Receiver.
- Updated the Position for GGA dialog to add the 'Rover Pos for NTRIP Server' checkbox.
- Added the option to Use Fixed GGA when connecting to VRS so when a VRS mountpoint is detected, the actual rover position will be sent to the NTRIP server to generate the VRS coordinates.
- Added a WiFi Configuration feature to MAGNET Field. Under Receiver Management, the user can now control the WiFi settings This is available for receivers that have WiFi support.
- Updated the SRL-35 radio configuration support so once an initial connection has been made, the user is no longer queried for the communication setting to be accepted. The Radio Configuration is now saved in the background.
- Updated the Radio Link icon to include the following visual indicators:
  - 98-100%, Green, 4 bars of 4



- 80-97%, Green, 3 bars
  - 50-79%, yellow, 2 bars
  - 1-49%, orange, 1 bar
  - 0% red dot, no bars
- 
- Added a warning message when starting the base with antenna heights that exceed RTK Protocol limits of 6.3 meters.
  - Added support for 8FSK and 16FSK protocols for the R4T-BT radio.
  - Renamed 'Clear NVRAM' to 'Factory Reset'
  - All supported Satellite Systems can now be used in a Relay Session.
  - Added Mission Planning to the Main Menu.
  - Added the option to display the IMEI and MEID Number in Receiver Information.
  - Added the option in Setup > Receiver management > Info to 'Save to File' the receiver info.
  - Receiver recovery view is now in Receiver Management and includes auto and manual recovery.
  - When configured for mmGPS+, the Fixed mmGPS+ solution type is now set by default.
  - Added an option to enable NMEA GNGMP message output on a Field Controller Serial Port. The option allows you to select any Grid or Datum + GG parameters for output.
  - Added support for Image capture using the camera on the T-18 Controller.
  - Added support for the internal GNSS on a Panasonic Toughpad.
  - Added support for the SRL-35 radio as a Repeater.
  - Added support for the Alinco 2 radio.

### Optical Enhancements

- Added Guide Light Icon in the toolbarr for MAGNET Field OnBoard on the OS/FX

### **Exchange**

## New Features/Improvements:

- PDF:
  - Added the ability to import a pdf as a background image in MAGNET Field.
  - MAGNET users can now import and attach a pdf as a background image to their jobs in MAGNET Field Map.
    - Added the option to set the insertion point and Scale.
      - The scale can be defined by picking either points or lines on the pad and then in the MAGNET Field job. Users can select two points on the pdf (image) and two points in the job. MAGNET Field will transform (Rotate/Scale) the image based on the selected points in the Job. The rotated/scaled pdf will then be stored as a background image.
    - Option 2 when inserting the pdf to a job is to pick two points on the image (or a line) and then enter the distance between the points (line length) as well as the rotation angle. MAGNET field will rotate/scale the pdf based on the distance and rotation angle entered.
- Added the option to write the Project Name in a TP3 file as the File Name.
- Added support when exporting raw data in the RW5 format for Direct/Reverse readings.
- Added support to create a worldfile for jpg/tiff format.
- MaXML Improvements
  - 1.2 Import/Export Support
  - Custom Projection Import from MaXML
- Import Civil 3D point properties from DXF/DWG including Point Number, Full Description and Codes
- Improved Surface(s) import from CAD formats. Meshes are now supported

## Resolved Issues

## Resolved Issues:

- Coordinate Systems:
  - in V5.0 on a WM devices, the Czech Table Projection would not show in the list of Coordinate Systems.
  - Updated the Geoid list so Geoid 12B would install. In the previous release, Geoid 12B was not available.
  - In MAGNET-Field (version 4.3.3) when using RTCM3-Online-Transformation data from the reference network SAPOS to get Gauss-Krüger-coordinates and DHHN2016-heights. At times, the coordinate values would differ by up to 4cm (X,Y) and 8cm (Ht).
- Stake > Road:
  - At times, the prism constant values would not display correctly. Selecting the Prism Icon and reselecting the correct prism would then refresh the display.
  - When staking a road with all transition points selected and the station interval set. The entered station interval would not be used when advancing the station.
- Upgrading Jobs:
  - When upgrading a job (\*.mjf) from 4.3.x to 5.0. At times, the job files would not open.
  - When updating a job from MAGNET Field 3.3.1 to MAGNET field 5.0. The surface in the job file was not imported.
- Raw Data file:
  - Addressed and issue when storing raw data. Points stored show the timestamp in UTC time not the local time off the controller or device.
- Export:
  - Raw Data export to RW5 format. When exporting data, an 'invalid display' error message would show.
  - When exporting in the Topcon Text custom format. If you first export a dwg/dxf, the coordinates decimal places for the points of the Custom text file would not export.
  - When exporting Raw Data to the GTS-7 format. If points were measured with two

faces, when the raw data was exported, the points would only have one (1) measurement.

- When exporting Points by Codes (filter). All points were exported and not just Points with Codes.
- Addressed an issue when exporting raw data to the KOF format. The base station record was not stored correctly.
- When exporting a job with a Localization to a \*.tp3. The localization would not be written to the file.
- FBK format raw data output: The export file would not show the raw angular observation data of direct and reverse for TS measurements . Only the averaged angular values of the horizontal and zenith angle were exported.
- When exporting LandXML files, if the job data was collected using Hybrid, the format of the file was incorrect.
- Addressed an issue when exporting to the GTS-7 format. The file was not storing offset points correctly.
- When exporting TS raw data to Topcon Custom TS (\*.txt) the Refraction PPM can now be included with the raw data export.
- Import:
  - When importing a LandXML file that contains a road(s), at times the road would not import and resulted in an undefined error on import.
  - When importing Microstation DGN files, MAGNET Field would default to metric if the user did not specify the dgn file import units.
  - When importing points using the Topcon Text Custom format. If the points were local points with ground coordinates and the projection was set to 'none', the file would not import.
  - Importing background images. When importing TIFF files, if the background image was white, the image background would switch to black so linework and points were not visible.
- Quick Codes:
  - When editing the line code, the entered number was at times not stored correctly.

- When using portrait mode on a Field Controller, the quick code button in the Topo Map view the button text has string values that are cut off. The buttons will now scale to allow the full text of the Quick Code be displayed when in portrait mode.
- Total Stations:
  - In MAGNET Field v5.0; when changing to Sheet, MAGNET Field did not send the 0.0 Constant to the Total Station.
  - In Remote Benchmark, at times the setup would not update with the elevation from the Benchmark.
  - In Remote Benchmark with multiple setups, the first Occupation point name would show for the second, third, etc. setups.
  - When the instrument configuration is set to Direct/Reverse. If the Measure reverse distance box is checked after direct measurement when turning to Face 2 observation measure/store button disabled and will not take a measurement.
- GNSS:
  - GLONASS: when using GLONASS in the solution, and the RTCM 3 MSM format, at times GLONASS was not used in the solution.
  - DGPS: Addressed an issue when connecting to the internal GNSS with a DGPS configuration on a S-10 Controller.
  - Addressed an issue when connecting to a Trimble network. MAGNET Field V 5.0 was not able to retrieve the source table from the Trimble Caster network in Kuwait( Trimble Ntrip Caster 3.1 created by Trimble Pivot Platform).
  - Correct Base: Point averaging was not allowed when using Correct Base, and only a single epoch could be used.
  - When working in a reference network, using MAGNET Field on a WM Controller, and connecting to a mount point which transmits an online datum, the new datum-name would not be displayed.
  - Addressed an issue when connecting to a MR-1 GNSS receiver. When connecting, you would get a 'incorrect antenna type' error message and you could not start a base.
- General
  - Addressed an issue when connecting to a WMS services located in Italy. Except in

the case of EPSG projections, WMS server connections are now loading.

- Addressed an issue when loading custom menu configurations in V5.0. The menu would load, but restarting MAGNET Field would return the menu to the default (Factory) MAGNET Field configuration.
- Addressed an issue when changing the virtual ports in MAGNET Field. When connected to a HiperHR, an 'Incompatible Receiver, Wrong Radio or, Virtual Port setting error message would display.
- Addressed an issue when enabling Bing/OSM maps on a WM/CE Field Controller. At times, the device would hang and not load the maps.
- Addressed an issue when connected to a Topcon GPT-805A Total Station. When connected using a RC2, the measurement screen would not show any measurements.
- Survey: When measuring points with GNSS and entering codes from the keyboard. The cursor by default is always in one place, so if you press ABC in code before moving the cursor to the Code Field, you would only get C.
- Addressed a performance issue when running MAGNET Field on a Windows Mobile controller. The background would no longer refresh and commands were slow to respond.
- Addressed an issue when connected to a Topcon GT Total Station. The arrow keys would not respond when turning the total station
- Addressed an issue with Special characters on the MAGNET Keyboard. %, @, \, ( ), greyed out and not available for use.
- Addressed an issue when using copy/paste or select all on an FC-5000 Field Controller. The copy/paste/select all option was not available when pressing down on the screen.

## MAGNET Enterprise

### **General**

- Added support for concurrent logins from MAGNET Field, Enterprise and Office. Users may now log in from separate applications using the same Enterprise Login credentials.

# MAGNET Office - V5.1

## General - All Office Products

### MAGNET Office V5.1 Release Notes

Magnet Office v5.1 is a general release of the various modules that are available in the Magnet Office product suite. Included in this release is a reconfiguration of the existing products and modules. The reconfiguration has been done to simplify the product offerings without a reduction of functionality. All the new product configurations have increased and improved the functionality of the old products.

The following table shows the New MAGNET Office Product configuration(s) compared to the existing MAGNET Office products.

New Product	Existing Products
<b>Layout</b>	Layout Enterprise
<b>Survey</b>	Layout Topo Tools Tools + Post Processing Enterprise
<b>Site</b>	Layout Topo Tools + Post Processing Enterprise Site Modeler Explorer
<b>Construction</b>	Layout Topo Tools Tools + Post Processing Enterprise Site Modeler Explorer Takeoff Resurfacing
<b>Project</b>	Layout Topo Tools + Post Processing Enterprise Site Modeler Explorer Takeoff Resurfacing Mass Haul DynaRoad Schedule DynaRoad Control

#### Notes:

- Magnet 3D Exchange is not included in the reconfiguration of Magnet Office and remains as a standalone product. New Features and Improvements listed below are included in Magnet 3D Exchange. Fixed Issues listed below are included where



applicable. Some fixed issues listed may apply to a function not included in Magnet 3D Exchange.

- Specific functionality additions, improvements, revisions and corrections are listed below by Magnet Office product. New product names are used, please refer to the above matrix to determine the updates that apply to the new configurations.

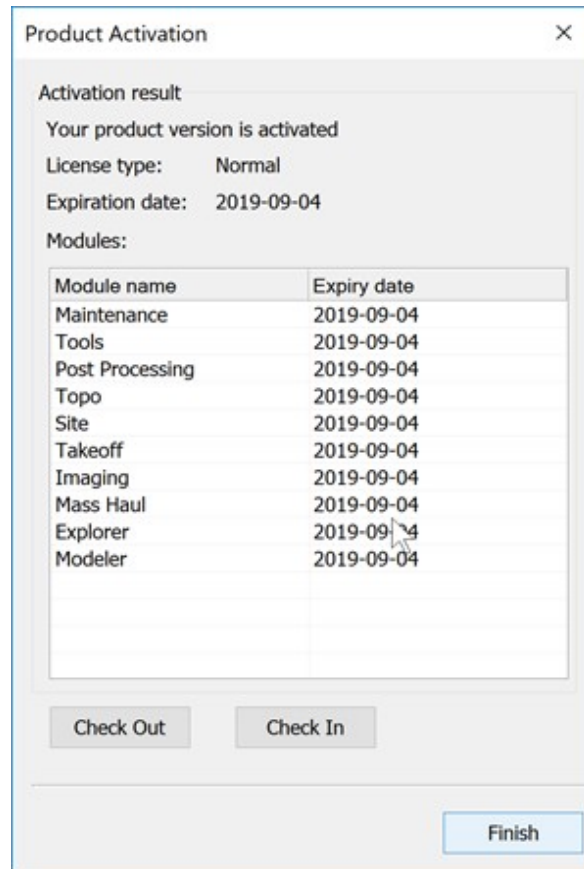
## General

The general improvements listed below are included in all Magnet Office products unless otherwise noted.

## New Features and Improvements

- License Check In/Out – Magnet Office products included in the reconfiguration and new products listed above include the ability to check in/out a license. This functionality allows the user access to MAGNET Office from any computer it has been installed.
- A typical example is the user has MAGNET Office installed on both a work and home computer. From either computer, the user can check the license out to work with MAGNET Office, and then check the license back in when they are done working.
- The requirements to use Check In/Out are:
  - Requires a connection to the internet at least once during a 30 day period.
  - Requires manual check in/out of license
  - Requires valid product serial number when checking in/out
  - Requires that your subscription is valid (service plan/maintenance) to enable check in/out.
- Activation Workflow:
  - Initial activation of the product automatically executes a “check out” of the licenses.
    - Once activated if the license is not required to be used from other computers, there is no need to check the license in.
  - Initial activation and Check Out workflow:
    - Launch product
    - Activation Required notice displayed
    - Select activation type. (this workflow details online type)

- Enter Magnet Enterprise credentials to login
- Enter serial number and select device ID
- Product Activation dialog will display including the Check Out and Check In options.



- Initial activation automatically checks out the license, selecting Check Out at this time is not required.
- Check In workflow:
  - From the Help Ribbon select the Licenses icon
  - Enter Magnet Enterprise credentials to login
  - On Product Activation dialog select Check In
  - Confirm deactivation message
  - Confirm product shut down message

Note: The prompt to save unsaved data will display before shutdown.

- Network versions of Magnet Office do not use the Cloud Check In/Out functionality. Server based check in/out only is provided for network installations.
- Magnet 3D Exchange does not include Check In/Out functionality.
- Offline Activations and activations to a USB Key do not support check in/out functionality. If a license is activated via the offline method or to a USB Key check in/out options on the license dialog will be unavailable. Licenses activated using these two methods can be disabled by contacting [magnet@topcon.com](mailto:magnet@topcon.com) and then reactivated using the online method to enable check in/out functionality.
- Import - various supported file types now provide a summary of data included in the file with the ability to select the data, layers and entities, when applicable, during import. Current file types supported by this option are as follows:
  - MAGNET Field Job (\*.mjf)
  - MAGNET XML (\*.XML)
  - MAGNET XML package (\*.XMLZIP)
  - Bentley Infrastructure Model (icm.dgn)
  - Autodesk dwg/dxf
  - LandXML
  - Inframodel
  - 12d ASCII
  - CPIXML
  - SSS
  - CLIP
  - ISPOL
  - SBG
  - SBG Pxy
  - SBG Geo
  - TDS
- New LandXML import to list and allow selection of data to import.
  - Supports multiple roads and provides options to define cross section spacing, design surfaces and to create dtm from cross section data on import.
- Cloud Connections - added ability to create new folders in a connected project within Magnet Enterprise Data Manager.
- Elevation Prompt dialog - added the breakline toggle when creating linework.
- Magnet MaXML Import/Export - updated import/export for Magnet XML (\*.xml) to include attributes.

- Languages – Added Dutch and Spanish translations.
- Import/Export
  - Added import/export support for Leica Hexml v1.7 files
  - Added export to 12d text file (\*.12da)
  - Export to TP3 – revised to retain specified file name during export. Previously the Magnet Office project name was being used by default.

## Resolved Issues - All Office Products

### Fixed Issues

- 3D Toggle and New Tab – fixed issue with selection of entities. During the selection of multiple entities using a crossing window or window selection, the first point in the selection was not included. Fixed issue with the individual selection of entities inconsistent selection behavior.
- Import Autocad dwg – corrected issue with dwg files containing surfaces defined as 3d faces. When imported the 3d faces were being converted to polygons resulting in no surfaces imported.
- Export to Autocad dwg – Background images attached to a project are now included in the exported dwg file.
- Export to TP3 –corrected issue when exporting “ active/selected layers” resulting in all project layers being exported.
- Drag & Drop to Open – fixed issue with drag and drop to open a \*.mjo file. MJO files can now be opened by drag and drop method when other projects are open.
- Export to LandXML – corrected issue when using the “Selection” option in the Export dialog. The Selection option was resulting in all project data being exported.

- Custom Colors – fixed issue will custom color definition rgb and hsi fields not accepting three-character input.
- Raw Data Editor – updated the Raw Data Editor to display point information in black when the background color set to white. (Not included in Magnet 3D Exchange)
- Import Magnet Field job (\*.mjf) – corrected issue with “R” rectangle command code not working when importing mjf files. Note: during import if the “Import Linework” option is on, the rectangle will be created using a string. If the “Import Linework” option is off, the rectangle will be created using line segments.

## MAGNET Layout

### New Functionality and Improvements

- Insert Point Offset Text
  - Added the option to include or suppress the arrow when labeling the offset distance.
  - Added a “Label Only” option to suppress the dimension line and only add the offset text label.
  - Added the ability to label multiple point offsets simultaneously. Note: selection of the multiple points is required before running the command.

### Fixed Issues

- WMS (Web Map Service) – fixed issue with some WMS supporting CRS:84 not displaying images. Added a new option in “Select Map Service” dialog to support “Inverse Axis Order”. If the selected WMS supports Coordinate systems with inverse axis order (CRS: \*). When the “Inverse Axis Order” is checked, the map request will be sent with CRS:84 coordinate system.

## MAGNET Survey

## New Functionality and Improvements

- ePlan Functionality/Support (Australia)
  - Added Rounding setting to bearings when exporting to ePlan xml.
  - Added support for the creation of the multipart header parcel in ePlan
  - Updated ePlan support to reflect listed recent changes.
    - The enumeration list for RedHorizontal@horizontalFix has been updated to remove and replace GPS with Policy 3. (NSW)
    - ePlan 3.31.3 determination of Class and Order has been updated by adding an enumeration of NA to enums for RedVerticalObservation and RedHorizontalPosition@Order. (NSW)
- Create Enclosing Boundary – revised to included option to use linework when creating a “tight” enclosing boundary.
- Delete by Boundary – the default settings for this command have been updated to set “Outside” as the area to delete and “Window” as the selection option.
- Raster to Vector – added new functionality to import a pdf file and extract vectors after import.
  - Added to the Insert ribbon, Raster/Vector ribbon group.
  - Includes Recalibrate option which allows for the realignment of the pdf, transparency settings, and display toggle.
  - Includes Trace option for tracing of specific raster data. Includes auto trace option with dashed line recognition.
  - Includes Extract Vector options. Extraction options include by window, crossing window selection or all vectors.

Note: the Raster to Vector functionality is located in the Model ribbon in Magnet Site, Construction and Project.

## Fixed Issues

- Roads View (Cross-Section and Profile) plotting
  - Corrected issue when plotting multiple sheets, not all sheets were plotted.
  - Corrected issue with sheet numbers for multiple page plotting listing page 1 of x on all sheets. Please note that, for all the existing drawings, user must click View->Regen to correct the sheet numbers in the drawing.

- Inverse function – added the “Clear” option in the Inverse UI to clear data. The Inverse UI retains the inverse data when closed until cleared. Note that the Inverse UI is modeless; it can be docked, floating or hidden and remain open at all times.
- Horizontal Alignments (changing layers) – when selecting a horizontal alignment and linked points in order to change the layer by selecting a layer from the layer dropdown list, only the linked points were being placed on the selected layer. Corrected workflow to also place alignment on specified layer.
- Import DXF – fixed the issue with individual surfaces being combined into one surface when importing dxf file.
- Road View Plotting – fixed issue when plotting cross-sections or profiles to pdf. Printing to pdf at 100% scaling was not plotting all data or all sheets.
- Lot Annotation – fixed issue with the Lot Name prefix label not allowing a space between the prefix and lot name. When defining the prefix if a space is added after the prefix it will now be used in the lot name label.
- Create Entity (Right Mouse Button, Add Tangent Arc) – Made changes to the behavior of Create Entity -> RMB -> Add – Arc Tangent option. Note that Add Arc Tangent is only available from the RMB after at least one segment of the entity is created. Workflow is as follows:
  - Create one segment of the entity or one line in the “Create Entity” routine
  - Click RMB> Add – Arc Tangent option
  - A new prompt for radius “Define Radius” is displayed. User may enter the radius in UI or select a point\location in the view to define\calculate the radius.
  - After radius is defined, a field for Angle, chord or length is displayed in the UI. User may enter the values in the respective fields or select a location in the view to automatically define\calculate the values.

Note: Create entity allows for the continuous entry of straight line segments and arcs by using direction or coordinate creation methods.
- Drawing Editor – Fixed issue with print spooling from the Drawing Editor. Print spooling was delayed when a background image was present but not displayed.

## **MAGNET Site**

## New Features and Improvements:

- Corridor Subgrades:
  - Improved to include subgrade tie slope option. Allows ability to tie a subgrade to the design surface or subgrade by user defined slope. Slopes can be defined by slope percent, ratio or degree of slope.
- Edit Strings - updated to include two new options for adding points to a selected string.
  - Distance along string
  - Reference alignment station
- Corridor functionality:
  - Corridor Width and Slope Zones
    - Updated to include a new option to copy slopes/widths from one zone to another.
    - Updated to include option to set zone width and/or slope to specific value
    - Both options are accessed by selecting "Set" in the slope zone or width dialog.
  - Corridor Strings
    - Added option to create additional points on corridor strings at a user defined spacing on straights and curves.
    - Added option to create points on corridor strings at designated stations/chainages.
    - Both options work with strings created by the corridor design or reference strings.
- Corridor Cross Section Viewer

Added a new cross section viewer in the corridor ribbon. This option can be used to view and calculate volumes from cross section data using corridor data or by selecting a horizontal alignment and individual surfaces.

When selecting a corridor, the surfaces and surface types will be preloaded based on the corridor design data. When selecting an alignment, the cross section set must first be given a name, then the individual surfaces selected and their types defined.

Cross view and control panel options included are defined as follows:

- Cross Section View



- Volume for cut, fill and subgrades are displayed for the cross-section interval defined by selecting the setting button in the control panel. Volume data is only displayed for sections matching the interval spacing. For example an interval of 20 will display volume for stations 0, 20,40,60 etc. Note that when using the slider to browse stations, the volume data is not shown in the graphic view.
  - Settings - use the settings button to control the display of section data and the definition of cut/fill color shading.
- o Control Panel
- Name – name of cross-section set. Note that when using individual surfaces and a specified horizontal alignment, this field must be completed prior to selecting the horizontal alignment or surfaces.
  - New – clears the section data fields and allows for creation of a new cross-section set.
  - Delete – deletes a cross-section set. Note that when cross-section sets are created they are stored with the project and can be loaded at any time.
  - Corridor – select the corridor design to display cross-section data from. To select a corridor first check on the corridor check box.
  - Alignment – select the horizontal alignment to use with the cross-section set.
  - Settings Button – specify the cross-section interval. Using the forward/back buttons at the bottom of the control panel will increase and decrease stationing along the specified alignment.
  - Surface Button – use this option to select the surfaces, surface type and materials. Material definition is optional but is provided for takeoff calculations if required.  
The order of the surfaces does not need to be defined, the program will determine where each surface is positioned on the cross-section. Each surface must have its type defined.
  - Calculate Volumes – with this option toggled on, total volumes, based on cross-section average end method will be displayed in the control panel.
  - Report – this option will create a volume report.

**Note: Material definitions – Are not included in Magnet Site. Requires Magnet**

## Construction or Project.

### Fixed Issues

- Corridor Templates – Corrected issue with corridor design resulting in program crash when applying multiple side templates to the right and left side of the centerline.

## MAGNET Construction

### New Features and Improvements:

- Resurface View – Profile Lock - Improved the profile lock option in dialogs where the option is available. By default, the Profile Lock Option will be off when the dialog is opened. If the option is turned on the setting will be retained for the specific routine within the project. The profile lock settings per command are retained at a project level. New projects created will use the default setting for this option until changed by the user.
- Corridor Subgrades:
  - Improved to include a subgrade tie slope option. Allows ability to tie a subgrade to the design surface or subgrade by user defined slope. Slopes can be defined by slope percent, ratio or degree of slope.
  - Added material definition for use with Takeoff calculations.
- Takeoff by Surfaces (dtms) is new functionality located in the Takeoff Settings dialog. It is designed to work with surfaces representing the design and existing surfaces either created in Magnet Office or imported from 3<sup>rd</sup> party formats. Linework can be created or imported from 3<sup>rd</sup> party formats and defined as various materials and/or material boundaries for use with the takeoff. Layers are used for the assigning of materials and material types for different entity types. The linework can be either 2D or 3D.

When linework defines a material area with subgrades, the linework is draped on the specified design surface and the defined subgrade depths are used to create a subgrade surface if required.

Note: normal takeoff preparation and setup is required for assigning materials.

- A new option to select the Design dtm to be used in takeoff calculations has been added to the Takeoff Settings dialog.
- Takeoff Site Processing and Reports – updated to include the option to calculate

takeoff volumes by corridor and/or cross section sets.

## MAGNET Project

### New Features and Improvements:

- Mass Haul Analysis – This option opens the mass haul takeoff control dialog when selected. The settings option is to be used to define the design surface option and mass haul volume calculation method for transfer to magnet project mass haul view.
- Transfer to Mass Haul – has been moved to the Takeoff UI. When the mass haul type has been selected in the Takeoff UI or the Mass Haul Analysis icon is selected, the Transfer to Mass Haul option is available. Note: The mass haul takeoff must be calculated to enable the transfer to mass haul option.

The calculation workflow and transfer options for takeoff volumes to be transferred to Mass Haul has been improved to include the following new options.

- Zero Contour – this option is unchanged and transfers material volume data based on zero (0) contours for cut/fill areas. The site is broken up into cut and fill polygons based on the zero contour between cut and fill areas. These polygons are automatically named using the naming convention of CutArea1, CutArea2, FillArea1, FillArea2 etc.
- Grid - This new option creates a grid at the specified grid spacing for the site and transfers material volumes based on the grid squares. The grid's position is based on the site boundaries. Grid spaces are automatically named. Naming starts at the top left corner using letters going left to right and numbers going top down. It will automatically work out how many letter and numbers are required. If there is less than 26 columns letters A-Z are used, but if there are more than 26 columns then two letter combinations, AA, AB, AC, etc, are used. The same logic is used for rows. If the TakeOff has multiple sites the grid names will be prefixed by 1-, 2- etc.
- Layer Polygons – This new option will use all the polygons in a specified layer and send volumes based on these boundaries. The polygons do not need to be in a grid but can be any shape as long as they do not overlap. If the polygons do not have a name, a prompt will ask the user if they want to

automatically name them. Using the automatic naming option will result in naming such as POLY-1, POLY-2 or BND-1, BND-2 etc. If the polygons already have names, it will use the existing names. An error message is displayed if the polygons in the layer do not have unique names. A prompt is displayed asking "automatically rename to unique names".

- If Layer Polygons is selected, the function will check if all polygons have a name and that they are unique. This is mandatory for the transfer to Mass Haul. If not, there are three methods to rename polygons.
  1. Using text in a layer - a single piece of text is selected on the screen. The layer of the picked text is used to rename all the polygons to text in the layer that the polygons enclose.
  2. Grid - this option will check that the selected polygons form a grid and rename them accordingly. Naming starts at the top left corner using letters going left to right and numbers going top down. It will automatically work out how many letter and numbers it needs. So below there are less than 26 columns so it will just use A-Z but if it has more than 26 columns then it will use two letters. AA, AB, AC, etc. Same for rows.
  3. Sequentially – allows for entry of a prefix, for example "BND". The polygons will be renamed BND-1, BND-2, BND-3 etc.
- Separate subgrades and remove/replace areas – with this option toggled on, boundaries defined as subgrade polygons in takeoff will be transferred to Mass Haul as its own boundary. With this option toggled off, the takeoff volumes calculated for each subgrade will be included in any grid square that overlaps the subgrade area.
- Separate Roads/Corridors/Cross Sections - with this option toggled on, roads, corridors and/or cross sections will be transferred to Mass Haul as its own boundary. With this option toggled off, the takeoff volumes calculated for each subgrade will be included in any grid square that overlaps the subgrade area.
- Mass Haul, Schedule, Control functionality
  - Transfer to Mass Haul – Now includes pdf files that have been added to as background images in Magnet Office. When transfer to mass haul is executed, the pdf background images will be transferred, along with the takeoff volumes,

and will be displayed in the Map View within Magnet Project.

- Gantt View
  - Added Description column
  - Added Comment column
- Task View
  - Added Description column
- Added Portuguese translation

## Fixed Issues

- Transfer to Mass Haul
  - Removed takeoff category name from the material name when transferring to mass haul.
  - Corrected issue with unit settings when transferring quantities from Takeoff to mass haul.

## MAGNET Office Tools

### New Features and Improvements:

#### General:

- Implemented Check In/Out licensing for Magnet Tools when included in a Magnet Office subscription.
  - Magnet Layout and 3D Exchange do not include Magnet Tools
  - Magnet Tools when purchased separately from Magnet Survey, Site, Construction or Project does not include check in/out functionality.
- Magnet Tools Ribbon (included in Civil 3D and AutoCAD) – updated to be compatible with AutoCAD and Civil 3D 2019.
- Enterprise - added ability to create new folders in a connected project within Magnet Enterprise Data Manager.

- Added support for Prism Spacer Antennas for HiPer VR and GRX3.

### Coordinate Systems:

- Added new Datum (SK95(G32453\_2017)) to the Russian State Coordinate System.
- Added Estonian projection L-EST97
- Added Brazil geoid Mapgeo2015
- Added Belgium geoid hBG18
- Added support for specifying the direction of transformation for custom defined datum parameters. Added transfer options of "To WGS" or "To Local".

### Import/Export:

- Export to TP3 – revised to retain specified file name during export. Previously the Magnet Office project name was being used by default.
- Topcon XML format – removed obsolete format from import/export option.

## **MAGNET Exchange for Autodesk**

### New Features and Improvements:

- Updated to be compatible with AutoCAD and Civil 3D 2019.
- Revised export to \*.mjf/\*.tp3 of project containing multiple surfaces. All surfaces were being combined into one surface in Civil 3D. 3D faces are now exported to different surfaces based on layers.

### Fixed Issues

- Issue with exported surfaces being combined into one surface in Civil 3D. 3D faces are now exported to different surfaces based on layers.

## MAGNET Field - V5.0

### **General**

The following additions/revisions have been made to MAGNET Field and MAGNET Field Layout

Unless noted, the improvements and/or revisions listed below are included in all MAGNET Field Products

#### [New Features/Improvements:](#)

- Added support to allow users to change language settings directly in Configure> Global
- Enhanced Global Settings dialog and redesigned for Portrait Screens
- MAGNET users can now see all tasks assigned to them at once. In previous versions of MAGNET Field you could only see the tasks you were assigned for the current project
  - Dates are now shown below the days of the week in the mobile timecard
  - Added the ability to sort scheduled tasks by the Start Date, End Date, Task Name and Project Name.

The screenshot shows a mobile application interface titled 'Schedule'. At the top, there is a navigation bar with an 'M' icon, a 'Schedule' title, and three icons: a document with 'M', a yellow arrow, and a blue house. Below the navigation bar is a table with the following columns: 'Project Name', 'Task Name', 'Start Date ▲', 'End Date', and '% CMP'. The table contains six rows of data. Below the table, there is a section labeled 'Tasks for period' with the date range '1 Mar. 2018 - 31 Mar. 2018'. At the bottom, there are four buttons: a left arrow '<<', a dropdown menu currently showing 'By month', a button labeled 'Current month', and a right arrow '>>'.

Project Name	Task Name	Start Date ▲	End Date	% CMP
Test 2	Boundary	12 Mar. 2018	16 Mar. 2018	0
TestProject	Topo	12 Mar. 2018	16 Mar. 2018	0
TestProject	Boundary	12 Mar. 2018	23 Mar. 2018	0
Test 2	Topo	12 Mar. 2018	23 Mar. 2018	0
TestProject	Construction Sta...	26 Mar. 2018	30 Mar. 2018	0
Test 2	Construction Sta...	26 Mar. 2018	13 Apr. 2018	0

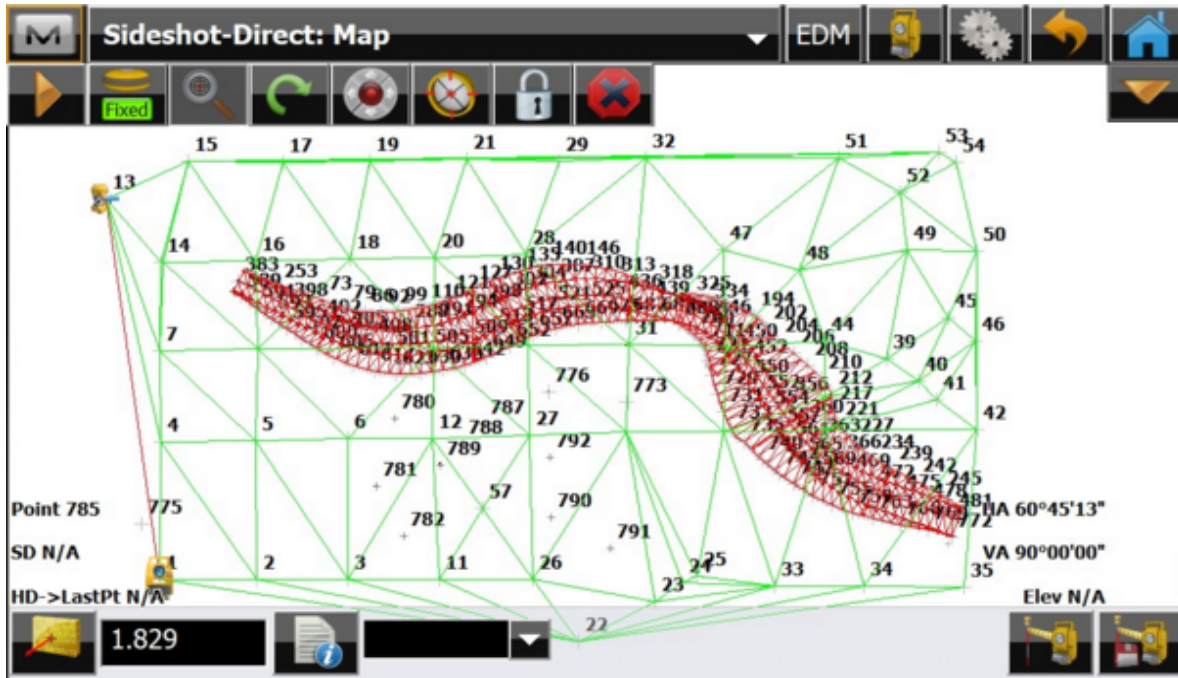
Tasks for period: 1 Mar. 2018 - 31 Mar. 2018

Navigation buttons: << By month Current month >>

- When mandatory/required fields are empty, they are now highlighted to inform the user that the required data is missing
- When using MF in Tablet mode, the OnScreen Keyboard would at times overlap the edit boxes, now when the Keyboard is enabled, MF will scroll so the edit field is still visible
- When the input field is a numbers only field, the Onscreen keyboard has been updated to only display a numbers keyboard.
  - In Edit>Roads, for example when the input is a numbers only, the keyboard will only show the updated numeric keyboard
- Updated Exchange>Enterprise browser to significantly increase the speed when loading projects
- In Delete > Job, users can select and delete multiple jobs at one time. Previously you had to individually select each job you want to delete.
- Updated the Sky Plot to include separate buttons for satellite systems
- Upgrade to RealDWG 2018 so MAGNET Field now supports ACAD 2018 dwg format on the Windows platform. For Windows Mobile/CE \*.dwg support has also been updated to ACAD 2018.



- Updated the Subscription notification so the user will be notified multiple times (daily) including the day of expiration for the final week of the subscription
- When connected to a HiperHR and TILT is enabled, we now store and display Tilt values and magnetic strength information with the compensated point in the raw data.
  - Important for QC purposes
- When connected to a HiperHR, the Battery Status is now displayed at External Battery and Internal Battery rather than Battery A and Battery B.
- Added support for RTCM3 CS Oblique Mercator projection. This we added to better support some Leica Spider Networks that use the Oblique Mercator Projection
- Added support for Tracking Galileo E5 and E6 signals
  - Support Galileo for positioning
- Added quick access to Disconnect NTRIP MP in Topo and Stakeout.
  - Under M > Setup added Connect MP and Disconnect MP as options. The option changes depending on whether you are currently receiving corrections.
- Updated the TS target icons so you can easily identify when configured as a 360 deg prism
- When importing points to an existing job, if the imported data has a point with the same name as an Occupation point in the current job, the user is now warned they will overwrite their current occupation and if the user allows the point to be overwritten, MF will recompute the job.
- Added the option of 'current time' as a date/time attribute and is also the default time
- Enhanced support for photos in a job. When photos are attached to the points in a job (photo notes) are now stored in the .mjf (MAGNET Job File). A built-in photo viewer has also been added so users can quickly view all photos in the job
- Extend the Enterprise/Sitelink pages with 'Use Proxy' option that applies to Windows Proxy settings. This option will help with some users who could not perform an online activation due to IT restrictions
- Moved the Hybrid Positioning Connection checkbox to the Connection Screen.
- In Hybrid mode, the RTK status is now shown in the Optical Toolbar. You can also click on the RTK status button to open the GNSS Status screens.



- Updated the Controller Battery icon to indicate when the controller was plugged in and charging.

## Calculate

### New Features/Improvements

- Allow users to calculate the center point of a column by measuring one point on the column and two HZ angles.
- Added Vertical Deflection Angle value to the Calc Corner Angle report
- Added a Closure report in Enter Plan that shows misclosures from the end of the last point to the start point of the plan.
- Added function of Session Check calculation to the Calculate menu to check GPS RTK Session data.
  - This function was added to check every 2nd measurement of the same point.



- Added the function to import session check data from the job (mjf, mjfzip, tsj, etc) from another field controller.

## Configure

### New Features/Improvements:

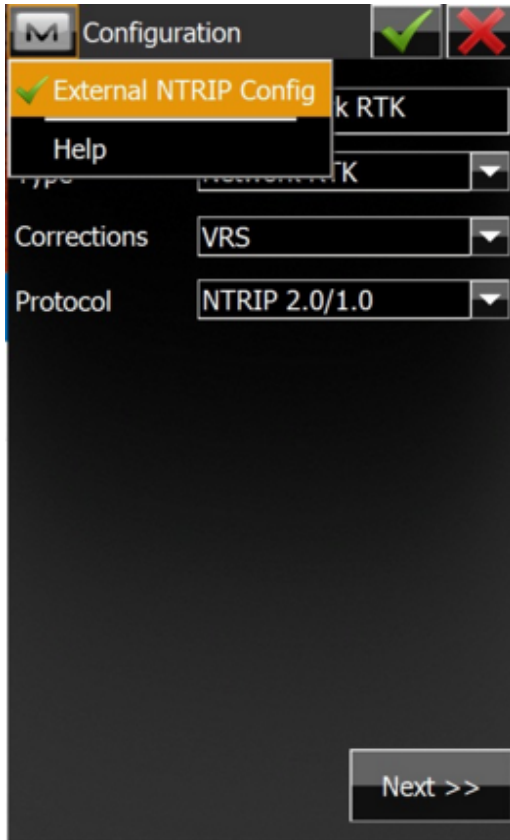
#### Equipment

- Added support for Military (mil) angle units.
- Updated the Backup settings and added the ability to do a 'Full' backup. The full backup stores your license, settings and the current job as well as options to include all jobs from the job folder.
- In the Point Attributes screen, added the ability to Edit the Prefix/Suffix setting as well as added a selector for 'Increment Point Number' so users can update the point increments.
- Modified the output of RTCM3 MSM3 to minimize the size of the correction data message to improve performance of some radios (Alinco)
- Added support for Cyrillic keyboard
- Added the GNSS Mission Planning icon to the Setup menu
- MAGNET Field will now warn users if connected GNSS receiver is different than the selected configuration
- Users can now set a limit to the number of Satellites used at the Relay Base.

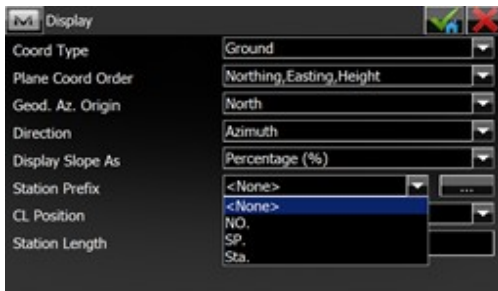
- Apply Base correction for all VRS Bases is now on by default
- Added support for CSD (data call) for the HiperHR Base and Rover
- Added 'Correct Base' to the Setup Menu for GNSS rovers
- To simplify GNSS configurations, removed GLO P and L2C checkboxes and MAGNET Field now always enable L2C if the Receiver OAF supports it. if the Receiver OAF does not support it, MAGNET Field will enable GLO P and only use if Use GLONASS is selected
- Added the option when configuring the HiperHR for the Bluetooth Port option. This option is often used as an option for NMEA
- Added Point Properties to the first page of Survey Settings, so the user can change the point properties in the measurement screen
- Added support for Spain/Vodafone M2M provider
- Added support for RTCM message 1029 which is the NTRIP Operator Custom text message.
- Added support for QZSS for RT DGPS, and works similar to other SBAS system support in MAGNET Field
- Added the option in Project Settings to change the display slope values as either ratios or as a percentage.
  - When defined as a ratio, you also have the ability to define the display values as X:1, 1:X.
- Added Min SVs Setting in "Raw Data Logging to Controller".



- Added new "External Ntrip Client" option to Survey Style view.
  - Support for a Dedicated Connection terminal for VRS is specifically for Japan.



- Added the function of Station Prefix for Display in Configure. Users can choose between 3 prefixes (No./Sta./SP.) as default.



## Coordinate System

## New Features/Improvements:

### Coordinate Systems:

- Added support for new Geoid model of Australia 2020 (AUSGeoid2010)
- Added support for the New Zealand Geoid (2016)
- Updated support for the Czech transformation correction table for the global transformation from ETRF to Czech CS
- Added support for the Kansas Regional Coordinate System (KRCS)
- Added support for the Russian State Coordinate system (GSK-2011) ellipsoid and datum
- Added support for the Brazilian MapGEO 2015 Geoid
- RTCM CS Oblique Mercator Support

## **Equipment**

### GNSS Enhancements

- Added support for RTK TCP/IP for HIper HR
- Added support for G5-A1 Antenna
- Added support for the T-18 Field Controller
- Added support for the MR-2 as a survey rover
  - External radios and external cell configurations supported
- Updated support for the FH915 UHF radio module for so when configured for either Network RTK and Long Link, MAGNET Field will now Turn Off the radio .
- Added support for FEC for internal Satel as well as external SRL-35 modem
- Added Support for the SPX RD8000 cable finder
- Added support for the Leica Disto D510/D810.
- Added support for the DL-501 digital level

- Added support a Japanese antenna parameter file.
  - The antenna parameter file was made official regulation by JSIMA.

## mmGPS Support Enhancements

- Added a new setup dialog for mmGPS.



- Added Import/Export to/from job in Exchange for mmGPS calibration
- Added the option in Job Setup to Import mmGPS calibration from the previous job
- Added support for exporting mm Calibration data in a MAGNET Job (.mjf)\_; and support for exporting mmGPS Calibration data to .tp3 files

## Optical Enhancements

- Updated support for the Ln-100 so when MAGNET Field is connected to the LN-100, if tracking to a prism is lost, the LN-100 will turn back to the design point location.
  - Configure > Layout > Turn to Design Point
- Added support for the GM/iM-50 manual total station
- Updated support for the GM-100 and ES-60 to add support for reflective sheets

## **Exchange**



## New Features/Improvements:

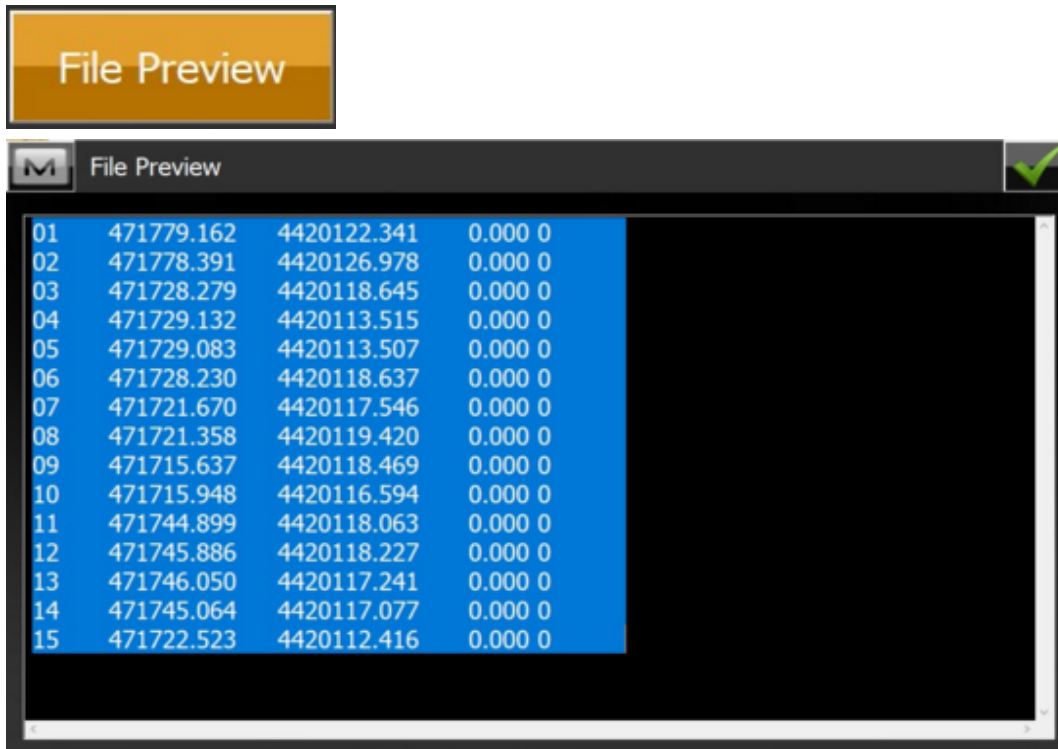
### New Formats Supported for Import/Export

- Inframodel (IM3)
- Lecia HeXML 1.7
- LandXML 1.2 and 2.0 (including Coordinate System Definition)
- LandXML 1.2 (Japanese Regulation) - This format is used for Japanese Public Construction Work (i-Construction)
- Trimble TIN Model Files (\*.ttm)
- CPIXML (FC-5000 Only)
- DLF Raw Data (export only)
- GeoPAK SOE (X-Sections)
- Bentley ICM iModel (including Roads and Surfaces)

### Other Enhancements:

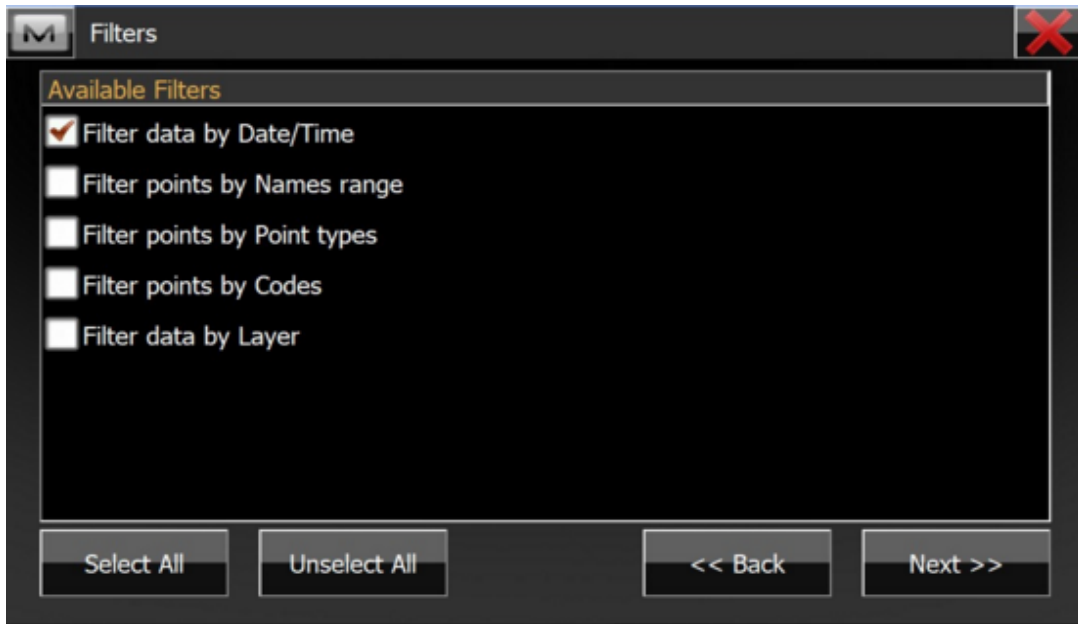
- Added an option to export Background drawings
- Added support for Lat/Long values in JPEG world file. Updated support for JPEG world files and support Lat/Long in the world file where previously only Plane Coordinates were supported.
- Allow users to define the precision when exporting for Feet/Inches
- Added the filter 'Filter Stakeout Reports by Type' when exporting stake reports
- Added support for the import and export of custom projections.
- Added the ability to assign descriptions from P3d as Codes. previously you could assign descriptions as Notes only, but now have the option to assign descriptions as Codes OR Notes.
- Added support for the Import and Export of X-Section data in SIMA format.
- Added the option to Export areas by Layer. There are now two options for export by Layer:
  - Areas
  - Lines and Areas when you select Multiple as the data type
- When importing a text file with Full Codes from the global code library, on import, MF will now use the Global Code library rather than create new codes

- Added a 'File Preview' button in the Text Custom Formats Import/Export function. The first rows of a file are displayed so you can see if the custom format is correctly defined for the data in the file.

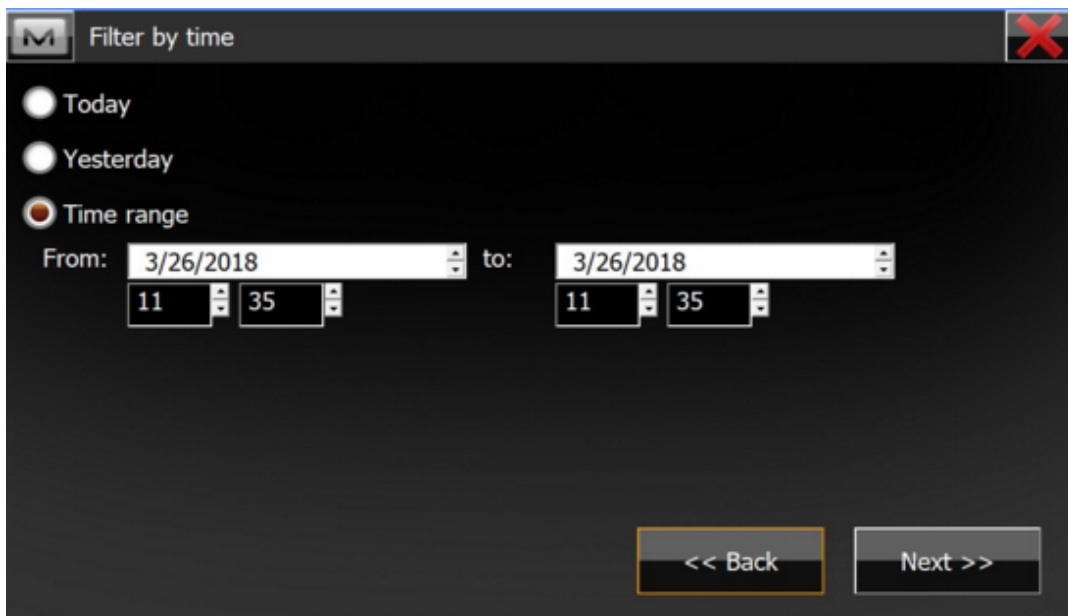


- Added support when exporting FC6/GRS7 format files for the 'created by' field in the format definition
- Added support when exporting a LandXML file to include the job Coordinate System in the file.
- Added support to Import and Export CPIXML format files
- Import/Export Wizard improvements. When selecting Multiple as the data type the following options are available
  - Select File Units
  - Use Point Filter (by Layer or Code)
  - Select Point Types
  - Filter lines by Layer
  - Export areas as lines
  - Export GPS raw data
  - Export TS raw data
- Updated the Import/Export User Interface to simplify the filter options.

- Allow the user to check different types of filters (by time, by range, etc) and then show the separate dialog for the filters that are selected



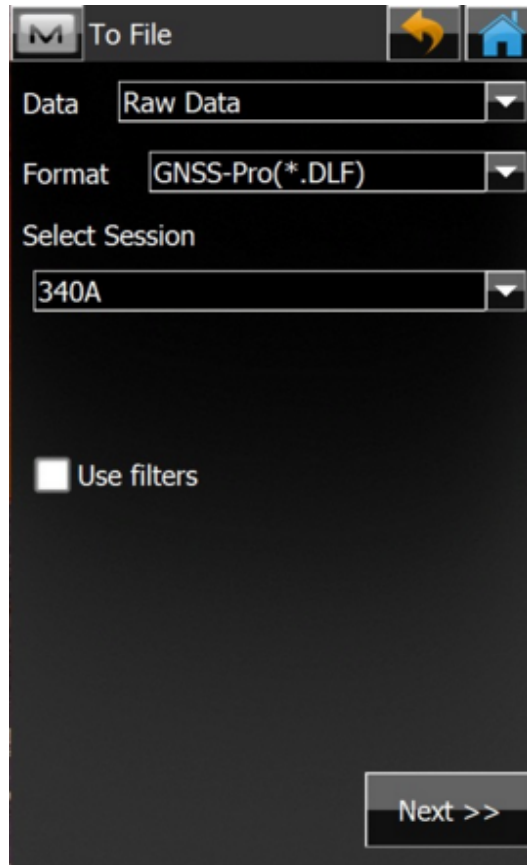
- Updated the Import Export filter options to include more granular filters so the user can easily export and import the data they want.
  - Added the option to export 'Today' and 'Yesterday' to the filter options
  - Added Date and Time Range filters as an option to 'Filter by Time'



- Import from text/csv points if points with the same name are in the file and Data Type = Points/Multiple
  - If users selects Data Type = Multiple, then import points with the same name as separate points
- Improved the ascii file import support to allow files with empty columns to still import and on import, MAGNET Field will skip the columns
- Added support in Import/Export 3DMC Formats (tp3, pt3) for Codes as Notes option.
- In Exchange History, added the status of 'uploaded' or 'downloaded' to the displayed attributes
- Added the option when importing a \*.dwg/\*.dxf to import APL block points and all block points
- Updated the Export line/area function so lines and areas that are created by codes are exported to the layer they are originally on.
- When importing data into a job the imported layers are tracked by name. if there is an existing layer in the job with the same name, MAGNET Field now allow you to merge the layers so you can continue to import into the already existing layer.
- When you download a job from MAGNET Enterprise, the job is now, by default, downloaded to the MAGNET job folder on the controller.
- Updated Job setup to allow users to:
  - Copy background drawings between jobs
  - Copy surfaces between jobs
  - Copy the last Backsight Setup to an existing job
  - Added the ability to filter data by layer for import/export between jobs. This allows the user to move selected data between jobs.
  - mmGPS Calibrations can be imported from the previous job.
- Added support to export mm Transmitter calibration data to gc3 or tp3 files if needed.
- Updated Export to LandXML format, and added a time stamp to the file
- Updated Exchange From and To File and added a Most Recently Used section to the top of the file format list.
  - Order Import/Export data format items according to the Most Recently Used.

- Save the top 4 recently used data types and separate them by a \_\_\_\_\_ so the user can quickly find the most commonly used and not have to search the entire list.
- Maintain a separate Most Recently Used list for Import and Export
- Added the ability to export GPS Offsets to the Topcon Custom GPS Format
  - Including: AzDist, Line, TwoDist,
  - Lazer offsets will be saved as Azimuth Distance Offsets
- Updated support for importing a drawing as background, and if the imported file has named points, MF will load the points in the job even if 'Load as Background drawing' is set
- Added support for import of Codes from Hexagon LandXML.
- Added ppm value as an option when exporting Topcon Custom TS (.txt).
- Updated Exchange > Enterprise so if you have configured a Bentley ProjectWise repository, you can now see the repository when logged in from MAGNET Field
- Added support for the import of Civil 3D COGO points.
- Updated dwg support to support ACAD 2018 format on Windows (7/10) and CE/WM Field controllers.
- Updated Import Linework so there are now separate checkboxes to allow the user to select 'load linework as background' and 'load points as background'
- Added the option on point import to allow the user to select the layer that the points will be placed on. Also added a shortcut to edit layers so you can create a layer before importing the data.
- When importing CAD files (DWG/DXF) allow users to select the layers they want to import from the file. Allows the user to import ONLY the data they need.
- Added support to Export of Photo Notes for OpenRoads Survey (Bentley).
  - Support photo notes for SurvCE (.RW5) format
- Extended the DLF raw data format and added QZSS/BeiDou Satellite support to the Raw GNSS data format
- Added support when importing \*.dwg files to support ACAD Proxy Entities
- In Exchange From File, MAGNET Field will now allow you to import points without Heights and also points without North/East but with a Height so users can have height only points in the job.

- Added the option to Import /Export X section sets from/to GeoPAK SOE format
- Added support for the new format GNSS-Pro(DLF-file) for the output raw data.



#### MaXML Enhancements:

- Updated MaXML to V1.1 with support of Custom projections/Stake Reports/Stake Reports Configurations/Quick Codes/mmGPS Calibrations and Field Report data types
- Stakeout Report Configuration and Data Import/Export from/to MaXML format
- Import/Export Reports with MaXML or MXLZIP
- When point photo notes are exported to MaXML, the image file names are based on the corresponding point names.

## Edit

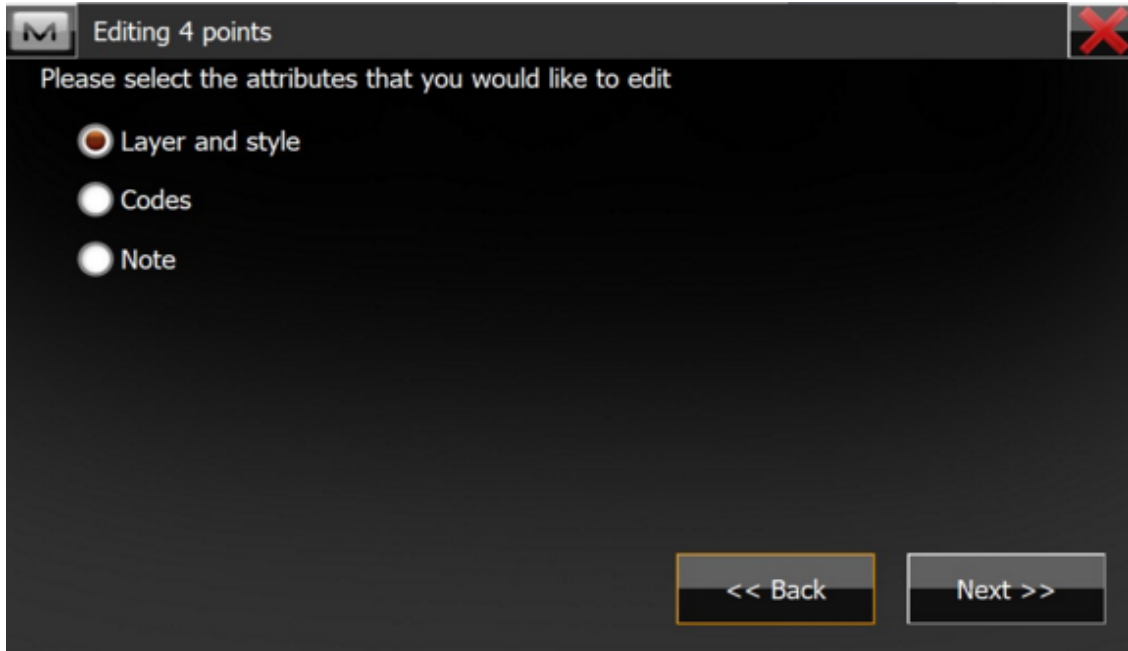
### New Features/Improvements:

- In Edit Points added the option to Sort by Nearest to the Sort by option list
- Added 'Layer' to the columns shown in Edit points.
- Added the option to select end edit multiple points in Edit Points. You can now select multiple points and edit Codes, Layer/Style and Notes

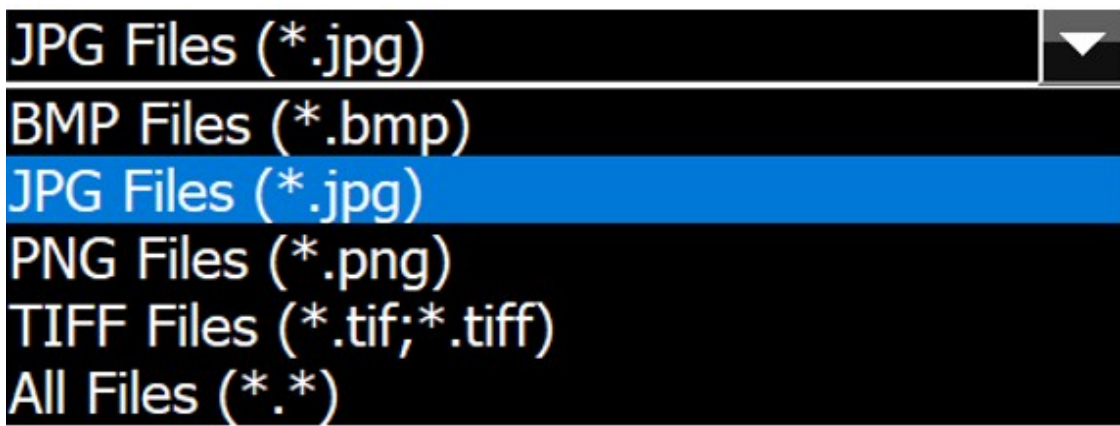


Point	North(m)	East(m)	Elevation(m)	Code	Layer
1	89.88	440.81	39.62		From Barkley
2	90.05	473.05	42.31		From Barkley
3	89.71	503.00	41.42		From Barkley
4	136.65	441.28	41.70		From Barkley
5	136.94	472.69	41.76		From Barkley
6	137.51	503.16	41.48		From Barkley
7	167.19	441.05	41.12		From Barkley
8	101.79	701.03	40.81		From Barkley

Sort Find Find Next Delete Edit Add



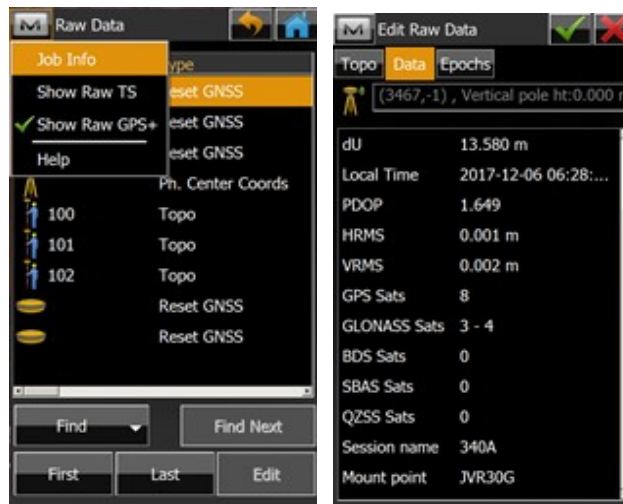
- Added support in Edit Field Reports for Tiff and PNG formats when inserting an image



- Updated Quick Code groups so they are now available across all jobs. MAGNET Field allows users to save QuickCode groups to the library in MAGNET Field and can be used in any job
- In Edit > Point, renamed 'Report Point' to 'Create Field Report'



- Added a visual indicator to the photo tab in Edit > Points so the user can see if there are photos attached to the point
- Added the ability to Export points to field report under 'M' > Edit Point
- When points are measured with TILT they now have a unique icon so you can easily identify them in the job records
- Enhanced Attribute support in MAGNET Field
  - Users to create required Attributes for Codes but no longer have to set a default value.
  - Updated Attributes so users can now keep their list of Code Attributes in the order they are created. In previous versions, the list would automatically alphabetize.
- Updated point display in the Raw Data editor so when deleted points are displayed, they are marked with a (x) mark before the point name. For Quality control, you can now see what points have been deleted from the job, and you can also restore the point if needed.
- Under Edit > Surfaces, 'Create Surface' has been added as an option.
- Added the column of "Session name" to Job info from [M] Menu in GNSS Raw Data table.
  - "Session name" info was added in Edit -> Raw Data -> Data.



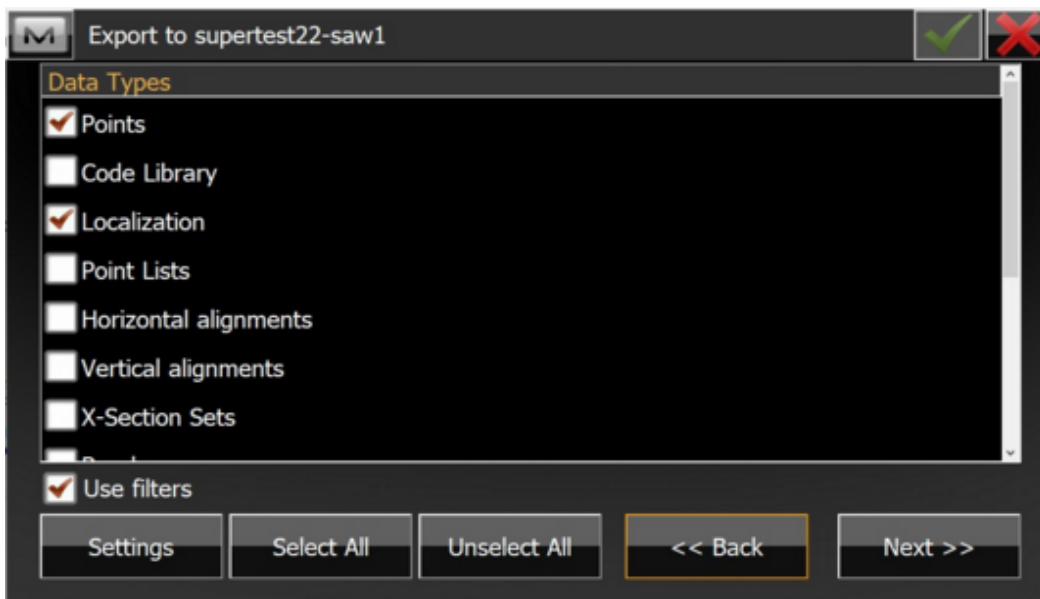
- Added the function to display RTK Session info from the measurement screen. "Survey Session" was added as a Data Label option.
- Added the function of the importing session check data from the job (mjf, mjfzip, tsj, etc) by the other controller.

- Deleted points are now shown in brackets in Edit > Raw Data

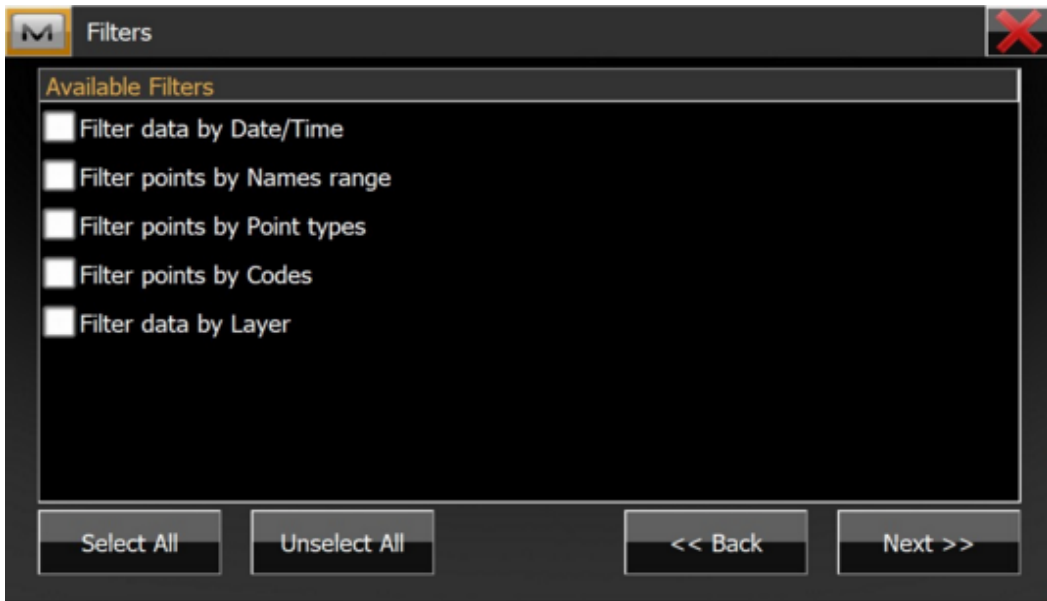
## Job

### New Features/Improvements:

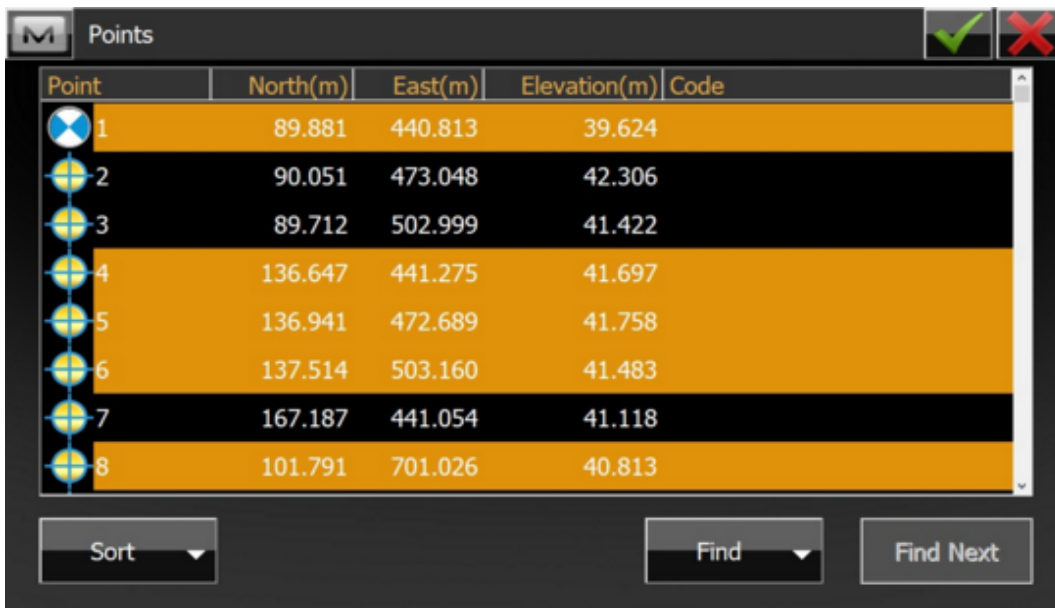
- Added the ability to attach scan files using 'Save Job As'.
- Added Total Station FW version to the Job Info
- Added support in Open/Save Job As for mxl/mxlzip/tp3 formats
- Updated Create New Job to allow users to copy Quick Codes to a new job. You no longer need to set up Quick Code groups with every job.
- When a job is downloaded from MAGNET Enterprise that has the same name as an existing job on the Field Controller, the job will be renamed to xxxxx(1). Where xxxxx is the name of the job
- Added support for ampersand (&) in a MAGNET Field job name
- Added support for importing the last BS setup to an existing job. Previous support was to import a backsight setup into a New Job ONLY
- Enhanced the exchange of points between jobs.



- With additional Filters to allow you to select the data you want



And select the points you want to copy to a job.

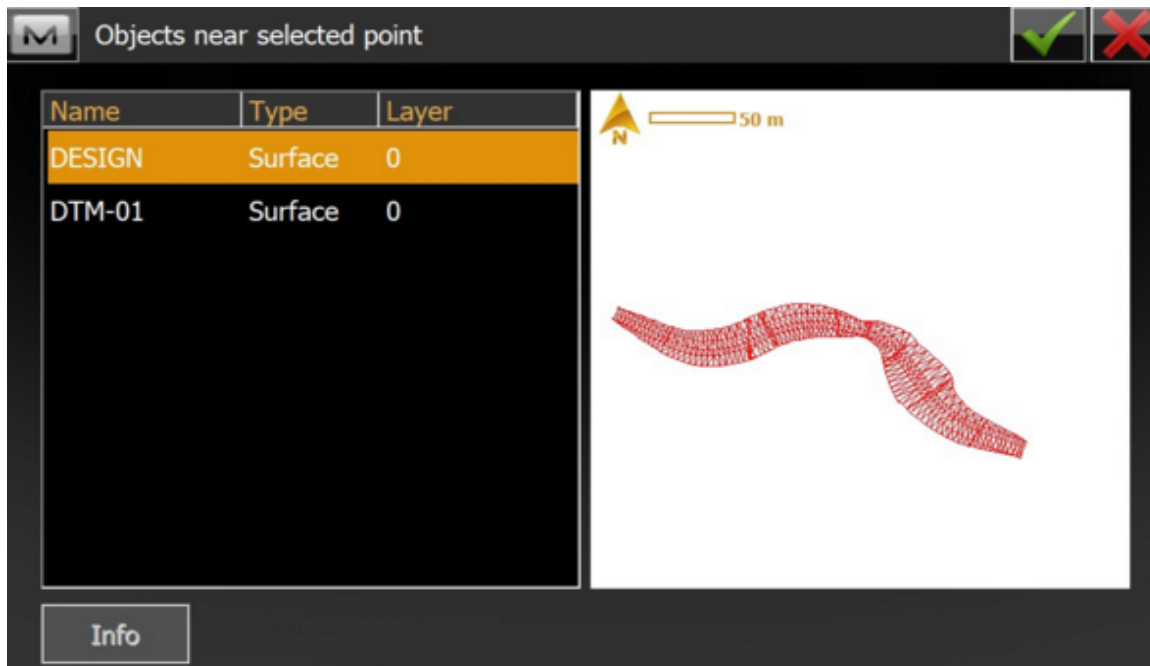


- Added the option to do a Full Backup with options to store jobs and license. This feature can be used to recover on the same or other controller during clean install

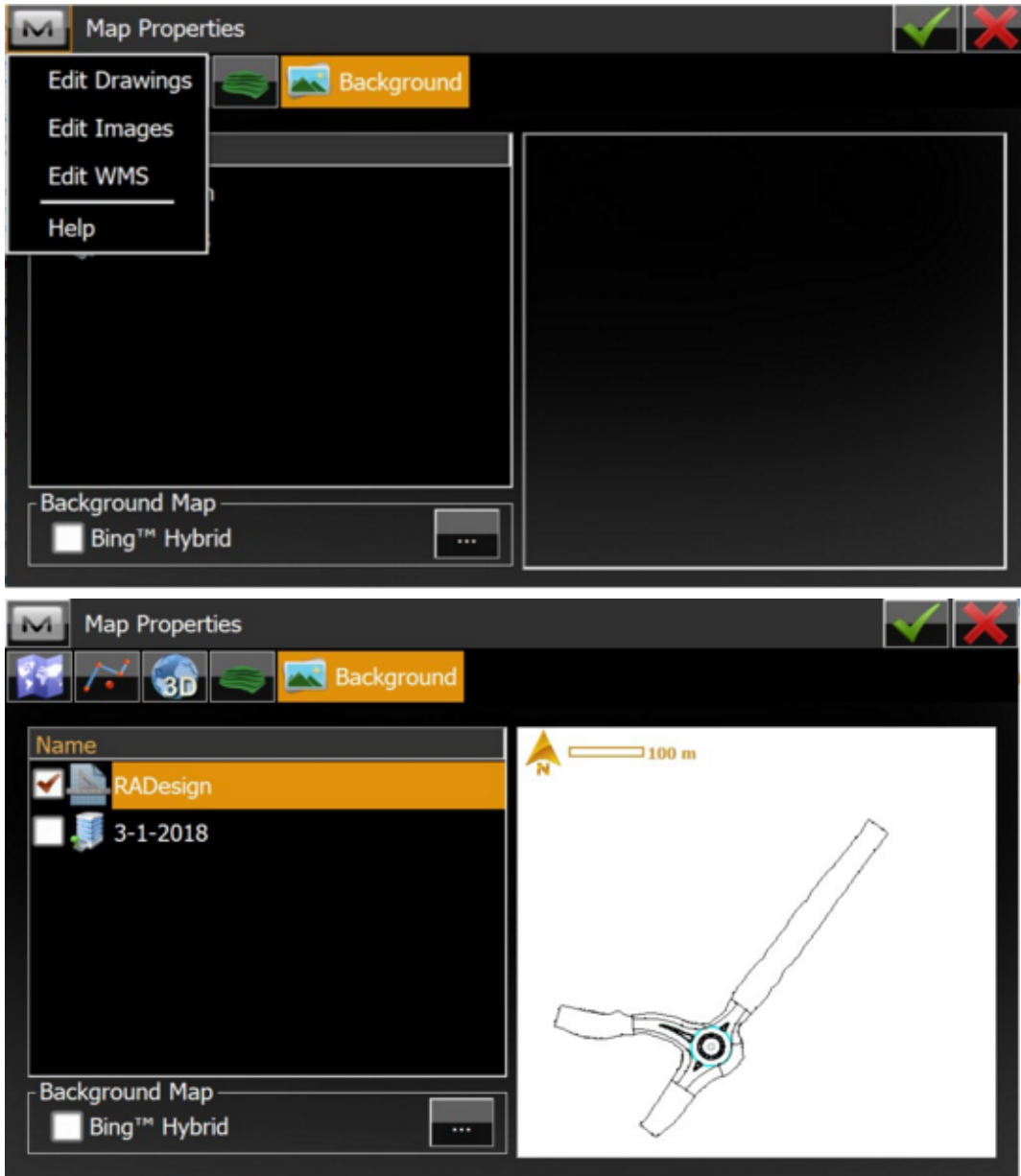
## Map

## New Features/Improvements:

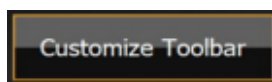
- Enhanced 3D Mode button options
  - Solid + Wireframe has been added as a display option
  - Updated the 3D mode navigation to allow easier rotation/panning/zooming when in 3D mode
  - Added 3D Ortho Mode
  - Background Drawings now supported in 3D Mode
  - Switch map to North orientation with one click on the Compass
- Increased the number of map data labels to 6 so the users can add additional live data points to the map screens
- Added support for selecting a surface on the main map and added Stakeout, Edit, Delete and Add to Layer features to the Rt Click when a surface is selected. When selecting objects on the map, a Selection window will show that now includes surfaces. users can pick the surface they want to stake, edit, etc direction from the main map.
  - Added the ability to select a surface on the map.
  - Added a map view to 'select surface' dialog.

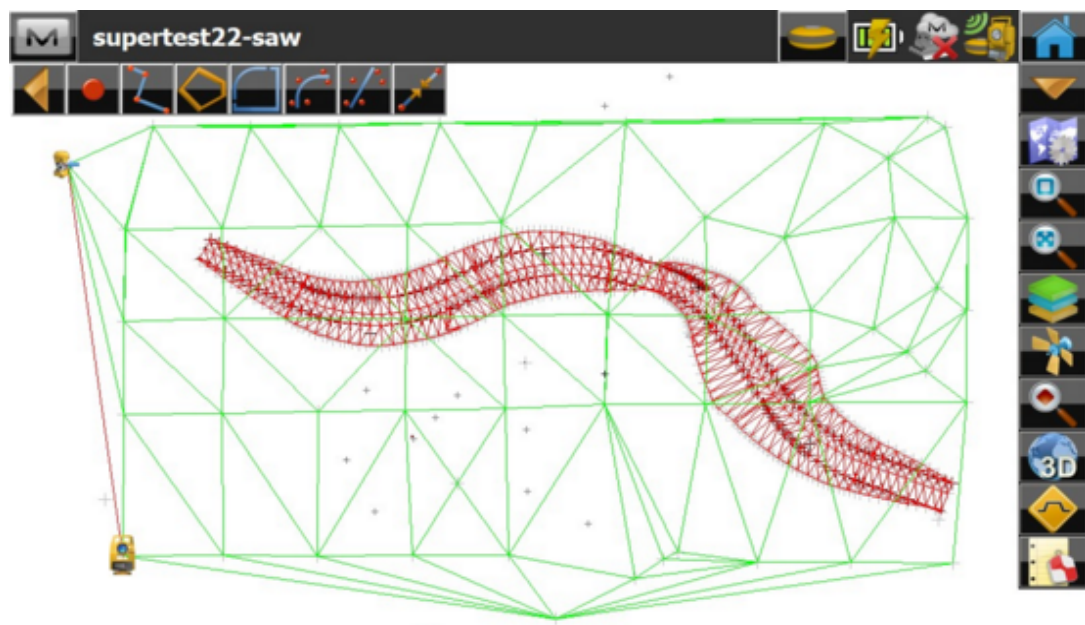
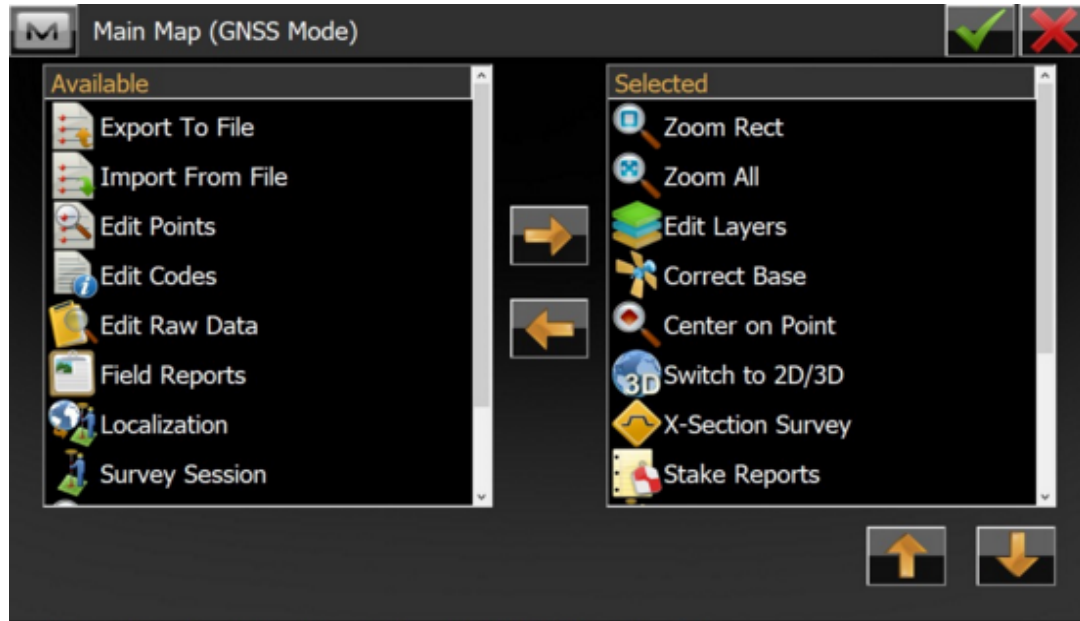


- Added support in the main map, to selecting an alignment (road) > stake road now by default stake the selected road.
- When you have a Reference CL or Alignment selected, on the Stake Map we now show the Reference Line highlighted on the map and only show the stationing on the Reference line. Set active road to map for all stakeout > road routines
- Enhanced the import of CAD data and always import the data as a background drawing. Includes DXF, DWG, DGN, iModel). All points are also imported as regular points. Updated ACAD support to DWG2018 on the PC version and up to 2016 on the WM/CE version of MAGNET Field
- Added the view option 'Solid + Wireframe' and the option to colorize surfaces in the 3D Map properties options
- Added a Map View to the Edit Layer dialog, so when a layer is turned on/off, the map view will reflect those changes.
- Updated the Stakeout Map screen so the bottom of the Stakeout Map is now semi-transparent so the controls at the bottom of the screen no longer cover the map.
- Added support in the map view for WMS tiles in 3D mode
- Enhanced the Map Properties options so users can upload images and drawings in Edit>Background in Map Properties. The following types are supported: jpg, bmp, tiff, geotiff.
  - Users can select uploaded items to display on the map in the map properties dialog /Background tab. The dialog shows a list with preview controls.
- Updated the Drawings and Background user interface in MAGNET Field
  - In the Background tab implement control with options for Drawing, Images Map Background + WMS layers
    - Added the option to specify the WMS service(s)
    - The Map + WMS Layers allow single selection map background source
    - Control with checkboxes of available layers in the WMS. You can choose layers from different WMS services
    - In 'M' Context menu, added edit for Drawings, Images, WMS
    - Added support for Virtual map files list to Map Properties
    - Bing and WMS background maps are now supported in the 3D map



- Added the Customized Map Toolbar as an option to all Survey, Stake and the Main Map screens. The customized toolbar allows the user to create a favorites menu of MAGNET features that are specific to the way they work and allow the user to create custom favorites menus for both GNSS and Optical configurations. The Favorites configurations are global so you create the custom configurations and use them across any job.





- On the main map, users can now select multiple linework to create and build a surface. The entity selection options have also been updated to add the ability to select multiple entities in Area and Point List
- Enhanced the ability to select lines and line segments. Users can now select two separate line segments of the same line on the 2d and 3D map.
- On the main map, when selecting 'Center to Point' the selected point is now highlighted on the map

- Significantly improved the speed when selecting a point in a large job.
- The Point symbol size has been updated to correspond to the user selected font size.
- On the main Map the 'join' function has been added to the main map drawing toolbar.



- Updated support for Cyrillic or Chinese text that is included in a ACAD DXF or DWG. In previous versions the text would be displayed as a box.
- In 3D mode, the Pan option has been added to allow for easier navigation when working in 3D mode
- in 3D mode, the default view is now set so the observers position is now by default up on a slight angle to allow better viewing of the model when switching to 3D mode
- Added support to allow users to Delete a Layer and at the same time, all of the data on the layer. In Previous versions, you would first have to delete the data and then you could delete the layer
- Enhanced the map view to only show the stationing for the active selected line.
- Updated the 3D map to show linework with selected points the same as the 2D map shows.

## Setup

### [New Features/Improvements:](#)

- Updated the Benchmark routine to allow setting the benchmark by angle only measurements. When the occupation point and target point Hz coords are known, MAGNET Field will use the point to point horizontal distance and measured vertical angle to compute slope distance and measured vertical angle to compute vertical distance.
- Added 'GNSS status' to M > Setup > Backsight in Hybrid mode
- A Receiver Management function has been added to the GNSS Setup feature and allows you to upload Reviver FW as well as get current OAF and Receiver Info (Including Serial



Number, Unique Board ID, Firmware version, OAF Expiration date )

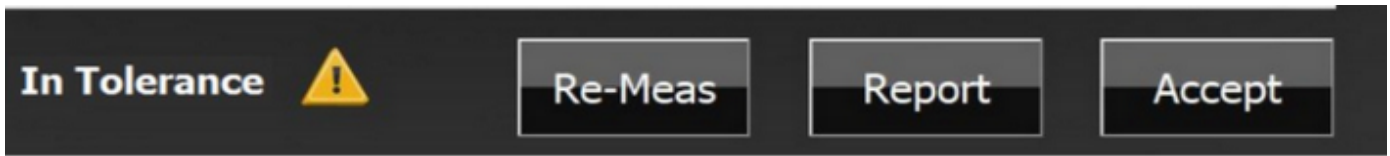
- Users can now upload GNSS FW directly from MAGNET Field, as well as get current OAF and Receiver Information and upload a Receiver OAF.



## Survey

### New Features/Improvements:

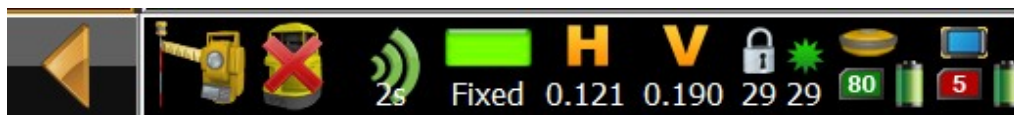
- Updated support for Predefined Points in Set Collection
  - The HR now changes to correspond with Target Type set
  - Added a warning when measurements are out of the acceptable range and shows a message to indicate 'In Tolerance' or Tolerance Exceeded. This allows the user to quickly decide if the observation results are within tolerance without having to go to the results view.



- Added the option to show Road Points to Survey > X-Section.
- Added the ability to display the cross-section shape in the X-Section Window in the Map View. Users can check the shape of their cross section visually while in Survey > X Section
  - Added the function to connect the cross-sectional observation point in X-Section.
- Added the Pole cross-sectional observation option in Survey > X-Section.
- Added the display option in Survey Map Labels (GNSS) to show Antenna offset height + HR when configured for Hybrid
- In Point Attributes settings, add the option to 'Store As' with Prefix/Suffix and allow: None, Prefix, Suffix
- In the Topo Map, the bottom control bar is now semi-transparent to provide additional area on the map.
- Added the Quick Code groups list to the 'M' Context menu, and you can now select the Quick Code group you want to use directly from the list.
- Updated the Instrument status on the GNSS Toolbar when in Hybrid mode. Users can now see if they are still connected to the TS



- In the GNSS Toolbar, RTK Quality has been replaced with RTK Age.

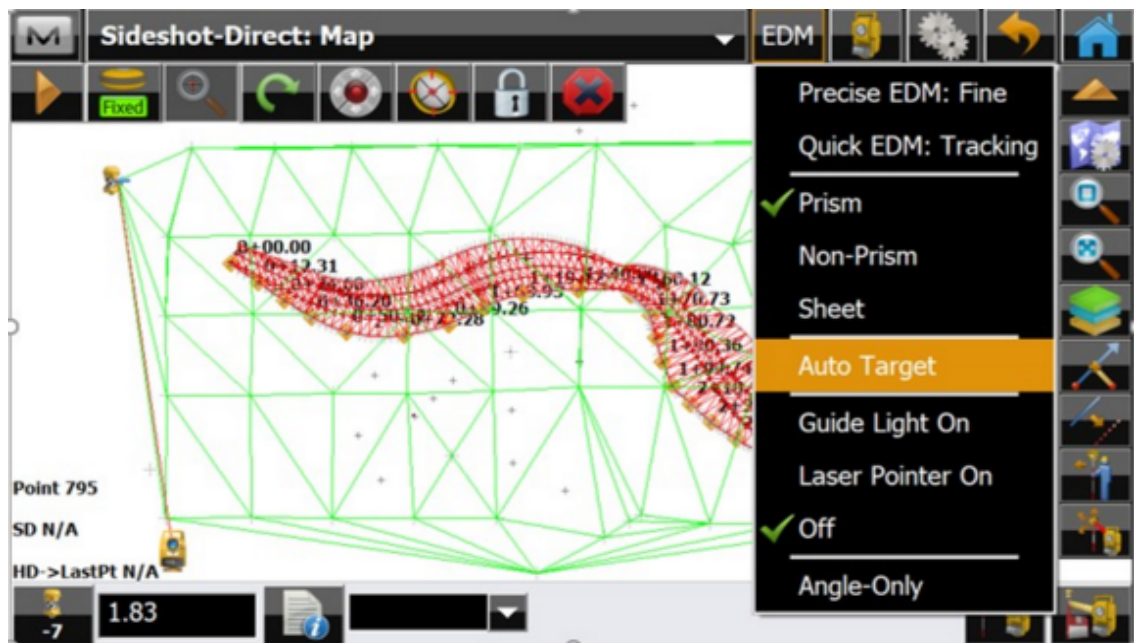


- Added the ability to select the layer of the object separate from the code in Survey mode
  - Layer selector (like Code selector) in Survey / Topo

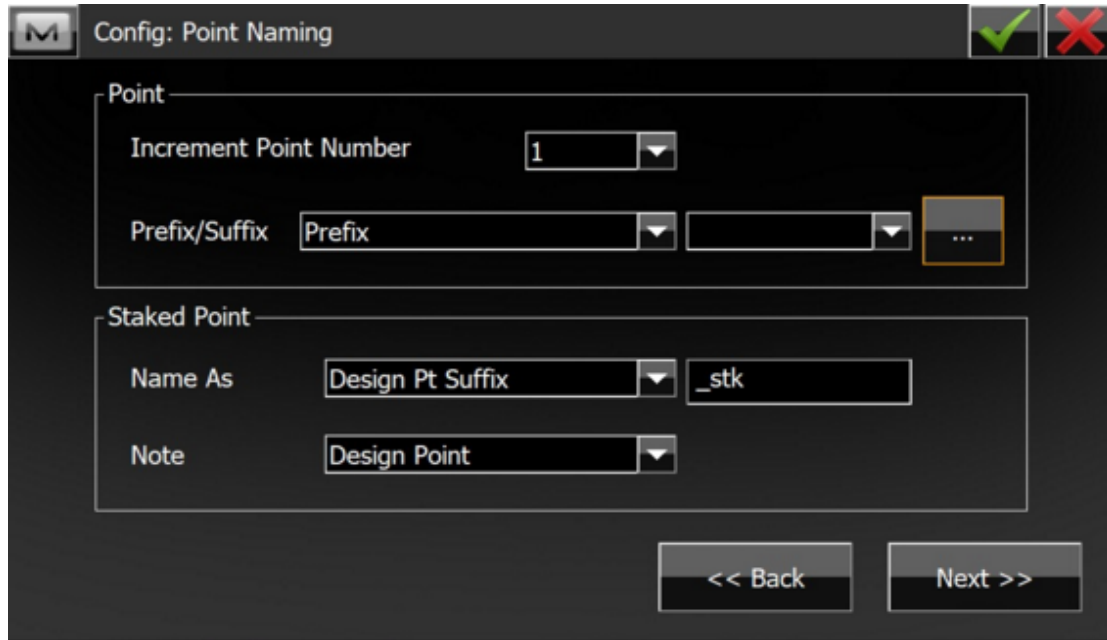
- Added support for Vertical search offset measurements when in Total Station mode. When using Vertical Search, you first Measure the ferrule of the pole and then the second measurement is to the center of the prism. For the second measurement you measure vertical angle and distance. The HA is stored from the pole measurement, and the VA and SD are by prism measurement.
  - Vertical Search Offset is accessed from the M (menu) in Topo



- Added the setting of 'Auto-Target' to the EDM button in Survey



- In Topo Survey, moved the Point Properties setting to Configure > Point Naming for ease of access to the settings



- Added a visual indicator to a dialog screen of the input mode. This indicator (icon) is reflected the change in BASIC Mode of Total Station. This feature was added for the Japanese Survey Market.



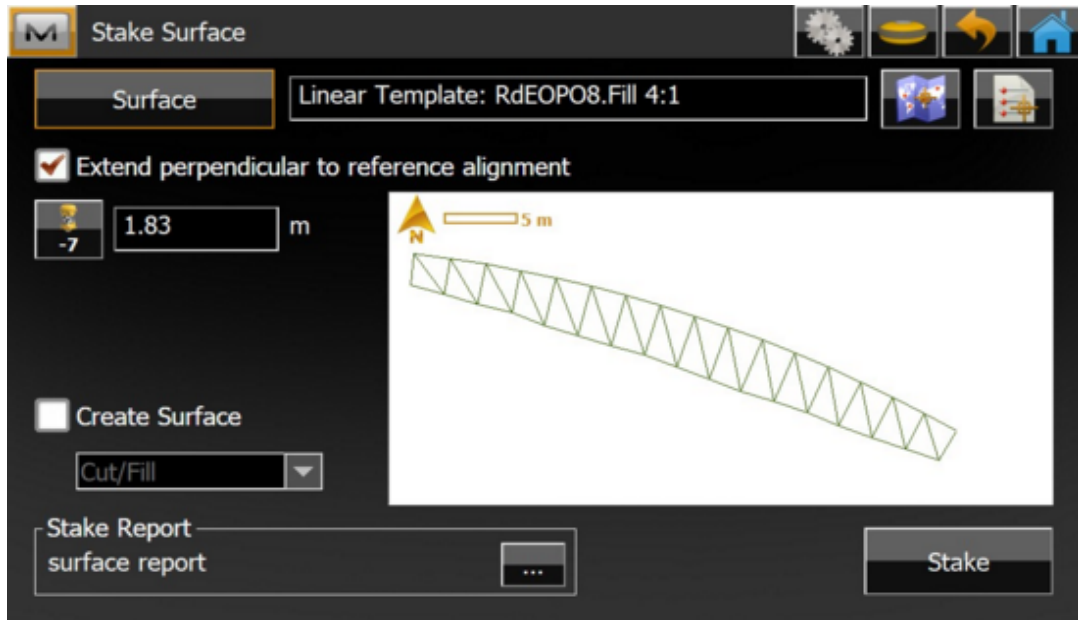
## Stake

### New Features/Improvements:

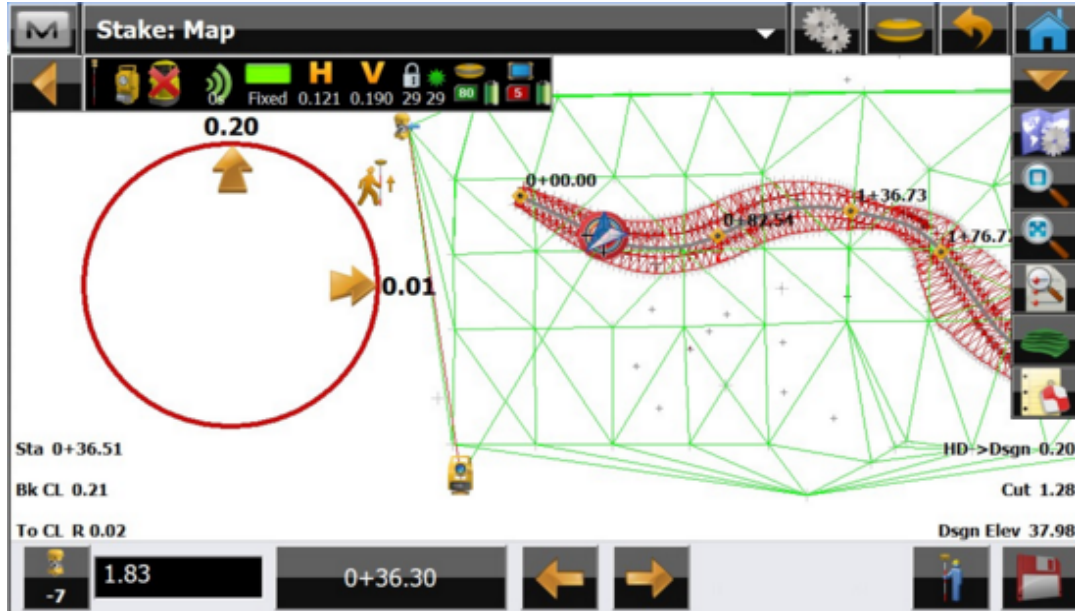
#### Reference Surfaces:

- If you have a ref CL or Alignment selected, we now show the ref line highlighted on the map and only show the stationing on the ref line. Set active road to map for all stakeout > road routines
- Added support for extending the reference surface in Stake Road, Real-Time Road and Slopes and Surfaces. Reference Surfaces can be extended perpendicular to a Reference

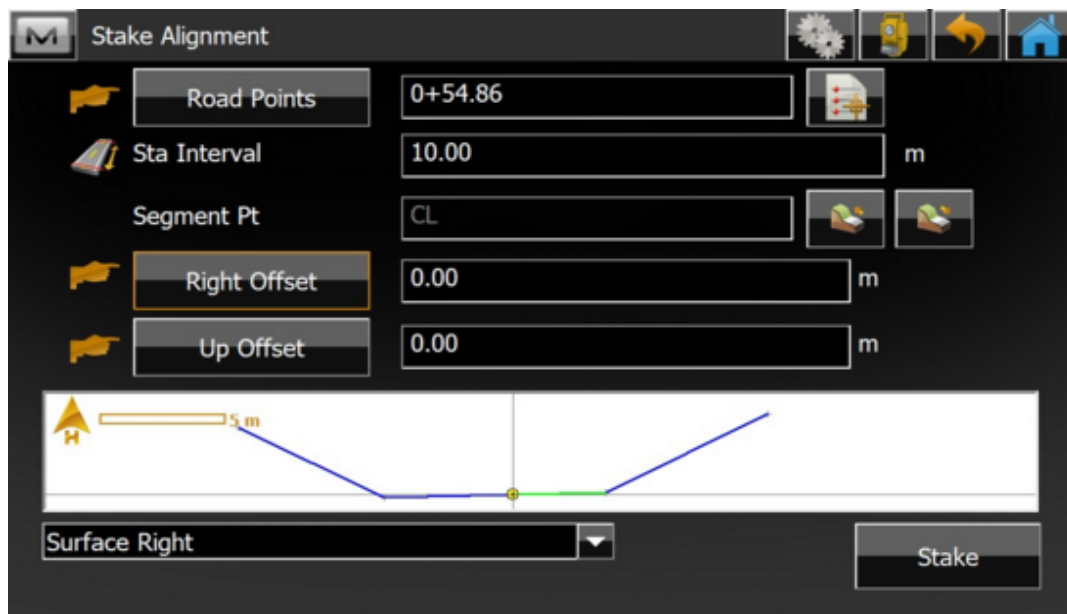
Alignment to allow users to extend the edge of an existing surface to hold the grade of the surface and extend to any distance.



- Added the data label 'Staked Count' to the stake points screen. The label will display # of points staked which shows the total number of points staked. If 'include previous staked option' is enabled, then the total count will include the previous staked points.
  - When Staking Grids, the total includes the points in the grids.
- In the Map view, MAGNET Field will now show the HA even when not tracking the prism. The HA currently shows when tracking a prism.
- Combined the Map and Normal view in Stake to show the navigation compass in the map view.
  - Deltas to the design point are shown in real time with the compass

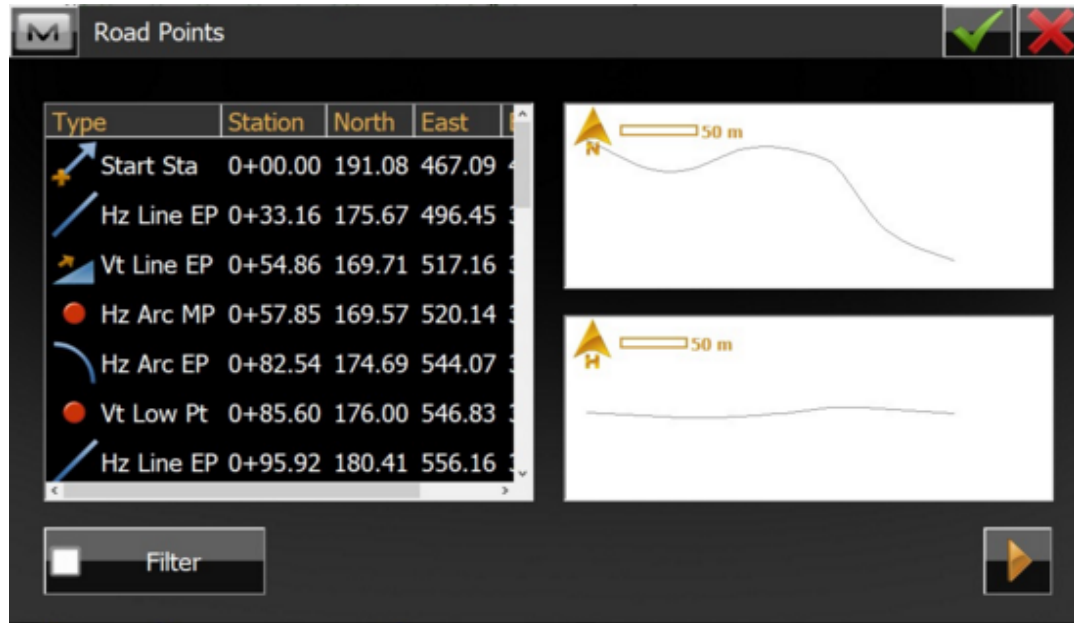


- Added the ability to display Road Points to all Road Functions. The user can select the Road Points in BS Setup (by Station/Offset), X-Section Survey, Stake Road and Stake Slope.

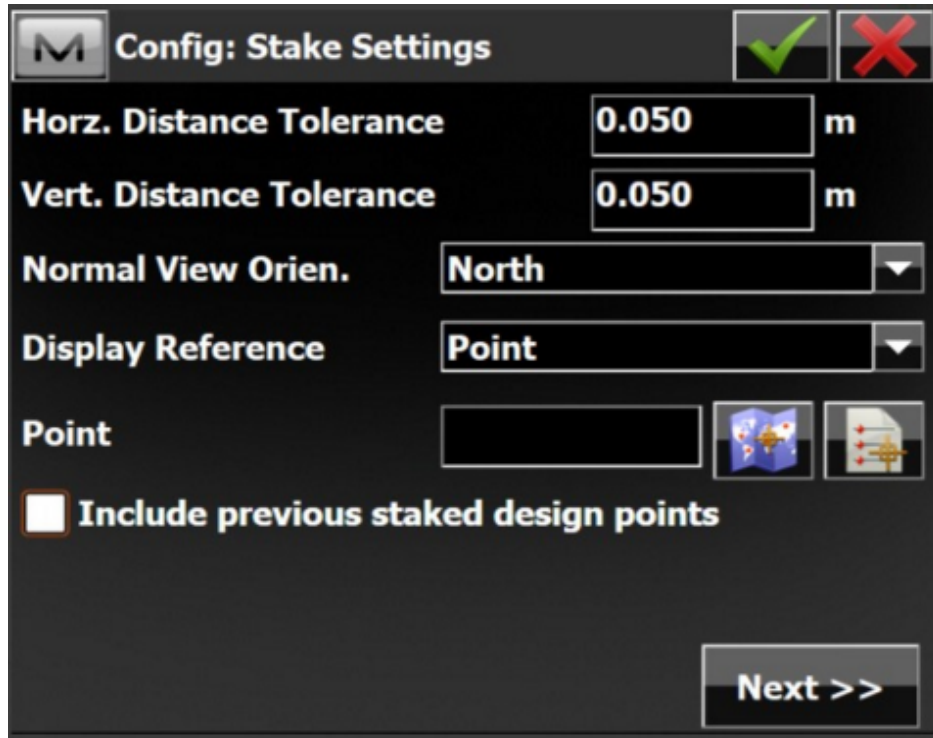


Road Points are the Horizontal and Vertical transition points as defined along a Road.





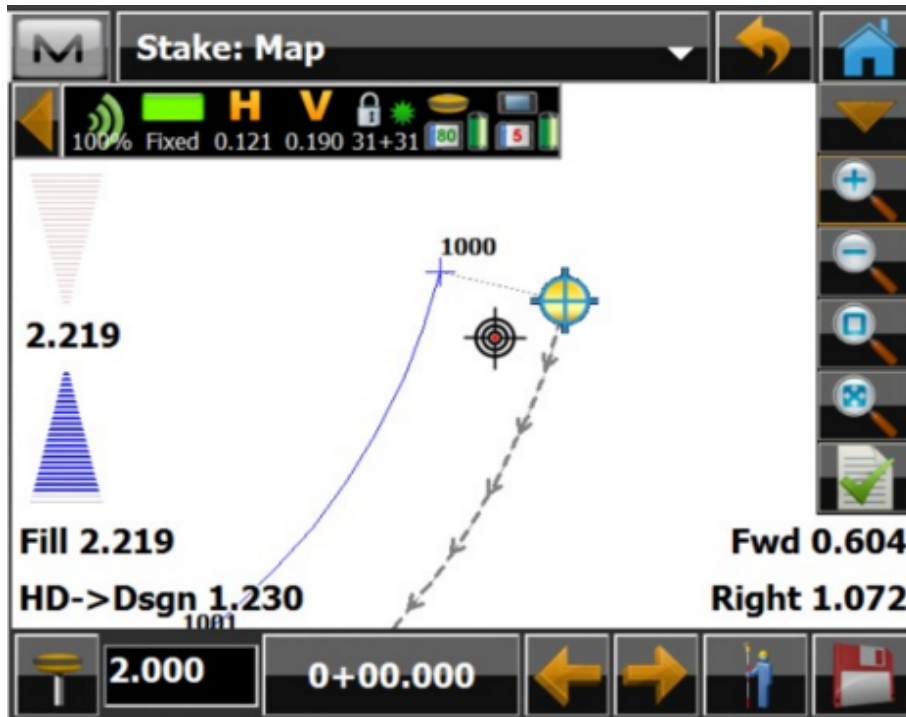
- Enhanced Drape Mode – added the feature of Drape Floor or Ceiling
  - Users can now project a point to either the floor or ceiling
    - Measure a point on the floor or ceiling to define the surface
    - MF calculated the floor/ceiling plane
    - Point is projected to the defined surface
- In Stake > Points, users can now select the 'next' point to stake directly from the map, and do not have to return to the point list to select the next point.
- Added data labels for:
  - Number of total/staked/not stake points
  - Distance from the Occupation point to Current Position
  - Added Left/Right data label for staking out a line with a conventional instrument
  - Added the distance from the instrument to the prism in Stakeout. On large sites this can be helpful and also if there are more than 1 instrument on the site, the user will know if they are receiving data from the correct instrument
- Added the setting for Set Elevation tolerance in Configure > Layout. Previously the user would have to configure the elevation tolerance in Stake Reports.



- Added Setup > Reference Alignment option in Stake Surface. Users can select both a Reference CL and Reference Alignment when Staking Roads, Surfaces, Grids, etc.
- Added the option in Stake Map to select a design point on the map to stake.
- When calculating 3D line lengths, the lines are now being draped to a surface when there is a reference surface set.
- When slope staking, the routine has been updated so the user will now get a distance to the Catch Point even if they are not passed the Hinge Point. In previous versions, you had to be past the Hinge Point to get a distance to the Catch Point.
- Enhance Stake Grid so Next Nearest Point is on by default. This allows the user to start anywhere and proceed in any direction to the next point without having to use a Point List.
- Added an option in stake surface to allow the user to define a plane with three points (from map/list/measure) and then stake the plane.
  - Added plane offset to Stake Reports and as a Custom Map Label
- Added MLM (missing line function) from Basic Mode to MAGNET Field.
  - Added the ability to select the method (A—B, A-C)/(A-B, B-C)
- When staking a line, added the option to specify 2 end points to the slope stake routine.



- Added the option 'Extend Surface' to all stake routines. The outside triangle(s) of the Surface will now be extended when using a Reference Centerline or Reference Alignment
- When staking a offset line, in the map view, MAGNET Field will now show a dashed line to the current offset point and the offset line being staked



- Enhanced the Point to Line feature in MAGNET Field. The feature has been updated to allow a 'line of sight' direction to the line the surveyor is setting the point. Previously the point to line was calculated based on a perpendicular direction to the line.
- When staking Surfaces and Roads, added an optional Cross Section view. In the Section view, the road element selected is highlighted. The Cross Section view is enabled in the Map Properties window in Stake.



## Reports

### New Features/Improvements:

- Added an option to store Field and Stake Reports as a PDF in Landscape Mode
- Added support in Photo Notes for the following formats: .jpeg, .png, .tif and .tiff

## Resolved Issues

### Resolved Issues:

- On WM/CE Field Controllers the Calculate Area function would allow user to choose the wrong edge pt which resulted in wrong results
- Addressed an issue when exporting multiple images to a file. Not all images would export from the MAGNET Field job.
- The recent Windows update 1709 would change the size of the the title bar and icons in MAGNET Field when the application was opened and closed, causing them to get smaller every time the application was started.
- Addressed an issue when a MAGNET Field job was using the Swedish projection and geoid. Changing geoid model does not change height of offset points.

- Addressed an issue when importing \*.KOF files into a MAGNET Field job. If the exporting software used underscores instead of spaces between data fields the file would not import correctly.
- When exporting raw data as Topcon Custom TS (\*.txt), the offset was exported as meters only.
- Addressed an issue when exporting 2d lines to \*.dwg format. If 'Use 3D coordinates' is turned off in the export wizard, 3d polylines were still exported as 3D and not as 2D polylines.
- Addressed an issue in MAGNET Field support for Machine Control Systems. When the flag "Setup instrument for 3DMC" is set, the coordinates of station computation is correct, but the backsight angle was incorrect. The incorrect backsight angle was then used in the LPS setup. The correct backsight angle is now used in the setup.
- Addressed an issue when reading the OAF info on the HiperHR. An incorrect 'does not support L2C' message was displayed.
- Addressed an issue when switching between Hybrid and non-Hybrid modes. At times, after switching, the Hybrid adapter height would not be used in the measurement
- Addressed an issue in the MAGNET Field Satellite tracking screens. Both Galileo and Beidou satellites were shown with a lock symbol in the Tracking screens even when the satellite systems were turned off in the user interface. The tracking screen display has been updated so when the satellite systems were disabled, they will not show in the tracking screens.
- Updated Field and Stake Report generation so when MAGNET Field is configured for Russian, Cyrillic symbols are now properly displayed.
- Updated the import of DXF files from HHK GEOgraf Software. When importing files with arcs, the arc would show as straight lines.
- Addressed an issue when inserting TIF files as background Maps. At times, an unknown format message was shown.
- Addressed a crash in Stake when MAGNET Field was configured with the Swedish projection and the background map was enabled. When staking a line, MAGNET Field at times would crash.
- Addressed an issue when exporting Stakeout reports and \*.tvf format files. Deleted points would still export in the files.
- Addressed an issue with photo image quality when using the FC-5000 Data Collector. The

1920x x 1080 images were being exported as 640 x x480.

- Addressed an issue with RTCM3.1 message (1021) when using the SAPOS Baden-Wurttemberg reference network. The datum name was incorrectly displayed in MAGNET Field.
- Addressed an issue when importing and displaying large drawing files in WM Field Controllers. Performance has been improved to allow large files to import and display.
- Addressed an issue when importing TIFF files. Certain formats for TIFF files were not supported.
- Addressed an issue in the Remote Benchmark routine. The user now has the option to create a new point (Design Point) by checking the option when saving the Benchmark measurement
- Addressed an issue in Traverse Adjustment. When traversing through a BS point, previously the point would not be adjusted. With this update, the point is now adjusted with the traverse.
- Older GNSS receivers when connected to MAGNET Field would allow users to select Galileo under Tracking settings. If the GNSS receiver does not have the option (or support) for Galileo, the option is now greyed out.
- Addressed an issue with Auto Tracking when using a RC4 and a QS Robot. The autotracking icon would not respond and turn to the prism.
- Addressed an issue when MAGNET Field/Layout was configured for Hybrid surveying and performing a Hybrid Resection, the e-bubble would not show on the screen
- Addressed an issue when configured for DGPS. In the Satellite status screen, no Satellites were displayed.
- Addressed an issue when exporting RAW data to Leica GS18 and GS16 formats. When importing the file(s) into a supporting application, the format was not recognized.
- When staking a line with the Stake setting set to Point = Range start and Note = Station & Offset, the note would only show the point numbers for the start and end point and did not store the shot in the designated point range
- Addressed an issue when storing a benchmark elevation. You could observe the point for elevation, but MAGNET Field would require a Northing and Easting to store the point.
- Addressed an issue when importing Carlson CL files. If the file(s) contained a Station Equation, MAGNET Field would not import the file.

- Updated the export of images for use in ESRI applications. The position was not embedded in the image, but instead show on the image. The position information is now embedded in the image file.
- Addressed an issue when connecting to a Trimble IBSS base station.
- When staking points with zero or null elevation, at times, the Total Station would plunge the scope. This issue has been addressed and if the point does not have an elevation (or is Null), then the scope will use the default Vertical Angle of 90 deg
- Addressed an issue when the turning speed was set to 16 (default setting) on the LN-100. MAGNET Field would report a tilt error.

## MAGNET Office 5.0.1

### General

#### MAGNET Office V5.0.1 Release Notes

MAGNET Office 5.0.1 is an update for the following MAGNET Office products.

- MAGNET Office Site
- MAGNET Office Topo
- MAGNET Office Layout
- MAGNET 3D Exchange
- MAGNET Tools

#### Magnet Tools

- Fixed issue when exporting points to a \*.csv file. Metric values were exported when coordinate unit set to US Feet.
- Fixed issue with the least squares adjustment workflow. The Processing progress bar showed 'In Progress' after the adjustment was complete.

#### Magnet Office Site

- Fixed issue with the display of arcs in the 3D View.
- Fixed issue with line styles not being displayed in the Drawing Editor.
- Fixed issue when printing to 100% scale to a physical printer.
- Fixed issue with Least Squares Transformation scale input.
- Fixed issue with symbol scaling when using symbol grips.
- Fixed issue with Insert Text cursor not advancing with input.
- Fixed issue with Slope Zone grid elevation display.

#### Magnet Office Topo

- Fixed issue with the display of arcs in the 3D View.
- Fixed issue with line styles not being displayed in the Drawing Editor.
- Fixed issue with printing to 100% scale to physical printer.

- Fixed issue with Least Squares Transformation scale input.
- Fixed issue with symbol scaling when using symbol grips.
- Fixed issue with Insert Text cursor not advancing with input.

### Magnet Office Layout

- Fixed issue with the display of arcs in the 3D View.
- Fixed issue with line styles not being displayed in the Drawing Editor.
- Fixed issue with printing to 100% scale to physical printer.
- Fixed issue with symbol scaling when using symbol grips.
- Fixed issue with Insert Text cursor not advancing with input.

### Magnet 3D Exchange

- Fixed issue with the display of arcs in the 3D View.
- Fixed issue when printing to 100% scale to a physical printer.
- Fixed issue with symbol scaling when using symbol grips.

## MAGNET Office - V5.0

### **General - All Office Products**

#### MAGNET Office V5.0 Release Notes

The following additions/revisions have been made to MAGNET Office v5.0

- MAGNET Office Topo
- MAGNET Office Site
- MAGNET Office Modeler/Explorer
- MAGNET Office Mass Haul
- MAGNET Office Schedule
- MAGNET Office Control
- MAGNET Office Resurfacing
- MAGNET Office Layout
- MAGNET Office 3D Exchange
- MAGNET Office Tools
- Topcon Exchange for AutoCAD

#### Notes:

- Magnet Office Site is required for Magnet Office Mass Haul and Resurfacing. Revisions and fixes applied to Magnet Site are included in Magnet Mass Haul and Resurfacing modules.
- Magnet Office Modeler is a new module automatically included in Magnet Office Takeoff and Mass Haul solution products. Modeler is a parametric modeling engine that helps with converting 2D data into 3D and produce combined multi-disciplinary models from various input sources. Modeler supports BIM formats (LandXML, IFC) as well as generic CAD formats.
  - Magnet Office Explorer is included in Modeler. Explore is used for visualization of the supported formats contained in Modeler.
- Magnet Office Schedule and Control functionality (formerly DynaRoad Schedule and Control modes) is now automatically included in Magnet Mass Haul solution licenses



- Schedule provides functionality to schedule required tasks for project completion.
- Control provides functionality to measure and compare on-site progress with planned progress.
- Schedule and Control functionality is included only in the Magnet Mass Haul solution.

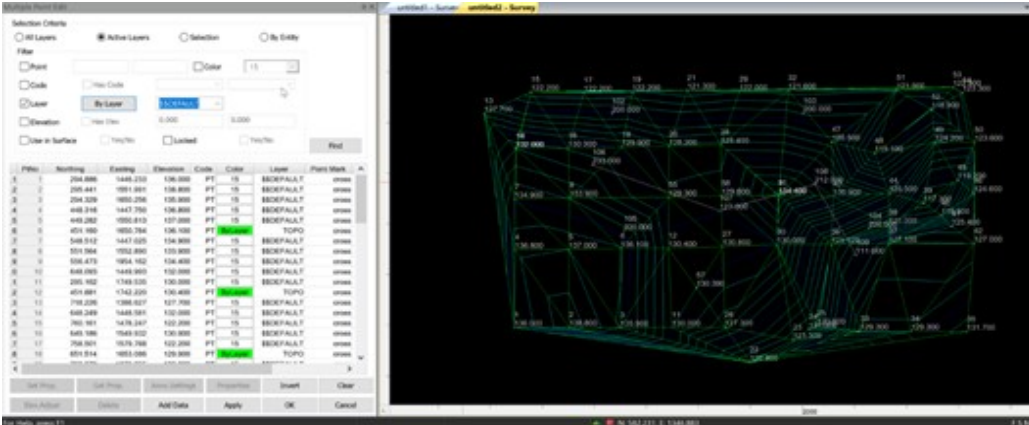
Specific functionality additions, improvements, revisions and corrections are listed below per Magnet Office product.

### New Features/Improvements:

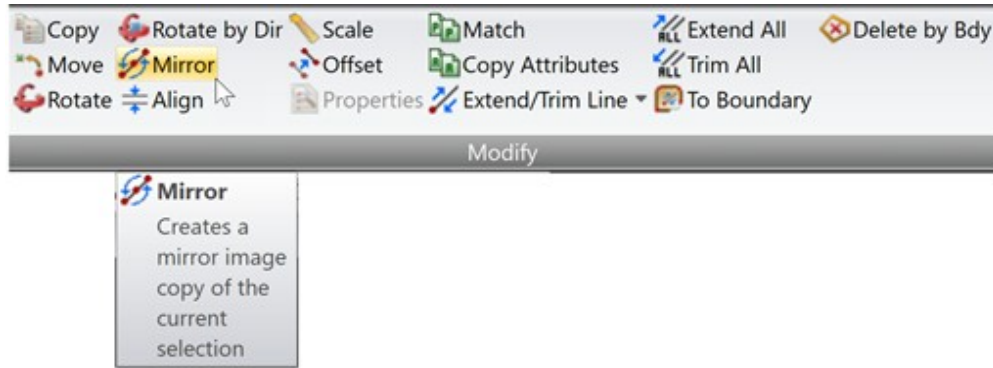
#### General

Improvements listed below are included in all MAGNET Office products unless otherwise noted.

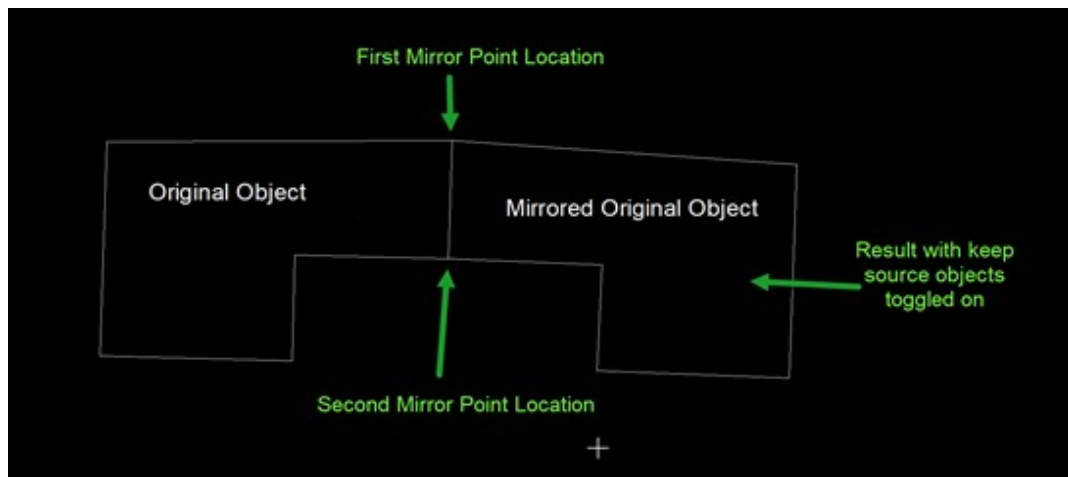
- Improved UI to support Hi DPI (4K) monitors
- Edit Points, located in the Modify ribbon, has been revised to include new filter, display, zooming, editing and entry capabilities. The UI has been updated to be a modeless interface which allows for the function to remain open while other functions are being used. The interface can be set to auto hide, pinned, or docked to the top, bottom or sides of the display.
- Implemented new unified installation interface from MAGNET Field.
  - New options for extracting cross section surface data.
    - From Entities
    - From PDF
    - From Layers



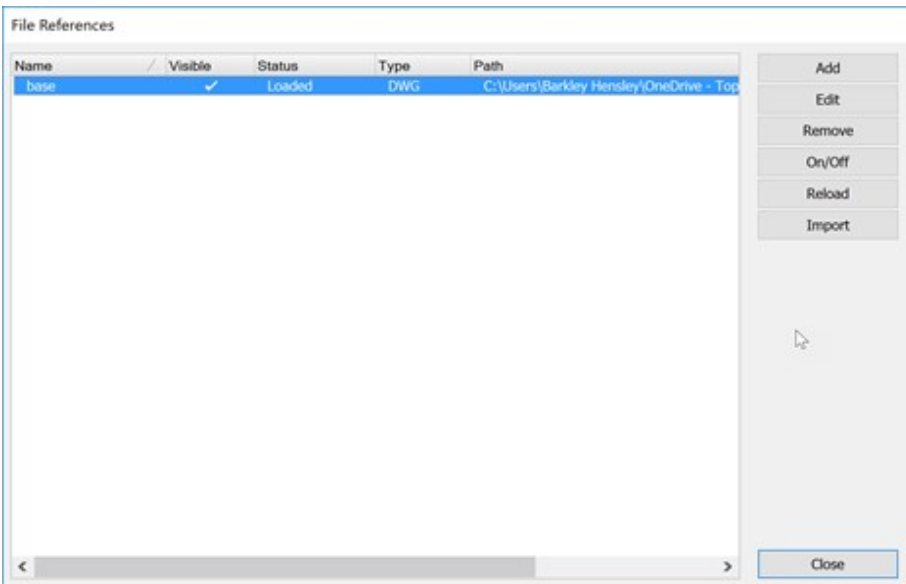
- New filter options of Selection, By Entity, Layer and Layer group have been added.
- The grid display is configurable for content and order of content. Settings will be retained when changed.
- The grid allows for manual entry of x,y,z data for the creation and editing of points. Point deletion is also supported. Note: attention must be given to the update linework settings also provided in the grid area if deleting a point that is linked to an entity.
- The Edit Point interface and the Survey View are interactive. If a point or points are selected in the Survey view the grid rows for those points will be highlighted and vice versa.
- When a point is selected in the grid, the survey view will be updated to zoom to the selected point. The zoom level is determined by the zoom level set in the Survey view. If you are zoomed in closely then the selected point will be zoomed to the current zoom level. If multiple points are created a zoom level will be determined to display all of the selected points within the survey view simultaneously.
- If the Edit Points interface is open, whether set to autohide or pinned, points created in the survey view by other functions will automatically be added to the edit points grid. Note: if a filter has been applied then newly created points would need to be within the filter guidelines to be automatically added to the grid. An easy way to update the grid with all points is to set the All Layers filter as current.
- Mirror is a new command located in the Modify Ribbon > Modify Ribbon group.
  - This command with or without a pre-selection. Supported entities are Points, Lines, Arcs, Circles, Polylines, Strings, Polygons(Polygon, Boundary, lot, pad) and Alignment.



- After running the command and selecting the object, user will be prompted to define the mirror axis. Mirror axis can be defined, by selecting two points on the survey view, by selecting two locations in the survey view, by selecting a line from the survey view or by entering two point numbers in the input bar.
- User may also choose whether to keep the source object or not; by checking “Keep source objects” checkbox in the input bar.
- If the “Keep source objects” checkbox is selected it will create new objects in the mirrored location else it will move the selected object to the mirrored location.



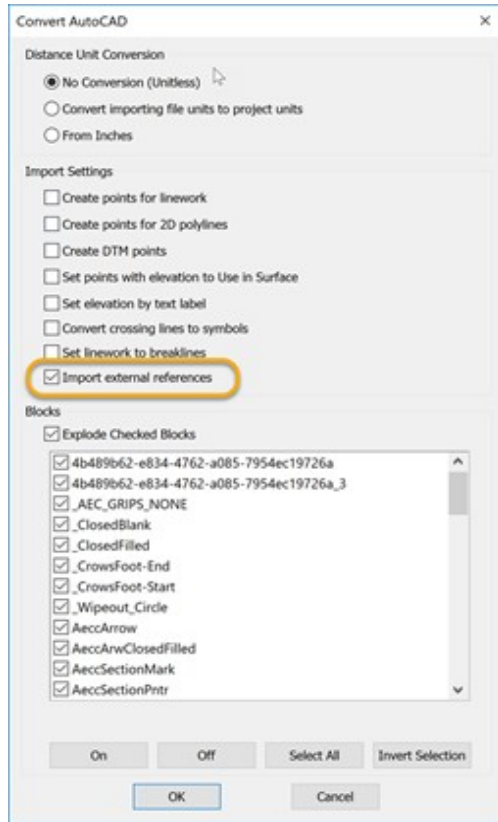
- File References is a new option located in the File ribbon > Standard ribbon group. This option allows for referencing Autocad dwg and Bentley dgn files to a MAGNET Office project. Once referenced, the data from the file will be displayed in a light grey color. The intent of this function is to use the attached files as references. Snap options are available for use with reference files for the purposes of measuring precise distances or for creating entities if need from the reference file.



- Add – Displays UI for adding reference file to project.
  - Edit – Displays same UI as Add and allows for editing the reference file path, name and display setting.
  - Remove – Removes reference file from project
  - On/Off – Visibility setting
  - Reload – If the referenced file has been updated this option will reload the file and reflect any updates made. Note: If a referenced file has been updated and saved, the next time a project containing these files as references are opened, the reference file will reflect the updates applied and saved to it.
  - Import – This option imports the selected reference file and makes its contents part of the existing project.
- Station/Offset display - Added the constant display of the cursor's station/offset position from a referenced alignment in the survey view and road view.
    - When multiple alignments are present, double clicking on the alignment name will display a dialog allowing for selection of any alignment for reference.
    - When the alignment window in the Road View is active the alignment name, and the cursor's station/offset position is displayed.
    - The display is located in the Status bar at the bottom of the screen.

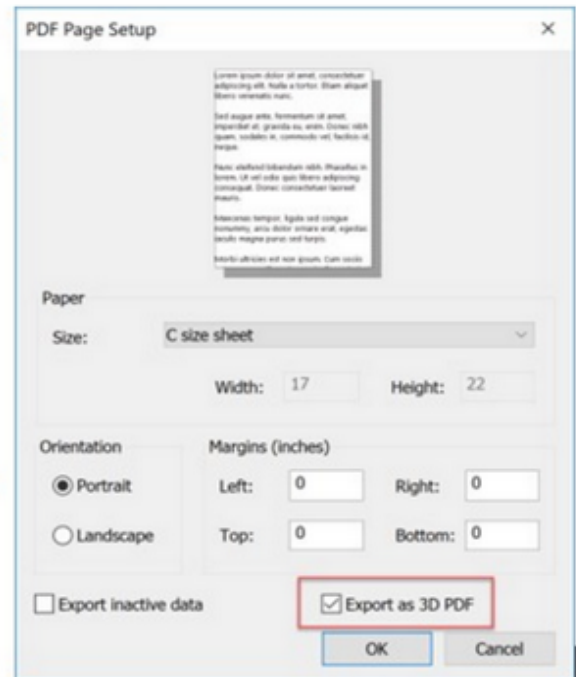
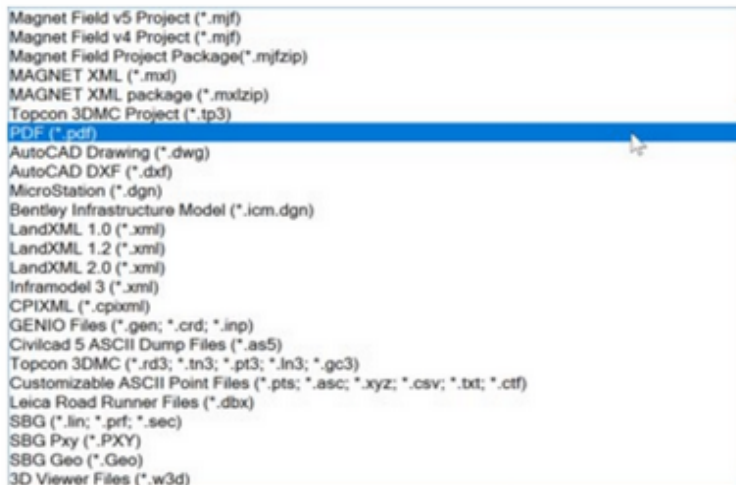


- Prompt for Elevation option has been improved to provide an option to turn off the prompt. Then the dialog is displayed the first time if the Prompt option is toggled off, the prompt will not return until turned back on. To turn the prompt on press ctrl+E to display the prompt dialog and toggle on the Prompt option.
- Import/Export
  - Added Bentley's icm.dgn format for import/export.
  - Direct import from Bentley Projectwise is available through MAGNET Enterprise Data Manager. Use the Cloud Connection ribbon to logon to MAGNET Enterprise and select the Bentley folder, or the name of the Bentley repository. Supported files can be directly imported into the active MAGNET Office project, saved to a harddrive or both.
  - Direct export of the active project to Bentley Projectwise mapped folders is available through MAGNET Enterprise Data Manager. For mapping of projects in MAGNET Enterprise please refer to the help section within Magent Enterprise.
- Autocad 2018 dwg format is now supported.
  - Import dwg has been improved to support Autocad xrefs when attached to the file being imported



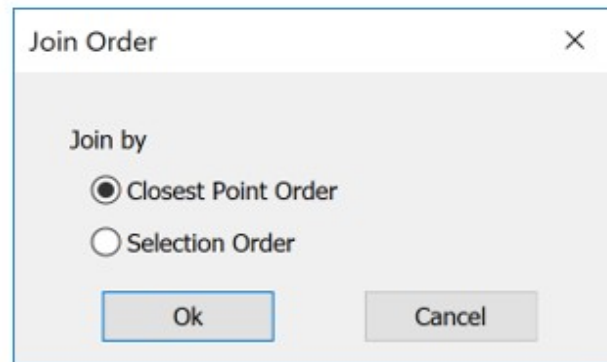
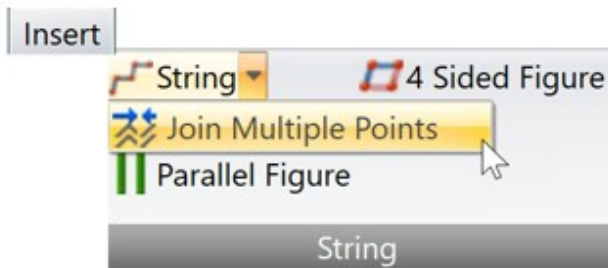
- Import dwg has been improved to include the option to import linework as breaklines. The option is located in the Import Settings options on convert Autocad dialog displayed during import.
- MAGNET Field, Field Reports are now supported in MAGNET Office. Field reports are located in the Survey Ribbon within MAGNET Office.
  - When MAGNET Field jobs containing field reports are imported into MAGNET Office, the field reports will be available for display.
  - Field reports are included in the export to MAGNET Field jobs.
  - Field reports are displayed by selecting the field report icon in the Survey ribbon.
  - Pdf files can be created by using the Save as PDF option.
- TP3 files:
  - Import added the option to import point descriptions as either notes or codes in MAGNET Office.

- Export to TP3 has been updated to include the option to export MAGNET Office point codes or notes as descriptions.
- Points without names will now use the next available point number in MAGNET Office.
- Infamodel3 has been added to the import/export options.
- Added import/export support for SBG GEO and PXY files.
  - Note: when exporting a SBG (\*.LIN) file 3 files, (LIN/PRF/SEC will be created.
- Import of LandXML files containing road design data and multiple surfaces has been updated to import all surfaces. A prompt for selection of the surface to use as the "Design" surface in the road view has been added.
- Control Points has been improved to support the import of ASCII text files.
- Added new option to Export 3D pdf from the Survey view, 3D Toggle view or 3D Tab view. This file can be opened in a pdf viewer and viewed in 3D.



- To export as 3D PDF toggle on the option highlighted above.
- Export Inactive Data will export all data in the project that is not being displayed at the time of export.

- Import ASCII text files has been updated to provide an option to ignore survey codes. This option will import the data on the active layer in the project and ignore survey codes for linework and property definitions.
  - Note: the Update Survey option contained in editors such as the Spreadsheet Entry Editor, Raw Data Editor, Traverse Editor will also provide the option to ignore survey codes.
- Added new option, Insert String by multiple points to the Insert Ribbon, String group. This option allows for the pre selection of point to join by individual or window selection. The connection order options consist of by nearest point or selection order.



- The Follow option available from the right mouse button menu has been improved to support polylines. The follow option will follow existing polylines between the specified entry and exit locations. Tip, use End point snap to ensure correct locations.
- Modify, Segment Line has been improved to work on multiple lines simultaneously.
- Select by Points has been improved to select points irrespective of the code. It is now possible to select a mixture of points with and without codes.
  - Added a new check box to the select by points tab code section. If unchecked the search will be done regardless of the code setting.

## MAGNET Site, Topo and Layout



## MAGNET Office Site, Topo and Layout

### New Functionality and Improvements

- Command Aliases the optional command line has been improved to dock at the bottom of the screen and remains active when opened. This allows for the entry of commands by typing short cut codes for commands.
  - Use the Command Aliases option to define existing commands by short cuts. For example the Modify copy command may be defined as CO. Available commands for definition are listed in the command aliases.
  - The command line is turned on by pressing the space bar.
  - Auto hide is available for use with the command line.
  - Plotting has been improved to support transparency settings for background images.
  - Added new option to Insert Polyline by multiple points to the Insert Ribbon, Polyline/Polygon group.
  - Added new option to Insert Polygon Area by multiple points to the Insert Ribbon, Polyline/Polygon group

### Fixed Issues

- Corrected issue with the Pan command in the Drawing Editor causing intermittent program crash.
- Corrected issue when printing a project containing a background image with a rotated orientation to a pdf file. The resulting pdf file placed the background image in the wrong position.
- Corrected issue with the Clipping option in Polygon Area and Boundary functions. Clipping was not consistently clipping out entities.
- Corrected issue with North arrow scale when opening older jobs containing drawings.
- Corrected issue with option "Create Layer from source layer" when exporting from the drawing editor to AutoCAD dwg. The "suffix" option was not working.
-

## MAGNET Site and Topo

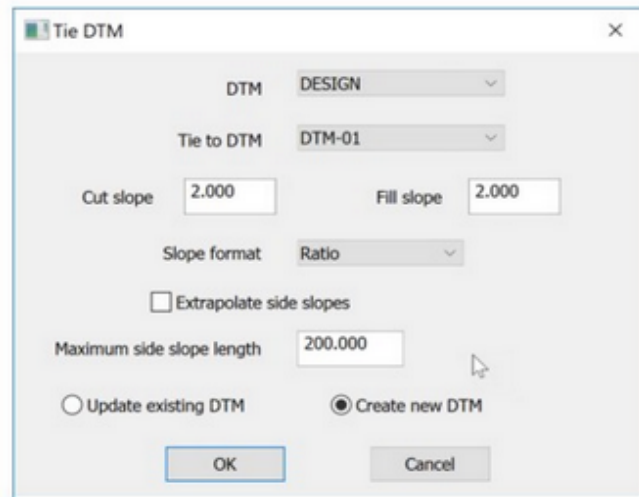
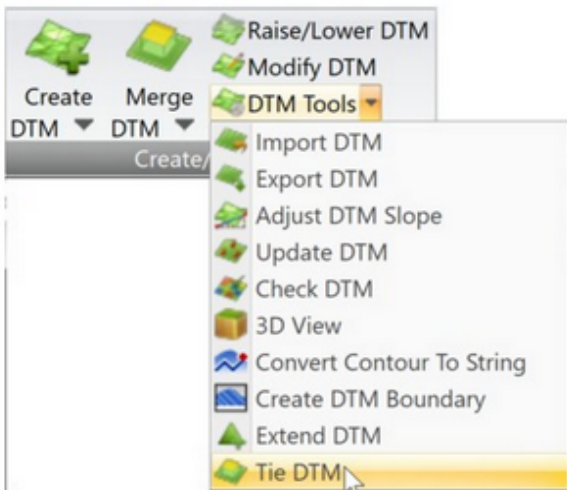
### MAGNET Office Site and Topo

#### New Functionality and Improvements

- Improved printing Cut/Fill maps to pdf. Resulting pdf file size has been reduced.
- Annotation has been update to include support for entities that do not contain points.
  - Entities created with the “Create Point” setting turned off in the Settings ribbon are now available for annotation.
  - Entities that have had their points deleted using the Delete Points from Entity option in the Modify ribbon can also now use the annotation toggle.
  - Annotations are updated if the entity is changed by direction or distance.
- Compare Points has been updated to add new options for comparison. The command is located in the Inquiry ribbon. The function now allows for:
  - Added definition of base points to compare by options:
    - All Data
    - Active Layers
    - Current Selection
    - Points (user specified by number)
    - Entity (user selected)
  - Added definition of target points or surface for comparison options.
    - Data within current project
    - Points (user defined or All)
    - DTM (surface)
    - Data within another job (project must be open)
    - Points
    - DTM
  - X,Y,Z tolerance settings are required to generate a report. Note: When base points have multiple points within the tolerance settings, each point compared with the

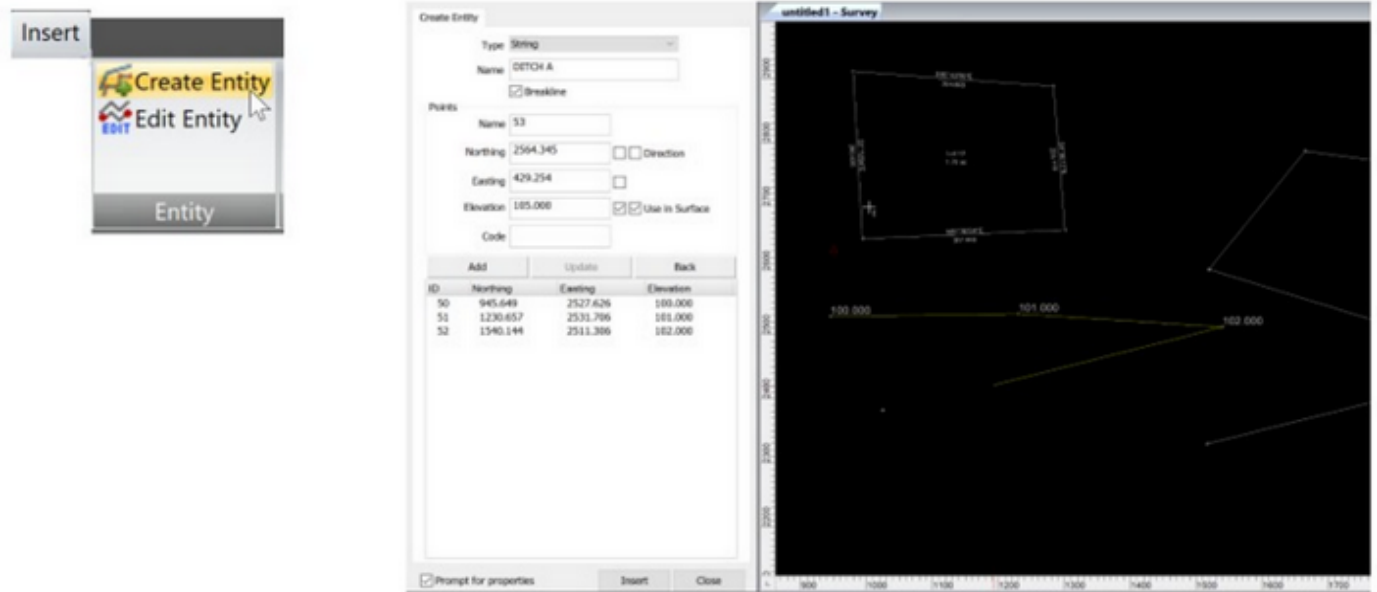
base points will be listed on individual lines. For example if base point 1 has four compared points within the tolerance settings, point 1 will have four rows of data listed.

- Optional Label Elevation Difference settings are provided. If Label Elev Diff to ggle is checked, the elevation difference will be inserted for the point as text in the specified layer. Note: if the Cut/Fill label option is toggled on in the report options, the elevation difference will be reported with a "C" or "F" prefix as well labeled the same within the project.
  - Multiple report options have been provided. Note: when using Excel as an external editor, toggle ON the option of Excel Format to have the data separated into columns within Excel.
- Tie DTM is a new option located in the Surface Ribbon > DTM Tools > that ties one dtm to another by user defined slope.



- Extrapolate side slopes is used when you want to extend existing side slopes of a surface to another surface. This option uses the outer triangle slopes and extends them to the reference surface.
- DTM Shading has been improved to default to a two color shading scheme from lowest to highest elevation. The legacy shading scheme is still available and can be accessed for use by selecting the "advanced" button in the Edit DTM dialog.

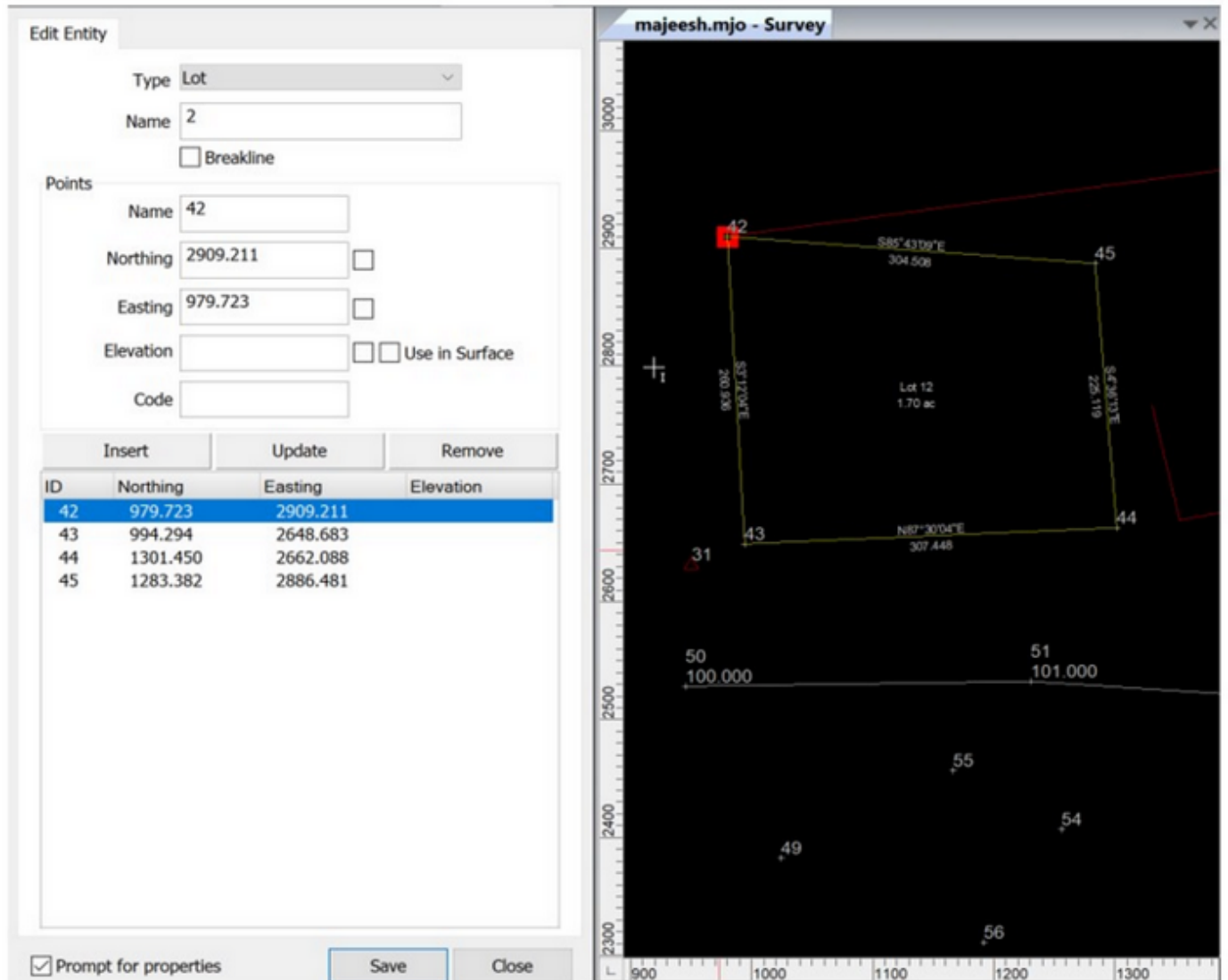
- Insert Perpendicular Line has been improved to add the option to interpolate the elevation of the created points from the active DTM. Toggle on the Interpolate from DTM option on the status bar.
- Insert Parallel Line has been improved to add the option to interpolate the elevation of the created points from the active DTM. Toggle on the Interpolate from DTM option on the status bar.
- A new Create Entity interface has been implemented for quick creation of different types of entities. The function is in the Insert ribbon, entity group.
  - The following entity creation is supported:
- Points, lines/arcs, strings, polygon areas, boundaries, polylines, lots, and pads. Select the required entity from the type dropdown



- Coordinate data can be entered manually, or locations picked from the graphic window within the interface
- Creation of entities by direction and distance is supported.
- Creation of entities by point number is supported. Point numbers may be entered in various ways. Example points defined for creation of a string using 1-10,35,45, 57-62 will create a string starting at point 1 continuing sequentially through point 10, then connect to points 35 and 45 then continue sequentially to point 57.
- Point property settings of use in surface and elevation on/off are readily available.
  - Note: if elevation option is toggled on until the elevation is entered or the elevation toggle turned off, the elevation field will have red shading indicating

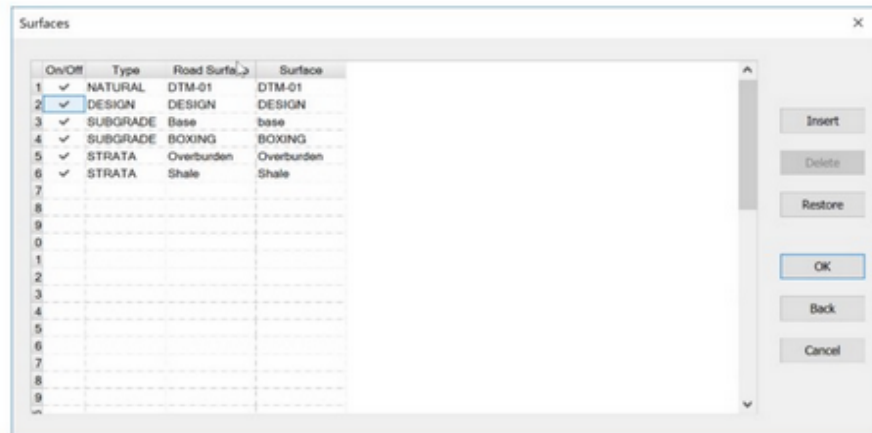
that input is required.

- Prompt for properties of the entities being created can be turned off. When ON the normal property dialog for the entity being created will be displayed.
  - To create an entity, once the entity is defined either select the create entity option from the right mouse click menu or select the insert button.
  - Right click context menus are provided for each entity supported.
  - Use the Add button to add existing points during entity creation.
  - Use the Back button to remove the previous entity segment or point creation.
  - Use the update button to save changes to point coordinate data or property data.
    - If changing a coordinate of a point the update button must be used to apply the changes. Entities containing this point will then be updated if applicable.
  - All point or x,y,z data used in the creation of an entities is displayed in the grid area of the interface.
- Edit Entity is a new option for editing entities. Using this option not only will the properties, color, layer etc be available for edit but also the coordinate data for the points used to create the entity.



- Edit Entity is located in the Modify ribbon as well as the Insert ribbon in the.
- When an entity is selected the appropriate edit dialog will be displayed. Selecting a string will display available edits for a string, selecting a lot will display the edit lot options etc.
- Once the interface is active, selecting entities in the project will automatically change the entity type and provide the available data for edit. There is no need to shut down the interface to select a different type entity, simply select the next entity to edit.
- Entity types can be quickly converted as well. Simply select an entity, the type will be automatically set for the entity, to convert the entity simply select another type from the dropdown.

- If the elevation option is on and there is no value in the elevation field, the field be shaded red and you will not be able to proceed until the elevation is entered or the elevation toggle turned off.
- Use the Insert option to insert a point into an entity. The selected point will be added between the two nearest points on the entity.
- Use the Update option to apply coordinate changes to a point contained within the entity.
- Use the Remove option to remove any point contained in the entity.
  - Note: The Insert and Remove options are when selected place the routine in that state until selected again. If the insert option is selected insertion of points into the selected entity will continue until the insert button is selected again. Remove works in the same way.
  - To access certain properties of an entity, the Prompt for Properties toggle should be on.
- Background Images now supports import of GeoTiff files.
  - Multiple GeoTiff files can be inserted simultaneously by selecting the files to import in the dialog displayed when running the Background image command.
  - The Background Image command is found in the Insert Ribbon, Image/PDF options.
- Cross Sections from DTM has been improved to create cross sections from multiple surfaces simultaneously. The previous setting of "Additional Sections" has been removed and the functionality combined with the new Multiple Surfaces option.
  - Toggle on the Multiple surfaces option
  - Fill out the XS from DTM settings, press next
  - Fill out or select next to the additional cross section dialog
  - Fill out the Surfaces dialog to include the surfaces that sections are required on.
    - Define the surface type for each surface cross section.
  - View cross section in the Road view by opening the alignment used for section generation.



Note: The surfaces will be available in the Road View. Applying a template to the design surface will update the design surface after update to Survey View is ran. Subgrade surfaces will be available in the pavement parameters option allowing modification to these surfaces.

- Road View
  - Profile Annotations have been improved for VC start and end stations. (MAGNET Site only)
    - If the VC start and end stations fall on existing stations annotations, the VC start and end leaders will no longer be drawn.
  - Tie Slopes (batters) has been improved to support tie slopes for multiple strings.
    - If there is more than one string with tie slope settings, the tie slope (batter) strings created will have a unique digit added to them.
  - Add Cross Section is a new option added to the road view cross section ribbon.
    - This option allows the creation of a natural ground cross section at any specified station. After adding a section, processing the design will generate the design surface cross section at the added cross section.
    - The specification of road design elements, such as templates, superelevation tables, tie slopes (batters) etc, start/end locations at odd stations will automatically add natural ground cross sections.
  - Delete Cross Section is a new option to delete cross section data.



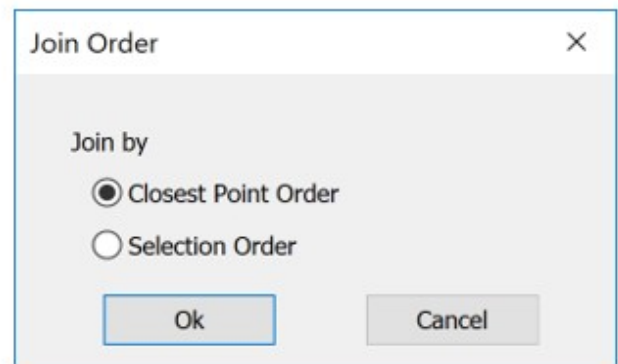
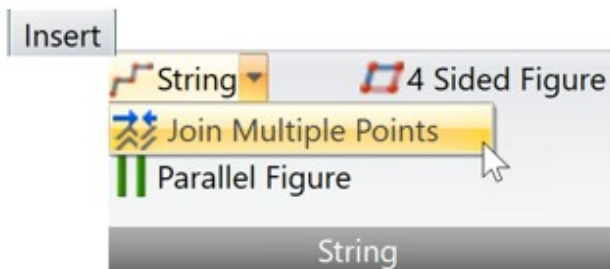
## Resolved Issues

- Data Clean-up has been revised to correct an issue with Delete Duplicate points. Not all duplicates were being deleted.
- Corrected issue with Horizontal Alignment Report incorrectly reporting the Bearing values for bearing in and out of arc segments.
- Fixed issue with Boundaries named with lowercase letters not being recognized when using the Select by Region.
- Corrected issue with negative stations (chainages) not plotting in profile (long section) and cross section plots generated from the Road View.
- Corrected issue with calculating peg chainage around turning points of an alignment. Some projects displayed invalid peg chainage alert. alert.

## MAGNET 3D Exchange

### MAGNET 3D Exchange

- Added Merge DTM option. This option provide functionality to merge five DTMs surfaces simultaneously.
- DTM Shading has been improved to default to a two color shading scheme from lowest to highest elevation. The legacy shading scheme is still available and can be accessed for use by selecting the “advanced” button in the Edit DTM dialog.
- Added new option, I nsert String by multiple points to the Insert Ribbon, String group. This option allows for the pre selection of point to join by individual or window selection. The connection order options consist of by nearest point or selection order.



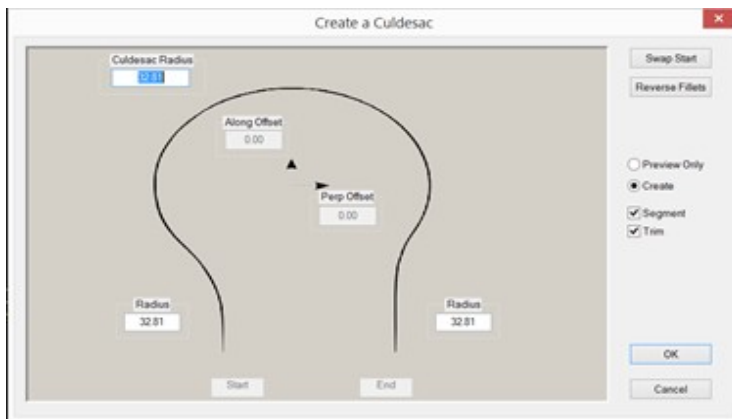
## Resolved Issues

- Data Clean-up has been revised to correct an issue with Delete Duplicate points. Not all duplicates were being deleted.

## MAGNET Office Topo

### MAGNET Office Topo

- Added a Cul-de-sac design interface. Located in the Design Ribbon, Subdivision group, this routine creates a cul-de-sac based on selected center point and offset strings.



## MAGNET Office Site

### MAGNET Office Site

#### New Features and Improvements:

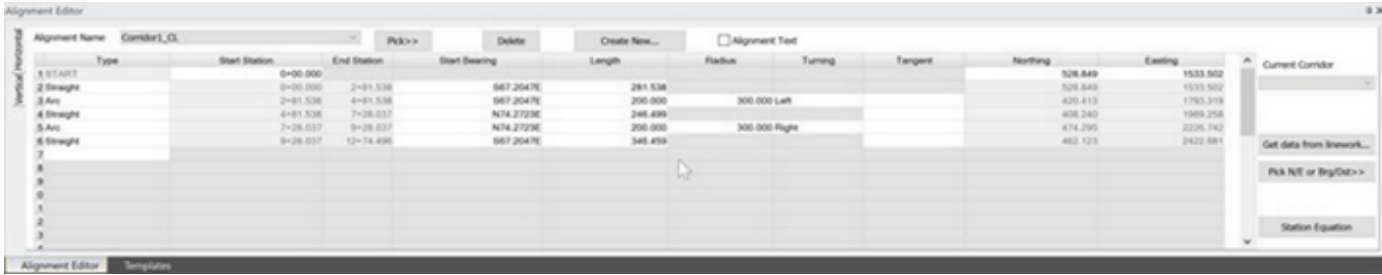
- Corridor functionality has been added to MAGNET Office Site only. Corridor can be used to design multiple design requirements of a site or road project. The intent of the corridor functionality is to aid in the recreation of design plans. All elements of a corridor design are interlinked so that changes made to any design element will update the corridor design.  
New horizontal and vertical alignment editors have been included as well as a new template editor.  
Zones have been introduced as part of the corridor functionality. Using Zones widths and Zone slopes any station along the horizontal alignment can quickly and easily be modified and the corridor design updated.

All editors alignment, template and zone widths/slopes are all modeless; meaning that all editors can be opened simultaneously while functionality from the survey view, main CAD view, is still accessible.

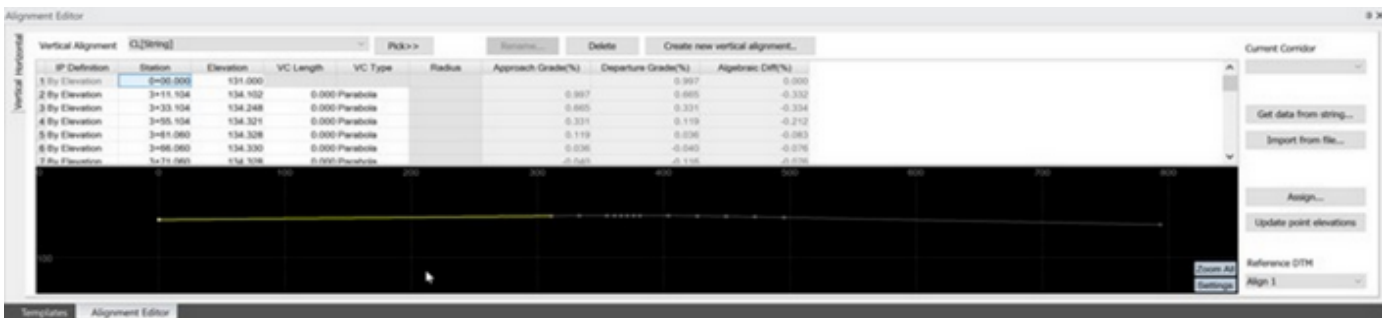


- Create Corridor is used to defines the elements to be used for the creation of the corridor.
  - Corridor Name
  - Horizontal Alignment Name
  - Vertical Alignment Name
  - Reference Surface
  - Layer for offset strings
  - Design DTM name
- Corridor Settings is used to change any setting defined when creating the corridor.
- Rename/Delete Corridors is used to rename or delete existing corridors.
- Save as Corridor as Road Design can be used to save the H/V alignments and road template used in the corridor so that the data can be opened and used in the road view.
  - Note: Only the road template used in a corridor design will be transferred to the road view. Side templates, used in corridor design are not transferred to the road view. In addition complex templates which may be defined in the corridor template interface may not correctly transfer to the road view.
- Create Alignment creates a horizontal alignment that can be used in any corridor design.
- Alignment Editor is used for both creation and edit of horizontal and vertical alignments. The editors can be used independent of corridors but also can be used to specifically work with alignments assigned to corridors. When an alignment is selected in the editor that has been included in a corridor, the corridor name will be displayed and the vertical alignment assigned to the corridor will be loaded in the vertical alignment tab.

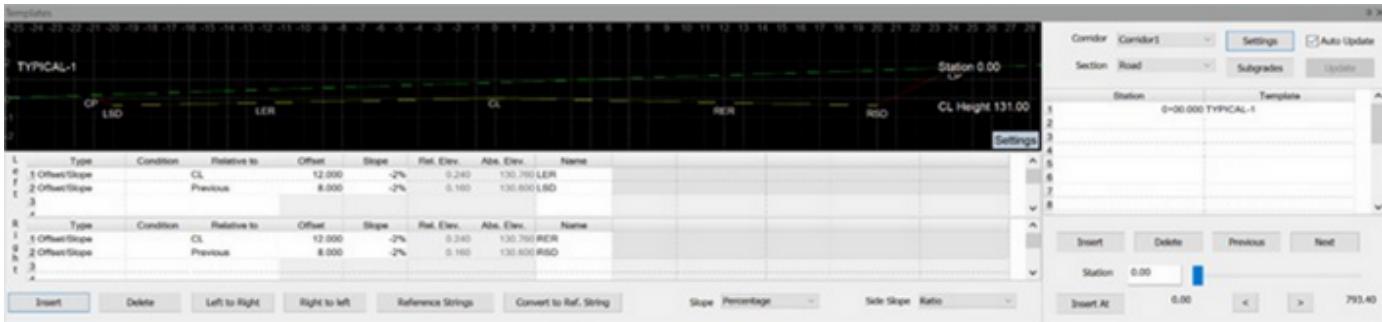
#### Horizontal Alignment Editor



Vertical Alignment Editor



Create/Edit Templates is used to define or edit templates used in a corridor design. There are two types of templates Road and Side.



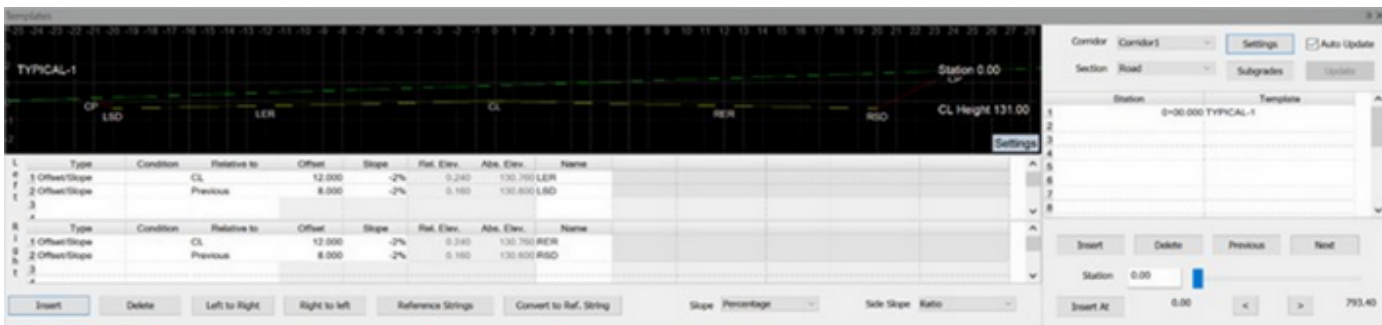
- Road templates are used typically to define the roadway from shoulder to shoulder.
- Side templates are used to define areas outside of the roadway shoulders that are referenced to the horizontal alignment stationing. Side templates can be used to define simply tie slopes to the reference surface or complex designs including ditches, varying side slopes, benching etc. Side templates are defined for both the left and right side of the roadway. If a

2:1 slope is required as the slope to the reference surface, one side template defining a 2:1 side slope can be used for the left and right sides of the road. The program will correctly apply the slope in cut and fill and in the correct direction pertaining to the side of the road which it is applied.

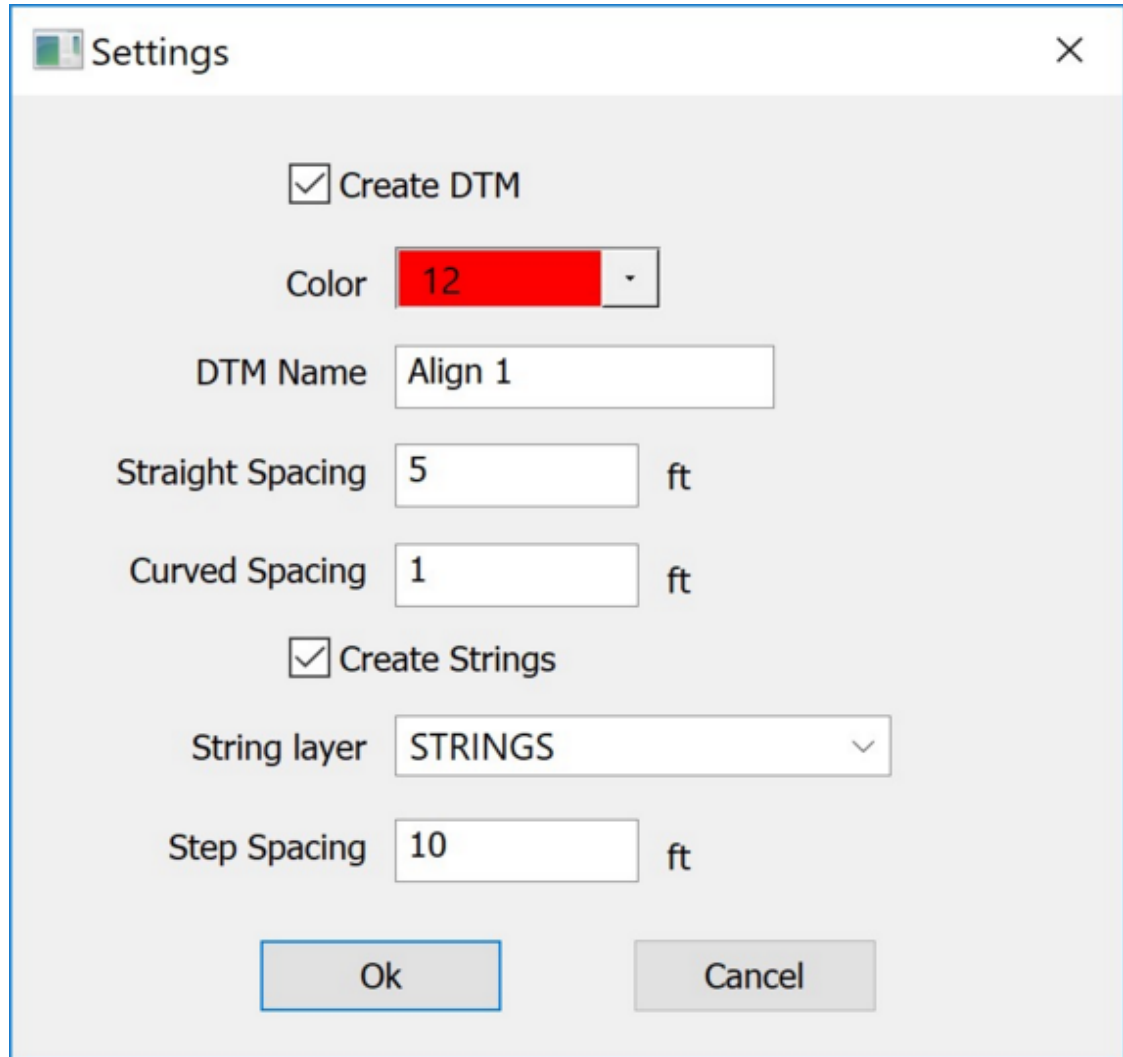
- Template Types represent the definition for the template leg being defined. There are multiple options when defining template types.
  - Offset/Slope – defined by horizontal distance and slope. The template leg created extends at the defined slope until the defined offset distance is reached.
  - Offset/Rel. Elev. – defined by horizontal distance and relative elevation value (difference in elevation) from the relative to point.
  - Offset/Abs. Elev. – defined by horizontal distance and absolute elevation.
  - Slope Rel/ Elev. – defined by horizontal distance and relative elevation (difference in elevation) from the relative to point.
  - Slope/Abs. Elev. – defined by slope and absolute elevation. The template leg created is created by extending the defined slope until it reaches the absolute elevation specified. 5% to elevation 1200 for example.
  - Side Slope – defined by a slope value and used to tie to reference DTM; typically used in Side templates. If the start of this template type is in fill the slope will go down to tie to the reference surface and vice-versa if in cut. Applicable if corridor has a reference surface defined.
  - Side Slope/Offset – defined by an offset distance. The template segment extends to the horizontal distance intersection with the corridor reference surface. Applicable if corridor has a reference surface defined.
  - Bench – defined by slope, bench width and height. Benches will be created either going up or down, depending on if in cut or fill, at the defined slope specified between benches until the reference surface is intersected. Applicable if corridor has a reference surface defined.
  - Reference String – define by a relative to string. selected string used in design. Template segments (types) can be defined to a reference string that has been added to a corridor. Reference strings can also be used as a relative to definition in the template. Required for use of Zone Widths and Slopes.
  - Slope/Intersection – defined by slope from specified “relative to” setting intersecting at specified template segment name.

- Connect/Intersection – this option will connect two template segment names at a specified intersection name.
- Template Type Conditions
  - Cut – template type will be applied only if the last template segment was in a cut area.
  - Fill - template type will be applied only if the last template segment was in a fill area.
  - Note – If the condition field is blank, the template segment will be created under all conditions, regardless of whether the last segment was in cut or fill

### Template Editor



- Edit Template Rt Panel area.
  - Corridor – corridor name
  - Section – template type either Road or Side
  - Settings – user defined settings for DTM/String creation.

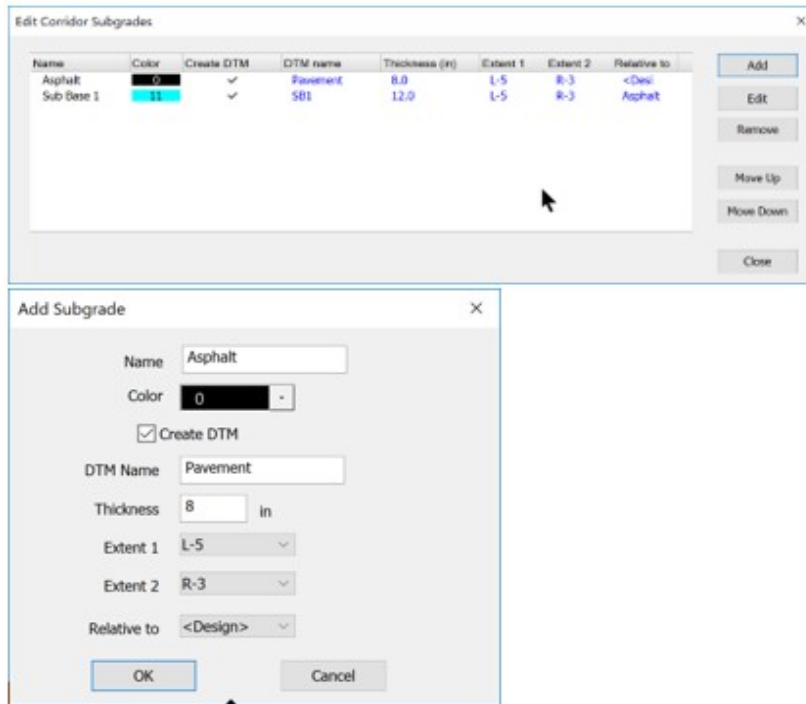


The image shows a 'Settings' dialog box with the following options and values:

- Create DTM
- Color: 12 (with a red color swatch)
- DTM Name: Align 1
- Straight Spacing: 5 ft
- Curved Spacing: 1 ft
- Create Strings
- String layer: STRINGS
- Step Spacing: 10 ft

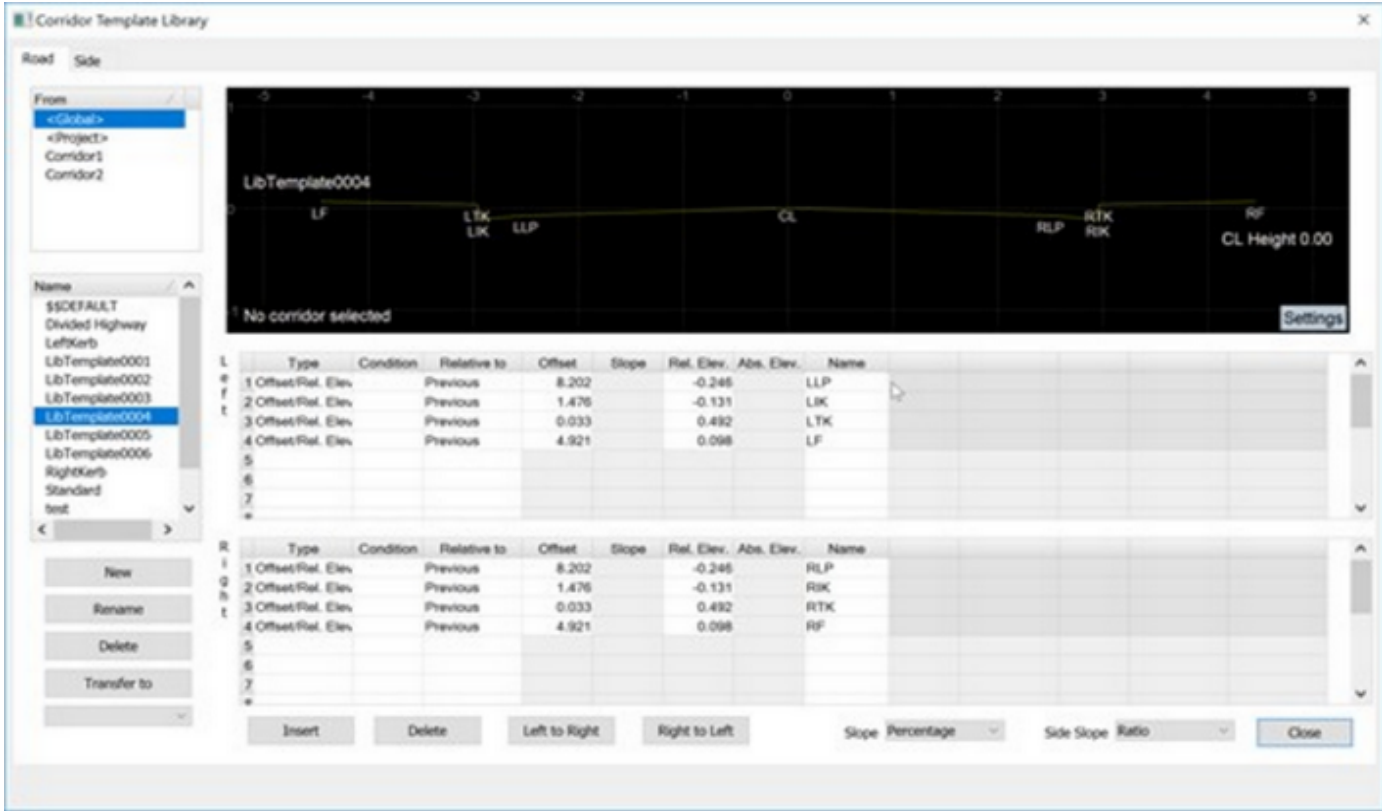
Buttons: Ok, Cancel

- Subgrades – underlying materials that make up subgrades can be created in the template editor. Subgrade surfaces copy the slope of the design surface between two specified corridor template strings or reference strings. The depth of the subgrade is defined by the entering the depth of the subgrade in the thickness data field. The thickness can be referenced to the design surface or another previous subgrade. A subgrade reference surface must be specified for correct setting of the thickness.

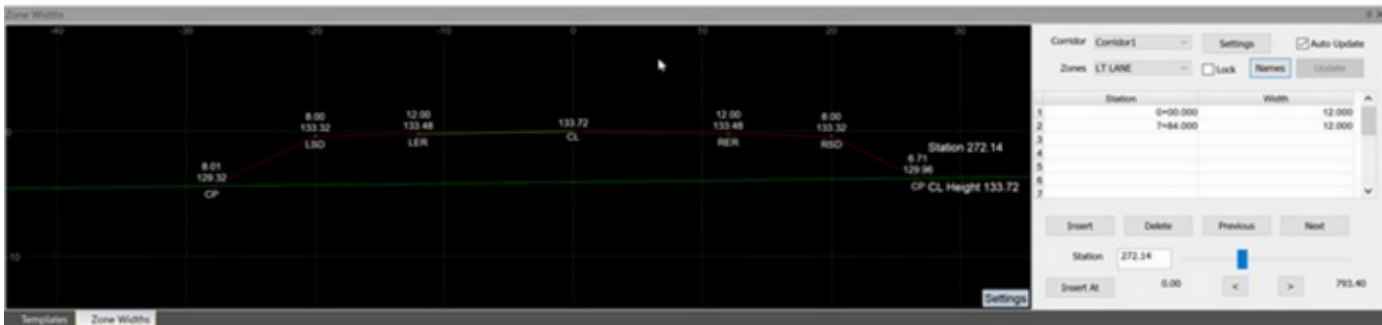


- Insert, Delete, Previous and Next buttons are used to insert and delete rows in the Station/width grid and to advance or back up to rows within the grid.
  - Insert At inserts a station at the cross-section indicator in the survey view.
  - < and > icons advance the cross-section preview by the step spacing setting located in the settings dialog.
- Template Library provides access to three template libraries, Global, Project and Corridor. Templates that are typical and required for later access can be created in the global library. Templates can be transferred from/to global, project and corridor libraries.

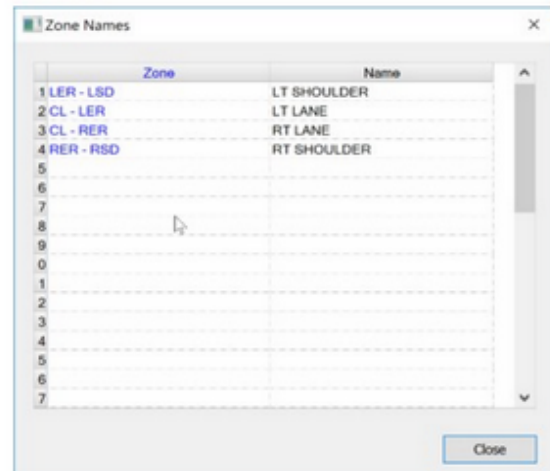




- Zone Widths is used to quickly change the width of a specified zone at any horizontal alignment station. Reference strings must be created using the convert to reference string option in the template editor prior to using zone widths.



- **Zones** are defined between reference strings and the initial zone names are based on the reference string names. For example a template with names of CL and a template leg from CL to LEP will result in a zone name of CL-LEP.
- **Lock** – this option locks the active zone so that when clicking in the survey view to advance to specific stations or inspecting other data, the zone will not change.
- **Zone Names** can be user defined by selecting the Names button.
- **Insert, Delete, Previous and Next** buttons are used to insert and delete rows in the Station/width grid and to advance or back up to rows within the grid.
- **Insert At** inserts a station at the cross-section indicator in the survey view.
- **< and >** icons advance the cross-section preview by the step spacing setting located in the Zone settings dialog.



- Zone Slopes is used to quickly change the slope of a specified zone at any horizontal alignment station. Reference strings must be created using the convert to reference string option in the template editor prior to using zone widths. The UI for Zone Slopes is the same UI used for Zone Widths but specific to slopes at specified stations.

## Fixed Issues

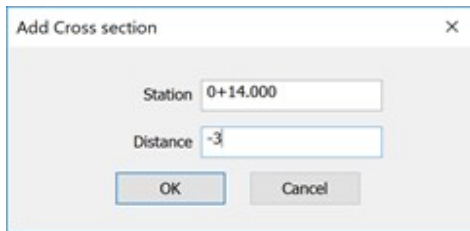
- Corrected issue with when applying a template to a profile/curb string. The template strings were only applied to one side.
- Corrected issue with some road strings generated in road design not having the elevation flag turned on. Strings such as verges (shoulder extensions), ditches and compound side slopes (batters) created when updating the survey view from the road view resulted in their point elevation flag not being turned on.

## MAGNET Office Resurface

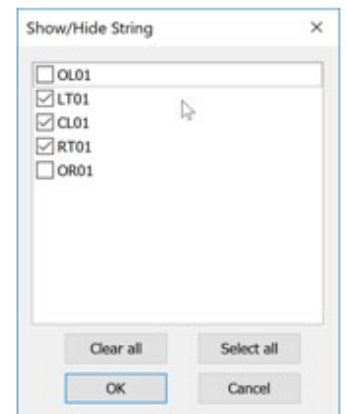
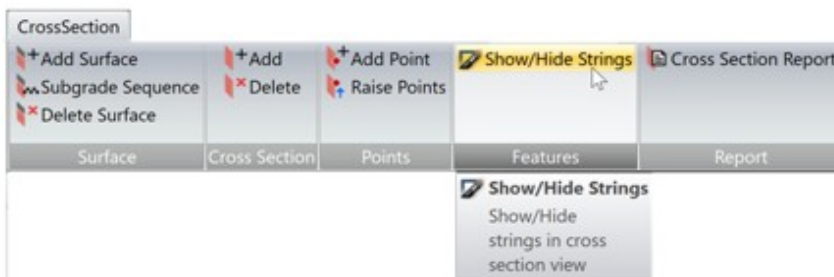
## MAGNET Office Resurface

### New Features and Improvements:

- Add Cross Section is a new option that allows for adding a cross section anywhere along the design alignment.
  - The cross section will be added based on the distance specified from the active or specified station.
  - A negative value is entered in the distance field if a cross section is required before the reference station.

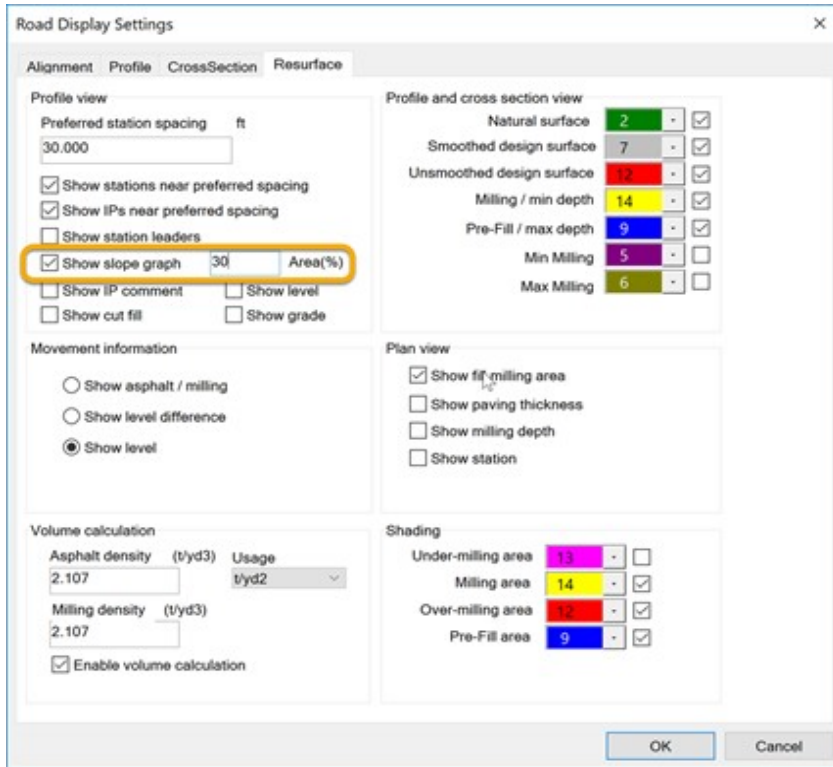


- A new option Show/Hide Strings has been added to the Features group in the Cross Section ribbon in the resurface design interface.



- Under Mill Shading has been added as a new display option in the resurface design interface plan view window. To display under milling areas toggle on the Under-milling area option in the resurface settings dialog.
- Jump to Station has been added to the Plan View within the Resurface design interface. This option allows for the user to "Jump" to the nearest station to a selection point of a string. There are three options for using the jump station option.

- Click the Right Mouse Button (RMB) select Jump to Station and pick a location on any string to jump to the nearest cross section station.
  - While pressing the Ctrl button pick on a string to jump to the nearest cross section station.
  - Use the draggable station marker (color cyan) to indicate the current station.
  - Profile and cross section windows will update dynamically with the change in stations.
- The Cross Section window has been improved to interactively update as the station indicator line is moved in the profile pane.
  - The Start/End Mark functionality has been improved to automatically flip the start and end marks if the end mark is moved to a position before the start mark. Historically when the end mark was moved in front of the start mark, this would result in the start mark being moved to a position in front of the alignment start station.
  - Insert String is a new option that has been added to the Design ribbon of the resurface design interface. This option allows for the insertion of a new string based on specified offsets from a selected reference string.
  - Slope Graph in the long section (profile) window has been improved. The graph area is now resizable and is based on a user entered percentage of the long section window.
    - The slope graph settings are found in the Settings ribbon, Resurface tab.



- The Create Resurface Design interface has been improved to support additional cross section generation from optionally selected strings. Historically cross sections were generated perpendicularly from the selected centerline only. This option allows for cross section generation from critical locations along offset strings in addition to the centerline cross section locations.
- The Alignment Plan View window has been improved to indicate the station range defined by the start and end marks in the profile window. The specified range will display thicker than the original alignment width.
- Quantity Report has been added as a new option on the Resurface report dialog. This option adds the fill, pre-fill, and mill quantities to the resurface report. Cumulative material quantity for the selected lanes is reported at each specified station.

## Resolved Issues

- Corrected issue with Widen Road functionality not retaining the defined cross slope and not adding the new string in the plan view window.
- Corrected issue with volume calculations shown in the status bar not immediately being updated with design changes.
- Corrected issue with shading not immediately being updated with design changes.

- Corrected issue with Average Level option when using variable interval stationing.
  - Note: the method for calculation of average level has changed. The new method may take longer to process but yields much more accurate results.
- The Alignment window (plan view) in the resurface design UI has been updated to correct an issue with the data display. All data was not being displayed when the Display Survey Data option was On in the Alignment pane settings.

## **MAGNET Office Takeoff**

### MAGNET Office Takeoff

#### Improvements

- Improved speed of creating Strata DTMs.
- Takeoff Total Site calculations and DTM creation has been improved to temporarily resolve crossing breaklines resulting from breaklines created both in the design layer group and subgrades. Crossing breaklines are temporarily converted to individual segments during volume and subgrade dtm creation. Subgrade breaklines are given highest priority during total site volume and dtm creation. Note: this applies to Takeoff Total site calculations only and not the Create DTM command.

#### Resolved Issues

- Borehole entry has been revised to correct an issue allowing the creation of a borehole without entering strata data.
- Borehole entry has been revised to correct an issue with a borehole being created at coordinates of 0,0 when the Insert/Edit borehole dialog was closed.

## **Resolved Issues - All Office Products**

## Resolved Issues:

- Corrected issue with entering negative elevations when units are set to feet and inches. Negative elevations without a feet value were being converted to positive elevations.
- Corrected issue for points containing no elevation when exported to TP3 file resulting in points containing incorrectly referenced elevations. Elevation values were listed as 1.#Q0 ' for example. Points with no elevation are now exported to TP3 files as points with elevation zero (0).
- Corrected Import of LandXML files created in GeoPak SS4 not importing station equations for horizontal alignments.
- Corrected issue with Point names containing spaces not being supported in Control Points. Control Point names can now include spaces.

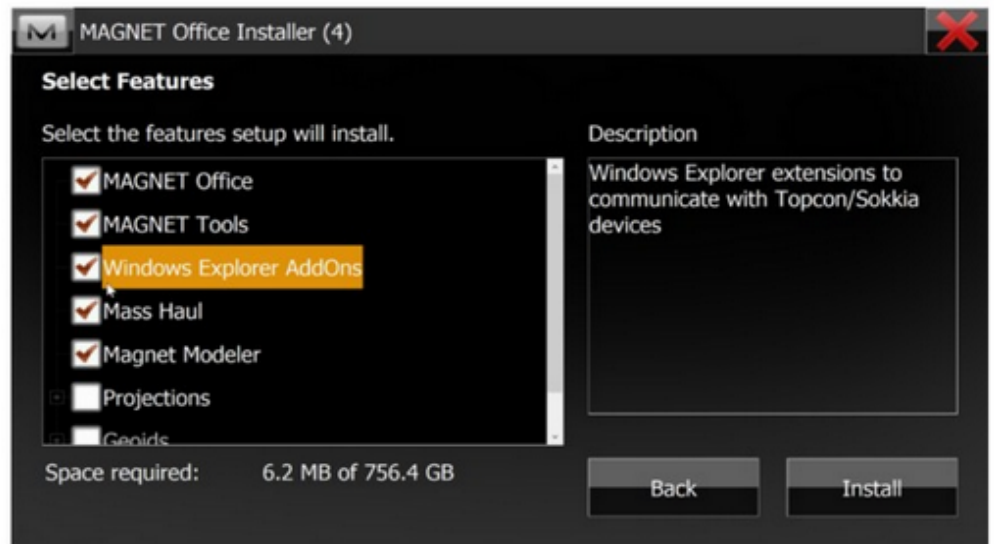
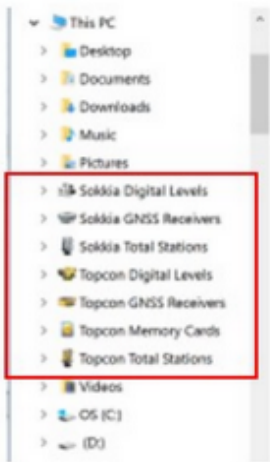
## MAGNET Tools - V5.0

### General

#### MAGNET Office Tools

#### New Features and Improvements:

- Installation of shell extensions for Windows Explorer to communicate with hardware is now optional.



- Improved UI to support Hi DPI (4K) monitors.

#### Coordinate Systems:

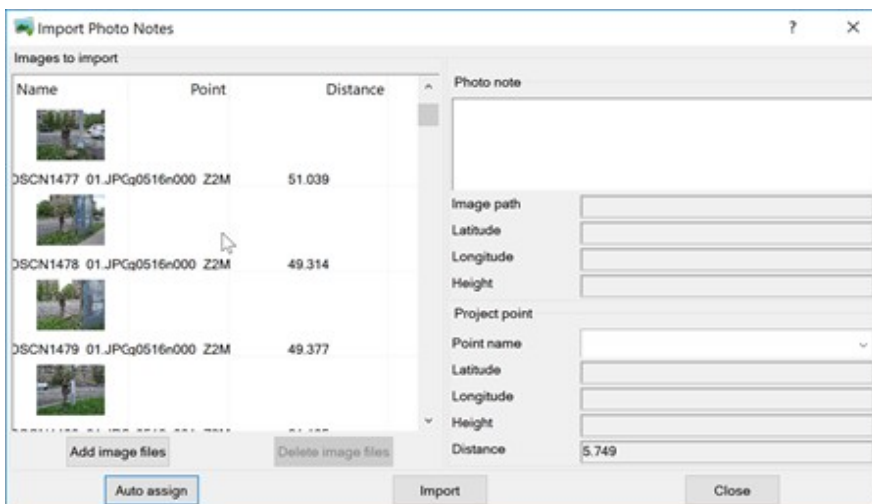
- Added Geocentric Datum of Australia 2020 (MGA2020)
- Added New Zealand geoid 2016
- Add Swedish geoid SWEN17 for RH70 and RH2000
- Added Russian State Coordinate system GSK-2011



- Added Kansas Regional coordinate system
- Added RTCM3 CS Oblique Mercator support.
- Added display of geoid reference datum in Geoid list.

## Import/Export

- Added import/export of Bentley icm.dgn format.
  - Direct import from Bentley Projectwise is available through MAGNET Enterprise Data Manager. Use the Cloud Connection ribbon to logon to MAGNET Enterprise and select the Bentley folder, or the name of the Bentley repository. Supported files can be directly imported into the active MAGNET Office project, saved to a harddrive or both.
  - Direct export of the active project to Bentley Projectwise mapped folders is available through MAGNET Enterprise Data Manager. For mapping of projects in MAGNET Enterprise please refer to the help section within Magent Enterprise.
- Added new option I mport Photo Notes in the Job ribbon, Exchange ribbon group.
  - This option imports a photo note or multiple photo notes simultaneously and assigns them to points.
  - The Auto Assign option will automatically assign photo notes to points based on GPS coordinates if present in the image file.



- Added support for Import of GSI 8 and GSI 16 formats.

- Added support for LandXML 2.0 import/export
- Added support for export of GNSS data to Star\*Net.

### Traverse Adjustment

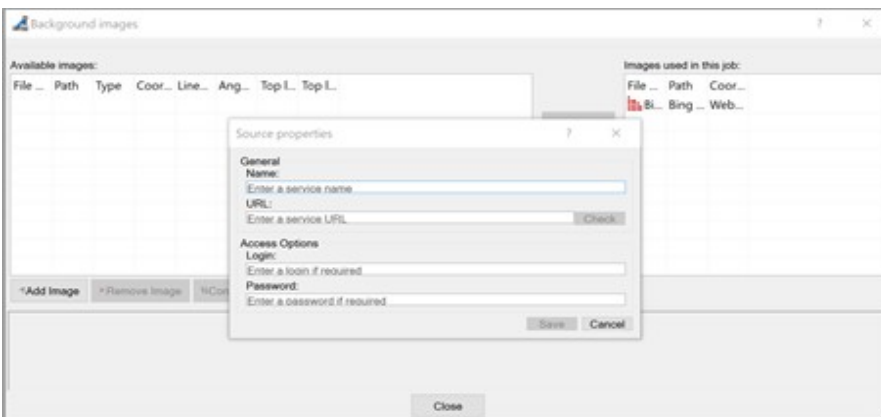
- Updated TS (total station) traverse adjustment to support compass rule adjustment regardless of the direction of traverse, clockwise or counter clockwise.
- Reorganized the table of measurements for TS traverse reports.

### Reports:

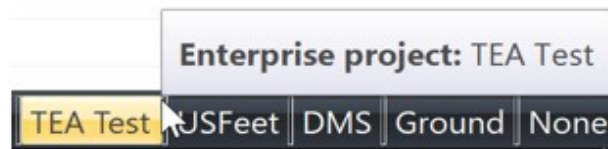
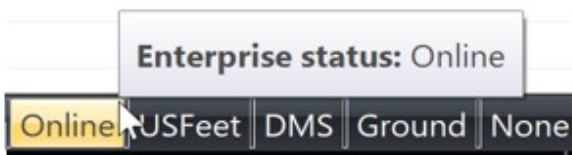
- Added Tilt parameters to the GPS Occupation report.
- Added EDM and Prism Mode to the TS Observation report.

### Miscellaneous:

- Event marker support improvements
  - Added option to Import event markers into the GNSS post processing log file from external text file.
  - Added option to view existing event markers for a GNSS occupation with the ability to edit time delay (offset) and delete events.
  - Added option to Export event markers to text file.
- Revised Post Processing engine options to use only the BaseLine PP engine for post-processing.
- Added support for using Web Mapping Services (WMS) maps as background image in the View ribbon, Spatial group.



- Added Point Coordinate Sets tab in the point properties dialog. Each coordinate has a quality shown that indicates the source action that produced the coordinates. All coordinates generated after operations such as post processing, adjustment, check shots etc are displayed.
- Added the display option for Depth in the GPS Observation tabular view. This is in support of depth sounding applications.
- Added option to switch UI language directly from within MAGNET Tools. From the help ribbon select the Language icon and select language. Changing the language will initiate a restart of MAGNET Tools.
- Added MAGNET Enterprise connection status and connected project in the bottom right corner of the status bar. When connected to MAGNET Enterprise the icon will display Online, when connected to a project Online will be replaced with the project name.



## MAGNET Exchange for Autodesk

### **General**

#### MAGNET Exchange for Autodesk

#### New Features and Improvements:

- Program has been updated to reflect a name change from Topcon Exchange for Autocad to MAGNET Exchange for Autodesk.
- Added the option to directly import MAGNET Field \*.mjf files from MAGNET Enterprise into Civil 3D.