MONTANA
Department of Transportation

RIGHT-OF-WAY PLACING EXISTING R/W AND PLSS LINEWORK PROCEDURE

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Overview

Guide to starting the Right of Way MAP file, working with Data References within a Autodesk Docs Project Environment. For creation of all project dwg files, use the 'Civil 3D 2024 Montana' application to open Autodesk. These workflow notes guide the process in using C3D to place linework, for more detail in the design and application of placing linework, please review Chapter 23 of the R/W Design Manual.

Process Provenance

- Date of development: 11/12/2025
- Revision date: *N/A*
- Application/Tool(s): *AutoCAD / Civil 3D*
- Version(s): *Civil 3D 2024*
- Environment(s): *MDT Civil 3D State Kit r2024 v2.21*
- Contact: *Open a Case*

References

Right of Way Design Manual – Chapter 23

Right-of-Way Placing Proposed R/W Procedure

Placing Existing R/W and PLSS Linework

Section I. Creating the ROMAP File

Creating the .dwg File

The ROMAP file will follow the standard naming conventions (XXXXX00XROMAP001.dwg). To create a new drawing, select the Civil 3D icon from the top left of the application and select 'New'. From the pop-up window, select the 'design-start.dwt'. Once the file is open, save it immediately in the Autodesk Docs project in the RO folder. To save, use 'Ctrl+S' and navigate to the project folder in Autodesk Docs.

Assigning a Coordinate System to .dwg

Most MDT projects will use the State Plane Coordinate system [NSRS11.MTIF], NAD83, 2011 MT International Feet. To assign this coordinate system, the command MAPCSASSIGN can be used, or the link to the Map CS Assign dialog box can be found in the Start Tool Palette in the State Kit. (Note: To show the coordinate system of the drawing in the status bar of your C3D Profile, use the command MAPSTATUSBAR to show the coordinate system in the lower status bar ribbon of your screen.)

Once in the 'Coordinate System - Assign' dialog window, search "MTIF" into the dialog box and select 'NSRS11.MTIF'. Click 'Assign' to close the dialog box.

Attaching Aerial Imagery

Online Maps

Once a coordinate system has been assigned to a drawing, navigate to the blue 'Geolocation' tab in the ribbon. In the Online Maps group, use the dropdown under 'Map Off' to select Map (satellite), Map Hybrid (satellite with labels), or Map Roads (labels and gray background).

Geo-Referenced Raster Imagery (Montana State Library NAIP Imagery)

Set the active layer to X-IMAG-AERI. From the Insert tab, ArcGIS Group, select Autodesk Connector for ArcGIS.

If an Autodesk Connector For ArcGIS sign in opens, select Access As Guest.

Navigate to the project location, using the toolbar at the top of the window. Search for a nearby town or address. The rectangle with the green background will select the current extents of the window, and the rectangle with the blue box will allow a rectangular selection. The purple arrow allows the user to upload a polygon to use as the extents of the imagery.

Once an area has been selected, use the left pane of the window to search 'Montana NAIP 2023' (note, Montana collects aerial imagery on odd years and publishes the data one year later. Imagery is roughly 12-18 months behind the current date. As of 5/2024,

Geo-Referenced Raster Imagery (Continued)

NAIP imagery from 2023 is available for the majority of the state, the next imagery available will be the NAIP 2025 available for use in mid-2026).

Scroll through the list and select 'Montana NAIP 2023', another pane will expand. Under the 'Layers' group, select the checkmark for the imagery. Click the blue 'Add to my design project' button at the bottom left of the screen.

In the 'Import Layers' dialog window, select 'Import'. In the 'Import Raster data from ArcGIS' dialog window, change the Raster Data Folder using the file folder button, navigate to the RO folder in ADDocs and create a new folder titled 'RO_Aerial_Photo'. Once complete, under the Layer Name/Resolution table, change the resolution of the MSDI_Framework_NAIP_2023 to 'Source resolution'. Select Import.

The image is inserted into the drawing as a clipped raster. The raster image will come in on the current layer and will cover any existing linework or civil objects. To move the raster to the back of the drawing order, select the raster border, right click, select Display Order and Send to Back. Once the image has been sent to the back of the drawing order, lock the layer by using the Layer Lock command [LAYLCK] found on the home tab, layers group. This will prevent selecting or stretching the xref raster while operating other commands in the drawing. The raster is an external reference and can be unloaded in the external references manager [xref].

Section II. Associating the Drawing to the Autodesk Docs Project

Set the Working Folder

In the 'Toolspace' palette on the Prospector Tab, navigate to the 'Data Shortcuts []', right click and select 'Set Working Folder…'. In the dialog box, navigate to the project in Autodesk Docs and select the 'Project Files' folder and select 'Select Folder'.

Set the Data Shortcuts Project Folder

In the 'Toolspace' palette on the Prospector Tab, navigate to the 'Data Shortcuts []', right click and select 'Set Data Shortcuts Project Folder…', verify that the Folder has a green checkmark and has the 'XXXXX00X Data Shortcuts' name selected, then click 'OK'.

Associate Project to Current Drawing

In the 'Toolspace' palette on the Prospector Tab, navigate to the 'Data Shortcuts []', right click and select 'Associate Project to Current Drawing', verify the working folder is the same as the previous step, and click 'OK'.

Section III. Attaching the Retracement Survey

Attach the XREF

The Retracement drawing is added via xref into the ROMAP drawing. To add the dwg, use the xref manager [xref] or by the 'Insert' tab on the ribbon in the 'References' group - 'Attach'.

In the dialog box, navigate to the SU folder for the project in Autodesk Docs. Select the XXXXX00XSUCAD001.dwg and open the file. In the 'Attach External Reference' dialog box, verify that the 'Scale', 'Insertion Point', 'Rotation', are unchecked, the 'Reference Type' is set to 'Overlay', and the 'Path type' is 'Relative path'. Select 'OK' in the dialog box to load the xref into the drawing.

Inserting an XREF into a Drawing

From the 'External References' palette, right-click on the Retracement. From the listed options, select 'Bind'.

In the 'BindXrefs/DGN underlays' window, change the menu to 'Insert' and click 'OK'. The Retracement is now inserted as a block into the active drawing, breaking all links to the source document. To work with the individual elements in the block, select any portion of the block in model space and explode the block using the command EXPLODE.

Purge Block Library

Once an xref is exploded into a drawing, the block is remembered by the system settings. If the linework is removed once the block is bound and exploded into the drawing, in order to reference the information in again from the xref manager and bind/insert into the drawing, the original block must be purged (removed) from the drawing.

To Purge the Block Library, use the command 'PURGE'.

In the 'Purge' dialog window, expand 'Blocks' on the list on the left side of the window. Navigate to the XXXXX00XSUCAD001 block in the list, select the check mark beside it and select 'Purge Checked Items'.

The System will ask to purge each block selected, unless 'Confirm each item to be purged' is unchecked in the 'Options menu'.

Section IV. Data Cleanup of the SUCAD File

Replacing SUCAD Blocks

Once the SUCAD has been attached and inserted into the drawing, remove any unnecessary points, lines, and blocks. Using the Right of Way Tool Palette, replace all SUCAD blocks with the appropriate MDT R/W blocks. To access the Right of Way Tool Palette, navigate to the 'MDT Tools' tab on the ribbon, in the 'MDT Palettes' group, select the 'MDT Palette Groups' dropdown button and select 'MDT Right of Way'.

Complete PLSS Section Breakdown

Complete any needed exterior and interior section breakdowns using Chapter 23 of the R/W Design Manual.

Change Active Properties for Survey Layers

Utilize the R/W Layer State (Directions in 818 - Startup Procedure) to update the layer properties for the following layers. Once the layer state is active in the ROMAP drawing, the following updates are made to the layer attributes:

Layer	Description/Line	Color	Linetype	Lineweight
VL-ESMT-NHWY-E	Existing Non-Highway Easement Lines	White (7)	Continuous	0.006
VL-PLSS-EXTR-E	Found Exterior Section Lines	Green (3)	MDT_Style3	0.008
VL-PLSS-EXTR-P	Unfound Exterior Section Lines	White (7)	MDT_Style3	0.008
VL-PLSS-INTR-E	Found Interior Section Lines	Light Blue (150)	MDT_Style3	0.008
VL-PLSS-INTR-P	Unfound Interior Section Lines	Orange (30)	MDT_Style3	0.008
VL-PROP-E	Property Lines	Burnt Orange (20)	Continuous	0.006
VL-RAIL-RWAY-E	Railroad Right of Way Lines	Dark Blue (132)	MDT_Style6	0.006
VL-RWAY-E	Existing R/W Line	Dark Orange (32)	Continuous	0.006
VL-RWAY-A	Existing R/W Line (Apparent)	Purple (202)	Continuous	0.006

These properties are automatically overridden utilizing the Right of Way Layer State.

Section V. Creating Polylines for Existing Highway and Railroad Right of Way

Preface

The ROMAP drawing is utilized by multiple functional areas across the engineering and preconstruction divisions at MDT. For many downline processes in Road Design and GIS it is imperative that alignments are created for both existing and proposed right of way limits. These alignments are ultimately created in a separate drawing called the 'ROXSF drawing'. Instructions for the ROXSF drawing are posted under 'Right of Way Cross Section Drawing'. The first step of this process is data cleanup and grouping within the ROMAP. The following instructions will allow for a simpler and more accurate process in the creation of alignments from polylines created from these R/W limits.

Creating Polylines from Existing Linework

In the ROMAP drawing, select one of the VL-RWAY-E lines and use the command PEDIT [PE]. Since polylines are directional, it is best practice to work from lower (beginning) stationing to higher (ending) stationing along the project. Lines from the SUCAD survey will typically not be a polyline, most likely the prompt: 'Object selected is not a polyline, Do you want to turn it into one? <Y>' will appear. Type 'Y' then Enter. The command line will then prompt several choices. The goal of this work is to Join [J] the remaining features along the existing R/W linework together. To do this, type 'J' then Enter. The prompt will then ask to select objects to join. Select all linework that is connected along the original polyline selected. There may be a need to break the existing R/W limits into multiple polyline segments at public road intersections where the linework is broken. Work from the beginning to the end stations of the alignment on the left and right sides of the limits respectively. There can be as little as 2 polyline segments that comprise the left and right limits of the EX R/W, but can contain as many as necessary to complete the polyline segmentation.

Known Errors in Polyline Creation

There are certain line features that are utilized by survey that cannot be made into polylines. Splines and certain arcs, for example, will not be added to the polyline segments when created. A good check to verify that all the object selected were added to the polyline segment is after the command PE is run with the Join subcommand, the command bar will alert of how many segments were selected and how many were added to the polyline segment. If there are more selected objects than added objects to the polyline, additional steps will need to be performed to group all segments into one polyline.

Through investigation, there are two reasons why objects will not join, one being linework that is not connected (endpoint to endpoint) and the other being MicroStation converted projects utilizing a non-compliant curve program.

Endpoint-to-Endpoint Disconnection

For endpoint-to-endpoint connection object errors, the rectification is to confirm that the snap points are endpoint-to-endpoint connected at the break location. If there is a surveyed location for the break, relocate the object snap to the break object center snap; otherwise use the trim or filet command with a zero radius to force closure of the segments. If the relocation of the snap is greater than 0.25", consult the Survey department for direction on the location of the true break location.

MicroStation Conversion Projects - Non-Conforming Arcs

For non-joining line-arc segment errors, the rectification is to redraw the arc segment using the 3-point arc command found in the 'Home' tab of the ribbon, under the 'Draw' group, or use the command 'ARC'. To use the 3-point Arc, verify that the object snaps 'Endpoint' and 'Midpoint' are enabled. Select the beginning of the arc at the endpoint of the line segment, then select the midpoint of the existing arc, and finally then select the endpoint of the arc at the object snap for the endpoint of the line-arc connection. Verify the linework is on the correct layer, then use the [PE], [J] Command again to force closure and make the linework a polyline, then delete the original line that is not part of the polyline segment from the drawing.

Section VI. Adding COS & Boundary Lines from Existing Tracts of Record

Certificate of Survey and Property Ownership Linework

COS and Property Lines are placed on VL-PROP-E.

Transparent Commands

Commands

For surveys & metes and bounds legal descriptions, the 'Create Line by Bearing' Command is an easy way to draw an existing legal description. To use the command string [L, enter; 'BD, enter] or from the Home Tab of the ribbon, in the Draw group, use the dropdown on the line to select 'Create Line by Bearing'. The ['BD'] is a transparent command that is utilized within the [Line] command. There are other types of transparent commands including ['SO] for Station/Offset (to an alignment0, ['AD] for Angle/Distance, ['ZD] for Azimuth/Distance. All the transparent commands can also be found on the 'Transparent' ribbon, under the 'Plan' group.

Quadrants and Bearings

Once in a transparent command (e.g. 'BD), you will be prompted to select a quadrant and identify a bearing. Quadrants can both be typed and clicked. The quadrants start at 1 in the NW and ends at 4, clockwise, in the NE.

Cardinal Direction	Bearing Number
NE	1
SE	2
SW	3
NW	4

Bearings are entered by degrees, minutes, seconds and have two acceptable formats: [XXdXX'XX"],[XX.XXXX].

For example, if a line has a record bearing of 45°15'30", to assign the bearing you may type [45d15'30"] or [45.1530].

Ownership Dots

Ownership Delineation Dots are used to better denote changes in parcel ownership for R/W plans. The level that dots are to be placed are RR-PRCL-BNDY. Ownership dots are not annotative by nature and must be placed appropriately based on the scale of a project. The offset scale amounts are shown as follows:

Plan Scale	Offset Distance
1" = 200'	10'
1" = 100'	5'
1" = 50'	2.5'

Ownership dots shall be trimmed together at break points along a R/W boundary or a property corner. Using the trim [TR] and filet [F] command with a radius of 0' dots may be trimmed together. If an ownership dot line is to be broken to trim to two entities (common line for two parcels abutting a highway) the Break [BR] command shall be used. The Break at a Point [BREAKATPOINT] command breaks a feature at a single point, rather than two lines when using the Break command.

Section VII. Placing Existing Access Control Linework

Preface

R/W has created a custom palette to streamline Access Control Linework in the ROMAP. To access the palette, go to the 'MDT Tools' Tab on the Ribbon, in the 'MDT Palettes' group, select the 'MDT Right of Way' palette. There are two tabs in the palette, 'MDT RW Blocks' and 'Access Control'. On the Access Control Tab of the Palette there are 8 buttons to use, 4 for existing AC and 4 for proposed AC. Proposed AC workflow notes may be found in ***Right-of-Way Placing Proposed R/W Procedure***.

The Access Control Palette works with annotation scale set at the time of placement, meaning if the scale of a project is 1" = 50', the annotation scale shall be set in model space to 1:50 for the placement of the access control linework. Once the linework is placed in model space, it will no longer become annotative.

To best place AC linework, the existing R/W linework should be grouped as a polyline.

Access Control ON Existing Right of Way Linework

To place either EFAC or ELAC on R/W, use the correct button from the AC Palette, select the polyline, the command will then ask what side to place the new AC linework, select the side closest to the centerline, then hit 'Enter'.

Note: Be sure to enter out of the command fully, otherwise linework may be overridden to incorrect linetypes.

Access Control OFF Existing Right of Way Linework

To place either EFAC or ELAC off the R/W Linework, use the appropriate button from the AC Palette. The command will enter a line command to draw linework. It may be easiest to have points or temporary lines drawn to place the access control lines in place using object snaps. Once the linework has been placed, hit 'Enter'.

Note: The individual lines drawn from the off R/W buttons are not automatically converted to polylines. It is best practice to use the Polyline Edit command [PEDIT] to convert and join the linework together. To Reverse the Text Placement above/below the line created, reverse the polyline direction using [PEDIT] then [R] for reverse direction.

Note: Be sure to enter out of the command fully, otherwise linework may be overridden to incorrect linetypes.