MONTANA
Department of Transportation

Project Development & Delivery - Digital Design and Modeling Services

CONTROL DIAGRAMS AND ABSTRACTS IN AUTODESK

Contents

CONTENTS **1**
OVERVIEW **2**
STATEMENT OF NEED **2**
ACRONYMS/DEFINITIONS USED IN THIS DOCUMENT **2**
REFERENCES **2**
REVISIONS **2**
PROCESS DESCRIPTION AND EXAMPLES **3**
Section I. Control Diagrams and Control Abstracts 3
Procedure – File Setup 3
Procedure – Import Survey Control Points 7
Procedure – Convert TXT to CSV 9
Procedure – Insert Imagery into Control Diagram 12
Procedure – Set Up Control Diagram Layout 13
Procedure – Insert Control Abstract Table(s) 14

Overview

This document contains the workflows necessary for creating control diagrams and control abstract tables in Civil 3D.

Process Guide

Application/Tool(s):	AutoCAD / Civil 3D
Version(s):	13.6.2123.0 Civil 3D 2024.4.6 Update
Environment:	MDT Civil 3D State Kit r2024 v2.3.1
Released/Revised:	8/19/2026



SUPPORT
Open a Case

Statement of Need

Workflows specific to the creation of control and traverse diagrams were not covered in the Civil 3D production training classes. For that reason, the Road Design Workflow Subcommittee identified the need for documentation covering the topic.

Disclaimer: Because the State Kit is continuously being updated and improved, the styles and layers in this documentation may vary from what is in the current version of the State Kit.

Acronyms/Definitions Used in This Document

ACC – Autodesk Construction Cloud, Autodesk's new cloud storage ecosystem with enhanced tools, which will replace BIM 360 when it is retired.

NOTE: As of 3/24/26 ACC has been renamed Autodesk Forma

References

Coordinate System Settings Support Document

Import NAIP TIFF Imagery into Civil 3D

Revisions

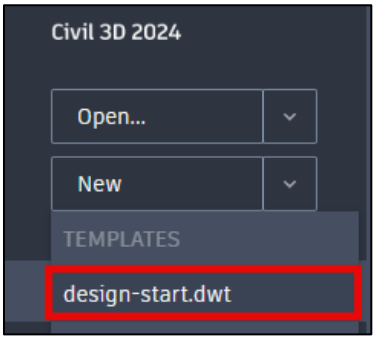
4/6/2026	Updates for ADA Accessibility

Process Description and Examples

Section I. Control Diagrams and Control Abstracts

Procedure – File Setup

1. Create a new file using the ***design-start.dwt*** template. Save it as ***<UPN>RDABS001.dwg*** to the RD directory of the project on BIM 360/ACC.

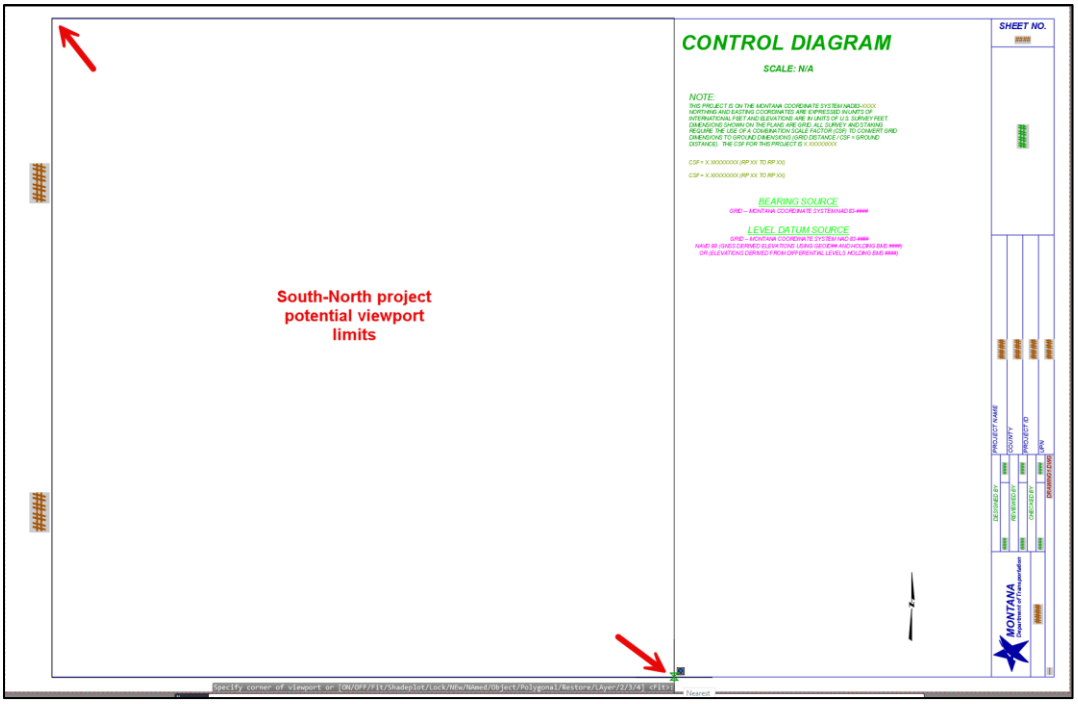


2. Assign the project's coordinate system to the drawing according to the Coordinate System Settings support document.
3. Change the drawing scale to ***1" = 5000'*** or ***1" = 2000'*** depending on the length of the project. Long projects may require the ***1" = 5000'*** scale.
4. In the *MDT Tools* tab in the ribbon, select the *MDT Sheet Layouts* dropdown from the *MDT Sheets* panel and select the *Road Layouts* button. Then shift select the ***RD-Control-Diagram*** and ***RD-Control-Abstract*** layouts and click ***OK*** to add them to the drawing.
5. Follow the steps below to create a viewport in the newly created layouts:
    a. Set the active layer to ***GS-VPRT***.

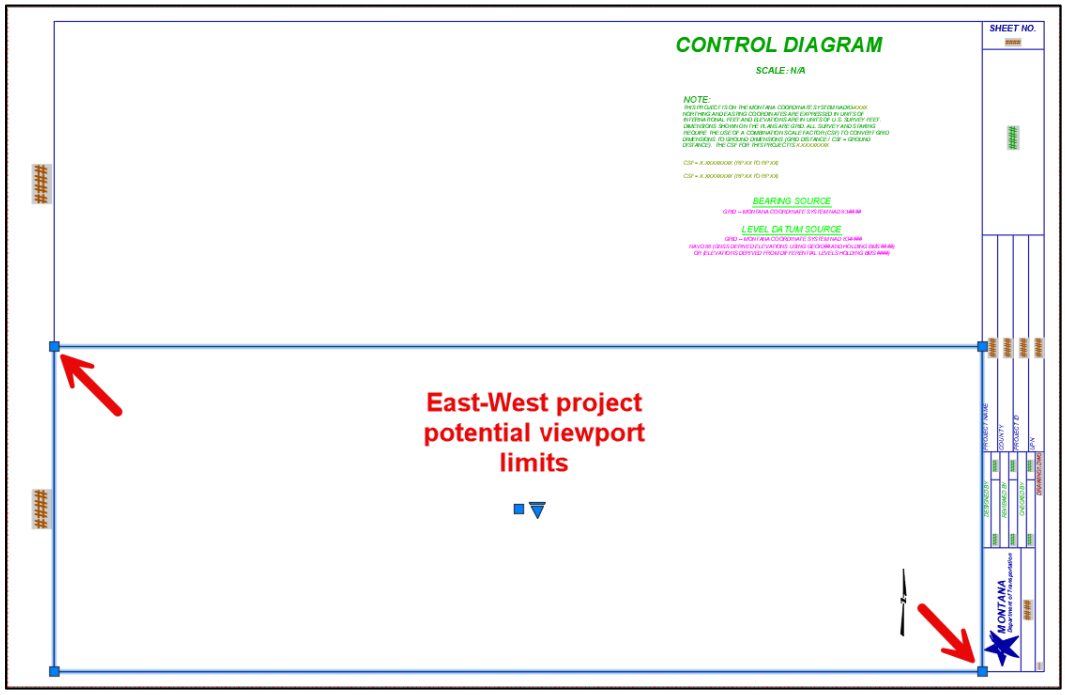


b. Use the command ***VPORTS*** or use the ***Rectangular*** tool on the *Layout Tools* contextual tab in the ribbon to create the viewport.

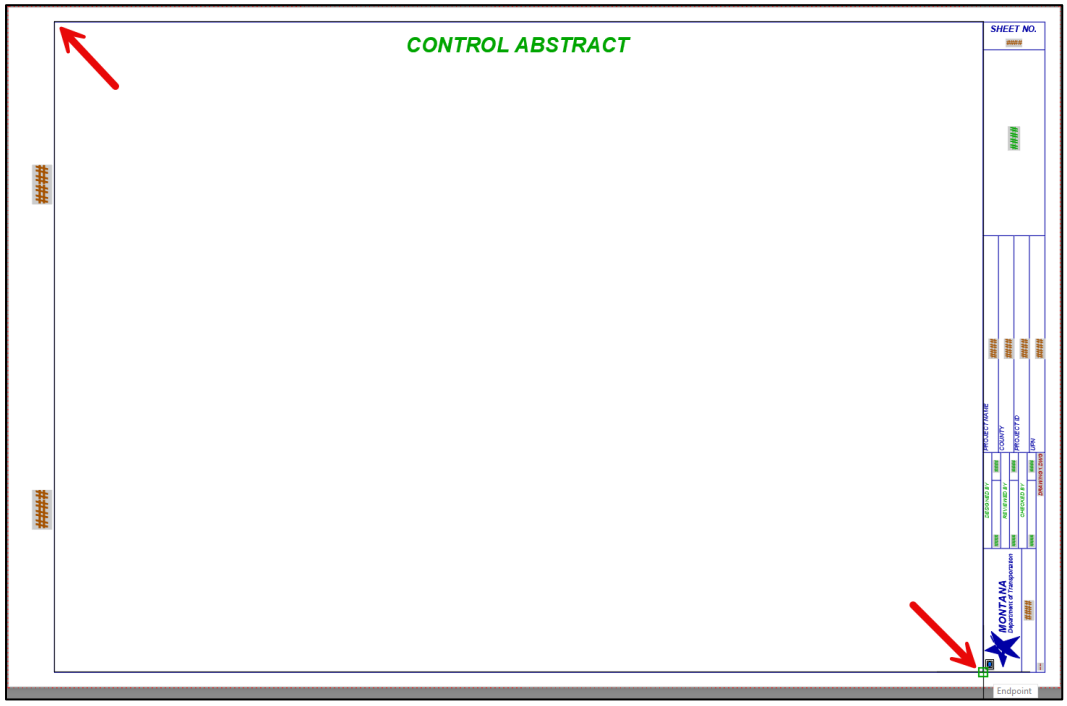
   For the ***RD-Control-Diagram*** layout, select the upper left inside border of the title block and create a rectangle that snaps to the bottom of the title block, leaving paper space for the *Control Diagram*, *Bearing Source*, and *Level Datum Source* blocks. This is ideal for projects that run south-north.



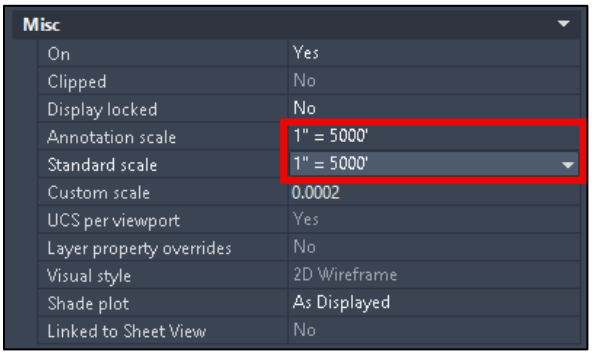
For east-west projects, the viewport extents may need utilize either the upper or lower half of the title block, using the midpoint of the title block, like shown below:



For the ***RD-Control-Abstract*** layout, use the inner border limits of the title block as the viewport extents.

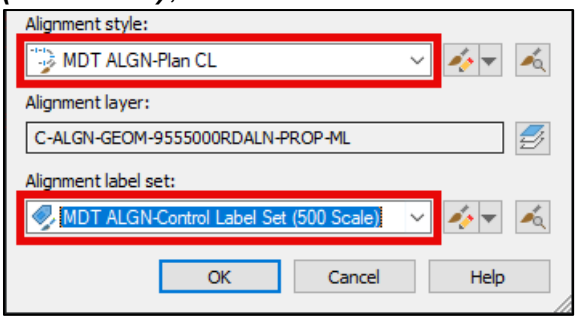


6. Select the viewport border, then set the annotation scale of both viewports using the *Properties* palette to match the drawing scale set in Step 3.

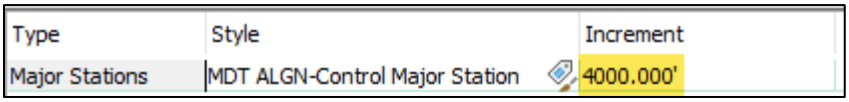


7. In the *Prospector* tab in *Toolspace,* right click *Data Shortcuts* and *Set the Working Folder* to the Project Files folder for the appropriate project. Right click *Data Shortcuts* again and select ***Associate Project to Current Drawing***.

8. Create a reference to the design alignment. Set the alignment style ***to MDT ALGN-Plan CL*** and the alignment label set to ***MDT ALGN-Control Label Set (500 Scale)***, then select ***OK***.



NOTE: The increment between major stations can be adjusted based on the length of the project. Select the labels on the alignment, right click, and select ***Edit Alignment Labels***. Adjust the *Increment* value as necessary by double clicking in the box and typing in a new value.



Procedure – Import Survey Control Points

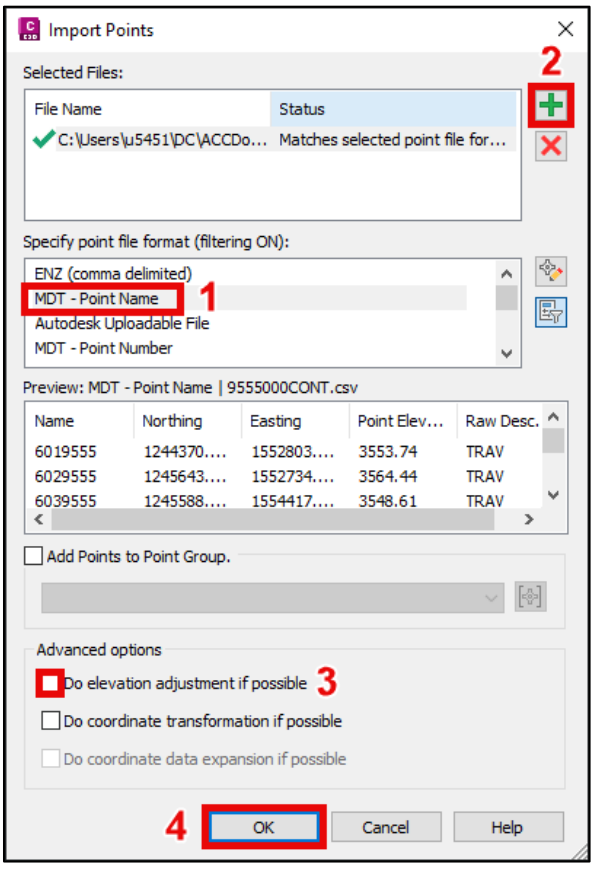
1. Download the ***XXXXXXXXSUCONXXX.CSV*** file from the SU or DI folder PCMS. It may be necessary to download the ***DIGPAXXX.zip*** to find the file. If the control data is not delived as a csv file skip to *Convert TXT to CSV Procedure*.
2. In the csv file, delete the column headers (if present) and ensure that the Raw Description (fifth column contents) for all the points is listed as ***TRAV***. If changes were made to the file, save a copy of the csv, then close the file.

	A	B	C	D	E
1	6019555	1244371	1552803	3553.74	TRAV
2	6029555	1245644	1552734	3564.44	TRAV
3	6039555	1245588	1554417	3548.61	TRAV
4	6049555	1247290	1553730	3558.15	TRAV
5	6059555	1248325	1555145	3598.35	TRAV
6	6069555	1248222	1555868	3594.97	TRAV
7	6079555	1250871	1555823	3585.04	TRAV
8	6089555	1250193	1557261	3564.89	TRAV
9	6099555	1252187	1557551	3540.59	TRAV
10	6109555	1253428	1558839	3497.93	TRAV
11	6119555	1254775	1558570	3533.13	TRAV
12	6129555	1256059	1558968	3533.81	TRAV
13	6139555	1255454	1559505	3552.63	TRAV

3. Upload the file to the project's RD Folder on BIM 360/ACC.
4. In Civil 3D, switch to model space, then select ***Points from File*** from the *Import* panel in the *Insert* tab.

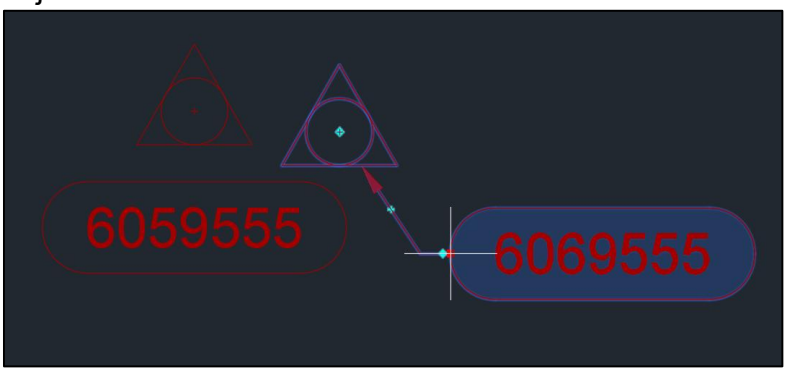
5. In the *Import Points* dialog, specify the point file format to ***MDT - Point Name***, then select the green **+** and navigate to the csv on BIM 360/ACC. If necessary, ***uncheck*** "*Do elevation adjustment if possible*" in the *Advanced options* section. The *Preview* window will populate after selecting the file. Then select ***OK***. The points will populate in model space.

   NOTE: It may be necessary to change the file type in Windows Explorer to search for .csv instead of the default .txt file.



Warning – Do not have the point file open or the file will not import.

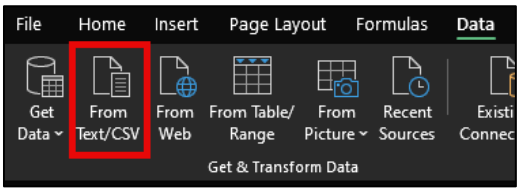
6. Drag overlapping labels away from one another to improve readability by selecting a point and selecting the square grip to drag the label away from the other point. The dragged state of the label will draw an arrow pointing to the object.



Procedure – Convert TXT to CSV

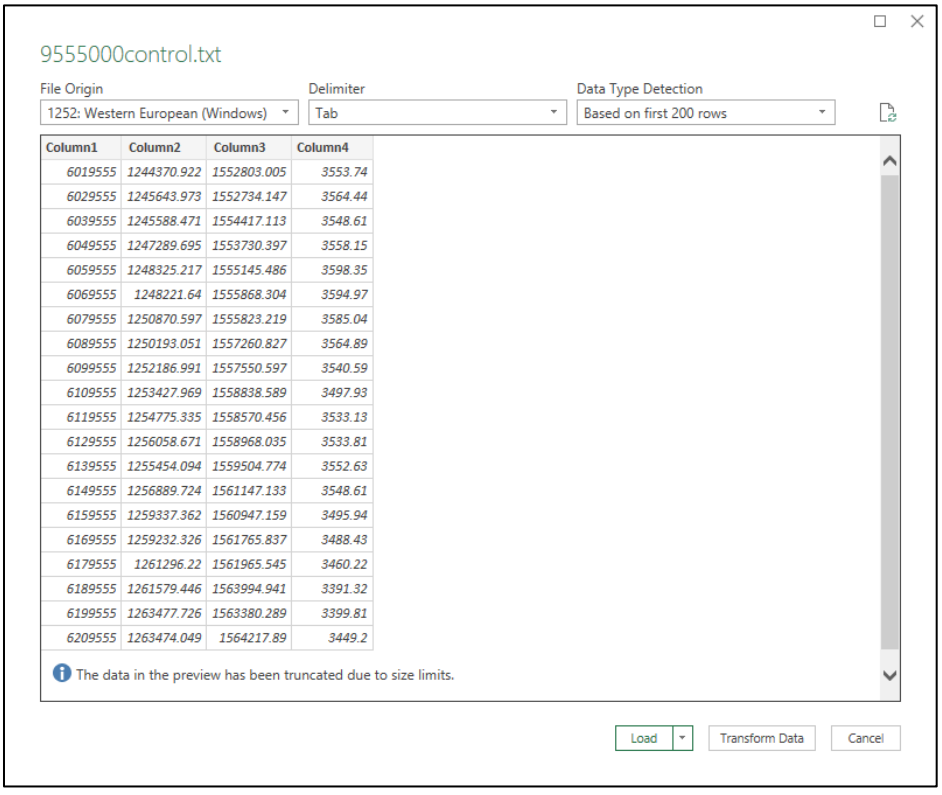
If the control data was not delivered as a csv, perform the following steps:

1. Download the Survey ***<UPN>DIGPAXXX.zip*** from PCMS and unzip the contents.
2. Create a new Excel file and save it as ***<UPN>SUCONXXX.CSV*** using the *CSV UTF-8* format to the RD folder on BIM 360/ACC.
3. Select the *Data* tab and select the ***From Text/CSV*** button.

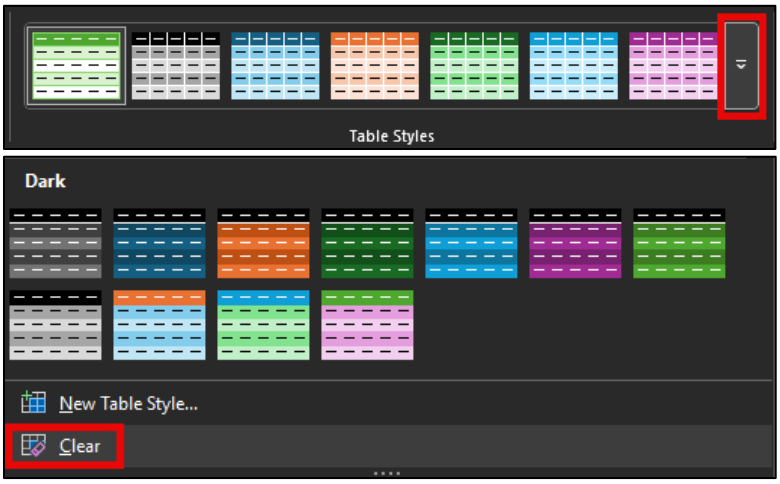


4. Navigate to the ***xxxxxcontrol.txt*** (file name may vary) file within the DIGPA folder and open the file.

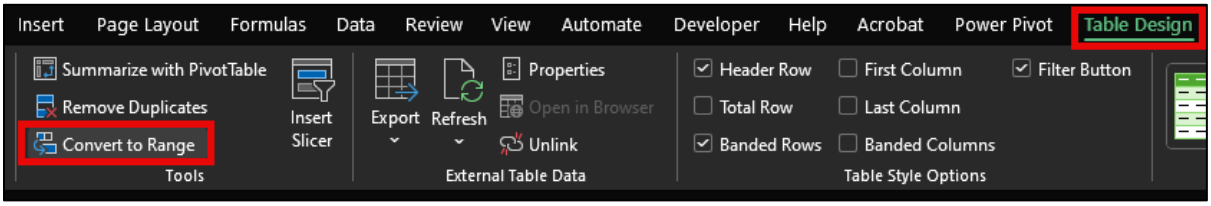
   The delimiter should default correctly. The format will likely be Tab. The preview will show how it will be imported into the file. Change settings as necessary. Then select ***Load***.

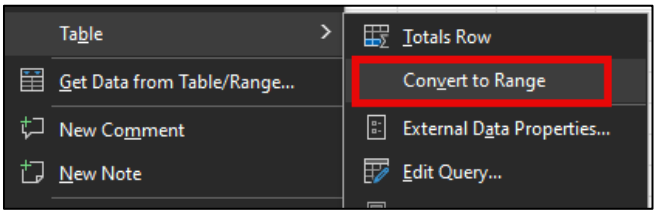


5. Select the table and click the *Quick Styles* dropdown in the *Table Styles* group in the ribbon. Then select ***Clear*** to remove the table formatting.



6. Click anywhere in the table, then select the *Table Design* contextual tab on the ribbon and select ***Convert to Range*** from the *Tools* panel -or- right click the table, then in the shortcut menu, click **Table** > **Convert to Range**. A warning will pop up. Select ***OK*** to remove the query definition from the sheet.





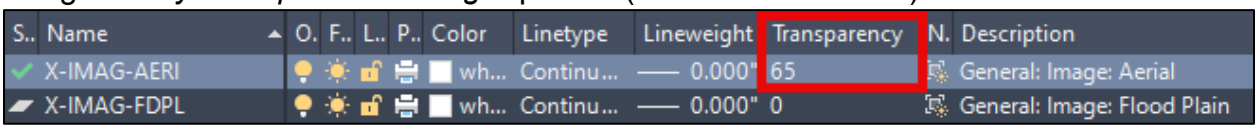
7. The order for the columns should be as follows: point name, northing, easting, elevation, description. Type ***TRAV*** in the fifth column for the description and copy it down for all the points.

Column1	Column2	Column3	Column4	
6019555	1244370.922	1552803.005	3553.74	TRAV
6029555	1245643.973	1552734.147	3564.44	TRAV
6039555	1245588.471	1554417.113	3548.61	TRAV
6049555	1247289.695	1553730.397	3558.15	TRAV
6059555	1248325.217	1555145.486	3598.35	TRAV
6069555	1248221.64	1555868.304	3594.97	TRAV
6079555	1250870.597	1555823.219	3585.04	TRAV
6089555	1250193.051	1557260.827	3564.89	TRAV

8. Delete the column headers.
9. Delete the Sheet1 sheet in the workbook.
10. Save the file and close it.

Procedure – Insert Imagery into Control Diagram

1. Set the active layer to ***X-IMAG-AERI*** and set the *Transparency* to 65 for the layer using the *Layer Properties Manager* palette (Command: ***LAYER***).

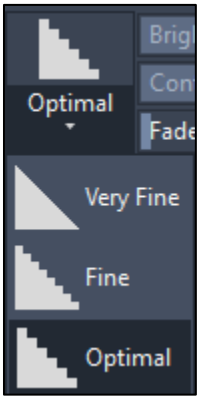


2. Select the *Geolocation* tab in the ribbon and set the *Online Map* to ***Esri Imagery*** or ***Bing Aerial***.

   NOTE: For shorter projects, it may be better to import NAIP TIFF imagery following the Import NAIP TIFF Imagery into Civil 3D tip document. The Geolocation map is sufficient for large scale projects while TIFF imagery map is preferable for shorter projects due to higher quality ground resolution.

3. After the map populates, select ***Capture Area*** from the *Online Map* panel in the *Geolocation* tab. Draw a window around the extents of the project. Then turn the map off. Once the map is turned off, only the clip will remain.

4. If necessary, adjust the resolution of the imagery by selecting the image, then selecting the ***Fine*** or ***Very Fine*** from the resolution dropdown in the *Map Image* contextual tab.



Procedure – Set Up Control Diagram Layout

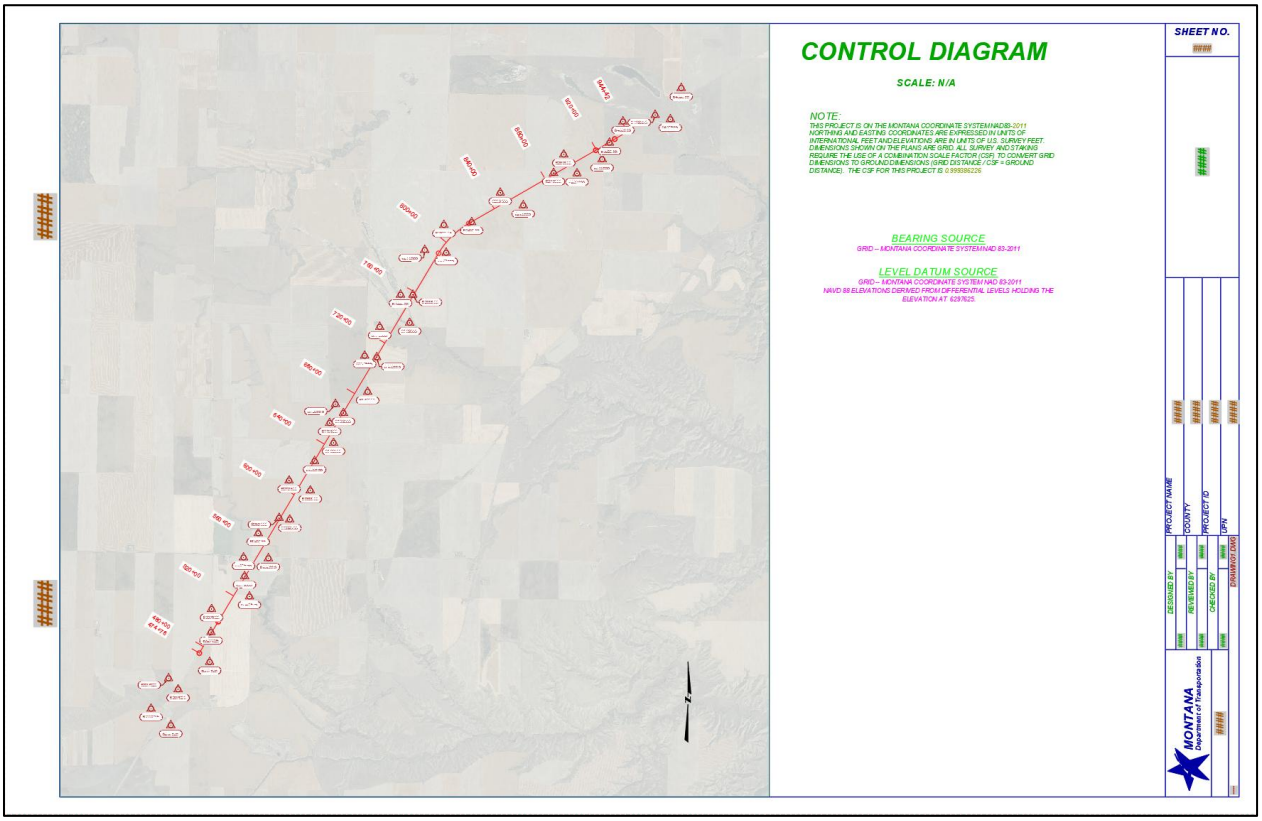
1. Select the ***RD-Control-Diagram*** layout. Double click within the viewport to activate it, then use either the ***Zoom Extents*** (Command: ***ZE***) or ***Zoom Window*** (Command: ***ZW***) command to center the points within the viewport. If necessary, adjust the size of the viewport to better match the size of the map image. When complete, ***lock*** the viewport by selecting the viewport border in paper space and selecting the lock icon in the *Layout Viewports* section of the *Layout Tools* contextual tab.

2. In paper space, move the ***P-NorthArrow-Only*** block to the map, then use the ***CHSPACE*** command to transfer the north arrow to model space.

3. ***Move*** the ***N-ControlAbstractNote*** and ***N-LevelData*** blocks as needed, then double click the ***N-ControlAbstractNote*** block to edit the text in the note using the *Enhanced Attribute Editor*. Utilize the Survey Control Readme (*<UPN>SURME001.txt*) file for the coordinate system and CSF information.

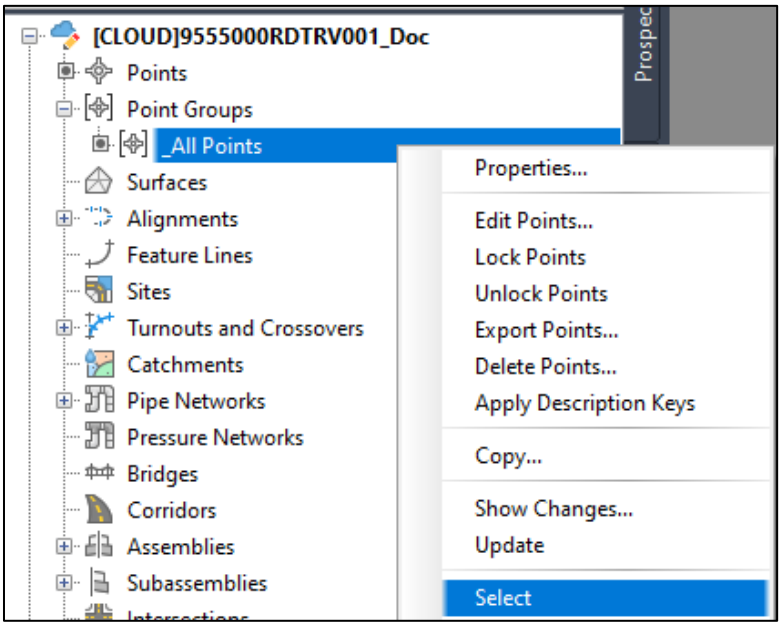
4. ***Explode*** the ***N-LevelData*** block. Type in the appropriate coordinate system and NAVD 88 elevations according to the Survey Readme file.

   NOTE: Survey prefers that the Montana State Plane Coordinate Zone as well as the horizontal coordinates and geoid that were used in the survey are included in the note.

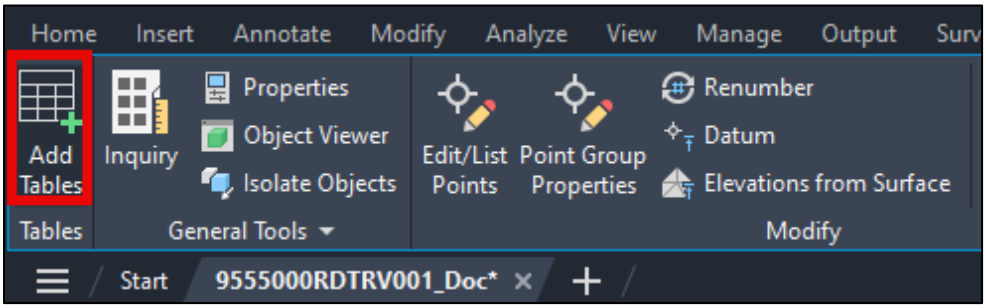


Procedure – Insert Control Abstract Table(s)

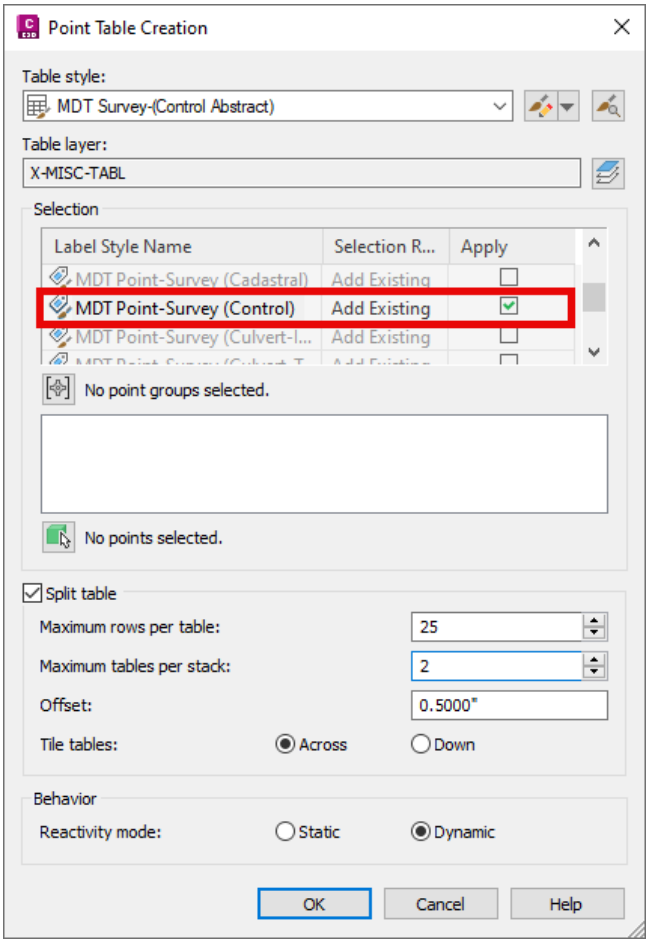
1. Select the ***RD-Control-Abstract*** layout. Double click within the viewport to enter model space. In the ***Point Groups*** section in the ***Prospector***, right click ***All Points*** and then click ***Select***.



2. In the ***COGO Points*** contextual tab in the ribbon, select ***Add Tables*** from the ***Tables*** panel.



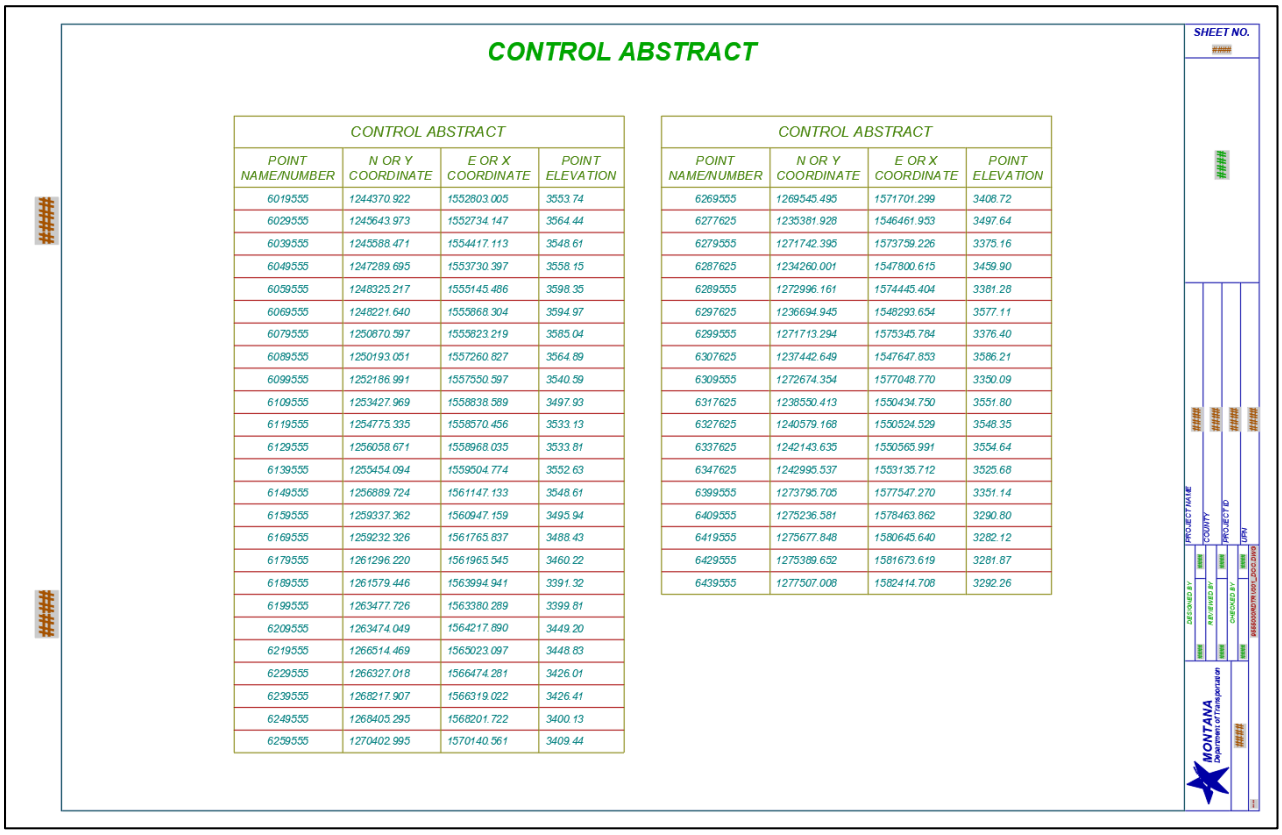
3. In the *Point Table Creation* dialog, set the *Table style* to ***MDT Survey-(Control Abstract)***. In the selection pane, select the check box next to ***MDT Point-Survey (Control)***. Set the split table options to 25 rows per table and 2 tables per stack. Select ***Across*** for *Tile tables* and ***Dynamic*** for *Reactivity mode*. Then select ***OK***.



4. If the viewport is centered on the points, pan to a location to the right of the project so that the paper space is blank. Click a point on the left side of the viewport within the model space to place the table(s). The table(s) will populate after selecting a data point.

5. Pan within the viewport to center the table(s), then lock the viewport.

   NOTE: The annotation scale of the viewport must match the scale of the drawing. If there are display issues, then use the command ***REA*** (***REGENALL***).



CONTROL ABSTRACT

CONTROL ABSTRACT

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION
6019555	1244370.922	1552803.005	3553.74
6029555	1245643.973	1552734.147	3564.44
6039555	1245588.471	1554417.113	3548.61
6049555	1247289.695	1553730.397	3558.15
6059555	1248325.217	1555145.486	3598.35
6069555	1248221.640	1555868.304	3594.97
6079555	1250870.597	1555823.219	3585.04
6089555	1250193.051	1557260.827	3564.89
6099555	1252186.991	1557550.597	3540.59
6109555	1253427.969	1558838.589	3497.93
6119555	1254775.335	1558570.456	3533.13
6129555	1256058.671	1558968.035	3533.81
6139555	1255454.094	1559504.774	3552.63
6149555	1256889.724	1561147.133	3548.61
6159555	1259337.362	1560947.159	3495.94
6169555	1259232.326	1561765.837	3488.43
6179555	1261296.220	1561965.545	3460.22
6189555	1261579.446	1563994.941	3391.32
6199555	1263477.726	1563380.289	3399.81
6209555	1263474.049	1564217.890	3449.20
6219555	1266514.469	1565023.097	3448.83
6229555	1266327.018	1566474.281	3426.01
6239555	1268217.907	1566319.022	3426.41
6249555	1268405.295	1568201.722	3400.13
6259555	1270402.995	1570140.561	3409.44

CONTROL ABSTRACT

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION
6269555	1269545.495	1571701.299	3408.72
6277625	1235381.928	1546461.953	3497.64
6279555	1271742.395	1573759.226	3375.16
6287625	1234260.001	1547800.615	3459.90
6289555	1272996.161	1574445.404	3381.28
6297625	1236694.945	1548293.654	3577.11
6299555	1271713.294	1575345.784	3376.40
6307625	1237442.649	1547647.853	3586.21
6309555	1272674.354	1577048.770	3350.09
6317625	1238550.413	1550434.750	3551.80
6327625	1240579.168	1550524.529	3548.35
6337625	1242143.635	1550565.991	3554.64
6347625	1242995.537	1553135.712	3525.68
6399555	1273795.705	1577547.270	3351.14
6409555	1275236.581	1578463.862	3290.80
6419555	1275677.848	1580645.640	3282.12
6429555	1275389.652	1581673.619	3281.87
6439555	1277507.008	1582414.708	3292.26

SHEET NO.

PROJECT NAME

COUNTY

PROJECT ID

CRN

DESIGNED BY

RECOMMENDED BY

CHECKED BY

MONTANA Department of Transportation

6. Add the layouts to the project's sheet set.