

*Intro to Right of Way Mapping
in
Civil 3D 2014*



Justin L. Evers, PSM
FDOT Central Office

Topics

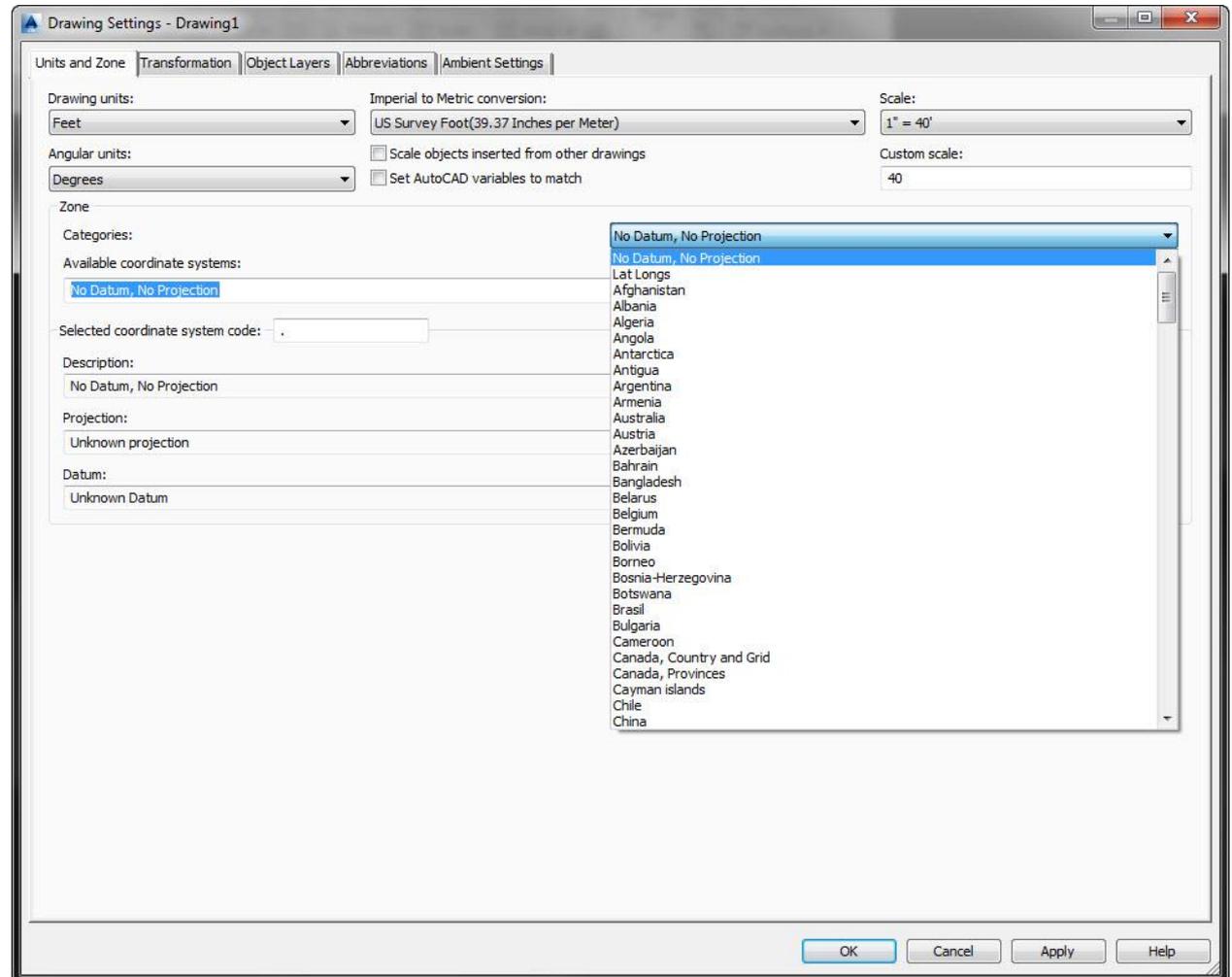
- ◆ Settings
- ◆ Drawing Lines and Curves
- ◆ Labeling
- ◆ Coordinate Geometry (COGO)
- ◆ Best-Fit Line
- ◆ Paper Space
- ◆ Rotating Layouts
- ◆ Inserting Images
- ◆ Design Center
- ◆ Annotation Scale

Templates

- ◆ DOT has pre-made drawing templates
- ◆ Templates include:
 - ✓ Linetypes
 - ✓ Label styles
 - ✓ Point styles
 - ✓ Fonts
 - ✓ Blocks
 - ✓ Sheet borders

Drawing Settings

- ◆ State Plane
- ◆ Feet
- ◆ Degrees



Sanity Settings

- ◆ The following settings will make Civil 3D easier and less stressful:
 - ✓ MSLTSCALE – This is the model space linetype scale. This setting makes your linetypes react to the annotation scale. SET TO 1.
 - ✓ PSLTSCALE – This is the paper space linetype scale. SET TO 1 for the same reasons as MSLTSCALE.
 - ✓ LTSCALE – Controls the overall line scaling. SET TO 1.

Sanity Settings

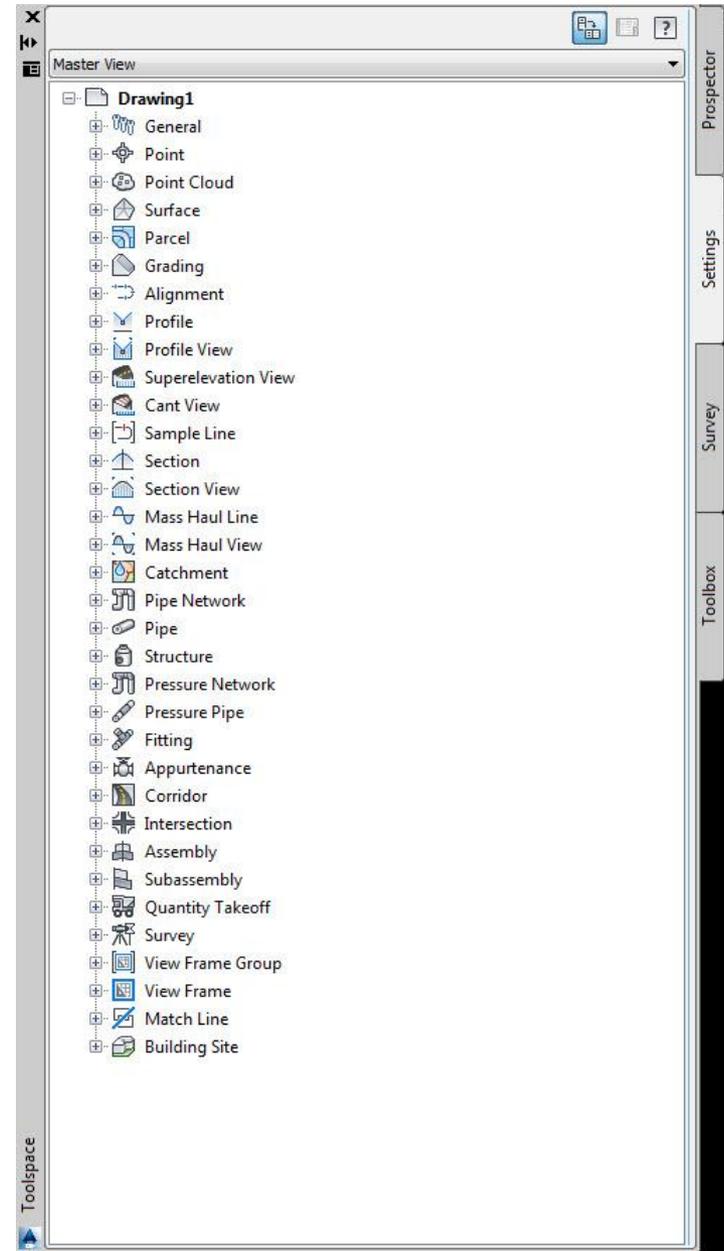
- ◆ The following settings will make Civil 3D easier and less stressful:
 - ✓ **LAYEREVALCTL** – Controls pop-ups that happen when new layers are introduced into the drawing. Happens when you copy objects in or *XREF* in drawings. SET TO 0 so you won't see them.
 - ✓ **GEOMARKERVISIBILITY** – Appears when you set the coordinate system in a drawing. Looks like a block but it's not really there and you can't select it or delete it. SET TO 0 so it will go away.

Workspace Settings

- ◆ Civil 3D comes with default workspaces for you to use
 - ✓ Civil 3D
 - ✓ Drafting and Annotation
 - ✓ 3D Modeling
 - ✓ Planning and Analysis
- ◆ Default workspaces are not geared towards surveying and mapping
- ◆ Workspaces are highly customizable

Toolspace

- ◆ New to Civil 3D
- ◆ Command Central
- ◆ Lets you:
 - ✓ Edit and delete points
 - ✓ Edit label styles
 - ✓ Edit alignments
 - ✓ Import and export points



Properties

- ◆ Information Center
- ◆ Tells you:
 - ✓ Line length
 - ✓ Coordinates
 - ✓ Layer
 - ✓ Linetype
 - ✓ Color
 - ✓ Arc length
 - ✓ Radius

The screenshot shows the Properties palette in AutoCAD, displaying various properties for a selected object. The palette is organized into several sections: General, 3D Visualization, Plot style, View, and Misc. The General section includes properties like Color, Layer, Linetype, Linetype scale, Lineweight, Transparency, and Thickness. The 3D Visualization section includes Material and Shadow display. The Plot style section includes Plot style, Plot style table, Plot table attachment, and Plot table type. The View section includes Center X, Center Y, Center Z, Height, and Width. The Misc section includes Annotation scale, UCS icon On, UCS icon at origin, UCS per viewport, UCS Name, and Visual Style.

General	
Color	<input type="checkbox"/> ByLayer
Layer	0
Linetype	———— ByLayer
Linetype scale	1
Lineweight	———— ByLayer
Transparency	ByLayer
Thickness	0

3D Visualization	
Material	ByLayer
Shadow display	Casts and Receives S...

Plot style	
Plot style	ByLayer
Plot style table	FDOT.stb
Plot table attach...	Model
Plot table type	Named without trans...

View	
Center X	25.6523
Center Y	9.5278
Center Z	0
Height	47.4636
Width	97.7343

Misc	
Annotation scale	1" = 40'
UCS icon On	Yes
UCS icon at origin	Yes
UCS per viewport	Yes
UCS Name	
Visual Style	2D Wireframe

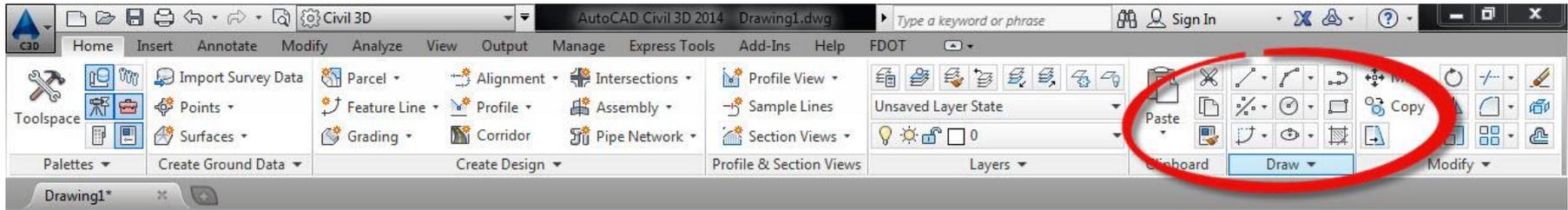
Drawing Lines

- ◆ Common methods:
 - ✓ Line by Northing/Easting
 - ✓ Line by Bearing
 - ✓ Line by Angle
 - ✓ Line by Station/Offset
 - ✓ Line from Extension
 - ✓ Line by End of Object
 - ✓ Line Perpendicular from Point



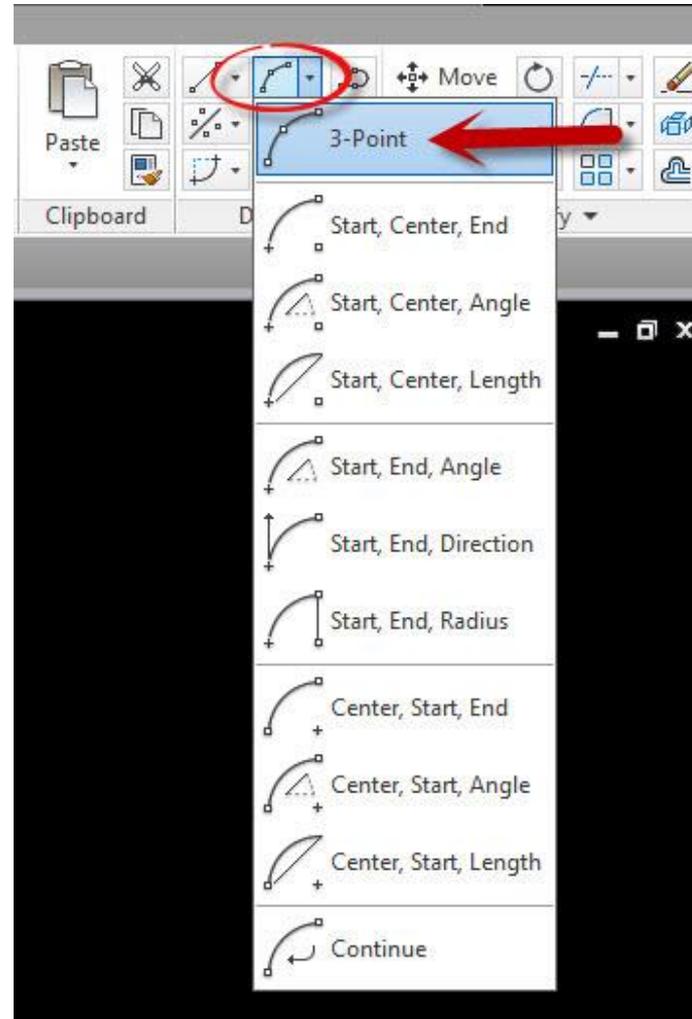
Drawing Curves

- ◆ Curves can be drawn by point method or by mathematical method
- ◆ Both methods are located under the *Draw* section of the *Home* ribbon



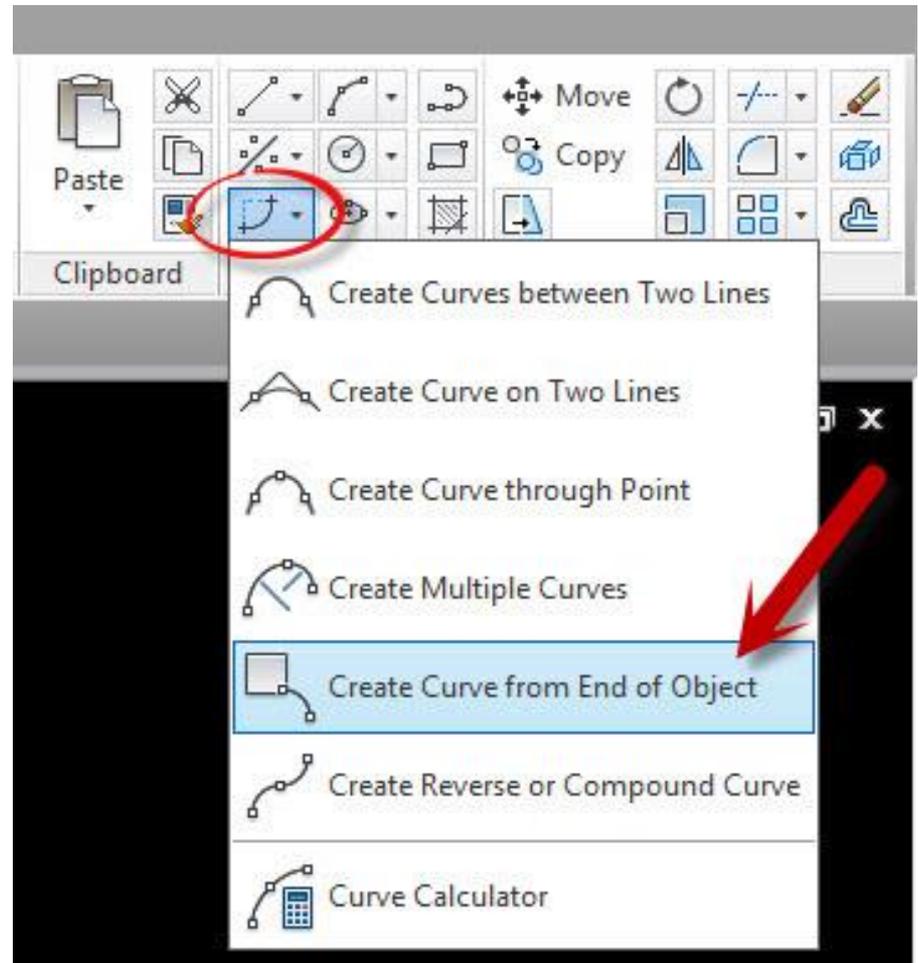
Drawing Curves by Point Method

- ◆ Select the *3-Point* icon and choose the method you want to use
- ◆ This method does not work unless you have points along the curve or you know the beginning, end, and center of the curve
- ◆ Works well for topo and as-builts but not for boundary and right of way



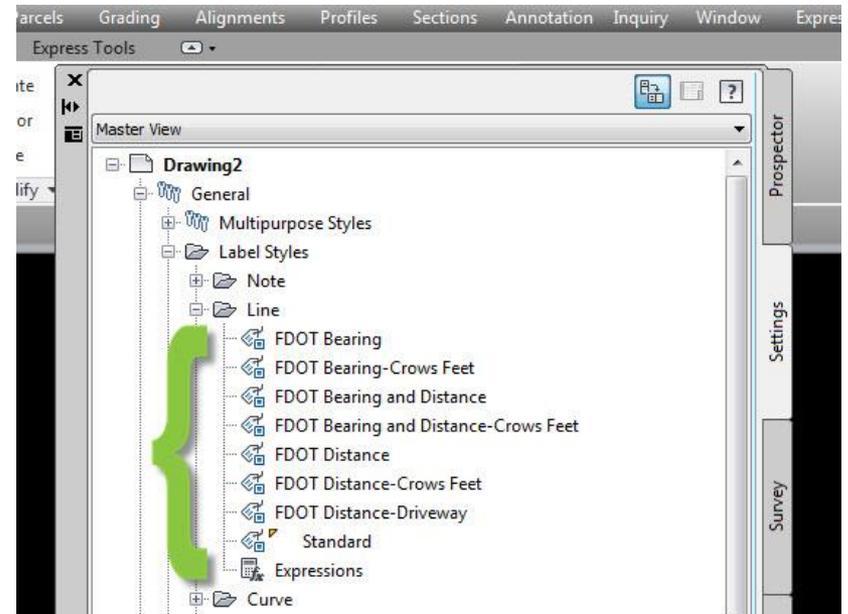
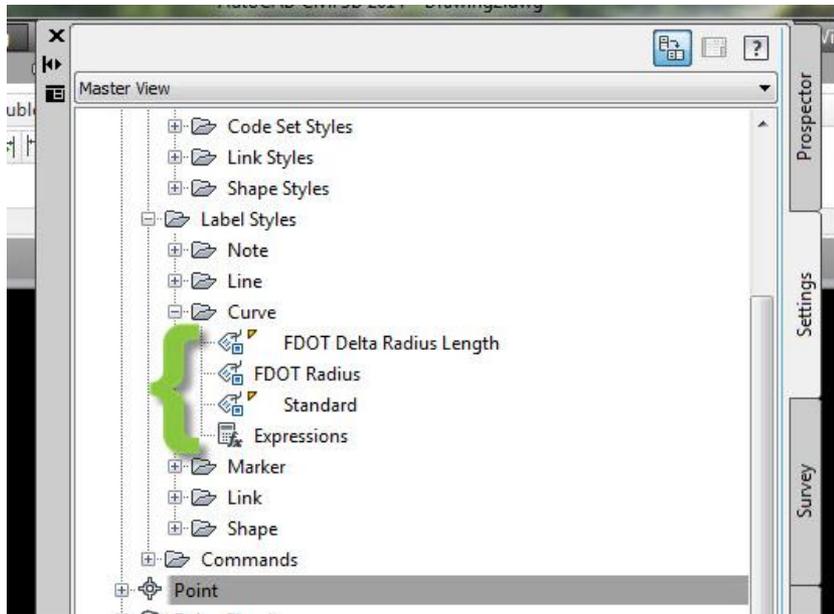
Drawing Curves - Mathematical Method

- ◆ Select the *Curves* icon and then *Create Curve from End of Object*
- ◆ This will enable you to draw a curve using mathematical properties such as delta, length, radius, chord, etc.
- ◆ This is the method used for drawing curves for a baseline, centerline or legal description



Labeling Lines and Curves

- ◆ DOT has included pre-defined label styles for you to use.



COGO

- ◆ Points can be created by a variety of methods in Civil 3D depending on the scenario
- ◆ Common methods:
 - ✓ Manual
 - ✓ Coordinate
 - ✓ Along Lines and Curves
 - ✓ Bearing and Distance
 - ✓ Angle and Distance

Best-Fit Line

- ◆ Useful when trying to establish one common line for a row of points
- ◆ Uses least squares to create lines and arcs
- ◆ Will work for curves too

The screenshot displays a software interface for regression analysis. On the left, a 'Property Value' table shows details for 'Entity1' (Line), including Length (1000.000'), Direction (N89° 59' 24.73"E), Start Point, and End Point. The main area contains a table with 11 data points, each with columns for Pt No., Exclude, Pass Through, Point Northing, Point Easting, Weight, Offset to Entity, Northing on Entity, and Easting on Entity. Below the table is a 'Regression Graph' showing a scatter plot of points with a red best-fit line and a green curve.

Pt No.	Exclude	Pass Through	Point Northing	Point Easting	Weight	Offset to Entity	Northing on Entity	Easting on Entity
1	<input type="checkbox"/>	<input type="checkbox"/>	888305.2939'	958486.5798'	1.000	0.045'	888305.2487'	958486.5798'
2	<input type="checkbox"/>	<input type="checkbox"/>	888305.3939'	958586.5891'	1.000	0.128'	888305.2658'	958586.5891'
3	<input type="checkbox"/>	<input type="checkbox"/>	888305.1610'	958686.7454'	1.000	-0.122'	888305.2829'	958686.7454'
4	<input type="checkbox"/>	<input type="checkbox"/>	888305.2939'	958786.8269'	1.000	-0.006'	888305.3000'	958786.8269'
5	<input type="checkbox"/>	<input type="checkbox"/>	888305.5939'	958886.6121'	1.000	0.277'	888305.3171'	958886.6121'
6	<input type="checkbox"/>	<input type="checkbox"/>	888304.9561'	958986.1243'	1.000	-0.378'	888305.3341'	958986.1243'
7	<input type="checkbox"/>	<input type="checkbox"/>	888305.2439'	959086.6283'	1.000	-0.107'	888305.3513'	959086.6282'
8	<input type="checkbox"/>	<input type="checkbox"/>	888305.3139'	959186.6366'	1.000	-0.054'	888305.3684'	959186.6366'
9	<input type="checkbox"/>	<input type="checkbox"/>	888305.2792'	959286.6580'	1.000	-0.106'	888305.3855'	959286.6580'
10	<input type="checkbox"/>	<input type="checkbox"/>	888305.8524'	959386.8718'	1.000	0.450'	888305.4026'	959386.8719'
11	<input type="checkbox"/>	<input type="checkbox"/>	888305.2939'	959486.5798'	1.000	-0.126'	888305.4197'	959486.5798'

Paper Space

- ◆ Paper space is used for:
 - ✓ Sheet borders
 - ✓ Notes
 - ✓ Legends
 - ✓ North arrows and scales
- ◆ Nothing in paper space shows up in model space
- ◆ Nothing in paper space shows up in another sheet's paper space

Paper Space

- ◆ Paper space usually has an active viewport which enables you to see into model space
- ◆ Paper space has a scale of 1:1
- ◆ Objects scaled for model space will look huge in paper space
- ◆ Objects scaled for paper space will look tiny in model space
- ◆ Borders, legends, north arrows, and scales are scaled for paper space in FDOT R/W templates

Rotating Layouts

- ◆ There are several different ways to rotate in Civil 3D
- ◆ *ALIGNSPACE* is the easiest and safest way
- ◆ *DVIEW* does the same thing as *ALIGNSPACE*, but is more complicated
- ◆ You should never rotate the UCS in model space.

Rotating Layouts - ALIGNSPACE

- ◆ Pro

- ✓ Keeps everything oriented to the World Coordinate System (WCS)

- ◆ Con

- ✓ Text is not aligned

WCS vs UCS

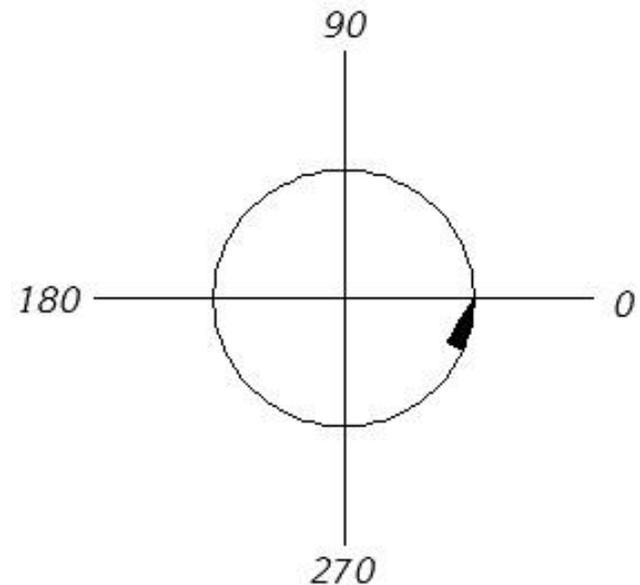
- ◆ WCS – World Coordinate System
 - ✓ Is unchangeable
 - ✓ Works on State Plane Coordinates
- ◆ UCS – User Coordinate System
 - ✓ Can be changed
 - New initial point set
 - New rotation

Rotating the UCS

NEVER ROTATE THE UCS IN MODEL SPACE!!!

Rotating Layouts - *DVIEW*

- ◆ Used to change the orientation of a sheet layout
- ◆ Rotates counter clockwise with 0 to the right



Rotating Layouts - *DVIEW*

- ◆ Must be in model space in a particular sheet layout
- ◆ Viewport must be unlocked
- ◆ Use *DVIEW* command
- ◆ Inside the *DVIEW* command, use the *Twist* option
- ◆ You must know the angle required to rotate your baseline to zero (zero being to the right)
- ◆ You can use negative (-) angles

Inserting Images

- ◆ Inserted image
 - ✓ *MAPIINSERT, IINSERT*
 - ✓ References the entire image (XREF)
 - ✓ Slows down AutoCAD
- ◆ FDO connected image
 - ✓ DATACONNECT or MAPCONNECT
 - ✓ Links an image
 - ✓ Only displays the area being shown at any given time
 - ✓ “Faster” than an inserted image

Design Center

- ◆ Design Center is an easy way to manage drawing properties like:
 - ✓ linetypes
 - ✓ blocks
 - ✓ layers
- ◆ Provides an easy, visual way to insert blocks

Annotation Scale

- ◆ Annotation scale is a powerful tool that allows you to set text and blocks to a certain size regardless of the drawing scale.
- ◆ For example, if you set your text to print at .1" high in paper space, AutoCAD will hold that size no matter what scale you print in.
- ◆ DOT has set the appropriate items to annotate in the provided drawing templates.

Annotation Scale

- ◆ Allows text to show on different sheets at the correct scale for that sheet
 - ✓ The same text can show up at .1" for 40 scale detail sheets and .05" for 100 scale overall sheets
 - ✓ Eliminates the need for multiple pieces of the same text for sheets of different scales

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Justin L. Evers, PSM

850-414-4683

justin.evers@dot.state.fl.us