

# Chapter 7 - Manipulating and Modifying Design Graphics

Now that you know how to place basic elements and control their placement using various locks and snap modes, you're ready to learn how to manipulate and modify the elements you've placed.

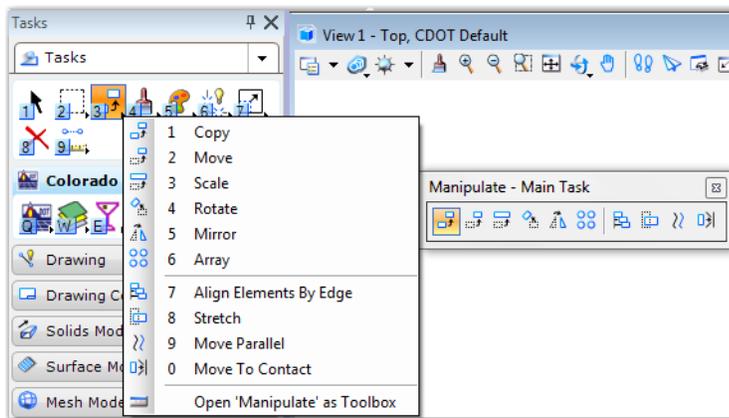
## Chapter Objectives:

- Identify each of the tools on the Manipulate toolbar
- Identify each of the tools on the Modify toolbar
- Discuss the use of Active Depth
- Discuss the ACS Plane lock
- Discuss the CDOT Custom Linestyles and linestyle scales
- Discuss changing an element's symbology
- Identify the CDOT Miscellaneous Tools
- Describe MicroStation tags

## Using Manipulate Tools

The **Manipulate** toolbar commands allow you to manipulate the entire element (copy, move, rotate, scale, etc.). Follow your prompts closely to properly execute the commands.

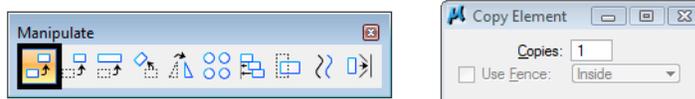
## Manipulate Commands



Some of the more commonly used commands include:

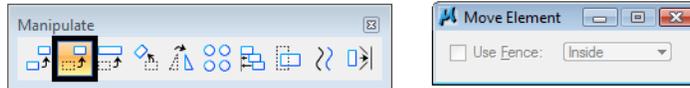
### Copy

Copies an element from one location to another.



## Move

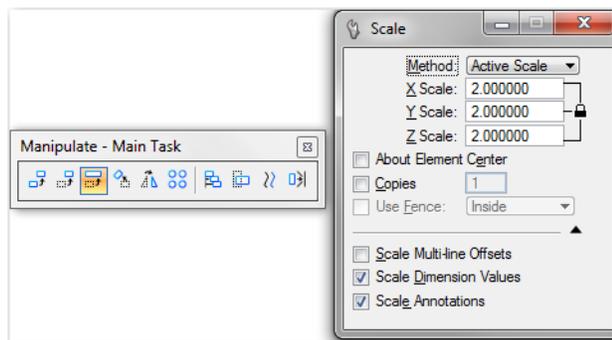
Moves an element from one location to another.



## Scale

Resizes an element based on one of two methods:

- ◆ **Active scale**
- ◆ **3 points**



**About Element Center**, which, when used with the **Active Scale** method, allows you to scale about the element's center with just one data point.

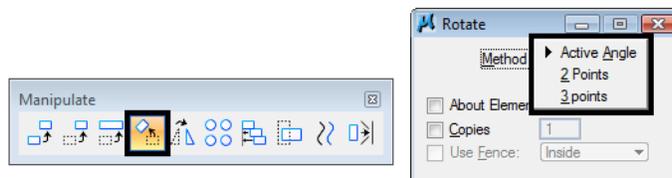
In the expanded tool settings box, there are two toggles that affect dimensioning not associated with elements. The **Scale Dimension Value** toggle increases the value of the dimension by the scale factor when on. The **Scale Annotations** toggle changes the size of the text by the scale factor when on.

If you like, you can create a copy or copies of the scaled element.

## Rotate

Rotates an element using one of three methods:

- ◆ **Active Angle**
- ◆ **2 Points**
- ◆ **3 Points**



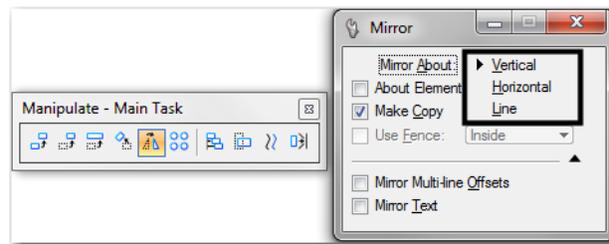
Like the **Scale** command, you can toggle on **About Element Center** which allows you to always rotate about the element's center.

### Mirror

Mirrors an element using one of three methods:

- ◆ **Vertical** — about vertical axis
- ◆ **Horizontal** — about horizontal axis
- ◆ **Line** — about line defined by two data points

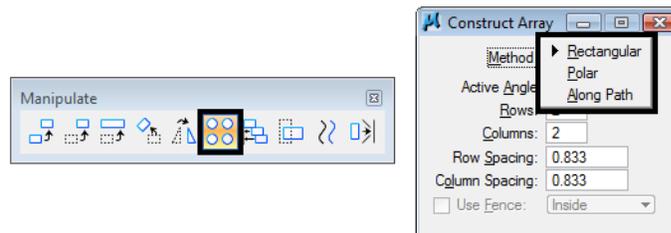
In the expanded tool settings box, there is a toggle to **Mirror Text**. When on text is mirrored.



### Construct Array

Copies elements multiple times in an array of two types:

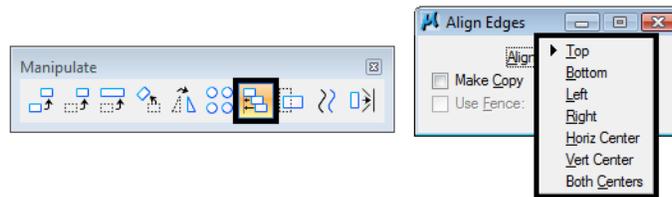
- ◆ **Rectangular**
- ◆ **Polar**
- ◆ **Along Path**



### Align Elements By Edge

Aligns the edge of one element with the edge of another element using one of the following alignment options:

- ◆ **Top**
- ◆ **Bottom**
- ◆ **Left**
- ◆ **Right**
- ◆ **Horiz Center**
- ◆ **Vert Center**
- ◆ **Both Centers**



### Stretch

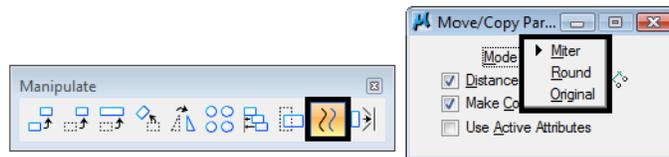
Used to stretch elements by a defined fence or cells.



### Move Parallel

Moves or copies an element parallel to the original element using one of three modes.

- ◆ **Miter** — extends or shortens the segments while maintaining the angle of their connections
- ◆ **Round** — fills the gap with a rounded arc between the two moved elements
- ◆ **Original** — the resulting element is the same type as the original element.



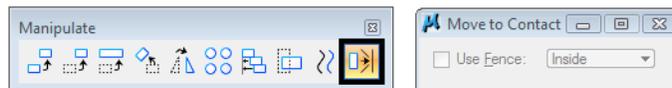
The **Miter** and **Round** modes also help eliminate “loops” that sometimes form in interior corners of the offset element using the **Original** mode.

If you specify a distance, you only need to data point the direction.

With **Use Active Attributes** on, the parallel element takes on the active level, color, style and weight.

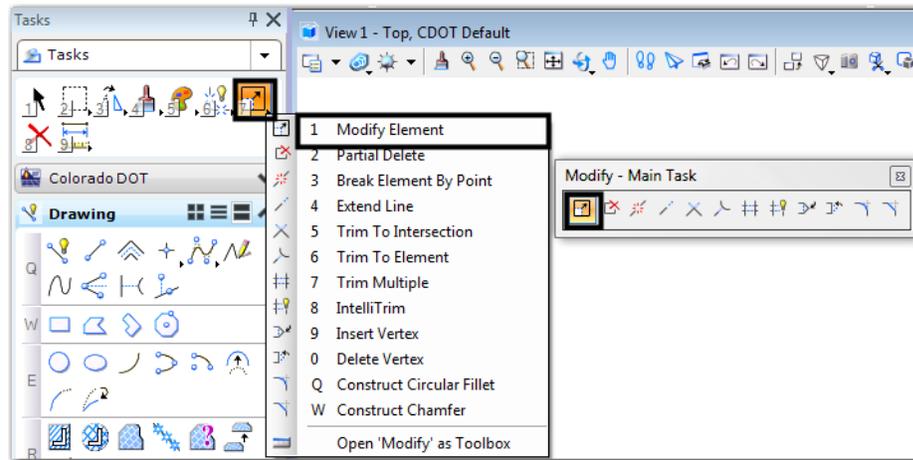
### Move To Contact

Used to move elements until they contact another element.



## Using the Modify tools

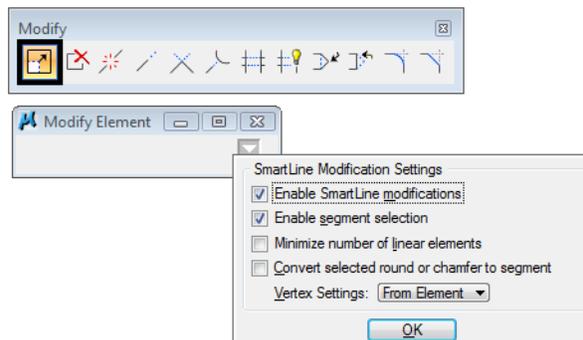
The **Modify** toolbar commands allow you to modify a piece or part of an element (trim, extend, partial delete), instead of manipulating it as a whole.



## Modify

Modifies the geometry of an element. This tool works differently on different types of elements. For example, you can:

- ◆ Move a vertex or segment of a line, linestring or shape
- ◆ Scale a block or circular arc
- ◆ Change a circle's radius



## Partial Delete

Deletes part of an element. The element can be closed, or you can delete an interior portion of line, linestring, curve or arc.



## Break Element

Breaks an element at a defined point.



## Extend

Extend or shorten a line or linestring.



If **Distance** is off, enter a data point to define the new endpoint (i.e. dynamically extend or shorten the line or linestring).

**Note:** Toggle on **From End** to extend/shorten from the nearest endpoint that you identify. If off, the line is extended/shortened relative to the origin point, no matter where you identify the line.

## Extend Two Elements to Intersection

Extends two lines, linestrings, or arcs to their intersection. If the lines or elements currently intersect, it will shorten the elements to their intersection point.



## Trim to Element

Trims or extends one line, linestring or arc to intersect with another element (which does not have to be another line, linestring or arc). Normally the element to be trimmed or extended is selected first, however, a toggle in the tool settings dialog box allows you to pick the cutting/extend to element first.



## Trim

Trims or extends an element at its intersection with a specified cutting element. A drop down menu in the tool settings dialog box allows you to Trim, Extend, or Extend and Trim. The Trim option will only affect elements that cross the cutting element or a line extending along the cutting element. Extend will only affect elements that do not cross the cutting element or a line extending along the cutting element. You can trim multiple elements and you can have more than one cutting element.



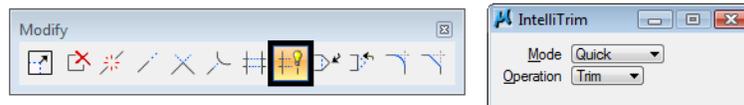
When identifying elements to trim, always data point on the portion of the element that you want trimmed.

You can place two cutting elements in a selection set before executing the command and trim elements between them. However, a more effective way of accomplishing this is to use the **IntelliTrim** command.

### IntelliTrim

Trims, extends or cuts multiple elements in one operation using two different modes:

- ◆ **Quick Mode** — allows you to draw a line through multiple elements to trim (or extend) to one cutting (or extension) element
- ◆ **Advanced Mode** — allows you to select multiple cutting elements. You can trim or extend elements between or outside of the cutting elements



To extend elements, set the **Operation** to **Extend** and follow the same steps to define an extension element and then draw a line through the elements to extend.

The Operation **Cut** will break elements in two pieces at the cutting element.

### Insert Vertex

Inserts a vertex on a line, linestring or shape. It is also used to attach a line segment onto the end of a line or linestring.



### Delete Vertex

Deletes a vertex on a line, linestring or shape.



### Fillet

Constructs a circular fillet (an arc) of a specified radius between two elements or two sides of a linestring or shape. You can truncate one side, both sides or neither side of the original element.



**Note:** To fillet between 3D elements, they must be co-planar.

## Chamfer

Constructs a chamfer between two lines or two sides of a linestring or shape.



**Note:** To chamfer between 3D elements, they must be co-planar.

## Drawing graphics in 3D

When drawing graphics in a 3D file, you can either draw planar graphics at a particular elevation, or you can draw 3D graphics (endpoints at different elevations).

### Active Depth

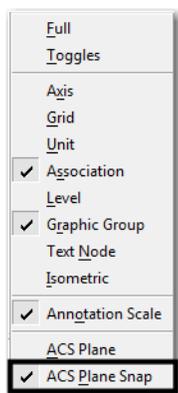
To draw planar graphics at a particular depth in a 3D file, set the active depth to the desired depth **<az=depth>**, and then place the graphics. The active depth would be the elevation you want to place the graphics if you're drawing in the top view. For example, if you want to draw the 5000 ft. contour, set **az=5000**, then draw the contour. All data points will be placed at a Z value of 5000 unless you snap or AccuSnap to existing elements.

### ACS Plane Lock

When on, the ACS Plane lock forces all data points to the "0" elevation of the Active Coordinate System. This lock overrides the Active Z set for the drawing as well as snapping to elements of different elevations.

### ACS Plane Snap

When placing new graphics by snapping on to existing elements, you'll pick up the elements' elevation if **ACS Plane Snap** is turned off. **ACS Plane Snap** locks all of your data points onto the view's active depth plane. Therefore, if you want to place planar elements, but you're snapping on to elements at different elevations, set the active depth to the desired elevation **<az=depth>**, and then turn **ACS Plane Snap** on.



### Using the CDOT Menu ModElev Add On

Another way to set the elevation of an element in the top view of a 3D file is to move it (after it is placed) in the Z direction only. This is useful if you want to planarize elements to a specified elevation. The ModElev program is located on the **CDOT Menus**. Select **Add On's > ModElev**.



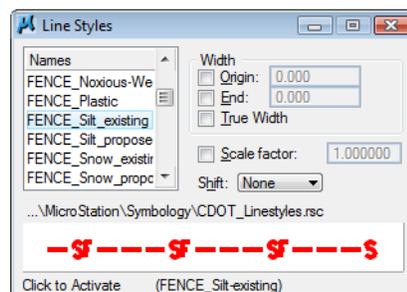
You can specify the elevation to planarize a single element, elements within a fence or all elements in the design file.

### CDOT Custom Line styles

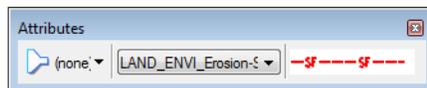
CDOT custom line styles are used to represent various types of graphics in the CDOT MicroStation configuration. CDOT custom line styles, unlike standard line styles, can be scaled. The line style scale should match the plot scale of the sheet file in which they will be referenced.

#### Setting the Scale

You should set the line style scale before placing the custom line style. The line style scale is set under **Element > Line Style > Custom**. In the default CDOT workspace, the custom line style scale is set to **100**. You only need to change the custom line style scale if you will eventually reference this file into a sheet with a different scale.



**Note:** Custom line styles are assigned to levels via **ByLevel** symbology. The line style is automatically selected when the level is set active.



#### Changing the scale

If you have placed a line style at the wrong scale, you can change the scale with the keyin **Change Linestyle Scale ##** (where ## = the scale), and then select the element to change. setting the linestyle scale through the linestyles dialog box?

## Changing Direction

Some custom line styles are directional and depend on the direction they are drawn (e.g. Type 3 guardrail). If you place a custom line style in the wrong direction, key in **Change Direction**, and then select the element.

For more information on custom line styles, see the *CDOT CADD Manual, Chapter Five – Drafting Standards, Section 5.7 – Line Styles* and follow the *CDOT Line Styles* links.

### CDOT LINE STYLES

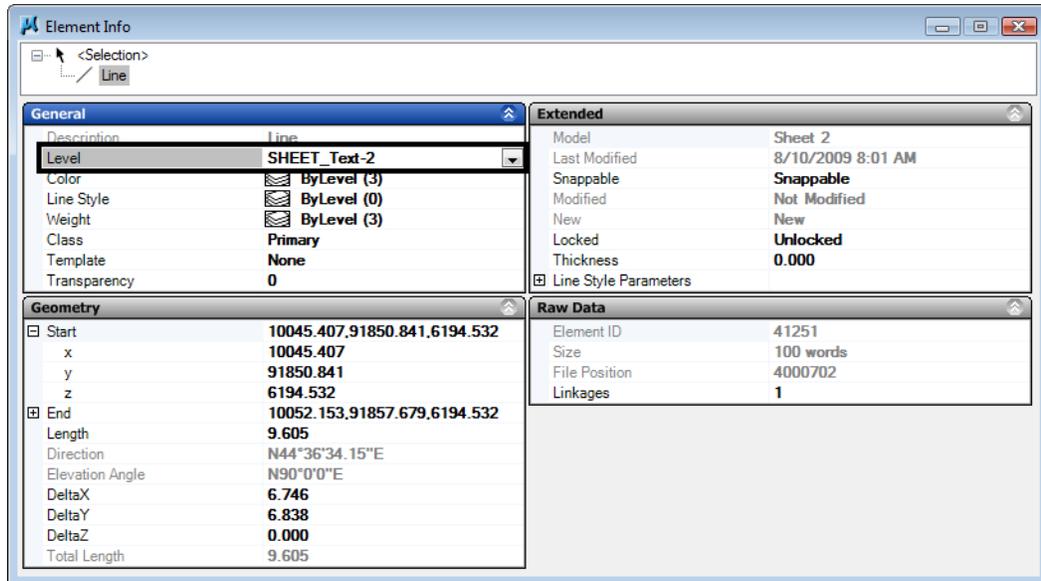
FFDS_Line		FENCE_Mover-Wire-Combination_proposed	
DES_CURBOUTTER_DL_3ft-Left_Existing		GEOT_Book_Existing	
DES_CURBOUTTER_DL_3ft-Right_Existing		GUERAIL_Barrier-Cable-Existing	
DES_CURBOUTTER_DL_3ft-Left_Proposed		GUERAIL_Barrier-Cable-Proposed	
DES_CURBOUTTER_DL_3ft-Right_Proposed		GUERAIL_Barrier-Type-1-7-Existing	
DES_CURBOUTTER_DL_3ft-Right_Proposed		GUERAIL_Barrier-Type-1-7-Proposed	
DES_LANE_Double-Yield_Existing		GUERAIL_Double-Type-3-5_Existing	
DES_LANE_No-Pass-Left_Existing		GUERAIL_Double-Type-3-5_Proposed	
DES_LANE_No-Pass-Right_Existing		GUERAIL_Left_Existing	
DES_LANE_Skip_Existing		GUERAIL_Left_Proposed	
DES_Road-Centerline_Existing		GUERAIL_Right_Existing	
DES_Top-Of-FIL_Proposed		GUERAIL_Right_Proposed	
DNVLEdge-Of-Wetland-Left_Existing		GUERAIL_Type-5-Minimal_Existing	
DNVLEdge-Of-Wetland-Right_Existing		HYDR_Erected-Fly-Proposed	
DNVLEditch-Outlet-Canal_Existing		HYDR_Erected-Proposed	
DNVLEditch-Outlet-Water-Str_Existing		LANE_Shrub-Left_Existing	
FENCE_Braced-Wire_Existing		LANE_Shrub-Right_Existing	
FENCE_Braced-Wire_Proposed		LANE_Tree-Left_Existing	
FENCE_Barrier_Existing		LANE_Tree-Right_Existing	
FENCE_Barrier_Proposed		MISC_DASH_150-100_Existing	
FENCE_Chain-Link_Existing		MISC_DASH_200-100_Existing	
FENCE_Chain-Link_Proposed		MISC_DASH_250-100_Existing	
FENCE_Chain-Barrier_Proposed		MISC_DASH_200-200_Existing	
FENCE_Fiber_Existing		MISC_DASH_300-100_Existing	
FENCE_Fiber_Proposed		MISC_DASH_400-150_Existing	
FENCE_Gate_Existing		MISC_SOLID-Double_Existing	
FENCE_Gate_Proposed		MISC_Wall-Proposed-Left	
FENCE_Noisium-Woods		MISC_Wall-Proposed-Right	
FENCE_Plastic		MISC_Wall_Existing	
FENCE_Sk_Existing		MISC_Existing	
FENCE_Sk_Proposed		PPHE_Gravel_Existing	
FENCE_Snow_Existing		PPHE_Gravel_Proposed	
FENCE_Snow_Proposed		RAIL_Sign-Post-Centerline_Existing	
FENCE_Wood_Existing		RDR-Barrier-Acc-Cent_Existing	
FENCE_Wood_Proposed		RDR-Barrier-Acc-Cent_Proposed	
FENCE_Mover-Wire-Combination_Existing			

## Changing Levels and ByLevel Symbology

If you place an element on the wrong level, and thereby place it with the wrong *ByLevel* symbology, you can change that element to the correct level. Once changed, the graphics will take on the new level's *ByLevel* symbology (as long as the element was originally placed *ByLevel*).

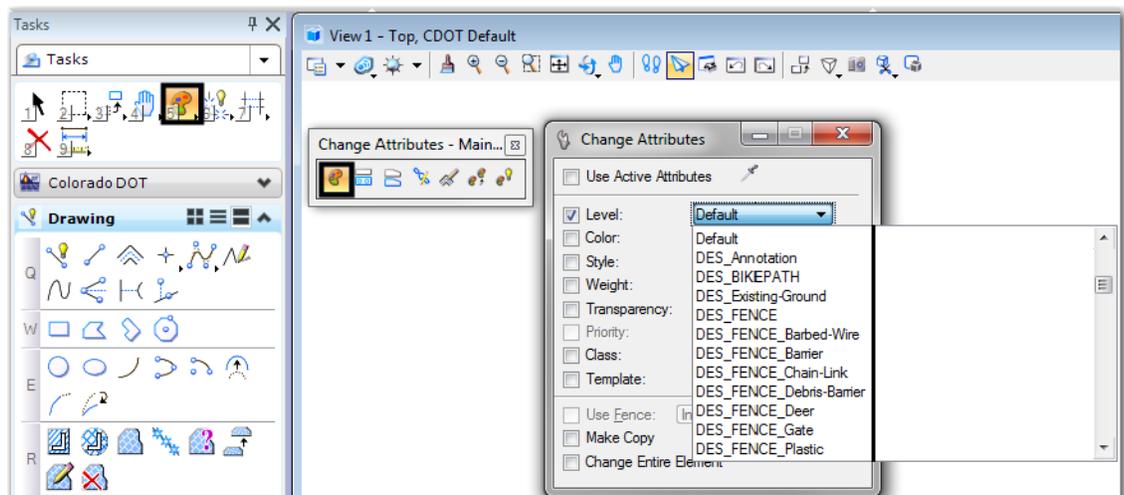
## Using Element Information

You can change the level of an element using the **Element Information** command.



## Using the Change Element Attributes tool

The **Change Element Attributes** command on the **Change Attributes** toolbar also allows you to change an element's level.



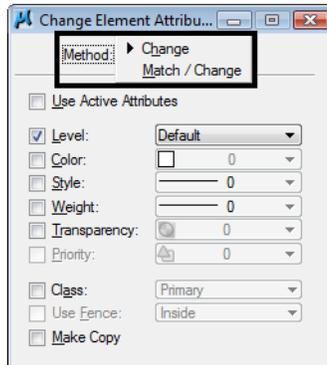
There are two options:

- **Change**

With this option, set the level you want to change to, then select the element.

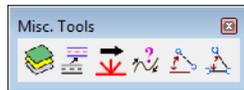
- **Match/Change**

With this option, you can change an element to a level by matching another element's level. First select the element to match, then select the element to change.



**Note:** *Be careful!* If **Use Active Attributes** is turned **on**, the level you set in the **Change** option, or the level you match in the **Match/Change** option, will become the **active level**. If you do not want to change your active level, turn this option **off**.

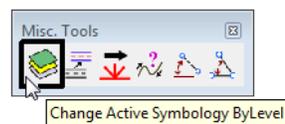
### The CDOT Misc. Toolbar



The CDOT Miscellaneous Tools toolbar (**Add On's > Launch Miscellaneous Tools** from the **CDOT Menu**) contains six useful tools:

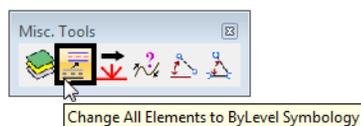
#### **Change Active Symbology ByLevel**

If you accidentally change the active color, line style or line weight in the **Change Element Attributes** command, you can re-set the actives back to **ByLevel** symbology with the **Change Active Symbology ByLevel** command.



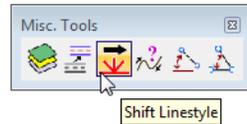
#### **Change All Elements to ByLevel Symbology**

If graphics have been placed with symbology other than **ByLevel** symbology, use the **Change All Elements to ByLevel Symbology** command. This is especially useful before plotting to ensure all graphics conform to CDOT standards.



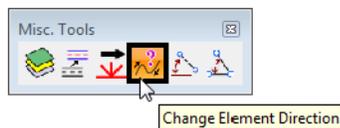
## Shift Linestyles

Sometimes custom line styles need to be shifted to meet in corners to avoid interference with other graphics. Use the **Shift Linestyle** tool to accomplish this.



## Change Element Direction

The display of some custom line styles is dependent on the direction the line was drawn. Use the **Change Element Direction** tool to reverse the line so that the style is displayed as desired.



## Active Angle From 2 PTs

Use the **Active Angle From 2 Pts** tool to set the active angle by the selection of two points.



## Active Angle From 3 Pts

Use the **Active Angle From 3 Pts** tool to set the active angle by the selection of three points.



## Tags

MicroStation tags are a special way of attaching information to elements drawn in the design file. For example, survey graphics contain tag information like feature name, the InRoads preference and description.

Use the **Review Tags** command on the **Tags** toolbar to obtain tag information on an element.

