

AutoCAD® Civil 3D® 2013 Essentials



Chapter 2

Parcels

This chapter contains the following topics:

- ✓ **Lines and Curves**
- ✓ **Introduction to Parcels**
- ✓ **Creating and Editing Parcels by Layout Overview**
- ✓ **Creating and Editing Parcels**
- ✓ **Renumbering Parcels**
- ✓ **Parcel Reports**
- ✓ **Parcel Labels**
- ✓ **Parcel Tables**

Learning Objectives

This chapter provides instruction to enable you to do the following:

2.1 Lines and Curves



Draw Parcels from a legal description using lines, curves or polylines, and transparent commands.

2.2 Introduction to Parcels



Create parcels from objects in the drawing or in an external reference file.



Change the properties and display order of parcels to ensure that the correct linetype and color are displayed.

2.3 Creating and Editing Parcels by Layout Overview



Design a parcel layout using the various Parcel Creation tools.

2.4 Creating and Editing Parcels



Subdivide parcels into smaller lots using the Parcel Layout tools.

2.5 Renumbering Parcels



Change the parcel numbers so that they are numbered in order.

2.6 Parcel Reports



Create predefined reports to share useful engineering data about the parcels created in the drawing.

2.7 Parcel Labels



Add annotation to parcels to communicate line bearing, distances, and areas for each lot.

2.8 Parcel Tables



Change area, line, and curve labels into tags and display in a table for better readability of the drawing.

 **Certification**

Topic:

✓ Lines and Curves

Objectives:

- ✓ Use the line and curve commands
- ✓ Use the Transparent command

2.1 Lines and Curves



Draw Parcels from a legal description using lines, curves or polylines, and transparent commands.

Often, the first thing that has to be drawn up is the legal description of the property being subdivided. Designers need to enter into the computer, in the form of lines and curves, what they are given in a text description. The AutoCAD® Civil 3D® software makes this task easy with the many options under the **Lines** and **Curves** commands in the *Home* tab>Draw panel. You can click the expansion arrow next to lines or curves, to display a number of options that AutoCAD® software does not contain, as shown in Figure 2–1.

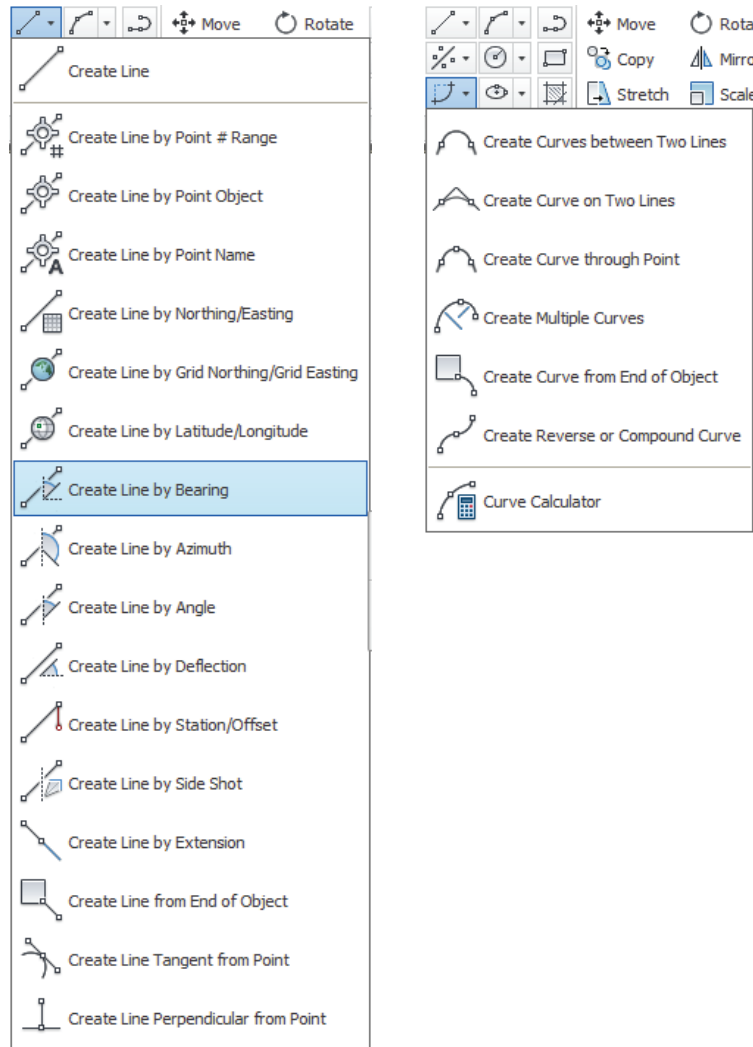




























Figure 2–1

A second option is to use transparent commands. These are similar to Object Snaps because they can only be accessed while in another command. Once the required command has been started, you can click the **Transparent** tool or type an apostrophe letter combination in the Command Line for the required **Transparent** command. The benefit to using these to draw parcels over the **Lines** and **Curves** options shown in Figure 2–1 is that a **Polyline** command can be used to create one entity rather than many individual lines that would need to be joined later.

Transparent Commands

Icon	Command Line	Description
	'AD	Specifies a point location at an angle and distance from a known point and direction.
	'BD	Specifies a point location at a bearing and distance from a known point (or the last point occupied).
	'ZD	Specifies a point location at an azimuth and distance from a known point (or the last point occupied).
	'DD	Specifies a point location at an angle and distance from a known point and previous direction.
	'NE	Specifies a point location using northing and easting coordinates.
	'GN	Specifies a point location using a grid northing and grid easting. (Note: You must have the drawing zone, coordinate system, and transformations set for grids.)
	'LL	Specifies a point location using latitude and longitude. (Note: You must have the drawing zone, coordinate system, and transformations set.)
	'PN	Specifies a point location using a point number found in the drawing or active project.
	'PA	Specifies a point location using a point name found in the drawing or active project.
	'PO	Specifies a point location by picking any part of an existing COGO point in the drawing.
	'ZTP	Zooms to a point within the drawing or active project by specifying the point number or name.
	'SS	Specifies a point location at an angle and distance from a known point and direction (uses the last two entered points to set the reference line).
	'SO	Specifies a point location at a station and an offset from an alignment in the current drawing.

	.g	Specifies a point location by picking any part of an existing COGO point in the drawing.
	.n	Specifies a point location by northing and easting.
	.p	Specifies a point location by specifying a COGO point number.
	'STAE	Specifies a profile view point location by specifying an alignment station in plan and an elevation.
	'SSE	Specifies a profile view point location by specifying a surface, an alignment station, and a point in plan view.
	'SPE	Specifies a profile view point location by specifying a COGO point and an alignment station in plan view.
	'PSE	Specifies a profile view point location by specifying a station and an elevation.
	'PGS	Specifies a profile view point location using grade and station values from a known point.
	'PGE	Specifies a profile view point location using grade and elevation values from a known point.
	'PGL	Specifies a profile view point location using grade and length values from a known point (or the last point occupied).
	'MR	Specifies a radius equal to that of an existing object.
	'ML	Specifies a length equal to that of an existing object.
	'CCALC	Calculates curve parameters based on input.

Practice 2a

Estimated time for completion: 20 minutes

Beginning a Subdivision Project



Draw a parcel from a legal description.

In this practice you will use the legal description below to draw a parcel. You will then create a parcel from the linework.

From the **POINT OF BEGINNING**; thence, S 00° 26' 42.2" W for a distance of 922.4138 feet to a point on a line. Thence, S 00° 24' 20.8" W for a distance of 508.3493 feet to a point on a line. Thence, S 66° 03' 35.8" W for a distance of 92.1845 feet to the beginning of a curve.

Said curve turning to the right through 42° 35' 49.2", having a radius of 627.1788 feet, and whose long chord bears S 87° 21' 30.4" W for a distance of 455.6165 feet to the beginning of another curve.

Said curve turning to the left through an angle of 19° 13' 40.4", having a radius of 154.4828 feet, and whose long chord bears N 80° 57' 25.2" W for a distance of 51.6000 feet.

Thence, S 89° 25' 44.6" W for a distance of 724.9442 feet to a point on a line. Thence, N 00° 11' 09.9" E for a distance of 1904.2647 feet to a point on a line. Thence, S 61° 50' 15.3" E for a distance of 135.9034 feet to a point on a line. Thence, S 64° 05' 35.8" E for a distance of 77.8201 feet to a point on a line. Thence, S 78° 09' 29.2" E for a distance of 63.8821 feet to a point on a line. Thence, S 66° 23' 19.5" E for a distance of 379.2248 feet to a point on a line. Thence, S 66° 17' 17.4" E for a distance of 278.5122 feet to a point on a line. Thence S 84° 58' 37.7" E a distance of 466.8116 feet to the **POINT OF BEGINNING**

Task 1 - Draw a parcel from a legal description.

1. Open **PCL1-A1-Parcels.dwg** from the *C:\Civil 3D Projects\Civil3D-Training\Parcels* folder.

- To make the annotation easier to read, change the current drawing scale. In the Status Bar, set the Annotation Scale to **1:40**, as shown in Figure 2–2.

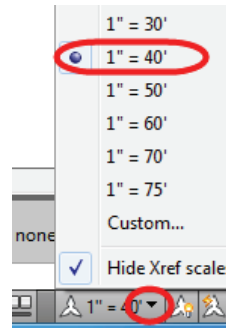






Figure 2–2

- Start the **Line** command. For the starting point, type **6257490.0191,2037127.1292**.
- Click  (Bearing Distance) in the Transparent Command toolbar. Use the legal description at the beginning of the practice to find the bearings and distances to type.
- For the first line, type **3** for the southwest quadrant. Type **0.26422** for the bearing. Type **922.4138** for the distance. Stay in the **Line** command with the **Bearing Distance Transparent** command running for the next few lines.
- Type **3** for the southwest quadrant, type **0.24208** for the bearing, and type **508.3493** for the distance.
- Type **3** for the southwest quadrant, type **66.03358** for the bearing, and type **92.1845** for the distance. Press <Esc> twice to end the command.
- When you come to the curve, click  (Create Curve from End of Object) in the *Home* tab>Draw panel. Select the last line that was drawn using the **Bearing Distance** command.
- Type **R** for radius and then type **627.1788** for the radius.
- Type **C** for Chord and then type **455.6165** for the chord length.
- Click  (Create Reverse or Compound Curve) in the *Home* tab>Draw panel. Select the last curve drawn.
- Type **R** for reverse curve and then type **154.4828** for the radius.

13. Type **C** for Chord and then type **51.6** for the chord length.
14. Start the **Line** command. For the starting point, pick the endpoint of the last arc drawn.
15. Click  (Bearing Distance) in the Transparent Command toolbar. Type **3** for the southwest quadrant, type **89.25446** for the bearing, and type **724.9442** for the distance.
16. Type **1** for the north-east quadrant, type **0.11099** for the bearing, and type **1904.2647** for the distance.
17. Type **2** for the south-east quadrant, type **61.50153** for the bearing, and type **135.9034** for the distance.
18. Type **2** for the south-east quadrant, type **64.05358** for the bearing, and type **77.8201** for the distance.
19. Type **2** for the south-east quadrant, type **78.09292** for the bearing, and type **63.8821** for the distance.
20. Type **2** for the south-east quadrant, type **66.23195** for the bearing, and type **379.2248** for the distance.
21. Type **2** for the south-east quadrant, type **66.17174** for the bearing, and type **278.5122** for the distance.
22. Press <Esc> once to exit the **Bearing Distance** command. Hold down <Ctrl> as you right-click and select **Endpoint**, select the starting point of the parcel to close on the point of beginning.
23. Start the **Polyline Edit** command by typing **PE**. Type **J** to select the **Join** option and join the two curves and all of the parcel lines to create one closed polyline. This prevents any closure errors that might arise later.
24. Save the drawing.

 **Certification**

Topic:

✓Parcels

Objectives:

✓Create parcels using parcel layout tools

2.2 Introduction to Parcels



Create parcels from objects in the drawing or in an external reference file.



Change the properties and display order of parcels to ensure that the correct linetype and color are displayed.

A Site under development (as shown in Figure 2–3), is the starting point for defining smaller parcels. The development's agreement or covenants determine the size, setback, and other criteria for the new parcels. If a parcel is residential, there might be restrictions affecting minimum parcel areas, setbacks, and where to locate a house. If it is a commercial property, there might be restrictions or specific mandates for access, traffic control, parking spaces, etc. The **Parcel Layout** commands are used for subdividing larger parcels.

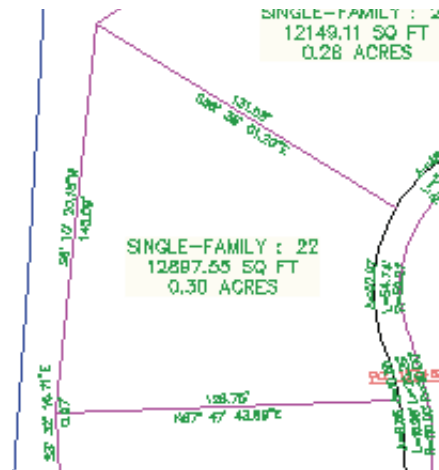


Figure 2–3

Sites, parcels, and alignments are closely related. Each can exist by itself and you do not need to have any alignments associated with the parcels. However, you often start with a site boundary and then divide the site into smaller parcels by placing alignments within its boundary.

- Parcels are listed in the *Prospector* tab in the Sites branch, as shown in Figure 2–4.

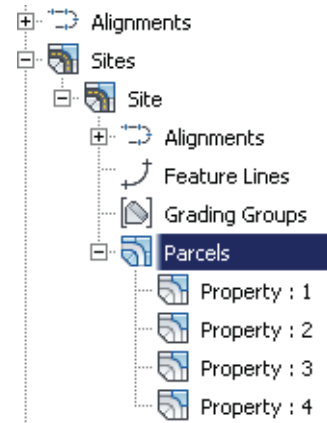


Figure 2–4

- When adding alignments to a site, the Parcels list is updated in the *Prospector* tab.
- As in all other AutoCAD Civil 3D objects, Parcel object layers are controlled in the Drawing Settings dialog box, in the *Object Layers* tab, as shown in Figure 2–5.

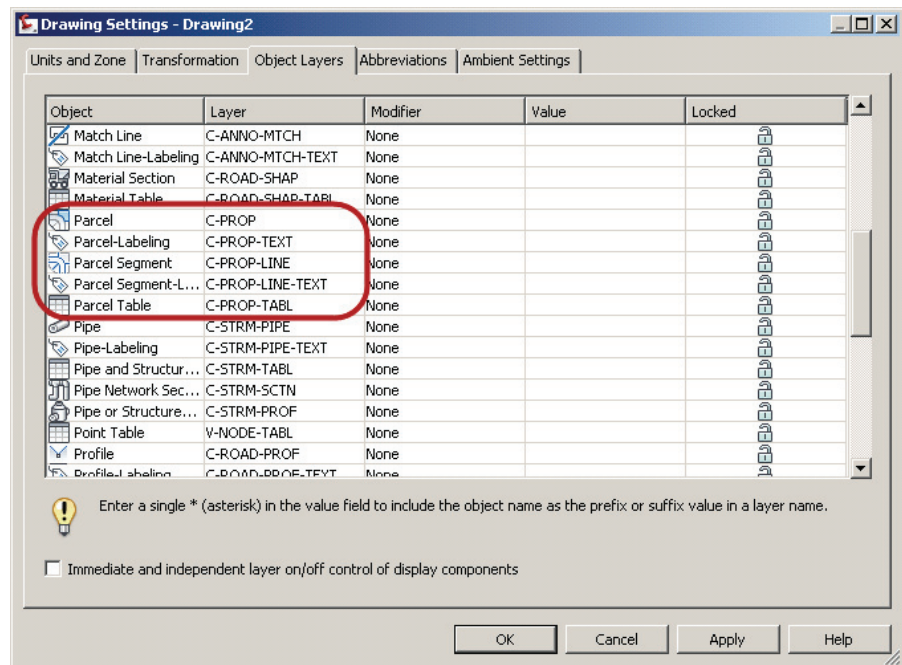


Figure 2–5

ROW Parcel

The right-of-way (ROW) parcel is related to the alignment and parcels. This special parcel represents land that is owned, maintained, and used for the community by a regulatory body (usually the local municipality). Typically, the ROW contains road, sidewalks, and utilities. The contents of the ROW depend on the covenants or agreements made before the site is developed. For example, in some cases the sidewalks and utilities might be located in an easement outside the road ROW.

- The AutoCAD Civil 3D software contains a **ROW** command, which creates a parcel using offsets from an alignment.
- A ROW parcel can represent the front yard definition of several potential parcels.
- While normal parcels automatically adjust to changes to an alignment, ROW parcels are static as shown in Figure 2–6. Therefore, you should only create ROW parcels after determining a final location for an alignment.

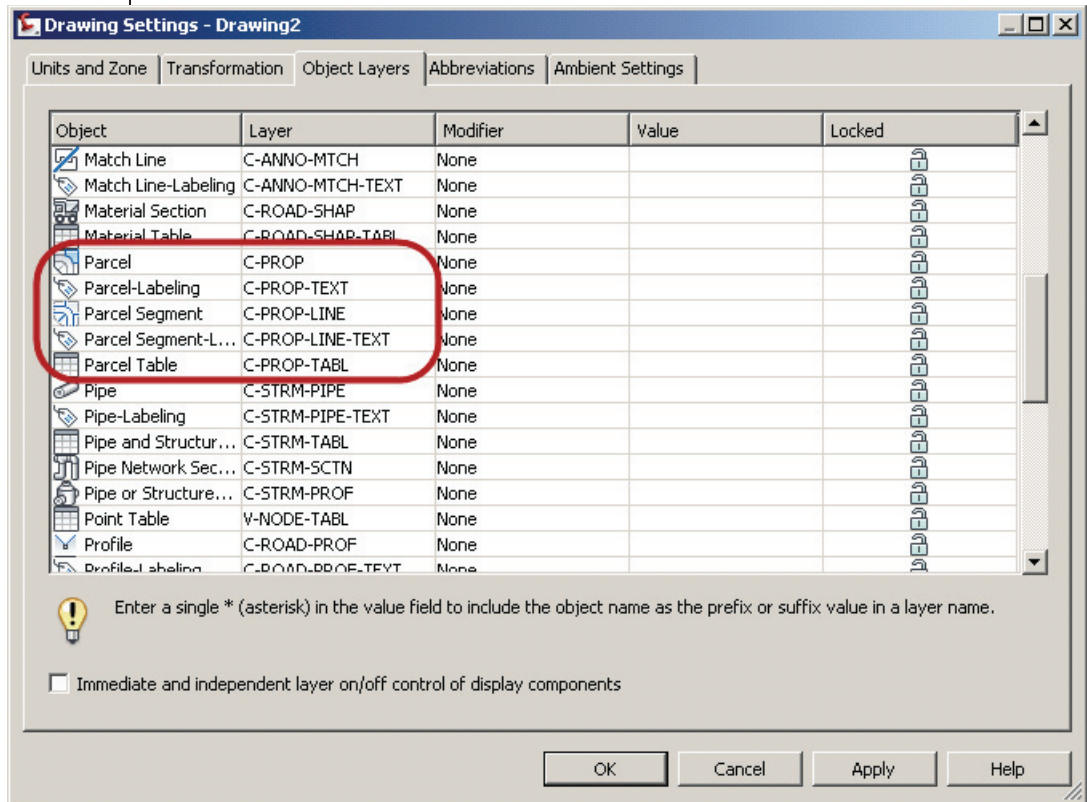


Figure 2–6

Parcel Style Display Order

Parcel segment display is controlled by parcel styles, and parcel lines can abut parcels with different styles. Select the **Parcels** collection (under *Sites*), right-click, and select **Properties**, as shown in Figure 2–7, to open the Site Parcel Properties dialog box. You can select which parcel style should take precedence in the *Parcel style display order* area in the Site Parcel Properties dialog box, as shown in Figure 2–7. Placing the style for the overall parent tract (the Site Parcel Style) at the top of the list causes the outside parcel lines to display differently than those inside.

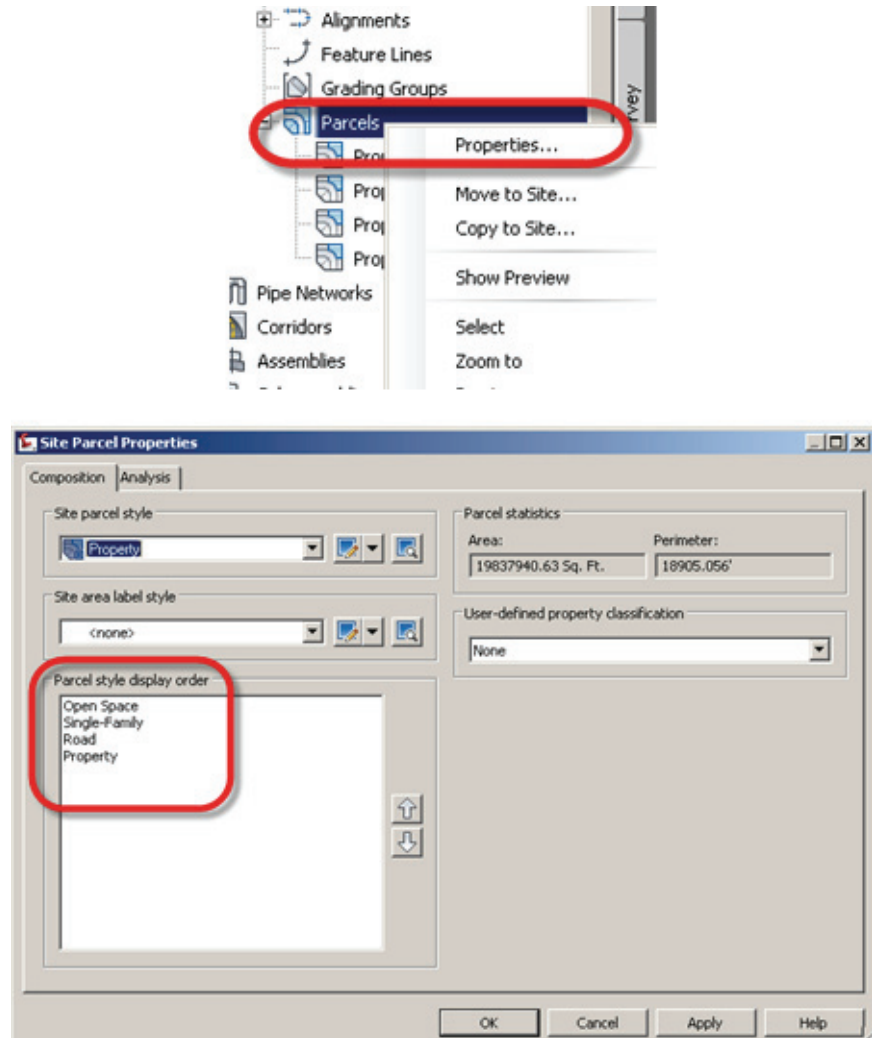


Figure 2–7

Parcel Properties

The properties of a parcel include its name, style, and an *Analysis* tab containing the parcel's area, perimeter, and point-of-beginning (POB). The Parcel Property's *Composition* tab displays the label style, area, and perimeter, as shown in Figure 2–8.

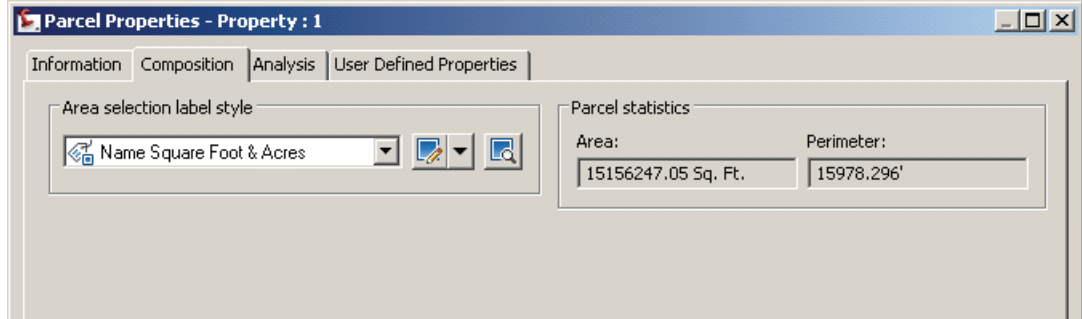


Figure 2–8

The *Analysis* tab contains a parcel boundary Inverse or Mapcheck analysis. In the upper right area of the tab, you can change the POB location and the analysis direction, as shown in Figure 2–9.

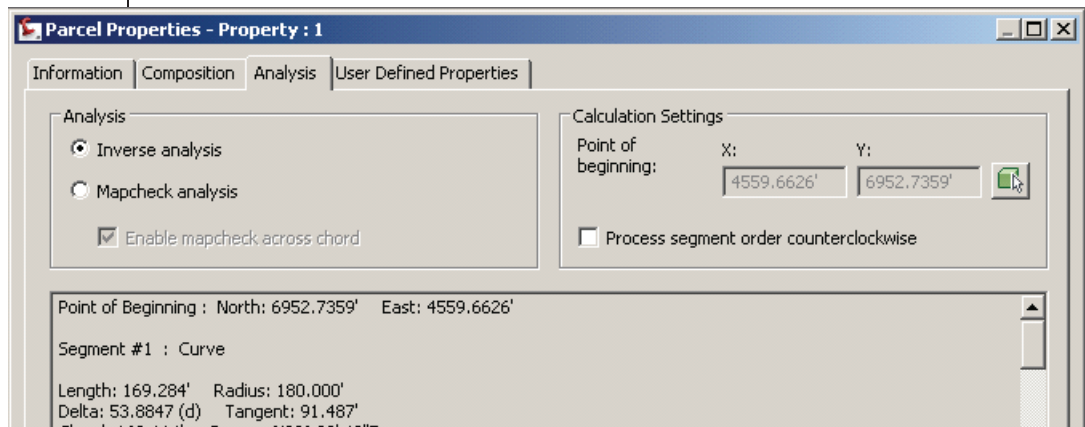


Figure 2–9

- The Mapcheck analysis precision is the same as the drawing distance precision.
- The Inverse report precision is set to the precision of the AutoCAD Civil 3D software (10 to 12 decimal places).
- The default direction of a Mapcheck or Inverse analysis is clockwise. You can change the direction to counter-clockwise if needed.
- A POB can be any vertex on the parcel's perimeter.

The *User Defined Properties* tab contains site-specific details, such as the *Parcel Number*, *Parcel Address*, *Parcel Tax ID*, and other properties you might want to define, as shown in Figure 2–10. Custom properties can be assigned to a drawing by using the *User Defined Property Classifications* area in the *Settings* tab, under the *Parcels* collection.

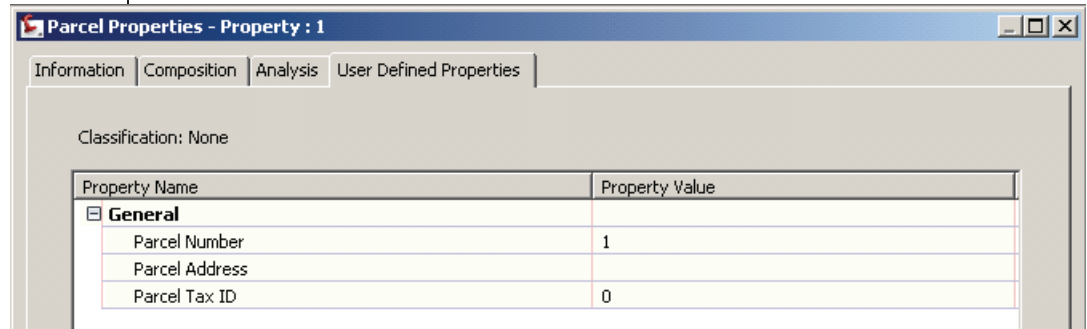


Figure 2–10

Parcel Labels and Styles

There are two types of parcel annotation: an area label for the parcel itself and the segments defining the parcel.

A parcel area label usually consists of a parcel's number or name, area, and perimeter, as shown in Figure 2–11. Most offices define their own parcel label styles. A parcel label style can include several additional parcel properties, address, PIN, Site name, etc. In the AutoCAD Civil 3D software, you select a parcel by selecting a parcel area label, not the parcel segments.



Figure 2–11

Create Parcels from Objects

The AutoCAD Civil 3D software can create parcels from AutoCAD objects, such as closed polylines and closed sequences of lines and arcs. Avoid gaps, multiple polyline vertices at the same location, and polylines that double-back over themselves, which might lead to errors in parcel layouts.

These objects can be selected in the current drawing or from an XREF. Note that AutoCAD Civil 3D parcel lines in an XREF cannot be selected (only lines, arcs, and polylines can be selected). Additionally, AutoCAD Civil 3D parcels created from AutoCAD objects do not maintain a relationship to the objects after creation.

Creating Right-of-Way Parcels

Once a site contains property that has been defined as a parcel and alignments have been generated, you are ready to start creating subdivision plans. One command that can speed up the process is **Parcels>Create ROW**. It automatically creates Right-of-Way parcels based on alignment setbacks.

ROW parcels do not automatically update when alignments change. Therefore, you might want to create ROWs after you are certain where you want the alignments to be for this alternative.

Hint: Multiple Alternatives in the Same Drawing

Sites enable you to organize alignments, parcels, and related data into separate containers, so that parcel lines from one site alternative do not clean up with parcel lines in others. However, sites do not offer layer or other kind of visibility control. Therefore, if you intend to have multiple parcel layout alternatives in the same drawing, you should consider placing parcel area labels and parcel segments on different layers.

Practice 2b

Estimated time for completion: 15 minutes

Create Parcels From Objects



Create parcels from objects in the drawing or external reference file.

Task 1 - Create a Site parcel from objects.

1. Continue working with the drawing from the previous practice or open **PCL1-B1-Parcels.dwg**.
2. Create a parcel from existing objects in Model Space. In the *Home* tab>Create Design panel, expand Parcel and select **Create Parcels from Objects**, as shown in Figure 2–12.

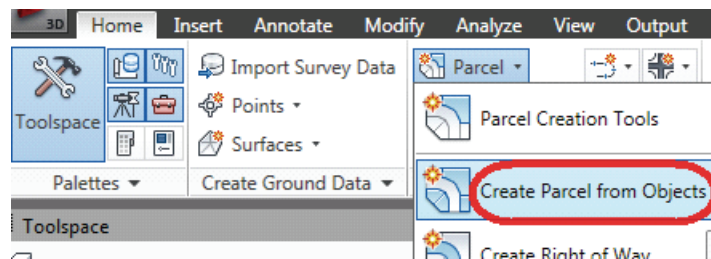
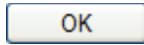


Figure 2–12

3. In the model, select the polyline that represent the property boundary and press <Enter> when done selecting. Set the following parameters:
 - Site: **Site 1**
 - Parcel style: **Property**
 - Area Label style: **Name Area & Perimeter**
 - Erase existing entities: Select this option.

4. Enter the remaining values as shown in Figure 2–13. Click



to accept and close the dialog box.

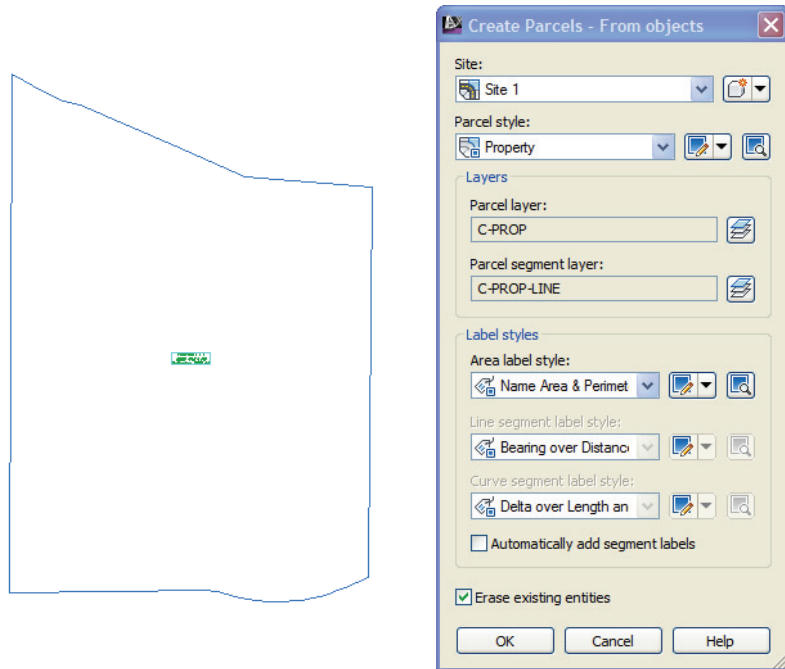


Figure 2–13

5. One parcel will be created. In the *Prospector* tab, expand the current drawing branch and the **Sites** branch. Continue to expand until you reach the *Parcels* branch, as shown in Figure 2–14. Note: If the + is not displayed next to *Parcels*, press <F5> to refresh the *Prospector* tab view.

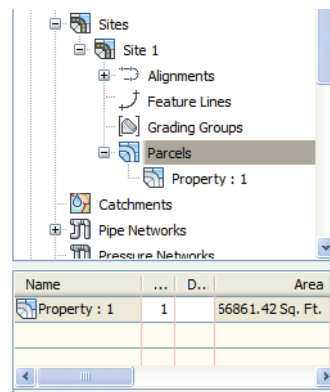


Figure 2–14

Task 2 - Create a new site and parcel from referenced objects.

You have received a drawing from the Land planning department that shows the street layout and different parcels. Using this plan, you will create parcels from xref objects.

1. Continue working with the drawing from the previous task or open the file **PCL1-B2-Parcels.dwg**.
2. Create a new site branch in which you can store all of the parcels that are relevant to the Main development site. In the *Prospector* tab, right-click on the Sites branch and select **New**. Type **C3D Training** as the name and click to close the dialog box.
3. You now need to move the Property:1 Parcel from Site 1 to the C3D Training site. Expand the *Site1* collection, expand the *Parcels* collection, right-click on Property:1 parcel and select **Move to Site**, as shown on the left in Figure 2–15.
4. In the Move to Site dialog box, select **C3D Training**, as shown on the right in Figure 2–15. Click to close the dialog box. Only the required parcel is moved to the project site and the others are removed.

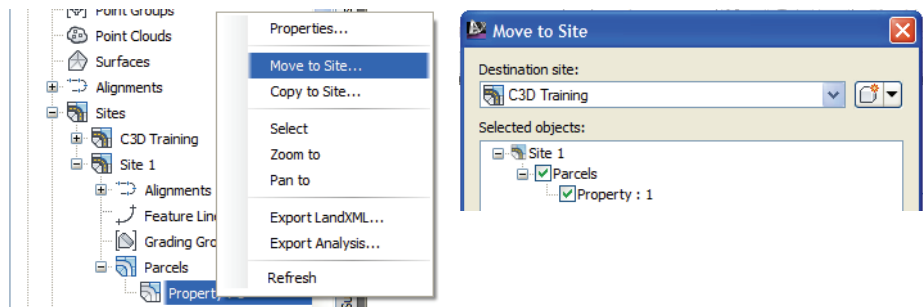


Figure 2–15

5. To save time, the x-referenced drawing **Base-original Property**, has already been referenced. Note that you have set the zone and units for the project drawings. This enables you to geo reference the drawings using **Locate using Geographic data**, as shown in Figure 2–16.

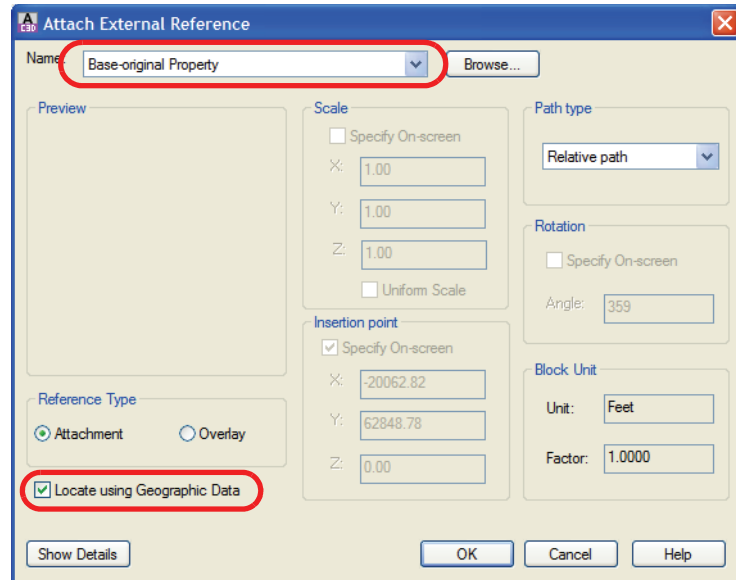



Figure 2–16

6. Thaw the layer **Base-originalProperty|A-Property-Future**.
7. To create parcels from the xref file, in the *Home* tab>Create Design panel, expand Parcel and select **Create Parcels from Objects**. Type **X** (for xref) in the Command Line and press <Enter>.
8. When prompted to select the xref objects, type **WP** (for window poly) in the Command Line and press <Enter>. Draw a boundary, which contains all of the polylines that define the internal site, as shown on the left in Figure 2–17. Once you have finished defining the boundary, end the **WP selection** command by pressing <Enter>. Press <Enter> again to end the **XREF selection** command.
9. In the Create Parcels - From Objects dialog box, verify that the Site name is **C3D Training** and accept the remaining defaults, as shown on the right in Figure 2–17. Click  to close the dialog box.

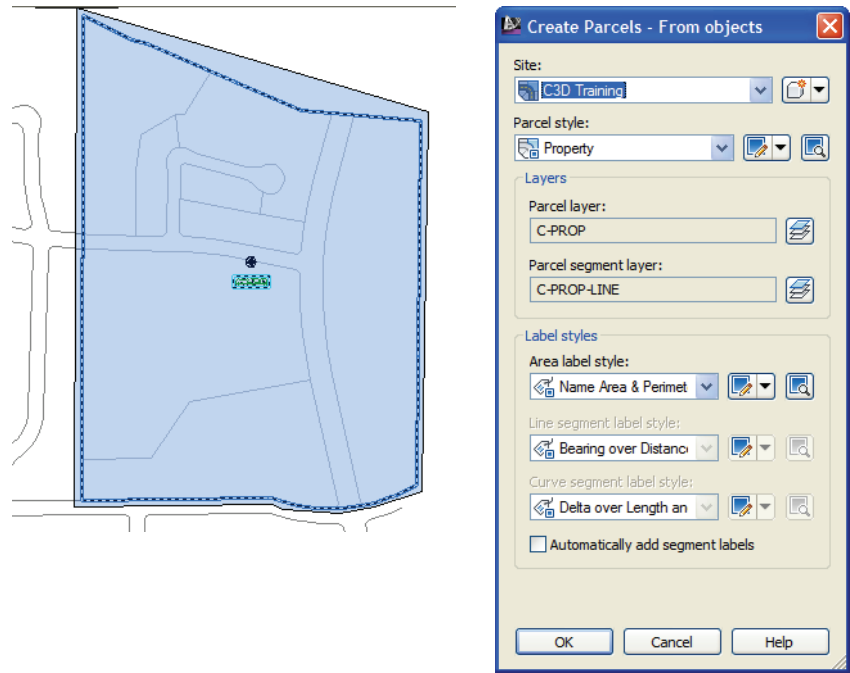


Figure 2–17

10. The project site has nine parcels. Using Quick Properties, select each of the parcel labels and rename the parcels according to Figure 2–18. Note that your default parcel numbers might be different because the parcels are numbered randomly.

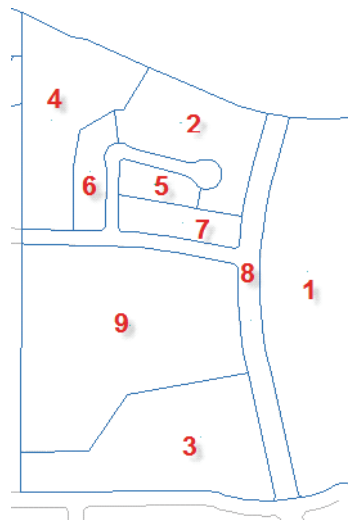



Figure 2–18

Property Name	Style
1. Commercial C1	Property
2. Multi Family MF	Property
3. Municipal Reserve MR	Property

4. Pond PUL	Open Space
5. Residential BLK2 R1	Property
6. Residential BLK1 R1	Property
7. Residential BLK3 R1	Property
8. Right Of Way	Road
9. School MSR	Property

11. In the Site Parcel Properties dialog box, select **Property** in the *Parcel style display order* area, as shown in Figure 2–19.

Click  to move it up in the list.

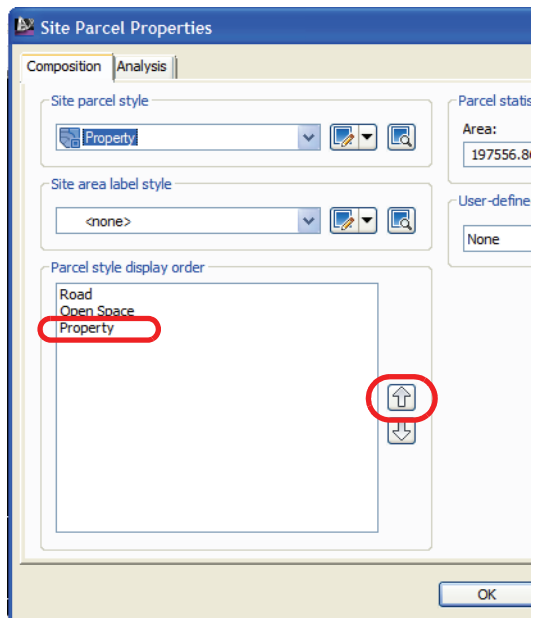


Figure 2–19

12. Click .

13. Save the drawing.


Certification
Topic:

✓ Parcels

Objectives:

✓ Design a parcel layout

2.3 Creating and Editing Parcels by Layout Overview



Design a parcel layout using the various Parcel Creation tools.

In addition to creating parcels from polylines, arcs, and lines, the AutoCAD Civil 3D software can also intelligently create (and adjust) parcels using commands in the Parcel Layout Tools toolbar. To open the Parcel Layout Tools toolbar, expand Parcel in the Create Design panel, and select **Parcel Creation Tools**, as shown in Figure 2–20.

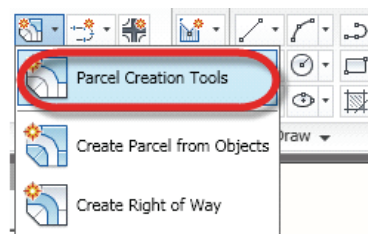




Figure 2–20

-  (Create Parcel) assigns parcel creation settings, such as parcel type, labeling styles, and other parameters.
- The **Line** and **Curve** commands can be used to create individual line and curve parcel segments. Segments created with these tools are considered *fixed*.
-  (Draw Tangent - Tangent with No Curves) enables you to create a series of connected parcel line segments.

- The Parcel Sizing flyout (shown in Figure 2–21), contains a list of commands for creating and editing parcels. The methods used to create parcels include defining the last parcel segment by slide direction, slide angle, swing line, or freehand drawing of a parcel boundary. The most frequently used method is **Slide Line**.

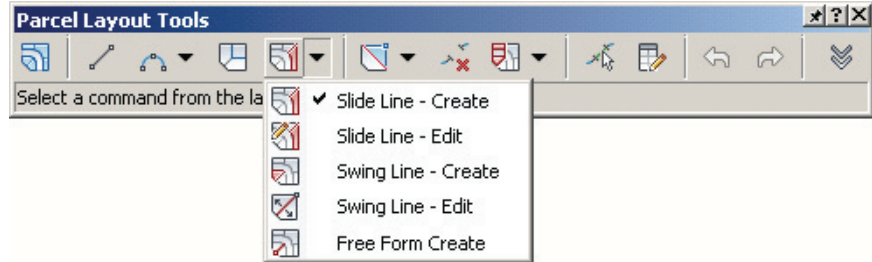





Figure 2–21

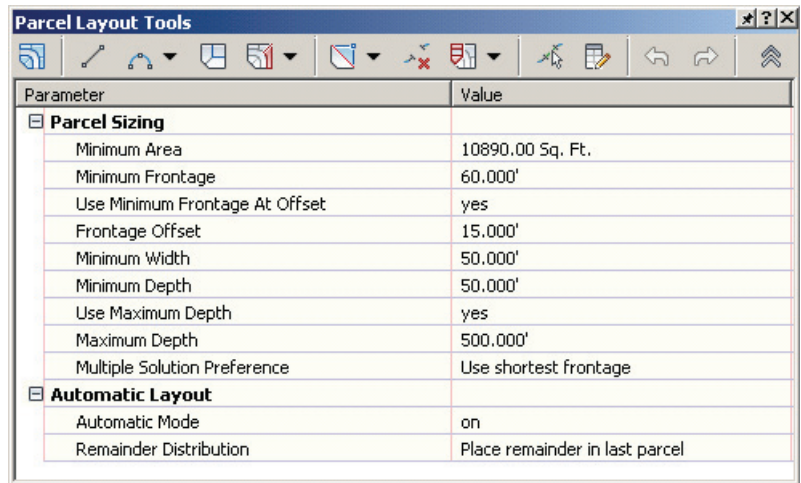
- The commands at the center of the toolbar (shown in Figure 2–22), enable you to further edit parcel segments. These commands include inserting or deleting PIs (points of intersection), deleting parcel segments, or creating or dissolving parcel unions.



Figure 2–22

-  (Pick Sub-Entity) enables you to select a parcel line and display its details in the Parcel Layout Parameters dialog box.
-  (Sub-entity Editor) opens and closes the Parcel Layout Parameters dialog box.
- The next two commands enable you to **Undo** and **Redo** parcel edits. These can be used while the Parcel Layout Tools have been opened.

- The drop-down arrow () expands the toolbar to display the Parcel Creation parameters, as shown in Figure 2–23 (also accessible through the Command Settings of *CreateParcelByLayout* in the *Settings* tab).



Parameter	Value
Parcel Sizing	
Minimum Area	10890.00 Sq. Ft.
Minimum Frontage	60.000'
Use Minimum Frontage At Offset	yes
Frontage Offset	15.000'
Minimum Width	50.000'
Minimum Depth	50.000'
Use Maximum Depth	yes
Maximum Depth	500.000'
Multiple Solution Preference	Use shortest frontage
Automatic Layout	
Automatic Mode	on
Remainder Distribution	Place remainder in last parcel

Figure 2–23

- The *Parcel Sizing* area sets the minimum area for parcels to be laid out. *Minimum Frontage* sets the minimum width of a parcel at the ROW or at a setback from the ROW.
- *Use Minimum Frontage At Offset* specifies whether or not to use frontage offset criteria.
- *Frontage Offset* sets the default value for the frontage offset from the ROW.
- *Minimum Width* sets the default minimum width at the frontage offset.
- *Minimum Depth* sets the minimum depth of new or existing parcels at the mid-point and is perpendicular to the frontage of the parcel.
- *Use Maximum Depth* specifies whether or not to use maximum depth criteria.
- *Maximum Depth* sets the maximum depth for new parcels or when editing parcels.
- *Multiple Solution Preference* specifies whether or not to use the shortest frontage or the smallest area when multiple solutions are encountered.
- *Automatic Layout* affects how parcel auto-sizing subdivides a parcel block.


Certification
Topic:

✓Parcels

Objectives:

✓Create parcels using parcel layout tools

2.4 Creating and Editing Parcels



Subdivide parcels into smaller lots using the Parcel Layout tools.

The **Create Parcel by Layout** tools can help you to quickly create a subdivision plan. Although these tools can make your job easier and are faster than manual drafting, they are only effective in creating the last side of new parcels. Therefore, you might need to create additional (or adjust) parcel lines manually to guide the AutoCAD Civil 3D software to the best solution. For example, the area shown in Figure 2–24, requires you to create minimum 950 sq m (10,225 sq ft) parcels.

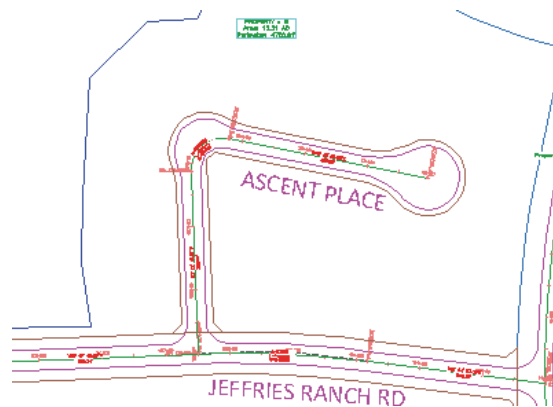


Figure 2–24


The back parcel lines (those along the west and south of the Cul-De-Sac area, and between Jeffries Ranch Rd and Ascent Place) were drawn manually and saved in a separate drawing file. Once inserted, they are used to guide the creation of the parcels next to Ascent Place. If you ask the AutoCAD Civil 3D software to automatically subdivide this area, the result is a total of 15 residential lot parcels, as shown in Figure 2–25.



Figure 2-25

The various creation and editing techniques available in the Create Parcel by Layout toolbar are as follows:

Freehand

The **Line** and **Curve** commands and  (Draw Tangent - Tangent with No Curves) enable you to create lot lines without having to specify an area. In contrast, the following commands all create parcels based on a specified area.

Slide Line

The **Slide Line - Create** command enables you to subdivide a larger parcel by creating new parcel lines that hold a specific angle relative to the Right-of-Way, such as 90° or a specific bearing or azimuth. The **Slide Line - Edit** command enables you to modify a parcel to a specified area while holding the same angle from the ROW or a specific bearing or azimuth. The commands are shown in Figure 2-26.

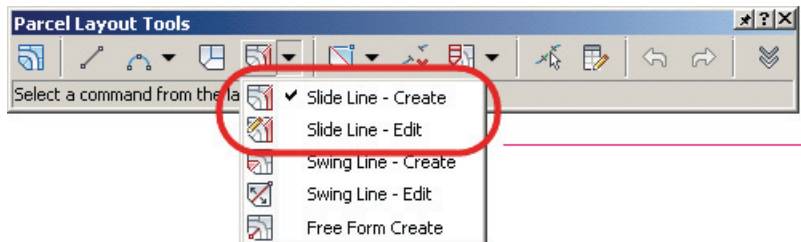


Figure 2-26

Swing Line

The **Swing Line - Create** command enables you to create a new parcel by creating a parcel segment that connects to a specified point, such as a property corner. The **Swing Line - Edit** command enables you to resize a parcel while specifying a lot corner. These commands are shown in Figure 2–27.

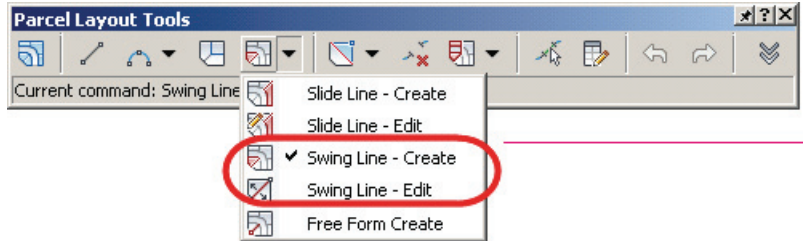


Figure 2–27

Free Form Create

The **Free Form Create** command enables you to create a new lot by specifying an area, attachment point and angle, or two attachment points.

Frontage

When using these routines, you are prompted to select a parcel interior point and trace its frontage geometry. This is a critical step. As you trace the frontage, the command creates a jig (heavy highlight) that recognizes the changing geometry of the frontage line work.

Practice 2c

Estimated time for completion: 15 minutes

Creating and Editing Parcels



Create and edit parcels to maximize the number of lots you can create with the required area and frontage.



You have three parcels zoned as single-family residential: Block 1 (1.31ac), Block2 (0.94ac), and Block3 (1.47ac). Your client, the land developer, requires you to maximize the number of lots in these three parcels, while noting the minimum area and frontages as required by the Land Use bylaws.

Task 1 - Create parcels by slide angle.

1. Continue working with the drawing from the previous practice or open **PCL1-C1-Parcels.dwg** from the *C:\Civil 3D Projects\Civil3D-Training\Parcels* folder.
2. In the *View* tab>Views panel, select the preset view **C3D-Parcel-Create parcel**.
3. In the *Home* tab>Create Design panel, expand Parcel and select **Parcel Creation Tools**. The Parcel Layout Tools toolbar displays as shown in Figure 2–28.



Figure 2–28

4. Click  and enter the values shown in Figure 2–29. As you enter each value, note the values in the dialog box. They identify the uses of the values. When finished, click  to collapse the expanded toolbar.

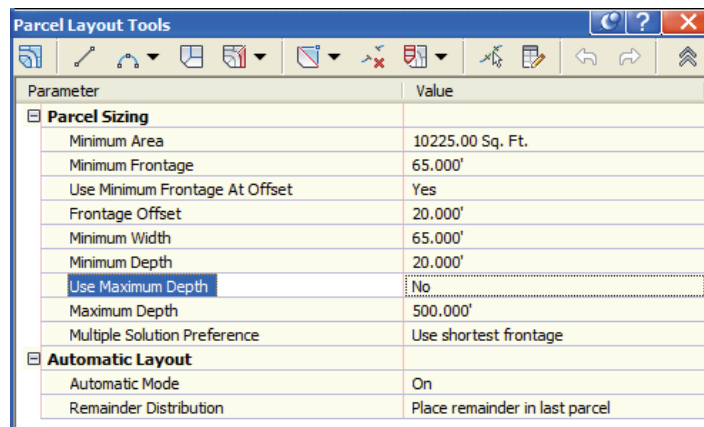



Figure 2–29

5. In the Parcel Layout Tools toolbar, expand  and select **Slide Line - Create**, as shown in Figure 2–30.

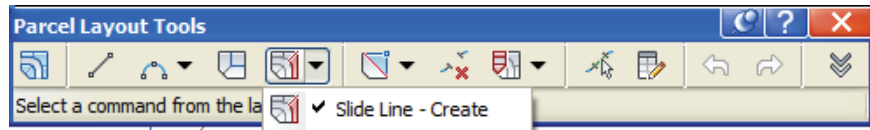


Figure 2–30

6. In the Create Parcels - Layout dialog box, set the following parameters, as shown in Figure 2–31:

- Site: **C3D Training**
- Parcel style: **Single-Family**
- Area label style: **Name Square Foot & Acres**

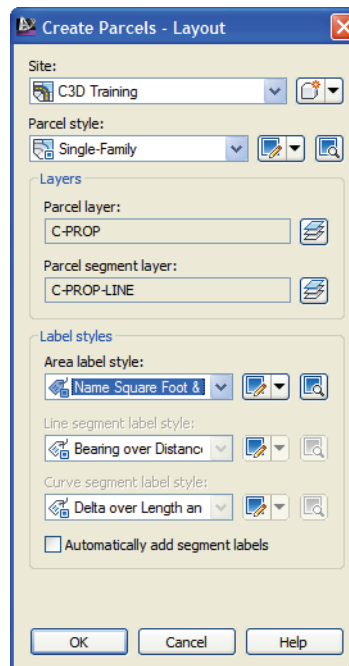
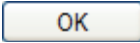


Figure 2–31

7. Click  to accept the changes and close the dialog box.
8. When prompted to select the parcel to be subdivided, select the label for parcel **RESIDENTIAL BLK1 R1**, as shown in Figure 2–32.

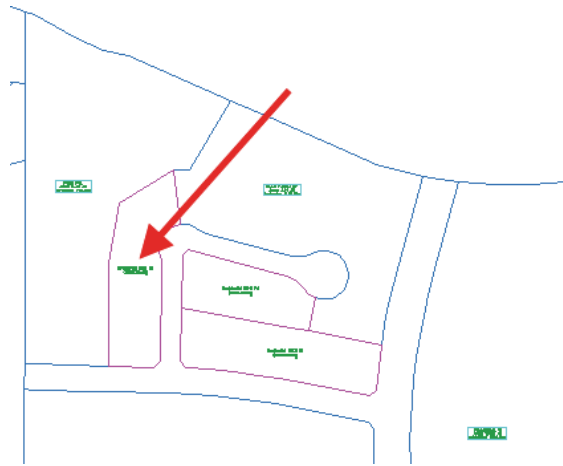


Figure 2-32

9. When you are prompted for the *starting point on frontage*, select the south end of the corner cut. Press <Ctrl>, right-click, and select **endpoint**. Then select the corner cut, **Pt1**, shown in Figure 2-33.
10. When prompted for the *end point of the frontage*, set the end point of the property line to the north, **Pt 2**, as shown in Figure 2-33. Use the same process as the previous step to set the end point.
11. When prompted for the *angle of the property line* that will be used to define each lot, select a point east of the parcel near **Pt 3**, as shown in Figure 2-33. For the second point, press <Ctrl>, right-click, and select **Perpendicular**. Then select the line at Pt 4.

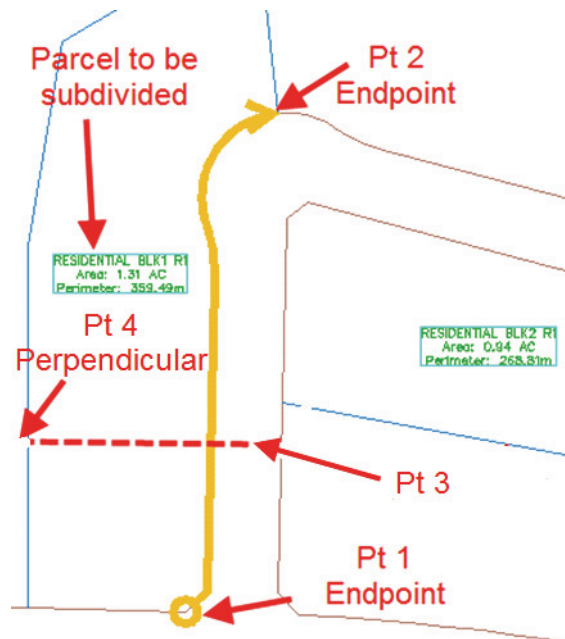


Figure 2-33

12. When prompted to *Accept results*, press <Enter>.
13. When prompted to select another parcel to subdivide, press <Enter> to end the command.
14. Type **X** at the Command Line to exit the layout tool.
15. Save the drawing.


Certification
Topic:

✓ Parcels

Objectives:

✓ Select styles to annotate parcels

2.5 Renumbering Parcels



Change the parcel numbers so that they are numbered in order.

Creating parcels using the methods that have already been taught results in inconsistent parcel numbering. AutoCAD Civil 3D parcels can be renumbered individually using Parcel Properties, or in groups using **Modify>Parcel>Renumber/Rename**.

This command enables you to specify a starting parcel number and the increment you want to have between parcels. (It also enables you to rename your parcels based on a different name template.) When renumbering, the command prompts you to identify parcels in the order in which you want to have them numbered. The Renumber/Rename Parcels dialog box is shown in Figure 2–34.

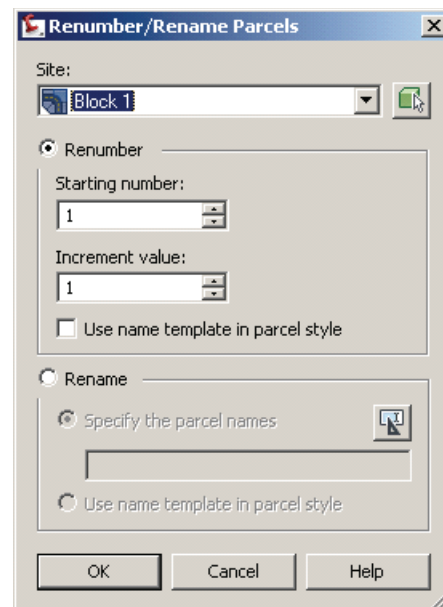


Figure 2–34

Practice 2d

Estimated time for completion: 15 minutes

Rename/Renumber Parcels



Renumber the lots created so that they are in sequential order.

Task 1 - Rename and renumber parcels.

1. Continue working with the drawing from the previous practice or open **PCL1-D1-Parcels.dwg**.
2. In the *View* tab>*Views* panel, select the preset view **C3D-Parcel-Create parcel**.
3. Before renaming the newly created parcels, you need to change the label style of the original parcel. Select the parcel label **RESIDENTIAL BLK1 R1**, right-click, and select **Edit Area Selection Label Style**. Select **Name Square Foot & Acres** as the style and click to apply the changes and close the dialog box, as shown in Figure 2–35.

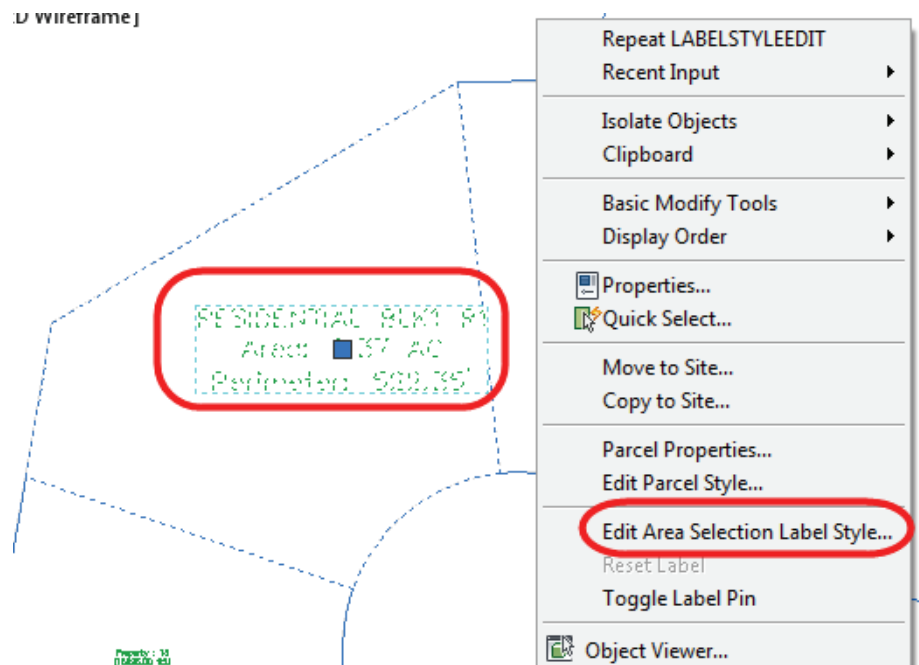


Figure 2–35

4. Rename and renumber the lots so that you have the same numbering system. In the *Modify* tab>*Design* panel, select **Parcel**. The *Parcel* contextual tab displays.

5. In the *Parcel* tab>Modify panel, select **Renumber/Rename**, as shown in Figure 2–36.

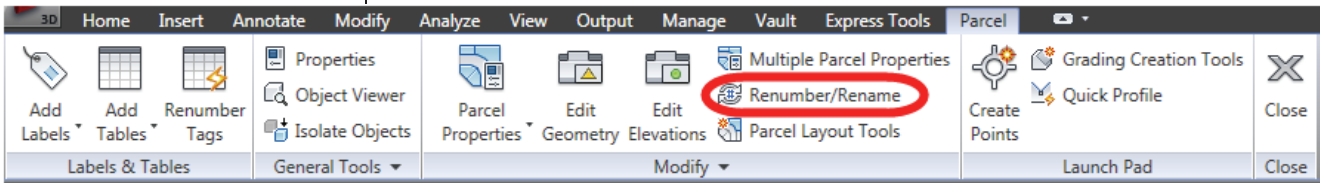



Figure 2–36

6. In the Renumber/Rename Parcel dialog box, select the **Rename** option. Select the **Specify the parcel names** option and click , as shown in Figure 2–37.

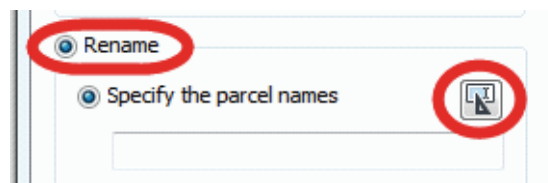
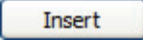
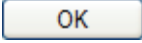


Figure 2–37

7. In the Name Template dialog box, type **BLK1 Lot** followed by a space in the *Name* field, as shown in Figure 2–38. Expand the Property Fields drop-down list, select **Next Counter**, and click . Click  to apply the changes and close the dialog box.

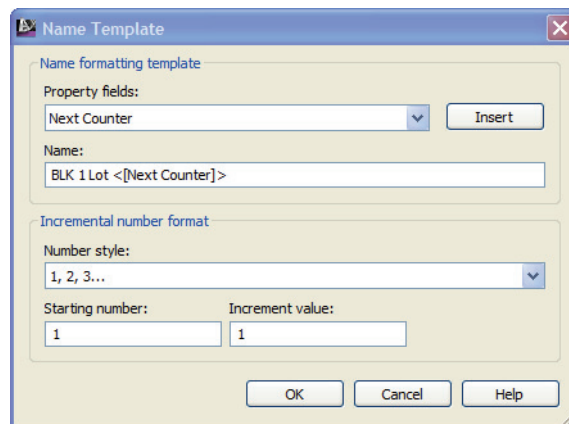
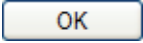


Figure 2–38

8. In the Renumber/Rename Parcel dialog box, click  to accept the changes and close the dialog box.

9. When prompted for the points, select all of the parcels to be renumbered. Select the three points shown in Figure 2–39 and press <Enter> to complete the selection. Press <Enter> again to exit the command.

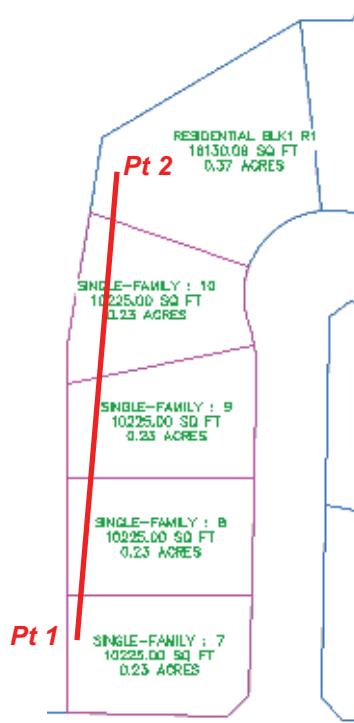


Figure 2–39

10. Save the drawing.

Task 2 - Edit parcels using Swing Line - Edit.

In this task, you adjust the last three lots of the parcel (or lotting plan) so that they are more marketable.

1. Continue working with the drawing from the previous task or open the file **PCL1-D2-Parcels.dwg**.
2. You first need to adjust the Lot line between Parcel 3 and Parcel 4. In the *Home* tab>Create Design panel, select **Parcel**. In the expanded list, select **Parcel Creation Tools**.

- In the Parcel Layout Tools toolbar, select **Swing Line - Edit**, as shown in Figure 2–40.

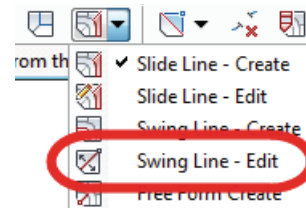


Figure 2–40

- In the Create Parcel - Layout dialog box, set the following parameters, as shown in Figure 2–41:

- Site: **C3D Training**
- Parcel Style: **Single-Family**
- Area Label style: **Name Square Foot & Acres**

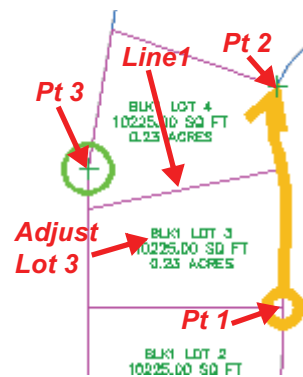




Figure 2–41

- You do not want to label segments, so do not enable this option. Click when done.
- When prompted to select the parcel line to adjust, select the parcel line between Lot 3 and Lot 4.
- When prompted for the parcel to adjust, select **Lot 3**.
- When prompted for the *start frontage*, select the bottom right corner of **Lot 3, pt1**. When prompted for the *end of the frontage*, select the top right corner of **Lot 4, pt2**.
- When prompted for the *swing point*, select the end point of **pt3**.
- When prompted to accept the results, type **yes** and press <Enter>.

11. You have the required results for Lot 3. However, Lot 4 is 10225.00 sqft and Lot 5 is 16130.09 sqft. You want to create even-sized lots, each being approximately 13,177.5 sqft. Display the Parcel Layout Tools toolbar if it is not visible.
12. You should still be in the **Swing Line - Edit** command. (If not, repeat Steps 2 to 3 of this task.)
13. In the Parcel Layout Tools toolbar, click  to expand it. Change the minimum area to **13,177.5 sqft**. Collapse the toolbar if needed by clicking .
14. When prompted to select the parcel line to adjust, select the parcel line between Lot 4 and Lot 5 (Line 1).
15. When prompted for the parcel to adjust, select **Lot 4**.
16. When prompted for the *start frontage*, select the bottom right corner of **Lot 4, pt1**. When prompted for the *end of the frontage*, select the top right corner of **Lot 5, pt2**.
17. When prompted for the *swing point*, select the end point of **pt3**, as shown in Figure 2–42.

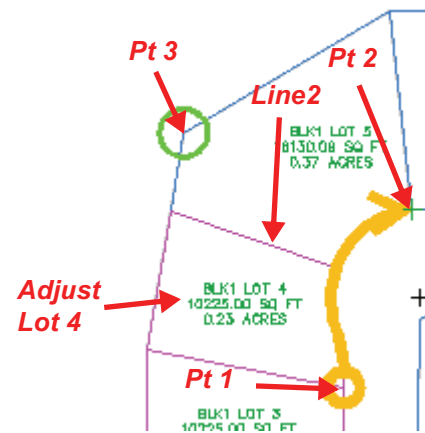


Figure 2–42

18. When prompted to accept the results, type **yes** and press <Enter>.
19. Press <Esc> or click **X** in the Parcel Layout Tools dialog box to close it.
20. If time permits, repeat the steps above to subdivide the Parcels Block 2 and Block 3. If you do not complete the subdivisions for Parcels Block 2 and Block 3, you will need to open **PCL-C1-Parcels** in the next practice.
21. Save the drawing.

2.6 Parcel Reports



Create predefined reports to share useful engineering data about the parcels created in the drawing.

The AutoCAD Civil 3D software contains several types of parcel reports. Parcel Inverse and Mapcheck data is available in the *Analysis* tab in the Parcel Properties dialog box, as shown in Figure 2–43. The report can be generated clockwise or counter-clockwise, and the point of beginning can be specified.

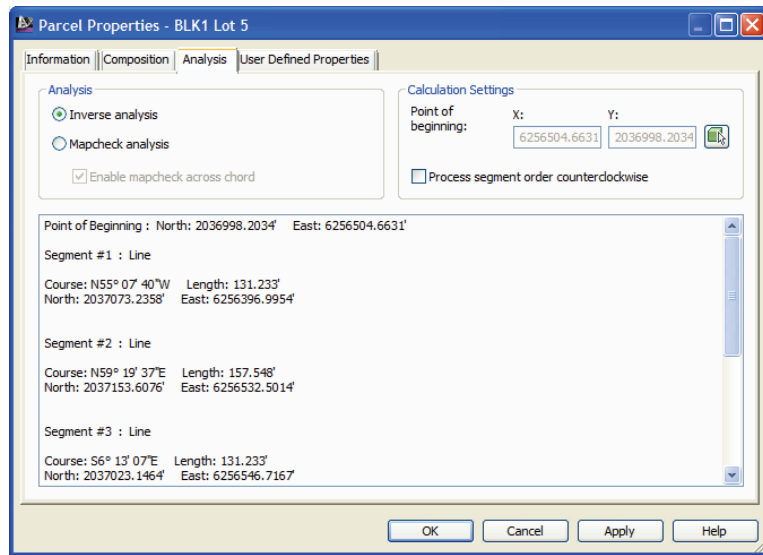


Figure 2–43

This dialog box does not enable output. If you want to generate a printable report, use the AutoCAD Civil 3D Toolbox. It includes several stock Parcel-related reports (such as Surveyor Certificates, Inverse and Mapcheck reports, Metes and Bounds), as shown in Figure 2–44.

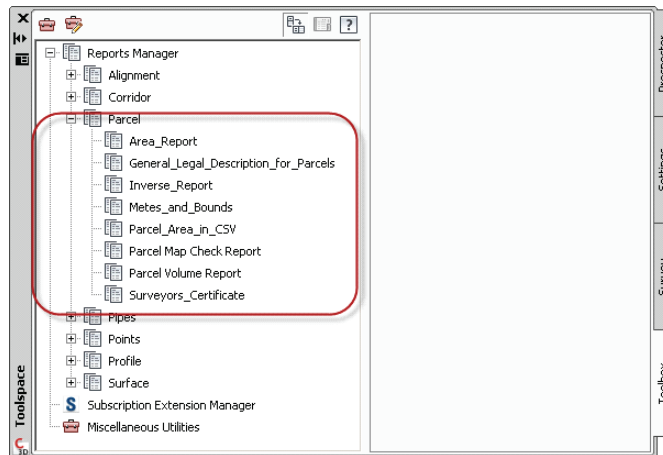


Figure 2–44


Certification
Topic:

✓Parcels

Objectives:

✓Select styles to annotate parcels

2.7 Parcel Labels



Add annotation to parcels to communicate line bearing, distances, and areas for each lot.

Parcel area labels are a means of graphically selecting a parcel, such as when creating Right-of-Ways. In the Parcel creation and editing examples, the parcel segment labels were created for you automatically. This section explores the functionality of these labels in more depth.

The Add Labels dialog box (**Annotate>Add Labels>Parcel>Add Parcel Labels...**) can be used to assign the required label styles and place labels in the drawing. It can set the line, curve, and spiral styles and toggle between single and multiple segment labeling, as well as access the Tag Numbering Table. The dialog box is shown in Figure 2–45.

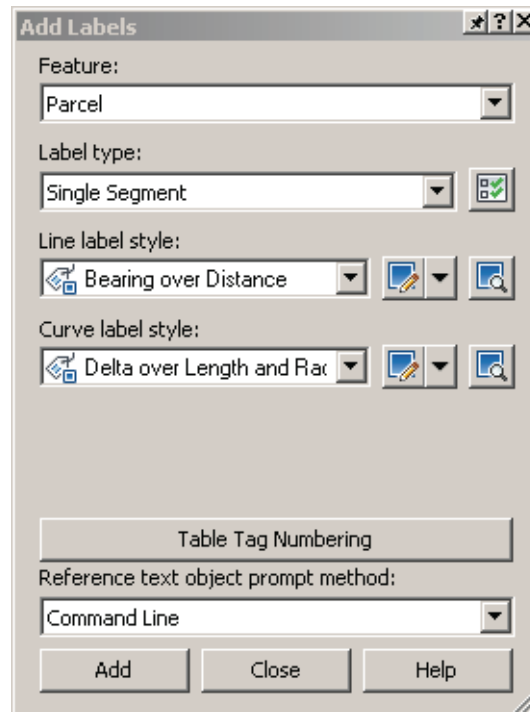


Figure 2–45

- Parcel labels, as with all AutoCAD Civil 3D labels, are capable of rotating and resizing to match changes in the viewport scale and rotation.
- A segment label has two definitions: composed and dragged state. A dragged state can be quite different from the original label definition.

- The AutoCAD Civil 3D software can label segments while sizing parcels.
- Labeling can be read clockwise or counter-clockwise around the parcel.
- Labels can be added through an external reference file using the same commands that label objects in their source drawing. This makes it easier to have multiple plans that need different label styles.
- The **Replace Multiple Labels** option is useful when you want to replace a number of parcel segment labels with another style. However, if you are labeling through an external reference file, labels created in the source drawing cannot be modified.

Parcel Area labels are controlled using Parcel Area Label Styles, which control the display of custom information (such as the parcel number, area, perimeter, address, etc.). For example, you can create more than one parcel area label, if you need to show different parcel information on different sheets as shown in Figure 2–46.

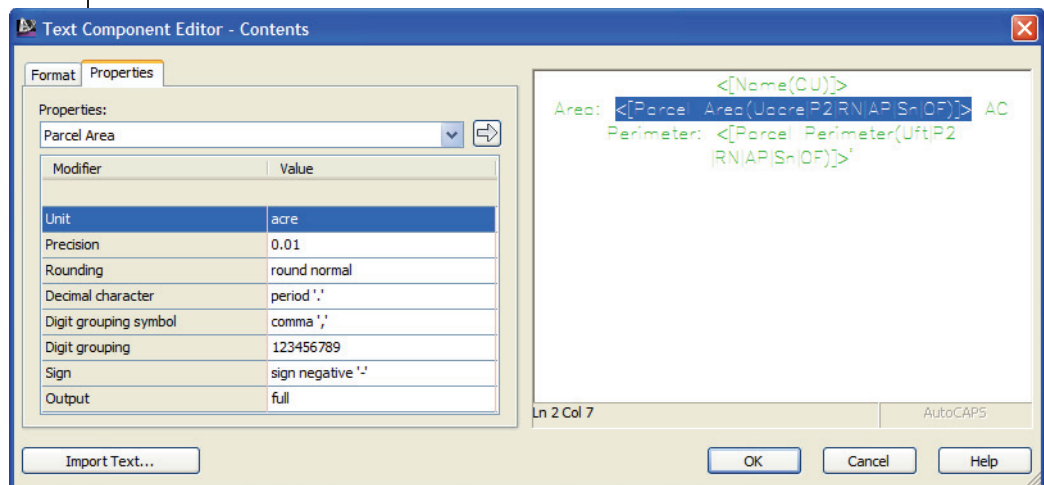


Figure 2–46

Parcel Segment labels annotate the line and curve segments of a parcel, as shown in Figure 2–47. You can label all of the segments of a parcel with one click or only label selected parcel segments.

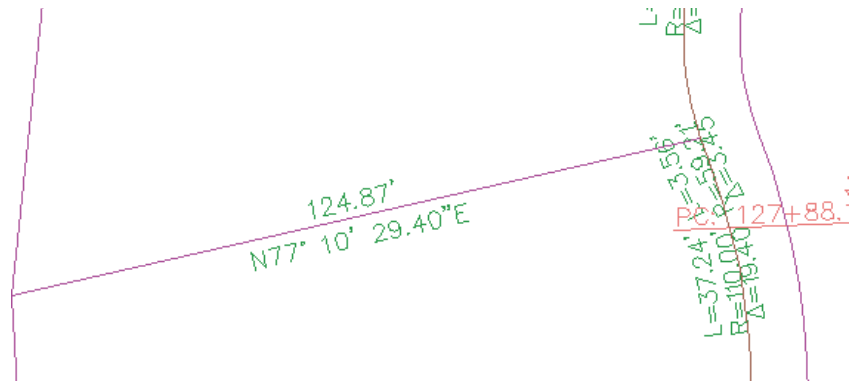


Figure 2–47

All labels have two definitions: one for the original location, and another when it is moved from its original location. A dragged label can remain as originally defined or can be changed to stacked text.



Certification

Topic:

✓ Parcels

Objectives:

✓ Select styles to annotate parcels

2.8 Parcel Tables



Change area, line, and curve labels into tags and display in a table for better readability of the drawing.

Parcel tables are an alternative to labeling individual parcel areas and segments. An example is shown in Figure 2–48.

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L76	112.01	N4° 08' 12.22"W	
L77	395.08	N85° 33' 05.19"E	
L78	471.49	N85° 33' 05.19"E	
L79	210.99	N4° 17' 33.13"W	
L80	211.55	N4° 17' 33.13"W	
L81	115.43	S25° 31' 05.98"W	

Figure 2–48

When creating a table, the AutoCAD Civil 3D software changes the parcel segment labels to an alpha-numeric combination, called a *tag*. A tag with an **L** stands for line and a **C** stands for curve. A segment's tag has a corresponding entry in the table.

- A table can only represent a selected set of label styles.

- The **Add Existing** option (shown in Figure 2–49) creates a table from existing objects. New objects are not added to the table. The **Add Existing and New** option creates a table with existing and new objects.

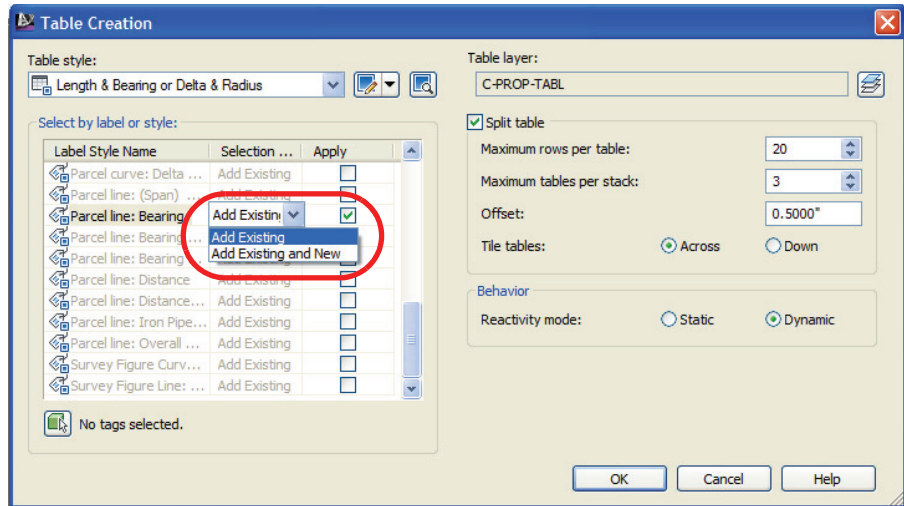


Figure 2–49

- A table can have a dynamic link between a segment's tag and table entry. If the segment changes, the table entry updates.
- The AutoCAD Civil 3D software switches a label to a tag by changing the *Display* mode from **Label** to **Tag**, as shown in Figure 2–50.

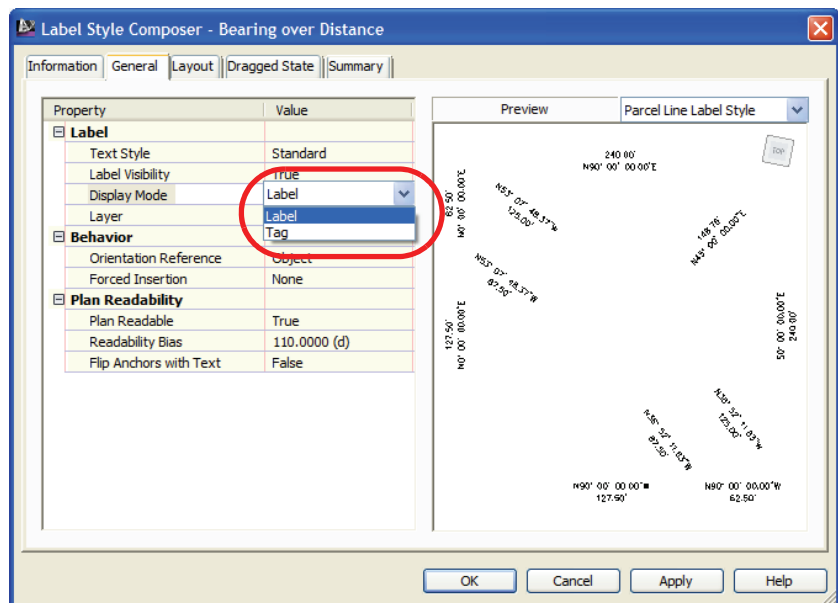


Figure 2–50

Practice 2e

Estimated time for completion: 20 minutes

Reporting On and Annotating the Parcel Layout




Add labels, tags, and tables to the drawing to display useful parcel information.



Create predefined reports to share useful parcel information in a textual format.

Task 1 - Add Parcel labels.

1. Continue working with the drawing from the previous practice or open **PCL1-E1-Parcels.dwg** from the *C:\Civil 3D Projects\Civil3D-Training-1\Parcels* folder.
2. In the *Annotate* tab>Labels & Tables panel, click  (Add Labels), as shown in Figure 2–51.

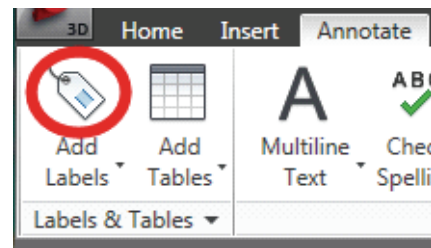


Figure 2–51

3. In the Add Labels dialog box, set the following parameters, as shown in Figure 2–52:
 - Feature: **Parcel**
 - Label type: **Multiple Segment**
 - Line label style: **Bearing over Distance**
 - Curve label style: **Delta over Length and Radius**

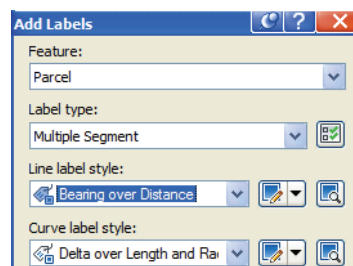
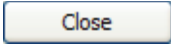


Figure 2–52

4. Click .

5. When prompted to select the Parcels that you want to annotate, select the single-family parcel labels in Model Space.
6. When prompted for the label direction, type **CL** for clockwise and press <Enter>.
7. Repeat the previous three steps for all remaining single-family parcels.
8. Press <Enter> when finished labeling the parcels.
9. Select **X** in the Add Labels dialog box or click  to close the dialog box.
10. Save the drawing.

Parcels can also be labeled in an XREF file.

Task 2 - Create Line and Curve Segment Tables.

The labels are overlapping in a number of locations, making the drawing difficult to read. In this task, you try two methods to fix this. In the first method, you drag the label to a location in which there is no conflict. In the second method, you add a label tag and an associated table.

1. Continue working with the drawing from the previous task or open **PCL1-E2-Parcels.dwg**.
2. In the View tab>Views panel, select the preset view **C3D-Parcel-Add Tag1**.
3. Select the label **8.91ft**, select the square grip, and drag to place the label in a location in which there is no conflict. Do the same for the label **24.21ft**, as shown in Figure 2–53.

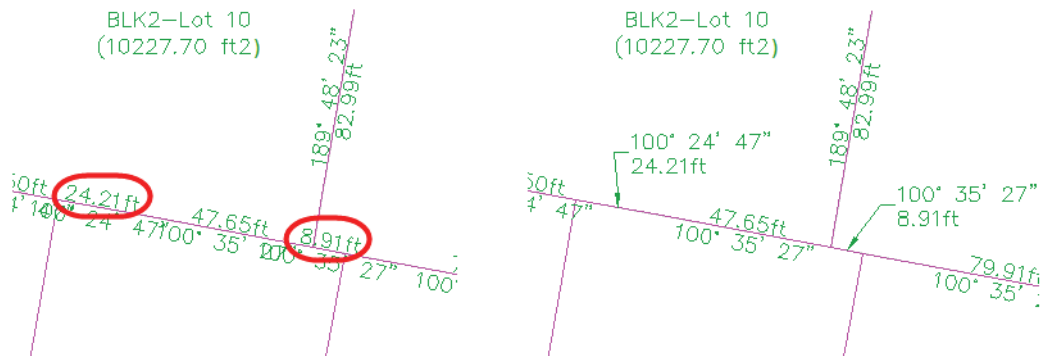


Figure 2–53

- You will now add tags and a table. In the *Annotate* tab> Label & Tables panel, expand Add Tables, expand Parcel, and select **Add segment**, as shown in Figure 2–54.

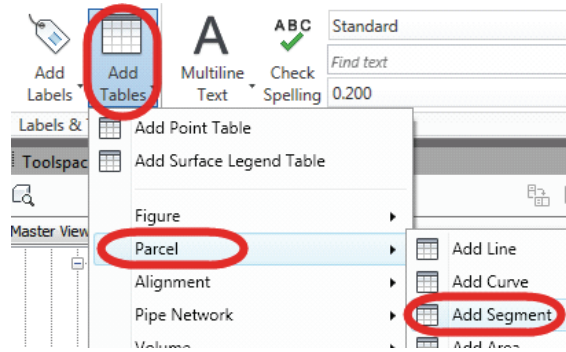



Figure 2–54

- In the Table Creation dialog box, click  (Select on screen) and select the labels shown in Figure 2–55. Press <Enter> when done.

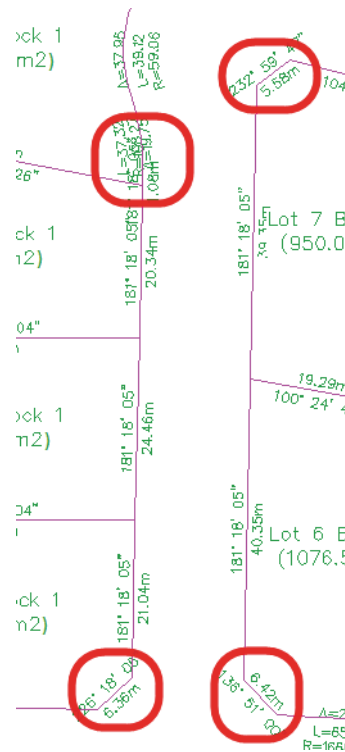
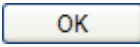


Figure 2–55

- When prompted to convert labels to tags or to not add labels, select **Convert all selected label styles to tag mode**.
- Click  to close the Table Creation dialog box.

- When prompted for a location for the table, select a location in an open space, as shown in Figure 2–56.

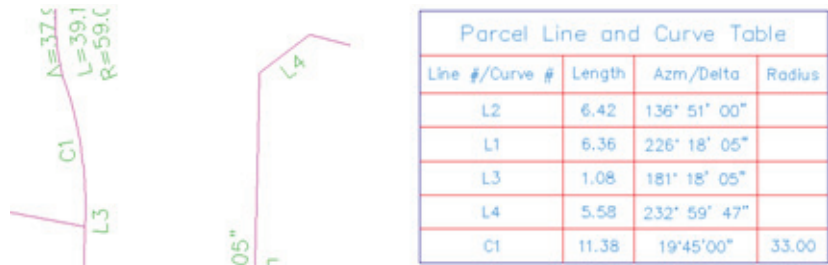
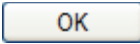


Figure 2–56

- Save the drawing.

Task 3 - Create a Parcel Area Table.

- Continue working with the drawing from the previous task or open **PCL1-E3-Parcels.dwg**.
- In the *Annotate* tab>Label & Tables panel, expand Add Tables, expand Parcel, and select **Add Area**.
- In the Table Creation dialog box, in the *Select by label or style* area, select the style name **Parcel Name - Area** as shown in Figure 2–57. All parcels with this style will be selected. Click  to close the dialog box.

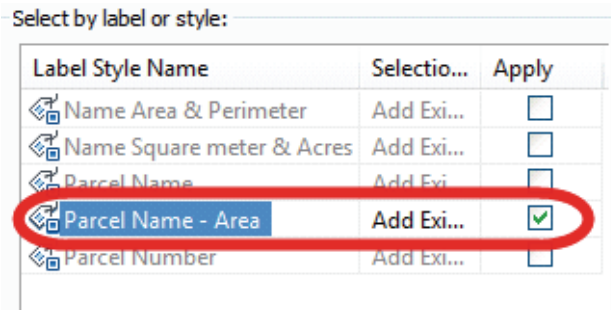


Figure 2–57

- Select a location to insert the table into the drawing, as shown in Figure 2–58.


Parcel Area Table				
Lot	Area	Perimeter	Segment Lengths	Segment Bearings
BLK1–Lot 1	10225.00ft ²	407.10	126.51 69.02 20.88 109.83 80.86	N89° 58' 04.39"E S1° 18' 04.79"W S46° 18' 04.79"W N88° 41' 55.21"W N0° 01' 55.61"W
BLK1–Lot 2	10225.00ft ²	415.37	128.38 80.25 126.51 80.23	N89° 58' 04.39"E S1° 18' 04.79"W S89° 58' 04.39"W N0° 01' 55.61"W
BLK1–Lot 3	10225.00ft ²	418.87	132.28 66.70 128.38 91.51	S79° 12' 46.38"E S1° 18' 04.79"W S89° 58' 04.39"W N0° 01' 55.61"W

Figure 2–58

- Save the drawing.

Task 4 - Create a Parcel Report.

- Continue working with the drawing from the previous task or open **PCL1-E4-Parcels.dwg**.
- If the *Toolbox* tab is not displayed, go to the *Home* tab >

Palettes panel, and click  (Toolbox), as shown in Figure 2–59.

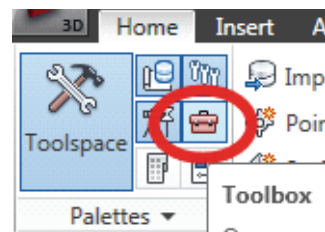

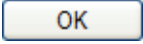
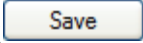


Figure 2–59

- In the *Toolbox* tab, expand the *Reports Manager* and *Parcel* collections. Right-click on Surveyor's Certificate and select **Execute**.
- In the Export to LandXML dialog box, click  (Pick from drawing), located at the bottom left of the dialog box.
- When prompted to select a parcel, select one of the single-family lots that you created earlier and press <Enter>.

6. In the Export to XML Report dialog box, note that only the Lots you selected now display a checkmark. Click  to close the dialog box.
7. In the Save As dialog box, type the required filename for the report and click  to close the dialog box.
8. Review the report (as shown in Figure 2–60), and close the web browser.

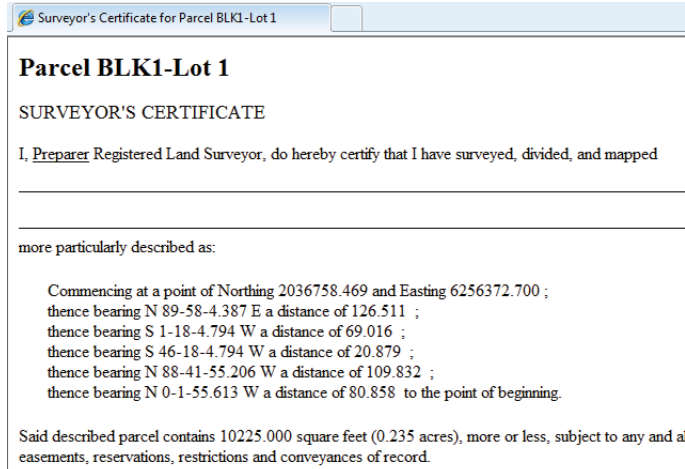


Figure 2–60

9. Save the drawing.

Either of these formats can be opened in word processors, such as Microsoft Word, which can read all of the formatting displayed in the web browser. Report settings, such as the Preparer's name, can be assigned by selecting **Report Settings** in the Toolspace.











Chapter Review Questions

1. Where are parcels listed?
 - a. Under the Survey tree in the Prospector tab.
 - b. Within a site under the Sites tree in the Prospector tab.
 - c. Under the Figures Tree inside the Survey Database.
 - d. In the Layers panel in the Home tab.
2. What does a parcel style assign in the Display tab?
 - a. Layer to which parcel segments are assigned.
 - b. How big the parcel can be.
 - c. The label text that describes the line segments.
 - d. The label text that describes the area and name of the parcel.
3. What is the default direction of a Mapcheck or Inverse report?
 - a. Clockwise
 - b. Counter-clockwise
 - c. Always starts going north.
 - d. Always starts going south.
4. How do you adjust parcel display order?
 - a. Select the parcel segments, right-click and select Draw Order.
 - b. Move the parcel up or down in the parcel preview list in the Prospector tab.
 - c. Select the parcel area label, right-click and select Draw Order.
 - d. Under Sites, right-click on Parcels and select Properties.

5. How do you draw a parcel boundary from a legal description in the most efficient way possible?
 - a. Calculate the Cartesian coordinate angle for each bearing or azimuth within the legal description and type (distance)<(angle) for each line or curve.
 - b. Calculate the cartesian coordinate angle for each bearing or azimuth within the legal description, place your cursor in that direction, and type the distance.
 - c. Use the extended Lines and Curves options in the *Home* tab>Draw panel or Transparent commands within the Line or Polyline command.
 - d. There is no fast way to do this.
6. How do you create or subdivide parcels interactively?
 - a. Draw parcel segments at each location in which you want a parcel line.
 - b. Create and Edit tools in the Parcel Layout toolbar.
 - c. Select the parcel, right-click and select subdivide.
 - d. Used the AutoCAD Measure or Divide command to help you place lot lines and even intervals.
7. Which **Parcel Create** command enables you to hold a specified angle relative to the Right-Of-Way?
 - a. Slide line-create
 - b. Swing line-create
 - c. Free Form create
 - d. Use the Add fixed line command.
8. What are the types of AutoCAD Civil 3D Parcel labels that can be set up in the *Setting* tab? Check all that apply.
 - a. Parcel Line
 - b. Parcel Area
 - c. Parcel Curve
 - d. Parcel Perimeter

-
9. What does the Add Labels dialog box do?
- a. Create label styles.
 - b. Add or change labels interactively after parcel creation.
 - c. Add or change labels during parcel creation.
 - d. Creates static text describing what you want to label.
10. What are parcel tables an alternative to? Check all that apply.
- a. Drawing the parcels.
 - b. Creating tags.
 - c. Labeling parcel areas in an already crowded drawing.
 - d. Labeling parcel segments in an already crowded drawing.

Command Summary

Button	Command	Location
	Add Labels	<ul style="list-style-type: none"> ■ Ribbon: <i>Annotate</i> tab>Labels & Tables panel
	Add Tables	<ul style="list-style-type: none"> ■ Ribbon: <i>Annotate</i> tab>Labels & Tables panel
	Bearing Distance	<ul style="list-style-type: none"> ■ Toolbar: Transparent Commands ■ Command Prompt: 'bd
	Create Curve from End of Object	<ul style="list-style-type: none"> ■ Ribbon: <i>Home</i> tab>Draw panel ■ Command Prompt: CurveFromEndOfObject
	Create Reverse or Compound Curve	<ul style="list-style-type: none"> ■ Ribbon: <i>Home</i> tab>Draw panel ■ Command Prompt: ReverseOrCompound
	Create Parcel From Objects	<ul style="list-style-type: none"> ■ Ribbon: <i>Home</i> tab>Create Design panel ■ Command Prompt: ParcelFromObjects
	Parcel Creation Tools	<ul style="list-style-type: none"> ■ Ribbon: <i>Home</i> tab>Create Design panel ■ Command Prompt: CreateParcelByLayout
	Slide-Line Create	<ul style="list-style-type: none"> ■ Toolbar: Parcel Layout Tools
	Swing-Line Edit	<ul style="list-style-type: none"> ■ Toolbar: Parcel Layout Tools
	Rename Renumber	<ul style="list-style-type: none"> ■ Contextual Ribbon: <i>Parcels</i>>Modify ■ Command Prompt: EditParcelNumbers