

# SECTION 1

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# REGIS Data Editing ArcGIS 10

# Welcome

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- **Introduction**

- Instructor: Jason Moore, GISP, REGIS GIS Specialist

- **Attendee Introduction**

- Your Name
- Department or Group
- What you do
- What would you like to edit
- Any prior GIS editing experience?

# Logistics

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- **Schedule**

- Begin 8:30 AM
- Finish by 12:30 PM or sooner

- **Facilities**

- Break Room with refrigerator and additional coffee and a pop/snack machine in the lower lobby
- Restrooms in hallway down from elevators
- Telephones – available, please ask

# About REGIS

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- GIS Consortium made up of twenty participants
- REGIS Participants include
  - 9 cities and 1 village
  - 7 townships
  - 3 other organizations like KCRC, ITP and GVMC
- Officially kicked off September 1997
- Officially debuted December 2001
- Provides access to applications, data and support
- Help to understand how GIS can be used in your organization
- Agency staff are your GIS staff

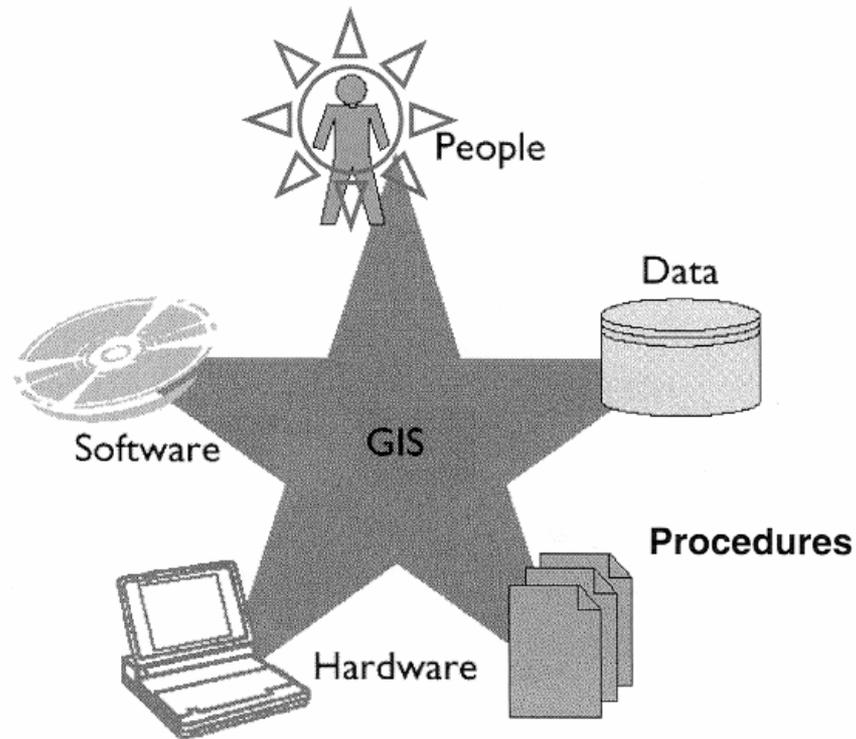


**GVMC**

# What is a GIS?

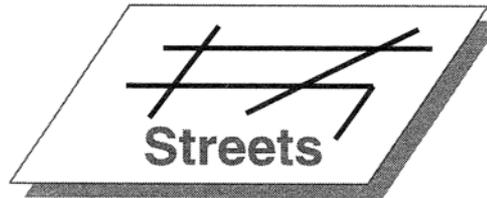
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- An integration of five basic components
  - People
  - Data
  - Hardware
  - Software
  - Procedures

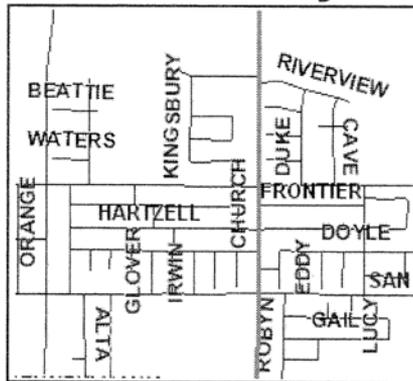


# Components of Geographic Data

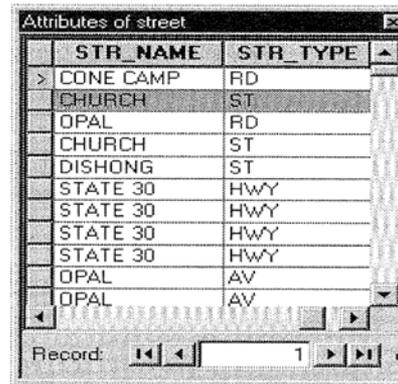
- Three general components to geographic information



## Geometry



## Attributes



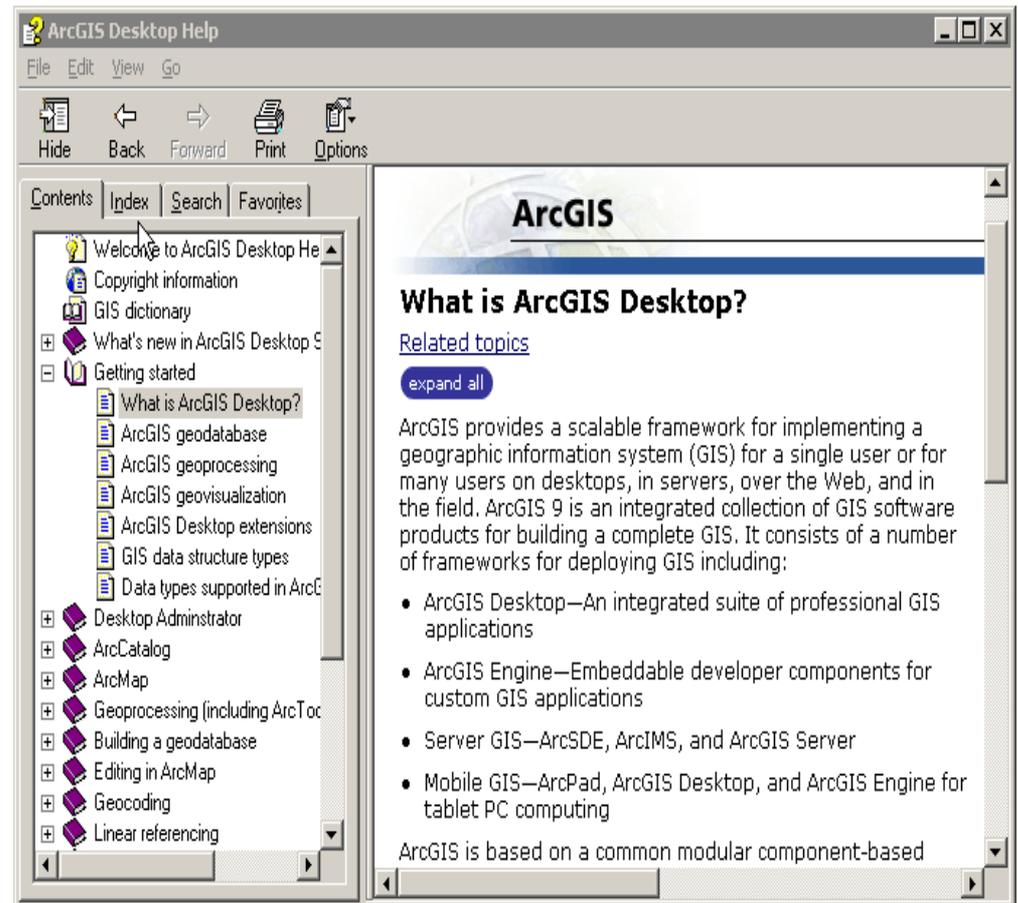
STR_NAME	STR_TYPE
> CONE CAMP	RD
CHURCH	ST
OPAL	RD
CHURCH	ST
DISHONG	ST
STATE 30	HWY
STATE 30	HWY
STATE 30	HWY
OPAL	AV
OPAL	AV

## Behavior

**Rules**  
**Streets and highways may not intersect**

# Getting “Online” Help

- Within ArcGIS application
- Contents tab
- Index tab
- Search tab
- Other help
- REGIS Help Desk
  - Telephone
  - E-mail
  - Fax



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## SECTION 2

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# SDE Geodatabase & Versions

# Overview of REGIS GIS Applications

- Increasing functionality from ArcIMS to ArcView and ArcEditor



Public



RIMS

ArcMap

A screenshot of the ArcView desktop GIS application showing a map of a region with various colored overlays and labels. The text "ArcView – Desktop GIS for Mapping, Data Integration, and Analysis" is overlaid on the top left of the screenshot.

ArcView – Desktop GIS for Mapping,  
Data Integration, and Analysis

A screenshot of the ArcEditor desktop GIS application showing a detailed map with various colored overlays and labels. The text "ArcEditor – Desktop GIS with Advanced Geographic Data Editing and Management" is overlaid on the top left of the screenshot.

ArcEditor – Desktop GIS with Advanced  
Geographic Data Editing and Management

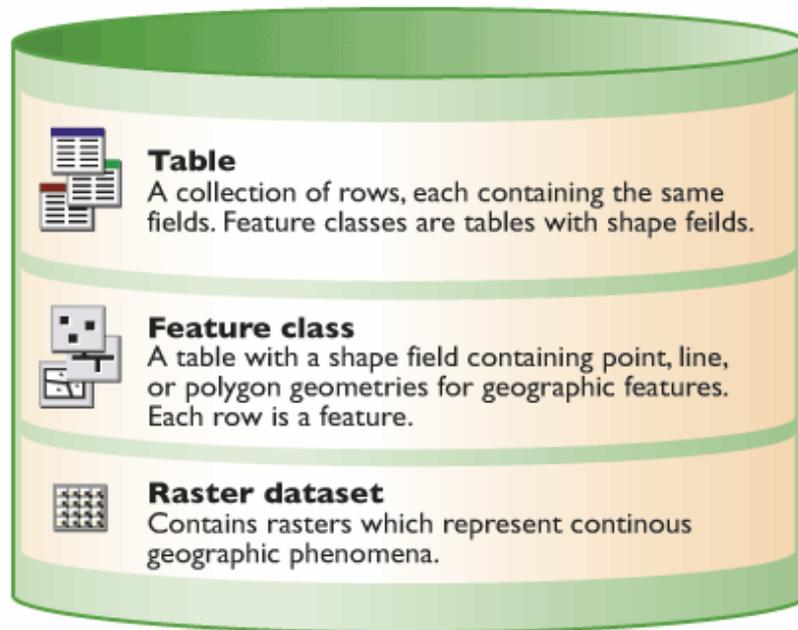
Data Editing

A screenshot of the ArcInfo desktop GIS application showing a map with various colored overlays and labels. The text "ArcInfo – Complete Desktop GIS with Advanced Geoprocessing and Analysis" is overlaid on the top left of the screenshot.

ArcInfo – Complete Desktop GIS with  
Advanced Geoprocessing and Analysis

# SDE Geodatabase & Versions

## What is a SDE Geodatabase?

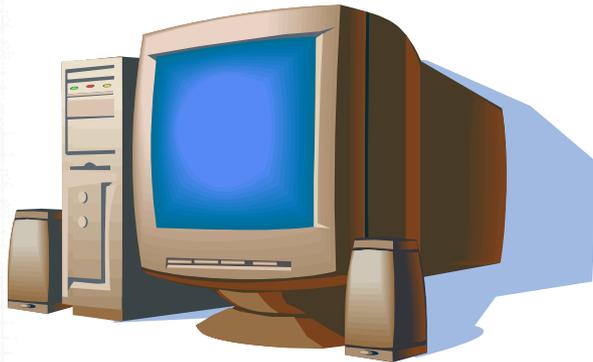


- ESRI's technology for accessing and managing geospatial data within relational databases
- When you need a multiuser geodatabase that can be edited and used simultaneously by many users, the ArcSDE geodatabase provides the solution

# SDE Geodatabase & Versions

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## REGIS Data Editing Environment



- Two Servers : Editor and Publisher
- Every Weekend edits from Editor get transferred to Publisher Server

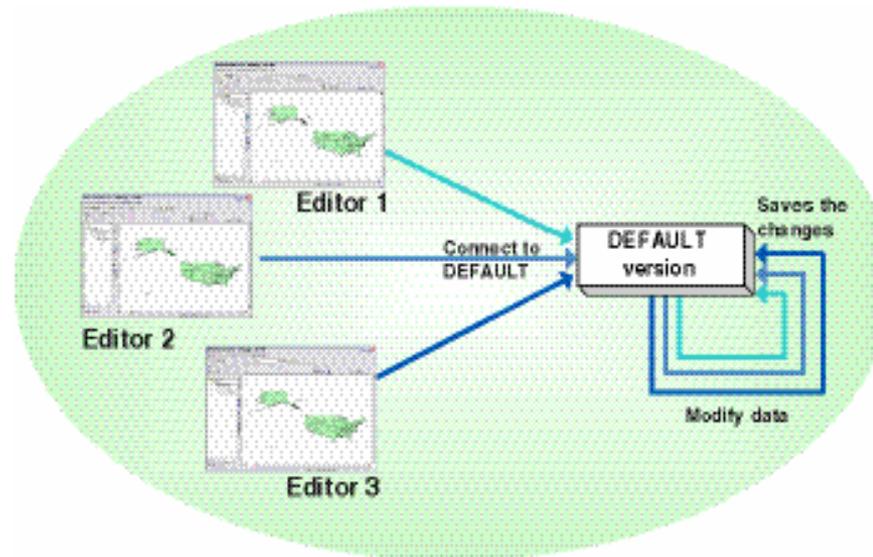
# SDE Geodatabase & Versions



Name	Owner	Access
ProjectB	"ROCKETJAY\PLLAMA"	Public
ProjectA	"ROCKETJAY\SASHA"	Public
QA	DBO	Public
DEFAULT	dbo	Protected

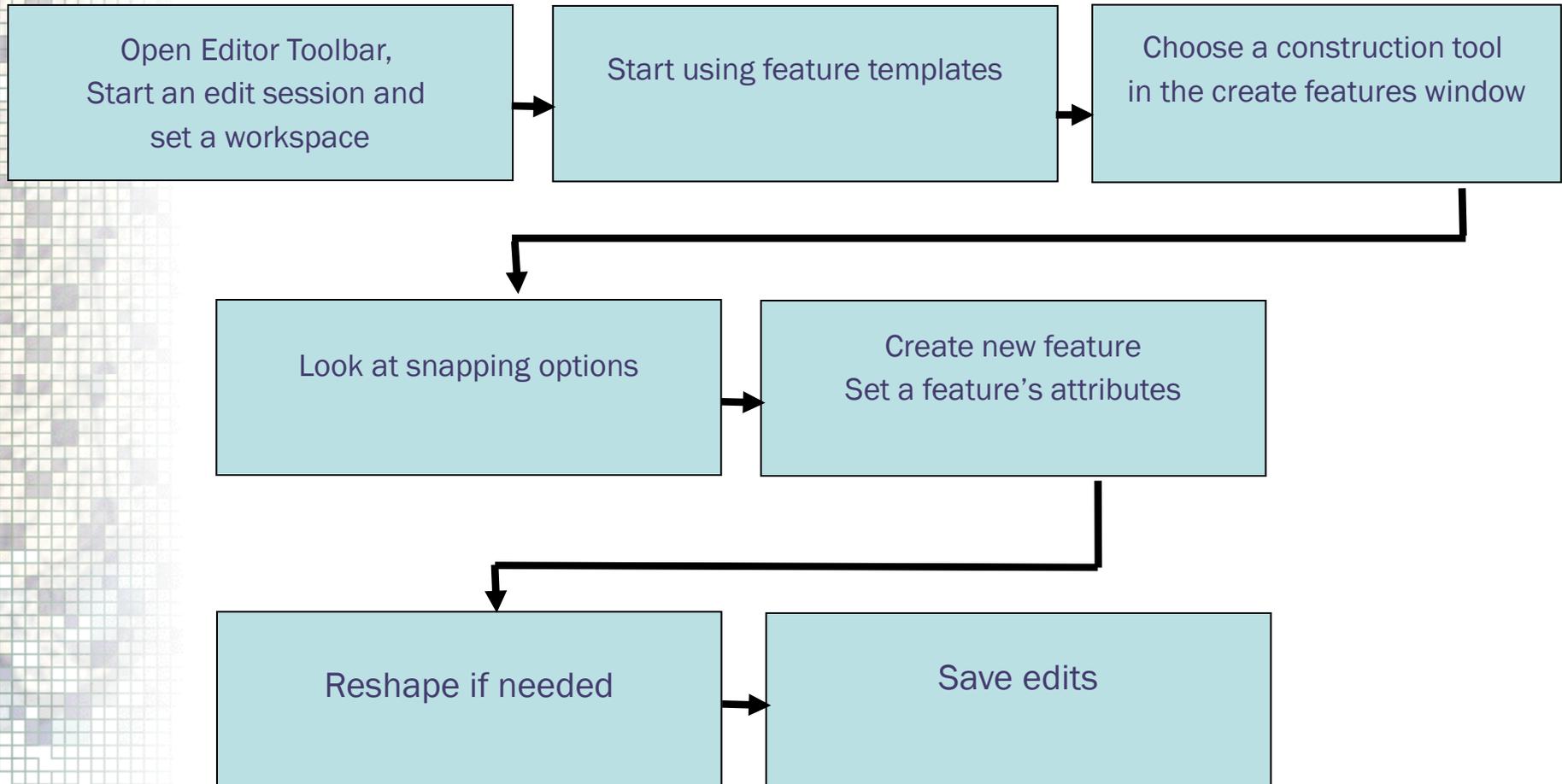
## What is Versioning?

- Edit data in REGIS with an Edit Session
- Version must be created to start an edit session



Ex.2.2

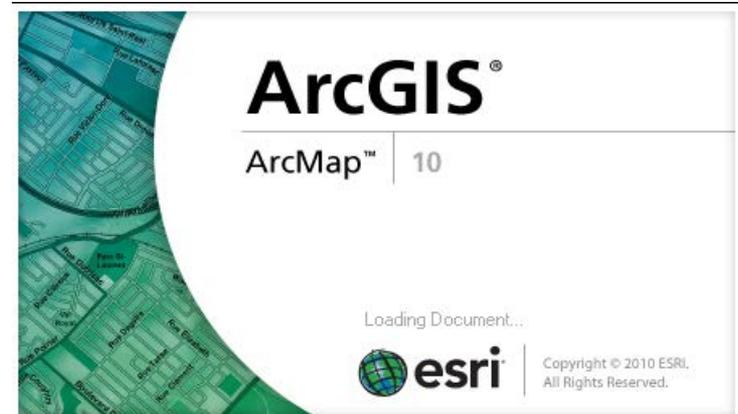
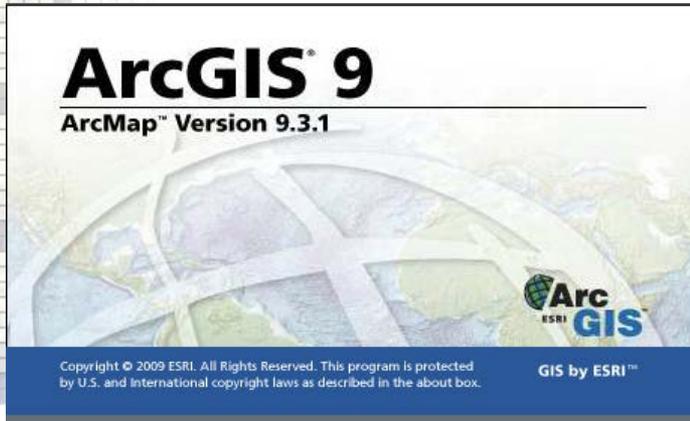
# ArcGIS 10 Editing Workflow



# Recent Move From ArcGIS 9.3 to 10

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- Significant changes to editing workflow and toolbars
- Has anyone edited data in ArcMap before?



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# SECTION 3

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# Editing Features & Attributes

# Editing Features & Attributes

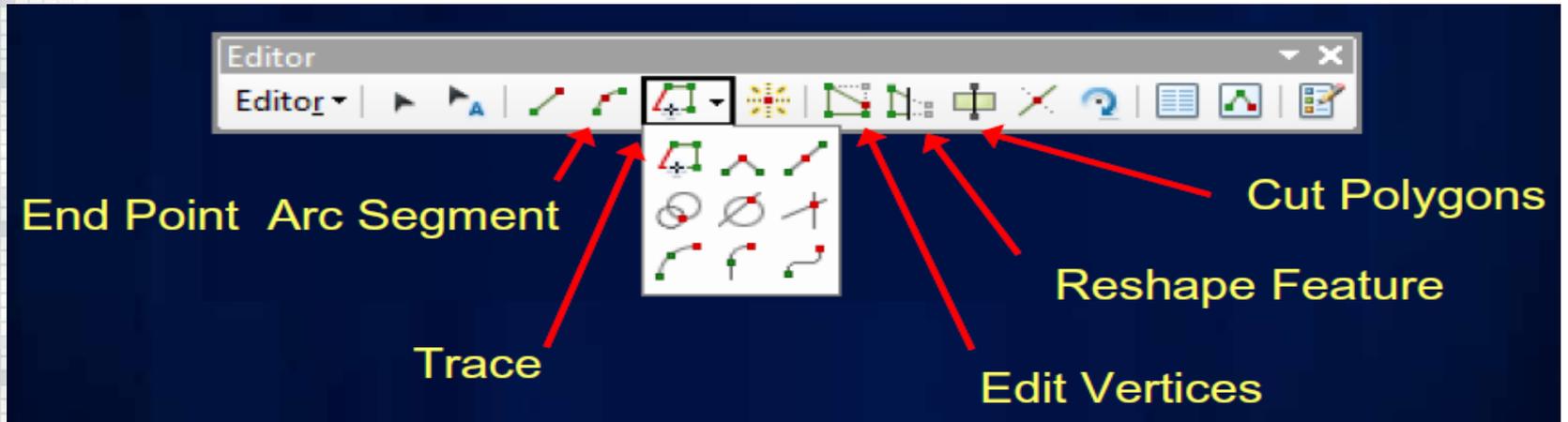
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## Two Types of Vector Data You Can Edit

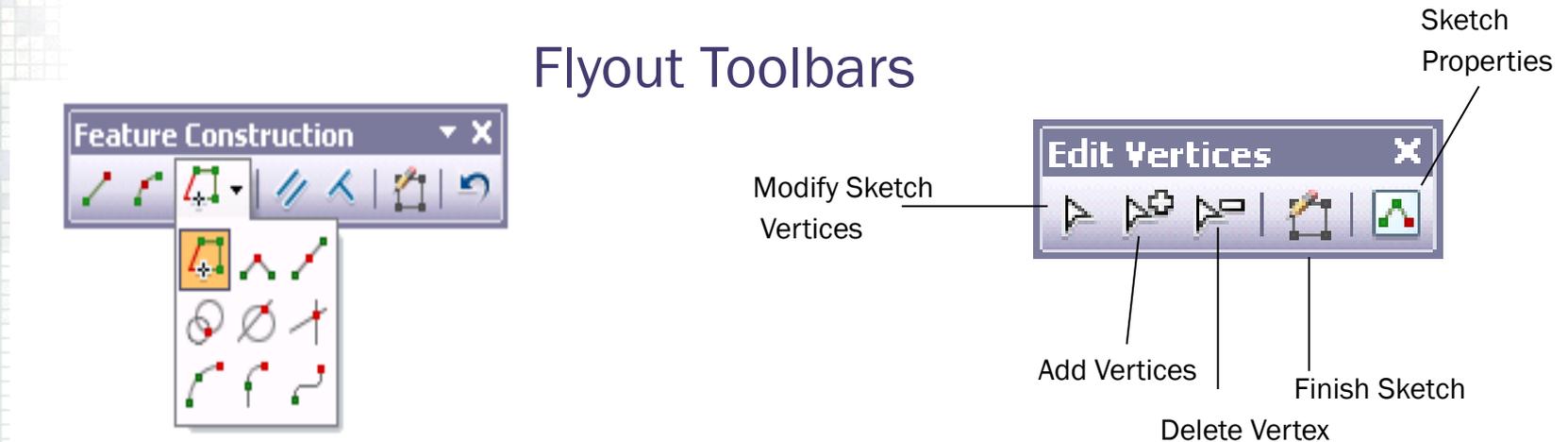
	<b>Geodatabase</b>	<b>Shapefile</b>
<b>Collections of datasets</b>	A geodatabase is a collection of feature datasets.	A shapefile folder is a collection of shapefiles.
<b>Datasets</b>	A feature dataset is a collection of feature classes.	A shapefile has one shapefile feature class.
<b>Collections of features</b>	A feature class is a collection of features of the same type.	A shapefile feature class is a collection of shapefile features.
<b>Features</b>	Point, multipoint, polyline, polygon, annotation, dimension, multipatch, and network.	Point, multipoint, line, polygon, and multipatch.
<b>Topologies</b>	Geodatabase datasets may contain topologies or a geometric network.	Map topology may be used to integrate and edit shapefile feature classes.

# Editing Features & Attributes

## Editing Toolbars Overview

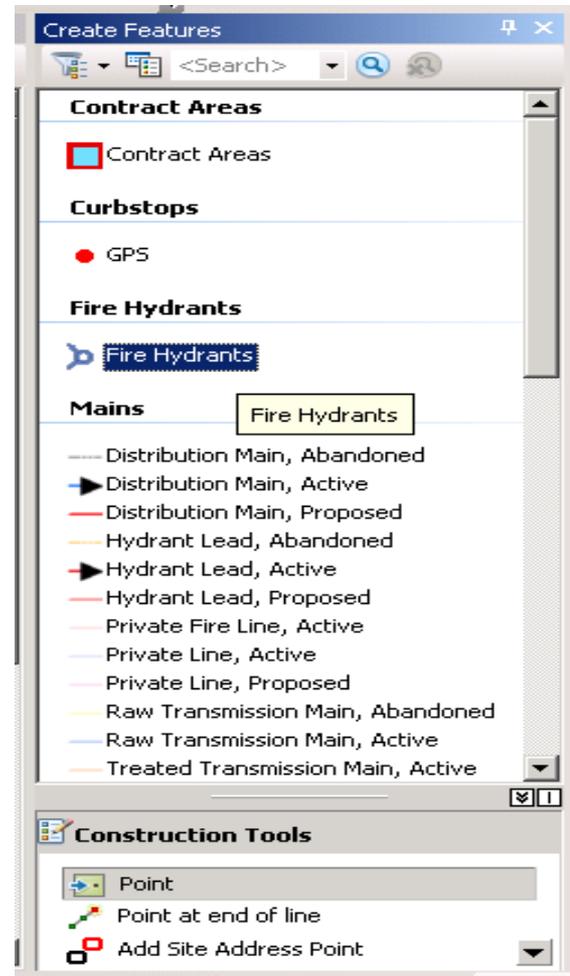


## Flyout Toolbars



# Editing Features & Attributes

- Create Features Window
- Window will be used each you create features in the map
- Uses of feature templates



Ex.3-1

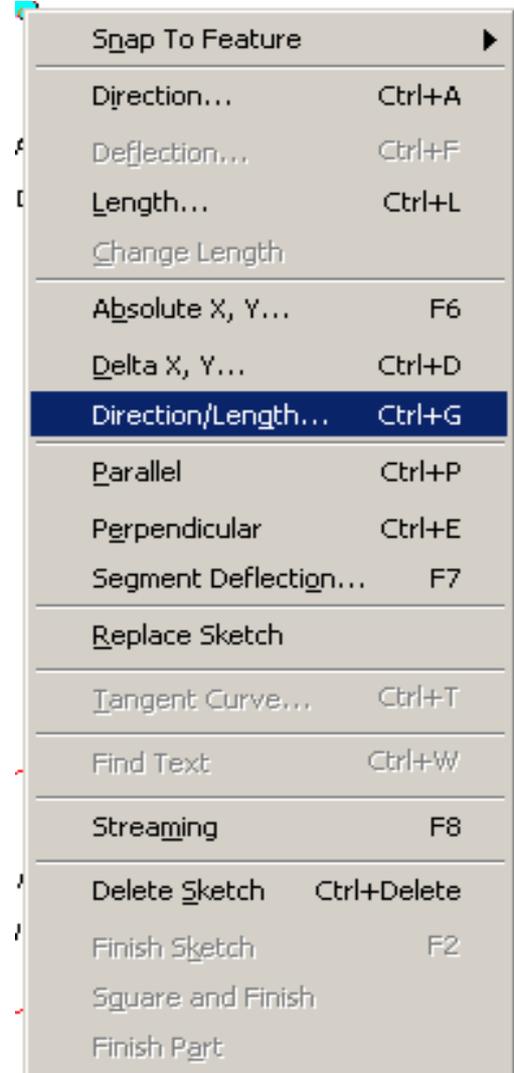
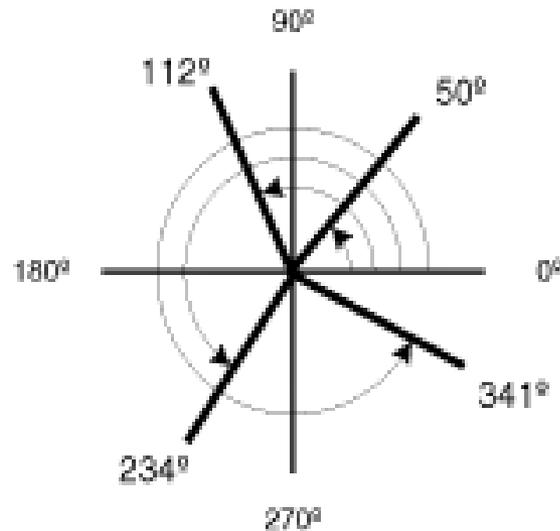
# Editing Features & Attributes

- Define all info needed to create a new feature
- Auto populate fields for editing attributes

Attribute Name	Default Value
HYDRANT_NUMBER	<Null>
OPEN_DIRECTION	Right
DIST_TO_MAIN	<Null>
DIST_VALVE	<Null>
MANUFACTURER	<Null>
MODEL	<Null>
PRIVATE_FLAG	No
SOURCE	<Null>
ADDRESS	<Null>
OWNER	<Null>
MAINT_RESP	<Null>
STATUS	Active
YEAR_INSTALLED	<Null>
Comments	<Null>
THREAD_SIZE	<Null>
FLOW_RATE	<Null>

# Editing Features & Attributes

- Setting Direction and Distance



# Editing Features & Attributes

- Rotate Tool



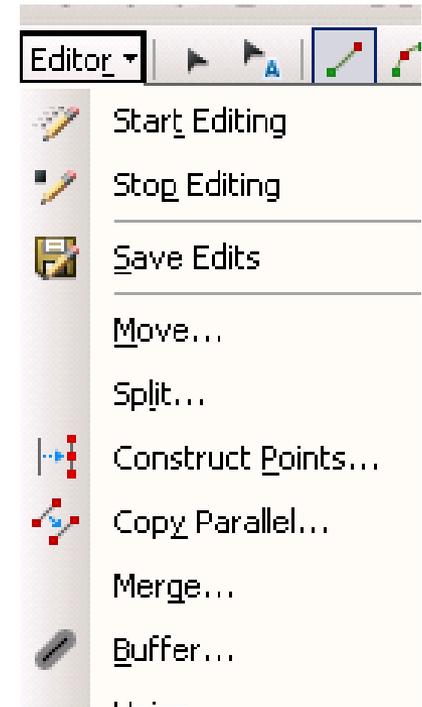
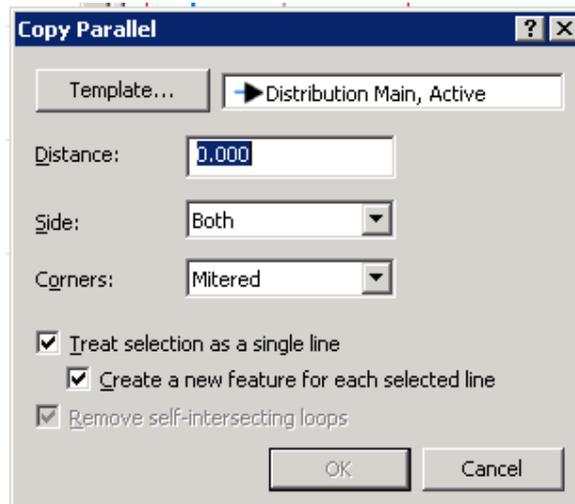
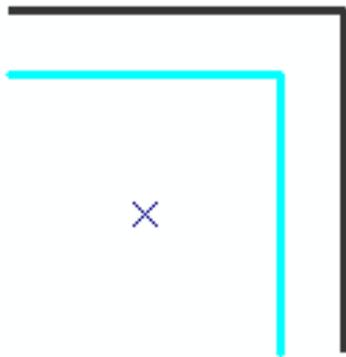
Press the A key to set the angle  
Rotate 90 degrees



Ex.3-2

# Editing Features & Attributes

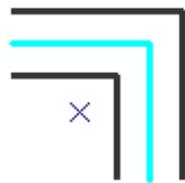
- **Copy Parallel**



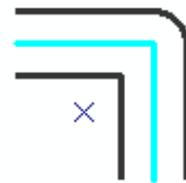
- **Method**



Beveled



Mitered

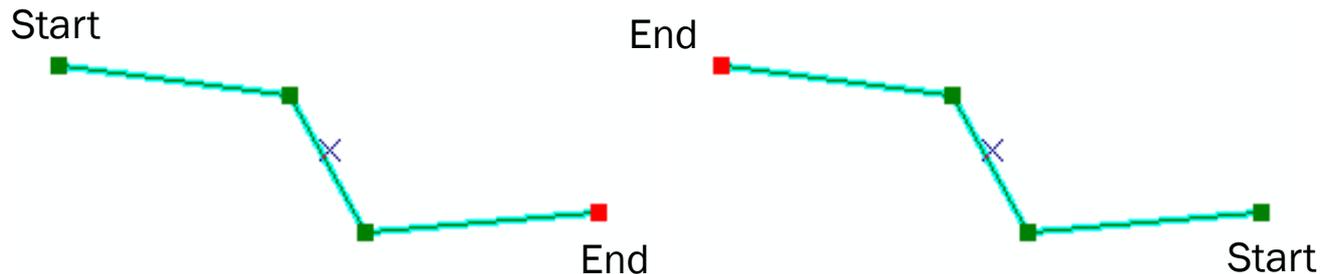


Rounded

# Editing Features & Attributes

- **Flipping Lines & Flow Direction**

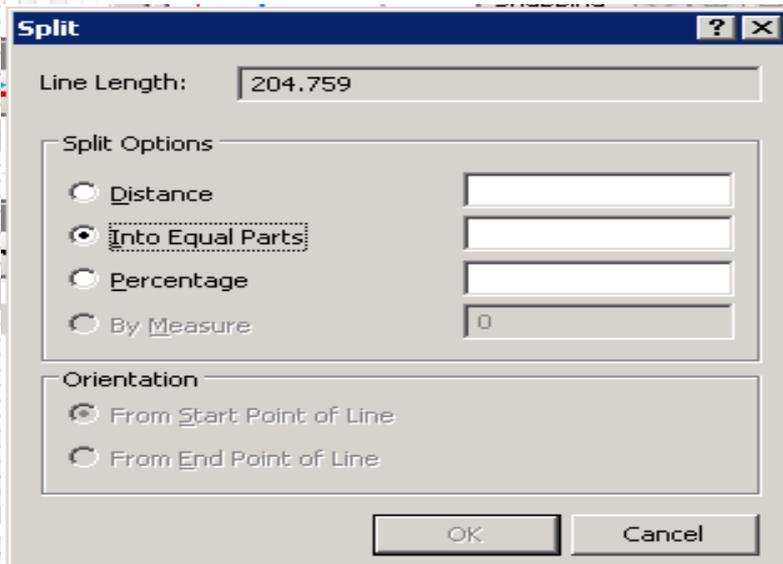
- A storm sewer line is a good example of a feature where flow direction is important.



Ex.3-3

# Editing Features & Attributes

- Split Tool



- This line is split 20 meters from the start point.



- This line is split at a percentage of the line's length. In this case, 45 percent.



- If your data has m-values, you can also choose to split based on measure units.

# Editing Features & Attributes

- Editing Attributes



Table

Pipe Fittings

	SUBTYPE *	BEND_ANGLE	JOINT_TYPE	MATERIAL	SOURCE
	Tee	No Bend	<Null>	Ductile Iron	As-Built
	Tap	<Null>	<Null>	Ductile Iron	<Null>
	Tap	No Bend	<Null>	<Null>	<Null>
	Plug	<Null>	<Null>	<Null>	<Null>
	Tee	No Bend	<Null>	Unknown	<Null>
	Tee	No Bend	<Null>	<Null>	<Null>
	Tee	<Null>	<Null>	<Null>	<Null>
	Tap	<Null>	<Null>	<Null>	As-Built
	Tap	No Bend	<Null>	Ductile Iron	GPF 4512
	Tap	No Bend	<Null>	<Null>	<Null>
	Tap	No Bend	<Null>	<Null>	<Null>
	Tap	<Null>	<Null>	<Null>	<Null>
	Tee	No Bend	<Null>	Unknown	<Null>
	Horizontal_Bend	45 Degree	<Null>	Unknown	Wyoming Water Map
	Close	No Bend	Mechanical	Cast Iron	<Null>

Pipe Fittings: (0 out of \*2000 Selected)

"\*" means scroll down to view additional

Attributes

Parcels

- Parcel ID: 2993
  - is owned by
    - 548
- Parcel ID: 6859

Blocks

- Block ID: 10946

OBJECTID	636
Property ID	1636
Land-use code	1
Zoning	1
PARCEL_ID	2993
Residential	Residential
Zoning_simple	Residential
SHAPE_Length	452.444714
SHAPE_Area	10030.788541

OBJECTID  
Object ID  
Null values not allowed

# Editing Features & Attributes

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- Subtypes

- A subset of features that share the same attributes
  - E.G. Water Mains Feature Class
    - Subtype 1: Distribution
    - Subtype 2: Hydrant Lead
    - Subtype 3: Private Fire Line
    - Subtype 4: Transmission Main

## Mains

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- Distribution Main, Abandoned
- ▶ Distribution Main, Active
- Distribution Main, Proposed
- Hydrant Lead, Abandoned
- ▶ Hydrant Lead, Active
- Hydrant Lead, Proposed
- Private Fire Line, Active
- Private Line, Active
- Private Line, Proposed
- Raw Transmission Main, Abandoned
- Raw Transmission Main, Active
- Treated Transmission Main, Active

# Editing Features & Attributes

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- **FacilityID**
  - It is important to note the “FacilityID” field must be kept unique at all times.

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## Section 4

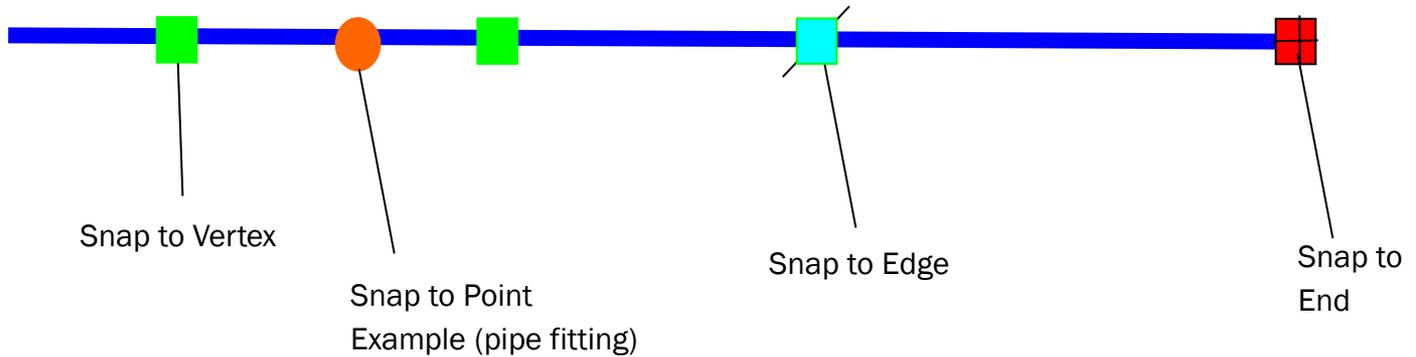
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# Snapping Environment

# Snapping Environment

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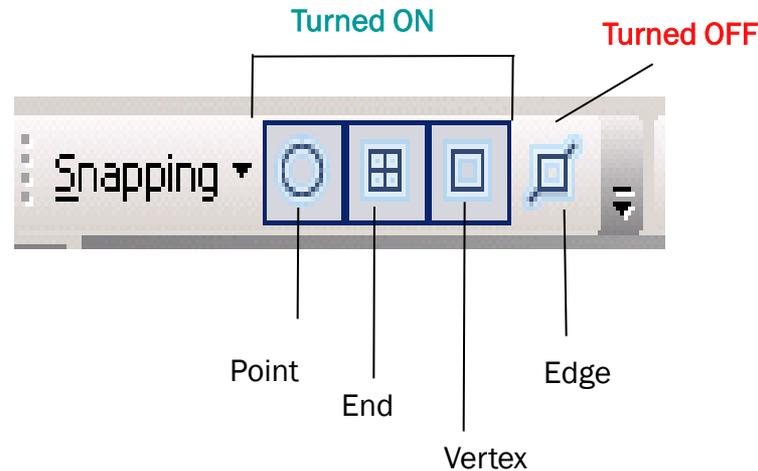
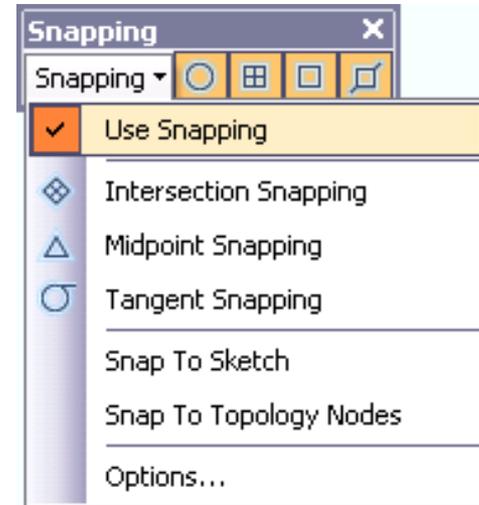
- Snapping Options
- By Default Snapping is turned on



# Snapping Environment

- Snapping Tolerance

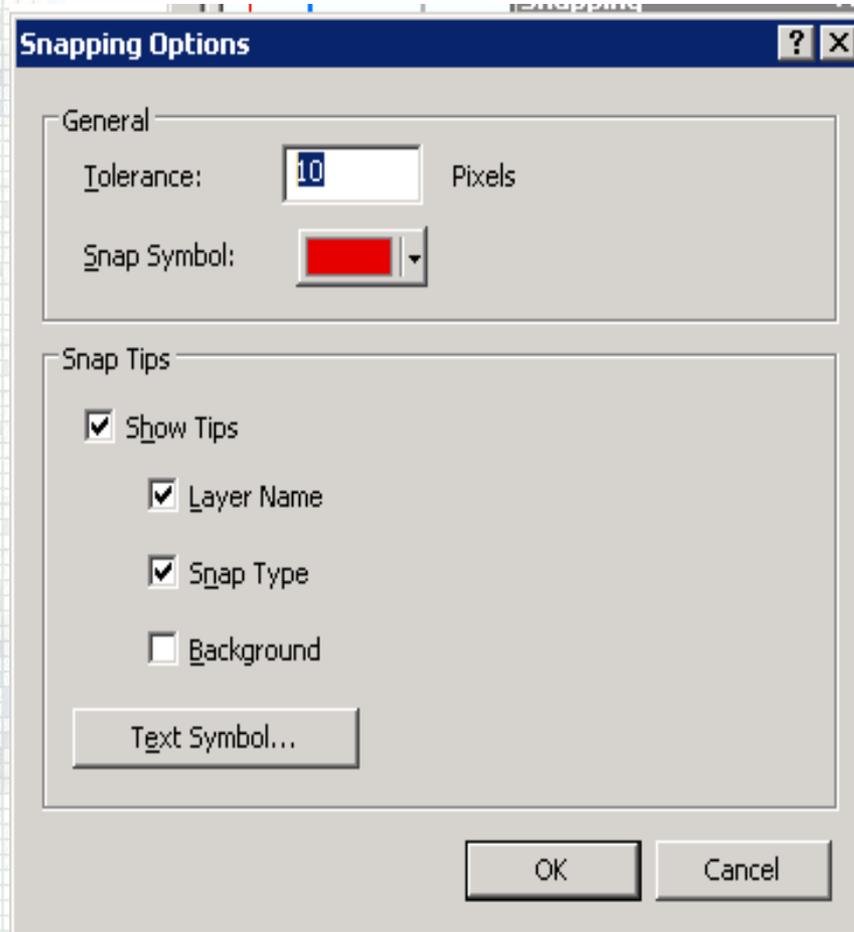
-Distance within which the pointer or feature is snapped to another location



# Snapping Environment (cont.)

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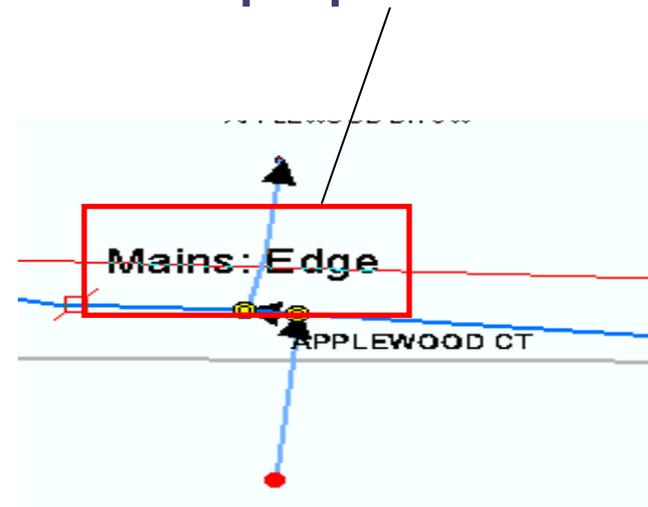
# Snapping Environment



- **Set Options**

- Distance within which the pointer or feature is snapped to another location

- **Snap Tips**



Ex.4.1

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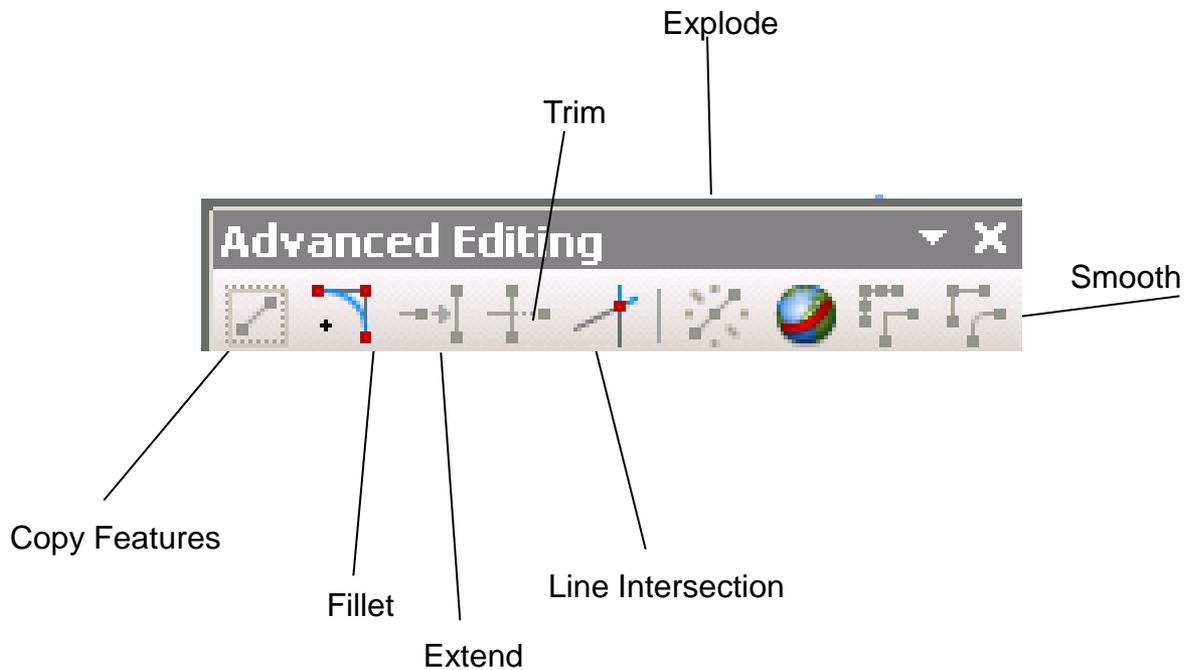
# SECTION 5

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## Other Editing Toolbars In REGIS

# Other Editing Toolbars

## Advanced Editing Toolbar



Ex.5-31, 5-2 & 5-3

# Other Editing Toolbars in REGIS

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- **Infrastructure Editing Toolbar**



- Core Editing and Selection Tools used to edit infrastructure
- Network Validation
- Split lines at selected points
- Merge geometric network lines
- Add a Lateral
- Establish flow direction/show flow direction
- Flip Selected lines/flip selected lines to match flow

<http://video.arcgis.com/watch/349/how-to-use-the-infrastructure-editing-template>



## SECTION 6

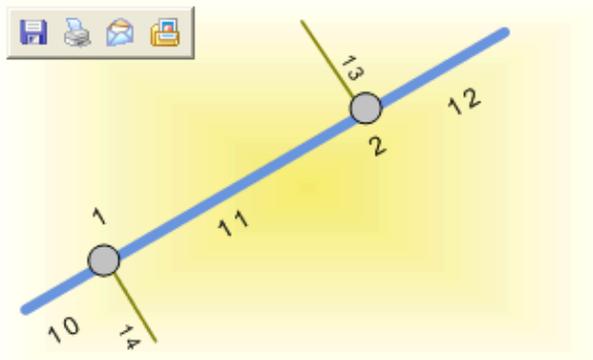
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# Topology & Geometric Networks

# Topology & Geometric Networks

- **What is a Geometric Network**

- A model of real world systems
- Used to find such things as grease-back ups in a sanitary sewer system or find what areas will be affected if a certain water system valve is turned off or a water main breaks.



**Water junction fittings (Points)**

OID	Shape	Equip ID	Valve Type
1		816-32	T203
2		816-45	Y53

**Water mains (Lines)**

OID	Shape	Diameter	Material
10		8	Concrete
11		10	PVC
12		8	Concrete

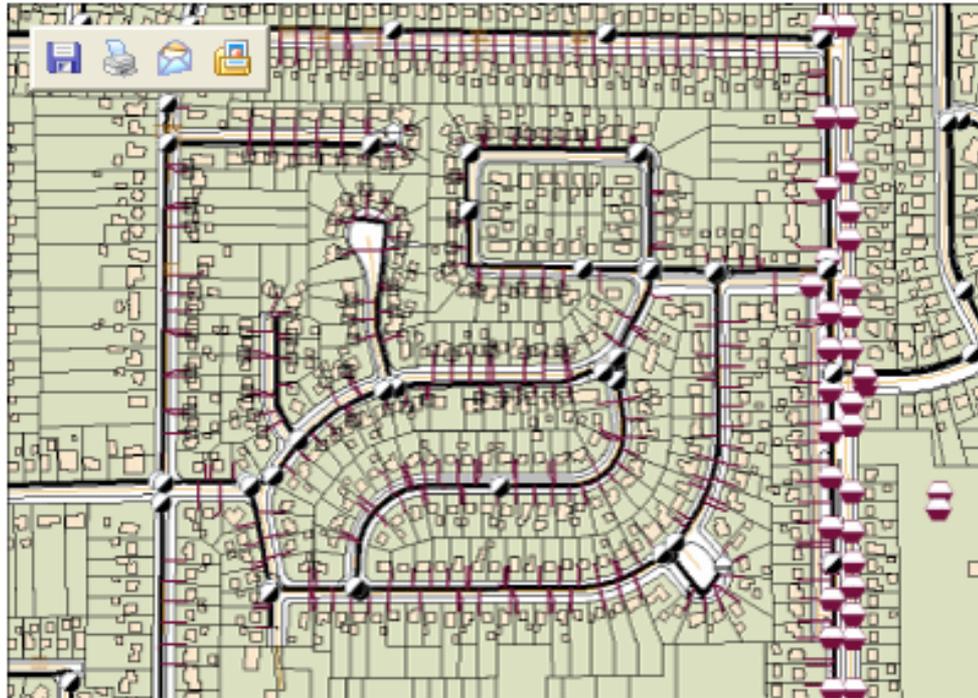
**Water services (Lines)**

OID	Shape	Service ID	Material
13		1001	Cast iron
14		1002	Copper

# Topology & Geometric Networks

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- Two Main Elements to a Geometric Network
  - Edge
  - Junction



# Topology & Geometric Networks

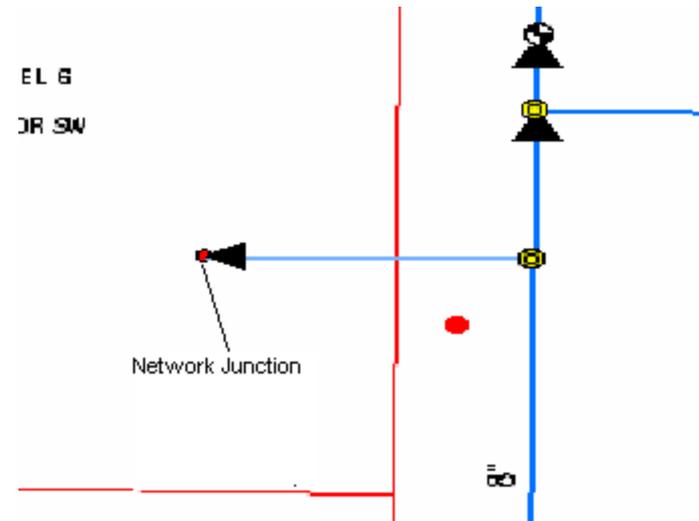
- What is Topology? – A set of rules that model how points, lines and polygons share geometry
- Used to maintain data integrity

 <p><b>Points</b></p>	 <p><b>Points on points</b></p>	 <p><b>Points on lines</b></p> <p><i>Must be covered by endpoint of Point must be covered by line</i></p>	 <p><b>Points on polygons</b></p> <p><i>Must be properly inside polygons Must be covered by boundary of</i></p>
 <p><b>Lines</b></p> <p><i>Must not have dangles Must not have pseudo-nodes Must not overlap Must not self overlap Must not intersect Must not self intersect Must not intersect or touch interior Must be single part</i></p>	 <p><b>Lines on points</b></p> <p><i>Endpoint must be covered by</i></p>	 <p><b>Lines on lines</b></p> <p><i>Must not overlap with Must be covered by feature class of</i></p>	 <p><b>Lines on polygons</b></p> <p><i>Must be covered by boundary of</i></p>
 <p><b>Polygons</b></p> <p><i>Must not overlap Must not have gaps</i></p>	 <p><b>Polygons on points</b></p> <p><i>Contains point</i></p>	 <p><b>Polygons on lines</b></p> <p><i>Boundary must be covered by</i></p>	 <p><b>Polygons on polygons</b></p> <p><i>Must be covered by feature class of Must be covered by Must not overlap with Must cover each other Area boundary must be covered by boundary of Tessellate</i></p>



# Topology & Geometric Networks

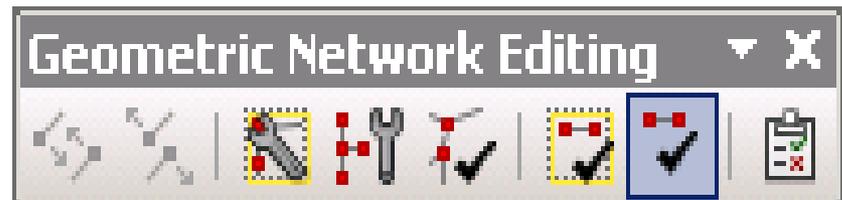
- About Network Junctions in REGIS
  - A Network Junction is a placeholder until an actual feature is placed on the end of a line feature.
  - This placeholder is needed if any sort of analysis or modeling will be done on the geometric network.



# Connectivity

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- **Geometric Network Editing Toolbar**
  - Connect
  - Disconnect

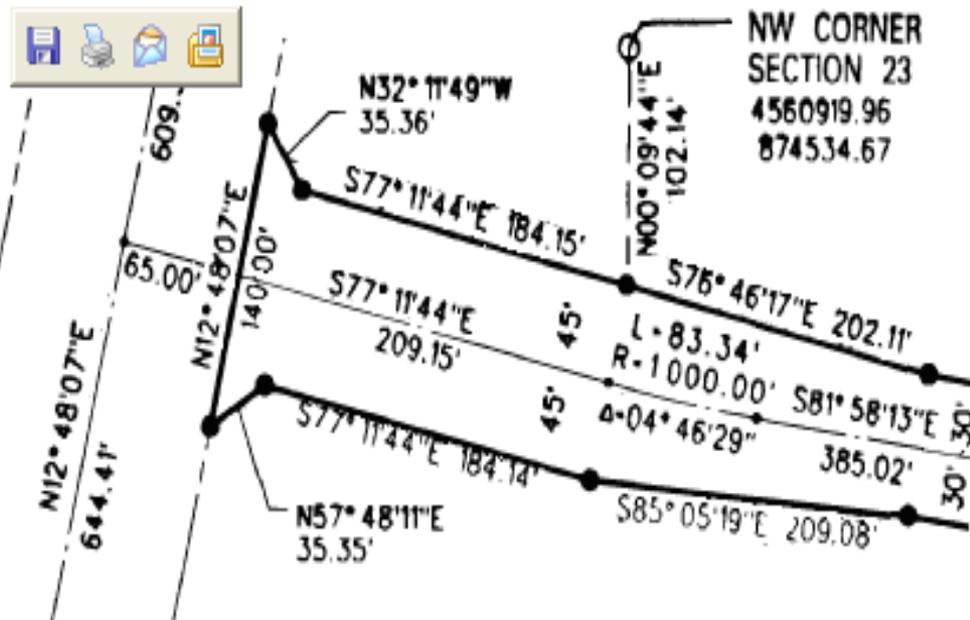
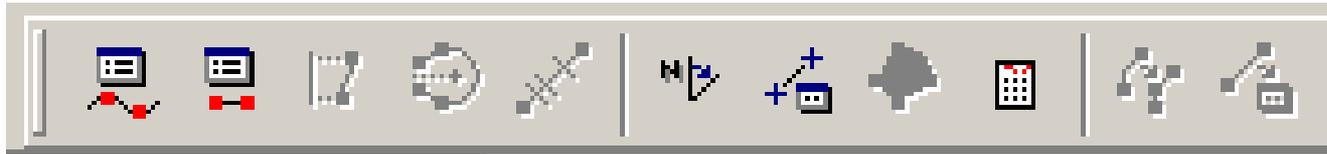


Connect

Disconnect

# Overview of the COGO Tool

- COGO Tool

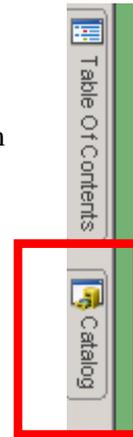


## Exercise 2.1 – How to Create Database Connection to Editing Server

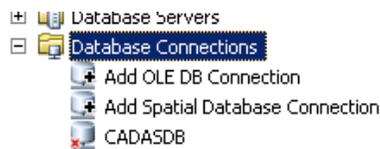
In this exercise, you will learn how to:

- Connect to editor server on REGIS.

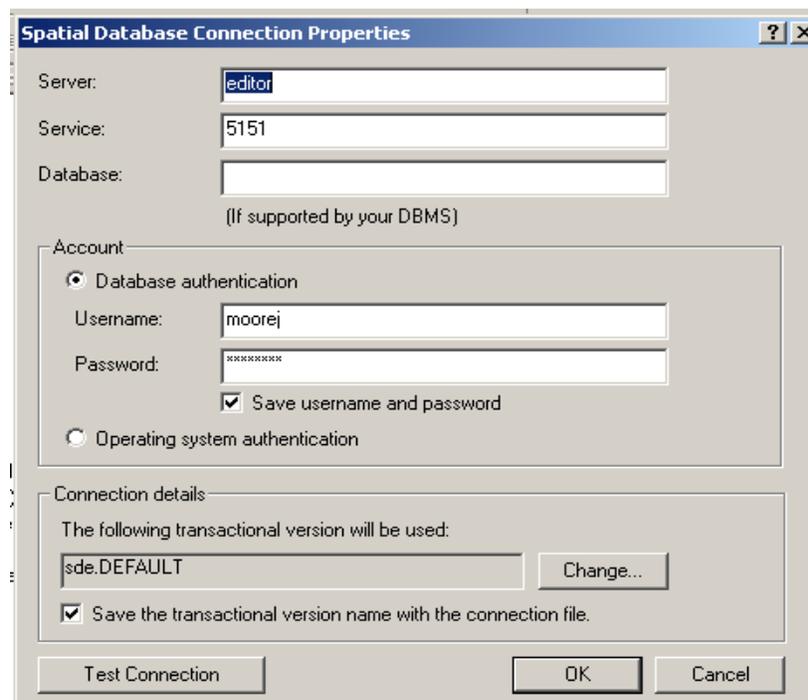
1. To setup a Database connection to the editing server on the REGIS system you must first open the ArcCatalog window in ArcMap.
2. In ArcCatalog, double click on Database Connections.



3. Click Add Spatial Database Connection.



4. In the Spatial Database Connection Properties window, fill in the information as shown in the graphic below. For your Username and Password, use your REGIS username and password is “password”. Click Test Connection before you click OK.

A screenshot of the 'Spatial Database Connection Properties' dialog box. The 'Server' field contains 'editor', the 'Service' field contains '5151', and the 'Database' field is empty. Below these fields is the text '(If supported by your DBMS)'. The 'Account' section has two radio buttons: 'Database authentication' (selected) and 'Operating system authentication'. Under 'Database authentication', the 'Username' field contains 'moorej' and the 'Password' field contains '\*\*\*\*\*'. There is a checked checkbox for 'Save username and password'. The 'Connection details' section has a text box for 'The following transactional version will be used:' containing 'sde.DEFAULT' and a 'Change...' button. There is a checked checkbox for 'Save the transactional version name with the connection file.'. At the bottom are three buttons: 'Test Connection', 'OK', and 'Cancel'.

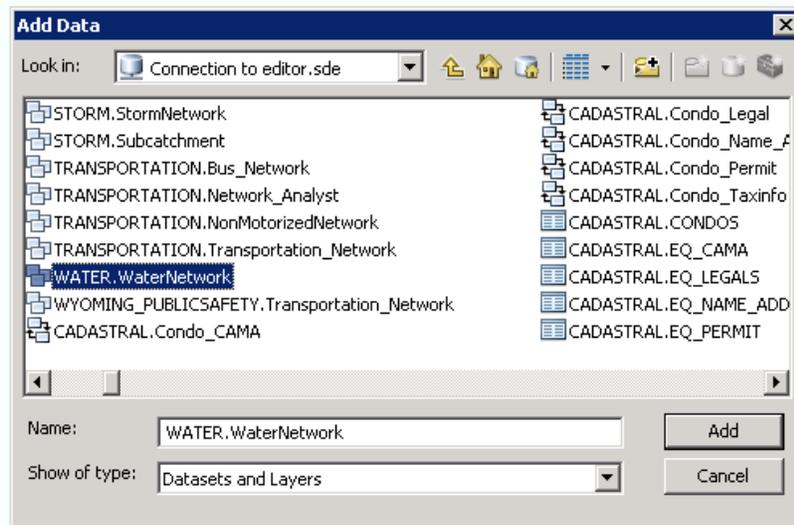
*End of Exercise 2.1*

## Exercise 2.2 – How to Change Versions and Start Editing

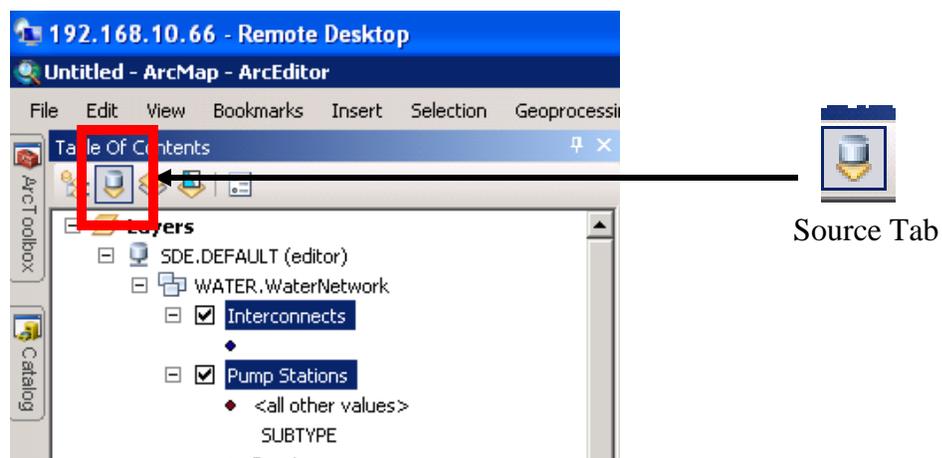
In this exercise, you will learn how to:

- Connect to your version.
- Start editing.

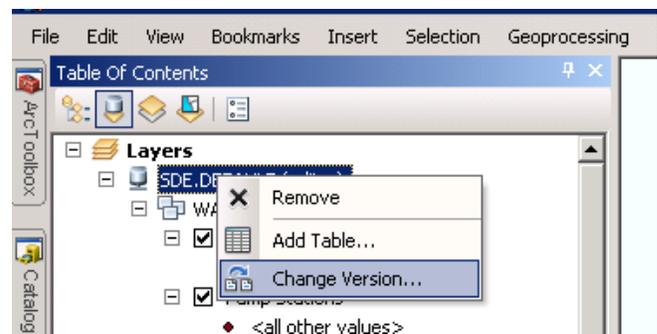
1. Click the add data button  to add the network or data layer you plan to edit into ArcMap from the editor server. In this exercise and for the rest of the course, you will use the Water System network, so add (WATER.WaterNetwork).

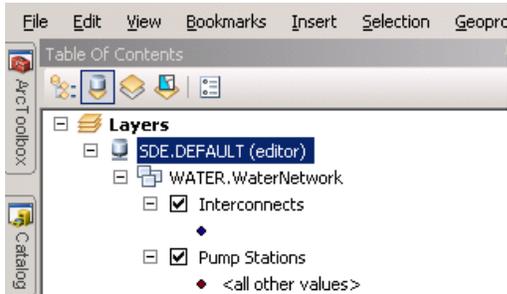


2. To change to your version that was setup for you by REGIS, select the Source Tab at the top of your Table of Contents (TOC).

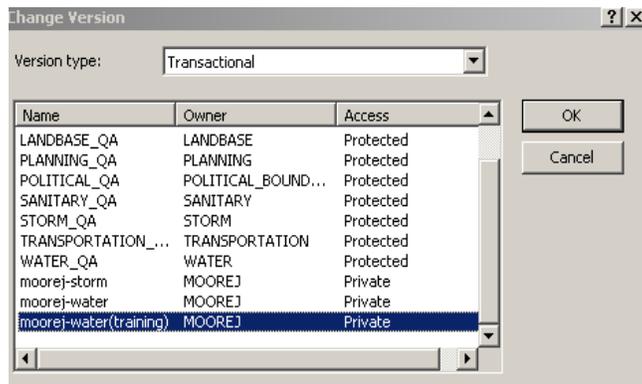


3. Highlight SDE.DEFAULT (editor), right click and select change version.



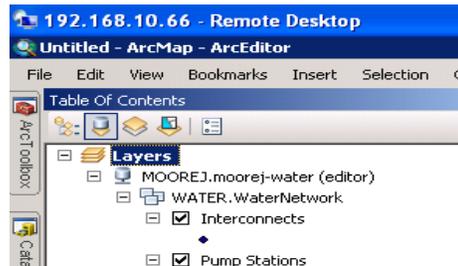


4. This will bring up the Change Version window.

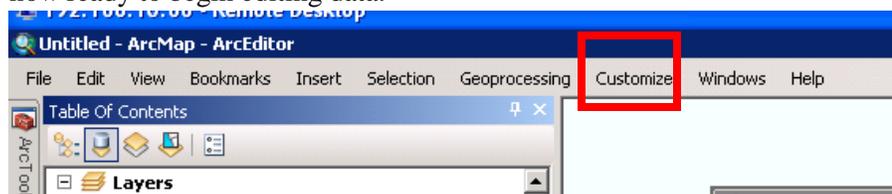
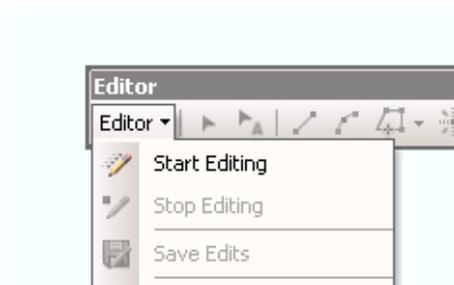


Select your version in the list and click OK. Your version name for this exercise will be (*username-water(training)*).

5. You will now see that SDE.DEFAULT (editor) has changed over to your version (in the example below the version selected is (MOOREJ.moorej-water).



6. Locate the Editor toolbar in your ArcMap window. If you do not see the Editor toolbar, right click in the grey area next to Help or click Customize, scroll down and check Editor. Once the toolbar appears, click on **Editor > Start Editing**. You are now ready to begin editing data.



## Exercise 3.1 – Create a Feature

In this exercise, you will learn:

- How to use the Create Features window.
- How to create a feature (point, line and polygon).

*Exercise Objective: Create a point feature in your version that represents a fire hydrant, a line feature that represents a water main and a polygon that represents a water district.*

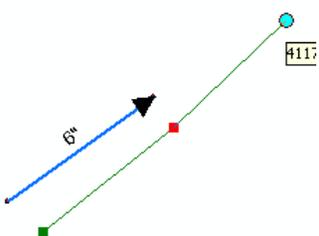
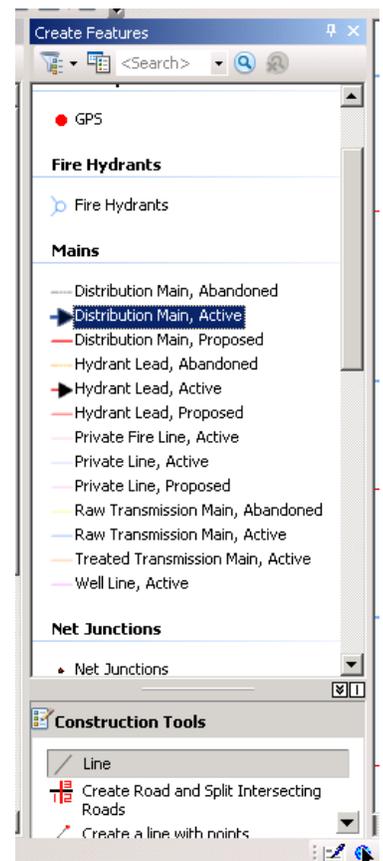
### Create a point

- 1) If you haven't already, locate the editor toolbar and start an edit session
- 2) You will see a the **Create Features** window fly out once the edit session is started
- 3) In the Create Features window highlight the *Fire Hydrants* layer
- 4) Next, under Construction Tools at the bottom of the Create Features window click on **Point**.
- 5) Next, Move into the map display and left click to place the point where the fire hydrant should be.



### Create a line

- 1) If you haven't already, locate the editor toolbar and start an edit session
- 2) You will see a the **Create Features** window fly out once the edit session is started
- 3) In the Create Features window highlight the subtype called **Distribution Main, Active** to edit the water mains layer
- 4) Next, under Construction Tools at the bottom of the Create Features window click on **Line**.
- 5) Navigate to the point in the map where you would like the first point of the water main line to be and left click once. You will see a Feature Construction fly out toolbar open. Ignore this for now.

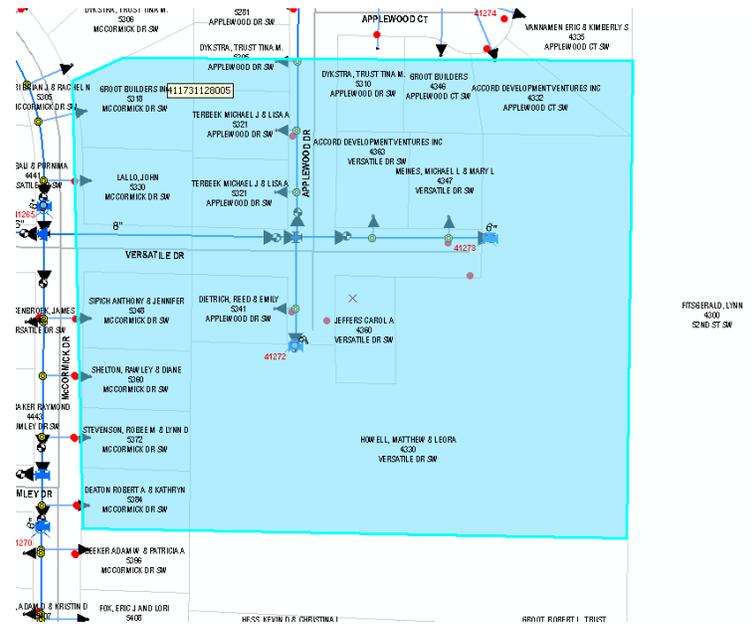
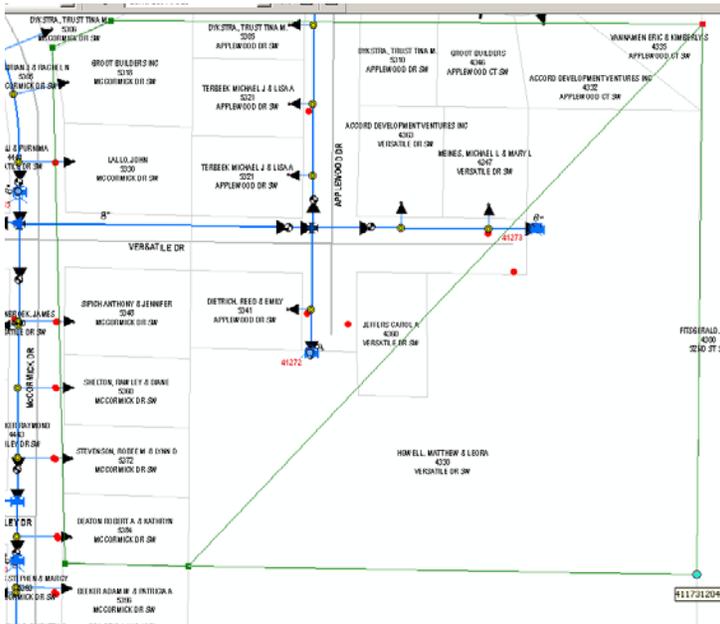
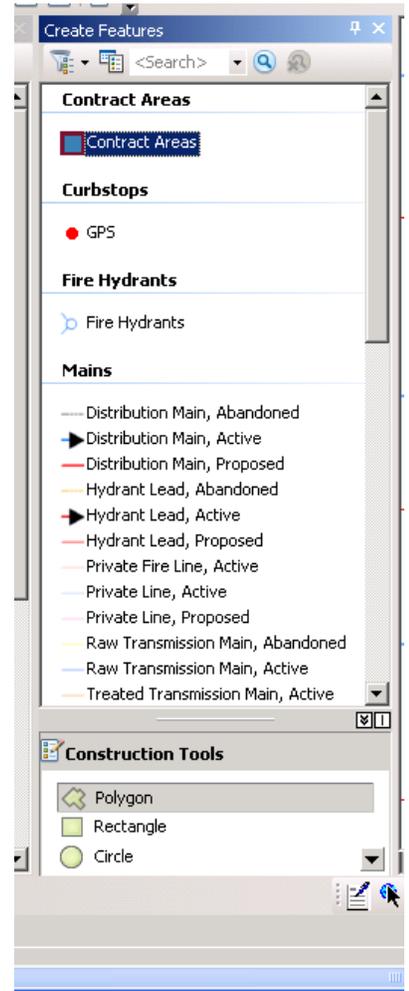


- 6) Find where you would like the second vertex to be placed and double click and the water main line will be created. If you would like to create a line with multiple vertices, simply left click once

rather than double clicking and you can continue creating the line feature. (see graphic on the left).

## Create a polygon

1. If you haven't already, locate the editor toolbar and start an edit session.
2. You will see the **Create Features** window fly out once the edit session is started.
3. In the Create Features window, highlight the layer called Contract Areas.
4. Next, under Construction Tools at the bottom of the Create Features window, click on **Polygon**.
5. Navigate to the point in the map where you would like the first point of the Contract Area polygon to be and left click once. You will notice the first vertex has been created.
6. Next, find where you would like the second vertex to be placed and left click. Repeat this process and when you are at the point to finish the sketch, double click and the polygon will be created



End of Exercise 3.1

## Exercise 3.2 – How to Set Direction, Distance and Rotate Features

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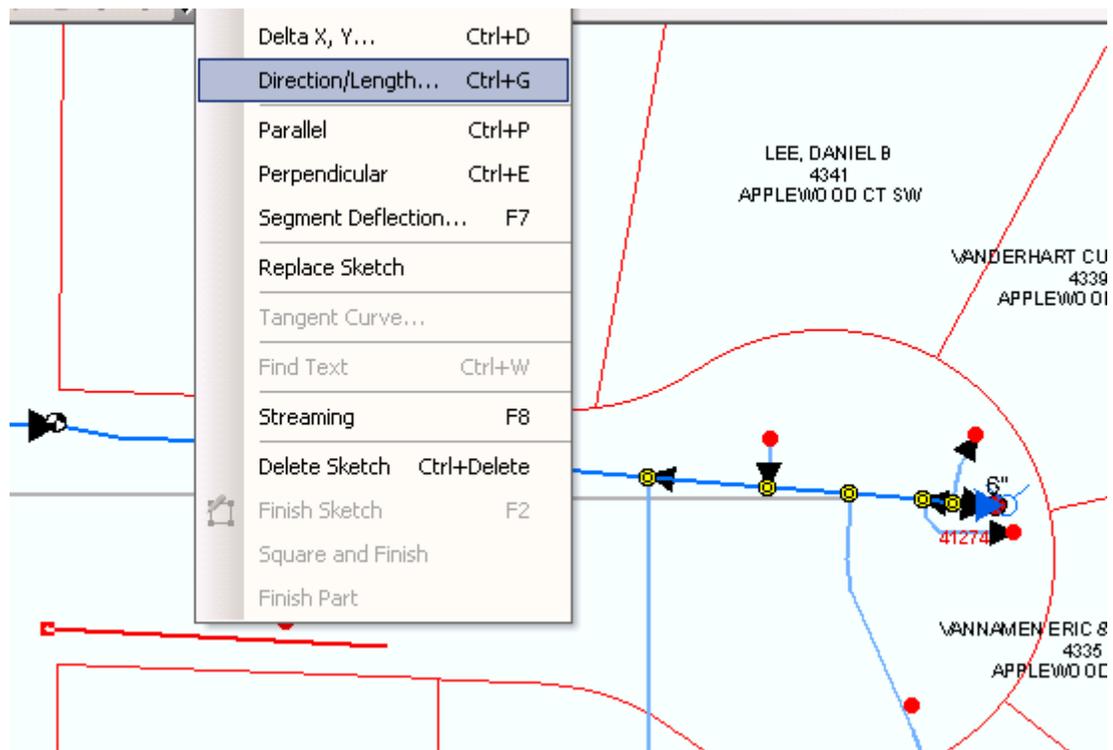
In this exercise, you will learn:

- How to set the direction and distance of a feature.
- How use the rotate tool.

*Exercise Objective: Create a 45 degree bend in a water main feature that is 120 ft in length. Use the rotate tool to rotate the above mentioned water main feature.*

### Set Direction and Distance

- 1) Zoom to the intersection of Applewood Ct SW & Applewood Dr SW in the City of Wyoming.
- 2) In the Create Features window highlight Distribution Main, Active and click on the Line Construction Tool.
- 3) Click any where in the map to start the first vertex of the water main.
- 4) Right click and select **Direction/Length**.



- 5) In the **Direction/Length** pop up box enter 45/120, meaning you want to draw a water main feature at an angle of 45 degrees that is 120 ft in length. (Note: You are using the default Units where a 90 degree angle represents north, and 180 degrees represents west.)

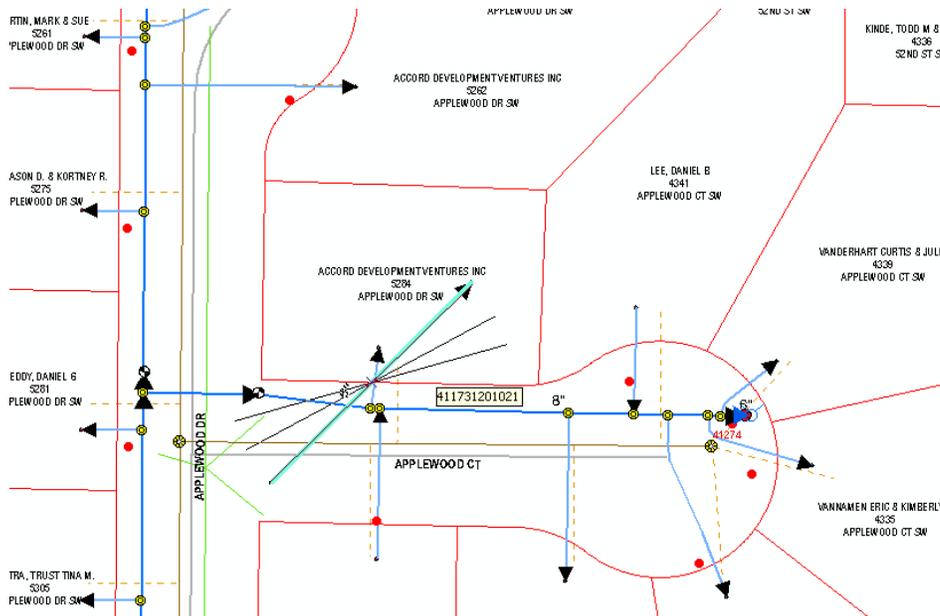


- 6) The water main you are about to create will be previewed in the map. To finish the sketch, right click and click **Finish Sketch**.

### Rotate a Feature

- 1) Use the **Edit tool**  to select the water main you just created.

- 2) Click the **Rotate Tool** .



- 3) In the map, left click and drag the mouse to rotate the feature clockwise or counterclockwise. Tap the **A** key and an angle pop up box will appear. Type in 22.5 and click **Enter**. The water main will adjust accordingly.

*End of Exercise 3.2*

## Exercise 3.3 – How to Use Copy Parallel and Flip Lines

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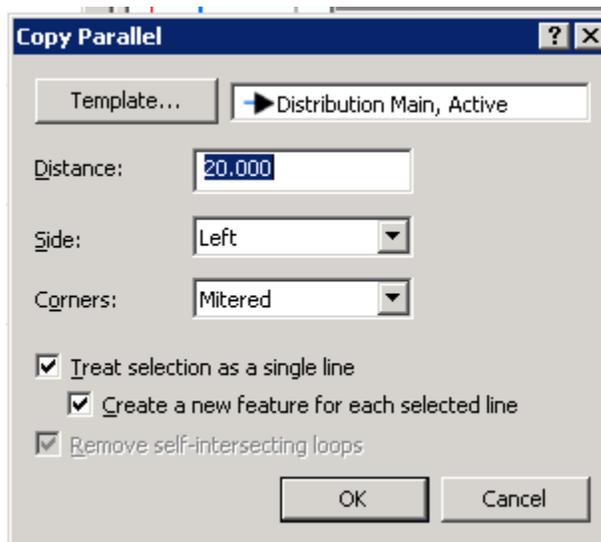
In this exercise, you will learn:

- How to use the Copy Parallel tool.
- How to flip line features to model flow direction.

*Exercise Objective: Create a water main that is off set 20 feet from the centerline in Applewood Ct. Change the flow direction of the water main by flipping the end point.*

### Set Direction and Distance

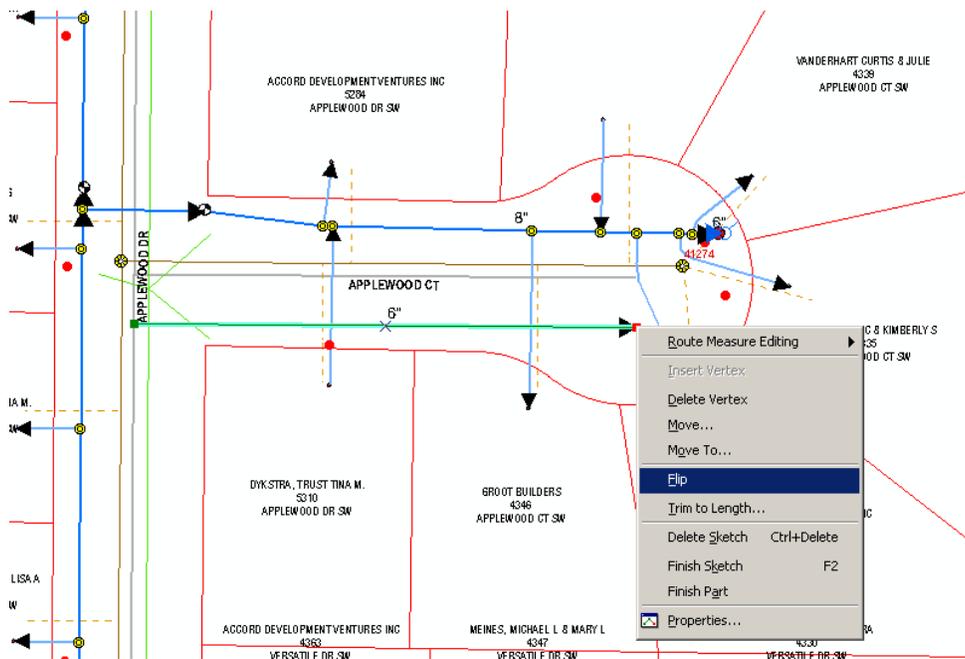
- 1) Zoom to the intersection of Applewood Ct SW & Applewood Dr SW.
- 2) In the Create Features window highlight **Distribution Main, Active** and select **Line** under Construction Tools.
- 3) Select the street centerline in Applewood Ct. using the Edit Tool. 
- 4) Click  on the Editor toolbar and select **Copy Parallel**  from the drop down list.
- 5) Enter the information as shown in the graphic below and click **OK**.



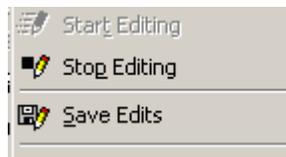
- 6) A Water Main feature will be created 20' south of the street centerline in Applewood Ct.

## Flip a line feature

- 1) Use the **Edit tool**  and double click on the water main you just created. You will notice a green vertex and a red vertex are shown on each end of the line feature. The green vertex represents the start of the line and the red represents the end. Flip the line so the flow direction is moving towards the West (Applewood Dr.).
- 2) Position your mouse over the red vertex of the water main you just created, right click and chose Flip.



- 3) When finished, always remember to save edits by clicking  on the Editor toolbar and save edits.



*End of Exercise 3.3*

## Exercise 3.4 – How to edit attributes

In this exercise, you will learn:

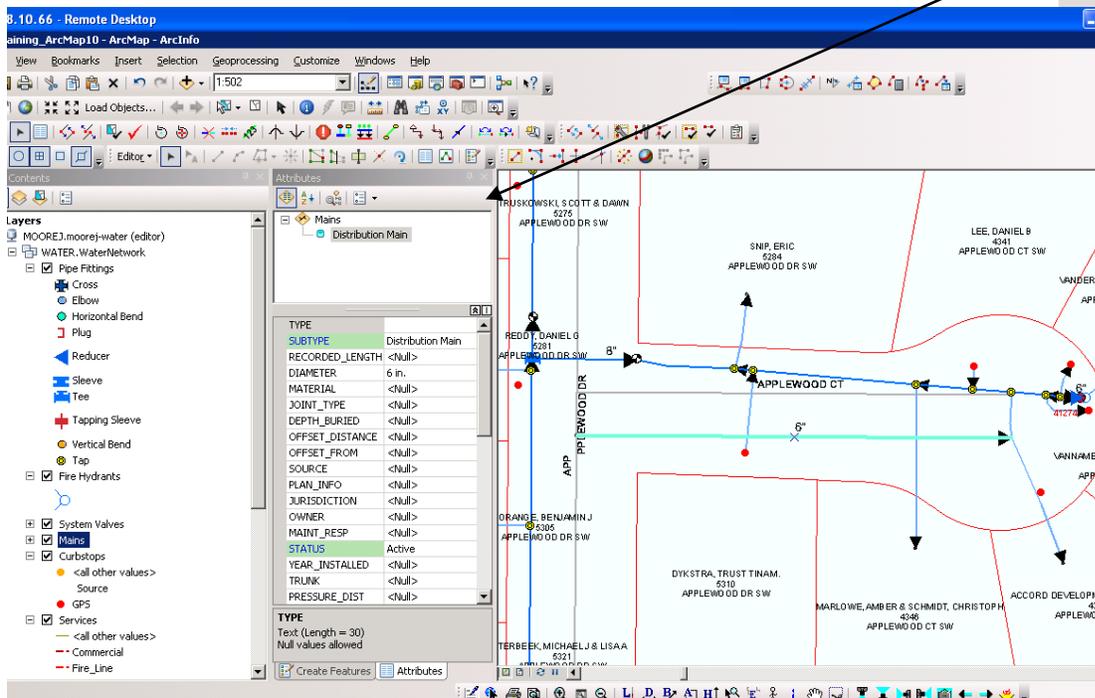
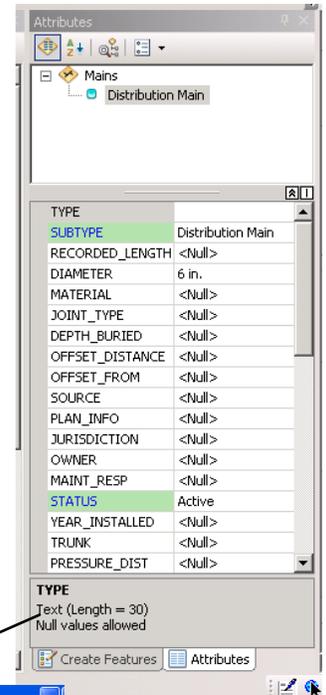
- How to edit attributes of a feature

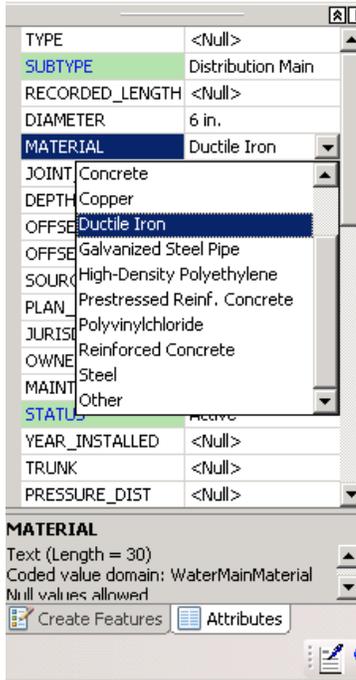
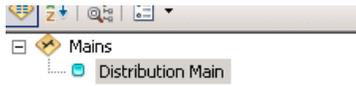
*Exercise Objective: Edit the attributes of the water main you created in Applewood Ct. in exercise 3.3. The water main has the following information:*

- Size = 6" in diameter
- Pipe material = Ductile Iron

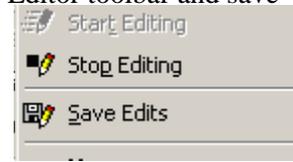
### Edit Attributes

1. Zoom to the intersection of Applewood Ct SW & Applewood Dr SW.
2. Use the **Edit tool**  to select the water main you created in Applewood Ct during exercise 3.3.
3. Click the **Attributes button**  and the Attributes dialog box will pop up. *NOTE: If you need to select more than one feature, hold down the Shift key while using the Edit tool to select each feature.*
4. The top of the Attributes dialog box shows the features you've selected. Features are displayed by their primary display field. You will move to the bottom of the box to edit the attributes of the water main feature. Change the *Diameter field* to 6 in. and the *Material field* to Ductile Iron. Both are drop down selections.





- When finished always remember to save edits by clicking  on the Editor toolbar and save edits.



*End of Exercise 3.4*

## Exercise 4.1 – Using the Snapping and Feature Construction Toolbars

In this exercise, you will learn:

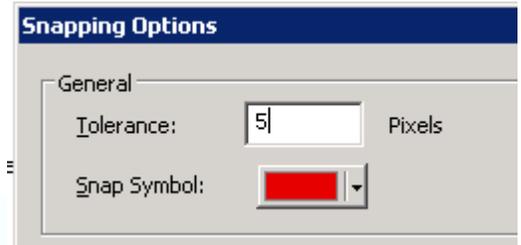
- Modify snapping properties
- How to use the snapping toolbar
- Use the Feature Construction flyout toolbar

*Exercise Objective: Add the snapping toolbar and use the toolbar to add a water main and pipe fitting in Versatile Dr connected to the North & South main in Applewood Dr.*

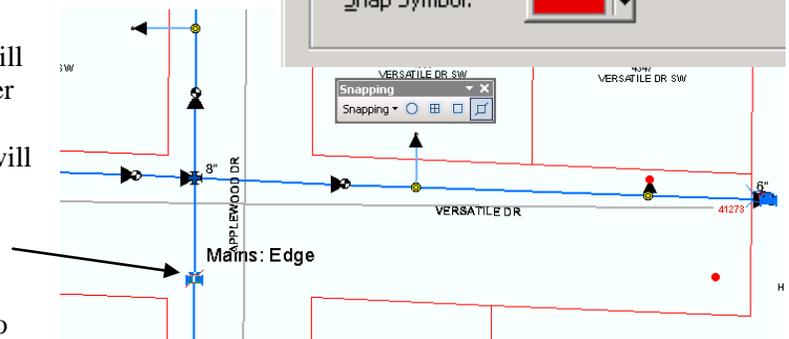
- 1) Zoom to the intersection of Applewood Dr. & Versatile Dr.
- 2) Use the knowledge you learned in exercise 3.1 to create a Pipe Fitting (tee) anywhere near the new water main. You will snap the Pipe Fitting (tee) to the water main using the Snapping toolbar.
- 3) Since snapping is turned on by default you will be ready to snap the pipe fitting to the main, but first you will need to add the snapping toolbar by clicking Customize > Toolbars> Snapping.
- 4) In this example we will want to snap the tee to the EDGE of water main in Applewood Dr., so turn off the snapping for all other options on the snapping toolbar other than EDGE. See graphic below.



- 5) Next, click the Snapping drop down button > Options > Set the Tolerance to 5 Pixels.



- 6) With the Point construction tool still active, zoom into the existing water main in Applewood Dr. and move close to it with your mouse. You will notice the point you are about to create snaps to the existing water main. Left click to create the Pipe Fitting. The Snap tip will also indicate you are in fact snapping to the water main's edge.



- 7) Now, use the knowledge you learned in exercise 3.1 to create an Active, Distribution Main. You will use the snapping toolbar to make sure the main is snapped correctly to the pipe fitting just added.

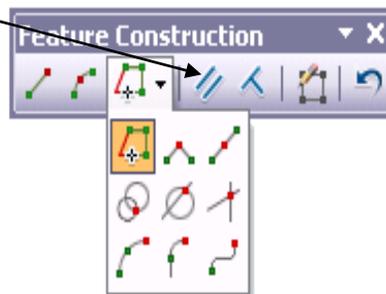
- 8) In this example, we will want to snap the water main to the POINT of pipe fitting in Applewood Dr., so turn off the snapping for all other options on the snapping toolbar other than point. See graphic below.



- 9) With the Line construction tool still active, zoom into the pipe fitting you added to the water main in Applewood Dr. and move close to it with your mouse. You will notice the snap tip indicates you are in fact snapping to the pipe fitting point.



- 10) Left click to start the water main. When you left click you will see the Feature Construction toolbar fly out. Click on the toolbar to bring it to the front. Click on the Constrain Parallel button





## Exercise 5.1 –How to use the Split and Flip Tools

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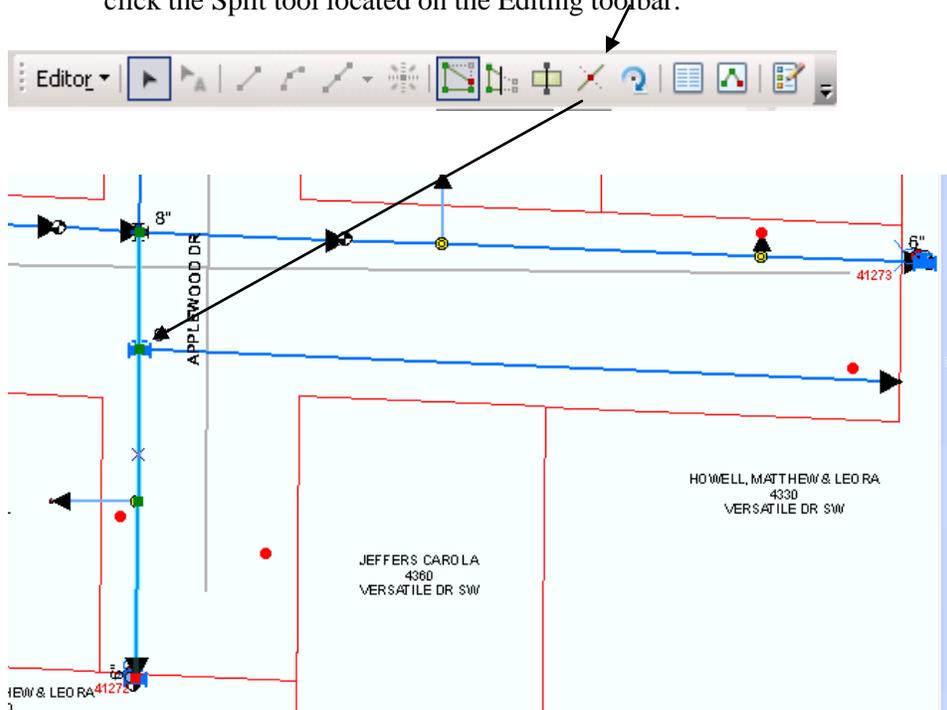
In this exercise, you will learn:

- How to use the split tool
- How to use the flip tools

***Exercise Objective:** Use the Split tool to separate the existing water main in Applewood Dr. that you snapped the new water main to in exercise 4.1. Second, use the split tool to split the existing water main at a certain distance to add a Pipe Fitting (Sleeve) 28' to the east. Use the flip tools to change the flow direction of the new water main.*

### Split Tool

1. Zoom to the intersection of Applewood Dr SW & Versatile Dr where you added the water main in exercise 4.1.
2. Open the Snapping Properties window and make sure the snapping for Mains is set to Vertex, Edge and End
3. To split the existing 8" water main in Applewood Dr, double click on the water main and click the Split tool located on the Editing toolbar.

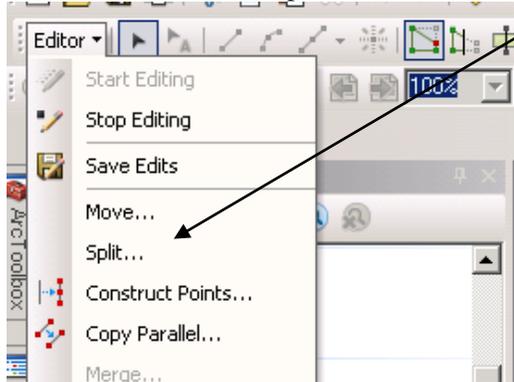


4. Click on the point where the new water main from Versatile Dr. intersects the existing water main you intend to split and the existing water main will be split at the point you clicked on.

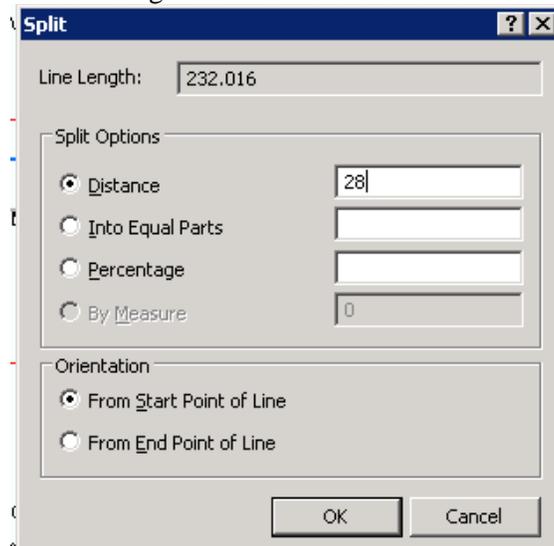
### Split to a specified distance

1. To add the Water Fitting (sleeve) 28' to the east use the Edit Tool  and double click to select the existing 6" water main in Versatile Dr.

2. Click the Editor drop down menu and click Split



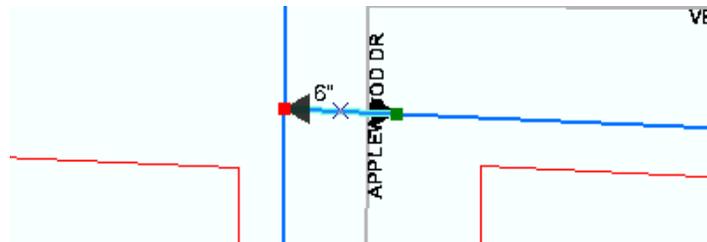
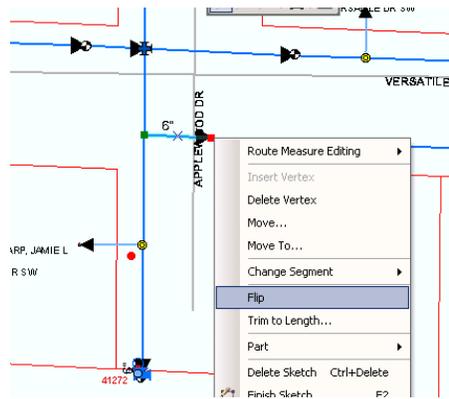
3. The Split window appears. Follow the example below. Notice how the total length of the line currently selected is displayed at the top of the window. Close the options shown in the graphic below. This will split the line exactly 28 feet south of the end point, which is the intersection of the existing water main and the new water main.



4. Use the knowledge you gained in exercises 3.1 & 4.1 to create a Pipe Fitting (sleeve) and snap that sleeve to the point where you split the water main in the step above. (Hint use snapping)

## Flip tool

1. Use the Edit Tool and double click on the 28' line segment
2. Move the mouse over the red vertex (end vertex) of the line
3. When Right click and click Flip and the red vertex indicating flow direction will flip from the west to the east.



*End of Exercise 5.1*

## Exercise 5.2 – Advanced Editing Toolbar: Copy Features and Fillet

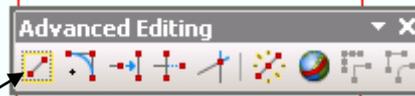
In this exercise, you will learn:

- How to Copy Features
- How to use the Fillet Tool

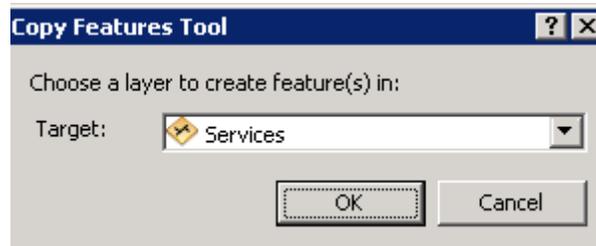
*Exercise Objective: Copy an existing water service line to create a new water service line that will connect to the Curb/Stop Box that has been placed from a GPS unit. Use the Fillet tool to represent a bend in the new water service line.*

### Copy Features Tool

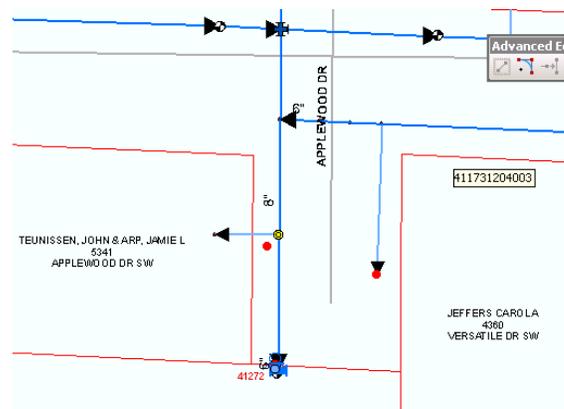
1. If the advanced editing toolbar is not added, go to Customize > Toolbars > click Advanced Editing to add the toolbar to your project
2. Zoom to the intersection of Applewood Dr & Versatile Dr.
3. Locate an existing water service line and double click on the water service using the Edit Tool 



4. Click the copy features tool on the Advanced Editing toolbar
5. Next, click in the map south of the water main you added in Versatile Dr.
6. A window will pop up prompting you to select the target layer. Select Services in the drop down menu.
7. Click Ok and the tool will paste the feature you just copied.



8. Use the knowledge you acquired from exercise 4.1 to snap the water service line to the new water main running West to East in Versatile Dr. and to the existing GPS located curb/stop box located to the south near 4360 Versatile. When finished the water service should look like the graphic to the right.



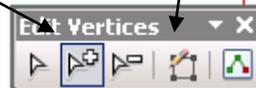
## Fillet Tool

Using the **Edit Select** tool  double click on the water service line

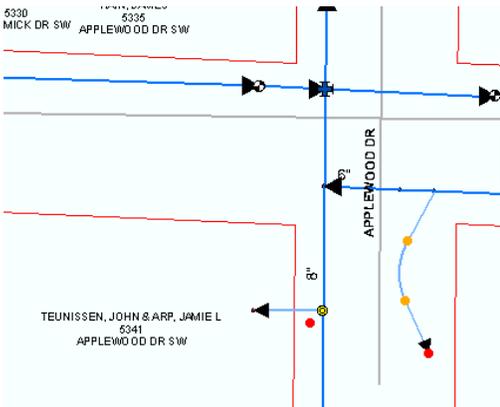
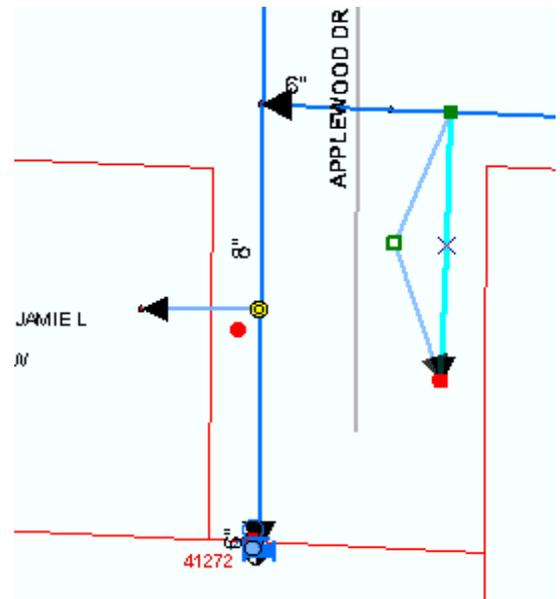
The Edit Vertices fly out toolbar with pop up.

Use the Add Vertex tool to add a vertex near the center of the new service you created.

Click Finish Sketch after the vertex is added



Once the vertex is added hover over the new vertex with your mouse and pull the vertex to the left to create an angle on the water service line.



Click on the **Fillet Tool**

 on the Advanced Editing toolbar. Click on each side of the middle vertex that you just inserted and move the mouse to begin the Fillet or curve.

Move the mouse to the right to create a radius, click in the map to finish the sketch.

*End of Exercise 5.2*

## Exercise 5.3 – Advanced Editing Toolbar: Trim & Line Intersection

In this exercise, you will learn:

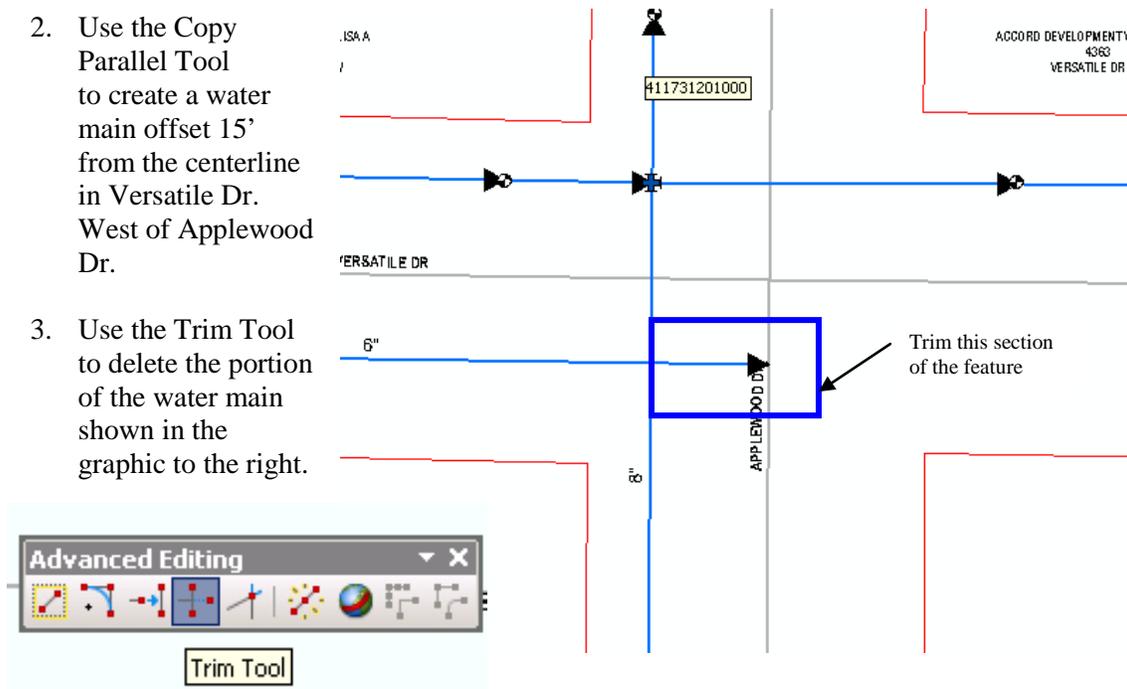
- How to Trim features
- How to use the Line Intersection tool

### Trim Tool

1. Zoom to the intersection of Versatile Dr SW & Applewood Dr SW.

2. Use the Copy Parallel Tool to create a water main offset 15' from the centerline in Versatile Dr. West of Applewood Dr.

3. Use the Trim Tool to delete the portion of the water main shown in the graphic to the right.

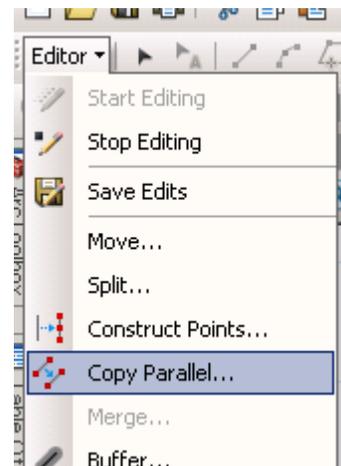


4. Double click on the 8" water main feature running North and South in Applewood Dr.
5. Click the Trim Tool. Cross Hairs will appear indicating the Trim Tool is working.
6. Click on the portion of the feature that is highlighted in the graphic shown above with the cross hairs. The tool will trim the feature where the new water main and the 8" water main in Applewood Dr. intersect (tool trims new feature based on existing feature).

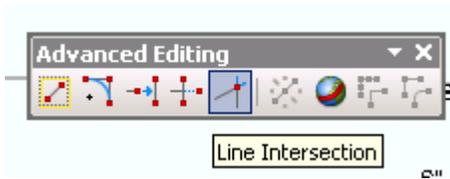
### Line Intersection Tool

*Zoom to the intersection of Versatile Dr. & Applewood Dr.*

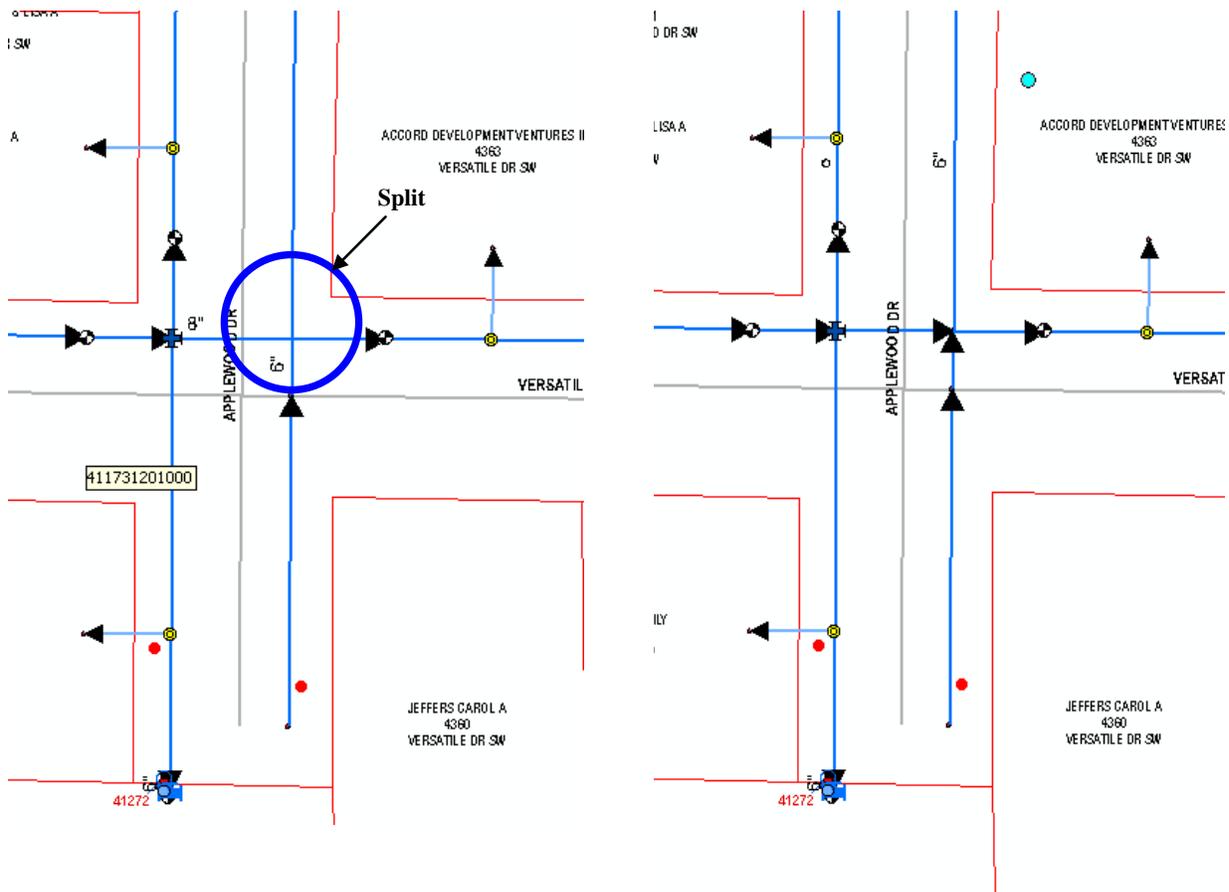
1. Use the Copy Parallel Tool to create a water main 15' East of the centerline in Applewood Dr. (Note you have to select multiple street centerline segments before you use copy parallel).



2. Click the Line Intersection tool to split the new water main where it intersects the existing water main running East and West in Versatile Dr.



3. Click on the existing water main running East and West in Versatile.
4. Click the new water main you just created running North and South in Applewood Dr.
5. The circle crosshairs will jump to the intersection. Press Enter and the tool will split the features at the intersection.



*End of Exercise 5.3*

## Exercise 6.1 –Geometric Network Editing

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In this exercise, you will learn:

- How to set and verify connectivity
- How to disconnect a feature from the network

*Exercise Objective: Use the Geometric Editing toolbar verify connectivity of new water service placed in exercise 5. Use the Geometric Network Editing toolbar to disconnect an existing water service to move to a new location.*

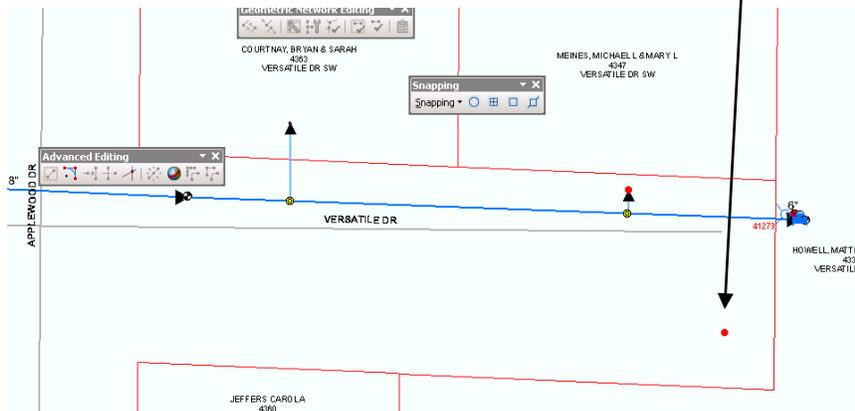
### Disconnect a Feature

- 1) Locate the service located at 4363 Versatile Dr SW. This is the water main service you need to disconnect to move to a new location.
- 2) Double click on the water service for this address located south of the property.

- 3) Disconnect the water service feature by using the disconnect button  on the Geometric Network Editing Toolbar. (Note: Trying to move the water service without disconnecting the feature will create issues with the data fabric.)

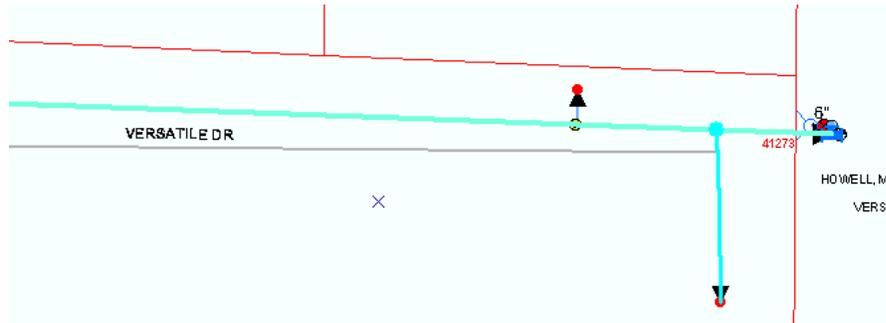


- 4) The process will finish and you are now able to move the water service feature to a new position and snap the feature to the Curb/Stop Box and the existing water main. Try moving the service to the curb box GPS locate at the end of Versatile Dr and use snapping to connect it to the water main and curb box (red point)



## Verify Connectivity

1. Once you have the service line moved and snapped at the new location highlight the features as shown in the graphic below.



2. To verify that features are connecting properly, click on the Connect button  on the Geometric Network Editing toolbar.
3. The Edit Tool  will disappear and a white arrow will appear while the Geometric Network connectivity is being verified. The Edit Tool will then reappear after the connectivity has been verified. A message box will appear if there are issues with connectivity.

*End of Exercise 6.1*