



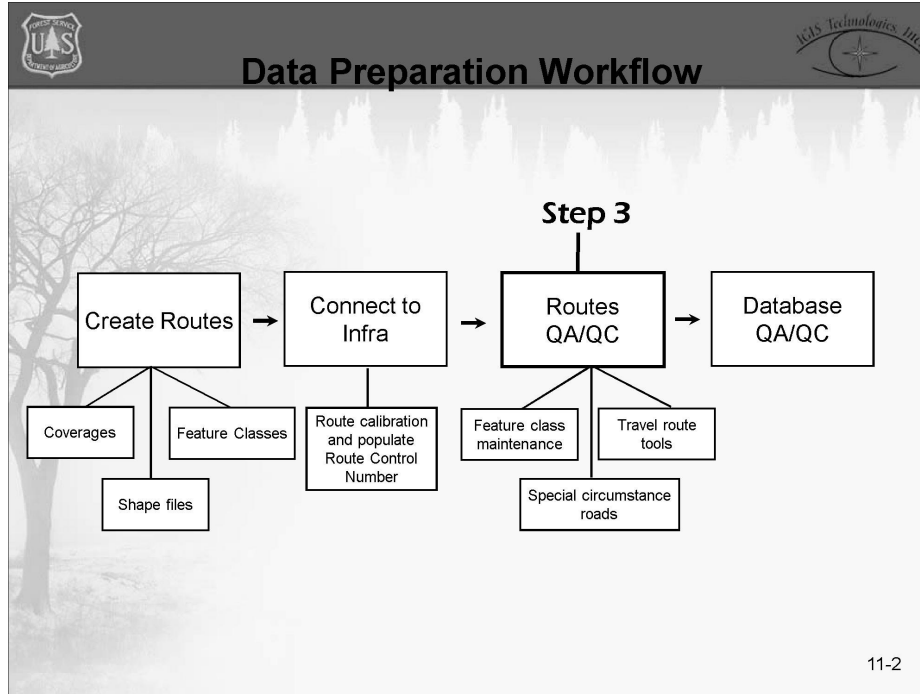
## Special Circumstance Roads

***Objective: To address some of the needs of special circumstance roads such as: loops, dual designations, and Y intersections.***

11-1



## Special Circumstance Roads

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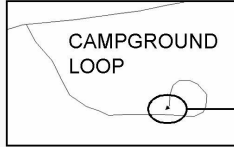
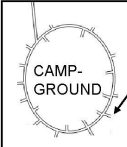
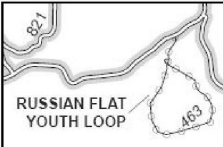
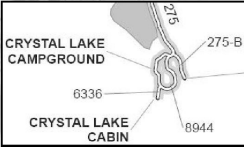
Within the third step in data preparation you will deal with special circumstance roads. These are roads that require special attention, quality assurance, and editing to ensure clear readability on the MVUM. This includes looped routes, y-intersections, and direction of arcs. This chapter will cover some tips on how to address these situations.

## Special Circumstance Roads



### Road with Loops

- Campground road loops
- Loop trails
- Campsite spurs not part of the FSR road system
- Leave gap larger than fuzzy tolerance



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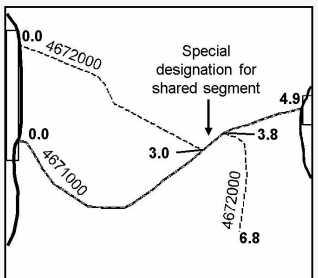
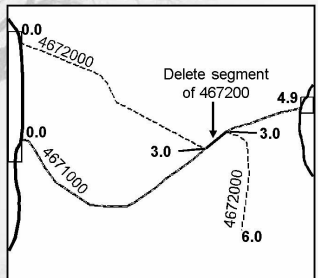
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A route that originated from a coverage and has a road with a loop may need to be edited. The measurements in this loop may be out of order. If a route coverage looped around and connected back to itself the calibration tools could get confused and break the route into parts with the measurements out of order. This situation does not affect a geodatabase's ability to measure lengths. Because of the potential issues, any route with a loop in it should be examined closely. The arc should be broken just prior to reconnecting back to itself. Most of the time a loop in a route will be measured in a counterclockwise manner however, a Forest can manage their routes with loops the best way they see fit. This approach to measuring a loop simulates how you would most often drive around a one way loop typical of most campgrounds.



### Dual Designations

- Discouraged, can cause public confusion
- Two options when dealing with dual designations
  1. Discontinuous route
  2. Shared routes with incremented mile post




	BMP	EMP	Linear Event
4671000	0.0	4.9	ROUTE STATUS
4672000	0.0	6.0	ROUTE STATUS


	BMP	EMP	Linear Event
4671000	0.0	4.9	ROUTE STATUS
4672000	0.0	3.0	ROUTE STATUS
4672000	3.8	6.8	ROUTE STATUS

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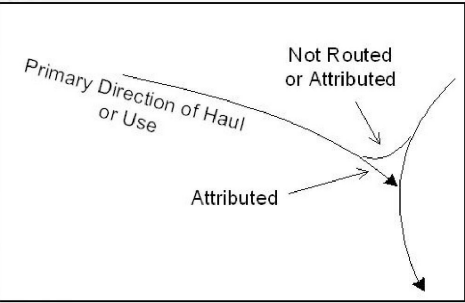
A segment of road that has a dual route designation (i.e., represents both a trail and a road) is discouraged due to the confusion it can potentially cause the public. The purpose behind dual designations is to make both routes without double counting mileage and double entering events for the shared segment. If a segment of a route has dual designations one of two methods can be performed. The first is to make one route discontinuous. The route will be disconnected by the line segment it shares with another route but is still able to be calibrated. This solution is recommended in most cases and is the least complicated. The second method is to create the route as a continuous route and increment the mile posting on the shared segment. Following this method the route system can be built and also calibrated. The linear events in Infra will show a gap in the route where the dual designation occurs.



### Y Intersections



- Determine leg of primary direction and attribute normally
- Don't attribute or route alternate leg (back leg)



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Although Y intersections go against the design policy they exist in many parts of the country. It is not recommended to attribute or route the back leg of the Y intersect because it may cause calibration and routing problems. If the alternate route has its own individual route number then it should be kept. If the route number of the back-leg is the same as the primary route than it should be deleted. When encountering a Y intersection you should: determine the leg of the Y that is in the direction of primary haul or use and attribute the arcs of primary route as normal. For the alternate leg of the Y-intersection, you could remove this segment from your route layer so that it doesn't show up or get labeled. If the back leg being removed is of significant length i.e. over 200 feet, consult with the transportation engineer or recreation program before removing. Eliminating long segments of roads or trails could cause confusion and change the total mileage of a forest's network.



### Flip Arc

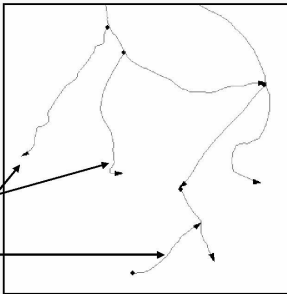
- All trails or road arcs should begin at their junction
- I-Web Spatial Editor Travel Routes toolbar tools
  - Turn on/off direction arrows
  - Flip Route

1

Display

- Turn ON/OFF Route Labels
- Turn ON/OFF Direction Arrows
- Turn ON/OFF Route Hatches

2



3



Edit Tools Help

- Edit Attributes
- Display Min/Max Measures
- Add Route
- Calculate EMP From Length
- Calibrate selected routes with BMP/EMP values
- Modify Route
- Delete Route
- Flip Route
- Drop Measures
- Connect Routes to Infra
- Mid Point Calibrate Routes (Next Version)

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Routes on an MVUM have a specific direction and must be correct for mileposts, seasonal designation, and other Infra data to be displayed properly. Every route has a beginning and ending milepost used to calibrate that route. The direction must be correct for distances referenced on the MVUM to be correct and for end users to interpret the map correctly. If the direction of an arc is wrong, the Infra data will be displayed incorrectly because the beginning and ending milepost referenced on that route will be at the wrong ends. This could cause a user to interpret allowed motor vehicle access at the opposite end of a route.

An arc gets its direction by the order the vertices were added during the production process. Because direction of the arcs may not have been a priority during their creation, all arcs must be checked to make sure they are displaying the correct direction. The I-Web Spatial Editor Routes toolbar has two tools to help check and correct arcs that are displaying the wrong direction. Under the Display dropdown on the I-Web toolbar, the Turn On/Off Direction Arrows changes the symbology of the arcs in the selected route feature class to display as arrows showing their direction. Under the Edit drop down on the I-Web toolbar, the Flip Route tool can change the direction of a selected arc.



Demo

- Review how to handle a loop in a road



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**Exercise:**

**Review and edit special circumstance roads**

- Goal: To perform edits when necessary on road features such as: loops, Y intersects, and dual designations



1. Navigate to the Ex11 folder
2. Edit the roads so the special circumstances display and are measured properly

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### Summary

- ☒ Roads with loops need to be broken (not snapped back to itself).
- ☒ Arcs should have a direction that starts from their junction
- ☒ Dual designation of routes should be avoided and can be handled by a discontinuous or shared route.
- ☒ Do not attribute the back leg of a Y intersection.

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### Exercise 11: Special Circumstance Roads



**Exercise goal:** In this exercise you will examine special circumstances found in road features and make edits that provide better MVUM clarity.

Why is this important? Special circumstance like dual designations, loops, and Y intersections often occur in the roads feature class. These circumstances must be interpreted and edited to display the route correctly.

Upon completion of the exercise, you will be able to QA route data for ...

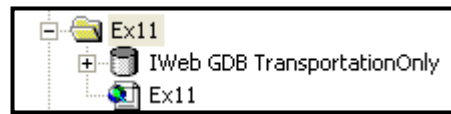
- ✓ Identify and edit a loop in a route so it displays and is measured properly
- ✓ Identify and edit a Y intersection so it displays and is measured properly
- ✓ Identify and edit a route that has dual designations so it displays and is measured properly

<b>STEP</b>	<b>DESCRIPTION</b>	<b>PAGE</b>
1	Roads with loops in them	11 – 12
2	Editing Y intersects	11 – 15
3	Dual designations	11 – 18

### Step 1: Correcting and Editing a Loop in a Road

Loops can occur in a situation like 1-way campground roads. If left as is, the route may unpredictably create its measures and subsequent ticmarks depending on whether it moves clockwise or counter clockwise around the loop. In this step you will edit a loop in the road routes so it displays systematically. The direction of the loop can be either direction. The direction of the loop is decided by the transportation engineer.

- a. In ArcMap navigate to C:/training/Ex11 and open the **Ex11.mxd** file.

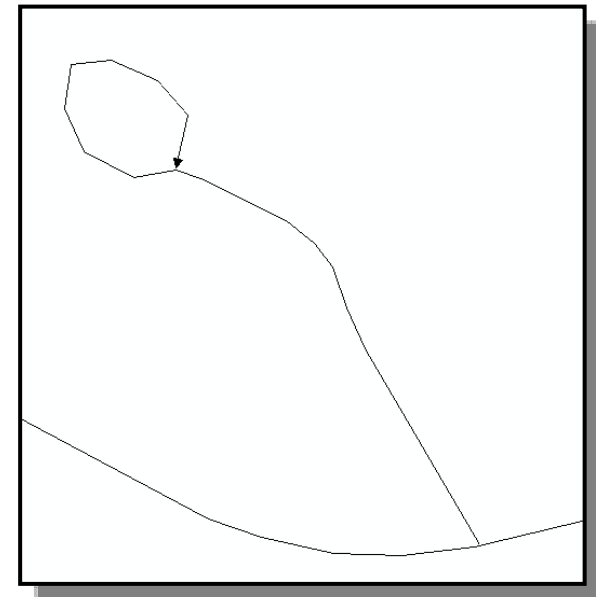


- b. In the main menu click on **View → Bookmarks → loop**.

The symbology of the road feature class is set to arrows showing the direction of the route. This symbol is helpful to show the beginning and ending of a route and allows you to see if a route is displaying the correct direction.


The bookmark zooms in to a road feature with a loop. It is important that the direction is correct and the end of the route is not snapped back to itself.

- c. Start an edit session with the Road feature class as the target and the task set to Modify Feature.



## Special Circumstance Roads

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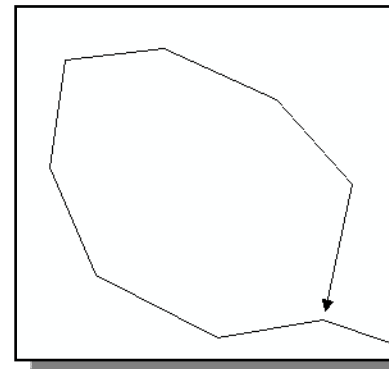
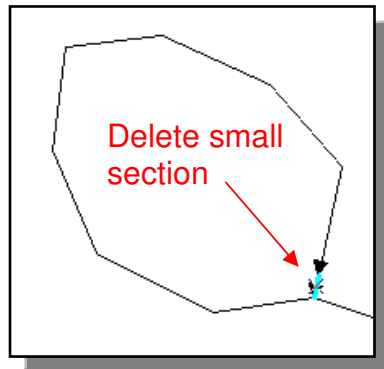
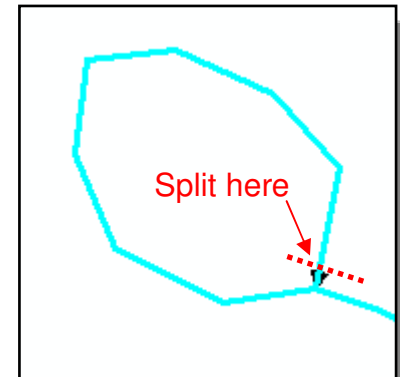
- d. Set the snapping on the Editor toolbar by choosing **Editor → Snapping**. Select the **Road vertex** checkbox.
- e. From the Edit Toolbar, choose the Edit tool  and double-click the campground loop route.

Notice the end of the arc symbolized with an arrow is snapped to another vertex of the arc. This does not follow MVUM standards.

- f. From the Editor toolbar, select the **Split** tool and split the selected arc according to the graphic.



- g. Select and **Delete** the small arc segment to leave a small gap.



The break in the loop should be small so it appears continuous on the map.

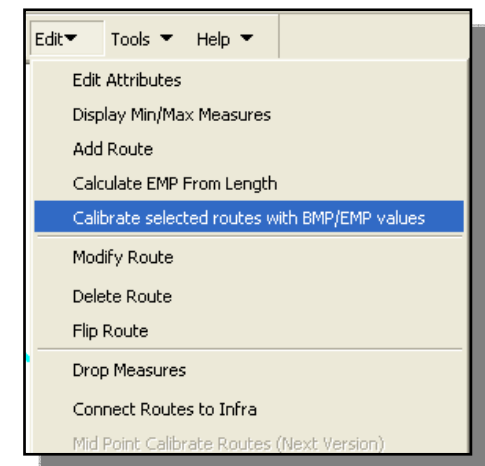
## Special Circumstance Roads

After altering the geometry of a route it must be recalibrated. You will use the calibrate tool on the I-Web Spatial Editor Travel Routes toolbar.

- h. Activate the I-Web Spatial Editor Travel Routes toolbar by selecting the **Connect to I-Web button** and select the **Production I-Web Server**. Then click the **Update Metadata** and copy the previous metadata.

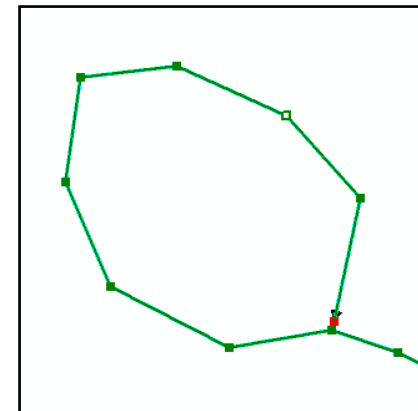
Now that the loop is broken the route must be recalibrated to get the correct M values to show up for each vertex.

- i. Using the Edit tool select the loop route and from the I-Web Spatial Editor Travel Routes toolbar select **Edit → Calibrate selected routes with BMP/EMP values**.
- j. Say **Yes** to the message that asks if you want to use an existing table for calibration (This is the table we have pre-downloaded for you but in practice you would likely use a fresh table that might be more current.
- k. With the loop still selected, click on the **Sketch Properties** icon to open the Edit Sketch Properties window. You may have to set the task to Modify feature in the Edit toolbar. Click on the different records in the Edit Sketch Properties window to make sure the M values increase as you go counter clockwise around the loop.



Part		X	Y	M
0	9	460755.820	4332279.300	0.178
	10	460745.910	4332283.800	0.166
	11	460737.100	4332282.800	0.157
	12	460735.820	4332273.300	0.147
	13	460739.910	4332263.800	0.136
	14	460750.660	4332258.300	0.124
	15	460756.746	4332259.287	0.117

M values will not match this graphic example

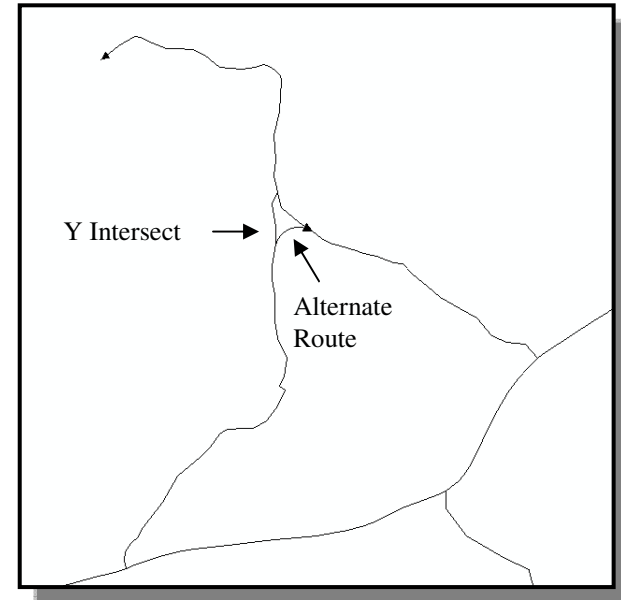
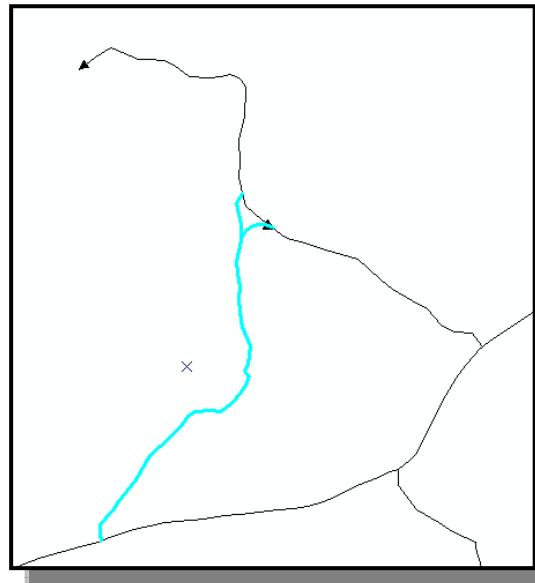


### Step 2: Editing Y intersect


Y intersects are sometimes found in MVUM road GIS data. This happens as shortcut paths have migrated over time into the corporate route layer. The current GIS Data Dictionary standard does not endorse displaying Y intersects. When a Y intersect is encountered it should be edited to not show the backleg / alternate route.

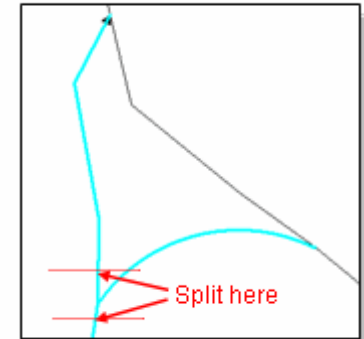
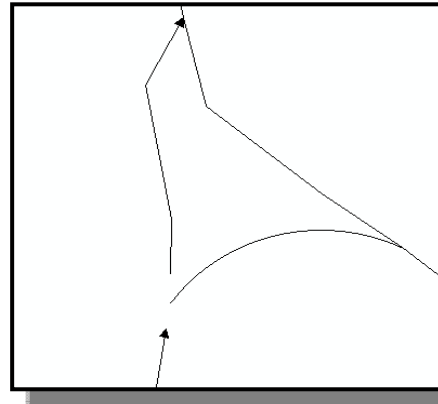
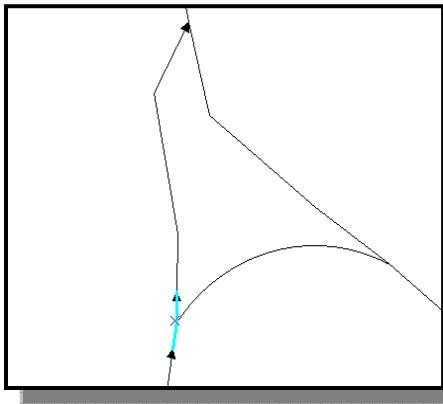
- a. In the main toolbar click **View** → **Bookmarks** → **Y intersect**.


- b. With the Edit tool  on the Editor Toolbar, Select the route on the left.

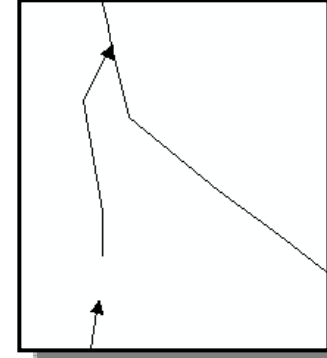
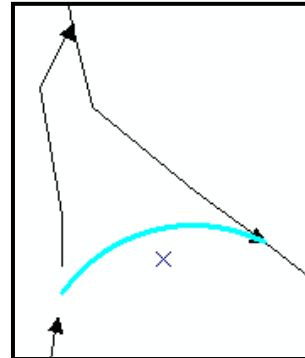
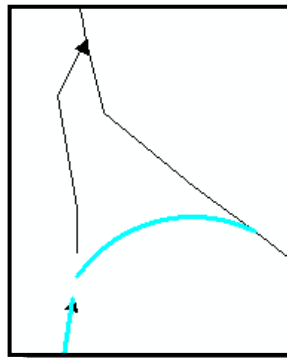


## Special Circumstance Roads

- c. Zoom to the Y intersect. Select the Split tool  from the Editor Toolbar. Split the arc in two locations according to the diagram on both sides of where the alternate route begins.
- d. Select the smallest arc segment and delete it.



- e. With the Edit tool select the back leg and use the **Explode Multi-part Feature** tool in the Advanced Editing tool bar to break the multi feature arc into two. Select the back leg and delete it (You may have to turn on this toolbar: View → Toolbars → Advanced Editing). 

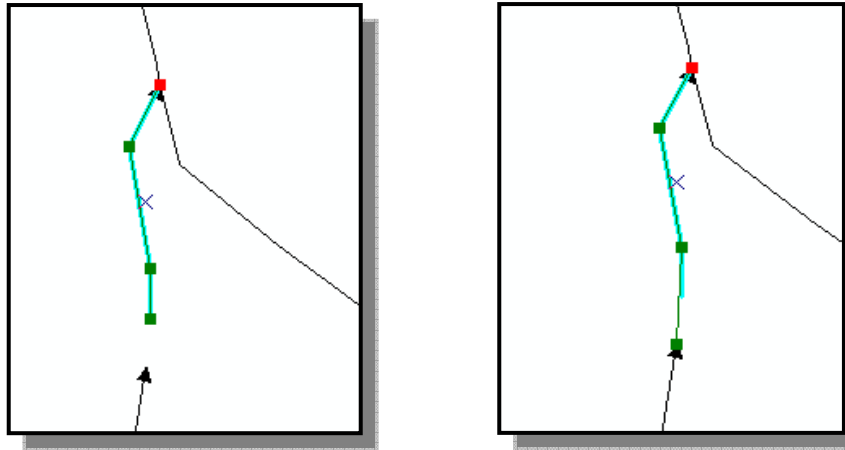




## Special Circumstance Roads

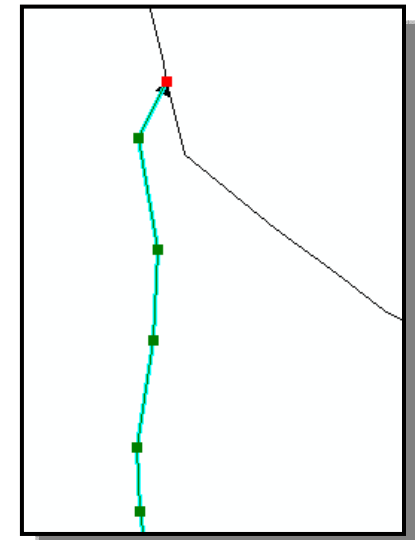
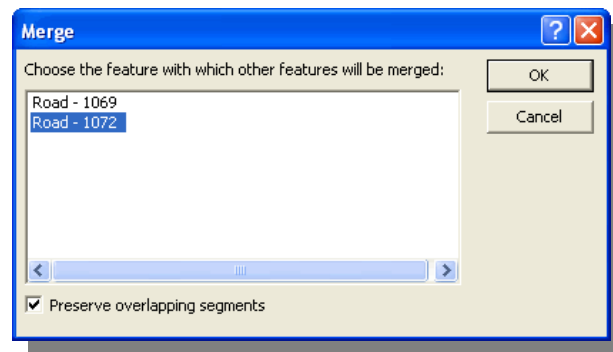
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- f. With the Edit tool selected, double click the upper segment of the arc. Ensure that Modify Feature is the task in the Editor toolbar. Move the bottom vertex down and snap it on the last vertex of the bottom arc.



- g. Select both arcs and Use the **Merge** tool in the Editor drop-down menu in the Editor toolbar. In the Merge window, select **Road - 1064** and click **OK**.

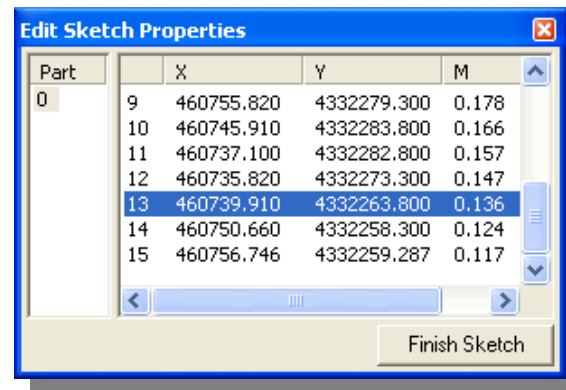
Now you have one arc with a single Route Control number which will receive one clear label.



## Special Circumstance Roads

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- h. With the arc still selected navigate to the I-Web Spatial Editor Travel Routes toolbar click **Edit → Calibrate selected routes with BMP/EMP values** (Click Yes when asked to use existing calibration table).
- i. Set the task in the Editor toolbar to **Modify Feature** and click on the Sketch Properties icon to review the M values assigned to the vertices of the arc. When clicking on each record, you should see the vertex highlight in order along the newly edited arc.



Part		X	Y	M
0	9	460755.820	4332279.300	0.178
	10	460745.910	4332283.800	0.166
	11	460737.100	4332282.800	0.157
	12	460735.820	4332273.300	0.147
	13	460739.910	4332263.800	0.136
	14	460750.660	4332258.300	0.124
	15	460756.746	4332259.287	0.117

M values will not match this graphic example

### Step 3: Dual Designations

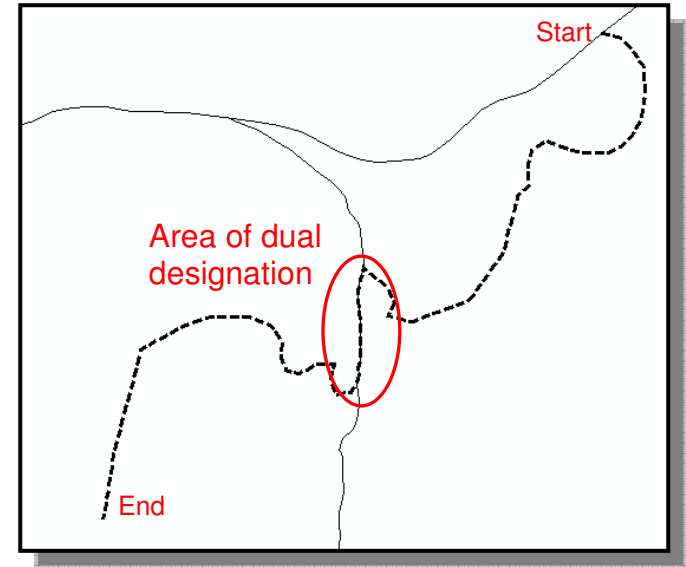
When two routes are coincident, the overlapping segment is considered to have dual designations. Dual designations can cause confusion to the public. In this exercise you will address a dual designation route by creating a discontinuous route. This will involve creating a gap in Route A where it previously overlapped Route B. The measured length will be continuous throughout the entire route (i.e., does not subtract out the gap distance).

- a. In the main toolbar click **View → Bookmarks → dual designation.**

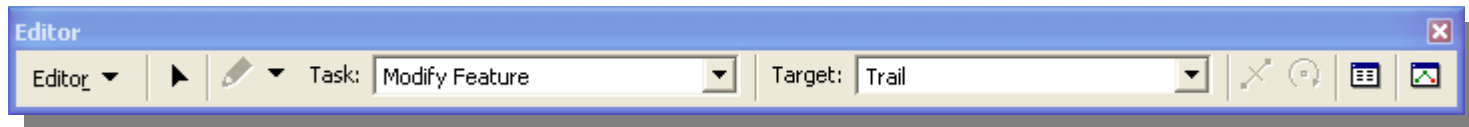
## Special Circumstance Roads

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The data frame zooms to a trail that is coincident with a road for a small segment. This dual designation will be edited.



- b. Start an edit session with the **Trail** feature class as the target and set the task to **Modify Feature**.



- c. Ensure you have an I-Web connection (your tools will be grayed out if you don't). From the Display drop down menu in the I-Web Spatial Editor Travel Routes toolbar click on the **Turn On/Off Route Hatches**.


This tool will label the BMP and EMP data and put hatch marks at quarter intervals on the route.

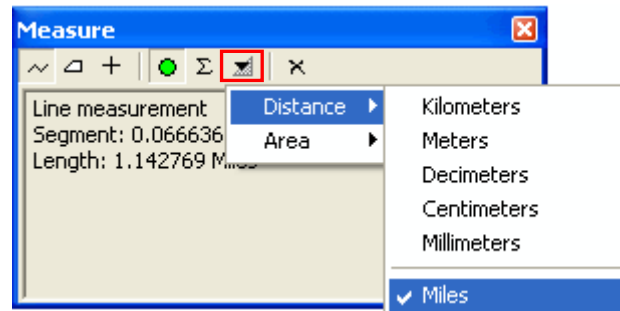
### Question:

1. What are the beginning and ending milepost values for the trail?

## Special Circumstance Roads

d. **Zoom in** to the route segment with dual designation

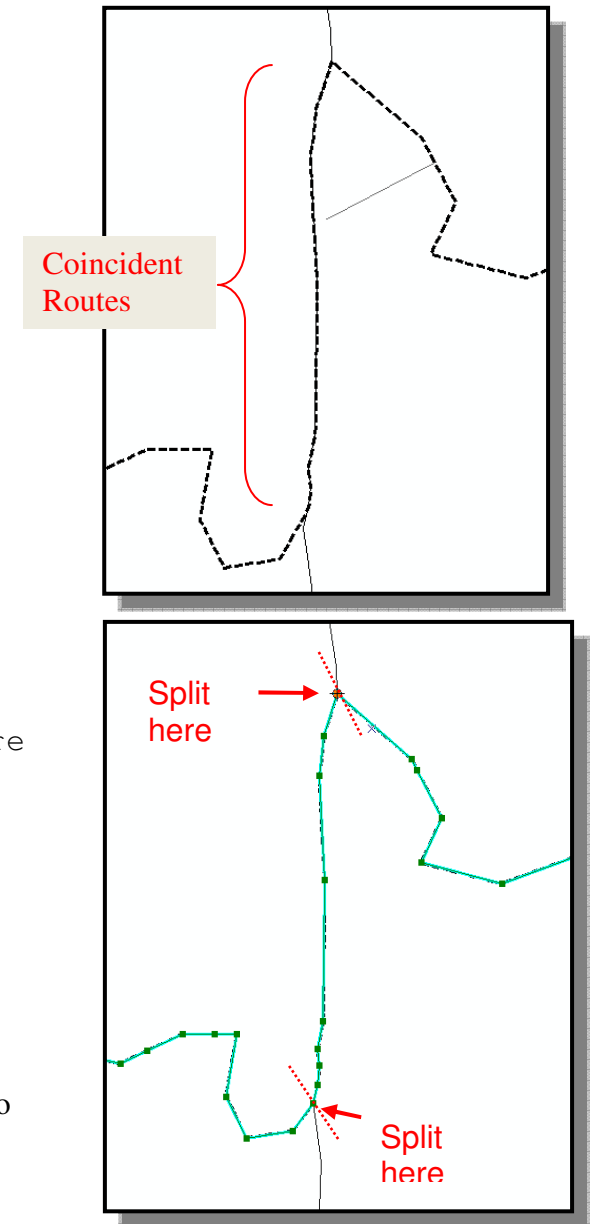
e. Click on the **Measure** tool  on the Tools Toolbar. In the Measure window set the distance to miles.



f. Measure the length within the bracket where the routes are coincident.

g. Set selectable layers so only trails are checked on.

This distance is important as it will need to be subtracted from the overall length of the trail to make the calibration correct.



## Special Circumstance Roads

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Question:

2. What is the distance the two routes are coincident?

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h. Use the **Edit Tool** in the Editor Toolbar to select the trail route.



i. Click on the **Split** tool in the Editor Toolbar and Split the trail on the vertex where it first overlaps the road feature.

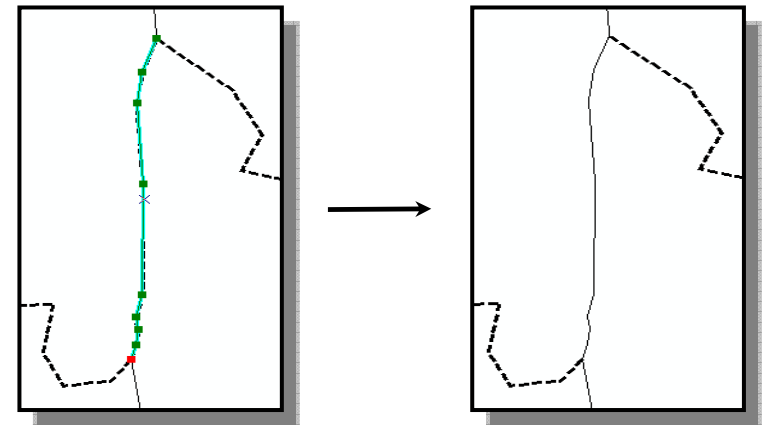


j. **Select** the Trail route that is still coincident with the road route.

k. **Split** the Trail route again on the last coincident vertex of the trail route.

Now that the trail is split along the overlapping segment, you can delete it.

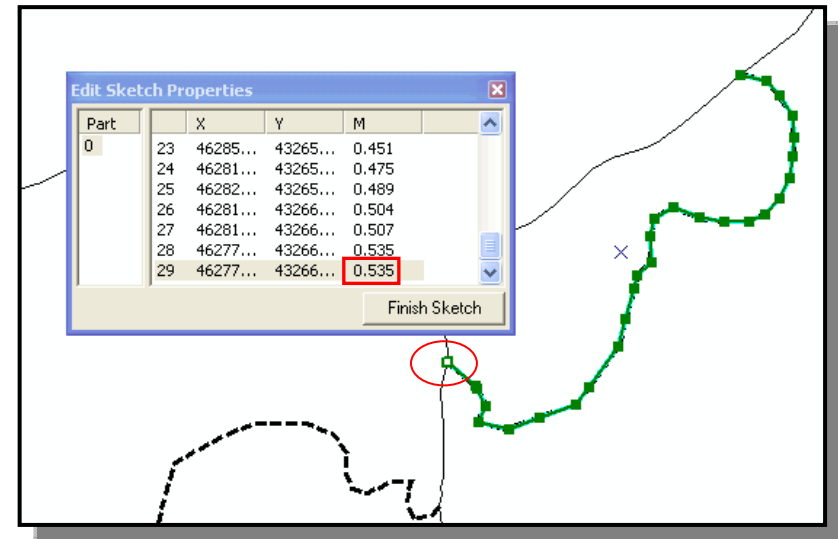
l. Select and delete the segment of the Trail route that is still coincident with the road.



## Special Circumstance Roads

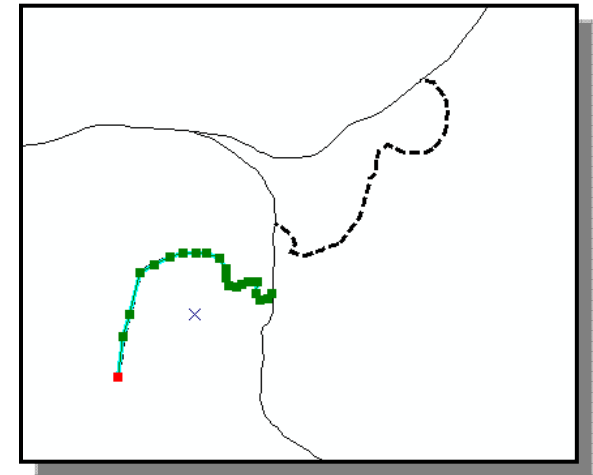
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- m. In the main menu bar click **View** → **Bookmarks** → **dual designation** to view the entire trail route.
- n. Using the Edit tool in the Edit Toolbar Select the segment of trail to the right of the overlap area as seen with selected vertices in the graphic (you may have to zoom out to see all of it). Set the task in the Editor Toolbar to Modify Feature.
- o. With the trail selected, click on the **Sketch Properties** tool in the Editor Toolbar. Scroll to the bottom of the Edit Sketch Properties window and write down the M value for the last vertex. M Value = \_\_\_\_\_. **Close** the Edit Sketch Properties window.



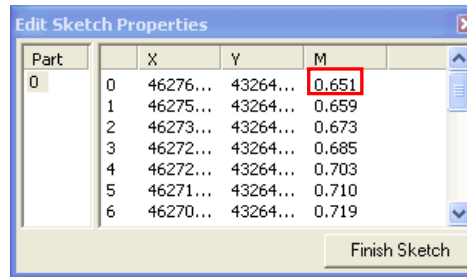
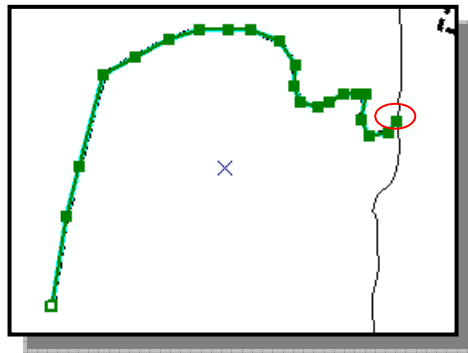
This value needs to be used to start the first vertex in the left part of the trail segment. This will allow for a continuous measurement along the two separated trail segments.

- p. Using the **Edit** Tool select the left segment of the trail route and open the Edit Sketch Properties window.

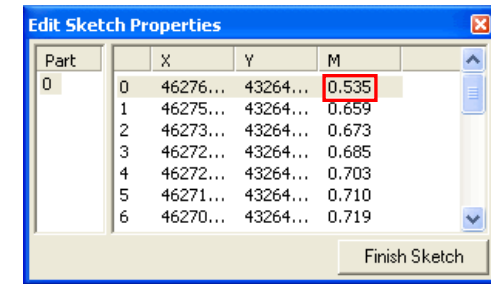


## Special Circumstance Roads

- q. In the Edit Sketch Properties window change the very first M value from 0.651 to **0.535** and close the Edit Sketch Properties window.



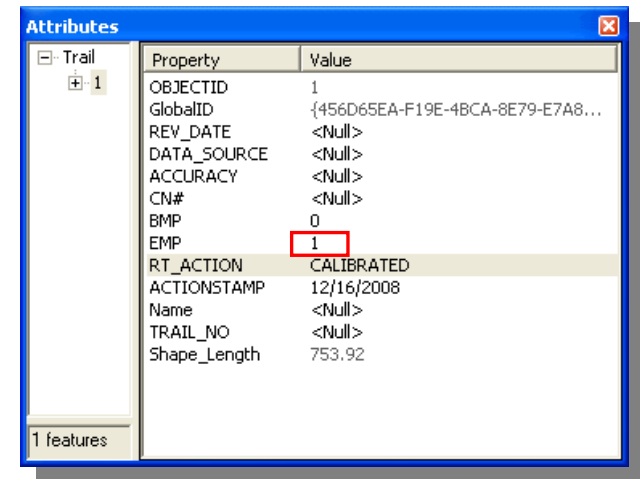
Part	X	Y	M
0	46276...	43264...	0.651
1	46275...	43264...	0.659
2	46273...	43264...	0.673
3	46272...	43264...	0.685
4	46272...	43264...	0.703
5	46271...	43264...	0.710
6	46270...	43264...	0.719



Part	X	Y	M
0	46276...	43264...	0.535
1	46275...	43264...	0.659
2	46273...	43264...	0.673
3	46272...	43264...	0.685
4	46272...	43264...	0.703
5	46271...	43264...	0.710
6	46270...	43264...	0.719

Remember the distance the route was coincident? You will remove this 0.1 mile from the end of the trail route.

- r. With the second trail segment still selected, click the **Attributes** button in the Editor Toolbar and change the EMP value from 1.1 to **1.0** and close the Attributes window.



Property	Value
OBJECTID	1
GlobalID	{456D65EA-F19E-4BCA-8E79-E7A8...
REV_DATE	<Null>
DATA_SOURCE	<Null>
ACCURACY	<Null>
CN#	<Null>
BMP	0
EMP	1
RT_ACTION	CALIBRATED
ACTIONSTAMP	12/16/2008
Name	<Null>
TRAIL_NO	<Null>
Shape_Length	753.92

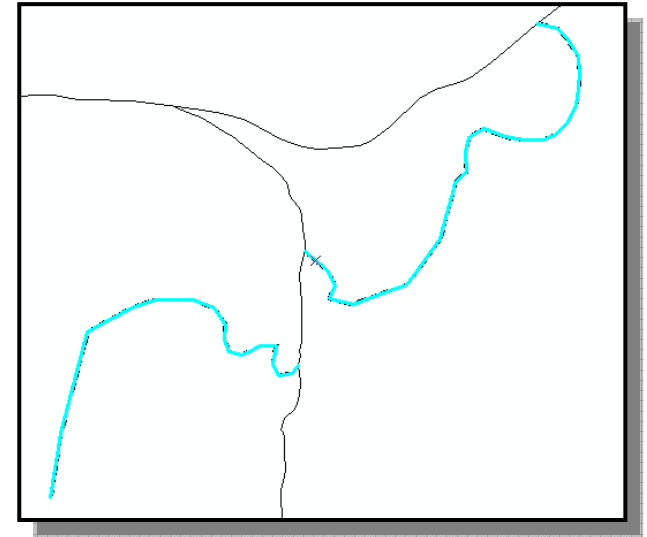
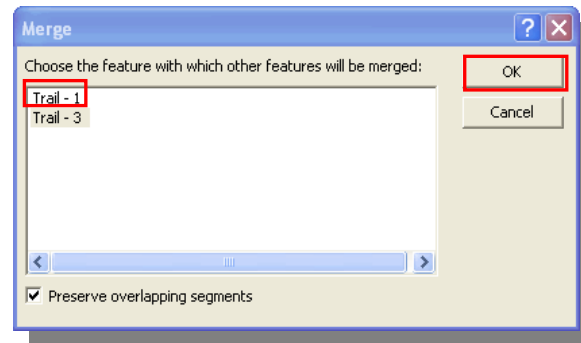
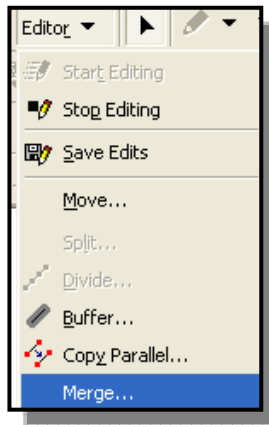
Now this 0.1 mile will only exist in the Road routes data and not be duplicated in the trail route. Finally you will merge these two segments together which results in an accurately calibrated multipart feature.

- s. **Shift + Click** to select the other trail segment so both trail segments are selected.

## Special Circumstance Roads

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- t. From the **Editor** drop down menu in the Editor Toolbar, click **Merge**. Select Trail- 1 in the Merge window to use its attributes since this is the feature with correct EMP value and click **OK**.



- u. From the I-Web Spatial Editor Travel Routes Toolbar click **Edit → Calibrate selected routes with BMP/ EMP values**. Before calibrating make sure the EMP is 1.
- v. Set the task to **Modify Feature** and select the feature with the edit tool. Open the **Sketch Properties** tool to see the continuous measurement values from 0-1.0 by selection **Part 0** and **Part 1** in this multipart feature.
- w. **Save** your edits, **Stop** the edit session and **Save** the map document.

Throughout this exercise you interpreted and edited special circumstance found in routes. Your local data situations may vary from the examples you worked on but will all be managed the same way. It is important to remember whenever the geometry of a feature is altered it must be calibrated again.

**End Exercise.**