



Siting a new hospital in Loudoun County, VA

Use GIS to create new knowledge

Two analytical functions in ArcGIS Online are proximity tools and tools that manage layers. In this exercise, you will use the proximity tools of buffer and drive-time and the managing layers tool of intersect.

The Loudoun County Board of Supervisors has requested that the GIS Department analyze the county for a potential new hospital. The potential site must meet the following parameters:

- One mile away from the existing main roads
- Two miles from the most populated places
- Twenty minutes away from the existing hospital
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Build skills in these areas

- Using analytical functions to solve a problem
- Using proximity tools of buffer and drive-times
- Using overlay skill of intersect
- Enriching layers

What you need

- Account required
- Estimated time: 30 minutes – 1 hour



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1. Open and save a map

1. Sign into your [ArcGIS organizational account](#).
2. Open [Loudoun Hospital](#).
3. On the top ribbon click Save As.
4. Save the map with the following parameters:
 - a. Title: Loudoun Hospital_your initials
 - b. Tags: Delete existing tags and use individualized tags
 - c. Summary: Site selections for a new hospital in Loudoun County, VA

Save Map

Title:

Tags:
Add tag(s)

Summary:

Save in folder:

5. Become familiar with the layers by turning them on and off.

2. Use proximity tools of buffer and drive_time

In this section of the lesson, you will use two proximity tools to create additional layers to solve the problem. You will use the create buffer and the create drive-time areas proximity tools.

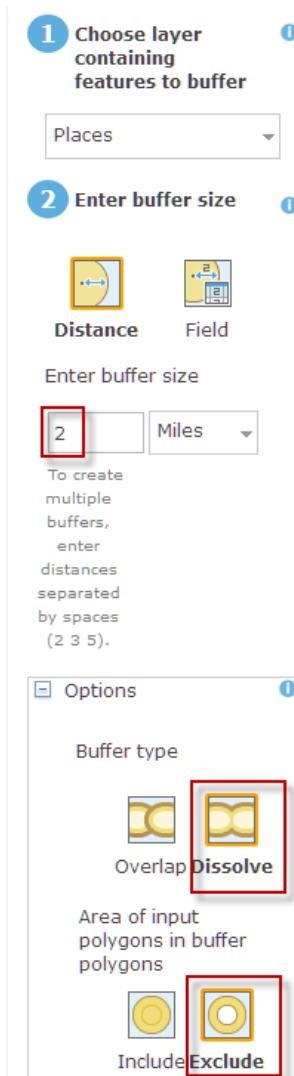
Create Buffers – create areas a given distance away.



Create Drive-Time Areas – the area that can be reached within a specified drive time.



1. Click Perform Analysis under Places.



2. Choose Use Proximity.

3. Select Create Buffers and use the following parameters:

a. Buffer size = 2 miles

b. Expand Options

Dissolve

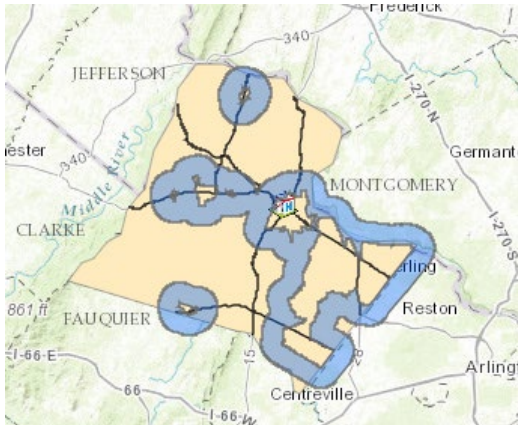
Exclude

c. Result layer name = bufplaces2mi_yourinitials

d. Uncheck Use current map extent

4. Click RUN ANALYSIS.

5. Uncheck Places.

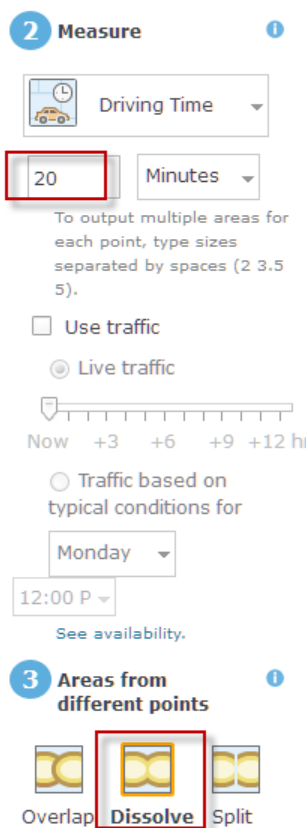


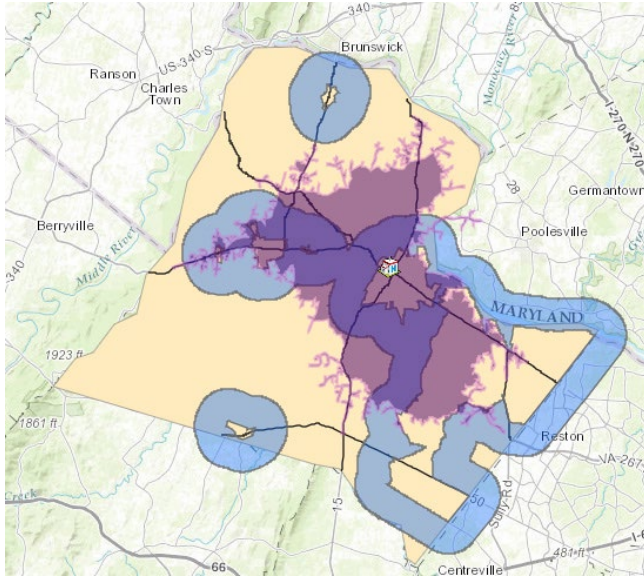
6. Click Perform Analysis under Loudoun Hospital.

7. Choose Use Proximity.

8. Select Create Drive-Time Areas and use the following parameters:

- Measure = 20 minutes
- Areas from different points = Dissolve
- Result layer name = drive20min_hospital_yourinitials
- Uncheck Use current map extent





9. Click RUN ANALYSIS.

3. Erase 2-mile buffered places within 20-minute drive-time from hospital

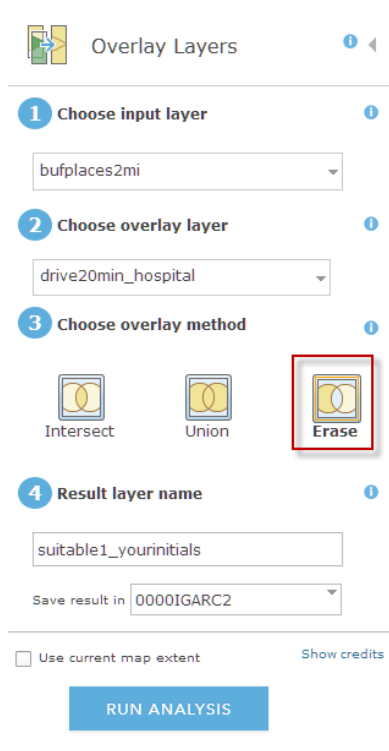
The hospital should not be located anywhere within the 20-minute drive time. Use the analytical overlay tool to erase those areas.

Erase – The result will contain features or portions of features in the overlay layer that do not overlap with the areas in the analysis layer.



1. Click Perform Analysis under bufplaces2mi.
2. Choose Manage Date.

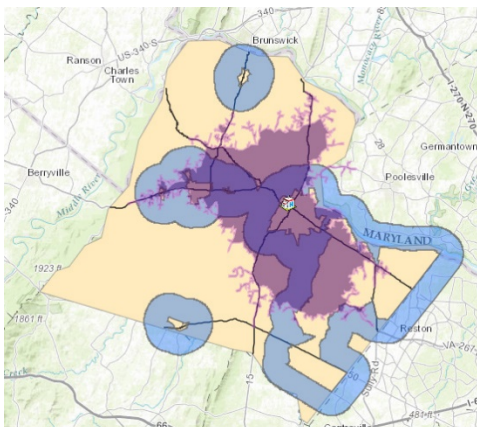
3. Choose Overlay layers and use the following parameters:
 - a. Overlay layer = drive20min_hospital
 - b. Overlay method = Erase
 - c. Result layer name = suitable1_yourinitials
 - d. Uncheck Use current map extent



The screenshot shows the 'Overlay Layers' tool interface. It is divided into four numbered steps:

- 1 Choose input layer:** A dropdown menu is set to 'bufplaces2mi'.
- 2 Choose overlay layer:** A dropdown menu is set to 'drive20min_hospital'.
- 3 Choose overlay method:** Three icons are shown: 'Intersect', 'Union', and 'Erase'. The 'Erase' icon, which shows a yellow circle with a white circle inside, is highlighted with a red rectangular border.
- 4 Result layer name:** A text input field contains 'suitable1_yourinitials'. Below it, a 'Save result in' dropdown menu is set to '0000IGARC2'.

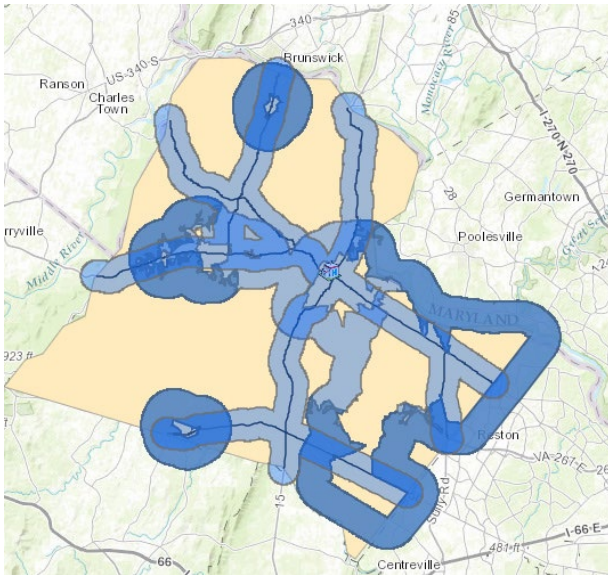
At the bottom, there is an unchecked checkbox for 'Use current map extent' and a 'Show credits' link. A blue 'RUN ANALYSIS' button is positioned at the bottom center.



4. Click RUN ANALYSIS.
5. Turn off drive20minhospital.

4. Buffer 1 mile from Loudoun roads

1. Click Perform Analysis under roads.
2. Choose Use Proximity.
3. Select Create Buffers and use the following parameters:
 - a. Buffer size = 1 mile
 - Expand options
 - Buffer type = Dissolve
 - b. Result layer name = bufrrds1mile-yourinitials
 - c. Uncheck Use current map extent
4. Click RUN ANALYSIS.



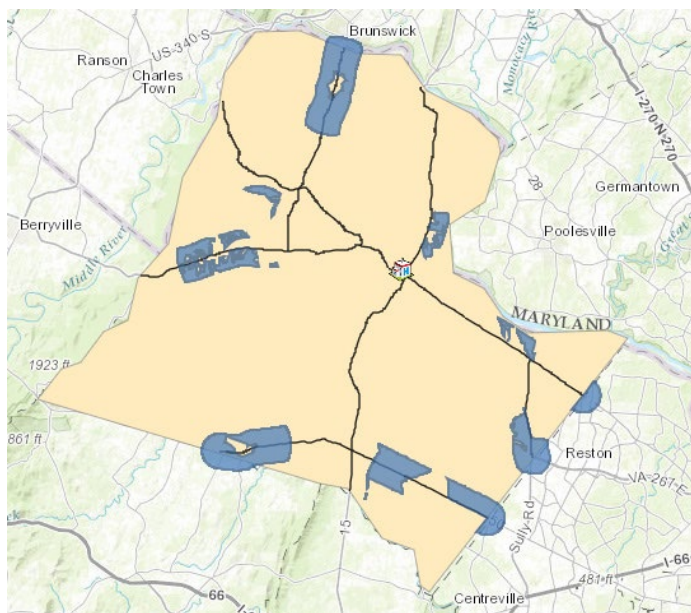
5. Use manage layers tool intersect

Now you want only the areas that are within the 1-mile buffer of the road and the buffered area of the places. For this you will use the intersect tool.

1. Click Perform Analysis under the bufrds1mile layer.
2. Click Manage Data.
3. Select Overlay layers and use the following parameters:
 - a. Overlay layer = suitable1
 - b. Overlay method = intersect
 - c. Result layer name = potentialhospitalareas_yourinitials
 - d. Uncheck Use current map extent
4. Click RUN ANALYSIS.
5. Uncheck suitable1.
6. Uncheck bufrds1mil.

The area shown are the areas that meet all the criteria of the problem:

- One mile away from the existing roads.
- Two miles from the most populated places.
- Twenty minutes away from the existing hospital.



6. Make a decision

Your last task is to rank the areas. You can change the basemap. You can use the measuring tool to calculate acreage or you can add additional layers from ArcGIS Online.

Write a paragraph defending your site selection.

