# Roads and Highways Address Management Tools



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# Address management

The address management tools are used to collect and manage address block ranges, site addresses, and related mailing address data. They can be used by planning, public safety, or land records organizations to streamline the collection, maintenance, and use of authoritative address information.

The Esri Roads and Highways address management tools support the ArcGIS for Local Government data model.

#### Address management tools

Esri Roads and Highways provides the following address management tools.

#### **Create Route**

You can add a new route in the system using the **Create Route** button on the **Roads And Highways Editing** toolbar available with desktop. For more information, see Creating a new route.



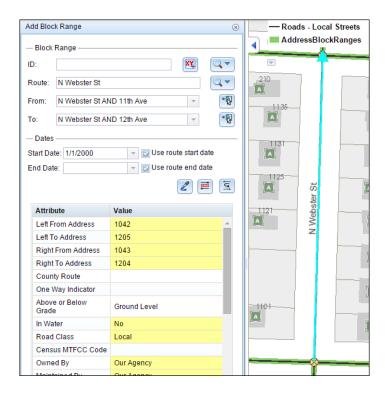
#### Add Street Names

You can add a new street name and related attributes to your master street table using the **Add Street Names** widget. For more information, see Adding street names.



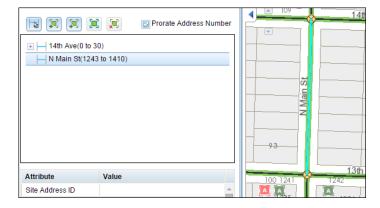
#### Add or Edit Block Range

You can add a new block range or edit the existing block range using the **Add Block Range** widget. For more information, see Adding block ranges.



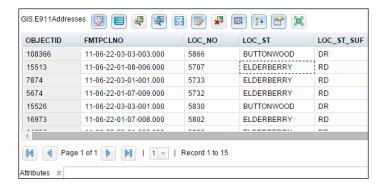
#### **Add Site Address widget**

You can add the site address points where block ranges are present, as well as where block ranges are not present, using the **Add Site Address widget**. For more information, see Adding site addresses.



#### Edit site address points

You can modify the attributes of site address points or the location of site address points using the event table. For more information, see Editing events in the selection table.



### Requirements

- · ArcGIS for Desktop along with Esri Roads and Highways for Desktop is needed to manage the centerlines and editing routes.
- ArcGIS for Server along with Esri Roads and Highways for Server is needed to publish a linear referencing-enabled map service to consume it in the Roadway Characteristics Editor.
- Your existing address management data in the Esri Roads and Highways schema. For more information, see Preparing data for address management.
- You need to deploy the Roadway Characteristics Editor application. The address management widgets are located in this web application. For more information, see Roadway Characteristics deployment guide.
- Configure the address management widgets in the Roadway characteristics Editor. For more information, see Configuring the address management widgets.

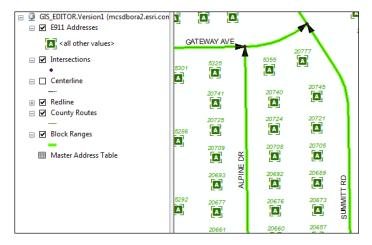
### Preparing data for address management

Esri Roads and Highways provides tools to manage address data, including address block ranges, site address points, and street names on top of an LRS. If you are a member of a state or the federal government, these tools enable you to manage address data for geocoders for data provided by local government agencies on your LRS. If you are a member of a local government, you can use the LRS to not only manage roadway inventory data but also address data, thereby managing one centerline for both.

The following sections discuss how to model and load your address block ranges, site address points, and street names data into the data model used by Esri Roads and Highways.

#### **Data model**

The following screen shot shows the data model:



#### Address block ranges

Address block ranges are modeled as a linear event layer (event feature class) on a network, with referent columns that need to be populated with intersection referents.

If you're using the ArcGIS for Local Government data model, the RoadCenterline feature class should be used as the Address block range event layer. Add the missing columns from the list below.

For more information about LRS events, see Event types.

For more information, see Storing referent and offset information for event location.

The following table lists the required fields:

Field	Data type	Length	IsNullable	Description
EventID	String	Between 32 and 255	Yes	Unique ID for each event record.
RouteID	String	Length of the Network RouteID field or greater	Yes	Unique ID for each route in the network.
FromDate	Date	8	Yes	The date the event became active on the route.
ToDate	Date	8	Yes	The date the event was retired on the route.
FromMeasure	Any Numeric		Yes	The measure on the route where the beginning of the event will be located.
ToMeasure	Any Numeric		Yes	The measure on the route where the end of the event will be located.
FromReferentMethod	Short Integer	5	Yes	Method of referencing the offset feature. This can be X,Y coordinates, Stationing, Length, LRS Network, Event, Intersection, or other point feature class. For the Block range event, it will be the Intersection feature class.
FromReferentLocation	String	Between 50 and 255	Yes	Location of the offsetting feature. This can be an X,Y coordinate, Feature/EventID, or IntersectionID. For the Block range event, it will be the IntersectionID.
FromReferentOffset	String	Between 50 and 255	Yes	The offset measure. Saved in the unit of measure configured when configuring offset fields. Since Block range goes from intersection to intersection, this value will be zero.

ToReferentMethod	Short Integer	5	Yes	Method of referencing the offset feature. This can be X,Y coordinates, Stationing, Length, LRS Network, Event, Intersection, or other point feature class. For the Block range event, it will be the Intersection feature class.
ToReferentLocation	String	Between 50 and 255	Yes	Location of the offsetting feature. This can be an X,Y coordinate, Feature/EventID, or IntersectionID. For the Block range event, it will be the IntersectionID.
ToReferentOffset	String	Between 50 and 255	Yes	The offset measure. Saved in the unit of measure configured when configuring offset fields. Since Block range goes from intersection to intersection, this value will be zero.
RightFromAddress	Any Numeric		Yes	Stores the lowest address value on the right side of the road.
RightToAddress	Any Numeric		Yes	Stores the highest address value on the right side of the road.
LeftFromAddress	Any Numeric		Yes	Stores the lowest address value on the left side of the road.
LeftToAddress	Any Numeric		Yes	Stores the highest address value on the left side of the road.
FullStreetName	String	Length of the full street name from Master street table or greater	Yes	The full street name including its prefix or suffix.

#### Site address points

Site address points are modeled as a point feature class that stores the rooftop location of an address.

If you're using the ArcGIS for Local Government data model, the SiteAddressPoint feature class should be used as the Site Address points layer. For more information, see Local Government Information Model.

The following table lists the required fields:

Field	Data type	Length	IsNullable	Description
addressNumber	Any Numeric		Yes	Address number field that stores the address number.
FullStreetName	String	Length of the full street name from Master street table or greater	Yes	Street name field, which will save the full street name including its prefix or suffix.

#### Master street table

The Master street table stores the unique street names along with other street name attributes.

If you're using the ArcGIS for Local Government data model, the MasterStreetName table should be used as the Master street table.

The following table lists the required field:

Field	Data Type	Length	IsNullable	Description
FullStreetName	String	Length of the full street name from Master street table or greater	Yes	Street name field, which will save the full street name including its prefix or suffix.

The Address Management tools can be configured against the ArcGIS for Local Government data model or your own custom model, as long as your model contains the required fields mentioned above.

#### Additional information

For more information about the Esri Roads and Highways linear referencing model and data loading process, see ALRS Data Model and Creating and loading the ALRS.

### Setting up the address management data

Complete the following steps to set up the address management data using Esri Roads and Highways:

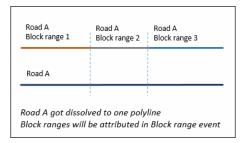
#### Steps:

- 1. Create an ALRS in the enterprise geodatabase of your choice if you have not already done so. For more information, see Creating a new ALRS.
- Create an LRS network if you do not already have one.For more information, see Creating an LRS network.

■ Note: If you're using the ArcGIS for Local Government data model and do not currently use linear referencing as a means to manage roadway data, you may want to create an LRS network based on the spatial geometry length for measures.

3. Prepare the data to load as routes. If you're managing the block range information on a road centerline, dissolve the block ranges to get single polyline geometry for each route.

The following diagram explains the concept of dissolving the block ranges to the route, which is required by Esri Roads and Highways.

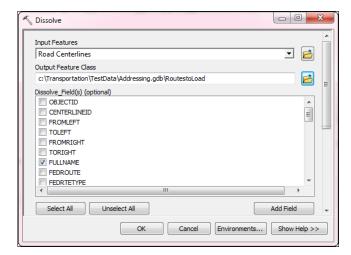


- a. Open the Dissolve geoprocessing tool.
- b. Choose a dissolve field.In this example, Route ID is used.

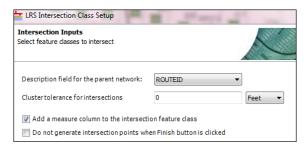
Note: If you're using the ArcGIS for Local Government data model, you can create a new field by concatenating the full road name with any other field that can help you identify the unique route, or use full road name if it is unique.

c. Select Multipart feature as True.

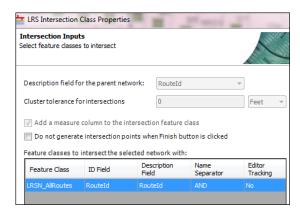
The following image shows a sample screen capture of the Dissolve geoprocessing tool:



- Load the routes to the network.
   For more information, see Loading Routes.
- Create an LRS intersection class.
   For more information, see Creating an LRS intersection class.
  - a. Check the Add a measure column to the intersection feature class box during generation or registration.



b. Use the same route network when creating an LRS intersection class.



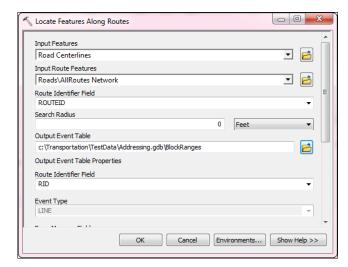
6. Prepare block range data to register as an event.

If your block range feature class does not have the measures associated with it, which will be the case if you do not use linear referencing as a means to manage roadway data, use the Locate Features Along Routes geoprocessing tool to populate the measures as follows. For more information, see Locate features along routes.

- a. Use your block range feature class as an event layer input.
- b. Use the network registered in step 2 as an input for the input route feature class. The route ID field should be populated and should match the routes you loaded.

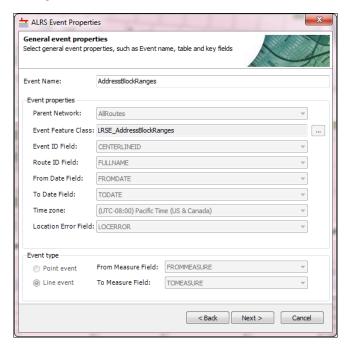
The output of the tool is a new feature class; use the output feature class from here on.

You can archive the existing block range feature class. The following image shows a screen capture of the Locate Features Along Routes geoprocessing tool:

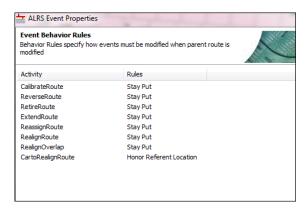


- 7. Register an LRS line event with referent location for the Block Range data.
  - a. Register an LRS event by route and measure.

For more information, see Registering an event by route and measure. The following screen capture shows the event registration:

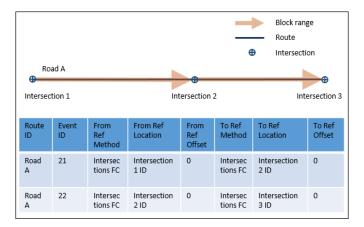


b. During registration, on the Event Behavior Rules dialog box, for the CartoRealign Route activity, choose the
 Honor Referent location behavior rule. For all other edit activities, choose the Stay Put behavior rule.
 For more information, see Event behaviors. The following screen capture shows the Event Behavior Rules dialog
 box:



8. For each block range event, populate **From** and **To** reference intersection information.

For more information about reference information, see Storing referent and offset information for event location. You need to do it manually using ArcGIS tools or a Python script. The following diagram shows the concept of populating **From** and **To** reference intersection information, which is required by Esri Roads and Highways.



- a. Intersect the start point of the block range line feature class with the intersection point feature class.
- b. From the intersect output, filter out the result that does not match the RouteID of the block range.
- c. When the event's EventID and RouteID match the intersect output derived from step b, populate the referent offset fields
- d. Populate the code for your interaction class from the dReferentMethod domain into the From Referent method.
- e. Populate the IntersectionID into the From Referent Location field.
   Since block ranges go from intersection to intersection, the From Referent Offset is zero.
- f. Repeat steps a through e for the block range end point to populate the To Referent fields.
- 9. Once you have your data prepared, publish a map service.
  - a. Create a map document and minimally add the Route layer, Intersection layer, Block range event layer, Site address point feature layer, and Master street table.
  - b. Publish the map document with ArcGIS for Server and enable the Esri Roads and Highways for Server Linear Referencing and Feature Access capability.
- 10. Deploy the Roadway Characteristics Editor.

For more information, see the Roadway Characteristics Editor deployment guide.

11. Configure the Roadway Characteristics Editor.

For more information, see Configuring the Roadway Characteristics Editor web application.

12. Configure the Address Management widget.

For more information, see Configuring the Address Management widgets.

### Configuring the Address Management widgets

You can configure the Roadway Characteristics Editor Address Management widgets in the address\_management.json file in the Roadway Characteristics Editor web folder on the web server to modify and deploy.

The Address Management widgets are part of the Roadway Characteristic Editor (RCE). For them to work, RCE must be configured and deployed. For more information on deployment and configuring the Roadway Characteristics Editor, see Roadway Characteristics Editor deployment guide.

Before configuring the Address Management widgets, you must first load your address data into Roads and Highways. For more information about preparing data for address management, see Preparing data for address management.

#### **Properties** Description blockRangeLayer Specifies the setting for editing block ranges in RCE. The Block range layer is the linear event feature class that stores the block range data. layerName These are the required configurations: · rightFromAddressField · layerName—Name of the Block Range layer in the map service • rightFromAddressField—Name of theRight From Address Field that stores the lowest address value on the right side of the road rightToAddressField leftFromAddressField • rightToAddressField—Name of the Right To Address Field that stores the highest address value on the right side of the road leftToAddressField · leftFromAddressField—Name of the Left From Address Field that stores the lowest address value on the left side of the road fullStreetNameField • leftToAddressField—Name of the Left To Address Field that stores the highest address value on the left side of the road • fullStreetNameField—Name of the Street name field that saves the full street name including its prefix or suffix · copyFields · copyFields—List of fields that need to be copied from the exiting block range when a new block range is created in the upstream or downstream of existing bl on same route "blockRangeLayer" : { "layerName" : "BlockRanges", "rightFromAddressField" : "R LO ADD", "rightFromAddressField" : "R LO ADD", "rightGromAddressField" : "F. LO ADD", "leftFromAddressField" : "F. ADD", "leftFromAddressField" : "LH T. ADD", "leftFromAddressField" : "LH T. ADD", "fullStreenNameField" : "FULL ST" "copyFields":["LOW\_RANGE","HI\_RANGE","EDIT\_PRIV","ALIGN\_SRC","ORTHO\_VER","JOIN\_ID","ZIPL","ZIPR","CITY","STATE\_ABBR","TYPE","PREFIX","SUFFIX","COUNTY","PRETYPE","CLAMETICAL COUNTY","PRETYPE","CLAMETICAL COUNTY","PRETYPE","CLAMETICAL COUNTY","PRETYPE","CLAMETICAL COUNTY","PRETYPE","CLAMETICAL COUNTY","STATE\_ABBR","TYPE","PREFIX","SUFFIX","COUNTY","PRETYPE","CLAMETICAL COUNTY","STATE\_ABBR","TYPE","SUFFIX","COUNTY","PRETYPE","CLAMETICAL COUNTY","STATE\_ABBR","TYPE","SUFFIX","SUFFIX","COUNTY","PRETYPE","CLAMETICAL COUNTY","STATE\_ABBR","TYPE","SUFFIX","SUFFIX","CLAMETICAL COUNTY","STATE\_ABBR","TYPE","SUFFIX","SUFFIX","CLAMETICAL COUNTY","STATE\_ABBR","TYPE","SUFFIX", Add or Edit Block Range masterStreetNameTable Specifies the setting for adding streets to the master street name table in RCE. These are required configurations. tableName • tableName—Name of the master street name table in the map service fullStreetNameField • fullStreetNameField—Name of the Street name field that saves the full street name including its prefix or suffix asterStreetNameTable" : { "tableName" : "GIS.MasterAddressTable", "fullStreetNameField" : "ROUTEID" Add Site Addresses siteAddressPoints Specifies the setting for managing the site address point in RCE. These are required configurations · layerName—Name of the Site Address Point layer in the map service laverName · addressNumberField · addressNumberField—Name of the Address number field streetNameField streetNameField—Name of the Street name field that saves the full street name, including its prefix or suffix "siteAddressPoints" : { "layerName" : "GIS.E911Addresses", "addressNumberField" : "ADD NO", "streetNameField" : "FULL\_ST", Add Site Addresses selectionSymbols Specifies the style, color, width, size, and outline of all address feature selections made on the map. "selectionSymbols": { "line": { "style": "solid", "color": "#00ffff", "width": 3 }, "arrowHead": { "style": "triangle", "color": "#00ffff", "size": 20, "outline": { "style": "solid", "color": "#008080", "width": 2 } } Types of line symbols include solid, dash, dot, dashdot, and dashdotdot—the default style is solid. The color is specified as #RRGGBB in HTML hexadecimal color codes.

Address Management configuration properties

# Adding or editing block ranges

Block ranges represent the line segments that determine the address range for the block within the jurisdiction of a local government. A block range typically goes between intersections and is associated with a route. The **Add Block Range** widget allows you to add a new block range or edit an existing block range.

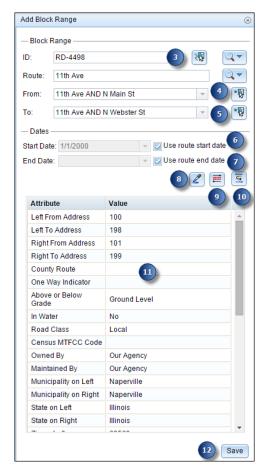
Note: To access this widget in the Roadway Characteristics Editor, the address management configuration file needs to be configured. For more information, see Configuring the Address Management widgets.

#### Steps:

- 1. Open a web browser and browse to the Roadway Characteristics Editor.
- 2. On the Edit tab, in the Edit Addresses group, click Block Range.



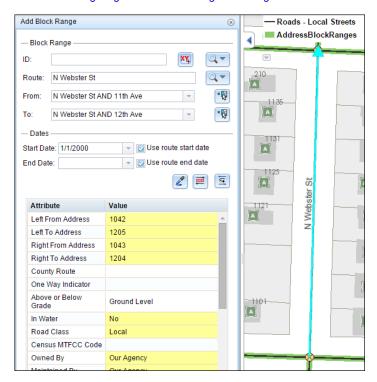
The Add Block Range dialog box appears.



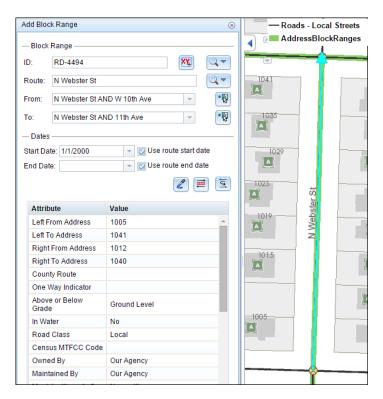
- 3. Click the Select a Block Range button 🖓 and click the route where you want to add or edit the block range.
  - Note: If a message appears that is related to acquiring locks, the need to reconcile, or not being able to acquire locks, Roads and Highways conflict prevention is enabled. For more information about these messages, see Conflict prevention in the Roadway Characteristics Editor.
  - Note: If there is no block range present, a new block range is added at that location. If a block range is present, that block range is selected for editing.

When adding the new block range, the widget's dialog box is populated with the following information:

- Route ID—The route ID where the block range will be located.
- From Intersection—The intersection that is located at the start of the block range and is present on the same route will be populated in the drop-down list. If more than one applicable intersection exists, you can choose one from the drop-down list. If it's the route start and no other intersection is present, the text Route Start is displayed.
- To Intersection—The intersection that is located at the end of the block range and is present on the same route will be populated in the drop-down list. If more than one applicable intersection exists, you can choose one from the drop-down list. If it's the route end and no other intersection is present, the text Route End is displayed.
- Address range attributes—The fields with address range attributes will be derived with a suggested address range if
  there are adjacent block range(s) present. The fields used for address range are configured in the configuration file.
   For more information about configuring address management, see Configuring the Address Management Widgets.
- All other Attributes—The other attributes get copied from adjacent block range if it is present. You can configure
  which fields get copied from the adjacent block range. For more information about configuring address management,
  see Configuring the Address Management widgets.



When editing the existing block range, the widget's dialog box is populated with existing information that you can edit.



- 4. Select the intersection where the block range will start by clicking the **From** drop-down arrow.
  - For the new block range, the drop-down list is populated with the intersections that are located at the start of the block range and are present on the same route.
  - For an existing block range, if there is no intersection populated automatically, the intersection can be selected using the drop-down list or the **Select intersection** tool.
  - For an existing block range, if the intersection is already populated, it can be modified using the **Select intersection** tool for the following conditions only:
    - You can choose from new intersections that are created within the existing block range due to route edits.
    - You can extend an existing block range when no block range currently exists in that location.
    - You can choose an adjacent intersection on the same route if no block range is present at that location. This
      is particularly helpful in cases where an existing intersection is deleted due to route edits.
- 5. Select the intersection where the block range will end by clicking the **To** drop-down arrow.
  - For the new block range, the drop-down list is populated with the intersections that are located at the end of the block range and are present on the same route.
  - For an existing block range, if there is no intersection populated automatically, the intersection can be selected using the drop-down list or the **Select intersection** tool.
  - For an existing block range, if the intersection is already populated, it can be modified using the Select intersection tool for the following conditions only:
    - You can choose from new intersections that are created within the existing block range due to route edits.
    - You can extend an existing block range when no block range currently exists in that location.
    - You can choose an adjacent intersection on the same route if no block range is present at that location. This
      is particularly helpful in cases where an existing intersection is deleted due to route edits.
- 6. Choose the start date that will define the start date of the block range.
  - · Click the Start Date drop-down calendar to choose the start date.
  - Check the Use route start date check box to use the start date of the routes.

The start date defaults to today's date, but you can choose a date using the date picker. The end date is optional, and if it is not provided, the block range remains valid now and into the future.

- 7. Choose the end date that will define the end date of the block range.
  - Click the End Date drop-down calendar to choose the end date.
  - Check the Use route end date check box to use the end date of the routes.
- 8. To copy attributes from another block range, click the **Copy Attributes** button 2 and click a block range on the map from which to copy the attributes.
  - Note:

The address range values are not copied.

- To flip the address range values of a selected block range, click the Flip Parity button \(\vec{\xi}\).
   This does not change the direction of the block range.
- 10. To flip the direction of a selected block range, click the **Reverse Direction** button <u>≡</u>.
  - Note: This does not flip the address range values.
  - Note: Reversing the block range direction will reverse the geometrical direction of the block range event.
- 11. Provide or edit the attribute information for the block range you selected.
  - Note
- If the cell is gray, the cell cannot be edited.
- · If the cell is white, the cell is editable.
- If the cell is red, the cell is non-nullable, which can be left blank.
- A yellow-colored cell shows that it has been edited in this edit session, but the edits have not been saved.
- 12. Click Save.

If you're creating a new block range, it's displayed on the map; otherwise, changes to an existing block range are saved.

# Adding site addresses

Site address points represent the location of a site or service delivery address assigned by a local government. Typically, site address points are placed on top of the structure associated with the address or at the center of a parcel.

To see the Site Addresses widget in Roadway Characteristics Editor, you need to configure the address management configuration file. For more information about configuring address management, see Configuring the Address Management widgets.

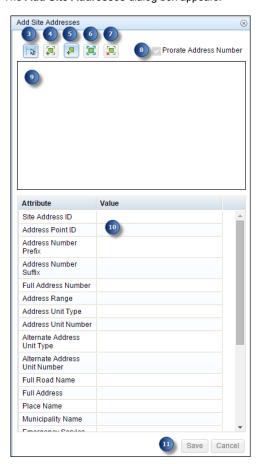
Note: To edit the existing site address points, select the address points using selection tools and then edit the attributes, location, or both in the selection table.

For more information about selection tools in Roadway Characteristics Editor, see Selecting events by attribute and Selecting events by spatial geometry.

For more information, also see Editing events in the selection table.

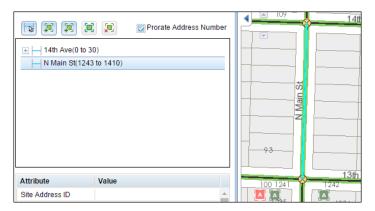
#### Steps:

- 1. Browse to Roadway Characteristics Editor in a web browser.
- On the Edit tab, in the Edit Addresses group, click Site Addresses properties.
   The Add Site Addresses dialog box appears.



Note: Currently, the address management widgets do not support conflict prevention. For more information about conflict prevention, see Conflict prevention in the Roadway Characteristics Editor.

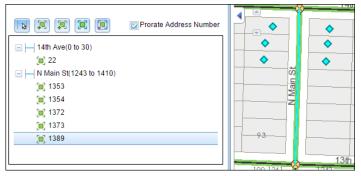
Click the Select Block Range button | si and click a block range on the map.
 The selected block ranges are populated in a tree. The tree shows a hierarchical representation of the block range and site address points.



4. Click the **Add Site Addresses** button and click the location along the block range from where the address should be assigned.

Make sure the block range is highlighted on the map before you click it.

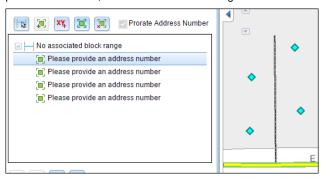
The site addresses are added in the tree as children of the respective block range. If the **Prorate Address Number** check box is checked, the suggested address number is populated. Otherwise, the site addresses do not have any suggested address number.



5. Click the Add Site Addresses without Block Range button , and click the location in the map where the address should be assigned.

You don't need to have an existing block range to use this tool.

The site addresses are added in the tree, but they are not associated with any of the block ranges. Note that it does not prorate the address, since there is no block range associated with it.



Tip: You can only select or delete the site address points before saving them.

- 6. To select and move the added site address point, click the **Select Site Addresses** button [...], click the site address point graphic, and then drag the site address point to the new location.

  Click anywhere on the map to deselect the site address point.
  - **Tip:** You can only select the site address points before saving them.

- 7. To delete a site address point, highlight the node in the tree and click the **Delete Site Address** button ...
  This will remove the node from the tree and remove the graphic from the map. The site address point is denoted by the **Site Address** icon ...
  - ▶ Note: If a block range is highlighted, the block range and all associated site address points are deleted. This will remove the block range node and all child site address nodes from the tree and will remove the site address graphics from the map. The block range is denoted by the Block Range icon ⊢.
- 8. Choose whether you want the site address number to be prorated.
  - If the **Prorate Address Number** check box is checked, the suggested address number is prorated based on the location of the site address point with respect to the block range.
  - If the **Prorate Address Number** check box is not checked, the site addresses do not have any suggested address number. The address number can be added by editing in the feature attribute table.
- 9. The tree will show you block ranges and site addresses that you have added on that block range. Click the site address node to jump to its attributes in the attribute table.
- 10. Use the navigation tools to navigate to the site address you just added.
- 11. Click Save.

All the site addresses are saved.



# Adding street names

The MasterStreetName table is used to store a master list of valid street names. This table includes the unique elements of a road name direction, name, type, and so on. This master list of street names is used to populate full street names in the **Adding or Editing Block Range** widget and in the **Adding Site Addresses** widget.

Note: If you use the ArcGIS for Local government data model, you might have Full street name as the RouteID. In that case, the **Adding or Editing Block Range** widget will not allow you to populate the Full street name.

Note: To access this widget in the Roadway Characteristics Editor, the address management configuration file needs to configured. For more information, see Configuring the Address Management widgets.

#### Steps:

- 1. Open a web browser and browse to the Roadway Characteristics Editor.
- On the Edit tab, in the Edit Addresses group, click Street Names. The Add Street Names dialog box appears.



- 3. Enter the new street name.

  If the entered street name does not exists already, you can add attributes for a new street name and save.
- 4. Enter the attributes for the street you are adding.
- 5. Click Save.

This will add a street name in the MasterStreetName table. You can use the newly added street in the **Adding or Editing Block Range** widget and in the **Adding Site Addresses** widget.