

SpatialMap 911 V.3

USER GUIDE

POWERED BY



SPATIAL SYSTEMS ASSOCIATES, INC.
GIS & FMIS IMPLEMENTATION & SUPPORT SERVICES
GEOGRAPHIC INFORMATION SYSTEMS | FACILITIES MANAGEMENT INFORMATION SYSTEMS

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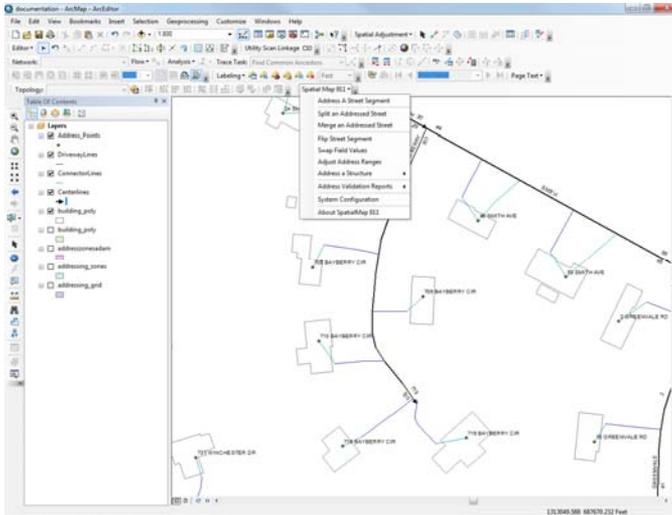
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Introduction

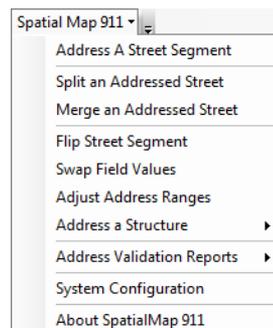
SpatialMap 911 is an advanced address maintenance application for users of Esri's ArcGIS Desktop. It provides automation tools to maximize efficiency and maximize data integrity.



SpatialMap 911 was developed using Esri's ArcObjects technology and works with the user's standard ArcView, ArcEditor, and ArcInfo license level. SpatialMap 911 leverages the powerful ArcObjects application programming interface to implement addressing specific rules and processes that are not available in the native ArcMap user interface.

SpatialMap 911's capabilities are provided through a toolbar that is automatically added to your system when the software is installed.

Using SpatialMap 911, the street segment and address features can



be stored in a geodatabase or shapefile format. SpatialMap 911 allows for flexible geodatabase design and typically can utilize existing schemas avoiding costly redesign or the adoption of a “proprietary” vendor schema. This is all facilitated by convenient configuration wizards that make system setup easy. The configuration information can be stored on a network and thus multi-user implementations are a snap.

SpatialMap 911 supports standardized and hybrid address ranging systems. Such systems as grid based, distance based, and century systems can easily be implemented and maintained. Through the use of an addressing system polygon layer, different geographic regions within the same dataset can easily follow different addressing rules.

SpatialMap 911 allows the user to make informed decisions based upon their expertise and the existing information. When adding an address range to a road, or assigning a new address to a building, the user always has the ability to review and override the system recommended address values. This is not uncommon when unexpected development occurs or a need arises to accommodate existing addressing errors that cannot be corrected.

SpatialMap 911 utilizes a “road name list” to ensure that road names are spelled consistently throughout the dataset. This greatly reduces the potential for typos during data entry.

The SpatialMap 911 street segment maintenance tools assist in managing the addressing attributes including road name, address range, zip code, and other user defined fields. Operations such as splitting an addressed street segment are simplified because the application automatically suggests the new address values of the resulting features, and allows the user to adjust the suggested address values efficiently and accurately.

When assigning addresses to addressable structures, SpatialMap 911 allows addresses to be assigned to features in

multiple feature layers such as an address point, building polygon, and parcel polygon layers in one step. This functionality is discussed later in the section “Addressing a Structure.”

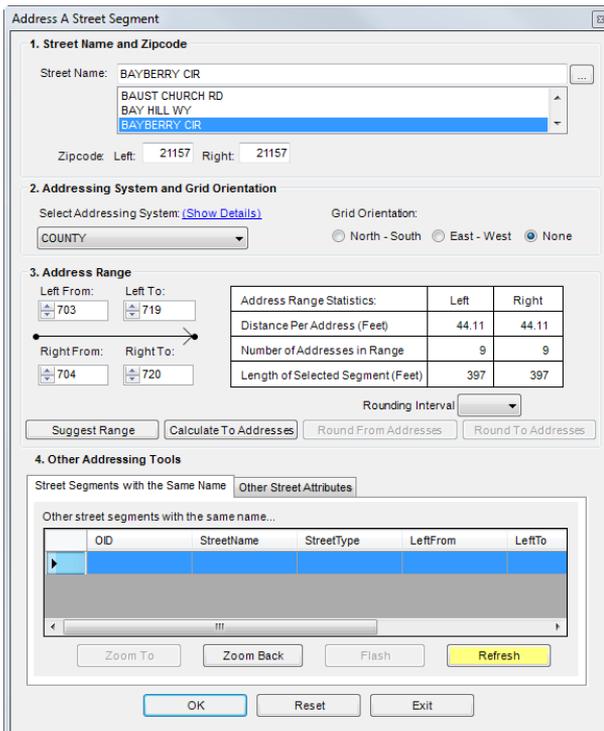
Note on Editing:

To activate most of the tools within SpatialMap 911 an editing session must be started inside of ArcMap.

I. Adding an Address Range to a Street

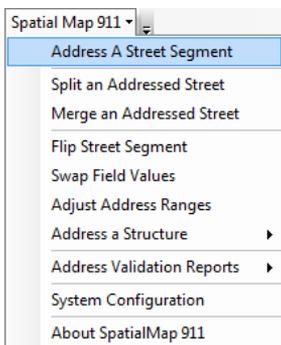
Purpose:

Used to create and/or adjust addressing attributes related to a single street segment.



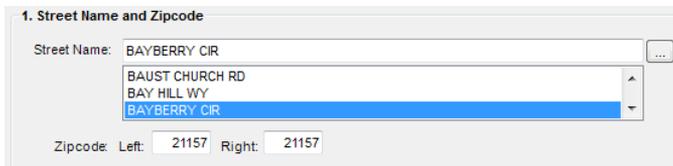
Description:

The “Address a Street Segment” tool creates or adjusts attributes of a street segment. The tool is designed to edit the name, zip code, addressing system, orientation, and the address ranges of the selected segment.



In order to access the tool select the street segment to edit and choose “Address a Street Segment” from the SpatialMap 911 dropdown menu.

1. Street Name and Zip code



The Street Name and Zip code section allows you to edit the name of the street segment selected as well as the zip code for each side of the street segment. Possible street names are retrieved from a database and populate the street name box. This is done to minimize misspelled street names.

In order to add, edit, or remove potential street names select the button labeled “...” at the end of the street name box. The road name list configuration will come up on the screen. Instructions on how to use the Road Name list

configuration can be found in the section titled “System configuration”.

The zip code section allows for the direct input of zip codes for both sides of the selected street segment. In most circumstances both boxes should have the same zip code value. Sometimes a street segment will fall along a zip code boundary which would require a different zip code for either side of the street.

We recommend that your map symbolize the centerlines with arrow heads at the end of each segment to make it easier to differentiate the left and right sides of the street.

2. Addressing System and Grid Orientation



2. Addressing System and Grid Orientation

Select Addressing System: [Show Details](#)

COUNTY

Grid Orientation:

North - South East - West None

This section contains a dropdown box that lets you select which addressing system will be used to address the street segment. Details on the addressing system chosen can be viewed by clicking on the Show Details link. The Show Details link describes the separate attributes of the addressing system you currently have selected.

If a grid system is selected, the grid orientation radio buttons describe the possible directions by which the selected street segment can be ranged. A default grid orientation is stored in the street name list. The controls will automatically populate with the default orientation when the street name is selected. One of the grid orientation options must be

selected, in order to range a street in a grid based system.

3. Address Range

3. Address Range

Left From: Left To:

Right From: Right To:

Address Range Statistics:	Left	Right
Distance Per Address (Feet)	44.11	44.11
Number of Addresses in Range	9	9
Length of Selected Segment (Feet)	397	397

Rounding Interval:

The Address Range section is where the range attributes of the street segment are suggested and edited. It consists of left from/left to and right from/right to scroll boxes as well as the Address Range Statistics table. The scroll boxes will auto increment by a value of 2 up or down to maintain the odd or even designation. It is also possible to manually edit the address ranges by placing the cursor in the textboxes and typing the desired value. Manual edits are not restricted by odd/even side of the street segment. Edits can also be made by selecting a rounding interval of 10 or 100 from the Rounding Interval dropdown menu and clicking the Round From Addresses or Round To Addresses buttons.

Buttons

- **Suggest Range:** This button suggests a range for the selected street segment based on the addressing system selected in the Addressing System and Grid Orientation section.
- **Round From Addresses:** This button rounds the from addresses by the interval selected in the rounding interval dropdown box.

- **Round To Addresses:** This button rounds the to addresses by the interval selected in the rounding interval dropdown box.
- **Calculate To Address:** This button is only available when the selected addressing system is a distance based or grid distance hybrid. This button will calculate the to address by adding the from address value to the product of the road segment's length times the distance between addresses defined for the addressing system.

The address range statistics box is a table which describes three separate values for left and right sides of the selected street segment.

1. **Distance per address:** This statistic describes the distance between each unique address along the segment. This number is calculated by dividing the length of the segment by the number of addresses in the total range.
2. **Number of addresses in range.**
3. **Length of selected street segment, in feet.**

4. Other Addressing Tools

Street Segments with the Same Name

4. Other Addressing Tools

Street Segments with the Same Name

Other street segments with the same name...

OID	StreetName	StreetType	LeftFrom	LeftTo	RightFrom	RightTo
203	SMITH	AVE	58	84	59	83
2708	SMITH	AVE	108	160	103	161
4275	SMITH	AVE	44	56	45	55

This tab remains blank until edits applied to the selected segment have been refreshed. If there are any other street segments with the same name the table will be populated with those segment's attributes. If existing segments have address ranges that overlap with the segment being edited, those values will be shown in bold red text. The purpose of this tab is to minimize mistakes when assigning an address range to multi-segmented centerlines. The buttons will become active if any street segments populate the table. Select a segment by clicking on the available rows.

Buttons

- **Zoom To:** This button moves the map view to the segment highlighted in the table.
- **Zoom Back:** This button moves the map view to the line segment that is currently being edited.
- **Flash:** This button flashes the segment, inside the map view, that is highlighted in the table.
- **Refresh:** This button refreshes the table to determine if there are any other streets with the same name. Use this button after changing the street name, zip code, or address range attributes. It's important to note that the Address a Street Segment tool will not allow you to save unless the "Other street segments with the same name..." table has been refreshed since the last attribute was changed.

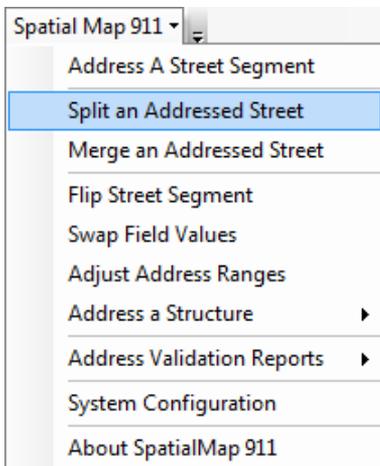
Purpose:

Used to split a street segment and allow edits to the ranges of the resulting two segments.

Description:

The Split an Addressed Street tool splits the geometry and adjusts the address range of a street segment. The tool is designed to edit the ranges of the two segments resulting from the split of the original street segment.

In order to access the tool select the street segment to be split and choose Split an Address Street from the SpatialMap 911 dropdown menu.



The current tool within ArcMap will change to the edit sketch drawing tool. Draw a line across the street you wish to split, you do not need to snap to a vertex although it is possible to do so. Once the split line has been completed the Adjust Split Point dialog will appear to allow you to edit the new street segment address values.

Some functionality will look similar to the other tools inside the SpatialMap 911 toolset specifically the Address Statistics, increment intervals and rounding interval controls.

a. Address Values Before the Split

This area shows the address ranges for the street segment before it is split.

b. Address Values After the Split

This area is where the user can edit the adjacent address ranges of the newly formed street segments. This can be done by directly editing or by using the increment address values or Round Address Values tools on the right.

The user should consider existing address numbers for nearby address points to fine tune the values to achieve an optimum result.

c. Increment Address Values

This area allows you to increment the adjacent addresses of the newly formed street segments.

Select an interval of 1, 10 or 100 using the drop down box and then increment up or down using the buttons provided. The increment increase or decrease will affect all four of the editable address ranges.

d. Round Address Values

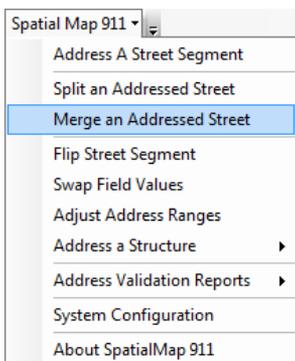
This section looks similar to the increment address values section, the primary difference is that the two buttons available affect segment 1 and segment 2 individually. The dropdown box lets you select 10 or 100 rounding intervals. Clicking either the segment 1 or segment 2 buttons will round the respective segments.

e. Address Range Statistics After Split

Address Range Statistic	Segment 1		Segment 2	
	Left	Right	Left	Right
Distance Per Address (Feet)	37.33	37.33	57.67	57.67
Number of Addresses in Range	6	6	3	3
Length of Selected Segment (Feet)	224	224	173	173

These range statistics are similar to those in the Address a Street Segment tool except that these statistics are for both of the newly formed street segments. See the “Adding an Address Range to a Street” section for more information on range statistics.

III. Merge an Addressed Street Segment



Purpose:

Used to merge street segments of the same name together.

Description:

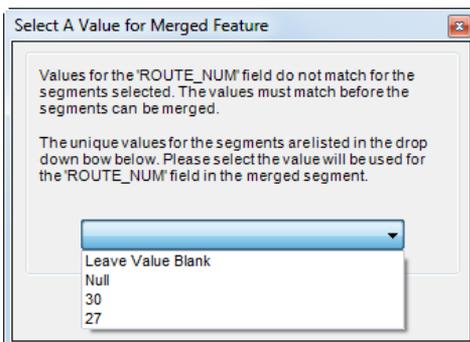
The Merge an Addressed Street tool will merge the geometries and recalculate attributes of multiple street centerline segments. This process will only work on a selection of segments

that have all of the same naming attributes (Prefix, Name, Type, and Suffix). The address range for the newly merged street feature will be calculated by taking the maximum and minimum values of the ranges for the selected segments. Null values and all zero values are ignored in the calculation.

If the segments differ in directionality, then the direction of the newly merged street segment is assigned randomly based on one of the selected street segments. You can use the Flip Street Segment tool to alter the geometry.

To use this tool, you must be editing. Select the street segments to be merged and choose **Merge an Addressed Street** from the SpatialMap 911 dropdown menu.

The merge tool performs an analysis on the attributes of the features before merging them. First it will verify that the street segments have all of the same naming



attributes, it will exit if they do not. Then, it will compare each of the editable field values to each other and prompt if there are differences. The unique values from the features will be present in a dialog and you can choose which value should be assigned to the newly created street segment. Also listed in the box is to calculate an empty string "", 0 (for numerical fields), or NULL into the field for the new feature.

You can exclude fields from analysis through the SpatialMap 911 configuration manager interface, under Settings→Fields→Merge Fields.

IV. Flipping A Street Segment

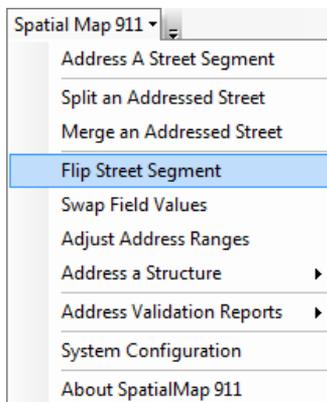
Purpose:

Used to flip a street segment's geometry and associated fields.

Description:

The Flip Address Ranges tool performs a flip of the selected street segment's geometry. In this process the street segment directionality will change as well as the attribute fields specified during the system configuration (For example: Left From, Left To address ranges etc...). No dialog appears therefore all involved fields must be determined during the system configuration. See the section titled "Configuration Settings" for more information on flip fields.

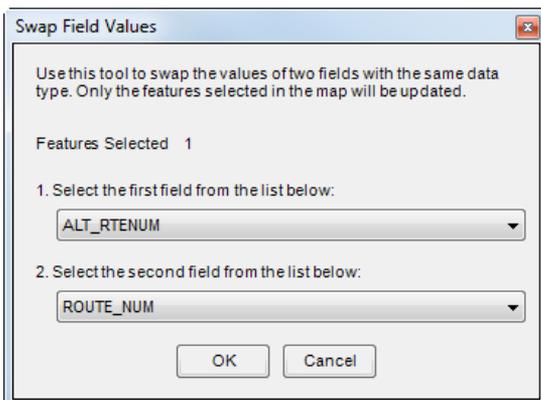
In order to access the tool select the street segment to be flipped and choose Flip Street Segment from the SpatialMap 911 dropdown menu.



V. *Swapping Field Values*

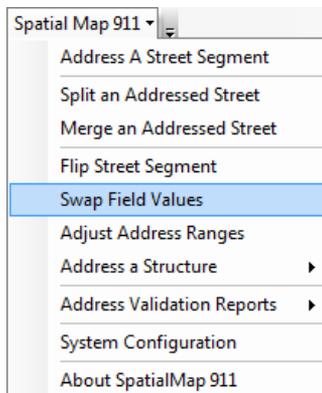
Purpose: Used to swap the values between two fields of the selected street segment.

Description: The Swap Field Values tool performs a swap of attributes between two fields of the selected segment.



In order to access the tool select the street segment with attributes to be swapped and choose Swap Field Values from the SpatialMap 911 dropdown menu.

The Swap Field Values tool displays two dropdown boxes and a display of the number of features selected. The swap can be undone with the undo function like all SpatialMap 911 functions.



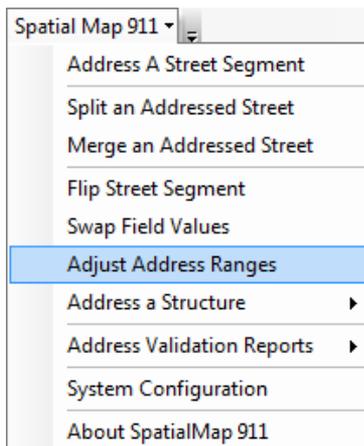
VI. Adjusting a Street's Address Range

Purpose: Used to adjust the address ranges for one or two street segment(s).

Description: The Adjust Address Ranges tool is used to adjust the ranges of two adjacent street segments of the same name. In order to use the tool, two adjacent (connected) roads must be selected. The tool is designed to display and edit the original address ranges.

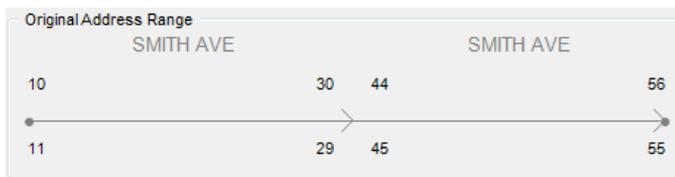
	Segment 1		Segment 2	
Address Range Statistic	Left	Right	Left	Right
Distance Per Address (Feet)	54.18	59.60	62.71	73.17
Number of Addresses in Range	11	10	7	6
Length of Selected Segment (Feet)	596	596	439	439

In order to access the tool select the street segment to edit and chose Address A Street Segment from the SpatialMap 911 dropdown menu.



a. Original Address Range

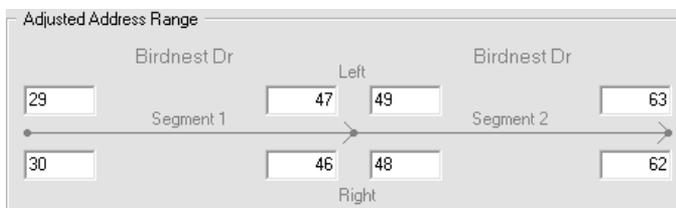
This section displays the two street segments and their original address ranges for each side of the street. These are the address ranges that will repopulate the fields in the Adjusted Address Range section if the user hits the Reset values button.



b. Adjusted Address Range

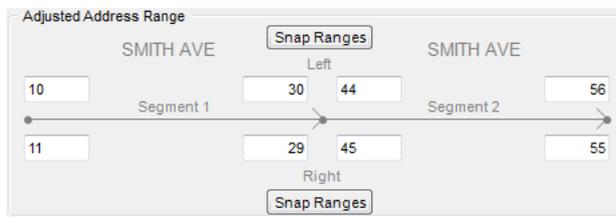
The main section of the tool offers eight textboxes to edit the ranges for both of the selected street segments. The top row of boxes represents the left side of the segments while the bottom row represents the right side. Address range values can be edited manually or with the available Increment and Round Address Value options.

Please note that by manually editing the addresses it is possible to enter odd numbered addresses on the even side of the street and vice versa. This functionality is included in order to accommodate street segments with unorthodox address ranges.



c. Snap Ranges

If the **Allow Address Range Snapping** checkbox is checked in the SpatialMap 911 Configuration, then the **Snap Ranges** button will be visible in the Adjusted Address Range section.

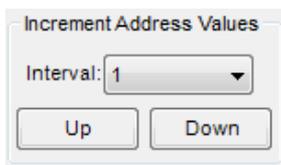


These buttons are enabled if the detected adjacent segments have a gap or an overlap between the adjacent ranges of the segments.

Click on the **Snap Ranges** button to automatically “snap” the ranges to abut each other. The Snap Range button is specific to the side of the centerline it is located on, and will adjust the range based on the values of the segments on that side of street only, maintaining the odd or even property of the side of street.

d. Increment Address Values

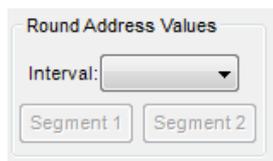
This section allows for editing, by increments, of the adjacent addresses of the newly formed street segments.



Select an interval of 1, 10 or 100 using the dropdown box and then increment up or down using the buttons provided. The incremental change of the adjacent addresses is limited by

the from and to address ranges of the combined street segments.

e. Round Address Values



This section looks similar to the increment address values section, the primary difference is that the two buttons

available affect Segment 1 and Segment 2 individually. Select a rounding interval of 10 or 100 using the dropdown box and then round the respective segment by using either the segment 1 or segment 2 buttons. The tool will then round these segments to the nearest 10th or 100th respectively.

f. Address Range Statistics

These range statistics are similar to those in the Address A Street Segment tool except that these statistics are for both of the street segments involved in the adjustment. See the section titled “Adding an Address Range to a Street” for more information on address range statistics.

Address Range Statistic	Segment 1		Segment 2	
	Left	Right	Left	Right
Distance Per Address (Feet)	54.18	59.60	62.71	73.17
Number of Addresses in Range	11	10	7	6
Length of Selected Segment (Feet)	596	596	439	439

OK Cancel

VII. Addressing a Structure

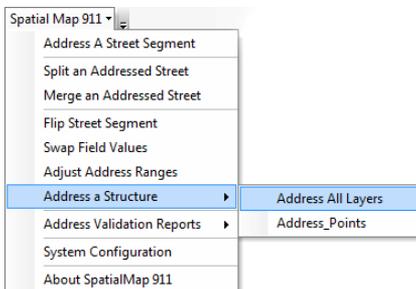
Purpose:

Used to assign an address to addressable structures based upon the location along a street segment, and also allows for editing of these values.

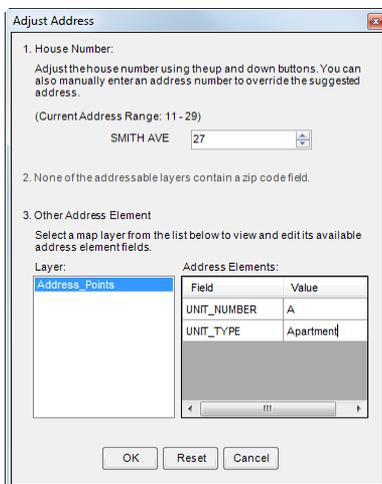
Description:

The Address a Structure tool suggests a house number, based upon the egress point along the street segment and which side of the street the egress point is on. The user can either accept or adjust the house number as needed and the system automatically cross references all of the existing addresses to ensure that it is not already assigned. However, it does not ensure correct sequence. This must be done by the user.

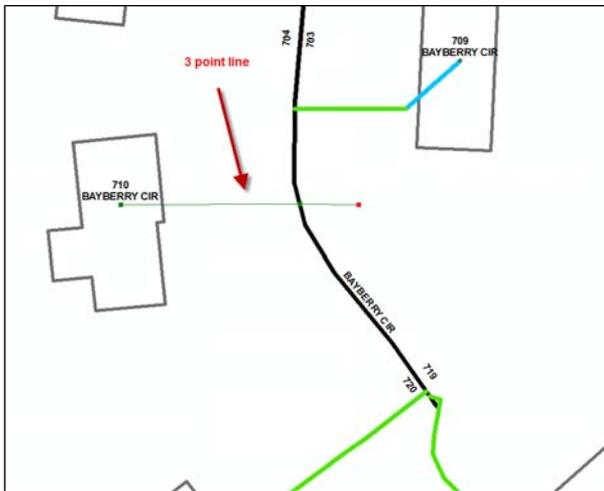
When addressing a structure it is recommended to setup the snapping environment so that you can snap to the vertex of your address points and the end of your access lines.



layer” or Address a structure → Address all Layers option from the Spatial Map 911 menu.



To address an addressable structure, first, choose the Address a Structure → “the name of your addressable structure



Next, draw a 2 or three point line from the addressable structure through the point of egress and through the street that the structure is being addressed. Finally, finish the edit sketch. If a connector line layer is configured within the SpatialMap 911 configuration database; once the sketch has been finished, the geometry drawn will be kept as a feature. Creating the feature this way assures that the point of egress of the connector line to the centerline is created correctly, and that the established connector line can then be used in the Address Quality Evaluation processes.

If you do not wish to keep the automatically created connector line feature, it can be deleted or modified using standard ArcGIS editing tools.

If the address a structure process is cancelled during the assignment of the address, the connector line feature is not saved.

The normal addressing elements associated with the street such as: name and prefix direction are automatically assigned to the equivalent fields in the structure layer(s). The tool lets you edit the house number and zip code manually if required.

1. House Number

This section displays the house number that the SpatialMap 911 tool has suggested based on the participating street segment. The house number can be manually edited or edited by using the up and down scroll buttons. If edits are made which suggest an address number for the structure that is outside of the accepted range, a warning will appear.

2. Zip code

This section displays the zip code that the SpatialMap 911 tool has suggested for this structure. If the structure should be assigned a zip code different from the suggested one it can be manually edited.

2. ZIP Code:

3. Other Address Elements

This section allows you to edit any additional fields for addressing that were specified during the configuration setup. All of the addressable layers will show up in the left hand column and the additional fields available for editing will show up in the right hand column. This additional information must be manually entered into each appropriate row in the right hand column.

3 Other Address Element

Select a map layer from the list below to view and edit its available address element fields.

Layer:

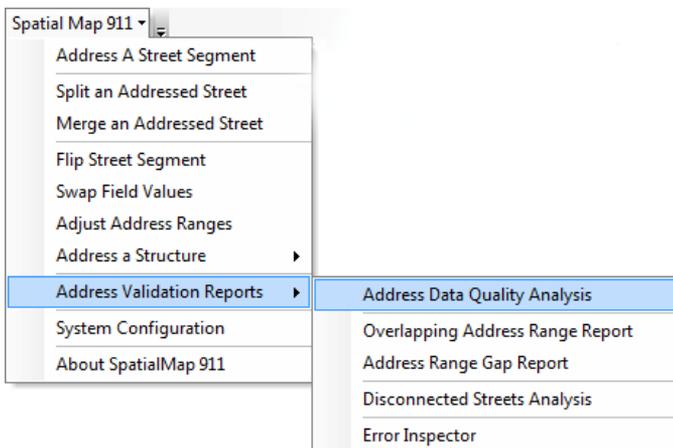
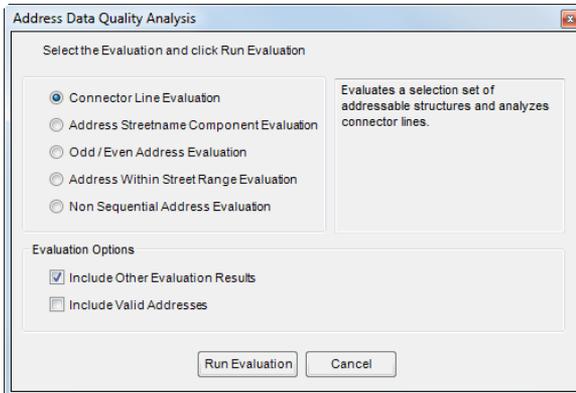
Address_Points

Address Elements:

Field	Value
UNIT_NUMBER	
UNIT_TYPE	

OK Reset Cancel

VIII. Address Validation Reports



a. Address Data Quality Analysis

This section describes the address validation processes within SpatialMap 911. The primary purpose of these processes is to check your data for accuracy with regards to address attribution and connectivity. These reports check the accuracy of the addressable structures point layer and their associated street segments. In general, when there is a conflict between the two the evaluation

report will mark them as conflicts in the resulting report. The results of these evaluations are stored in a .dbf table file that can then be used to investigate and correct problems. All but one of the evaluations are run on the addressable structure features selected by the user. The exception is the “Non Sequential Address Evaluation”. This evaluation is run on a selection of street features defined by the user.

Order of Evaluation Reports

It is the best practice to execute the address validation checks in the order in which they are listed. This will produce the highest level of data accuracy.

It is possible for the user to decide on which evaluation should be run. However, this can cause the validation reports to miss potential errors within the addressable structures dataset.

For example, say an addressable structure is not connected to its associated street segment. The “Non Sequential Address Evaluation” routine will ignore that addressable structure and exclude that structure from the error report. If problems associated with access lines have not been addressed then this will prevent the associated addresses from being checked in later evaluations. For a comprehensive check on the addressable structures it is best to run the evaluations in the order with which they are listed.

Include Other Evaluation Results

It is possible to review errors generated by evaluations listed above the selected evaluation in the suggested order. This is done by placing a check in the box labeled “Include Other Evaluation Results”. This will cause the addressing conflicts that are not associated with the current evaluation to be present in the resulting evaluation table.



If structure A is not connected to a street segment via an access line then it will normally be ignored by an Address validation routine. If the 'Include Other Evaluation Results' checkbox is checked then all errors from the evaluation will be reported.

By default the checkbox for this option is checked on, if you do not wish to include these result with the report then uncheck this option.

Include Valid Addresses

This option includes valid addressable structures in the particular evaluation report being run. The resulting table will include all of the features being evaluated, those with errors and those without. By default the checkbox for this option is checked on, if you do not wish to include the valid addressable structure results with the report then uncheck this option.

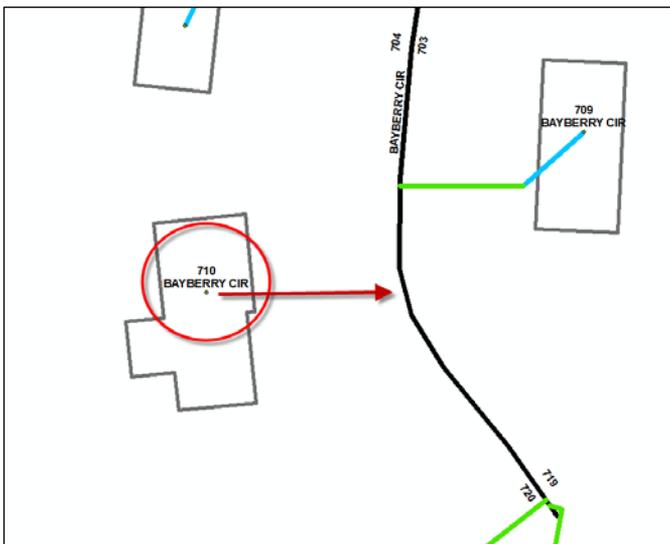
Evaluation results

Each of the evaluations produces a data table with the results. The data table stores the information about the addressable structures in conflict and their associated errors. The user will be prompted on where to store the data table file when the evaluation is run. At the end of the chosen evaluation the user is prompted on whether or not to add the newly created table to the current ArcMap session. From there the user can investigate and correct the problems using standard ArcMap techniques, or the Error Inspection Tool.

1. Access Line Evaluation

This evaluation report checks for spatial connectivity between selected addressable structures and street segments. Later steps within the Address Evaluation process are dependent upon access line connectivity.

In some cases the errors with connectivity may be a result of an access line not actually snapped to a particular addressable structure or street segment. This can occur even if the access line appears to be very close to the addressable structure or street segment.



Checks For

- Connectivity between addressable structures and street segments via access lines

- One access line per addressable structure to street segment

Possible Errors

- "STRUCTURE DOES NOT CONNECT TO ACCESS LINE"

There is no associated access line that reaches the addressable structure. This can be a simple case of there being no access line or the access line is not properly snapped to the addressable structure.

- "STRUCTURE CONNECTS TO MULTIPLE ACCESS LINES"

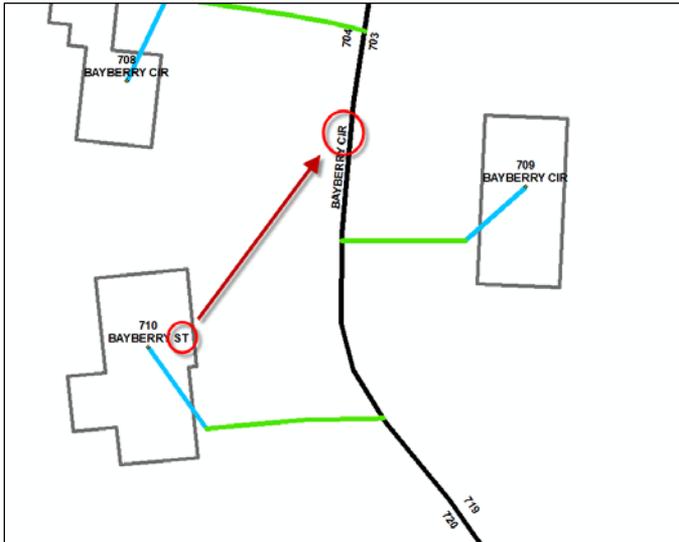
There are multiple access lines that connect to the addressable structure. Delete any extraneous access lines associated with the addressable structure.

- "ACCESS LINE DOES NOT CONNECT TO STREET"

The access line associated with the addressable structure is not fully connected to the street segment. In some cases the access line may appear to be connected to the associated street segment but is not. Turn on snapping for the street segment layer; reattach the access line to ensure that it is connected.

2. Address Street Name Component Check

This evaluation checks the selected addressable structures to ensure that the street name components, such as pre-fix, suffix, or street name are correct. This is done by comparing the street name components in the selected addressable structure to that of its associated street segment.



Checks For

- Differences between addressable structures and their associated street segments.

Possible Errors

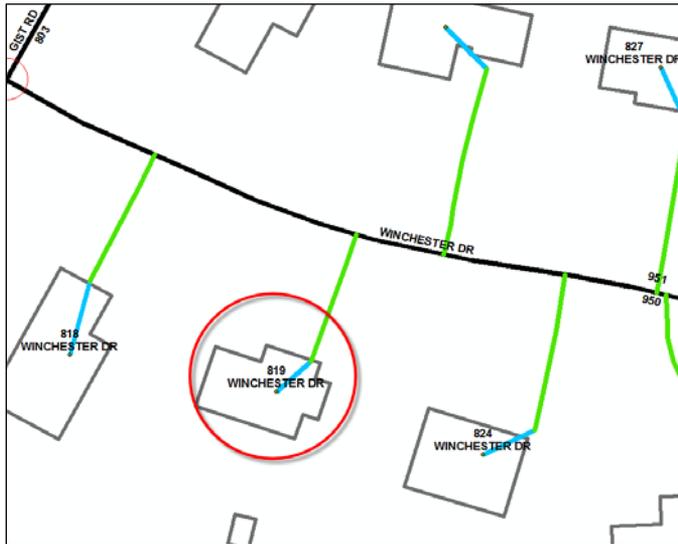
- "ACCESS LINE CONNECTS TO STREET WITH INVALID ADDRESS COMPONENTS"

There is a difference in the street name components of the addressable structure and its associated street segment. For example, the tool

checks for different spelling of street name or missing/extra suffix/prefix among other street name components.

3. Odd/Even Address Evaluation

This evaluation checks a selected addressable structure to determine if its address number does not match the odd/even status of the street segment it is associated with. Addressable structures that are on the wrong side of the street will be noted as such.



Checks For

- Consistent odd or even address assignment along a side of a street segment

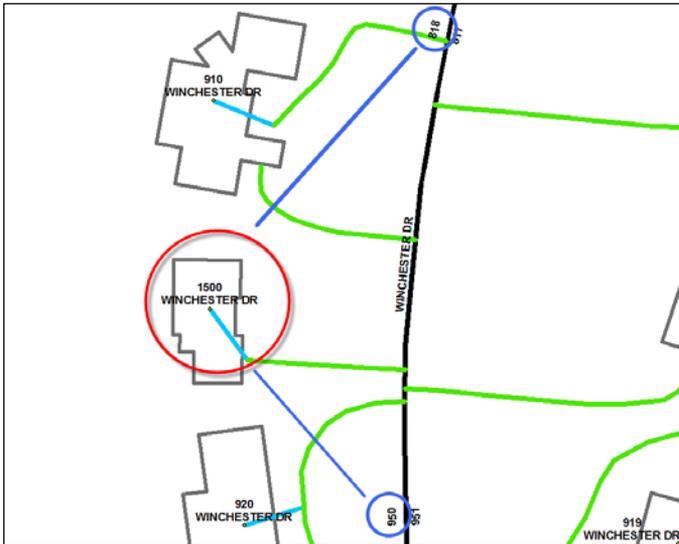
Possible Errors

- "STRUCTURE ADDRESSED TO WRONG SIDE OF ROAD"

The associated addressable structure's address number does not match the odd/even status of its associated street segment.

4. Address within Street Range Evaluation

This evaluation checks a selected addressable structure to determine if its address number falls within the address range of its associated street segment. If the address number falls outside of the range then that particular addressable structure will be marked in the error report. This evaluation depends on connectivity between the addressable structure and street segment.



Checks For

- Checks to see if the address number of a given structure falls within the range of its associated street segment.

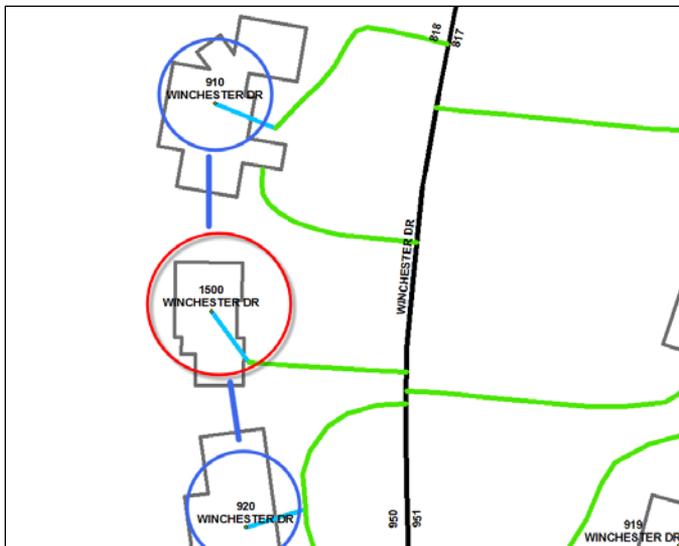
Possible Errors

- "ADDRESS OUT OF RANGE FOR SEGMENT"

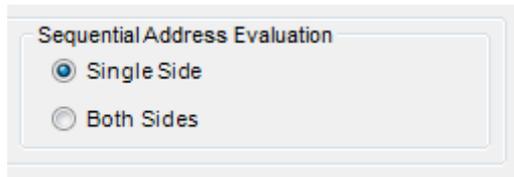
The associated addressable structure's address number does not fall within the range of its associated street segment.

5. Non Sequential Address Evaluation

This evaluation checks the addressable structures along the selected streets for sequentially. It compares the address number for each addressable structure to the rest of the structures along the street segment. If an addressable structure along a street segment falls out of sequence with the other then it will be marked. While this isn't always an indication that the addressable structure marked was in error, it does bring the addressable structure to the attention of the end user.



This evaluation also allows the user to delineate between checking one or both sides of the street.



Once this evaluation has been selected, you will be given the option of evaluating one or both sides of the street.

Checks For

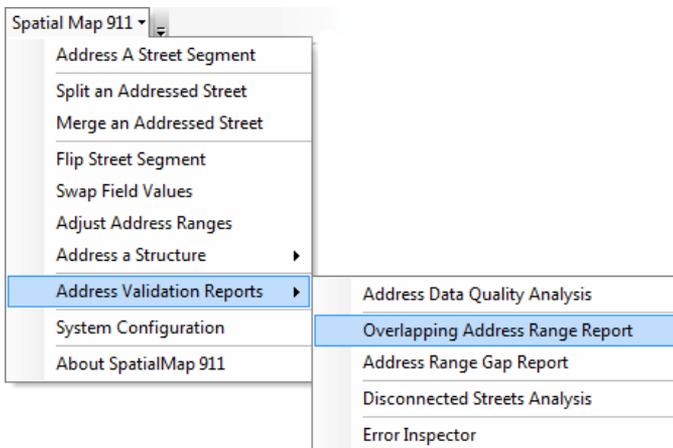
- Addressable structures with house numbers that are out of sequence with regards to one or both sides of the street.

Possible Errors

- "ADDRESS OUT OF SEQUENCE"

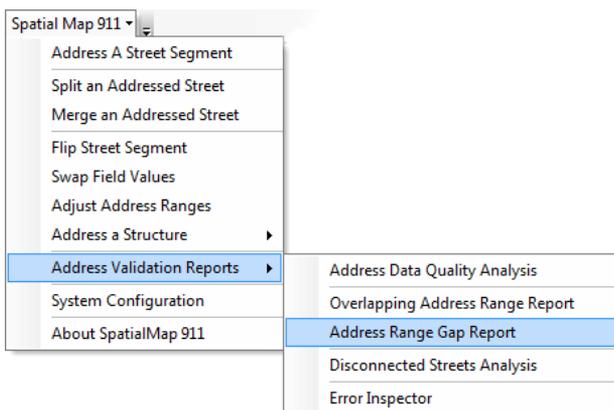
The associated addressable structure's address number does not fall within sequence along its street segment.

b. Overlapping Address Range Report



This report runs on the selected street segments or the entire street layer defined within the configuration file. The resulting table describes which street segments with the same street name value have overlapping address ranges. These street segments do not necessarily have to be adjacent to one another for there to be an error. Street segments with different zip codes but the same name will be checked against one another for range overlap. At the end of the report SpatialMap will ask you if you wish to display the table within ArcMap. The table will display and show the individual street segments that are in error as well as the ranges that overlap.

c. Gap Check



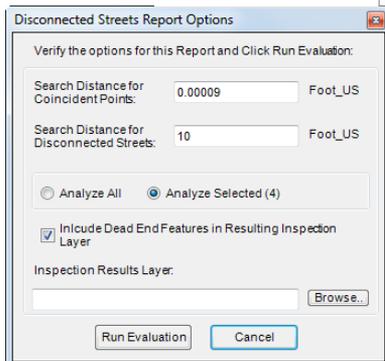
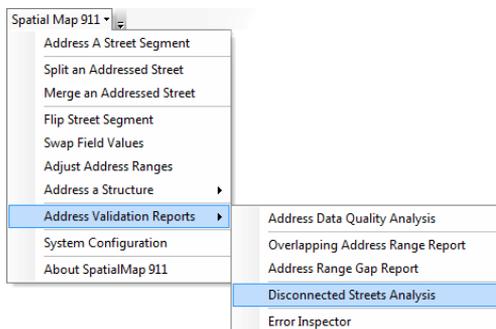
The Gap Check Evaluation report checks for gaps between adjacent street segments with the same name. The “Maximum Reported Address Gap” report option can be set to limit the number of gaps reported. In most cases large gaps in address ranges occur intentionally. It is the smaller gaps that usually represent errors. Setting this report option in the configuration settings will restrict the results of the gap check to only those with a

gap size equal to or lesser than the maximum reported address gap. Leaving this option blank will result in all gaps being reported.

OID	CL_NAME	GAP_SIZE	CL_OID1	CL_OID2	STATUS	NOTES
0	SMITH AVE	28	2804	203		

If the range of adjacent street segments is off then they will be reported. The major fields that should be considered in the gap check report are the OID1 and OID2 fields. These identify the two street segments with which the address range gap occurs. The GAP_SIZE field lets the user know the difference in address range between the two street segments. The STREET_NAME field is the street name that the two segments share.

- d. Disconnected Streets Analysis** This evaluation will analyze a set of centerline features for connectivity and export endpoints that are not connected to another centerline to a point shapefile.



This evaluation requires a Street Centerline layer to be configured in the System Configuration.

By default, this analysis will run against the selected street segments. Alternatively, the analysis

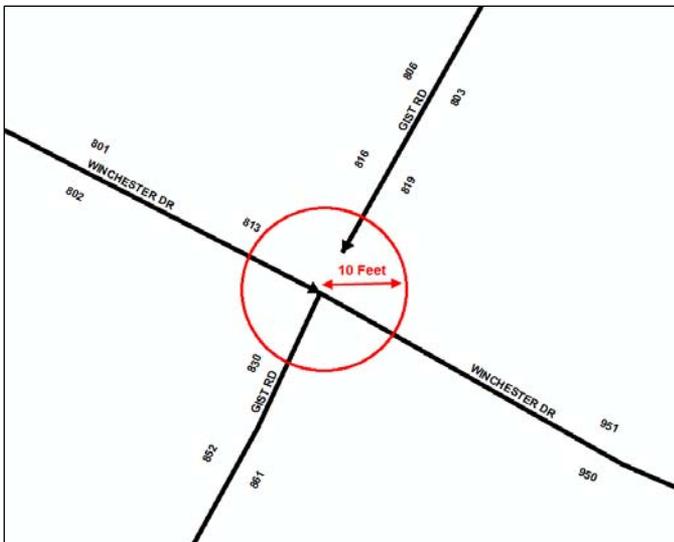
can be run against all street segments.

Before running the evaluation, set the parameters that are required for the report to run.

The **Search Distance for Coincident Points** is the value in map units that the evaluation will consider points to be coincident. Typically, this should be less than 1 foot.

The **Search Distance for Disconnected Streets** is the value in map units that a centerline will be considered disconnected from an endpoint of another centerline.

For example, if a centerline is supposed to intersect another centerline, but is disconnected as a result of an editing error, the endpoint of the centerline that is not snapped to the other centerline will not intersect the centerline, but it is still within 10 feet of the centerline.



A point is created for an endpoint that does not connect to any other centerlines besides the one it is an endpoint for.

The search distance values are stored in the system configuration database for continued use of the application.

Check the **Include Dead End Features** checkbox to include endpoints that only intersect the centerline they are an endpoint for, and are considered dead ends or possible cul-de-sacs. Un-checking this box will remove the dead ends from the results layer.

You must specify an output shapefile under **Inspection Results Layer**. Click the **Browse** button to choose a location for your file.

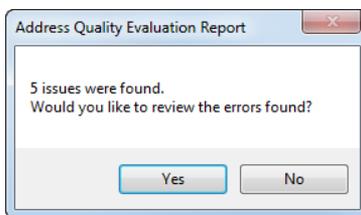
The output shapefile has two attribute fields, **CL_OID** which indicates the Object ID of the centerline that the endpoint is from, and **STATUS** which describes the type of point recorded.

FID	Shape *	CL_OID	STATUS	X_COORD *	Y_COORD *
3	Point	488	Dead End	1312570.90145	686193.94742
8	Point	796	Dead End	1312990.67456	685236.97787
9	Point	1679	Dead End	1313978.37042	686641.55381
14	Point	2852	Dead End	1313556.93097	684886.53927
16	Point	3208	Disconnect	1313420.25933	686446.28714
29	Point	6288	Dead End	1312476.35144	685344.97044

The features can be browsed to using standard ArcGIS tools.

IX. Error Inspection Tool

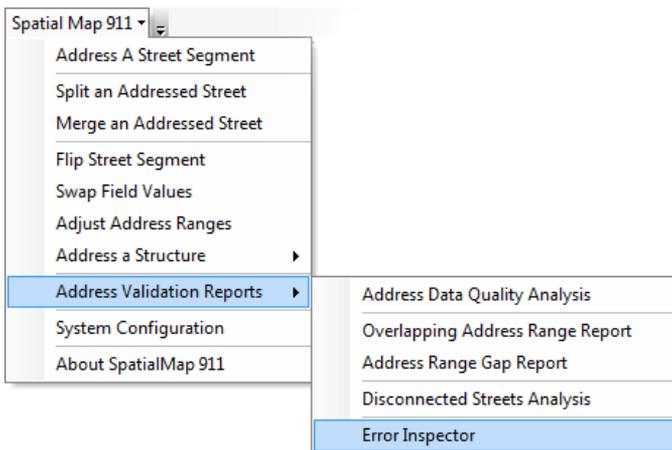
For all of the Address Validation Reports except for the Disconnected Streets Analysis, the output is a table of addresses or street segments that are in violation



of the type of analysis run. Once the evaluation is complete, you will be prompted to review the errors found. This will add the evaluation results table to the map document and launch the Error Inspection Tools.

Please note, the table will only be added if you choose to review the results of the analysis.

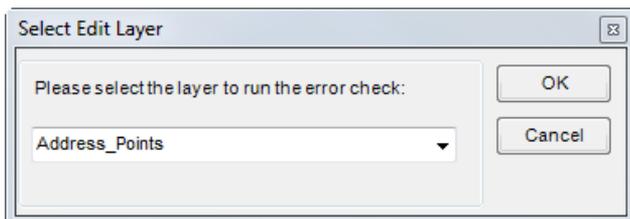
The **Error Inspection Tools** are also available through the **SpatialMap911** menu:



The Error Inspector Tools will look for standalone tables in the map document that have the correct formatting for an evaluation report, and will allow you to choose which one you would like to review:



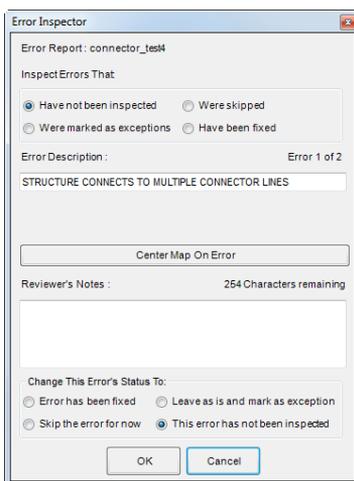
You must then select the addressable structures point layer that you used to perform the analysis.



The Error Inspector dialog will be displayed, providing an interface for browsing between features that are in conflict and allowing you to maintain a status on which features have been inspected and fixed, marked as an exception, or skipped.

Each record in the evaluation results table is displayed one at a time in the Error Inspector interface. This allows for the review and update of each feature on an individual basis that was considered in error during the evaluation.

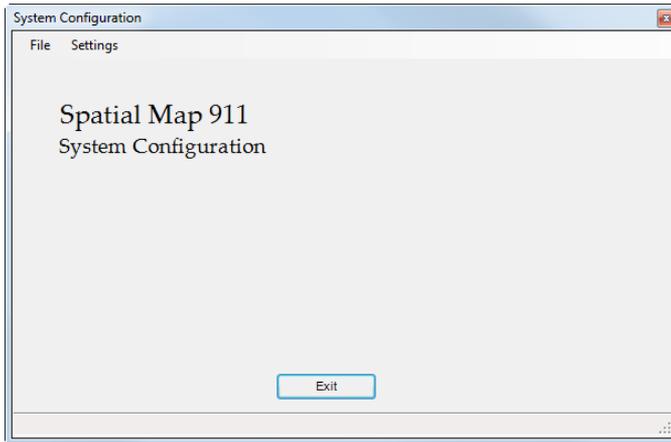
1. You can click on the options for **Inspect Errors That:** to filter the records based on their current status. By default, all records have an empty status, which indicates that they have not been inspected.
2. The **Error Description** area displays the error found during the analysis.
3. Click **Center Map on Error** to pan to the feature associated with the error in the map window. You can



then use SpatialMap 911 tools to fix addressing problems or standard ArcGIS tools to fix any geometry issues that were encountered.

4. The **Reviewer's Notes** is used to record additional information that will be useful in describing the error. This section is particularly useful when an error is assigned a status of exception or skipped. You can enter up to 254 characters of notes in the **Reviewer's Notes** area.
5. At the bottom of the window, click on the options to change the Error's status in the table:
 - **Error has been fixed**—The addressing or geometry problem has been fixed in the map window.
 - **Leave as is and mark as exception**— The error is an exception and does not need to be repaired.
 - **Skip the error for now**—Additional information or processing is needed, and the error will be fixed or marked as an exception later.
 - **This Error has not been inspected**—Mark this error to be included in the review.
6. To get to the next error to review, click **OK**. If all errors have been inspected, then the error inspector will find the features that have been marked as skipped. If all errors have been inspected and none are skipped, you will be able to browse through the errors that have been fixed.
7. Click **Cancel** to exit the Error Inspector. You can restart Error Inspection on a table at any time by accessing the Error Inspector through the SpatialMap 911 menu.

X. System Configuration



The System Configuration is the key to all of the SpatialMap 911 functions. The system configuration defines the manner by which the SpatialMap 911 toolset operates with the data. It utilizes a database which holds the definitions for all the fields that will be edited and used within the toolset. The records store information on where the street segment layer is located and what fields, within that layer, correspond to system recognized fields. For example, the system must recognize certain fields in the streets layer such as: street name, street suffix, House Number From Right, etc.

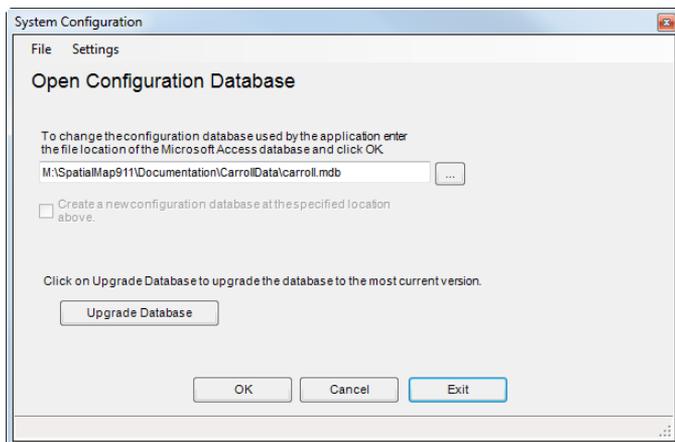
During the configuration process, you will identify data based on ArcMap layers from within an ArcMap project file (.MXD). You should prepare your ArcMap project file's layer names before performing this configuration process to make the ArcMap environment more user friendly. For example, your road centerlines may have a layer name of "SDE.rcl911" that you might want to rename to be Road Centerlines. Once this has been done, you will want to save your ArcMap project file for your ongoing use as it goes hand in hand with

the SpatialMap 911 configuration database. If you have multiple concurrent users, you will need to have separate MXD files for each user. The simplest way to facilitate this is to set up one standard MXD and then make copies for each user, typically including the user's name in the MXD name. Within the MXD, the user can set their own color, scale thresholds, labeling styles, etc. they just can't rename the layer itself as this would cause SpatialMap 911 to not be able to find it when needed. Likewise, it is important that you don't have multiple layers with the exact same name within the ArcMap project file.

Opening or editing configuration settings that have already been established for the end user can be tricky and it is advised to do so only when necessary. Changes made in the system configuration, once saved, will not be visited again during the normal workflow process.

We recommend that the configuration database be backed up regularly.

a. Open a Configuration Database



The most important part of the file menu is the "Open Configuration Database" option. This section allows you to

direct the tools towards a specific configuration database, allowing multiple editors to use the same configuration for data editing.

There is also the ability to create a new configuration database by entering the location and new name, then clicking the “Create a new configuration database..” checkbox. The new configuration database will need to be populated with all the necessary information covered below, but the format will be appropriate for use with the SpatialMap 911 system.

b. Street Layers Settings

System Configuration

File Settings

Streets Layer Settings

1. Select the layer name: Centerlines

2. Select the field names:

Prefix Direction: PREFIX_DIR

Street Name: STREETNAME

Street Type: STREETTYPE

Suffix Direction: SUFFIX_DIR

Full Name: FULL_NAME

3. Intentionally Blank House Number

Allow Range Snapping in Adjust Address Ranges Tool

House From Left: FRADDL_P

House To Left: TOADDL_P

House From Right: FRADDR_P

House To Right: TOADDR_P

Left Zone: ZIP_L

Right Zone: ZIP_R

Save Reload Exit

The purpose of this section is to direct the Address Maintenance tools towards the correct street layer and fields to edit.

1. Select the Layer Name

This section allows the user to select the name of the streets layer. This list will contain any line layers in the table of contents so be careful to pick the street centerline layer.

2. Select the field names

This section consists of a series of drop down boxes which allow you to point the Address Maintenance tools to the corresponding fields for the layer current.

- a) Prefix Direction Example:

South Hampton St SW

- b) Street Name Example:

South **Hampton** St SW

- c) Street Type Example:

South Hampton **St** SW

- d) Suffix Direction Example:

South Hampton St **SW**

- e) Full Name Example:

South Hampton St SW

- f) House From

This is an address range value. One of four that store the address values at the ends of a street segment.

- g) Zone

Zip code, one for each side of the street

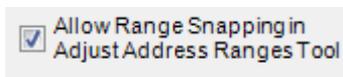
3. Intentionally Blank House Number

Enter a value into this text box that will populate the housing number ranges when no number is entered. For example: If the end user creates a road with no address range it will be populated

with the Intentionally Blank House Number. This is to indicate that the road has been reviewed and the address is blank for a reason. Please note that after you change the Intentionally Blank House Number and try to save a warning will appear to confirm this change. This change will update all existing blank house numbers with the new one. Examples of possible blank house numbers are -99 or UNK to stand for unknown. The configuration tool will not allow you to enter a blank housing number that does not match the address number field type within the street segment layer.

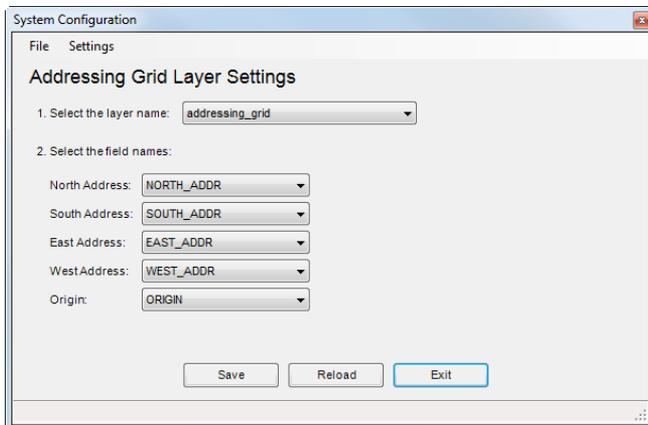
Allow Range Snapping

This setting will enable a button on the **Adjust Address Ranges** tool window that simplifies the process of adjusting address ranges so they are coincident with each other.



c. Addressing Grid

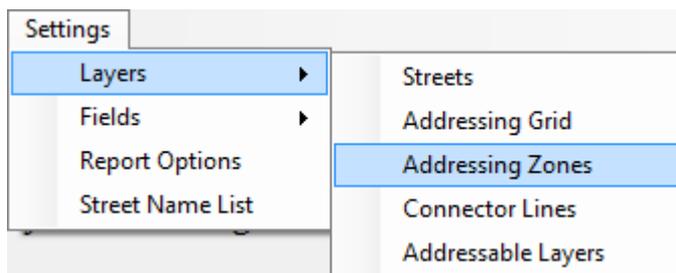
Setup the addressing grid layer for the maintenance tools. First, select the layer name from the dropdown



list. Then, identify the field names with their corresponding drop down lists.

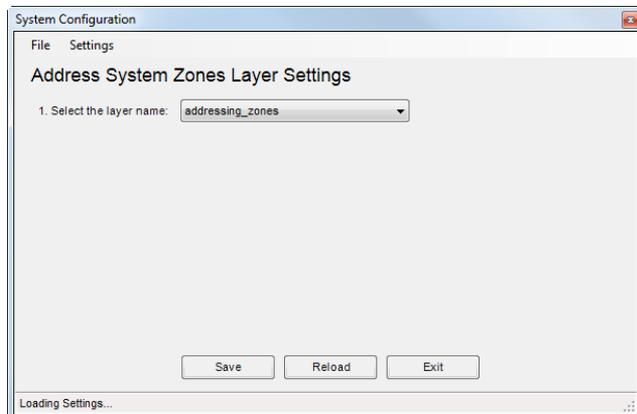
A typical addressing grid will have a starting point, or origin, in a fixed position. The addresses might be assigned based on the distance from the starting point. Some addressing grids have their starting point located in a corner of the grid; whereas others might have theirs located in the center.

d. Addressing Zones

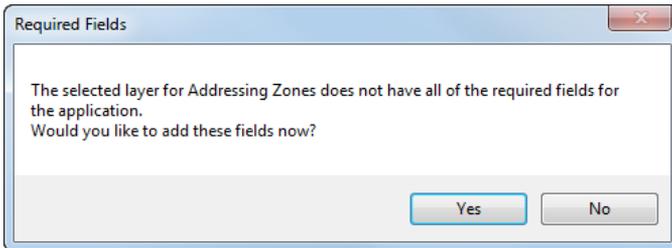


The addressing zones layer is critical in the addressing of street segments. The addressing system and its parameters are determined based off of the centerline's location within an addressing zone.

This section contains a drop down box which asks for the name of the address zone polygon layer.



If the polygon layer selected does not have the required fields, you will be prompted for SpatialMap 911 to automatically add these fields to the layer.



You can also manually add the fields using ArcGIS tools.

The fields and values required for the addressing zones:

Field Name	Type	Length	Description
AZDBWADD	Long Integer		Distance between addresses Valid Values: User Determined
AZSTAADDR	Long Integer		The starting address for non-grid based systems Valid Values: User Determined
AZDESCR	String	255	Name of the Addressing Zone Valid Values: User Determined

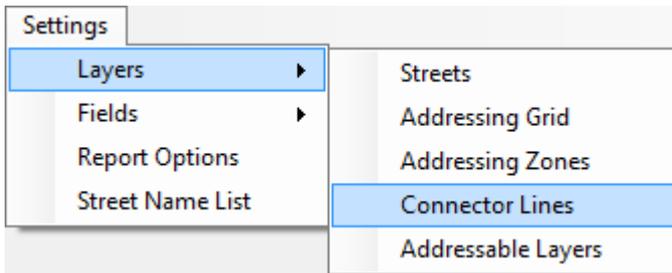
Field Name	Type	Length	Description
AZSYSTYPE	String	255	Type of Addressing System Valid Values: GRID, DISTANCE, CENTURY, GRID DISTANCE HYBRID
AZDBWADDU	String	50	Units in which the distance between addresses are described Valid Values: FOOT_US, METERS
AZEVONR	String	5	Are even addresses on the right side of the street? Valid Values: YES, NO

Unless provided with a pre-populated Address Zones layer, you will need to edit the address zones layer with ArcGIS tools and add these values to the Address Zones fields.

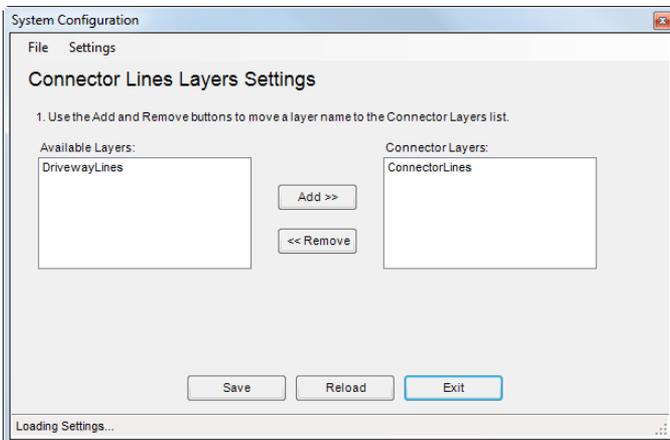
e. Connector Lines

This section contains a list on the right of the available non-centerline layers located in the current map

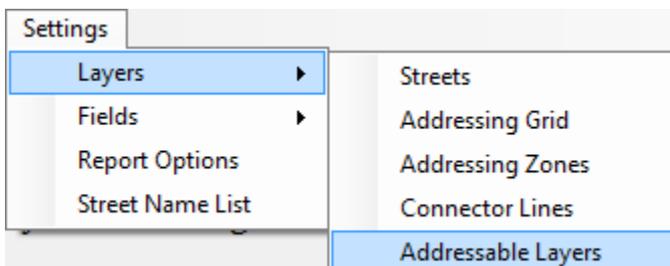
project. Clicking “Add” will add the layer to the list on connector lines layers on the left.



The connector line layers are used when running the data quality analysis evaluation reports. However, they are not actually required to perform address maintenance. If multiple connector line layers exist (for example, a connector line and a driveway line) then all connector line layers must be included in the configuration.

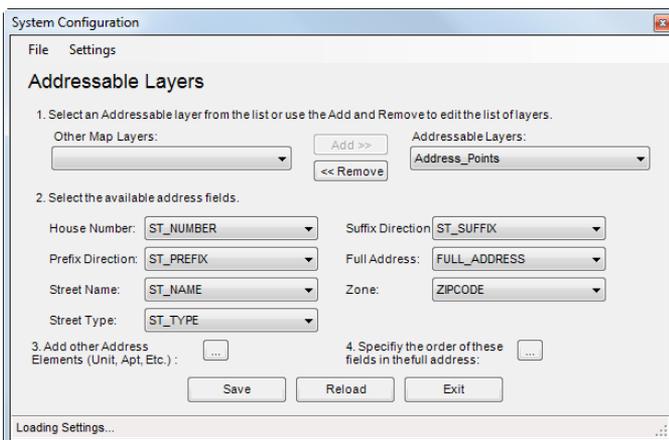


f. Addressable Layers



1. Select an Addressable Layer

This section is devoted to identifying layers that contain features that can be addressed. Examples of addressable layers are address points, building polygons, and other layers that have the fields necessary to store a unique address. This section contains two drop down lists of layer names, Addressable Layers and Other Map Layers. First, layers in the Other Map Layers list are added to the addressable Layers list using the add button. Then, the user selects the layer in the Addressable Layers list to configure the layer's Address Fields.



2. Select the Available Address fields

This section is similar to the streets layer configuration for defining the address fields associated with the layer.

- a) House Number
 125 South Hampton St SW
- b) Prefix Direction Example:
 125 **South** Hampton St SW
- c) Street Name Example:
 125 South **Hampton** St SW
- d) Street Type Example:
 125 South Hampton **St** SW
- e) Suffix Direction Example:
 125 South Hampton St **SW**
- f) Full Address
 125 South Hampton St SW
- g) Zone
 Zip code, one for each side of the street

3. Add Other Address Elements

Use the Add and Remove buttons in this section to build the Other Address Elements list. Other Address Elements are fields that contribute to the uniqueness of an address. Some examples are Unit or Apartment Number and Street Address Suffix.

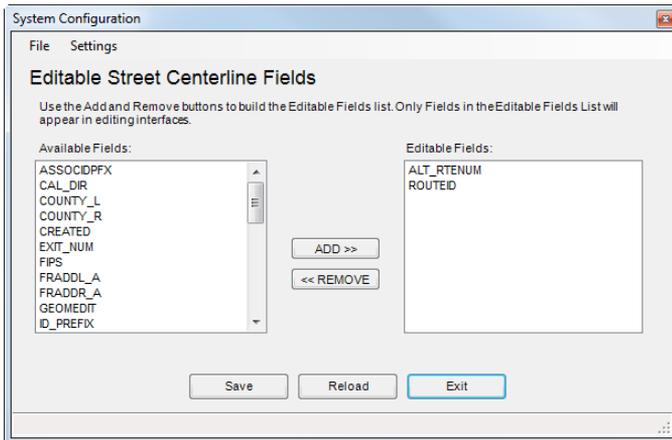
4. Order the Fields in Addressable Layer

The full address field stores a combination of the other address fields as a concatenated string. Storing this concatenation of address components is for added

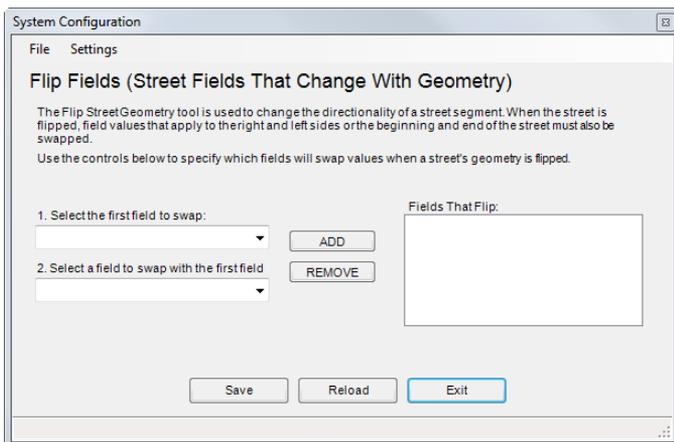
convenience when labeling and setting up reports. This section allows you select and order the address components that will be used to populate the full address field. For example: If you just wanted the street number, name, and direction you could check off those three fields but no others.

g. Editable Street Centerline Fields

This simple section allows you to add and remove additional fields for editing. When a field is added to the editable Fields list then it will become available in the Address a Street Segment Tool. Basically this section lets you edit non-addressing fields easily while inside the SpatialMap 911 toolset.

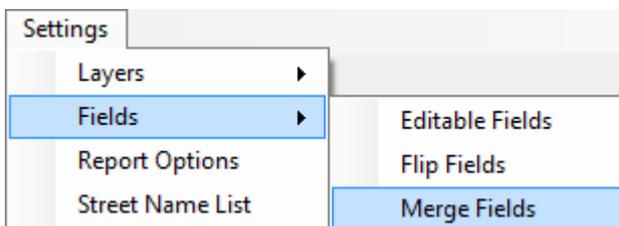


i. Flip Fields



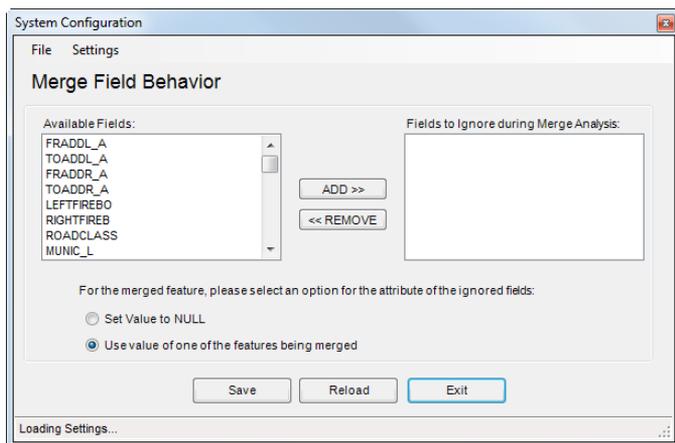
This configuration section defines which fields will swap values when you use the flip a street geometry tool. According to the text on the configuration menu, “The Flip Street Geometry tool is used to change the directionality of a street segment. When the street is flipped, field values that apply to the right and left side of the beginning and end of the street must also be swapped.” Any additional fields that depend on the direction of the street segment must be flipped here. You will only need to put additional fields outside of the normal left or right street address ranges since they will be flipped automatically.

ii. Merge Fields



In the **Merge Addressed Street Tool**, SpatialMap 911 performs a brief analysis of the features to be merged. If there is a conflict between the fields, the user will be prompted. This interface allows you to select centerline attributes that will be ignored during this analysis.

On the left, the list of available fields from the centerlines layer is listed. On the right is the list of fields that are currently ignored in the analysis. Click on **ADD** or **REMOVE** to alter the list of fields to be ignored.

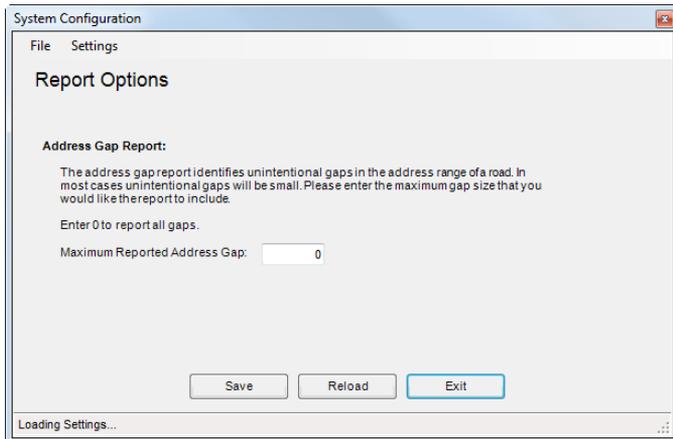
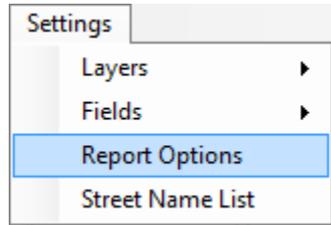


When you select fields to be ignored during the merge analysis, a default value must be specified to assign to those fields for the newly merged feature. The value can be assigned to NULL, or a value of one of the features being merged, which will be randomly assigned. If you would like to choose the value to assign to the merged feature, do not include the field to be ignored, and you will be prompted during the merge process.

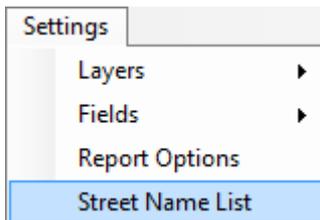
h. Other Functions of the Configuration Tools

i. Report Options

For the Address Gap Report, please enter a value for the maximum reported address gap, and enter 0 to report all gaps.



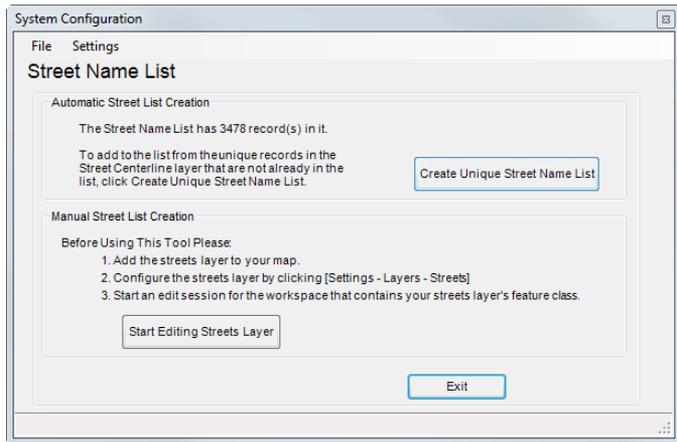
ii. Street Name List



One of the features of SpatialMap 911 is the ability to maintain a unique street name list of all of the street centerlines in the jurisdiction. This list is

used by the Address a Street Segment tool to maintain consistent street names among multiple features.

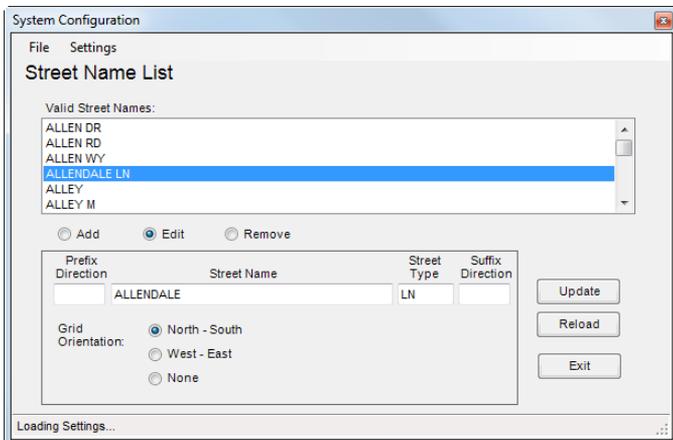
If a street name list does not exist, click on **Create Unique Street Name List** to establish unique street centerline names from the configured centerlines layer. Please note, you must have the centerlines layer configured before you can run this tool.



The unique names found in the centerlines layer will be parsed and added to the configuration database.

After the list is created, you should review it to find anomalies and correct them.

Click on **Start Editing Streets Layer** to access the edit interface of the Street Name List.



This configuration section can be reached via the Address A Street Segment Tool or the Update System Configuration. The purpose of this configuration is to setup the list of possible street names to be used with the Address Maintenance tools. It's here that you would add a new street being built by developers, sort of a master list of streets for the whole dataset.

The application can update the street name attributes of features in the streets layer based on changes made to the street names in this list. Because of this functionality, you are required to start an edit session for the workspace that contains the streets layer, before you can access the street name list in the configuration settings.

1. Valid Street Names

This is a scrolling list that displays all of the street names that are acceptable for use in the current area. It's possible to navigate via the keyboard by holding down the first letter of the street you want instead of using the scrollbar provided.

2. Add, Edit, and Remove Tabs

Three tabs make up the rest of the Street Name list Configuration. Edit, Add, and Remove. Each has four input boxes for the street name components.

In addition each tab has an option where you can check the type of grid orientation associated with the street.

a. Edit

In the edit tab you have access to all of the streets and when you select one in the list box it will automatically populate the text boxes. Any changes made to the street can be undone by hitting the Reload button. Save the edits by hitting the Update button. The application will present the option of updating the street name attributes of features in the streets layer with the old street name.

b. Add

When you click on the Add tab it will gray out the street list box. Enter the information for the street and pick a grid orientation. Hitting the add button will add the street to the name list and an alert box will come up notifying you that it has been added. The reload button has no functionality in this tab.

c. Remove

The remove section will not allow you to edit the street attributes but simply remove the current street selected. If you do try to remove a road from the list an alert will come up asking if you want to permanently remove the road selected. The reload button has no functionality in this tab. Removing a street name from the list will not modify features in your streets layer.

SpatialMap 911 Installation and Configuration Guide

If you have a previous version of Spatial Map 911 installed, uninstall it through Control Panel → Add or Remove Programs before continuing with the new installation.

SpatialMap 911 Application Installation

1. Run the Spatial Map 911 installation file from the CD, setup.exe.
2. The SpatialMap 911 Installation will finish.

Sentinel Protection Installer

SpatialMap 911 requires a connection to a Safenet Sentinel Key to acquire a license. The Sentinel Key can operate in two modes: Standalone and Server Mode.

- **Standalone Key Configuration** has a single user key that must be attached directly to the computer running SpatialMap 911. This configuration allows only one user at a time to access the SpatialMap 911 license.
- **Server Key Configuration** is a single key that serves multiple licenses for multiple users. This key can either be attached directly to a user machine; but most often is attached to a server to which multiple users connect to acquire a license.

The configuration process for each Key Configuration is described below.

Standalone Key Configuration

A standalone key configuration requires the SafeNet sentinel hardware key drivers to be installed on the local machine running SpatialMap 911 that will have the Standalone Key attached.

1. From the SpatialMap 911 Installation CD, open the **Sentinel Protection Installer** folder.
2. Run **Sentinel Protection Installer 7.4.0**
3. In the Sentinel Protection Installer, accept the terms of the license agreement and select the Complete Install. The install will prompt you that it wants to change settings on your firewall, click **Yes** to enable these settings, and **Finish** the install.
4. Launch SSALicenseManager.exe which is located in the Installation folder for SpatialMap 911.



5. Select **Sentinel Key Standalone Mode** to set the Sentinel Key mode.



6. Click **OK** to accept the configuration. This will write a configuration file to the install directory of SpatialMap 911 that will store the sentinel key information.

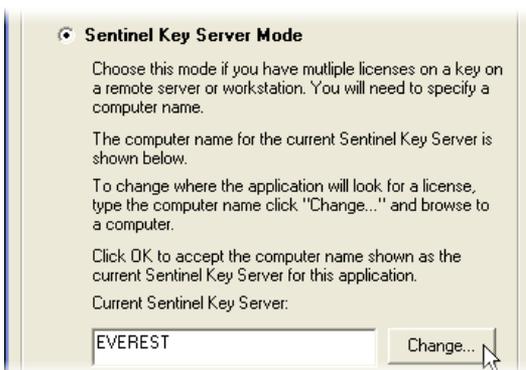
Server Key Configuration

A server key configuration requires the SafeNet sentinel hardware key drivers to be installed on the remote server that will have the Server Key attached.

1. From the SpatialMap 911 Installation CD, open the **Sentinel Protection Installer** folder.
2. Run **Sentinel Protection Installer 7.4.0**
3. In the Sentinel Protection Installer, accept the terms of the license agreement and select the Complete Install. The install will prompt you that it wants to change settings on your firewall, click **Yes** to enable these settings, and **Finish** the install.
4. Launch SSALicenseManager.exe which is located in the Installation folder for SpatialMap 911.



5. Select **Sentinel Key Server Mode** to set the Sentinel Key mode.



The name of the remote server or workstation must be specified, and the Sentinel Key Server Software must be running on the remote machine.

6. Click **OK** to accept the configuration. This will write a configuration file to the install directory of SpatialMap 911 that will store the sentinel key information.



Configuration of Tools in ArcMap

In the ArcGIS 10 / SpatialMap 911 Version 3 version, the tools are automatically added to the ArcMap toolbars list.

Congratulations, your SpatialMap 911 product is now ready for use.