

# Extended Element Properties

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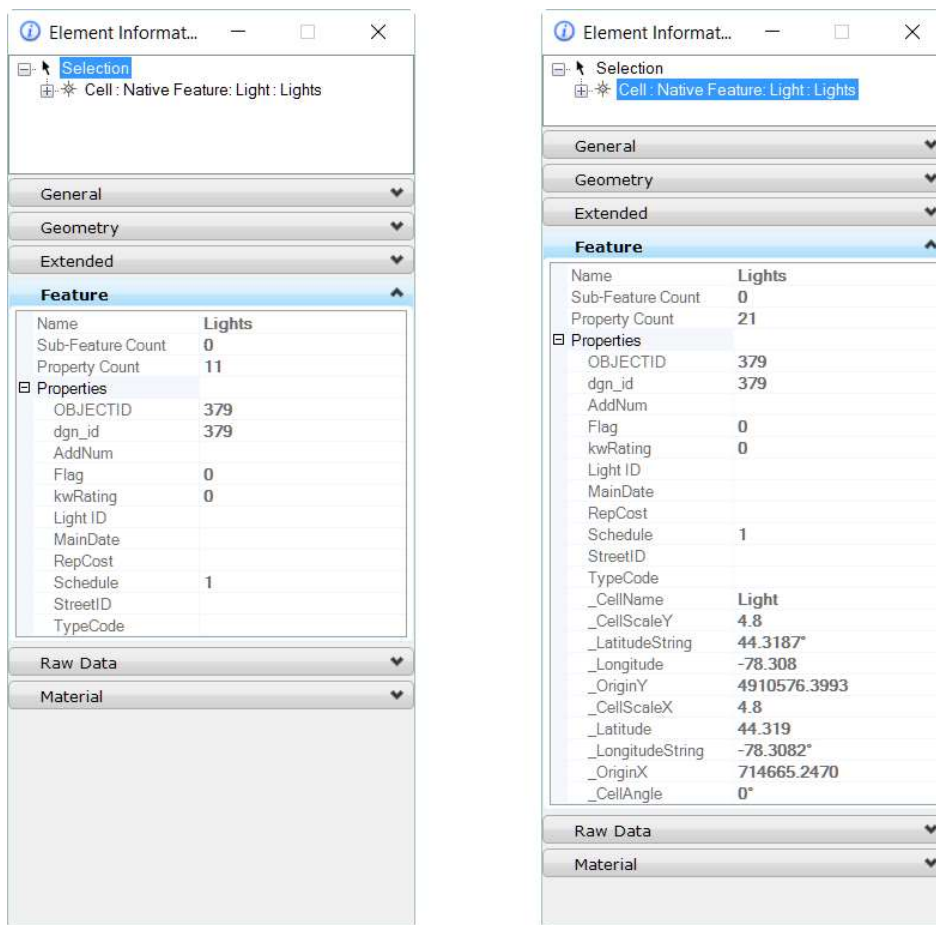
# Extended Element Properties

## Introduction

The following article discusses the usage and implementation of *xprops.ma*, a custom Bentley Map MDL application that seamlessly extends feature properties to include MicroStation element information such as: *text strings, cell names, cell scales, XY coordinate positions, and latitude/longitude positions*.

The extended properties are exposed in the Element Information dialog, as well as any dialog you find Bentley Map XFM properties. This includes the Data Browser, Interoperability dialog, and several of the Map Manager functions including feature labels, and the search dialog.

The following graphic illustrates the Element Information dialog without xprops loaded (left) and the same element with xprops loaded (right).



# Extended Element Properties

## Installation and Configuration

The xprops application is an MDL program provided with this article. Extract and place copies of the DLL and MA files in either the ...\\Map\\mdlapps\\ or ...\\MicroStation\\mdlapps\\ folder.

If desired the configuration variable MS\_GEOINITCMD can be defined to automatically load the MDL when a Bentley Map session is started. This can be done in the Bentley Geospatial Administrator by adding a new entry in the Workspace Macros node:

Macros			
Name	Operator	Value	Comment
MS_DESIGNSEED	=	Seed2d.dgn	Default seed file
GDI_SUPPRESS_SQL_SERVER_QUERY_NON_UNDOABLE_WARNING	=	1	Suppress SQL query warning dialog
MS_GEOXFM_CREATE_ORPHAN_FOR_MISSING_CELLS	=	1	Flag to create orphan cell XML when specified cell is missing
MS_GEOINITCMD	=	MDL SILENTLOAD XPROPS	Automatically load the extended properties application
*			

If you prefer, you can manually start the application using the keyin *mdl load xprops*.

To unload the application, use the keyin *mdl unload xprops*. This keyin may need to be run twice to fully unload the application from your design session.

Once loaded, the following keyins are available:

Keyin	Description
XPROPS VERSION	Displays application build time.
XPROPS ON OFF	Enables or disables extended properties for all feature classes.
XPROPS OFF=MyFeatureClassName	Disables extended properties for specific feature class.  For example, to turn off the extended properties for a feature class called <i>Lights</i> , use the keyin <i>xprops off=Lights</i>  Note that the feature class name is case sensitive.
XPROPS ON=MyFeatureClassName	Enables extended properties for specific feature class.  For example, to turn on the extended properties for a feature class called <i>Lights</i> , use the keyin <i>xprops on=Lights</i>  Note that the feature class name is case sensitive.

## Extended Element Properties

### Geographic Coordinates

A strength of this application is its ability to recognize the attached Geographic Coordinate System (GCS) and provide you with the latitude and longitude coordinates of your features. The geographic extended properties are described as:

<code>_Latitude</code>	The latitude of the point or vertex expressed in decimals.
<code>_LatitudeString</code>	The latitude expressed in either decimal degrees or degrees/minutes/seconds.
<code>_Longitude</code>	The longitude of the point or vertex expressed in decimals
<code>_LongitudeString</code>	The longitude expressed in either decimal degrees or degrees/minutes/seconds

For searching based on geographic locations, use the `_Latitude` and/or `_Longitude` properties.


For feature labels and PBA text values, use the string variation which includes the degree symbol.

To control how the string variation is displayed, adjust the design file angle readout to either DD.DDD or DD MM SS. You can find this by navigating to *Settings > Design file > Angle Readout > Format* . Changing the angle format is immediate and reflected when the view is updated or dialog is reopened.

Modify Angle Readout Settings

Format: DD.DDDD

Accuracy: 0.1234



Latitude=44.3137°  
Longitude=-78.3040°

Analyze Result

Default	
Property	Value
_Latitude	44.314
_LatitudeString	44.3142°
_Longitude	-78.304
_LongitudeString	-78.3043°

Modify Angle Readout Settings

Format: DD MM SS

Accuracy: 0.1234



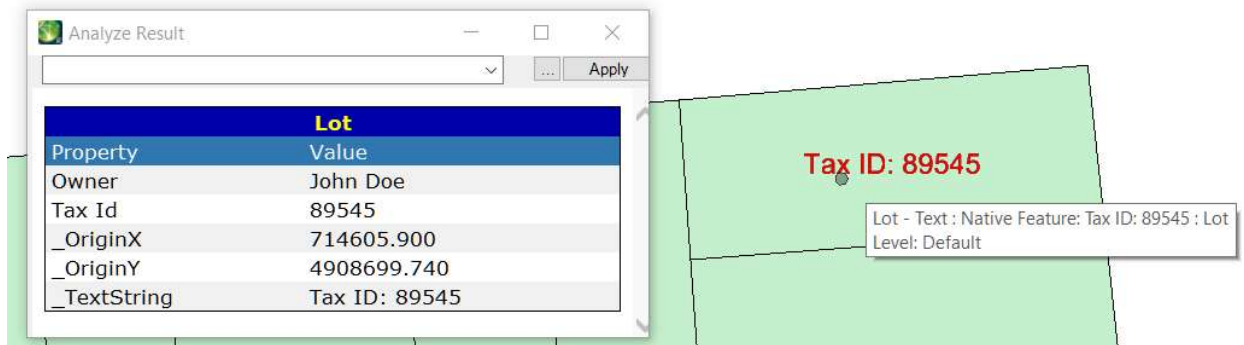
Latitude=44°18'49.2268"  
Longitude=-78°18'14.5115"

Analyze Result

Default	
Property	Value
_Latitude	44.314
_LatitudeString	44°18'51.2089"
_Longitude	-78.304
_LongitudeString	-78°18'15.3614"

Deleting the GCS from the design file will remove the latitude and longitude extended properties that are made available for use in Bentley Map.

## Extended Element Properties



As well, changing the GCS from one to another, may require the design file to be closed and reopened in order to display the new geographic coordinates.

### Feature Types

The extended properties will vary for each of the feature types: polygon, line and point.

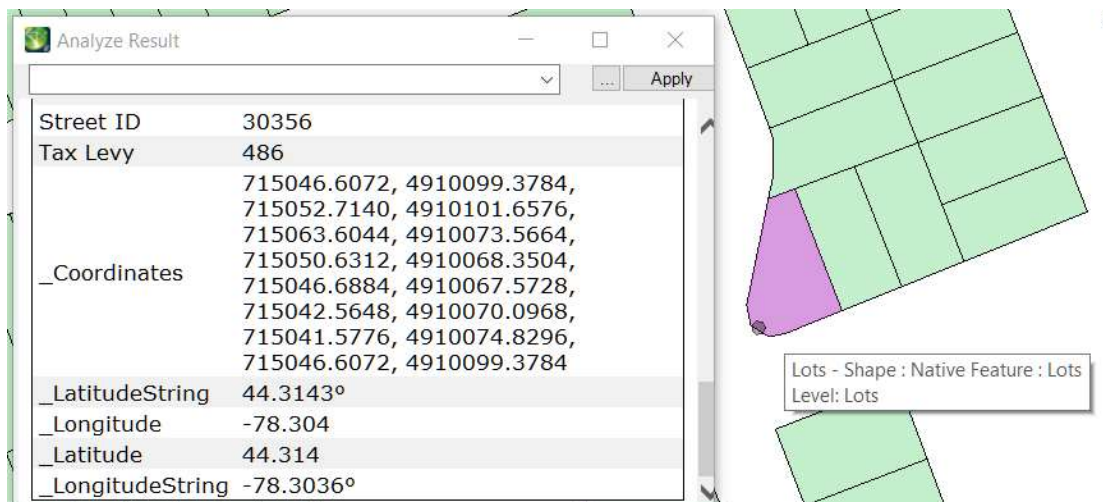
The following element types are supported by xProps:

**Polygon Features:** Shape, Closed B-Spline, Complex Shape, Ellipse

**Linear Features:** Arc, B-spline Curve, Complex Chain, Curve, Line String

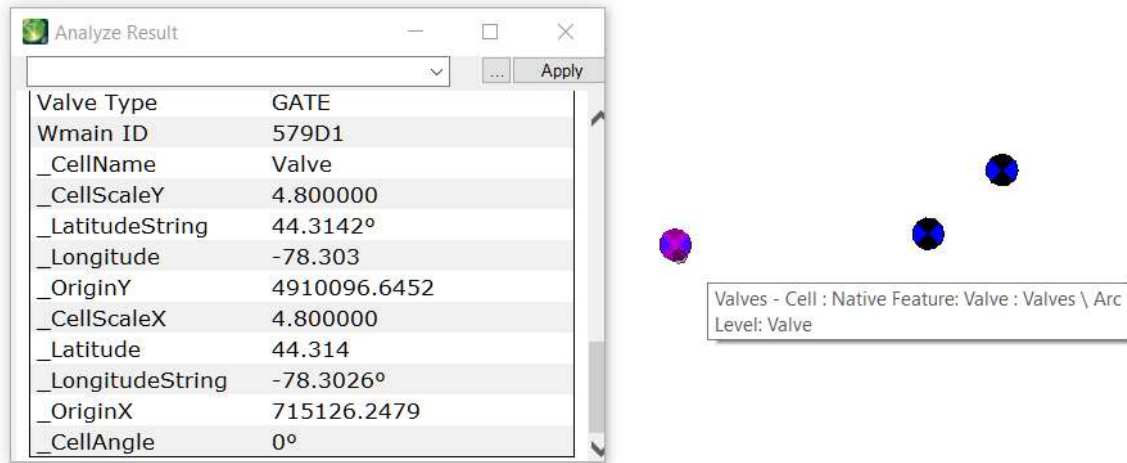
**Point:** Cell, Text

Polygons will show the XY(Z) coordinates of all vertices, and the geographic coordinates of the first vertex.

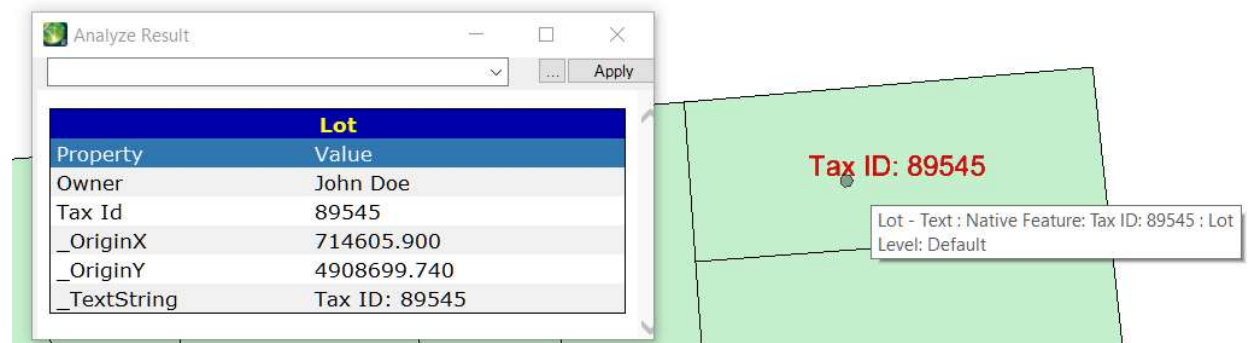


## Extended Element Properties

The extended properties for Point Cell features includes the cell name, scale, angle in addition to the origin XY(Z) and geographic coordinates.



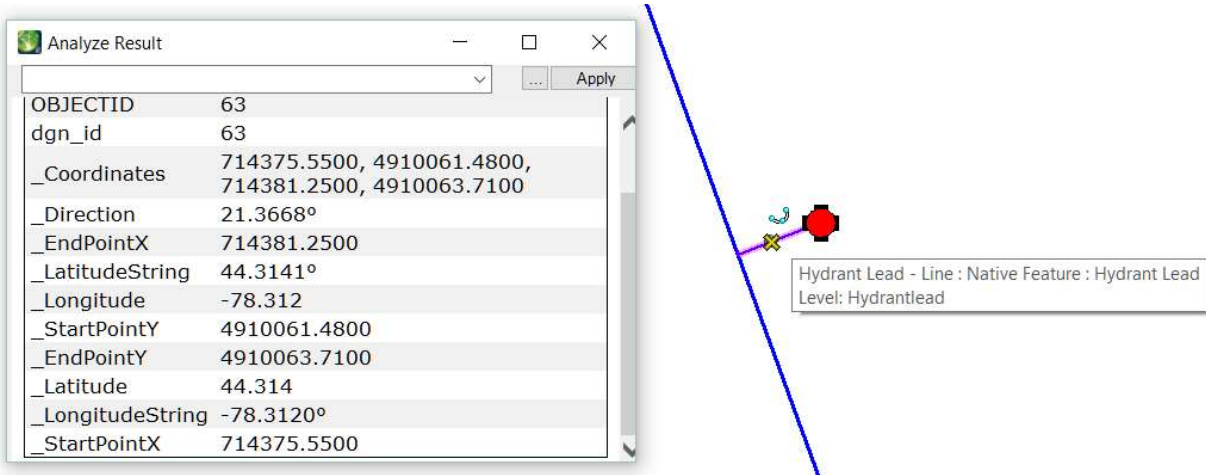
For Point Text features, the text string is returned as well as the origin coordinates. In the graphic below, there is no GCS defined in the file. As a result, the latitude/longitude extended properties are not available for display or use.



## Extended Element Properties

For linear features that consist of a single line, you'll find the XY(Z) and geographic coordinates for the start and end points as well as the line direction expressed in degrees.

For line strings, the coordinates for all vertices are returned, and the direction is based on the first segment.



# Extended Element Properties

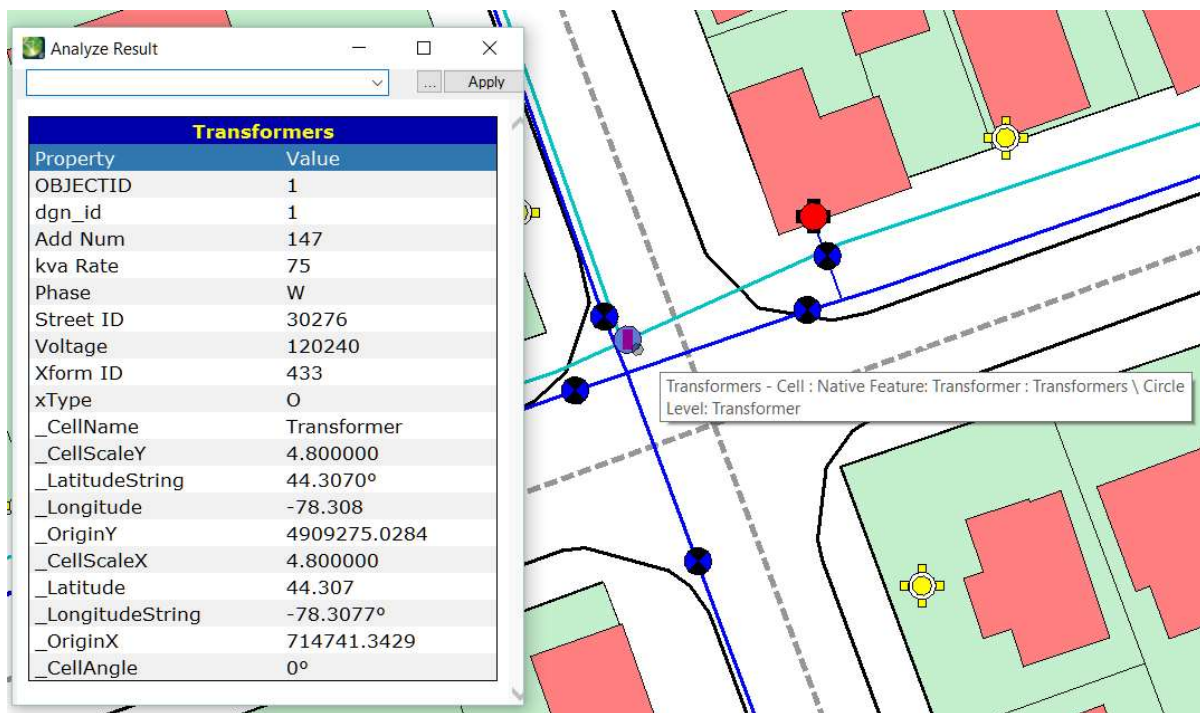
## Usage

Xprops seamlessly extends business properties for all Bentley Map session data and does this without changing the element or XMF feature. In addition, since the extended properties are only available when xprops is running, nothing is written to the design file.

The following examples illustrates just some of the usage of xprops in a typical Bentley Map project.

## Analyze XFM Feature

Review a features extended properties with the *Analyze XFM Feature* tool. The properties are easily recognizable by their underscore prefix. Note that the content ordering of the Analyze Result dialog is controlled by *default.xslt*.



**Analyze Result**

Property	Value
OBJECTID	1
dgn_id	1
Add Num	147
kva Rate	75
Phase	W
Street ID	30276
Voltage	120240
Xform ID	433
xType	0
_CellName	Transformer
_CellScaleY	4.800000
_LatitudeString	44.3070°
_Longitude	-78.308
_OriginY	4909275.0284
_CellScaleX	4.800000
_Latitude	44.307
_LongitudeString	-78.3077°
_OriginX	714741.3429
_CellAngle	0°

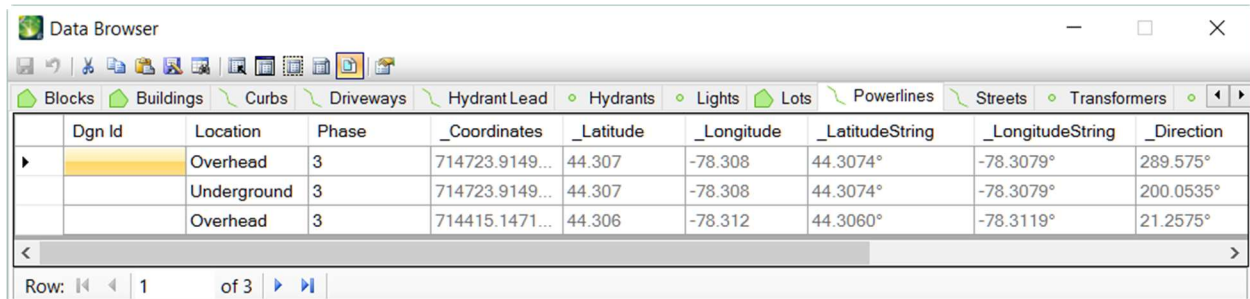
Transformers - Cell : Native Feature: Transformer : Transformers \ Circle  
Level: Transformer



## Extended Element Properties

### Data Browser

When using the Data Browser, the extended properties will appear to the right of the XFM properties and are read only.



The screenshot shows the Data Browser window with a toolbar and a tabbed interface. The 'Powerlines' tab is selected. The table displays the following data:

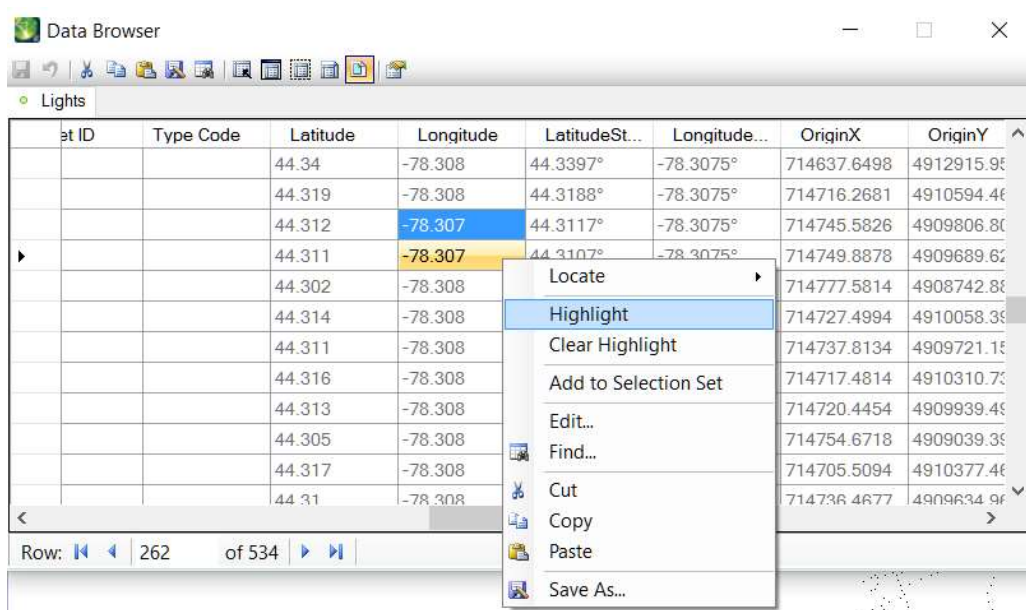
	Dgn Id	Location	Phase	_Coordinates	_Latitude	_Longitude	_LatitudeString	_LongitudeString	_Direction
▶		Overhead	3	714723.9149...	44.307	-78.308	44.3074°	-78.3079°	289.575°
		Underground	3	714723.9149...	44.307	-78.308	44.3074°	-78.3079°	200.0535°
		Overhead	3	714415.1471...	44.306	-78.312	44.3060°	-78.3119°	21.2575°

At the bottom, it shows 'Row: 1 of 3'.

Once loaded, you can use any of the Data Browser tools to refine the display of the rows.

For example:

- Order the content based on the size, name or angle of the cell.
- Sort the data by their latitude/longitude values in order to locate or highlight features based on their geographic location.
- Perform finds on specific values, copy values to insert into other applications for further analysis.
- And even add features to a MicroStation selection set based on their extended properties.



The screenshot shows the Data Browser window with the 'Lights' tab selected. A context menu is open over a row, showing options like 'Locate', 'Highlight', 'Clear Highlight', 'Add to Selection Set', 'Edit...', 'Find...', 'Cut', 'Copy', 'Paste', and 'Save As...'. The table displays the following data:

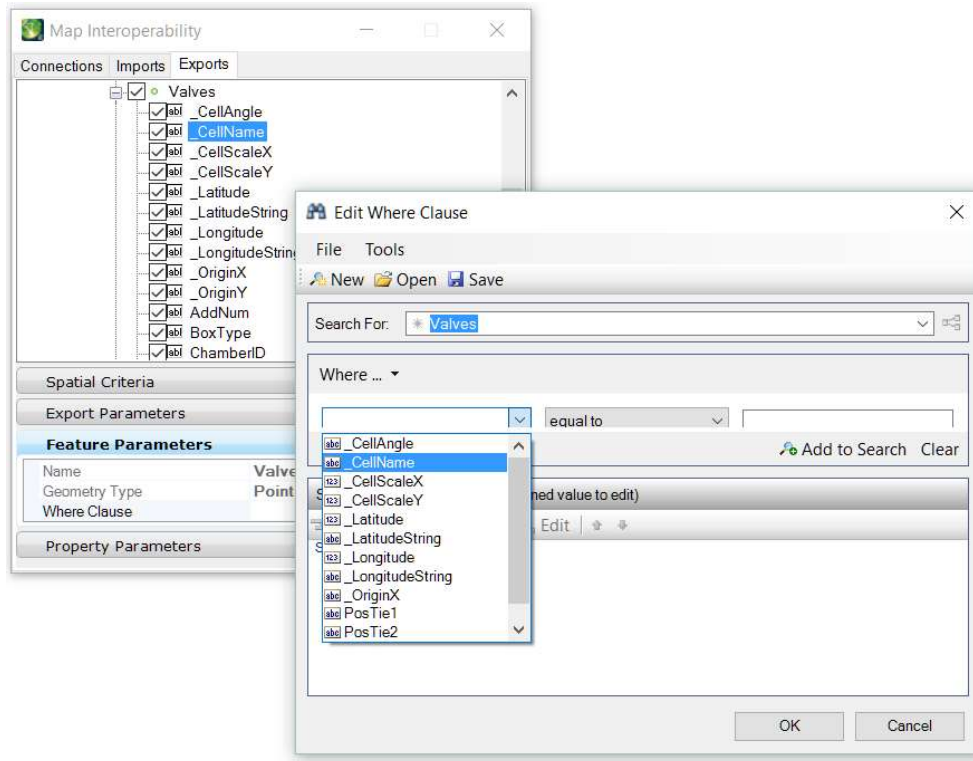
	Set ID	Type Code	Latitude	Longitude	LatitudeSt...	Longitude...	OriginX	OriginY
			44.34	-78.308	44.3397°	-78.3075°	714637.6498	4912915.95
			44.319	-78.308	44.3188°	-78.3075°	714716.2681	4910594.46
			44.312	-78.307	44.3117°	-78.3075°	714745.5826	4909806.80
▶			44.311	-78.307	44.3107°	-78.3075°	714749.8878	4909689.62
			44.302	-78.308			714777.5814	4908742.88
			44.314	-78.308			714727.4994	4910058.38
			44.311	-78.308			714737.8134	4909721.18
			44.316	-78.308			714717.4814	4910310.70
			44.313	-78.308			714720.4454	4909939.49
			44.305	-78.308			714754.6718	4909039.39
			44.317	-78.308			714705.5094	4910377.46
			44.31	-78.308			714736.4677	4909634.96

At the bottom, it shows 'Row: 262 of 534'.

## Extended Element Properties

### Map Interoperability


Create a Where Clause when exporting features to another GIS format such as shapefiles.



### Property Based Annotation (PBA)

Knowing that the extended properties can be used anywhere you would also use XFM properties, incorporate them into your schema for generating Property Based Annotation.

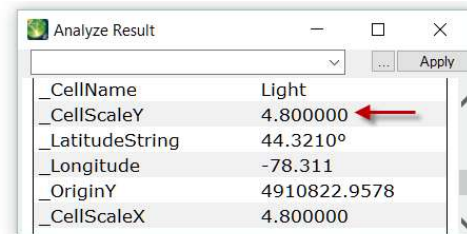
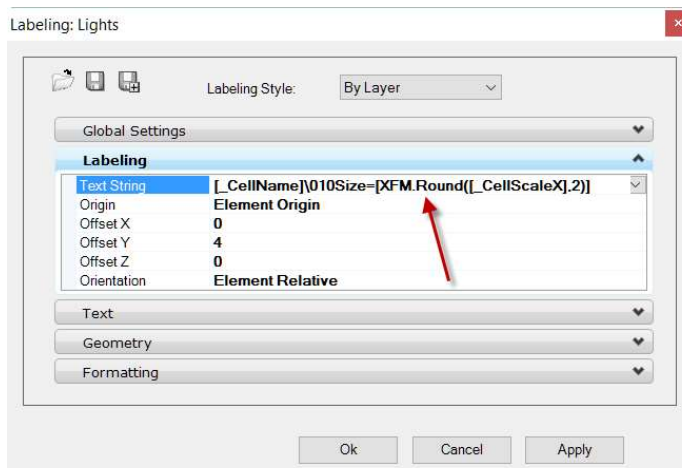
Symbology		
Key	Value	
Scale	0.001	
Apply Drawing Scale	<input checked="" type="checkbox"/>	
Apply Scale On Edit	<input checked="" type="checkbox"/>	
Override Scale		
Color	0	
Level	LightsText	
Style		
Style Scale	1	
Weight	0	
Line Spacing	0.25	
Text Style	Notes	
Class	Primary	
Priority	0	
Transparency	0	
PBA	LAT=[_LatitudeString]010LONG=[_LongitudeString]	

 LAT=44.3199°  
LONG=-78.3045°

## Extended Element Properties

### Labeling

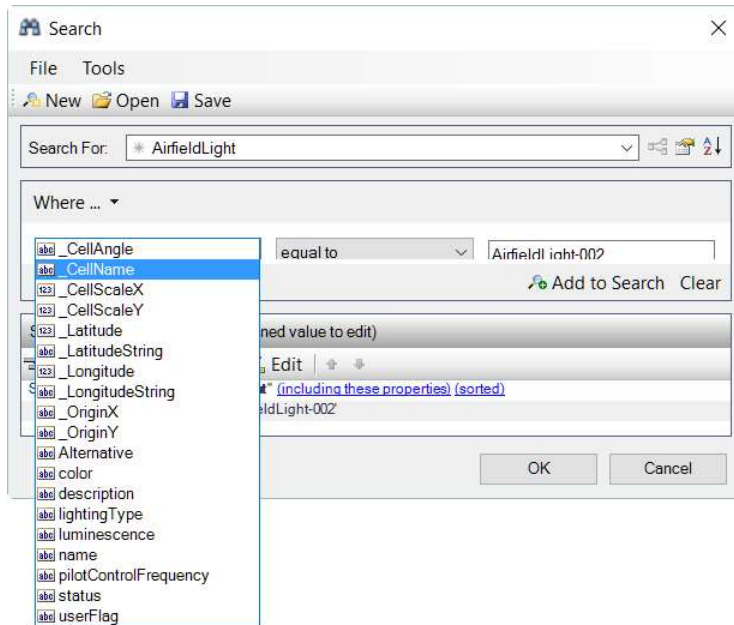
The extended properties are available in the Map Manager Labeling dialog as well. In this example, the name of the cell and size is being labeled. Note the use of `[XFM.Round([property]).2]` to round up the scale value.



### Searching

Searching on the extended properties is no different than searching on XFM properties. When searching on longitude or geographic values, use `_Latitude` or `_Longitude`. This eliminates the need to enter a degree symbol when searching on `_LatitudeString` and `_LongitudeString`.

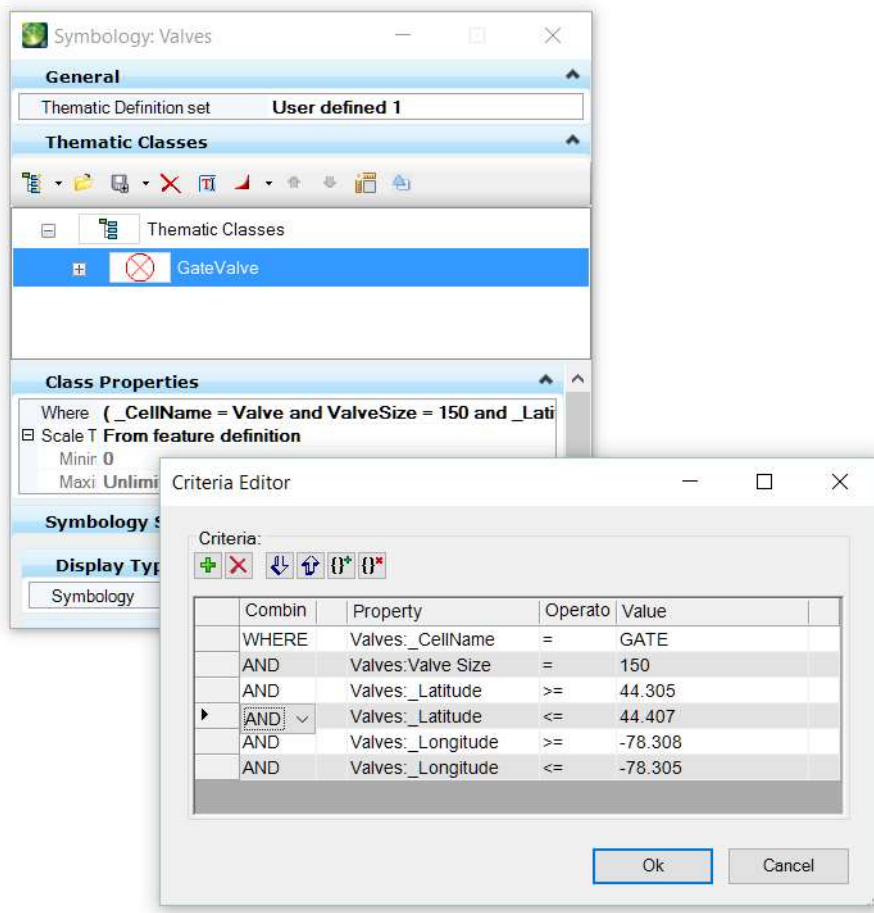
## Extended Element Properties



### Thematic Resymbolization

When it comes to resymbolizing your map based on properties, the xprop application provides a number of advantages. For example, you can now resymbolize point cell features based the cell name as well as the geographic location. The ability to create search criteria with both XFM and extended properties allows an infinite number of Map Manager resymbolizing strategies.

## Extended Element Properties



### Disclaimer

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