



# OpenRoads Designer Extended Attribution

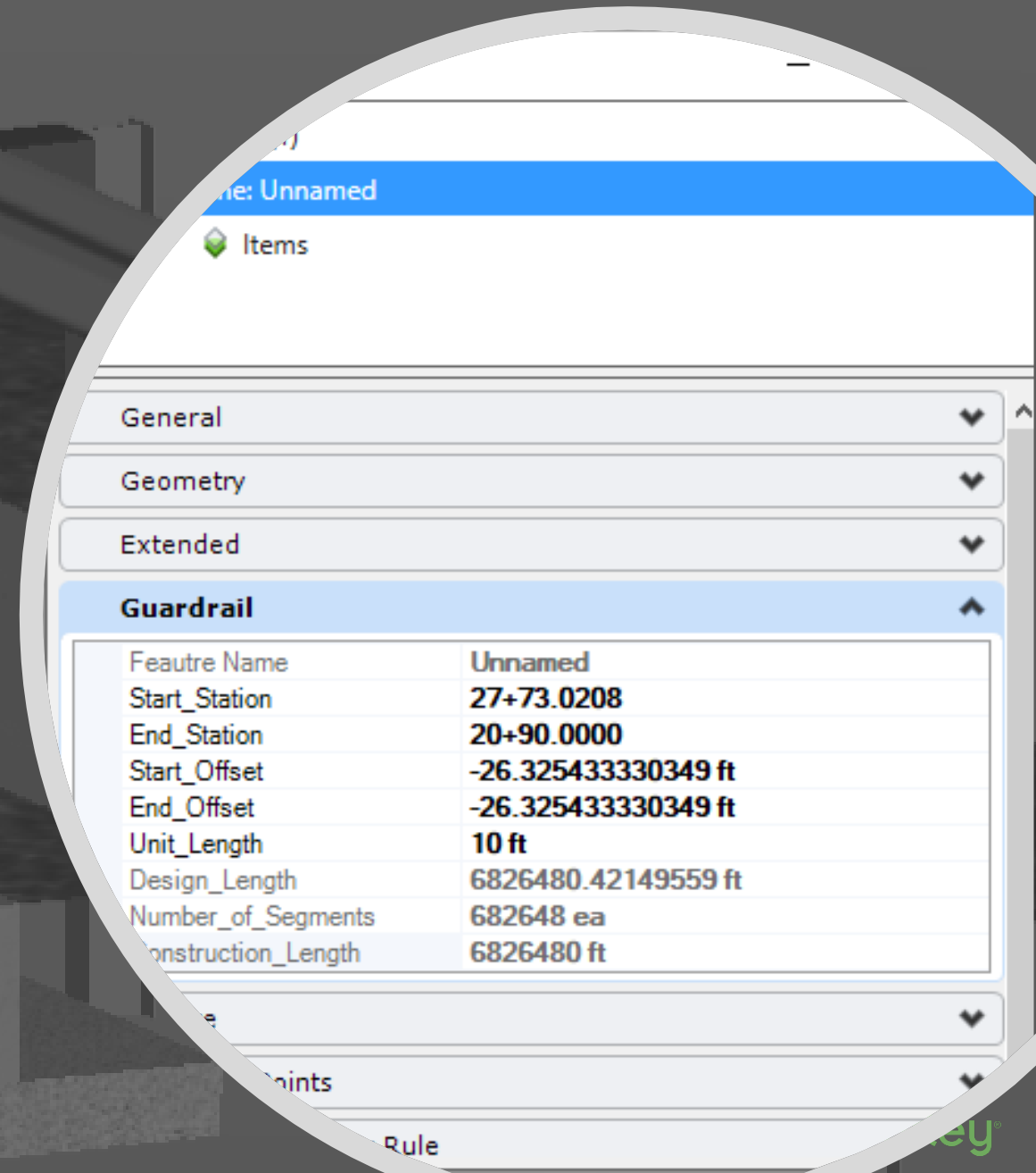
Dan Ahern, PE  
OpenRoads Product Manager



# What are Item Types?

Customizable set of properties used to describe an object or an element.

- Specification number
- Pay item data
- Element's state
  - Existing to remain
  - To be removed





Total Results: 7

Drag a column header and drop it here to group

Element ID	Pay Item Number
2607	570-001-000
2602	570-001-000
2592	570-002-000
2577	570-002-000
2572	570-002-000
2567	570-002-000
2562	570-002-000

# Why use Item Types?

## Attribution of Model Enriching Design Data

## Results/Outputs

- Reports
- Dynamic Annotation
- Display Styles



# Asset Manager

Civil Extension  
to Item Types

*Technology Preview*

Spreadsheet  
Based  
Management

Bulk  
Assignment

Pick Lists

Calculated  
Expressions

Lookup  
Tables

Alignment  
Station and  
Offset

Latitude and  
Longitude  
Coordinates

Grouping

Filtering

Named  
Boundaries

Export to  
SHP Files

Feature  
Definition





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	A	B	C	D	E	F
1						
2	#Filter	Level			Enter the levels to filter on using a ';' delimited list (e.g. "EdgeOfPaveme	
3	#Filter	Color			Enter the colors to filter on using a ';' delimited list. Use word ByLevel if r	
4	#Filter	Line Style			Enter the line styles to filter on using a ';' delimited list. Indicate line styl	
5	#Filter	Line Weight			Enter the line weights to filter on using a ';' delimited list. Use word ByLe	
6	#Filter	Element Type			Enter the element types to filter on using a ';' delimited list (e.g. "Linestr	
7	#Filter	Cell Name			Enter the cell names to filter on using a ';' delimited list (e.g. "PPOLE" or	
8	#Filter	Transparency			Enter the transparencies to filter on using a ';' delimited list. Values can b	
9	#Filter	Material			Enter the mater	
10	#Filter	Feature Definition			Enter the featur	
11						
12						
13		Name	Type	Pick List	Default Value	
14						
15		Note: You can add as many properties as needed as long as they have a unique name in col				
16	#Property	Sign_Type	Text			
17	#Property	Mounting_Type	Text			
18	#Property	Text	Text			
19						
20						

... | \_Filter Groups | \_Pick List Definitions | \_Blank Asset | **Sign Panel Basic** | Sign Det

Properties

Elements (1)

Point: Unnamed10

Extended Element

General

Geometry

Extended

Feature

Geometry Points

Point Constraints

**Sign Panel Basic**

Sign\_Type

Mounting\_Type

Text

Stop

1 Post

TOP



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# Bulk Assignment







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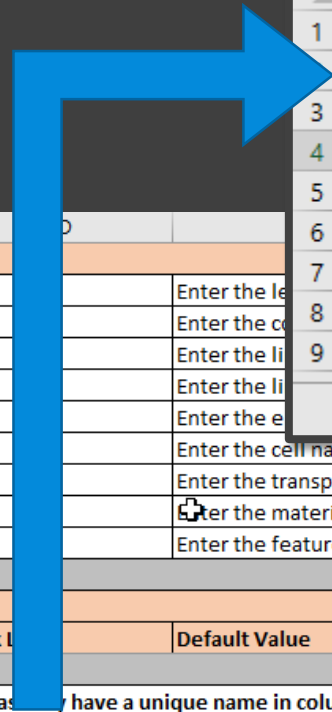
Grouping

Filtering

Named  
Boundaries

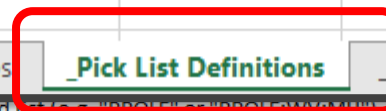
Export to  
SHP Files

Feature  
Definition



	A	B	C	D
1				
2	#Filter	Level		Enter the level to filter on using a ';' delimited list (e.g. "1 Post;2 Post;3 Post")
3	#Filter	Color		Enter the color to filter on using a ';' delimited list (e.g. "White;Black;Grey")
4	#Filter	Line Style		Enter the line style to filter on using a ';' delimited list (e.g. "Solid;Dashed;Dotted")
5	#Filter	Line Weight		Enter the line weight to filter on using a ';' delimited list (e.g. "1;2;3")
6	#Filter	Element Type		Enter the element type to filter on using a ';' delimited list (e.g. "Sign;Mounting;Post")
7	#Filter	Cell Name		Enter the cell names to filter on using a ';' delimited list (e.g. "A1;A2;A3")
8	#Filter	Transparency		Enter the transparencies to filter on using a ';' delimited list. Values can be between 0 and 100. Ranges are specified by a hyphen (e.g. "0-50;51-100")
9	#Filter	Material		Enter the materials to filter on using a ';' delimited list (e.g. "concrete" or "concrete;brick;stone")
10	#Filter	Feature Definition		Enter the feature definitions to filter on using a ';' delimited list (e.g. "EdgeOfPavement" or "EdgeOfPavement;EdgeOfRoad")
11				
12				
13		<b>Name</b>	<b>Type</b>	<b>Pick List</b>
14				
15		<b>Note: You can add as many properties as needed as long as they have a unique name in column B.</b>		
16	#Property	Sign_Type	Text	Sign Type
17	#Property	Mounting_Type	Text	Mounting Type
18	#Property	Text	Text	
19	#Property	Catalog_Number	Text	S-xxx
20	#Property	Background_Color	Text	White
21	#Property	Text_Color	Text	White
22	#Property	Height	Number	12
23	#Property	Width	Number	24
24	#Property	Shape	Text	Sign Shape
25	#Property	Area	Number	
26	#Property	Panel_Unit_Price	Number	
27	#Property	Mounting_Type_Unit_Price	Number	
28	#Property	Panel_Cost	Number	
29				

	A	B	C	D	E	F
1	<b>Pick List Name</b>	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>	<b>Option 4</b>	<b>Option 5</b>
2	Mounting Type	1 Post	2 Post	3 Post	Structure Mounted	
3	Sign Type	Speed-45	Speed-55	Stop	Yield	
4	Sign Shape	Rectangle	Octagon	Diamond	Circle	Inverted Triangle
5						
6						
7						
8						
9						





# Pick Lists





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	A	B	C	D	E	F	G	H
1		Graphical Filters						
2	#Filter	Level			Enter the levels to filter on using a ';' delimited list (e.g. "EdgeOfPavement" or "EdgeOfPavement;Fence;Pipe")			
3	#Filter	Color			Enter the colors to filter on using a ';' delimited list. Use word ByLevel if needed (e.g. "1" or "1;34;ByLevel")			
4	#Filter	Line Style			Enter the line styles to filter on using a ';' delimited list. Indicate line style by number/name. Use ByLevel if needed (e.g. "1" or "1;Dash")			
5	#Filter	Line Weight			Enter the line weights to filter on using a ';' delimited list. Use word ByLevel if needed (e.g. "1" or "1;2;ByLevel")			
6	#Filter	Element Type			Enter the element types to filter on using a ';' delimited list (e.g. "Linestring" or "Line;LineString;Complex Chain")			
7	#Filter	Cell Name			Enter the cell names to filter on using a ';' delimited list (e.g. "PPOLE" or "PPOLE;WV;MH")			
8	#Filter	Transparency			Enter the transparencies to filter on using a ';' delimited list. Values can be between 0 and 100. Ranges are specified by "low-high" (e.g. "0-100")			
9	#Filter	Material			Enter the materials to filter on using a ';' delimited list (e.g. "concrete" or "concrete;brick;stone")			
10	#Filter	Feature Definition			Enter the feature definitions to filter on using a ';' delimited list (e.g. "EdgeOfPavement" or "EdgeOfPavement;EdgeOfAsphalt;EdgeOfConcrete")			
11								
12		Custom Properties						
13		Name	Type	Pick List	Default Value	Calculation Expression	Expression Failure Value	Unit
14		User Defined Attributes						
15		Note: You can add as many properties as needed as long as they have a unique name in column B.						
16	#Property	Sign_Type	Text	Sign Type				
17	#Property	Mounting_Type	Text	Mounting Type				
18	#Property	Text	Text					
19	#Property	Catalog_Number	Text		S-xxx			
20	#Property	Background_Color	Text		White			
21	#Property	Text_Color	Text		White			
22	#Property	Height	Number		12			in [inches]
23	#Property	Width	Number		24			in [inches]
24	#Property	Shape	Text	Sign Shape				
25	#Property	Area	Number			iif(this.Shape = "Rectangle", (this.Height/12) * (this.Width/12), iif(this.Shape = "Circle", (this.Height/12) * (this.Width/12), 0))		ft² [feet squared]
26	#Property	Panel_Unit_Price	Number					\$ [dollar]
27	#Property	Mounting_Type_Unit_Price	Number					\$ [dollar]
28	#Property	Panel_Cost	Number			this.Panel_Unit_Price + this.Mounting_Type_Unit_Price		\$ [dollar]
29								
30								

Filter Groups

Pick List Definitions

Blank Asset

Sign Panel Basic

Sign Detailed

Sign (Stop)

Sign (Stop) Lookup

Sign Location

Sign (Speed)

Sign (Speed) Lookup

Guardrail





# Calculated Expressions





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	A	B	C	D	E
1					
2	#Filter	Level			Enter the levels to filter on using
3	#Filter	Color			Enter the colors to filter on using
4	#Filter	Line Style			Enter the line styles to filter on using
5	#Filter	Line Weight			Enter the line weights to filter on using
6	#Filter	Element Type			Enter the element types to filter on using
7	#Filter	Cell Name			Enter the cell names to filter on using
8	#Filter	Transparency			Enter the transparencies to filter on using
9	#Filter	Material			Enter the materials to filter on using
10	#Filter	Feature Definition			Enter the feature definitions to filter on using
11					
12					
13		<b>Name</b>	<b>Type</b>	<b>Pick List</b>	<b>Default Value</b>
14					
15		Note: You can add as many properties as needed as long as they have a unique name in column B.			
16	#Property	Sign_Type	Text	Sign Type	
17	#Property	Mounting_Type	Text	Mounting Type	
18	#Property	Text	Text		
19	#Property	Catalog_Number	Text		S-xxx
20	#Property	Background_Color	Text		White
21	#Property	Text_Color	Text		White
22	#Property	Height	Number		12
23	#Property	Width	Number		24
24	#Property	Shape	Text	Sign Shape	
25	#Property	Area	Number		
26	#Property	Panel_Unit_Price	Number		
27	#Property	Mounting_Type_Unit_Price	Number		
28	#Property	Panel_Cost	Number		
29					
30					

Properties

Elements (1)

Line

General

Extended

Geometry

Raw Data

Sign (Speed)

Sign\_Type

Mounting\_Type

Text

Catalog\_Number

Background\_Color

Text\_Color

Height

Width

Shape

Area

Panel\_Unit\_Price

Mounting\_Type\_Unit\_Price

Panel\_Cost

1 Post

45

S-106

White

Black

0 in

0 in

Rectangle

0 ft<sup>2</sup>

0 \$

0 \$

0 \$



# Lookup Table Configuration Variable

~~ITEMTYPE\_EXCELLOOKUP~~  
ITEMTYPE\_LOOKUP

	A	B	C	D	E	F	G	H	I	J
1	Sign_Type	Catalog_Number	Width	Height	Text	Text_Color	Background_Color	Shape	Panel_Unit_Price	
2	Speed-45	S-106	24	30	45 MPH	Black	White	Rectangle	200	
3	Stop	S-218	36	36	STOP	White	Red	Octagon	300	
4	Yield	S-225	36	36	YIELD	Black	Yellow	Inverted Triangle	250	
5										
6										
7										

Help Sign\_Type\_Lookup Mounting\_Type\_Lookup +

Each tab is a different lookup table



Graphical Filters

	A	B	C	D	E	F	G	H	I	J	
1											
2	#Fi										
3	#Fi										
4	#Fi	1	Sign_Type	Catalog_Number	Width	Height	Text	Text_Color	Background_Color	Shape	Panel_Unit_Price
5	#Fi	2	Speed-45	S-106	24	30	45 MPH	Black	White	Rectangle	200
6	#Fi	3	Stop	S-218	36	36	STOP	White	Red	Octagon	300
7	#Fi	4	Yield	S-225	36	36	YIELD	Black	Yellow	Inverted Triangle	250
8	#Fi	5									
9	#Fi	6									
10	#Fi	7									

Help Sign\_Type\_Lookup Mounting\_Type\_Lookup

Name	Type	Pick List	Default Value	Calculation Expression	Expression Failure Value
Note: You can add as many properties as needed as long as they have a unique Name in column B.					
Sign_Type	Text	Sign Type	Stop		
Mounting_Type	Text	Mounting Type	1 Post		
Text	Text			Lookup.GetEntry("Sign_Type_Lookup","Sign_Type",this.Sign_Type).Text_Color	
Catalog_Number	Text			Lookup.GetEntry("Sign_Type_Lookup","Sign_Type",this.Sign_Type).Catalog_Number	
Background_Color	Text			Lookup.GetEntry("Sign_Type_Lookup","Sign_Type",this.Sign_Type).Background_Color	

1 2 3 4

Lookup.GetEntry("Sign\_Type\_Lookup","Sign\_Type",this.Sign\_Type).Text\_Color

1. Tab in lookup spreadsheet file
2. Column in lookup spreadsheet to match
3. Row in Asset Manager files to match
4. Column in lookup spreadsheet to return





# Lookup Tables





# Asset Manager

Civil Extension  
to Item Types

*Technology Preview*

Spreadsheet  
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SHP Files

Feature  
Definition



# Alignment, Station, Offset, Elevation Values

- Defined as **Default Values**
- Do not Automatically Update, manual refresh required

	A	B	C	D	E
1					
2	#Filter	Level			Enter the levels to filter on using a ';' delimit
3	#Filter	Color			Enter the colors to filter on using a ';' delimit
4	#Filter	Line Style			Enter the line styles to filter on using a ';' del
5	#Filter	Line Weight			Enter the line weights to filter on using a ';' d
6	#Filter	Element Type			Enter the element types to filter on using a '
7	#Filter	Cell Name			Enter the cell names to filter on using a ';' de
8	#Filter	Transparency			Enter the transparencies to filter on using a '
9	#Filter	Material			Enter the materials to filter on using a ';' deli
10	#Filter	Feature Definition			Enter the feature definitions to filter on usin
11					
12					
13		<b>Name</b>	<b>Type</b>	<b>Pick List</b>	<b>Default Value</b>
17	#Property	Start_Station	Text		\$(START_STATION)
18	#Property	End_Station	Text		\$(ALIGNMENT_NAME)
19	#Property	Start_Offset	Number		\$(END_ELEVATION)
20	#Property	End_Offset	Number		\$(END_LATITUDE)
21	#Property	Unit_Length	Number		\$(END_LONGITUDE)
22	#Property	Design_Length	Number		\$(END_OFFSET)
23	#Property	Number_of_Segments	Number		\$(END_OFFSET_ABS)
24	#Property	Construction_Length	Number		\$(END_OFFSET_SIDE)
25					\$(END_STATION)



# Alignment Station and Offset





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# Latitude and Longitude Values

Defined as  
**Default Values**

Requires  
GeoCoordinate  
system

Do not  
Automatically  
Update, manual  
refresh required

	A	B	C	D	E
1					
2	#Filter	Level			Enter the levels to filter on using a ';' delimit
3	#Filter	Color			Enter the colors to filter on using a ';' delimit
4	#Filter	Line Style			Enter the line styles to filter on using a ';' del
5	#Filter	Line Weight			Enter the line weights to filter on using a ';' d
6	#Filter	Element Type			Enter the element types to filter on using a '
7	#Filter	Cell Name			Enter the cell names to filter on using a ';' de
8	#Filter	Transparency			Enter the transparencies to filter on using a '
9	#Filter	Material			Enter the materials to filter on using a ';' deli
10	#Filter	Feature Definition			Enter the feature definitions to filter on usin
11					
12					
13		<b>Name</b>	<b>Type</b>	<b>Pick List</b>	<b>Default Value</b>
17	#Property	Start_Station	Text		\$(START_STATION)
18	#Property	End_Station	Text		\$(ALIGNMENT_NAME)
19	#Property	Start_Offset	Number		\$(END_ELEVATION)
20	#Property	End_Offset	Number		\$(END_LATITUDE)
21	#Property	Unit_Length	Number		\$(END_LONGITUDE)
22	#Property	Design_Length	Number		\$(END_OFFSET)
23	#Property	Number_of_Segments	Number		\$(END_OFFSET_ABS)
24	#Property	Construction_Length	Number		\$(END_OFFSET_SIDE)
25					\$(END_STATION)



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	A	B	C	D
1	Filter Group Name	Option 1	Asset 2	Asset 3
2	Speed Sign	Sign (Speed) Lookup		
3	Stop Sign	Sign (Stop) Lookup		
4	Guardrail	Guardrail		
5				
6				
7				
8				
9				
10				

Asset Manager

Library Name: Asset Management

☐ <No Filter Group>

☒ Speed Sign

☐ Sign (Speed) Lookup

☐ Sign Location

☒ Stop Sign

☐ Sign (Stop) Lookup

☐ Sign Location

☒ Guardrail

☐ Guardrail

Elements

Element Selection

☒ All Elements

☐ Selection Set

☐ Fence

☐ Named Boundary

☒ Inside ☐ Overlap

Linear Reference

Reference Alignment

Assign Export

Assignment Mode

☒ Add ☐ Replace ☐ Remove



# Grouping





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Filtering

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Definition



	A	B	C	D	E	F
1						
2	#Filter	Level			Enter the levels to filter on using a ';' delimited list (e.g. "Edge	
3	#Filter	Color			Enter the colors to filter on using a ';' delimited list. Use word	
4	#Filter	Line Style			Enter the line styles to filter on using a ';' delimited list. Indic	
5	#Filter	Line Weight			Enter the line weights to filter on using a ';' delimited list. Us	
6	#Filter	Element Type			Enter the element types to filter on using a ';' delimited list (	
7	#Filter	Cell Name	45 MPH Speed		Enter the cell names to filter on using a ';' delimited list (e.g.	
8	#Filter	Transparency			Enter the transparencies to filter on using a ';' delimited list.	
9	#Filter	Material			Enter the materials to filter on using a ';' delimited list (e.g. "	
10	#Filter	Feature Definition			Enter the feature definitions to filter on using a ';' delimited	
11						
12						
13		Name	Type	Pick List	Default Value	Calculation Expression
14						
15		Note: You can add as many properties as needed as long as they have a unique name in column B.				
16	#Property	Sign_Type	Text	Sign Type	Speed	
17	#Property	Mounting_Type	Text	Mounting Type	1 Post	
18	#Property	Text	Text		45	
19	#Property	Catalog_Number	Text		S-106	
20	#Property	Background_Color	Text		White	
21	#Property	Text_Color	Text		Black	
22	#Property	Height	Number			
23	#Property	Width	Number			
24	#Property	Shape	Text	Sign Shape	Rectangle	
25	#Property	Area	Number			iif(this.Shape = "Rectangle", (th
26	#Property	Panel_Unit_Price	Number			
	◀ ▶ ...	_Blank Asset	Sign Panel Basic	Sign (Stop)	Sign (Stop) Lookup	Sign Location
					Sign (Speed)	Sign (Speed) Lookup



# Filtering





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Asset Manager

Library Name: Asset Management

▶ ☐ <No Filter Group>

▶ ☐ Speed Sign

▶ ☐ Stop Sign

▶ ☐ Guardrail

Elements

Element Selection

☐ All Elements

☐ Selection Set

☐ Fence

☒ Named Boundary

☒ Inside ☐ Overlap [Select Named Boundaries \(0\)](#)

Linear Reference

Reference Alignment

Assign Export

Assignment Mode

☒ Add ☐ Replace ☐ Remove

[Apply Assets](#)



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# Exports selected Item Types to individual SHP files

Asset Manager

Library Name: Asset Management

- > ☐ <No Filter Group>
- > ☐ Speed Sign
- > ☐ Stop Sign
- > ☒ Guardrail

Elements

Element Selection

- ☐ All Elements
- ☐ Selection Set
- ☐ Fence
- ☒ Named Boundary
  - ☒ Inside
  - ☐ Overlap

Select Named Boundaries (0)

Linear Reference

Reference Alignment

Assign Export

☐ Export in 3D

Maximum field length: 50

Export to Shapefile



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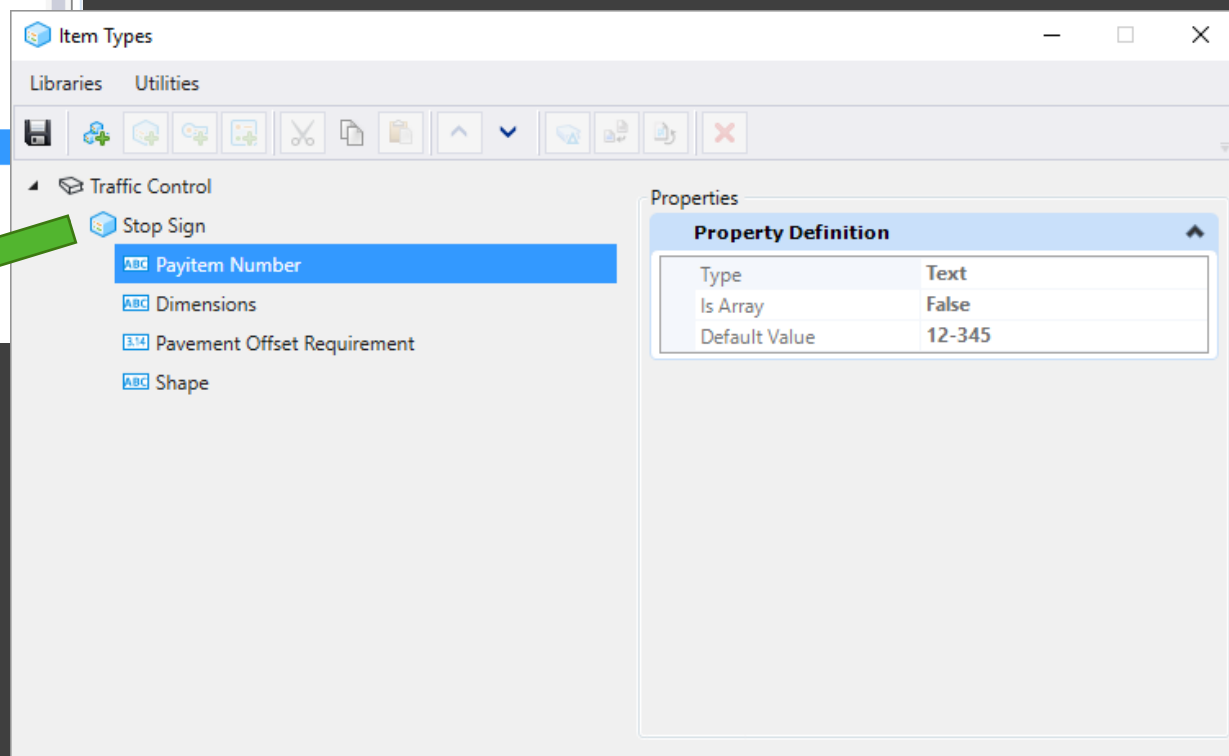
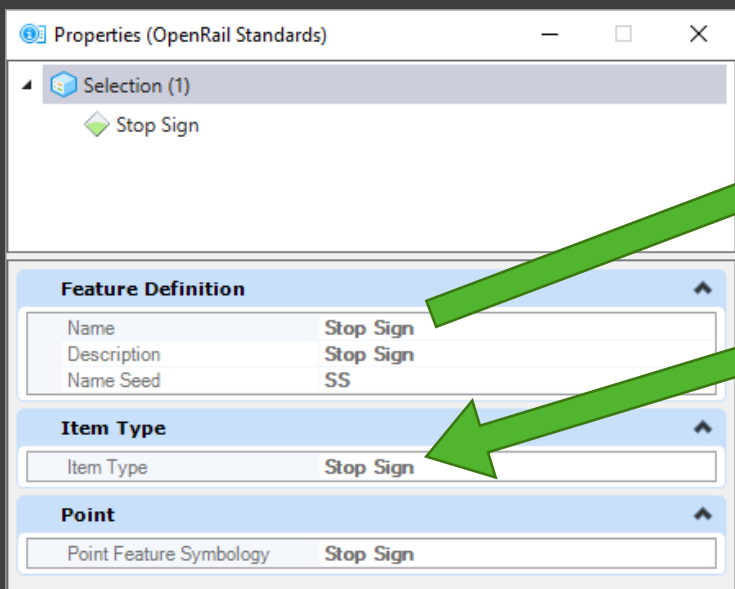
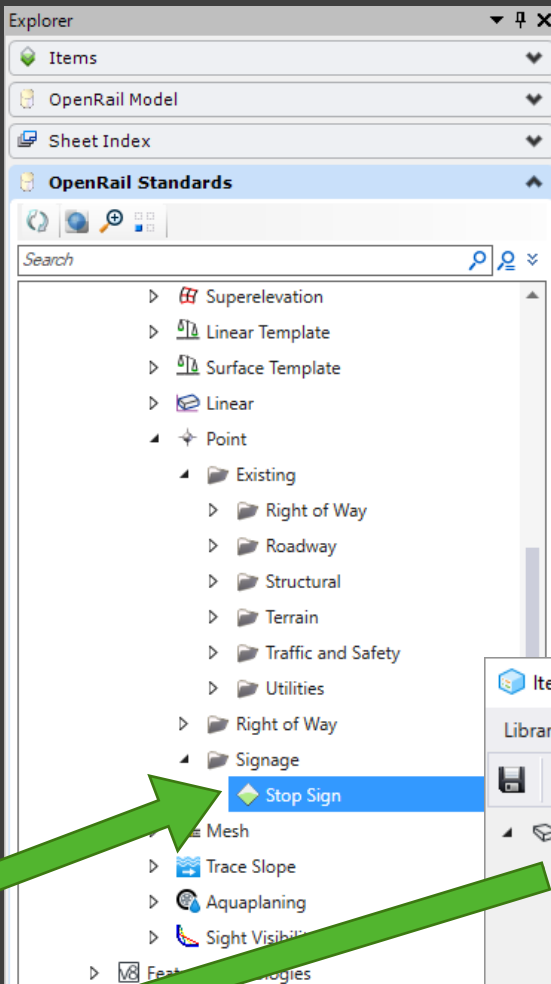
Grouping

Filtering

Named  
Boundaries

Export to  
SHP Files

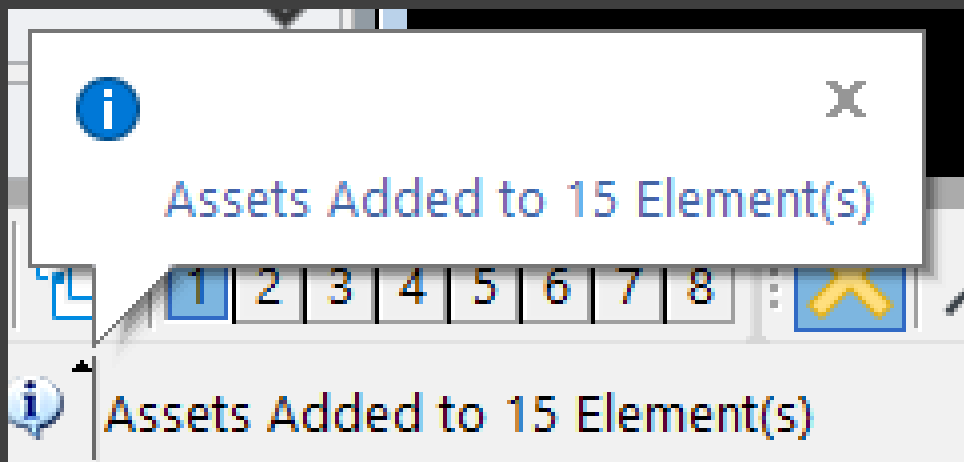
Feature  
Definition





## New in 2019 Release 3

- Many crash and performance cleanups
- Improved messaging when assets are applied



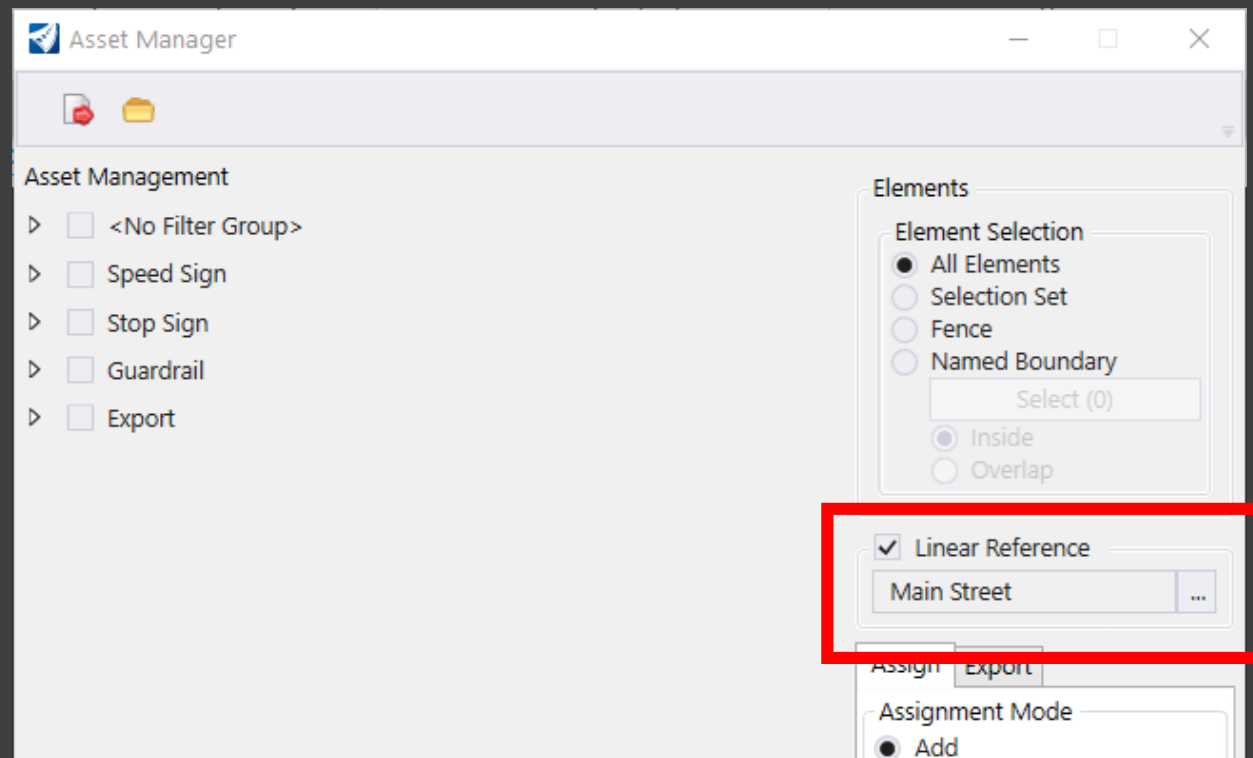


# Control how Assets are Applied to Complex and Child Elements

	A	B	C	D	E
1					
2	#Filter	Level			Enter the levels to filter on us
3	#Filter	Color			Enter the colors to filter on us
4	#Filter	Line Style			Enter the line styles to filter o
5	#Filter	Line Weight			Enter the line weights to filter
6	#Filter	Element Type			Enter the element types to filt
7	#Filter	Cell Name			Enter the cell names to filter o
8	#Filter	Transparency			Enter the transparencies to fil
9	#Filter	Material			Enter the materials to filter on
10	#Filter	Feature Definition			Enter the feature definitions t
11					
12	#Option	Custom Properties			
13			Complex Element Only		
14			Complex Element and Child Elements		
15			Child Elements Only		
16					
17					
18					
19					



## Enhanced Interface for Linear Reference



- Improved how station offsets are calculated for additional element types
- Fixed station offset to be correct if element is beyond end of linear reference geometry





## EC Expression

A text string that defines the syntax to be evaluated by the expression evaluator.

*Once you attach an item type with an expression defined, the corresponding value of the expression will display in the element's Properties dialog.*



# Expression Editor

Item Types

Libraries Utilities

Expression Examples

- Display String
  - Total Length
  - Total Length All
  - Total Length All Rounded
  - Element ID
  - Feature Name
  - Feature Definition
  - Level
  - Color
  - Master Unit
  - Sub Unit
- Item Details
  - Location
  - Phase
  - Type
  - Item Description

Properties

Property Definition

Type	Text
Is Array	False
Default Value	
Expression	:h.round(this.GetElement().LinearEle...
Expression Failure Value	
Pick List	(None)

Expression Builder

```
system.Math.round(this.GetElement().LinearElement_Length,2)
```

Test

OK Cancel



# Math Examples

Description	Expression	Result
Addition	$1 + 4$	5
Multiplication	$2.3 * 3$	6.9
Division	$12/5$	2.4
Remainer	$25 \bmod 3$	1
Sin	<code>System.Math.Sin(45*System.Math.PI/180)</code>	0.7071
Round	<code>System.Math.Round(4.53459,2)</code>	4.53
Maximum	<code>System.Math.Max(1.2, 1.1)</code>	1.2
PI	<code>System.Math.PI</code>	3.14159...
Absolute	<code>System.Math.Abs(-45.39)</code>	45.39



# Length Examples

## Expression

~~this.CotElement().CotDisplayString("TotalLength")~~

this.GetElement().LinearElement\_Length

system.Math.round(this.GetElement().LinearElement\_Length,2)



# Display String Examples

Description	Expression
Element ID	<code>this.GetElement().GetDisplayString("ElementID")</code>
Feature Name	<code>this.GetElement().GetDisplayString("FeatureName")</code>
Feature Definition	<code>this.GetElement().GetDisplayString("ObjectSettings")</code>
Level	<code>this.GetElement().GetDisplayString("Level")</code>
Color	<code>this.GetElement().GetDisplayString("Color")</code>
Master Units	<code>this.GetModel().GetDisplayString("MasterUnit")</code>
Sub Units	<code>this.GetModel().GetDisplayString("SubUnit")</code>



# Concatenate String Examples

## Expression

Location = NE Quadrant

Phase = 3

Type = Ramp

this.Location & this.Phase & this.Type  
= NE Quadrant3Ramp

this.Location & "-" & this.Phase & "-" & this.Type  
= NE Quadrant-3-Ramp



Thank You!

