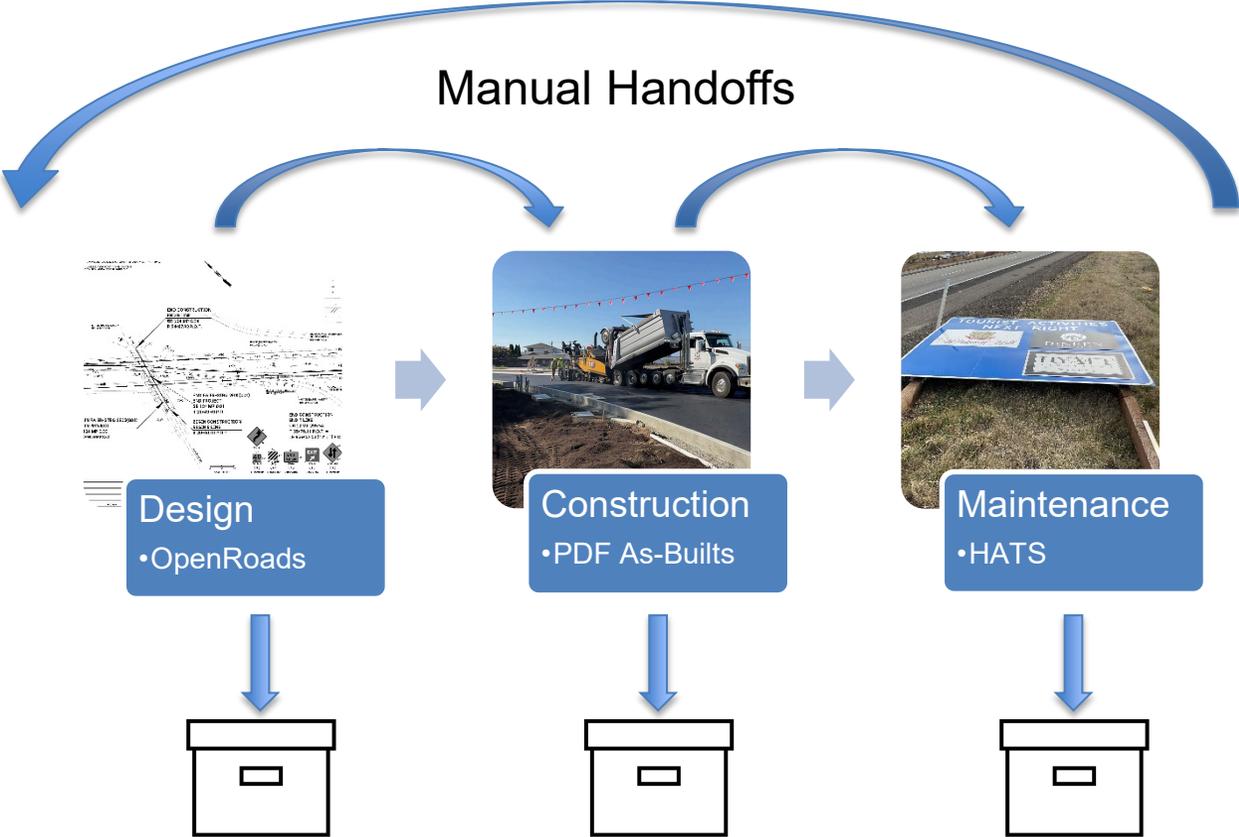


# **Creating a Digital Lifecycle for Traffic Signs**

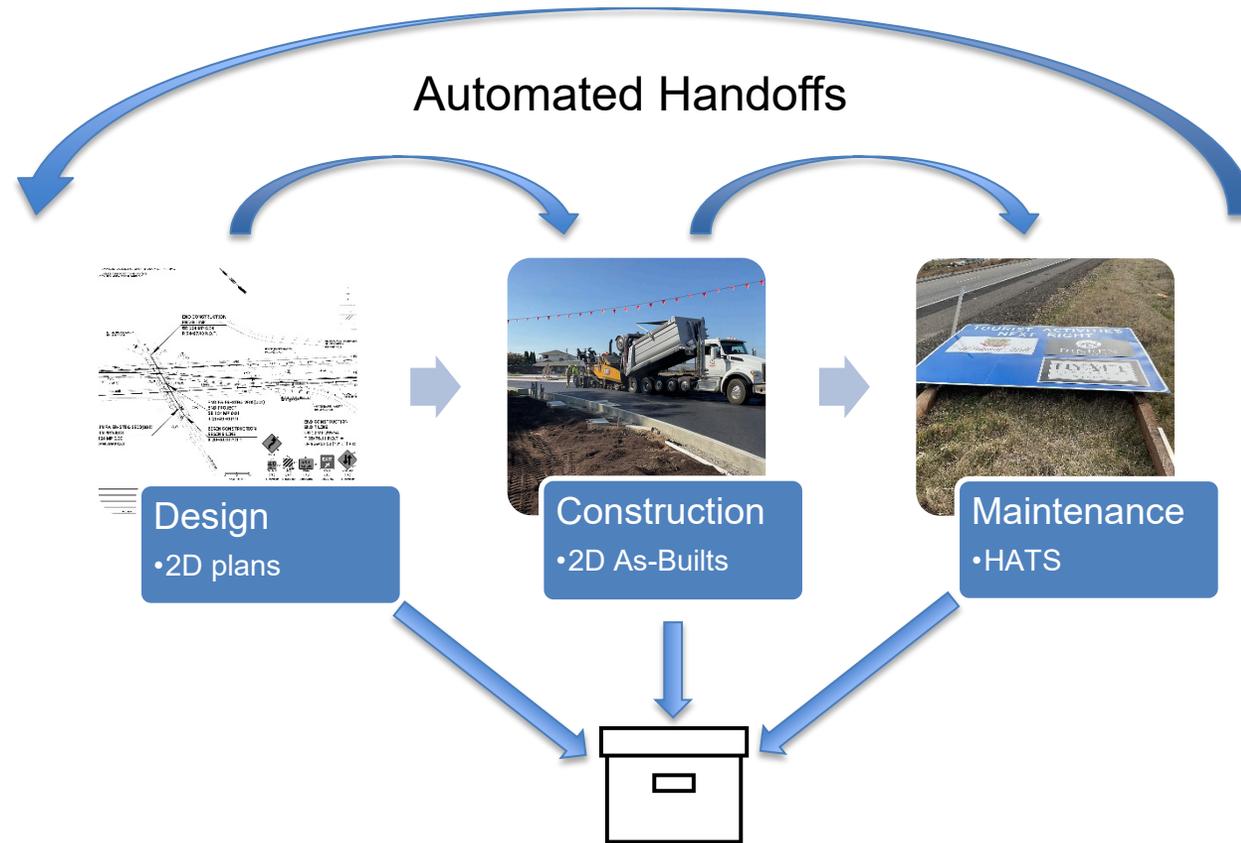
**ADCMS Grant**

Jim Mahugh, Digital Delivery Lead  
January 26, 2026

# Lifecycle of Signs

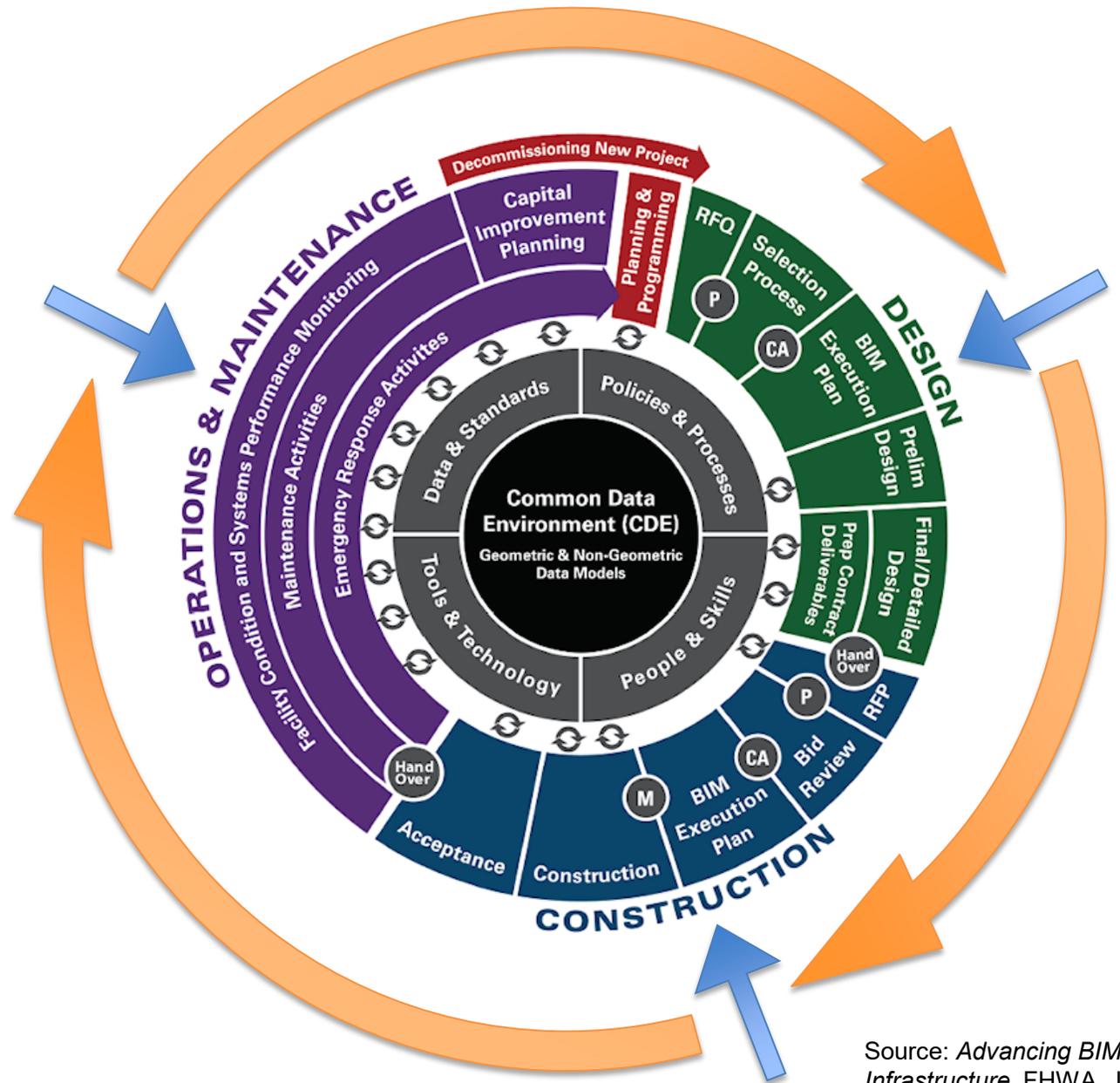


# Lifecycle of Signs



# Lifecycle of Signs

A Connected Environment Through The Entire Agency



Source: *Advancing BIM for Infrastructure*, FHWA, June 2021

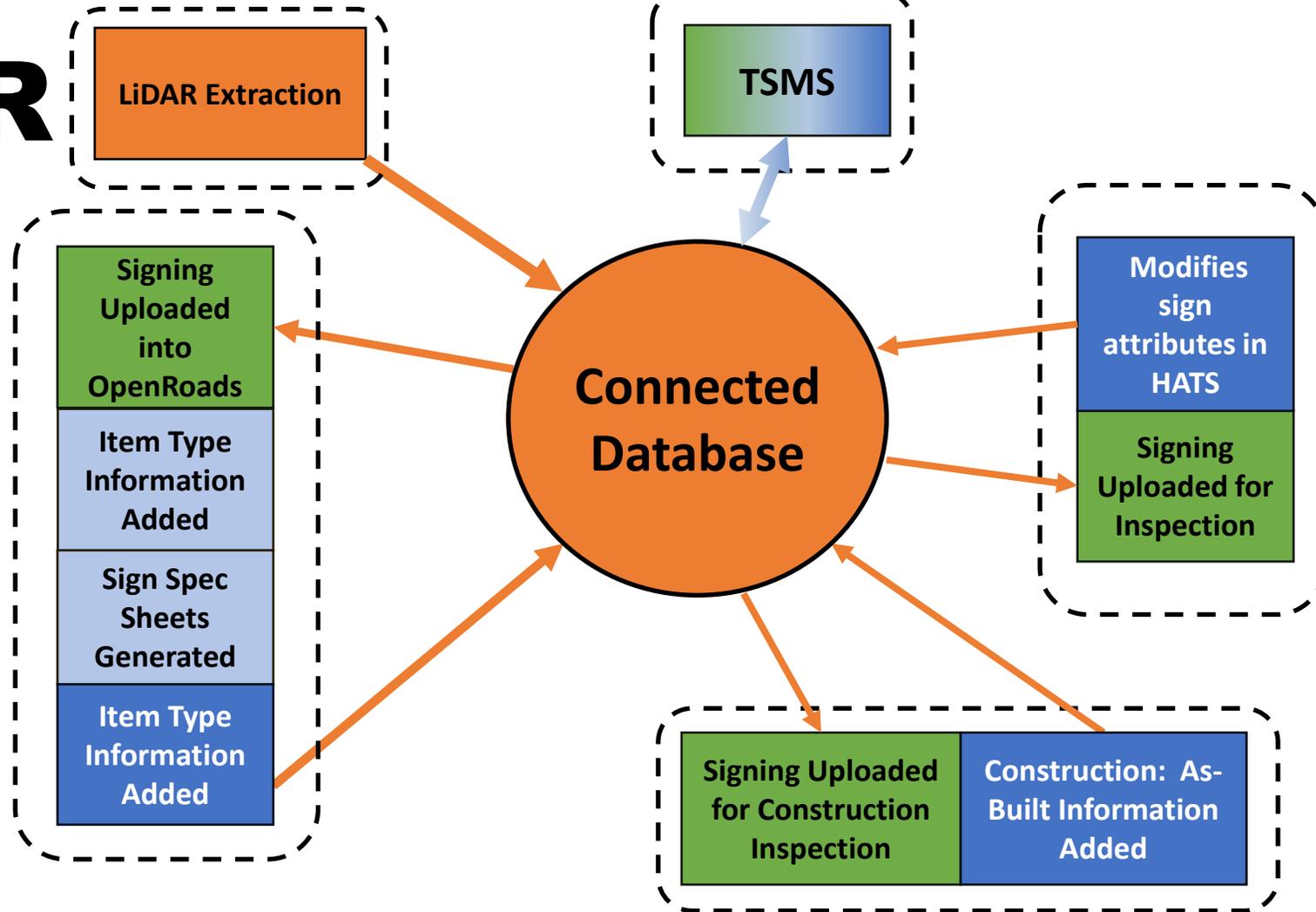
# LiDAR

# Traffic

# Maintenance

# Design

# Construction

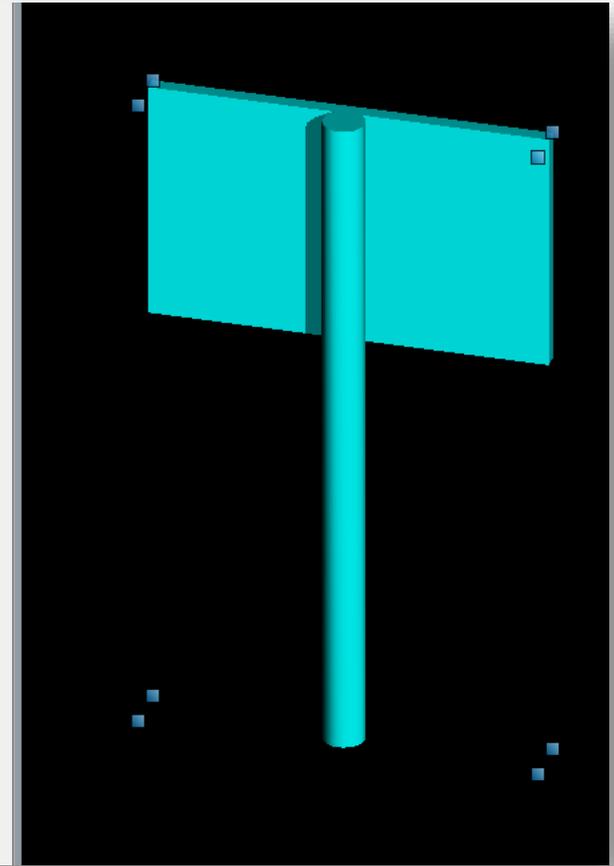


Orange = Items the study will work on  
Blue = Processes that put data in  
Green = Programs that take out data

# IFC: Images vs. Data

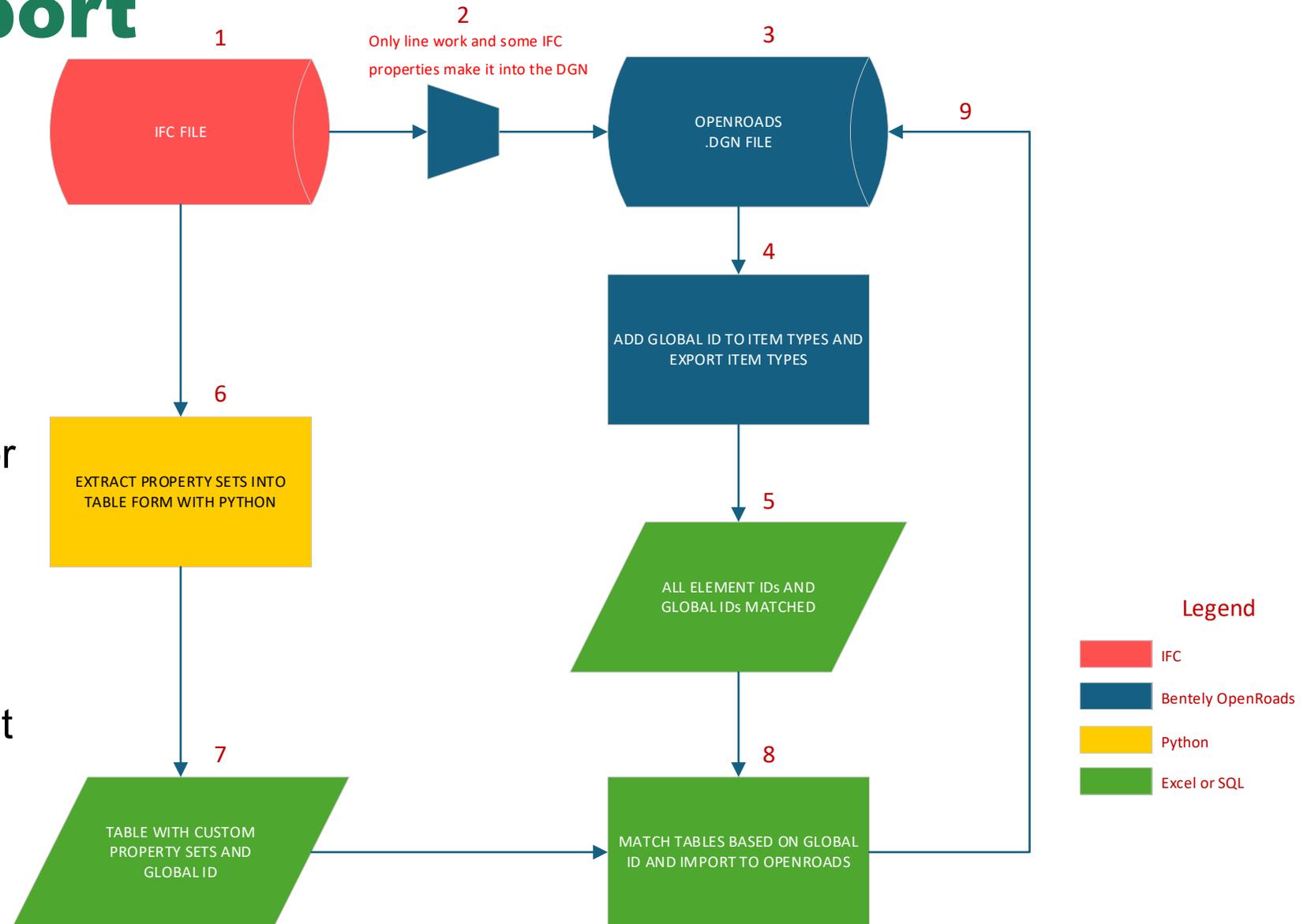
- Picture/Image ... IFC
- Data ... bSDD
- Need 3Di or 2Di models
  - “i” for Intelligent

IFC_sign	
GlobalId	Oycwg7NYNzJumxecMgWRAg
Signs	
Info_Standard_Bid_Items	
Standard_Item_Section	TRAFFIC
Standard_Item_Description	PERMANENT SIGNING
Standard_Item_Number	6890
Unit_of_Measure	L.S.
Info_Sign_Location	
Reference_Alignment_1	
Reference_Alignment_2	
Station_Alg_1	
Offset_Alg_1	
Station_Alg_2	
Offset_Alg_2	
Alignment_Station_Offset	0
Info_Sign	
Sign_Code	R1-3
Sign_Name	Multiway Stop, 4-Way
Height	15
Width	24
Series	Regulatory
Standard	U.S. 2004
IfcBuildingElementProxy	
Description	[[IFC4].[IfcBuildingElementProxy]
GlobalId	Oycwg7NYNzJumxecMgWRAg
Name	Extended Element
ObjectType	<null>
PredefinedType	
Tag	140
Raw Data	
Element ID	1370
> Range Low	1209680.131',889186.636',-8.000'
> Range High	1209680.740',889191.341',0.000'
Size	164
Linkages	2



# IFC: Data Import

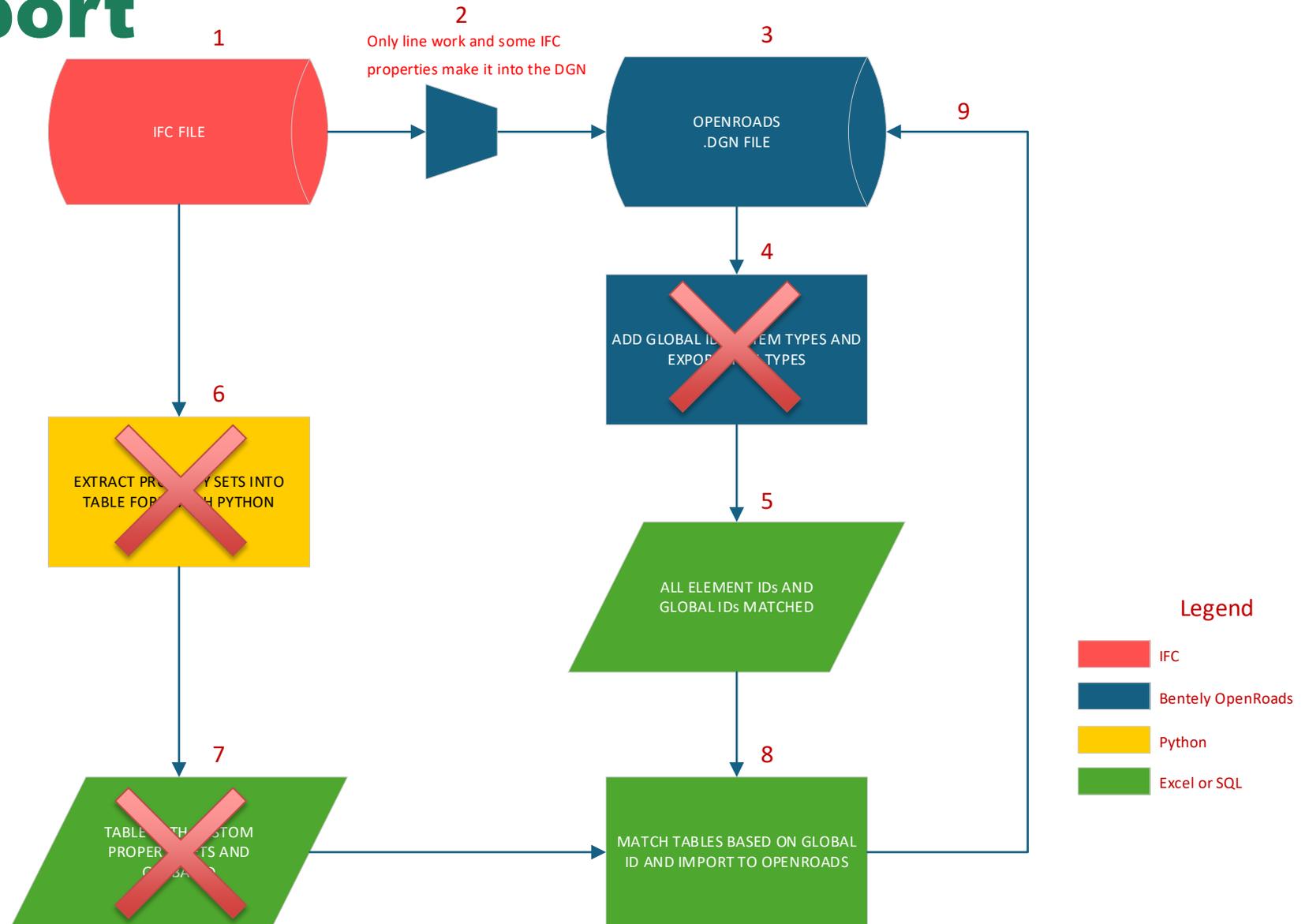
- Intended for portability of 3D information models
- Drafting signs in 3D has limited value
- AutoDesk and Bentley allow for exporting to IFC but have limited support for importing IFC
- IFC does not have adequate definitions for DOT assets
- It is a 9-step process to get the data into OpenRoads



# IFC: Data Import

Don't blame the vendors

- No standard property set
- No standard item types
- To build this today would be a custom interface for every user
- If you can't import, you can't export



# IFC: Data

- bSDD for Asphalt

ETIM International > ETIM > 10.1 > External asphalt lay...

Property

English Download as Change request

Name **External asphalt layer**

Code EF011460 [Copy](#)

Identifier (URI) <https://identifier.buildingsmart.org/uri/etim/etim/10.1/prop/EF011460> [Copy](#)

Definition

Description

Data type Boolean

Show more

Allowed values (0)

Classes (1)

Name	Definition	Set	Identifier (URI)
Cast-iron pipe	A durable pipe made of cast iron used for plumbing and drainage.	Options	<a href="#">Copy</a>

Items per page: 10 1 - 1 of 1

Search asphalt

Search also in descriptions

Results for "asphalt" (6)

Name	Code	Definition	Dictionary	Version	Status	Identifier (URI)
Machin <del>X</del> chisel	EC002833	A robust tool made of hardened steel, used in combination with machines such as demolition hammers o...	ETIM	Latest 10.1	Active	<a href="#">Copy</a>
Vibrat <del>X</del> e plate	EC003131	A machine used to compact soil, gravel, or paving materials.	ETIM	Latest 10.1	Active	<a href="#">Copy</a>
Asphalt <del>X</del>	EF022345		ETIM	Latest 10.1	Active	<a href="#">Copy</a>
External asphalt layer	EF011460		ETIM	Latest 10.1	Active	<a href="#">Copy</a>
Suitab <del>X</del> le for asphalt	EF006352		ETIM	Latest 10.1	Active	<a href="#">Copy</a>
Suitable for under <del>X</del> installation (bitumen, hot asphalt)	EF003684		ETIM	Latest 10.1	Active	<a href="#">Copy</a>

Items per page: 10 1 - 6 of 6



# IFC: Data

- bSDD for Traffic Signs

Q traffic sign × Login / Register

Search also in descriptions ⓘ

Results for "traffic sign" (90)

Name	Code	Definition	Dictionary	Version	Status	Identifier (URI)
Traffic Signs	wsdotsigns		Traffic Signs	0.5	Preview	
Warning/signing plate	EC001777	A visual indicator used to mark hazards or provide safety instructions.	ETIM	Latest 10.1	Active	
Pictogram sanitary room	EC011706	A visual sign used to indicate sanitary facilities.	ETIM	Latest 10.1	Active	
Traffic management/road signage	EC003588	A device and/or sign used to regulate and direct vehicle and pedestrian traffic.	ETIM	Latest 10.1	Active	
Storage and transport frame for traffic management/road signage	EC004157	A frame used for organizing and moving traffic signs and related equipment.	ETIM	Latest 10.1	Active	
Indication- and signalling lamp	EC000399	A lamp designed to provide status indication or signalling in systems.	ETIM	Latest 10.1	Active	

Dictionary Download as English (US) Change request

Name **Traffic Signs**

Dictionary code wsdotsigns

Version 0.5

Identifier (URI) <https://identifier.buildingsmart.org/uri/wsdot/wsdotsigns/0.5> Copy

More info

Organization Washington State DOT

Organization code wsdot Show more

**Classes (1)** Filter classes

Name	Code	Definition	Identifier (URI)
Sign	SIGN	A sign is a notice on display that gives information or instructions in a written, symbolic or other...	

Items per page: 10 1 - 1 of 1

**Materials (0)**

**Properties (42)** Filter properties

Name	Code	Definition	Identifier (URI)
Fabrication Date	FabricationDate	Date the sign is created.	
Facing	Facing	Compass Direction Code for the direction the sign is facing (a vector that is perpendicular to the s...	

# IFC: Data

- bSDD for Traffic Signs

Washington State DOT > Traffic Signs > 0.5 > Fabrication Date

Property English (US) Download as Change request

**Name** Fabrication Date

**Code** FabricationDate [Copy](#)

**Identifier (URI)** .../uri/wsdot/wsdotsigns/0.5/prop/FabricationDate [Copy](#)

**Definition** Date the sign is created.

**Description**

**Data type** Time

Show more

Allowed values (0)

Classes (2) Filter classes

Name	Definition	Set	Identifier (URI)
Sign	A sign is a notice on display that gives information or instructions in a written, symbolic or other...	SignHistory	<a href="#">Copy</a>
Sign History	Contains information about the sign's history including manufacture, design, construction, and maint...	SignManufacturing	<a href="#">Copy</a>

Items per page: 10 1 - 2 of 2

Dictionary Download as English (US) Change request

**Name** Traffic Signs

**Dictionary code** wsdotsigns

**Version** 0.5

**Identifier (URI)** https://identifier.buildingsmart.org/uri/wsdot/wsdotsigns/0.5 [Copy](#)

**More info**

**Organization** Washington State DOT

**Organization code** wsdot

Show more

Classes (1) Filter classes

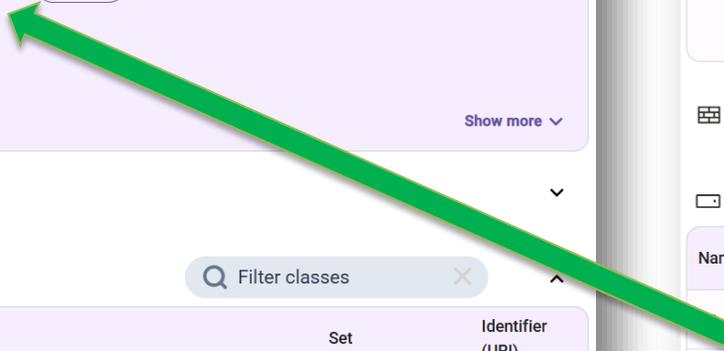
Name	Code	Definition	Identifier (URI)
Sign	SIGN	A sign is a notice on display that gives information or instructions in a written, symbolic or other...	<a href="#">Copy</a>

Items per page: 10 1 - 1 of 1

Materials (0)

Properties (42) Filter properties

Name	Code	Definition	Identifier (URI)
Fabrication Date	FabricationDate	Date the sign is created.	<a href="#">Copy</a>
Facing	Facing	Compass Direction Code for the direction the sign is facing (a vector that is perpendicular to the s...	<a href="#">Copy</a>



# IFC: Data

- bSDD for Traffic Signs
  - Exact Code

Name	Code	Definition
 Fabrication Date	<b>FabricationDate</b>	Date the sign is created.

Dictionary

Download as English (US) Change request

Name **Traffic Signs**

Dictionary code wsdotsigns

Version 0.5

Identifier (URI) <https://identifier.buildingsmart.org/uri/wsdot/wsdotsigns/0.5> Copy

More info

Organization Washington State DOT

Organization code wsdot

Show more

1) Filter classes

Definition Identifier (URI)

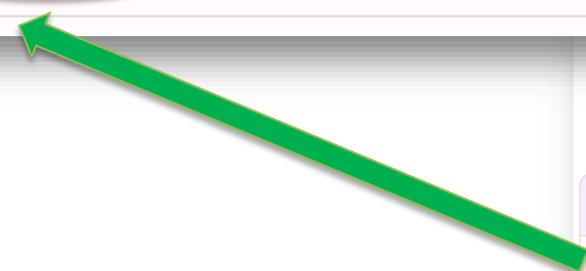
A sign is a notice on display that gives information or instructions in a written, symbolic or other...

Items per page: 10 1 - 1 of 1

Materials (0)

Properties (42) Filter properties

Name	Code	Definition	Identifier (URI)
 Fabrication Date	FabricationDate	Date the sign is created.	
 Facing	Facing	Compass Direction Code for the direction the sign is facing (a vector that is perpendicular to the s...	



# WSDOT Traffic Signs Data Dictionary

- WSDOT Traffic Signs Data Dictionary is Available on bSDD Website
- Utilized the Excel Spreadsheet Template to Import Into bSDD
- Latest Version is 0.5
- 42 Properties
- 7 Groups of Properties



<https://search.bsdd.buildingsmart.org/uri/wsdot/wsdotsigns/>

# Data Dictionary: Lessons Learned

- bSDD tools are robust and worked
- No Training, had to learn the hard way
  - 40-60 hours to create our first
  - Subsequent ones would take much less
- Getting people to agree on attributes takes months
- Searching for existing properties is a pain
- Definitions and descriptions are frequently not filled out



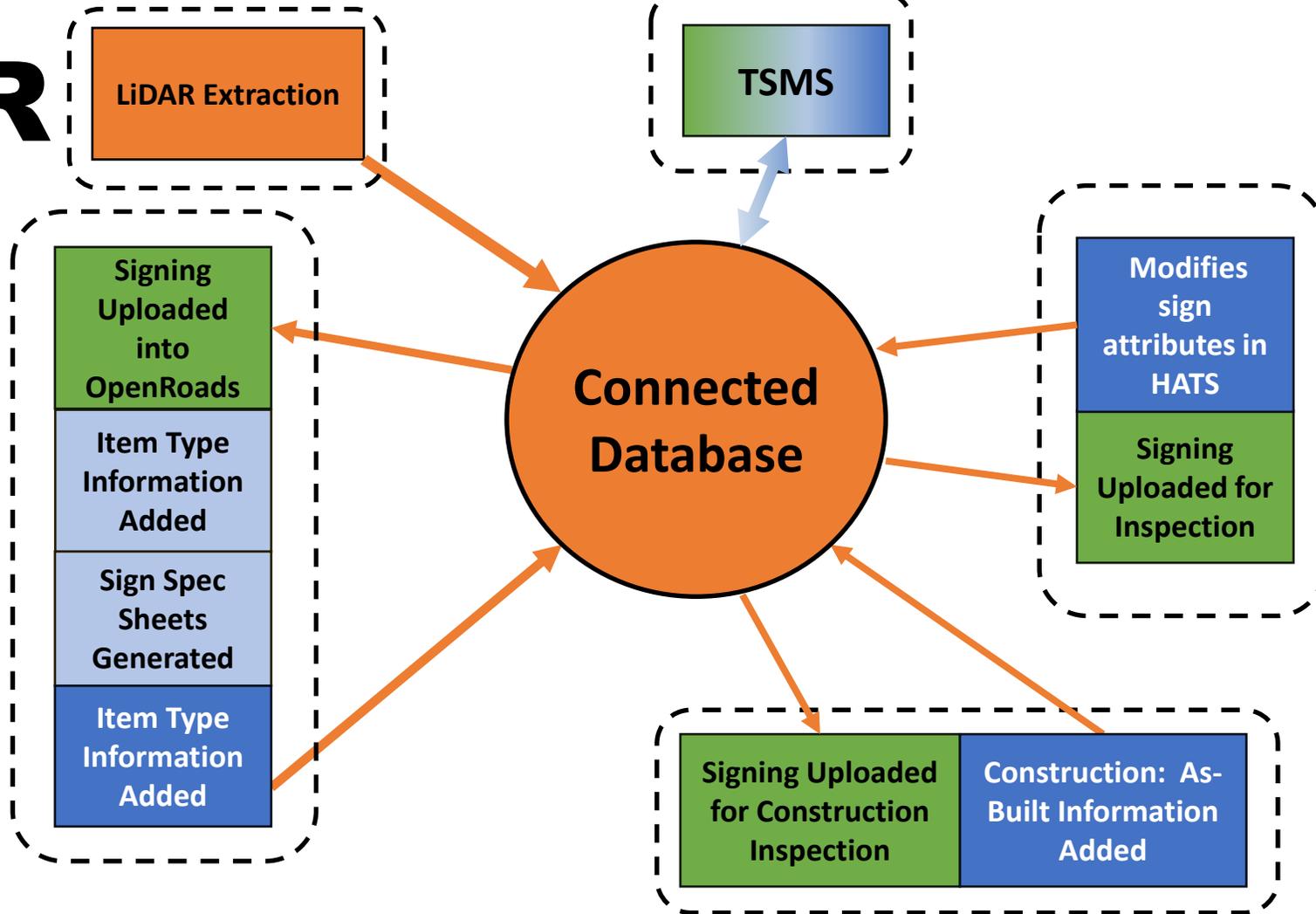
<https://search.bsdd.buildingsmart.org/uri/wsdot/wsdotsigns/>

# LiDAR

# Traffic

# Maintenance

# Design

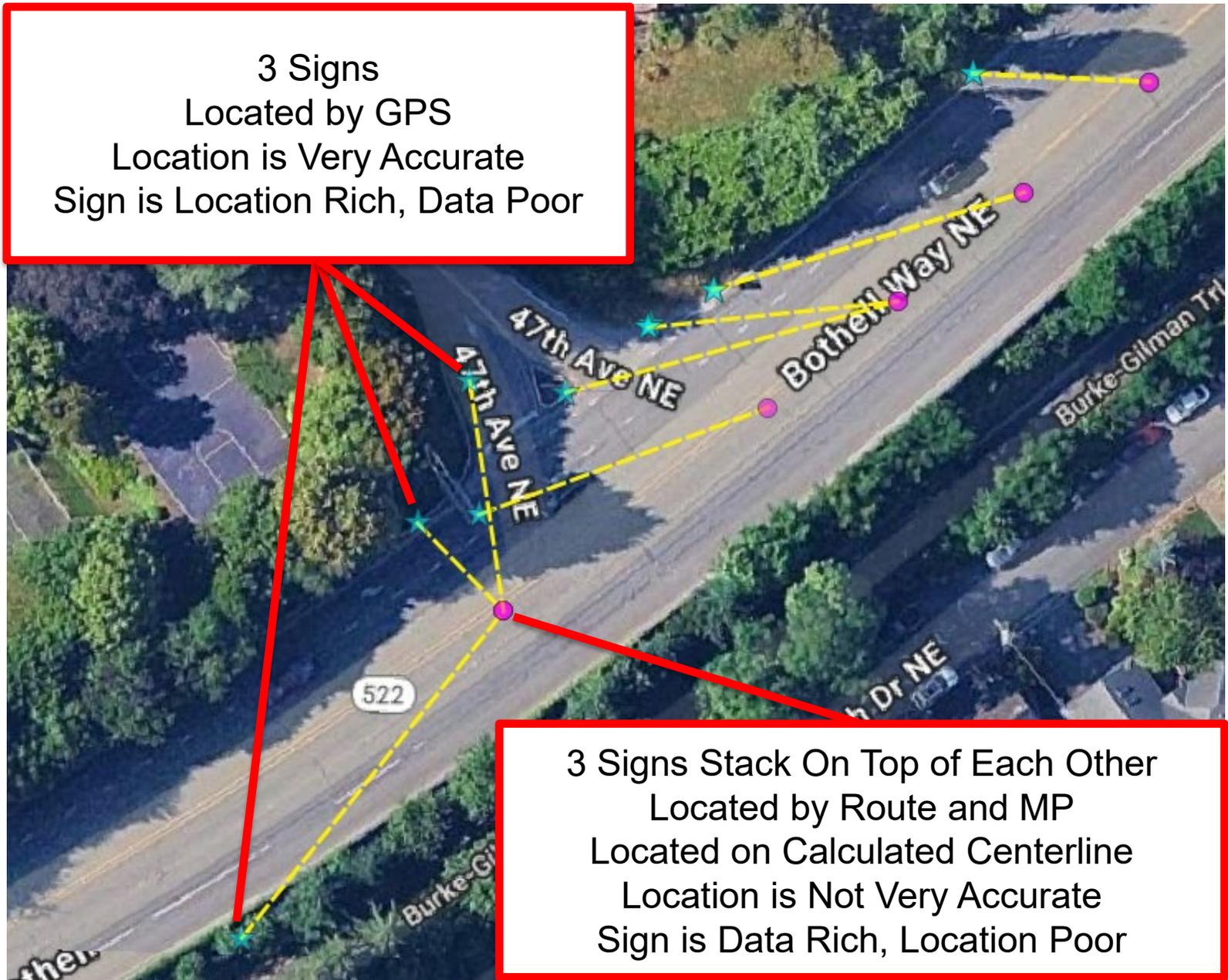


Orange = Items the study will work on  
 Blue = Processes that put data in  
 Green = Programs that take out data

# Construction

# Data Join

- Different Databases hold valuable information
- Combining them via geolocation is the most valuable



# Connect the data silos

## TSMS

GUID	ID	sign_sr	sign_mp	fab_number	sign_traf_dir	sign_ht	sign_width	sign_message
dc40439b-2843-476c-a793-6e817c46e255	195964	522	5.85	D3-401	EB	18	108	STATE ROUTE 104 GEORGE HEAD SHIELD NE BALLINGER WAY
1f6da8a4-eeed-4d57-9afe-02873d05f5df	32515	522	5.95	E1-1	WB	96	180	STATE ROUTE 104 WEST TO INTERSTATE 5 EDMONDS 180 DEG. ARROW / ONLY
a6e261b0-0afc-4b89-9a54-27881d8bd90c	32509	522	6.142	E1-1	WB	96	180	STATE ROUTE 104 WEST TO INTERSTATE 5 MOUNTLAKE TERRANCE EDMONDS RIGHT 1/4 MILE
474bbaf8-82f7-4ca6-8e1e-fc66fac453eb	33665	104	28.234	M8-401	WB	60	60	TO STATE ROUTE 99 <\ / WEST STATE ROUTE 104 />
340998ce-5944-4164-8bda-7eb96ec5be2a	204361	104	28.83	D3-401	EB	24	102	SR 104 NE 205TH ST LK BALLINGER WY
3ee56507-b408-4a14-ac7e-200d92745fe0	204362	104	28.83	D3-401	WB	24	102	SR 104 NE 205TH ST LK BALLINGER WY

## Connected Database

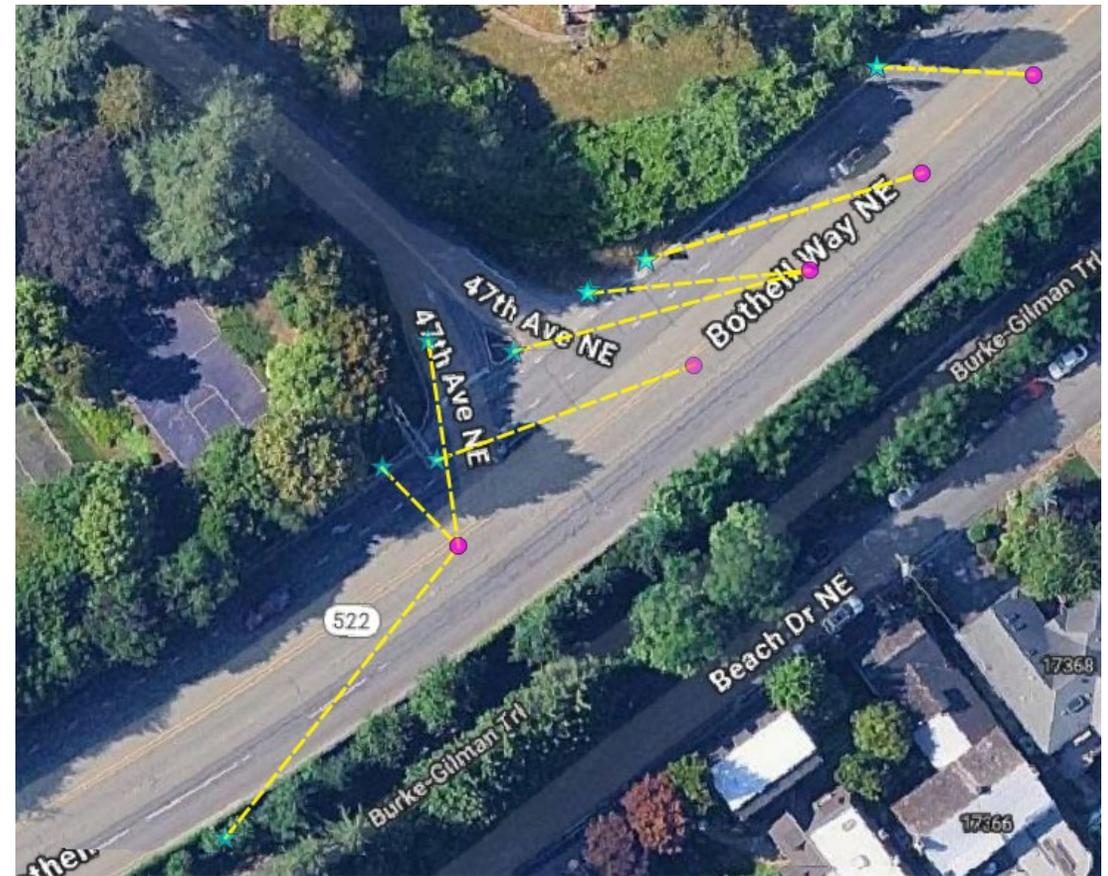
Parent GUID	Child GUID	Source	Location Lat	Location Long
38a108bb-03ee-4d02-86fd-2251e386ce3d	1f6da8a4-eeed-4d57-9afe-02873d05f5df	TSMS	47.75448406	-122.2745168
38a108bb-03ee-4d02-86fd-2251e386ce3d	8bf56c06-3fb2-4fc6-8f36-90d487cf7cfe	LiDAR	47.75448406	-122.2745168
38a108bb-03ee-4d02-86fd-2251e386ce3d	52f64b0c-180d-4fc0-a58c-6322a92f3941	Design	47.75448406	-122.2745168
38a108bb-03ee-4d02-86fd-2251e386ce3d	ed797a39-27d9-4c1b-afc5-098fb195e91b	Construction	47.75448406	-122.2745168
38a108bb-03ee-4d02-86fd-2251e386ce3d	8b51e27e-2e8a-4c6a-b52f-19f01f7586ff	Maintenance	47.75448406	-122.2745168

## LiDAR

GUID	OBJECTID	State Plane X	State Plane Y	State Plane Z	MUTCD	Width	Height	Content
fc526952-7ae7-4b09-8327-7e9e67420680	549	1203487.037020487	887585.8774674876	57.00858189026331	D3-1	9.33	1.84	NE BALLINGER WAY
60df532a-8ebf-4618-b060-1f6afabbc231	1131	1189078.733593159	896685.9145114024	346.6278320487322	D3-1	9.33	2.45	104 NE 205TH ST LK BALLINGER WY
82a72df4-0e28-48e4-af64-6aace82649a8	1418	1204634.832076639	888644.2184771934	92.00577800432657	D1-1	14	8.14	104 WEST TO Edmonds RIGHT 1/4 MILE
c0e9b8c9-bd7e-48d8-9f46-6cc8894f34da	1470	1197063.247054259	893713.5352	243.3114562749845	D3-1	9.25	1.77	104 BALLINGER WAY NE
8bf56c06-3fb2-4fc6-8f36-90d487cf7cfe	2012	1203884.429559956	887899.9646945333	71.03726572751815	G20-1a	14.22	8.16	104 WEST TO I-5\nEdmonds\nONLY
9a839e5e-d008-40b3-af64-5c5e8e6c1fa1	2598	1188207.364765034	896890.4980186858	371.8963211806597	D1-1	5.20	5.25	TO 99 WEST 104
ab885ec1-05eb-4a06-9dcd-cce9cd660b51	2735	1187630.790346089	897134.9313158051	396.8449921401324	D1-1	9.22	11.19	TO 104 N 205th St

# Data Join

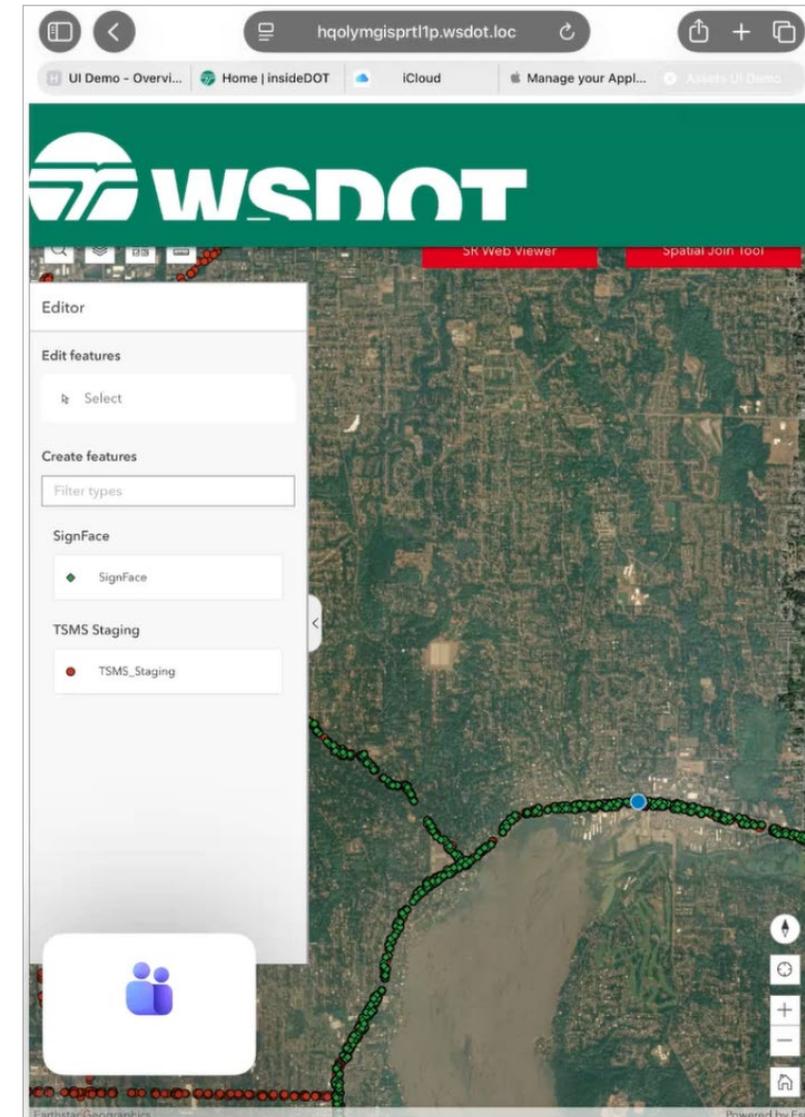
- A successful data join enriches the overall data
- The first match will take a long time
- Subsequent data collection should be quicker with accurate geolocation



# Construction & Maintenance

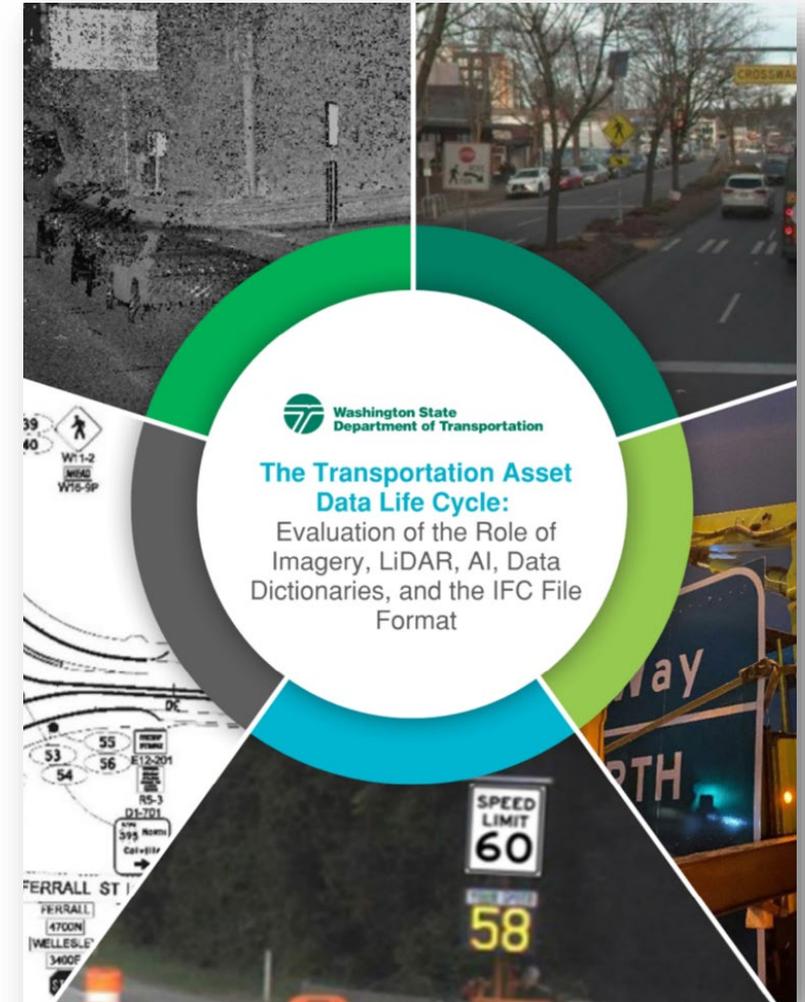
Tools Must:

- Be Easy to Use
- Save Time



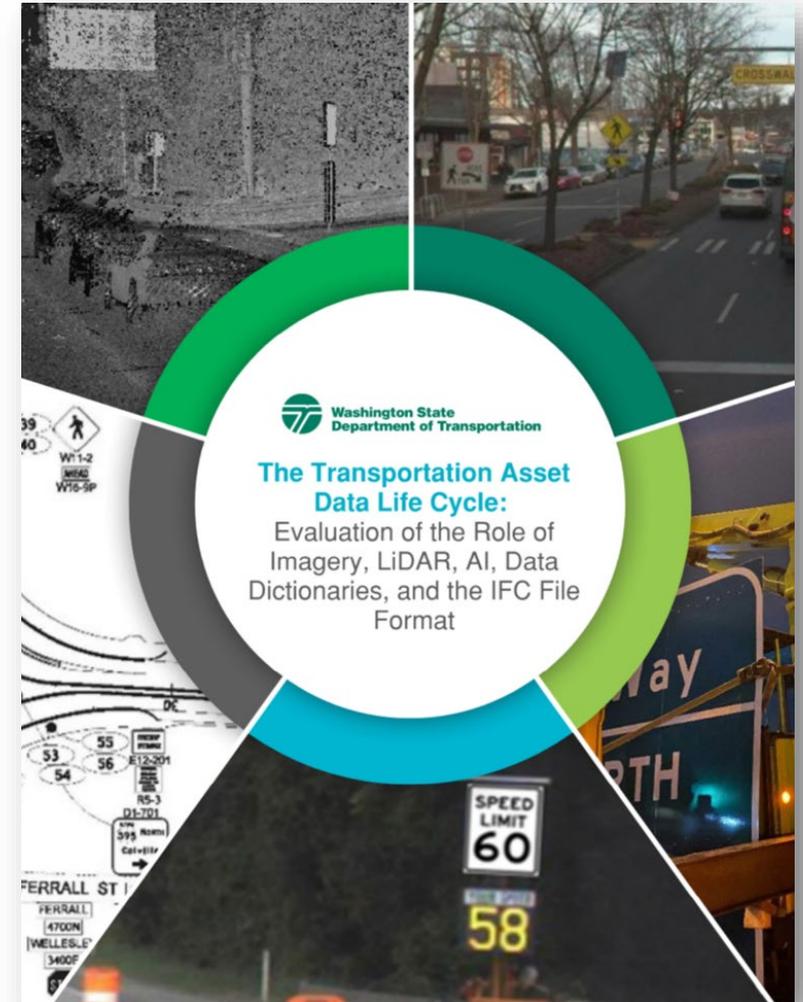
# Traffic Signs Lifecycle Benefits

- Improved Accuracy
  - Precision location
- Operational Efficiency
  - No redundant steps
  - Real-Time data availability
- Lifecycle Continuity
  - Connects all processes within an enterprise asset information model
- Estimated annual savings of \$361,000



# Other Items

- LiDAR extraction of assets
  - Signs
  - Curb Ramps
  - MIRE elements





**Jim Mahugh**

Digital Delivery Lead

Washington State DOT

360-705-7245

[Jim.Mahugh@wsdot.wa.gov](mailto:Jim.Mahugh@wsdot.wa.gov)