Unique Integration Tools Leveraging The Core ArcGIS Platform

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&

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Leveraging core ESRI functions allows:

- Custom workflows utilizing out-of-the-box functionality
- Reducing dependency on third-party applications and add-ins
- Lower asset management costs
- Lower operational overhead
- Reduced non-asset information and attributes

Asset Management Challenges

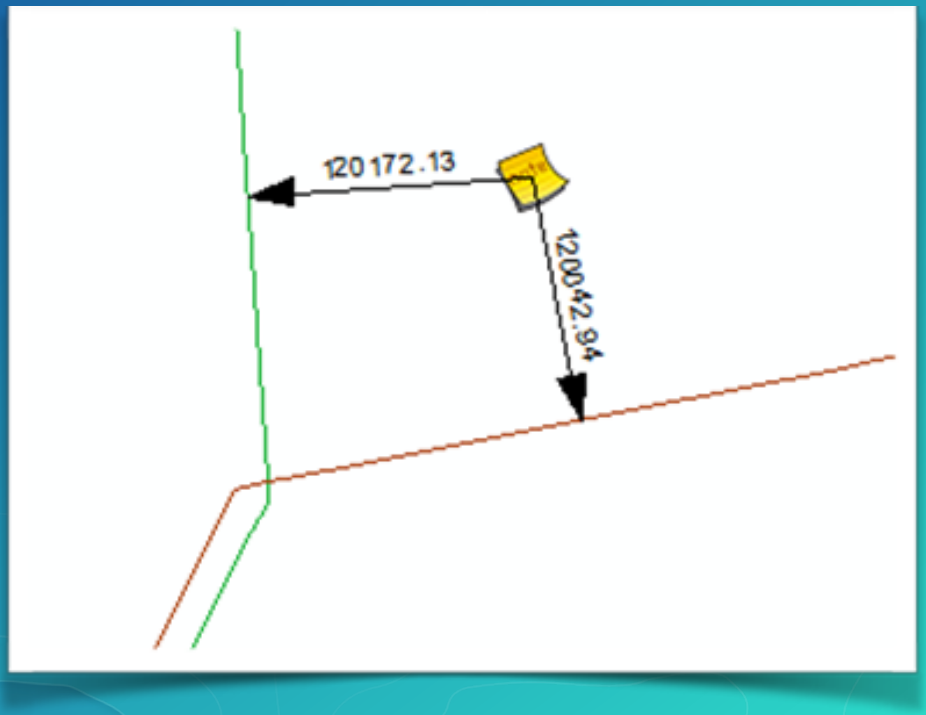
- Data Maintenance – Time & Cost
- Data Quality – Complete & Correct
- Reporting – Efficiency
- Data Redundancy

Asset Management Solution

- Database Level Spatial Data Management:
  - Oracle Spatial (SDO Geometry)
  - SQL Spatial (ST Geometry)
  - Streamline Data Storage Platform (UPDM)
  - Eliminate Data That Can Be Derived
  - Fully Maintained With ESRI Tools (No 3rd Party Needed)

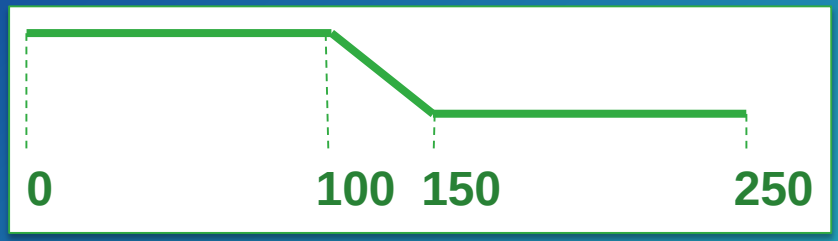
Database Spatial Functions

- Leverage Spatial Data Functions:
  - Intersection Functions
  - Live Buffers
  - On-the-fly Stationing



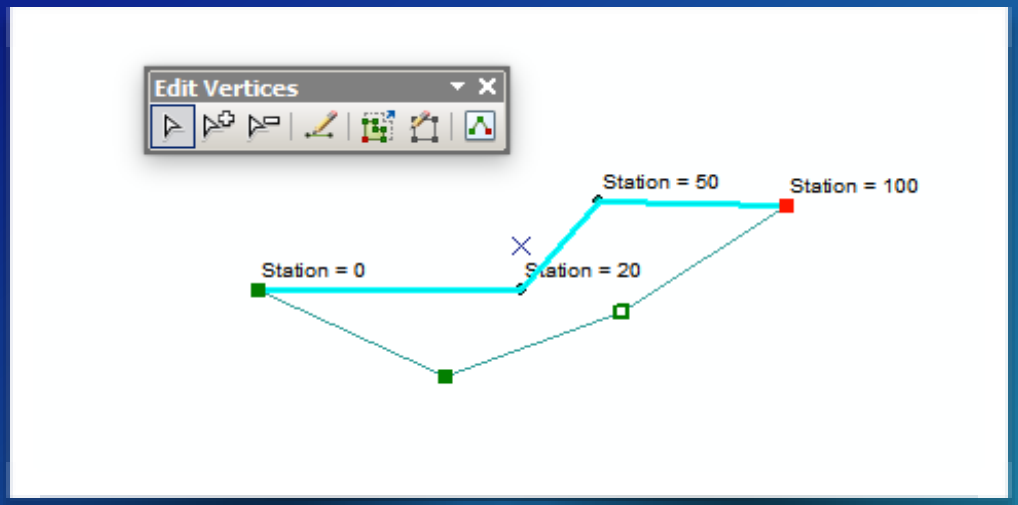
Control Point Example

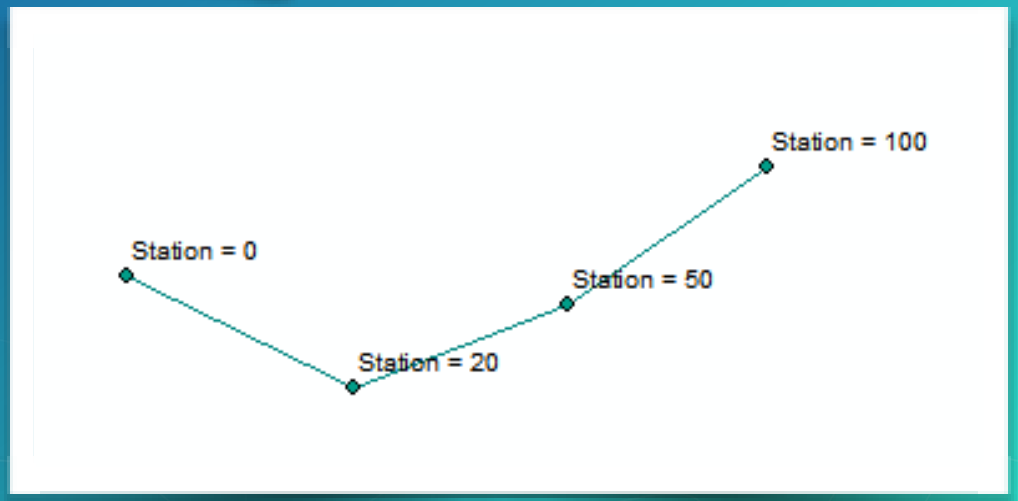
- All measures are maintained in the pipe geometry (m-values)
- Vertices are assigned measures, so that geometry changes don't change measures.



ESRI_OID	shape	STATIONSERIESEVENTID	STATUS	STATION	POINT_ORDER	CP_TYPE	X	Y
57	Point ZM	{20DD4729-F447-4648-802D-FC45A513C81C}	10	0	1	BEG_CP	-79.831252	39.82570
58	Point ZM	{20DD4729-F447-4648-802D-FC45A513C81C}	10	100	2	BETWEEN	-79.83123	39.82580
59	Point ZM	{20DD4729-F447-4648-802D-FC45A513C81C}	10	150	3	BETWEEN	-79.831131	39.8257
60	Point ZM	{20DD4729-F447-4648-802D-FC45A513C81C}	10	250	4	BETWEEN	-79.831016	39.82577
61	Point ZM	{20DD4729-F447-4648-802D-FC45A513C81C}	10	360	5	BETWEEN	-79.830789	39.82569

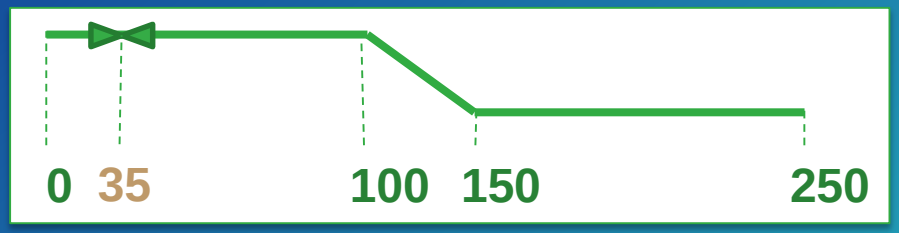
Control Point Example





Valve Example

- Stationing for online features
- Route IDs are derived from linear features (pipes)

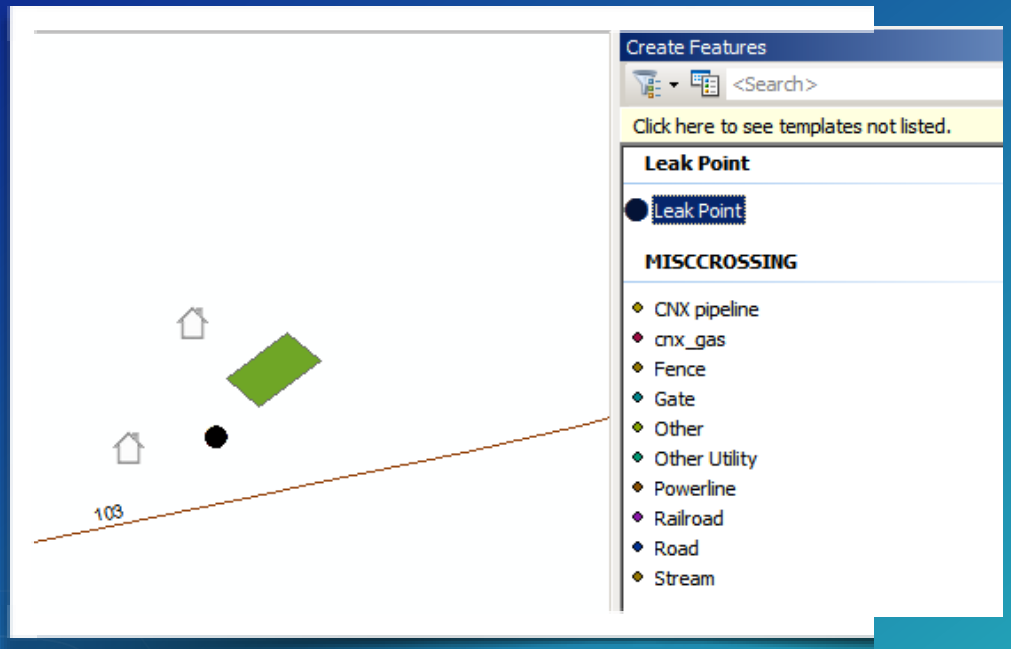


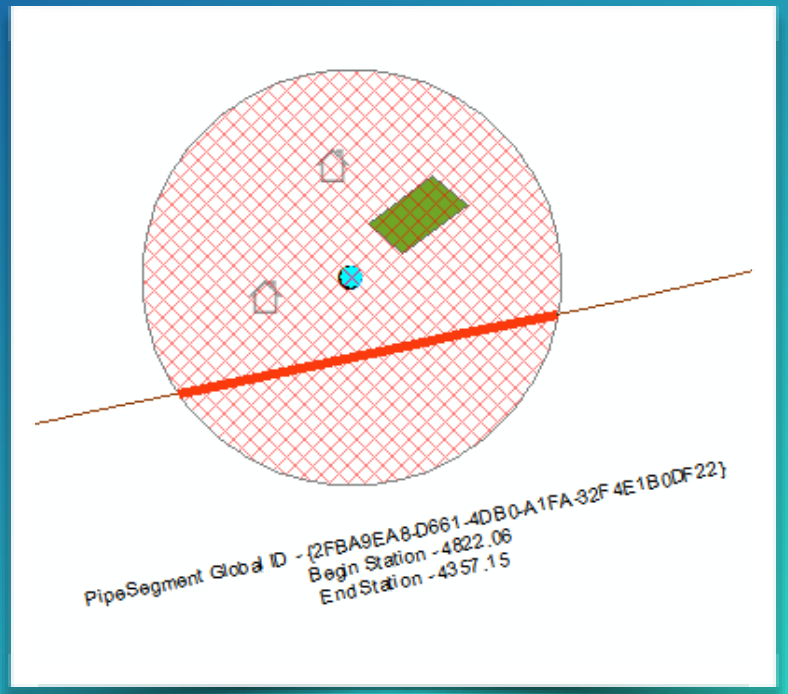
VALVENAME	GLOBALID *	STATUS	Current Possition	SUBTYPECD	MANUFACTURER	INLETCONNECTME	OUTLET
GATE_VALVE_001	{CC630FC0-CC98-4D5D-856D-7C9E2ADEF2A1}	Built - Active	True	6" - Gas - Gate Valve	A O Smith Corporati	Flanged	
	{DDEA38A5-92A7-45C3-BC57-7CB3AAF63876}	Built - Active	True	3" - Gas - Ball Valve	A O Smith Corporati	Flanged	<Null>

OBJECTID	EVENTID	STATIONSERIESEVENTID	STATION	VALVENAME	SUBTYPECD	OUTLETCO
1443	{CC630FC0-CC98-4D5D-856D-7C9E2ADEF2A1}	{6F73D2BC-5EDF-4A02-B25D-5BD2A1BD1158}	35	GATE_VALVE_001	1106	
1439	{C8A85389-A182-4482-A7E9-EB1DCE696D69}	{921D2E0E-29E9-4252-9EDC-BE11A8DEE979}	49.11	<Null>	1500	<Null>

Offline Points Example

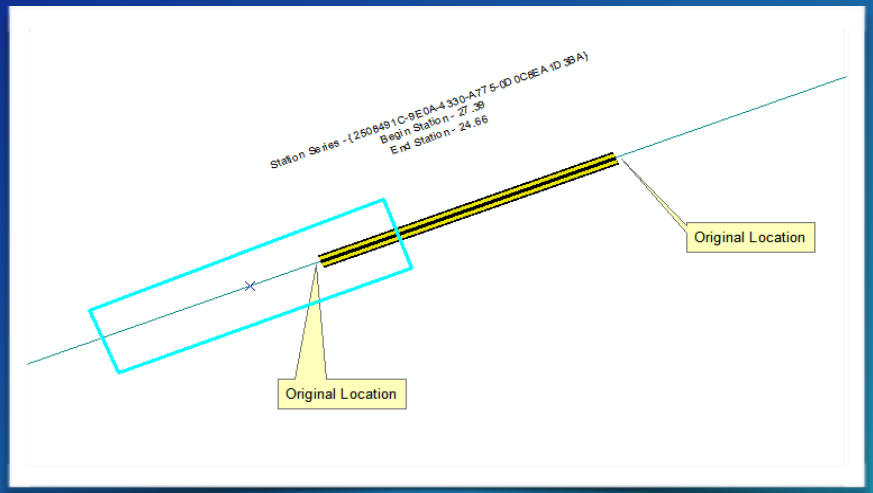
- Offline points can be buffered to derive stationing

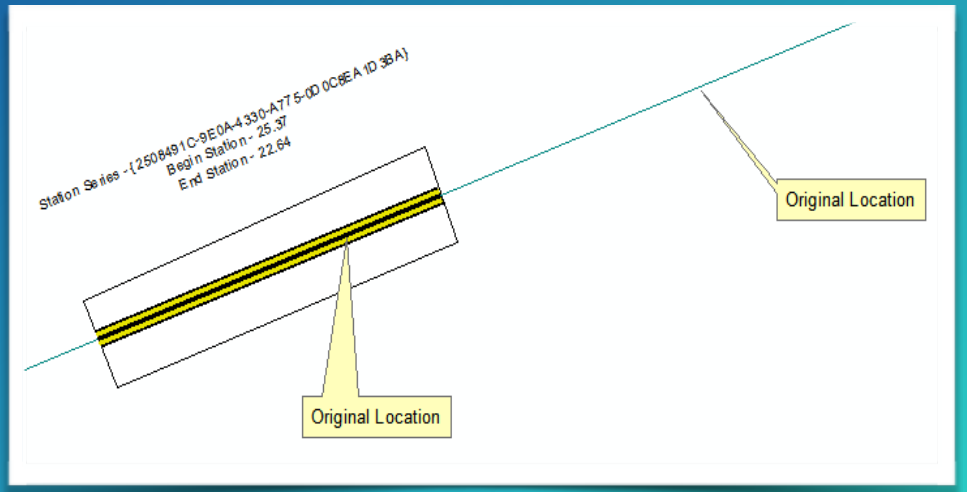




Polygon Example

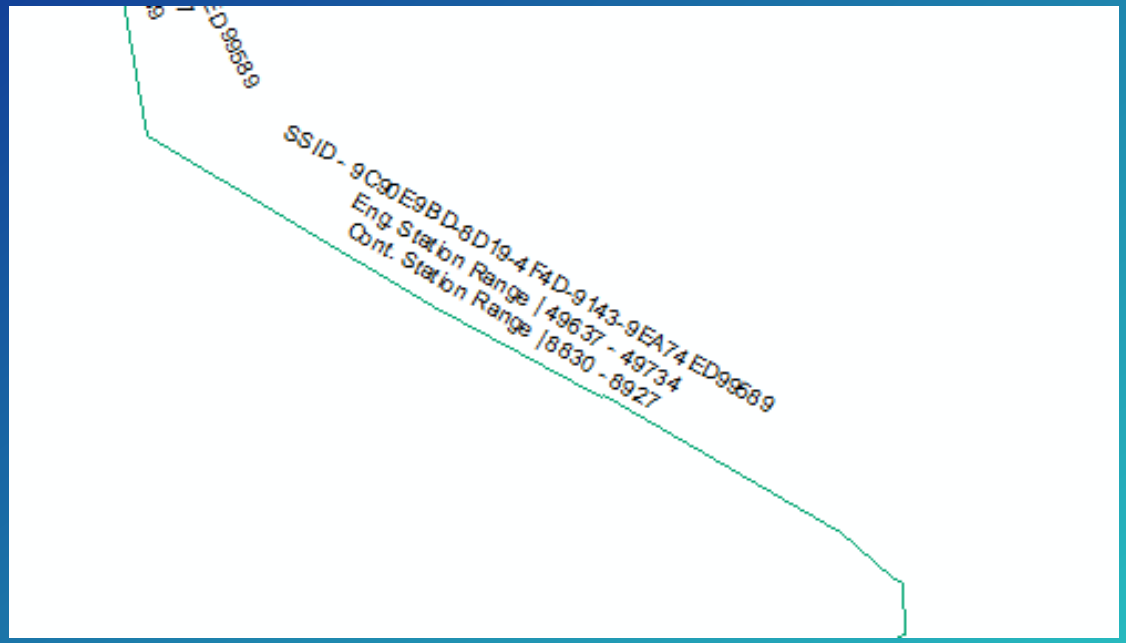
- Locate enter & exit stations for polygons on linear features (casing on pipeline)





Continuous Reference Mode Example

- Report multiple reference modes without storing and maintaining them



Continuous Reference Mode Example (Cont.)

SQLQuery1.sql - local...\davidellerbeck (52))*

```
select
r.OBJECTID,
r.LINE_ORDER,
'Steel' as material,
cast(right(r.subtypecd,4) / 100 as varchar(10)) + '"' as OUTSIDEDIAMETER,
r.STATIONSERIESEVENTID,
r.GLOBALID as EVENTID,
cast(r.shape.STStartPoint().M as numeric(32,0)) as ENG_BEGINSTATION,
cast(r.shape.STEndPoint().M as numeric(32,0)) as ENG_ENDSTATION,
case when
    r.LINE_ORDER = 1 then
        0
    else
        cast(r.shape.STStartPoint().M + dbo.sfAtlas_RouteContDiff(r.FEATURE_NAME,r.LINE_ORDER,r.shape) as numeric(32,0)) end as CONT_BEGINSTATION,

case when
    r.LINE_ORDER = 1 then
        cast(r.shape.STEndPoint().M - r.shape.STStartPoint().M as numeric(32,0))
    else
        cast(r.shape.STEndPoint().M + dbo.sfAtlas_RouteContDiff(r.FEATURE_NAME,r.LINE_ORDER,r.shape) as numeric(32,0)) end as CONT_ENDSTATION,
r.SHAPE

from
gdotroute r;
```

100 %

Results | Spatial results | Messages

	OBJECTID	LINE_ORDER	material	OUTSIDEDIAMETER	STATIONSERIESEVENTID	EVENTID	ENG_BEGINSTATION	ENG_ENDSTATION	CONT_BEGINSTATION	CONT_ENDSTATION
1	803	1.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{F5A46FFE-1DA7-4B14-92B0-77536003E125}	50510	58564	0	8054
2	804	2.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{96143CA2-A2CB-4135-8B6B-F483D1B79FEF}	50421	50510	8054	8143
3	805	3.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{133FD5E4-8FCB-4524-A85F-DCB3457651C1}	50386	50421	8143	8178
4	806	4.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{E05BC4FC-E00F-43AC-938D-948BABFE0AE3}	50244	50386	8178	8320
5	807	5.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{7C5B1CF5-447E-47A1-8B3B-7B5C97DB4C5E}	50122	50244	8320	8442
6	808	6.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{60DD3650-0391-4FCB-AE6A-638530C56B7F}	49734	50122	8442	8830
7	809	7.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{362AC61D-D46E-4710-879B-188389CE74FA}	49637	49734	8830	8927
8	810	8.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{F7C3E4E1-A69D-4644-B7AB-9C8D23161876}	49525	49637	8927	9039
9	811	9.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{F0579FBF-3B1B-4CE2-9B13-9B9BB444CA6A}	49484	49525	9039	9080
10	812	10.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{DADFBA42-BE8F-480D-9DF4-140A0FCF7C89}	49036	49484	9080	9528
11	813	11.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{F5544BA8-40B6-4059-BD29-52139DF5FF74}	49020	49036	9528	9544
12	814	12.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{62741E23-1097-42C0-945E-FAC728D26113}	48969	49020	9544	9595
13	815	13.00000000	Steel	20"	9C90E9BD-8D19-4F4D-9143-9EA74ED99589	{CF7BDE02-A7B3-4DFE-9F5D-E94032F66D6C}	48949	48969	9595	9615

Data Quality

- Find errors by comparing data attributes to spatially related features (i.e. valve diameters to pipe diameters)

Worksheet | Query Builder

```
select
v.OBJECTID,
substr(v.subtypecd,2,10)/1000 || '"' as DIAMETER,
case when ps_end.SUBTYPECD is null then
  Null
    else
    substr(ps_end.SUBTYPECD,2,10)/1000 || '"' end as INPIPEDIAMETER,
case when ps_beg.SUBTYPECD is null then
  Null
    else
    substr(ps_beg.SUBTYPECD,2,10)/1000 || '"' end as OUTPIPEDIAMETER

from
valve_mv v

left join
pipesegment_mv ps_end
```

Query Result

SQL | Fetched 50 rows in 0.174 seconds

	OBJECTID	DIAMETER	INPIPEDIAMETER	OUTPIPEDIAMETER
1	15679	2.375"	2.375"	2.375"
2	10487	3.5"	(null)	3.5"
3	5528	4.5"	4.5"	4.5"
4	8503	8.625"	8.625"	8.625"
5	8509	8.625"	8.625"	8.625"

View Data In Many Model Formats

- Data can be stored in a small footprint and be displayed as a different model

- Useful for integrating with third-party applications
  - Class Calculators
  - HCA Calculators
  - Alignment Sheet Generators

Reporting

- Reporting activities can consume large amounts of time and resources
  - Annual DOT reports
  - Railroad Commission
  - NPMS/PHMSA

Reporting (cont.)

- By storing data in a simplified structure, dynamic segmentation is not required
- Spatial database functions assist in breaking information up by polygon boundaries

Contact Information

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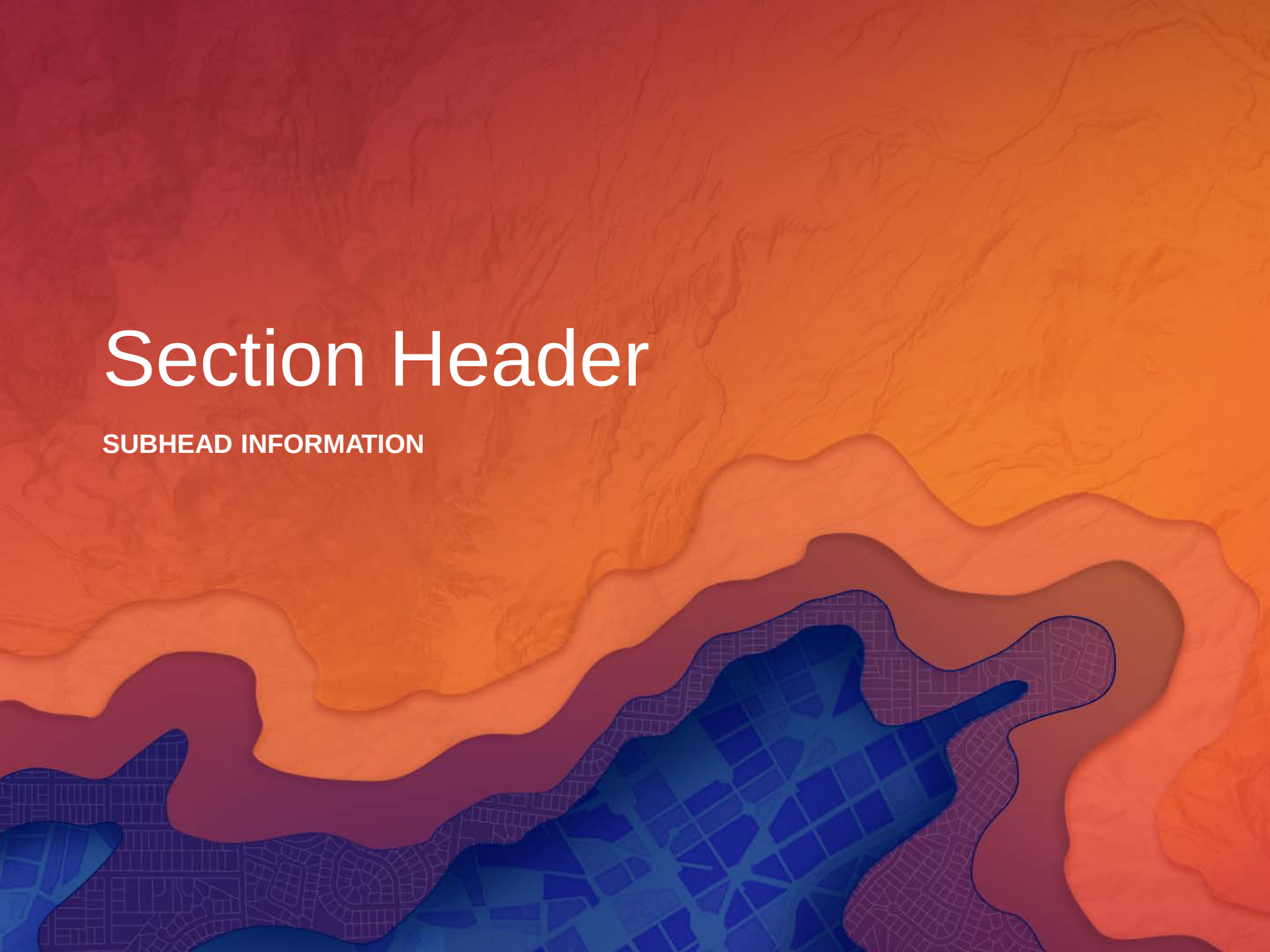
Section Header

SUBHEAD INFORMATION



Header for Demo Slide

Supporting Text