Building and Maintaining a Roads & Highways Data Model for Local Government

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Presentation Overview

- Background and Regional Context.
- Conceptual Underpinnings.
- The Model:
  - Data Dictionary;
  - Core/geometry;
  - Simple events; and,
  - Complex events and interfaces.
  - Street name and block range model.
- Next Steps.

Background & Regional Context

- CDOT's efforts in the early 2000's.
- Regional LRS workgroup.
- Boulder County completed their design in 2009.
- Denver (CCD) picked it up in 2010-2011.
- Indirect involvement of other metro jurisdictions through the DRCOG/DRDC Streets Subcommittee.
- Esri R&H solution beta release program gave:
  - Opportunity to validate DB modeling/maintenance paradigms;
  - Insight into software capabilities; and,
  - Critical Feedback to Esri for product improvement.

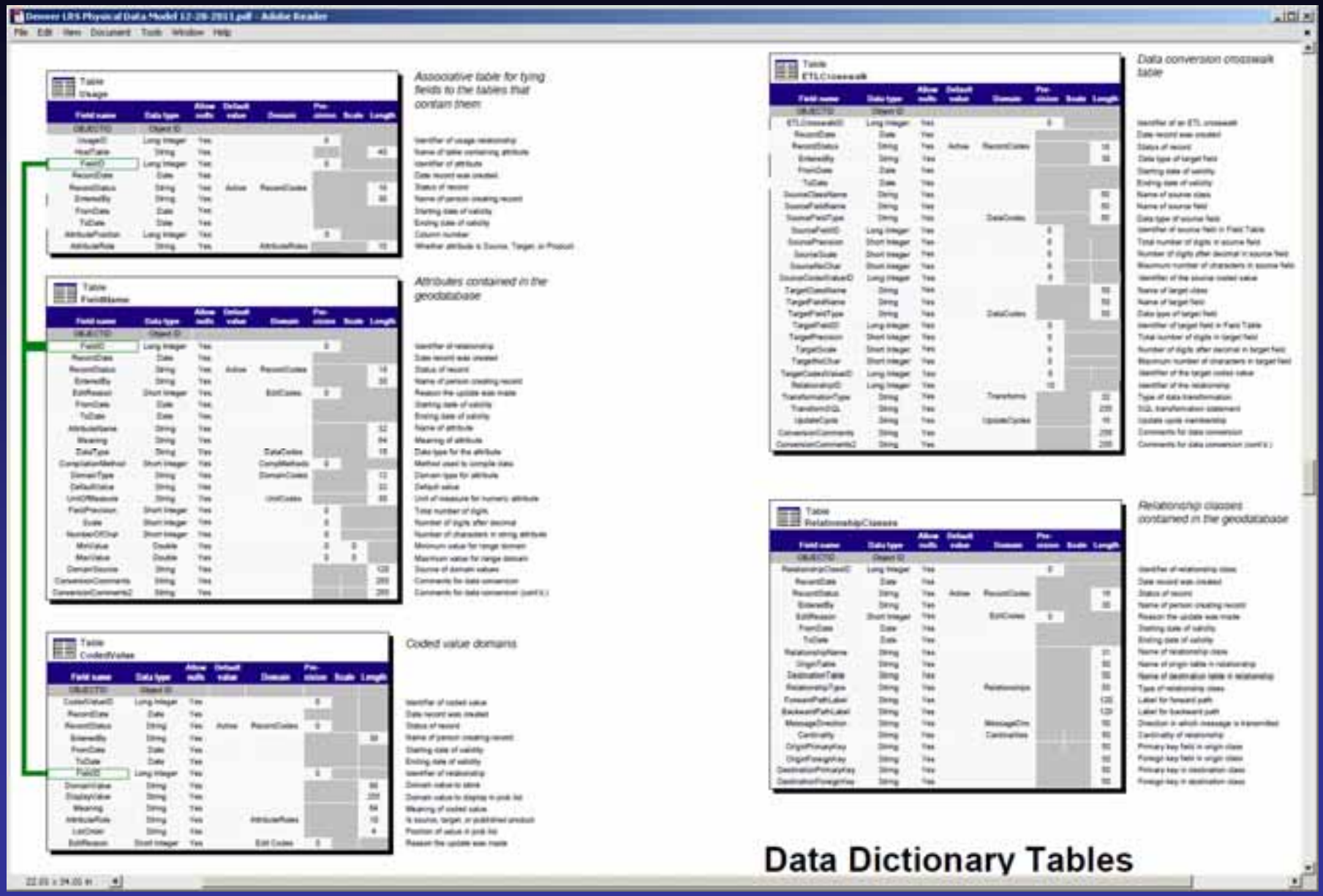
Conceptual Foundations

- DynSeg!
- Butler's work: Designing Geodatabases for Transportation, Esri Press, 2008.
- Esri Roads & Highways Solution.
- Dwarfs standing on the shoulders of giants
  - *"One who develops future intellectual pursuits by understanding the research and works created by notable thinkers of the past" (Wikipedia)*

The Model: Data Dictionary

- Data Object descriptions.
- Includes source, target and output objects.
- Domains for coded values.
- ETLCrosswalk table.
- Relationship Classes.
- Field-level tracking: current model to new model.
- Python script uses it to generate an empty schema.
- Data loading is scripted.

Data Model Diagram for Data Dictionary



Core Data Model

- Centerline FC – 1 feature per “segment”.
- 1-to-1 relationship with “BlockRange” complex event.
- Centerline Sequence Table.
- Route Table.
- CalibrationPoints FC.
- Redline FC.
- Core Data Objects are extensible

The Model: Core Objects

Simple feature class
Centerline

Geometry: Polyline
Contains M values: Yes
Contains Z values: Yes

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
FromDate	Date	Yes			0	0	8
ToDate	Date	Yes			0	0	8
RoadwayID	String	Yes					12
RoadwayIdGuid		Yes			0	0	38
Shape_Length	Double	Yes			0	0	

Table
CenterlineSequence

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
FromDate	Date	Yes			0	0	8
ToDate	Date	Yes			0	0	8
RouteID	String	Yes					50
RoadwayID	String	Yes					12
NetworkID	Long	Yes		dLRSNetworks	0		
RoadwayIdGuid		Yes			0	0	38

Table
Route

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
FromDate	Date	Yes			0	0	8
ToDate	Date	Yes			0	0	8
RouteID	String	Yes					50
RouteName	String	Yes					50

Simple feature class
CalibrationPoint

Geometry: Point
Contains M values: Yes
Contains Z values: Yes

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
FromDate	Date	Yes			0	0	8
ToDate	Date	Yes			0	0	8
CalibrationPointID	String	Yes					12
RouteID	String	Yes					50
NetworkID	Long	Yes		dLRSNetworks	0		
Measure	Double	Yes			0	0	

Simple feature class
Redline

Geometry: Polyline
Contains M values: Yes
Contains Z values: Yes

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
EffectiveDate	Date	Yes			0	0	8
ActivityType	Short	Yes		dActivityType	0		
RouteID	String	Yes					50
RouteName	String	Yes					50
FromMeasure	Double	Yes			0	0	
ToMeasure	Double	Yes			0	0	
Shape_Length	Double	Yes			0	0	

Simple Events

- Butler version of model had all events in one table.
- Esri recommends one table per event.
- Denver retained design for combined event table…
- But created one table per simple event.

Table
EV_CivilJur

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
EVENT_ID	Long	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
ENTITY_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRSNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes	B	SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255

Simple Events in Prototype DB

100Block	FunctionalClass	OwnerType
AdminClass	HUTFEligibility	SpeedLimit
AliasStName	LaneWidth	StateHwyNo
Bridge_Line	MaintJur	StreetName
Bridge_Point	MajorRoute	SubdivisionName
CFCC	NHS	SubdivisionStatus
CivilJur	NumThruLanes	TollRoute
ConstYear	OneWay	TotalNumLanes
County	OwnerName	TravelDirection

Complex Events

- Extension of simple events - allow multiple attributes.
- Initial data load scripts - ETLs from external systems.
- Include “greatest hit” attributes.
- Can include Table Name and foreign key.

Pavement Segments (Deighton PMS)

Table
PavementSegment

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
PAVE_SEGMENT_ID	Long	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
SEGMENT_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRSNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes	B	SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255
SURFACE_TYPE	String	Yes		PaveTypes			4
PCI	Long	Yes			0		
RSL	Long	Yes			0		
ELEMENT_ID	Long	Yes			0		
YEAR_OF_LAST_WORK	Long	Yes			0		
LAST_TREATMENT	String	Yes					20
SEGMENT_LENGTH	Long	Yes			0		
FROM_DESCRIPTION	String	Yes					150
TO_DESCRIPTION	String	Yes					150

Bridges (Polygon FC - PONTIS)

Simple feature class
Bridge

Geometry Polygon
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Pre-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
BRIDGE_ID	Long	Yes			0		
BRIDGE_TYPE	Short	Yes		BridgeTypes	0		
IS_MAJOR_BRIDGE	String	Yes	TRUE	TrueFalse			5
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
BRIDGE_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
SOURCE_BRIDGE_ID	String	Yes					20
STRUCTURE_TYPE	String	Yes		StructureTypes			12
STRUCTURE_MATERIAL	String	Yes		StructureMaterials			12
OPERATING_RATING	Double	Yes			0	0	
INVENTORY_RATING	Double	Yes			0	0	
LOCATION_DESC	String	Yes					255
BRIDGE_ROADWAY_WIDTH	Double	Yes			0	0	
BRIDGE_OWNER	String	Yes					32
YEAR_BUILT	Short	Yes			0		
IS_POSTED	String	Yes		TrueFalse			5
NUMBER_OF_SPANS	Short	Yes			0		
BRIDGE_CUSTODIAN	String	Yes					30
BRIDGE_LENGTH	Double	Yes			0	0	
BRIDGE_WIDTH	Double	Yes			0	0	
DENVER_HEALTH_INDEX	Double	Yes			0	0	
SUFFICIENCY_RATING	Double	Yes			0	0	
SDFO_STATUS	String	Yes					2
STRUCTURE_EVALUATION	String	Yes					1
FRACTURE_CRITICAL	String	Yes		TrueFalse			5
SCOUR_CRITICAL	String	Yes		ScourCodes			5
ADT	Long	Yes			0		
T_FACTOR	Short	Yes			0		
DETOUR_LENGTH	String	Yes					255
DECK_RATING	String	Yes		RatingCodes			2
SUPERSTRUCTURE_RATING	String	Yes		RatingCodes			2
SUBSTRUCTURE_RATING	String	Yes		RatingCodes			2
CHANNEL_RATING	String	Yes		ChannelCodes			2
CULVERT_RATING	String	Yes		CulvertCodes			2
WATERWAY_RATING	String	Yes		WaterwayCodes			2
NODE_MASTER_ID	Long	Yes			0		
SHAPE_Length	Double	Yes			0	0	
SHAPE_Area	Double	Yes			0	0	

Table
BridgeRoute

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
BRIDGE_ROUTE_ID	Long	Yes			0		
BRIDGE_ID	Long	Yes			0		
EVENT_ID	Long	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
OVER_OR_UNDER	String	Yes	OVER				5
ROAD_LEVEL	String	Yes					5
MAX_WIDTH	Short	Yes			0		
MAX_HEIGHT	Short	Yes			0		
MAX_WEIGHT	Short	Yes			0		

BlockRange Complex Event

Table
BlockRange

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
BLOCK_RANGE_ID	Long	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
RANGE_STATUS	String	Yes	IN USE	AddressCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRSNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes	B	SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255
SEGMENT_NAME	String	Yes					32
STREET_NAME_ID	Long	Yes			0		
COMPLETE_STREET_NAME	String	Yes					150
SHORT_STREET_NAME	String	Yes					32
LEFT_FROM_ADD	Long	Yes			0		
LEFT_TO_ADD	Long	Yes			0		
LEFT_NUMBER_PARITY	String	Yes					16
LEFT_CITY	String	Yes		Cities			20
RIGHT_FROM_ADD	Long	Yes			0		
RIGHT_TO_ADD	Long	Yes			0		
RIGHT_NUMBER_PARITY	String	Yes					16
RIGHT_CITY	String	Yes		Cities			20
LEFT_IS_ADDRESSABLE	String	Yes	TRUE	TrueFalse			5
RIGHT_IS_ADDRESSABLE	String	Yes	TRUE	TrueFalse			5
LEFT_COUNTY	String	Yes		Counties			12
RIGHT_COUNTY	String	Yes		Counties			12
FROM_DESCRIPTION	String	Yes					254
TO_DESCRIPTION	String	Yes					254
FROM_ELEVATION	Short	Yes			0		
TO_ELEVATION	Short	Yes			0		
COMMENTS	String	Yes					255
LENGTH_OF_SEG	Double	Yes			0	0	
CL_MASTER_ID	Long	Yes			0		
HUNDRED_BLOCK_MAJOR	Short	Yes			0		
LRS_QUADRANT	String	Yes					2
BLOCK_NAME	String	Yes					60
FROM_NODE	Long	Yes			0		
TO_NODE	Long	Yes			0		
CL_MASTER_ID_TEXT	String	Yes					255

Intersections

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Simple feature class
Intersection

	Geometry	Point
Contains M values	No	
Contains Z values	No	

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
INTERSECTION_ID	Long Integer	Yes			0		
INTERSECTION_TYPE	String	Yes	AT-GRADE	IntTypes			16
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
INTERSECTION_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
BASIC_GEOMETRY	String	Yes	QUAD	IntGeometries			16
CONTROL_TYPE	String	Yes	STOP	ControlTypes			16
TRAFFIC_SIGNAL_ID	Long Integer	Yes			0		
NUMBER_APPROACHES	Short Integer	Yes			0		
CONTROL_JURISDICTION	String	Yes		Jurisdictions			16
SURFACE_TYPE	String	Yes		PaveTypes			4
INTER_DIR	String	Yes		InterDirs			16
NODE_MASTER_ID	Long Integer	Yes			0		
ALPHA_INTER_NAME	String	Yes					64
NODE_NAME_0	String	Yes					64
NODE_NAME_1	String	Yes					16
NODE_NAME_2	String	Yes					16
PARENT_MASTER_ID	Long Integer	Yes			0		

Table
InterchangeHasIntersection

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
INTERCHANGE_ID	Long Integer	Yes			0		
INTERSECTION_ID	Long Integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
RELATIONSHIP_STATUS	String	Yes					16

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Simple feature class
Interchange

	Geometry	Point
Contains M values	No	
Contains Z values	No	

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
INTERCHANGE_ID	Long Integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
INTERCHANGE_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
INTERCHANGE_TYPE	String	Yes	FULL	IntrchngTypes			16
INTERCHANGE_NAME	String	Yes					30
INTERCHANGE_NUMBER	String	Yes					5

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Table
IntersectionRoute

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
EVENT_ID	Long Integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
ENTITY_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRSNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes	B	SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255

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Coded value domain
IntrchngTypes

Description IntrchngTypes
Field type String
Split policy Default value
Merge policy Default value

Code	Description
FULL	Full interchange
PARTIAL	Directional interchange
SLIP RAMP	Slip ramp
LA ONLY	Multiple limited-access hwys.
REST AREA	Rest area access
RESTRICTED	Authorized vehicles only
UNKNOWN	Unknown
NONE	None

Railroads, Including Light Rail

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Table
RRCompany

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
RR_COMPANY_ID	Long Integer	Yes			0		
PARENT_CO	String	Yes					32
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
COMPANY_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
COMPANY_NAME	String	Yes					50
LABEL_NAME	String	Yes					20
CONTACT_PERSON	String	Yes					48
CONTACT_PHONE	String	Yes					20
CONTACT_STREET	String	Yes					20
CONTACT_CITY	String	Yes					48
CONTACT_STATE	String	Yes					32
CONTACT_ZIP	String	Yes					20
ALT_PHONE	String	Yes					48

Table
RRCompanyUsesRRTrack

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
RR_COMPANY_ID	Long Integer	Yes			0		
RR_TRACK_ID	Long Integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
FROM_DATE	Date	Yes			0	0	8
TRACK_USAGE	String	Yes					10

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Coded value domain
TrackTypes
Description TrackTypes
Field type String
Split policy Default value
Merge policy Default value

Code	Description
MAIN	Main
SIDING	Siding
SPUR	Spur
INTERCHANGE	Interchange track
OTHER	Other
YARD	Yard

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Simple feature class
RRTrack
Geometry Polyline
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
RR_TRACK_ID	Long Integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes		RecordCodes			16
POSITION_STATUS	String	Yes		EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
TRACK_TYPE	String	Yes		TrackTypes			12
TRACK_NUMBER	Short Integer	Yes			0		
RAIL_WEIGHT	Short Integer	Yes			0		
RR_COMPANY_ID	Long Integer	Yes			0		
COMPANY_NAME	String	Yes					50
SUBDIV_NAME	String	Yes					32
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SHAPE_Length	Double	Yes			0	0	

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Simple feature class
GradeCrossing
Geometry Point
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
GRADE_CROSSING_ID	Long Integer	Yes			0		
NATIONAL_GC_ID	String	Yes					7
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes		RecordCodes			16
CROSSING_STATUS	String	Yes		EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRGNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes		SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255
RR_AT_MEASURE	Double	Yes			0	0	
MAIN_RR_TRACK_ID	Long Integer	Yes			0		
NUMBER_OF_TRACKS	Short Integer	Yes			0		
PROTECTION_TYPE	String	Yes		GCProtection			16
CROSSING_MATERIAL	String	Yes		XingMats			16
NUMBER_OF_BUSES	Short Integer	Yes			0		
NUMBER_OF_TRAINS	Short Integer	Yes			0		
TRACK_SPEED	Short Integer	Yes			0		
MIN_SIGHT_DISTANCE	Double	Yes			0	0	
ID_EXEMPT	String	Yes		TrueFalse			5
NODE_MASTER_ID	String	Yes					12

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Traffic Operations Objects

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Simple feature class
ITSDevice

Geometry: Contains M values No; Contains Z values No
Point: No

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
ITS_DEVICE_ID	Long integer	Yes			0		
ITS_DEVICE_TYPE	String	Yes		DeviceTypes			16
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
ITS_DEVICE_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
LOCATION_DESC	String	Yes					255
ITS_DEVICE_NUMBER	String	Yes					16
ITS_DEVICE_OWNER	String	Yes		CommOwners			16
ITS_DEVICE_MFR	String	Yes		DeviceMfrs			16
ITS_DEVICE_MODEL	String	Yes		DeviceModels			16
ITS_DEVICE_SERIAL_NO	String	Yes					16
AUTHORITY_ID	String	Yes		Authorities			12
AUTHORITY_FEATURE_ID	String	Yes					16
HYPERLINK	String	Yes					100
LOCATION_CODE	String	Yes					16
CAMERA_DIRECTION	String	Yes					20
LOCATION_OF_CAMERA	String	Yes					255
APPROACH	String	Yes					50
COUNT_ENABLED	String	Yes		TrueFalse			5
POLE_LOCATION	String	Yes					255
PUBLISHED_VIEW	String	Yes		TrueFalse			5
CAMERA_VIEW	String	Yes					255
NUMBER_OF_CAMERAS	Short integer	Yes			0		
EDIT_REASON	Short integer	Yes		EditCodes	0		
COMMENTS	String	Yes					255

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Table
SnowRoute

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SNOW_ROUTE_ID	Long integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
SEGMENT_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRSNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes	B	SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255
SNOW_ROUTE_DESC	String	Yes					254
SNOW_ROUTE_PRIORITY	String	Yes					5
SNOW_ROUTE_DISTRICT	String	Yes					5
SCHOOL	String	Yes					50

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Simple feature class
TRAFFIC_COUNTS

Geometry: Contains M values No; Contains Z values No
Point: No

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	No					
TRAFFIC_COUNT_ID	Long integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
COUNT_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRSNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes	B	SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255
COUNT_STREET	String	Yes					255
INTERSECT_STREET	String	Yes					255
COUNT_DIRECTION	String	Yes		Directions			12
COUNT_METHOD	String	Yes		CountMethods			16
ADT	Long integer	Yes			0		
AADT	Long integer	Yes			0		
AMPHV	Long integer	Yes			0		
PMPHV	Long integer	Yes			0		
AAWDT	Long integer	Yes			0		
AAWET	Long integer	Yes			0		
K_FACTOR	Double	Yes			0	0	
D_FACTOR	Double	Yes			0	0	
T_FACTOR	Double	Yes			0	0	
COUNT_TYPE	String	Yes		CountTypes			30
TURN_TYPE	String	Yes		TurnTypes			20
COUNT_START	Date	Yes			0	0	8
COUNT_END	Date	Yes			0	0	8
GROWTH_RATE	Double	Yes			0	0	

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Simple feature class
TrafficSignal

Geometry: Contains M values No; Contains Z values No
Point: No

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
TRAFFIC_SIGNAL_ID	Long integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
SIGNAL_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
SIGNAL_OWNER	String	Yes		Jurisdictions			16
LOCATION_CODE	String	Yes					16
LOCATION_ID	Long integer	Yes			0		
SIGNAL_TYPE	String	Yes		SignalTypes			16
INSTALLATION_DATE	Date	Yes			0	0	8
REBUILD_DATE	Date	Yes			0	0	8
MAJOR_RETIME_DATE	Date	Yes			0	0	8

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Parking-Related Objects

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Simple feature class
ParkingMeter

Geometry Point
Contains M values No
Contains Z values No

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
PARKING_METER_ID	Long integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
METER_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
METER_TYPE	String	Yes		MeterTypes			16
POLE_ID	String	Yes					10
COLLECTION_AREA	String	Yes					16
CONFIGURATION_ID	Short integer	Yes			0		
CONFIGURATION	String	Yes					60
TERMINAL_ID	String	Yes					32
RFID	String	Yes					16
LATITUDE	Long integer	Yes			0		
LONGITUDE	Long integer	Yes			0		
HOUSING	String	Yes					16
VAULT_CAPACITY	Double	Yes			0	0	
IS_ACTIVE	String	Yes		TrueFalse			5

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Table
ParkingRestriction

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
PARKING_RESTRICTION_ID	Long integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
RESTRICTION_STATUS	String	Yes	IN USE	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRSNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes	B	SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255
RESTRICTION_TYPE	String	Yes					16
TOW_AWAY	String	Yes		TrueFalse			5
COLOR	String	Yes					8
START_DATE	Date	Yes			0	0	8
END_DATE	Date	Yes			0	0	8
START_TIME	Short integer	Yes			0		
END_TIME	Short integer	Yes			0		
WEEK_OF_MONTH	String	Yes					8
APPLIES_MONDAY	String	Yes		TrueFalse			5
APPLIES_TUESDAY	String	Yes		TrueFalse			5
APPLIES_WEDNESDAY	String	Yes		TrueFalse			5
APPLIES_THURSDAY	String	Yes		TrueFalse			5
APPLIES_FRIDAY	String	Yes		TrueFalse			5
APPLIES_SATURDAY	String	Yes		TrueFalse			5
APPLIES_SUNDAY	String	Yes		TrueFalse			5
APPLIES_HOLIDAY	String	Yes		TrueFalse			5
EXCEPTION_DAY	String	Yes					16
EXCEPTION_START_TIME	Short integer	Yes			0		
EXCEPTION_END_TIME	Short integer	Yes			0		

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Permit-Related Objects

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Table
ROWPermit

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
ROW_PERMIT_NUMBER	Long integer	Yes			0		
PROJECT_NAME	String	Yes					64
PERMIT_TYPE	String	Yes	CONST				16
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
PERMIT_STATUS	String	Yes	APPLIED				16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
APPLICANT	String	Yes					32
FORECAST_START_DATE	Date	Yes			0	0	8
ACTUAL_START_DATE	Date	Yes			0	0	8
FORECAST_END_DATE	Date	Yes			0	0	8
ACTUAL_END_DATE	Date	Yes			0	0	8
CONTACT	String	Yes					32
CONTACT_PHONE	String	Yes					20
CONTACT_EMAIL	String	Yes					32
PROJECT_COST	Double	Yes			0	0	
PERMIT_COST	Double	Yes			0	0	

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Table
PermitFacility

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
PERMIT_FACILITY_ID	Long integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
PERMIT_STATUS	String	Yes	APPLIED				16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRSNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes	B	SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255
ROW_PERMIT_NUMBER	Long integer	Yes			0		
FACILITY_TYPE	String	Yes	ROUTE				16
FACILITY_ID	Long integer	Yes			0		
FACILITY_DESCRIPTION	String	Yes					128
EVENT_ID	Long integer	Yes			0		

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Project-Related Objects

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Table
Project

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
PROJECT_NUMBER	Long integer	Yes			0		
PROJECT_NAME	String	Yes					64
PROJECT_TYPE	String	Yes	1				16
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
PROJECT_STATUS	String	Yes	PROPOSED	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
SPONSORING_AGENCY	String	Yes					32
FORECAST_START_DATE	Date	Yes			0	0	8
ACTUAL_START_DATE	Date	Yes			0	0	8
FORECAST_END_DATE	Date	Yes			0	0	8
ACTUAL_END_DATE	Date	Yes			0	0	8
TOTAL_BUDGET	Double	Yes			0	0	
ESTIMATED_COST	Double	Yes			0	0	
ACTUAL_COST	Double	Yes			0	0	
PROJECT_MANAGER	String	Yes					32
PM_PHONE	String	Yes					20
PM_EMAIL	String	Yes					32

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Table
ProjectFacility

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
PROJECT_FACILITY_ID	Long integer	Yes			0		
RECORD_DATE	Date	Yes			0	0	8
RECORD_STATUS	String	Yes	ACTIVE	RecordCodes			16
PROJECT_STATUS	String	Yes	PROPOSED	EntityCodes			16
FROM_DATE	Date	Yes			0	0	8
TO_DATE	Date	Yes			0	0	8
NETWORK_ID	String	Yes		dLRSNetwork			16
ROUTE_ID	String	Yes					30
FROM_MEASURE	Double	Yes			0	0	
TO_MEASURE	Double	Yes			0	0	
SIDE_OF_ROAD	String	Yes	B	SideCodes			8
EVENT_TYPE	String	Yes		EventTypes			20
EVENT_VALUE	String	Yes					255
FACILITY_TYPE	String	Yes	ROUTE				16
FACILITY_ID	Long integer	Yes			0		
FACILITY_DESCRIPTION	String	Yes					128
EVENT_ID	Long integer	Yes			0		
PROJECT_NUMBER	Long integer	Yes			0		
SUB_COMP_DATE	Date	Yes			0	0	8
WARRANTY_EXPIRE_DATE	Date	Yes			0	0	8

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Street Name Model

StreetName

FieldName	DataType	DefaultValue	Domain
STREET_NAME_ID	Long		
RECORD_DATE	Date		
RECORD_STATUS	String	Active	RecordCodes
STREET_NAME_STATUS	String	In Use	AddressCodes
CREATED_BY_AGENCY	String		
FROM_DATE	Date		
TO_DATE	Date		
PRE_MODIFIER	String		
PRE_DIRECTION	String		Directions
PRE_TYPE	String		
STREET_NAME	String		
POST_TYPE	String		
POST_DIRECTION	String		Directions
POST_MODIFIER	String		
COMPLETE_STREET_NAME	String		
SHORT_STREET_NAME	String		
FROM_ADD	Long		
TO_ADD	Long		
NUMBER_PARITY	String		ParityCodes
IS_ADDRESSABLE	String		Y/N/Partial

StreetName stores all names for segments (Official, Alias, Public Safety, Hwy)

BlockRange

FieldName	DataType	DefaultValue	Domain
BLOCK_RANGE_ID	Long		
RECORD_DATE	Date		
RECORD_STATUS	String	Active	RecordCodes
RANGE_STATUS	String	In Use	AddressCodes
FROM_DATE	Date		
TO_DATE	Date		
NETWORK_ID	String		dLRSNetwork
ROUTE_ID	String		
FROM_MEASURE	Double		
TO_MEASURE	Double		
SIDE_OF_ROAD	String	B	SideCodes
EVENT_TYPE	String		EventTypes
EVENT_VALUE	String		
LEFT_FROM_ADD	Long		
LEFT_TO_ADD	Long		
LEFT_NUMBER_PARITY	String		
LEFT_CITY	String		Cities
RIGHT_FROM_ADD	Long		
RIGHT_TO_ADD	Long		
RIGHT_NUMBER_PARITY	String		
RIGHT_CITY	String		Cities
LEFT_IS_ADDRESSABLE	String	True	TrueFalse
RIGHT_IS_ADDRESSABLE	String	True	TrueFalse
LEFT_COUNTY	String		Counties
RIGHT_COUNTY	String		Counties
FROM_DESCRIPTION	String		
TO_DESCRIPTION	String		
FROM_ELEVATION	Short		
TO_ELEVATION	Short		
COMMENTS	String		
LENGTH_OF_SEG	Double		
CL_MASTER_ID	Long		
HUNDRED_BLOCK_MAJOR	Short		
BLOCK_NAME	String		

StreetNameToBlockRangeHasStreetName

Origin	Destination	Key
StreetName	BlockRangeHasStreetName	STREET_NAME_ID

BlockRangeHasStreetName

FieldName	DataType	Domain
STREET_NAME_ID	Long	
BLOCK_RANGE_ID	Long	
RECORD_DATE	Date	
FROM_DATE	Date	
TO_DATE	Date	
NAME_TYPE	String	NameTypes

BlockRangeToBlockRangeHasStreetName

Origin	Destination	Key
BlockRange	BlockRangeHasStreetName	BLOCK_RANGE_ID

Other Model Components

- Projects and Permits
- Emergency Services Zones for CAD.
- CDOT Highway User Tax Fund (HUTF).
- Communications Model: Traffic Control & City WAN.
- Public Transportation (Bus/LRT routes, etc.)

Consumers of Published Products

- Azteca Cityworks MMS.
- Accela Permitting System.
- Crash Magic Traffic Safety System.
- VersaTerm – Police Records Mgt. System.
- TriTech 911 Dispatch System.
- Police and Fire MDT's.
- Manatron Tax Parcel Mgt. System.
- City geocoding users.
- Planning and Zoning.
- General Cartographic users.
- Dozens of Boundary Layers.

Finis

- Questions?
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