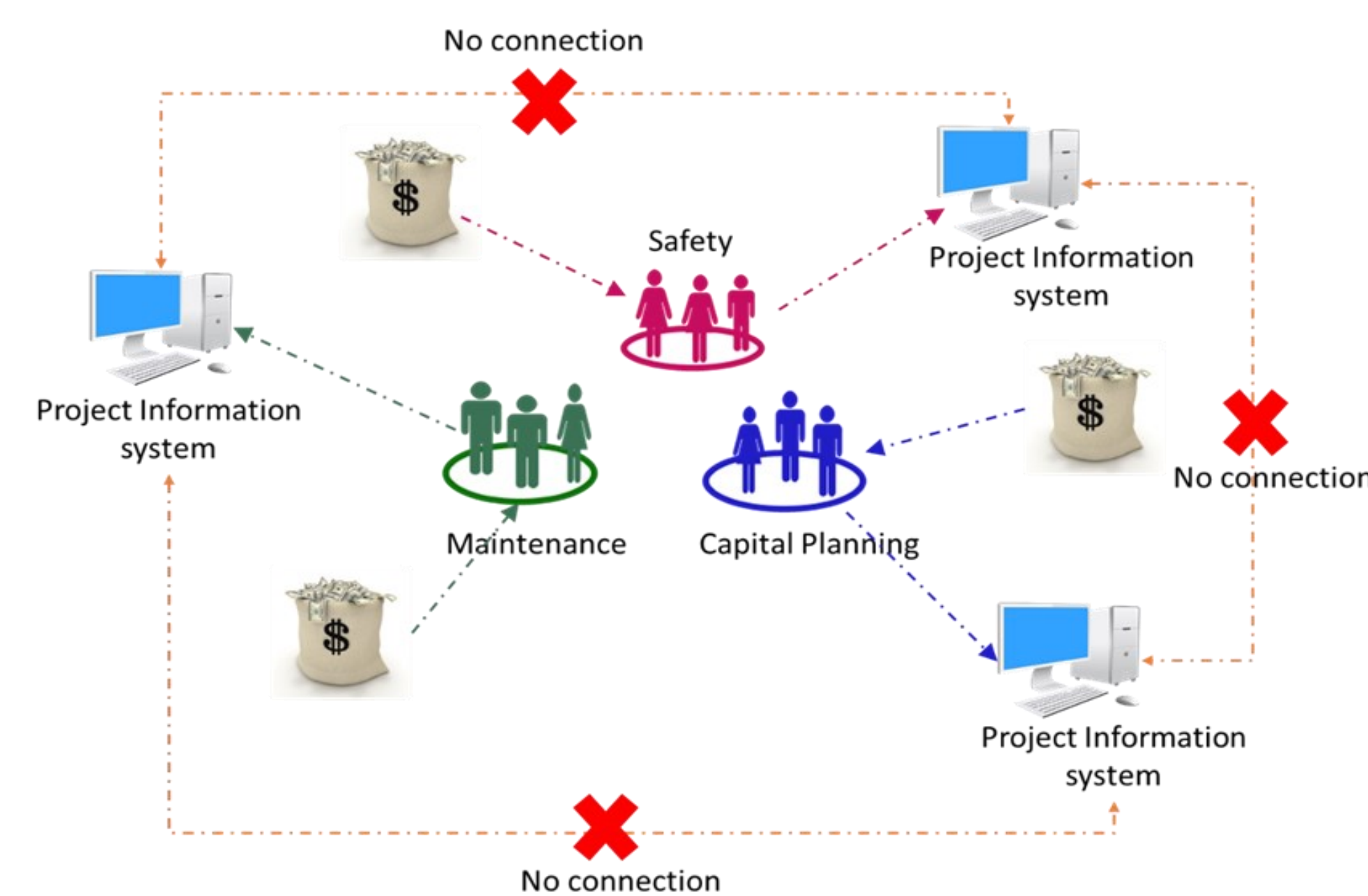


## Challenge

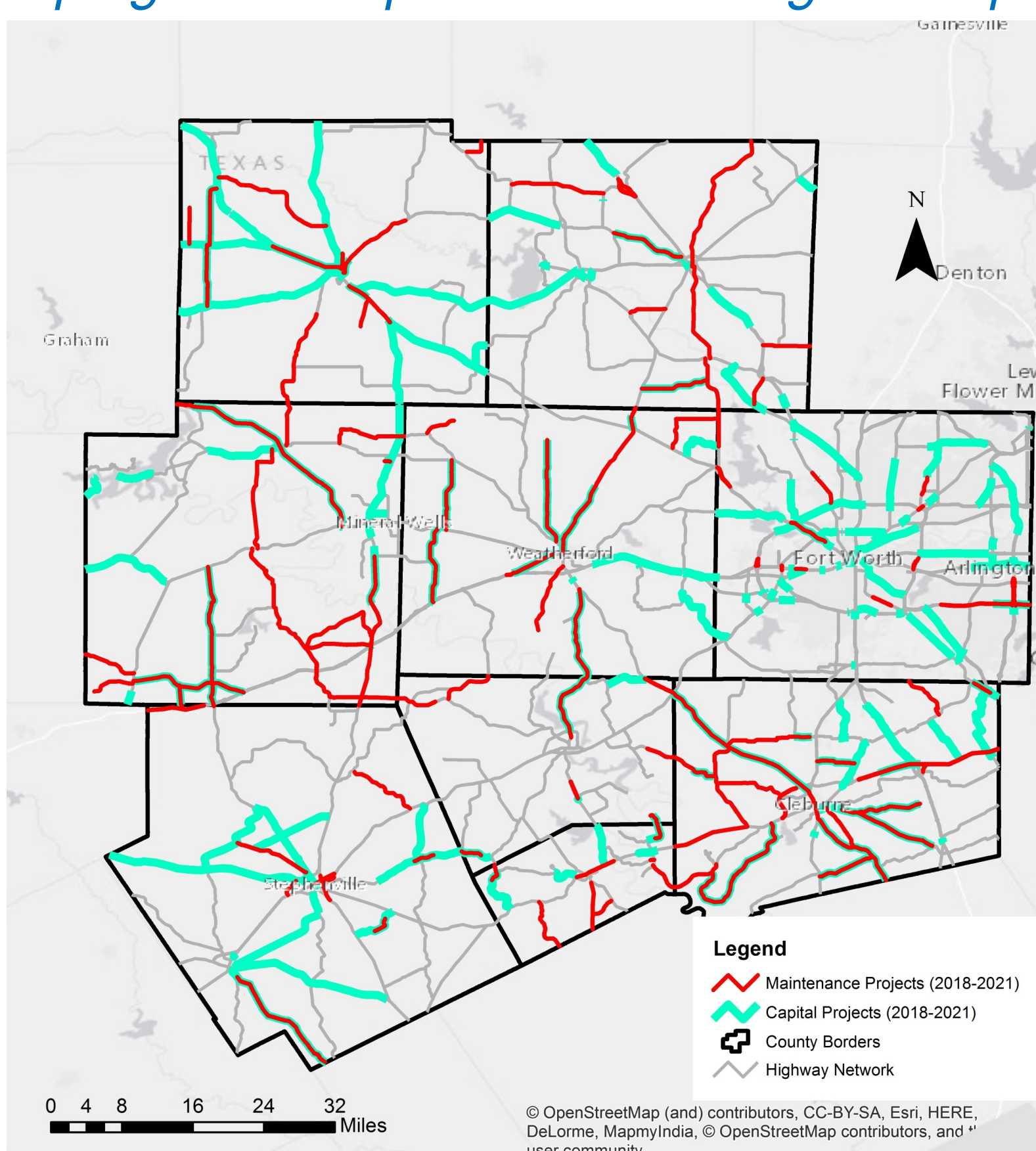
Development of a practical and repeatable process for integrating construction and maintenance project plans:

- As a result of the existing organizational structure, the current process of planning highway infrastructure is **siloed** in nature.
- There are **multiple incompatible information systems** used by different functional groups.
- Nonetheless, functional groups plan projects for assets (roads, bridges) **on the same network**.



## Current Scenario (Motivation)

- GIS ArcMap displaying the planned project in the **Fort Worth district**.
  - Overlapping lines represents **spatially conflicting projects**.
  - Spatial conflicts can either be :
    - Planned** complementary projects on the same route
    - Unplanned** projects occurring on the same route (Unintentional)
- Unplanned conflicts needs to be identified and resolved during planning stage for developing efficient pavement management program.*



## Objectives

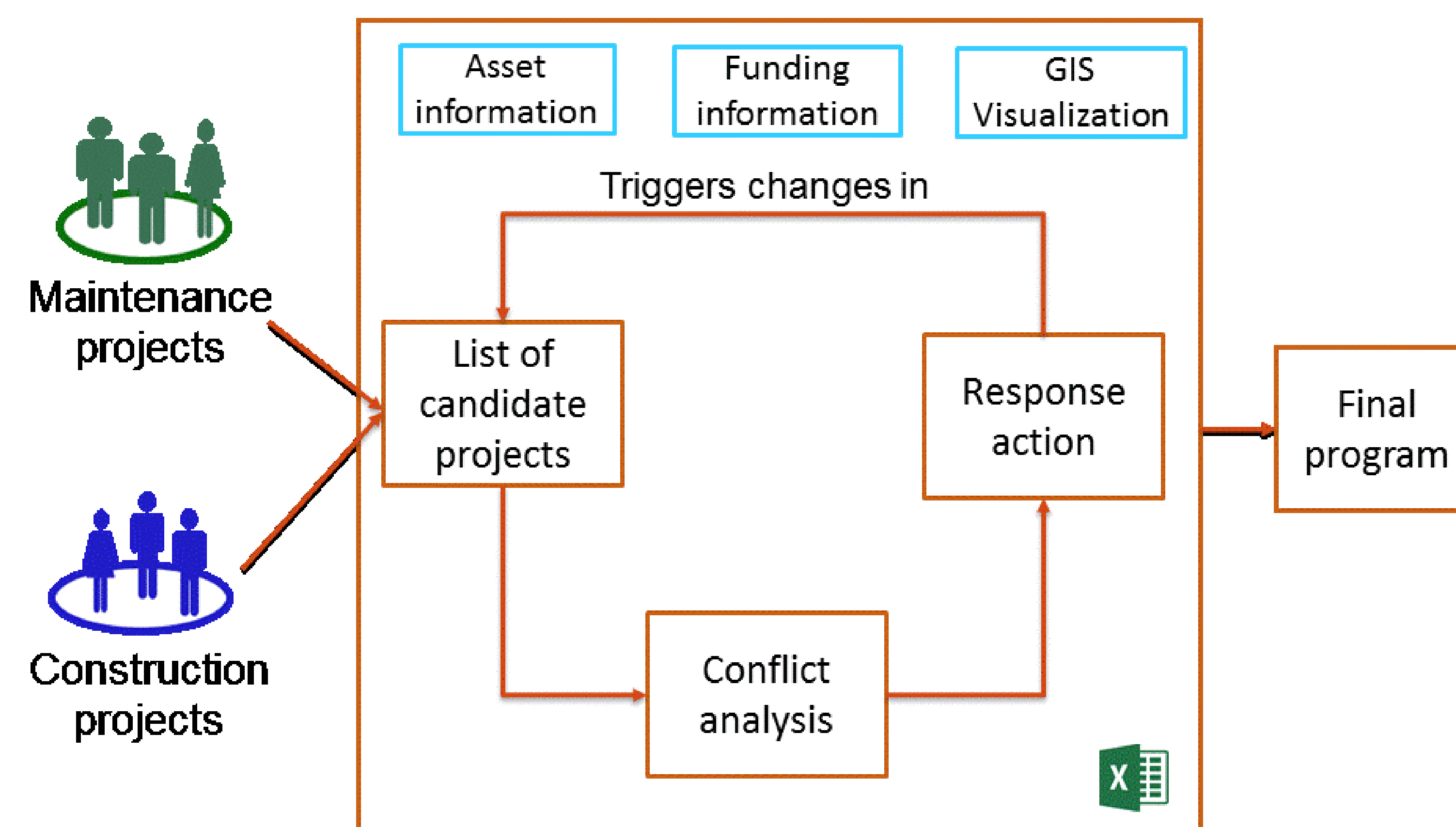
To provide a **collaborative platform** to support cross-functional planning of highway projects to **avoid costly planning errors**.

The **specific objectives** of the Sandbox tool include:

- Identifying spatial-temporal conflicts** among a list of candidate projects for potential response action.
- Providing a **standard format** for documenting inter-project conflicts and **generating contextual information** to guide conflict resolution decisions.
- Provide **supplementary asset condition score information** to assist decision-makers in resolving potential conflicts.
- Visualizing **different scenarios** of candidate projects in **GIS** to spatially confirm the priority list of the highway projects to be submitted for funding approval.

## Sandbox Tool Framework

- Microsoft Excel**-based tool. Easy to use.
- Provides an **integrated environment** for cross-functional planning.
- Supports **iterative process** to identify conflicts, take appropriate response action, update funds utilized and add/remove/modify candidate projects.



## Tool Screenshots

Candidate Projects Sheet (Screen 1):

OPEN SANDBOX GIS		SAVE CHANGES TO PROJECTS		CONFLICT ANALYSIS		GENERATE ASSET INFO									
FISCAL_YR	PROJECT_ID	COUNTY	Hwy	FROM	TO	EST_COST	DESCRIPTION	BRG_DPO	END_DPO	DIRECTION	ROADBED	ROAD_ID	INFORM ACTION SYSTEM	CONFLICT STATUS	CONDITION SCORE
2021	0007-07-027	Palo	SH0016	STRAWN CITY LIMIT	EASTLAND COUNTY	\$ 1,118,745	REPAIR BASE	84.184	85.96	NS	Main	SH0016-KG	DCIS		96.94
2022	0007-08-029	Palo	SH0016	US 180	FM 207	\$ 4,235,320	REPAIR BASE	71.478	82.331	NS	Main	SH0016-KG	DCIS		82.06
2022	0007-10-061	Palo	US0180	WEST OF FOLLARD	WEST OF US	\$ 900,000	REPAIR BASE	273.896	274.854	EW	Main	US0180-KG	DCIS	Potential Conflict	78.02
2019	0007-10-066	Palo	US0180	EAST OF SH	WEST OF	\$ 579,280	CLEAN DITCH	272.203	272.468	NA	Main	US0180-KG	DCIS		97
2022	0008-01-046	Palo	US0180	WEST OF FM 1821		\$ 1,800,000	REPAIR BASE	274.83	276.659	EW	Main	US0180-KG	DCIS	Potential Conflict	80.4
2020	0008-02-073	Parker	US0180	US 180 WB	OVER DRY	\$ 159,920	FULL DEPTH DECK REPAIRS	280.383	280.408	NA	Main	US0180-KG	DCIS		97.5
2021	0008-03-094	Parker	IH0020	FM 1187/3325	TARRANT/P	\$ 21,800,000	CONSTRUCT ARKER	415.02	422.596	NS	Frontage	IH0020-AG	DCIS		49.93
2019	0008-03-120	Parker	IH0020	HUDSON OAKS DR	FM 1187/FM	\$ 2,614,320	REPAIR	415.82	417.905	EW	Main	IH0020-KG	DCIS		96.7
2022	0008-05-030	Tarrant	SH0180	US 287	DR	\$ 482,916	REPAIR BASE	0.506	0.939	EW	Main	SH0180-KG	DCIS		74.52
2019	0008-07-035	Tarrant	SH0180	FIELDER RD	WEST 23RD ST	\$ 4,959,299	REPAIR BASE	11.245	16.932	EW	Main	SH0180-KG	DCIS		69.88
2021	0008-09-037	Parker	FM1187	MAVERICK ST	FM 5	\$ 6,440,000	WIDENING OF	2.403	2.579	NS	Main	FM1187-KG	DCIS		34.16
2019	0008-12-093	Tarrant	IH0020	AT HW 20	CONN "B"	\$ 123,370	PAINT INTERIOR	436.142	436.281	NA	Main	IH0020-KG	DCIS		97.5
2020	0008-13-234	Tarrant	IH0020	FWWR DRIVE	AT SUN VALLEY	\$ 1,400,000	RECONSTRUCT	437.679	438.327	NA	Frontage	IH0020-KG	DCIS		39
2019	0008-13-239	Tarrant	IH0020	AT SP 305	AT SUN VALLEY	\$ 740,151	EXISTING	0.722	0.919	NS	Main	IH0020-AG	DCIS		100
2020	0008-13-243	Tarrant	IH0020	IH 20 CONN R	0.124 MI SW OF FM	\$ 412,020	REPLACE FAILED	439.716	439.087	NA	Main	IH0020-KG	DCIS	Potential Conflict	48.78
2020	0008-14-118	Tarrant	IH0820	0.124 MI SW OF FM	OF FM 1220	\$ 289,763	DECK JOINTS AT	10.713	10.959	NA	Main	IH0820-KG	DCIS	Potential Conflict	100
2020	0008-14-120	Tarrant	IH0820	CAHOBA, D	IH 35	\$ 590,399	INSTALL MILED	8.245	17.144	NA	Main	IH0820-KG	DCIS	Conflict	95.18

Detailed Conflict Analysis (Screen 2):

Conflict ID	Highway Name	Project_ID_1	Project_De scription_1	Project_ID_2	Project_De scription_2	Conflict Length	Time_Gap	Conflict Type	Response Action	Responsible Manager	Status
Conflict 1	US0180	0007-10-061	REPAIR BASE	0008-01-046	REPAIR BASE FAILURES, MILL	0.024	0				
Conflict 2	IH0820	0008-14-118	INSTALL PROTECTIO	0008-14-120	MILLED EDGELINE RUMBLE STRIPS	0.246	0				
Conflict 3	IH0020	0008-16-042	CONSTRUC T 1 AUX	0008-16-048	ABUTMENT DISTRESSED REPAIR	0.119	1				
Conflict 4	US0081	0013-08-130	CONSTRUC T GRADE	0013-08-133	REPAIR CONCRETE FAILURES, HMAC	1.569	1				
Conflict 5	US0081	0013-08-130	CONSTRUC T GRADE	0013-08-140	NB, HMAC OVERLAY, PAVEMENT MILL &	1.569	2				
Conflict 6	US0081	0013-08-133	REPAIR CONCRETE	0013-08-140	NB, HMAC OVERLAY, PAVEMENT MILL &	4.14	1				
Conflict 7	IH0035 W	0014-03-087	RECONSTRUCT THRU LANE	0014-03-088	INTERCHANGE AT	0.1	0				
Conflict 8	IH0035 W	0014-16-278	PAINT INTERIOR	0014-16-282	REPLACE FAILED DECK JOINTS AT	0.015	1				
Conflict 9	IH0035 W	0014-16-281	REPAIR FC DOOR	0014-16-282	REPLACE FAILED DECK JOINTS AT	0.322	0				
Conflict 10	SH0183	0094-01-033	REPLACE RAILROAD	0094-01-040	REPAIR BASE FAILURES, MILL	0.074	1				
Conflict	11S0380	0134-04-037	REPAIR	0134-04-038	WIDEN ROADWAY	0.004	0				

## Highlights

- Sandbox tool helps in identifying spatial-temporal conflicts at early stages of planning.
- Features like generating asset information, visualization in GIS and a structured conflict resolution environment assists decision makers in developing efficient pavement management programs.

## Acknowledgements

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