



THE MARRIAGE OF TRAFFIC SIMULATION & 3D VISUALIZATION TO IMPROVE STAKEHOLDER UNDERSTANDING



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Outline

- Traffic Operations Analysis – Engineer Oriented
- Stakeholder Involvement
- Focus of Traffic Simulation
- Intent of 3D Visualization
- Marriage of Traffic Simulation & 3D Visualization
- Project Overviews
 - SH 35/SH 361 Interchange – Corpus Christi
 - US 69/FM 71 Interchange – Port Arthur
 - FM 3351 Corridor – San Antonio
- Summary





Traffic Operations Analysis – Engineer Oriented

TSAP Manual Includes Overview of Tools

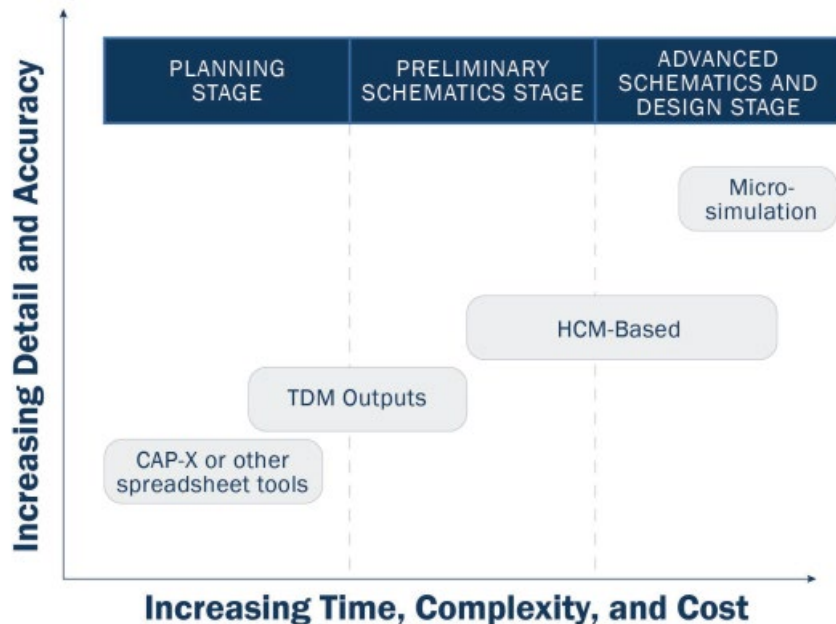


Figure 4-1: Tool Selection by Project Development Stage

Traffic and Safety Analysis Procedures Manual



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Traffic Operations Analysis – Engineer Oriented

CAPx – Screening of Potential Alternatives

Capacity Analysis for Planning of Junctions

Input Worksheet

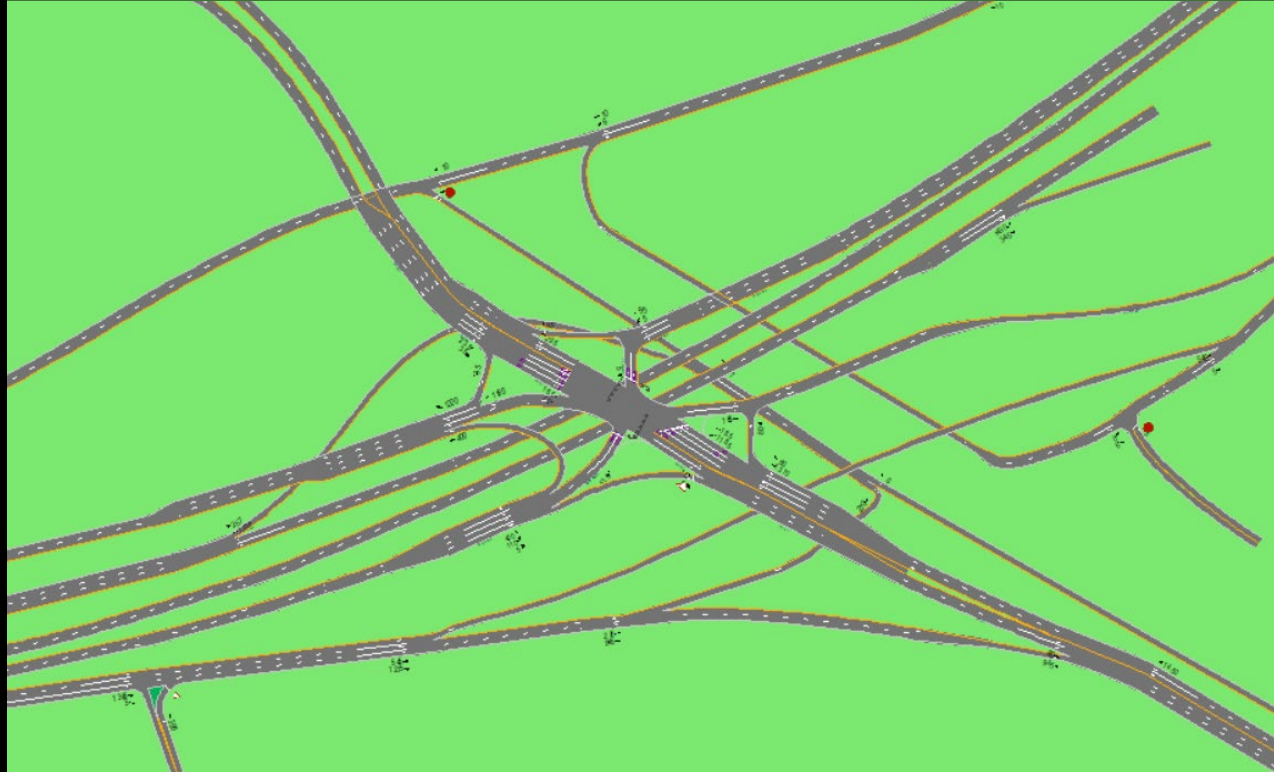
Results for Roundabouts															
#	TYPE OF ROUNDABOUT	Zone 1 (North)			Zone 3 (East)			Zone 2 (South)			Zone 4 (West)			Overall v/c Ratio	Ranking
		Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3		
9.1	50 ICD	-0.07			-0.21			3.92			-6.27			3.92	2
9.2	75 ICD	-0.08			-0.24			3.71			-9.23			3.71	1
9.3	1 X 1	4.53			6.83			3.28			8.59			8.59	7
9.4	1 X 2	1.66			5.09	1.75		2.93			7.69	0.90		7.69	5
9.5	2 X 1	0.75	3.78		2.83			1.36	1.92		5.70			5.70	4
9.6	2 X 2	0.33	1.39		5.46	0.60		1.24	1.71		2.44	0.72		5.46	4
9.7	3 X 3	0.62	0.21	1.09	3.09	1.83	0.63	1.17	0.17	1.45	4.25	2.89	0.52	4.25	2

Results for Interchanges																
#	TYPE OF INTERCHANGE	Sheet	Zone 1 (Rt Mrg)		Zone 2 (Lt Mrg)		Zone 3 (Ctr. 1)		Zone 4 (Ctr. 2)		Zone 5 (Lt Mrg)		Zone 6 (Rt Mrg)		Overall v/c Ratio	Ranking
			CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C		
10.1	Diamond	N-S					2469	1.54	971	0.61					1.54	9
10.2		E-W					1220	0.76	2634	1.65					1.65	10
11.1	Partial Cloverleaf	N-S					180	0.11	104	0.07					0.11	1
11.2		E-W					2464	1.96	1049	0.66					1.54	8
13.1	Displaced Left Turn	N-S	307	0.19			2251	1.41	1294	0.81			1212	0.76	1.41	5
13.2		E-W	489	0.31			277	0.17	2346	1.47			2235	1.40	1.47	6
14.1	Double Crossover Diamond	N-S	307	0.19	2189	1.37	198	0.12	1181	0.74	404	0.25	1095	0.68	1.37	4
14.2		E-W	392	0.24	404	0.25	205	0.13	2382	1.49	1236	0.77	1735	1.08	1.49	7
15.1	Single Point	N-S	260	0.16			1297	0.81					754	0.47	0.81	2
15.2		E-W	392	0.24			1316	0.82					897	0.56	0.82	3



Traffic Operations Analysis – Engineer Oriented

**Synchro/HCS –
Macro Level Analysis**





Traffic Operations Analysis – Engineer Oriented

Traffic Simulation – Detailed Analysis





Stakeholder Involvement

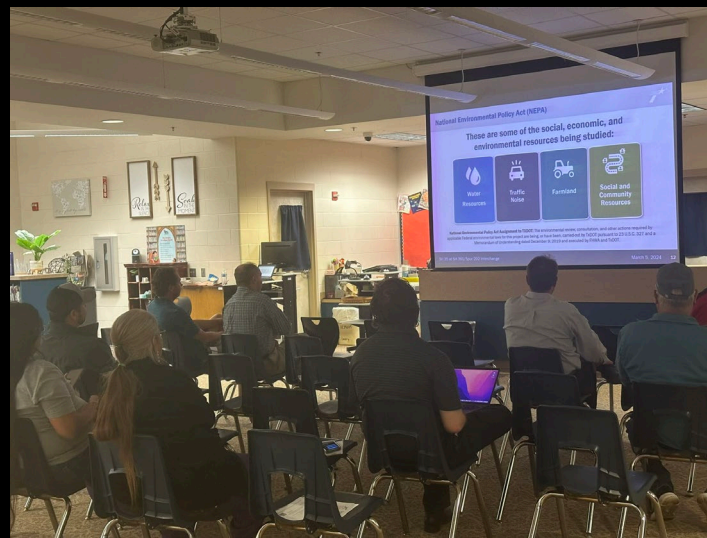
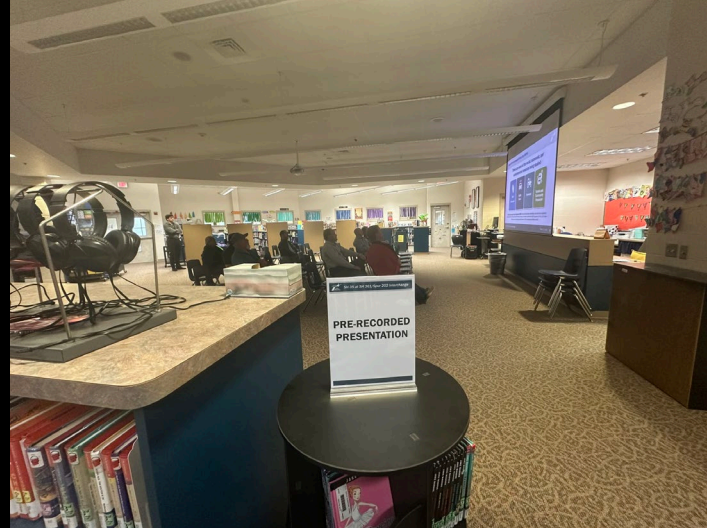
Key project task in obtaining comments and acceptance from a variety of sources.

MPO's

City/County/State Agencies

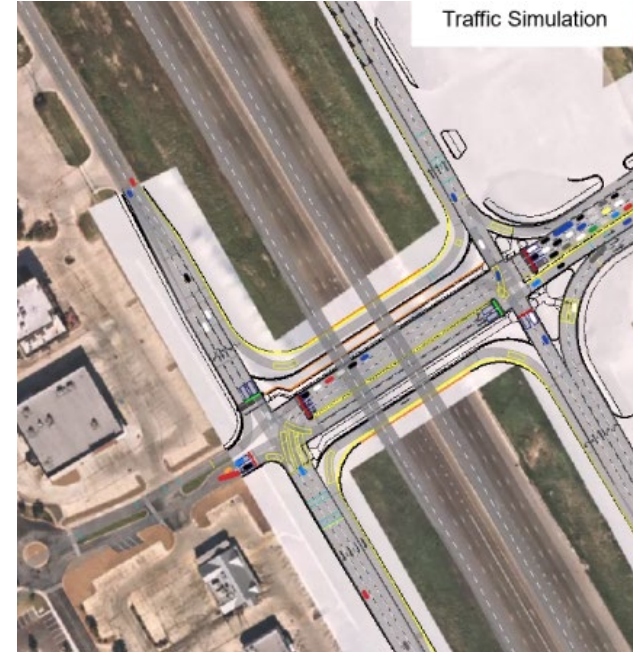
Homeowners

Commercial Businesses



Technical Focus of Traffic Simulation

- Excellent tool for engineers and planners to better understand complex transportation networks
- Allows for improved understanding of immediate project study area as well as potential impacts to adjacent segments
- Provides visualization of expected traffic operations



Intent of 3D Visualization



- Encompasses all attributes of the transportation system (signing, aesthetics, etc.) as necessary to better enhance project improvements
- Enhanced drive-thrus allow stakeholders to better understand how the project improvements will impact them
- Traffic flow can be portrayed or realistic

Stakeholder Expectations of 3D Visualization

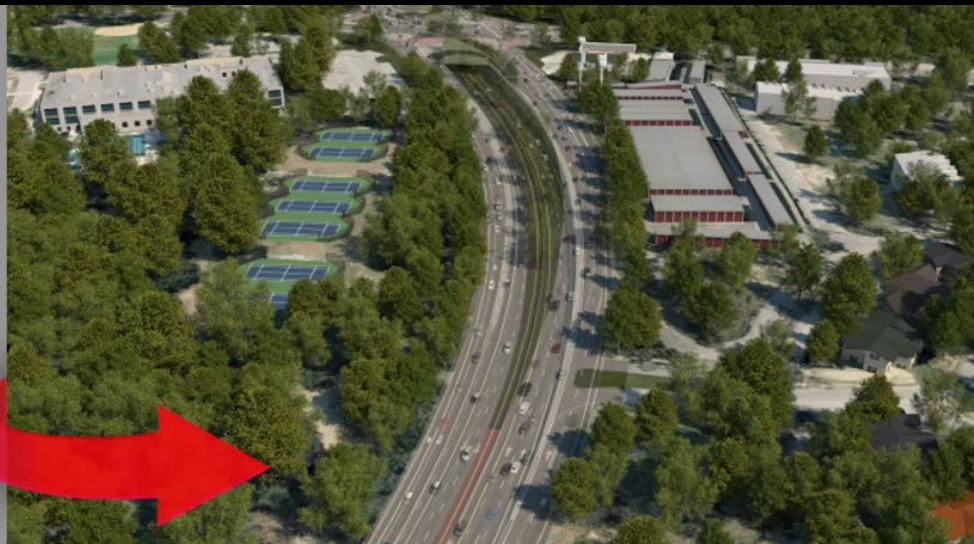
- Tailoring the rendering to be specific to the location and needs of the study area. This allows stakeholder buy-in of the project.
- Provide context sensitive information. This includes graphics to show key locations, road names, orientation, etc.
- Beyond the 3D video, there may need to be additional explanation. Explains to the observer how to travel through an intersection or interchange.





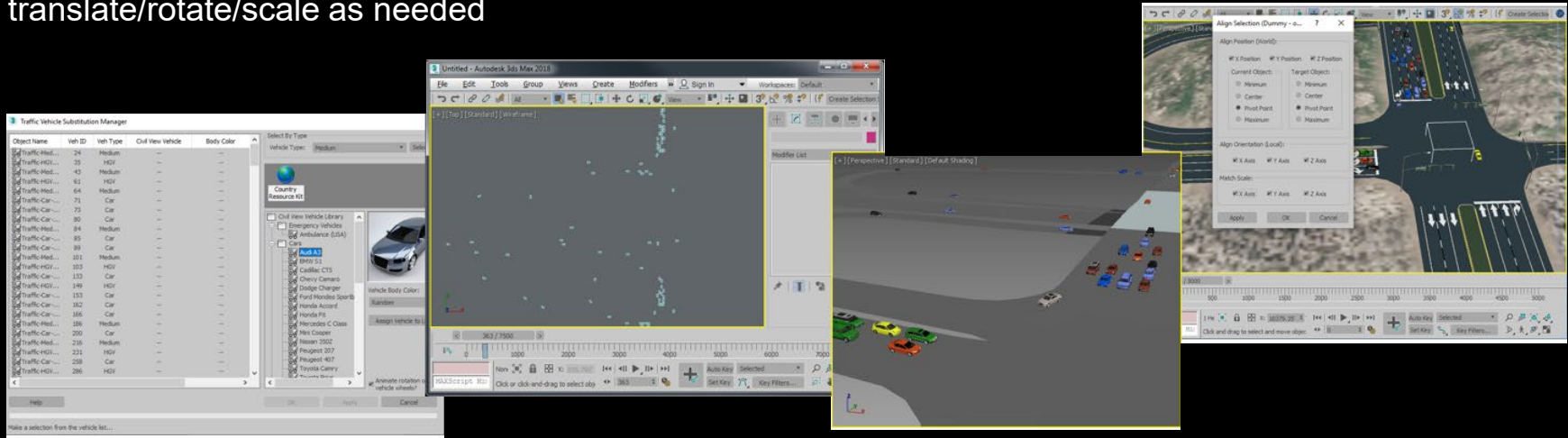
The Marriage of Traffic Simulation & 3D Visualization

- Working with traffic engineers, it's relatively simple to create and integrate highly accurate and photorealistic vehicle and traffic animations
- Easy to add large numbers of vehicles automatically to a scene
- Realistically moving traffic based on real-world variables
- Easily update for different roadway scenarios, time of day, future estimated conditions
- Ability to use 3ds Max's rendering capabilities



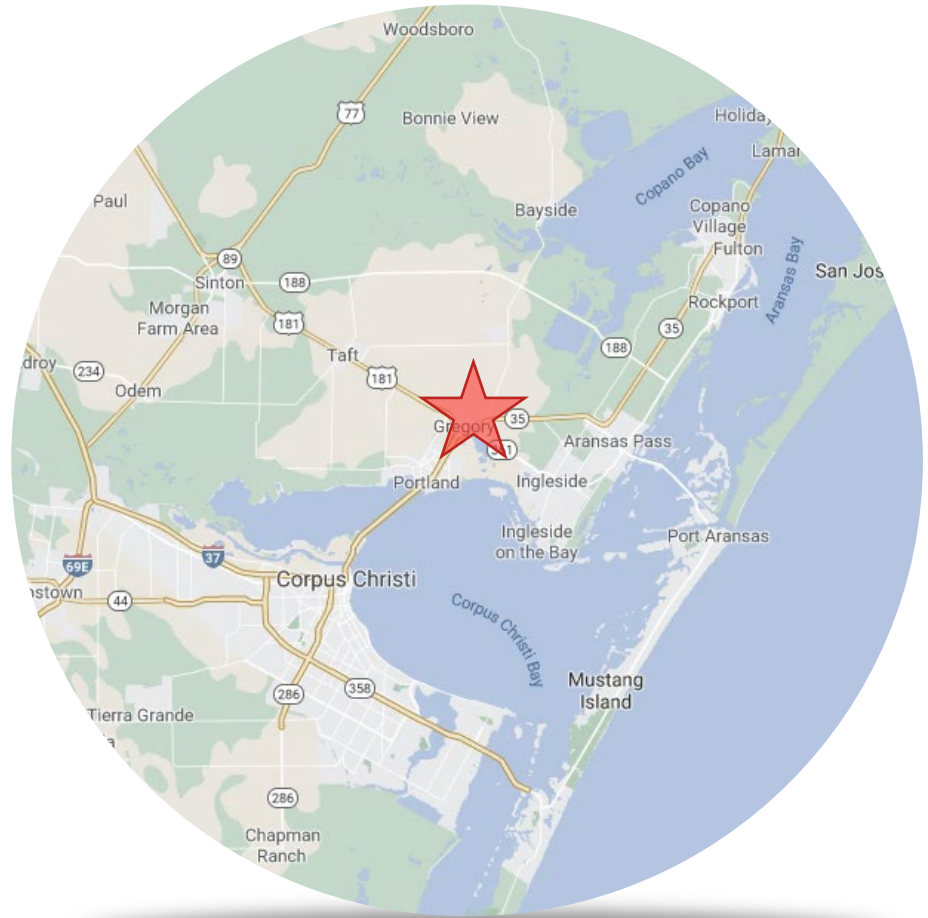
The Marriage of Traffic Simulation & 3D Visualization

- FZP file generated from VISSIM with proper parameters set
- Import FZP file into 3ds Max via Civil View plugin
- Align roadway to VISSIM boxes via translate/rotate/scale as needed
- Track vehicles to roadway surface using the Surface Tracking Manager
- Create custom library objects for different renderers or different vehicles





SH 35/SH 361/US 181 Interchange & SH 361 Corridor





SH 35/SH 361/US 181 Interchange & SH 361 Corridor

- Key Route to Several Chemical Plants
- High Peak Hour Shift Changes
- Local Commuters



SH 35/SH 361/US 181 Interchange & SH 361 Corridor

PROJECT FACTS

LOCATION



SH 361 in and around the cities of Portland, Gregory, and Ingleside

PROJECT LIMITS



Focuses on SH 361 and the SH 361/SH 35/US 181 interchange

EXISTING FACILITY



- Two lanes in each direction
- Six railroad crossings
- Very little capacity to support future growth

LENGTH



Approx. 5.4 miles



SH 35/SH 361/US 181 Interchange & SH 361 Corridor

PURPOSE: What are we trying to do?

- Improve level-of-service and manage congestion and delay for future year conditions
- Reduce delays associated with railroad crossings
- Provide direct connections for heaviest traffic movements
- Reduce frequency and severity of crashes
- Provide more direct connections out of the floodplain for hurricane evacuation

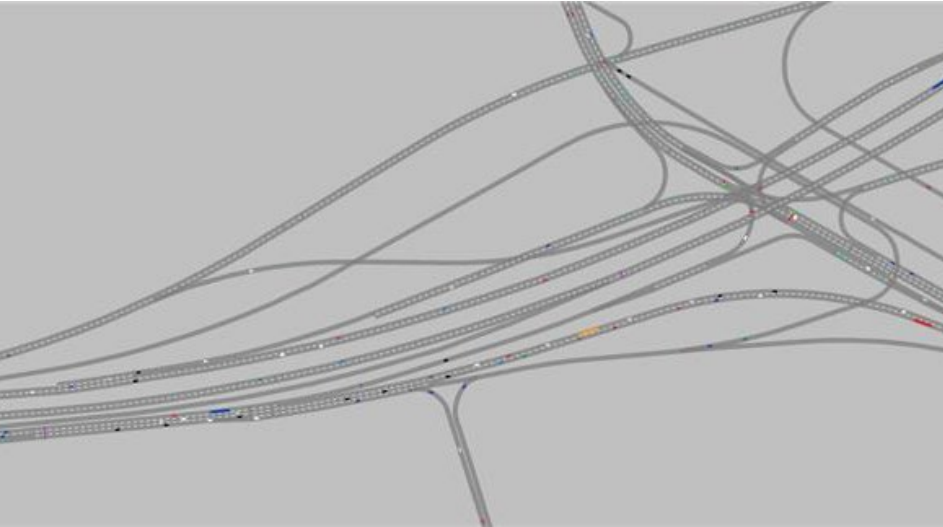


SH 35/SH 361/US 181 Interchange & SH 361 Corridor

- Innovative Interchange Selected
- Single Point Urban Interchange (SPUI)
- First Innovative Interchange within Corpus Christi Region
- 3D Visualization Developed to Enhance Public's Understanding of Improvements



SH 35/SH 361/US 181 Interchange & SH 361 Corridor



VISSIM without Aerial

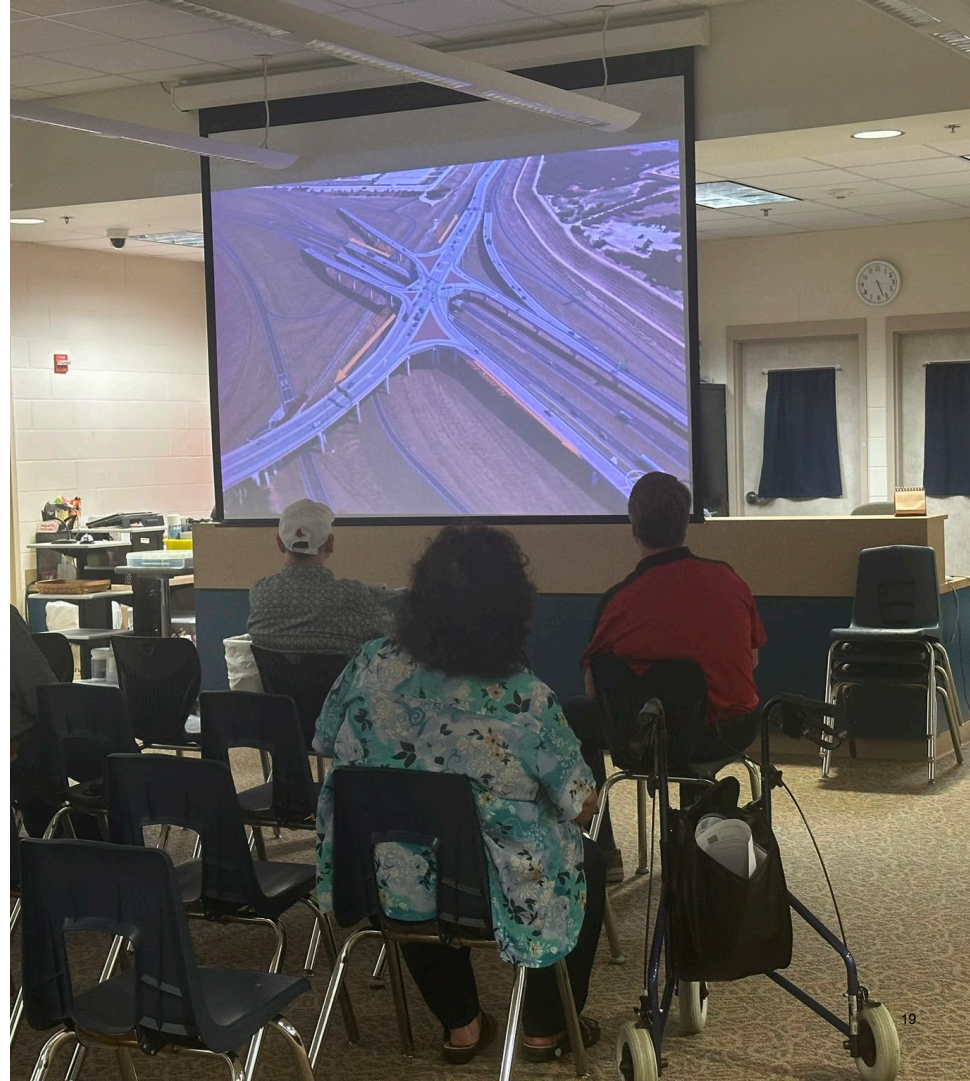


VISSIM with Aerial



SH 35/SH 361/US 181 Interchange & SH 361 Corridor

- Prerecorded presentation including 3D visualization





SH 35/SH 361/US 181 Interchange & SH 361 Corridor

VISSIM Video



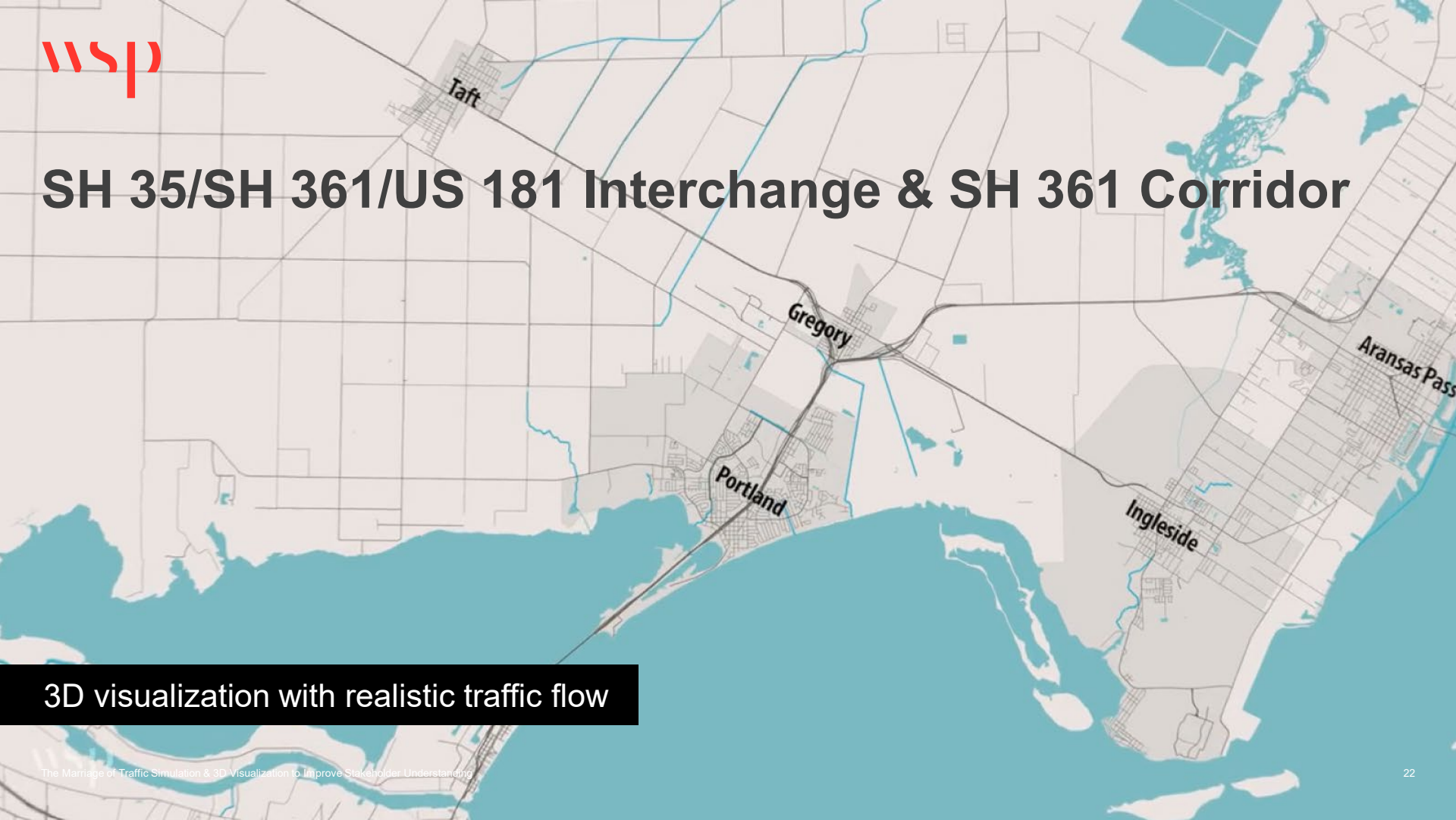
SH 35/SH 361/US 181 Interchange & SH 361 Corridor



3D visualization with realistic traffic flow



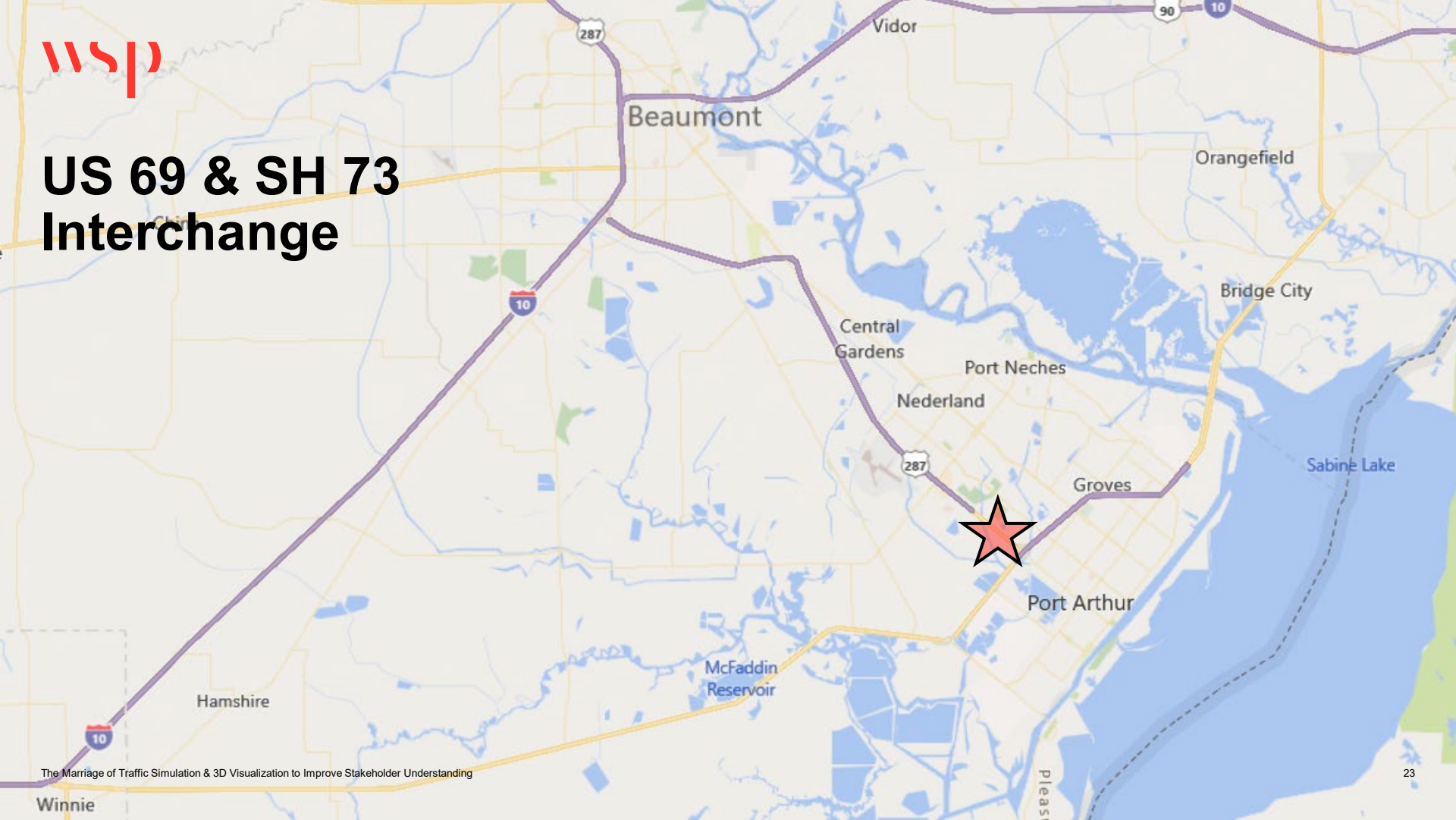
SH 35/SH 361/US 181 Interchange & SH 361 Corridor



3D visualization with realistic traffic flow



US 69 & SH 73 Interchange





US 69 & SH 73 Interchange

PROJECT LIMITS



US 69 from 39th Street to Jimmy Johnson Boulevard/ 75th Street and SH 73 from Spur 215 to 9th Avenue

LENGTH



Limits extend along US 69 for approximately 2.6 miles and along SH 73 for approximately 2.0 miles

LOCATION



Jefferson County



US 69 & SH 73 Interchange

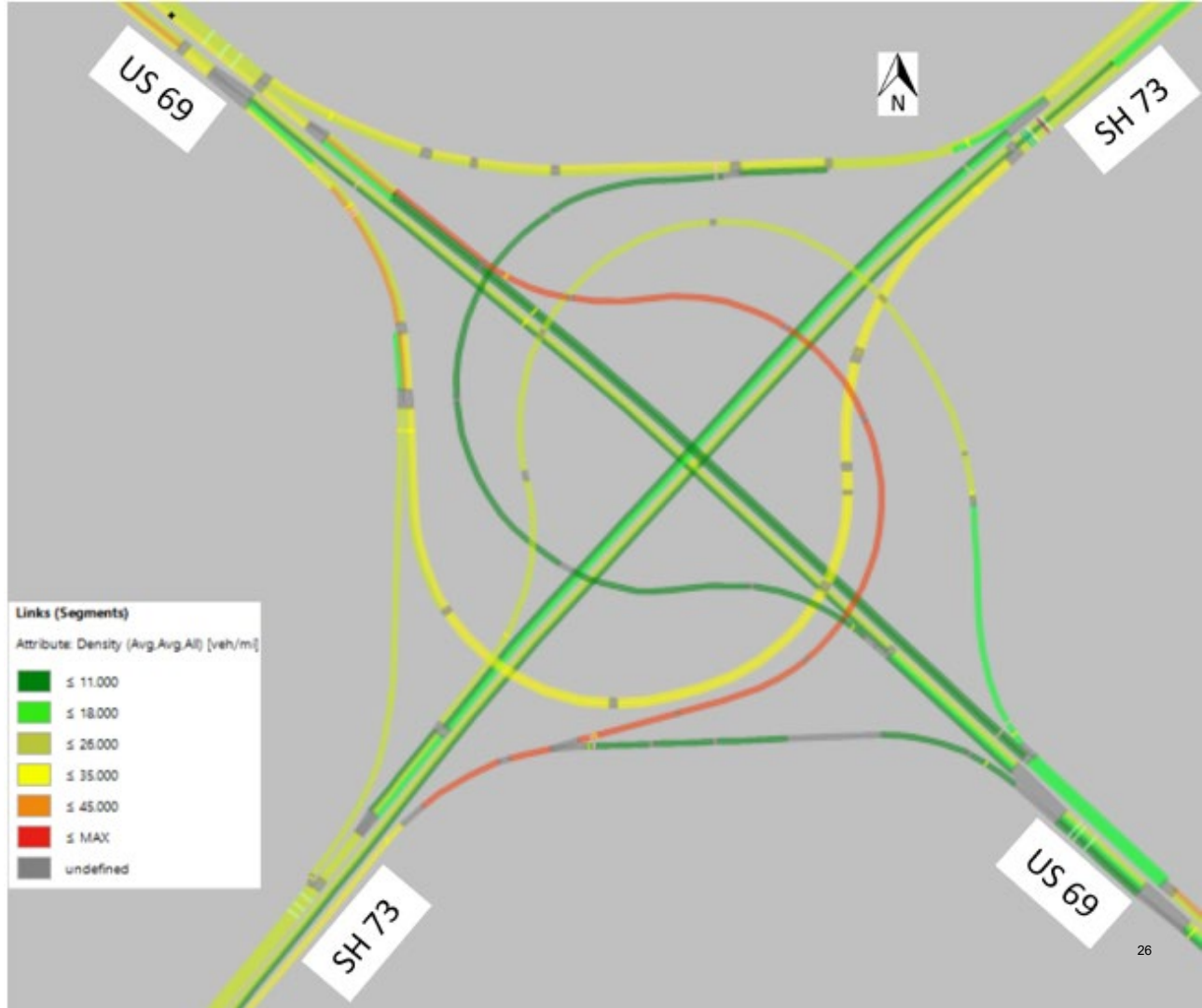
The proposed improvements include:

- Reconfiguring the cloverleaf interchange to a turbine configuration, including:
 - direct connectors;
 - main lane/ramp improvements
 - frontage road
- Constructing retaining walls and culverts
- Widening and replacing bridges



US 69 & SH 73 Interchange

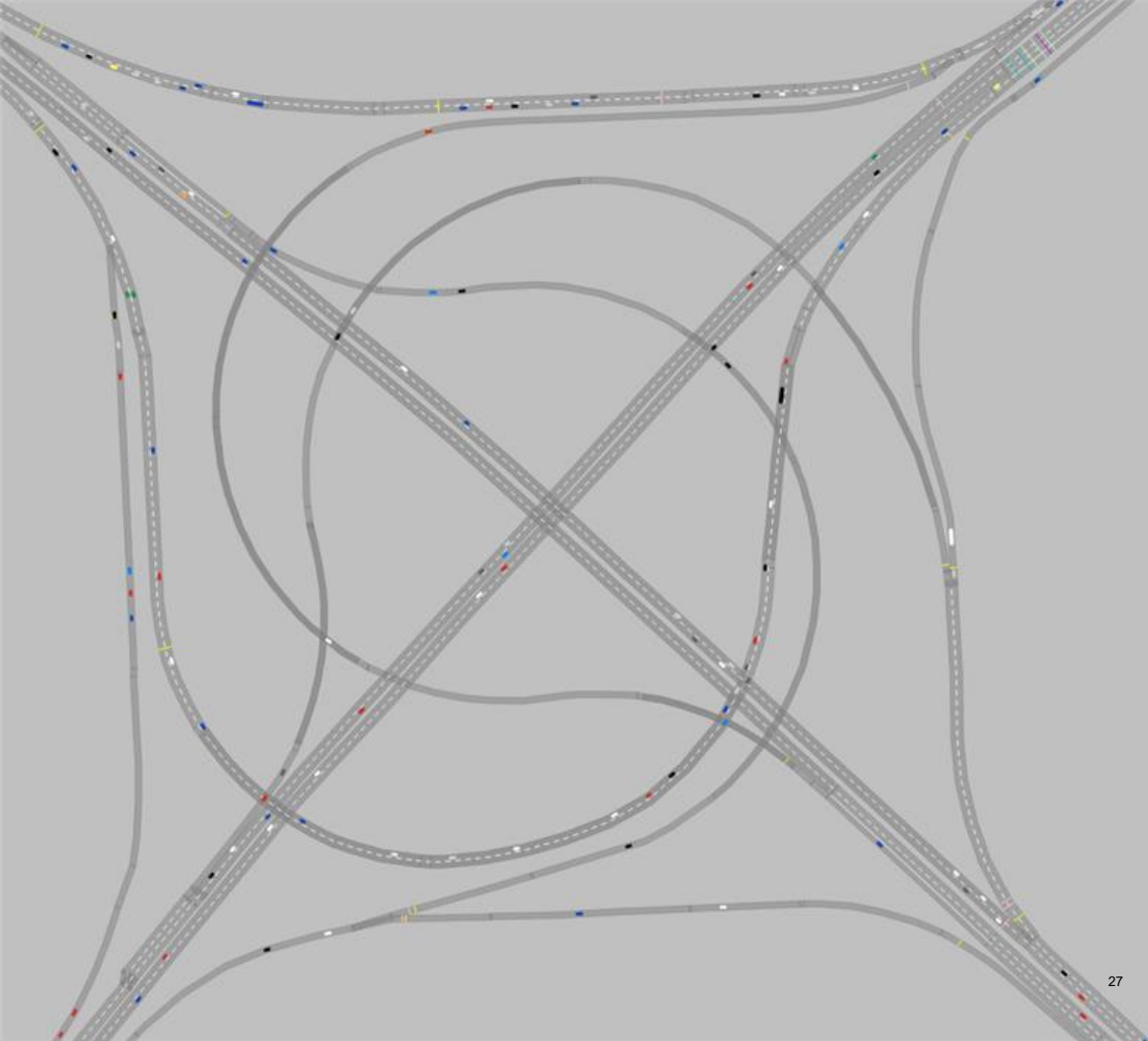
- Several Measures of Effectiveness Available to Engineer
- Travel Speed Output from VISSIM to the Right





US 69 & SH 73 Interchange

VISSIM Video





US 69 & SH 73 Interchange

3D visualization with realistic traffic flow



FM 3351 – I-10 to SH 46

- FM 3351 from I-10 to SH 46 located within Bexar, Comal, Kendall Counties
- Project Limits Reduced to I-10 to Desperado Way





FM 3351 – IH10 to SH 46

PURPOSE: What are we trying to do?

- Improve safety for pedestrians, bicyclists and vehicular traffic
- Improve mobility in the rapidly growing northern region of Bexar County
- Improve operational efficiency of the corridor

LOCATION



FM 3351 from I-10 to SH 46
located within Bexar, Comal,
Kendall Counties

PROJECT LIMITS



Reduced to IH-10 to
Desperado Way

NOT TO SCALE

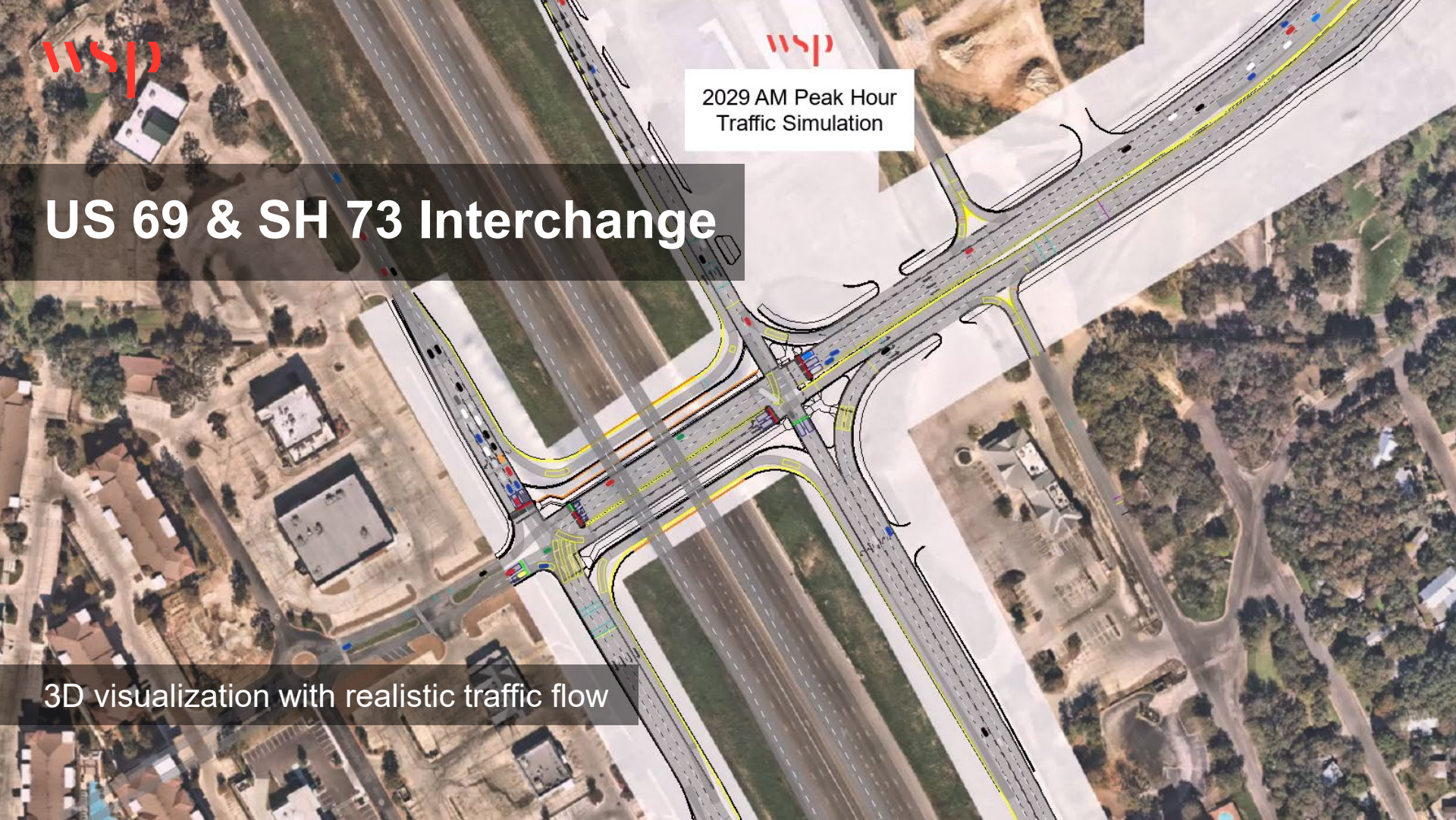




2029 AM Peak Hour
Traffic Simulation

US 69 & SH 73 Interchange

3D visualization with realistic traffic flow





FM 3351 – IH10 to SH 46

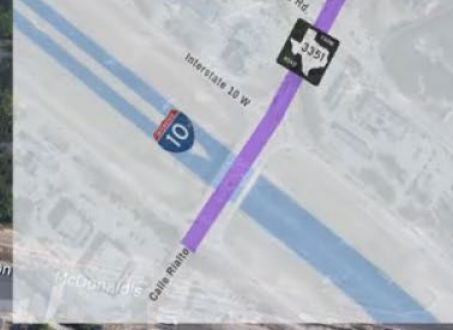
3D Visualization with Realistic Traffic Flow



WSP I-10 & FM 3351 Interchange

FM 3351 – IH10 to SH 46

3D visualization with realistic traffic flow



Bill Miller
BBQ



SUMMARY



3D visualization enhances stakeholder understanding of proposed improvements



Traffic simulation an excellent tool for congested and/or innovative solutions



Traffic operations analysis necessary during selection of preferred transportation improvement alternative