

MPO Policy Advisory Committee meeting, November 10, 2015

# Ben Wilson Street Corridor Study

DRAFT REPORT OF FINDINGS AND ALTERNATIVES



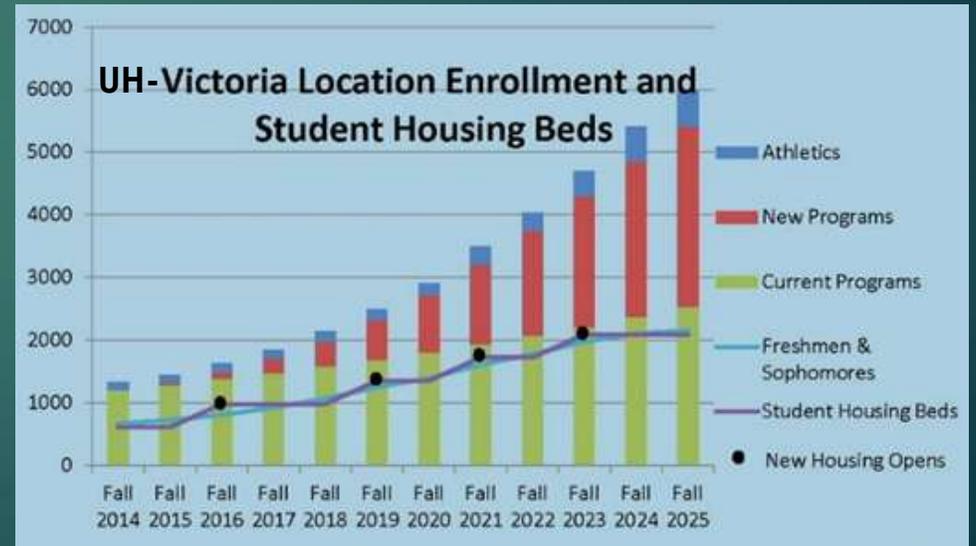
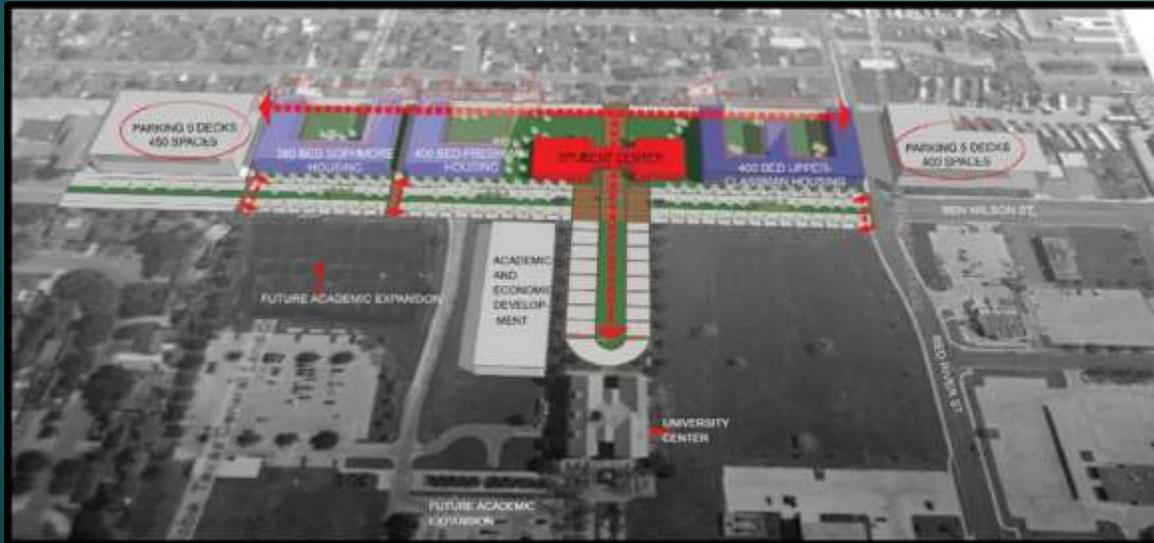
# Corridor Development

- ▶ UH-V
- ▶ Victoria College
- ▶ Citizens Medical Center
- ▶ Residential
- ▶ Minor Commercial/Office



# UH-Victoria

- ▶ Moving dorms from south of BUS 59 to east of Ben Wilson Street
- ▶ Plans to add more dorms, student center, parking garages
- ▶ Plans to grow to 6,000 students in next 10 years



# Corridor Network Function

► Important link in local arterial network

2-Year Crash Summary	
Disregarded red light	11
Failure to yield for left turn	4
Intoxication	1
Failure to yield to pedestrian	1
Failure to control speed	1
	<b>18</b>

Count Location	2012 (TxDOT)	2013 (MPO)	2015 (FNI)
Ben Wilson St. south of Red River St.	12,630	12,714	12,848
Ben Wilson St. north of Red River St.	n/a	n/a	13,277
Ben Wilson St. south of Airline Rd.	n/a	n/a	12,139
Ben Wilson St. north of Airline Rd.	7,970	n/a	n/a
Red River St. west of Ben Wilson St.	9,120	9,170	8,499
Airline Rd. west of Ben Wilson St.	7,170	7,870	6,944
Ben Jordan St. south of Red River St.	12,760	11,478	n/a
Ben Jordan St. north of Red River St.	14,950	13,105	n/a
BUS 59, west of Ben Wilson St.	25,150	25,991	n/a
BUS 59, east of Ben Wilson St.	18,190	19,343	n/a

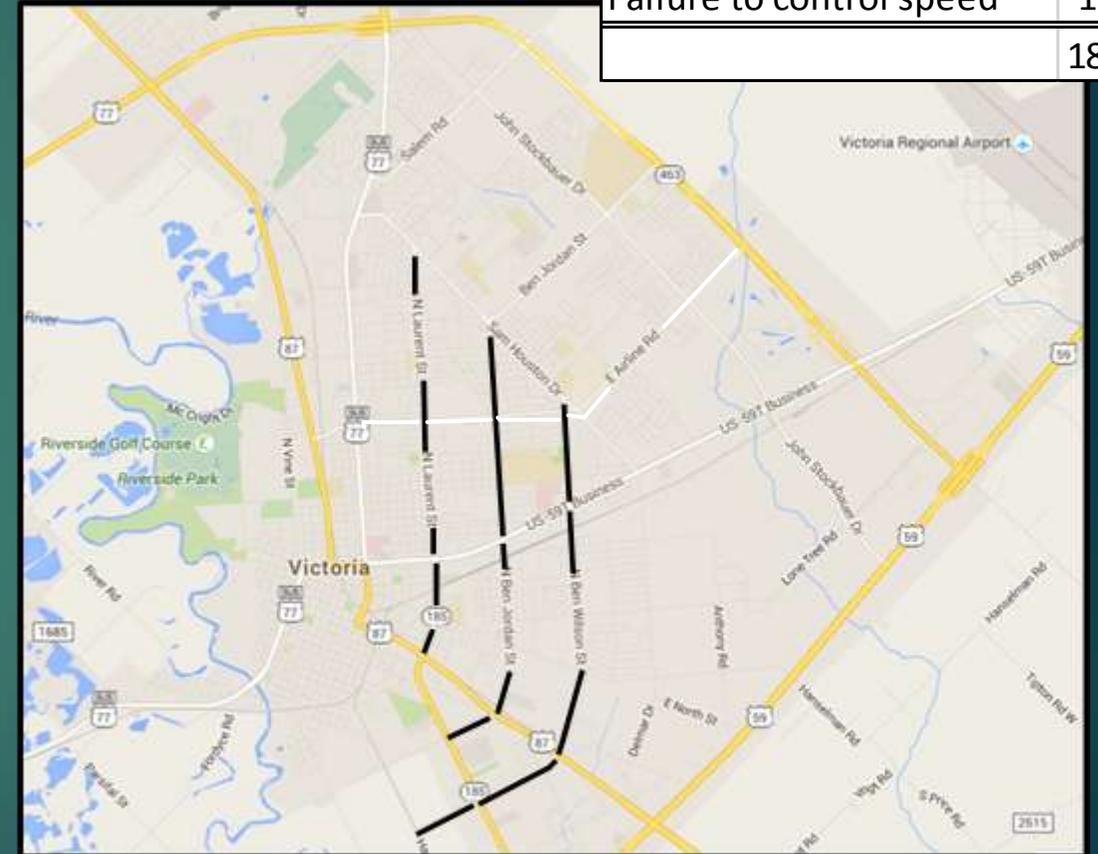


Figure 9. Victoria Roadway Network Parallel to Ben Wilson Street

Table 1. Historical Daily Traffic Volumes on Roadways near the Ben Wilson Street Corridor

# Future Traffic Volumes

- ▶ 2040 MTP projects 10% growth in 25 years
  - ▶ Included modest growth for UH-V
- ▶ UH-V growth to 6,000 students would increase traffic on Ben Wilson Street by about 20%
  - ▶ Parking garage at Red River Street important
  - ▶ High pedestrian volumes cross Ben Wilson Street
- ▶ Volumes for analysis:
  - ▶ BUS 59 to Red River: 13,000 -> 16,000 vpd
  - ▶ Red River to Airline: 13,000 -> 15,000 vpd
  - ▶ Airline to Sam Houston: 8,000 -> 9,000 vpd
- ▶ Constraining int'ns @ Airline Road, BUS 59



# Level of Service (LOS)

## ▶ Characteristics of Traffic Flow by LOS

- ▶ **A: free flow.** Traffic flows at or above the posted speed limit with complete mobility between lanes.
- ▶ **B: reasonably free flow.** LOS A speeds are maintained, maneuverability within traffic stream is slightly restricted.
- ▶ **C: stable flow, at or near free flow.** Lane changes require more driver awareness, interaction with other vehicles.
- ▶ **D: approaching unstable flow.** Speeds slightly decrease as traffic volume slightly increase. Driver comfort levels decrease.
- ▶ **E: unstable flow, operating at capacity.** Flow becomes irregular because there are few gaps in traffic, speeds rarely reach the posted limit.
- ▶ **F: forced or breakdown flow.** Vehicle congestion, with frequent slowing required. Generally more demand than capacity.

### Level of Service (Intersection Delay)

A	< 10 sec/veh
B	10-20 sec/veh
C	20-35 sec/veh
D	35-55 sec/veh
E	55-80 sec/veh
F	> 80 sec/veh

### Level of Service (Free Flow Density)

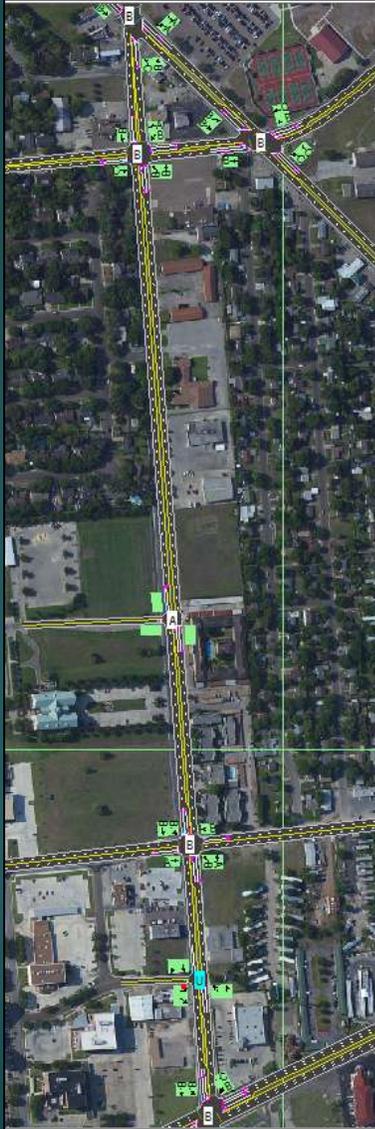
A	0-11 veh/mi/ln
B	11-18 veh/mi/ln
C	18-26 veh/mi/ln
D	26-35 veh/mi/ln
E	35-45* veh/mi/ln
F	>45* veh/mi/ln

# Traffic Operations

- ▶ Existing Lanes
  - ▶ 2 lanes each way plus CTL
- ▶ Minimal Lanes
  - ▶ 1 lane each way plus CTL
  - ▶ Red River reduced
  - ▶ Airline reduced
- ▶ 2015 Traffic operates well
- ▶ 20% Growth (@ Airline Road)
  - ▶ Int'n LOSC -> LOS D
  - ▶ Int'n ICU 71% -> 82%

<b>Table 3. Intersection Capacity Utilization (2015 volumes)</b>				
<b>Intersection</b>	ICU of Existing Lanes (LOS)		ICU of Minimal Lanes (LOS)	
	AM	PM	AM	PM
	Peak Hr	Peak Hr	Peak Hr	Peak Hr
<b>Ben Wilson @ Sam Houston</b>	50% (B)	48% (B)	50% (B)	48% (B)
<b>Ben Wilson @ Airline</b>	52% (A)	50% (A)	68% (C)	71% (C)
<b>Ben Wilson @ Red River</b>	52% (A)	48% (A)	58% (B)	57% (B)
<b>Ben Wilson @ BUS 59</b>	53% (A)	57% (B)	59% (B)	60% (B)

# Traffic Model – Synchro - Existing



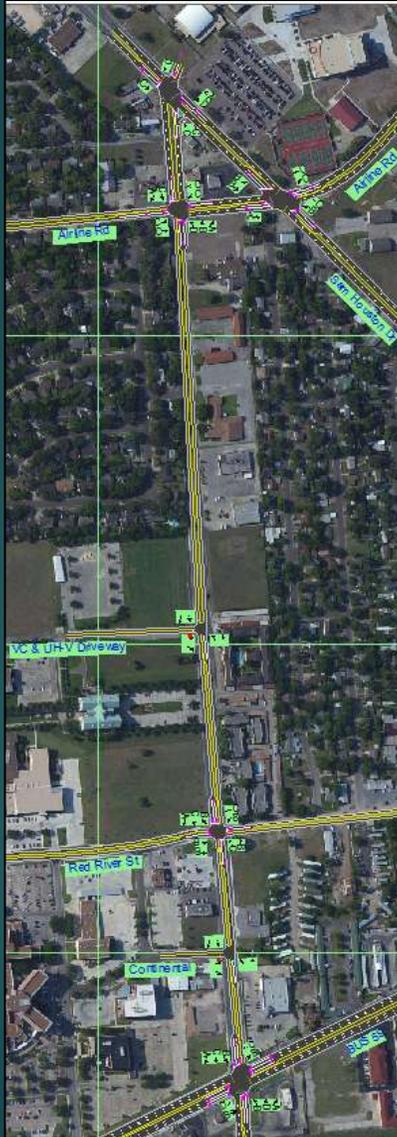
AM Existing  
5-Lane



PM Existing  
5-Lane



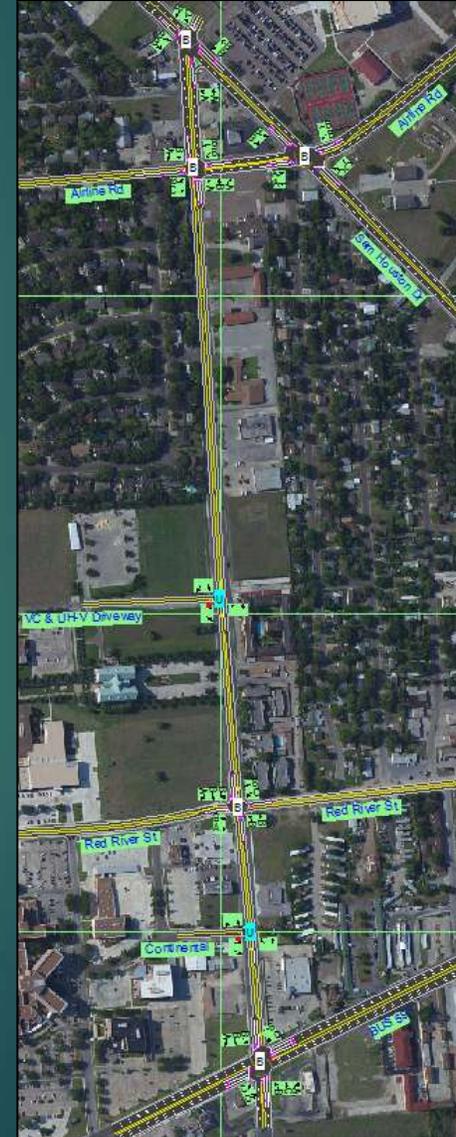
# Traffic Model – Synchro – 3-Lane



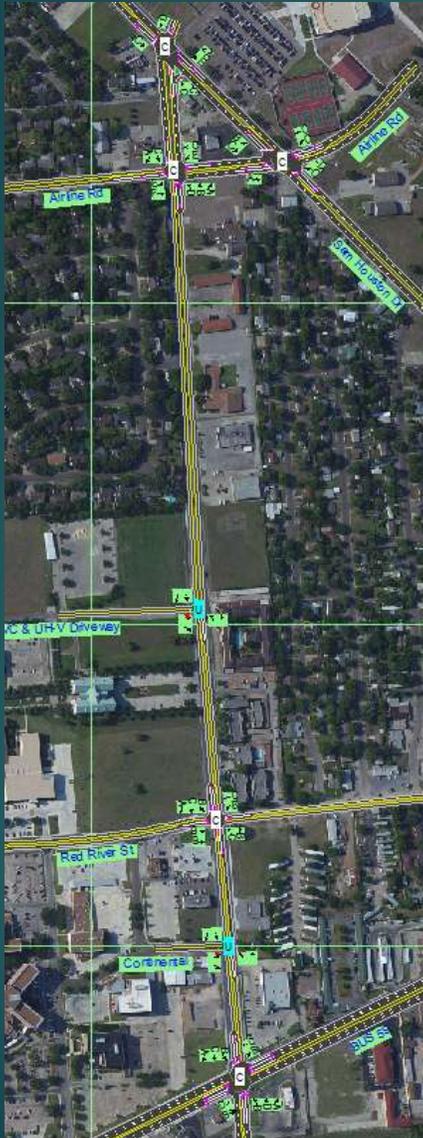
AM Proposed  
3-Lane



PM Proposed  
3-Lane



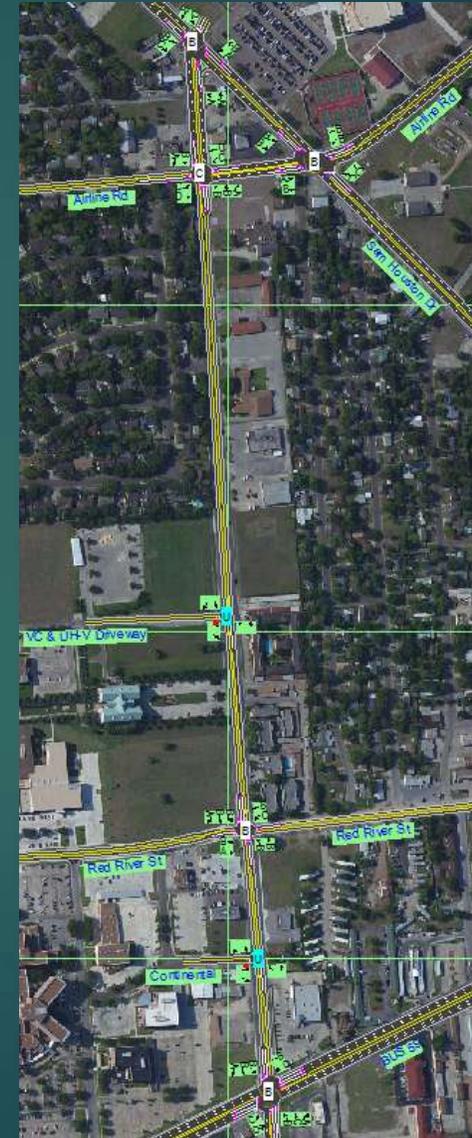
# Traffic Model – Synchro – 3-Lane +20%



AM Proposed  
3-Lane



PM Proposed  
3-Lane

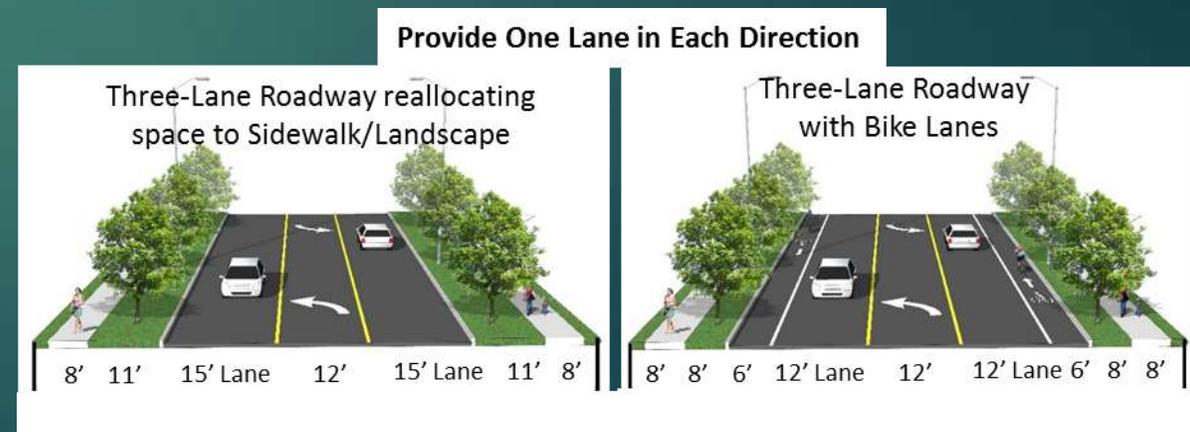
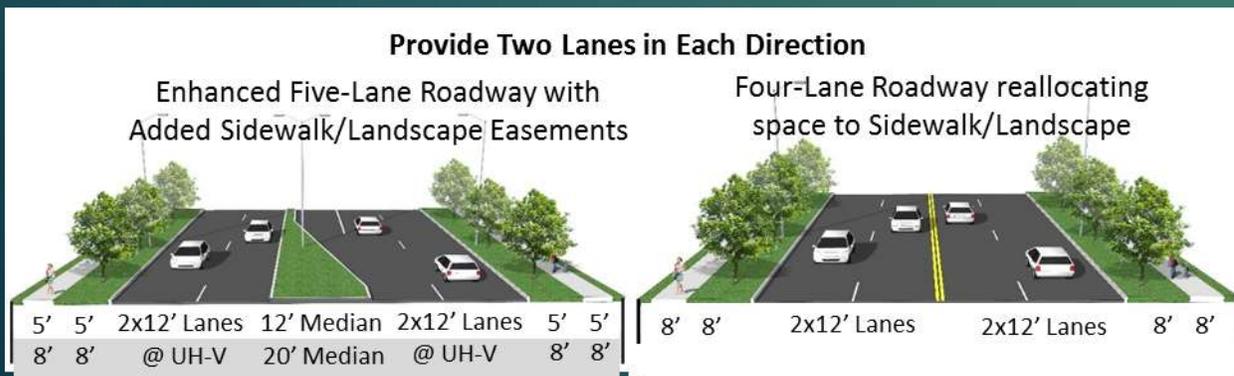


# Development & Assessment of Alternatives

- ▶ **Goal: Traffic Operations** (30 points)
  - ▶ Objective: Process traffic volumes with acceptable Level of Service (10 points)
  - ▶ Objective: Context sensitive traffic operations (10 points)
  - ▶ Objective: Accommodate emergency access (5 points)
  - ▶ Objective: Accommodate transit vehicles and passenger service (5 points).
- ▶ **Goal: Pedestrian and Bicycle Mobility and Safety** (30 points)
  - ▶ Objective: Enhance the crossing safety of peds and bicyclists at UH-V (20 points)
  - ▶ Objective: Enhance the crossing safety of peds and bicyclists at intersections (5 points)
  - ▶ Objective: Enhance the pedestrian and bicyclist conveyance along Ben Wilson (5 points)
- ▶ **Goal: Cost Effective Solution** (25 points)
  - ▶ Objective: Cost effective improvements that leverages private investments (15 points)
  - ▶ Objective: Minimize the lifecycle cost of public investment (10 points)
- ▶ **Goal Corridor Aesthetics** (15 points)
  - ▶ Objective: Enhance the aesthetics for pedestrian, bicyclist and motorists (15 points)

# Alternative Improvements

- ▶ 1A – Existing 5-lane roadway with raised medians and added landscaping
- ▶ 1B – Enhanced 5-lane at UH-V with 4 lanes north of UH-V
- ▶ 2A – 5 lanes with some raised medians and raised section for ped underpass
- ▶ 2B – 5 lanes, 4 lanes north of UH-V with raised section for ped underpass
- ▶ 3A – 3 lanes north of Red River & enhanced roadside, 5 lanes south of Red River
- ▶ 3B – 3 lanes north of BUS 59 to Airline, enhanced sidewalks and landscaping

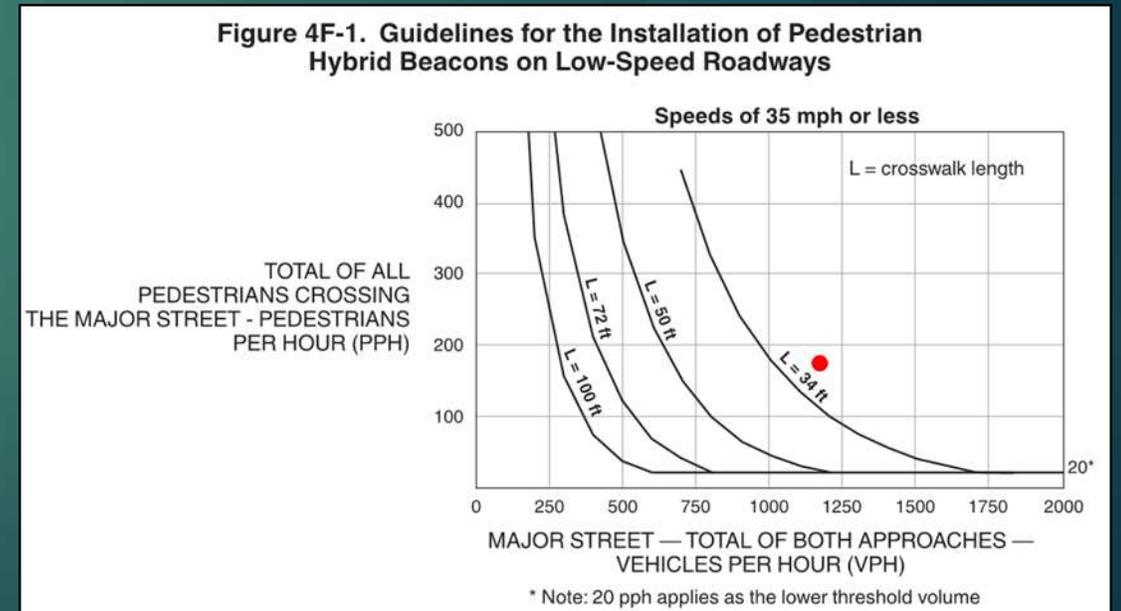
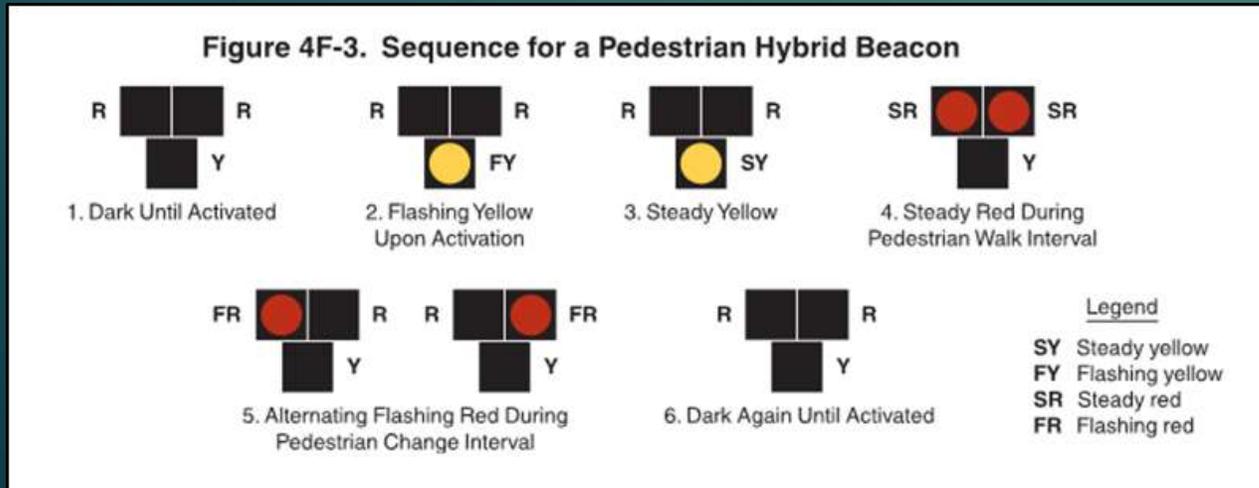


# Potential Corridor Treatments

- ▶ HAWK Pedestrian Signal
- ▶ Pedestrian Signal Heads
- ▶ Raised Medians / Pedestrian Refuge
- ▶ Enhanced Sidewalks
- ▶ Enhanced Landscaping & Aesthetics
- ▶ Grade Separated Pedestrian Crossing at Student Center
- ▶ Complete Streets/Context Sensitive Solutions

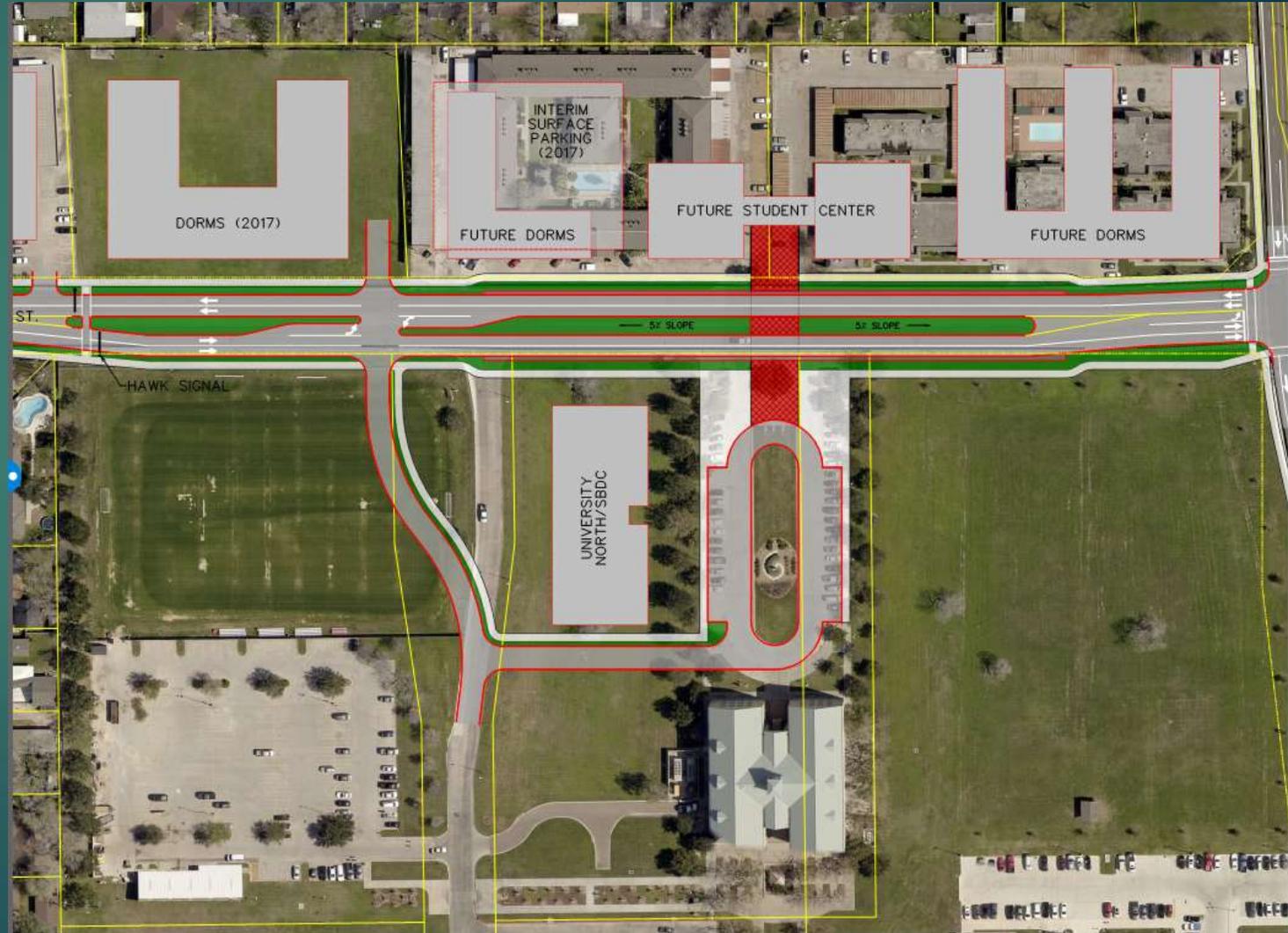
# HAWK Pedestrian Signal

- ▶ New type of signal now standard in MUTCD
- ▶ Proven to have 90% driver compliance
- ▶ Dark until activated by pedestrian
- ▶ Can be coordinated with adjacent signal



# Grade Separated Crossing

- ▶ Raise Ben Wilson Street
- ▶ Re-route main entry
- ▶ Student Center planned to have lower level plaza
- ▶ Street match SC 2<sup>nd</sup> Floor
- ▶ Split bridges for light & air
- ▶ 10-ft clear, 50-ft wide



# Alternative 1A

Evaluation Criteria	Criteria Maximum	Score
<b>Goal: Traffic Operations</b> <ul style="list-style-type: none"> <li>All intersections operate at LOS B or better; all movements are at LOS C or better</li> <li>High capacity, moderate speed roadway through campus and residential area</li> <li>Two lanes in each direction allow cars to pull over for emergency access</li> <li>Transit vehicles stop in lane to serve bus stop, vehicles pass in second thru lane</li> </ul>	10 10 5 5	10 5 4 2
<b>Goal: Pedestrian and Bicycle Mobility and Safety</b> <ul style="list-style-type: none"> <li>HAWK signals for ped/bike crossing safety across 4 lanes with 12-foot median</li> <li>Ped crossings at Airline Rd SW corner still constrained, others unchanged</li> <li>Sidewalks at back of curb in some areas, others mostly 4 and 5 feet wide</li> </ul>	20 5 5	10 2 1
<b>Goal: Cost Effective Solution</b> <ul style="list-style-type: none"> <li>Retain curb lines, limited raised medians, mill &amp; overlay street, some UH-V funds</li> <li>Maintain 5-lane street, reconstruct 5 lane street in a few years</li> </ul>	15 10	14 2
<b>Goal: Corridor Aesthetics</b> <ul style="list-style-type: none"> <li>Landscaping along sidewalks at UH-V, raised medians limited by multiple driveways</li> </ul>	15	3
<b>TOTAL SCORE</b>		<b>53</b>



FIGURE 10

BEN WILSON STREET ALTERNATIVE 1A

# Alternative 1B

Evaluation Criteria	Criteria Maximum	Score
<b>Goal: Traffic Operations</b> <ul style="list-style-type: none"> <li>All intersections operate at LOS B or better; all movements are at LOS C or better</li> <li>High capacity, moderate speed roadway through campus and residential area</li> <li>Two lanes in each direction allow cars to pullover for emergency access</li> <li>Transit vehicles stop in lane to serve bus stop, vehicles pass in second thru lane</li> </ul>	10 10 5 5	10 6 4 3
<b>Goal: Pedestrian and Bicycle Mobility and Safety</b> <ul style="list-style-type: none"> <li>HAWK signals for ped/bike crossing safety across 4 lanes with 20-foot median</li> <li>The crossing at the Airline Rd. intersection would be improved</li> <li>Sidewalks in front of UH-V would be 8' wide, 5' to 8' north of UH-V</li> </ul>	20 5 5	12 3 2
<b>Goal: Cost Effective Solution</b> <ul style="list-style-type: none"> <li>Modify curb lines north of UH-V, create selected raised medians as funds available</li> <li>Construct and maintain 4 and 5-lane roadway</li> </ul>	15 10	10 5
<b>Goal: Corridor Aesthetics</b> <ul style="list-style-type: none"> <li>Landscaping along sidewalks at UH-V, raised medians limited by multiple driveways</li> </ul>	15	6
<b>TOTAL SCORE</b>		<b>61</b>



BEN WILSON STREET ALTERNATIVE 1B FIGURE 11

# Alternative 2A

Evaluation Criteria	Criteria Maximum	Score
<b>Goal: Traffic Operations</b> <ul style="list-style-type: none"> <li>All intersections operate at LOS B or better; all movements are at LOS C or better</li> <li>Addresses high crash intersection at Airline, tendency for high speeds</li> <li>Two lanes in each direction allow cars to pullover for emergency access</li> <li>Transit vehicles pullover to serve bus stop; bus stop relocated further north</li> </ul>	10 10 5 5	10 4 4 2
<b>Goal: Pedestrian and Bicycle Mobility and Safety</b> <ul style="list-style-type: none"> <li>Pedestrian underpass at focal point of ped activity, HAWK signal near garage</li> <li>Crossing at Airline Rd. would be improved</li> <li>The pedestrian conveyance along Ben Wilson Rd north of UH-V would be improved</li> </ul>	20 5 5	20 4 3
<b>Goal: Cost Effective Solution</b> <ul style="list-style-type: none"> <li>Embankment and bridge to create pedestrian underpass is costly, reduce HAWKS</li> <li>Raised roadway must coincide with Student Center, maintain bridges &amp; 5 lanes</li> </ul>	15 10	5 2
<b>Goal: Corridor Aesthetics</b> <ul style="list-style-type: none"> <li>Landscaping along sidewalks at UH-V, raised medians limited by multiple driveways</li> </ul>	15	5
<b>TOTAL SCORE</b>		<b>59</b>



FIGURE 12

BEN WILSON STREET ALTERNATIVE 2A

# Alternative 2B

Evaluation Criteria	Criteria Maximum	Score
<b>Goal: Traffic Operations</b> <ul style="list-style-type: none"> <li>All intersections operate at LOS B or better; all movements are at LOS C or better</li> <li>Improves high crash intersection at Airline, some tendency for high speeds</li> <li>Two lanes in each direction allow cars to pull over for emergency access</li> <li>Transit vehicles pullover to serve bus stop; bus stop relocated further north</li> </ul>	10 10 5 5	10 6 4 2
<b>Goal: Pedestrian and Bicycle Mobility and Safety</b> <ul style="list-style-type: none"> <li>Pedestrian underpass at focal point of ped activity, HAWK signal near garage</li> <li>Crossing at Airline Rd. would be improved</li> <li>Pedestrian conveyance along Ben Wilson Rd north of UH-V would be improved</li> </ul>	20 5 5	20 4 3
<b>Goal: Cost Effective Solution</b> <ul style="list-style-type: none"> <li>Embankment and bridge to create pedestrian underpass is costly, reduce HAWKS</li> <li>Raised roadway must coincide with Student Center, maintain bridges, some 5 lanes</li> </ul>	15 10	5 3
<b>Goal: Corridor Aesthetics</b> <ul style="list-style-type: none"> <li>Landscaping along sidewalks at and north of UH-V, raised median limited, elevated roadway visual impact on UH-V</li> </ul>	15	7
<b>TOTAL SCORE</b>		<b>64</b>



BEN WILSON STREET ALTERNATIVE 2B FIGURE 13

# Alternative 3A

Evaluation Criteria	Criteria Maximum	Score
<b>Goal: Traffic Operations</b> <ul style="list-style-type: none"> <li>All intersections operate at LOS B or better; all movements are at LOS C or better</li> <li>3-lanes encourages slower speeds, 5-lanes allows for commercial to south</li> <li>Areas of raised medians limit pullover for emergency access</li> <li>Transit vehicles pull over to serve bus stop</li> </ul>	10 10 5 5	10 10 2 4
<b>Goal: Pedestrian and Bicycle Mobility and Safety</b> <ul style="list-style-type: none"> <li>HAWK signals for ped/bike crossing safety across 2 lanes with 20-foot median</li> <li>Crossing for peds greatly improved at Airline Dr and somewhat at Red River St</li> <li>8-to10-foot sidewalks north of Red River Rd</li> </ul>	20 5 5	15 4 5
<b>Goal: Cost Effective Solution</b> <ul style="list-style-type: none"> <li>Rebuild curb lines, create selected raised medians, UH-V funds for enhancements</li> <li>Maintain and operate a 3-lane street with a 5-lane segment</li> </ul>	15 10	11 8
<b>Goal: Corridor Aesthetics</b> <ul style="list-style-type: none"> <li>Landscaping along sidewalks north of Red River St, raised medians to extent possible</li> </ul>	15	14
<b>TOTAL SCORE</b>		<b>83</b>



BEN WILSON STREET ALTERNATIVE 3A FIGURE 14

# Alternative 3B

Evaluation Criteria	Criteria Maximum	Score
<b>Goal: Traffic Operations</b> <ul style="list-style-type: none"> <li>All intersections operate at LOS B or better; all movements are at LOS D or better</li> <li>3-lanes encourages slower speeds and lower crash severity</li> <li>Areas of raised medians limit pullover for emergency access</li> <li>Transit vehicles pull over to serve bus stop</li> </ul>	10 10 5 5	10 8 2 4
<b>Goal: Pedestrian and Bicycle Mobility and Safety</b> <ul style="list-style-type: none"> <li>HAWK signals for ped/bike crossing safety across 2 lanes with 20-foot median</li> <li>Crossing for peds greatly improved at Airline Dr and at Red River St</li> <li>8-to10-foot sidewalks along entire corridor</li> </ul>	20 5 5	15 5 5
<b>Goal: Cost and Constructability</b> <ul style="list-style-type: none"> <li>Rebuild curb lines, create selected raised medians, UH-V funds for enhancements</li> <li>Maintain and operate a 3-lane street, possible future widening south of Red River</li> </ul>	15 10	10 7
<b>Goal: Corridor Aesthetics</b> <ul style="list-style-type: none"> <li>Landscaping along sidewalks for the length of the corridor, raised medians to extent possible</li> </ul>	15	15
<b>TOTAL SCORE</b>		<b>81</b>



# Evaluation of Alternatives

Alternative	Traffic Operations	Pedestrian Mobility and Safety	Cost Effective Solution	Corridor Aesthetics	Total
1A: Enhanced Existing Five-Lane Roadway	21	13	16	3	53
1B: Five-Lane/Four-Lane Roadway	23	17	15	6	61
2A: Five/Four with Ped Underpass	20	27	7	5	59
2B: Five/Three with Ped Underpass	22	27	7	7	64
3A: Five-Lane/Three-Lane Roadway	26	24	19	14	83
3B: Three-Lane Roadway	24	25	17	15	81

# Possible Treatment on Airline Road

- ▶ West of Ben Wilson Road
  - ▶ 3-Lane Airline Road
  - ▶ Reallocate 12 feet
    - ▶ Buffer for sidewalks
    - ▶ Bike lanes
- ▶ East of Ben Wilson Road
  - ▶ 2 WB lanes -> LT only | Thru&Rt



# Possible Treatment on Red River Street

- ▶ Re-stripe 4 lanes:
  - ▶ One 12' lane each way
  - ▶ One 6' bike lane each way
  - ▶ Center turn lane

