

## MEMO

**TO:** Matt Rector, P.E. (City of Hutto)

**DATE:** January 16, 2024

**FROM:** Queenie Ye, P.E., PTOE (Pape-Dawson)  
Howard Chen, P.E. (Pape-Dawson)

**PROJECT NO.:** 13083-00

**CC:** Victor Gil, P.E., R.P.L.S. (Gil Engineering)

**RE:** Hutto HS Traffic Study Memo



Pape-Dawson Engineers was retained to prepare a Traffic Study memo for Hutto High School. The memo is intended to conduct the Circulation Study for Hutto High School and determine the Level of Services for the study intersections in the Existing Condition.

### Background

Hutto High School is located in the southeast of Chris Kelley Boulevard (FM 685) and State Highway 79 (SH 79) in the City of Hutto, Williamson County. The school currently has approximately 1,900 student enrollments in grades 9-12 and plans to keep the similar enrollment counts in future years. The school bell time is 9:00 AM and 4:25 PM.

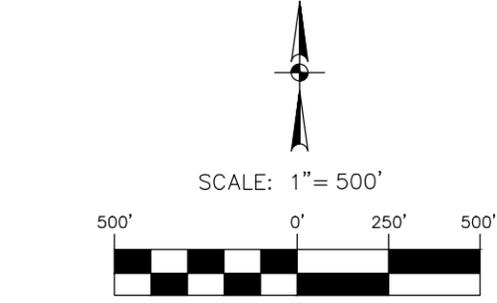
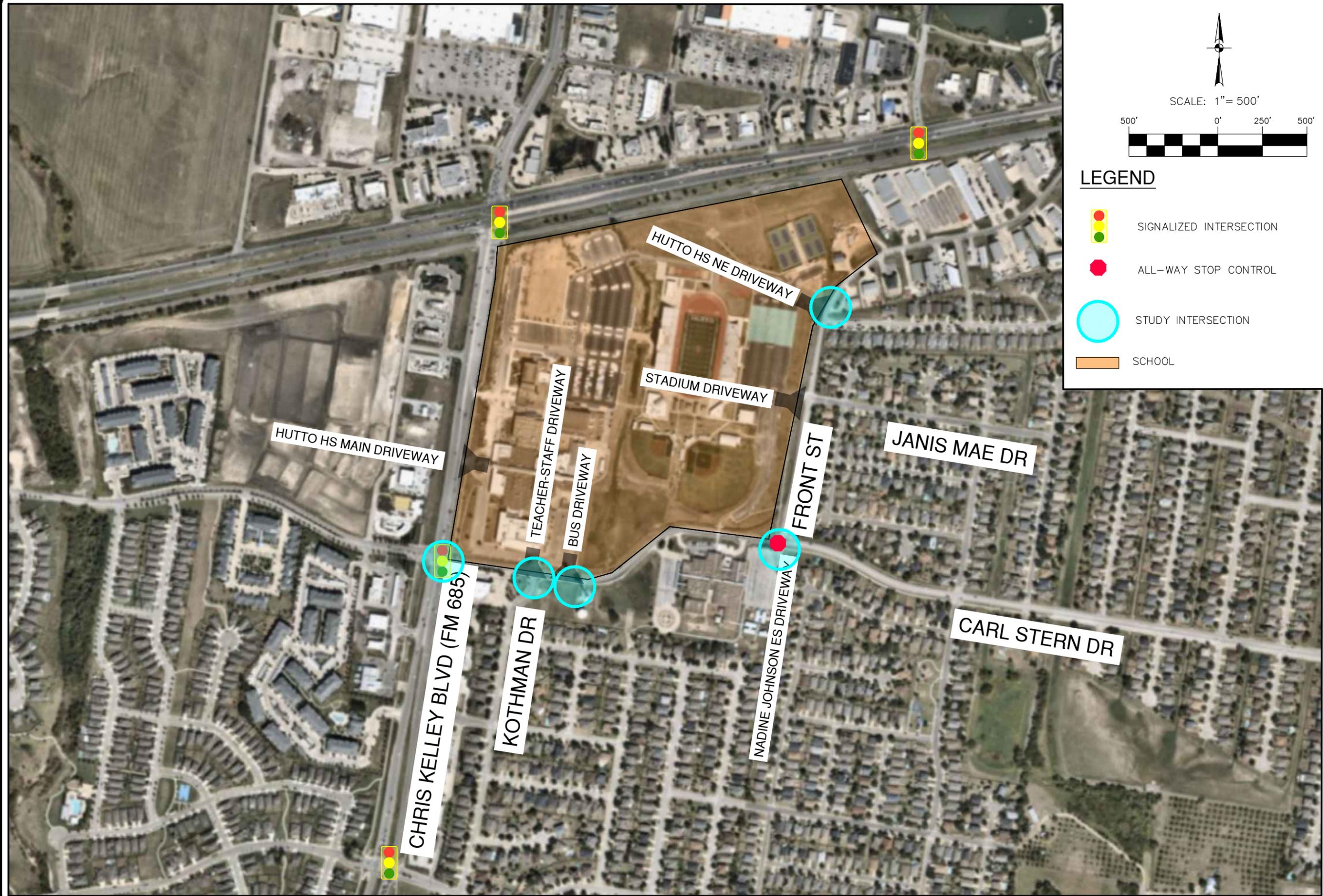
The school is expanding and providing new practice rooms for the dance team, adding Career and Technical Education (CTE) facilities, and adding parking spaces.

Although the renovation project does not involve increasing the student classrooms to accommodate more students, the City has concerns that the previous study (Pape-Dawson- 2016) was prior to several improvements in campus. The City wants to determine what improvements should be implemented to address the traffic in school peak hours. The scope discussion is shown in **Attachment A**.

The TIA memo will include five study intersections as shown in the following:

1. FM 685 at Carl Stern Drive
2. Carl Stern Drive at Bus Driveway
3. Carl Stern Drive at Teacher/ Staff Driveway & Kothman Drive
4. Carl Stern Drive at W Front Street/ Nadine Johnson Elementary School Driveway
5. W Front Street at Hutto HS Northeast Driveway

The Traffic Study Memo is prepared following the general TIA guidelines, reasonable assumptions, and engineering judgement. The School's location and study intersections map is shown in **Figure 1**.



**LEGEND**

-  SIGNALIZED INTERSECTION
-  ALL-WAY STOP CONTROL
-  STUDY INTERSECTION
-  SCHOOL

**HUTTO HS TRAFFIC STUDY**  
 CITY OF HUTTO, TEXAS  
 FIGURE 1 : LOCATION MAP

JOB NO. 13283-00  
 DATE JAN 2024  
 DESIGNER HC  
 CHECKED QY  
 DRAWN HC  
 SHEET 1 of 1

## Hutto HS Traffic Study Memo

January 16, 2024

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### Roadway Network and Site Access

Descriptions of the area roadways are shown below, and the existing intersection geometries are shown in **Figure 2**.

#### FM 685 (Chris Kelley Parkway)

In the vicinity of the site, FM 685 is a four-lane divided roadway with sidewalk on the east side. The posted speed limit on FM 685 is 50 miles per hour. FM 685 is identified on the City of Hutto Thoroughfare Plan as a Major Arterial and is under the jurisdiction of TxDOT.

#### Carl Stern Drive

In the vicinity of the site, Carl Stern Drive is a two-lane roadway with a center two-way left-turn lane with sidewalks on both sides (the northside sidewalks extending from 340 feet west from FM 685 in the west to Bus Driveway in the east, approximately 1,100 feet in total). The posted speed limit on Carl Stern Drive is 30 miles per hour. Carl Stern Drive is identified on the City of Hutto Thoroughfare Plan as a Major Collector. There is a 20 mile per hour school zone on Carl Stern Drive that extends from 220 feet east of FM 685 to 150 feet west of N Pauley Drive.

#### W Front Street

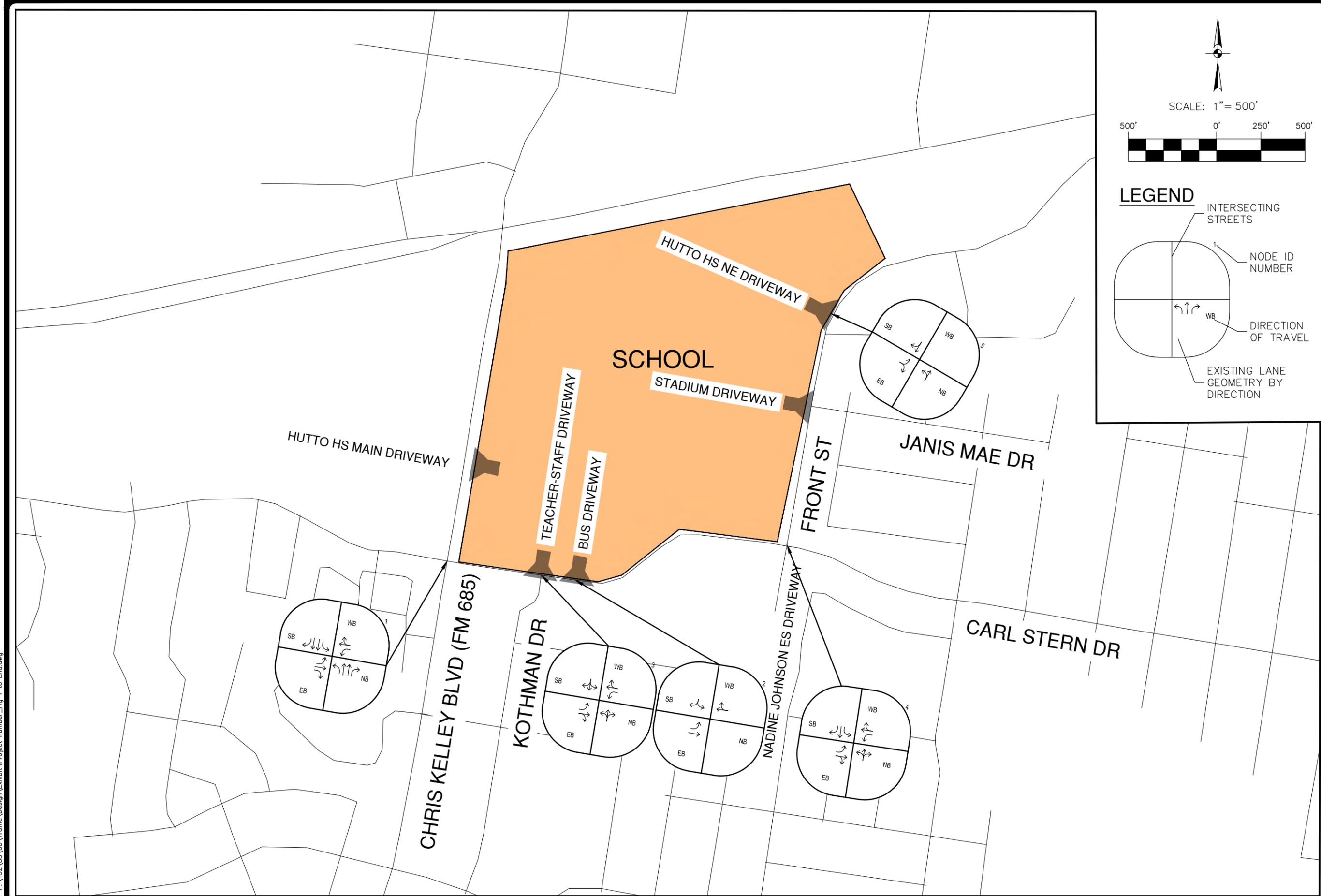
W Front Street is a two-lane undivided roadway with a two-way left-turn lane south of Janis Mae Drive. W Front Street has no sidewalks. The posted speed limit on Front Street is 30 miles per hour. The 20 mile per hour school zone on Front Street extends from Carl Stern Drive to 80 feet north of High School NE Driveway. Front Street is identified on the City of Hutto Thoroughfare Plan as a Local Residential Street.

The Hutto High School renovation project does not involve the construction of a new driveway along roadways. All driveways already exist.

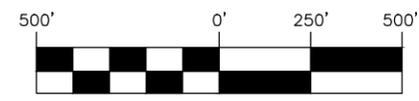
### Roadway Network and Site Access

The existing Hutto High School bell schedule is from 9:00 AM to 4:25 PM. Intersection turning movement counts (TMC) were performed during the school associated AM peak hour (7:00- 9:00 AM) and PM peak hour (3:00- 6:30 PM) at the key intersections. The AM and PM peak hours for the roadway network were determined to be from 8:00-9:00 AM and 4:30- 5:30 PM, based on the school bell time. **Figure 3** illustrates the existing traffic volumes for the AM and PM peak hours of the roadway network. Detailed traffic count information is contained in **Attachment B**.

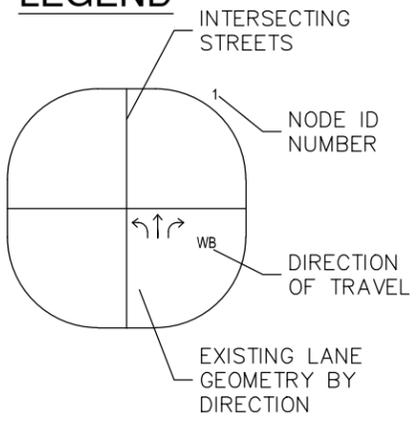
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SCALE: 1" = 500'



**LEGEND**



**HUTTO HS TRAFFIC STUDY**

CITY OF HUTTO, TEXAS

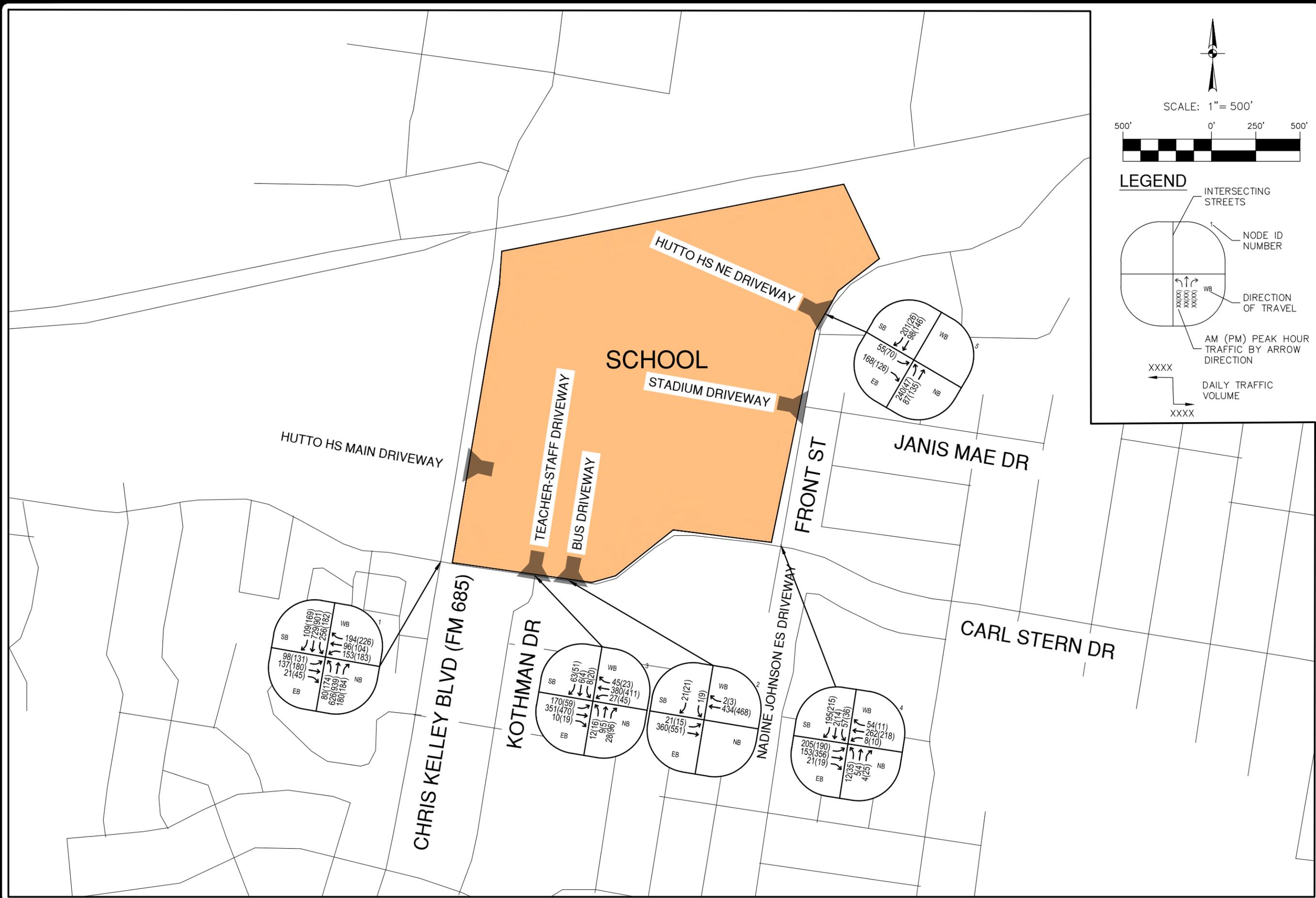
**FIGURE 2 : EXISTING GEOMETRIES (2023)**

JOB NO.	13283-00
DATE	JAN 2024
DESIGNER	HC
CHECKED	QY
DRAWN	HC
SHEET	1 of 1

**PAPE-DAWSON ENGINEERS**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
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 TBPCE FIRM REGISTRATION #470 | TBPES FIRM REGISTRATION #10028800

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SCALE: 1" = 500'

**LEGEND**

- INTERSECTING STREETS
- NODE ID NUMBER
- DIRECTION OF TRAVEL
- AM (PM) PEAK HOUR TRAFFIC BY ARROW DIRECTION
- DAILY TRAFFIC VOLUME

**HUTTO HS TRAFFIC STUDY**  
 CITY OF HUTTO, TEXAS  
 FIGURE 3 : EXISTING CONDITIONS (2023)

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**Existing Intersection Capacity Analysis - 2023**

Capacity analysis results for the Existing Conditions at all key intersections are presented in **Table 1**.

**Table 1. Intersection Capacity Analysis – Existing Condition (2023)**

Intersection	Approach	Movement	AM Peak Hour		PM Peak Hour	
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
<b>Signalized Intersections:</b>						
FM 685 at Carl Stern Drive			D	41.5	D	40.7
<b>Unsignalized Intersections:</b>						
Carl Stern Drive and Bus Driveway	SB	LR	B	11.4	B	12.5
	EB	L	A	8.4	A	8.5
Carl Stern Drive and Kothman Drive/ Teacher Staff Driveway	NB	LTR	C	16.2	B	14.8
	SB	LTR	B	13.8	C	15.9
	EB	LTR	A	8.9	A	8.5
	WB	LTR	A	8.2	A	8.7
W Front Street/ Nadine Johnson ES Driveway and Carl Stern Drive	NB	LTR	B	11.2	B	12.7
	SB	L-T-R	B	11.9	B	13.5
	EB	L	B	13.9	C	23.2
	WB	L	C	19.1	C	17.5
W Front Street and Hutto High School NE Driveway	NB	LT	A	6.9	A	2.2
	EB	LR	B	13.7	B	11.1

As shown in **Table 1**, the signalized intersection of FM 685 at Carl Stern Drive currently operate at the level of service D in the AM and PM peak hours, which is deemed as acceptable level of service in TxDOT jurisdiction. The other unsignalized intersections currently operate at the level of service C or above in the AM and PM peak hours. Therefore, no mitigation measures are required.

Capacity analysis sheets are shown in **Attachment E**.

## Hutto HS Traffic Study Memo

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### Circulation Study

This Circulation Study will examine the traffic operations with field observations.

### Existing Traffic Operations

The existing traffic operations are illustrated in **Figure 4**. The existing operations include the following:

#### Parent Cars Circulation

Parent cars will enter at Hutto High School Northeast Driveway. The drop-off and pick-up location will be located at the north of the main building. All the parent cars will exit the access on Northeast Driveway. All the available parent car queuing length inside the campus will be 3,160 feet.

#### School Buses Circulation

School buses will use the bus loop in the south of campus, entering Bus Driveway (on Carl Stern Dr), dropping off/ picking up students in the east of the main building, and exiting Bus Driveway.

#### Visitor Circulation

Visitors will use the southwest circulation route, entering Teacher- Staff Driveway and exiting Hutto High School Main Driveway.

### Field Observations

Pape-Dawson Engineers conducted field observations near the campus on Thursday, January 11<sup>th</sup>, 2024. Following are the observations:

- Hutto High School NE Driveway (Parent Cars Route Entrance/ Exit) has no spill-over onto Front Street, observed without operation issues. There's no officer at the Hutto High School NE Driveway intersection.
- There're officers near Bus Driveway for crosswalk. Bus Circulation operates smoothly without issues and no queuing spilled onto Carl Stern Drive.
- Visitor Circulation operates smoothly without issues.

All the photos are shown in **Attachment E**.



HUTTO HS TRAFFIC STUDY  
 CITY OF HUTTO, TEXAS  
 FIGURE 4 : TRAFFIC OPERATIONS

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## **Hutto HS Traffic Study Memo**

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### **Conclusion and Recommendations**

Based on the results of the analysis of the Hutto High School development, there are no traffic impacts identified at the study intersections.

The queuing capacity provided by the school is sufficient. The school queuing will not spill onto public roads.

### **Attachment:**

- Attachment A- Scoping Discussion
- Attachment B- Traffic Count Data
- Attachment C- Site Plans
- Attachment D- Capacity Analysis Sheets
- Attachment E- Fielding Photos

**END OF MEMO**

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<b>North/South Street:</b>		<b>Chris Kelley Blvd (FM 685)</b>										
<b>East/West Street:</b>		<b>Carl Stern Dr</b>										
<b>TOD:</b>	<b>AM</b>	<b>Date:</b>	15-Nov-23			<b>Synchro Node:</b>	Raw Data: P:\132\83\00\Traffic\Data\RAW\Site 1 - Chr					
	<b>Northbound</b>			<b>Southbound</b>			<b>Eastbound</b>			<b>Westbound</b>		
	Chris Kelley Blvd (FM 685)			Chris Kelley Blvd (FM 685)			Carl Stern Dr			Carl Stern Dr		
<b>Time</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>
7:00 AM	17	165	23	38	232	8	23	38	11	73	46	46
7:15 AM	34	210	33	47	280	14	17	33	13	74	48	42
7:30 AM	41	231	47	42	283	14	29	26	15	73	46	52
7:45 AM	24	177	40	55	270	14	43	26	18	49	45	51
8:00 AM	17	160	43	52	184	22	34	26	8	40	34	37
8:15 AM	24	142	35	73	191	20	23	31	5	40	29	65
8:30 AM	20	166	56	69	178	36	17	35	4	43	19	44
8:45 AM	19	158	46	62	176	31	24	45	4	30	14	48
<b>Total</b>	<b>196</b>	<b>1409</b>	<b>323</b>	<b>438</b>	<b>1794</b>	<b>159</b>	<b>210</b>	<b>260</b>	<b>78</b>	<b>422</b>	<b>281</b>	<b>385</b>
<b>Peak Hour</b>	<b>116</b>	<b>783</b>	<b>143</b>	<b>182</b>	<b>1065</b>	<b>50</b>	<b>112</b>	<b>123</b>	<b>57</b>	<b>269</b>	<b>185</b>	<b>191</b>

<b>Pedestrians</b>				
	<b>NB</b>	<b>SB</b>	<b>EB</b>	<b>WB</b>
7:00 AM				
7:15 AM				
7:30 AM				
7:45 AM				
8:00 AM				
8:15 AM				
8:30 AM				
8:45 AM				

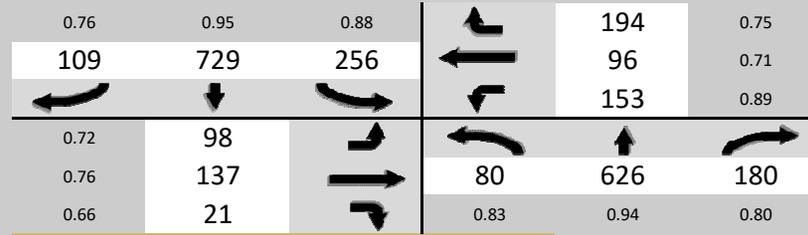


Diagram for: 08:00 AM-09:00 AM  
Peak Hour: 07:00 AM-08:00 AM



North/South Street:		Chris Kelley Blvd (FM 685)											
East/West Street:		Carl Stern Dr											
TOD:	PM	Date:	15-Nov-23		Synchro Node:	Raw Data: P:\132\83\00\Traffic\Data\RAW\Site 1 - Chr							
	Northbound			Southbound			Eastbound			Westbound			
	Chris Kelley Blvd (FM 685)			Chris Kelley Blvd (FM 685)			Carl Stern Dr			Carl Stern Dr			
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
3:00 PM	29	182	29	49	147	25	22	17	5	35	31	54	
3:15 PM	18	188	38	28	73	14	21	26	8	35	23	58	
3:30 PM	18	144	39	48	89	20	20	21	11	48	28	48	
3:45 PM	20	190	40	84	152	43	26	29	6	48	20	72	
4:00 PM	17	199	46	78	195	24	31	41	9	40	21	48	
4:15 PM	31	198	52	79	228	45	21	46	10	23	22	53	
4:30 PM	46	212	27	28	241	33	23	37	12	33	27	40	
4:45 PM	47	243	36	68	217	35	38	46	8	69	24	62	
5:00 PM	40	272	64	29	219	48	42	47	11	47	27	64	
5:15 PM	41	212	57	57	224	53	28	50	14	34	26	60	
5:30 PM	37	235	34	88	239	35	28	48	9	43	31	56	
5:45 PM	39	263	48	66	184	35	39	36	8	38	28	60	
<b>Total</b>	<b>383</b>	<b>2538</b>	<b>510</b>	<b>702</b>	<b>2208</b>	<b>410</b>	<b>339</b>	<b>444</b>	<b>111</b>	<b>493</b>	<b>308</b>	<b>675</b>	
<b>Peak Hour</b>	<b>165</b>	<b>962</b>	<b>191</b>	<b>242</b>	<b>899</b>	<b>171</b>	<b>136</b>	<b>191</b>	<b>42</b>	<b>193</b>	<b>108</b>	<b>242</b>	
Pedestrians													
	NB	SB	EB	WB									
3:00 PM					0.80	0.93	0.67			226	0.88		
3:15 PM					169	901	182			104	0.96		
3:30 PM										183	0.66		
3:45 PM					0.78	131							
4:00 PM					0.90	180				174	939	184	
4:15 PM					0.80	45				0.93	0.86	0.72	
4:30 PM					Diagram for: 04:30 PM-05:30 PM								
4:45 PM					Peak Hour: 04:45 PM-05:45 PM								
5:00 PM													
5:15 PM													
5:30 PM													
5:45 PM													



<b>North/South Street:</b>		<b>Bus Driveway</b>										
<b>East/West Street:</b>		<b>Carl Stern Dr</b>										
<b>TOD:</b>	<b>AM</b>	<b>Date:</b>	15-Nov-23			<b>Synchro Node:</b>	Raw Data: P:\132\83\00\Traffic\Data\RAW\Site 2 - Car					
	Northbound			Southbound			Eastbound			Westbound		
				Bus Driveway			Carl Stern Dr			Carl Stern Dr		
<b>Time</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>
7:00 AM	0	0	0	0	0	1	0	116	0	0	157	1
7:15 AM	0	0	0	0	0	0	0	155	0	0	201	1
7:30 AM	0	0	0	0	0	2	0	98	0	0	181	3
7:45 AM	0	0	0	0	0	2	0	91	0	0	142	1
8:00 AM	0	0	0	0	0	0	0	92	0	0	136	0
8:15 AM	0	0	0	0	0	1	3	81	0	0	115	0
8:30 AM	0	0	0	1	0	6	11	96	0	0	108	1
8:45 AM	0	0	0	0	0	14	7	91	0	0	75	1
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>26</b>	<b>21</b>	<b>820</b>	<b>0</b>	<b>0</b>	<b>1115</b>	<b>8</b>
<b>Peak Hour</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>460</b>	<b>0</b>	<b>0</b>	<b>681</b>	<b>6</b>

Pedestrians				
	NB	SB	EB	WB
7:00 AM				
7:15 AM				
7:30 AM				
7:45 AM				
8:00 AM				
8:15 AM				
8:30 AM				
8:45 AM				

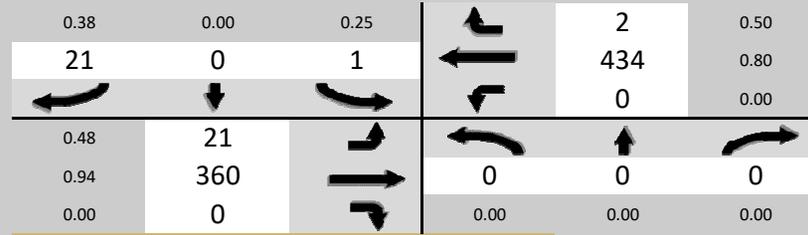


Diagram for: 08:00 AM-09:00 AM  
Peak Hour: 07:00 AM-08:00 AM

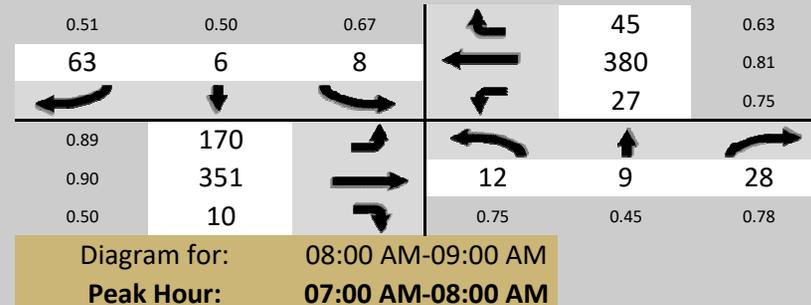


North/South Street:		Bus Driveway											
East/West Street:		Carl Stern Dr											
TOD:	PM	Date:	15-Nov-23		Synchro Node:	Raw Data: P:\132\83\00\Traffic\Data\RAW\Site 1 - Chr							
	Northbound			Southbound			Eastbound			Westbound			
				Bus Driveway			Carl Stern Dr			Carl Stern Dr			
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
3:00 PM	0	0	0	0	0	3	3	101	0	0	146	1	
3:15 PM	0	0	0	1	0	1	0	91	0	0	123	0	
3:30 PM	0	0	0	0	0	0	3	88	0	0	120	1	
3:45 PM	0	0	0	0	0	1	0	132	0	0	151	0	
4:00 PM	0	0	0	0	0	2	1	145	0	0	117	3	
4:15 PM	0	0	0	1	0	5	2	135	0	0	82	1	
4:30 PM	0	0	0	3	0	12	10	120	0	0	95	0	
4:45 PM	0	0	0	2	0	2	0	147	0	0	118	0	
5:00 PM	0	0	0	2	0	6	4	130	0	0	132	2	
5:15 PM	0	0	0	2	0	1	1	154	0	0	123	1	
5:30 PM	0	0	0	0	0	4	0	163	0	0	131	2	
5:45 PM	0	0	0	0	0	1	1	156	0	0	137	1	
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>38</b>	<b>25</b>	<b>1562</b>	<b>0</b>	<b>0</b>	<b>1475</b>	<b>12</b>	
<b>Peak Hour</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>12</b>	<b>6</b>	<b>603</b>	<b>0</b>	<b>0</b>	<b>523</b>	<b>6</b>	
Pedestrians													
	NB	SB	EB	WB									
3:00 PM					0.44	0.00	0.75				3	0.38	
3:15 PM					21	0	9				468	0.89	
3:30 PM											0	0.00	
3:45 PM					0.38	15							
4:00 PM					0.89	551					0	0	
4:15 PM					0.00	0					0.00	0.00	
4:30 PM					Diagram for: 04:30 PM-05:30 PM								
4:45 PM					Peak Hour: 05:00 PM-06:00 PM								
5:00 PM													
5:15 PM													
5:30 PM													
5:45 PM													



<b>North/South Street:</b>		<b>Teacher-Staff Parking Lot Driveway/ Kothman</b>										
<b>East/West Street:</b>		<b>Carl Stern Dr</b>										
<b>TOD:</b>	<b>AM</b>	<b>Date:</b>	15-Nov-23	<b>Synchro Node:</b>		<b>Raw Data:</b>	P:\132\83\00\Traffic\Data\RAW\Site 3 - Car					
	<b>Northbound</b>			<b>Southbound</b>			<b>Eastbound</b>			<b>Westbound</b>		
	Kothman Dr			Teacher/ Staff Driveway			Carl Stren Drive			Carl Stern Drive		
<b>Time</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>
7:00 AM	1	0	18	2	0	0	5	97	2	10	143	5
7:15 AM	1	0	34	0	0	1	7	118	1	21	173	7
7:30 AM	4	0	3	1	0	2	11	94	2	12	166	7
7:45 AM	4	0	5	1	0	2	18	87	4	7	125	10
8:00 AM	2	2	4	2	1	1	30	87	4	8	117	9
8:15 AM	2	0	6	1	2	13	47	79	5	3	101	9
8:30 AM	4	2	9	2	0	18	45	98	1	7	92	18
8:45 AM	4	5	9	3	3	31	48	87	0	9	70	9
<b>Total</b>	<b>22</b>	<b>9</b>	<b>88</b>	<b>12</b>	<b>6</b>	<b>68</b>	<b>211</b>	<b>747</b>	<b>19</b>	<b>77</b>	<b>987</b>	<b>74</b>
<b>Peak Hour</b>	<b>10</b>	<b>0</b>	<b>60</b>	<b>4</b>	<b>0</b>	<b>5</b>	<b>41</b>	<b>396</b>	<b>9</b>	<b>50</b>	<b>607</b>	<b>29</b>

<b>Pedestrians</b>				
	<b>NB</b>	<b>SB</b>	<b>EB</b>	<b>WB</b>
7:00 AM				
7:15 AM				
7:30 AM				
7:45 AM				
8:00 AM				
8:15 AM				
8:30 AM				
8:45 AM				

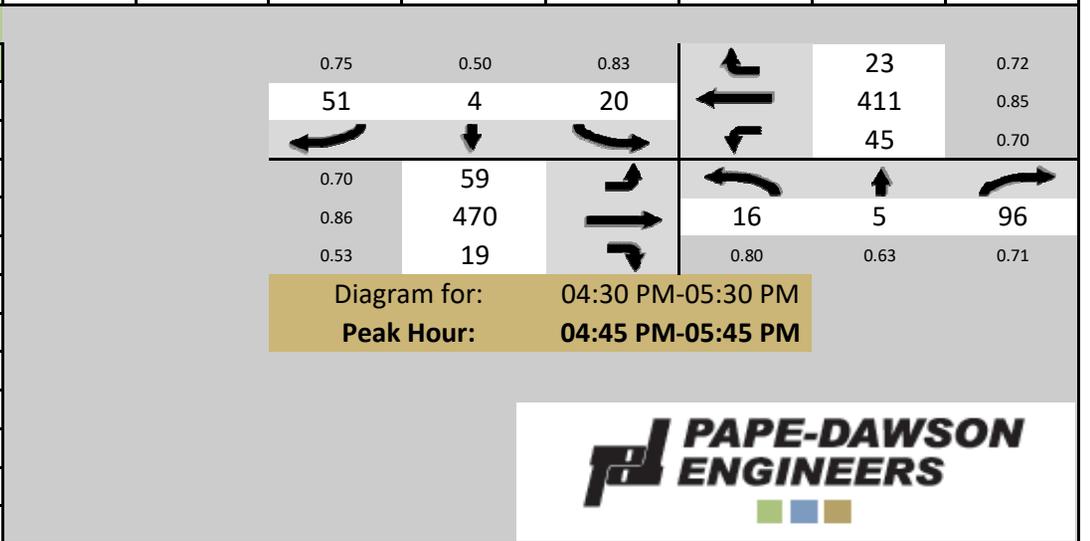


**North/South Street:** Teacher-Staff Parking Lot Driveway/ Kothman  
**East/West Street:** Carl Stern Dr

**TOD:** PM **Date:** 15-Nov-23 **Synchro Node:** **Raw Data:** P:\132\83\00\Traffic\Data\RAW\Site 3 - Chr

Time	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
3:00 PM	3	0	13	2	1	4	7	89	2	26	127	7
3:15 PM	1	0	12	0	0	3	4	80	5	13	118	2
3:30 PM	3	0	7	4	2	7	10	79	9	9	110	4
3:45 PM	2	0	12	4	1	9	9	115	10	18	136	4
4:00 PM	1	1	15	3	0	2	10	127	9	5	108	6
4:15 PM	3	1	8	7	1	18	14	125	8	10	78	4
4:30 PM	3	0	34	5	1	17	9	99	2	16	86	5
4:45 PM	4	2	22	4	1	10	21	121	9	14	101	5
5:00 PM	4	2	24	6	2	14	15	113	4	6	121	8
5:15 PM	5	1	16	5	0	10	14	137	4	9	103	5
5:30 PM	3	2	24	3	1	5	17	139	10	6	123	7
5:45 PM	5	0	18	1	2	6	4	137	9	24	104	4
<b>Total</b>	<b>37</b>	<b>9</b>	<b>205</b>	<b>44</b>	<b>12</b>	<b>105</b>	<b>134</b>	<b>1361</b>	<b>81</b>	<b>156</b>	<b>1315</b>	<b>61</b>
<b>Peak Hour</b>	<b>16</b>	<b>7</b>	<b>86</b>	<b>18</b>	<b>4</b>	<b>39</b>	<b>67</b>	<b>510</b>	<b>27</b>	<b>35</b>	<b>448</b>	<b>25</b>

Pedestrians				
	NB	SB	EB	WB
3:00 PM				
3:15 PM				
3:30 PM				
3:45 PM				
4:00 PM				
4:15 PM				
4:30 PM				
4:45 PM				
5:00 PM				
5:15 PM				
5:30 PM				
5:45 PM				



<b>North/South Street:</b>		<b>Nadine Johnson ES DWY/ Front St</b>										
<b>East/West Street:</b>		<b>Carl Stern Dr</b>										
<b>TOD:</b>	<b>AM</b>	<b>Date:</b>	15-Nov-23		<b>Synchro Node:</b>		<b>Raw Data:</b>	P:\132\83\00\Traffic\Data\RAW\Site 4 - Car				
	<b>Northbound</b>			<b>Southbound</b>			<b>Eastbound</b>			<b>Westbound</b>		
	Nadine Johnson ES DWY			Front St			Carl Stren Drive			Carl Stern Drive		
<b>Time</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>
7:00 AM	20	8	25	4	14	45	19	36	27	34	90	4
7:15 AM	24	5	28	5	6	54	35	54	18	25	69	2
7:30 AM	7	1	5	3	2	46	36	57	6	1	112	3
7:45 AM	2	1	1	3	0	26	42	41	3	2	105	6
8:00 AM	6	1	0	3	0	44	43	44	8	2	101	16
8:15 AM	3	2	0	11	1	47	47	31	9	0	75	8
8:30 AM	3	1	1	17	1	60	62	40	2	2	50	14
8:45 AM	0	1	3	26	0	44	53	38	2	4	36	16
<b>Total</b>	<b>65</b>	<b>20</b>	<b>63</b>	<b>72</b>	<b>24</b>	<b>366</b>	<b>337</b>	<b>341</b>	<b>75</b>	<b>70</b>	<b>638</b>	<b>69</b>
<b>Peak Hour</b>	<b>53</b>	<b>15</b>	<b>59</b>	<b>15</b>	<b>22</b>	<b>171</b>	<b>132</b>	<b>188</b>	<b>54</b>	<b>62</b>	<b>376</b>	<b>15</b>

<b>Pedestrians</b>				
	<b>NB</b>	<b>SB</b>	<b>EB</b>	<b>WB</b>
7:00 AM				
7:15 AM				
7:30 AM				
7:45 AM				
8:00 AM				
8:15 AM				
8:30 AM				
8:45 AM				

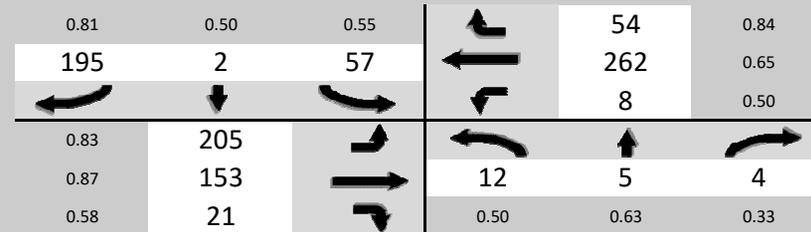


Diagram for: 08:00 AM-09:00 AM  
Peak Hour: 07:00 AM-08:00 AM

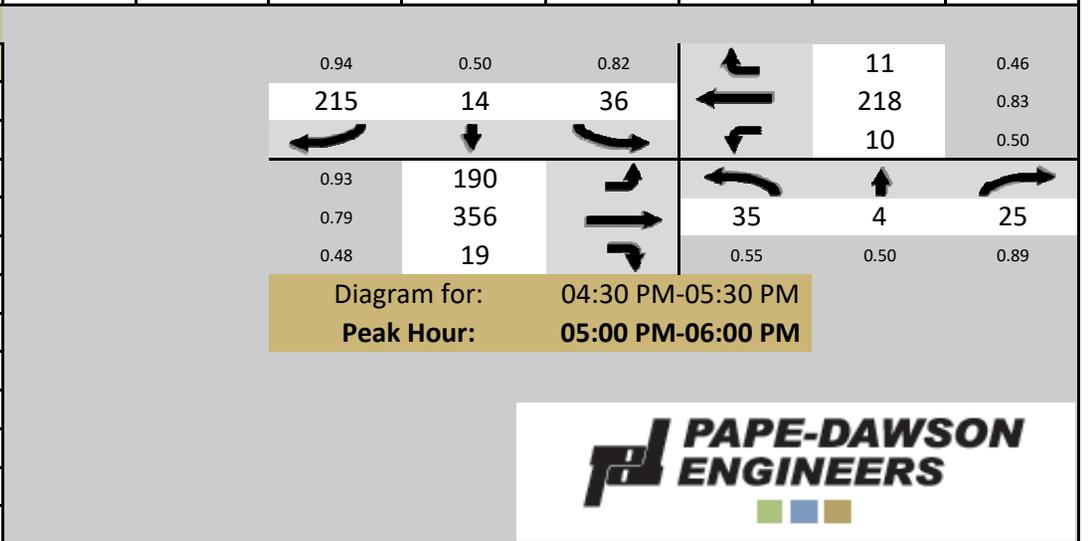


**North/South Street:** Nadine Johnson ES DWY/ Front St  
**East/West Street:** Carl Stern Dr

**TOD:** PM **Date:** 15-Nov-23 **Synchro Node:** **Raw Data:** P:\132\83\00\Traffic\Data\RAW\Site 4 - Chr

Time	Northbound			Southbound			Eastbound			Westbound		
	Nadine Johnson ES DWY			Front St			Carl Stren Drive			Carl Stern Drive		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
3:00 PM	18	8	19	5	3	51	39	78	3	5	74	4
3:15 PM	10	0	4	0	1	37	19	70	1	3	64	4
3:30 PM	12	3	3	7	1	61	22	69	1	0	61	5
3:45 PM	7	0	1	5	0	47	40	91	4	1	84	5
4:00 PM	5	2	2	4	1	50	51	86	3	2	93	4
4:15 PM	7	1	7	17	1	38	42	87	2	7	44	11
4:30 PM	7	1	6	9	2	47	49	79	5	5	39	4
4:45 PM	9	0	6	6	5	57	43	83	10	2	57	1
5:00 PM	16	2	7	11	7	56	47	81	2	2	56	0
5:15 PM	3	1	6	10	0	55	51	113	2	1	66	6
5:30 PM	2	0	0	13	1	59	52	113	0	1	71	9
5:45 PM	2	0	1	5	1	52	60	106	0	1	93	5
<b>Total</b>	<b>98</b>	<b>18</b>	<b>62</b>	<b>92</b>	<b>23</b>	<b>610</b>	<b>515</b>	<b>1056</b>	<b>33</b>	<b>30</b>	<b>802</b>	<b>58</b>
<b>Peak Hour</b>	<b>23</b>	<b>3</b>	<b>14</b>	<b>39</b>	<b>9</b>	<b>222</b>	<b>210</b>	<b>413</b>	<b>4</b>	<b>5</b>	<b>286</b>	<b>20</b>

Pedestrians				
	NB	SB	EB	WB
3:00 PM				
3:15 PM				
3:30 PM				
3:45 PM				
4:00 PM				
4:15 PM				
4:30 PM				
4:45 PM				
5:00 PM				
5:15 PM				
5:30 PM				
5:45 PM				



<b>North/South Street:</b>		<b>Front St</b>											
<b>East/West Street:</b>		<b>Hutto HS NE Driveway</b>											
<b>TOD:</b>	<b>AM</b>	<b>Date:</b>	15-Nov-23		<b>Synchro Node:</b>			<b>Raw Data:</b>	P:\132\83\00\Traffic\Data\RAW\Site 5 - Car				
	<b>Northbound</b>			<b>Southbound</b>			<b>Eastbound</b>			<b>Westbound</b>			
	Front St			Front St			Hutto HS NE Driveway						
<b>Time</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	<b>Left</b>	<b>Through</b>	<b>Right</b>	
7:00 AM	6	17	0	0	36	2	2	0	2	0	0	0	
7:15 AM	4	32	0	0	39	6	1	0	2	0	0	0	
7:30 AM	12	31	0	0	26	8	5	0	8	0	0	0	
7:45 AM	10	32	0	0	13	11	3	0	7	0	0	0	
8:00 AM	30	26	0	0	20	13	6	0	15	0	0	0	
8:15 AM	50	21	0	0	27	39	12	0	38	0	0	0	
8:30 AM	77	17	0	0	24	56	20	0	42	0	0	0	
8:45 AM	83	23	0	0	27	93	17	0	73	0	0	0	
<b>Total</b>	<b>272</b>	<b>199</b>	<b>0</b>	<b>0</b>	<b>212</b>	<b>228</b>	<b>66</b>	<b>0</b>	<b>187</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Peak Hour</b>	<b>240</b>	<b>87</b>	<b>0</b>	<b>0</b>	<b>98</b>	<b>201</b>	<b>55</b>	<b>0</b>	<b>168</b>	<b>0</b>	<b>0</b>	<b>0</b>	

<b>Pedestrians</b>				
	<b>NB</b>	<b>SB</b>	<b>EB</b>	<b>WB</b>
7:00 AM				
7:15 AM				
7:30 AM				
7:45 AM				
8:00 AM				
8:15 AM				
8:30 AM				
8:45 AM				

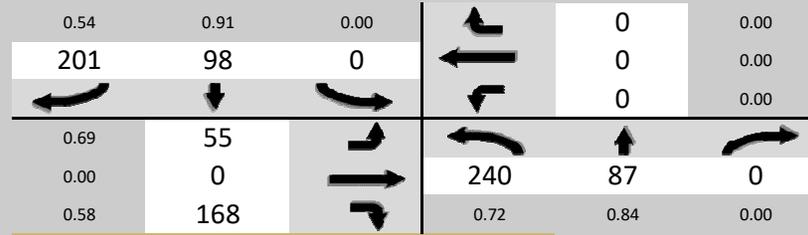
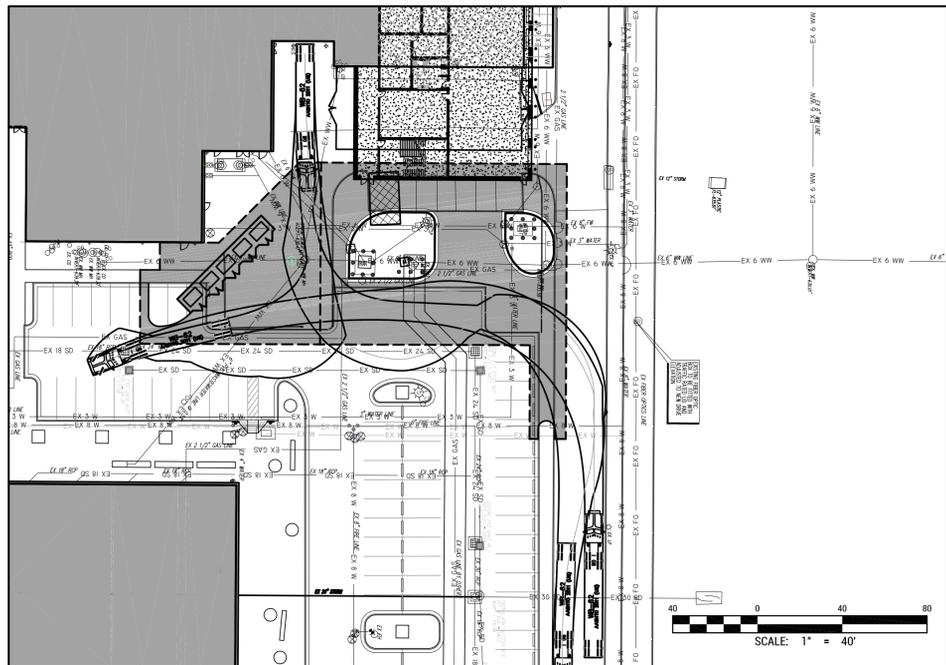
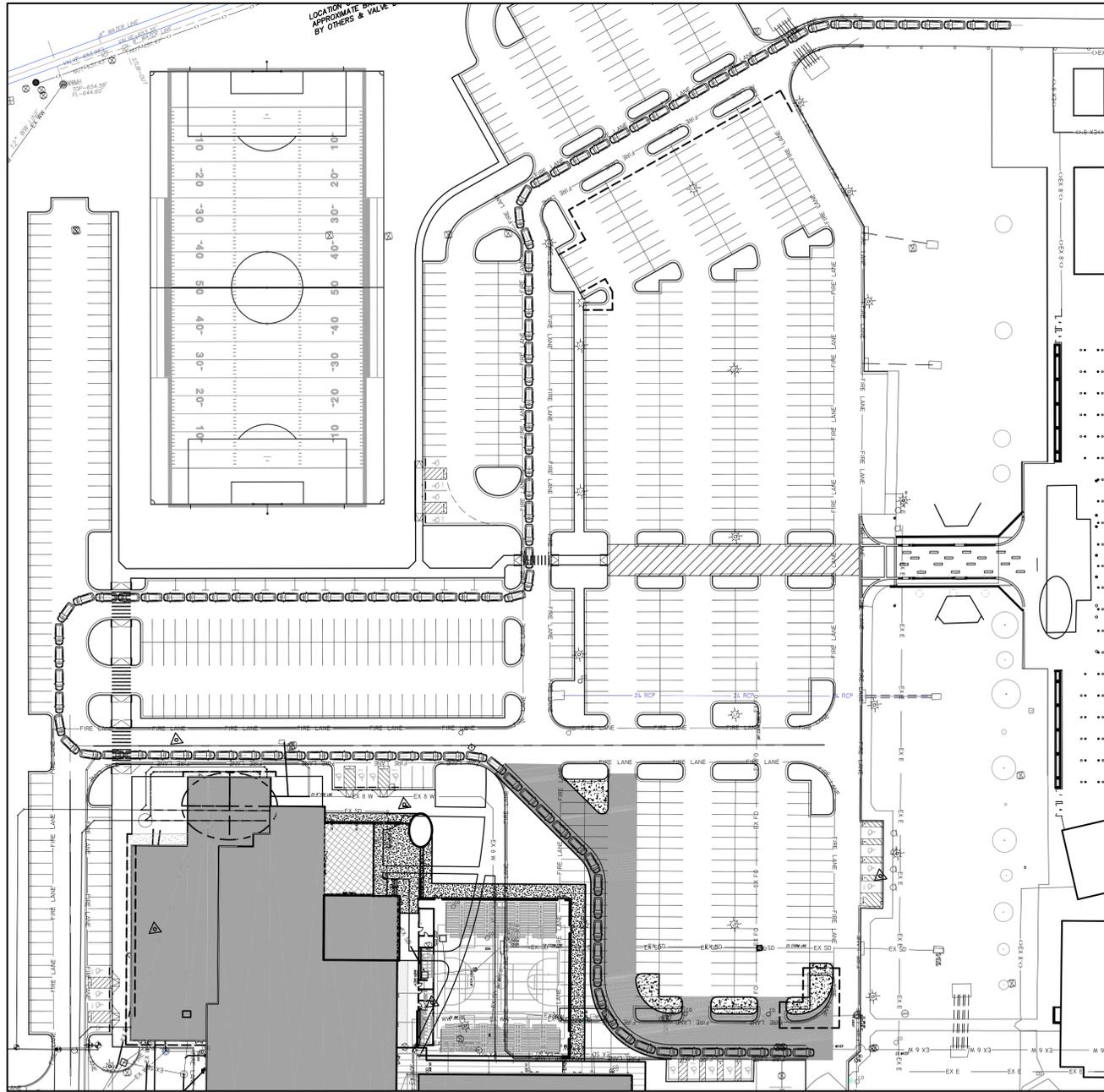


Diagram for: 08:00 AM-09:00 AM  
Peak Hour: 08:00 AM-09:00 AM

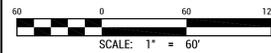
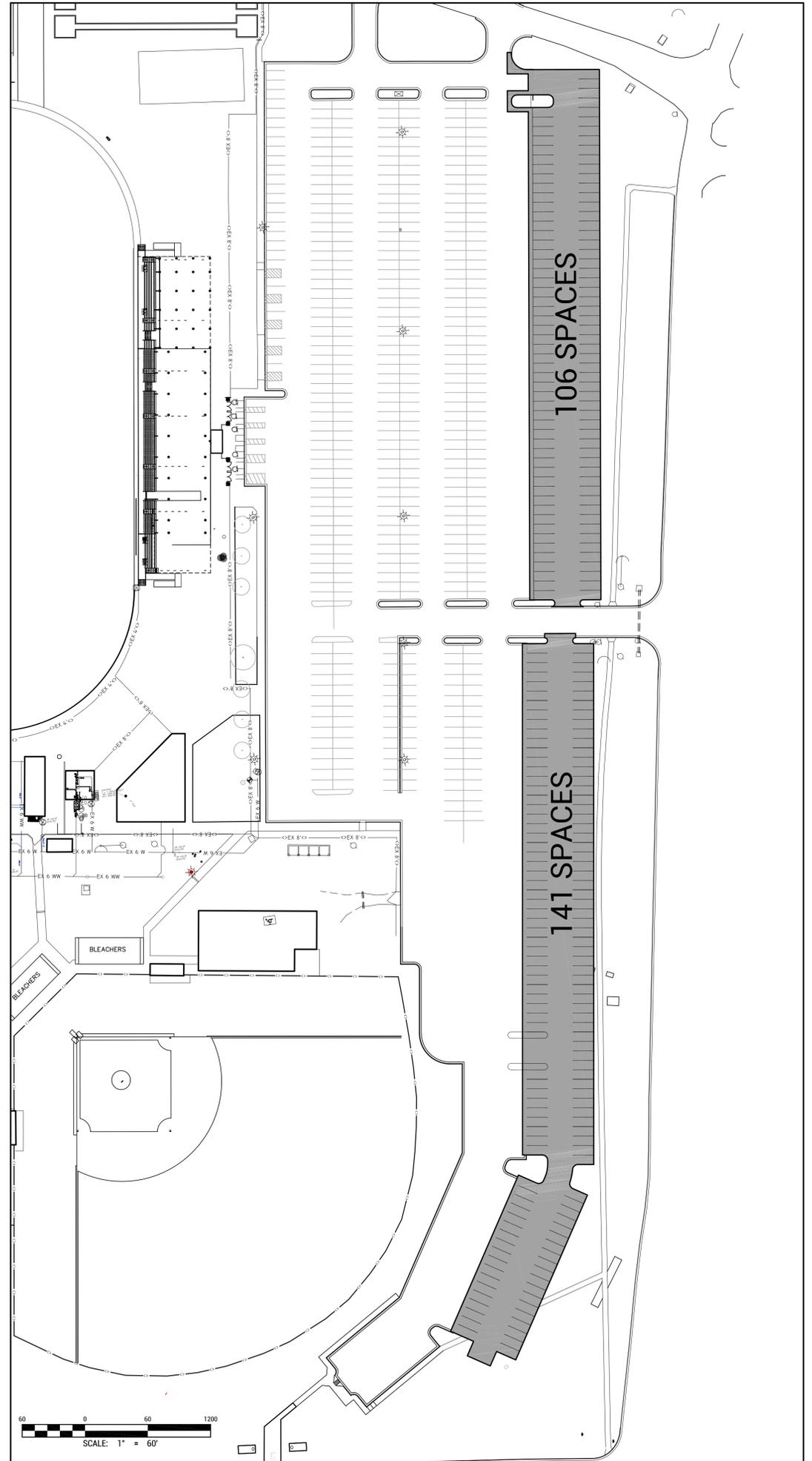


North/South Street:		Front St											
East/West Street:		Hutto HS NE Driveway											
TOD:	PM	Date:	15-Nov-23		Synchro Node:		Raw Data:	P:\132\83\00\Traffic\Data\RAW\Site 5 - Chr					
	Northbound			Southbound			Eastbound			Westbound			
	Front St			Front St			Hutto HS NE Driveway						
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
3:00 PM	7	39	0	0	38	3	4	0	7	0	0	0	
3:15 PM	6	21	0	0	28	1	0	0	5	0	0	0	
3:30 PM	9	14	0	0	32	1	5	0	29	0	0	0	
3:45 PM	11	27	0	0	27	5	2	0	21	1	0	0	
4:00 PM	24	19	0	0	46	14	1	0	5	0	0	0	
4:15 PM	29	32	0	0	25	10	16	0	59	0	0	0	
4:30 PM	13	35	0	0	25	10	37	0	58	0	0	0	
4:45 PM	6	36	0	0	40	8	24	0	33	0	0	0	
5:00 PM	12	25	0	0	33	5	5	0	14	0	0	0	
5:15 PM	16	39	0	0	48	3	4	0	21	0	0	0	
5:30 PM	16	39	0	0	49	15	12	0	21	0	0	0	
5:45 PM	17	43	0	0	42	6	9	0	11	0	0	0	
<b>Total</b>	<b>166</b>	<b>369</b>	<b>0</b>	<b>0</b>	<b>433</b>	<b>81</b>	<b>119</b>	<b>0</b>	<b>284</b>	<b>1</b>	<b>0</b>	<b>0</b>	
<b>Peak Hour</b>	<b>72</b>	<b>122</b>	<b>0</b>	<b>0</b>	<b>136</b>	<b>42</b>	<b>78</b>	<b>0</b>	<b>155</b>	<b>0</b>	<b>0</b>	<b>0</b>	
Pedestrians													
	NB	SB	EB	WB									
3:00 PM					0.65	0.76	0.00				0	0.00	
3:15 PM					26	146	0				0	0.00	
3:30 PM											0	0.00	
3:45 PM					0.47	70							
4:00 PM					0.00	0					47	135	0
4:15 PM					0.54	126					0.73	0.87	0.00
4:30 PM					Diagram for: 04:30 PM-05:30 PM								
4:45 PM					Peak Hour: 04:00 PM-05:00 PM								
5:00 PM													
5:15 PM													
5:30 PM													
5:45 PM													





1  
A PRELIMINARY PLAN  
SCALE: 1" = 40"



PROJECT TITLE: HUTTO I.S.D. HIGH SCHOOL  
MODERNIZATION PROJECT

SHEET TITLE: PRELIMINARY SITE PLAN

DRAWN:

DATE: 8-31-2023

REVISIONS:

SHEET NUMBER

A

HCM Signalized Intersection Capacity Analysis  
 1: FM 685 & Carl Stern Dr

01 Existing AM- 2023  
 01/15/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	137	21	153	96	194	80	626	180	256	729	109
Future Volume (vph)	98	137	21	153	96	194	80	626	180	256	729	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1676		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1676		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	107	149	23	166	104	211	87	680	196	278	792	118
RTOR Reduction (vph)	0	0	20	0	73	0	0	0	99	0	0	68
Lane Group Flow (vph)	107	149	3	166	242	0	87	680	97	278	792	50
Turn Type	Split	NA	Perm	Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4						6			2
Actuated Green, G (s)	11.8	11.8	11.8	19.1	19.1		8.5	36.8	36.8	13.6	41.9	41.9
Effective Green, g (s)	11.8	11.8	11.8	19.1	19.1		8.5	36.8	36.8	13.6	41.9	41.9
Actuated g/C Ratio	0.12	0.12	0.12	0.19	0.19		0.09	0.37	0.37	0.14	0.42	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	210	221	188	340	322		151	1311	586	242	1493	667
v/s Ratio Prot	0.06	c0.08		0.09	c0.14		0.05	0.19		c0.16	c0.22	
v/s Ratio Perm			0.00						0.06			0.03
v/c Ratio	0.51	0.67	0.01	0.49	0.75		0.58	0.52	0.16	1.15	0.53	0.07
Uniform Delay, d1	41.0	41.9	38.6	35.7	37.8		43.7	24.3	20.9	42.9	21.4	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	7.9	0.0	1.1	9.4		5.2	1.5	0.6	103.9	1.4	0.2
Delay (s)	43.0	49.8	38.6	36.8	47.3		48.9	25.8	21.6	146.8	22.7	17.3
Level of Service	D	D	D	D	D		D	C	C	F	C	B
Approach Delay (s)		46.3			43.7			27.0			51.2	
Approach LOS		D			D			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			41.5				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			99.3				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			68.9%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timing Report, Sorted By Phase  
1: FM 685 & Carl Stern Dr

01 Existing AM- 2023  
01/15/2024



Phase Number	1	2	3	4	5	6
Movement	NBL	SBT	WBTL	EBTL	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	18	40	32	18	18	40
Maximum Split (%)	16.7%	37.0%	29.6%	16.7%	16.7%	37.0%
Minimum Split (s)	9.5	9.5	9.5	9.5	9.5	9.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)						
Flash Dont Walk (s)						
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	18	76	58	0	18
End Time (s)	18	58	0	76	18	58
Yield/Force Off (s)	13.5	53.5	103.5	71.5	13.5	53.5
Yield/Force Off 170(s)	13.5	53.5	103.5	71.5	13.5	53.5
Local Start Time (s)	90	0	58	40	90	0
Local Yield (s)	103.5	35.5	85.5	53.5	103.5	35.5
Local Yield 170(s)	103.5	35.5	85.5	53.5	103.5	35.5

Intersection Summary

Cycle Length	108
Control Type	Actuated-Uncoordinated
Natural Cycle	60

Splits and Phases: 1: FM 685 & Carl Stern Dr



HCM Unsignalized Intersection Capacity Analysis  
2: Carl Stern Dr & Bus DWY

01 Existing AM- 2023  
01/15/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	
Traffic Volume (veh/h)	21	360	434	2	1	21
Future Volume (Veh/h)	21	360	434	2	1	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	391	472	2	1	23
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage (veh)	2		2			
Upstream signal (ft)	726					
<b>pX, platoon unblocked</b>						
vC, conflicting volume	474				910	473
vC1, stage 1 conf vol					473	
vC2, stage 2 conf vol					437	
vCu, unblocked vol	474				910	473
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				100	96
cM capacity (veh/h)	1088				508	591
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>SB 1</b>		
Volume Total	23	391	474	24		
Volume Left	23	0	0	1		
Volume Right	0	0	2	23		
cSH	1088	1700	1700	587		
Volume to Capacity	0.02	0.23	0.28	0.04		
Queue Length 95th (ft)	2	0	0	3		
Control Delay (s)	8.4	0.0	0.0	11.4		
Lane LOS	A			B		
Approach Delay (s)	0.5		0.0	11.4		
Approach LOS				B		
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			33.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 3: Kothman Dr/Hutto ISD PD DWY & Carl Stern Dr

01 Existing AM- 2023  
 01/15/2024

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	170	351	10	27	380	45	12	9	28	8	6	63		
Future Volume (Veh/h)	170	351	10	27	380	45	12	9	28	8	6	63		
Sign Control	Free			Free				Stop			Stop			
Grade	0%			0%				0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	185	382	11	29	413	49	13	10	30	9	7	68		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	TWLTL				TWLTL									
Median storage veh	2				2									
Upstream signal (ft)	530													
pX, platoon unblocked					1.00			1.00	1.00	1.00	1.00	1.00		
vC, conflicting volume	462				393				1300	1278	388	1282	1258	438
vC1, stage 1 conf vol									758	758		496	496	
vC2, stage 2 conf vol									542	520		787	763	
vCu, unblocked vol	462				391				1300	1277	385	1282	1258	438
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)									6.1	5.5		6.1	5.5	
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83				98				94	96	95	96	98	89
cM capacity (veh/h)	1099				1165				222	265	661	248	286	619
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1								
Volume Total	185	393	29	462	53	84								
Volume Left	185	0	29	0	13	9								
Volume Right	0	11	0	49	30	68								
cSH	1099	1700	1165	1700	374	492								
Volume to Capacity	0.17	0.23	0.02	0.27	0.14	0.17								
Queue Length 95th (ft)	15	0	2	0	12	15								
Control Delay (s)	8.9	0.0	8.2	0.0	16.2	13.8								
Lane LOS	A		A		C	B								
Approach Delay (s)	2.9		0.5		16.2		13.8							
Approach LOS					C		B							
Intersection Summary														
Average Delay			3.2											
Intersection Capacity Utilization			47.6%		ICU Level of Service				A					
Analysis Period (min)			15											

Intersection	
Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↕		↶	↷	↶
Traffic Vol, veh/h	205	153	21	8	262	54	12	5	4	57	2	195
Future Vol, veh/h	205	153	21	8	262	54	12	5	4	57	2	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	223	166	23	9	285	59	13	5	4	62	2	212
Number of Lanes	1	1	0	1	1	0	0	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	3	2	2
HCM Control Delay	13.9	19.1	11.2	11.9
HCM LOS	B	C	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	57%	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	24%	0%	88%	0%	83%	0%	100%	0%
Vol Right, %	19%	0%	12%	0%	17%	0%	0%	100%
Sign Control	Stop							
Traffic Vol by Lane	21	205	174	8	316	57	2	195
LT Vol	12	205	0	8	0	57	0	0
Through Vol	5	0	153	0	262	0	2	0
RT Vol	4	0	21	0	54	0	0	195
Lane Flow Rate	23	223	189	9	343	62	2	212
Geometry Grp	8	8	8	8	8	7	7	7
Degree of Util (X)	0.051	0.434	0.337	0.017	0.618	0.125	0.004	0.356
Departure Headway (Hd)	8.07	7.009	6.417	7.107	6.48	7.275	6.767	6.055
Convergence, Y/N	Yes							
Cap	446	512	558	502	553	491	527	591
Service Time	5.77	4.779	4.187	4.879	4.251	5.045	4.536	3.824
HCM Lane V/C Ratio	0.052	0.436	0.339	0.018	0.62	0.126	0.004	0.359
HCM Control Delay	11.2	15.1	12.4	10	19.3	11.1	9.6	12.2
HCM Lane LOS	B	C	B	A	C	B	A	B
HCM 95th-tile Q	0.2	2.2	1.5	0.1	4.2	0.4	0	1.6

HCM Unsignalized Intersection Capacity Analysis  
 5: W Front St & Parent DWY

01 Existing AM- 2023  
 01/15/2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	168	240	87	98	201
Future Volume (Veh/h)	55	168	240	87	98	201
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	183	261	95	107	218
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage (veh)				2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	833	216	325			
vC1, stage 1 conf vol	216					
vC2, stage 2 conf vol	617					
vCu, unblocked vol	833	216	325			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	78	79			
cM capacity (veh/h)	405	824	1235			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	243	356	325			
Volume Left	60	261	0			
Volume Right	183	0	218			
cSH	656	1235	1700			
Volume to Capacity	0.37	0.21	0.19			
Queue Length 95th (ft)	43	20	0			
Control Delay (s)	13.7	6.9	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.7	6.9	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			6.3			
Intersection Capacity Utilization			58.8%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis  
1: FM 685 & Carl Stern Dr

02 Existing PM- 2023  
01/15/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	180	45	183	104	226	174	939	184	182	901	169
Future Volume (vph)	131	180	45	183	104	226	174	939	184	182	901	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1671		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1671		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	142	196	49	199	113	246	189	1021	200	198	979	184
RTOR Reduction (vph)	0	0	43	0	77	0	0	0	69	0	0	103
Lane Group Flow (vph)	142	196	6	199	282	0	189	1021	131	198	979	81
Turn Type	Split	NA	Perm	Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4						6			2
Actuated Green, G (s)	13.0	13.0	13.0	21.3	21.3		13.1	35.7	35.7	13.3	35.9	35.9
Effective Green, g (s)	13.0	13.0	13.0	21.3	21.3		13.1	35.7	35.7	13.3	35.9	35.9
Actuated g/C Ratio	0.13	0.13	0.13	0.21	0.21		0.13	0.35	0.35	0.13	0.35	0.35
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	227	239	203	372	351		228	1247	557	232	1254	561
v/s Ratio Prot	0.08	c0.11		0.11	c0.17		0.11	c0.29		c0.11	0.28	
v/s Ratio Perm			0.00						0.08			0.05
v/c Ratio	0.63	0.82	0.03	0.53	0.80		0.83	0.82	0.23	0.85	0.78	0.14
Uniform Delay, d1	41.8	43.0	38.6	35.6	38.0		43.0	29.9	23.2	43.0	29.2	22.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	19.7	0.1	1.5	12.6		21.3	6.1	1.0	24.9	4.9	0.5
Delay (s)	47.1	62.7	38.7	37.1	50.6		64.3	35.9	24.1	68.0	34.1	22.8
Level of Service	D	E	D	D	D		E	D	C	E	C	C
Approach Delay (s)		53.9			45.8			38.1			37.5	
Approach LOS		D			D			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			40.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			101.3			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			77.7%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

Timing Report, Sorted By Phase  
1: FM 685 & Carl Stern Dr

02 Existing PM- 2023  
01/15/2024



Phase Number	1	2	3	4	5	6
Movement	NBL	SBT	WBTL	EBTL	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	18	40	32	18	18	40
Maximum Split (%)	16.7%	37.0%	29.6%	16.7%	16.7%	37.0%
Minimum Split (s)	9.5	9.5	9.5	9.5	9.5	9.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)						
Flash Dont Walk (s)						
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	18	76	58	0	18
End Time (s)	18	58	0	76	18	58
Yield/Force Off (s)	13.5	53.5	103.5	71.5	13.5	53.5
Yield/Force Off 170(s)	13.5	53.5	103.5	71.5	13.5	53.5
Local Start Time (s)	90	0	58	40	90	0
Local Yield (s)	103.5	35.5	85.5	53.5	103.5	35.5
Local Yield 170(s)	103.5	35.5	85.5	53.5	103.5	35.5

Intersection Summary

Cycle Length	108
Control Type	Actuated-Uncoordinated
Natural Cycle	75

Splits and Phases: 1: FM 685 & Carl Stern Dr



HCM Unsignalized Intersection Capacity Analysis  
 2: Carl Stern Dr & Bus DWY

02 Existing PM- 2023  
 01/15/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↶
Traffic Volume (veh/h)	15	551	468	3	9	21
Future Volume (Veh/h)	15	551	468	3	9	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	599	509	3	10	23
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage (veh)	2		2			
Upstream signal (ft)	726					
pX, platoon unblocked					0.94	
vC, conflicting volume	512				1142	510
vC1, stage 1 conf vol					510	
vC2, stage 2 conf vol					631	
vCu, unblocked vol	512				1118	510
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	96
cM capacity (veh/h)	1053				430	563
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>SB 1</b>		
Volume Total	16	599	512	33		
Volume Left	16	0	0	10		
Volume Right	0	0	3	23		
cSH	1053	1700	1700	515		
Volume to Capacity	0.02	0.35	0.30	0.06		
Queue Length 95th (ft)	1	0	0	5		
Control Delay (s)	8.5	0.0	0.0	12.5		
Lane LOS	A			B		
Approach Delay (s)	0.2	0.0		12.5		
Approach LOS				B		
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			39.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 3: Kothman Dr/Hutto ISD PD DWY & Carl Stern Dr

02 Existing PM- 2023  
 01/15/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	470	19	45	411	23	16	5	96	20	4	51
Future Volume (Veh/h)	59	470	19	45	411	23	16	5	96	20	4	51
Sign Control	Free			Free				Stop			Stop	
Grade	0%			0%				0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	511	21	49	447	25	17	5	104	22	4	55
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage (veh)	2				2							
Upstream signal (ft)	530											
pX, platoon unblocked				0.91		0.91		0.91	0.91	0.91	0.91	0.91
vC, conflicting volume	472		532			1252		1220	522	1303	1218	460
vC1, stage 1 conf vol						650		650		558	558	
vC2, stage 2 conf vol						602		570		746	660	
vCu, unblocked vol	472		440			1228		1193	429	1284	1191	460
tC, single (s)	4.1		4.1			7.1		6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)						6.1		5.5		6.1	5.5	
tF (s)	2.2		2.2			3.5		4.0	3.3	3.5	4.0	3.3
p0 queue free %	94		95			94		98	82	91	99	91
cM capacity (veh/h)	1090		1023			290		327	572	236	324	602
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	64	532	49	472	126	81						
Volume Left	64	0	49	0	17	22						
Volume Right	0	21	0	25	104	55						
cSH	1090	1700	1023	1700	493	411						
Volume to Capacity	0.06	0.31	0.05	0.28	0.26	0.20						
Queue Length 95th (ft)	5	0	4	0	25	18						
Control Delay (s)	8.5	0.0	8.7	0.0	14.8	15.9						
Lane LOS	A		A		B		C					
Approach Delay (s)	0.9		0.8		14.8		15.9					
Approach LOS					B		C					
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			47.2%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection	
Intersection Delay, s/veh	19.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↕		↶	↷	↶
Traffic Vol, veh/h	190	356	19	10	218	11	35	4	25	36	14	215
Future Vol, veh/h	190	356	19	10	218	11	35	4	25	36	14	215
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	207	387	21	11	237	12	38	4	27	39	15	234
Number of Lanes	1	1	0	1	1	0	0	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	3	2	2
HCM Control Delay	23.2	17.5	12.7	13.5
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	55%	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	6%	0%	95%	0%	95%	0%	100%	0%
Vol Right, %	39%	0%	5%	0%	5%	0%	0%	100%
Sign Control	Stop							
Traffic Vol by Lane	64	190	375	10	229	36	14	215
LT Vol	35	190	0	10	0	36	0	0
Through Vol	4	0	356	0	218	0	14	0
RT Vol	25	0	19	0	11	0	0	215
Lane Flow Rate	70	207	408	11	249	39	15	234
Geometry Grp	8	8	8	8	8	7	7	7
Degree of Util (X)	0.161	0.415	0.757	0.024	0.514	0.085	0.031	0.427
Departure Headway (Hd)	8.354	7.23	6.686	7.982	7.438	7.797	7.286	6.572
Convergence, Y/N	Yes							
Cap	429	498	542	449	485	460	492	549
Service Time	6.106	4.965	4.422	5.725	5.181	5.53	5.02	4.305
HCM Lane V/C Ratio	0.163	0.416	0.753	0.024	0.513	0.085	0.03	0.426
HCM Control Delay	12.7	15	27.4	10.9	17.8	11.3	10.3	14.1
HCM Lane LOS	B	B	D	B	C	B	B	B
HCM 95th-tile Q	0.6	2	6.6	0.1	2.9	0.3	0.1	2.1

HCM Unsignalized Intersection Capacity Analysis  
 5: W Front St & Parent DWY

02 Existing PM- 2023  
 01/15/2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	126	47	135	146	26
Future Volume (Veh/h)	70	126	47	135	146	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	137	51	147	159	28
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage (veh)				2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	422	173	187			
vC1, stage 1 conf vol	173					
vC2, stage 2 conf vol	249					
vCu, unblocked vol	422	173	187			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	84	96			
cM capacity (veh/h)	704	871	1387			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	213	198	187			
Volume Left	76	51	0			
Volume Right	137	0	28			
cSH	803	1387	1700			
Volume to Capacity	0.27	0.04	0.11			
Queue Length 95th (ft)	27	3	0			
Control Delay (s)	11.1	2.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.1	2.2	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			4.7			
Intersection Capacity Utilization			40.6%	ICU Level of Service	A	
Analysis Period (min)			15			

Northbound FM 685 at Carl Stern Drive (Signalized Intersection)



Southbound FM 685 at Carl Stern Drive (Signalized Intersection)



Eastbound Carl Stern Drive at FM 685 (Signalized Intersection)



Westbound Carl Stern Drive at FM 685 (Signalized Intersection)



Northbound FM 685 at Main Driveway



Southbound FM 685 at Main Driveway



Eastbound Carl Stern Drive at Teacher and Staff Driveway



Westbound Carl Stern Drive at Teacher and Staff Driveway



Eastbound Carl Stern Drive at Bus Driveway



Westbound Carl Stern Drive at Bus Driveway



Eastbound Carl Stern Drive at W Front St



Westbound Carl Stern Drive at W Front St



Southbound W Front St at Carl Stern Drive



Northbound W Front St at Parent Car Driveway



Southbound W Front St at Parent Car Driveway

