

**DISTRICT 6-STATE HIGHWAY
151 & POTRANCO ROAD AREA
TRAFFIC STUDY**

February 2014

Texas Board of Professional Engineers, Firm Registration # 470

LAND DEVELOPMENT ENVIRONMENTAL TRANSPORTATION WATER RESOURCES SURVEYING

TO: Councilman Ray Lopez
City of San Antonio, Texas District 6

DATE: February 28, 2014

FROM:  Kerri Collins, P.E., PTOE, LEED AP
Justin Clark, E.I.T.

PROJECT NO.: 7912-40

CC: Christina De La Cruz, P.E.

RE: District 6-SH 151 and Potranco Road Area Traffic Study

Pape-Dawson Engineers was retained to prepare an area-wide Traffic Study in response to community concerns regarding future developments in the area. The traffic analysis evaluated existing conditions and future conditions with identified developments in place. In addition, the analysis also included a scenario assuming that both Military Drive and Ingram Road were extended. Military Drive will be extended south to Potranco Road and Ingram Road will be extended north connecting Potranco Road to Military Drive. In addition a pedestrian crossing feasibility analysis was performed to consider providing a pedestrian underpass utilizing existing drainage structures under Potranco Road. The following sections provide a summary of the methodology applied, the analysis results, and our recommendations.

Scope of Study

The existing condition of the area intersections were established for the weekday AM and PM peak hours. Current operational deficiencies were identified and level-of-service results were provided for each study intersection. Planned developments in the study area were identified and where available, project information was obtained from Pape-Dawson Engineers' files or from the City of San Antonio. A total of 11 projects were identified for inclusion in the traffic study. An annual growth rate was agreed upon with the City and applied to the existing traffic counts to expand the volumes to year 2023, the agreed upon future build year. Two Scenarios were developed for evaluation of the future conditions. Scenario 1 assumes the road network remains the same, i.e., Military Drive and Ingram Road are not extended, but the projects are all constructed and background volumes have grown to year 2023 levels. Scenario 2 assumes the same as Scenario 1 but the roadway network includes the completion of Military Drive and Ingram Road. Operational deficiencies were identified for each Scenario and improvements were developed to address the deficiencies. Opinions of probable cost were developed for the improvements. In addition a pedestrian crossing feasibility study was conducted.

Existing Condition

The study area is located on the west side of the City of San Antonio in Council District 6 and includes an area north of Interstate Highway 410 and State Highway 151. The study area is bordered by Micron Drive on the east side, Military Drive and Reed Road on the north side and

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Hunt Lane on the west side. The major roadways in the study area are Interstate Highway 410, Potranco Road (Farm to Market 1957), Military Drive, Ingram Road and Hunt Lane.

Currently, Interstate Highway 410 (IH-410) is designated as a north-south freeway in the study area. The frontage roads are one-way with three lanes in each direction with a posted speed limit of 45 miles per hour. Interstate Highway 410 is identified on the City of San Antonio Major Thoroughfare Plan (MTP) as a freeway with 250 feet to 500 feet of right-of-way and is under the jurisdiction of the Texas Department of Transportation (TxDOT).

Potranco Road (FM 1957) is a five-lane undivided roadway with a two-way left-turn lane and is oriented in an east-west direction. The posted speed limit on Potranco Road is 45 miles per hour. Potranco Road is under jurisdiction of TxDOT and is identified on the City of San Antonio MTP as a Primary Arterial Type A with 120 feet of right-of-way.

Military Drive is a four-lane divided roadway with a raised landscaped median with left-turn bays between IH-410 and Potranco Road. North of Potranco Road and adjacent to the Estonia neighborhood, Military Drive is a two lane undivided roadway. West of Sequoia Height, Military Drive becomes a four-lane divided roadway with a raised landscaped median with left-turn bays. The posted speed south of Potranco Road is 45 miles per hour; north of Potranco Road the speed limit is 35 miles per hour. Military Drive is under jurisdiction of the City of San Antonio and is identified on the City of San Antonio MTP as a Secondary Arterial Type A with 86 feet of right-of-way. The section of Military Drive between Potranco Road and the Estonia Development has not been constructed but would provide more direct access to IH-410 and Potranco Road.

Ingram Road is a four-lane divided roadway with a raised landscaped median and is generally oriented in a north-south direction, south of Potranco Road. North of Potranco Road, Ingram Road is generally oriented in an east-west direction. The posted speed limit on Ingram Road is 35 miles per hour. Ingram Road is under jurisdiction of the City of San Antonio and is identified on the City of San Antonio MTP as a Secondary Arterial Type A with 86 feet of right-of-way. Two sections of Ingram Road have not been constructed; one section, when completed, would extend north from the intersection of Potranco Road connecting to the existing Estonia neighborhood, the second section would connect between the Estonia neighborhood and Crown Meadow.

Hunt Lane is a four-lane divided roadway with a raised landscaped median and is oriented in a north-south direction. The posted speed limit on Hunt Lane is 45 miles per hour. Hunt Lane is under jurisdiction of the City of San Antonio and is identified on the MTP as a Secondary Arterial Type A with 86 feet of right-of-way. The study area is shown in **Figure 1**.

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Existing Traffic Volumes

Area traffic data collected for other projects were obtained from the files of Pape-Dawson Engineers for use. Available traffic data was supplemented where necessary. Traffic counts collected at intersections are referred to as Turning Movement Counts (TMC) since they identify traffic volumes by the turning movements allowed on each intersection approach. These counts are recorded during two-hour peak periods in the morning and evening on a typical weekday. The traffic data was collected on March 22, 2013 and on October 22 through 24th, 2014, during the AM and PM peak hours. **Figure 2** illustrates the existing traffic volumes at each of the study intersections.

- IH-410 Frontage Roads and Military Drive (2)
- IH-410 Frontage Road and Richland Hills
- Military Drive and Walmart/Sony Driveway
- Ingram Road and Richland Hills
- Potranco Road and Richland Hills
- Potranco Road and Ingram Road
- Potranco Road and Military Drive
- Potranco Road and Micron Drive
- Ingram Road and Micron Drive
- Military Drive and Reed Road
- Military Drive and Richland Hills
- Richland Hills and Jack Jordan Middle School Driveway
- Richland Hills and Christian Evers Elementary School Driveway
- Military Drive and Earl Warren High School Driveway
- Military Drive and Hunt Lane

Future Conditions

Two Scenarios were evaluated for the future condition. In addition the traffic associated with each proposed project was assigned to the roadway network for each scenario.

Scenario 1

Considers the current roadway network and will utilize the existing traffic volumes with an annual growth factor applied followed by the addition of proposed project traffic to develop the year 2023 future volumes.

Scenario 2

The completion of the extension of Military Drive south to Potranco Road and the extension of Ingram Road south of Potranco Road. The existing traffic volumes will be manually reassigned based on the assumptions regarding likely changes to travel patterns. Following the reassignment, the growth factor will be applied and project traffic added.

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Annual Growth Rate

An annual growth rate was estimated at 3.0% per year based on historical average daily traffic (ADT) counts performed by TxDOT between 2008 and 2012. This rate represents the average growth rate for the area surrounding the site. **Table 1** illustrates historical ADT data for Potranco Road and Stage Highway 151.

Table 1: Rate of Traffic Growth

Location	Year	AADT	Rate of Growth (%)	Growth (%)
Potranco Road West of Culebra Road	2008	16,500		
	2009	16,660	1.0%	
	2010	16,100	-3.4%	-2.7%
	2011	15,500	-3.7%	
	2012	14,800	-4.5%	
SH 151 south of Military Drive	2008	69,000		
	2009	70,000	1.4%	
	2010	71,000	1.4%	3.1%
	2011	75,000	5.6%	
	2012	78,000	4.0%	
SH 151 north of Potranco Road	2008	67,000		
	2009	73,000	9.0%	
	2010	77,000	5.5%	6.1%
	2011	81,000	5.2%	
	2012	85,000	4.9%	
SH 151 south of Potranco Road	2008	77,000		
	2009	83,000	7.8%	
	2010	92,000	10.8%	5.5%
	2011	97,000	5.4%	
	2012	95,000	-2.1%	
Average				3%

Future Traffic Volumes

The projected future volumes for Scenario 1 were developed by applying the annual growth factor to the existing volumes to project them to year 2023. In addition, the expected traffic generated by the proposed developments in the study area was included in the 2023 volumes. The volumes for Scenario 1 are shown in **Figure 3**.

For Scenario 2, the 2023 volumes were redistributed to account for the completion of Military Drive and Ingram Road as shown in **Figure 4**. It was assumed that all of the roadway extension projects could be completed by 2023. The traffic volumes were re-distributed based on the

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completion of the roadways and the anticipated changes to travel patterns. The 2023 projected peak hour volumes for Scenario 2 are presented in **Figure 4**.

In addition, the expected traffic generated by the proposed developments in the study area was included in the traffic analysis. The future developments included in the analysis are shown in **Figure 1**. A description of each development and the projected site traffic for each development included in the study is shown in **Table 2**.

Table 2: Trip Generation of Proposed Developments in the Study Area

Land Use #	Development Name	Sq ft/Units	ITE Land Use	AM Peak Hour		PM Peak Hour	
				Enter	Exit	Enter	Exit
1	Westpointe Commercial	328 Apartments 32,450 sqft	Multi-Family Residential/Shopping Center	50	80	132	117
2	Legacy at SH 151	Multi-Use	Gym, Fast-Food, Restaurants, Specialty Retail	331	320	343	283
3	Wal-Mart (Neighborhood)	35,524 sqft/10 fuel positions	Supermarket/Gas Station	126	97	240	233
4	Rec Center/Library/Commercial	Multi-use	Rec Center, Library, Shopping Center	153	79	207	218
5	HEB	55,071 sqft	Supermarket	116	71	266	255
6	Richland Hills Commercial	103,283 sqft	Shopping Center	61	38	187	199
7	Project Echo (CPS)	67,133 sqft	Utilities	30	24	23	28
8	Estonia Development	379 Homes left to be built	Single-Family Residential	71	213	239	140
9	Grad Tequila Restaurant	6,582 sqft	High Turnover Sit-Down Restaurant	39	32	39	26
10	Carl's Jr.	2,941 sqft	Fast-food Restaurants	68	65	50	46
11	Pecos Flats Apartments	384 units	Muilt-Family Residential	39	95	100	69
Total				1,084	1,114	1,823	1,614
				2,198		3,437	

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Traffic Analysis

Capacity analyses were conducted for 22 major intersections in the study area for the Existing Conditions (2013) and Future Conditions (2023) for Scenarios 1 and 2. The following study intersections were included in the analysis:

- 1) IH-410 Frontage Roads and Military Drive (2)
- 2) IH-410 WB Frontage Road and Richland Hills
- 3) Military Drive and Walmart/Sony Driveway
- 4) SH 151 Frontage Roads and Ingram Road (2)
- 5) Ingram Road and Richland Hills
- 6) SH 151 Frontage Roads and Potranco Road (2)
- 7) Potranco and Richland Hills
- 8) Potranco Road and Ingram Road
- 9) Potranco Road and Military Drive
- 10) Potranco Road and Micron Drive
- 11) Ingram Road and Micron Drive
- 12) Military Road and Reed Road
- 13) Military Drive and Richland Hills
- 14) Richland Hills and Jack Jordan Middle School Driveway
- 15) Richland Hills and Christian Evers Elementary School Driveway
- 16) Military Drive and Earl Warren High School Driveway
- 17) Military Drive and Hunt Lane
- 18) SH 151 Frontage Roads and Hunt Lane (2)

The evaluation of peak-hour operations was performed using *Synchro, Version 8*¹. Capacity analyses are presented in standard level-of-service format. Level of service at a signalized intersection is based on the average control-delay measured in seconds per vehicle (sec/veh). The control delay is calculated using an equation that combines the stopped-delay with the vehicle acceleration/deceleration delay that is caused by the signalized intersection.

The capacity of a controlled leg of an unsignalized two-way stop-controlled intersection is established through an estimation of available gaps in traffic on the major roadway, driver judgment in selecting a gap, and required follow-up time by each driver in a queue. The level-of-service for each stop-controlled approach is determined by the average total delay per vehicle. The total delay represents the time from when the vehicle stops at the end of the queue until the vehicle departs from the stop line.

Level of service is designated from A to F, with A representing the best traffic conditions with least delay and F representing poor conditions with the highest delay. The general characteristics

¹ Trafficware®. 2012. *Synchro Studio 8, Synchro Plus SimTraffic and 3D Viewer*. Sugarland, Texas.

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associated with each level of service for unsignalized intersections based on the *Highway Capacity Manual*² and the detailed Synchro Capacity Analysis Worksheets are attached.

Existing Conditions

Capacity analysis results for the Existing Condition are presented in **Table 3**. Currently, the signalized intersections of IH-410 Frontage Roads and Military Drive operate at a LOS E during the AM peak hour and LOS F during the PM peak hour. The intersection of SH 151 Southbound Frontage Road and Ingram Road operates at a LOS F during the AM and PM peak hours. The SH 151 Southbound Frontage Road and Ingram operates at a LOS F during the PM peak hour. The SH 151 Southbound frontage Road and Potranco Road operates at a LOS E during the PM peak hour. The intersection of Potranco Road and Richland Hills operates at a LOS F during the AM peak hour. The signalized intersection of Potranco Road and Military Drive operates at a LOS E during the AM peak hour. SH 151 Northbound Frontage Road and Hunt Lane operates at a LOS E during the AM peak hour.

The southbound approach of Richland Hills at IH-410 Southbound Frontage Road operates at a LOS F during the AM and PM peak hours. The northbound approach of Ingram Road at Potranco Road operates at a LOS F during the AM peak hour and LOS E during the PM peak hour. The westbound left-turn on Potranco Road at Ingram Road functions at a LOS E during the AM peak hour. The eastbound approach of the Jack Jordan Middle School Driveway at Richland Hills operates at a LOS F during the AM peak hour.

In summary 8 of the 15 signalized intersections currently operate at a LOS E or LOS F during one or both peak hours and 3 of the 7 unsignalized intersections experience a LOS E or F along one or more approaches during one or both peak hours

² Transportation Research Board/National Research Council. 2000. *Highway Capacity Manual. Third Edition*, Washington, D.C.

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Table 3: Intersection Capacity Analysis – Existing Conditions (2013)

Intersection #	Intersection	Approach	Movement	AM Peak Hour		PM Peak Hour	
				LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Signalized Intersections:							
1	IH-410 Northbound Frontage Road and Military Drive			E	67.1	F	90.5
2	IH-410 Southbound Frontage Road and Military Drive			E	62.5	F	121.6
4	Military Drive and Walmart Driveway/Sony Place			A	5.6	B	11.0
5	SH 151 Southbound Frontage Road and Ingram Road			F	364.7	F	82.8
6	SH 151 Northbound Frontage Road and Ingram Road			C	30.1	F	114.3
8	SH 151 Southbound Frontage Road and Potranco Road			D	42.8	E	79.9
9	SH 151 Northbound Frontage Road and Potranco Road			D	35.6	D	37.5
10	Potranco Road and Richland Hills			F	98.1	D	46.8
12	Potranco Road and Military Drive			E	76.9	C	24.2
13	Potranco Road and Micron Drive			C	33.4	C	27.6
17	Military Drive and Richland Hills			C	21.3	B	19.9
20	Military Drive and Earl Warren High School Driveway			B	10.8	C	25.7
21	Military Drive and Hunt Lane			C	31.4	D	37.8
22	SH 151 Northbound Frontage Road and Hunt Lane			E	61.8	B	18.3
23	SH 151 Southbound Frontage Road and Hunt Lane			C	23.6	B	14.9
Unsignalized Intersections:							
3	IH-410 Southbound Frontage Road and Richland Hills	SB	R	F	83.3	F	88.2
7	Ingram Road and Richland Hills ⁽¹⁾	AWSC		C	16.3	D	32.3
11	Potranco Road and Ingram Road	NB	L-R	F	149.6	E	41.2
		WB	L	E	35.8	B	2.4
14	Micron Drive and Ingram Road	AWSC		C	17.4	A	9.5
16	Military Drive and Reed Road	SB	L-R	D	29.1	B	13.4
		EB	LT	A	8.2	A	6.9
18	Richland Hills and Jack Jordan Middle School Driveway	NB	LT	A	8.7	A	1.6
		EB	L-R	F	323.3	C	17.9
19	Richland Hills and Christian Evers Elementary School Driveway	NB	LT	A	1.1	A	1.2
		EB	LR	C	19.8	C	15.2

Note: (1) intersection capacity analysis results based on HCM 2010 procedures incorporated in Synchro 8

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Future Conditions

The future conditions for year 2023 were analyzed during the AM and PM peak hours with the traffic volumes shown in **Figure 3** for Scenario 1. The volumes shown in **Figure 4** were used in the analysis of Scenario 2. **Table 4** shows the LOS results for both future condition scenarios.

The intersection of IH-410 Frontage Roads and Military Drive will function at a LOS F during both peak periods for each scenario. The SH 151 Southbound Frontage Road and Ingram Road will function at a LOS F during both peak periods under each scenario. The SH 151 Northbound Frontage Road and Ingram will function at a LOS F during the PM peak hour. The SH 151 Frontage Road intersections and Potranco Road will function at a LOS F during both peak hours for each scenario. Potranco Road and Richland Hills will function at a LOS F during both peak hours. Potranco Road and Military Drive will function at a LOS F during the AM peak hour and LOS E during the PM peak hour under Scenario 1. The intersection will function at a LOS F during both peak hours under Scenario 2. The intersection of Potranco Road and Micron Drive will function at a LOS F during the AM peak hour and LOS D during the PM peak hour. The intersection of Military Drive and Richland Hills will function at a LOS F during both peak hours under Scenario 1. The intersection will function at a LOS C during the AM peak hour and LOS F during the PM peak hour. Military Drive and Hunt Lane will function at a LOS F during the AM and PM peak hour. SH 151 Northbound Frontage Road and Hunt Lane will function at a LOS F during the AM peak hour and LOS D during the PM peak hour under both scenarios. SH 151 Southbound Frontage Road and Hunt Lane will function at a LOS F during the AM peak hour and LOS C during the PM peak hour.

Table 4: Signalized Intersection Capacity Analysis-2023

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Control Delay (sec/veh)	LOS	Control Delay (sec/veh)
IH-410 Northbound Frontage and Military Drive					
1	Scenario 1	F	165.9	F	194.1
	Scenario 2	F	175.9	F	187.0
IH-410 Southbound Frontage and Military Drive					
2	Scenario 1	F	168.2	F	264.3
	Scenario 2	F	254.1	F	386.0
Military Drive and Walmart Driveway/Sony Place					
4	Scenario 1	A	6.4	B	13.9
	Scenario 2	A	5.6	B	14.7
SH 151 Southbound Frontage Road and Ingram Road					
5	Scenario 1	F	604.9	F	164.9
	Scenario 2	F	605.0	F	163.6

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Intersection #	Condition	AM Peak Hour		PM Peak Hour	
		LOS	Control Delay (sec/veh)	LOS	Control Delay (sec/veh)
SH 151 Northbound Frontage Road and Ingram Road					
6	Scenario 1	D	36.4	F	276.8
	Scenario 2	D	38.1	F	271.5
SH 151 Southbound Frontage Road and Potranco Road					
8	Scenario 1	F	134.7	F	219.8
	Scenario 2	F	134.7	F	220.1
SH 151 Northbound Frontage Road and Potranco Road					
9	Scenario 1	F	122.7	F	147.0
	Scenario 2	F	117.3	F	144.6
Potranco Road and Richland Hills					
10	Scenario 1	F	313.4	F	235.2
	Scenario 2	F	294.1	F	163.7
Potranco Road and Military Drive					
12	Scenario 1	F	256.3	E	71.3
	Scenario 2	F	356.7	F	281.4
Potranco Road and Micron Drive					
13	Scenario 1	F	81.6	D	52.1
	Scenario 2	F	85.7	D	52.3
Military Drive and Richland Hills					
17	Scenario 1	F	252.3	F	245.1
	Scenario 2	C	25.4	F	122.1
Military Drive and Earl Warren High School Driveway					
20	Scenario 1	B	11.6	C	23.4
	Scenario 2	B	12.0	C	21.5
Military Drive and Hunt Lane					
21	Scenario 1	F	95.6	F	165.0
	Scenario 2	F	95.5	F	164.9
SH 151 Northbound Frontage Road and Hunt Lane					
22	Scenario 1	F	186.2	D	42.7
	Scenario 2	F	186.2	D	42.7
SH 151 Southbound Frontage Road and Hunt Lane					
23	Scenario 1	F	121.7	C	20.1
	Scenario 2	F	121.7	C	20.1

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Table 5 shows the LOS results for the unsignalized intersections. The southbound approach of Richland Hills at the IH-410 Southbound Frontage Road will function at a LOS F during both peak hours for each scenario. The all-way stop-controlled intersection of Ingram Road and Richland Hills will function at a LOS E during the AM peak hour and LOS F during the PM peak hour.

The northbound approach of Potranco Road and Ingram Road will function at a LOS F during both peak periods under each scenario. The westbound left-turn movement will function at a LOS F during the AM peak hour under each scenario; during the PM peak hour the movement will function at a LOS D under Scenario 1 and LOS C under Scenario 2. In Scenario 2, Ingram Road is assumed to have been constructed from Potranco Road north to the Estonia Development. The southbound approach of Ingram Road at Potranco Road will function at a LOS F during both peak hours. The eastbound left-turn movement will function at a LOS A during the AM peak hour and LOS C during the peak hour.

The intersection of Micron Drive and Ingram Road will function at a LOS F during the AM peak hour and LOS B during the PM peak hour. The southbound approach of Reed Road at Military Drive will function at a LOS F during both peak hours under both scenarios.

The eastbound approach of the Jack Jordan Middle School Driveway will function at a LOS F during the AM peak hour under both scenarios; during the PM peak hour the approach will function at a LOS F in Scenario 1 and LOS D in Scenario 2. The eastbound approach of the Christian Evers Elementary School Driveway will function at a LOS F during the AM peak hour and LOS E during the PM peak hour in Scenario 1; in Scenario 2 the approach will function at a LOS D during the AM peak hour and LOS C during the PM peak hour.

Table 5: Unsignalized Intersection Capacity Analysis-2023

Intersection				AM Peak Hour		PM Peak Hour	
#	Condition	Approach	Movement	LOS	Control Delay (sec/veh)	LOS	Control Delay (sec/veh)
IH-410 Southbound Frontage Road and Richland Hills							
3	Scenario 1	SB	R	F	551.1	F	627.2
	Scenario 2	SB	R	F	569.4	F	555.5
Ingram Road and Richland Hills⁽¹⁾							
7	Scenario 1	AWSC		E	35.7	F	74.6
	Scenario 2			E	37.8	F	73.3

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Intersection				AM Peak Hour		PM Peak Hour	
#	Condition	Approach	Movement	LOS	Control Delay (sec/veh)	LOS	Control Delay (sec/veh)
Potranco Road and Ingram Road							
11	Scenario 1	NB	L-R	F	837.6	F	305.9
		WB	L	F	351.4	D	31.3
	Scenario 2	NB	LTR	F	Err	F	Err
		SB	LTR	F	Err	F	Err
		EB	L	A	9.8	C	16.9
		WB	L	F	479.8	C	37.5
Micron Drive and Ingram Road							
14	Scenario 1	AWSC		F	60.5	B	11.8
	Scenario 2	AWSC		F	60.5	B	11.8
Military Drive and Reed Road							
16	Scenario 1	SB	L-R	F	233.5	F	1,292.1
		EB	LT	B	11.7	A	9.3
	Scenario 2	SB	L-R	E	49.4	F	133.4
		EB	LT	A	7.2	A	8.5
Richland Hills and Jack Jordan Middle School Driveway							
18	Scenario 1	NB	LT	C	17.2	A	2.5
		EB	LR	F	4,609.9	F	98.8
	Scenario 2	NB	LT	B	12.9	A	2.5
		EB	LR	F	4,525.5	D	27.2
Richland Hills and Christian Evers Elementary School Driveway							
19	Scenario 1	NB	LT	A	1.7	A	2.0
		EB	LR	F	79.1	E	47.7
	Scenario 2	NB	LT	A	1.5	A	1.8
		EB	LR	D	28.1	C	21.2

Note: (1) intersection capacity analysis results based on HCM 2010 procedures incorporated in Synchro 8

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Recommended Improvements

As shown in **Table 4** and **Table 5** above, several of the intersections will have a LOS E or LOS F during the AM or PM peak hour under Scenario 1 or Scenario 2. Therefore, improvements were identified at those intersections. The improvements are shown in **Tables 6** and **7** for the signalized and unsignalized intersections. The recommended improvements are very similar for both scenarios since the majority of the over capacity intersections are freeway to arterial type interchanges. The LOS and delay shown in **Table 6** and **Table 7** does not include the Potranco Road widening between SH 151 and Culebra Road.

Although the delay is significantly reduced with the recommended improvements, all of the intersections on the IH-410 and SH 151 Frontage Roads will function at a LOS F during the AM or PM peak hour or both peak hours. The SH 151 frontage roads and Potranco Road intersections could be improved by widening Potranco Road to six-lanes. The other interchanges will be fully built-out with the addition of the right-turn lanes recommended in **Table 6**. The only other feasible improvement without direct connectors is alternative type interchanges. The recommended westbound right turn-lane on Ingram Road at the SH 151 Northbound Frontage Road and eastbound right-turn lane on Potranco Road at the SH 151 Southbound Frontage Road could have impacts of the adjacent properties.

The intersection of Potranco Road and Richland Hills will still operate at a LOS F during the AM and PM peak hours with improvements although the delay is significantly reduced. The intersection of Potranco Road and Military Drive will function at a LOS E during the AM peak hour and LOS C during the PM peak hour with the construction of an eastbound right-turn lane. The intersection of Military Drive and Richland Hills will function at a LOS F during the AM and PM peak hour with the added westbound left-turn lane however the delay is cut in half. The Military Drive and Hunt Lane intersection will function at a LOS E during the AM peak hour and LOS F during the PM peak hour with the recommended improvements. The westbound right-turn lane at the intersection will impact the residential parcels north of Military Drive. Military Drive roadway would likely have to be shifted south to allow for the construction of the right-turn lane and may impact future develops south of Military Drive.

Table 6: Recommended Improvements – Signalized Intersections

#	Intersection	Condition	AM Peak Hour		PM Peak Hour		Mitigation Improvements
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	
1	IH-410 Northbound Frontage Road and Military Drive	Scenario 1	F	165.9	F	194.1	Add NBR and WBR
		Improvements	F	240.3	F	162.9	
		Scenario 2	F	175.9	F	187.0	Add NBR and WBR
		Improvements	F	230.6	F	170.8	

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Table 6: Recommended Improvements – Signalized Intersections

#	Intersection	Condition	AM Peak Hour		PM Peak Hour		Mitigation Improvements
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	
2	IH-410 Southbound Frontage Road and Military Drive	Scenario 1	F	168.2	F	264.3	Add SBR and EBR
		Improvements	F	116.0	F	138.3	
		Scenario 2	F	254.1	F	386.0	Add SBR and EBR
		Improvements	F	167.4	F	208.2	
5	SH 151 Southbound Frontage Road and Ingram Road	Scenario 1	F	604.9	F	164.9	Add EBR
		Improvements	F	392.3	F	90.1	
		Scenario 2	F	605.0	F	163.6	Add EBR
		Improvements	F	400.5	F	89.8	
6	SH 151 Northbound Frontage Road and Ingram Road	Scenario 1	D	36.4	F	276.8	Add WBR
		Improvements	D	35.6	F	232.4	
		Scenario 2	D	38.1	F	271.5	Add WBR
		Improvements	D	36.3	F	225.5	
8	SH 151 Southbound Frontage Road and Potranco Road	Scenario 1	F	134.4	F	219.8	Add EBR
		Improvements	F	119.9	F	132.2	
		Scenario 2	F	134.7	F	220.1	Add EBR
		Improvements	F	120.4	F	131.5	
9	SH 151 Northbound Frontage Road and Potranco Road	Scenario 1	F	122.7	F	147.0	Add WBR
		Improvements	F	97.1	F	104.9	
		Scenario 2	F	117.3	F	144.6	Add WBR
		Improvements	F	97.3	F	106.3	

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Table 6: Recommended Improvements – Signalized Intersections

#	Intersection	Condition	AM Peak Hour		PM Peak Hour		Mitigation Improvements
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	
10	Potranco Road and Richlands Hills	Scenario 1	F	313.4	F	235.2	Add SBL; EBR; WBR; Convert SBT to SBR Optimized Splits
		Improvements	F	123.2	F	136.8	
		Scenario 2	F	294.1	F	163.7	
		Improvements	F	120.7	F	97.2	
12	Potranco Road and Military Drive	Scenario 1	F	256.3	F	71.3	Add EBR
		Improvements	E	57.7	C	24.5	
		Scenario 2	F	356.7	F	281.4	
		Improvements	F	187.0	F	123.9	
17	Military Drive and Richland Hills	Scenario 1	F	252.3	F	245.1	Add WBL and EBL
		Improvements	E	59.1	E	75.6	
		Scenario 2	C	25.4	F	122.1	
		Improvements	B	16.6	B	17.9	
21	Military Drive and Hunt Lane	Scenario 1	F	95.6	F	165.0	Add NBR, and WBR Optimized Splits
		Improvements	E	70.8	F	87.4	
		Scenario 2	F	95.5	F	164.9	
		Improvements	E	68.7	E	57.4	
22	SH 151 Northbound Frontage Road and Hunt Lane	Scenario 1	F	186.2	D	42.7	Add NBR, Optimize Timing
		Improvements	E	62.0	C	21.6	
		Scenario 2	F	186.2	D	42.7	
		Improvements	E	62.0	C	20.8	

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Table 6: Recommended Improvements – Signalized Intersections

#	Intersection	Condition	AM Peak Hour		PM Peak Hour		Mitigation Improvements
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	
			23	SH 151 Southbound Frontage Road Hunt Lane	Scenario 1	F	
Improvements	F	99.9	C	20.1			
		Scenario 2	F	121.7	C	20.1	Optimize Timing
		Improvements	F	99.9	C	24.8	

Table 7 shows the recommended improvements for the unsignalized intersections. The all-way stop-controlled intersection of Ingram Road and Richland Hills will function at a LOS E during the AM peak hour and LOS F during the PM peak hour. The intersection will operate at a LOS A during the AM and LOS D during the PM peak hour in Scenario 1 with signalization; the intersection will operate at LOS C during both peak hours in Scenario 2 with the same improvement. Potranco Road and Ingram Road will function at a LOS E during the AM peak hour and LOS D during the PM peak hour in both scenarios if signalized. The Military Drive and Reed Road intersection has a significant amount of eastbound left-turns which will block the through traffic especially if Military Drive is extended to Potranco Road. An eastbound left-turn lane could be constructed to prevent vehicles from blocking the eastbound through at the intersection.

Table 7: Recommended Improvements – Unsignalized Intersections

#	Intersections	Condition	Approach/ Movement	AM Peak Hour		PM Peak Hour		Mitigation Improvements
				LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	
				7	Ingram Road and Richland Hills	Scenario 1	E	
Improvements	A	8.3	D	49.9				
		Scenario 2	E	37.8	F	73.3	Signalize Intersection	
		Improvements	C	25.5	C	34.5		

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Table 7: Recommended Improvements – Unsignalized Intersections

#	Intersections	Condition	Approach/ Movement	AM Peak Hour		PM Peak Hour		Mitigation Improvements
				LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	
11	Potranco Road and Ingram Road	Scenario 1	NB-LTR	F	837.6	F	305.9	Signalize Intersection
			SB-LTR	F	351.4	D	31.3	
		Improvements		E	67.3	D	35.9	
		Scenario 2	NB-LTR	F	Err	F	Err	
			SB-LTR	F	Err	F	Err	
		Improvements		E	73.2	C	30.6	
		16	Military Drive and Reed Road	Scenario 1	SB-L-R	F	233.5	F
EB-LT	B				11.7	A	9.3	
Improvements	SB-L-R			F	233.5	F	1292.1	
	EB-L			B	12.8	B	10.8	
Scenario 2	SB-L-R			E	49.4	F	133.4	EB Left-turn lane
	EB-LT			A	7.2	A	8.5	
Improvements	SB-L-R			E	46.7	F	83.1	
				EB-L	B	10.1	B	

Although the intersection improvements identified in **Table 6** and **Table 7** do improve the intersection delay the intersection still operate at LOS F during one or both of the peak hours. Providing a third lane in each direction on Potranco Road would significantly improve the capacity at the intersections. Potranco Road is identified on the City of San Antonio Major Thoroughfare Plan as a primary Arterial with 120 feet of right-of-way which would allow for the construction of a third lane in each direction. **Table 8** shows the LOS and delay for both scenarios if Potranco Road was widened to six-lanes. The intersection of Potranco Road and Ingram Road was assumed to be signalized in both scenarios. The intersection improvements identified above were assumed to be constructed for the analysis.

The SH 151 Frontage Road intersections and Potranco Road will still operate at a LOS F during the AM or PM peak hours or both. The only other improvement which would improve the intersection is providing three-lanes on the frontage roads.

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Table 8: Intersection Capacity Analysis Widening Potranco to six-lanes-2023

Intersection #	Condition	AM Peak Hour		PM Peak Hour	
		LOS	Control Delay (sec/veh)	LOS	Control Delay (sec/veh)
SH 151 Southbound Frontage Road and Potranco Road					
8	Scenario 1	F	91.1	F	87.5
	Scenario 2	E	75.4	F	85.8
SH 151 Northbound Frontage Road and Potranco Road					
9	Scenario 1	E	60.3	F	106.0
	Scenario 2	E	61.3	F	104.7
Potranco Road and Richland Hills					
10	Scenario 1	E	59.1	F	93.3
	Scenario 2	D	51.4	E	66.0
Potranco Road and Ingram Road					
11	Scenario 1	D	35.5	C	25.7
	Scenario 2	B	13.7	C	20.6
Potranco Road and Military Drive					
12	Scenario 1	D	46.9	C	24.2
	Scenario 2	F	83.0	E	69.4
Potranco Road and Micron Drive					
13	Scenario 1	D	49.1	D	39.6
	Scenario 2	D	45.1	D	43.3

Opinion of Probable Cost of Recommended Improvements

An Opinion of the probable cost to implement the mitigation improvements identified above in **Tables 6-8** are shown in **Table 9**. The cost figures include engineering (including signal and stop sign warrant studies), and construction. No right-of-way acquisition costs were assumed in the total.

Table 9: Opinion of Probable Cost of Mitigation Improvements

Mitigation Improvements	Probable Cost
Roadway Extensions or Widening	
A1 Military Road Extension (between Potranco Road and Military Drive)	\$3,921,000
A2 Military Road Widening (between Ingram Road and Sequoia Height)	\$5,917,000
B1 Ingram Road Extension (between Potranco and Estonia development)	\$1,888,000
B2 Ingram Road Widening (in Estonia development boundary)	\$1,743,000
C Potranco Road Widening (from four-lanes to six-lanes)	\$14,775,000
Intersection Improvements	
1 IH-410 Northbound Frontage Road and Military Drive	

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	Add Northbound and Westbound Right-turn Lane	\$273,000
2	IH-410 Southbound Frontage Road and Military Drive	
	Add Southbound and Eastbound Right-turn Lane	\$273,000
5	SH 151 Southbound Frontage Road and Ingram Road	
	Add Eastbound Right-turn Lane	\$64,000
6	SH 151 Northbound Frontage Road and Ingram Road	
	Add Westbound Right-turn Lane	\$64,000
8	SH 151 Southbound Frontage Road and Potranco Road	
	Add Eastbound Right-turn Lane	\$102,000
9	SH 151 Northbound Frontage Road and Potranco Road	
	Add Westbound Right-turn Lane	\$102,000
10	Potranco Road and Richland Hills	
	Add Southbound Left and Eastbound and Westbound Right-turn Lanes	\$228,000
	Covert Southbound Through/ Right to Exclusive Right-only lane	
12	Potranco Road and Military Drive	
	Add Northbound and Southbound Left-turn lanes and Eastbound Right-turn lane	\$216,000
16	Military Drive and Reed Road	
	Add Eastbound left-turn lane	\$197,000
17	Military Drive and Richland Hills	
	Add westbound Left-turn lane	\$197,000
21	Military Drive and Hunt Lane	
	Add Northbound and Westbound Right-turn lanes	\$237,000
22	SH 151 Northbound Frontage Road and Hunt Lane	
	Add Northbound Right-turn lane	\$102,000
Signalizing intersections		
7	Ingram Road and Richland Hills Drive	\$250,000
11	Potranco Road and Ingram Road	\$250,000
12	Potranco Road and Military Drive	
	Modify existing signal for forth leg in Scenario 2	\$75,000
Signal Timing Improvements		
10	Potranco Road and Richland Hills	\$5,000
21	Military Drive and Hunt Lane	\$5,000
22 & 23	SH 151 Frontage Roads and Hunt Lane	\$5,000
Total Improvement Cost		\$30,692,000

Pedestrian Crossing Feasibility Analysis

Two pedestrian crossing options were reviewed across Potranco to access the proposed District 6 Recreational Center and Library on the SAWS property along Richland Hills. Option 1 consists of using the existing drainage channel under Potranco Road just west of Richland hills. Option 2 consists of just adding sidewalks along Richland hills to connect the existing portions and future Rec Center. **Figure 6** shows the two proposed pedestrian crossing options.

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Option 1: Install Pedestrian facilities through existing drainage easements.

This option would connect the neighborhoods north of Potranco on Richland Hill Drive to the vacant San Antonio Water System (SAWS) property at the corner of Richland Hills Drive and Ingram Road via drainage channels. The pedestrian path would begin just south of the TARA subdivision on Richland Hills Drive and would install approximately 1600 LF of 6 foot wide concrete sidewalk in the privately owned green belt/drainage easement leading up to the existing culvert at Potranco Road. A portion of the existing riprap at the upstream end of this culvert would need to be removed. Stairs and ADA accessible ramp with handrail would be needed to continue the pedestrian path down the 10 foot elevation drop to the bottom of the channel. The path would then continue through any of the TXDOT owned 5 – 10 foot x 10 foot concrete box culverts under Potranco Road. The path then continues down the city owned drainage right-of-way concrete lined channel and another set of stairs and ADA accessible ramp with handrail would be needed to continue the path down the 4 foot elevation drop at the end of the concrete channel. A portion of the existing rip rap and energy dissipaters would need to be removed to install the pedestrian features. At this point the channel again becomes an earth channel and a 6 foot concrete sidewalk would need to be installed for approximately 1300 LF to the southern end of the SAWS property at Ingram Road. Here another set of stairs and ADA accessible ramp would be needed to complete the trail up to the SAWS property.

The channel would require hydraulic modeling due to the pedestrian features being installed where the rip rap is removed. There are existing utilities such as water, sewer and gas that should be avoided and may require adjustments. Over half of the route is in a private easement and/or TXDOT right of way as noted and placement of this path would require approval from these owners. Placing required handrails for the ADA ramps and stairs would require maintenance of these rails after storm events due to trash build up and possible damage to them from debris. The 6' wide concrete sidewalk constructed in the channel would require deep toe downs or other methods to deal with potential erosion issues. The route does not expose pedestrians to traffic however it does appear to be a more circuitous route to the SAWS property than option 2. Estimated construction cost for this option is \$400,000 which does not include engineering.

Option 2: Complete sidewalk along streets

Option 2 would also connect the neighborhoods north of Potranco on Richland Hill Drive to the vacant San Antonio Water System (SAWS) property at the corner of Richland Hills Drive and Ingram Road. This option would continue the sidewalk along the west side of Richland Hills Drive. A 6 foot concrete sidewalk would be installed adjacent to the curb; it would connect to the existing sidewalk just south of the TARA subdivision and continue 1000 LF south to connect to the existing sidewalk near the Pirate's Cove Car Wash. The existing signal at Potranco Road and Richland Hills Drive appears to have ADA compliant ramps and pedestrian indications. It does appear that one ramp may be out of ADA compliance with the push button set too far back

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for the ramp and would require modification. Another 900 LF of 6 foot wide concrete sidewalk would need to be installed along the SAWS property to the intersection with Ingram Road.

Traffic control requirements would be to shutdown of the outside lane of traffic on Richland Hills while the sidewalk is being constructed. All construction would take place in city owned right-of-way. Existing SAWS fire hydrants may need to be relocated and valve adjustments may be required. Estimated construction cost for this option is \$100,000 which does not include engineering.

Onsite School Queue Storage

A report published by the FHWA, *Operational Safety Guidelines around schools in Texas*³, recommends the length for parent drop-off/pick-up on-site stacking. The original study was conducted in South Carolina and North Carolina. However, additional data was collected in Texas to validate the South Carolina and North Carolina guidelines for on-site stacking length. The data collected at Texas schools did show that the observed maximum queue lengths were often well below the recommended on-site stacking lengths for South Carolina and North Carolina. **Table 6** shows the recommended on-site stacking lengths for Texas schools which are considerably shorter than what is recommended in South Carolina and North Carolina.

Table 6: Recommended Parent Drop-off/Pick-up Zone On-Site Stacking Length for Texas

School Type	Student Population	Loop Drive Stacking Length (ft)
Elementary	200 – 600	400 – 750
	600 – 1400	750 – 1500
Middle	200 – 600	500 – 800
	600 – 1200	800 – 1600
High	400 – 800	800 – 1200
	800 – 2500	1200 – 1500

Note: For high school populations greater than 2500 students, consider two separate student pick-up/drop-off loops.

Christian Evers Elementary has approximately 875 feet of on-site stacking which may be adequate if there is 733 students or less. Jack Jordan Middle School has approximately 930 feet of on-site stacking which is enough for 697 students. Based on field observations it seems there are more students at one or both of the campuses since there the queue backs up on to Richland Hills Drive.

Conclusion & Recommendations

Based on the traffic analysis results we are recommending the following improvements:

³ Cooner, S.A., K. Fitzpatrick, M.D. Wooldridge, J.A. Crawford, and G.L. Ford. *Traffic Operations and Safety at School: Operational Safety Guidelines around Schools in Texas*. Research Report FHWA/TX-04/0-4286-2., Texas Transportation Institute, Texas A&M University System, College Station, January 2004.

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- Widen Potranco Road to six-lanes between State Highway 151 and Culebra Road (FM 471).
- Extend Military Drive north from Potranco Road to connect with existing section adjacent to the Estonia Development. Extending Military Drive will reduce volumes on Richland Hills and Potranco Road. The extension of Ingram Road from Potranco Road to Military Drive provides a minimal benefit for the Estonia Development therefore it is recommended that Military Drive be extended first.
- Construct signals at the intersection of Ingram Road and Richland Hills, Potranco Road and Ingram Road and modify the signal Potranco Road and Military Drive with Military Road Extension.
- Construct northbound and westbound right-turn lanes at the intersection of IH-410 Northbound Frontage Road and Military Drive.
- Construct southbound and eastbound right-turn lanes at the intersection of IH-410 Southbound Frontage Road and Military Drive.
- Construct eastbound right-turn lane on Ingram Road at the SH 151 Southbound Frontage Road
- Construct westbound right-turn lane on Ingram Road at the SH 151 Northbound Frontage Road. Right-of-way would be required for the construction of the improvement and may impact the existing gas station.
- Construct eastbound right-turn lane on Potranco Road at SH 151 Southbound Frontage Road. Right-of-way would be required for the construction of the right-turn lane and may impact the Texaco gas station.
- Construct westbound right-turn lane on Potranco Road at SH 151 Northbound Frontage Road.
- Widen southbound approach of Richland Hills at Potranco Road to provide dedicated left-turn lane, two through lanes and dedicated right-turn lane. Construct an eastbound and westbound right-turn lane on Potranco Road. The southbound improvements would require the median to be removed to allow for the widening. Currently, the TARA neighborhood sign is in the median therefore it would need to be moved to a different location.
- Construct a northbound left-turn lane on Military Drive at Potranco Road which requires a portion of the existing median to be removed. The northbound approach should be restriped for dedicated left-turn lane, through only lane and shared through/right-turn lane. The southbound approach of Military Drive would be constructed with the extension of the roadway. The lane assignment should match the northbound approach. In addition construct an eastbound right-turn lane on Potranco Road at Military Drive.
- Construct an eastbound and westbound left-turn lane on Military Drive at Richland Hills. Military Drive would need to be widened to the north side to allow for the construct of the left-turn lanes however the right-of-way is available along Military Drive.

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- Construct a northbound right-turn lane on Hunt Lane at Military Drive. Construct a westbound right-turn lane on Military Drive at Hunt Lane. The construction of the westbound right-turn lane may not be feasible since right-of-way would be required from residential parcels north of Military Drive.
- Construct a northbound right-turn lane on the SH 151 Northbound Frontage Road at Hunt Lane
- All of the signals were assumed to be optimized once the improvements are constructed since it is likely the City of San Antonio Transportation and Capital Improvements Department will be making ongoing changes to the signal timing in the study area.
- Consideration should be given to alternative interchanges since most of the frontage road intersections will still have a poor LOS with the recommended improvements.
- The onsite school pick-up/drop-off queue storage should be discussed with Northside ISD to develop an alternative to reduce the queuing along Richland Hills during the AM and PM pick-up/drop-off periods.
- The pedestrian crossing through the existing drainage culvert (Option 1) under Potranco Road is feasible however; additional hydraulic analysis is required to determine the impacts of removing a portion of the existing rip-rap. Option 2 does expose pedestrians to traffic when crossing Potranco Road however it is a more direct route to the existing SAWS property.

END OF MEMO

ATTACHMENTS

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Kerri M. Collins
2/28/14

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Traffic Count Data

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Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	Micron Dr and Potranco Rd
Project #:	7190-19
North-South street:	Micron Dr
East-West street:	Potranco Rd
Time Period:	9 7:00 AM - 9:00 AM
Date recorded:	Tuesday October 22, 2013
Traffic Count/ Sub:	GRAM Traffic
Path to Raw Data:	P:\79112\401Data\RAW\site1695-01am.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
7:00 AM	2	1	4	41	32	33	8	188	112	34	76	5
7:15 AM	2	0	2	60	34	54	8	218	91	72	75	0
7:30 AM	6	2	3	72	16	82	10	212	85	45	95	2
7:45 AM	0	9	5	27	30	62	5	241	122	31	111	1
8:00 AM	3	0	5	24	5	48	8	260	83	22	56	2
8:15 AM	2	1	6	9	11	31	10	175	104	20	94	0
8:30 AM	0	0	5	10	2	20	8	222	87	12	87	1
8:45 AM	4	2	6	9	5	17	23	237	74	14	78	0
Total	19	15	36	252	135	347	80	1753	758	250	672	11
Peak Movement Total	10	12	14	200	112	231	31	859	410	182	357	8
Peak Turn Percent	28%	33%	39%	37%	21%	43%	2%	66%	32%	33%	65%	1%
Peak Approach Total	36			543			1300			547		

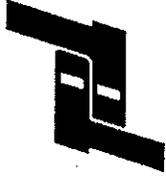
Peak Hour: 7:00 AM - 8:00 AM
 Percent Trucks: 0%

Time	Approach		Pedestrians	
	NB	SB	EB	WB
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
Total	0	0	0	0
Peak Total	0	0	0	0

Peak Hour Approach Traffic Volume and Percentage	
	<p>43% 21% 37% 231 112 200</p> <p> </p>
<p>2% 31 66% 859 32% 410</p> <p> </p>	<p>8 1% 357 65% 182 33%</p> <p> </p>
<p>Micron Dr</p>	<p>Potranco Rd</p>

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Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Micron Dr and Potranco Rd
Project #:	7190-19
North-South street:	Micron Dr
East-West street:	Potranco Rd
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\79\12\401\Data\RAW\site\695-01pm.xls

Time Movement Vehicle Type	Northbound			Southbound			Eastbound			Westbound		
	C	T	thru	C	T	thru	C	T	thru	C	T	thru
4:00 PM	82		4	4		54	27		196	11		171
4:15 PM	61		7	7		66	49		231	5		186
4:30 PM	58		4	6		38	33		241	1		188
4:45 PM	56		1	7		34	38		217	3		221
5:00 PM	35		5	2		30	60		259	4		234
5:15 PM	44		0	5		32	35		289	8		277
5:30 PM	30		1	3		19	46		268	6		272
5:45 PM	20		4	8		8	53		245	4		219
Total	386	0	26	49	0	281	341	0	1946	42	0	1768
Peak Movement Total	165		7	17		115	179		1033	21		1004
Peak Turn Percent	57%		2%	9%		40%	91%		76%	2%		97%
Peak Approach Total	287			196			1358			1039		

Time	Approach	NB	SB	EB	WB
4:00 PM	4:15 PM	0	0	0	0
4:15 PM	4:30 PM	0	0	0	0
4:30 PM	4:45 PM	0	0	0	0
4:45 PM	5:00 PM	0	0	0	0
5:00 PM	5:15 PM	0	0	0	0
5:15 PM	5:30 PM	0	0	0	0
5:30 PM	5:45 PM	0	0	0	0
5:45 PM	6:00 PM	0	0	0	0
Total		0	0	0	0
Peak Total		0	0	0	0

Time	Approach	NB	SB	EB	WB
4:00 PM	4:15 PM	0	0	0	0
4:15 PM	4:30 PM	0	0	0	0
4:30 PM	4:45 PM	0	0	0	0
4:45 PM	5:00 PM	0	0	0	0
5:00 PM	5:15 PM	0	0	0	0
5:15 PM	5:30 PM	0	0	0	0
5:30 PM	5:45 PM	0	0	0	0
5:45 PM	6:00 PM	0	0	0	0
Total		0	0	0	0
Peak Total		0	0	0	0

Peak Hour: 4:45 PM - 5:45 PM
Percent Trucks: 0%



EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	Micron Dr and Ingram Rd
Project #:	7190-19
North-South street:	Micron Dr
East-West street:	Ingram Rd
Time Period:	9 7:00 AM - 9:00 AM
Date recorded:	Tuesday October 22, 2013
Traffic Count/ Sub:	GRAM Traffic
Path to Raw Data:	P:\78112\40Data\RAW\site1695-02am.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	C	T	thru	C	T	thru	C	T	thru	C	T	thru
7:00 AM	0	0	16	33	0	0	0	0	0	8	0	0
7:15 AM	0	0	29	34	0	5	0	0	0	28	1	0
7:30 AM	0	0	14	33	0	8	0	0	0	24	0	0
7:45 AM	1	0	20	33	0	3	0	0	0	18	0	0
8:00 AM	0	0	15	29	0	6	0	0	0	8	1	0
8:15 AM	0	0	12	14	0	8	0	0	0	7	0	0
8:30 AM	0	0	17	12	0	10	0	0	0	7	1	0
8:45 AM	0	0	10	17	0	8	0	0	0	7	0	0
Total	1	0	133	205	0	53	0	0	0	107	0	3
Peak Movement Total	1	0	79	133	0	21	0	0	0	78	1	83
Peak Turn Percent	1%	0%	78%	26%	0%	21%	0%	0%	0%	48%	1%	51%
Peak Approach Total	101			519			162			162		

Peak Hour: 7:00 AM - 8:00 AM
 Percent Trucks: 0%

Time	Pedestrians		
	NB	SB	WB
7:00 AM	0	0	0
7:15 AM	0	0	0
7:30 AM	0	0	0
7:45 AM	0	0	0
8:00 AM	0	0	0
8:15 AM	0	0	0
8:30 AM	0	0	0
8:45 AM	0	0	0
Total	0	0	0
Peak Total	0	0	0

Peak Hour Approach Traffic Volume and Percentage	

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	Micron Dr and Ingram Rd
Project #:	7190-19
North-South street:	Micron Dr
East-West street:	Ingram Rd
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub	GRAM Traffic
Path to Raw Data	P:\79112\40Data\RAWsite1695-02pm.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
4:00 PM	0	35	10	0	29	0	0	0	0	14	0	15
4:15 PM	0	44	17	16	29	0	0	0	0	14	1	17
4:30 PM	1	47	7	14	23	0	0	0	0	13	1	25
4:45 PM	0	48	19	17	23	0	1	1	1	13	1	39
5:00 PM	0	48	9	11	28	0	0	0	0	21	0	29
5:15 PM	0	47	8	17	26	0	0	0	0	21	1	32
5:30 PM	0	49	14	13	24	0	0	0	0	20	0	39
5:45 PM	0	45	8	7	31	0	0	0	0	17	1	46
Total	1	363	92	105	213	0	3	0	1	133	5	242
Peak Movement Total	0	192	50	58	101	0	1	1	1	75	2	139
Peak Turn Percent	0%	79%	21%	36%	64%	0%	33%	33%	33%	35%	31%	64%
Peak Approach Total					159		3			216		

Peak Hour: 4:45 PM - 5:45 PM
 Percent Trucks: 0%

Time	Pedestrians		
	NB	SB	EB
4:00 PM	0	0	0
4:15 PM	0	0	0
4:30 PM	0	0	0
4:45 PM	0	0	0
5:00 PM	0	0	0
5:15 PM	0	0	0
5:30 PM	0	0	0
5:45 PM	0	0	0
Total	0	0	0
Peak Total	0	0	0

Peak Hour Approach Traffic Volume and Percentage	
<p>0% 64% 36% 0 101 58</p>	<p>139 64% 2 1% 75 35%</p>
<p>33% 1 33% 1 33% 1</p>	<p>Ingram Rd</p> <p>0 192 50 0% 79% 21%</p>

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Military Dr and Loop 410 frontage road
Project #:	7190-19
North-South street:	Military Dr
East-West street:	Loop 410 frontage road /
Time Period:	9:00 AM - 9:00 AM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub	GRAM Traffic
Path to Raw Data	P:\7911240Data\RAW\site1695-03EBam.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	34	148	87	259	0	33	284	5	0	0	0
7:30 AM	0	72	177	90	291	0	26	274	3	0	0	0
7:45 AM	0	74	165	79	278	0	26	252	1	0	0	0
8:00 AM	0	74	121	61	227	0	32	109	7	0	0	0
8:15 AM	0	60	122	57	197	0	17	51	13	0	0	0
8:30 AM	0	61	140	50	141	0	35	65	14	0	0	0
8:45 AM	0	60	128	45	170	0	36	293	5	0	0	0
9:00 AM	0	48	92	65	128	0	27	340	10	0	0	0
Total	0	483	1093	534	1691	0	232	1688	58	0	0	0
Peak Movement Total	0	254	611	317	1055	0	117	919	16	0	0	0
Peak Turn Percent	0%	29%	71%	23%	77%	0%	11%	87%	2%	0%	0%	0%
Peak Approach Total		865		1372				1052				0

Peak Hour: 7:00 AM - 8:00 AM
Percent Trucks: 0%

Time	Approach		Pedestrians	
	NB	SB	EB	WB
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
Total	0	0	0	0
Peak Total	0	0	0	0

Peak Hour Approach Traffic Volume and Percentage	
 0% 77% 23% 0 1055 317	 0% 77% 23% 0 1055 317
 0% 77% 23% 0 1055 317	 0% 77% 23% 0 1055 317
 11% 117 87% 919 2% 16	 0% 254 611 29% 71%

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Military Dr and Loop 410 frontage road
Project #:	7190-19
North-South street:	Military Dr
East/West street:	Loop 410 frontage road /
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\7912\401Data\RAW\site1695-03EBpm.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
4:00 PM	0	112	130	50	216	0	48	53	10	0	0	0
4:15 PM	0	116	130	76	227	0	29	39	8	0	0	0
4:30 PM	0	116	162	70	229	0	40	47	12	0	0	0
4:45 PM	0	141	143	81	232	0	40	51	6	0	0	0
5:00 PM	0	178	178	85	232	0	23	42	10	0	0	0
5:15 PM	0	181	162	94	227	0	31	53	10	0	0	0
5:30 PM	0	165	178	66	223	0	28	47	12	0	0	0
5:45 PM	0	147	148	77	212	0	31	41	11	0	0	0
Total	0	1156	1231	599	1798	0	270	373	79	0	0	0
Peak Movement Total	0	665	661	326	914	0	122	193	38	0	0	0
Peak Turn Percent	0%	50%	50%	26%	74%	0%	35%	55%	11%	0%	0%	0%
Peak Approach Total		1326			1240			353				

Peak Hour: 4:45 PM - 5:45 PM
Percent Trucks: 0%

Time	Pedestrians		
	NB	SB	EB
4:00 PM	0	0	0
4:15 PM	0	0	0
4:30 PM	0	0	0
4:45 PM	0	0	0
5:00 PM	0	0	0
5:15 PM	0	0	0
5:30 PM	0	0	0
5:45 PM	0	0	0
Total	0	0	0
Peak Total	0	0	0

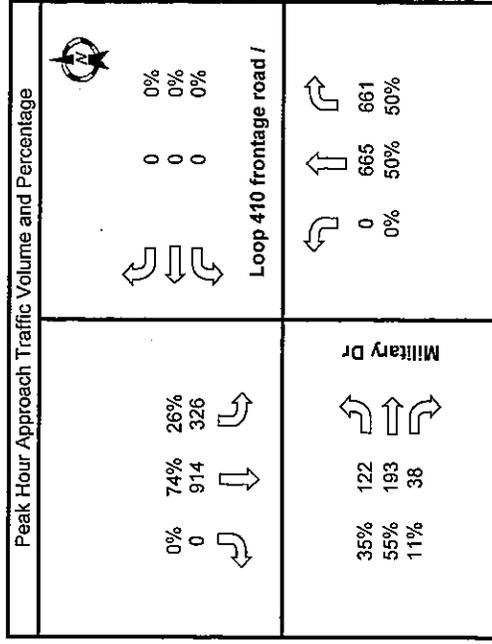


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Military Dr and
Project #:	7190-19
North-South street:	Military Dr
East-West street:	/ Loop 410 frontage road
Time Period:	9 7:00 AM - 9:00 AM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\7912\401Data\RAW\site1695-03WBam.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
7:00 AM	11	72	0	0	135	5	0	0	0	217	49	39
7:15 AM	10	59	0	0	161	10	0	0	0	252	49	35
7:30 AM	20	71	0	0	138	12	0	0	0	252	68	31
7:45 AM	21	101	0	0	108	7	0	0	0	210	76	40
8:00 AM	11	53	0	0	95	11	0	0	0	199	61	36
8:15 AM	22	78	0	0	86	5	0	0	0	116	75	34
8:30 AM	15	69	0	0	104	13	0	0	0	125	66	34
8:45 AM	17	74	0	0	93	10	0	0	0	99	61	26
Total	127	577	0	0	920	73	0	0	0	1470	505	275
Peak Movement Total	62	303	0	0	542	34	6%	0	0	931	242	145
Peak Turn Percent	17%	83%	0%	0%	94%	6%	0%	0%	0%	71%	18%	11%
Peak Approach Total		365			576						1318	

Peak Hour: 7:00 AM - 8:00 AM
Percent Trucks: 0%

Time	Approach		Pedestrians	
	NB	WB	SB	EB
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
Total	0	0	0	0
Peak Total	0	0	0	0

Peak Hour Approach Traffic Volume and Percentage	

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	Military Dr and
Project #:	7190-19
North-South street:	Military Dr
East-West street:	/ Loop 410 frontage road
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub	GRAM Traffic
Path to Raw Data	P:\79\12\401Data\RAW\site1695-03WBp.m.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	C	T	I	C	T	I	C	T	I	C	T	I
4:00 PM	43	0	0	112	0	0	0	0	0	130	0	0
4:15 PM	31	0	0	154	0	0	0	0	0	156	0	0
4:30 PM	41	0	0	140	0	0	0	0	0	172	0	0
4:45 PM	38	0	0	132	0	0	0	0	0	169	0	0
5:00 PM	52	0	0	128	0	0	0	0	0	177	0	0
5:15 PM	66	0	0	171	0	0	0	0	0	171	0	0
5:30 PM	41	0	0	119	0	0	0	0	0	180	0	0
5:45 PM	44	0	0	142	0	0	0	0	0	193	0	0
Total	356	0	0	1098	0	0	0	0	0	1381	0	0
Peak Movement Total	203	0	0	560	0	0	0	0	0	617	0	0
Peak Turn Percent	25%	0%	0%	79%	0%	0%	0%	0%	0%	37%	0%	0%
Peak Approach Total	797	0	0	712	0	0	0	0	0	1654	0	0

Peak Hour: 5:00 PM - 6:00 PM
 Percent Trucks: 0%

Time	Pedestrians			Trucks		
	NB	SB	EB	NB	SB	EB
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
Total	0	0	0	0	0	0
Peak Total	0	0	0	0	0	0

Peak Hour Approach Traffic Volume and Percentage	
	283 17% 754 46% 617 37%
	203 25% 594 75% 0 0%
	0 0% 0 0% 0 0%
	0 0% 0 0% 0 0%
/ Loop 410 frontage road	

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	Military Dr and Wal-Mart Driveway
Project #:	7190-19
North-South street:	Military Dr
East-West street:	Wal-Mart Driveway /
Time Period:	9:00 AM - 9:00 AM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\7912140\Data\RAW\site1695-04am.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
7:00 AM	5	93	0	0	136	12	9	0	0	0	0	0
7:15 AM	5	93	0	0	149	8	9	0	0	0	0	0
7:30 AM	3	94	0	0	137	15	9	0	0	0	0	0
7:45 AM	1	122	0	0	100	11	9	0	0	0	0	0
8:00 AM	2	76	0	0	95	8	7	0	0	0	0	0
8:15 AM	3	80	0	0	84	14	7	0	0	0	0	0
8:30 AM	4	81	0	0	75	13	9	0	0	0	0	0
8:45 AM	3	76	0	0	95	16	4	0	0	0	0	0
Total	26	715	0	0	871	97	63	0	0	0	0	0
Peak Movement Total	14	402	0	0	522	46	36	0	0	0	0	0
Peak Turn Percent	3%	97%	0%	0%	92%	8%	55%	0%	0%	10%	0%	0%
Peak Approach Total	416			568			66			0		

Peak Hour: 7:00 AM - 8:00 AM
 Percent Trucks: 0%

Time	Pedestrians		
	NB	SB	WB
7:00 AM	0	0	0
7:15 AM	0	0	0
7:30 AM	0	0	0
7:45 AM	0	0	0
8:00 AM	0	0	0
8:15 AM	0	0	0
8:30 AM	0	0	0
8:45 AM	0	0	0
Total	0	0	0
Peak Total	0	0	0

Peak Hour Approach Traffic Volume and Percentage	
	8% 92% 0% 46 522 0 ↙ ↘ ↗
Military Dr 55% 36 0% 0 45% 30	↙ ↘ ↗
	0% 0% 0% 0 0 0 ↖ ↗ ↘
Wal-Mart Driveway / 14 402 0 3% 97% 0%	↖ ↗ ↘

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Military Dr and Wal-Mart Driveway
Project #:	7190-19
North-South street:	Military Dr
East-West street:	Wal-Mart Driveway /
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\7912\401Data\RAW\site1695-04pm.xls

Time Movement Vehicle Type	Northbound			Southbound			Eastbound			Westbound		
	C	T	I	C	T	I	C	T	I	C	T	I
4:00 PM	12			69			0			0		
4:15 PM	4			98			0			0		
4:30 PM	130			33			0			0		
4:45 PM	9			88			0			0		
5:00 PM	173			96			0			0		
5:15 PM	13			122			0			0		
5:30 PM	177			137			0			0		
5:45 PM	13			101			0			0		
5:45 PM	11			116			0			0		
Total	76	0	1195	0	0	827	0	0	320	0	0	138
Peak Movement Total	44		653	476		172	0		174	0		68
Peak Turn Percent	6%		94%	73%		27%	0%		72%	0%		28%
Peak Approach Total	697			648			242			0		

Peak Hour 5:00 PM - 6:00 PM
Percent Trucks 0%

Time Approach	Pedestrians			Trucks		
	NB	SB	WB	EB	WB	MB
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
Total	0	0	0	0	0	0
Peak Total	0	0	0	0	0	0

Peak Hour Approach Traffic Volume and Percentage	
 27% 172 73% 476 0% 0 0% 0 0% 0	0% 0 0% 0 0% 0 0% 0 0% 0
72% 174 0% 0 28% 68	44 6% 653 94% 0 0%

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Military Dr and Potranco Rd
Project #:	7190-19
North-South street:	Military Dr /
East-West street:	Potranco Rd
Time Period:	9 7:00 AM - 9:00 AM
Date recorded:	Thursday October 24, 2013
Traffic Count Sub	GRAM Traffic
Path to Raw Data	P:\7912401Data\RAW\site1695-05am.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
7:00 AM	30	0	52	0	0	0	0	0	235	56	76	0
7:15 AM	30	0	83	0	0	0	0	0	152	67	90	0
7:30 AM	29	0	61	0	0	0	0	0	371	56	105	0
7:45 AM	46	0	81	0	0	0	0	0	353	57	143	0
8:00 AM	32	0	59	0	0	0	0	0	250	39	114	0
8:15 AM	36	0	50	0	0	0	0	0	215	24	134	0
8:30 AM	27	0	43	0	0	0	0	0	199	36	103	0
8:45 AM	33	0	34	0	0	0	0	0	182	35	101	0
Total	263	0	463	0	0	0	0	0	2247	370	866	0
Peak Movement Total	155	0	277	0	0	0	0	0	1401	677	414	0
Peak Turn Percent	33%	0%	67%	0%	0%	0%	0%	0%	67%	33%	64%	0%
Peak Approach Total	412			0			2078			650		

Peak Hour 7:00 AM - 8:00 AM
Percent Trucks 0%

Time	Pedestrians		
	NB	SB	WB
7:00 AM	0	0	0
7:15 AM	0	0	0
7:30 AM	0	0	0
7:45 AM	0	0	0
8:00 AM	0	0	0
8:15 AM	0	0	0
8:30 AM	0	0	0
8:45 AM	0	0	0
Total	0	0	0
Peak Total	0	0	0

Peak Hour Approach Traffic Volume and Percentage	
 0% 0% 0% 0 0 0 	0 0% 414 64% 236 36% Potranco Rd
0% 0% 0% 0 0 0 	135 33% 0 0% 277 67% Military Dr /

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Military Dr and Potranco Rd
Project #:	7190-19
North-South street:	Military Dr /
East-West street:	Potranco Rd
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Thursday October 24, 2013
Traffic Count Sub:	GRAM Traffic
Path To Raw Data:	P:\79112401Data\RAWsite\695-05pm.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
4:00 PM	78	0	62	0	0	0	0	169	87	37	181	0
4:15 PM	72	0	73	0	0	0	0	180	90	30	238	0
4:30 PM	105	0	105	0	0	0	0	177	87	28	229	0
4:45 PM	89	0	99	0	0	0	0	167	90	33	254	0
5:00 PM	96	0	115	0	0	0	0	198	122	43	279	0
5:15 PM	82	0	98	0	0	0	0	203	118	40	230	0
5:30 PM	80	0	108	0	0	0	0	209	103	43	263	0
5:45 PM	95	0	96	0	0	0	0	191	103	35	244	0
Total	697	0	756	0	0	0	0	1494	800	289	1918	0
Peak Movement Total	353	0	417	0	0	0	0	641	446	161	1016	0
Peak Turn Percent	46%	0%	54%	0%	0%	0%	0%	64%	36%	14%	86%	0%
Peak Approach Total	770	0	770	0	0	0	0	1247	1247	1177	1177	0

Peak Hour: 5:00 PM - 6:00 PM
Percent Trucks: 0%

Time	Approach			Pedestrians		
	NB	SB	WB	EB	WB	WB
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
Total	0	0	0	0	0	0
Peak Total	0	0	0	0	0	0

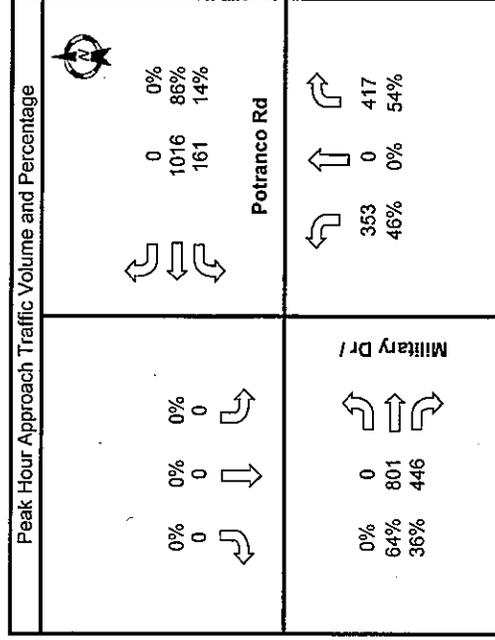


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	and
Project #:	7190-19
North-South street:	/ Richard Hills Dr
East-West street:	/ Loop 410 frontage road
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\79112\401Data\RAW\site1695-06pm.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Peak Movement Total	0	0	0	0	0	0	0	0	0	0	0	0
Peak Turn Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Approach Total	0			145			0			2453		
	0%			100%			0%			85%		
	0			145			0			2882		

Peak Hour: 5:00 PM - 6:00 PM
Percent Trucks: 0%

Time	Approach	Pedestrians	
		NB	SB
4:00 PM	4:15 PM	0	0
4:15 PM	4:30 PM	0	0
4:30 PM	4:45 PM	0	0
4:45 PM	5:00 PM	0	0
5:00 PM	5:15 PM	0	0
5:15 PM	5:30 PM	0	0
5:30 PM	5:45 PM	0	0
5:45 PM	6:00 PM	0	0
Total		0	0
Peak Total		0	0

Peak Hour Approach Traffic Volume and Percentage	
 100% 0% 0% 145 0 0 	429 15% 2453 85% 0 0% / Loop 410 frontage road
0% 0% 0% 0 0 0 	0 0% 0 0% 0 0% / Richard Hills Dr

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Richard Hills Dr and Ingram Rd
Project #:	7190-19
North-South street:	Richard Hills Dr
East-West street:	Ingram Rd
Time Period:	9:00 AM - 9:00 AM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\7912\401Data\RAW\site1695-07am.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
7:00 AM	9	62	72	5	7	1	8	17	1	42	51	10
7:15 AM	8	51	62	3	11	2	6	15	2	44	68	14
7:30 AM	9	41	61	3	13	4	8	20	1	43	73	21
7:45 AM	13	51	49	8	11	12	6	25	5	26	69	33
8:00 AM	19	37	41	6	8	4	10	16	4	33	65	20
8:15 AM	17	41	32	3	18	6	7	18	4	34	69	22
8:30 AM	20	48	36	7	13	8	10	15	5	25	55	14
8:45 AM	18	55	36	5	15	9	6	25	4	22	44	7
Total	113	386	389	40	96	46	61	151	26	269	494	141
Peak Movement Total	39	205	244	19	42	19	28	77	9	155	261	78
Peak Turn Percent	8%	42%	50%	24%	53%	24%	25%	68%	8%	31%	53%	16%
Peak Approach Total	488			80			114			494		

Peak Hour: 7:00 AM - 8:00 AM
Percent Trucks: 0%

Time	Pedestrians		
	NB	SB	WB
7:00 AM	0	0	0
7:15 AM	0	0	0
7:30 AM	0	0	0
7:45 AM	0	0	0
8:00 AM	0	0	0
8:15 AM	0	0	0
8:30 AM	0	0	0
8:45 AM	0	0	0
Total	0	0	0
Peak Total	0	0	0

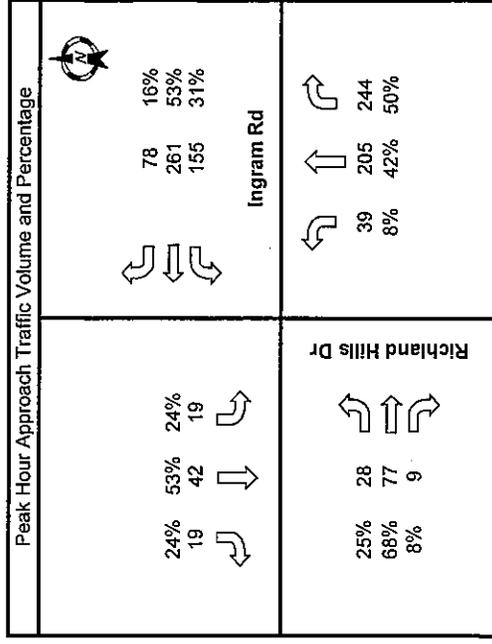


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	Richland Hills Dr and Ingram Rd
Project #:	7190-19
North-South street:	Richland Hills Dr
East-West street:	Ingram Rd
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Tuesday October 22, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\79\12\401Data\RAW\site1695-07pm.xls

Time	Movement	Northbound			Southbound			Eastbound			Westbound			
		C	T	thru	C	T	thru	C	T	thru	C	T	thru	
4:00 PM	4:15 PM	4	17	27	14	45	8	5	48	8	64	42	4	
4:15 PM	4:30 PM	4	22	40	23	46	11	5	34	10	59	54	5	
4:30 PM	4:45 PM	4	26	40	31	74	13	7	51	13	57	39	8	
4:45 PM	5:00 PM	4	16	38	35	60	5	6	48	7	47	51	8	
5:00 PM	5:15 PM	4	24	40	76	65	15	3	68	16	77	42	6	
5:15 PM	5:30 PM	2	17	46	35	69	14	5	62	9	38	55	5	
5:30 PM	5:45 PM	1	24	44	44	85	7	7	77	12	45	59	6	
5:45 PM	6:00 PM	0	28	32	49	84	12	7	61	7	46	35	7	
	Total	23	0	307	0	307	0	45	0	449	0	433	0	377
	Peak Movement Total	7	93	162	204	303	48	22	268	744	206	191	24	
	Peak Turn Percent	3%	35%	62%	37%	56%	9%	7%	80%	13%	46%	45%	6%	
	Peak Approach Total	262			555			334			421			

Peak Hour: 5:00 PM - 6:00 PM
 Percent Trucks: 0%

Time	Approach	Pedestrians		
		NB	SB	WB
4:00 PM	4:15 PM	0	0	0
4:15 PM	4:30 PM	0	0	0
4:30 PM	4:45 PM	0	0	0
4:45 PM	5:00 PM	0	0	0
5:00 PM	5:15 PM	0	0	0
5:15 PM	5:30 PM	0	0	0
5:30 PM	5:45 PM	0	0	0
5:45 PM	6:00 PM	0	0	0
Total		0	0	0
Peak Total		0	0	0

Peak Hour Approach Traffic Volume and Percentage	
	<p>Richland Hills Dr</p> <p>9% 55% 37% 48 303 204</p> <p>7% 22 80% 268 13% 44</p>
<p>Ingram Rd</p> <p>24 6% 191 45% 206 49%</p>	<p>7 3% 93 35% 162 62%</p>

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Ingram Rd and Potranco Rd
Project #:	7190-19
North-South street:	Ingram Rd /
East-West street:	Potranco Rd
Time Period:	9 7:00 AM - 9:00 AM
Date recorded:	Wednesday October 23, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\70912\401Data\RAW\site1695-08am.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
7:00 AM	1	0	67	0	0	0	4	485	0	21	99	0
7:15 AM	0	0	72	0	0	0	2	445	0	22	125	0
7:30 AM	0	0	50	0	0	0	2	431	0	26	154	0
7:45 AM	0	0	58	0	0	0	6	352	0	45	173	0
8:00 AM	1	0	36	0	0	0	8	291	0	26	124	0
8:15 AM	3	0	57	0	0	0	3	281	0	27	118	0
8:30 AM	0	0	38	0	0	0	5	265	0	27	112	0
8:45 AM	1	0	29	0	0	0	4	225	0	17	109	0
Total	6	0	407	0	0	0	34	2775	0	211	1014	0
Peak Movement Total	1	0	247	0	0	0	14	1713	0	114	551	0
Peak Turn Percent	0%	0%	100%	0%	0%	0%	1%	99%	0%	17%	83%	0%
Peak Approach Total	248			0			1727			665		

Peak Hour: 7:00 AM - 8:00 AM
Percent Trucks: 0%

Time	Approach	Pedestrians	
		NB	SB
7:00 AM	0	0	0
7:15 AM	0	0	0
7:30 AM	0	0	0
7:45 AM	0	0	0
8:00 AM	0	0	0
8:15 AM	0	0	0
8:30 AM	0	0	0
8:45 AM	0	0	0
Total	0	0	0
Peak Total	0	0	0

Peak Hour Approach Traffic Volume and Percentage	
Ingram Rd /	Potranco Rd
0% 0	0% 0
99% 1713	83% 551
1% 14	17% 114
	100% 247

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Ingram Rd and Potranco Rd
Project #:	7190-19
North-South street:	Ingram Rd /
East-West street:	Potranco Rd
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Wednesday October 23, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\7912\401Data\RAW\site1695-08pm.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
4:00 PM	3	0	60	0	0	0	0	177	0	0	38	0
4:15 PM	3	0	73	0	0	0	0	218	1	0	36	0
4:30 PM	1	0	70	0	0	0	0	185	5	0	38	0
4:45 PM	5	0	89	0	0	0	0	201	2	0	51	0
5:00 PM	2	0	124	0	0	0	0	200	4	0	43	0
5:15 PM	3	0	93	0	0	0	0	193	4	0	51	0
5:30 PM	2	0	87	0	0	0	0	214	3	0	46	0
5:45 PM	1	0	95	0	0	0	0	209	4	0	78	0
Total	20	0	691	0	0	0	0	1597	23	0	381	0
Peak Movement Total	8	0	399	0	0	0	0	816	15	0	218	0
Peak Turn Percent	2%	0%	98%	0%	0%	0%	0%	98%	2%	0%	15%	0%
Peak Approach Total	407			0			831			1435		

Peak Hour: 5:00 PM - 6:00 PM
Percent Trucks: 0%

Time	Pedestrians			Trucks		
	NB	SB	WB	NB	SB	WB
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
Total	0	0	0	0	0	0
Peak Total	0	0	0	0	0	0

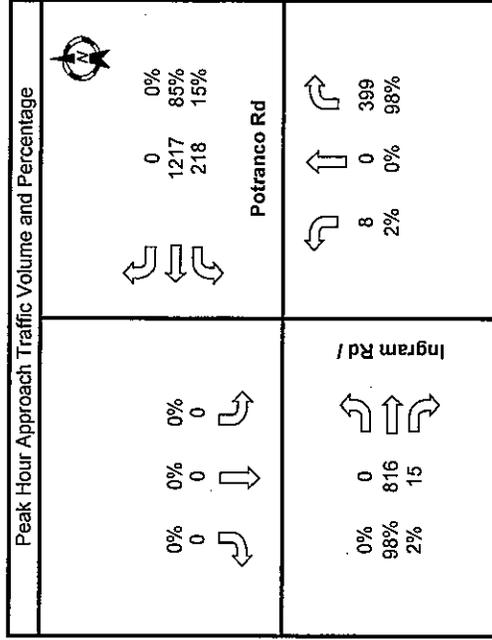


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	and Military Dr
Project #:	7190-19
North-South street:	/ Reed Rd
East-West street:	Military Dr
Time Period:	9 7:00 AM - 9:00 AM
Date recorded:	Wednesday October 23, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\79112\401Data\RAW\site1695-09am.xls

Time	Northbound			Southbound			Eastbound			Westbound			
	C	T	thru	C	T	thru	C	T	thru	C	T	thru	
7:00 AM	0	0	0	0	0	0	69	0	0	0	0	0	55
7:15 AM	0	0	0	0	0	0	28	0	0	0	0	0	35
7:30 AM	0	0	0	0	0	0	37	0	0	0	0	0	31
7:45 AM	0	0	0	0	0	0	59	0	0	0	0	0	41
8:00 AM	0	0	0	0	0	0	96	0	0	0	0	0	20
8:15 AM	0	0	0	0	0	0	72	0	0	0	0	0	21
8:30 AM	0	0	0	0	0	0	103	0	0	0	0	0	23
8:45 AM	0	0	0	0	0	0	73	0	0	0	0	0	19
Total	0	0	0	0	0	0	537	0	0	0	0	0	245
Peak Movement Total	0	0	0	0	0	0	330	0	0	0	0	0	105
Peak Turn Percent	0%	0%	0%	1%	3%	0%	84%	0%	0%	0%	0%	0%	93%
Peak Approach Total	0	0	0	333	0	0	416	0	0	0	0	0	113

Time	Approach	NB	SB	EB	WB
7:00 AM		0	0	0	0
7:15 AM		0	0	0	0
7:30 AM		0	0	0	0
7:45 AM		0	0	0	0
8:00 AM		0	0	0	0
8:15 AM		0	0	0	0
8:30 AM		0	0	0	0
8:45 AM		0	0	0	0
Total		0	0	0	0
Peak Total		0	0	0	0

Time	Approach	NB	SB	EB	WB
7:00 AM		0	0	0	0
7:15 AM		0	0	0	0
7:30 AM		0	0	0	0
7:45 AM		0	0	0	0
8:00 AM		0	0	0	0
8:15 AM		0	0	0	0
8:30 AM		0	0	0	0
8:45 AM		0	0	0	0
Total		0	0	0	0
Peak Total		0	0	0	0

Peak Hour: 7:45 AM - 8:45 AM
 Percent Trucks: 0%

Time	Approach	NB	SB	EB	WB
7:00 AM		0	0	0	0
7:15 AM		0	0	0	0
7:30 AM		0	0	0	0
7:45 AM		0	0	0	0
8:00 AM		0	0	0	0
8:15 AM		0	0	0	0
8:30 AM		0	0	0	0
8:45 AM		0	0	0	0
Total		0	0	0	0
Peak Total		0	0	0	0

Peak Hour Approach Traffic Volume and Percentage

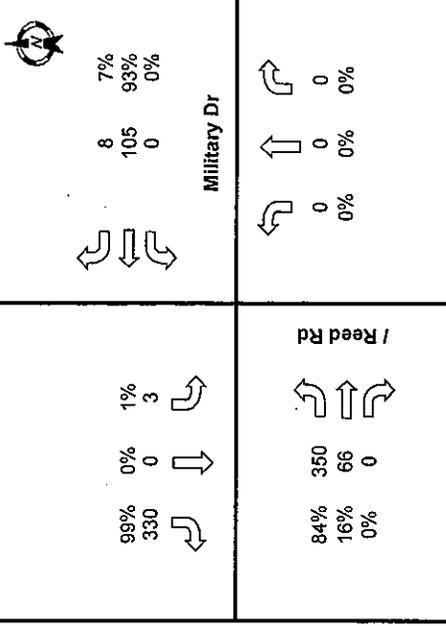


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	and Military Dr
Project #:	7190-19
North-South street:	/ Reed Rd
East-West street:	Military Dr
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Wednesday October 23, 2013
Traffic Count/ Sub:	GRAM Traffic
Path to Raw Data:	P:\79112401Data\RAW\site1695-09pm.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	2	0	0	0	0	0
Peak Movement Total	0	0	0	2	0	0	396	130	0	0	69	8
Peak Turn Percent	0%	0%	0%	0%	0%	0%	75%	25%	0%	0%	90%	10%
Peak Approach Total	0			472			526			77		

Peak Hour: 5:00 PM - 6:00 PM
 Percent Trucks: 0%

Time	Approach			Pedestrians		
	NB	SB	WB	EB	WB	WB
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
Total	0	0	0	0	0	0
Peak Total	0	0	0	0	0	0

Peak Hour Approach Traffic Volume and Percentage	

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Richard Hills Dr and Military Dr
Project #:	7190-19
North-South street:	Richard Hills Dr
East-West street:	Military Dr
Time Period:	9 7:00 AM - 9:00 AM
Date recorded:	Thursday October 24, 2013
Traffic Count Sub	GRAM Traffic
Path to Raw Data	P:\79\12\40\DATA\RAW\site\695-10am.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
7:00 AM	33	0	39	7	15	1	0	70	68	53	37	0
7:15 AM	42	1	32	5	8	1	0	64	66	41	27	1
7:30 AM	43	4	28	4	10	1	0	39	37	28	25	0
7:45 AM	62	1	55	1	3	3	0	60	44	42	33	1
8:00 AM	62	1	51	3	3	2	0	54	44	47	65	0
8:15 AM	66	1	36	1	2	2	0	65	58	39	69	2
8:30 AM	63	0	32	3	1	0	2	60	28	22	125	1
8:45 AM	20	3	18	0	5	1	0	85	30	17	54	0
Total	391	11	291	24	47	11	2	497	375	289	435	5
Peak Movement Total	253	3	174	8	9	7	2	239	174	150	292	4
Peak Turn Percent	59%	1%	40%	33%	38%	29%	0%	58%	42%	34%	65%	1%
Peak Approach Total	430			24			415			446		

Peak Hour 7:45 AM - 8:45 AM
Percent Trucks 0%

Time	Approach			Pedestrians		
	NB	SB	WB	EB	WB	WB
7:00 AM	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0
Total	0	0	0	0	0	0
Peak Total	0	0	0	0	0	0

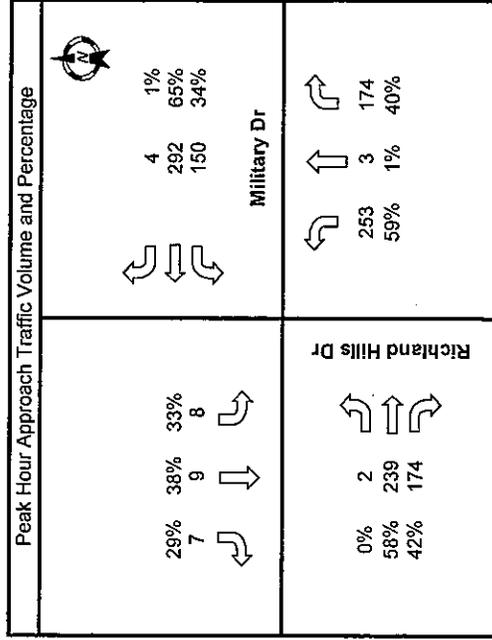


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	Richard Hills Dr and Military Dr
Project #:	7190-19
North-South street:	Richard Hills Dr
East-West street:	Military Dr
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Thursday October 24, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\79112\401Data\RAW\site1695-10pm.xls

Time Movement Vehicle Type	Northbound			Southbound			Eastbound			Westbound		
	C	T	thru	C	T	thru	C	T	thru	C	T	thru
4:00 PM	65	3	3	65	3	3	56	42	23	44	23	44
4:15 PM	52	6	63	63	1	1	108	41	33	51	33	51
4:30 PM	46	3	46	46	0	0	83	39	37	63	37	63
4:45 PM	51	4	59	59	0	0	78	48	34	59	34	59
5:00 PM	65	12	52	52	2	2	78	44	39	61	39	61
5:15 PM	56	6	50	50	1	1	59	30	44	58	44	58
5:30 PM	46	5	51	51	2	2	79	29	41	75	41	75
5:45 PM	52	6	60	60	2	2	70	46	60	66	60	66
Total	433	0	446	0	13	0	611	0	319	0	311	0
Peak Movement Total	214	25	220	9	1	11	347	172	143	234	10	
Peak Turn Percent	47%	5%	48%	43%	5%	52%	67%	33%	37%	60%	3%	
Peak Approach Total	459			21			521			387		

Peak Hour: 4:15 PM - 5:15 PM
 Percent Trucks: 0%

Time	Approach			Pedestrians		
	NB	SB	EB	WB	EB	WB
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
Total	0	0	0	0	0	0
Peak Total	0	0	0	0	0	0

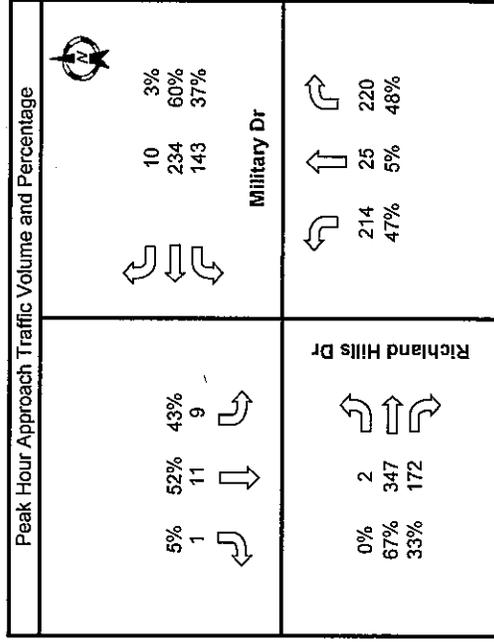


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Richard Hills Dr and Potranco Rd
Project #:	7190-19
North-South street:	Richard Hills Dr
East-West street:	Potranco Rd
Time Period:	9 7:00 AM - 9:00 AM
Date recorded:	Thursday October 24, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data	P:\7911240\DATA\RAW\site1695-15am.xls

Time	Northbound			Southbound			Eastbound			Westbound			
	C	T	right	C	T	right	C	T	right	C	T	right	
7:00 AM	6	21	23	73	37	14	1	80	27	80	27	27	
7:15 AM	3	25	43	66	27	427	22	411	23	84	35	35	
7:30 AM	7	32	31	52	45	411	13	375	31	77	34	34	
7:45 AM	20	10	15	63	43	252	10	252	88	120	23	23	
8:00 AM	13	27	18	48	33	261	17	261	37	73	21	21	
8:15 AM	13	28	27	44	23	205	18	205	36	143	42	42	
8:30 AM	21	16	13	46	27	229	21	229	26	83	16	16	
8:45 AM	6	16	14	19	18	198	19	198	31	105	14	14	
Total	89	175	184	411	253	2358	148	1465	286	0	765	0	212
Peak Movement Total	36	88	112	254	152	1465	73	1465	156	35	361	119	119
Peak Turn Percent	15%	37%	47%	40%	24%	86%	4%	86%	9%	7%	70%	23%	23%
Peak Approach Total	236			643			1694			515			

Peak Hour: 7:00 AM - 8:00 AM
Percent Trucks: 0%

Time	Pedestrians		Trucks	
	NB	SB	EB	WB
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
Total	0	0	0	0
Peak Total	0	0	0	0

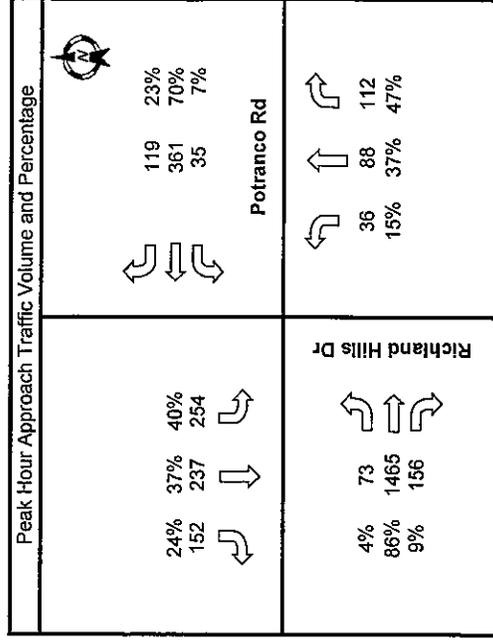


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Richard Hills Dr and Potranco Rd
Project #:	7190-19
North-South street:	Richard Hills Dr
East-West street:	Potranco Rd
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Thursday October 24, 2013
Traffic Count/Sub:	GRAM Traffic
Path to Raw Data:	P:\79112\401Data\RAW\site1695-15pm.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	C	T	right	left	T	right	left	T	right	left	T	right
4:00 PM	59	37	45	27	35	45	31	149	35	4	238	24
4:15 PM	41	21	50	46	43	50	50	151	26	9	237	25
4:30 PM	54	38	31	22	36	31	42	157	42	15	225	23
4:45 PM	40	22	27	28	31	27	31	146	42	22	267	35
5:00 PM	45	16	22	24	32	22	31	148	24	8	245	33
5:15 PM	47	29	12	22	25	12	36	202	36	21	266	36
5:30 PM	61	15	18	34	36	18	36	145	27	15	252	33
5:45 PM	40	44	20	29	46	20	45	190	21	7	263	23
Total	387	0	222	0	284	0	302	1288	0	101	1993	0
Peak Movement Total	193	104	72	148	139	72	108	685	108	51	1026	125
Peak Turn Percent	30%	16%	23%	34%	43%	23%	11%	73%	11%	4%	85%	10%
Peak Approach Total	647			320			941			1202		

Peak Hour: 5:00 PM - 6:00 PM
Percent Trucks: 0%

Time	Approach			Redesigns		
	NB	SB	WB	EB	WB	WB
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
Total	0	0	0	0	0	0
Peak Total	0	0	0	0	0	0

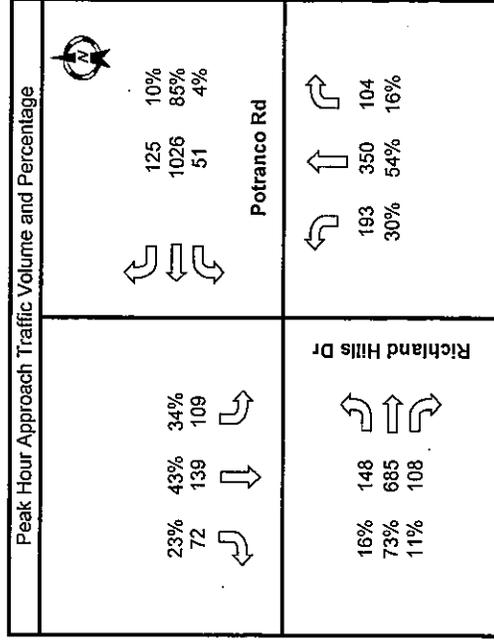


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Hunt Ln and Military Dr
Project #:	7190-19
North-South street:	Hunt Ln
East-West street:	Military Dr
Time Period:	9:00 AM - 9:00 AM
Date recorded:	Thursday October 24, 2013
Traffic Count-Sub	GRAM Traffic
Path to Raw Data:	P:\79\1240\Data\RAW\site1695-13am.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
7:00 AM	1	36	21	50	224	13	21	114	24	31	25	28
7:15 AM	2	51	35	65	206	10	17	95	20	30	30	43
7:30 AM	4	56	38	70	127	11	19	84	13	28	37	38
7:45 AM	2	71	33	115	124	10	20	72	4	35	37	50
8:00 AM	2	67	37	124	93	6	13	64	4	36	35	80
8:15 AM	2	39	56	121	65	6	18	42	6	42	34	81
8:30 AM	0	37	60	116	82	25	10	78	4	52	38	84
8:45 AM	3	62	38	45	62	5	14	31	4	65	59	125
Total	16	419	318	706	983	86	132	580	79	319	295	529
Peak Movement Total	9	214	127	300	681	44	77	365	61	124	129	159
Peak Turn Percent	3%	61%	36%	29%	66%	4%	15%	73%	12%	30%	31%	39%
Peak Approach Total		350		1025				503			412	

Peak Hour: 7:00 AM - 8:00 AM
Percent Trucks: 0%

Time	Approach	Pedestrians			
		NB	SB	EB	WB
7:00 AM	7:15 AM	0	0	0	0
7:15 AM	7:30 AM	0	0	0	0
7:30 AM	7:45 AM	0	0	0	0
7:45 AM	8:00 AM	0	0	0	0
8:00 AM	8:15 AM	0	0	0	0
8:15 AM	8:30 AM	0	0	0	0
8:30 AM	8:45 AM	0	0	0	0
8:45 AM	9:00 AM	0	0	0	0
Total		0	0	0	0
Peak Total		0	0	0	0

Peak Hour Approach Traffic Volume and Percentage	

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	Hunt Ln and Military Dr
Project #:	7190-19
North-South street:	Hunt Ln
East-West street:	Military Dr
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Thursday October 24, 2013
Traffic Count/Sub:	GRAM Traffic
Path to Raw Data:	P:\79N124\0Data\RAW\site 1695-13pm.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
4:00 PM	0	88	53	79	59	9	15	66	2	21	53	42
4:15 PM	6	134	29	56	49	13	17	42	3	59	92	157
4:30 PM	5	110	38	58	63	21	16	44	2	37	74	92
4:45 PM	6	130	48	67	55	19	16	55	3	23	52	70
5:00 PM	4	164	32	61	73	23	32	49	4	30	81	76
5:15 PM	5	145	29	34	86	30	16	44	6	22	61	80
5:30 PM	1	146	33	49	81	18	27	66	6	22	67	57
5:45 PM	4	142	32	54	60	14	15	50	5	20	72	45
Total	31	1059	294	458	526	147	154	416	31	234	552	619
Peak Movement Total	21	538	147	242	240	76	81	190	12	149	299	395
Peak Turn Percent	3%	76%	21%	43%	43%	14%	29%	67%	4%	18%	35%	47%
Peak Approach Total		706		558		283					843	

Peak Hour: 4:15 PM - 5:15 PM
Percent Trucks: 0%

Time	Approach	Pedestrians		
		NB	SB	EB
4:00 PM	4:15 PM	0	0	0
4:15 PM	4:30 PM	0	0	0
4:30 PM	4:45 PM	0	0	0
4:45 PM	5:00 PM	0	0	0
5:00 PM	5:15 PM	0	0	0
5:15 PM	5:30 PM	0	0	0
5:30 PM	5:45 PM	0	0	0
5:45 PM	6:00 PM	0	0	0
Total		0	0	0
Peak Total		0	0	0

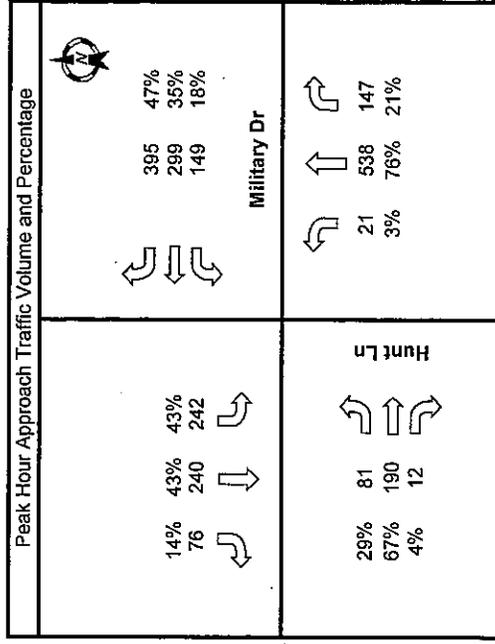


EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
555 E. Ramsey
San Antonio, TX 78216

Location:	and Military Dr
Project #:	7190-19
North-South street:	/ Warren High School
East-West street:	Military Dr
Time Period:	9:00 AM - 9:00 AM
Date recorded:	Wednesday October 23, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\7912401Data\RAW\site1695-14am.xls

Time Movement Vehicle type	Northbound			Southbound			Eastbound			Westbound		
	C	T	thru	C	T	thru	C	T	thru	C	T	thru
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Peak Movement Total	0	0	0	0	0	0	0	0	0	0	0	0
Peak Turn Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Approach Total	0	0	0	0	0	0	0	0	0	0	0	0

Time	Approach	NB	SB	EB	WB
7:00 AM	7:15 AM	0	0	0	0
7:15 AM	7:30 AM	0	0	0	0
7:30 AM	7:45 AM	0	0	0	0
7:45 AM	8:00 AM	0	0	0	0
8:00 AM	8:15 AM	0	0	0	0
8:15 AM	8:30 AM	0	0	0	0
8:30 AM	8:45 AM	0	0	0	0
8:45 AM	9:00 AM	0	0	0	0
Total		0	0	0	0
Peak Total		0	0	0	0

Peak Hour: 8:00 AM - 9:00 AM
Percent Trucks: 0%

Time	Approach	Pedestrians			
		NB	SB	EB	WB
7:00 AM	7:15 AM	0	0	0	0
7:15 AM	7:30 AM	0	0	0	0
7:30 AM	7:45 AM	0	0	0	0
7:45 AM	8:00 AM	0	0	0	0
8:00 AM	8:15 AM	0	0	0	0
8:15 AM	8:30 AM	0	0	0	0
8:30 AM	8:45 AM	0	0	0	0
8:45 AM	9:00 AM	0	0	0	0
Total		0	0	0	0
Peak Total		0	0	0	0

Peak Hour Approach Traffic Volume and Percentage

Approach	Volume	Percentage
Warren High School	197	40%
Military Dr	297	60%
Total	494	100%

EXHIBIT (C) - TRAFFIC IMPACT ANALYSIS

PART 1 OF 4



Pape Dawson Engineers, Inc.
 555 E. Ramsey
 San Antonio, TX 78216

Location:	and Military Dr.
Project #:	7190-19
North-South street:	/ Warren High School
East-West street:	Military Dr
Time Period:	45 4:00 PM - 6:00 PM
Date recorded:	Wednesday October 23, 2013
Traffic Count Sub:	GRAM Traffic
Path to Raw Data:	P:\79\12\40\Data\RAW\site\695-14pm.xls

Time	Northbound			Southbound			Eastbound			Westbound		
	left	thru	right	left	thru	right	left	thru	right	left	thru	right
4:00 PM	0	0	0	14	0	23	21	63	0	0	104	38
4:15 PM	0	0	0	111	0	186	41	152	0	0	77	31
4:30 PM	0	0	0	41	0	34	29	92	0	0	86	22
4:45 PM	0	0	0	9	0	14	22	104	0	0	80	19
5:00 PM	0	0	0	36	0	38	15	96	0	0	92	39
5:15 PM	0	0	0	33	0	32	30	113	0	0	90	23
5:30 PM	0	0	0	23	0	40	21	121	0	0	112	18
5:45 PM	0	0	0	20	0	30	11	111	0	0	119	10
Total	0	0	0	287	0	397	190	852	0	0	760	200
Peak Movement Total	0	0	0	197	0	272	107	444	0	0	335	111
Peak Turn Percent	0%	0%	0%	42%	0%	58%	19%	81%	0%	0%	75%	25%
Peak Approach Total	0	0	0	469	551	446	551	446	551	446	551	446

Peak Hour: 4:15 PM - 5:15 PM
 Percent Trucks: 0%

Time	Approach			Pedestrians		
	NB	SB	EB	WB	EB	WB
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
Total	0	0	0	0	0	0
Peak Total	0	0	0	0	0	0

Peak Hour Approach Traffic Volume and Percentage	