

**DEVELOPMENT OF REGIONAL IMPACT
(DRI #3586)**

**TRAFFIC STUDY
FOR
MORELAND AND CUSTER**

CITY OF ATLANTA, GEORGIA



Prepared for:

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May 02, 2022
A & R Project # 22-014

EXECUTIVE SUMMARY

Traffic impacts were evaluated for the added traffic from the proposed mixed-use development that will be located in the southeast corner of the intersection of SR 42/US 23 (Moreland Avenue) and Custer Avenue in the City of Atlanta. The development will consist of:

- Apartments: 413 Units
- Townhomes: 260 Units
- Retail: 19,500 sf

The development proposes site accesses at the following locations:

- Site Driveway 1: Right-in/right-out driveway on SR 42/US 23 (Moreland Avenue)
- Site Driveway 2: Right-in/right-out (Western) driveway on Custer Avenue to align with Collision Repair Center (Eastern) Driveway
- Site Driveway 3: Full-access (Middle) driveway on Custer Avenue align with existing driveway
- Site Driveway 4: Full-access (Eastern) driveway on Custer Avenue align with Citgo (Western) Driveway

Traffic Operations

Existing and future operations after completion of the project were analyzed at the intersections of:

1. SR 42/US 23 (Moreland Avenue) at Eastland Road
2. SR 42/US 23 (Moreland Avenue) at Custer Avenue
3. SR 42/US 23 (Moreland Ave) at McDonough Boulevard
4. Bouldercrest Road at Eastland Road
5. Custer Avenue at Site Driveway 4 (E) / Citgo Driveway (W)
6. Custer Avenue at Site Driveway 3 (M) / existing driveway (W)
7. Custer Avenue at Site Driveway 2 (W RIRO) / Collision Repair Center Driveway (E)
8. SR 42/US 23 (Moreland Avenue) at Site Driveway 1 (RIRO)

The analysis included the evaluation of Future operations for “No-Build” and “Build” conditions, both of which account for increases in annual growth of through traffic. The results of the analysis indicated that the differences between the “No-Build” and “Build” scenarios are insignificant after the site mitigation improvements were accounted for. Almost all approaches are operating at or better than the level-of-service standards after inclusion of site generated traffic in the “Build” condition.

Table E1 provides the traffic operations for the “No-Build” and “Build” conditions for the year 2024. As per GRTA requirements, all approaches that do not meet the LOS standard are shown in Table E1. The overall total additional site trips and overall respective percentage of total volume for failing approaches in the “Build” condition operations are also reported in Table E1.

TABLE E 1 — FUTURE INTERSECTION OPERATIONS FOR FAILING APPROACHES

Intersection		<i>No-Build Condition</i>		<i>Build Condition</i>					
		NO IMPROVEMENTS LOS (Delay)		NO IMPROVEMENTS LOS (Delay)		SITE VOLUMES AT FAILING APPROACH BUILD WITH IMPROVEMENTS		PERCENT SITE TRIPS OF TOTAL APPROACH TRIPS AT FAILING APPROACHES	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
3	<u>SR 42/US 23 (Moreland Ave) @ McDonough Blvd</u>	<u>A (4.6)</u>	<u>A (8.8)</u>	<u>A (5.0)</u>	<u>A (9.5)</u>				
	-Eastbound Approach	D (47.4)	D (47.2)	D (47.2)	D (47.7)	-	-	-	-
	-Westbound Approach	A (0.0)	F (85.3)	A (0.0)	F (85.3)	0	0	0%	0%
	-Northbound Approach	A (2.9)	A (6.0)	A (3.1)	A (6.3)	-	-	-	-
	-Southbound Approach	A (5.3)	A (8.5)	A (5.6)	A (9.0)	-	-	-	-

The westbound approach at the intersection of SR 42/US 23 (Moreland Avenue) and McDonough Boulevard is a driveway to an existing warehouse building. The westbound approach is operating at level-of-service F in PM peak hour in the existing conditions traffic operations analysis. This approach is projected to continue to operate at level-of-service F in the PM peak hour in the “No-Build” and “Build” condition analyses, as shown in the table above. The delay is a function of the existing driveway being a side street approach at a traffic signal with a high-volume main line. The existing driveway serves 0 vehicles during the AM peak hour and 2 vehicles during the PM peak hour (Figure 5). Given the low volumes at the approach and the cycle length of the traffic signal, the delay of the approach is calculated to be as a level-of-service “F”. At traffic signals, the main line carries significantly greater volumes and is prioritized in traffic signal operations.

Site Access Configuration

All the site driveway intersections are recommended to be un-signalized with a STOP sign on driveway approaches. It is recommended that the full access driveways consist of one entering and one exiting lane.

Site Mitigation Improvements

- Construction of deceleration lane on Driveway 1 (RIRO) on SR 41/US 23 (Moreland Avenue)
- Provide crosswalks across all site driveways on SR 41/US 23 (Moreland Avenue) and Custer Avenue
- Sidewalks along site frontage on SR 41/US 23 (Moreland Avenue) and Custer Avenue
- Trail or path along site frontage on Custer Avenue

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INTRODUCTION

The purpose of this study is to determine the traffic impact that will result from the proposed Broadstone at Moreland mixed-use development that will be located in the southeast corner of the intersection of SR 42/US 23 (Moreland Avenue) and Custer Avenue in City of Atlanta, Georgia. The traffic analysis evaluates the current operations compared to the future conditions with the traffic generated by the development. The development will consist of:

- Apartments: 413 Units
- Townhomes: 260 Units
- Retail: 19,500 sf

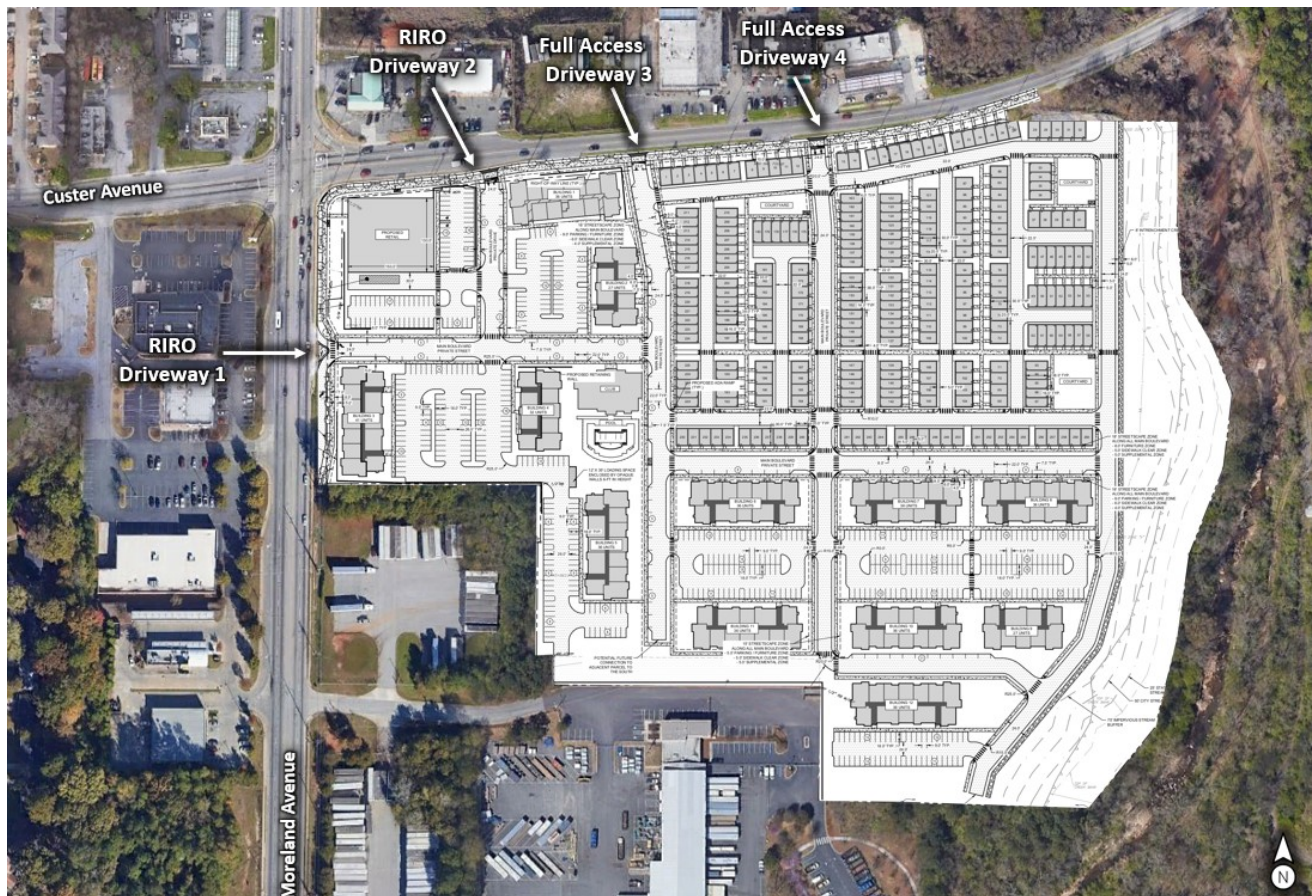


Figure 1 – Site Overlay

The development proposes site accesses at the following locations:

- Site Driveway 1: Right-in/right-out driveway on SR 42/US 23 (Moreland Avenue)
- Site Driveway 2: Right-in/right-out (Western) driveway on Custer Avenue to align with Collision Repair Center (Eastern) Driveway
- Site Driveway 3: Full-access (Middle) driveway on Custer Avenue to align with existing (Western) Driveway

- Site Driveway 4: Full-access (Eastern) driveway on Custer Avenue to align with Citgo (Western) Driveway

Traffic Operations

Existing and future operations after completion of the project were analyzed at the intersections of:

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6. Custer Avenue at Site Driveway 3 (M) / existing driveway (W)
7. Custer Avenue at Site Driveway 2 (W RIRO) / Collision Repair Center Driveway (E)
8. SR 42/US 23 (Moreland Avenue) at Site Driveway 1 (RIRO)

Recommendations to improve traffic operations have been identified as appropriate and are discussed in detail in the following sections of the report.

STUDY NETWORK DETERMINATION

The study network was determined by evaluating the amount of traffic that the proposed development will add to each roadway segment in the area. According to GRTA requirements, a roadway segment carries a “significant” amount of traffic if the project contributes 7% or more trips to the two-way daily service volumes of the roadway at the appropriate level of service standard. A level of service standard of “D” was used for determining the study area network, unless the level of service standard “E” is allowable as detailed in GRTA’s Policies and Procedures (April 2021).

The traffic generated by the proposed project was then assigned to the area roadways using the trip distribution to determine the site-generated traffic on each roadway segment. The boundaries of the study network extend to the most distant intersections where at least 7% of the service volumes on the segment are attributed to project traffic. The following study intersections fell within the 7% rule and/or have been selected as being suitable for evaluation in discussions with GRTA, ARC, GDOT, City of Atlanta, and DeKalb County:

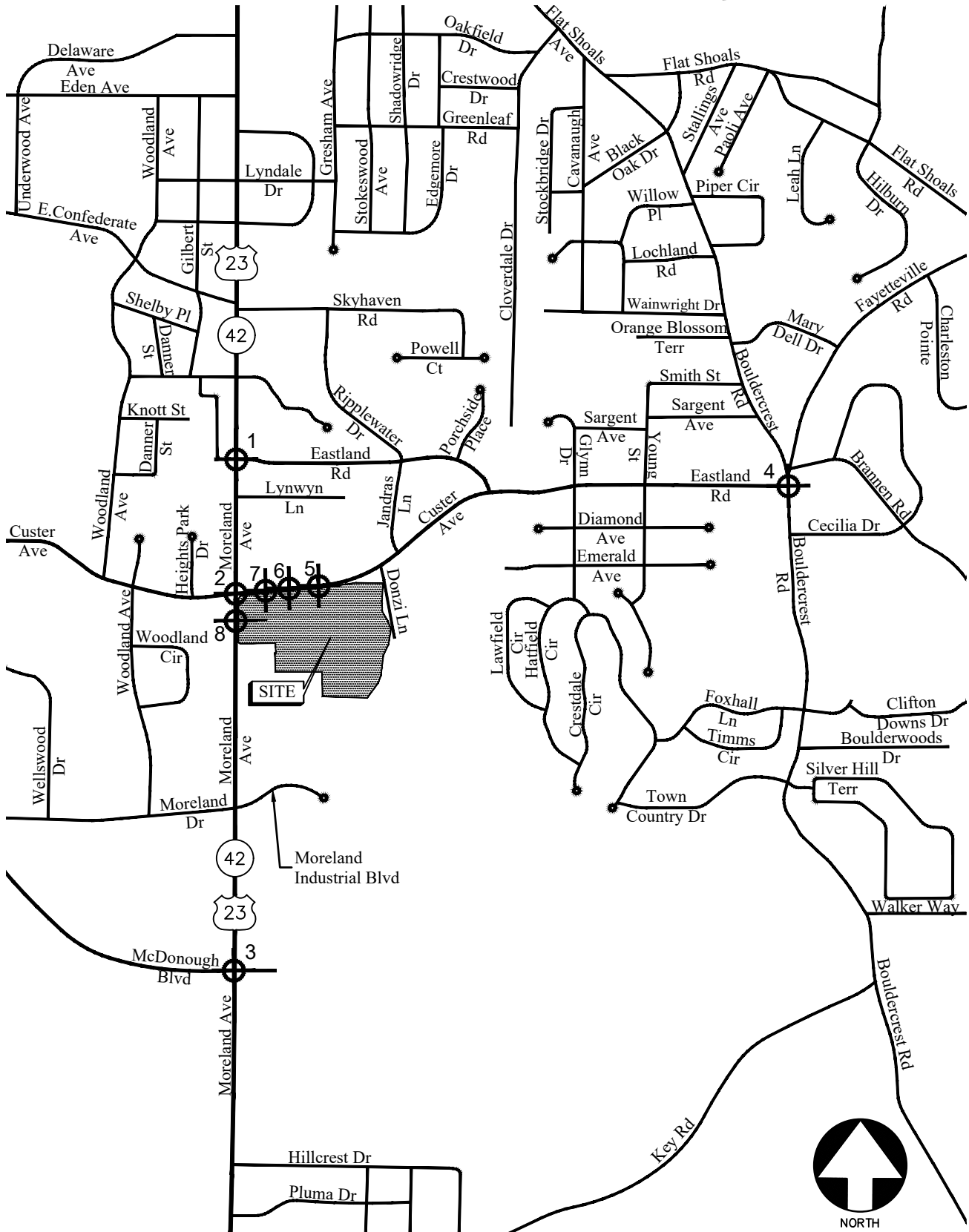
- SR 42/US 23 (Moreland Avenue) at Eastland Road
- SR 42/US 23 (Moreland Avenue) at Custer Avenue
- SR 42/US 23 (Moreland Ave) at McDonough Boulevard
- Bouldercrest Road at Eastland Road
- Custer Avenue at Citgo Driveway (W)
- Custer Avenue at existing driveway (W)
- Custer Avenue at Collision Repair Center Driveway (E)

The distribution that was taken into account in the 7% rule determination is shown in Figure 2. The location of the development and the surrounding study network is shown in Figure 3. Other intersections within this corridor, such as un-signalized side streets, right-in / right-out driveways or private driveways have not been included in the study network.



Figure 2 – Trip Distribution

Study Intersections



LOCATION MAP

FIGURE 3
A&R Engineering Inc.

EXISTING ROADWAY FACILITIES

The following is a brief description of each of the roadway facilities located in proximity to the site:

SR 42/US 23 (Moreland Avenue)

SR 42/US 23 (Moreland Avenue) is a north-south, four-lane roadway with two way left-turn lane and posted with a speed limit of 45 mph in the vicinity of the site. Georgia Department of Transportation (GDOT) traffic counts (Station ID 121-5225) indicate that the daily traffic volume on SR 42/US 23 (Moreland Avenue) in 2019 was 28,200 vehicles per day south of Moreland Drive. GDOT classifies SR 42/US 23 (Moreland Avenue) as an Urban Principal Arterial roadway.

Custer Avenue

Custer Avenue is an east-west, two-lane, undivided roadway with a posted speed limit of 35 mph in the vicinity of the site. GDOT traffic counts (Station ID 089-3947) indicate that the daily traffic volume on Custer Avenue in 2019 was 8,900 vehicles per day south of Jandras Lane. GDOT classifies Custer Avenue as an Urban Minor Collector roadway.

Eastland Road

Eastland Road is an east-west, two-lane, undivided roadway with a posted speed limit of 35 mph in the vicinity of the site. GDOT traffic counts (Station ID 089-3945) indicate that the daily traffic volume on Eastland Road in 2019 was 10,000 vehicles per day east of Custer Avenue. GDOT classifies Eastland Road as an Urban Minor Collector roadway.

Bouldercrest Road

Bouldercrest Road is a north-south, two-lane, undivided roadway with a posted speed limit of 35 mph.

McDonough Boulevard

McDonough Boulevard is an east-west, four-lane roadway with two way left-turn lane and posted with a speed limit of 45 mph.

TABLE 1 — ADDITIONAL ROADWAY INFORMATION		
Roadway	# of Lanes	Ownership
Moreland Avenue (SR 23)	4	GDOT
Custer Avenue SE	2	City of Atlanta
McDonough Boulevard (SR 42)	2	GDOT
Eastland Road	2	Dekalb County
Bouldercrest Road	2	Dekalb County

EXISTING BICYCLE, PEDESTRIAN AND TRANSIT

Bicycle paths or sidewalks

Sidewalks are present along both sides of Moreland Avenue (SR 42) and on Custer Avenue to the west of Moreland Avenue. Sidewalks are intermittently present along Custer Avenue to the east of Moreland Avenue (SR 42). The eastern site frontage along Custer Avenue does not have sidewalk present. Crosswalks are present at the intersection of Moreland Avenue and Custer Avenue.

The following are potential pedestrian and bicycle destinations:

- MARTA transit bus stops
- fast food restaurants and local restaurants along Moreland Avenue
- Kroger, Aldi
- Dollar Tree, Dollar General, Family Dollar

Existing Transit Facilities

MARTA bus stops for routes 4, 9, and 832 are located in the vicinity of the proposed development. No existing high-capacity transit stations were identified in the vicinity of the proposed development. Transit operating days include weekdays, Saturday, and Sunday. The graphic below includes the location of existing bus stops in the network.



Figure 4 – Bus Routes near Proposed Development

The proposed route to transit from the proposed development is to access the sidewalk along site frontage to the intersection of Moreland Avenue and Custer Avenue.

Transit Stop Ridership:

TABLE 2 – MARTA RIDERSHIP DATA

Office of Regional Planning
Special Projects and Analysis



MARTA Ridership by Stop for Moreland @ Broadstone Site

May 19, 2021

CODE	Description
SGN	Sign on U-channel post
SNT	Non-ad shelter, 2010s Tolar design
SAT	At shelter, 2010s Tolar design
NS	Near side of intersection
FS	Far side of intersection
AT	AT address
OP	Opposite to address number
N/A	Not available due to service not running under MARTA Essential Service Plan

*All Routes are now restored and running as of April 24th, 2021.

STOP NO.	STOP NAME	ROUTE NO.	STOP TYPE	LOCATION	DIRECTION	2019 ON	2019 OFF	2020 ON	2020 OFF
127012	MORELAND AVE SE @ CUSTER AVE SE	4	SAT	NS	S	11	32	9	51
127012	MORELAND AVE SE @ CUSTER AVE SE	832	SAT	NS	S	5	10	N/A	N/A
127044	CUSTER AVE SE @ 1278	9	SGN	AT	W	10	6	N/A	N/A
127046	MORELAND AVE SE @ CUSTER AVE SE	4	SAT	NS	N	30	8	51	6
127064	CUSTER AVE SE @ MORELAND AVE SE	9	SNT	FS	E	12	14	N/A	N/A
128134	CUSTER AVE SE @ 1278	9	SGN	OP	E	6	13	N/A	N/A

Transit Stop Amenity Standards:

All MARTA bus stops should be marked with a MARTA bus stop sign, including contact information for bus schedules and customer service. MARTA will determine if the bus stop location qualifies the stop to include a bus shelter and bench based on the following factors: ridership, level of service of stops, proximity to other shelters, equity, and local land use.

STUDY METHODOLOGY

In this study, the methodology used for evaluating traffic operations at each of the subject intersections is based on the criteria set forth in the Transportation Research Board's Highway Capacity Manual, 6th edition (HCM 6). Synchro software, which utilizes the HCM methodology, was used for the analysis. The following is a description of the methodology employed for the analysis of unsignalized and signalized intersections.

Unsignalized Intersections

For unsignalized intersections controlled by a stop sign on minor streets, the level-of-service (LOS) for motor vehicles with controlled movements is determined by the computed control delay according to the thresholds stated in Table 3 below. LOS is determined for each minor street movement (or shared movement), as well as major street left turns. LOS is not defined for the intersection as a whole or for major street approaches. The LOS of any controlled movement which experiences a volume to capacity ratio greater than 1 is designated as "F" regardless of the control delay.

Control delay for unsignalized intersections includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Several factors affect the control delay for unsignalized intersections, such as the availability and distribution of gaps in the conflicting traffic stream, critical gaps, and follow-up time for a vehicle in the queue.

Level-of-service is assigned a letter designation from "A" through "F". Level-of-service "A" indicates excellent operations with little delay to motorists, while level-of-service "F" exists when there are insufficient gaps of acceptable size to allow vehicles on the side street to cross the main road without experiencing long total delays.

TABLE 3 — LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS		
Control Delay (sec/vehicle)	LOS by Volume-to-Capacity Ratio*	
	v/c ≤ 1.0	v/c ≥ 1.0
≤ 10	A	F
> 10 and ≤ 15	B	F
> 15 and ≤ 25	C	F
> 25 and ≤ 35	D	F
> 35 and ≤ 50	E	F
> 50	F	F

*The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection.

Source: Highway Capacity Manual, 6th edition, Exhibit 20-2 *LOS Criteria: Motorized Vehicle Mode*

Signalized Intersections

According to HCM procedures, LOS can be calculated for the entire intersection, each intersection approach, and each lane group. HCM uses control delay alone to characterize LOS for the entire

intersection or an approach. Control delay per vehicle is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Both control delay and volume-to-capacity ratio are used to characterize LOS for a lane group. A volume-to-capacity ratio of 1.0 or more for a lane group indicates failure from capacity perspective. Therefore, such a lane group is assigned LOS F regardless of the amount of control delay.

Table 4 below summarizes the LOS criteria from HCM for motorized vehicles at signalized intersection.

TABLE 4— LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS		
Control Delay (sec/vehicle)*	LOS for Lane Group by Volume-to-Capacity Ratio*	
	v/c ≤ 1.0	v/c ≥ 1.0
≤ 10	A	F
> 10 and ≤ 20	B	F
> 20 and ≤ 35	C	F
> 35 and ≤ 55	D	F
> 55 and ≤ 80	E	F
> 80	F	F

*For approach-based and intersection wide assessments, LOS is defined solely by control delay

Source: Highway Capacity Manual, 6th edition, Exhibit 19-8 *LOS Criteria: Motorized Vehicle Mode*

LOS A is typically assigned when the volume-to-capacity (v/c) ratio is low and either progression is exceptionally favorable, or the cycle length is very short. LOS B is typically assigned when the v/c ratio is low and either progression is highly favorable, or the cycle length is short. However, more vehicles are stopped than with LOS A. LOS C is typically assigned when progression is favorable, or the cycle length is moderate. Individual *cycle failures* (one or more queued vehicles are not able to depart because of insufficient capacity during the cycle) may begin to appear at this level. Many vehicles still pass through the intersection without stopping, but the number of vehicles stopping is significant. LOS D is typically assigned when the v/c ratio is high and either progression is ineffective, or the cycle length is long. There are many vehicle-stops and individual cycle failures are noticeable. LOS E is typically assigned when the v/c ratio is high, progression is very poor, the cycle length is long, and individual cycle failures are frequent. LOS F is typically assigned when the v/c ratio is very high, progression is very poor, the cycle length is long, and most cycles fail to clear the queue.

EXISTING 2022 TRAFFIC ANALYSIS

Existing Traffic Volumes

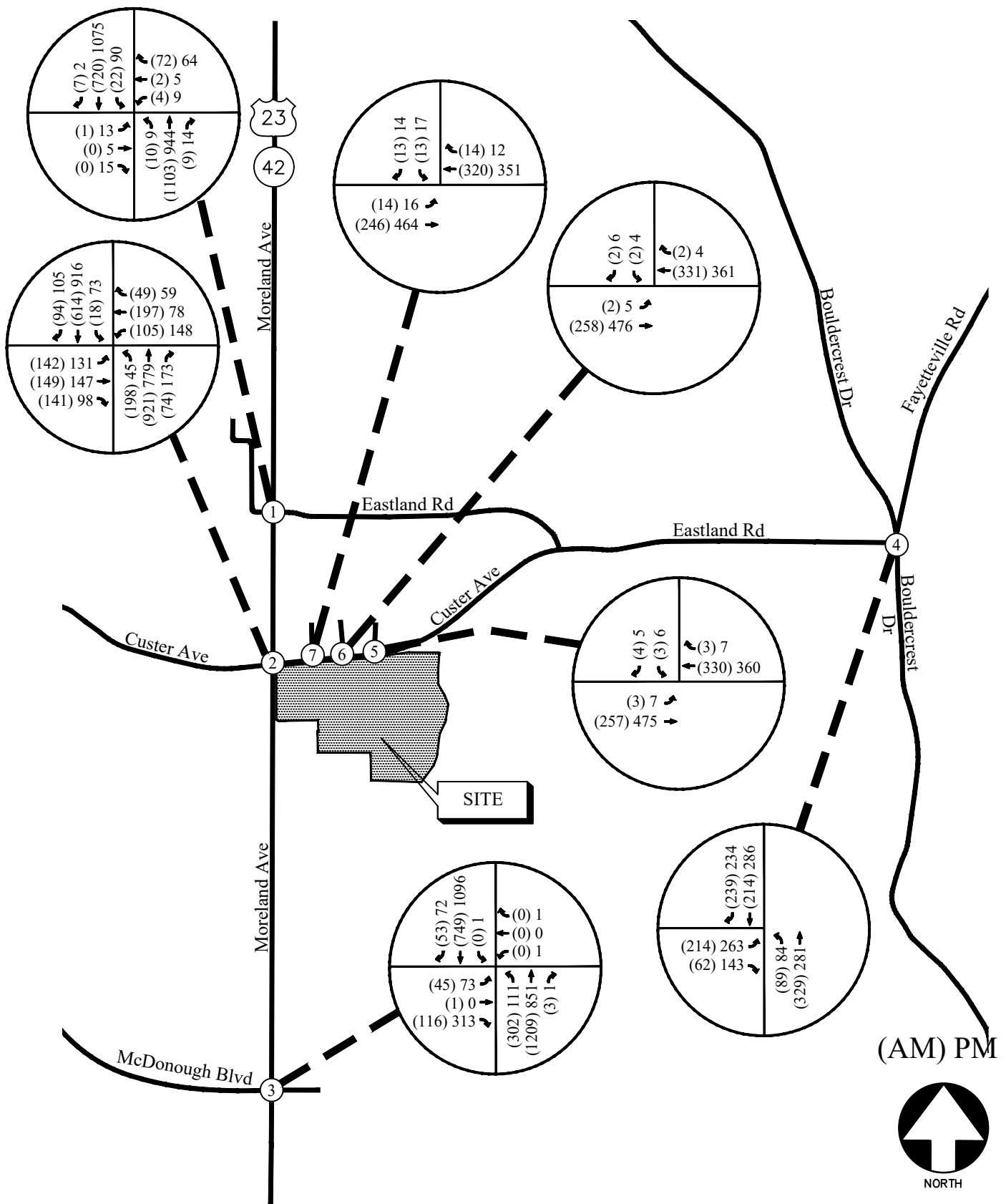
Traffic counts were obtained at the following study intersections. We collected AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak hour turning movement counts on Tuesday, February 8, 2022 at the following intersections:

- SR 42/US 23 (Moreland Avenue) at Eastland Road
- SR 42/US 23 (Moreland Avenue) at Custer Avenue
- SR 42/US 23 (Moreland Ave) at McDonough Boulevard
- Bouldercrest Road at Eastland Road

Traffic counts were obtained at the following study intersections. We collected AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak hour turning movement counts on Thursday, March 31, 2022 at the following intersections:

- Custer Avenue at Citgo Driveway (W)
- Custer Avenue at existing driveway (W)
- Custer Avenue at Collision Repair Center Driveway (E)

The existing traffic volumes are shown in Figure 5.



EXISTING WEEKDAY PEAK-HOUR VOLUMES

FIGURE 5

A&R Engineering Inc.

EXISTING TRAFFIC OPERATIONS

Existing 2022 traffic operations were analyzed at the study intersections in accordance with the HCM methodology using the volumes in Figure 3. The results of the analyses are shown in Table 5.

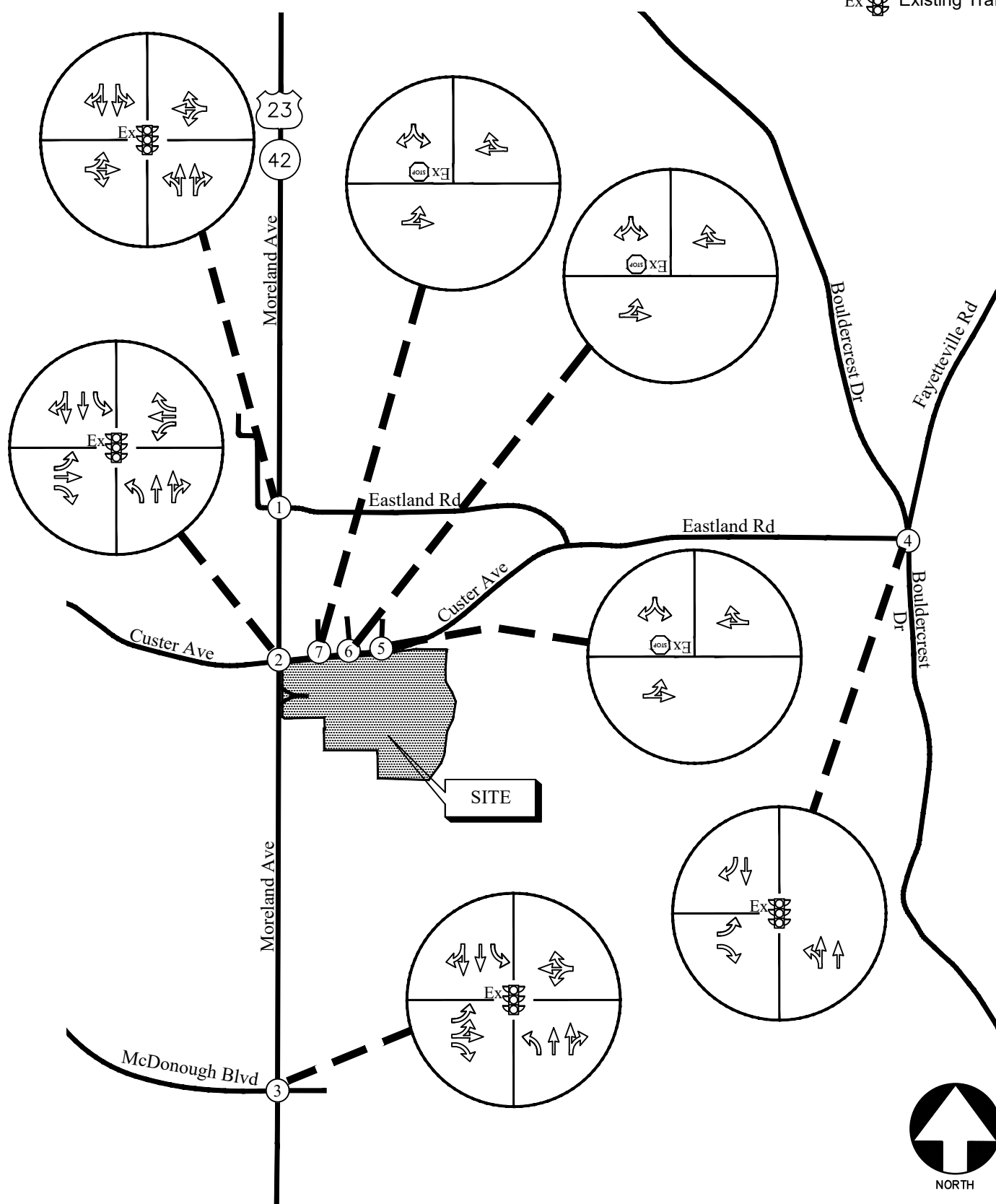
TABLE 5 — EXISTING INTERSECTION OPERATIONS					
Intersection		Traffic Control	LOS (Delay)		LOS Standard
			AM Peak Hour	PM Peak Hour	
1	<u>SR 42/US 23 (Moreland Ave) @ Eastland Rd</u>	Signalized	<u>A (5.1)</u>	<u>A (5.6)</u>	<u>D/D</u>
	-Eastbound Approach		D (47.8)	D (49.5)	D/D
	-Westbound Approach		D (54.3)	D (53.7)	D/D
	-Northbound Approach		A (3.3)	A (2.8)	D/D
	-Southbound Approach		A (2.6)	A (3.6)	D/D
2	<u>SR 42/US 23 (Moreland Ave) @ Custer Ave</u>	Signalized	<u>C (24.1)</u>	<u>C (22.0)</u>	<u>D/D</u>
	-Eastbound Approach		D (43.1)	D (48.0)	D/D
	-Westbound Approach		D (47.8)	D (45.5)	D/D
	-Northbound Approach		B (16.7)	B (16.0)	D/D
	-Southbound Approach		B (18.9)	B (16.0)	D/D
3	<u>SR 42/US 23 (Moreland Ave) @ McDonough Blvd</u>	Signalized	<u>A (4.5)</u>	<u>A (8.7)</u>	<u>D/D</u>
	-Eastbound Approach		D (47.4)	D (47.2)	D/D
	-Westbound Approach		A (0.0)	F (85.3)	D/F
	-Northbound Approach		A (2.9)	A (5.9)	D/D
	-Southbound Approach		A (5.2)	A (8.4)	D/D
4	<u>Bouldercrest Road @ Eastland Road</u>	Signalized	<u>B (13.5)</u>	<u>B (15.9)</u>	<u>D/D</u>
	-Eastbound Approach		D (40.1)	D (38.3)	D/D
	-Northbound Approach		A (5.2)	A (5.7)	D/D
	-Southbound Approach		A (5.0)	A (5.7)	D/D
5	<u>Custer Avenue @ Citgo Driveway (W)</u>	Stop Controlled on SB Approach	A (8.0)	A (8.1)	D/D
	-Southbound Approach		B (11.5)	B (14.1)	D/D
6	<u>Custer Avenue @ Existing Driveway (W)</u>	Stop Controlled on SB Approach	A (8.0)	A (8.1)	D/D
	-Southbound Approach		B (11.6)	B (13.1)	D/D
7	<u>Custer Avenue @ Collision Repair Center Driveway (E)</u>	Stop Controlled on SB Approach	A (8.0)	A (8.1)	D/D
	-Southbound Approach		B (11.4)	B (12.9)	D/D

The results of existing traffic operations analysis indicate that all the signalized intersections are operating at overall level-of-service “C” or better during the AM and PM peak hours and the unsignalized approaches are operating at level of-service “B” or better in both the AM and PM peak hours.

The existing traffic control and lane geometry for the intersections are shown in Figure 6.

LEGEND

- Ex  Existing Signed Approach
-  Existing Lane Geometry
- Ex  Existing Traffic Signal



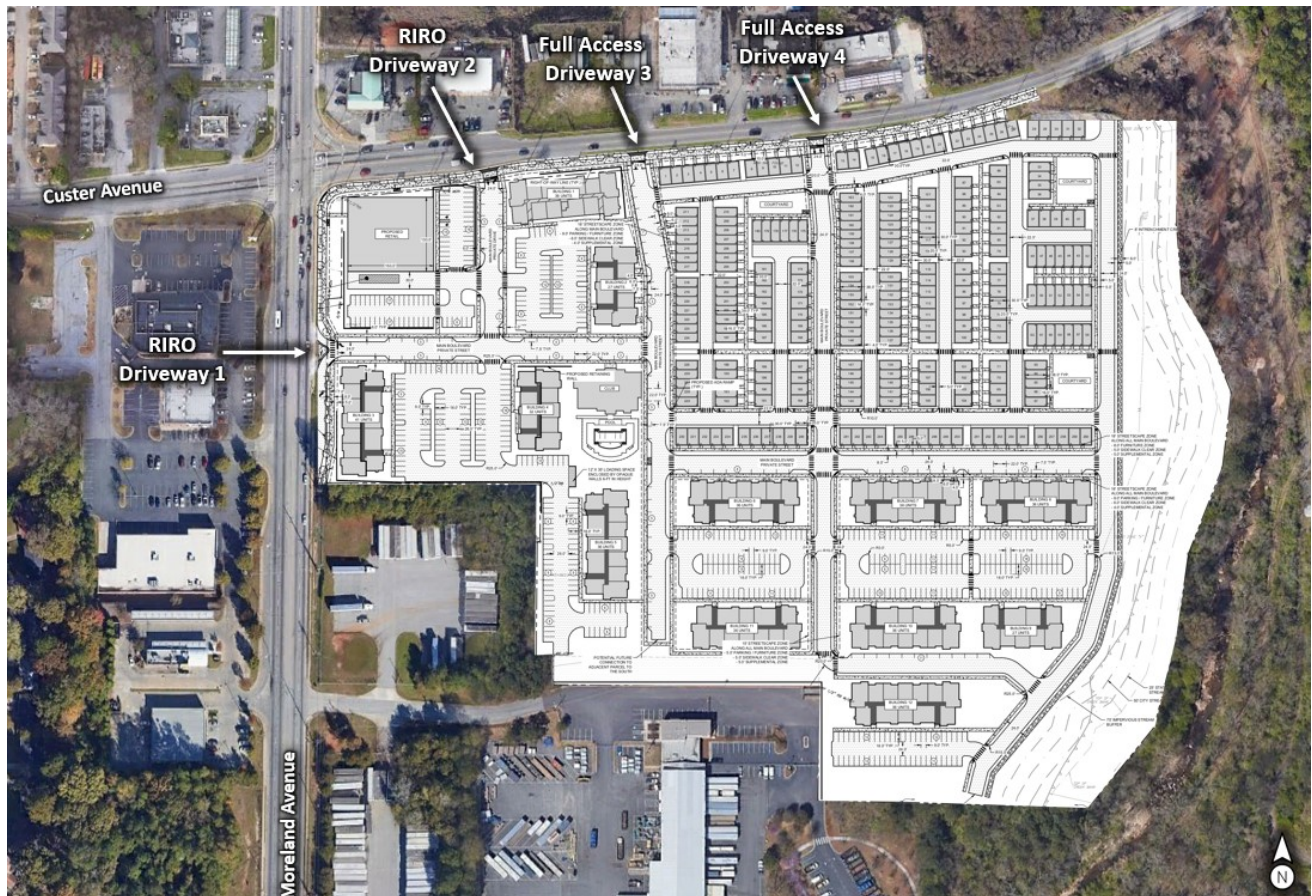
EXISTING TRAFFIC CONTROL AND LANE GEOMETRY

FIGURE 6

A&R Engineering Inc.

PROJECT DESCRIPTION

The proposed mixed-use development, Moreland and Custer, will consist of 413 apartments, 260 townhomes, and 19,500 sf of retail space. The development can be accessed from four access points, two of which are proposed to be right-in/right-out and two are proposed to be full access. The graphic below includes a site overlay that identifies those site access points.

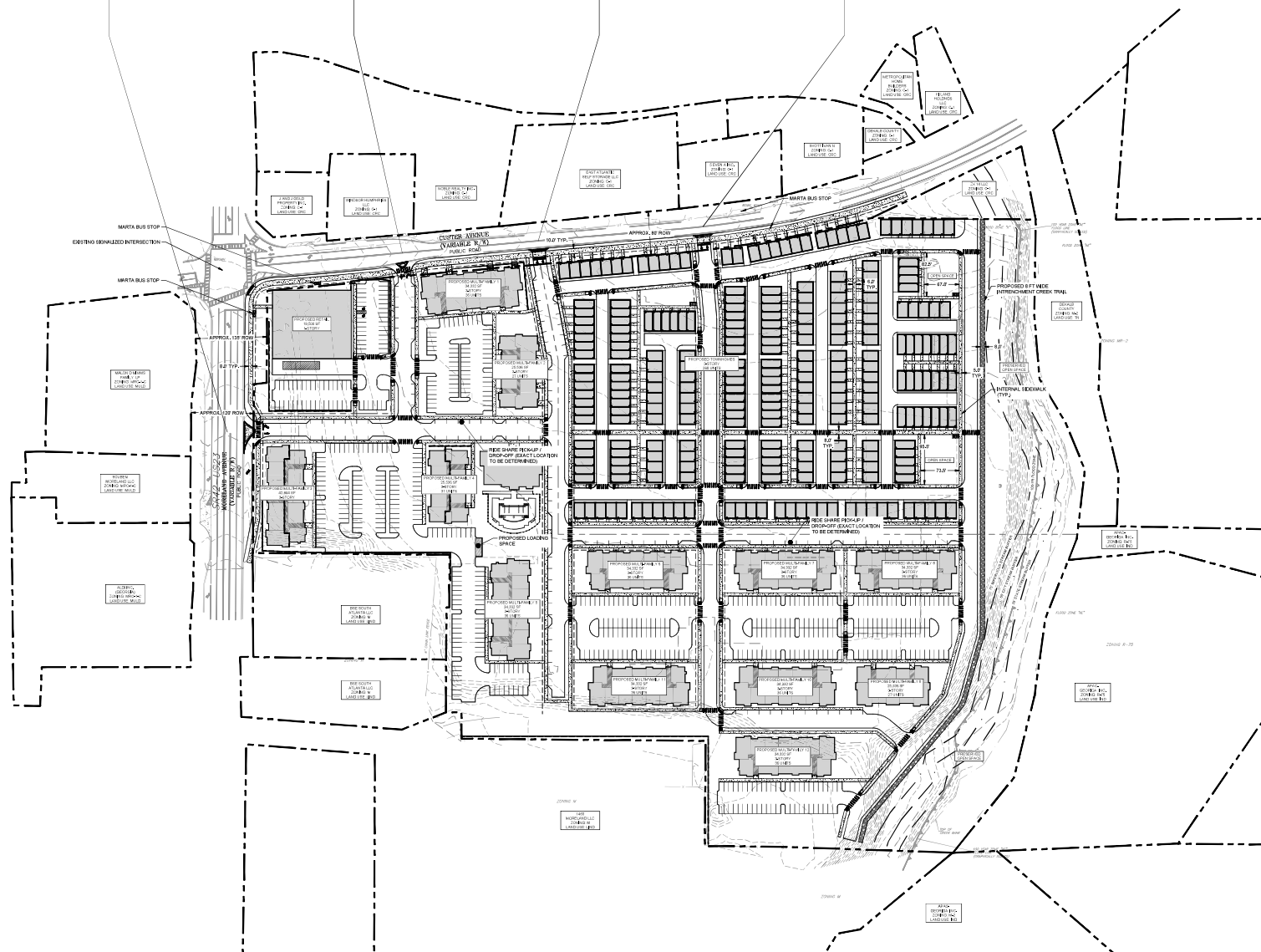


Planned Bicycle and Pedestrian Facilities

There are no bicycle lanes present along Custer Avenue or Moreland Avenue (SR 42). Sidewalks will be provided along site frontage and pedestrian connections will be provided internally on the site. No pedestrian or trail crossing is proposed from the site across the entrenchment creek. Any future trail or path along the creek is proposed to be located on the east side of the creek (away from the site) where an unofficial unpaved foot path exists. The site proposes to provide a connection to this future path via sidewalk on the Southside of Custer Avenue. Our research of existing and proposed paths/trails in the area is included in the Appendix.

Site Plan

A site plan is shown in Figure 7 on the next page.

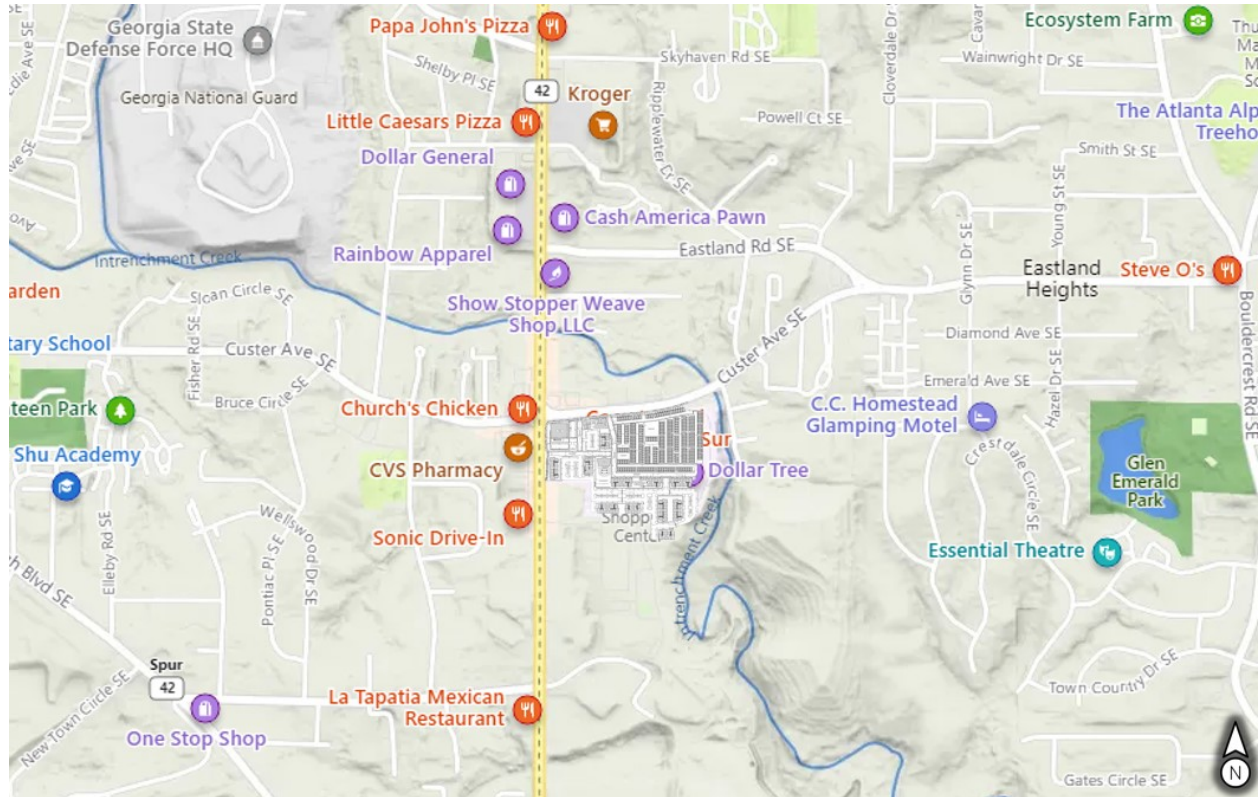


GSWCC CERT. (LEVEL II)	0000062135
DRAWN BY	HED
DESIGNED BY	MCP
REVIEWED BY	BWS
DATE	04/21/2022
PROJECT NO.	015002008
TITLE	
DRI SITE PLAN	
SHEET NUMBER	
C0-20	

Figure 7 – Site Plan

Potential Pedestrian & Bicycle Destinations:

Potential pedestrian and bicycle destinations in the vicinity of the proposed development include Fast food and local restaurants located along Moreland Avenue, Kroger, Aldi, Dollar Tree, South River Trail, the Beltline, etc.



Planned Transit Facilities

The proposed development will include the existing MARTA bus stop.

Parking

Required Parking	
Commercial	19 spaces
Residential	750 spaces
Proposed Parking	
Commercial	58 spaces
Residential	1,197 spaces
Alternative Parking	
	N/A

Proposed Zoning

The future land use map has this property zoned as Mixed Residential Commercial District (MRC1-C; low density mixed use). No zoning change is being requested.

Consistency with Adopted Comprehensive Plan

The future land use map designates this property as a low-density mixed-use land use. The existing land use and future land use map are in alignment to provide the following:

- Support the growth of existing businesses in metro Atlanta by providing a source of employment and housing for people who work in the City of Atlanta
- Develop a neighborhood/activity center that is attractive to residents
- Effectively promotes metro Atlanta as a place to live, work, visit and do business in a coordinated and cohesive manner
- Provides basic retail services that are an unmet need in many areas of the City of Atlanta
- Provides neighborhood stabilization to the area of proposed development

Project Phasing

This project has been evaluated for the complete build-out of the development in 2024.

Trip Generation

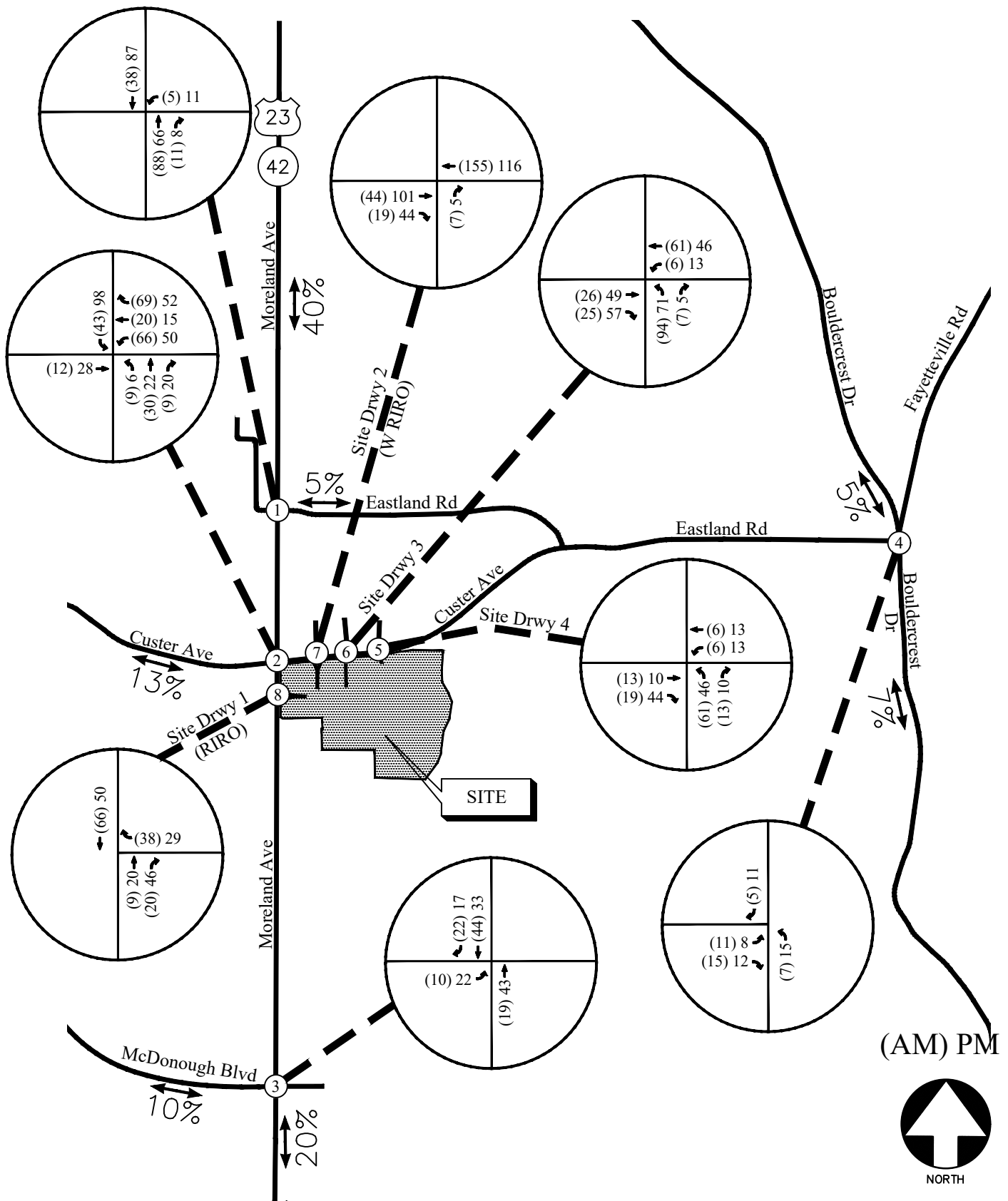
Trip generation estimates for the project were based on the rates and equations published in the 11th edition of the Institute of Transportation Engineers (ITE) Trip Generation report for the daily, AM and PM peak hours. This reference contains traffic volume count data collected at similar facilities nationwide. The trip generation was based on the following ITE Land Uses: 215 – *Single-Family Attached Housing*, 221 – *Multifamily Housing (Mid-Rise) - Not Close to Rail Transit* and 814 – *Strip Retail Plaza (<40k)*. Due to the availability of public transit near the proposed site, an alternate mode reduction of 7 percent was used for the AM and PM peak hours. The calculated total trip generation for the proposed development is shown in Table 6.

TABLE 6 – TRIP GENERATION FOR PROPOSED DEVELOPMENT

Land Use	Size	AM Peak Hour			PM Peak Hour			24 Hour
		Enter	Exit	Total	Enter	Exit	Total	Two-way
ITE 215 – Single-Family Attached Housing	273 units	42	94	136	91	69	160	2,030
Mixed-Use Reduction		-1	-1	-2	-2	-3	-5	-38
ITE 221 – Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	408 units	39	129	168	97	62	159	1,900
Mixed-Use Reduction		-1	-1	-2	-2	-2	-4	-35
814 – Strip Retail Plaza (<40k)	12,000 sf	19	13	32	44	45	89	736
Mixed-Use Reduction		-2	-2	-4	-5	-4	-9	-73
Alternate Mode Reduction (7%)		-7	-16	-23	-16	-12	-28	-316
Total Trips (without Reductions)		100	236	336	232	176	408	4,666
New External Trips (with Reductions)		89	216	305	207	155	362	4,204

Trip Distribution

The trip distribution describes how traffic arrives and departs from the site. An overall trip distribution was developed for the site based on a review of GDOT ADT volumes and the locations of major roadways and highways that will serve the development. The site-generated peak hour traffic volumes, shown in Table 6, were assigned to the study area intersections based on this distribution. The outer-leg distribution and AM and PM peak hour new traffic generated by the site are shown in Figure 8.



TRIP DISTRIBUTION AND SITE-GENERATED
WEEKDAY PEAK HOUR VOLUMES

FIGURE 8
A&R Engineering Inc.

FUTURE 2024 TRAFFIC ANALYSIS

The future 2024 traffic operations are analyzed for the “Build” and “No-Build” conditions. This provides a basis of reference for determining both the contribution of the site to overall traffic conditions and the additional improvements needed to provide sufficient site access and capacity for passing traffic. Note that survey and construction drawings would be needed to verify the feasibility and extent of additional right-of-way required for any recommended improvements.

Improvements that are identified as “System Improvements” address deficiencies that are found within the existing road network prior to any impacts from the proposed development’s added traffic. Improvements that are identified as “Site Mitigation Improvements” address further impacts that are a result of the proposed development’s added traffic.

Future “No-Build” Conditions

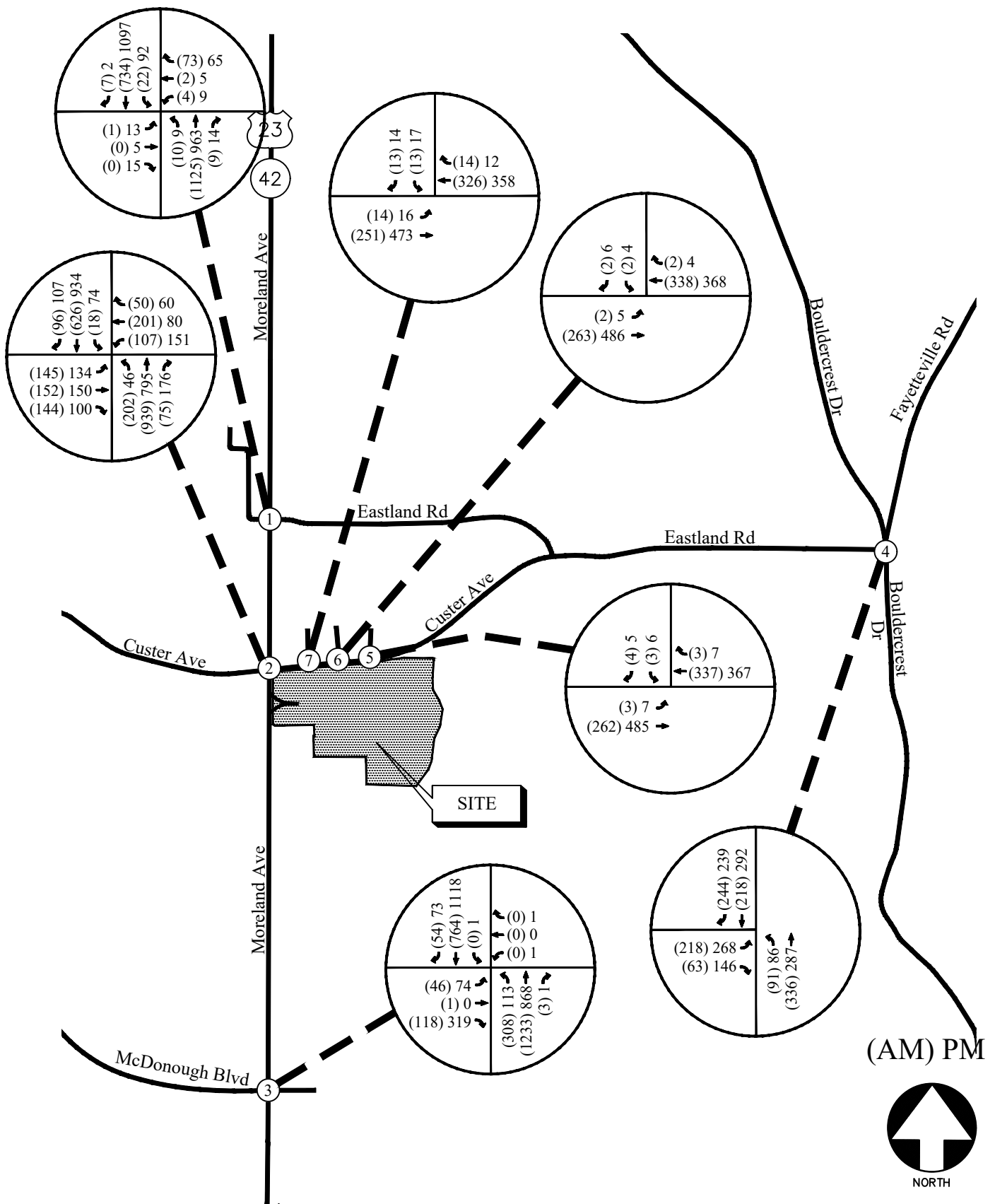
The “No-Build” (or background) conditions provide an assessment of how traffic will operate in the study horizon year without the study site being developed as proposed, with projected increases in through traffic volumes due to normal annual growth. The Future “No-Build” volumes consist of the existing traffic volumes (Figure 6) plus increases for annual growth of through traffic.

Annual Traffic Growth

In order to evaluate future traffic operations in this area, a projection of normal traffic growth was applied to the existing volumes. The Georgia Department of Transportation recorded average daily traffic volumes at several locations in the vicinity of the site. Reviewing the growth over the last three years revealed no consistent positive growth of through traffic; therefore, a growth rate of 1% was used in the analysis. This growth factor was applied to the existing traffic volumes between collector and arterial roadways in order to estimate the future year traffic volumes prior to the addition of site-generated traffic. The resulting Future “No-Build” volumes on the roadway are shown in Figure 9.

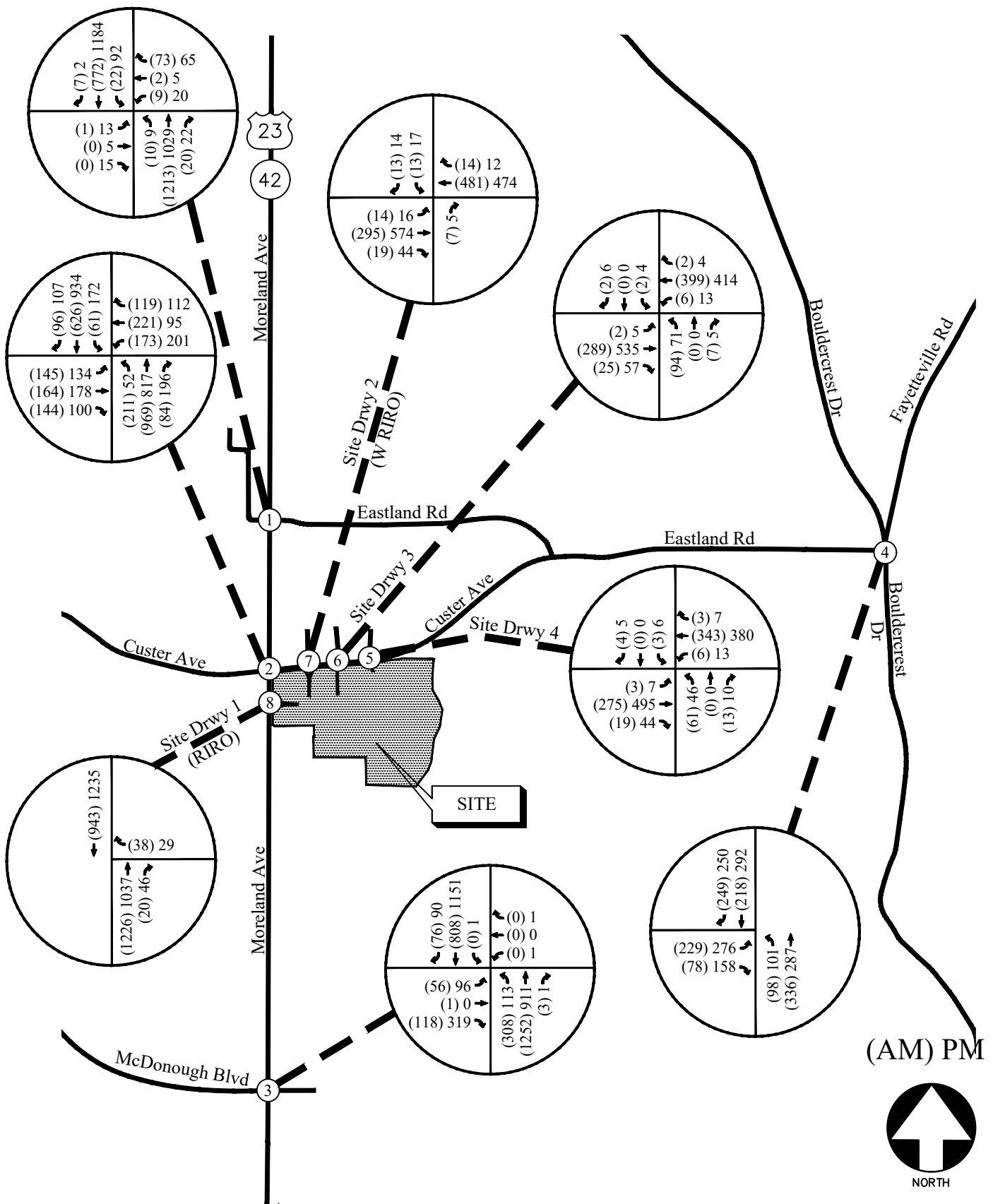
Future “Build” Conditions

The “Build” or development conditions include the estimated background traffic from the “No-Build” conditions plus the added traffic from the proposed development. In order to evaluate future traffic operations in this area, the additional traffic volumes from the site (Figure 8) were added to base traffic volumes (Figure 9) to calculate the future traffic volumes after the construction of the development. These total future traffic volumes are shown in Figure 10.



FUTURE (NO-BUILD) WEEKDAY PEAK HOUR VOLUMES

FIGURE 9
A&R Engineering Inc.



FUTURE (BUILD) WEEKDAY PEAK HOUR VOLUMES

FIGURE 10

A&R Engineering Inc.

Site Access Configuration

The following access configuration was utilized when modeling the proposed site driveway intersections:

The development proposes site accesses at the following locations:

- Site Driveway 1: Right-in/right-out driveway on SR 42/US 23 (Moreland Avenue)
- Site Driveway 2: Right-in/right-out (Western) driveway on Custer Avenue to align with Collision Repair Center (Eastern) Driveway
- Site Driveway 3: Full-access (Middle) driveway on Custer Avenue to align with the existing (Western) driveway
- Site Driveway 4: Full-access (Eastern) driveway on Custer Avenue to align with Citgo (Western) Driveway

It is recommended that all driveways consist of one entering lane and one exiting lane and are stop-sign controlled on the driveway approaches.

Future Traffic Operations

The future 2024 “No-Build” and “Build” traffic operations were analyzed using the volumes in Figure 9 and Figure 10, respectively, and the results are shown in Table 7.

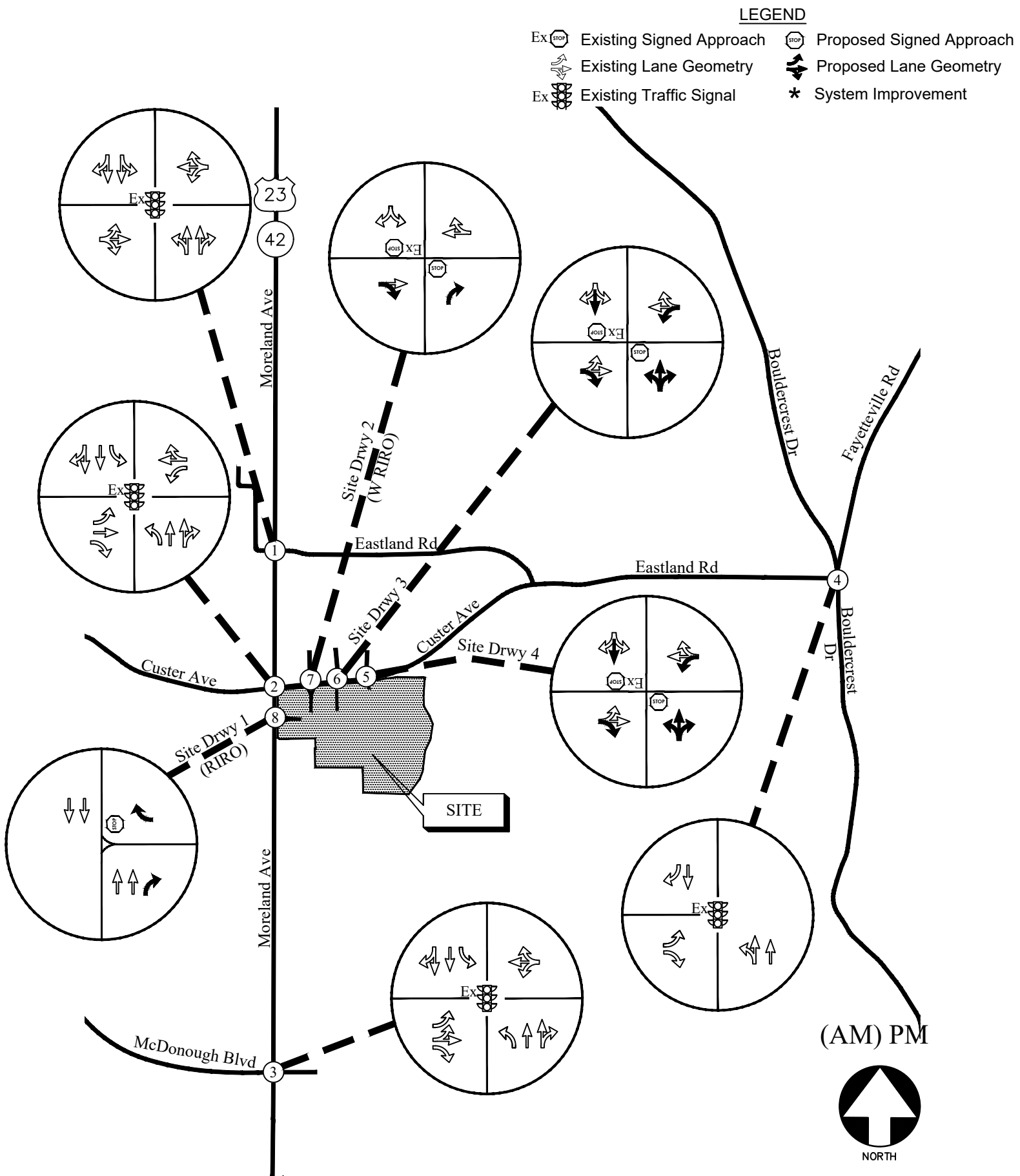
TABLE 7 — FUTURE INTERSECTION OPERATIONS

Intersection		Future Condition: LOS (Delay)				LOS Standards
		NO-BUILD		BUILD		
		AM Peak	PM Peak	AM Peak	PM Peak	
1	<u>SR 42/US 23 (Moreland Ave) @ Eastland Rd</u>	<u>A (5.2)</u>	<u>A (5.7)</u>	<u>A (5.5)</u>	<u>A (6.2)</u>	<u>D/D</u>
	-Eastbound Approach	D (47.7)	D (49.4)	D (47.3)	D (48.4)	D/D
	-Westbound Approach	D (54.2)	D (53.6)	D (53.8)	D (53.0)	D/D
	-Northbound Approach	A (3.4)	A (2.8)	A (3.9)	A (3.2)	D/D
	-Southbound Approach	A (2.6)	A (3.7)	A (2.8)	A (4.3)	D/D
2	<u>SR 42/US 23 (Moreland Ave) @ Custer Ave</u>	<u>C (24.4)</u>	<u>C (22.3)</u>	<u>C (26.7)</u>	<u>C (26.0)</u>	<u>D/D</u>
	-Eastbound Approach	D (43.2)	D (47.8)	D (43.5)	D (47.2)	D/D
	-Westbound Approach	D (47.6)	D (45.7)	D (47.1)	D (51.4)	D/D
	-Northbound Approach	B (17.0)	B (16.3)	C (20.2)	C (21.2)	D/D
	-Southbound Approach	B (19.4)	B (16.3)	C (20.5)	B (18.5)	D/D
3	<u>SR 42/US 23 (Moreland Ave) @ McDonough Blvd</u>	<u>A (4.6)</u>	<u>A (8.8)</u>	<u>A (5.0)</u>	<u>A (9.5)</u>	<u>D/D</u>
	-Eastbound Approach	D (47.4)	D (47.2)	D (47.2)	D (47.7)	D/D
	-Westbound Approach	A (0.0)	F (85.3)	A (0.0)	F (85.3)	D/F
	-Northbound Approach	A (2.9)	A (6.0)	A (3.1)	A (6.3)	D/D
	-Southbound Approach	A (5.3)	A (8.5)	A (5.6)	A (9.0)	D/D
4	<u>Bouldercrest Road @ Eastland Road</u>	<u>B (13.5)</u>	<u>B (16.0)</u>	<u>B (14.1)</u>	<u>B (16.3)</u>	<u>D/D</u>
	-Eastbound Approach	D (40.0)	D (38.1)	D (39.3)	D (37.8)	D/D
	-Northbound Approach	A (5.3)	A (5.9)	A (5.7)	A (6.4)	D/D
	-Southbound Approach	A (5.1)	A (5.8)	A (5.4)	A (6.1)	D/D
5	<u>Custer Ave @ Citgo Driveway (W) / Site Driveway 4 (E)</u>					
	-Eastbound Left	A (8.0)	A (8.1)	A (8.0)	A (8.1)	D/D
	-Westbound Left	-	-	A (7.9)	A (8.6)	-
	-Northbound Approach	-	-	C (16.2)	C (24.3)	-
	-Southbound Approach	B (11.5)	B (14.3)	B (12.4)	C (17.1)	D/D
6	<u>Custer Ave @ Existing Driveway (W) / Site Driveway 3 (M)</u>					
	-Eastbound Left	A (8.0)	A (8.1)	A (8.2)	A (8.2)	D/D
	-Westbound Left	-	-	A (7.9)	A (8.8)	-
	-Northbound Approach	-	-	C (20.3)	D (34.5)	-
	-Southbound Approach	B (11.7)	B (13.2)	B (13.5)	C (16.3)	D/D
7	<u>Custer Ave @ Collision Repair Center Driveway (E) / Site Driveway 2 (W RIRO)</u>					
	-Eastbound Left	A (8.0)	A (8.1)	A (8.5)	A (8.5)	D/D
	-Northbound Approach	-	-	A (9.3)	A (10.4)	-
	-Southbound Approach	B (11.5)	B (13.0)	B (14.2)	B (16.6)	D/D
8	<u>SR 42/US 23 (Moreland Ave) @ Site Driveway 1 (RIRO)</u>					
	-Westbound Approach	-	-	C (15.0)	B (13.2)	-

The results of future traffic operations analysis indicate that all the signalized intersections will continue to operate at overall level-of-service “C” or better during the AM and PM peak hours and the unsignalized approaches will operate at level of-service “D” or better in both the AM and PM peak hours. Recommendations on traffic control and lane geometry are shown in Figure 11.

Site Mitigation Improvements:

- Construction of deceleration lane at Driveway 1 (RIRO) on SR 41/US 23 (Moreland Avenue)
- Provide crosswalks across all site driveways on SR 41/US 23 (Moreland Avenue) and Custer Avenue
- Sidewalks along site frontage on SR 41/US 23 (Moreland Avenue) and Custer Avenue
- Trail or path along site frontage on Custer Avenue Trail or path along site frontage on Custer Avenue



FUTURE TRAFFIC CONTROL AND LANE GEOMETRY

FIGURE 11

A&R Engineering Inc.

CONCLUSIONS AND RECOMMENDATIONS

Traffic impacts were evaluated for the added traffic from the proposed mixed-use development that will be located in the southeast corner of the intersection of SR 42/US 23 (Moreland Avenue) and Custer Avenue in the City of Atlanta. The development will consist of:

- Apartments: 413 Units
- Townhomes: 260 Units
- Retail: 19,500 sf

The development proposes site accesses at the following locations:

- Site Driveway 1: Right-in/right-out driveway on SR 42/US 23 (Moreland Avenue)
- Site Driveway 2: Right-in/right-out (Western) driveway on Custer Avenue to align with Collision Repair Center (Eastern) Driveway
- Site Driveway 3: Full-access (Middle) driveway on Custer Avenue align with existing driveway
- Site Driveway 4: Full-access (Eastern) driveway on Custer Avenue align with Citgo (Western) Driveway

Traffic Operations

Existing and future operations after completion of the project were analyzed at the intersections of:

- SR 42/US 23 (Moreland Avenue) at Eastland Road
- SR 42/US 23 (Moreland Avenue) at Custer Avenue
- SR 42/US 23 (Moreland Ave) at McDonough Boulevard
- Bouldercrest Road at Eastland Road
- Custer Avenue at Site Driveway 4 (E) / Citgo Driveway (W)
- Custer Avenue at Site Driveway 3 (M) / existing driveway (W)
- Custer Avenue at Site Driveway 2 (W RIRO) / Collision Repair Center Driveway (E)
- SR 42/US 23 (Moreland Avenue) at Site Driveway 1 (RIRO)

The analysis included the evaluation of Future operations for “No-Build” and “Build” conditions, both of which account for increases in annual growth of through traffic. The results of the analysis indicated that the differences between the “No-Build” and “Build” scenarios are insignificant after the site mitigation improvements were accounted for. All approaches are operating at or better than the level-of-service standards after inclusion of site generated traffic in the “Build” condition.

Site Access Configuration

All the site driveway intersections are recommended to be un-signalized with a STOP sign on driveway approaches. It is recommended that the full access driveways consist of one entering and one exiting lane.

Site Mitigation Improvements

- Construction of deceleration lane at Driveway 1 (RIRO) on SR 41/US 23 (Moreland Avenue)
- Provide crosswalks across all site driveways on SR 41/US 23 (Moreland Avenue) and Custer Avenue
- Sidewalks along site frontage on SR 41/US 23 (Moreland Avenue) and Custer Avenue
- Trail or path along site frontage on Custer Avenue Trail or path along site frontage on Custer Avenue

Appendix

Existing Intersection Traffic Counts	
GRTA Letter of Understanding.....	
Linear Regression of Daily Traffic.....	
Existing Intersection Analysis.....	
Future “No-Build” Intersection Analysis	
Future “Build” Intersection Analysis	
Future “Build” (With Improvements)	
Intersection Analysis	
Traffic Volume Worksheets	

Existing Intersection Traffic Counts

A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Moreland Ave @ Eastland Ave

7-9 am | 4-6 pm

File Name : 20220032

Site Code : 20220032

Start Date : 2/8/2022

Page No : 1

Groups Printed- Cars,Buses & Trucks

	Moreland Ave Northbound				Moreland Ave Southbound				Life Storage Drwy Eastbound				Eastland Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	223	1	224	4	142	1	147	1	0	2	3	0	0	6	6	380
07:15 AM	5	245	2	252	7	186	2	195	0	0	0	0	0	1	13	14	461
07:30 AM	1	275	2	278	3	164	2	169	0	0	0	0	2	1	12	15	462
07:45 AM	4	294	2	300	4	204	3	211	0	0	0	0	1	0	31	32	543
Total	10	1037	7	1054	18	696	8	722	1	0	2	3	3	2	62	67	1846
08:00 AM	0	289	3	292	8	166	0	174	1	0	0	1	1	0	16	17	484
08:15 AM	4	243	4	251	5	153	3	161	0	0	2	2	2	0	18	20	434
08:30 AM	3	221	3	227	7	155	1	163	2	0	1	3	3	1	18	22	415
08:45 AM	3	229	6	238	11	170	1	182	0	0	1	1	3	0	15	18	439
Total	10	982	16	1008	31	644	5	680	3	0	4	7	9	1	67	77	1772
*** BREAK ***																	
04:00 PM	2	198	2	202	17	250	0	267	2	0	7	9	2	0	15	17	495
04:15 PM	2	254	3	259	19	249	0	268	0	1	5	6	2	1	12	15	548
04:30 PM	0	205	3	208	17	267	0	284	3	3	3	9	1	3	23	27	528
04:45 PM	3	229	6	238	21	256	0	277	5	3	1	9	3	1	20	24	548
Total	7	886	14	907	74	1022	0	1096	10	7	16	33	8	5	70	83	2119
05:00 PM	1	240	3	244	20	284	1	305	2	1	4	7	3	2	16	21	577
05:15 PM	3	224	3	230	19	287	0	306	6	1	5	12	1	0	13	14	562
05:30 PM	2	251	2	255	30	248	1	279	0	0	5	5	2	2	15	19	558
05:45 PM	2	230	1	233	24	238	0	262	1	0	6	7	4	0	16	20	522
Total	8	945	9	962	93	1057	2	1152	9	2	20	31	10	4	60	74	2219
Grand Total	35	3850	46	3931	216	3419	15	3650	23	9	42	74	30	12	259	301	7956
Apprch %	0.9	97.9	1.2		5.9	93.7	0.4		31.1	12.2	56.8		10	4	86		
Total %	0.4	48.4	0.6	49.4	2.7	43	0.2	45.9	0.3	0.1	0.5	0.9	0.4	0.2	3.3	3.8	

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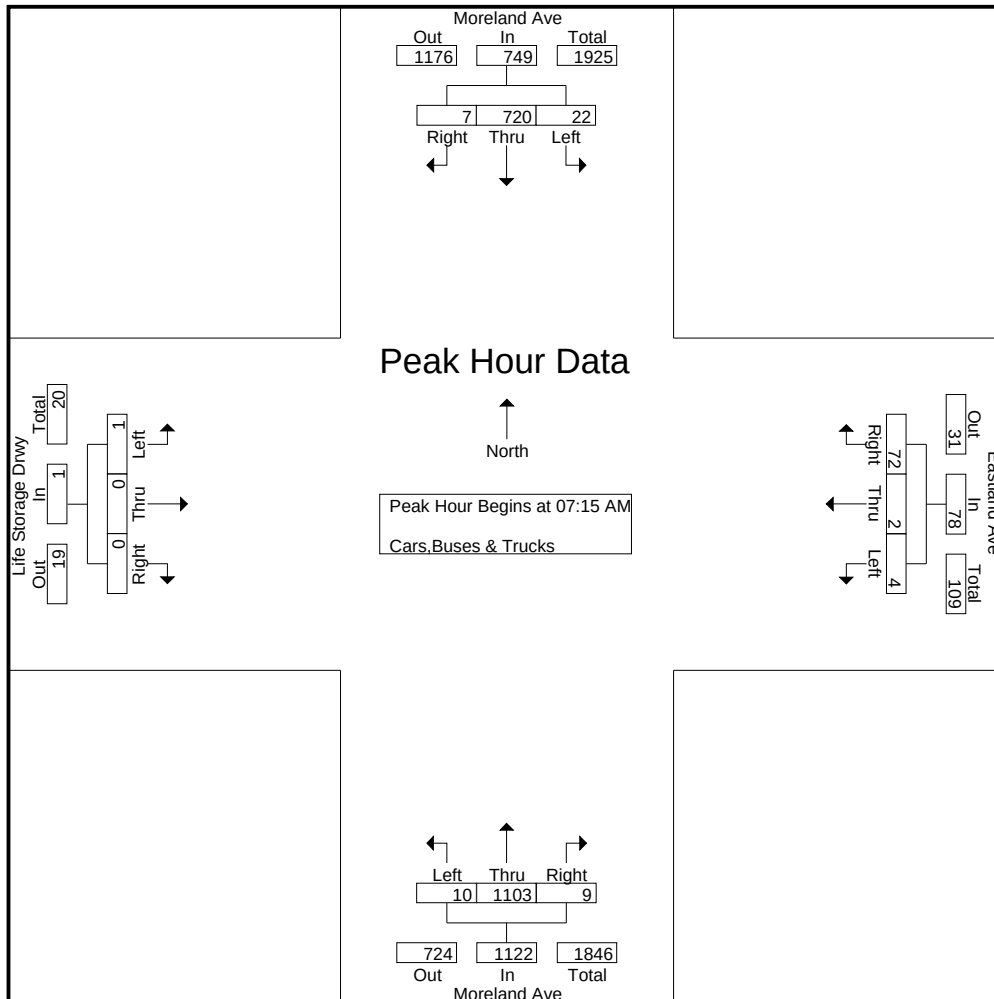
File Name : 20220032

Site Code : 20220032

Start Date : 2/8/2022

Page No : 2

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Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	5	245	2	252	7	186	2	195	0	0	0	0	0	1	13	14	461
07:30 AM	1	275	2	278	3	164	2	169	0	0	0	0	2	1	12	15	462
07:45 AM	4	294	2	300	4	204	3	211	0	0	0	0	1	0	31	32	543
08:00 AM	0	289	3	292	8	166	0	174	1	0	0	1	1	0	16	17	484
Total Volume	10	1103	9	1122	22	720	7	749	1	0	0	1	4	2	72	78	1950
% App. Total	0.9	98.3	0.8		2.9	96.1	0.9		100	0	0		5.1	2.6	92.3		
PHF	.500	.938	.750	.935	.688	.882	.583	.887	.250	.000	.000	.250	.500	.500	.581	.609	.898



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TMC DATA

Moreland Ave @ Eastland Ave

7-9 am | 4-6 pm

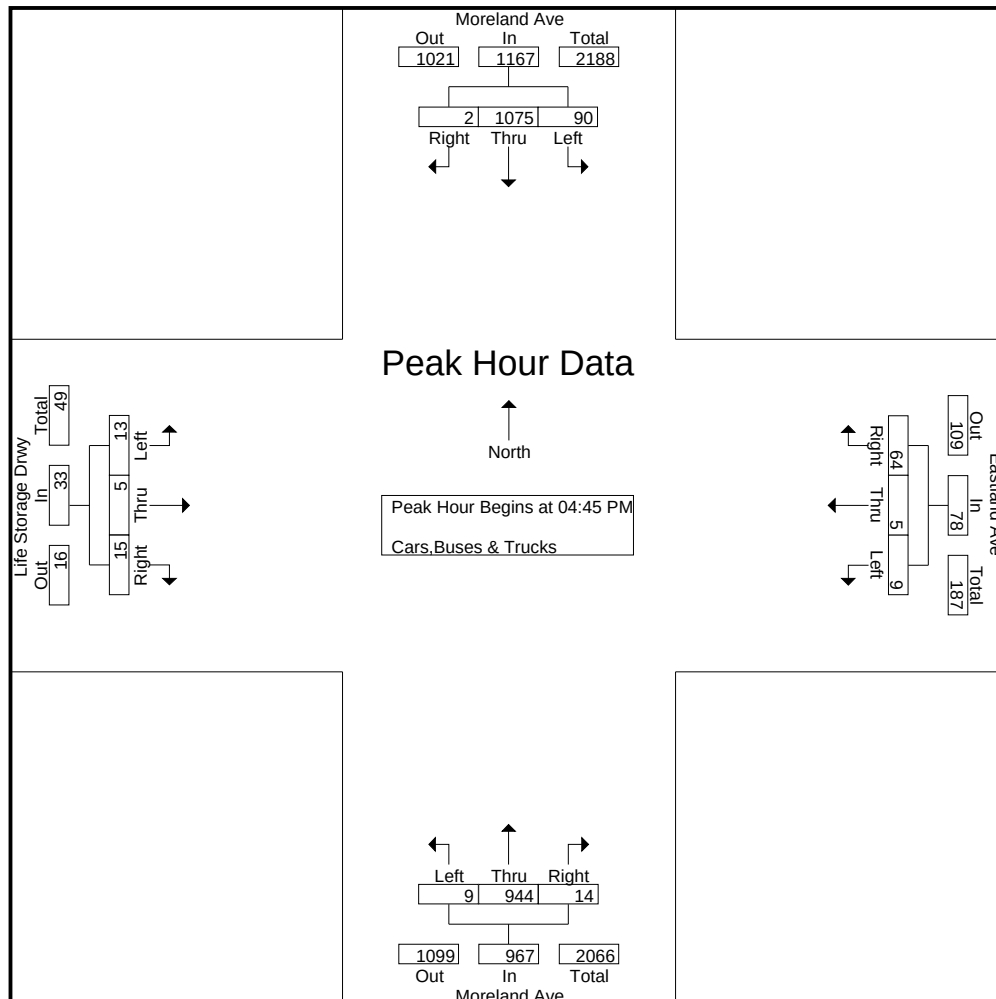
File Name : 20220032

Site Code : 20220032

Start Date : 2/8/2022

Page No : 3

	Moreland Ave Northbound				Moreland Ave Southbound				Life Storage Drwy Eastbound				Eastland Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	3	229	6	238	21	256	0	277	5	3	1	9	3	1	20	24	548
05:00 PM	1	240	3	244	20	284	1	305	2	1	4	7	3	2	16	21	577
05:15 PM	3	224	3	230	19	287	0	306	6	1	5	12	1	0	13	14	562
05:30 PM	2	251	2	255	30	248	1	279	0	0	5	5	2	2	15	19	558
Total Volume	9	944	14	967	90	1075	2	1167	13	5	15	33	9	5	64	78	2245
% App. Total	0.9	97.6	1.4		7.7	92.1	0.2		39.4	15.2	45.5		11.5	6.4	82.1		
PHF	.750	.940	.583	.948	.750	.936	.500	.953	.542	.417	.750	.688	.750	.625	.800	.813	.973



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2160 Kingston Court, Suite 'O',
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TMC DATA

Moreland Ave @ Custer Ave

7-9 am | 4-6 pm

File Name : 20220031

Site Code : 20220031

Start Date : 2/8/2022

Page No : 1

Groups Printed- Cars,Buses & Trucks

	Moreland Ave Northbound				Moreland Ave Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	15	197	20	232	3	107	16	126	8	11	5	24	27	21	7	55	437
07:15 AM	42	230	20	292	2	129	21	152	25	32	20	77	27	45	10	82	603
07:30 AM	69	237	22	328	3	154	28	185	24	29	32	85	20	54	12	86	684
07:45 AM	55	213	15	283	4	169	26	199	41	50	35	126	33	64	11	108	716
Total	181	877	77	1135	12	559	91	662	98	122	92	312	107	184	40	331	2440
08:00 AM	32	241	17	290	9	162	19	190	52	38	54	144	25	34	16	75	699
08:15 AM	19	240	25	284	9	122	23	154	22	14	11	47	23	25	12	60	545
08:30 AM	15	205	18	238	15	133	27	175	22	20	5	47	30	21	16	67	527
08:45 AM	6	204	21	231	9	135	19	163	18	11	6	35	27	19	16	62	491
Total	72	890	81	1043	42	552	88	682	114	83	76	273	105	99	60	264	2262
*** BREAK ***																	
04:00 PM	21	187	35	243	17	215	21	253	41	28	40	109	42	27	9	78	683
04:15 PM	16	177	43	236	10	212	27	249	36	40	50	126	38	30	11	79	690
04:30 PM	17	157	45	219	20	237	17	274	41	44	23	108	37	31	14	82	683
04:45 PM	10	203	36	249	19	210	27	256	29	28	19	76	42	20	10	72	653
Total	64	724	159	947	66	874	92	1032	147	140	132	419	159	108	44	311	2709
05:00 PM	18	183	49	250	11	218	29	258	39	33	30	102	38	17	20	75	685
05:15 PM	5	197	41	243	20	242	19	281	39	50	33	122	38	20	15	73	719
05:30 PM	12	196	47	255	23	246	30	299	24	36	16	76	30	21	14	65	695
05:45 PM	9	200	29	238	23	205	30	258	32	43	11	86	38	16	7	61	643
Total	44	776	166	986	77	911	108	1096	134	162	90	386	144	74	56	274	2742
Grand Total	361	3267	483	4111	197	2896	379	3472	493	507	390	1390	515	465	200	1180	10153
Apprch %	8.8	79.5	11.7		5.7	83.4	10.9		35.5	36.5	28.1		43.6	39.4	16.9		
Total %	3.6	32.2	4.8	40.5	1.9	28.5	3.7	34.2	4.9	5	3.8	13.7	5.1	4.6	2	11.6	

A & R Engineering, Inc.

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TMC DATA

Moreland Ave @ Custer Ave

7-9 am | 4-6 pm

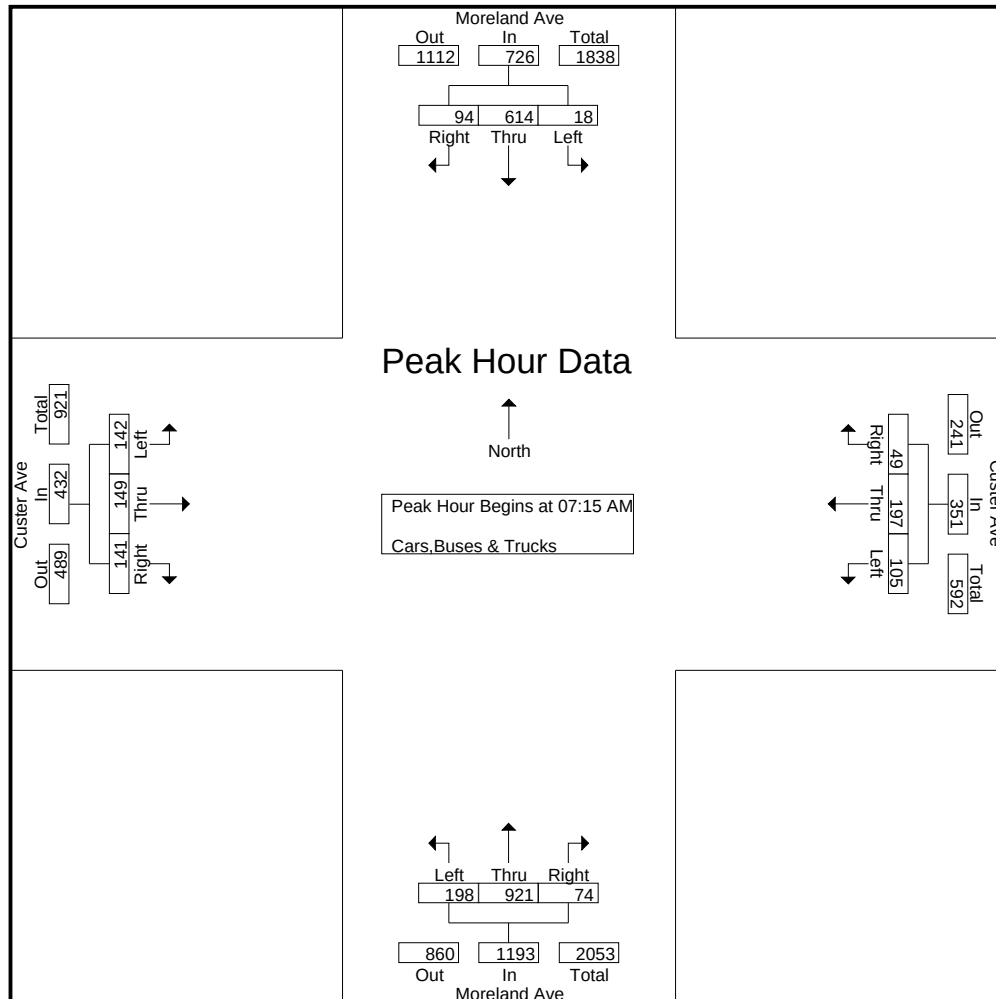
File Name : 20220031

Site Code : 20220031

Start Date : 2/8/2022

Page No : 2

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Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
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07:15 AM	42	230	20	292	2	129	21	152	25	32	20	77	27	45	10	82	603
07:30 AM	69	237	22	328	3	154	28	185	24	29	32	85	20	54	12	86	684
07:45 AM	55	213	15	283	4	169	26	199	41	50	35	126	33	64	11	108	716
08:00 AM	32	241	17	290	9	162	19	190	52	38	54	144	25	34	16	75	699
Total Volume	198	921	74	1193	18	614	94	726	142	149	141	432	105	197	49	351	2702
% App. Total	16.6	77.2	6.2		2.5	84.6	12.9		32.9	34.5	32.6		29.9	56.1	14		
PHF	.717	.955	.841	.909	.500	.908	.839	.912	.683	.745	.653	.750	.795	.770	.766	.813	.943



A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Moreland Ave @ Custer Ave

7-9 am | 4-6 pm

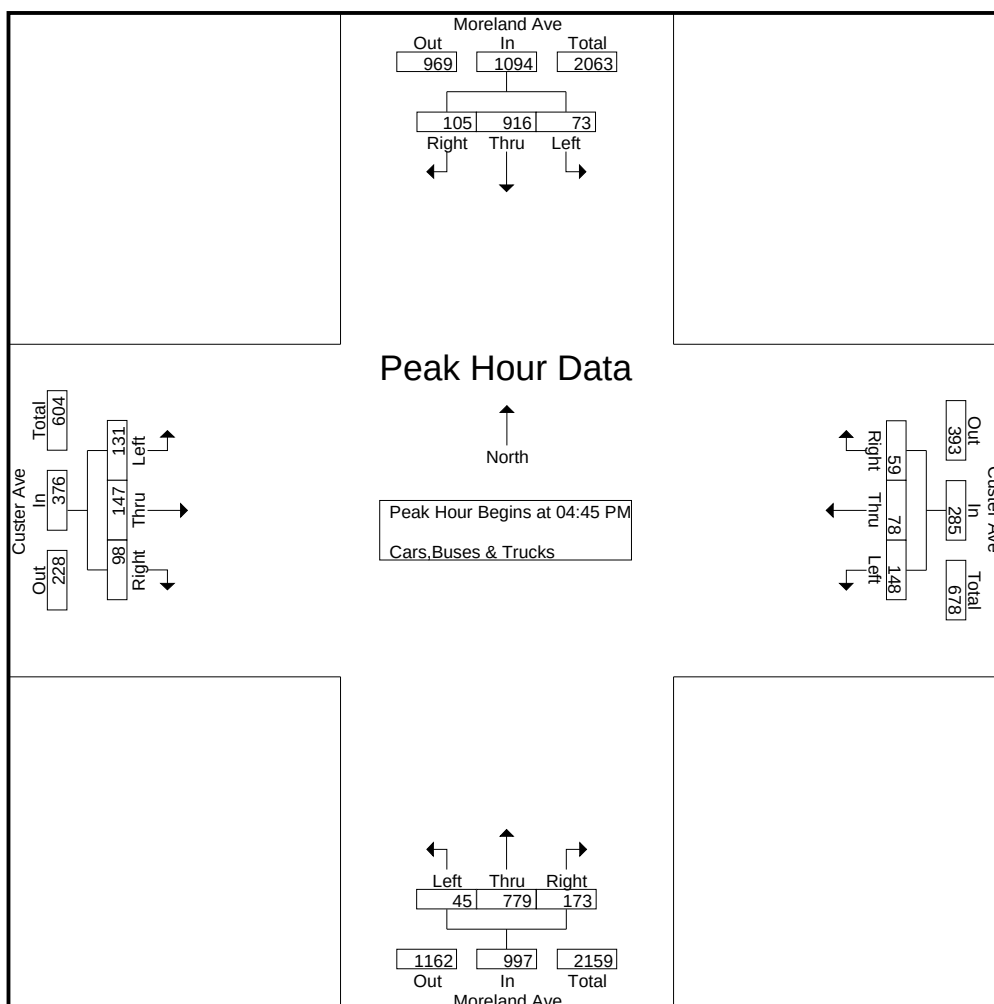
File Name : 20220031

Site Code : 20220031

Start Date : 2/8/2022

Page No : 3

	Moreland Ave Northbound				Moreland Ave Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	10	203	36	249	19	210	27	256	29	28	19	76	42	20	10	72	653
05:00 PM	18	183	49	250	11	218	29	258	39	33	30	102	38	17	20	75	685
05:15 PM	5	197	41	243	20	242	19	281	39	50	33	122	38	20	15	73	719
05:30 PM	12	196	47	255	23	246	30	299	24	36	16	76	30	21	14	65	695
Total Volume	45	779	173	997	73	916	105	1094	131	147	98	376	148	78	59	285	2752
% App. Total	4.5	78.1	17.4		6.7	83.7	9.6		34.8	39.1	26.1		51.9	27.4	20.7		
PHF	.625	.959	.883	.977	.793	.931	.875	.915	.840	.735	.742	.770	.881	.929	.738	.950	.957



A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Moreland Ave @ SR 42 (McDonough Blvd)
7-9 am | 4-6 pm

File Name : 20220030

Site Code : 20220030

Start Date : 2/8/2022

Page No : 1

Groups Printed- Cars,Buses & Trucks

	Moreland Ave Northbound				Moreland Ave Southbound				SR 42 (McDonough Blvd) Eastbound				Road One Drwy Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	78	268	0	346	0	123	9	132	8	0	17	25	1	0	0	1	504
07:15 AM	72	319	1	392	0	172	15	187	4	0	20	24	0	0	0	0	603
07:30 AM	73	321	1	395	0	173	14	187	16	1	28	45	0	0	0	0	627
07:45 AM	74	289	0	363	0	210	12	222	12	0	36	48	0	0	0	0	633
Total	297	1197	2	1496	0	678	50	728	40	1	101	142	1	0	0	1	2367
08:00 AM	83	280	1	364	0	194	12	206	13	0	32	45	0	0	0	0	615
08:15 AM	84	243	1	328	0	133	7	140	10	0	38	48	1	0	0	1	517
08:30 AM	53	229	0	282	0	143	12	155	10	0	20	30	2	0	0	2	469
08:45 AM	55	224	0	279	0	149	10	159	11	0	19	30	1	0	0	1	469
Total	275	976	2	1253	0	619	41	660	44	0	109	153	4	0	0	4	2070
*** BREAK ***																	
04:00 PM	24	225	0	249	0	274	22	296	25	0	75	100	0	0	0	0	645
04:15 PM	27	194	0	221	0	247	25	272	21	0	76	97	1	0	0	1	591
04:30 PM	37	207	0	244	1	291	15	307	17	0	85	102	0	0	1	1	654
04:45 PM	29	214	1	244	0	240	16	256	11	0	65	76	0	0	0	0	576
Total	117	840	1	958	1	1052	78	1131	74	0	301	375	1	0	1	2	2466
05:00 PM	21	200	0	221	0	288	20	308	21	0	83	104	0	0	0	0	633
05:15 PM	24	230	0	254	0	277	21	298	24	0	80	104	1	0	0	1	657
05:30 PM	25	236	0	261	0	245	22	267	18	0	76	94	0	0	0	0	622
05:45 PM	29	202	0	231	0	207	18	225	14	0	59	73	0	0	0	0	529
Total	99	868	0	967	0	1017	81	1098	77	0	298	375	1	0	0	1	2441
Grand Total	788	3881	5	4674	1	3366	250	3617	235	1	809	1045	7	0	1	8	9344
Apprch %	16.9	83	0.1		0	93.1	6.9		22.5	0.1	77.4		87.5	0	12.5		
Total %	8.4	41.5	0.1	50	0	36	2.7	38.7	2.5	0	8.7	11.2	0.1	0	0	0.1	

A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Moreland Ave @ SR 42 (McDonough Blvd)

7-9 am | 4-6 pm

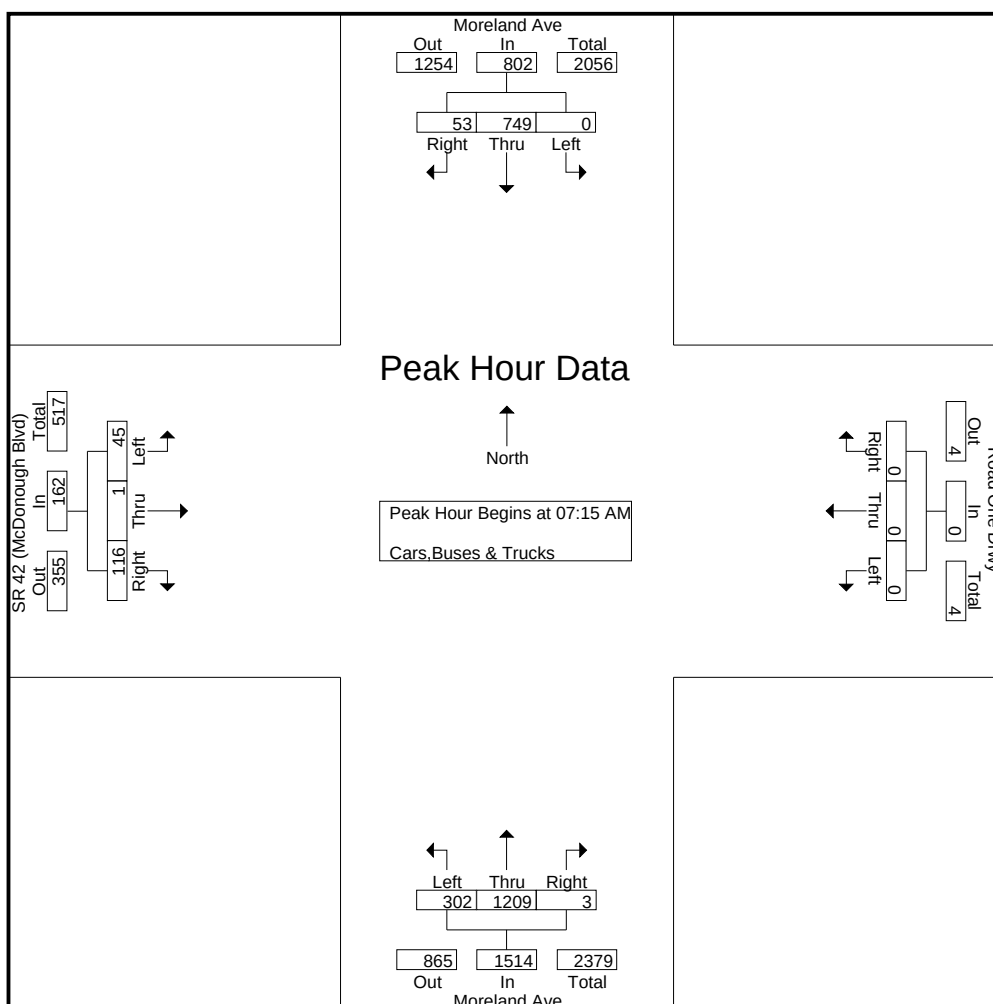
File Name : 20220030

Site Code : 20220030

Start Date : 2/8/2022

Page No : 2

	Moreland Ave Northbound				Moreland Ave Southbound				SR 42 (McDonough Blvd) Eastbound				Road One Drwy Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	72	319	1	392	0	172	15	187	4	0	20	24	0	0	0	0	603
07:30 AM	73	321	1	395	0	173	14	187	16	1	28	45	0	0	0	0	627
07:45 AM	74	289	0	363	0	210	12	222	12	0	36	48	0	0	0	0	633
08:00 AM	83	280	1	364	0	194	12	206	13	0	32	45	0	0	0	0	615
Total Volume	302	1209	3	1514	0	749	53	802	45	1	116	162	0	0	0	0	2478
% App. Total	19.9	79.9	0.2		0	93.4	6.6		27.8	0.6	71.6		0	0	0		
PHF	.910	.942	.750	.958	.000	.892	.883	.903	.703	.250	.806	.844	.000	.000	.000	.000	.979



A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Moreland Ave @ SR 42 (McDonough Blvd)

7-9 am | 4-6 pm

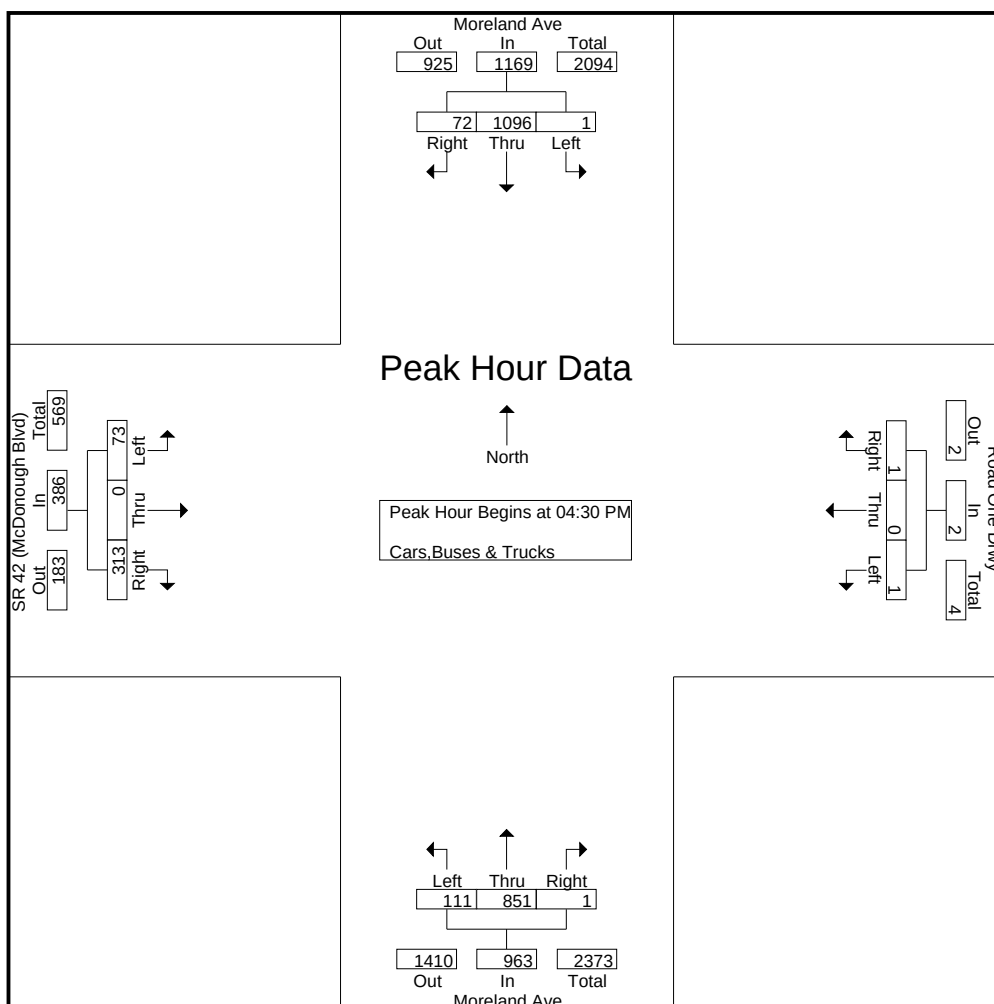
File Name : 20220030

Site Code : 20220030

Start Date : 2/8/2022

Page No : 3

	Moreland Ave Northbound				Moreland Ave Southbound				SR 42 (McDonough Blvd) Eastbound				Road One Drwy Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	37	207	0	244	1	291	15	307	17	0	85	102	0	0	1	1	654
04:45 PM	29	214	1	244	0	240	16	256	11	0	65	76	0	0	0	0	576
05:00 PM	21	200	0	221	0	288	20	308	21	0	83	104	0	0	0	0	633
05:15 PM	24	230	0	254	0	277	21	298	24	0	80	104	1	0	0	1	657
Total Volume	111	851	1	963	1	1096	72	1169	73	0	313	386	1	0	1	2	2520
% App. Total	11.5	88.4	0.1		0.1	93.8	6.2		18.9	0	81.1		50	0	50		
PHF	.750	.925	.250	.948	.250	.942	.857	.949	.760	.000	.921	.928	.250	.000	.250	.500	.959



A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Bouldercrest Rd @ Eastland Rd
7-9 am | 4-6 pm

File Name : 20220029

Site Code : 20220029

Start Date : 2/8/2022

Page No : 1

Groups Printed- Cars,Buses & Trucks

	Bouldercrest Rd Northbound				Bouldercrest Rd Southbound				Eastland Rd Eastbound				Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	16	76	0	92	0	22	45	67	38	0	4	42	0	0	0	0	201
07:15 AM	25	78	0	103	0	37	55	92	58	0	11	69	0	0	0	0	264
07:30 AM	23	99	0	122	0	73	70	143	53	0	19	72	0	0	0	0	337
07:45 AM	20	77	0	97	0	58	66	124	56	0	15	71	0	0	0	0	292
Total	84	330	0	414	0	190	236	426	205	0	49	254	0	0	0	0	1094
08:00 AM	21	75	0	96	0	46	48	94	47	0	17	64	0	0	0	0	254
08:15 AM	16	71	0	87	0	45	42	87	39	0	15	54	0	0	0	0	228
08:30 AM	18	73	0	91	0	47	37	84	32	0	11	43	0	0	0	0	218
08:45 AM	13	48	0	61	0	36	46	82	35	0	7	42	0	0	0	0	185
Total	68	267	0	335	0	174	173	347	153	0	50	203	0	0	0	0	885
*** BREAK ***																	
04:00 PM	17	62	0	79	0	66	65	131	65	0	35	100	0	0	0	0	310
04:15 PM	19	45	0	64	0	75	51	126	67	0	46	113	0	0	0	0	303
04:30 PM	22	71	0	93	0	70	48	118	45	0	35	80	0	0	0	0	291
04:45 PM	22	63	0	85	0	74	55	129	64	0	33	97	0	0	0	0	311
Total	80	241	0	321	0	285	219	504	241	0	149	390	0	0	0	0	1215
05:00 PM	19	67	0	86	0	65	74	139	79	0	39	118	0	0	0	0	343
05:15 PM	21	80	0	101	0	77	57	134	75	0	36	111	0	0	0	0	346
05:30 PM	15	51	0	66	0	62	53	115	69	0	32	101	0	0	0	0	282
05:45 PM	29	65	0	94	0	76	49	125	54	0	38	92	0	0	0	0	311
Total	84	263	0	347	0	280	233	513	277	0	145	422	0	0	0	0	1282
Grand Total	316	1101	0	1417	0	929	861	1790	876	0	393	1269	0	0	0	0	4476
Apprch %	22.3	77.7	0		0	51.9	48.1		69	0	31		0	0	0		
Total %	7.1	24.6	0	31.7	0	20.8	19.2	40	19.6	0	8.8	28.4	0	0	0	0	

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2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Bouldercrest Rd @ Eastland Rd

7-9 am | 4-6 pm

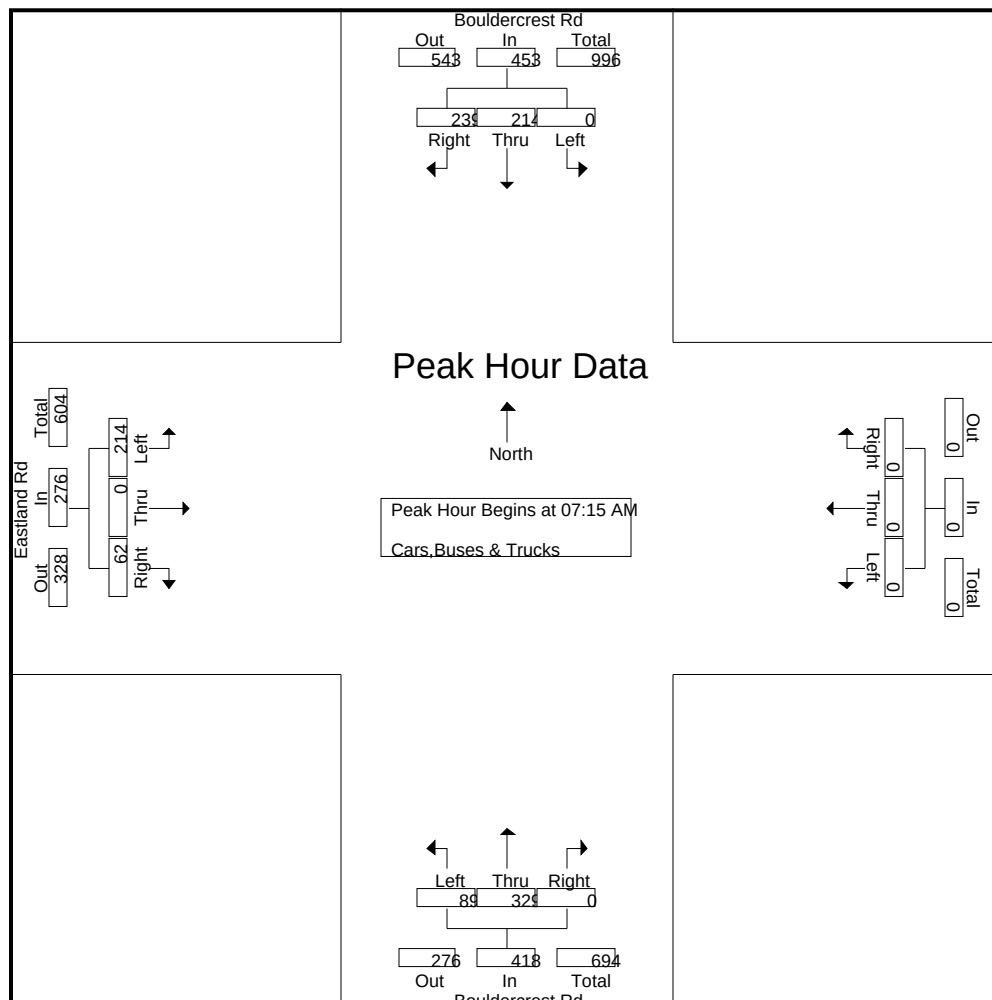
File Name : 20220029

Site Code : 20220029

Start Date : 2/8/2022

Page No : 2

	Bouldercrest Rd Northbound				Bouldercrest Rd Southbound				Eastland Rd Eastbound				Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	25	78	0	103	0	37	55	92	58	0	11	69	0	0	0	0	264
07:30 AM	23	99	0	122	0	73	70	143	53	0	19	72	0	0	0	0	337
07:45 AM	20	77	0	97	0	58	66	124	56	0	15	71	0	0	0	0	292
08:00 AM	21	75	0	96	0	46	48	94	47	0	17	64	0	0	0	0	254
Total Volume	89	329	0	418	0	214	239	453	214	0	62	276	0	0	0	0	1147
% App. Total	21.3	78.7	0		0	47.2	52.8		77.5	0	22.5		0	0	0		
PHF	.890	.831	.000	.857	.000	.733	.854	.792	.922	.000	.816	.958	.000	.000	.000	.000	.851



A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Bouldercrest Rd @ Eastland Rd

7-9 am | 4-6 pm

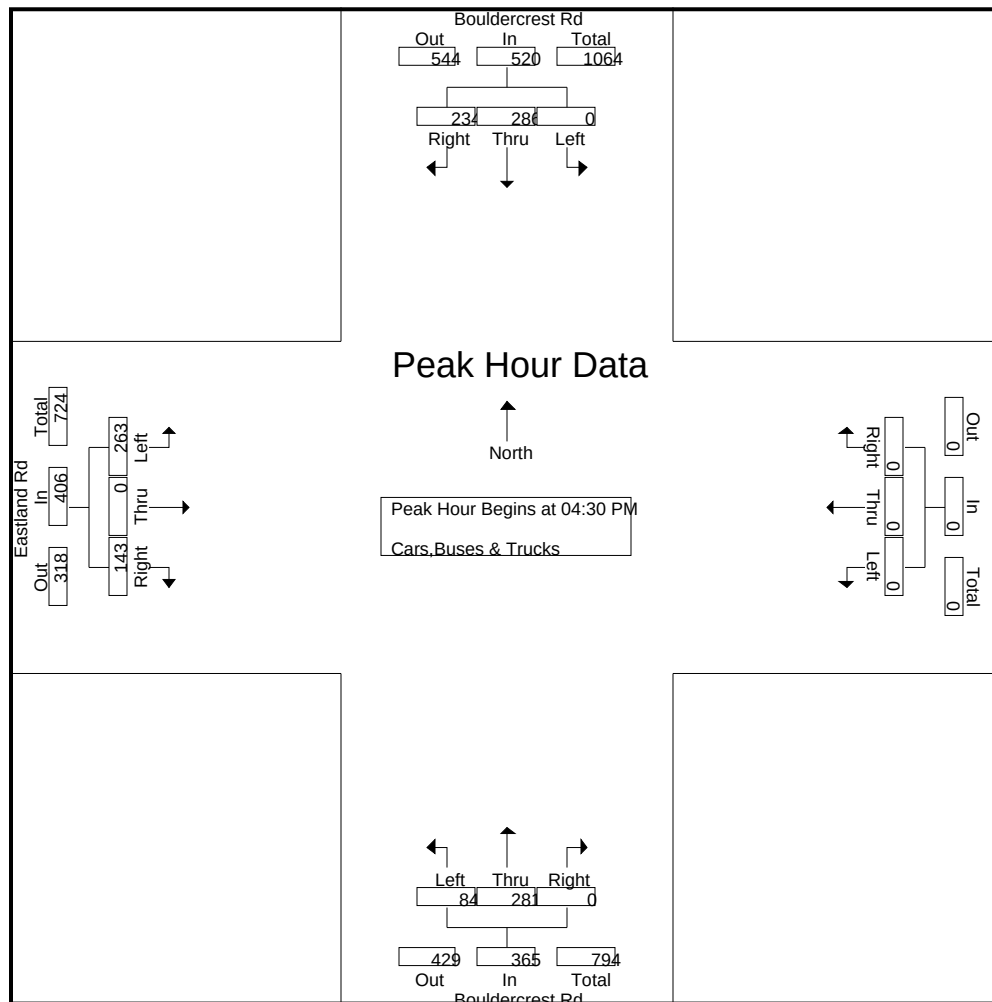
File Name : 20220029

Site Code : 20220029

Start Date : 2/8/2022

Page No : 3

	Bouldercrest Rd Northbound				Bouldercrest Rd Southbound				Eastland Rd Eastbound				Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	22	71	0	93	0	70	48	118	45	0	35	80	0	0	0	0	291
04:45 PM	22	63	0	85	0	74	55	129	64	0	33	97	0	0	0	0	311
05:00 PM	19	67	0	86	0	65	74	139	79	0	39	118	0	0	0	0	343
05:15 PM	21	80	0	101	0	77	57	134	75	0	36	111	0	0	0	0	346
Total Volume	84	281	0	365	0	286	234	520	263	0	143	406	0	0	0	0	1291
% App. Total	23	77	0		0	55	45		64.8	0	35.2		0	0	0		
PHF	.955	.878	.000	.903	.000	.929	.791	.935	.832	.000	.917	.860	.000	.000	.000	.000	.933



A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Custer Ave @ Eastern Drwy
7-9 am | 4-6 pm

File Name : 20220136

Site Code : 20220136

Start Date : 3/31/2022

Page No : 1

Groups Printed- Cars,Buses & Trucks

	Northbound				Eastern Drwy Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	1	32	0	33	0	49	1	50	83
07:15 AM	0	0	0	0	1	0	2	3	1	52	0	53	0	80	1	81	137
07:30 AM	0	0	0	0	1	0	0	1	1	61	0	62	0	90	1	91	154
07:45 AM	0	0	0	0	0	0	1	1	0	72	0	72	0	83	0	83	156
Total	0	0	0	0	2	0	3	5	3	217	0	220	0	302	3	305	530
08:00 AM	0	0	0	0	1	0	1	2	1	72	0	73	0	77	1	78	153
08:15 AM	0	0	0	0	1	0	1	2	0	58	0	58	0	60	2	62	122
08:30 AM	0	0	0	0	1	0	1	2	2	37	0	39	0	64	1	65	106
08:45 AM	0	0	0	0	1	0	0	1	1	49	0	50	0	47	1	48	99
Total	0	0	0	0	4	0	3	7	4	216	0	220	0	248	5	253	480
*** BREAK ***																	
04:00 PM	0	0	0	0	2	0	1	3	2	140	0	142	0	83	1	84	229
04:15 PM	0	0	0	0	1	0	2	3	1	133	0	134	0	75	3	78	215
04:30 PM	0	0	0	0	1	0	1	2	3	123	0	126	0	94	2	96	224
04:45 PM	0	0	0	0	1	0	1	2	2	110	0	112	0	70	1	71	185
Total	0	0	0	0	5	0	5	10	8	506	0	514	0	322	7	329	853
05:00 PM	0	0	0	0	2	0	2	4	1	104	0	105	0	82	2	84	193
05:15 PM	0	0	0	0	1	0	1	2	2	131	0	133	0	85	3	88	223
05:30 PM	0	0	0	0	2	0	1	3	3	119	0	122	0	103	1	104	229
05:45 PM	0	0	0	0	1	0	1	2	1	121	0	122	0	90	1	91	215
Total	0	0	0	0	6	0	5	11	7	475	0	482	0	360	7	367	860
Grand Total	0	0	0	0	17	0	16	33	22	1414	0	1436	0	1232	22	1254	2723
Apprch %	0	0	0		51.5	0	48.5		1.5	98.5	0		0	98.2	1.8		
Total %	0	0	0	0	0.6	0	0.6	1.2	0.8	51.9	0	52.7	0	45.2	0.8	46.1	

A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Custer Ave @ Eastern Drwy
7-9 am | 4-6 pm

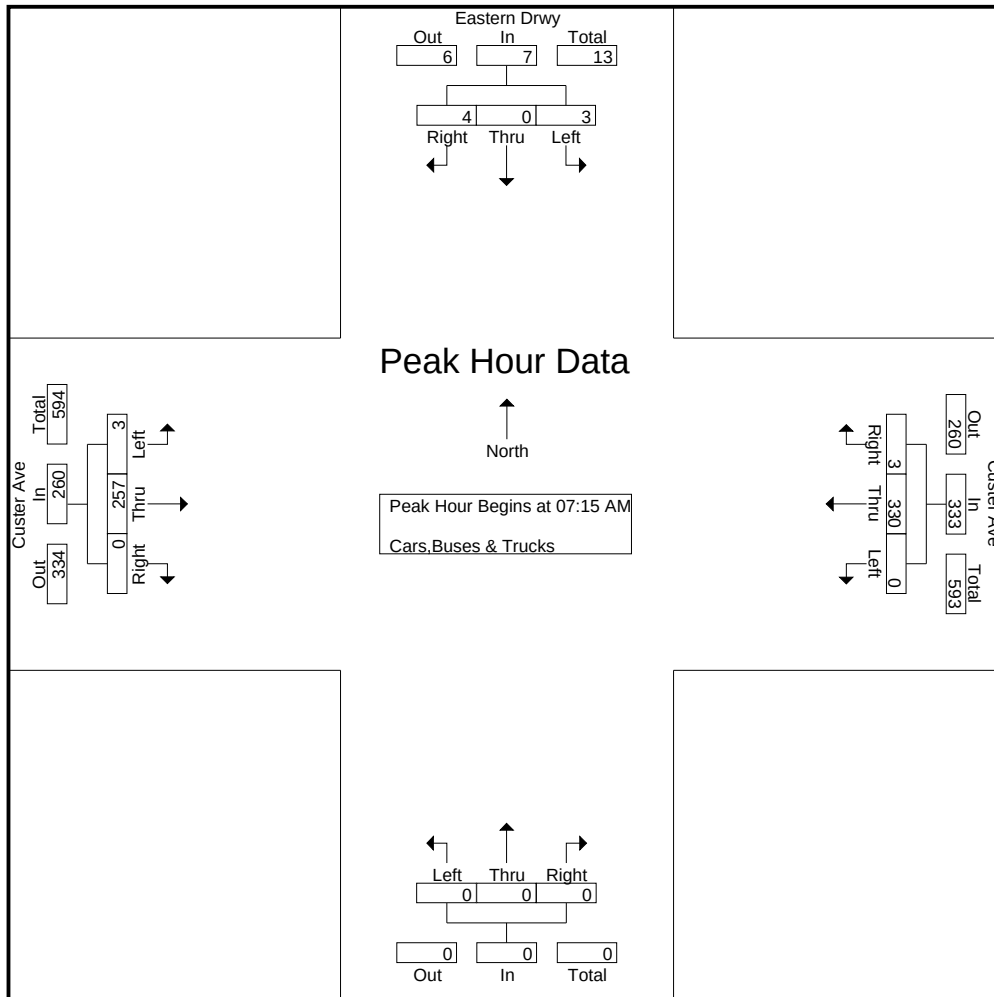
File Name : 20220136

Site Code : 20220136

Start Date : 3/31/2022

Page No : 2

	Northbound				Eastern Drwy Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	1	0	2	3	1	52	0	53	0	80	1	81	137
07:30 AM	0	0	0	0	1	0	0	1	1	61	0	62	0	90	1	91	154
07:45 AM	0	0	0	0	0	0	1	1	0	72	0	72	0	83	0	83	156
08:00 AM	0	0	0	0	1	0	1	2	1	72	0	73	0	77	1	78	153
Total Volume	0	0	0	0	3	0	4	7	3	257	0	260	0	330	3	333	600
% App. Total	0	0	0		42.9	0	57.1		1.2	98.8	0		0	99.1	0.9		
PHF	.000	.000	.000	.000	.750	.000	.500	.583	.750	.892	.000	.890	.000	.917	.750	.915	.962



A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA

Custer Ave @ Eastern Drwy

7-9 am | 4-6 pm

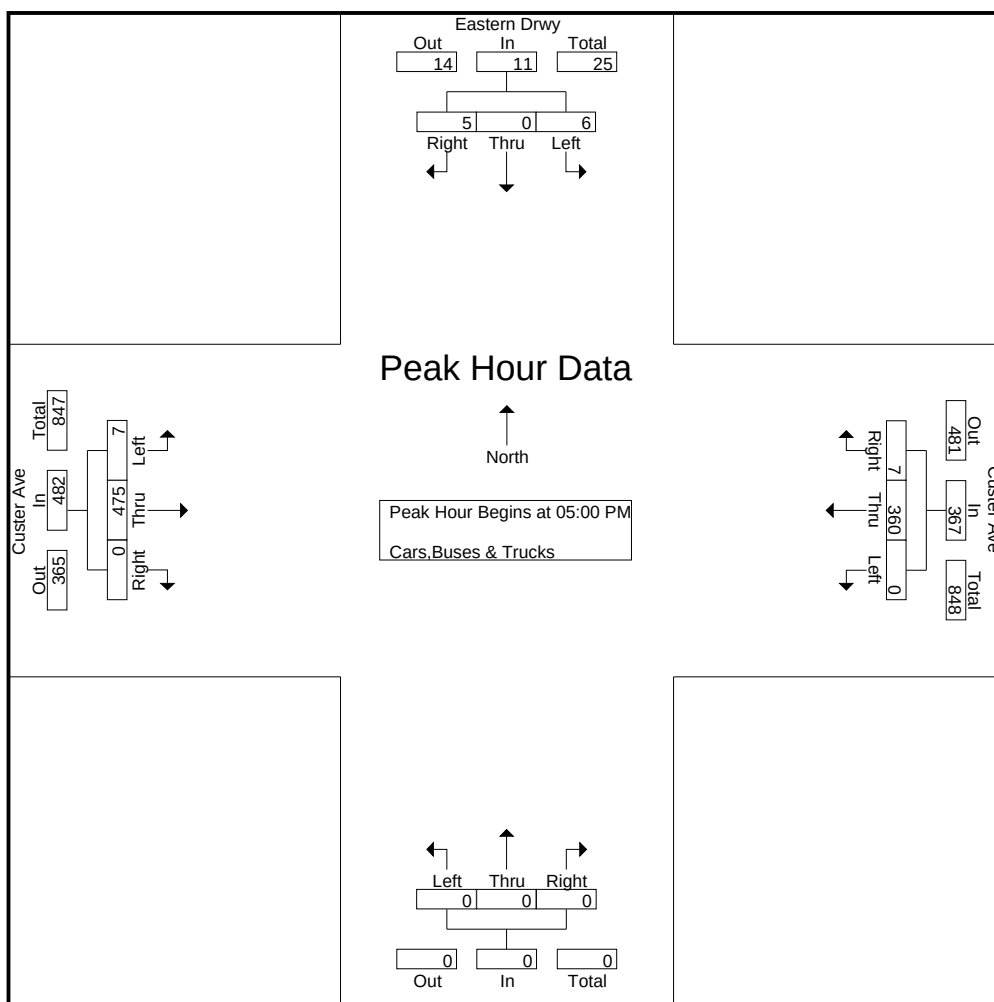
File Name : 20220136

Site Code : 20220136

Start Date : 3/31/2022

Page No : 3

	Northbound				Eastern Drwy Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	2	0	2	4	1	104	0	105	0	82	2	84	193
05:15 PM	0	0	0	0	1	0	1	2	2	131	0	133	0	85	3	88	223
05:30 PM	0	0	0	0	2	0	1	3	3	119	0	122	0	103	1	104	229
05:45 PM	0	0	0	0	1	0	1	2	1	121	0	122	0	90	1	91	215
Total Volume	0	0	0	0	6	0	5	11	7	475	0	482	0	360	7	367	860
% App. Total	0	0	0		54.5	0	45.5		1.5	98.5	0		0	98.1	1.9		
PHF	.000	.000	.000	.000	.750	.000	.625	.688	.583	.906	.000	.906	.000	.874	.583	.882	.939



A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC DATA
Custer Ave @ Central Drwy
7-9 am | 4-6 pm

File Name : 20220135
Site Code : 20220135
Start Date : 3/31/2022
Page No : 1

Groups Printed- Cars,Buses & Trucks

	Northbound				Central Drwy Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	1	31	0	32	0	50	0	50	82
07:15 AM	0	0	0	0	0	0	1	1	0	53	0	53	0	80	1	81	135
07:30 AM	0	0	0	0	1	0	0	1	1	61	0	62	0	91	1	92	155
07:45 AM	0	0	0	0	0	0	1	1	0	72	0	72	0	82	0	82	155
Total	0	0	0	0	1	0	2	3	2	217	0	219	0	303	2	305	527
08:00 AM	0	0	0	0	1	0	0	1	1	72	0	73	0	78	0	78	152
08:15 AM	0	0	0	0	0	0	1	1	0	59	0	59	0	61	0	61	121
08:30 AM	0	0	0	0	1	0	1	2	2	36	0	38	0	64	1	65	105
08:45 AM	0	0	0	0	1	0	0	1	0	50	0	50	0	48	1	49	100
Total	0	0	0	0	3	0	2	5	3	217	0	220	0	251	2	253	478
*** BREAK ***																	
04:00 PM	0	0	0	0	0	0	1	1	2	140	0	142	0	83	1	84	227
04:15 PM	0	0	0	0	1	0	2	3	1	133	0	134	0	76	0	76	213
04:30 PM	0	0	0	0	1	0	2	3	1	123	0	124	0	94	1	95	222
04:45 PM	0	0	0	0	1	0	1	2	2	109	0	111	0	70	1	71	184
Total	0	0	0	0	3	0	6	9	6	505	0	511	0	323	3	326	846
05:00 PM	0	0	0	0	2	0	2	4	1	105	0	106	0	82	2	84	194
05:15 PM	0	0	0	0	1	0	1	2	2	130	0	132	0	87	0	87	221
05:30 PM	0	0	0	0	0	0	2	2	1	120	0	121	0	102	1	103	226
05:45 PM	0	0	0	0	1	0	1	2	1	121	0	122	0	90	1	91	215
Total	0	0	0	0	4	0	6	10	5	476	0	481	0	361	4	365	856
Grand Total	0	0	0	0	11	0	16	27	16	1415	0	1431	0	1238	11	1249	2707
Apprch %	0	0	0		40.7	0	59.3		1.1	98.9	0		0	99.1	0.9		
Total %	0	0	0	0	0.4	0	0.6	1	0.6	52.3	0	52.9	0	45.7	0.4	46.1	

A & R Engineering, Inc.

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Marietta, GA 30067

TMC DATA

Custer Ave @ Central Drwy

7-9 am | 4-6 pm

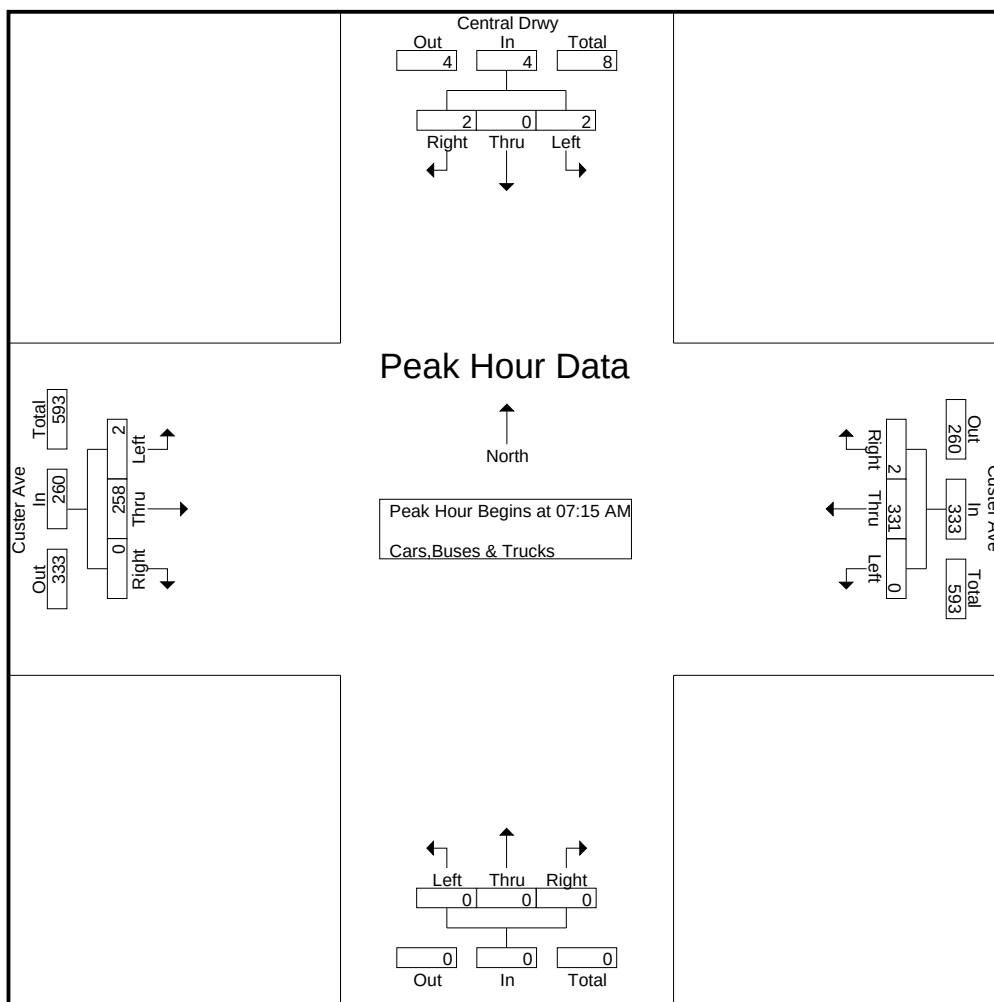
File Name : 20220135

Site Code : 20220135

Start Date : 3/31/2022

Page No : 2

	Northbound				Central Drwy Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	0	1	1	0	53	0	53	0	80	1	81	135
07:30 AM	0	0	0	0	1	0	0	1	1	61	0	62	0	91	1	92	155
07:45 AM	0	0	0	0	0	0	1	1	0	72	0	72	0	82	0	82	155
08:00 AM	0	0	0	0	1	0	0	1	1	72	0	73	0	78	0	78	152
Total Volume	0	0	0	0	2	0	2	4	2	258	0	260	0	331	2	333	597
% App. Total	0	0	0	0	50	0	50	50	0.8	99.2	0	99.2	0	99.4	0.6	99.4	99.4
PHF	.000	.000	.000	.000	.500	.000	.500	1.00	.500	.896	.000	.890	.000	.909	.500	.905	.963



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TMC DATA

Custer Ave @ Central Drwy

7-9 am | 4-6 pm

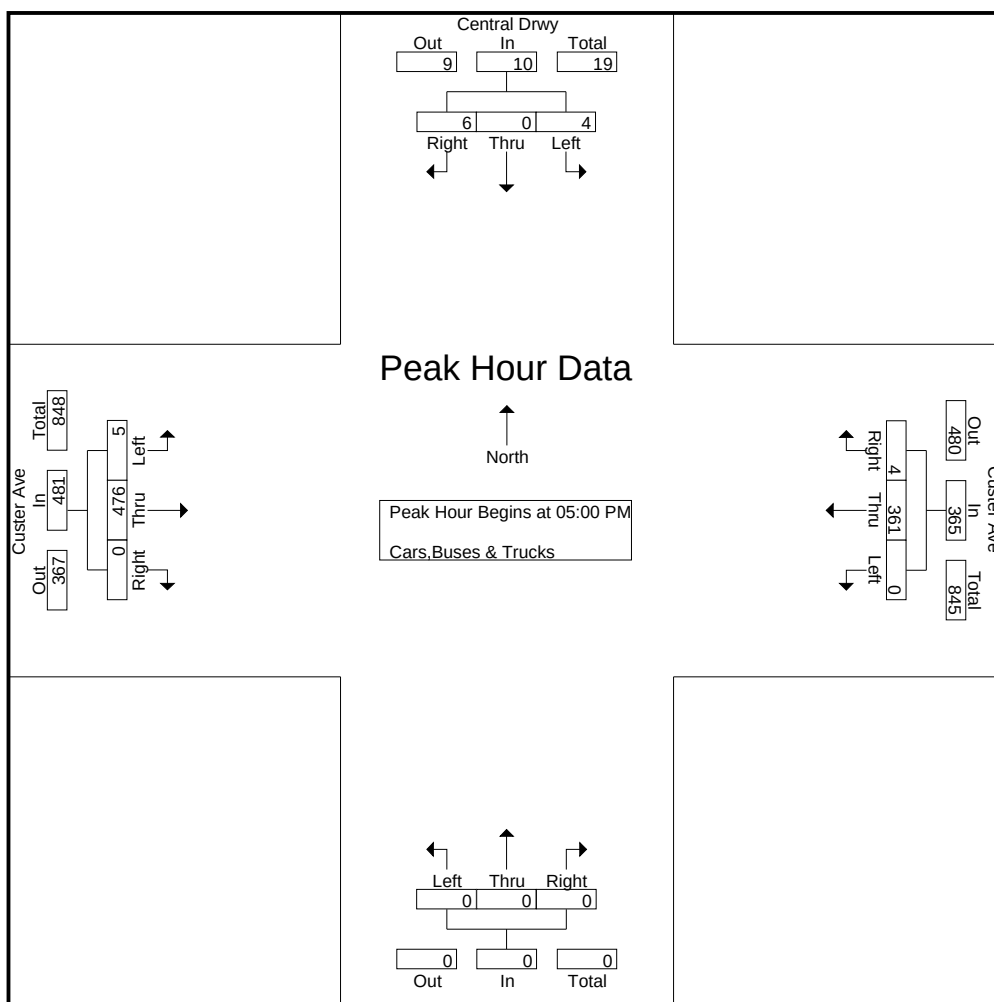
File Name : 20220135

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Start Date : 3/31/2022

Page No : 3

	Northbound				Central Drwy Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	2	0	2	4	1	105	0	106	0	82	2	84	194
05:15 PM	0	0	0	0	1	0	1	2	2	130	0	132	0	87	0	87	221
05:30 PM	0	0	0	0	0	0	2	2	1	120	0	121	0	102	1	103	226
05:45 PM	0	0	0	0	1	0	1	2	1	121	0	122	0	90	1	91	215
Total Volume	0	0	0	0	4	0	6	10	5	476	0	481	0	361	4	365	856
% App. Total	0	0	0		40	0	60		1	99	0		0	98.9	1.1		
PHF	.000	.000	.000	.000	.500	.000	.750	.625	.625	.915	.000	.911	.000	.885	.500	.886	.947



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TMC DATA

Custer Ave @ Western Drwy
7-9 am | 4-6 pm

File Name : 20220137

Site Code : 20220137

Start Date : 3/31/2022

Page No : 1

Groups Printed- Cars,Buses & Trucks

	Northbound				Western Drwy Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	3	0	3	6	2	29	0	31	0	47	3	50	87
07:15 AM	0	0	0	0	2	0	3	5	3	50	0	53	0	78	2	80	138
07:30 AM	0	0	0	0	4	0	4	8	2	60	0	62	0	88	4	92	162
07:45 AM	0	0	0	0	2	0	3	5	4	68	0	72	0	79	5	84	161
Total	0	0	0	0	11	0	13	24	11	207	0	218	0	292	14	306	548
08:00 AM	0	0	0	0	5	0	3	8	5	68	0	73	0	75	3	78	159
08:15 AM	0	0	0	0	3	0	3	6	4	55	0	59	0	58	4	62	127
08:30 AM	0	0	0	0	4	0	4	8	3	34	0	37	0	61	3	64	109
08:45 AM	0	0	0	0	4	0	3	7	4	47	0	51	0	46	4	50	108
Total	0	0	0	0	16	0	13	29	16	204	0	220	0	240	14	254	503
*** BREAK ***																	
04:00 PM	0	0	0	0	4	0	3	7	3	137	0	140	0	81	3	84	231
04:15 PM	0	0	0	0	3	0	2	5	4	130	0	134	0	74	4	78	217
04:30 PM	0	0	0	0	4	0	4	8	4	120	0	124	0	91	2	93	225
04:45 PM	0	0	0	0	4	0	4	8	5	105	0	110	0	67	4	71	189
Total	0	0	0	0	15	0	13	28	16	492	0	508	0	313	13	326	862
05:00 PM	0	0	0	0	5	0	5	10	5	102	0	107	0	79	3	82	199
05:15 PM	0	0	0	0	5	0	3	8	3	128	0	131	0	84	2	86	225
05:30 PM	0	0	0	0	4	0	4	8	4	116	0	120	0	99	4	103	231
05:45 PM	0	0	0	0	3	0	2	5	4	118	0	122	0	89	3	92	219
Total	0	0	0	0	17	0	14	31	16	464	0	480	0	351	12	363	874
Grand Total	0	0	0	0	59	0	53	112	59	1367	0	1426	0	1196	53	1249	2787
Apprch %	0	0	0		52.7	0	47.3		4.1	95.9	0		0	95.8	4.2		
Total %	0	0	0	0	2.1	0	1.9	4	2.1	49	0	51.2	0	42.9	1.9	44.8	

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TMC DATA

Custer Ave @ Western Drwy

7-9 am | 4-6 pm

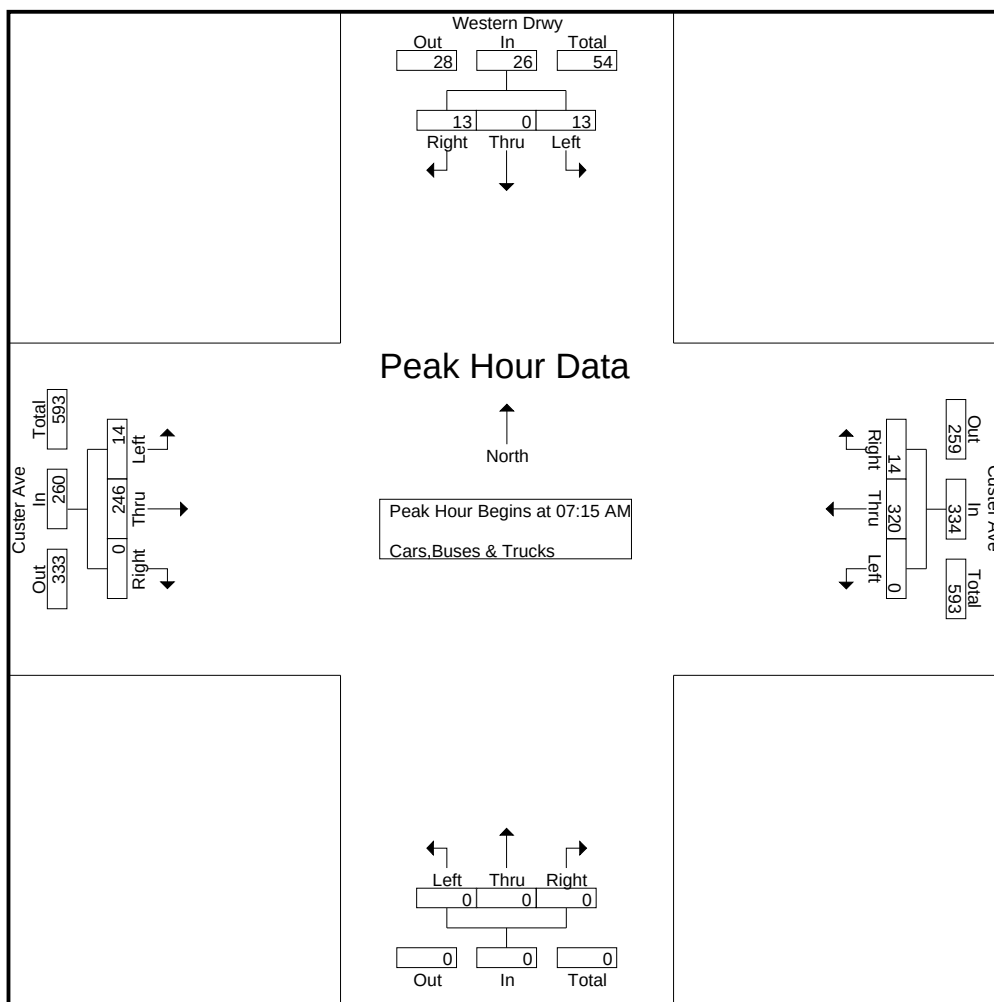
File Name : 20220137

Site Code : 20220137

Start Date : 3/31/2022

Page No : 2

	Northbound				Western Drwy Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	2	0	3	5	3	50	0	53	0	78	2	80	138
07:30 AM	0	0	0	0	4	0	4	8	2	60	0	62	0	88	4	92	162
07:45 AM	0	0	0	0	2	0	3	5	4	68	0	72	0	79	5	84	161
08:00 AM	0	0	0	0	5	0	3	8	5	68	0	73	0	75	3	78	159
Total Volume	0	0	0	0	13	0	13	26	14	246	0	260	0	320	14	334	620
% App. Total	0	0	0	0	50	0	50	50	5.4	94.6	0	50	0	95.8	4.2	50	50
PHF	.000	.000	.000	.000	.650	.000	.813	.813	.700	.904	.000	.890	.000	.909	.700	.908	.957



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TMC DATA

Custer Ave @ Western Drwy
7-9 am | 4-6 pm

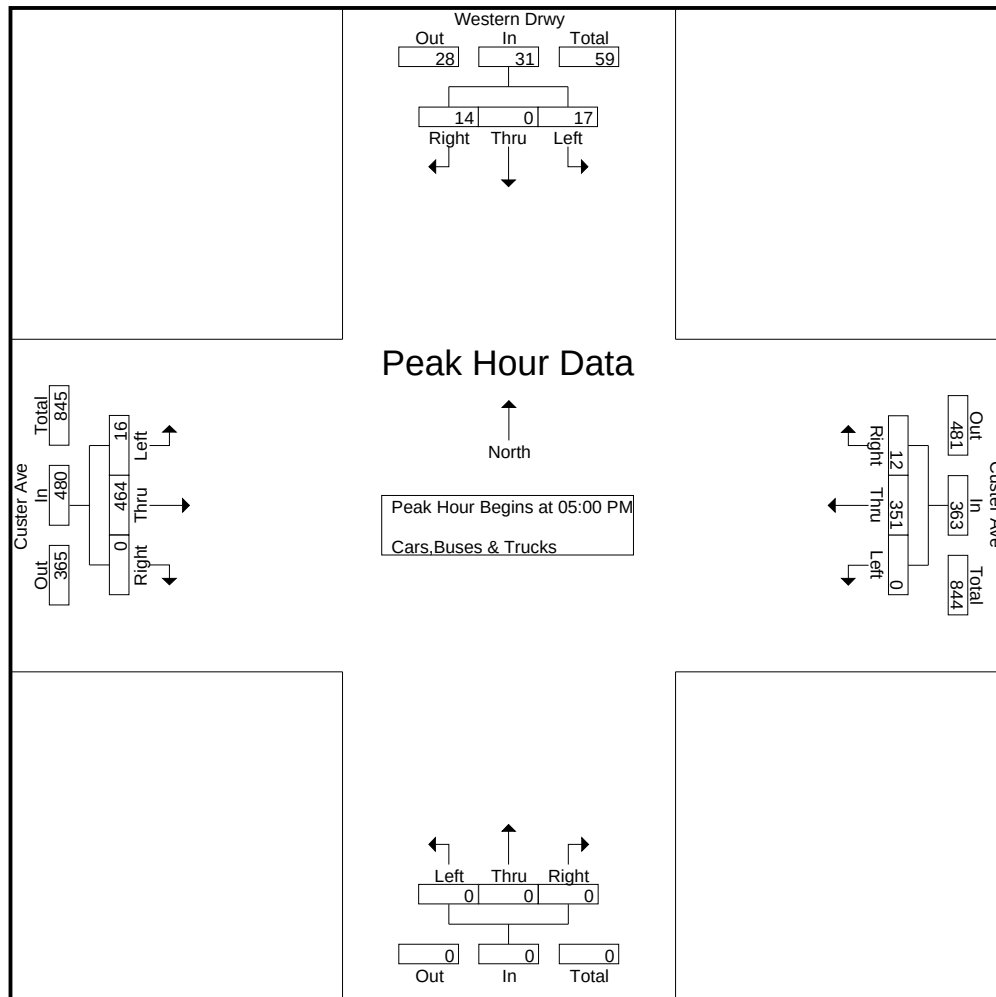
File Name : 20220137

Site Code : 20220137

Start Date : 3/31/2022

Page No : 3

	Northbound				Western Drwy Southbound				Custer Ave Eastbound				Custer Ave Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	5	0	5	10	5	102	0	107	0	79	3	82	199
05:15 PM	0	0	0	0	5	0	3	8	3	128	0	131	0	84	2	86	225
05:30 PM	0	0	0	0	4	0	4	8	4	116	0	120	0	99	4	103	231
05:45 PM	0	0	0	0	3	0	2	5	4	118	0	122	0	89	3	92	219
Total Volume	0	0	0	0	17	0	14	31	16	464	0	480	0	351	12	363	874
% App. Total	0	0	0		54.8	0	45.2		3.3	96.7	0		0	96.7	3.3		
PHF	.000	.000	.000	.000	.850	.000	.700	.775	.800	.906	.000	.916	.000	.886	.750	.881	.946



GRTA Letter of Understanding



LETTER OF UNDERSTANDING

April 12, 2022

Kevin Norton
EAH Acquisitions, LP
5775 Glenridge Drive, Building D
Suite 350

RE: **Moreland and Custer (DRI#: 3586)**

Dear Kevin Norton:

The purpose of this Letter of Understanding is to document the discussions during the Methodology Meeting held virtually on April 4, 2022, regarding **Moreland and Custer (DRI#: 3586)** Development of Regional Impact (DRI). The *GRTA DRI Review Procedures*, as well as the inputs and parameters documented in this Letter of Understanding and the revised Methodology Meeting Packet, shall be adhered to in preparing the GRTA required Transportation Study.

PROJECT OVERVIEW

- The proposed site is located a located to the southeast of the intersection of Moreland Avenue (SR 23) and Custer Avenue.
- The proposed development includes 273 townhouse units, 408 multi-housing units and 12,000 sf of retail space.
- The projected build-out is one phase to be completed by 2024.
- The proposed development includes two full site accesses and one right-in right-out site access on Custer Avenue and one right in/right out site access on Moreland Avenue.
- The DRI trigger for this development is a Permit and SAP Submittal.
- The vehicular trip generation is estimated to be 4,204 net daily trips based on the *ITE Trip Generation Manual 11th edition*.
- The applicant is applying for approval under GRTA's non-expedited Traffic Impact Study review process.

STUDY NETWORK

1. Moreland Avenue and Custer Avenue
2. Eastland Road and Moreland Avenue
3. Bouldercrest Road SE and Eastland Road
4. McDonough Boulevard and Moreland Avenue

METHODOLOGY MEETING PACKET INPUTS & PARAMETERS

- The Site Plan shall meet all the applicable requirements in Section 7.1 of the *GRTA DRI Review Procedures*.
- All Study Network intersections shall be analyzed during the AM and PM peak hours for (1) existing conditions, (2) future “no-build” conditions, and (3) future “build” conditions as specified in the *GRTA DRI Review Procedures*.
- This DRI shall be modeled and reviewed in one phase to be completed by 2024.
- The Level of Service (LOS) standard for all analysis shall be LOS D unless specified otherwise in Section 3.2.2.1. For example, a LOS E standard is allowed if the existing LOS for the intersection or approach is a LOS F.
- Default values should not be assumed in the traffic modeling. Existing conditions shall be taken into account as required in Section 3.2.2.
- The trip generation calculations in the revised Methodology Meeting Packet shall be used in the Transportation Study. Mixed-use and alternative mode reductions are allowed for this site. Pass-by reductions shall not exceed 15% of a roadway’s traffic volume standard established in Appendix 7.2.
- The trip assignment approach in the revised Methodology Meeting Packet shall be utilized for all Study Network intersection movements.
- The applicant shall research TIP, STIP, RTP and GDOT’s construction work program, as well as any local government and transit operator plans (SPLOST, CIP, etc.), to determine the open date, sponsor, cost of the project, funding source(s), for future roadway projects in the project vicinity. Programmed transportation projects anticipated to open on or before the Build Out year of the DRI Project shall be modeled as completed in the No-Build and Build conditions unless approved otherwise.
- A 1.0% annual traffic Background Growth Rate shall be used for all roadways.
- Capacity analysis shall be based on turning movement counts collected not more than 12-months prior to the date of the actual DRI submittal to GRTA, unless specified otherwise. As specified in Section 2.3, turning movement counts shall be collected while local schools are in session, on a Tuesday, Wednesday or Thursday (unless approved otherwise) and not during holiday periods (weeks of July 4th, Thanksgiving and +/- 5 days of Christmas).
- COVID-19: The transportation analysis shall utilize existing turning movement count data when available during COVID. All counts older than a year shall be grown by the Background Growth Rate unless approved otherwise. If new counts are required, a control count location where existing count data is available shall be used for developing traffic growth extrapolation rates. The traffic engineer shall submit the proposed growth rates to GRTA, GDOT and local government stakeholders for input and GRTA approval before submitting the Transportation Study.
- If the *GRTA DRI Review Procedures* requires an Enhanced Focus Area for Heavy Vehicles or an Enhanced Focus Area for Dense Urban Environments, the Transportation Study shall incorporate the inputs and parameters agreed to at the Methodology Meeting and documented in the revised Methodology Meeting Packet. These inputs may include a Heavy Vehicle modeling percentages, a Heavy Vehicle route map, a pedestrian crosswalk delay adjustment and a bus blockage adjustment factor.

ADDITIONAL REQUIREMENTS

All applicable requirements of the *GRTA DRI Review Procedures* must be met for the Transportation Study to be considered complete. The *GRTA DRI Review Procedures* are located on GRTA's DRI website: <https://www.srta.ga.gov/programs-projects/dev-of-regional-impact/> Contact GRTA staff if you have any questions on these requirements.

The Transportation Study shall also include as attachments the native LOS modeling file (i.e., Synchro modeling files) as well as the modeling reports (PDFs) for all Study Network intersections for the Existing, No-Build and Build conditions for all phases. The PDF reports shall be numbered (in page headers) and organized in order according to the Study Network numbering sequence in this Letter of Understanding. The reports shall also be organized in the following sequence: *Existing condition AM, Existing condition PM, No-build condition AM, No-Build condition PM, Build condition AM, Build condition PM*. If improvements are modeled, those PDFs shall be labeled as such and follow the appropriate condition's applicable peak period.

The Transportation Study appendices shall also include all turning movement count data, regardless of if using historic data or newly collected turning movement counts.

When documenting any Queue Length impacts required in Section 3.2.3.6, the TIS Executive Summary shall also note any individual *movements* not meeting the LOS standard where the DRI Project adds trips in the Build condition and exceeds available storage capacity for that movement.

When identifying mitigations in the existing, no-build and build conditions, the mitigations identified in preceding conditions shall not be modeled as complete when conducting the LOS analysis. The same mitigation may still be proposed as mitigation in the subsequent condition but it shall not be included as completed in the default analysis. For example, a turn lane may be identified as a needed improvement in the no-build condition. The turn lane should not be modeled as completed in the build condition. The turn lane should only be modeled as complete in the no-build with improvements condition and the build with improvements condition.

DRI REVIEW PACKAGE SUBMITTAL

GRTA will begin reviewing the DRI once the DRI Review Package is submitted and deemed complete. The DRI Review Package includes: the permitting Local Government inputting both Department of Community Affairs (DCA) forms into the DCA DRI website; and the **Traffic Engineer submittal of the GRTA Transportation Study (including LOS appendices, traffic count data and any other required attachments) and Site Plan to GRTA staff and ALL stakeholders included in the CC list of this Letter of Understanding.**

All DRI Review Packages shall be submitted electronically via email to all stakeholders in the CC list of the Letter of Understanding. If the DRI Review Package total file size is greater than 10 MB, the DRI Review Package shall be submitted via email with a FTP link provided for downloading the files.

Please contact me if you have any questions about the Letter of Understanding or the *GRTA DRI Review Procedures*.

Sincerely,

Elizabeth Davis
Senior Transit and Transportation Planner

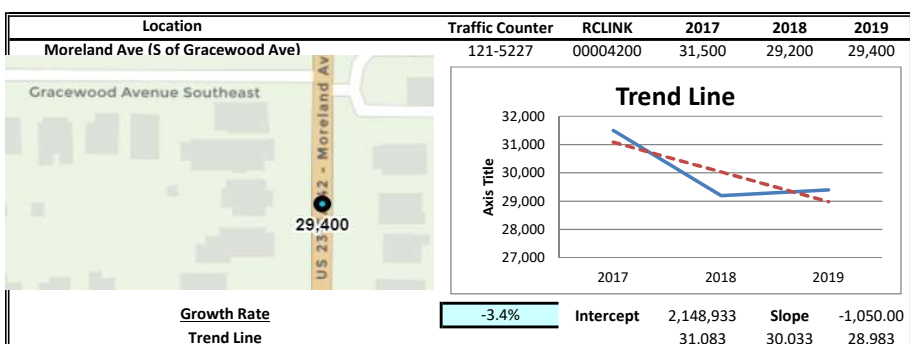
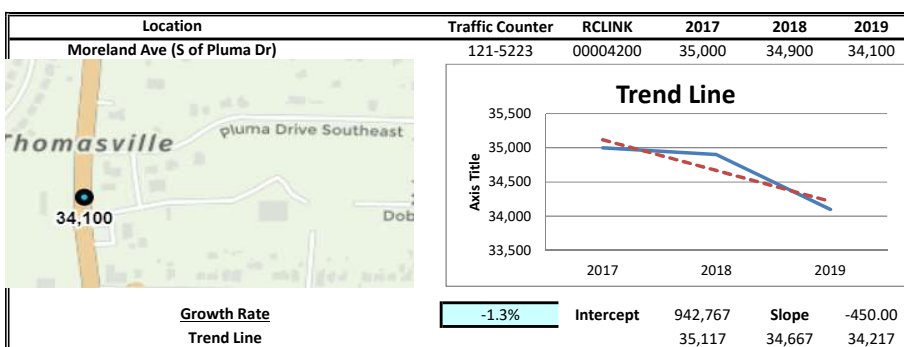
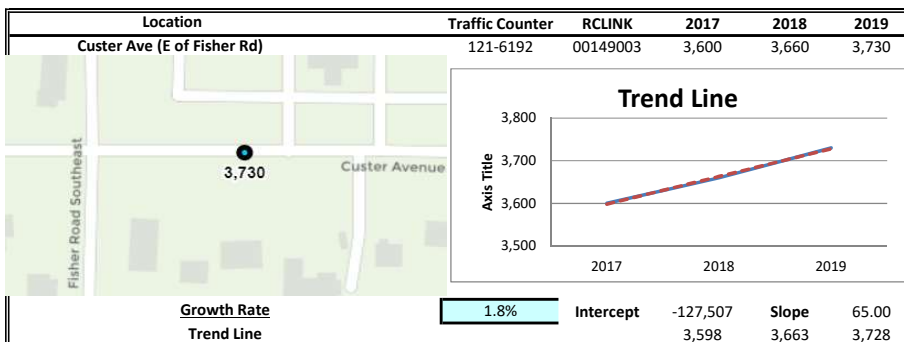
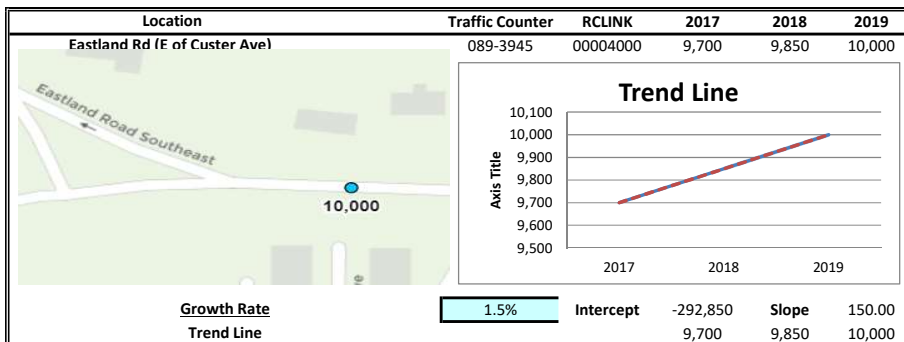
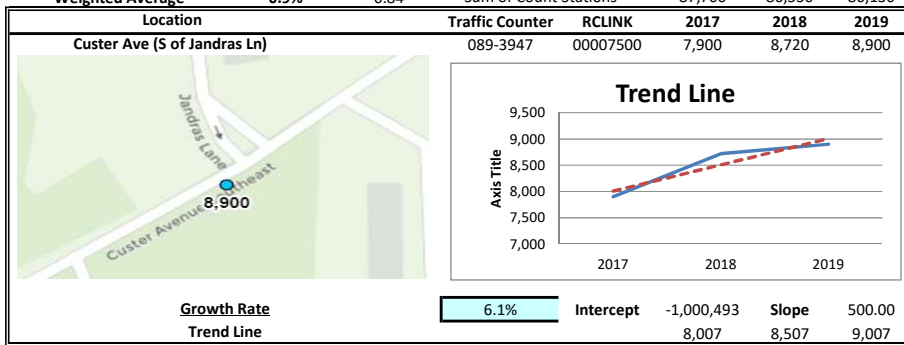
Cc:

Aries Little, ARC
Donald Shockey, ARC
December Weir, ATL/GRTA
Christopher Rome, Atlanta Beltline
Betty Smoot-Madison, City of Atlanta
Keyetta Holmes, City of Atlanta
Nursef Kadir, City of Atlanta
Monique B. Forte, City of Atlanta
Andrew Baker, Dekalb County
Patrece Keeter, Dekalb County
Sylvia Smith, Dekalb County
Joshua Higgins, GDOT
Corentin Auguin, MARTA
Jospeh Longo, MARTA
Natavis Harris, MARTA
Rosa Charles, MARTA

Abdul Amer, A&R Engineering
Kevin Norton, Empire Communities
Mark A. Tai, Stream Realty
Justin Adams, TCR
Garrett Wright, TCR
Walt Keller, TCR

Linear Regression of Daily Traffic

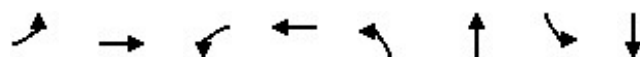
Location	Growth Rate	R Squared	Station ID	Route	2017	2018	2019
Custer Ave (S of Jandras Ln)	6.1%	0.88	089-3947	00007500	7,900	8,720	8,900
Eastland Rd (E of Custer Ave)	1.5%	1.00	089-3945	00004000	9,700	9,850	10,000
Custer Ave (E of Fisher Rd)	1.8%	1.00	121-6192	00149003	3,600	3,660	3,730
Moreland Ave (S of Pluma Dr)	-1.3%	0.83	121-5223	00004200	35,000	34,900	34,100
Moreland Ave (S of Gracewood)	-3.4%	0.68	121-5227	00004200	31,500	29,200	29,400
Weighted Average	-0.9%	0.84	Sum of Count Stations =		87,700	86,330	86,130



Existing Intersection Analysis

Timings
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

1a. Existing AM
04/26/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔		↔		↔		↔
Traffic Volume (vph)	1	0	4	2	10	1103	22	720
Future Volume (vph)	1	0	4	2	10	1103	22	720
Lane Group Flow (vph)	0	1	0	86	0	1247	0	832
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	23.5	23.5	26.5	26.5	24.5	24.5	23.5	23.5
Total Split (s)	30.0	30.0	30.0	30.0	90.0	90.0	90.0	90.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.01		0.49		0.44		0.31
Control Delay		51.0		23.1		2.6		2.1
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		51.0		23.1		2.6		2.1
Queue Length 50th (ft)		1		5		81		45
Queue Length 95th (ft)		7		55		143		83
Internal Link Dist (ft)		200		797		863		721
Turn Bay Length (ft)								
Base Capacity (vph)		254		396		2847		2662
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.00		0.22		0.44		0.31

Intersection Summary

Cycle Length: 120

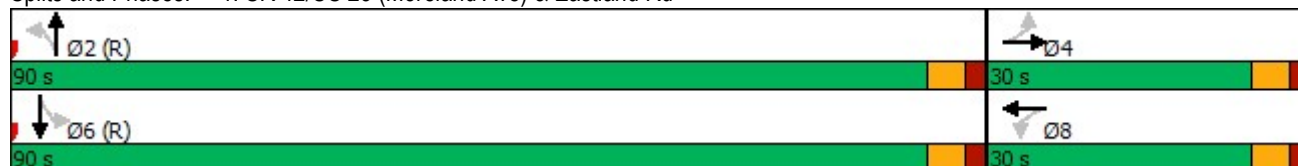
Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 1: SR 42/US 23 (Moreland Ave) & Eastland Rd



HCM 6th Signalized Intersection Summary
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

1a. Existing AM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	0	4	2	72	10	1103	9	22	720	7
Future Volume (veh/h)	1	0	0	4	2	72	10	1103	9	22	720	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1826	1900	1826	1826	1900
Adj Flow Rate, veh/h	1	0	0	4	2	80	11	1226	10	24	800	8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	5	0	5	5	0
Cap, veh/h	139	0	0	34	5	102	40	2878	23	84	2683	27
Arrive On Green	0.07	0.00	0.00	0.07	0.07	0.07	0.84	0.84	0.84	0.84	0.84	0.84
Sat Flow, veh/h	1162	0	0	34	78	1505	11	3424	28	62	3192	32
Grp Volume(v), veh/h	1	0	0	86	0	0	651	0	596	413	0	419
Grp Sat Flow(s),veh/h/ln	1162	0	0	1618	0	0	1806	0	1657	1630	0	1656
Q Serve(g_s), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	10.8	0.0	0.0	6.5
Cycle Q Clear(g_c), s	0.1	0.0	0.0	6.3	0.0	0.0	10.6	0.0	10.8	5.6	0.0	6.5
Prop In Lane	1.00		0.00	0.05		0.93	0.02		0.02	0.06		0.02
Lane Grp Cap(c), veh/h	139	0	0	141	0	0	1549	0	1393	1402	0	1392
V/C Ratio(X)	0.01	0.00	0.00	0.61	0.00	0.00	0.42	0.00	0.43	0.29	0.00	0.30
Avail Cap(c_a), veh/h	321	0	0	360	0	0	1549	0	1393	1402	0	1392
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	52.2	0.0	0.0	55.1	0.0	0.0	2.4	0.0	2.4	2.0	0.0	2.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	4.2	0.0	0.0	0.8	0.0	1.0	0.5	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	2.7	0.0	0.0	2.1	0.0	2.0	1.2	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.2	0.0	0.0	59.3	0.0	0.0	3.2	0.0	3.3	2.5	0.0	2.6
LnGrp LOS	D	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h	1			86			1247			832		
Approach Delay, s/veh	52.2			59.3			3.3			2.6		
Approach LOS	D			E			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	106.4			13.6			106.4			13.6		
Change Period (Y+Rc), s	5.5			5.5			5.5			5.5		
Max Green Setting (Gmax), s	84.5			24.5			84.5			24.5		
Max Q Clear Time (g_c+l1), s	12.8			2.1			8.5			8.3		
Green Ext Time (p_c), s	25.9			0.0			13.6			0.3		
Intersection Summary												
HCM 6th Ctrl Delay	5.2											
HCM 6th LOS	A											

Timings
2: SR 42/US 23 (Moreland Ave) & Custer Ave

1a. Existing AM
04/26/2022

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	142	149	141	105	197	198	921	18	614
Future Volume (vph)	142	149	141	105	197	198	921	18	614
Lane Group Flow (vph)	151	159	150	112	262	211	1059	19	753
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	5.0	15.0	5.0	15.0
Minimum Split (s)	15.0	35.5	35.5	15.0	34.5	15.0	31.5	15.0	41.5
Total Split (s)	19.0	46.0	46.0	15.0	42.0	28.0	74.0	15.0	61.0
Total Split (%)	12.7%	30.7%	30.7%	10.0%	28.0%	18.7%	49.3%	10.0%	40.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.65	0.43	0.34	0.37	0.81	0.51	0.54	0.07	0.45
Control Delay	52.2	54.5	8.5	41.7	75.8	16.5	22.2	14.1	26.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	54.5	8.5	41.7	75.8	16.5	22.2	14.1	26.7
Queue Length 50th (ft)	113	137	0	82	242	90	361	7	242
Queue Length 95th (ft)	162	196	57	123	325	153	486	21	357
Internal Link Dist (ft)		668			266		3965		408
Turn Bay Length (ft)			250			180		185	
Base Capacity (vph)	238	498	532	306	441	489	1964	304	1683
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.32	0.28	0.37	0.59	0.43	0.54	0.06	0.45

Intersection Summary

Cycle Length: 150

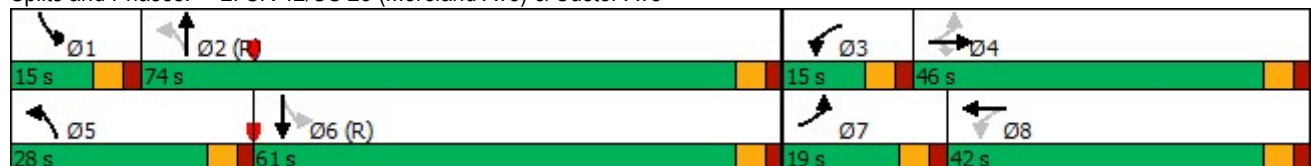
Actuated Cycle Length: 150

Offset: 12 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Splits and Phases: 2: SR 42/US 23 (Moreland Ave) & Custer Ave



HCM 6th Signalized Intersection Summary 2: SR 42/US 23 (Moreland Ave) & Custer Ave

1a. Existing AM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	149	141	105	197	49	198	921	74	18	614	94
Future Volume (veh/h)	142	149	141	105	197	49	198	921	74	18	614	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	151	159	0	112	210	0	211	980	79	19	653	100
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	5	5	5
Cap, veh/h	224	286		251	243		474	2009	162	315	1723	264
Arrive On Green	0.09	0.15	0.00	0.06	0.13	0.00	0.06	0.62	0.62	0.02	0.57	0.57
Sat Flow, veh/h	1767	1856	1572	1767	1856	0	1739	3251	262	1739	3016	461
Grp Volume(v), veh/h	151	159	0	112	210	0	211	523	536	19	375	378
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1767	1856	0	1739	1735	1779	1739	1735	1743
Q Serve(g_s), s	11.0	11.9	0.0	8.2	16.6	0.0	7.3	24.7	24.7	0.7	17.7	17.8
Cycle Q Clear(g_c), s	11.0	11.9	0.0	8.2	16.6	0.0	7.3	24.7	24.7	0.7	17.7	17.8
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.15	1.00		0.26
Lane Grp Cap(c), veh/h	224	286		251	243		474	1072	1099	315	991	996
V/C Ratio(X)	0.67	0.56		0.45	0.86		0.44	0.49	0.49	0.06	0.38	0.38
Avail Cap(c_a), veh/h	230	501		251	452		623	1072	1099	394	991	996
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.92	0.92	0.92	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.3	58.7	0.0	52.3	63.9	0.0	12.4	15.7	15.7	13.9	17.6	17.6
Incr Delay (d2), s/veh	7.3	1.7	0.0	1.2	8.9	0.0	0.6	1.5	1.4	0.1	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	5.7	0.0	3.7	8.4	0.0	2.7	9.7	9.9	0.3	7.2	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	60.4	0.0	53.5	72.8	0.0	13.0	17.1	17.1	13.9	18.7	18.7
LnGrp LOS	E	E		D	E		B	B	B	B	B	B
Approach Vol, veh/h		310	A		322	A		1270			772	
Approach Delay, s/veh		59.5			66.1			16.4			18.6	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.2	98.2	15.0	28.6	15.2	91.2	18.5	25.1				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	68.5	9.5	40.5	22.5	55.5	13.5	36.5				
Max Q Clear Time (g_c+l1), s	2.7	26.7	10.2	13.9	9.3	19.8	13.0	18.6				
Green Ext Time (p_c), s	0.0	16.5	0.0	0.8	0.4	9.9	0.0	1.0				
Intersection Summary												
HCM 6th Ctrl Delay			28.0									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.												

Timings

3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

1a. Existing AM

04/26/2022



Lane Group	EBL	EBT	EBR	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations								
Traffic Volume (vph)	45	1	116	302	1209	749		
Future Volume (vph)	45	1	116	302	1209	749		
Lane Group Flow (vph)	23	24	118	308	1237	818		
Turn Type	Split	NA	Perm	pm+pt	NA	NA		
Protected Phases	4	4		5	2	6	1	8
Permitted Phases			4	2				
Detector Phase	4	4	4	5	2	6		
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	5.0	15.0	15.0	5.0	6.0
Minimum Split (s)	23.5	23.5	23.5	15.0	23.5	24.5	15.0	23.5
Total Split (s)	25.0	25.0	25.0	40.0	86.5	61.5	15.0	23.5
Total Split (%)	16.7%	16.7%	16.7%	26.7%	57.7%	41.0%	10%	16%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5		
Lead/Lag				Lead	Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	None
v/c Ratio	0.26	0.27	0.55	0.55	0.41	0.32		
Control Delay	75.2	75.5	16.3	5.4	2.3	2.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	75.2	75.5	16.3	5.4	2.3	2.2		
Queue Length 50th (ft)	23	24	0	33	88	18		
Queue Length 95th (ft)	56	57	45	57	126	29		
Internal Link Dist (ft)		792			1166	3965		
Turn Bay Length (ft)	255			135				
Base Capacity (vph)	220	221	330	722	3008	2573		
Starvation Cap Reductn	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.10	0.11	0.36	0.43	0.41	0.32		

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 113 (75%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Splits and Phases: 3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy



HCM 6th Signalized Intersection Summary

3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

1a. Existing AM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	1	116	0	0	0	302	1209	3	0	749	53
Future Volume (veh/h)	45	1	116	0	0	0	302	1209	3	0	749	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1900	1159	1900	1900	1752	1826	1900	1900	1826	1900
Adj Flow Rate, veh/h	47	0	0	0	0	0	308	1234	3	0	764	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	0	0	50	0	0	10	5	0	0	5	0
Cap, veh/h	123	0		0	1	0	625	3168	8	418	2799	
Arrive On Green	0.03	0.00	0.00	0.00	0.00	0.00	0.05	0.89	0.89	0.00	0.81	0.00
Sat Flow, veh/h	3591	0	1610	0	1900	0	1668	3550	9	1810	3561	0
Grp Volume(v), veh/h	47	0	0	0	0	0	308	603	634	0	764	0
Grp Sat Flow(s),veh/h/ln	1795	0	1610	0	1900	0	1668	1735	1824	1810	1735	0
Q Serve(g_s), s	1.9	0.0	0.0	0.0	0.0	0.0	4.4	8.6	8.6	0.0	8.2	0.0
Cycle Q Clear(g_c), s	1.9	0.0	0.0	0.0	0.0	0.0	4.4	8.6	8.6	0.0	8.2	0.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	123	0		0	1	0	625	1548	1628	418	2799	
V/C Ratio(X)	0.38	0.00		0.00	0.00	0.00	0.49	0.39	0.39	0.00	0.27	
Avail Cap(c_a), veh/h	467	0		0	228	0	927	1548	1628	531	2799	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.91	0.00
Uniform Delay (d), s/veh	70.9	0.0	0.0	0.0	0.0	0.0	2.2	1.3	1.3	0.0	3.6	0.0
Incr Delay (d2), s/veh	1.9	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.7	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.0	0.0	0.0	0.8	1.2	1.2	0.0	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.8	0.0	0.0	0.0	0.0	0.0	2.8	2.1	2.0	0.0	3.8	0.0
LnGrp LOS	E	A		A	A	A	A	A	A	A	A	
Approach Vol, veh/h		47	A		0			1545			764	A
Approach Delay, s/veh		72.8			0.0			2.2			3.8	
Approach LOS		E						A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	139.3		10.7	12.8	126.5		0.0				
Change Period (Y+Rc), s	5.5	5.5		5.5	5.5	5.5		5.5				
Max Green Setting (Gmax), s	9.5	81.0		19.5	34.5	56.0		18.0				
Max Q Clear Time (g_c+l1), s	0.0	10.6		3.9	6.4	10.2		0.0				
Green Ext Time (p_c), s	0.0	25.1		0.1	0.9	11.6		0.0				

Intersection Summary

HCM 6th Ctrl Delay 4.1
HCM 6th LOS A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Timings 4: Bouldercrest Rd & Eastland Rd

1a. Existing AM
04/26/2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	214	62	89	329	214	239
Future Volume (vph)	214	62	89	329	214	239
Lane Group Flow (vph)	252	73	0	492	252	281
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	7			2	6	
Permitted Phases		4	2			6
Detector Phase	7	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	15.0	23.5	23.5	23.5	29.5	29.5
Total Split (s)	42.0	42.0	48.0	48.0	48.0	48.0
Total Split (%)	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio	0.70	0.19		0.25	0.20	0.24
Control Delay	43.2	7.8		6.9	6.9	1.5
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	43.2	7.8		6.9	6.9	1.5
Queue Length 50th (ft)	134	0		51	47	0
Queue Length 95th (ft)	181	28		85	91	24
Internal Link Dist (ft)	2625			1177	369	
Turn Bay Length (ft)	90					
Base Capacity (vph)	717	685		1950	1255	1158
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.35	0.11		0.25	0.20	0.24

Intersection Summary

Cycle Length: 90

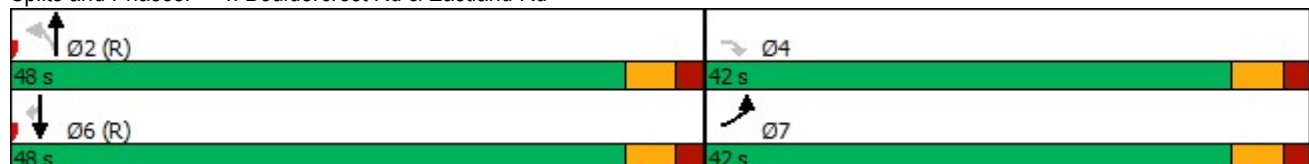
Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 4: Bouldercrest Rd & Eastland Rd



HCM 6th Signalized Intersection Summary 4: Bouldercrest Rd & Eastland Rd

1a. Existing AM
04/26/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	214	62	89	329	214	239
Future Volume (veh/h)	214	62	89	329	214	239
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	252	73	105	387	252	281
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	302	269	433	1629	1325	1123
Arrive On Green	0.17	0.17	0.71	0.71	0.71	0.71
Sat Flow, veh/h	1781	1585	529	2384	1870	1585
Grp Volume(v), veh/h	252	73	227	265	252	281
Grp Sat Flow(s),veh/h/ln	1781	1585	1212	1617	1870	1585
Q Serve(g_s), s	12.3	3.6	2.6	5.1	4.1	5.7
Cycle Q Clear(g_c), s	12.3	3.6	6.6	5.1	4.1	5.7
Prop In Lane	1.00	1.00	0.46			1.00
Lane Grp Cap(c), veh/h	302	269	917	1145	1325	1123
V/C Ratio(X)	0.84	0.27	0.25	0.23	0.19	0.25
Avail Cap(c_a), veh/h	722	643	917	1145	1325	1123
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.2	32.5	4.6	4.6	4.4	4.7
Incr Delay (d2), s/veh	6.0	0.5	0.6	0.5	0.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	1.4	1.2	1.5	1.3	9.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	42.2	33.1	5.3	5.1	4.7	5.2
LnGrp LOS	D	C	A	A	A	A
Approach Vol, veh/h	325			492	533	
Approach Delay, s/veh	40.1			5.2	5.0	
Approach LOS	D			A	A	
Timer - Assigned Phs	2		4		6	
Phs Duration (G+Y+Rc), s	69.3		20.7		69.3	
Change Period (Y+Rc), s	5.5		5.5		5.5	
Max Green Setting (Gmax), s	42.5		36.5		42.5	
Max Q Clear Time (g_c+l1), s	8.6		14.3		7.7	
Green Ext Time (p_c), s	6.7		0.9		5.7	
Intersection Summary						
HCM 6th Ctrl Delay			13.5			
HCM 6th LOS			B			

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	257	330	3	3	4
Future Vol, veh/h	3	257	330	3	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	268	344	3	3	4

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	347	0	0 620 346
Stage 1	-	-	- 346 -
Stage 2	-	-	- 274 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1212	-	- 452 697
Stage 1	-	-	- 716 -
Stage 2	-	-	- 772 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1212	-	- 451 697
Mov Cap-2 Maneuver	-	-	- 451 -
Stage 1	-	-	- 714 -
Stage 2	-	-	- 772 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1212	-	-	-	565
HCM Lane V/C Ratio	0.003	-	-	-	0.013
HCM Control Delay (s)	8	0	-	-	11.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	258	331	2	2	2
Future Vol, veh/h	2	258	331	2	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	269	345	2	2	2
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	347	0	-	0	619	346
Stage 1	-	-	-	-	346	-
Stage 2	-	-	-	-	273	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1212	-	-	-	452	697
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1212	-	-	-	451	697
Mov Cap-2 Maneuver	-	-	-	-	451	-
Stage 1	-	-	-	-	715	-
Stage 2	-	-	-	-	773	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		11.6		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1212	-	-	-	548	
HCM Lane V/C Ratio	0.002	-	-	-	0.008	
HCM Control Delay (s)	8	0	-	-	11.6	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0	

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	246	320	14	13	13
Future Vol, veh/h	14	246	320	14	13	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	256	333	15	14	14

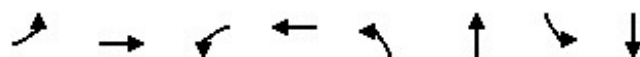
Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	348	0	0 499 341
Stage 1	-	-	- 341 -
Stage 2	-	-	- 158 -
Critical Hdwy	4.13	-	- 6.63 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.83 -
Follow-up Hdwy	2.219	-	- 3.519 3.319
Pot Cap-1 Maneuver	1209	-	- 516 701
Stage 1	-	-	- 719 -
Stage 2	-	-	- 855 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1209	-	- 509 701
Mov Cap-2 Maneuver	-	-	- 509 -
Stage 1	-	-	- 709 -
Stage 2	-	-	- 855 -

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1209	-	-	-	590
HCM Lane V/C Ratio	0.012	-	-	-	0.046
HCM Control Delay (s)	8	0.1	-	-	11.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Timings
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

1b. Existing PM
04/26/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔		↔		↔		↔
Traffic Volume (vph)	13	5	9	5	9	944	90	1075
Future Volume (vph)	13	5	9	5	9	944	90	1075
Lane Group Flow (vph)	0	33	0	80	0	996	0	1203
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	23.5	23.5	26.5	26.5	24.5	24.5	23.5	23.5
Total Split (s)	27.0	27.0	27.0	27.0	93.0	93.0	93.0	93.0
Total Split (%)	22.5%	22.5%	22.5%	22.5%	77.5%	77.5%	77.5%	77.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.33		0.48		0.35		0.54
Control Delay		42.9		27.1		2.3		3.6
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		42.9		27.1		2.3		3.6
Queue Length 50th (ft)		14		11		62		97
Queue Length 95th (ft)		46		59		105		172
Internal Link Dist (ft)		200		797		863		721
Turn Bay Length (ft)								
Base Capacity (vph)		252		342		2820		2240
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.13		0.23		0.35		0.54

Intersection Summary

Cycle Length: 120

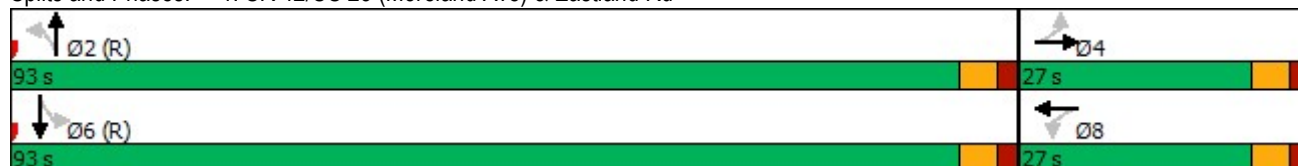
Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 1: SR 42/US 23 (Moreland Ave) & Eastland Rd



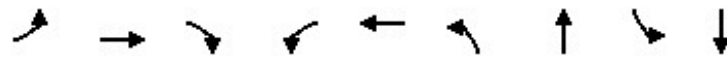
HCM 6th Signalized Intersection Summary
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

1b. Existing PM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	5	15	9	5	64	9	944	14	90	1075	2
Future Volume (veh/h)	13	5	15	9	5	64	9	944	14	90	1075	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1826	1900	1870	1826	1900
Adj Flow Rate, veh/h	13	5	15	9	5	66	9	973	14	93	1108	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	5	0	2	5	0
Cap, veh/h	71	33	52	40	12	88	39	2859	41	205	2377	4
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.84	0.84	0.84	0.84	0.84	0.84
Sat Flow, veh/h	452	496	791	106	178	1339	10	3392	49	202	2820	5
Grp Volume(v), veh/h	33	0	0	80	0	0	519	0	477	549	0	654
Grp Sat Flow(s),veh/h/ln	1739	0	0	1623	0	0	1798	0	1653	1366	0	1661
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	7.7	0.0	0.0	12.3
Cycle Q Clear(g_c), s	2.1	0.0	0.0	5.8	0.0	0.0	7.5	0.0	7.7	8.1	0.0	12.3
Prop In Lane	0.39		0.45	0.11		0.82	0.02		0.03	0.17		0.00
Lane Grp Cap(c), veh/h	156	0	0	140	0	0	1546	0	1393	1187	0	1400
V/C Ratio(X)	0.21	0.00	0.00	0.57	0.00	0.00	0.34	0.00	0.34	0.46	0.00	0.47
Avail Cap(c_a), veh/h	330	0	0	322	0	0	1546	0	1393	1187	0	1400
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.4	0.0	0.0	55.1	0.0	0.0	2.1	0.0	2.1	2.1	0.0	2.4
Incr Delay (d2), s/veh	0.7	0.0	0.0	3.7	0.0	0.0	0.6	0.0	0.7	1.3	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	2.5	0.0	0.0	1.5	0.0	1.4	1.8	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.1	0.0	0.0	58.7	0.0	0.0	2.7	0.0	2.8	3.4	0.0	3.6
LnGrp LOS	D	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h		33			80			996			1203	
Approach Delay, s/veh		54.1			58.7			2.7			3.5	
Approach LOS		D			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		106.6		13.4		106.6		13.4				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		87.5		21.5		87.5		21.5				
Max Q Clear Time (g_c+l1), s		9.7		4.1		14.3		7.8				
Green Ext Time (p_c), s		17.6		0.1		26.7		0.3				
Intersection Summary												
HCM 6th Ctrl Delay	5.8											
HCM 6th LOS	A											

Timings
2: SR 42/US 23 (Moreland Ave) & Custer Ave

1b. Existing PM
04/26/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	131	147	98	148	78	45	779	73	916
Future Volume (vph)	131	147	98	148	78	45	779	73	916
Lane Group Flow (vph)	136	153	102	154	142	47	991	76	1063
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	5.0	15.0	5.0	15.0
Minimum Split (s)	15.0	35.5	35.5	15.0	34.5	15.0	31.5	15.0	41.5
Total Split (s)	17.0	39.0	39.0	19.0	41.0	15.0	75.0	17.0	77.0
Total Split (%)	11.3%	26.0%	26.0%	12.7%	27.3%	10.0%	50.0%	11.3%	51.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.56	0.70	0.37	0.64	0.58	0.15	0.50	0.22	0.51
Control Delay	55.3	79.9	13.5	59.0	59.2	8.5	19.8	10.4	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	79.9	13.5	59.0	59.2	8.5	19.8	10.4	18.3
Queue Length 50th (ft)	110	146	0	126	110	16	294	23	303
Queue Length 95th (ft)	165	217	55	185	177	16	422	47	413
Internal Link Dist (ft)		668			266		3965		408
Turn Bay Length (ft)			250			180		185	
Base Capacity (vph)	248	412	429	247	427	338	1981	368	2093
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.37	0.24	0.62	0.33	0.14	0.50	0.21	0.51

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 9 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Splits and Phases: 2: SR 42/US 23 (Moreland Ave) & Custer Ave

	Ø1		Ø2 (R)		Ø3		Ø4
17 s		75 s		19 s		39 s	
	Ø5		Ø6 (R)		Ø7		Ø8
15 s		77 s		17 s		41 s	

HCM 6th Signalized Intersection Summary

2: SR 42/US 23 (Moreland Ave) & Custer Ave

1b. Existing PM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	147	98	148	78	59	45	779	173	73	916	105
Future Volume (veh/h)	131	147	98	148	78	59	45	779	173	73	916	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	136	153	0	154	81	0	47	811	180	76	954	109
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	5	5	5
Cap, veh/h	277	184		229	208		345	1785	396	372	1995	228
Arrive On Green	0.08	0.10	0.00	0.09	0.11	0.00	0.03	0.63	0.63	0.03	0.64	0.64
Sat Flow, veh/h	1767	1856	1572	1767	1856	0	1739	2822	626	1739	3138	358
Grp Volume(v), veh/h	136	153	0	154	81	0	47	499	492	76	527	536
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1767	1856	0	1739	1735	1713	1739	1735	1761
Q Serve(g_s), s	10.3	12.1	0.0	11.6	6.1	0.0	1.4	22.2	22.2	2.3	23.9	23.9
Cycle Q Clear(g_c), s	10.3	12.1	0.0	11.6	6.1	0.0	1.4	22.2	22.2	2.3	23.9	23.9
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.37	1.00		0.20
Lane Grp Cap(c), veh/h	277	184		229	208		345	1097	1084	372	1103	1120
V/C Ratio(X)	0.49	0.83		0.67	0.39		0.14	0.45	0.45	0.20	0.48	0.48
Avail Cap(c_a), veh/h	277	414		229	439		405	1097	1084	450	1103	1120
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	66.4	0.0	54.6	61.8	0.0	10.9	14.2	14.2	10.7	14.3	14.3
Incr Delay (d2), s/veh	1.3	9.4	0.0	7.5	1.2	0.0	0.2	1.3	1.3	0.3	1.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	6.2	0.0	5.6	2.9	0.0	0.5	8.6	8.5	0.9	9.3	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.6	75.8	0.0	62.1	63.0	0.0	11.0	15.5	15.5	11.0	15.8	15.8
LnGrp LOS	E	E		E	E		B	B	B	B	B	B
Approach Vol, veh/h		289	A		235	A		1038			1139	
Approach Delay, s/veh		66.8			62.4			15.3			15.5	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.3	100.4	19.0	20.3	9.8	100.9	17.0	22.3				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	11.5	69.5	13.5	33.5	9.5	71.5	11.5	35.5				
Max Q Clear Time (g_c+l1), s	4.3	24.2	13.6	14.1	3.4	25.9	12.3	8.1				
Green Ext Time (p_c), s	0.1	15.6	0.0	0.7	0.0	17.2	0.0	0.4				

Intersection Summary

HCM 6th Ctrl Delay 25.0
HCM 6th LOS C

Notes

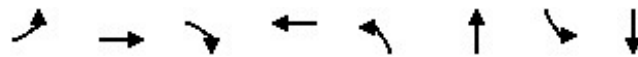
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Timings

3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

1b. Existing PM

04/26/2022



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	73	0	313	0	111	851	1	1096
Future Volume (vph)	73	0	313	0	111	851	1	1096
Lane Group Flow (vph)	38	38	326	2	116	887	1	1217
Turn Type	Split	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			4		2		6	
Detector Phase	4	4	4	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	5.0	15.0	5.0	15.0
Minimum Split (s)	23.5	23.5	23.5	23.5	15.0	23.5	15.0	24.5
Total Split (s)	33.0	33.0	33.0	23.6	19.0	78.4	15.0	74.4
Total Split (%)	22.0%	22.0%	22.0%	15.7%	12.7%	52.3%	10.0%	49.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.32	0.32	0.79	0.01	0.35	0.31	0.00	0.47
Control Delay	71.5	71.5	20.1	0.0	5.9	4.9	3.0	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.5	71.5	20.1	0.0	5.9	4.9	3.0	4.8
Queue Length 50th (ft)	38	38	0	0	12	60	0	25
Queue Length 95th (ft)	75	75	98	0	51	246	m0	521
Internal Link Dist (ft)		792		118		1166		3965
Turn Bay Length (ft)	255				135		275	
Base Capacity (vph)	311	311	562	225	383	2843	573	2572
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.12	0.58	0.01	0.30	0.31	0.00	0.47

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 89 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

Ø1	Ø2 (R)		Ø4	Ø8
15 s	78.4 s		33 s	23.6 s
Ø5	Ø6 (R)			
19 s	74.4 s			

HCM 6th Signalized Intersection Summary 3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

1b. Existing PM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	0	313	1	0	1	111	851	1	1	1096	72
Future Volume (veh/h)	73	0	313	1	0	1	111	851	1	1	1096	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1900	1900	418	1900	1900	1737	1826	1900	1900	1826	1900
Adj Flow Rate, veh/h	76	0	0	1	0	1	116	886	1	1	1142	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	0	0	100	0	0	11	5	0	0	5	0
Cap, veh/h	138	0		3	0	3	409	2882	3	526	2702	
Arrive On Green	0.04	0.00	0.00	0.00	0.00	0.00	0.03	0.81	0.81	0.00	0.78	0.00
Sat Flow, veh/h	3591	0	1610	852	0	852	1654	3556	4	1810	3561	0
Grp Volume(v), veh/h	76	0	0	2	0	0	116	432	455	1	1142	0
Grp Sat Flow(s),veh/h/ln	1795	0	1610	1704	0	0	1654	1735	1825	1810	1735	0
Q Serve(g_s), s	3.1	0.0	0.0	0.2	0.0	0.0	2.0	9.4	9.4	0.0	16.3	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	0.2	0.0	0.0	2.0	9.4	9.4	0.0	16.3	0.0
Prop In Lane	1.00		1.00	0.50		0.50	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	138	0		5	0	0	409	1406	1479	526	2702	
V/C Ratio(X)	0.55	0.00		0.37	0.00	0.00	0.28	0.31	0.31	0.00	0.42	
Avail Cap(c_a), veh/h	658	0		206	0	0	503	1406	1479	638	2702	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.85	0.85	0.00
Uniform Delay (d), s/veh	70.9	0.0	0.0	74.6	0.0	0.0	4.0	3.6	3.6	3.7	5.5	0.0
Incr Delay (d2), s/veh	3.4	0.0	0.0	36.7	0.0	0.0	0.4	0.6	0.5	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.1	0.0	0.0	0.5	2.7	2.9	0.0	5.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.3	0.0	0.0	111.3	0.0	0.0	4.4	4.2	4.1	3.7	5.9	0.0
LnGrp LOS	E	A		F	A	A	A	A	A	A	A	
Approach Vol, veh/h	76		A	2		1003				1143		A
Approach Delay, s/veh	74.3			111.3		4.2				5.9		
Approach LOS	E			F		A				A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	127.1		11.2	10.5	122.3		6.0				
Change Period (Y+Rc), s	5.5	5.5		5.5	5.5	5.5		5.5				
Max Green Setting (Gmax), s	9.5	72.9		27.5	13.5	68.9		18.1				
Max Q Clear Time (g_c+l1), s	2.0	11.4		5.1	4.0	18.3		2.2				
Green Ext Time (p_c), s	0.0	13.9		0.2	0.2	21.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	7.5											
HCM 6th LOS	A											

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Timings
4: Bouldercrest Rd & Eastland Rd

1b. Existing PM
04/26/2022

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	263	143	84	281	286	234
Future Volume (vph)	263	143	84	281	286	234
Lane Group Flow (vph)	283	154	0	392	308	252
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	7			2	6	
Permitted Phases		4	2			6
Detector Phase	7	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	15.0	23.5	23.5	23.5	29.5	29.5
Total Split (s)	43.0	43.0	47.0	47.0	47.0	47.0
Total Split (%)	47.8%	47.8%	52.2%	52.2%	52.2%	52.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio	0.72	0.33		0.21	0.25	0.22
Control Delay	42.3	6.3		7.4	8.0	1.7
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	42.3	6.3		7.4	8.0	1.7
Queue Length 50th (ft)	150	0		41	64	0
Queue Length 95th (ft)	212	43		78	130	30
Internal Link Dist (ft)	2625			1177	369	
Turn Bay Length (ft)	90					
Base Capacity (vph)	737	749		1861	1220	1124
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.38	0.21		0.21	0.25	0.22

Intersection Summary

Cycle Length: 90

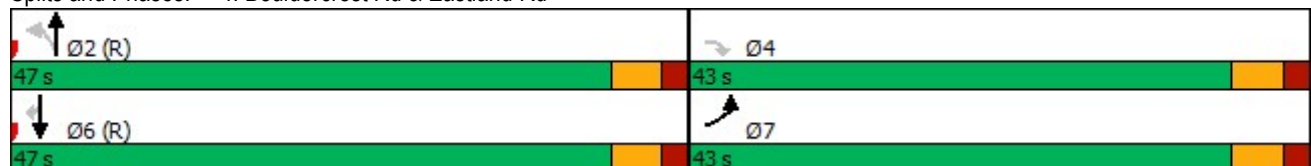
Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 4: Bouldercrest Rd & Eastland Rd



HCM 6th Signalized Intersection Summary 4: Bouldercrest Rd & Eastland Rd

1b. Existing PM
04/26/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	263	143	84	281	286	234
Future Volume (veh/h)	263	143	84	281	286	234
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	283	154	90	302	308	252
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	338	301	425	1522	1287	1090
Arrive On Green	0.19	0.19	0.69	0.69	0.69	0.69
Sat Flow, veh/h	1781	1585	531	2298	1870	1585
Grp Volume(v), veh/h	283	154	181	211	308	252
Grp Sat Flow(s),veh/h/ln	1781	1585	1127	1617	1870	1585
Q Serve(g_s), s	13.8	7.8	2.3	4.2	5.5	5.3
Cycle Q Clear(g_c), s	13.8	7.8	7.9	4.2	5.5	5.3
Prop In Lane	1.00	1.00	0.50			1.00
Lane Grp Cap(c), veh/h	338	301	835	1112	1287	1090
V/C Ratio(X)	0.84	0.51	0.22	0.19	0.24	0.23
Avail Cap(c_a), veh/h	742	660	835	1112	1287	1090
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	32.7	5.4	5.0	5.2	5.2
Incr Delay (d2), s/veh	5.5	1.3	0.6	0.4	0.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	3.0	1.1	1.3	1.9	8.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.6	34.1	6.0	5.4	5.7	5.7
LnGrp LOS	D	C	A	A	A	A
Approach Vol, veh/h	437			392	560	
Approach Delay, s/veh	38.3			5.7	5.7	
Approach LOS	D			A	A	
Timer - Assigned Phs	2		4		6	
Phs Duration (G+Y+Rc), s	67.4		22.6		67.4	
Change Period (Y+Rc), s	5.5		5.5		5.5	
Max Green Setting (Gmax), s	41.5		37.5		41.5	
Max Q Clear Time (g_c+l1), s	9.9		15.8		7.5	
Green Ext Time (p_c), s	5.1		1.3		6.1	
Intersection Summary						
HCM 6th Ctrl Delay			15.9			
HCM 6th LOS			B			

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	475	360	7	6	5
Future Vol, veh/h	7	475	360	7	6	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	500	379	7	6	5

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	386	0	0 897 383
Stage 1	-	-	- 383 -
Stage 2	-	-	- 514 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1172	-	- 310 664
Stage 1	-	-	- 689 -
Stage 2	-	-	- 600 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1172	-	- 308 664
Mov Cap-2 Maneuver	-	-	- 308 -
Stage 1	-	-	- 683 -
Stage 2	-	-	- 600 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1172	-	-	-	407
HCM Lane V/C Ratio	0.006	-	-	-	0.028
HCM Control Delay (s)	8.1	0	-	-	14.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	476	361	4	4	6
Future Vol, veh/h	5	476	361	4	4	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	501	380	4	4	6

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	384	0	0 893 382
Stage 1	-	-	- 382 -
Stage 2	-	-	- 511 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1174	-	- 312 665
Stage 1	-	-	- 690 -
Stage 2	-	-	- 602 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1174	-	- 310 665
Mov Cap-2 Maneuver	-	-	- 310 -
Stage 1	-	-	- 686 -
Stage 2	-	-	- 602 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1174	-	-	-	456
HCM Lane V/C Ratio	0.004	-	-	-	0.023
HCM Control Delay (s)	8.1	0	-	-	13.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	464	351	12	17	14
Future Vol, veh/h	16	464	351	12	17	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	494	373	13	18	15

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	386	0	0 661 380
Stage 1	-	-	- 380 -
Stage 2	-	-	- 281 -
Critical Hdwy	4.13	-	- 6.63 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.83 -
Follow-up Hdwy	2.219	-	- 3.519 3.319
Pot Cap-1 Maneuver	1171	-	- 411 666
Stage 1	-	-	- 690 -
Stage 2	-	-	- 742 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1171	-	- 403 666
Mov Cap-2 Maneuver	-	-	- 403 -
Stage 1	-	-	- 676 -
Stage 2	-	-	- 742 -

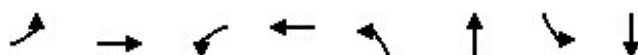
Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1171	-	-	-	490
HCM Lane V/C Ratio	0.015	-	-	-	0.067
HCM Control Delay (s)	8.1	0.1	-	-	12.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Future “No-Build” Intersection Analysis

Timings
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

2a. No-Build AM
04/26/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔		↔		↔		↔
Traffic Volume (vph)	1	0	4	2	10	1125	22	734
Future Volume (vph)	1	0	4	2	10	1125	22	734
Lane Group Flow (vph)	0	1	0	87	0	1271	0	848
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	23.5	23.5	26.5	26.5	24.5	24.5	23.5	23.5
Total Split (s)	30.0	30.0	30.0	30.0	90.0	90.0	90.0	90.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.02		0.50		0.46		0.33
Control Delay		52.0		23.0		3.0		2.4
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		52.0		23.0		3.0		2.4
Queue Length 50th (ft)		1		5		83		47
Queue Length 95th (ft)		7		55		147		85
Internal Link Dist (ft)		200		797		863		721
Turn Bay Length (ft)								
Base Capacity (vph)		212		398		2755		2573
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.00		0.22		0.46		0.33

Intersection Summary

Cycle Length: 120

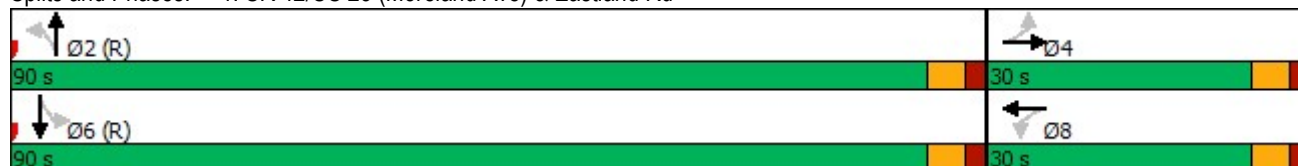
Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 1: SR 42/US 23 (Moreland Ave) & Eastland Rd



HCM 6th Signalized Intersection Summary
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

2a. No-Build AM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	0	4	2	73	10	1125	9	22	734	7
Future Volume (veh/h)	1	0	0	4	2	73	10	1125	9	22	734	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1826	1900	1826	1826	1900
Adj Flow Rate, veh/h	1	0	0	4	2	81	11	1250	10	24	816	8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	5	0	5	5	0
Cap, veh/h	139	0	0	34	5	103	40	2877	23	82	2683	26
Arrive On Green	0.07	0.00	0.00	0.07	0.07	0.07	0.84	0.84	0.84	0.84	0.84	0.84
Sat Flow, veh/h	1152	0	0	34	78	1506	11	3425	27	60	3194	31
Grp Volume(v), veh/h	1	0	0	87	0	0	663	0	608	421	0	427
Grp Sat Flow(s),veh/h/ln	1153	0	0	1618	0	0	1806	0	1657	1630	0	1656
Q Serve(g_s), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	11.1	0.0	0.0	6.7
Cycle Q Clear(g_c), s	0.1	0.0	0.0	6.3	0.0	0.0	11.0	0.0	11.1	5.8	0.0	6.7
Prop In Lane	1.00		0.00	0.05		0.93	0.02		0.02	0.06		0.02
Lane Grp Cap(c), veh/h	139	0	0	142	0	0	1548	0	1391	1400	0	1391
V/C Ratio(X)	0.01	0.00	0.00	0.61	0.00	0.00	0.43	0.00	0.44	0.30	0.00	0.31
Avail Cap(c_a), veh/h	320	0	0	360	0	0	1548	0	1391	1400	0	1391
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	52.1	0.0	0.0	55.0	0.0	0.0	2.4	0.0	2.4	2.0	0.0	2.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	4.2	0.0	0.0	0.9	0.0	1.0	0.6	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	2.7	0.0	0.0	2.3	0.0	2.1	1.2	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	0.0	0.0	59.2	0.0	0.0	3.3	0.0	3.4	2.6	0.0	2.6
LnGrp LOS	D	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h												
Approach Delay, s/veh												
Approach LOS												
Timer - Assigned Phs												
Phs Duration (G+Y+Rc), s												
Change Period (Y+Rc), s												
Max Green Setting (Gmax), s												
Max Q Clear Time (g_c+l1), s												
Green Ext Time (p_c), s												
Intersection Summary												
HCM 6th Ctrl Delay												
HCM 6th LOS												

Timings 2: SR 42/US 23 (Moreland Ave) & Custer Ave

2a. No-Build AM
04/26/2022

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	145	152	144	107	201	202	939	18	626
Future Volume (vph)	145	152	144	107	201	202	939	18	626
Lane Group Flow (vph)	154	162	153	114	267	215	1079	19	768
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	5.0	15.0	5.0	15.0
Minimum Split (s)	15.0	35.5	35.5	15.0	34.5	15.0	31.5	15.0	41.5
Total Split (s)	19.0	46.0	46.0	15.0	42.0	29.0	74.0	15.0	60.0
Total Split (%)	12.7%	30.7%	30.7%	10.0%	28.0%	19.3%	49.3%	10.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.66	0.43	0.35	0.37	0.81	0.53	0.55	0.07	0.46
Control Delay	52.7	54.3	8.4	41.6	75.8	17.1	22.8	14.4	27.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	54.3	8.4	41.6	75.8	17.1	22.8	14.4	27.3
Queue Length 50th (ft)	115	139	0	83	247	93	374	7	250
Queue Length 95th (ft)	164	199	57	125	331	157	501	21	369
Internal Link Dist (ft)		668			266		3965		408
Turn Bay Length (ft)			250			180		185	
Base Capacity (vph)	238	498	535	307	441	489	1954	297	1668
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.33	0.29	0.37	0.61	0.44	0.55	0.06	0.46

Intersection Summary

Cycle Length: 150

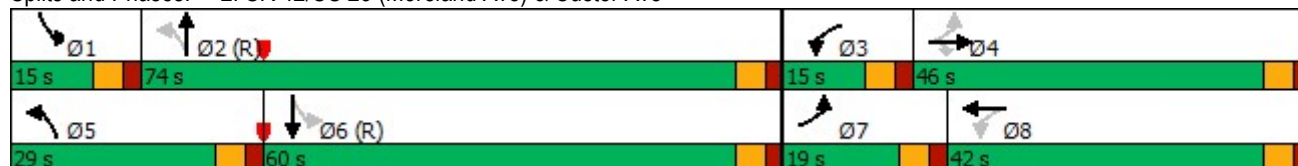
Actuated Cycle Length: 150

Offset: 15 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Splits and Phases: 2: SR 42/US 23 (Moreland Ave) & Custer Ave



HCM 6th Signalized Intersection Summary 2: SR 42/US 23 (Moreland Ave) & Custer Ave

2a. No-Build AM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	152	144	107	201	50	202	939	75	18	626	96
Future Volume (veh/h)	145	152	144	107	201	50	202	939	75	18	626	96
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	154	162	0	114	214	0	215	999	80	19	666	102
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	5	5	5
Cap, veh/h	226	292		253	247		466	1999	160	306	1708	261
Arrive On Green	0.09	0.16	0.00	0.06	0.13	0.00	0.07	0.61	0.61	0.02	0.57	0.57
Sat Flow, veh/h	1767	1856	1572	1767	1856	0	1739	3253	260	1739	3016	461
Grp Volume(v), veh/h	154	162	0	114	214	0	215	533	546	19	383	385
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1767	1856	0	1739	1735	1779	1739	1735	1743
Q Serve(g_s), s	11.1	12.1	0.0	8.3	17.0	0.0	7.5	25.6	25.6	0.7	18.4	18.5
Cycle Q Clear(g_c), s	11.1	12.1	0.0	8.3	17.0	0.0	7.5	25.6	25.6	0.7	18.4	18.5
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.15	1.00		0.26
Lane Grp Cap(c), veh/h	226	292		253	247		466	1066	1093	306	982	987
V/C Ratio(X)	0.68	0.55		0.45	0.87		0.46	0.50	0.50	0.06	0.39	0.39
Avail Cap(c_a), veh/h	230	501		253	452		623	1066	1093	385	982	987
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.91	0.91	0.91	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.9	58.4	0.0	52.0	63.7	0.0	12.8	16.1	16.1	14.3	18.1	18.1
Incr Delay (d2), s/veh	7.8	1.6	0.0	1.3	8.9	0.0	0.6	1.5	1.5	0.1	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	5.8	0.0	3.8	8.6	0.0	2.8	10.1	10.3	0.3	7.4	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	60.0	0.0	53.3	72.6	0.0	13.4	17.6	17.6	14.3	19.3	19.3
LnGrp LOS	E	E		D	E		B	B	B	B	B	B
Approach Vol, veh/h		316	A		328	A		1294			787	
Approach Delay, s/veh		59.4			65.9			16.9			19.2	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.2	97.7	15.0	29.1	15.5	90.4	18.6	25.5				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	68.5	9.5	40.5	23.5	54.5	13.5	36.5				
Max Q Clear Time (g_c+l1), s	2.7	27.6	10.3	14.1	9.5	20.5	13.1	19.0				
Green Ext Time (p_c), s	0.0	16.8	0.0	0.8	0.5	10.0	0.0	1.0				

Intersection Summary

HCM 6th Ctrl Delay	28.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Timings
3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

2a. No-Build AM
04/26/2022



Lane Group	EBL	EBT	EBR	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations								
Traffic Volume (vph)	46	1	118	308	1233	764		
Future Volume (vph)	46	1	118	308	1233	764		
Lane Group Flow (vph)	24	24	120	314	1261	835		
Turn Type	Split	NA	Perm	pm+pt	NA	NA		
Protected Phases	4	4		5	2	6	1	8
Permitted Phases			4	2				
Detector Phase	4	4	4	5	2	6		
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	5.0	15.0	15.0	5.0	6.0
Minimum Split (s)	23.5	23.5	23.5	15.0	23.5	24.5	15.0	23.5
Total Split (s)	25.0	25.0	25.0	41.0	86.5	60.5	15.0	23.5
Total Split (%)	16.7%	16.7%	16.7%	27.3%	57.7%	40.3%	10%	16%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5		
Lead/Lag				Lead	Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	None
v/c Ratio	0.27	0.27	0.56	0.56	0.42	0.33		
Control Delay	75.3	75.2	16.9	5.5	2.4	2.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	75.3	75.2	16.9	5.5	2.4	2.1		
Queue Length 50th (ft)	24	24	0	34	91	22		
Queue Length 95th (ft)	57	57	47	59	133	33		
Internal Link Dist (ft)		792			1166	3965		
Turn Bay Length (ft)	255			135				
Base Capacity (vph)	220	221	330	721	3006	2539		
Starvation Cap Reductn	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.11	0.11	0.36	0.44	0.42	0.33		

Intersection Summary

Cycle Length: 150

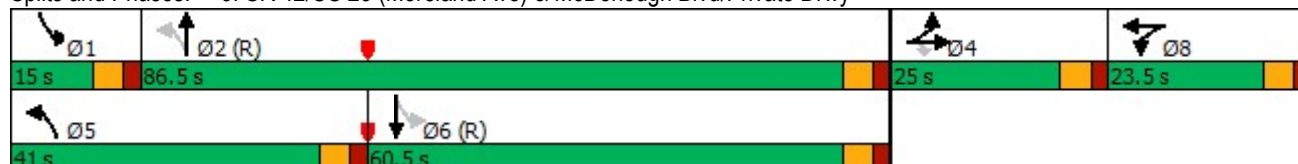
Actuated Cycle Length: 150

Offset: 113 (75%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Splits and Phases: 3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy



HCM 6th Signalized Intersection Summary

3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

2a. No-Build AM

04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	1	118	0	0	0	308	1233	3	0	764	54
Future Volume (veh/h)	46	1	118	0	0	0	308	1233	3	0	764	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1900	1900	1159	1900	1900	1752	1826	1900	1900	1826	1900
Adj Flow Rate, veh/h	48	0	0	0	0	0	314	1258	3	0	780	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	0	0	50	0	0	10	5	0	0	5	0
Cap, veh/h	124	0		0	1	0	617	3167	8	409	2795	
Arrive On Green	0.03	0.00	0.00	0.00	0.00	0.00	0.05	0.89	0.89	0.00	0.81	0.00
Sat Flow, veh/h	3591	0	1610	0	1900	0	1668	3551	8	1810	3561	0
Grp Volume(v), veh/h	48	0	0	0	0	0	314	615	646	0	780	0
Grp Sat Flow(s),veh/h/ln	1795	0	1610	0	1900	0	1668	1735	1824	1810	1735	0
Q Serve(g_s), s	2.0	0.0	0.0	0.0	0.0	0.0	4.6	8.9	8.9	0.0	8.5	0.0
Cycle Q Clear(g_c), s	2.0	0.0	0.0	0.0	0.0	0.0	4.6	8.9	8.9	0.0	8.5	0.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	124	0		0	1	0	617	1547	1627	409	2795	
V/C Ratio(X)	0.39	0.00		0.00	0.00	0.00	0.51	0.40	0.40	0.00	0.28	
Avail Cap(c_a), veh/h	467	0		0	228	0	929	1547	1627	523	2795	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.90	0.00
Uniform Delay (d), s/veh	70.8	0.0	0.0	0.0	0.0	0.0	2.3	1.4	1.4	0.0	3.7	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	0.0	0.0	0.0	0.7	0.8	0.7	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.0	0.0	0.0	0.8	1.2	1.2	0.0	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.8	0.0	0.0	0.0	0.0	0.0	2.9	2.1	2.1	0.0	3.9	0.0
LnGrp LOS	E	A		A	A	A	A	A	A	A	A	
Approach Vol, veh/h	48		A	0			1575			780		A
Approach Delay, s/veh	72.8			0.0			2.3			3.9		
Approach LOS	E						A			A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	139.3		10.7	13.0	126.3		0.0				
Change Period (Y+Rc), s	5.5	5.5		5.5	5.5	5.5		5.5				
Max Green Setting (Gmax), s	9.5	81.0		19.5	35.5	55.0		18.0				
Max Q Clear Time (g_c+l1), s	0.0	10.9		4.0	6.6	10.5		0.0				
Green Ext Time (p_c), s	0.0	26.0		0.1	0.9	11.8		0.0				

Intersection Summary

HCM 6th Ctrl Delay	4.2
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Timings 4: Bouldercrest Rd & Eastland Rd

2a. No-Build AM
04/26/2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	218	63	91	336	218	244
Future Volume (vph)	218	63	91	336	218	244
Lane Group Flow (vph)	256	74	0	502	256	287
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	7			2	6	
Permitted Phases		4	2			6
Detector Phase	7	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	15.0	23.5	23.5	23.5	29.5	29.5
Total Split (s)	41.0	41.0	49.0	49.0	49.0	49.0
Total Split (%)	45.6%	45.6%	54.4%	54.4%	54.4%	54.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio	0.70	0.19		0.26	0.20	0.25
Control Delay	43.2	7.8		7.0	7.0	1.5
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	43.2	7.8		7.0	7.0	1.5
Queue Length 50th (ft)	136	0		52	48	0
Queue Length 95th (ft)	184	28		88	94	24
Internal Link Dist (ft)	2625			1177	369	
Turn Bay Length (ft)	90					
Base Capacity (vph)	698	669		1942	1251	1157
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.37	0.11		0.26	0.20	0.25

Intersection Summary

Cycle Length: 90

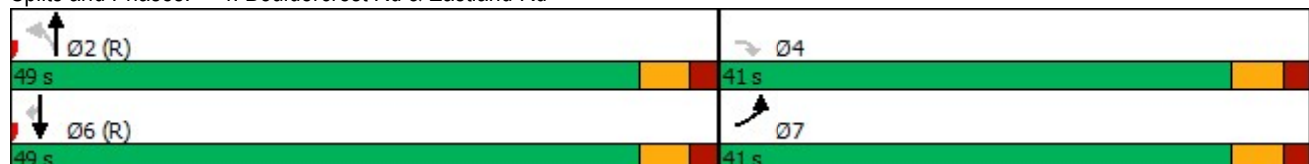
Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 4: Bouldercrest Rd & Eastland Rd



HCM 6th Signalized Intersection Summary 4: Bouldercrest Rd & Eastland Rd

2a. No-Build AM
04/26/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	218	63	91	336	218	244
Future Volume (veh/h)	218	63	91	336	218	244
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	256	74	107	395	256	287
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	306	272	430	1618	1321	1119
Arrive On Green	0.17	0.17	0.71	0.71	0.71	0.71
Sat Flow, veh/h	1781	1585	526	2376	1870	1585
Grp Volume(v), veh/h	256	74	230	272	256	287
Grp Sat Flow(s),veh/h/ln	1781	1585	1201	1617	1870	1585
Q Serve(g_s), s	12.5	3.7	2.8	5.3	4.2	5.8
Cycle Q Clear(g_c), s	12.5	3.7	7.0	5.3	4.2	5.8
Prop In Lane	1.00	1.00	0.46			1.00
Lane Grp Cap(c), veh/h	306	272	906	1142	1321	1119
V/C Ratio(X)	0.84	0.27	0.25	0.24	0.19	0.26
Avail Cap(c_a), veh/h	703	625	906	1142	1321	1119
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.1	32.4	4.8	4.7	4.5	4.7
Incr Delay (d2), s/veh	6.0	0.5	0.7	0.5	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	1.4	1.3	1.5	1.4	9.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	42.1	32.9	5.4	5.2	4.8	5.3
LnGrp LOS	D	C	A	A	A	A
Approach Vol, veh/h	330			502	543	
Approach Delay, s/veh	40.0			5.3	5.1	
Approach LOS	D			A	A	
Timer - Assigned Phs	2		4		6	
Phs Duration (G+Y+Rc), s	69.1		20.9		69.1	
Change Period (Y+Rc), s	5.5		5.5		5.5	
Max Green Setting (Gmax), s	43.5		35.5		43.5	
Max Q Clear Time (g_c+l1), s	9.0		14.5		7.8	
Green Ext Time (p_c), s	6.9		0.9		5.8	
Intersection Summary						
HCM 6th Ctrl Delay			13.5			
HCM 6th LOS			B			

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	262	337	3	3	4
Future Vol, veh/h	3	262	337	3	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	273	351	3	3	4

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	354	0	632
Stage 1	-	-	353
Stage 2	-	-	279
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1205	-	444
Stage 1	-	-	711
Stage 2	-	-	768
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1205	-	443
Mov Cap-2 Maneuver	-	-	443
Stage 1	-	-	709
Stage 2	-	-	768

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1205	-	-	-	557
HCM Lane V/C Ratio	0.003	-	-	-	0.013
HCM Control Delay (s)	8	0	-	-	11.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	263	338	2	2	2
Future Vol, veh/h	2	263	338	2	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	274	352	2	2	2
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	354	0	-	0	631	353
Stage 1	-	-	-	-	353	-
Stage 2	-	-	-	-	278	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1205	-	-	-	445	691
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	769	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1205	-	-	-	444	691
Mov Cap-2 Maneuver	-	-	-	-	444	-
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	769	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		11.7		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1205	-	-	-	541	
HCM Lane V/C Ratio	0.002	-	-	-	0.008	
HCM Control Delay (s)	8	0	-	-	11.7	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0	

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	251	326	14	13	13
Future Vol, veh/h	14	251	326	14	13	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	261	340	15	14	14

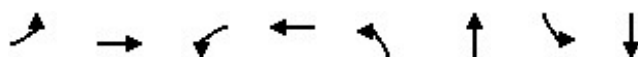
Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	355	0	0 509 348
Stage 1	-	-	- 348 -
Stage 2	-	-	- 161 -
Critical Hdwy	4.13	-	- 6.63 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.83 -
Follow-up Hdwy	2.219	-	- 3.519 3.319
Pot Cap-1 Maneuver	1202	-	- 509 694
Stage 1	-	-	- 714 -
Stage 2	-	-	- 852 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1202	-	- 501 694
Mov Cap-2 Maneuver	-	-	- 501 -
Stage 1	-	-	- 703 -
Stage 2	-	-	- 852 -

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1202	-	-	-	582
HCM Lane V/C Ratio	0.012	-	-	-	0.047
HCM Control Delay (s)	8	0.1	-	-	11.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Timings
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

2b. No-Build PM
04/26/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔		↔		↔		↔
Traffic Volume (vph)	13	5	9	5	9	963	92	1097
Future Volume (vph)	13	5	9	5	9	963	92	1097
Lane Group Flow (vph)	0	33	0	81	0	1016	0	1228
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	23.5	23.5	26.5	26.5	24.5	24.5	23.5	23.5
Total Split (s)	27.0	27.0	27.0	27.0	93.0	93.0	93.0	93.0
Total Split (%)	22.5%	22.5%	22.5%	22.5%	77.5%	77.5%	77.5%	77.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.33		0.49		0.36		0.55
Control Delay		43.1		27.0		2.4		3.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		43.1		27.0		2.4		3.8
Queue Length 50th (ft)		14		11		63		102
Queue Length 95th (ft)		46		59		108		181
Internal Link Dist (ft)		200		797		863		721
Turn Bay Length (ft)								
Base Capacity (vph)		250		343		2820		2222
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.13		0.24		0.36		0.55

Intersection Summary

Cycle Length: 120

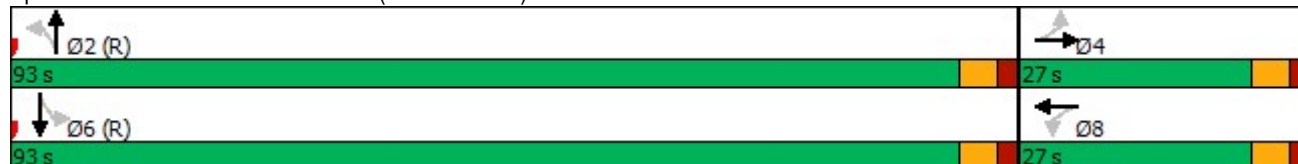
Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Splits and Phases: 1: SR 42/US 23 (Moreland Ave) & Eastland Rd



HCM 6th Signalized Intersection Summary
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

2b. No-Build PM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	5	15	9	5	65	9	963	14	92	1097	2
Future Volume (veh/h)	13	5	15	9	5	65	9	963	14	92	1097	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1826	1900	1870	1826	1900
Adj Flow Rate, veh/h	13	5	15	9	5	67	9	993	14	95	1131	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	5	0	2	5	0
Cap, veh/h	72	33	52	40	12	89	39	2858	40	204	2368	4
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.84	0.84	0.84	0.84	0.84	0.84
Sat Flow, veh/h	454	495	791	104	177	1342	10	3394	48	201	2811	5
Grp Volume(v), veh/h	33	0	0	81	0	0	529	0	487	559	0	669
Grp Sat Flow(s),veh/h/ln	1740	0	0	1623	0	0	1798	0	1653	1356	0	1661
Q Serve(g_s), s	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	7.9	0.0	0.0	12.8
Cycle Q Clear(g_c), s	2.1	0.0	0.0	5.9	0.0	0.0	7.7	0.0	7.9	8.4	0.0	12.8
Prop In Lane	0.39		0.45	0.11		0.83	0.02		0.03	0.17		0.00
Lane Grp Cap(c), veh/h	157	0	0	141	0	0	1545	0	1392	1177	0	1399
V/C Ratio(X)	0.21	0.00	0.00	0.58	0.00	0.00	0.34	0.00	0.35	0.47	0.00	0.48
Avail Cap(c_a), veh/h	330	0	0	322	0	0	1545	0	1392	1177	0	1399
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.3	0.0	0.0	55.0	0.0	0.0	2.1	0.0	2.1	2.2	0.0	2.5
Incr Delay (d2), s/veh	0.7	0.0	0.0	3.7	0.0	0.0	0.6	0.0	0.7	1.4	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	2.5	0.0	0.0	1.5	0.0	1.4	1.8	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.0	0.0	0.0	58.7	0.0	0.0	2.7	0.0	2.8	3.5	0.0	3.7
LnGrp LOS	D	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h	33		81				1016		1228			
Approach Delay, s/veh	54.0		58.7				2.8		3.6			
Approach LOS	D		E				A		A			
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	106.6		13.4		106.6		13.4					
Change Period (Y+Rc), s	5.5		5.5		5.5		5.5					
Max Green Setting (Gmax), s	87.5		21.5		87.5		21.5					
Max Q Clear Time (g_c+l1), s	9.9		4.1		14.8		7.9					
Green Ext Time (p_c), s	18.2		0.1		27.8		0.3					
Intersection Summary												
HCM 6th Ctrl Delay			5.8									
HCM 6th LOS			A									

Timings
2: SR 42/US 23 (Moreland Ave) & Custer Ave

2b. No-Build PM
04/26/2022

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	134	150	100	151	80	46	795	74	934
Future Volume (vph)	134	150	100	151	80	46	795	74	934
Lane Group Flow (vph)	140	156	104	157	146	48	1011	77	1084
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	5.0	15.0	5.0	15.0
Minimum Split (s)	15.0	35.5	35.5	15.0	34.5	15.0	31.5	15.0	41.5
Total Split (s)	18.0	39.0	39.0	19.0	40.0	15.0	75.0	17.0	77.0
Total Split (%)	12.0%	26.0%	26.0%	12.7%	26.7%	10.0%	50.0%	11.3%	51.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.57	0.71	0.37	0.65	0.61	0.16	0.51	0.23	0.52
Control Delay	55.5	80.0	13.4	59.7	61.9	8.7	20.2	10.6	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	80.0	13.4	59.7	61.9	8.7	20.2	10.6	18.7
Queue Length 50th (ft)	113	149	0	128	115	16	302	24	312
Queue Length 95th (ft)	169	220	55	187	183	15	435	48	426
Internal Link Dist (ft)		668			266		3965		408
Turn Bay Length (ft)			250			180		185	
Base Capacity (vph)	251	412	430	246	415	329	1976	360	2086
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.38	0.24	0.64	0.35	0.15	0.51	0.21	0.52

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 142 (95%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Splits and Phases: 2: SR 42/US 23 (Moreland Ave) & Custer Ave

				
Ø1	Ø2 (R)		Ø3	Ø4
17 s	75 s		19 s	39 s
				
Ø5	Ø6 (R)		Ø7	Ø8
15 s	77 s		18 s	40 s

HCM 6th Signalized Intersection Summary
2: SR 42/US 23 (Moreland Ave) & Custer Ave

2b. No-Build PM
04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	134	150	100	151	80	60	46	795	176	74	934	107
Future Volume (veh/h)	134	150	100	151	80	60	46	795	176	74	934	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	140	156	0	157	83	0	48	828	183	77	973	111
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	5	5	5
Cap, veh/h	281	187		229	199		337	1781	394	364	1989	227
Arrive On Green	0.08	0.10	0.00	0.09	0.11	0.00	0.03	0.63	0.63	0.03	0.63	0.63
Sat Flow, veh/h	1767	1856	1572	1767	1856	0	1739	2824	624	1739	3138	358
Grp Volume(v), veh/h	140	156	0	157	83	0	48	509	502	77	538	546
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1767	1856	0	1739	1735	1714	1739	1735	1761
Q Serve(g_s), s	10.5	12.4	0.0	11.8	6.3	0.0	1.4	23.0	23.0	2.3	24.7	24.7
Cycle Q Clear(g_c), s	10.5	12.4	0.0	11.8	6.3	0.0	1.4	23.0	23.0	2.3	24.7	24.7
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.36	1.00		0.20
Lane Grp Cap(c), veh/h	281	187		229	199		337	1094	1081	364	1100	1117
V/C Ratio(X)	0.50	0.84		0.69	0.42		0.14	0.46	0.46	0.21	0.49	0.49
Avail Cap(c_a), veh/h	281	414		229	427		397	1094	1081	441	1100	1117
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.4	66.2	0.0	54.5	62.6	0.0	11.1	14.5	14.5	11.0	14.6	14.6
Incr Delay (d2), s/veh	1.4	9.4	0.0	8.2	1.4	0.0	0.2	1.4	1.4	0.3	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	6.3	0.0	5.8	3.0	0.0	0.5	8.9	8.8	0.9	9.6	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.7	75.7	0.0	62.7	64.0	0.0	11.3	15.8	15.8	11.3	16.1	16.1
LnGrp LOS	E	E		E	E		B	B	B	B	B	B
Approach Vol, veh/h		296	A		240	A		1059			1161	
Approach Delay, s/veh		66.2			63.1			15.6			15.8	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.3	100.1	19.0	20.6	9.8	100.6	18.0	21.6				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	11.5	69.5	13.5	33.5	9.5	71.5	12.5	34.5				
Max Q Clear Time (g_c+l1), s	4.3	25.0	13.8	14.4	3.4	26.7	12.5	8.3				
Green Ext Time (p_c), s	0.1	16.0	0.0	0.7	0.0	17.6	0.0	0.4				

Intersection Summary

HCM 6th Ctrl Delay 25.3
HCM 6th LOS C

Notes

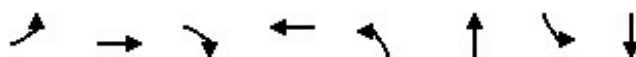
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Timings

3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

2b. No-Build PM

04/26/2022



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	74	0	319	0	113	868	1	1118
Future Volume (vph)	74	0	319	0	113	868	1	1118
Lane Group Flow (vph)	38	39	332	2	118	905	1	1241
Turn Type	Split	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			4		2		6	
Detector Phase	4	4	4	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	5.0	15.0	5.0	15.0
Minimum Split (s)	23.5	23.5	23.5	23.5	15.0	23.5	15.0	24.5
Total Split (s)	32.5	32.5	32.5	23.6	19.0	78.9	15.0	74.9
Total Split (%)	21.7%	21.7%	21.7%	15.7%	12.7%	52.6%	10.0%	49.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.32	0.33	0.79	0.01	0.36	0.32	0.00	0.48
Control Delay	71.2	71.6	20.0	0.0	6.2	4.9	3.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.2	71.6	20.0	0.0	6.2	4.9	3.0	5.0
Queue Length 50th (ft)	38	40	0	0	12	62	0	25
Queue Length 95th (ft)	75	76	98	0	52	253	m0	544
Internal Link Dist (ft)		792		118		1166		3965
Turn Bay Length (ft)	255				135		275	
Base Capacity (vph)	305	305	562	225	375	2841	563	2567
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.13	0.59	0.01	0.31	0.32	0.00	0.48

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 72 (48%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

Ø1	Ø2 (R)		Ø4	Ø8
15 s	78.9 s		32.5 s	23.6 s
Ø5	Ø6 (R)			
19 s	74.9 s			

HCM 6th Signalized Intersection Summary

3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

2b. No-Build PM

04/26/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	0	319	1	0	1	113	868	1	1	1118	73
Future Volume (veh/h)	74	0	319	1	0	1	113	868	1	1	1118	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1900	1900	418	1900	1900	1737	1826	1900	1900	1826	1900
Adj Flow Rate, veh/h	77	0	0	1	0	1	118	904	1	1	1165	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	0	0	100	0	0	11	5	0	0	5	0
Cap, veh/h	138	0		3	0	3	401	2882	3	517	2701	
Arrive On Green	0.04	0.00	0.00	0.00	0.00	0.00	0.03	0.81	0.81	0.00	0.78	0.00
Sat Flow, veh/h	3591	0	1610	852	0	852	1654	3556	4	1810	3561	0
Grp Volume(v), veh/h	77	0	0	2	0	0	118	441	464	1	1165	0
Grp Sat Flow(s),veh/h/ln	1795	0	1610	1704	0	0	1654	1735	1825	1810	1735	0
Q Serve(g_s), s	3.2	0.0	0.0	0.2	0.0	0.0	2.1	9.7	9.7	0.0	16.8	0.0
Cycle Q Clear(g_c), s	3.2	0.0	0.0	0.2	0.0	0.0	2.1	9.7	9.7	0.0	16.8	0.0
Prop In Lane	1.00		1.00	0.50		0.50	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	138	0		5	0	0	401	1406	1479	517	2701	
V/C Ratio(X)	0.56	0.00		0.37	0.00	0.00	0.29	0.31	0.31	0.00	0.43	
Avail Cap(c_a), veh/h	646	0		206	0	0	495	1406	1479	629	2701	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.84	0.84	0.00
Uniform Delay (d), s/veh	70.9	0.0	0.0	74.6	0.0	0.0	4.1	3.6	3.6	3.7	5.5	0.0
Incr Delay (d2), s/veh	3.5	0.0	0.0	36.7	0.0	0.0	0.4	0.6	0.6	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.1	0.0	0.0	0.5	2.8	2.9	0.0	5.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.4	0.0	0.0	111.3	0.0	0.0	4.5	4.2	4.2	3.7	6.0	0.0
LnGrp LOS	E	A		F	A	A	A	A	A	A	A	
Approach Vol, veh/h	77		A	2			1023			1166		A
Approach Delay, s/veh	74.4			111.3			4.2			6.0		
Approach LOS	E			F			A			A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	127.1		11.3	10.5	122.3		6.0				
Change Period (Y+Rc), s	5.5	5.5		5.5	5.5	5.5		5.5				
Max Green Setting (Gmax), s	9.5	73.4		27.0	13.5	69.4		18.1				
Max Q Clear Time (g_c+l1), s	2.0	11.7		5.2	4.1	18.8		2.2				
Green Ext Time (p_c), s	0.0	14.3		0.2	0.2	21.6		0.0				

Intersection Summary

HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Timings 4: Bouldercrest Rd & Eastland Rd

2b. No-Build PM
04/26/2022

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	268	146	86	287	292	239
Future Volume (vph)	268	146	86	287	292	239
Lane Group Flow (vph)	288	157	0	401	314	257
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	7			2	6	
Permitted Phases		4	2			6
Detector Phase	7	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	15.0	23.5	23.5	23.5	29.5	29.5
Total Split (s)	43.0	43.0	47.0	47.0	47.0	47.0
Total Split (%)	47.8%	47.8%	52.2%	52.2%	52.2%	52.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio	0.72	0.33		0.22	0.26	0.23
Control Delay	42.2	6.2		7.5	8.2	1.7
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	42.2	6.2		7.5	8.2	1.7
Queue Length 50th (ft)	152	0		43	66	0
Queue Length 95th (ft)	216	42		81	133	31
Internal Link Dist (ft)	2625			1177	369	
Turn Bay Length (ft)	90					
Base Capacity (vph)	737	751		1847	1215	1122
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.39	0.21		0.22	0.26	0.23

Intersection Summary

Cycle Length: 90

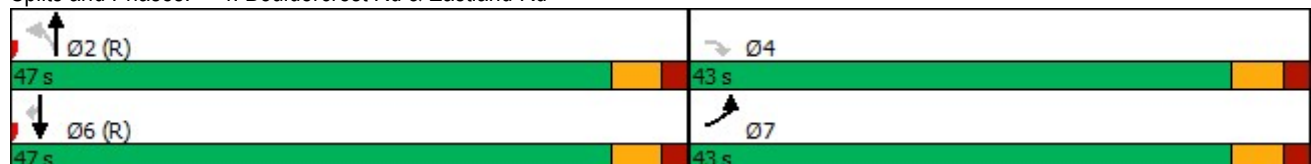
Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 4: Bouldercrest Rd & Eastland Rd



HCM 6th Signalized Intersection Summary 4: Bouldercrest Rd & Eastland Rd

2b. No-Build PM
04/26/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	268	146	86	287	292	239
Future Volume (veh/h)	268	146	86	287	292	239
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	288	157	92	309	314	257
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	343	306	421	1509	1281	1086
Arrive On Green	0.19	0.19	0.68	0.68	0.68	0.68
Sat Flow, veh/h	1781	1585	527	2288	1870	1585
Grp Volume(v), veh/h	288	157	184	217	314	257
Grp Sat Flow(s),veh/h/ln	1781	1585	1113	1617	1870	1585
Q Serve(g_s), s	14.0	8.0	2.6	4.4	5.7	5.5
Cycle Q Clear(g_c), s	14.0	8.0	8.3	4.4	5.7	5.5
Prop In Lane	1.00	1.00	0.50			1.00
Lane Grp Cap(c), veh/h	343	306	822	1108	1281	1086
V/C Ratio(X)	0.84	0.51	0.22	0.20	0.25	0.24
Avail Cap(c_a), veh/h	742	660	822	1108	1281	1086
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.0	32.5	5.6	5.2	5.4	5.3
Incr Delay (d2), s/veh	5.5	1.3	0.6	0.4	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	3.1	1.1	1.3	2.0	8.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.5	33.9	6.2	5.6	5.8	5.8
LnGrp LOS	D	C	A	A	A	A
Approach Vol, veh/h	445			401	571	
Approach Delay, s/veh	38.1			5.9	5.8	
Approach LOS	D			A	A	
Timer - Assigned Phs	2			4		6
Phs Duration (G+Y+Rc), s	67.1			22.9		67.1
Change Period (Y+Rc), s	5.5			5.5		5.5
Max Green Setting (Gmax), s	41.5			37.5		41.5
Max Q Clear Time (g_c+l1), s	10.3			16.0		7.7
Green Ext Time (p_c), s	5.2			1.3		6.3
Intersection Summary						
HCM 6th Ctrl Delay			16.0			
HCM 6th LOS			B			

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	485	367	7	6	5
Future Vol, veh/h	7	485	367	7	6	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	511	386	7	6	5
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	393	0	-	0	915	390
Stage 1	-	-	-	-	390	-
Stage 2	-	-	-	-	525	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1166	-	-	-	303	658
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	593	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1166	-	-	-	301	658
Mov Cap-2 Maneuver	-	-	-	-	301	-
Stage 1	-	-	-	-	679	-
Stage 2	-	-	-	-	593	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		14.3		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1166	-	-	-	400	
HCM Lane V/C Ratio	0.006	-	-	-	0.029	
HCM Control Delay (s)	8.1	0	-	-	14.3	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	486	368	4	4	6
Future Vol, veh/h	5	486	368	4	4	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	512	387	4	4	6

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	391	0	0 911 389
Stage 1	-	-	- 389 -
Stage 2	-	-	- 522 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1168	-	- 304 659
Stage 1	-	-	- 685 -
Stage 2	-	-	- 595 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1168	-	- 302 659
Mov Cap-2 Maneuver	-	-	- 302 -
Stage 1	-	-	- 681 -
Stage 2	-	-	- 595 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1168	-	-	-	447
HCM Lane V/C Ratio	0.005	-	-	-	0.024
HCM Control Delay (s)	8.1	0	-	-	13.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	473	358	12	17	14
Future Vol, veh/h	16	473	358	12	17	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	503	381	13	18	15

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	394	0	0 674 388
Stage 1	-	-	- 388 -
Stage 2	-	-	- 286 -
Critical Hdwy	4.13	-	- 6.63 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.83 -
Follow-up Hdwy	2.219	-	- 3.519 3.319
Pot Cap-1 Maneuver	1163	-	- 404 659
Stage 1	-	-	- 685 -
Stage 2	-	-	- 738 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1163	-	- 396 659
Mov Cap-2 Maneuver	-	-	- 396 -
Stage 1	-	-	- 671 -
Stage 2	-	-	- 738 -

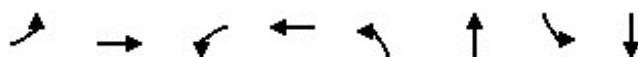
Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1163	-	-	-	483
HCM Lane V/C Ratio	0.015	-	-	-	0.068
HCM Control Delay (s)	8.1	0.1	-	-	13
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Future “Build” Intersection Analysis

Timings
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

3a. Future Build AM
05/02/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔		↔		↔		↔
Traffic Volume (vph)	1	0	9	2	10	1213	22	772
Future Volume (vph)	1	0	9	2	10	1213	22	772
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	23.5	23.5	26.5	26.5	24.5	24.5	23.5	23.5
Total Split (s)	28.0	28.0	28.0	28.0	82.0	82.0	82.0	82.0
Total Split (%)	25.5%	25.5%	25.5%	25.5%	74.5%	74.5%	74.5%	74.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		7.6		7.6		94.8		94.8
Actuated g/C Ratio		0.07		0.07		0.86		0.86
v/c Ratio		0.01		0.50		0.49		0.34
Control Delay		46.0		23.2		1.7		2.5
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		46.0		23.2		1.7		2.5
LOS		D		C		A		A
Approach Delay		46.0		23.3		1.7		2.5
Approach LOS		D		C		A		A

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 2.9

Intersection LOS: A

Intersection Capacity Utilization 55.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SR 42/US 23 (Moreland Ave) & Eastland Rd



HCM 6th Signalized Intersection Summary
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

3a. Future Build AM
05/02/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	0	9	2	73	10	1213	20	22	772	7
Future Volume (veh/h)	1	0	0	9	2	73	10	1213	20	22	772	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1826	1900	1826	1826	1900
Adj Flow Rate, veh/h	1	0	0	10	2	81	11	1348	22	24	858	8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	5	0	5	5	0
Cap, veh/h	153	0	0	44	8	103	41	2806	46	79	2646	24
Arrive On Green	0.07	0.00	0.00	0.07	0.07	0.07	0.83	0.83	0.83	0.83	0.83	0.83
Sat Flow, veh/h	1191	0	0	100	108	1407	10	3394	55	53	3200	30
Grp Volume(v), veh/h	1	0	0	93	0	0	722	0	659	442	0	448
Grp Sat Flow(s),veh/h/ln	1191	0	0	1615	0	0	1807	0	1652	1627	0	1656
Q Serve(g_s), s	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	12.7	0.0	0.0	7.1
Cycle Q Clear(g_c), s	0.1	0.0	0.0	6.2	0.0	0.0	12.5	0.0	12.7	6.1	0.0	7.1
Prop In Lane	1.00		0.00	0.11		0.87	0.02		0.03	0.05		0.02
Lane Grp Cap(c), veh/h	153	0	0	155	0	0	1528	0	1366	1380	0	1369
V/C Ratio(X)	0.01	0.00	0.00	0.60	0.00	0.00	0.47	0.00	0.48	0.32	0.00	0.33
Avail Cap(c_a), veh/h	328	0	0	364	0	0	1528	0	1366	1380	0	1369
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.3	0.0	0.0	50.1	0.0	0.0	2.7	0.0	2.7	2.2	0.0	2.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	3.7	0.0	0.0	1.1	0.0	1.2	0.6	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	2.6	0.0	0.0	2.5	0.0	2.4	1.2	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.3	0.0	0.0	53.8	0.0	0.0	3.8	0.0	4.0	2.8	0.0	2.9
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h	1			93			1381			890		
Approach Delay, s/veh	47.3			53.8			3.9			2.8		
Approach LOS	D			D			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	96.4			13.6			96.4			13.6		
Change Period (Y+Rc), s	5.5			5.5			5.5			5.5		
Max Green Setting (Gmax), s	76.5			22.5			76.5			22.5		
Max Q Clear Time (g_c+l1), s	14.7			2.1			9.1			8.2		
Green Ext Time (p_c), s	29.5			0.0			15.0			0.3		
Intersection Summary												
HCM 6th Ctrl Delay	5.5											
HCM 6th LOS	A											

Timings 2: SR 42/US 23 (Moreland Ave) & Custer Ave

3a. Future Build AM
05/02/2022

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	145	164	144	173	221	211	969	61	626
Future Volume (vph)	145	164	144	173	221	211	969	61	626
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	5.0	15.0	5.0	15.0
Minimum Split (s)	15.0	35.5	35.5	15.0	34.5	15.0	31.5	15.0	41.5
Total Split (s)	15.0	35.5	35.5	15.0	35.5	17.0	44.5	15.0	42.5
Total Split (%)	13.6%	32.3%	32.3%	13.6%	32.3%	15.5%	40.5%	13.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	34.8	25.5	25.5	35.1	25.6	57.2	47.7	49.1	41.5
Actuated g/C Ratio	0.32	0.23	0.23	0.32	0.23	0.52	0.43	0.45	0.38
v/c Ratio	0.64	0.41	0.32	0.47	0.85	0.66	0.76	0.32	0.60
Control Delay	36.5	37.8	6.9	28.5	56.3	26.2	32.4	18.6	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	37.8	6.9	28.5	56.3	26.2	32.4	18.6	28.2
LOS	D	D	A	C	E	C	C	B	C
Approach Delay		27.6			46.9		31.4		27.5
Approach LOS		C			D		C		C

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 32.4

Intersection LOS: C

Intersection Capacity Utilization 78.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: SR 42/US 23 (Moreland Ave) & Custer Ave

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	44.5 s	15 s	35.5 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
17 s	42.5 s	15 s	35.5 s

HCM 6th Signalized Intersection Summary 2: SR 42/US 23 (Moreland Ave) & Custer Ave

3a. Future Build AM
05/02/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	164	144	173	221	119	211	969	84	61	626	96
Future Volume (veh/h)	145	164	144	173	221	119	211	969	84	61	626	96
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	154	174	0	184	235	0	224	1031	89	65	666	102
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	5	5	5
Cap, veh/h	249	280		294	280		436	1692	146	281	1449	222
Arrive On Green	0.09	0.15	0.00	0.09	0.15	0.00	0.08	0.52	0.52	0.04	0.48	0.48
Sat Flow, veh/h	1767	1856	1572	1767	1856	0	1739	3231	279	1739	3016	461
Grp Volume(v), veh/h	154	174	0	184	235	0	224	553	567	65	383	385
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1767	1856	0	1739	1735	1776	1739	1735	1743
Q Serve(g_s), s	8.0	9.7	0.0	9.5	13.5	0.0	6.9	24.5	24.6	2.1	16.2	16.2
Cycle Q Clear(g_c), s	8.0	9.7	0.0	9.5	13.5	0.0	6.9	24.5	24.6	2.1	16.2	16.2
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.16	1.00		0.26
Lane Grp Cap(c), veh/h	249	280		294	280		436	908	930	281	833	837
V/C Ratio(X)	0.62	0.62		0.63	0.84		0.51	0.61	0.61	0.23	0.46	0.46
Avail Cap(c_a), veh/h	249	506		294	506		475	908	930	363	833	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.0	43.8	0.0	36.5	45.4	0.0	13.5	18.3	18.3	15.2	19.0	19.1
Incr Delay (d2), s/veh	4.5	2.3	0.0	4.2	6.7	0.0	0.9	3.0	3.0	0.4	1.8	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	4.6	0.0	4.5	6.7	0.0	2.5	9.7	9.9	0.8	6.5	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.6	46.0	0.0	40.6	52.1	0.0	14.4	21.4	21.3	15.7	20.9	20.9
LnGrp LOS	D	D		D	D		B	C	C	B	C	C
Approach Vol, veh/h		328	A		419	A		1344			833	
Approach Delay, s/veh		43.5			47.1			20.2			20.5	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.8	63.1	15.0	22.1	14.6	58.4	15.0	22.1				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	39.0	9.5	30.0	11.5	37.0	9.5	30.0				
Max Q Clear Time (g_c+l1), s	4.1	26.6	11.5	11.7	8.9	18.2	10.0	15.5				
Green Ext Time (p_c), s	0.0	8.4	0.0	0.8	0.2	7.7	0.0	1.0				

Intersection Summary

HCM 6th Ctrl Delay	26.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Timings
3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

3a. Future Build AM
05/02/2022



Lane Group	EBL	EBT	EBR	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations								
Traffic Volume (vph)	56	1	118	308	1252	808		
Future Volume (vph)	56	1	118	308	1252	808		
Turn Type	Split	NA	Perm	pm+pt	NA	NA		
Protected Phases	4	4		5	2	6	1	8
Permitted Phases			4	2				
Detector Phase	4	4	4	5	2	6		
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	5.0	15.0	15.0	5.0	6.0
Minimum Split (s)	23.5	23.5	23.5	15.0	23.5	24.5	15.0	23.5
Total Split (s)	23.5	23.5	23.5	19.0	38.0	34.0	15.0	23.5
Total Split (%)	23.5%	23.5%	23.5%	19.0%	38.0%	34.0%	15%	24%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5		
Lead/Lag				Lead	Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	None
Act Effct Green (s)	7.4	7.4	7.4	81.6	81.6	54.6		
Actuated g/C Ratio	0.07	0.07	0.07	0.82	0.82	0.55		
v/c Ratio	0.23	0.23	0.47	0.53	0.46	0.48		
Control Delay	47.6	47.5	10.8	6.8	3.4	15.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	47.6	47.5	10.8	6.8	3.4	15.1		
LOS	D	D	B	A	A	B		
Approach Delay		22.7			4.0	15.1		
Approach LOS		C			A	B		

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 9.0

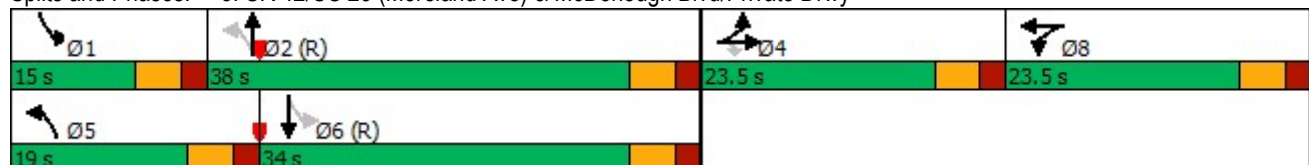
Intersection LOS: A

Intersection Capacity Utilization 60.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy



HCM 6th Signalized Intersection Summary

3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

3a. Future Build AM
05/02/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	1	118	0	0	0	308	1252	3	0	808	76
Future Volume (veh/h)	56	1	118	0	0	0	308	1252	3	0	808	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1900	1159	1900	1900	1752	1826	1900	1900	1826	1900
Adj Flow Rate, veh/h	58	0	0	0	0	0	314	1278	3	0	824	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	0	0	50	0	0	10	5	0	0	5	0
Cap, veh/h	172	0		0	2	0	580	2990	7	388	2487	
Arrive On Green	0.05	0.00	0.00	0.00	0.00	0.00	0.07	0.84	0.84	0.00	0.72	0.00
Sat Flow, veh/h	3591	0	1610	0	1900	0	1668	3551	8	1810	3561	0
Grp Volume(v), veh/h	58	0	0	0	0	0	314	624	657	0	824	0
Grp Sat Flow(s),veh/h/ln	1795	0	1610	0	1900	0	1668	1735	1824	1810	1735	0
Q Serve(g_s), s	1.6	0.0	0.0	0.0	0.0	0.0	4.5	8.9	8.9	0.0	8.8	0.0
Cycle Q Clear(g_c), s	1.6	0.0	0.0	0.0	0.0	0.0	4.5	8.9	8.9	0.0	8.8	0.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	172	0		0	2	0	580	1461	1536	388	2487	
V/C Ratio(X)	0.34	0.00		0.00	0.00	0.00	0.54	0.43	0.43	0.00	0.33	
Avail Cap(c_a), veh/h	646	0		0	342	0	689	1461	1536	558	2487	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	46.1	0.0	0.0	0.0	0.0	0.0	3.5	2.0	2.0	0.0	5.3	0.0
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.0	0.0	0.0	0.8	0.9	0.9	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.0	0.0	0.0	0.8	1.2	1.2	0.0	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.2	0.0	0.0	0.0	0.0	0.0	4.3	2.9	2.8	0.0	5.6	0.0
LnGrp LOS	D	A		A	A	A	A	A	A	A	A	
Approach Vol, veh/h		58	A		0			1595			824	A
Approach Delay, s/veh		47.2			0.0			3.1			5.6	
Approach LOS		D						A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	89.7		10.3	12.5	77.2		0.0				
Change Period (Y+Rc), s	5.5	5.5		5.5	5.5	5.5		5.5				
Max Green Setting (Gmax), s	9.5	32.5		18.0	13.5	28.5		18.0				
Max Q Clear Time (g_c+l1), s	0.0	10.9		3.6	6.5	10.8		0.0				
Green Ext Time (p_c), s	0.0	14.3		0.1	0.5	8.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay	5.0
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Timings

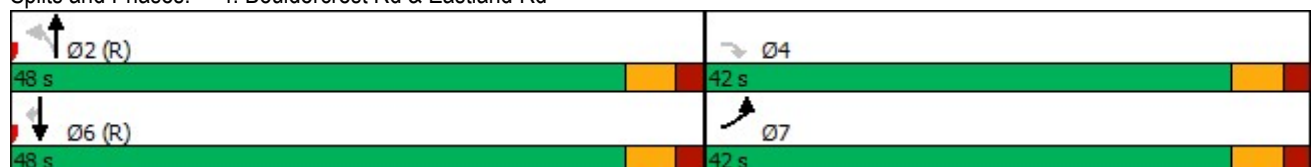
4: Bouldercrest Rd & Eastland Rd

3a. Future Build AM

05/02/2022

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	229	78	98	336	218	249
Future Volume (vph)	229	78	98	336	218	249
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	7			2	6	
Permitted Phases		4	2			6
Detector Phase	7	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	15.0	23.5	23.5	23.5	29.5	29.5
Total Split (s)	42.0	42.0	48.0	48.0	48.0	48.0
Total Split (%)	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	19.2	19.2		59.8	59.8	59.8
Actuated g/C Ratio	0.21	0.21		0.66	0.66	0.66
v/c Ratio	0.71	0.22		0.27	0.21	0.26
Control Delay	42.8	7.1		7.4	7.3	1.6
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	42.8	7.1		7.4	7.3	1.6
LOS	D	A		A	A	A
Approach Delay	33.7			7.4	4.3	
Approach LOS	C			A	A	
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green						
Natural Cycle: 55						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.71						
Intersection Signal Delay: 12.9				Intersection LOS: B		
Intersection Capacity Utilization 51.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Bouldercrest Rd & Eastland Rd



HCM 6th Signalized Intersection Summary

4: Bouldercrest Rd & Eastland Rd

3a. Future Build AM
05/02/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	229	78	98	336	218	249
Future Volume (veh/h)	229	78	98	336	218	249
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	269	92	115	395	256	293
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	320	285	442	1555	1306	1106
Arrive On Green	0.18	0.18	0.70	0.70	0.70	0.70
Sat Flow, veh/h	1781	1585	547	2313	1870	1585
Grp Volume(v), veh/h	269	92	231	279	256	293
Grp Sat Flow(s),veh/h/ln	1781	1585	1157	1617	1870	1585
Q Serve(g_s), s	13.1	4.5	3.7	5.7	4.3	6.2
Cycle Q Clear(g_c), s	13.1	4.5	8.0	5.7	4.3	6.2
Prop In Lane	1.00	1.00	0.50			1.00
Lane Grp Cap(c), veh/h	320	285	868	1129	1306	1106
V/C Ratio(X)	0.84	0.32	0.27	0.25	0.20	0.26
Avail Cap(c_a), veh/h	722	643	868	1129	1306	1106
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	32.1	5.2	5.0	4.8	5.0
Incr Delay (d2), s/veh	5.9	0.6	0.7	0.5	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	1.8	1.5	1.7	1.4	9.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	41.6	32.8	6.0	5.5	5.1	5.6
LnGrp LOS	D	C	A	A	A	A
Approach Vol, veh/h	361			510	549	
Approach Delay, s/veh	39.3			5.7	5.4	
Approach LOS	D			A	A	
Timer - Assigned Phs	2		4		6	
Phs Duration (G+Y+Rc), s	68.3		21.7		68.3	
Change Period (Y+Rc), s	5.5		5.5		5.5	
Max Green Setting (Gmax), s	42.5		36.5		42.5	
Max Q Clear Time (g_c+l1), s	10.0		15.1		8.2	
Green Ext Time (p_c), s	7.0		1.0		5.8	
Intersection Summary						
HCM 6th Ctrl Delay			14.1			
HCM 6th LOS			B			

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	3	275	19	6	343	3	61	0	13	3	0	4
Future Vol, veh/h	3	275	19	6	343	3	61	0	13	3	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	3	2	2	3	2	2	2	2	2	2	2
Mvmt Flow	3	286	20	6	357	3	64	0	14	3	0	4
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	360	0	0	306	0	0	675	674	296	680	683	359
Stage 1	-	-	-	-	-	-	302	302	-	371	371	-
Stage 2	-	-	-	-	-	-	373	372	-	309	312	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1199	-	-	1255	-	-	368	376	743	365	372	685
Stage 1	-	-	-	-	-	-	707	664	-	649	620	-
Stage 2	-	-	-	-	-	-	648	619	-	701	658	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1199	-	-	1255	-	-	363	373	743	356	369	685
Mov Cap-2 Maneuver	-	-	-	-	-	-	363	373	-	356	369	-
Stage 1	-	-	-	-	-	-	705	662	-	647	616	-
Stage 2	-	-	-	-	-	-	640	615	-	686	656	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			16.2			12.4		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	399	1199	-	-	1255	-	-	491				
HCM Lane V/C Ratio	0.193	0.003	-	-	0.005	-	-	0.015				
HCM Control Delay (s)	16.2	8	0	-	7.9	0	-	12.4				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	0				

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	2	289	25	6	399	2	94	0	7	2	0	2
Future Vol, veh/h	2	289	25	6	399	2	94	0	7	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	3	2	2	3	2	2	2	2	2	2	2
Mvmt Flow	2	301	26	6	416	2	98	0	7	2	0	2
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	418	0	0	327	0	0	748	748	314	751	760	417
Stage 1	-	-	-	-	-	-	318	318	-	429	429	-
Stage 2	-	-	-	-	-	-	430	430	-	322	331	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1141	-	-	1233	-	-	329	341	726	327	336	636
Stage 1	-	-	-	-	-	-	693	654	-	604	584	-
Stage 2	-	-	-	-	-	-	603	583	-	690	645	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1141	-	-	1233	-	-	326	338	726	322	333	636
Mov Cap-2 Maneuver	-	-	-	-	-	-	326	338	-	322	333	-
Stage 1	-	-	-	-	-	-	692	653	-	603	580	-
Stage 2	-	-	-	-	-	-	597	580	-	682	644	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			20.3			13.5		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	339	1141	-	-	1233	-	-	428				
HCM Lane V/C Ratio	0.31	0.002	-	-	0.005	-	-	0.01				
HCM Control Delay (s)	20.3	8.2	0	-	7.9	0	-	13.5				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	1.3	0	-	-	0	-	-	0				

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔				↔		↔	
Traffic Vol, veh/h	14	295	19	0	481	14	0	0	7	13	0	13
Future Vol, veh/h	14	295	19	0	481	14	0	0	7	13	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	3	2	2	3	2	2	2	2	2	2	2
Mvmt Flow	15	307	20	0	501	15	0	0	7	14	0	14

Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	516	0	0	-	-	0	-	-	-	164	693	846	509
Stage 1	-	-	-	-	-	-	-	-	-	-	509	509	-
Stage 2	-	-	-	-	-	-	-	-	-	-	184	337	-
Critical Hdwy	4.13	-	-	-	-	-	-	-	-	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	-	-	-	-	-	-	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1048	-	-	0	-	-	0	0	852	343	298	563	
Stage 1	-	-	-	0	-	-	0	0	-	546	537	-	
Stage 2	-	-	-	0	-	-	0	0	-	801	640	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1048	-	-	-	-	-	-	-	852	335	293	563	
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	335	293	-	
Stage 1	-	-	-	-	-	-	-	-	-	536	537	-	
Stage 2	-	-	-	-	-	-	-	-	-	780	628	-	

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	9.3	14.2
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	852	1048	-	-	-	-	420
HCM Lane V/C Ratio	0.009	0.014	-	-	-	-	0.064
HCM Control Delay (s)	9.3	8.5	0.1	-	-	-	14.2
HCM Lane LOS	A	A	A	-	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	-	-	0.2

Intersection

Int Delay, s/veh 0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗	↗		↗↗
Traffic Vol, veh/h	0	38	1226	20	0	943
Future Vol, veh/h	0	38	1226	20	0	943
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	175	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	5
Mvmt Flow	0	41	1333	22	0	1025

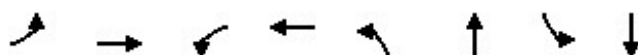
Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	667	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.94	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.32	-
Pot Cap-1 Maneuver	0	401	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	-	401	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	-	401
HCM Lane V/C Ratio	-	0.103
HCM Control Delay (s)	-	15
HCM Lane LOS	-	C
HCM 95th %tile Q(veh)	-	0.3

Timings
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

3b. Future Build PM
05/02/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔		↔		↔		↔
Traffic Volume (vph)	13	5	20	5	9	1029	92	1184
Future Volume (vph)	13	5	20	5	9	1029	92	1184
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	23.5	23.5	26.5	26.5	24.5	24.5	23.5	23.5
Total Split (s)	26.5	26.5	26.5	26.5	83.5	83.5	83.5	83.5
Total Split (%)	24.1%	24.1%	24.1%	24.1%	75.9%	75.9%	75.9%	75.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effect Green (s)		8.2		8.2		94.2		94.2
Actuated g/C Ratio		0.07		0.07		0.86		0.86
v/c Ratio		0.29		0.52		0.40		0.61
Control Delay		36.9		28.7		1.6		4.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		36.9		28.7		1.6		4.8
LOS		D		C		A		A
Approach Delay		36.9		28.7		1.6		4.8
Approach LOS		D		C		A		A

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 4.7

Intersection LOS: A

Intersection Capacity Utilization 84.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: SR 42/US 23 (Moreland Ave) & Eastland Rd



HCM 6th Signalized Intersection Summary
1: SR 42/US 23 (Moreland Ave) & Eastland Rd

3b. Future Build PM
05/02/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	5	15	20	5	65	9	1029	22	92	1184	2
Future Volume (veh/h)	13	5	15	20	5	65	9	1029	22	92	1184	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1826	1900	1870	1826	1900
Adj Flow Rate, veh/h	13	5	15	21	5	67	9	1061	23	95	1221	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	5	0	2	5	0
Cap, veh/h	81	37	60	59	15	88	40	2774	60	186	2338	4
Arrive On Green	0.08	0.08	0.08	0.08	0.08	0.08	0.82	0.82	0.82	0.82	0.82	0.82
Sat Flow, veh/h	463	488	793	255	193	1156	9	3366	73	180	2837	5
Grp Volume(v), veh/h	33	0	0	93	0	0	570	0	523	605	0	713
Grp Sat Flow(s),veh/h/ln	1744	0	0	1604	0	0	1799	0	1649	1360	0	1661
Q Serve(g_s), s	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	9.0	0.0	0.0	14.5
Cycle Q Clear(g_c), s	1.9	0.0	0.0	6.2	0.0	0.0	8.8	0.0	9.0	9.6	0.0	14.5
Prop In Lane	0.39		0.45	0.23		0.72	0.02		0.04	0.16		0.00
Lane Grp Cap(c), veh/h	178	0	0	162	0	0	1516	0	1359	1159	0	1369
V/C Ratio(X)	0.19	0.00	0.00	0.58	0.00	0.00	0.38	0.00	0.38	0.52	0.00	0.52
Avail Cap(c_a), veh/h	354	0	0	343	0	0	1516	0	1359	1159	0	1369
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.9	0.0	0.0	49.8	0.0	0.0	2.5	0.0	2.5	2.5	0.0	3.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	3.2	0.0	0.0	0.7	0.0	0.8	1.7	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	2.6	0.0	0.0	1.8	0.0	1.7	2.2	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.4	0.0	0.0	53.0	0.0	0.0	3.2	0.0	3.3	4.2	0.0	4.4
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		33			93			1093			1318	
Approach Delay, s/veh		48.4			53.0			3.2			4.3	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		96.2		13.8		96.2		13.8				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		78.0		21.0		78.0		21.0				
Max Q Clear Time (g_c+l1), s		11.0		3.9		16.5		8.2				
Green Ext Time (p_c), s		20.2		0.1		13.2		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			6.2									
HCM 6th LOS			A									

Timings
2: SR 42/US 23 (Moreland Ave) & Custer Ave

3b. Future Build PM
05/02/2022

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	134	178	100	201	95	52	817	172	934
Future Volume (vph)	134	178	100	201	95	52	817	172	934
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	5.0	15.0	5.0	15.0
Minimum Split (s)	15.0	35.5	35.5	15.0	34.5	15.0	31.5	15.0	41.5
Total Split (s)	15.0	34.5	34.5	16.0	35.5	15.0	44.5	15.0	44.5
Total Split (%)	13.6%	31.4%	31.4%	14.5%	32.3%	13.6%	40.5%	13.6%	40.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	25.6	16.4	16.4	28.1	17.6	54.9	47.9	66.6	56.3
Actuated g/C Ratio	0.23	0.15	0.15	0.26	0.16	0.50	0.44	0.61	0.51
v/c Ratio	0.54	0.68	0.30	0.73	0.68	0.21	0.72	0.56	0.62
Control Delay	37.5	56.1	5.4	46.8	43.4	13.0	29.7	24.8	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	56.1	5.4	46.8	43.4	13.0	29.7	24.8	21.6
LOS	D	E	A	D	D	B	C	C	C
Approach Delay		37.7			45.1		28.9		22.1
Approach LOS		D			D		C		C

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 29.5

Intersection LOS: C

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: SR 42/US 23 (Moreland Ave) & Custer Ave

			
Ø1	Ø2 (R)	Ø3	Ø4
15 s	44.5 s	16 s	34.5 s
			
Ø5	Ø6 (R)	Ø7	Ø8
15 s	44.5 s	15 s	35.5 s

HCM 6th Signalized Intersection Summary 2: SR 42/US 23 (Moreland Ave) & Custer Ave

3b. Future Build PM
05/02/2022

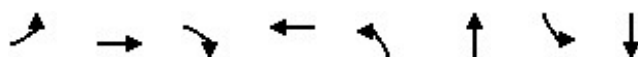
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	134	178	100	201	95	112	52	817	196	172	934	107
Future Volume (veh/h)	134	178	100	201	95	112	52	817	196	172	934	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	140	185	0	209	99	0	54	851	204	179	973	111
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	5	5	5
Cap, veh/h	324	228		265	247		302	1430	343	338	1711	195
Arrive On Green	0.09	0.12	0.00	0.10	0.13	0.00	0.04	0.52	0.52	0.07	0.55	0.55
Sat Flow, veh/h	1767	1856	1572	1767	1856	0	1739	2776	665	1739	3138	358
Grp Volume(v), veh/h	140	185	0	209	99	0	54	532	523	179	538	546
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1767	1856	0	1739	1735	1706	1739	1735	1761
Q Serve(g_s), s	7.5	10.7	0.0	10.5	5.4	0.0	1.6	23.6	23.6	5.3	22.5	22.5
Cycle Q Clear(g_c), s	7.5	10.7	0.0	10.5	5.4	0.0	1.6	23.6	23.6	5.3	22.5	22.5
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.39	1.00		0.20
Lane Grp Cap(c), veh/h	324	228		265	247		302	893	879	338	946	960
V/C Ratio(X)	0.43	0.81		0.79	0.40		0.18	0.60	0.60	0.53	0.57	0.57
Avail Cap(c_a), veh/h	326	489		265	506		389	893	879	373	946	960
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.6	47.0	0.0	39.7	43.7	0.0	13.3	18.6	18.7	14.6	16.5	16.5
Incr Delay (d2), s/veh	0.9	6.8	0.0	14.9	1.1	0.0	0.3	2.9	3.0	1.3	2.5	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	5.3	0.0	6.0	2.5	0.0	0.6	9.4	9.2	2.0	8.7	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	53.9	0.0	54.5	44.7	0.0	13.6	21.6	21.6	15.9	19.0	18.9
LnGrp LOS	D	D		D	D		B	C	C	B	B	B
Approach Vol, veh/h		325	A		308	A		1109			1263	
Approach Delay, s/veh		47.2			51.4			21.2			18.5	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	62.2	16.0	19.0	9.5	65.5	14.9	20.1				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	39.0	10.5	29.0	9.5	39.0	9.5	30.0				
Max Q Clear Time (g_c+l1), s	7.3	25.6	12.5	12.7	3.6	24.5	9.5	7.4				
Green Ext Time (p_c), s	0.1	8.5	0.0	0.8	0.0	9.2	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			26.0									
HCM 6th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.												

Timings

3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

3b. Future Build PM

05/02/2022



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	96	0	319	0	113	911	1	1151
Future Volume (vph)	96	0	319	0	113	911	1	1151
Turn Type	Split	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			4		2		6	
Detector Phase	4	4	4	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	5.0	15.0	5.0	15.0
Minimum Split (s)	23.5	23.5	23.5	23.5	15.0	23.5	15.0	24.5
Total Split (s)	23.5	23.5	23.5	23.5	15.0	38.0	15.0	38.0
Total Split (%)	23.5%	23.5%	23.5%	23.5%	15.0%	38.0%	15.0%	38.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	9.8	9.8	9.8	6.0	76.9	74.7	69.3	63.8
Actuated g/C Ratio	0.10	0.10	0.10	0.06	0.77	0.75	0.69	0.64
v/c Ratio	0.30	0.30	0.73	0.01	0.42	0.37	0.00	0.59
Control Delay	44.8	44.8	14.4	0.0	9.1	7.2	6.0	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	44.8	14.4	0.0	9.1	7.2	6.0	14.2
LOS	D	D	B	A	A	A	A	B
Approach Delay		21.4				7.4		14.2
Approach LOS		C				A		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 12.7

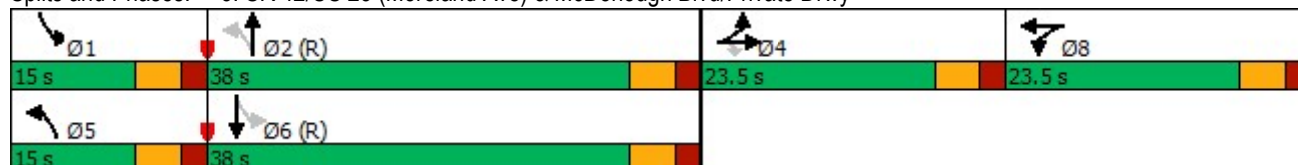
Intersection LOS: B

Intersection Capacity Utilization 73.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy



HCM 6th Signalized Intersection Summary

3: SR 42/US 23 (Moreland Ave) & McDonough Blvd/Private Drwy

3b. Future Build PM

05/02/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	96	0	319	1	0	1	113	911	1	1	1151	90	
Future Volume (veh/h)	96	0	319	1	0	1	113	911	1	1	1151	90	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No			No			No			No			
Adj Sat Flow, veh/h/ln	1885	1900	1900	418	1900	1900	1737	1826	1900	1900	1826	1900	
Adj Flow Rate, veh/h	100	0	0	1	0	1	118	949	1	1	1199	0	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Percent Heavy Veh, %	1	0	0	100	0	0	11	5	0	0	5	0	
Cap, veh/h	202	0		3	0	3	368	2557	3	445	2333		
Arrive On Green	0.06	0.00	0.00	0.00	0.00	0.00	0.05	0.72	0.72	0.00	0.67	0.00	
Sat Flow, veh/h	3591	0	1610	852	0	852	1654	3556	4	1810	3561	0	
Grp Volume(v), veh/h	100	0	0	2	0	0	118	463	487	1	1199	0	
Grp Sat Flow(s),veh/h/ln	1795	0	1610	1704	0	0	1654	1735	1825	1810	1735	0	
Q Serve(g_s), s	2.7	0.0	0.0	0.1	0.0	0.0	2.1	10.2	10.2	0.0	17.3	0.0	
Cycle Q Clear(g_c), s	2.7	0.0	0.0	0.1	0.0	0.0	2.1	10.2	10.2	0.0	17.3	0.0	
Prop In Lane	1.00		1.00	0.50		0.50	1.00		0.00	1.00		0.00	
Lane Grp Cap(c), veh/h	202	0		6	0	0	368	1247	1313	445	2333		
V/C Ratio(X)	0.49	0.00		0.36	0.00	0.00	0.32	0.37	0.37	0.00	0.51		
Avail Cap(c_a), veh/h	646	0		307	0	0	446	1247	1313	614	2333		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	45.8	0.0	0.0	49.7	0.0	0.0	6.2	5.4	5.4	5.5	8.2	0.0	
Incr Delay (d2), s/veh	1.9	0.0	0.0	35.5	0.0	0.0	0.5	0.8	0.8	0.0	0.8	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.1	0.0	0.0	0.5	3.0	3.1	0.0	5.3	0.0	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	47.7	0.0	0.0	85.3	0.0	0.0	6.7	6.2	6.2	5.5	9.0	0.0	
LnGrp LOS	D	A		F	A	A	A	A	A	A	A		
Approach Vol, veh/h	100		A		2		1068				1200		A
Approach Delay, s/veh	47.7				85.3		6.3				9.0		
Approach LOS	D				F		A				A		
Timer - Assigned Phs	1	2			4	5	6	8					
Phs Duration (G+Y+Rc), s	5.6	77.4			11.1	10.3	72.7	5.8					
Change Period (Y+Rc), s	5.5	5.5			5.5	5.5	5.5	5.5					
Max Green Setting (Gmax), s	9.5	32.5			18.0	9.5	32.5	18.0					
Max Q Clear Time (g_c+l1), s	2.0	12.2			4.7	4.1	19.3	2.1					
Green Ext Time (p_c), s	0.0	5.5			0.2	0.1	6.5	0.0					
Intersection Summary													
HCM 6th Ctrl Delay	9.5												
HCM 6th LOS	A												

Timings

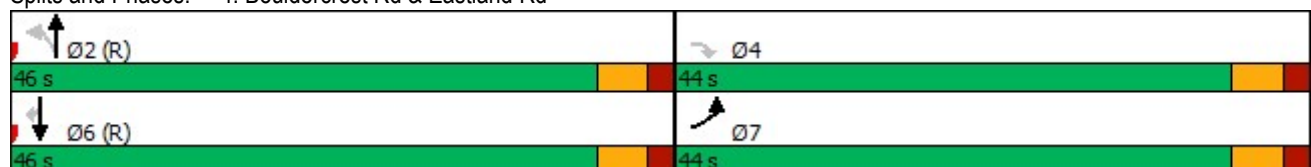
4: Bouldercrest Rd & Eastland Rd

3b. Future Build PM

05/02/2022

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	276	158	101	287	292	250
Future Volume (vph)	276	158	101	287	292	250
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	7			2	6	
Permitted Phases		4	2			6
Detector Phase	7	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	6.0	15.0	15.0	15.0	15.0
Minimum Split (s)	15.0	23.5	23.5	23.5	29.5	29.5
Total Split (s)	44.0	44.0	46.0	46.0	46.0	46.0
Total Split (%)	48.9%	48.9%	51.1%	51.1%	51.1%	51.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	20.8	20.8		58.2	58.2	58.2
Actuated g/C Ratio	0.23	0.23		0.65	0.65	0.65
v/c Ratio	0.73	0.34		0.23	0.26	0.24
Control Delay	41.9	6.0		7.9	8.4	1.7
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	41.9	6.0		7.9	8.4	1.7
LOS	D	A		A	A	A
Approach Delay	28.8			7.9	5.3	
Approach LOS	C			A	A	
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green						
Natural Cycle: 55						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.73						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 56.9%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 4: Bouldercrest Rd & Eastland Rd



HCM 6th Signalized Intersection Summary

4: Bouldercrest Rd & Eastland Rd

3b. Future Build PM
05/02/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	276	158	101	287	292	250
Future Volume (veh/h)	276	158	101	287	292	250
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	297	170	109	309	314	269
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	353	315	453	1401	1271	1077
Arrive On Green	0.20	0.20	0.68	0.68	0.68	0.68
Sat Flow, veh/h	1781	1585	573	2148	1870	1585
Grp Volume(v), veh/h	297	170	186	232	314	269
Grp Sat Flow(s),veh/h/ln	1781	1585	1019	1617	1870	1585
Q Serve(g_s), s	14.4	8.7	4.3	4.8	5.8	5.9
Cycle Q Clear(g_c), s	14.4	8.7	10.1	4.8	5.8	5.9
Prop In Lane	1.00	1.00	0.59			1.00
Lane Grp Cap(c), veh/h	353	315	756	1098	1271	1077
V/C Ratio(X)	0.84	0.54	0.25	0.21	0.25	0.25
Avail Cap(c_a), veh/h	762	678	756	1098	1271	1077
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.7	32.4	6.4	5.4	5.6	5.6
Incr Delay (d2), s/veh	5.4	1.4	0.8	0.4	0.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	3.4	1.5	1.5	2.0	9.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.1	33.8	7.1	5.8	6.0	6.1
LnGrp LOS	D	C	A	A	A	A
Approach Vol, veh/h	467			418	583	
Approach Delay, s/veh	37.8			6.4	6.1	
Approach LOS	D			A	A	
Timer - Assigned Phs	2		4		6	
Phs Duration (G+Y+Rc), s	66.6		23.4		66.6	
Change Period (Y+Rc), s	5.5		5.5		5.5	
Max Green Setting (Gmax), s	40.5		38.5		40.5	
Max Q Clear Time (g_c+l1), s	12.1		16.4		7.9	
Green Ext Time (p_c), s	5.4		1.4		6.4	
Intersection Summary						
HCM 6th Ctrl Delay			16.3			
HCM 6th LOS			B			

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	7	495	44	13	380	7	46	0	10	6	0	5
Future Vol, veh/h	7	495	44	13	380	7	46	0	10	6	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	3	2	2	3	2	2	2	2	2	2	2
Mvmt Flow	7	521	46	14	400	7	48	0	11	6	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	407	0	0	567	0	0	992	993	544	996	1013	404
Stage 1	-	-	-	-	-	-	558	558	-	432	432	-
Stage 2	-	-	-	-	-	-	434	435	-	564	581	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1152	-	-	1005	-	-	225	245	539	223	239	647
Stage 1	-	-	-	-	-	-	514	512	-	602	582	-
Stage 2	-	-	-	-	-	-	600	580	-	510	500	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1152	-	-	1005	-	-	219	238	539	214	233	647
Mov Cap-2 Maneuver	-	-	-	-	-	-	219	238	-	214	233	-
Stage 1	-	-	-	-	-	-	509	507	-	597	572	-
Stage 2	-	-	-	-	-	-	584	570	-	496	496	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.3			24.3			17.1		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	245	1152	-	-	1005	-	-	308				
HCM Lane V/C Ratio	0.241	0.006	-	-	0.014	-	-	0.038				
HCM Control Delay (s)	24.3	8.1	0	-	8.6	0	-	17.1				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.9	0	-	-	0	-	-	0.1				

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	5	535	57	13	414	4	71	0	5	4	0	6
Future Vol, veh/h	5	535	57	13	414	4	71	0	5	4	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	3	2	2	3	2	2	2	2	2	2	2
Mvmt Flow	5	563	60	14	436	4	75	0	5	4	0	6
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	440	0	0	623	0	0	1072	1071	593	1072	1099	438
Stage 1	-	-	-	-	-	-	603	603	-	466	466	-
Stage 2	-	-	-	-	-	-	469	468	-	606	633	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1120	-	-	958	-	-	198	221	506	198	212	619
Stage 1	-	-	-	-	-	-	486	488	-	577	562	-
Stage 2	-	-	-	-	-	-	575	561	-	484	473	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1120	-	-	958	-	-	192	215	506	192	206	619
Mov Cap-2 Maneuver	-	-	-	-	-	-	192	215	-	192	206	-
Stage 1	-	-	-	-	-	-	483	485	-	573	551	-
Stage 2	-	-	-	-	-	-	558	550	-	476	470	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.3			34.5			16.3		
HCM LOS							D			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	200	1120	-	-	958	-	-	328				
HCM Lane V/C Ratio	0.4	0.005	-	-	0.014	-	-	0.032				
HCM Control Delay (s)	34.5	8.2	0	-	8.8	0	-	16.3				
HCM Lane LOS	D	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	1.8	0	-	-	0	-	-	0.1				

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔				↔		↔	
Traffic Vol, veh/h	16	574	44	0	474	12	0	0	5	17	0	14
Future Vol, veh/h	16	574	44	0	474	12	0	0	5	17	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	3	2	2	3	2	2	2	2	2	2	2
Mvmt Flow	17	611	47	0	504	13	0	0	5	18	0	15

Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	517	0	0	-	-	0	-	-	329	851	1156	511	
Stage 1	-	-	-	-	-	-	-	-	-	511	511	-	
Stage 2	-	-	-	-	-	-	-	-	-	340	645	-	
Critical Hdwy	4.13	-	-	-	-	-	-	-	6.93	7.33	6.53	6.23	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.13	5.53	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.53	5.53	-	
Follow-up Hdwy	2.219	-	-	-	-	-	-	-	3.319	3.519	4.019	3.319	
Pot Cap-1 Maneuver	1047	-	-	0	-	-	0	0	667	266	196	562	
Stage 1	-	-	-	0	-	-	0	0	-	544	536	-	
Stage 2	-	-	-	0	-	-	0	0	-	649	467	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1047	-	-	-	-	-	-	-	667	259	191	562	
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	259	191	-	
Stage 1	-	-	-	-	-	-	-	-	-	530	536	-	
Stage 2	-	-	-	-	-	-	-	-	-	627	455	-	

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	10.4	16.6
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	667	1047	-	-	-	-	342
HCM Lane V/C Ratio	0.008	0.016	-	-	-	-	0.096
HCM Control Delay (s)	10.4	8.5	0.1	-	-	-	16.6
HCM Lane LOS	B	A	A	-	-	-	C
HCM 95th %tile Q(veh)	0	0.1	-	-	-	-	0.3

Intersection

Int Delay, s/veh 0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗	↗		↗↗
Traffic Vol, veh/h	0	29	1037	46	0	1235
Future Vol, veh/h	0	29	1037	46	0	1235
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	175	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	5
Mvmt Flow	0	32	1127	50	0	1342

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	564	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.94	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.32	-
Pot Cap-1 Maneuver	0	469	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	-	469	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	-	469
HCM Lane V/C Ratio	-	0.067
HCM Control Delay (s)	-	13.2
HCM Lane LOS	-	B
HCM 95th %tile Q(veh)	-	0.2

Traffic Volume Worksheets

22-014 Moreland Avenue and Custer Avenue DRI
Traffic Volumes

A&R Engineering
May 2022

1. SR 42 @ Eastland Rd
A.M. Peak Hour

Condition	SR 42/US 23 (Moreland Avenue)						SR 42/US 23 (Moreland Avenue)						Eastland Road						Eastland Road					
	Northbound						Southbound						Eastbound						Westbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	10	1103	9	1122		0	22	720	7	749		0	1	0	0	1		0	4	2	72	78	
Growth Factor (%):	1	1	1	1			1	1	1	1			1	1	1	1			1	1	1	1		
No-Build 2024 Volumes:	0	10	1125	9	1144		0	22	734	7	763		0	1	0	0	1		0	4	2	73	79	
Proposed Site Trips:	0	0	88	11	99		0	0	38	0	38		0	0	0	0	0		0	5	0	0	5	
Future 2024 Traffic Volumes:	0	10	1213	20	1243		0	22	772	7	801		0	1	0	0	1		0	9	2	73	84	

P.M. Peak Hour

Condition	SR 42/US 23 (Moreland Avenue)						SR 42/US 23 (Moreland Avenue)						Eastland Road						Eastland Road					
	Northbound						Southbound						Eastbound						Westbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	9	944	14	967		0	90	1075	2	1167		0	13	5	15	33		0	9	5	64	78	
Growth Factor (%):	1	1	1	1			1	1	1	1			1	1	1	1			1	1	1	1		
No-Build 2024 Volumes:	0	9	963	14	986		0	92	1097	2	1191		0	13	5	15	33		0	9	5	65	79	
Proposed Site Trips:	0	0	66	8	74		0	0	87	0	87		0	0	0	0	0		0	11	0	0	11	
Future 2024 Traffic Volumes:	0	9	1029	22	1060		0	92	1184	2	1278		0	13	5	15	33		0	20	5	65	90	

Number of Years = 2 (2022-2024)
Growth Factor (%) = 1

22-014 Moreland Avenue and Custer Avenue DRI
Traffic Volumes

A&R Engineering
May 2022

2. SR 42 @ Custer Ave

A.M. Peak Hour

Condition	SR 42/US 23 (Moreland Avenue)						SR 42/US 23 (Moreland Avenue)						Custer Avenue					
	Northbound						Southbound						Eastbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	198	921	74	1193		0	18	614	94	726		0	142	149	141	432	
Growth Factor (%):	1	1	1	1	1		1	1	1	1	1		1	1	1	1	1	
No-Build 2024 Volumes:	0	202	939	75	1216		0	18	626	96	740		0	145	152	144	441	
Proposed Site Trips:	0	9	30	9	48		0	43	0	0	43		0	0	12	0	12	
Future 2024 Traffic Volumes:	0	211	969	84	1264		0	61	626	96	783		0	145	164	144	453	

P.M. Peak Hour

Condition	SR 42/US 23 (Moreland Avenue)						SR 42/US 23 (Moreland Avenue)						Custer Avenue					
	Northbound						Southbound						Eastbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	45	779	173	997		0	73	916	105	1094		0	131	147	98	376	
Growth Factor (%):	1	1	1	1	1		1	1	1	1	1		1	1	1	1	1	
No-Build 2024 Volumes:	0	46	795	176	1017		0	74	934	107	1115		0	134	150	100	384	
Proposed Site Trips:	0	6	22	20	48		0	98	0	0	98		0	0	28	0	28	
Future 2024 Traffic Volumes:	0	52	817	196	1065		0	172	934	107	1213		0	134	178	100	412	

Number of Years = 2 (2022-2024)
Growth Factor (%) = 1

22-014 Moreland Avenue and Custer Avenue DRI
Traffic Volumes

A&R Engineering
May 2022

3. SR 42 @ McDonough Blvd

A.M. Peak Hour

Condition	SR 42/US 23 (Moreland Avenue)						SR 42/US 23 (Moreland Avenue)						McDonough Boulevard						xx Road					
	Northbound						Southbound						Eastbound						Westbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	302	1209	3	1514		0	0	749	53	802		0	45	1	116	162		0	0	0	0	0	0
Growth Factor (%):	1	1	1	1			1	1	1	1		1	1	1	1				1	1	1	1		
No-Build 2024 Volumes:	0	308	1233	3	1544		0	0	764	54	818		0	46	1	118	165		0	0	0	0	0	0
Proposed Site Trips:	0	0	19	0	19		0	0	44	22	66		0	10	0	0	10		0	0	0	0	0	0
Future 2024 Traffic Volumes:	0	308	1252	3	1563		0	0	808	76	884		0	56	1	118	175		0	0	0	0	0	0

P.M. Peak Hour

Condition	SR 42/US 23 (Moreland Avenue)						SR 42/US 23 (Moreland Avenue)						McDonough Boulevard						xx Road					
	Northbound						Southbound						Eastbound						Westbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	111	851	1	963		0	1	1096	72	1169		0	73	0	313	386		0	1	0	1	2	
Growth Factor (%):	1	1	1	1			1	1	1	1		1	1	1	1				1	1	1	1		
No-Build 2024 Volumes:	0	113	868	1	982		0	1	1118	73	1192		0	74	0	319	393		0	1	0	1	2	
Proposed Site Trips:	0	0	43	0	43		0	0	33	17	50		0	22	0	0	22		0	0	0	0	0	0
Future 2024 Traffic Volumes:	0	113	911	1	1025		0	1	1151	90	1242		0	96	0	319	415		0	1	0	1	2	

Number of Years = 2 (2022-2024)
Growth Factor (%) = 1

22-014 Moreland Avenue and Custer Avenue DRI
Traffic Volumes

A&R Engineering
May 2022

4. Bouldercrest @ Eastland
A.M. Peak Hour

Condition	Bouldercrest Road Northbound					Bouldercrest Road Southbound					Eastland Road Eastbound					- Westbound				
	U	L	T	R	Tot	U	L	T	R	Tot	U	L	T	R	Tot	U	L	T	R	Tot
Existing 2022 Volumes:	0	89	329	0	418	0	0	214	239	453	0	214	0	62	276	0	0	0	0	0
Growth Factor (%):	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
No-Build 2024 Volumes:	0	91	336	0	427	0	0	218	244	462	0	218	0	63	281	0	0	0	0	0
Proposed Site Trips:	0	7	0	0	7	0	0	0	5	5	0	11	0	15	26	0	0	0	0	0
Future 2024 Traffic Volumes:	0	98	336	0	434	0	0	218	249	467	0	229	0	78	307	0	0	0	0	0

P.M. Peak Hour

Condition	Bouldercrest Road Northbound					Bouldercrest Road Southbound					Eastland Road Eastbound					- Westbound				
	U	L	T	R	Tot	U	L	T	R	Tot	U	L	T	R	Tot	U	L	T	R	Tot
Existing 2022 Volumes:	0	84	281	0	365	0	0	286	234	520	0	263	0	143	406	0	0	0	0	0
Growth Factor (%):	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
No-Build 2024 Volumes:	0	86	287	0	373	0	0	292	239	531	0	268	0	146	414	0	0	0	0	0
Proposed Site Trips:	0	15	0	0	15	0	0	0	11	11	0	8	0	12	20	0	0	0	0	0
Future 2024 Traffic Volumes:	0	101	287	0	388	0	0	292	250	542	0	276	0	158	434	0	0	0	0	0

Number of Years = 2

Growth Factor (%) = 1

(2022-2024)

22-014 Moreland Avenue and Custer Avenue DRI
Traffic Volumes

A&R Engineering
May 2022

5. Custer Ave @ Drwy 4 (E)

A.M. Peak Hour

Condition	Site Driveway 4 (E)						Citgo Driveway (W)						Custer Avenue					
	Northbound						Southbound						Eastbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	0	0	0	0		0	3	0	4	7		0	3	257	0	260	
Growth Factor (%):	1	1	1	1			1	1	1	1			1	1	1	1		
No-Build 2024 Volumes:	0	0	0	0	0		0	3	0	4	7		0	3	262	0	265	
Proposed Site Trips:	0	61	0	13	74		0	0	0	0	0		0	0	13	19	32	
Future 2024 Traffic Volumes:	0	61	0	13	74		0	3	0	4	7		0	3	275	19	297	

P.M. Peak Hour

Condition	Site Driveway 4 (E)						Citgo Driveway (W)						Custer Avenue					
	Northbound						Southbound						Eastbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	0	0	0	0		0	6	0	5	11		0	7	475	0	482	
Growth Factor (%):	1	1	1	1			1	1	1	1			1	1	1	1		
No-Build 2024 Volumes:	0	0	0	0	0		0	6	0	5	11		0	7	485	0	492	
Proposed Site Trips:	0	46	0	10	56		0	0	0	0	0		0	0	10	44	54	
Future 2024 Traffic Volumes:	0	46	0	10	56		0	6	0	5	11		0	7	495	44	546	

Number of Years = 2 (2022-2024)
Growth Factor (%) = 1

22-014 Moreland Avenue and Custer Avenue DRI
Traffic Volumes

A&R Engineering
May 2022

6. Custer Ave @ Drwy 3 (M)

A.M. Peak Hour

Condition	Site Driveway 3 (M)						Existing Driveway (W)						Custer Avenue					
	Northbound						Southbound						Eastbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	0	0	0	0		0	2	0	2	4		0	2	258	0	260	
Growth Factor (%):	1	1	1	1			1	1	1	1			1	1	1	1		
No-Build 2024 Volumes:	0	0	0	0	0		0	2	0	2	4		0	2	263	0	265	
Proposed Site Trips:	0	94	0	7	101		0	0	0	0	0		0	0	26	25	51	
Future 2024 Traffic Volumes:	0	94	0	7	101		0	2	0	2	4		0	2	289	25	316	

P.M. Peak Hour

Condition	Site Driveway 3 (M)						Existing Driveway (W)						Custer Avenue					
	Northbound						Southbound						Eastbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	0	0	0	0		0	4	0	6	10		0	5	476	0	481	
Growth Factor (%):	1	1	1	1			1	1	1	1			1	1	1	1		
No-Build 2024 Volumes:	0	0	0	0	0		0	4	0	6	10		0	5	486	0	491	
Proposed Site Trips:	0	71	0	5	76		0	0	0	0	0		0	0	49	57	106	
Future 2024 Traffic Volumes:	0	71	0	5	76		0	4	0	6	10		0	5	535	57	597	

Number of Years = 2 (2022-2024)
Growth Factor (%) = 1

A&R Engineering
May 2022

A.M. Peak Hour

P.M. Peak Hour

Number of Years =	2	(2022-2024)
Growth Factor (%) =	1	

22-014 Moreland Avenue and Custer Avenue DRI
Traffic Volumes

A&R Engineering
May 2022

8. SR 42 @ Drwy 1 (RIRO)

A.M. Peak Hour

Condition	SR 42/US 23 (Moreland Avenue)						SR 42/US 23 (Moreland Avenue)						- Eastbound						Site Driveway 1 (RIRO)					
	Northbound						Southbound						Eastbound						Westbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	0	1193	0	1193		0	0	860	0	860		0	0	0	0	0		0	0	0	0	0	
Growth Factor (%):	1	1	1	1	1		1	1	1	1	1		1	1	1	1	1		1	1	1	1	1	
No-Build 2024 Volumes:	0	0	1217	0	1217		0	0	877	0	877		0	0	0	0	0		0	0	0	0	0	
Proposed Site Trips:	0	0	9	20	29		0	0	66	0	66		0	0	0	0	0		0	0	0	38	38	
Future 2024 Traffic Volumes:	0	0	1226	20	1246		0	0	943	0	943		0	0	0	0	0		0	0	0	38	38	

P.M. Peak Hour

Condition	SR 42/US 23 (Moreland Avenue)						SR 42/US 23 (Moreland Avenue)						- Eastbound						Site Driveway 1 (RIRO)					
	Northbound						Southbound						Eastbound						Westbound					
	U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot		U	L	T	R	Tot	
Existing 2022 Volumes:	0	0	997	0	997		0	0	1162	0	1162		0	0	0	0	0		0	0	0	0	0	
Growth Factor (%):	1	1	1	1	1		1	1	1	1	1		1	1	1	1	1		1	1	1	1	1	
No-Build 2024 Volumes:	0	0	1017	0	1017		0	0	1185	0	1185		0	0	0	0	0		0	0	0	0	0	
Proposed Site Trips:	0	0	20	46	66		0	0	50	0	50		0	0	0	0	0		0	0	0	29	29	
Future 2024 Traffic Volumes:	0	0	1037	46	1083		0	0	1235	0	1235		0	0	0	0	0		0	0	0	29	29	

Number of Years = 2 (2022-2024)
Growth Factor (%) = 1