

MEMORANDUM

To: El Paso County PCD File #: PPR-2315

From: Erick Berry, PE, PTOE, RSP1 (Ayres Associates)

Date: October 23, 2023 Project No.: 24-0409.00

Re: Super Star Car Wash (Claremont Business Park 2) Traffic Compliance Letter

Traffic Engineer's Statement

This Traffic Compliance Letter and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said Traffic Compliance Letter was prepared in general conformance with the criteria established by the County for traffic reports.



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within the report.

TVarley
Name

10/23/2023
Date

Accepted for File

By: Gilbert LaForce, P.E.
Engineering Manager

Date: 11/07/2023 5:50:43 PM

El Paso County Department of Public Works



Background

M&S Civil Consultants, Inc. contracted LSC Transportation Consultants, Inc. to prepare the August 2023 Claremont Business Park, Filing No. 2, Lots 1, 2A, 2B, and 3 Traffic Impact Study (TIS) for the Claremont Business Park 2 (CBP 2) development located in El Paso County, Colorado. The parcels on which the development is located are surrounded by the City of Colorado Springs limits; however, the CBP 2 parcels are not currently incorporated within the City. The development is located along the southeastern side of Meadowbrook Parkway, between Marksheffel Road and approximately 250 feet northeast of Woolsey Heights. The project location is shown in **Figure 1**.

The 2023 TIS analyzed the expected traffic impacts associated with Lots 1, 2A, 2B, and 3 of the proposed CBP 2 development. Lots 1, 2A, 2B, and 3 represent the remaining 5.34-acres of undeveloped land within the northern portion of the 13.72-acre CBP 2 development. The southern 8.38-acres of the CBP 2 development have been developed. The 2023 TIS is included in **Attachment 1**.

Figure 1 – Project Location



**Aerial imagery based on Google Earth, July 2022 aerial mapping*

The 2023 TIS, assumed that Lot 1 would house an automated car wash, while Lots 2A and 2B would house two fast-food restaurants with drive through windows, and Lot 3 would house a mini warehouse. Since the completion of the 2023 TIS, none of these developments have been constructed. Super Star Car Wash has proposed the development of an automated car wash on Lot 1, located in the northeastern corner of the CBP 2 development, as shown in **Figure 1**.

Super Star Car Wash retained Ayres Associates to complete a Traffic Compliance Letter for the proposed Super Star Car Wash. The purpose of this Traffic Compliance Letter is to perform a trip generation analysis for the Super Star Car Wash and verify that the expected trips generated by the proposed development the traffic analysis documented in the 2023 TIS. El Paso County has also requested that the Traffic Compliance Letter document a queuing analysis, sight triangle analysis, and auxiliary turn lane analysis for the proposed development access point driveway.

Trip Generation Analysis

The proposed Super Star Car Wash is expected to provide a single 150-foot-long car wash tunnel, along with three pay stations, and approximately 25 vacuum stations, located on a 1.5-acre parcel in the northeastern corner of the CBP 2 development. The proposed site plan is included in **Attachment 2**.

A trip generation analysis was conducted for the proposed Super Star Car Wash, utilizing the methodology documented in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. As described by ITE, the Trip Generation Manual contains text, tables, data plots, and statistics that describe the state-of-the-practice understanding of the relationship between walk, bicycle, transit, motor vehicle, and truck trip generation and characteristics associated with an individual development site or land use. The trip generation manual provides three methods for estimating trips at proposed developments: a data plot, a weighted trip generation rate, or a regression equation. Along with the weighted trip generation rate, a standard deviation value is also provided to indicate how widely dispersed the data points are around the calculated average.

Land Use 948, Automated Car Wash, was selected as the land use that best represented the proposed Super Star Car Wash. Two independent variables are available for estimating trips associated with Land Use 948: gross floor area (GFA), and number of car wash tunnels. The trip generation data based on the GFA includes only one data point for the PM peak hour, while the trip generation data based on the number of car wash tunnels includes three data points. Both sets of data are based on small enough sample sizes that the ITE Trip Generation Manual recommends using them with caution.

When considering the validity of the trip generation data, the ITE Trip Generation Handbook, 3rd Edition, states that if the number of data points is one or two, the use of a different independent variable should be utilized, or local data for similar sites should be collected and utilized. The ITE Trip Generation Handbook also states that if the number of data points is three, four, or five, the collection and use of local data for similar sites is encouraged, but it is acceptable to utilize the data based on the three, four, or five data points. Based on the direction provided in the ITE Trip Generation Handbook, the number of car wash tunnels was selected as the preferred variable for the trip generation analysis.

Land Use 948 currently features trip generation data for two time periods: a weekday PM peak hour and a Saturday peak hour. However, the 2023 TIS provided trip generation estimates for a weekday daily total, a weekday AM peak hour, and a weekday PM peak hour. It appears that the 2023 TIS estimated the weekday AM peak hour trips by assuming that they would be half of the weekday PM Peak hour trips. It also appears that the 2023 TIS estimated the weekday daily total by assuming 10 hours of operation, generating trips at the rate of the weekday PM Peak hour, resulting in an estimated 775 weekday daily total trips. Considering the trip generation characteristics of a car wash, the PM peak hour is likely the peak time period that experiences the most significant traffic volumes during a typical weekday, which means the 2023 TIS estimate of weekday daily total trips is likely a conservative estimate. Super Star Car Wash stated that they serve approximately 400 vehicles during a typical weekday; however, they did not have any data to support this observation. For the purposes of this Traffic Compliance Letter, the same assumptions made in the 2023 TIS were utilized for this trip generation analysis.

The ITE Trip Generation Handbook states that a key characteristic of a mixed-use development is that trips between various land uses can be made on site and these internal trips do not utilize the major street system. The trip origin, destination, and travel path are all within the site. This type of trip is defined as an internal trip. The 2023 TIS appears to have assumed a 4 percent internal trip capture rate; therefore, a 4 percent internal capture rate was applied to the trip generation analysis.

The ITE Trip Generation Handbook notes that not all traffic entering or exiting a site driveway is necessarily new traffic added to the street system. The actual amount of new traffic is dependent upon the purpose of the trip and the route used from its origin to its destination. In an effort to determine the actual amount of new traffic, the ITE Trip Generation Handbook defines two main types of vehicular trips generated by a site, pass-by trips, and non-pass-by trips, which include primary and diverted trips.



A pass-by trip is defined as a vehicle trip made as an intermediate stop on the way from an origin to a primary trip destination without a route diversion. A pass-by trip is not new to the overall roadway network and therefore may be reduced from the total external trips generated by a study site. The ITE Trip Generation Handbook does not include any pass-by trip reduction data for Land Use 948; however, the 2023 TIS appears to have assumed a 10 percent pass-by trip reduction associated with the automated car wash and fast-food restaurants. Therefore, a 10 percent pass-by trip reduction was applied to the trip generation analysis.

Based on the assumptions documented above, the Super Star Car Wash is expected to generate 670 non-pass-by trips on an average weekday, with 34 non-pass-by trips during the weekday AM peak hour and 66 non-pass-by trips during the weekday PM peak hour. The Super Star Car Wash trip generation analysis results are summarized in **Table 1**. The trip generation land use description and data plots are included in **Attachment 3**.

Table 1 – Super Star Car Wash Trip Generation Summary

ITE Land Use (Land Use Code)	Size	Units	Time Period								
			Weekday Total			Weekday AM			Weekday PM		
			Total	In	Out	Total	Avg Rate	Std Dev	In	Out	Total
Automated Car Wash (948)	1.00	Car Wash Tunnel	775	N/A	N/A	40	77.5	33.1	50%	50%	78
				20	20				39	39	
<i>Calculated Vehicle Trips</i>			775	20	20	40			39	39	78
<i>Internal Trip Reductions (4%)</i>			-31	-1	-1				-2	-2	
<i>Total Driveway Trips</i>			744	19	19	38			37	37	74
<i>Pass-By/Trip Reductions (10%)</i>			-74	-2	-2				-4	-4	
Total Non-Pass-By Trips			670	17	17	34			33	33	66

Trip Generation Comparison

The 2023 TIS analysis utilized the rates documented in the ITE Trip Generation Manual, 11th Edition. The analysis estimated the number of trips expected to be generated by an automated car wash, on Lot 1 of the CBP 2 development, with one car wash tunnel, utilizing Land Use 948 (Automated Car Wash).

As noted previously, the 2023 TIS analysis assumed internal capture and pass-by trip reductions were applicable and reduced the calculated number of vehicle trips generated to determine the total non-pass-by vehicle trips.

Based on the 2023 TIS analysis, Lot 1 of the CBP 2 development was expected to generate approximately 667 non-pass-by vehicle trips on an average weekday, with 34 non-pass-by trips during the weekday AM peak hour, and 68 non-pass-by trips during the weekday PM peak hour. The 2023 TIS trip generation results are summarized in **Table 2**.

Table 2 – 2023 TIS, CBP 2 Lot 1 Trip Generation Summary

ITE Land Use (Land Use Code)	Size	Units	Time Period						
			Weekday Total		Weekday AM			Weekday PM	
			Total	In	Out	Total	In	Out	Total
Automated Car Wash (948)	1.00	Car Wash Tunnel	775	20	20	40	39	39	78
<i>Calculated Vehicle Trips</i>			775	20	20	40	39	39	78
<i>Internal Trip Reductions (4%)</i>			-31	-1	-1		-2	-2	
<i>Total Driveway Trips</i>			744	19	19	38	37	37	74
<i>Pass-By Trip Reductions (10%)</i>			-77	-2	-2		-3	-3	
Total Non-Pass-By Trips			667	17	17	34	34	34	68

The number of trips expected to be generated by the proposed Super Star Car Wash is almost identical to the number of trips previously expected to be generated by Lot 1 of the CBP 2 development. The negligible difference in number of trips is due to rounding error, and should be considered insignificant. The comparison between the previously expected trips associated with Lot 1 of the CBP 2 development and the expected trips associated with the proposed Super Star Car Wash is summarized in **Table 3**.

Table 3 – Trip Generation Comparison Summary

Study Source (Development)	Time Period						
	Weekday Daily	AM Peak Generation			PM Peak Generation		
	Total	In	Out	Total	In	Out	Total
2023 TIS (CBP 2 Lot 1)	667	17	17	34	34	34	68
Traffic Compliance Letter (Super Star Car Wash)	670	17	17	34	33	33	66
Difference	-3	0	0	0	1	1	2

Queueing Analysis

A queueing analysis was conducted utilizing the M/M/1 queue theory. The M/M/1 queue theory represents a queue in which both the arrival and departure rates are randomly distributed, and there is a single departure channel. Under a M/M/1 queue theory, the average queue length can be calculated utilizing the following equation.

$$\text{Queue Length} = \left| \frac{\rho^2}{1 - \rho} \right|$$

Where,

$$\rho = \frac{\lambda}{\mu}$$

λ = arrival rate

μ = departure rate

As discussed previously, the proposed Super Star Car Wash is expected to generate 39 inbound trips during the PM peak hour; therefore, the arrival rate was assumed to be 39 vehicles per hour. While the type of car wash a patron chooses may impact the car wash time, an average processing rate of 2 minutes per vehicle was assumed; therefore, the departure rate was assumed to be 30 vehicles per hour. Based on the assumed arrival and departure rates, the average queue length was calculated as follows.

$$\rho = \frac{\lambda}{\mu} = \frac{39 \text{ vph}}{30 \text{ vph}} = 1.3$$

$$\text{Queue Length} = \left| \frac{\rho^2}{1 - \rho} \right| = \left| \frac{1.3^2}{1 - 1.3} \right| = |-5.6| = 5.6 = \sim 6 \text{ vehicles}$$

As shown in the calculations above, the average queue length expected during the weekday PM peak hour is 6 vehicles. The proposed Super Star Car Wash site plan indicates that the site will have enough storage to house approximately 25 vehicles on site. Therefore, the Super Star Car Wash is expected to provide enough storage for the average queue during the weekday PM peak hour, and queuing onto El Jefe Heights is not anticipated.

Sight Distance Analysis

The proposed Super Star Car Wash access is located along El Jefe Heights, at the southernmost limits of Lot 1, approximately 200 feet south of the intersection at El Jefe Heights and Meadowbrook Parkway.

The 2023 TIS performed a sight distance analysis for the CBP 2 development study intersections based on the criteria defined in El Paso County's Engineering Criteria Manual (ECM). The 2023 TIS noted that individual lot access points/driveways to El Jefe Heights will need to meet sight-distance criteria for "driveways", as prescribed in Tables 2-33 and 2-35 of the ECM.

Based on Table 2-33 of El Paso County's ECM, and an assumed posted speed limit of 25 mph along El Jefe Heights, the minimum sight distance along El Jefe Heights at the proposed Super Star Car Wash access is 150 feet.

Based on Table 2-35, and an assumed posted speed limit of 25 mph along El Jefe Heights, the required entering sight distance for the proposed Super Star Car Wash access is 250 feet for passenger cars and pickup trucks, 325 feet for single-unit trucks, and 425 feet for multi-unit trucks. It should be noted that it is expected to be unlikely for single-unit or multi-unit trucks to frequently utilize the proposed access, as they would not be able to utilize the car wash; therefore, the passenger cars and pickup trucks sight distance was considered the controlling criteria.

In an effort to maximize sight distance, the proposed Super Star Car Wash access point has been located as far away from Meadowbrook Parkway as possible, maintaining approximately 200 feet between the Meadowbrook Parkway edge of travel way and the proposed access point. Therefore, it is expected that the 150 feet minimum sight distance along El Jefe Heights, north of the proposed access point, can be provided. However, due to the constraints of the Lot 1 limits, the required 250 feet of entering sight distance for vehicles looking to the north cannot be provided, as the proposed access point can only provide approximately 200 feet of entering sight distance.

The location of the proposed Super Star Car Wash access point would provide approximately 450 feet between the Gary Watson Place edge of travel way and the proposed access point. Therefore, it is expected that the 150 feet minimum sight distance along El Jefe Heights, south of the proposed access point, can be provided. It is also expected that the required 250 feet of entering sight distance, for vehicles looking to the south, can be provided as well.

Auxiliary Turn Lane Analysis

An auxiliary turn lane analysis was conducted utilizing the criteria defined in Section 2.3.7.D of El Paso County's ECM. The 2023 TIS noted that El Jefe Heights will be classified as a local roadway. Based on Section 2.3.7.D of the ECM, a minor arterial or lower classification roadway requires the following:

- An exclusive left-turn lane at any access with a projected peak hour left turning ingress volume of 25 vehicles per hour, or greater.
- An exclusive right-turn lane at any access with a projected peak hour right turning ingress volume of 50 vehicles per hour, or greater.

As discussed previously, the Super Star Car Wash is expected to generate 39 inbound vehicles during the PM peak hour. Considering the connection to the surrounding transportation network it was assumed that 80 percent of vehicles would travel to the site via the Meadowbrook Parkway intersection to the north, while 20 percent of vehicles would travel to the site via the Gary Watson Place intersection to the south. Based on this assumption, it is expected that during the PM peak hour, approximately 31 vehicles will enter the site by making a southbound left-turn movement, from El Jefe Heights, and approximately 8 vehicles will enter the site by making a northbound right-turn, from El Jefe Heights.

Therefore, based on the criteria established in Section 2.3.7.D of the ECM, an exclusive left-turn lane along El Jefe Heights, at the proposed access point, is expected to be warranted. It is recommended that a minimum of 50 feet of storage be provided for this left-turn lane, while also providing an appropriate taper length, to meet the criteria established within the ECM. Furthermore, an exclusive right-turn lane along El Jefe Heights, at the proposed access point, is not expected to be warranted.

Conclusion

Based on the results of this trip generation comparison, the number of trips expected to be generated by the proposed Super Star Car Wash is almost identical to the number of trips previously expected to be generated by Lot 1 of the CBP 2 development, as described in the 2023 TIS. The negligible difference in number of trips is due to rounding error, and should be considered insignificant.

The average queue length expected during the PM peak hour on a typical weekday is 6 vehicles. The proposed Super Star Car Wash site plan indicates that the site will have enough storage to house approximately 25 vehicles on site. Therefore, the Super Star Car Wash is expected to provide enough storage for the average queue during the weekday PM peak hour, and queuing onto El Jefe Heights is not anticipated.

In an effort to maximize sight distance, the proposed Super Star Car Wash access point has been located as far away from Meadowbrook Parkway as possible, maintaining approximately 200 feet between the Meadowbrook Parkway edge of travel way and the proposed access point. Therefore, it is expected that the 150 feet minimum sight distance along El Jefe Heights, north of the proposed access point, can be provided. However, due to the constraints of the Lot 1 limits, the required 250 feet of entering sight distance for vehicles looking to the north cannot be provided, as the proposed access point can only provide approximately 200 feet of entering sight distance.

The location of the proposed Super Star Car Wash access point would provide approximately 450 feet between the Gary Watson Place edge of travel way and the proposed access point. Therefore, it is expected that the 150 feet minimum sight distance along El Jefe Heights, south of the proposed access point, can be provided. It is also expected that the required 250 feet of entering sight distance, for vehicles looking to the south, can be provided as well.

Based on the criteria established in Section 2.3.7.D of the ECM, an exclusive left-turn lane along El Jefe Heights, at the proposed access point, is expected to be warranted. It is recommended that a minimum of 50 feet of storage be provided for this left-turn lane, while also providing an appropriate taper length, to meet the criteria established within the ECM. Furthermore, an exclusive right-turn lane along El Jefe Heights, at the proposed access point, is not expected to be warranted.

The proposed CBP 2 development includes two proposed access points, provided as private streets, along Meadowbrook Parkway. The proposed south access point at Gary Watson Place, approximately 450 feet northeast of Woolsey Heights has been constructed. The proposed north access point at El Jefe Heights, approximately 490 feet west of Marksheffel Road, has not yet been constructed. Upon construction, El Jefe Heights is planned to extend south to Gary Watson Place. While it is not specifically part of the Super Star Car Wash development, El Jefe Heights will serve as the only access to the proposed development.

The 2023 TIS determined that the existing lane configuration at the intersection of Meadowbrook Parkway and El Jefe Heights is expected to provide an acceptable level of service. Considering the Super Star Car Wash development is expected to generate a negligible difference in the number trips generated by Lot 1, the existing lane configuration at this intersection is expected to provide similar expected operations as documented in the 2023 TIS.

Based on the trip generation analysis documented in this letter, the proposed Super Star Car Wash is expected to be in compliance with the August 2023 Claremont Business Park, Filing No. 2, Lots 1, 2A, 2B, and 3 Traffic Impact Study. The potential traffic impacts associated with the proposed Super Star Car Wash are expected to have been addressed by the 2023 Traffic Impact Study.



Attachment 1 – August 2023 Claremont Business Park, Filing No. 2, Lots 1, 2A, 2B, and 3 Traffic Impact Study



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Claremont Business Park 2
Filing No. 2
Lots 1, 2A, 2B, and 3
Traffic Impact Study
PCD File No. VR-23-003
(LSC #S234070)
August 22, 2023

Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

Date

Claremont Business Park 2

Filing No. 2

Lots 1, 2A, 2B, and 3

Prepared for:

Georgianne Willard

M&S Civil Consultants, Inc.

212 N. Wahsatch, Suite 305

Colorado Springs, CO 80903

AUGUST 22, 2023

LSC Transportation Consultants

Prepared by: Jeffrey C. Hodsdon, P.E.

EPC PCD File No. VR-23-003

LSC #S234260



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August 22, 2023

Georgianne Willard
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RE: Claremont Business Park 2
Filing No. 2
Lots 1, 2A, 2B, and 3
El Paso County, CO
Traffic Impact Study
PCD File No. VR-23-003
LSC #S234260

Dear Ms. Willard,

LSC Transportation Consultants, Inc. has prepared this traffic impact study (TIS) for the proposed vacation and replat of Claremont Business Park Claremont Business Park 2 Filing No. 2 in El Paso County, Colorado. The site is located southwest of the intersection of Marksheffel Road and Meadowbrook Parkway.

This report has been prepared to accompany the resubmittal of the project under El Paso County PCD File No. VR-23-003.

Filing No. 2 was studied previously in the LSC report entitled *Claremont Commercial Filing No. 2 Updated Traffic Impact Study* dated July 6, 2018 (EPC PCD File no. is SP-17-004) and in LSC's *Claremont Business Park 2 Traffic Impact Study* dated July 2, 2020 [minor rev. July 28] (EPC PCD File No. SP197)

REPORT CONTENTS

The preparation of this report included the following:

- An inventory of existing roadway and traffic conditions on major thoroughfares adjacent to the site, including surface conditions, functional classification, widths, pavement markings, traffic-control signs, posted speed limits, intersection and access spacing, roadway and intersection alignments, roadway grades, and auxiliary turn lanes;
- Current weekday peak-hour turning-movement traffic counts at the study area intersections;

- Estimated average weekday traffic (AWT) volumes adjacent to the proposed development on Marksheffel Road and Meadowbrook Parkway;
- Projections of 20-year background traffic volumes on Marksheffel Road and Meadowbrook Parkway;
- The proposed site land use and access plan;
- Estimates of average weekday and weekday peak-hour trip generation for the proposed 5-acre development and the estimated directional distribution of site-generated vehicle-trips on roadways and intersections adjacent to and in the vicinity of the site;
- Projected site-generated and resulting total peak-hour intersection traffic volumes at the following study-area intersections:
 - Marksheffel Road/Meadowbrook Parkway
 - Meadowbrook Parkway/El Jefe Heights
 - Meadowbrook Parkway/Gary Watson Place
- Projected total daily and peak-hour traffic volumes at the study-area intersections;
- Intersection level of service analysis at the study-area intersections;
- Queuing analysis on Meadowbrook Parkway between El Jefe Heights and Marksheffel Road;
- Evaluation of short- and long-term projected intersection volumes to determine potential requirements for any additional auxiliary right-/left-turn lanes at the proposed site-access points based on the criteria in El Paso County's *Engineering Criteria Manual (ECM)*; and
- Findings and recommendations.

LIST OF OTHER TRAFFIC REPORTS USED IN THE PREPARATION OF THIS REPORT

Previously-completed traffic reports in the vicinity of the proposed Claremont Business Park have been provided for reference and to provide context:

- Claremont Commercial Filing No. 2, Updated Traffic Impact Study – July 6, 2018
- Claremont Business Park, Tract C, Filing 2 – November 26, 2019
- Claremont Business Park (Filing 1A, Lot 2) – February 10, 2020
- Claremont Business Park 2 Traffic Impact Study – July 2, 2020 (minor rev. 7/28)
- Villas at Claremont Traffic Impact Analysis – January 24, 2023

LAND USE AND ACCESS

Figure 1 shows the site location relative to the adjacent and nearby roadways. Located southwest of the intersection of Marksheffel Road/Meadowbrook Parkway, the 5-acre site is comprised of the not-yet-developed, northern portion of Claremont Business Park 2 Filing No. 1. The vacation replat involves replatting into Filing No 2 with four lots: 1, 2A, 2B, and 3. Also, the original internal access easement would be replatted to provide a generally north-south vehicular connection (El Jefe) south to Gary Watson Point within the developed portion of Claremont Business Park 2 Filing No. 1. The currently-proposed land uses for Filing No. 2 Lots 1, 2A and 2B, and 3 consist of an automated car wash, two fast-food restaurants with drive through, and mini-warehouse, respectively. Of the 10 lots originally shown

on the 13.72-acre preliminary plan, the southern seven lots totaling 8.38 acres accessed by Gary Watson Place have been developed. Also, the abutting has been developed.

Access for the currently-proposed development lots is at the original location on Meadowbrook Parkway aligning with the existing full-movement access on the north side of Meadowbrook Parkway (about 490 feet west of Marksheffel Road – centerline spacing) and to the existing Meadowbrook/Gary Watson intersection via the required El Jefe connection south to Gary Watson Place. No direct access is proposed to US Highway 24 (US Hwy 24) or Marksheffel Road.

Figure 1 shows the area circulation and access points, while Figure 2 contains the proposed site plan showing the proposed land uses, on-site circulation, and proposed access points.

Design Changes to El Jefe Heights

El Jefe Heights is a planned private commercial street that will extend north from Gary Watson Point to Meadowbrook Parkway. The street will be 32-feet wide, plus curb and gutter. Just south of Meadowbrook, the roadway would be wider – 43-feet-wide, plus curb and gutter, for a short distance south of the intersection. This allows for alignment with the access on the north side of Meadowbrook. A 5-foot attached sidewalk on one side (east side) is shown on the construction drawings. This is consistent with the deviation dated July 1, 2020. The proposed street width is generally 2 feet wider than the 30 feet called out in the deviation. The street width exceeds the urban local street width (30 feet of pavement) shown in *ECM* Section 2.2.4.B.6/SD-4-1. This standard is also referenced in the deviation.

With respect to horizontal alignment, the roadway intersects Meadowbrook at a right angle and would have a 100-foot straight section back from the edge of Meadowbrook for stacking, etc. South of this straight section, there is a 100-foot centerline radius curve, followed by a 75-foot tangent section, followed by a 200-foot centerline radius curve in the opposite direction. South of this curve, the roadway alignment is straight for 300 feet before ending at a T-intersection with Gary Watson Point. A deviation request is included in this application for the one 100-foot centerline radius curve.

The Preliminary Plan showed a 90-degree bend in the right-of-way south of the first segment south of Meadowbrook. The deviation prepared with the Preliminary Plan indicated that the roadway will be private, which is still applicable, and includes the following justification with respect to “alignment:” *This deviation request would provide alignment and simulation to the current characteristic, design, and appearance of the Claremont Business Park commercial development.* There are locations within Claremont Business Park with 90-degree bends in the roadways.

The current alignment eliminates the T-intersection, and uses a continuous, generally north-south alignment using reverse curves to allow El Jefe to intersect both Meadowbrook and Gary Watson at right-angles.

The north curve radius is the same as the **Urban Local Low Volume** minimum centerline radius (100' from Table 2-7) and the radius of the next curve to the south matches the minimum centerline radius for the **Urban Local** (200' from Table 2-8).

The current justification in the M&S Civil Consultants deviation reads "THIS DEVIATION REQUEST WOULD PROVIDE ALIGNMENT TO THE CURRENT CHARACTERISTICS, DESIGN AND APPEARANCE OF THE CLAREMONT BUSINESS PARK COMMERCIAL DEVELOPMENT. ROAD TO BE MAINTAINED BY CLAREMONT BUSINESS PARK HOA." Please refer to the deviation request for additional details.

INTERSECTION/ACCESS SIGHT DISTANCE

Intersection (entering) sight distances at the intersections of El Jefe Heights/Meadowbrook must meet the criteria in *ECM* section 2.3.6.G (note: although El Jefe Heights is planned to be a private road, it will function similar to a public road. Table 2-21 indicates 445 feet of sight distance for the 40-mph design speed (35-mph posted speed limit). The stopping sight distance for traffic traveling along the major street, Meadowbrook Parkway, is required to be 305 feet. Please see Figure 3 for more details, and a graphical exhibit.

Sight distance will need to be maintained along the inside of the curve on Meadowbrook Parkway along Lot 3 and in other areas. Any site improvements including (but not limited to) landscaping, parking areas, buildings, monument signs etc. must not impede the required sight-distance lines of sight. Note: there are no vertical curves on Meadowbrook Parkway that would limit sight distance.

Individual lot access points/driveways to El Jefe Heights will need to meet sight-distance criteria for "driveways", as prescribed in the Tables 2-33 and 2-35.

ROAD AND TRAFFIC CONDITIONS AND MTCP CLASSIFICATION

Figure 1 shows the roads adjacent to and in the vicinity of the site. The following is a list of the adjacent roads serving the site, followed by a brief description of each:

Meadowbrook Parkway is a public, Urban Non-Residential Collector street that extends through the Claremont Business Park area from the US Hwy 24/SH 94 intersection to Marksheffel Road (generally parallel to US Hwy 24). Meadowbrook Parkway continues east from Marksheffel Road into Claremont Ranch to the east. Auxiliary left- and right-turn lanes currently exist on all approaches at the intersection of Meadowbrook/Marksheffel, which is signalized. The posted speed limits on Meadowbrook are 35 mph west of Marksheffel and 25 mph east of Marksheffel.

Marksheffel Road is a Principal Arterial that extends north from the City of Fountain to north of Woodmen Road. It is currently a four-lane roadway with a posted speed limit of 50 mph through the study area. Marksheffel Road is shown as a four-lane Principal Arterial on the *El Paso County Major Transportation Corridors Plan (MTCP) 2040 Roadway Plan*. The 2016 *MTCP* corridor preservation plan (2060) shows Marksheffel as a six-lane Expressway.

US Highway 24 (US Hwy 24) extends locally from the City of Colorado Springs to Peyton in a northeasterly direction and then continues east. US Hwy 24 is classified as EX- Expressway, Major Bypass by the Colorado Department of Transportation (CDOT) in the vicinity of the site and is shown as an Expressway on the *El Paso County Major Transportation Corridors Plan (MTCP)*. The 2040 *MTCP* shows US Hwy 24 as a **six-lane** Expressway. Based on the US Hwy 24 PEL study, US Hwy 24 is planned to be widened to a six-lane roadway in the future. The timing of this improvement is not known. This improvement has not been included in the long-term analysis.

El Jefe Heights is a proposed private, local street planned to extend north-south through the site between the north access to Meadowbrook Parkway and Gary Watson Point to the south.

Gary Watson Point is a private, local street extending east about 350 feet from Meadowbrook Parkway to a cul-de-sac.

Existing Traffic Volumes

New vehicular turning-movement traffic counts were conducted at the intersection of Marksheffel Road/Meadowbrook Parkway from 6:30-8:30 a.m. and from 4:00-6:00 p.m. in the summer of 2023. New counts were also completed at Meadowbrook Parkway/Gary Watson Point, the full-movement intersection with Meadowbrook Parkway 500 feet west of Marksheffel Road, and US Highway 24/Marksheffel Road. Figure 4 shows these turning-movement volumes, as well as the average weekday traffic volumes (estimated based on factored peak-hour count data) on the study-area roadways, including at the commercial access points north of the site. Raw count data is attached.

PEDESTRIAN AND BICYCLE FACILITIES

Meadowbrook Parkway has sidewalks along developed parcels, and the street width is sufficient to accommodate bicycles. There is a 12-foot paved concrete trail along the west side of Marksheffel Road extending north from just south of the bridge just north of Meadowbrook.

TRIP GENERATION

Estimates of the vehicle-trips projected to be generated by the 5-acre site (as described in the land-use section, Claremont Business Park 2 Filing No. 2 Lots 1, 2A, 2B, and 3) have been made using the nationally published trip-generation rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE). Corresponding trip-generation rates from the following ITE Land Use Categories have been used to develop the trip-generation estimates for site buildout:

- Automated Car Wash
- Fast Food with Drive Through Window
- Mini-Storage

Table 1 below presents a summary of the estimated site trip generation. A detailed trip-generation estimate, including ITE rates, is presented in Table 5 (attached). Figure 2 shows the layout within the proposed industrial park.

Table 1: Summary of Estimated Site Vehicle-Trip Generation

Analysis Period	Weekday		
	In	Out	Total
Morning Peak Hour	124	120	244
Afternoon Peak Hour	118	112	230
Daily/24-hour	1,448	1,448	2,895

The site is projected to generate about 2,895 total vehicle-trips on the average weekday during a 24-hour period, with approximately half entering and half exiting the site. During the morning peak hour, approximately 124 entering vehicles and 120 exiting vehicles would be generated. Approximately 118 entering and 112 exiting vehicles would be generated by the site during the afternoon peak hour.

Compared to trip-generation estimates in the previously-submitted traffic impact study for Claremont Business Park 2 Filing No. 1 Preliminary Plan, the site would generate approximately:

- Average weekday 24-hour period – 16 fewer daily trips
- Morning peak hour – 49 fewer additional trip and 85 additional exiting trips
- Afternoon peak hour – 4 fewer entering trips and 36 fewer exiting trips

Pass-By and Diverted Trips

The total number of trips to be generated by the site has also been aggregated by trip type to account for pass-by and diverted trips. A pass-by trip is one made by a motorist who would already be on an adjacent road regardless of the proposed development, but who stops in at the site while passing by. That pass-by motorist would then continue on his or her way to a final destination in the original direction. Table 5 (attached) shows the percent of the trips generated that were assumed to be pass-by trips. Non-primary trip percentage has been based on data from the *Trip Generation Handbook - An ITE Proposed Recommended Practice, 3rd Edition, 2014* by ITE and adjustments by LSC for site-specific conditions.

LSC has adjusted the average ITE percentage as pass-by trips for this site to only include trips from adjacent Meadowbrook Parkway. Diverted trips from adjacent US Highway 24 and Marksheffel Road are considered non-pass-by trips. These trips would be added to Meadowbrook Parkway and would result in altered turning movements at the nearby major intersections, but generally would not add “new impact” trips to US Hwy 24 or Marksheffel Road. ITE-average percent of non-pass-by trips estimated for the land proposed uses for this study are summarized in Table 5. The resulting pass-by and non-pass-by trips are shown in Table 5.

ITE *Trip Generation* estimated that the proposed Claremont Business Park development is projected to generate about 2,666 total, non-pass-by vehicle-trips on the average weekday during a 24-hour period, with about half entering the site and half exiting the site during the afternoon peak hour. Compared to the previously-submitted traffic impact study, this represents an increase of 31 daily non-pass-by trips generated by the site.

TRIP DISTRIBUTION AND ASSIGNMENT

Trip Directional Distribution

The directional-distribution estimate of site-generated vehicle-trips to the study-area roads and intersections is a necessary component in determining the site's traffic impacts. Figure 5 shows the percentages of the site-generated vehicle trips projected to be oriented to and from the site's major approaches. Estimates have been based on the following factors: the proposed new land use, the area roadway system serving the site, and the site's geographic location relative to the overall greater El Paso County/Colorado Springs area. Directional-distribution splits from LSC's previously-conducted Claremont Business Park traffic study (dated July 6, 2018) were used to estimate trip distributions and background volumes within the vicinity of the site.

Site-Generated Traffic

Site-generated traffic volumes have been estimated at the following intersections:

- Marksheffel Road/Meadowbrook Parkway
- Meadowbrook Parkway/El Jefe Heights (proposed north full-movement site access)
- Meadowbrook Parkway/Gary Watson Point (proposed south full-movement site access)
- US Highway 24/Marksheffel Road

These volumes have been calculated by applying the directional-distribution percentages estimated by LSC (from Figure 5) to the trip-generation estimates (from Table 5). Figure 6 shows the projected site-generated traffic volumes for the weekday morning and afternoon peak hours. The figure also shows the estimated average daily traffic volumes (ADTs).

BASELINE/BACKGROUND TRAFFIC VOLUMES

The report includes traffic count data for morning and afternoon peak hours at the intersection of Meadowbrook Parkway/Gary Watson Point. The current ADT on Gary Watson Point has been estimated based on factored peak-hour counts and shown in the report. Additionally, the current traffic turning to/from the east leg of this intersection (Gary Watson Point) provides a one-day "snapshot" of the peak-hour (AM and PM) trip generation of Lots 8-10. The trips are considered "baseline/background trips" in this report. The background turning volumes associated with the warehousing lots to the south are assumed at least as high as the previous TIS report estimates. For turning movements higher than the estimates in the TIS report, the actual count has been

assumed. A portion of these background trips are assumed shifted to El Jefe Heights with the proposed connection.

2023 Existing + Site-Generated Traffic Volumes

Figure 7 shows the sum of the 2023 existing traffic volumes (from Figure 4) and site-generated peak-hour traffic volumes (shown in Figure 6). These volumes represent the projected short-term total traffic following site buildout. Laneage and traffic control at the study-area intersections following site buildout are shown in Figure 7.

2043 Background Traffic Volumes

The long-term background volumes are generally comparable to the prior TIS report, with minor adjustments based on the most recent count data collected. Additionally, traffic generated by planned adjacent and nearby developments has been included in 2043 background traffic volumes, as shown in Figure 8.

2043 Total Traffic Volumes

Figure 9 shows the sum of 2043 background traffic volumes (from Figure 8) plus site-generated traffic volumes (from Figure 6).

LEVEL OF SERVICE ANALYSIS

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection and is indicated on a scale from "A" to "F." LOS A is indicative of little congestion or delay. LOS F indicates a high level of congestion or delay. Table 2 shows the level of service delay ranges for signalized and unsignalized intersections.

Table 2: Intersection Levels of Service Delay Ranges

Level of Service	Signalized Intersections	Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	Average Control Delay (seconds per vehicle) ⁽¹⁾
A	10.0 sec or less	10.0 sec or less
B	10.1-20.0 sec	10.1-15.0 sec
C	20.1-35.0 sec	15.1-25.0 sec
D	35.1-55.0 sec	25.1-35.0 sec
E	55.1-80.0 sec	35.1-50.0 sec
F	80.1 sec or more	50.1 sec or more

(1) For unsignalized intersections, if V/C ratio is greater than 1.0 the level of service is LOS F, regardless of the projected average control delay per vehicle.

LOS values have been included in each figure for each turning movement/approach during the weekday morning and afternoon peak hours for the proposed site-access intersections and off-site intersections in the study area:

- Figure 4: 2023 Existing Traffic, Lane Geometry, Traffic Control, and LOS
- Figure 7: 2023 Existing + Site Traffic, Lane Geometry, Traffic Control, and LOS
- Figure 8: 2043 Background Traffic, Lane Geometry, Traffic Control, and LOS
- Figure 9: 2043 Background + Site Traffic, Lane Geometry, Traffic Control, and LOS

LOS calculations for long-term scenarios were based upon recommended lane geometries and traffic controls outlined in the figures above (which were based on recommended improvements in LSC’s previously-conducted Claremont Business Park traffic study, dated July 6, 2018).

Marksheffel Road/Meadowbrook Parkway

Short-Term

Overall, the intersection of Marksheffel Road/Meadowbrook Parkway is projected to operate at LOS C or better during the short term upon site buildout. The eastbound dual-left, eastbound through, westbound left-turn, and westbound through lanes are projected to operate at LOS E during at least one short-term peak hour. However, analysis results show a volume-to-capacity (v/c) ratio to be well below 1.00 for the eastbound through turning movement during all short-term traffic scenarios. This is not uncommon for minor street approaches on arterial streets to operate at levels of service E or even F during peak periods, as signal timings would be adjusted to favor heavier northbound and southbound through volumes on Marksheffel Road. All other individual turning movements are expected to operate at LOS D or better during both short-term peak hours, with or without the site-generated traffic.

Long-Term

During the long term, the intersection of Marksheffel/Meadowbrook is projected to operate at LOS C or better *overall* during both peak hours. However, the following individual turning movements are projected to operate at LOS E during at least one peak hour due to high through volumes on Marksheffel Road: eastbound dual-left, eastbound through, westbound left, westbound through, southbound left, and northbound left. Levels of service in the E range are due to the assumed long cycle length and minimum phase splits for eastbound/westbound to maximize green time and signal progression for northbound Marksheffel Road.

Meadowbrook Parkway/Gary Watson Point (South Site Access)

All individual turning movements and approaches are projected to operate at LOS C or better as a two-way stop-sign-controlled intersection during both the short- and long-term traffic scenarios. Please refer to Figure 7 and Figure 9 for recommended lane configurations and LOS summaries at this intersection during the short- and long-term scenarios, respectively.

Meadowbrook Parkway/El Jefe Heights (North Site Access)

Short-Term

All individual turning movements and approaches are projected to operate at LOS C or better during the short-term as a two-way stop-sign-controlled intersection with the addition of a westbound left-turn deceleration lane. Please refer to Figure 7 for lane configuration analyzed and LOS summaries at this intersection during the short-term scenario.

Long-Term

The PM peak-hour LOS analysis indicates both northbound exiting turn lanes are projected to operate at LOS D or better during both long-term peak hours. Also, analysis assuming a separate northbound through/right-turn lane on this northbound approach shows improvement of the northbound exiting turning movements compared to a single-lane approach. Entering vehicles in the westbound left-turn lane are projected to operate at LOS A during both long-term peak hours.

Despite a Synchro-reported LOS F (HCM methodology) for the southbound approach projection during the afternoon peak hour, gaps created from the nearby signal at Marksheffel/Meadowbrook would allow southbound vehicles exiting the adjacent site to turn southbound left onto Meadowbrook.

Please refer to Figure 9 for analysis lane configurations and reported lane group levels of service at the proposed north site access during the long-term scenario.

Marksheffel Road/US Highway 24

Short Term

The intersection of Marksheffel Road/US Hwy 24 is projected to operate at LOS D overall during the morning and evening short-term peak hours, respectively, with or without the addition of short-term site-generated traffic. All left-turning movements are projected to operate at LOS E or worse before and after considering site-generated traffic during the morning and afternoon peak hour, respectively. All other turning movements at this intersection are projected to operate at LOS D or better during the short term upon site buildout.

Long Term

The intersection of Marksheffel Road/US Hwy 24 is projected to operate at LOS E overall during both the 2043 morning and afternoon peak hours, with and without considering site-generated traffic. High through volumes on US Hwy 24 and a high northeast-bound to north-bound left-turn volume (background traffic) are projected to result in LOS F overall operational performance during the 2043 evening peak hour.

VEHICLE QUEUING

Marksheffel Road/Meadowbrook Parkway

This section contains the projected 95th-percentile queues for the eastbound approach at the intersection of Meadowbrook Parkway/Marksheffel Road and for the westbound left turn at El Jefe Heights. Projected queue lengths have also been shown for other key turning movements at this intersection. Table 3 and Table 4 present the 95th-percentile queues reported on the Synchro analysis reports.

Both tables show the existing back-to-back left-turn vehicle storage lengths and the available stacking distance between the two intersections for the eastbound through/right lane. The latter distance is a function of the intersection spacing. The 95th-percentile queues for the projected short-term background plus site-generated and 2040 background plus site-generated scenarios are shown in the tables.

Short-Term

Short-term scenario queue reports indicate that the 95th-percentile eastbound queues would **not** exceed the available stacking length for either of the back-to-back left-turn lanes during either short-term peak hour. SimTraffic queueing reports indicated 95th-percentile queue lengths on Meadowbrook of up to 151 feet for the eastbound dual-left-turn lanes approaching Marksheffel and up to 46 feet for the westbound left-turn lane approaching El Jefe. Please refer to Table 3 for more details.

Table 3: 95th-Percentile Queues (2023 Background + Site)

Eastbound-Left at Meadowbrook/Marksheffel		
Queuing Metric	A.M. Peak	P.M. Peak
Storage Length (ft)	220'	220'
Taper Length (ft)	100'	100'
Total Stacking Distance (ft)	320'	320'
95th-percentile Queue (ft)	132'	151'
% Upstream Block Time	0%	0%
% Storage Block Time	0%	0%
Westbound-Left at Meadowbrook/El Jefe		
Queuing Metric	A.M. Peak	P.M. Peak
Storage Length (ft)	75'	75'
Taper Length (ft)	65'	65'
Total Stacking Distance (ft)	140'	140'
95th-percentile Queue (ft)	30'	46'
% Upstream Block Time	0%	0%
% Storage Block Time	0%	0%
Source: 95th-percentile queues from SimTraffic reports		

Long-Term

SimTraffic queueing reports indicated a 95th-percentile queue length of 138 feet and 283 feet in the long-term A.M. and P.M. peak hours, respectively, for the eastbound dual-left-turn lanes on Meadowbrook approaching Marksheffel. Queues from the adjacent eastbound through lane are projected to prevent vehicles from entering the eastbound dual-left-turn lanes during up to 8 percent of the PM peak hour. However, simulations indicated that these queues would clear during each traffic signal cycle. Additionally, the 283-foot queue would not extend far enough back to the west to block vehicles from entering or exiting at El Jefe, as there is 320 feet of total queue distance on the eastbound approach of Meadowbrook approaching Marksheffel.

The proposed westbound left-turn lane into the north site-access point (El Jefe Heights) from Meadowbrook Parkway is 75 feet long plus a 65-foot taper. This stacking distance would provide adequate storage capacity to accommodate the projected 95th-percentile queues, as the projected long-term queues are projected to reach a maximum of 54 feet. Please refer to Table 4 for more details.

Table 4: 95th-Percentile Queues (2043 Background + Site)

Eastbound-Left at Meadowbrook/Marksheffel		
Queuing Metric	A.M. Peak	P.M. Peak
Storage Length (ft)	220'	220'
Taper Length (ft)	100'	100'
Total Stacking Distance (ft)	320'	320'
95th-percentile Queue (ft)	138'	283'
% Upstream Block Time	0%	0%
% Storage Block Time	0%	8%
Westbound-Left at Meadowbrook/El Jefe		
Queuing Metric	A.M. Peak	P.M. Peak
Storage Length (ft)	75'	75'
Taper Length (ft)	65'	65'
Total Stacking Distance (ft)	140'	140'
95th-percentile Queue (ft)	38'	54'
% Upstream Block Time	0%	0%
% Storage Block Time	0%	0%
Source: 95th-percentile queues from SimTraffic reports		

AUXILIARY TURN LANE ANALYSIS, INTERSECTION CONFIGURATION, AND TRAFFIC CONTROL

Turn lanes associated with the north access were previously addressed with a deviation request. The turn lanes on Meadowbrook between El Jefe and Marksheffel cannot meet *ECM* criteria for deceleration plus storage plus taper due to the set intersection spacing. Note: deviation requests for these auxiliary turn lanes were approved by the County in 2018.

Marksheffel Road/Meadowbrook Parkway

No modifications/improvements would be required for the auxiliary turn lanes at this intersection as a result of site-generated traffic.:

Meadowbrook Parkway/El Jefe Heights

No further improvements will be needed to the turn lanes already in place along Meadowbrook Parkway at El Jefe Heights.

ROADWAY CLASSIFICATIONS

Meadowbrook Parkway is an Urban, Non-Residential Collector Street. El Jefe Way and Gary Watson Point are proposed to be private streets.

ROADWAY IMPROVEMENTS

- No new auxiliary turn lanes would be required, nor would any modifications to existing lanes be necessary.
- Construct El Jefe Heights between Meadowbrook Parkway and Gary Watson Point;
 - Timing: with this development;
 - Responsibility: applicant.
- Striping/signing improvements would be necessary with the opening of El Jefe Heights. Please refer to the CD plans by M & S Civil Consultants – signing and striping sheets.
 - Timing: with this development – prior to opening of El Jefe Heights
 - Responsibility: applicant.

DEVIATION REQUESTS

Deviations submitted for El Jefe Heights with this application are:

- Deviation to ECM SECTION 2.2.4.B.6/SD-4-1, THE PRIVATE ROADWAY SECTION SHALL MEET ALL DETAILS OF THE LOCAL URBAN ROAD SECTION EXCEPT REQUESTS TO EXCLUDE THE 5-FOOT-WIDE SIDEWALK (EACH SIDE) AS DEFINED IN THE DETAIL AND PROVIDE A 5--FOOT-WIDE SIDEWALK ON THE ONE SIDE ONLY,
- Deviation REQUEST TO REDUCE THE MINIMUM CENTERLINE RADIUS FROM 200' TO 100' [in one location/one curve], AND REQUEST TO WIDEN FROM THE STANDARD 30-FOOT-WIDE ASPHALT MAT TO A 32-FOOT-WIDE ASPHALT MAT. (REQUEST EL JEFE HEIGHTS ONLY.)

Previous Deviations were submitted for:

- El Jefe Heights and Gary Watson Point. The deviation addressed the proposed cross section, private streets waivers, and general alignment/consistency with other streets within Claremont Business Park. The proposed design changes to El Jefe Heights from the previously approved plat are included on page 3 of this report.
- The laneage along Meadowbrook Parkway west of Marksheffel Road – with the original preliminary plan.

COUNTY ROAD IMPROVEMENT FEE PROGRAM

Transportation Impact Fees

Per ECM Appendix B: State what the current applicable Transportation Impact Fees are and what option the developer will be selecting for payment.

It is our understanding that this site is within the Central Marksheffel District and will not be assessed any additional fees through the El Paso County Road Impact Fee program.

Reimbursable Improvements

There are no El Paso County *MTCP* roadway improvement projects in the study identified by the year 2040 per Map 13 and Table 4 of El Paso County's 2016 *MTCP*.

MULTI-MODAL TRANSPORTATION AND TDM OPPORTUNITIES

Meadowbrook Parkway has sidewalks and the street width is sufficient width to accommodate bicycles. Gary Watson Point has a sidewalk on one side of the street and the same is proposed for El Jefe Heights. There is a 12-foot-wide paved concrete trail along the west side of Marksheffel Road extending north from just south of the bridge just north of Meadowbrook. There is connectivity to the future Rock Island Regional Trail through the neighborhood to the north. The US Highway 24 PEL Study shows a proposed multi-use path along the north side of the highway. Mountain Metro Transit does not currently provide service adjacent to this site. However, the nearest route runs along Peterson Road (north of Galley). This is reasonably accessible via bicycle and the transit buses are furnished with bicycle racks. Transit service may expand to the east as growth continues to the east.

FINDINGS AND CONCLUSIONS

- The site is projected to generate about 2,895 new driveway vehicle-trips on the average weekday.
- During the weekday morning peak hour of adjacent street traffic, 124 vehicles would enter the site while 120 vehicles would exit.
- During the weekday afternoon peak hour of adjacent street traffic, 118 vehicles would enter the site while 112 vehicles would exit.
- Please refer to the "Level of Service" section above for detailed LOS results and discussion regarding reported level of service at the study-area intersections.
- Please refer to the "Auxiliary Turn Lane Analysis" section for evaluation of potential turn-lane needs. With the development of the commercial site, LSC recommends consideration of the potential addition of a dedicated, separate northbound right-turn lane on El Jefe approaching Meadowbrook – for traffic exiting the commercial area. This shows improvement to LOS D or better for the northbound turning movement.
- Please refer to the "Auxiliary Turn Lane Analysis, Intersection Configuration, and Traffic Control" section for detailed findings/recommendations regarding turn lanes at the study-area intersections.
- Meadowbrook Parkway is an Urban, Non-Residential Collector Street. El Jefe Way and Gary Watson Point are proposed to be private streets.
- Please refer to the "Queuing Analysis" section above for additional details. Long-term analysis indicated that the westbound 95th percentile left-turn queue at El Jefe/Meadowbrook is not projected to exceed the existing left-turn lane length (75 feet plus a 65-foot taper) during the morning or afternoon peak hour.
- Although the 95th percentile queue lengths from the Synchro reports are not greater than the available stacking lengths, there is the potential for queues to periodically back to the

El Jefe/Meadowbrook intersection. Should eastbound vehicle queues more regularly begin extending back from Marksheffel/Meadowbrook to or through the El Jefe/Meadowbrook intersection, a "DO NOT BLOCK INTERSECTION" sign (MUTCD R10-7) could be installed on the eastbound approach to this intersection. This would notify eastbound motorists of the periodic need (during peak periods) to allow for a gap at the intersection – not only for traffic to turn from the side street onto Meadowbrook, but also not to impede the westbound left-in movement from Meadowbrook onto El Jefe and into the commercial site. Also, the owner of the commercial parcel has reserved additional potential future ROW along the south side of Meadowbrook Parkway to accommodate potential future widening/additional laneage if needed in the future.

* * * * *

Please contact me if you have any questions regarding this report.

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

By: Jeffrey C. Hodsdon, P.E.
Principal

JCH/JAB:jas

Enclosures: Table 5
Figure 1 - Figure 9
Traffic Count Reports
Synchro LOS Reports
Static Queue Graphics
SimTraffic Queue Reports

Table 5



Table 5: Detailed Trip Generation Estimate

ITE		Value	Units ¹	Trip Generation Rates ²				ITE Trips Generated					% Internal Trips	Driveway Trips Generated					% Pass-By	% Non-Pass-By	Non-Passby Trips Generated							
Code	Description			Average Weekday	A.M. In	A.M. Out	P.M. In	P.M. Out	Average Weekday	A.M. In	A.M. Out	P.M. In		P.M. Out	Average Weekday	A.M. In	A.M. Out	P.M. In			P.M. Out	Average Weekday	A.M. In	A.M. Out	P.M. In	P.M. Out		
Currently Proposed Land Uses																												
948	Automated Car Wash	1	CWT	775.00	19.38	19.38	38.75	38.75	775	20	20	39	39	4%	744	19	19	37	37	10%	90%	667	17	17	34	34		
934	Fast-Food w/ Drive-Through Window	2,300	KSF	467.48	22.75	21.86	17.18	15.85	1075	53	51	40	37	4%	1032	51	49	38	36	10%	90%	925	46	44	34	32		
934	Fast-Food w/ Drive-Through Window	2,300	KSF	467.48	22.75	21.86	17.18	15.85	1075	53	51	40	37	4%	1032	51	49	38	36	10%	90%	925	46	44	34	32		
151	Mini-Warehouse	5,000	SU (100s)	18.04	0.54	0.52	0.77	0.77	90	3	3	4	4	4%	87	3	3	4	4	0%	100%	87	3	3	4	4		
				Total				3016	129	125	123	117		2895	124	120	118	112				2602	111	108	106	101		
For Comparison -- Trip Generation from July 2020 TIS Report																												
820	Shopping Center	33.8	KSF	-	-	-	-	-	-	-	-	-	-	-	2911	75	35	122	148	-	-	2635	70	32	111	136		
Change in Trip Generation from the July 2020 TIS Report																												
- Currently-Proposed Land Uses				-	-	-	-	-	-	-	-	-	-	-	2895	124	120	118	112	-	-	2602	111	108	106	101		
- Previously-Approved Land Uses				-	-	-	-	-	-	-	-	-	-	-	2911	75	35	122	148	-	-	2635	70	32	111	136		
															Difference	-16	49	85	-4	-36			Difference	-33	41	76	-5	-35

¹ KSF = 1,000 square feet, CWT = car wash tunnel, SU (100s) = 100 storage units

² Source: *Trip Generation, 11th Edition (2021)* by the Institute of Transportation Engineers (ITE)

Date: 08/21/2023



Attachment 2 – 2023 Super Star Car Wash Proposed Site Plan



Attachment 3 – Trip Generation Analysis Data

Land Use: 948

Automated Car Wash

Description

An automated car wash is a facility that allows for the mechanical cleaning of the exterior of vehicles. Manual cleaning service may also be available at the facility. Self-service car wash (Land Use 947) and car wash and detail center (Land Use 949) are related uses.

Additional Data

The sites were surveyed in the 1990s and the 2000s in New Jersey, New York, and Washington.

Source Numbers

552, 555, 585, 599, 954

Automated Car Wash (948)

Vehicle Trip Ends vs: Car Wash Tunnels
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 3

Avg. Num. of Car Wash Tunnels: 1

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Car Wash Tunnel

Average Rate	Range of Rates	Standard Deviation
77.50	50.00 - 104.50	33.07

Data Plot and Equation

Caution – Small Sample Size

