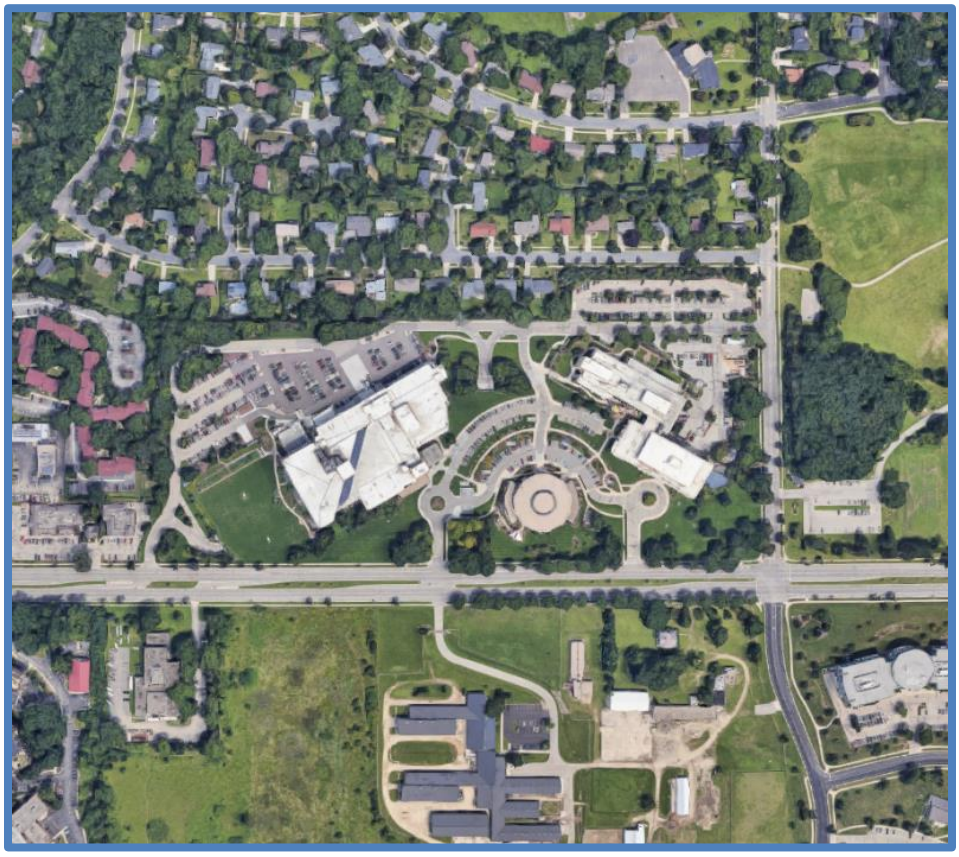
CMFG Life Headquarters Campus Renovation and Expansion
Traffic Generation Analysis

CITY OF MADISON
DANE COUNTY, WISCONSIN



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1.0 INTRODUCTION

KL Engineering has completed a traffic demand analysis for the proposed CUNA Mutual Group (referred to as CMFG in this report) redevelopment in Madison, Wisconsin. CMFG is located on the west side of Madison, north of Mineral Point Road between Credit Union Way (*a private roadway access to the CMFG campus*) and S Rosa Road. CMFG has approximately 27 acres of land and has a current capacity of 2,447 employees housed within three buildings. Parking is provided onsite, with 2,170 available spots on campus, the majority of which is located underground. In addition, CMFG had is expected to have a total of approximately 9,800 visitors at the campus in 2019.

The study area includes the following roadways:

- *Mineral Point Road* is a principal arterial roadway with a four-lane divided urban cross section, 40 mph speed limit, and an AWT of 28,000 vehicles per day (vpd).
- *South Rosa Road* is a collector street with a two-lane undivided urban cross section, 30 mph speed limit, and an AWT of 6,050 vpd.

A project location map is provided in **Exhibit 1**.

2.0 PROPOSED DEVELOPMENT

The proposed CMFG project will include demolition of the existing 5810 building. This building will be replaced by a new 5810 Building that will serve as the new Gateway building to the CMFG Campus. The current 5810 building is 56,700 sq ft and houses the campus food service functions, meeting rooms, and a 200-person auditorium.

The new 5810 building will have five levels of amenity space, totaling approximately 125,000 net sq ft It will include a kitchen, server, and dining space; training and conferencing spaces, and a 500-person auditorium to be used for company meetings, lectures, and community functions. With the construction of the new building, employee numbers will not increase, however, it is anticipated that the number of visitors will increase by 2,000-3,000 per year, with the highest concentration arriving between 7:00 am to 12:00 pm. The new building will include underground parking, primarily to serve visitors. Overall, this project will include removal of 35 surface parking spots and a gain of 177 underground parking spots, resulting in a total increase of 142 parking spots.

A proposed site plan is provided in **Exhibit 2**.

2.1 Existing / Proposed Access

Four access points currently serve the campus:

- *Driveway 1:* Right-In/Right-Out + Left-In access at Credit Union Way and Mineral Point Road.
- *Driveway 2:* Full access off Mineral Point Road just west of existing 5810 building/future building
- *Driveway 3:* Right-In/Right-Out access off Mineral Point Road just east of existing 5810 building/future 5810 building
- *Driveway 4: Full access at Credit Union Way and S Rosa Road*

No changes to access points to and from the CMFG campus are proposed as part of this project. With the construction of the new 5810 building, driveway 2 will include the entrance to the new underground parking and drop-off / pick-up area for visitors. Current employee parking and traffic circulation is not anticipated to change as a result of the new building. Therefore, the redevelopment is only anticipated to impact traffic volumes and operations at driveway 2.

3.0 EXISTING TRAFFIC VOLUMES

KL Engineering completed driveway turning movement counts at the existing four CMFG access points during the week of November 4th, 2019. Traffic counts were taken for a one-hour period during the morning and evening peak periods. AM and PM peak hours were based on traffic counts completed in November of 2017 at the Mineral Point Road & S Rosa Road intersection. The morning and evening peak traffic volume hours are 7:30-8:30 am and 4:30-5:30 pm. Existing peak hour traffic volumes for the driveways and at the Mineral Point Road & S Rosa Road intersection are shown in **Exhibit 3**. Traffic volumes provided at the Mineral Point Road & S Rosa Road intersection included a 0.2%/year growth rate to determine estimated 2019 values.

3.1 Existing Traffic Operations

Existing traffic operations at the four driveway locations were analyzed using the software programs Synchro and SimTraffic. Existing traffic volumes, roadway geometrics, and intersection control were used for the analysis.

The analysis results quantify operations at each CMFG access point and the Mineral Point Road & S Rosa Road intersection by estimating level of service (LOS), vehicular delays, volume/capacity ratios (v/c), and traffic queues. Synchro software was used to implement the Highway Capacity Manual 6th Edition (HCM 6) traffic analysis methodologies to estimate these measures of effectiveness at all study locations. Traffic volumes used for the analysis included the driveway turning movement counts completed in November 2019 and estimated 2019 Mineral Point Road and S Rosa Road traffic volumes based on the November 2017 counts.

Estimated delays were used to assign a LOS for each movement of each study intersection. Level of service is determined by taking delay levels from the mathematical models. The LOS is based on an A to F scale and represent the operating conditions as perceived by the driver as specified in the HCM. **Table 1 and Table 2** summarize the AM and PM peak hours at each of the study driveway and intersection locations for the existing year traffic scenario. Level of service representing long delays (LOS E or LOS F) are bolded and highlighted.

Table 1. Existing Year Operational Analysis Results
CMFG Driveways

Peak Period	Intersection	Access/Traffic Control	Meaure of Effectiveness	Intersection Movement											
				Eastbound			Westbound			Northbound			Southbound		
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM PEAK	Driveway 1	Stop Control: Right-In/Right-Out + Left-In	LOS	A	A			A	A						A
			DELAY (s)	9	0			0	0						10
			V/C	0.21	--			--	--						0.00
			Queue (ft)	25	--			--	--						<25
	Driveway 2	Stop Control: Full Access	LOS	A	A			A	A				B		B
			DELAY (s)	9	0			0	0				11		11
			V/C	0.04	--			--	--				0.02		0.02
			Queue (ft)	<25	--			--	--				<25		<25
	Driveway 3	Stop Control: Right-In/Right-Out	LOS		A			A	A						B
			DELAY (s)		0			0	0						10
			V/C		--			--	--						0.01
			Queue (ft)		--			--	--						<25
	Driveway 4	Stop Control: Full Access	LOS	C		C				A	A			A	A
			DELAY (s)	20		20				10	0			0	0
			V/C	0.04		0.04				0.26	--			--	--
			Queue (ft)	<25		<25				25	--			--	--

Table 1. Existing Year Operational Analysis Results (*Continued*)
CMFG Driveways

PM PEAK	Driveway 1	Stop Control: Right-In/Right-Out + Left-In	LOS	B	A			A	A						C
			DELAY (s)	11	0			0	0						23
			V/C	0.01	--			--	--						0.54
			Queue (ft)	<25	--			--	--						80
	Driveway 2	Stop Control: Full Access	LOS	B	A			A	A				B		B
			DELAY (s)	11	0			0	0				15		15
			V/C	0.02	--			--	--				0.12		0.12
			Queue (ft)	<25	--			--	--				<25		<25
	Driveway 3	Stop Control: Right-In/Right-Out	LOS		A			A	A						B
			DELAY (s)		0			0	0						14
			V/C		--			--	--						0.02
			Queue (ft)		--			--	--						<25
	Driveway 4	Stop Control: Full Access	LOS	C		C				A	A			A	A
			DELAY (s)	15		15				8	0			0	0
			V/C	0.55		0.55				0.01	--			--	--
			Queue (ft)	90		90				<25	--			--	--

Table 2. Existing Year Operational Analysis Results
Mineral Point Road & S Rosa Road Intersection

Peak Period	Intersection	Traffic Control	Meaure of Effectiveness	Intersection Movement												Overall Intersection
				Eastbound			Westbound			Northbound			Southbound			
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
AM Peak	Mineral Point Rd & S Rosa Rd	Signal	LOS	A	A	A	A	A	A	D	C		D	D		**A**
			DELAY (s)	6	6	5	2	0	0	46	34		38	49		**10**
			V/C	0.23	0.40	0.13	0.16	0.32	0.20	0.23	0.18		0.37	0.78		---
			Queue (ft)	35	145	35	<25	<25	<25	35	50		105	265		---
PM Peak	Mineral Point Rd & S Rosa Rd	Signal	LOS	A	A	A	A	A	A	**F**	D		**F**	D		**B**
			DELAY (s)	6	7	5	2	1	0	81	38		89	53		**16**
			V/C	0.13	0.42	0.04	0.11	0.56	0.05	0.80	0.53		0.92	0.81		---
			Queue (ft)	<25	175	<25	<25	<25	<25	155	185		275	310		---

All traffic movements at the CMFG driveway access points have an acceptable level of service. With the exception of left turns in both directions from S Rosa Road onto Mineral Point Road during the PM peak period, all traffic movements at the Mineral Point Road & S Rosa Road intersection have acceptable level of service conditions. Poor LOS for turning movements at the intersection are mainly due to the limited green time available for S Rosa Road because of the need for enough green time for Mineral Point Road to provide good progression and minimal delays.

4.0 PROJECTED TRAFFIC

4.1 Trip Generation

With the uniqueness of this redevelopment, traditional trip generation methodologies using the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition* were not used to estimate the number of trips expected to be generated by the project. Instead projected trips were based on the anticipated increase in trips due to estimated increases in visitors to the campus, added parking spots, and increased building size. The resulting trip generation estimate is provided below. Overall, it is anticipated that traffic volumes at driveway 2 will increase by 33% of the current total volumes at driveway 2 & 3.

Daily Trip Generation increases for proposed 5810 building:

- AM Peak Trips:
  - In: 19; Out: 6; Total: 25
- PM Peak Trips:
  - In: 6; Out: 19; Total: 25

No linked or pass-by trips are expected to occur due to the nature of the development. In addition, multimodal reductions were not included since the trip generation was based on existing vehicular trips.

4.2 Trip Distribution and Assignment

The projected trips generated by the proposed development have been assigned to the local roadway network based on the existing trip distribution patterns in and out of the CMFG campus, specifically at driveways 2 & 3. Projected trip distribution of the CMFG redevelopment traffic is as follows:

- 25% to/from the east on Mineral Point Road
- 70% to/from the west on Mineral Point Road
- 5% to/from the north on S Rosa Road

The trip distribution and assignment of development traffic to the roadway network is shown in **Exhibit 4**. All new trips are expected to occur at driveway 2 where access to the new underground visitor parking and drop-off/pick-up is located.

4.3 Total Traffic

Total traffic is determined by adding the new trips (Exhibit 4) to existing traffic (Exhibit 3). Proposed total traffic volumes are shown in **Exhibit 5**.

4.4 Proposed Traffic Operations

Traffic operations were analyzed using the existing roadway network and proposed total traffic volumes. The analysis was used to determine estimated LOS, vehicular delays, v/c ratios, and queues upon completion of the proposed redevelopment. Tables 3 & 4 summaries the AM and PM peak hours at each location for the proposed total traffic scenario. Level of service representing long delays (LOS E or LOS F) are bolded and highlighted.

Table 3. Total Traffic Operational Analysis Results
CMFG Driveways – No Improvements

Peak Period	Intersection	Access/Traffic Control	Meaure of Effectiveness	Intersection Movement											
				Eastbound			Westbound			Northbound			Southbound		
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM PEAK	Driveway 1	Stop Control: Right-In/Right-Out + Left-In	LOS	A	A			A	A						A
			DELAY (s)	9	0			0	0						10
			V/C	0.21	--			--	--						0.00
			Queue (ft)	25	--			--	--						<25
	Driveway 2	Stop Control: Full Access	LOS	A	A			A	A				B		B
			DELAY (s)	9	0			0	0				11		11
			V/C	0.05	--			--	--				0.03		0.03
			Queue (ft)	<25	--			--	--				<25		<25
	Driveway 3	Stop Control: Right-In/Right-Out	LOS		A			A	A						B
			DELAY (s)		0			0	0						10
			V/C		--			--	--						0.01
			Queue (ft)		--			--	--						<25
	Driveway 4	Stop Control: Full Access	LOS	C		C				A	A			A	A
			DELAY (s)	20		20				10	0			0	0
			V/C	0.04		0.04				0.26	--			--	--
			Queue (ft)	<25		<25				25	--			--	--

Table 3. Total Traffic Operational Analysis Results (*Continued*)
CMFG Driveways – No Improvements

PM PEAK	Driveway 1	Stop Control: Right-In/Right-Out + Left-In	LOS	B	A			A	A						C
			DELAY (s)	11	0			0	0						23
			V/C	0.01	--			--	--						0.54
			Queue (ft)	<25	--			--	--						80
	Driveway 2	Stop Control: Full Access	LOS	B	A			A	A				C		C
			DELAY (s)	11	0			0	0				15		15
			V/C	0.02	--			--	--				0.17		0.17
			Queue (ft)	<25	--			--	--				<25		<25
	Driveway 3	Stop Control: Right-In/Right-Out	LOS		A			A	A						B
			DELAY (s)		0			0	0						14
			V/C		--			--	--						0.02
			Queue (ft)		--			--	--						<25
	Driveway 4	Stop Control: Full Access	LOS	C		C				A	A			A	A
			DELAY (s)	15		15				8	0			0	0
			V/C	0.55		0.55				0.01	--			--	--
			Queue (ft)	90		90				<25	--			--	--

Table 4. Total Traffic Operational Analysis Results
Mineral Point Road & S Rosa Road Intersection – No Improvements

Peak Period	Intersection	Traffic Control	Meaure of Effectiveness	Intersection Movement												Overall Intersection
				Eastbound			Westbound			Northbound			Southbound			
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
AM Peak	Mineral Point Rd & S Rosa Rd	Signal	LOS	A	A	A	A	A	A	D	C		D	D		**A**
			DELAY (s)	6	6	5	2	0	0	46	34		38	50		**10**
			V/C	0.23	0.41	0.13	0.16	0.33	0.21	0.23	0.18		0.37	0.78		---
			Queue (ft)	35	145	35	<25	<25	<25	35	50		105	260		---
PM Peak	Mineral Point Rd & S Rosa Rd	Signal	LOS	A	A	A	A	A	A	**F**	D		**F**	D		**B**
			DELAY (s)	6	7	5	2	1	0	81	38		89	53		**16**
			V/C	0.14	0.42	0.04	0.11	0.57	0.05	0.80	0.53		0.92	0.81		---
			Queue (ft)	<25	180	<25	<25	<25	<25	155	185		275	310		---

Minimal to no increases in traffic LOS and delays to existing operations are anticipated as a result of the proposed redevelopment. Specifically, S Rosa Road will not experience any additional delay since the added traffic to the CMFG campus will be entering and exiting off Mineral Point Road.

4.5 Sensitivity Analysis

A sensitivity analysis was completed for the proposed redevelopment to identify possible traffic impacts to the adjacent roadway network when auditorium events occur on the CMFG campus that may increase traffic volumes more than the typical weekday. An increase of 142 trips in during the AM peak and 142 trips out during the PM peak were added to driveway 2, which would account for occupancy of all new parking spots on the campus. Even with this volume increase, traffic operations at driveway 2 were LOS C or better and no decrease in LOS occurred at the Mineral Point Road & S Rosa Road intersection.

5.0 CONCLUSION

The proposed reconstruction will result in increased traffic volumes at driveway 2, where the new underground visitor parking and drop-off/pick-up access will be. All other driveways will have minimal/no anticipated traffic volume changes. Overall, no significant traffic issues are expected at any of the four CMFG driveways (*including driveway 2*), at the Mineral Point Road & S Rosa Road intersection, or along S Rosa Road as a result of the proposed redevelopment at the CMFG campus.

Existing operations at the Mineral Point Road & S Rosa Road intersection result in poor LOS on the S Rosa Road approaches. Operations for S Rosa Road can be improved by adding more green time to the S Rosa Road approaches or adding protected northbound and southbound left-turn phases at the intersection. While these improvements may provide better operations for side street traffic, it would have a negative impact to mainline operations. A more detailed analysis of these improvements at a system level would be required to determine if more green time could be given to the sideroad without negatively affecting adjacent traffic signal coordination or resulting in other operational issues on Mineral Point Road.

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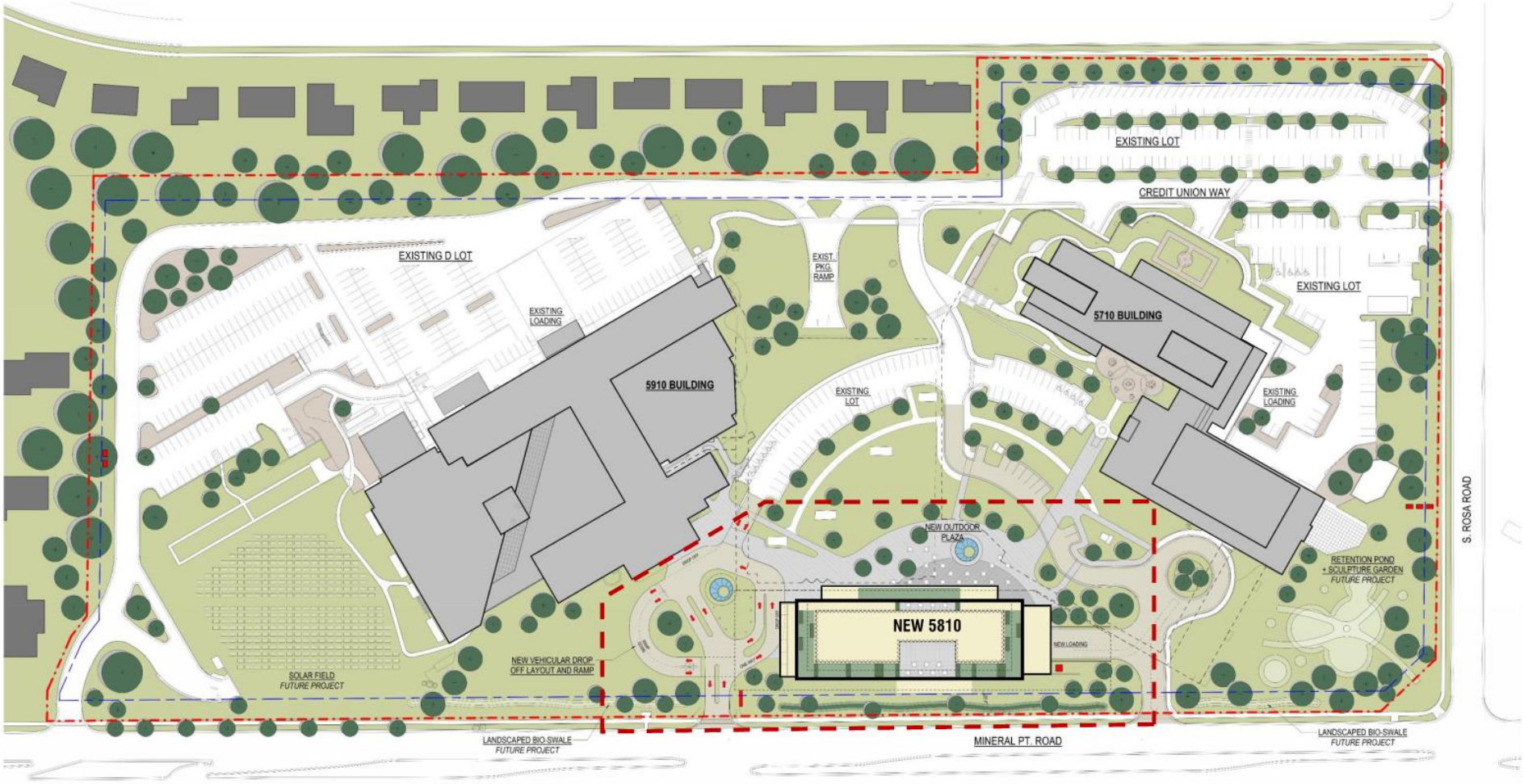
Project Location Map

Exhibit 2



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SITE PLAN – PHASE 1

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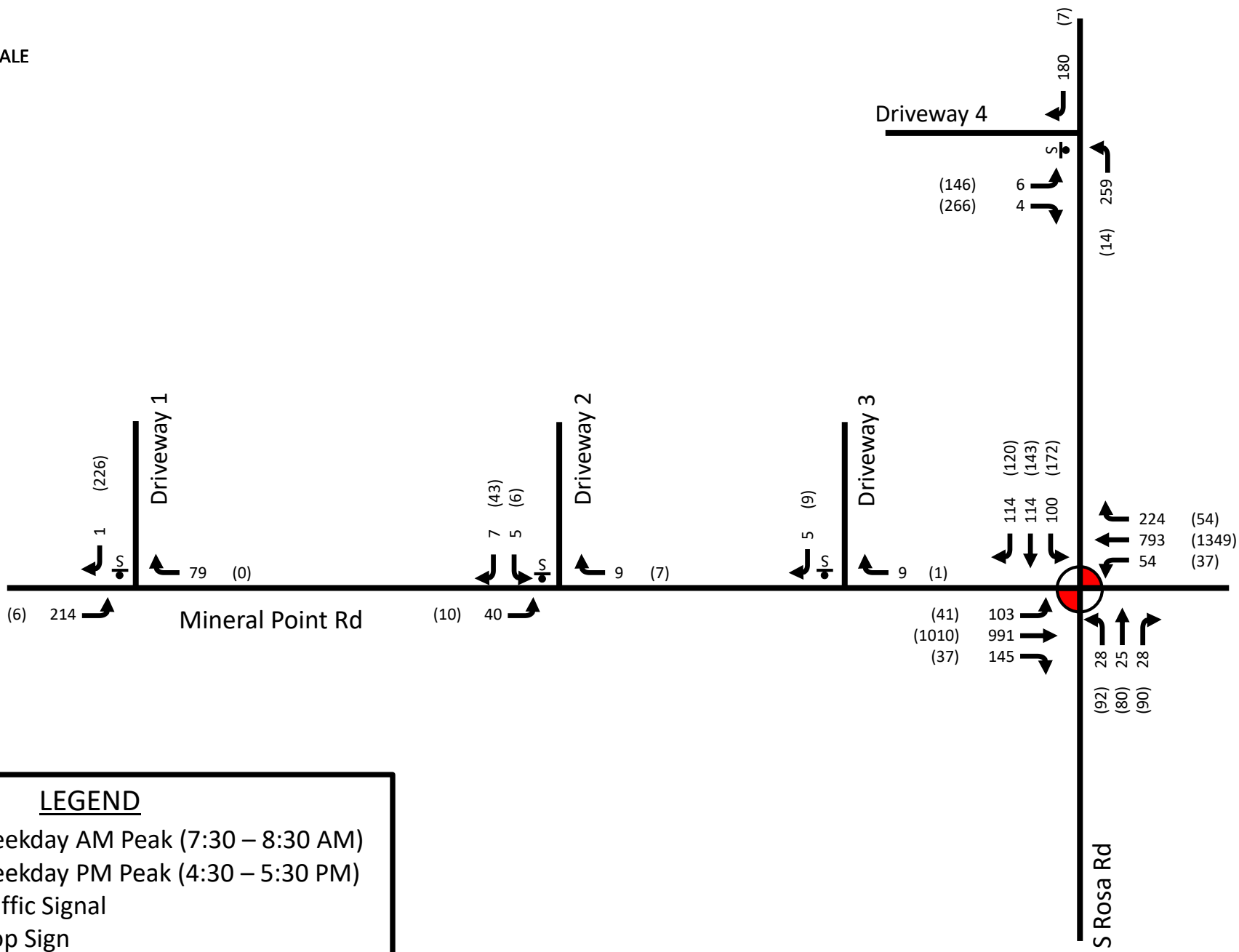
Proposed Site Plan

Exhibit 3

N

NOT TO SCALE



LEGEND

XX = Weekday AM Peak (7:30 – 8:30 AM)

(XX) = Weekday PM Peak (4:30 – 5:30 PM)

= Traffic Signal

= Stop Sign

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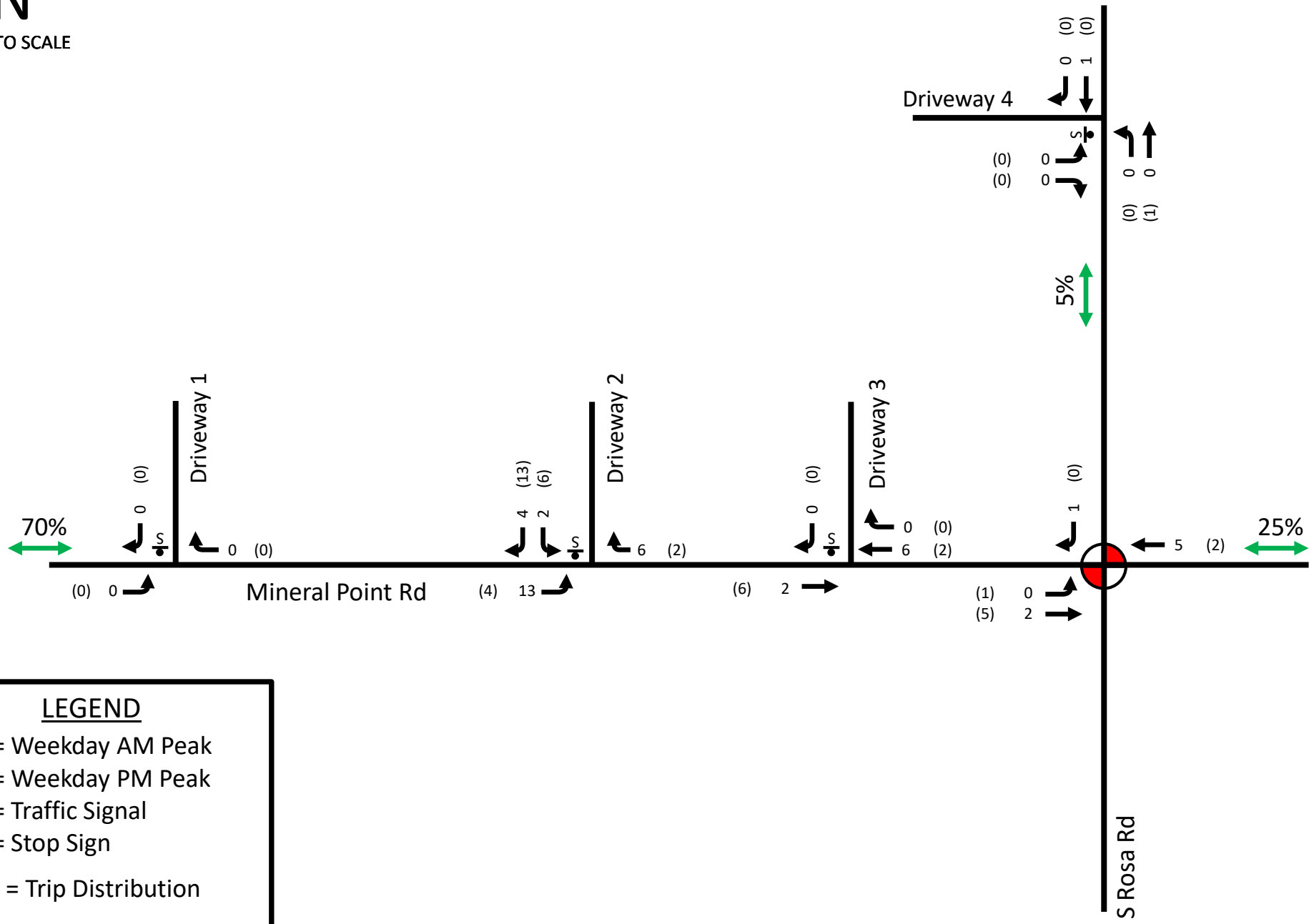
Existing Driveway Volumes

Exhibit 4

N

NOT TO SCALE



LEGEND

XX = Weekday AM Peak

(XX) = Weekday PM Peak

= Traffic Signal

S = Stop Sign

= Trip Distribution

XX%

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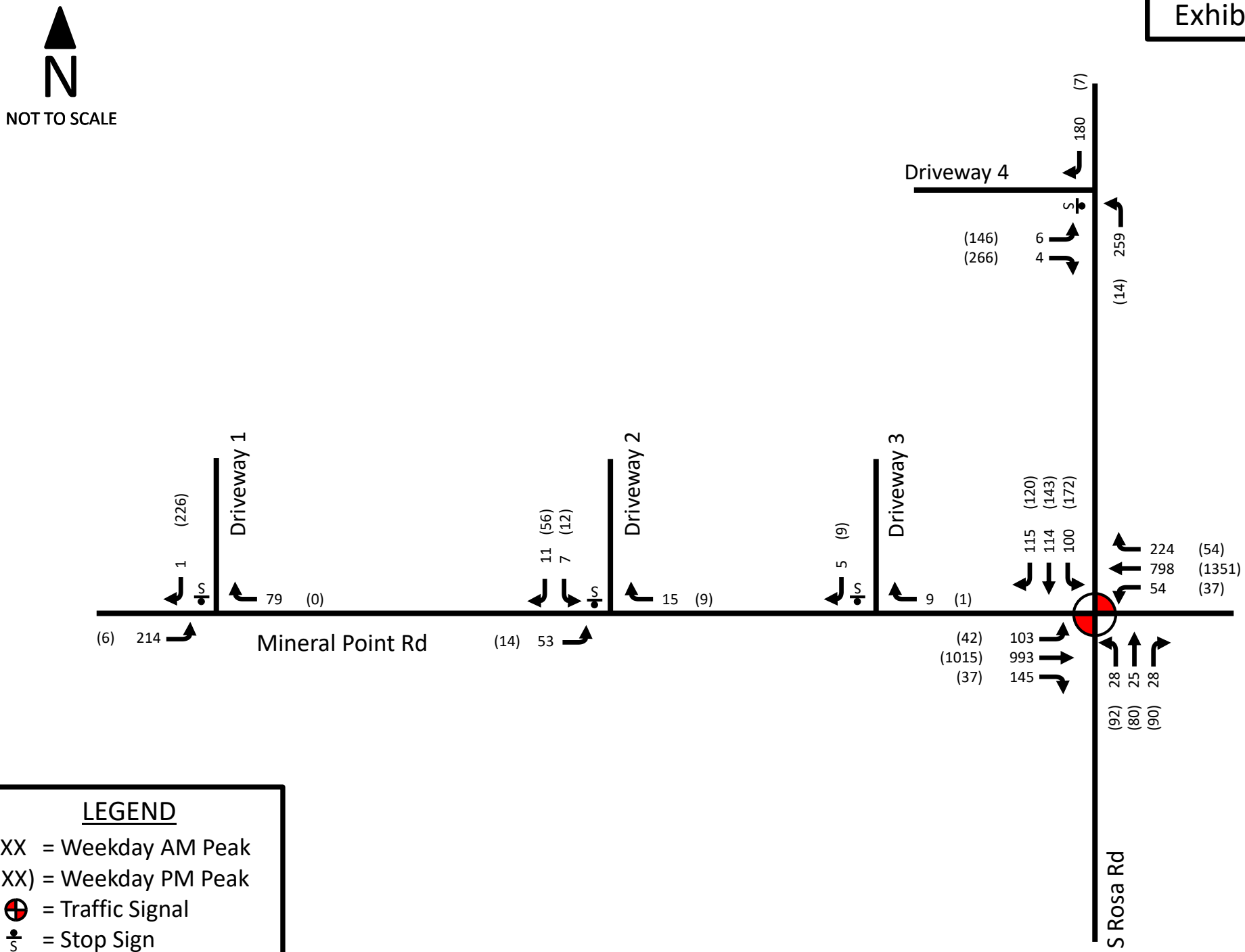
Trip Distribution and Assignment

Exhibit 5



LEGEND

XX = Weekday AM Peak

(XX) = Weekday PM Peak

= Traffic Signal

= Stop Sign

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Total Traffic Volumes