MISSION CHATEAU MISSION ROAD BETWEEN 84TH STREET & 85TH STREET PRAIRIE VILLAGE, KANSAS

TRAFFIC IMPACT STUDY

APRIL 5TH, 2013

OA Project No. 2012-2388

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1.0 INTRODUCTION & OBJECTIVE

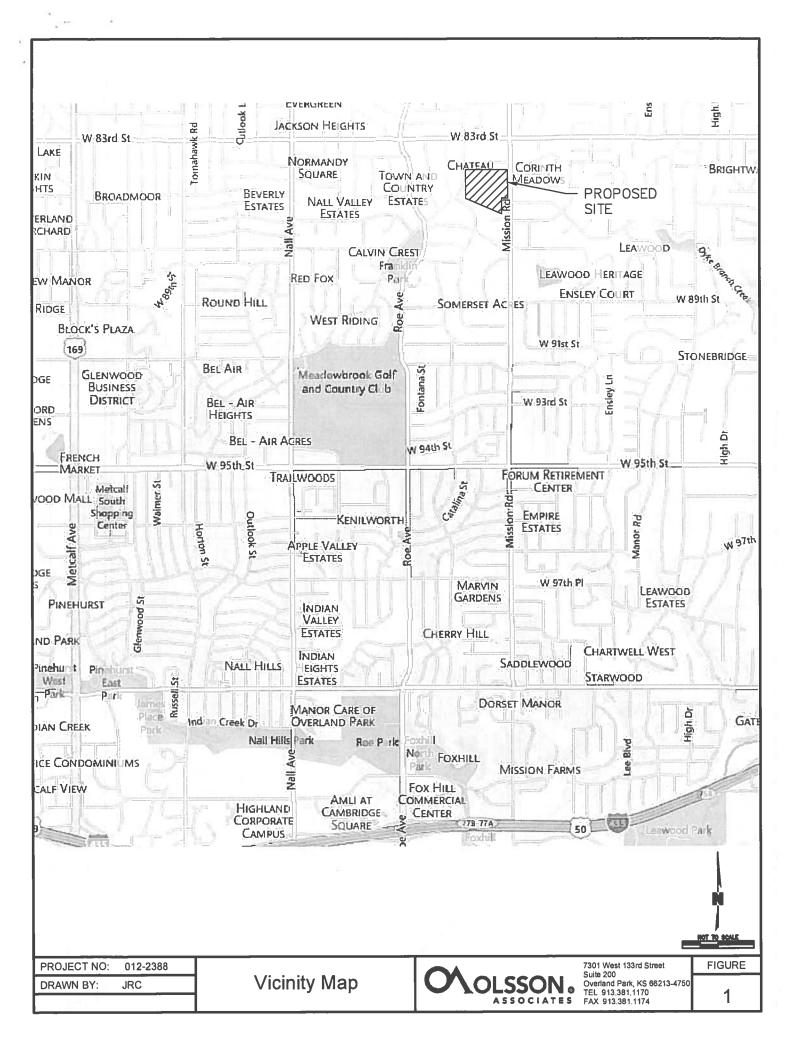
The objective of this study is to evaluate the traffic, roadway conditions and traffic impacts related to the proposed development. The proposed development replaces the closed Mission Valley Middle School that used to have an attendance of approximately 500 students. Existing traffic conditions will be analyzed to provide a baseline with which to evaluate the proposed development. This update will analyze the following scenarios for the AM and PM peak hour period for vehicular traffic operations:

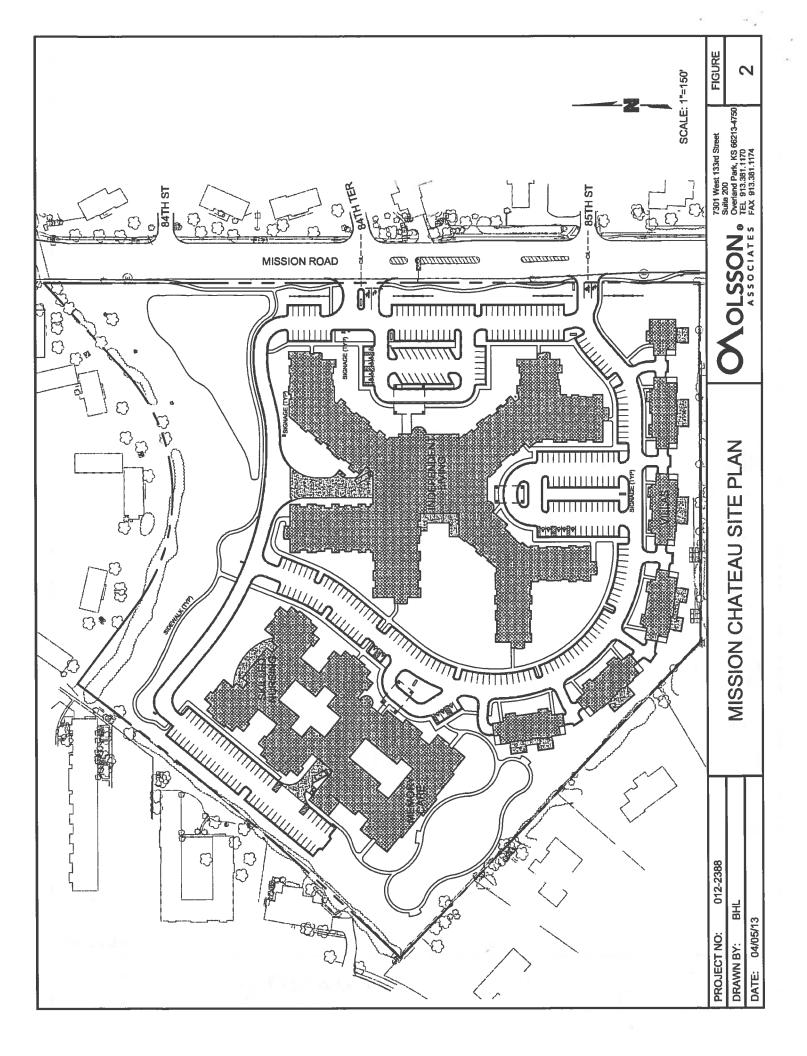
- Existing Conditions
- Existing Conditions with Proposed Development

For the above scenarios the following critical intersections will be analyzed:

Mission Road and proposed site drives

The approximate location of the development area is shown on the vicinity map, **Figure 1. Figure 2** illustrates the site plan for the Mission Valley development.





2.0 DESCRIPTION OF STUDY AREA

2.1 Proposed Development

The proposed development consists of a 92,565 SF Skilled Nursing and Memory Care Facility, a 271,140 SF Assisted Living and Independent Living Facility, and 24,915 SF of Villas.

Access to the development is proposed via two existing drives that will be relocated to align with 84th Terrace and 85th Street. The main entrance, Drive 1 is the northernmost entrance and aligns across from 84th Terrace at Mission Road. Drive 1 is a relocation of an existing drive and provides a single entering lane with two exiting lanes. Drive 2 is located approximately 375 feet south of Drive 1 and is aligned across from 85th Street along Mission Road. Drive 2 is a relocation of an existing drive and provides one entering and one exiting lane. The proposed site consolidates site drives from three to two drives aligned from existing City streets.

3.0 DATA COLLECTION

Olsson Associates collected AM and PM peak hour traffic counts at the intersections of Mission Road at 84th Terrace and 85th Street from Tuesday, October 30th, 2012 to Thursday, November 1st, 2012. The AM and PM peak hour periods were found to be from 7:30-8:30 AM and 5:00-6:00 PM respectively. Peak hour turning movement counts will be utilized for capacity analysis of existing and existing plus development scenarios as well as trip distribution determination for the proposed development.

Data collection sheets are provided in the **Appendix**.

4.0 EXISTING TRAFFIC CONDITIONS

Mission Road is classified as an undivided four lane major arterial roadway. Mission Road has a two-way-left-turn lane separating northbound and southbound traffic north of 84th Terrace. Mission Road has a posted speed limit of 35 mph in the vicinity of the site. 84th Terrace and 85th Street are residential streets with posted speed limits of 25 mph and are stop controlled at their intersection with Mission Road.

Just south of 84th Terrace is an existing pedestrian signal on Mission Road. This crossing was necessary to provide the safe crossing of Mission Road for school related traffic before the school closed.

The existing traffic volumes used for analysis are illustrated in **Figure 3**. The existing intersection geometrics and traffic control for the study area intersections are illustrated in **Figure 4**.



4.1 Capacity Analysis

Signalized intersection capacity analyses were performed using SYNCHRO, version 8.0, based on the Highway Capacity Manual (HCM) delay methodology. Unsignalized capacity analyses were performed in accordance with Chapter 17 of the HCM using the Highway Capacity Software (HCS+), version 5.6. For simplicity, the amount of delay is equated to a grade or Level of Service (LOS) based on thresholds of driver acceptance. A letter grade between A and F is assigned, where LOS A represents the best operation. **Table 1** represents the LOS associated with intersection control delay, in seconds per vehicle (sec/veh), for signalized and unsignalized intersections.

Table 1: Intersection Level of Service Summary

Level-of-Service Criteria				
Level of Service (LOS)	<u>Stop Control</u> Approach Delay sec/veh	Signal Control Control Delay sec/veh		
Α	≤ 10	≤ 10		
В	>10 and ≤ 15	>10 and ≤ 20		
С	>15 and ≤ 25	>20 and ≤ 35		
D	>25 and ≤ 35	>35and ≤ 55		
Е	>35 and ≤ 50	>55 and ≤ 80		
F	>50	>80		

Capacity analysis was completed as discussed above for the unsignalized intersections of Mission Road at 84th Terrace and 85th Street.

All individual movements at unsignalized intersections are operating at LOS D or better during the AM and PM peak hour periods under existing conditions.

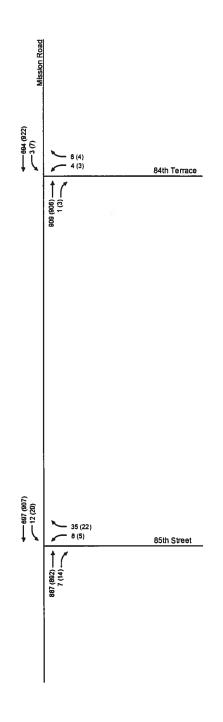
Figure 5 illustrates the existing level of service along the study area corridor.

Capacity analysis sheets for the signalized intersections analyzed in this memo are included in the **Appendix**.

4.2 Existing Recommendations

Study intersections are currently operating at acceptable levels of service. No improvements are recommended based on the existing operations.







XX (XX) - AM (PM) Peak Hour Volumes

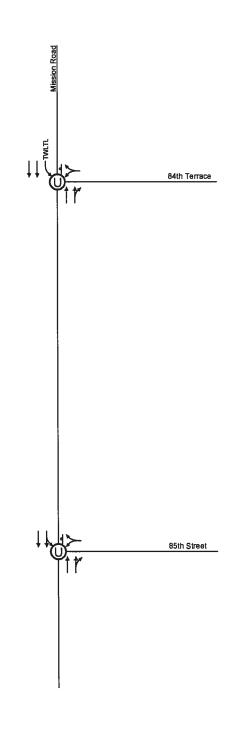
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Existing Peak Hour Volumes



7301 West 133rd Street	FIGURE
Suite 200 Overland Park, KS 66213-4750	
TEL 913.381.1170	3
TEL 913.381.1170 FAX 913.381.1174	3



LEGEND

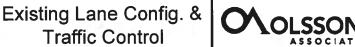
Unsignalized Intersection

Stop Sign Two Way Left-Turn Lane

XX' Turn Bay Storage Length

Traffic Control

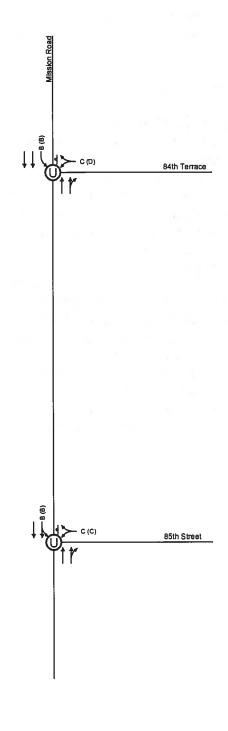
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7301 West 133rd Street Suite 200 Overland Park, KS 66213-4750 TEL 913.381.1170 FAX 913.381.1174

FIGURE

4



LEGEND

Unsignalized Intersection

Stop Sign

XX (XX) - AM (PM) Level of Service

NOT TO BOOLE

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EXIS

Existing Level of Service Olsson.

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FIGURE 5

5.0 EXISTING PLUS DEVELOPMENT CONDITIONS

The proposed development consists of a 92,565 SF Skilled Nursing and Memory Care Facility, a 271,140 SF Assisted Living and Independent Living Facility, and 24,915 SF of Villas.

Figure 2 illustrates the proposed site plan.

5.1 Trip Generation and Distribution

Trip generation characteristics expected for the site are shown in Table 2. These characteristics are based on the recently published 9th Edition of the Institute of Transportation Engineers Trip Generation Manual. The previously submitted study utilized data from the 8th Edition ITE Trip Generation Manual. Based on data available in the Trip Generation Manual the Independent Living Center and Villa land uses were analyzed as Senior Adult Housing (Attached and Detached). Land uses of Assisted Living and Nursing Home utilize the number of rooms for trip generation estimates while the Senior Adult Housing facilities utilize the number of dwelling units for trip generation estimates. The recently published 9th Edition now includes additional data on several of the land uses utilized in this study, specifically the Senior Adult Housing land use. Previously, the Senior Adult Housing land use had 1 data entry to base daily trip generation estimates. Where limited data is available, it is standard practice to use the data collected on the PM peak hour trips to estimate the number of daily trips. With the latest edition of the Trip Generation Manual this land use now has 5 studies where data on the daily trip rates were collected. Based on the most recent data available the proposed development is expected to generate approximately 1,153 daily trips on an average weekday and 101 trips and 102 trips during the AM and PM peak hours, respectively.

ITE				Trip Gen.	Daily	Trip Dis	tribution	Daily	Trips
Code/Page	Land Use	Size		Avg. Rate/Eq.	Trips	Enter	Exit	Enter	Exit
254/520	Assisted Living *	72	Occupied Beds	Average	198	50%	50%	99	99
252/489	Senior Adult Housing - Attached **	160	Dwelling Units	Equation	498	50%	50%	249	249
251/479	Senior Adult Housing - Detached **	11	Dwelling Units	Equation	67	50%	50%	34	33
620/1222	Nursing Home ***	137	Beds	Equation	390	50%	50%	195	195
Total					1,153			577	576
		AM F	eak Hour Trip G	eneration					
ΠE				Trip Gen.	AM Peak	Trip Dis	tribution	AM Peak	Hour Trip:
Code/Page	Land Use	Size		Avg. Rate/Eq.	Hour Trips	Enter	Exit	Enter	Exit
254/521	Assisted Living *	72	Occupied Beds	Average	13	68%	32%	9	4
252/490	Senior Adult Housing - Attached **	160	Dwelling Units	Equation	32	34%	66%	11	21
251/480	Senior Adult Housing - Detached **	11	Dwelling Units	Equation	32	35%	65%	11	21
620/1223	Nursing Home ***	137	Beds	Average	24	50%	50%	12	12
Total					101			43	58
		PM F	eak Hour Trip G	eneration					
ITE -				Trip Gen.	PM Peak	Trip Dis	tribution	PM Peak	Hour Trip
Code/Page	Land Use	Size		Avg. Rate/Eq.	Hour Trips	Enter	Exit	Enter	Exit
254/522	Assisted Living *	72	Occupied Beds	Average	21	50%	50%	11	10
252/491	Senior Adult Housing - Attached **	160	Dwelling Units	Equation	41	54%	46%	22	19
251/481	Senior Adult Housing - Detached **	11	Dwelling Units	Equation	9	61%	39%	5	4
620/1224	Nursing Home ***	137	Beds	Average	31	33%	67%	10	21
Total					102			48	54

Additional information on the anticipated staffing requirements and their associated arrival and departure times was acquired from the proposed operator. Estimated staff trips for peak hour periods are not anticipated to coincide with the peak hours of adjacent street traffic with the exception of a small number of staff expected to arrive at 8:00 AM and depart at 5:00 PM as show in Table 3.

*** - Land Use represents Skilled Nursing/Memory Care Facility as depicted in the site plan

Table 3: Estimated Staff Trips

Staff Count (Entire site)	Arrival Time	Departure Time
50 - 60	6:45 AM	3:00 PM
25	8:00 AM	5:00 PM
50	2:45 PM	11:00 PM
20	10:45 PM	7:00 AM

The ITE Trip Generation rates used represent studied facilities with varying staff size and operational activities. ITE accounts for all facets of trip generation for these facilities, including staff. Trip generations utilizing number of employees for the facilities, as opposed to number of units or beds, was also analyzed. It was determined that utilizing the number of units or beds for trip generation estimates was the more conservative approach.

The previous land use consisted of a middle school with approximately 500 students. A trip generation estimate was run for the previous land use using the ITE Trip Generation Manual for comparison purposes. The Mission Valley Middle School was estimated to incur approximately 270 AM peak hour trips, and 80 PM peak hour trips. Typically during the AM and PM peak hour time periods a school land use experiences a peak 20-minute event that occurs near the start and end times of school. The school start time period for the AM peak hour traffic would have coincided with the peak traffic on Mission Road while the afternoon release time of the school would have occurred before peak hour traffic volumes are present on Mission Road. During the afternoon release of the Mission Valley Middle School, approximately 150 vehicles were expected during a peak 20 minute period. For the purposes of this study trip generation estimates for the AM and PM peak hour periods are based on time periods that coincide with the peak traffic on Mission Road.

A comparison of the proposed and previous land uses generated trips is illustrated in **Table 4**. The complete ITE Trip Generation estimates for the previous land use can be found in the **Appendix**.

Table 4: Trip Generation Comparison

AM Peak Hour Comparison					
Previous Land Use					
	Enter	Exit	Total		
School	149	121	270		
Total	149	121	270		
	Proposed L	and Use			
	Enter	Exit	Total		
Residential	43	58	101		
Total	43	58	101		
Comparison					
	Enter	Exit	Total		
Previous	149	121	270		
Proposed	43	58	101		
Total	-106	-63	-169		

PM Peak Hour Comparison							
	Previous Land Use						
	Enter	Exit	Total				
School	39	41	80				
Total	39	41	80				
	Proposed	Land Use					
HIGGS	Enter	Exit	Total				
Residential	48	54	102				
Total	48	54	102				
Comparison							
	Enter	Exit	Total				
Previous	39	41	80				
Proposed	48	54	102				
Total	+9	+13	+22				

The AM peak hour trips for the proposed development are less than the previous land use of a middle school by 169 trips while the PM peak hour trips is expected to be slightly higher with 22 additional trips.

The proposed development trips are less likely to conflict with peak hour traffic along Mission Road. Additionally during the AM and PM peak hour period the arrival and departure rate of trips is expected to be less impactful than that of school land uses

which tend to have a high number of vehicles arrive during a short period of time. Typically during the AM and PM peak hour time periods a school land use experiences a peak 20-minute event that occurs near the start and end times of school. The proposed development would not be expected to experience such an event and would represent a more uniform traffic pattern.

Trip distribution was developed for the proposed site based on review of the area and existing traffic volumes. The distribution for the trips generated from the site is illustrated in **Table 5**.

Table 5: Traffic Distribution

<u>Trip Distri</u>	<u>bution</u>	
Direction	AM	PM
North via Mission Road	55%	50%
South via Mission Road	45%	50%
Total	100%	100%

The AM and PM peak hour period trips for the development, following distribution and assignment to the roadway network, are illustrated in **Figure 6**. Trips associated with the proposed development were added to the existing traffic volumes. The resulting existing plus development traffic volumes are illustrated in **Figure 7**. The existing plus development intersection geometrics and traffic control for the study area intersections are illustrated in **Figure 8**.

5.2 Driveway Spacing

The three existing site drives for the Mission Valley Middle School use are offset from adjacent City streets located across Mission Road. The proposed development site drives reduce the current number of drives from three site drives to two. Site drives should align across from City streets of 84th Terrace and 85th Street respectively. The proposed alignment of these drives is expected to provide improved operations along Mission Road in comparison with the previously located drives.

From the proposed site plan illustrated in **Figure 2**, Drive 1 is located across 84th Terrace with one entering and two exiting lanes and approximately 50' of throat distance. Drive 2 is aligned across from 85th Street and has one entering and one exiting lane with approximately 50' of throat distance. With the proposed throat distance it is recommended to provide signing along the site entrances such that inbound traffic has the right-of-way with stop signs controlling the northbound and southbound movements. The proposed development has a site drive that runs around the outside of the development and connects to both Drive 1 and Drive 2. This site design provides a good split for entering and exiting vehicles.

It is recommended that Drive 1 and Drive 2 be configured to align with the geometrics of their respective cross streets and that both drives have two exiting lanes.

In discussion with City staff they plan to remove the pedestrian crossing, including the pedestrian signal that used to provide crossing for the Mission Valley Middle School students. With this removal it is recommended to install pavement marking to accommodate a northbound left-turn-lane between 84th Terrace and 85th Street.

5.3 Sight Distance

Sight distance should be considered when determining driveway location to ensure that the proposed streets/drives meet sight distance guidelines as outlined in the American Association of State Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets 2011".

AASHTO provides guidance for intersection sight distance based on intersection control and turning type. AASHTO cases B1-B3 represent intersections with stop control on the minor road, which is the scenario for both proposed drives. Prior to final design, sight distance at all drives should be reviewed and must meet or exceed the requirements set forth by AASHTO.

Based on AASHTO guidelines, the sight distance for case B1 (left-turn) should provide a clear sight triangle of 440'. Likewise, the sight distance for case B2 (right-turn) should provide a clear sight triangle of 340'. Any potential obstructions currently or proposed within these areas must be removed to meet sight distance requirements.

5.4 Capacity Analysis

Section 4.1 above details the methods used for capacity analysis. Unsignalized capacity analysis was conducted for the study intersections, including the new drives associated with the proposed development.

Unsignalized capacity analysis was conducted for the study intersections. Study intersections are expected to operate at acceptable levels of service excluding the following movements. At the intersections of Mission Road and Drive 1/84th Terrace the eastbound thru/left-turn movements are expected to operate at LOS F during the AM and PM peak hour periods. Additionally, the westbound movement is expected to operate at LOS E during the PM peak hour period. This side street movement is slightly above the threshold of operating at LOS D as with existing conditions. At the intersection of Mission Road and Drive 2/85th Street the eastbound thru/left-turn movements are expected to operate at LOS F during the AM and PM peak hour periods. Unsignalized side street movements can be expected to operate at a lower level of service during the peak hour periods as higher major street movements are accommodated. The average vehicle queue is less than 1 vehicle for all side street movements and queuing is accommodated within the site drives' available throat distance. Development traffic is expected to have minimal impact to traffic on Mission Road.

Figure 9 further details level of service for each movement for signalized and unsignalized intersections.



Capacity analysis sheets for signalized intersections are included in the Appendix.

5.5 Existing plus Development Recommendations

With the proposed development volumes the following roadway improvements are recommended:

Mission Rd & Drive 1

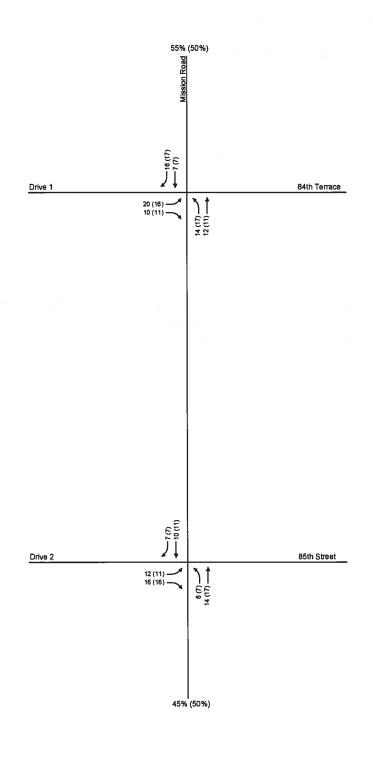
 Ensure that the geometrics of Drive 1 to align with those of the adjacent drive, 84th Terrace.

Mission Rd & Drive 2

• Ensure that Drive 2 has two exiting lanes and aligns with the adjacent drive, 85th Street.

Mission Rd

In discussion with City staff they plan to remove the pedestrian signal that used to provide crossing for the Mission Valley Middle School students. Removal of the pedestrian crossing and its current markings provides space for a short northbound left-turn lane to be striped between 84th Terrace and 85th Street. The five-lane section striping should taper back to a four lane section at 85th Street.





XX (XX) - AM (PM) Peak Hour Volumes

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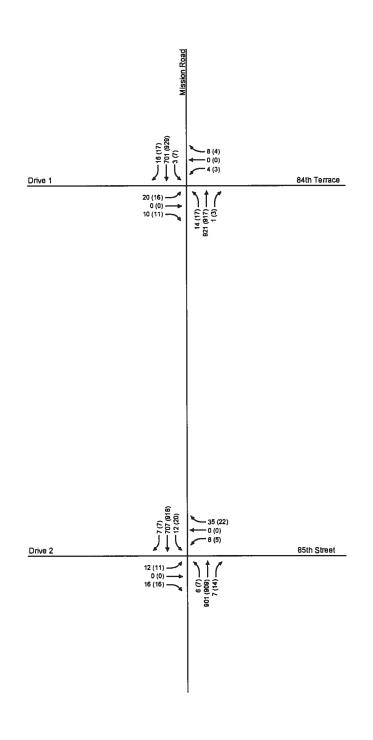
Existing plus Developemnt
Trip Distribution



7301 West 133rd Street Suite 200 Overland Park, KS 66213-4750 TEL 913.381.1170 FAX 913.381.1174

FIGURE

6





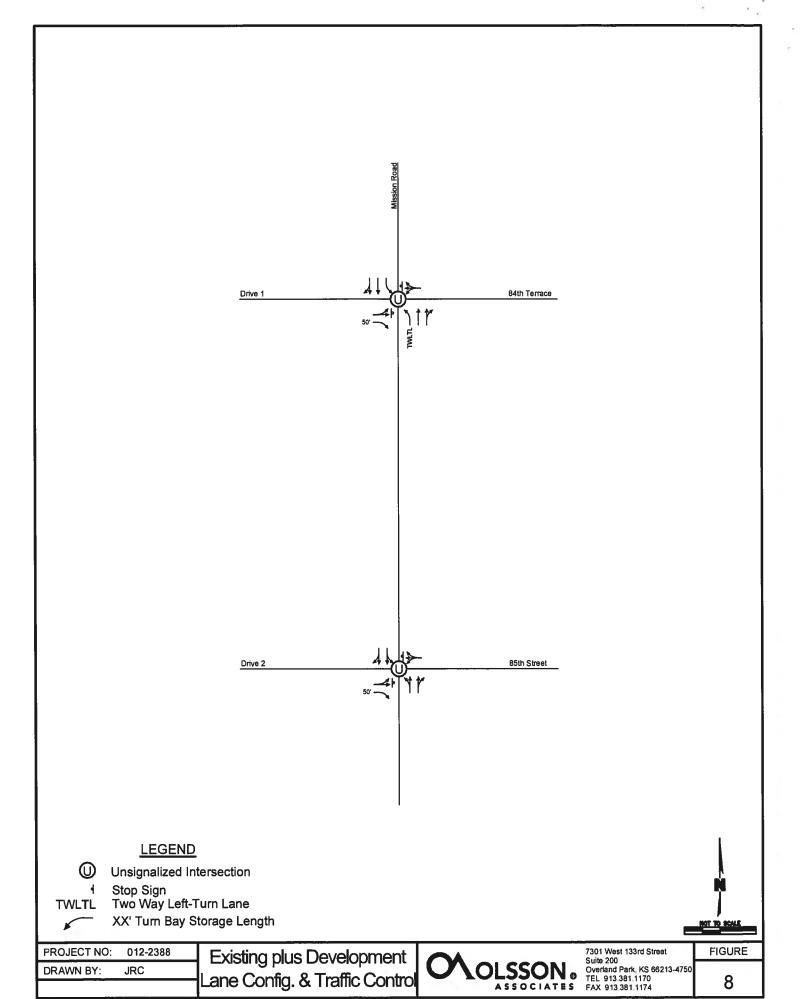
XX (XX) - AM (PM) Peak Hour Volumes

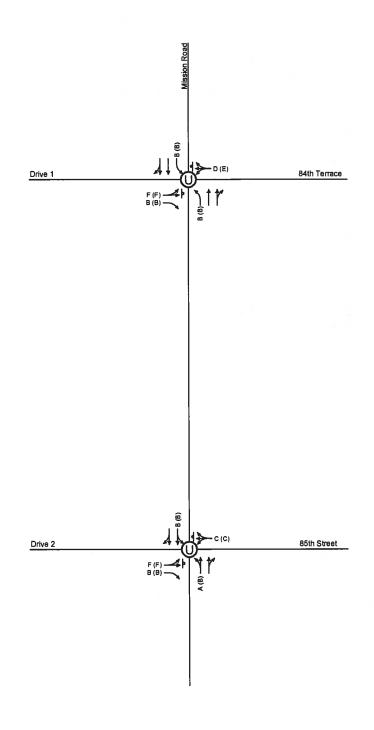
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Existing plus Development Peak Hour Volumes



FIGURE





LEGEND

Unsignalized Intersection

Stop Sign

-- XX (XX) - AM (PM) Level of Service

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Existing plus Development Level of Service



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Suite 200 Overland Park, KS 66213-4750	
TEL 913.381.1170	
EAY 013 381 117/	

	FIGURE
-4 750	9

6.0 RECOMMENDATIONS & CONCLUSIONS

This study considered the impact of a proposed development consisting of a Skilled Nursing Facility, Assisted Living Center, Independent Living Facility, and Villas, replacing the closed Mission Valley Middle School, on Mission Road. Site drives along Mission Road are reduced from three drives to two full access drives and should align with existing City streets of 84th Terrace and 85th Street. Operations of the proposed development are expected to be an improvement over the previous land use during the daily, AM and PM peak hour scenarios. Additionally, the proposed development is expected to represent a more uniform arrival and departure rate of trips during the peak hour periods. Based on the results of the capacity analyses and field observations, the following conclusions and recommendations are made for the proposed development area.

Existing Recommendations

Study intersections are currently operating at acceptable levels of service. No improvements are recommended based on the existing operations.

Existing plus Development Recommendations

With the proposed development volumes the following roadway improvements are recommended:

Mission Rd & Drive 1

 Ensure that the geometrics of Drive 1 to align with those of the adjacent drive, 84th Terrace.

Mission Rd & Drive 2

 Ensure that Drive 2 has two exiting lanes and aligns with the adjacent drive, 85th Street.

Mission Rd

In discussion with City staff they plan to remove the pedestrian signal that used to provide crossing for the Mission Valley Middle School students. Removal of the pedestrian crossing and its current markings provides space for a short northbound left-turn lane to be striped between 84th Terrace and 85th Street. The five-lane section striping should taper back to a four lane section at 85th Street.



APPENDIX

- **Existing Conditions**
 - Traffic Volumes
 - **Capacity Reports**
- Existing plus Development
 Development Data

 - **Capacity Reports**

File Name: MISSION RD & 84TH TERRACE (7-9AM) Site Code: 00000000 Start Date: 10/30/2012 Page No: 1

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Mission Road 84th Terrace

File Name: MISSION RD & 84TH TERRACE (7-9AM) Site Code: 00000000 Start Date: 10/30/2012 Page No: 2

		Σ π	MISSION RD From North	S t			84TH	4TH TERRA From Eas	T CE			∑ ^L	AISSION RE From South	8 t			Ē	From West	ţ,		
Start Time Right Thru	Right	Thru	Left	Peds	Left Peds App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thr	Left	Peds	App. Total Int. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1	is From (7:00 AM	to 08:45	AM - Pe	ak 1 of 1																
Peak Hour for Entire Intersection Begins at 07:30 AM	ire Inters	ection Be	gins at 0	17:30 AM																	
07:30 AM	0	191	-	0		_	0	_	0	7	0	242	0	0	242	0	0	0	0	0	436
07:45 AM	0	229	0	0	229	4	0	_	0	10	0	224	0	0	224	0	0	0	0	0	458
08:00 AM	0	153	0	0	153	0	0	0	0	0	-	220	0	0	221	0	0	0	0	0	374
08:15 AM	0	121	7	0	123	က	0	7	0	5	0	223	0	0	223	0	0	0	0	0	351
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Peak Hour for Each Approach begins at:			IS al.																	-
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+15 mins.	0	229	0	0	229	က	0	ч	0	10	0	224	0	0	224	0	0	0	0	0
+30 mins	C	153	C	0	153	-	0	-	0	2	_	220	0	0	221	0	0	0	0	0
+45 mins	· C	121	2	0	123	4	0	-	0	Ŋ	0	223	0	0	223	0	0	0	0	0
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File Name: MISSION RD & 85TH STREET (7-9AM) Site Code: 00000000 Start Date: 11/1/2012 Page No: 1

		Σ	MISSION RD	Ω.			85TH	H STREET	⊢			ΣĒ	MISSION RD	Q -			Ē	From West			
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App Total	Right	Thru	Lell	Peds	App. Total	Int. Total
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07:15 AM	0	81	0	0	8	-	0	0	0	_	C1	167	0	0	169	0	0	0	0	0	251
07:30 AM	0	155	С	C	155	œ	0	0	0	05	-	201	С	С	202	=	c	c	=	=	3
07:45 AM	0	185	_	0	186	v.	0	٣	0	00	0	212	0	0	212	0	0	0	0	С	Ŧ
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08:00 AM	0	210	V.	=	215	12	0	т	÷	15	CI	233	0	0	235	0	С	=	Ξ	0	7
08:15 AM	=	147	ý	-	153	9	С	ci	0	12	ব	241	=	С	245	0	c	0	=	=	7
08:30 AM	С	091	3	С	163	13	0	9	0	61	7	148	0	0	152	0	0	=	C	C	334
08:45 AM	0	121	7	C	125	2	0	7	0	বা	درا	13	0	0	137	C	0	0	0	0	7
Total	0	638	18	0	959	37	0	13	0	93	13	756	0	0	692	0	0	0	0	0	-
Grand Total	С	1127	30	0	1147	63	0	91	0	89	16	1432	0	c	8++1	0	0	0	0	С	2663
Appreh %	C	98.3	1.7	0		76.5	С	23.5	0		=	6.86	0	C		0	0	0	0		
Total %	0	42.3	0.8	0	43.1	CI	0	9.0	0	5.6	9.0	53.8	0	0	4.4.	0	0	0	0	=	
Unshifted	0	1127	20	0	1147	52	0	91	0	89	91	1432	0	0	1448	0	0	0	0	0	2663
% Unshifted	0	100	90	0	100	001	=	100	0	001	001	2	С	=	100	С	=	=	=	=	Ξ
Bank 1	0	0	0	0	0	0	0	С	0	0	0	Ç	0	0	0	C	=-	0	-	=	
% Bank 1	-	С	0	0	0	С	c	С	c	0	0	C	0	0	C	С	0	0	0	С	
Bank 2	C	0	0	C	0	0	c	0	0	0	0	0	0	0	0	0	0	=	0	0	
	4	•	<	9	4		;		;		4	•		;	•	<	٠				

Mission Road 85th Street

File Name: MISSION RD & 85TH STREET (7-9AM) Site Code: 00000000 Start Date: 11/1/2012 Page No: 2

		Σ	MISSION RD	QS -1			85TH	TH STREET	ET			∑ "	AISSION RD	S 4			Ŀ	From West	_		
			I TOTAL INCHES					TOTAL ESTA				-	MAC IIIO			1-			-		
Start Time	Right	Thr	Lell	Peds	Right Thru Left Peds App Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	App. Total Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1	; From 07.	00 AM to	5 08:45 AA	vt - Peak	1 of 1										And the state of t						
Peak Hour for Entire Intersection Begins at 07:30 AM	e Intersect	tion Begin	ns at 07:3() AM																	
07:30 AM	С	155	0	0	155	œ	C	0	0	00	_	201	0	0	202	0	=	=	0	С	365
07:45 AM	0	185	-	0	186	v	0	•	0	co	0	212	0	0	212	0	0	0	0	0	406
08:00 AM	0	210	10	0	215	2	0	3	0	5:	CI	233	0	0	235	0	0	0	0	0	165
08:15 AM	0	147	9	c	153	01	9	C	0	12	7	241	0	0	245	С	0	2	С	0	410
Total Volume	_	269	12	0	602	35	0	oc	С	43	7	887	C	С	K94	0	0	С	C	=	1646
% App. Total	0	98.3	1.7	0		2 .	0	18.6	0		0.8	99.2	0	0		0	0	0	0	-	
PHF	000	.830	500	000	.824	729	000	299.	000	717	.438	920	000.	90.	912	000	000	000	000	000	885

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak Loff L Deak Hour for Each Americach Remine of

Mission Road 84th Terrace

File Name: MISSION RD & 84TH TERRACE (4-6PM) Site Code: 000000000 Start Date: 10/30/2012 Page No: 1

1							-		1				4								
		Σ	MISSION RD	Q			84TH	4 TERRACE	ij			2	MISSION RD	Ω							
		<u></u>	From North	_			Fre	rom East					From South				Ξ	From West			
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Lell	Peds	App. Total	Int. Total
04:00 PM	0	991	0	0	991	-	0	L1	0	LeJ	0	7	c	C	7	0	0	0	0	0	313
04:15 PM	0	170	CI	0	181	CI	0	0	0	CI	_	149	0	0	150	0	0	D	0	0	333
04:30 PM	=	185	6	С	188	-	0	-	0	CI	CI	159	=	_	191	c	С	=	С	=	351
04:45 PM	0	177	च	C	181	0	С	С	0	0	0	193	С	=	193	•	0	С	С	0	374
Total	0	707	6	0	912	4	0	m	0	7	m	645	0	0	€±8	0	0	0	C	0	1371
05:00 PM	0	235	רו	=	237	7	0	נו	0	4	-	182	С	c	183	0	c	Ξ	c	2	424
05:15 PM	=	263	_	0	264	0	c	0	C	0	_	241	=	С	242	c	С	=	=	=	506
05:30 PM	0	229	_	C	230	-	0	_	0	CI	0	243	0	0	243	0	0	c	C	0	475
05:45 PM	0	195	۲۳,	0	861	-	0	0	0	_	_	240	0	0	241	C	0	0	0	0	017
Total	0	922	7	0	926	ব	0	m	0	7	m	906	0	0	606	0	0	0	0	0	1845
Grand Total	С	1629	91	0	1645	90	0	9	0	4	9	1551	0	=	1557	0	0	=	0	2	3216
Appreh %	С	66	_	0		57.1	c	42.9	0		0.4	9.66	C	-		0	0	0	0		
Total %	0	50.7	0.5	0	51.2	0.2	0	0.2	0	6.4	0.2	48.2	0	0	18.4	0	0	0	0	5	
Unshifted	0	1629	91	0	1645	œ	0	9	0	<u> </u>	9	1551	0	0	1557	0	0	0	0	0	3216
% Unshifted	0	100	100	0	100	901	=	100	0	190	<u>e</u>	901	0	=	901	C	c	=	=	=	2
Bank 1	=	0	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	=	<u>-</u>
% Bank 1	С	С	0	0	С	С	С	c	0	0	0	0	0	0	C	С	0	0	0	0	٦
Bank 2	0	0	0	C	0	0	С	0	0	0	0	0	c	0	0	0	0	=	0	0	J
1200F J	•		<	<	4	;	•	;	;	:	;	•		•			<	٠	4		

Mission Road 84th Terrace

File Name: MISSION RD & 84TH TERRACE (4-6PM) Site Code: 000000000 Start Date: 10/30/2012 Page No: 2

		Σ	MISSION RD	₽.			84TI	I TERRACE	CE			<u>N</u> 1	MISSION RD	Q.			Ĺ	11/11			
			I rom North	h			_	rom Last				-	From South			a common of		Lon west	1		
Start Time Right	Right	Thr	Left	Peds	Left Peds App Total Right	Right	Thru	Len	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total Int. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1	is From 04:	00 PM to	05:45 PN	1 - Peak 1	of 1																
Peak Hour for Entire Intersection Begins at 05:00 PM	ire Intersect	ion Begin	1s at 05:00) PM																	
05:00 PM	0	335	7	0	237	CI	C	7	0	-7	-	182	0	0	183	C	0	=	0	0	424
05:15 PM	0	263	_	0	797	0	0	0	9	0	-	241	0	0	242	-	0	0	0	0	506
05:30 PM	t	229	_	0	230	-	0	-	0	CI	0	243	0	0	243	0	0	0	=	0	475
05:45 PM	0	195	m	С	861	_	0	0	С		-	240	0	c	241	0	0	С	=	С	0++
Total Volume	C	922	7	c	676	च	0	دم	0	7	٣.	906	0	С	60%	0	С	С	0	0	1845
% App. Total	0	99.2	0.8	0		57.1	0	42.9	0		0.3	2.66	0	0		0	0	0	0		
2110	OWO	928	583	OOO	088	200	OOO	375	000	827	750	033	900	000	933	000	000	000		000	912

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak Lof L

US:00 PM												,					
		Ö	04: (5 PM				Ö	100 PM					04:00 PM				
-	c	237	7	0	0	=	C 1	-	182	0	=	183	=	0	=	=	=
_	0	797	-	=		¢	CI	_	241	0	С	242	=	С	=	=	=
_	C	230	0	0	c	0	0	С	243	0	0	243	C	С	С	c	0
3	Û	861	7	0	7	0	7	-	240	C	0	7	0	0	_	0	С
7	0	929	S	0	3	0	00	m	906	0	0	606	0	0	0	0	0
8.0	0		62.5	0	37.5	0		0.3	2 66	0	0		0	0	=	0	
583	000	088	.625	000	375	000	500	750	932	000	000	935	000	000	000	000	000

Mission Road 85th Street

File Name: MISSION RD & 85TH STREET (4-6PM)

00000000: : 11/1/2012 Site Code Start Date

Page No

App. Total Int. Fotal 2000 From West ----000000000 0000 00000000 Right 0000 00000 Peds App. Total 156 158 168 207 689 203 235 248 248 220 906 48.7 00 595 0000 Groups Printed-Linshifted - Bank 1 - Bank 2 85TH STREET MISSION RD From South Left 22200 200 232 245 215 892 1573 98.6 48 1573 100 151 157 167 206 681 2142228 App. Total 0 0 0 8 0000 00000000 From East Left 30.2 0.6 19 100 00000 4 6 6 1 6 6 7 7 3 3 3 3 3 3 # 8.63 E.1 4 00 9191 49.4 137 185 181 186 689 222 260 240 225 227 App. Total ----00000 MISSION RD From North Lell 20 - 6 25.5.5 1574 97.4 48.1 1574 100 130 175 180 182 667 Right ----Start Time 04:00 PM 04:15 PM 04:30 PM 04:45 PM Total Apprch % Total % % Bank 1 Bank 2 % Bank 2 05:00 PM 05:15 PM 05:30 PM 05:45 PM Unshifted % Unshifted Grand Total Bank 1

307 351 358 398 1414

432 496 430 430 1860

00000

3274

1274

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ē.,

Mission Road 85th Street

File Name: MISSION RD & 85TH STREET (4-6PM) Site Code: 000000000 Start Date: 11/1/2012 Page No: 2

		Σμ	MISSION RD From North	O 1			85TI	'H STREET rom East	T			ΣĒ	AISSION RD From South	Q (臣	From West			
Start Time	Right	Tha	Lell	Peds	Start Time Right Thru Left Peds App Tonal Right		Thru	Len	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	App. Total Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1	is From 04	:00 PM to	05:45 PM	1 - Peak 1	l Jo										Annual contract to the territory of the						
Peak Hour for Entire Intersection Begins at 05:00 PM	re Intersec	Hon Begin	ns at US:OU	Σ																	
05:00 PM	0	216	9	0	22	9	0		0	7	۲٦	200	0	0	203	0	=	=	0	0	437
05:15 PM	0	253	7	0	260	9	0	-	0	7	٣	232	0	0	235	0	0	0	0	0	502
05:30 PM	0	234	9	0	240	1	0	-	0	20	3	243	•	0	2.48	0	c	0	С	0	496
05:45 PM	0	204	_	С	205	٦,	0	7	0	S	v.	215	0	0	220	0	0	0	=	0	430
Total Volume	C	406	20	0	927	22	С	'n	0	27	<u>च</u>	892	-	=	906	0	0	=	c	0	1860
% App. Total	0	8.76	2.2	0		<u>~</u>	0	18.5	0		·C:	08.5	0	0		0	0	0	C	-	
SHIP	000	968	.714	000	168.	.786	000	.625	000	844	.700	016	000	000	.913	000	000	000	000	000	.926

_	
5	
_	
Peak	
2	
05:45	
0.5	
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PM to 0	
8	
04:00	
From	
Sis	
naly	
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Hour	
K	

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5	
7	
5	
<u> </u>	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak Lot	
4	
ġ	
2	Sal
Ξ	E
2	Be
2	5
5	roa
2	O.J.
×	7
Ş	Sac
V 113	5
11	ur í
훈	2
S.	Peak Hour for Each Approach Begins at:
5	4

Peak Hour for Cach Approx	n Approac	Sach Begins at																		
	05:00 PM					04:00 PM				0	5:00 PM				_	24,00 PM				_
+0 mins.	=		9	=	222	9	=	**	¢	7	er.	200	9	0	203	=	=	0	=	c
+15 mins.	=	153	7	С	260	귝	0	ব	0	oc	س	232	9	С	235	=	=	С	=	=
+30 mins.	0	134	9	C	240	9	0	3	0	6	3	245	0	0	2-18	C	0	С	0	С
+45 mins.	0	707		0	205	6	0	٣	0	10	vo.	215	0	0	220	0	0	0	0	0
Total Volume	0	206	20	0	927	77	0	<u> </u>	0	36	<u> </u>	892	0	0	906	0	0	0	0	0
% App. Total	0	8.76	2.2	0		61.1	0	38.9	0		1.5	5.86	0	0		0	0	=	0	
-IHd	000	968.	714	()()()	168	550	000	.875	000	643	700	910	000	000	.913	000	000	000	000	000

Conord Informati			0:4-1	. S. a	- 11 -					
General Information			Site Ir		atıo	n	1			
Analyst	JSS		Interse						4th Terrace	
Agency/Co.	Olsson A		Jurisdi				Prairie Vi	llage, KS	i	
Date Performed	10/30/201 AM Peak		Analys	is Year			Existing			
Analysis Time Period		пои	<u> </u>					· · ·		
Project Description Mis East/West Street: 84th			North/S	outh C	troot	: Mission	Pood			
ntersection Orientation:			Study F				Roau			
			Jolddy	enou (ilis).	0.20				
Vehicle Volumes an	ia Aajustme						0 41-1	1		
Major Street	1 1	Northbound 2	3	\rightarrow		4	Southbou	ina T	6	
Movement	+ ;	T	R				5 T	_	R	
/olume (veh/h)	+ -	909	1			3	694			
Peak-Hour Factor, PHF	1.00	0.94	0.25			0.38	0.76		1.00	
Hourly Flow Rate, HFR	0	967	4			7	913		0	
Percent Heavy Vehicles	0					2				
Median Type				Undiv	ided		·			
RT Channelized		<u> </u>	0						0	
_anes	0	2	0			1	2		0	
Configuration		T	TR			Ĺ	T			
Jpstream Signal		0				-	0			
Minor Street	i	Eastbound		Ť			Westbou	ınd		
Movement	7	8	9	_		10	11		12	
	L	T	R			L	Т		R	
/olume (veh/h)	_		1			4			8	
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.50	1.00		0.50	
Hourly Flow Rate, HFR veh/h)	0	0	0			8	0		16	
Percent Heavy Vehicles	0	0	0			2	0		2	
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0	1				0			
RT Channelized			0						0	
_anes	0	0	0	\dashv		0	0	\neg	0	
Configuration	1			\neg			LR		1	
Delay, Queue Length, a	nd Level of Se	rvice	•							
Approach	Northbound	Southbound	1	Westbo	und		T	Eastbour	nd	
Movement	1	4	7	8	Ī	9	10	11	12	
_ane Configuration	<u> </u>	L	,	LR	\dashv		 	 		
/ (veh/h)		7		24	\dashv		 	1	_	
	· · · · · ·	706			_		 	 	+	
C (m) (veh/h)				259	-		-		+	
//c		0.01		0.09	\rightarrow		-	 		
95% queue length		0.03		0.30	-		ļ		-	
Control Delay (s/veh)		10.2		20.3					\bot	
LOS		В		С			<u> </u>	<u></u>		
Approach Delay (s/veh)	_			20.3	3					
Approach LOS				С						

HCS+TM Version 5.6

Generated: 11/20/2012 8:23 AM

General Information	1		Site In	formati	on		11	
Analyst	JSS		Interse		-	Mission Ro	ad & 85ti	h Stree
Agency/Co.	Olsson As	ssociates	Jurisdio			Prairie Villa		
Date Performed	10/30/201		Analysi			Existing		
Analysis Time Period		-						
	ssion Valley							
East/West Street: 85th S			North/S	outh Stree	et: Missior	Road		
ntersection Orientation:				eriod (hrs				
/ehicle Volumes an		nts			1. N 1.1	11.,,		112
Major Street	Ta reguerno	Northbound				Southbour	nd	
Movement	1	2	3		4	T 5		6
NO VOINGING	Ĺ	T	R		L	Ť		R
/olume (veh/h)		887	7		12	697		
Peak-Hour Factor, PHF	1.00	0.92	0.44		0.50	0.83		1.00
Hourly Flow Rate, HFR	0	964	15		24	839		0
veh/h)		904	-			1 000		<u> </u>
Percent Heavy Vehicles	0			A localitatela	2			_
Median Type				Undivide	0			
RT Channelized			0					0
anes	0	2	0		0	2		0
Configuration		T	TR		LT	T		
Jpstream Signal		0				0		
linor Street	11	Eastbound		V 9		Westboun	d	
Movement	7	8	9		10	11		12
	L	Т	R		<u>L</u>	Т		R
/olume (veh/h)					8			35
Peak-Hour Factor, PHF	1.00	1.00	1.00		0.67	1.00		0.73
Hourly Flow Rate, HFR veh/h)	0	0	0		11	0		47
Percent Heavy Vehicles	0	0	0		2	0	T	2
Percent Grade (%)	1	0			_	0		
lared Approach	1	N				N		
Storage		0				0		
RT Channelized	1		0					0
Lanes	0	0	0		0	0	\neg	0
Configuration			 			LR		
Delay, Queue Length, a	nd Level of Se	rvice	-					
Approach	Northbound	Southbound	Ī	Vestbound	d	E	astbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR		1		1
v (veh/h)		24		58				1
C (m) (veh/h)		701		335		1		1
					+	-		1
//c		0.03		0.17	-			+
95% queue length		0.11		0.62	-	1		+
Control Delay (s/veh)		10.3		18.0				
LOS		В		С				
Approach Delay (s/veh)				18.0				
Approach LOS	_	-		С		T		

			lo:: :	•					
General Information			Site Ir	nform	atic	n	·		CHELD I
Analyst	JSS		Interse				Mission F		
Agency/Co.	Olsson A		Jurisdi				Prairie Vi	llage, KS	
Date Performed	10/30/201		Analys	is Yea	r		Existing		
Analysis Time Period	PM Peak	Hour					<u> </u>		
Project Description Mis									
East/West Street: 84th		<u></u>				: Mission	Valley		
ntersection Orientation:	North-South	<u> </u>	Study F	eriod ((hrs)	0.25			6 16 1
/ehicle Volumes ar	d Adjustme	nts							April 100
/lajor Street		Northbound					Southbou	ınd	II.
Movement	1	2	3			4	5		6
	L	Т	R			L	T		R
/olume (veh/h)		906	3			7	922		n= "
Peak-Hour Factor, PHF	1.00	0.93	0.75			0.58	0.88	- 1	1.00
lourly Flow Rate, HFR veh/h)	0	974	4			12	1047		0
Percent Heavy Vehicles	0	-	-			2	-		
Median Type				Undiv	<i>ided</i>				
RT Channelized			0			*			0
anes	0	2	0			1	2		0
Configuration		T	TR			L	T		
Jpstream Signal	Y:	0					0		
Minor Street	-	Eastbound	•				Westbou	nd .	
Movement	7	8	9			10	11	1	12
NO VOINGIR	Ĺ	T	R			L	T		R
/olume (veh/h)	 	- 	† "			3			4
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.38	1.00		0.50
Hourly Flow Rate, HFR	1		Ť						
veh/h)	0	0	0			7	0		8
Percent Heavy Vehicles	0	0	0			2	0		2
Percent Grade (%)		0					0		•
Flared Approach		N					N		-
Storage		0	 	-			0		
RT Channelized		Ť	0				<u> </u>		0
	0	0	0			0	0		0
_anes Configuration	+		 				LR		
			<u> </u>				LIN	<u> </u>	
Delay, Queue Length, a									
Approach	Northbound	Southbound		Westbo			+	Eastbour	
Movement	1	4	7	8	_	9	10	11	12
_ane Configuration		L		LR					
(veh/h)	ħ	12		15					
C (m) (veh/h)		701		189)		Ш		4 12
//c	-	0.02		0.08					
95% queue length		0.05		0.20					
		10.2		25.7					
Control Delay (s/veh)		<u> </u>			′		-	-	
_OS		В		D					
Approach Delay (s/veh)	_			25.7	7				
Approach LOS				D			1		

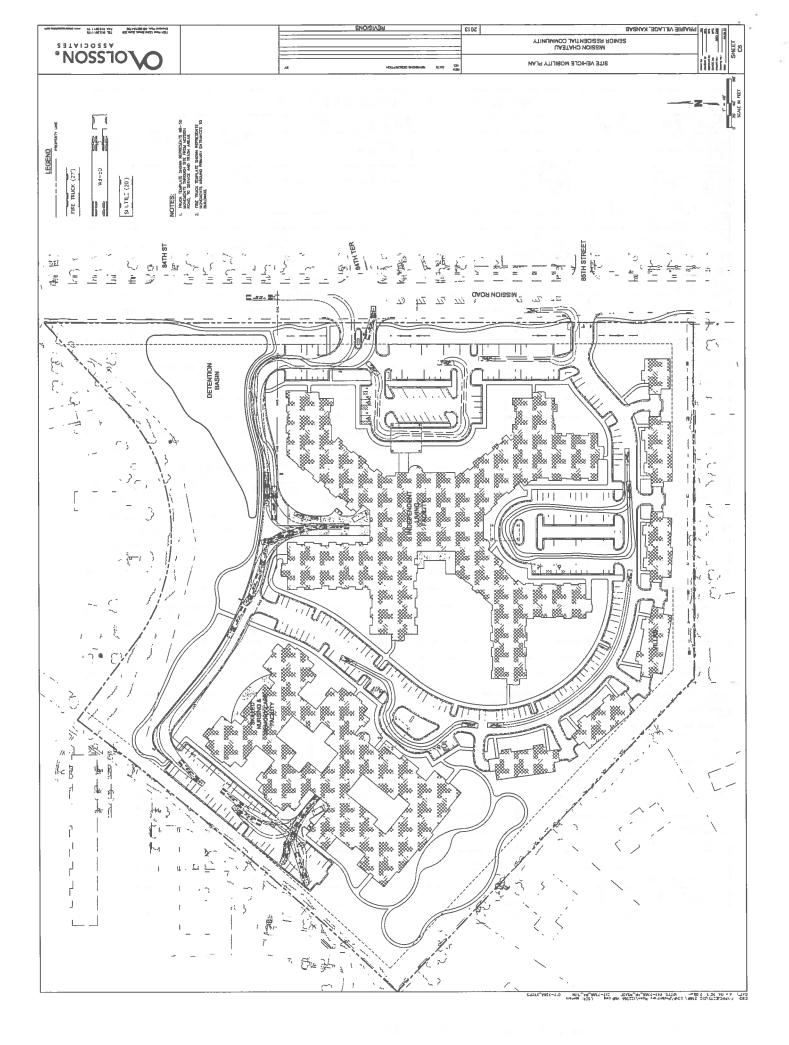
HCS+TM Version 5.6

Generated: 11/20/2012 8:24 AM

General Information	<u> </u>		Site Ir	1form	atio	n				
	JSS				4110		Mission F	200d & 81	Sth Stroot	
Analyst	Olsson A		Unterse Jurisdi				Prairie Vi			
Agency/Co. Date Performed	10/30/201			is Year			Existing	naye, No		
Analysis Time Period	PM Peak		Ariaiys	is rear			Existing			
	!	Tioui	<u> </u>				<u> </u>			
Project Description Mic East/West Street: 85th	ssion Valley		North/C	South C	t t	: Mission	Bood			
ntersection Orientation:			Study F				Roau			
			Study F	enou (1115).	0.25				
/ehicle Volumes ar	nd Adjustme									
Major Street	<u> </u>	Northbound		_			Southbou	ınd ,		
Movement	1 1	2	3			4	5		6	
/ 1	 	T	R	\rightarrow			907	_	R	
/olume (veh/h)	4.00	892	14	-		<u>20</u> 0.71			4.00	
Peak-Hour Factor, PHF	1.00	0.91	0.70			0.71	0.90		1.00	
lourly Flow Rate, HFR veh/h)	0	980	20			28	1007		0	
Percent Heavy Vehicles	0	_				2				
Median Type				Undiv	ided					
RT Channelized			0				1		0	
_anes	0	2	0			0	2		0	
Configuration		T	TR			LT	T			
Jpstream Signal	1	0					0			
Minor Street		Eastbound					Westbou	nd		
Movement	7	8	9			10	11		12	
	L	Т	R			L	Т		R	
/olume (veh/h)	1	1	1 T Y			5			22	
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.63	1.00		0.79	
Hourly Flow Rate, HFR (veh/h)	0	0	0			7	0		27	
Percent Heavy Vehicles	0	0	0		10	2	0		2	
Percent Grade (%)		0					0			
Flared Approach		T N	T				N N	1		
Storage	+	0	+				0	- 		
RT Channelized	+	 	0	-			l 	-+	0	
	0	0	0	-		0	0	-+	0	
anes	1 0	· · ·	1 0			U	LR	- -	1 0	
Configuration	11 1 2 2	<u> </u>					L LK	0		
Delay, Queue Length, a				A/a a4b a			1"	Cooth over	al	
Approach	Northbound	Southbound		Westbo	una			Eastbour		
Movement	1	4	7	8	\dashv	9	10	11	12	
_ane Configuration		LT		LR	_		ļ		-	
/ (veh/h)		28		34						
C (m) (veh/h)		688		291						
//c		0.04		0.12	?	<u>. </u>	1			
95% queue length		0.13		0.39	,					
Control Delay (s/veh)		10.5		19.0	$\overline{}$	150	1		1	
OS		B		C			1	 	+	
_				19.0	$\overline{}$					
Approach Delay (s/veh)	-						-			
Approach LOS			<u> </u>	С			I			

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Daily Trip Generation - Mission Valley

ITE Code/Page	Land Use	Size	=	Trip Gen. Avg. Rate/Eq.	Daily Trips	Trip Dist Enter	Trip Distribution Enter Exit	Daily Enter	Daily Trips er Exit
254/520 252/489 251/479 620/1222	Assisted Living * Senior Adult Housing - Attached ** Senior Adult Housing - Detached ** Nursing Home ***	72 160 11	Occupied Beds Dwelling Units Dwelling Units Beds	Average Equation Equation	198 498 67 390	50% 50% 50%	50% 50% 50%	99 249 34 195	99 249 33 195
Total					1,153			577	576
_		AM F	AM Peak Hour Trip Generation	neration					
ITE Code/Page	Land Use	Size		Trip Gen. Avg. Rate/Eq.	AM Peak Hour Trips	Trip Dist Enter	Trip Distribution Enter Exit	AM Peak Enter	AM Peak Hour Trips Enter Exit
254/521	Assisted Living *	72	Occupied Beds	Average	13	68%	32%	o ;	4 5
252/490 251/480	Senior Adult Housing - Attached *** Senior Adult Housing - Detached ***	160	Dwelling Units	Equation	3 25	35%	%2% 65%	= =	2 7
620/1223		137	Beds	Average	24	20%	20%	12	12
Total					101			43	28
		PM	PM Peak Hour Trip Generation	neration					
ΞL				Trip Gen.	PM Peak	Trip Dis	Trip Distribution	PM Peak	PM Peak Hour Trips
Code/Page	Land Use	Size		Avg. Rate/Eq.	Hour Trips	Enter	Exit	Enter	Exit
254/522	Assisted Living *	72	Occupied Beds	Average	21	20%	20%	1	10
252/491		160	Dwelling Units	Equation	41	24%	46%	22	19
251/481	Senior Adult Housing - Detached **	Ξ	Dwelling Units	Equation	O	61%	36%	2	4
620/1224		137	Beds	Average	31	33%	%29	10	21
Total			_		102			48	54

* - Land Use represents Assisted Living Facility as depicted in the site plan ** - Land Use represents Independent Living Facilities as depicted in the site plan *** - Land Use represents Skilled Nursing Facilities as depicted in the site plan

Conoral Information			C:4- 1-	· •	on			
General Information			Site ir	nformati	on	T		
Analyst	JMS		Interse	ection		Mission R Te	Road & Dri	ve 1/84th
Agency/Co.	Olsson Ass	sociates	Jurisdi	ction		16		
Date Performed	03/11/2013	3		is Year		Ex + Dev		
Analysis Time Period	AM			io i cai		LX · DCV		
Project Description 012	2-2388							
East/West Street: Drive			North/S	South Stree	et: Missior	Road		
ntersection Orientation:		1 - 1		Period (hrs		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
/ehicle Volumes an	d Δdiustmen	ite		<u> </u>	<u></u>			
Major Street	T Tajaotinon	Northbound				Southbou	nd	
Movement	1	2	3		4	5		6
	Ĺ	Т	R		L	T		R
/olume (veh/h)	14	921	1		3	701	- A	16
Peak-Hour Factor, PHF	0.92	0.94	0.25		0.38	0.76		0.92
lourly Flow Rate, HFR veh/h)	15	979	4	H	7	922		17
Percent Heavy Vehicles	2	-	-		2			-
/ledian Type				Undivide	d			
RT Channelized			0	_				0
anes	1	2	0	111	1	2		0
Configuration	L	T	TR		L	T	1 1	TR
Jpstream Signal	= 5 ⁻ =	0				0		
/linor Street		Eastbound				Westbou	nd	
Movement	7	8	9		10	11		12
	L	T	R		L	T		R
/olume (veh/h)	20	0	10		4	0	1	8
Peak-Hour Factor, PHF	0.92	0.92	0.92	T	0.50	1.00		0.50
lourly Flow Rate, HFR veh/h)	21	0	10		8	0		16
Percent Heavy Vehicles	2	2	2		2	2	10	2
Percent Grade (%)		0	1	11		0		
lared Approach		Y				N	X =	
Storage		3				0		
RT Channelized			0			1		0
anes	0	1	1		0	1		0
Configuration	LT		R			LTR		
Delay, Queue Length, a	nd Level of Ser	vice						
Approach	Northbound	Southbound	1	Westbound	d	1	Eastbound	<u> </u>
Movement	1	4	7	8	9	10	11	12
ane Configuration	L	L		LTR	+	LT		R
(veh/h)	15	7				21		10
<u> </u>	<u></u>			24	 			+
C (m) (veh/h)	726	698	1	193	-	85		592
//c	0.02	0.01		0.12	-	0.25		0.02
95% queue length	0.06	0.03		0.42		0.89		0.05
Control Delay (s/veh)	10.1	10.2		26.3		60.7		11.2
.os	В	В		D		F		В
Approach Delay (s/veh)	. I . I	—	4	26.3			44.7	=
Approach LOS		П п	Г	D		1	Ε	

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General Information	1	yan de te	Site Ir	nformation	on		. 2	1.7
Analyst	JMS		Interse	ction		Mission F	Road & Dri	ve 2/85th
Agency/Co.	Olsson As		Jurisdie	ction		1	-	
Date Performed	03/11/201	3		is Year		Ex + Dev		
Analysis Time Period	AM		_					
Project Description 01:								
ast/West Street: Drive					et: Mission	Road		
ntersection Orientation:			Study F	Period (hrs): 0.25			
/ehicle Volumes an	<u>id Adjustme</u>				1 71 -			
Major Street		Northbound	1 0	-1-4-17		Southbou	ind	0
Movement	1 1	2	3	_	4	5		6
/olume (veh/h)		901	R 7		12	707		7
Peak-Hour Factor, PHF	0.92	0.92	0.44		0.50	0.83		0.92
Hourly Flow Rate, HFR veh/h)	6	979	15		24	851		7
Percent Heavy Vehicles	2		-		2			-
Median Type				Undivided	d			
RT Channelized			0					0
anes	0	2	0		0	2		0
Configuration	LT	h	TR		LT			TR
Jpstream Signal		0			nd.	0		
/linor Street	I TOTAL TOTAL	Eastbound		E . 3		Westbou	nd	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
/olume (veh/h)	12	0	16		8	0		35
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.67	1.00		0.73
Hourly Flow Rate, HFR veh/h)	13	0	17		11	0 47 2 2		
Percent Heavy Vehicles	2	2	2		2	2 2		2
Percent Grade (%)		0	1			0		
lared Approach		Y				N		
Storage		2				0		
RT Channelized			0					0
anes	0	1	1	ļ	0	1		0
Configuration	LT		R			LTR		
Delay, Queue Length, a					P. N. L. B.	- 11.1	91	HI T
Approach	Northbound	Southbound		Westbound		+	Eastbound	-
Movement	1	4	7	8	9	10	11	12
ane Configuration	LT	LT		LTR		LT		R
(veh/h)	6	24		58		13		17
C (m) (veh/h)	779	692		272		89		624
r/c	0.01	0.03		0.21		0.15		0.03
95% queue length	0.02	0.11		0.79		0.49		0.08
Control Delay (s/veh)	9.7	10.4		21.8		52.2		10.9
os	Α	В		С		F		В
Approach Delay (s/veh)		_		21.8	I		28.8	
						+		

General Information	· · · · · · · · · · · · · · · · · · ·		Site Ir	formation	on			
						Mission F	oad & Dri	VO 1/84th
Analyst			Interse	ction		Te	oau & Dii	v e 1/0 4 11
Agency/Co.	Olsson As		Jurisdio	ction				
Date Performed	03/11/201	3	Analysi	is Year		Ex + Dev		
Analysis Time Period	PM					II		44477
Project Description 012						10.0		166
East/West Street: Drive				outh Stree		n Road		
ntersection Orientation:	North-South		Study F	Period (hrs)): <i>0.2</i> 5	_ 110'01		
/ehicle Volumes an	d Adjustmer	nts			4.5	2.46 (4.6)		ar u
Major Street	. 55	Northbound				Southbou	ınd	America.
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
/olume (veh/h)	17	917	3		7	929		17
Peak-Hour Factor, PHF	0.92	0.93	0.75		0.58	0.88	ne n	0.92
lourly Flow Rate, HFR veh/h)	18	986	4	1	12	1055		18
Percent Heavy Vehicles	2	-	-		2	-		-
/ledian Type				Undivided	1			
RT Channelized	P		0					0
anes	1	2	0		1	2		0
Configuration	L	T	TR		L	T		TR
Jpstream Signal		0		Ĩ.		0		II= TITE
/linor Street		Eastbound				Westbou	nd	-
Novement	7	8	9		10	11		12
	L	Т	R		L	T		R
/olume (veh/h)	16	0	11		3	0		4
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.38	1.00	1 = 1	0.50
lourly Flow Rate, HFR veh/h)	17	0	11		7	0		8
Percent Heavy Vehicles	2	2	2		2	2		2
Percent Grade (%)		0				0		
lared Approach		Y	i			N		
Storage		3				0		
RT Channelized			0					0
anes	0	1	1		0	1		0
Configuration	LT		R			LTR		
Delay, Queue Length, ar		vice					31	
Approach	Northbound	Southbound	= /	Vestbound	i		Eastbound	i
Movement	1	4	7	8	9	10	11	12
ane Configuration	L	L	· · · · · · · · · · · · · · · · · · ·	LTR		LT		R
(veh/h)	18	12		15	 	17		11
(ven/h) C (m) (veh/h)	645	694		132	 	66		543
· · · · ·	0.03	0.02			-	0.26		_
//c				0.11				0.02
95% queue length	0.09	0.05		0.38		0.91		0.06
Control Delay (s/veh)	10.7	10.3		35.7	1	77.5		11.8
.OS	В	В		Ε	l	F		В
Approach Delay (s/veh)				35.7	1		51.7	
Approach LOS	_			Е			F	

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General Information	<u> </u>		Site Ir	formati	on			
					-	Mission R	oad & Driv	re 2/85ti
Analyst	JMS		Interse	ction		St		
Agency/Co.	Olsson As		Jurisdio	ction				
Date Performed	3/11/2013 PM		— Analys	is Year		Ex + Dev		
Analysis Time Period	PIVI							
Project Description 012							_	
ast/West Street: Drive					et: Mission	Road		
ntersection Orientation:	North-South		Study F	Period (hrs): 0.25			
Vehicle Volumes an	d Adjustme							
Major Street		Northbound				Southbou	nd	
<u> Movement</u>	1	2	3		4	5	_	6
	L	Т	R		<u>L</u>	T		R
/olume (veh/h)	7	909	14		20	918		7
Peak-Hour Factor, PHF	0.92	0.91	0.70		0.71	0.90		0.92
Hourly Flow Rate, HFR	7	998	20		28	1020		7
Percent Heavy Vehicles	2				2			
Median Type			<u> </u>	Undivide		•		
RT Channelized			0					0
anes	0	2	0		0	2		0
Configuration	LT	 	TR		LT			TR
Jpstream Signal		0				0		
Minor Street		Eastbound				Westbou	nd	
Movement	7	8	9		10	11		12
VIO VOITIONE	i	T	R		L	Т		R
Volume (veh/h)	11	0	16		5	0		22
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.63	1.00		0.79
Hourly Flow Rate, HFR (veh/h)	11	0	17		7	0		27
Percent Heavy Vehicles	2	2	2	i	2	2	2 2	
Percent Grade (%)		0		ľ		0		
Flared Approach		Y				N	0	
Storage		2				0		
RT Channelized			0					0
Lanes	0	1	1		0	1	<u> </u>	0
Configuration	LT		R			LTR		
Delay, Queue Length, a	nd Level of Se	rvice						
Approach	Northbound	Southbound	1	Westboun	d	1	Eastbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	·	LTR	<u> </u>	LT		R
v (veh/h)	7	28		34	1	11		17
	672	677		223	+	66		559
C (m) (veh/h)					 -			_
v/c	0.01	0.04		0.15	-	0.17	-	0.03
95% queue length	0.03	0.13		0.53	+	0.56		0.09
Control Delay (s/veh)	10.4	10.5		24.0	╄	70.2	Ļ	11.0
LOS	В	В		С		F	<u> </u>	В
Approach Delay (s/veh)				24.0			34.6	
Approach LOS				C			D	



March 23, 2013

Keith Bredehoeft Director of Public Works 3535 Somerset Prairie Village, KS 66208

Re:

Mission Chateau Traffic Impact Study Review Prairie Village, Kansas

Dear Mr. Bredehoeft:

In response to your request and authorization, we reviewed the traffic impact study prepared by Olsson Associates (dated March 2013) for the proposed Mission Chateau development on Mission Road between roughly 84th Street and 85th Street. It is proposed on the site previously occupied by the Mission Valley Middle School. I also reviewed the site plan you provided to me (titled Proposed Drainage Map and dated November 6, 2012).

My comments on the traffic impact study and site plan are listed below.

- The report does not indicate the author. A traffic impact study should be signed by the author and/or professional engineer in responsible charge.
 The traffic study has been updated and is now signed and sealed by a professional engineer (Todd Fredericksen).
- 2. A new driveway is proposed across from 85th Street. There was no mention of available sight lines along Mission Road from this point. The study should include an evaluation based on current and proposed conditions. I did note some large trees behind the Mission Road sidewalk near the south property line. Similarly, sight lines at the north driveway should be assessed relative to proposed conditions. Berms are proposed, but not detailed, between the street and parking lot.
 Prior to final design, sight distance requirements must be reviewed and meet or exceed requirements set forth by AASHTO. Report updated.
- 3. The report notes that the two site driveways will align with 84th Terrace and 85th Street on the east side of Mission Road. Neither the traffic study nor the site plan shows the existing public streets to the east in sufficient detail to judge the alignments. It's important to specify that now to provide sufficient guidance to the designer. Absent a topographic survey, I'd suggest that the center lines of the driveways align with the center lines of the public streets on the opposite side of Mission Road.
 Sight drive alignment is now depicted on the site plan to align with the center of the adjacent streets.
- 4. Whereas the traffic impact study suggests marking a two-way center left-turn lane on Mission Road south of 84th Terrace, the additional width for that lane extends only about midway between 84th Terrace and 85th Street. It would be better to mark that space for a northbound left-turn lane. Revisions have been made to the traffic study to provide a northbound left-turn lane rather than a two-way-left-turn lane continuation. Recommendations for a two-way-left-turn lane were made in

the initial study to provide better continuity through the roadway section north of the study area and also provide access to the private drive just south of 84th Terrace. Proper taper must be provided for either recommendation as the existing roadway-width will govern.

5. The length of the throat of both site driveways is about 60 feet (it's difficult to know for certain since the curb line of Mission Road isn't clearly shown). Driveway throats should be at least 100 feet off of an arterial street for two main reasons - to store exiting traffic and to provide a transition for entering traffic. The relatively modest traffic volumes anticipated with this development suggest the shorter throat lengths could function adequately but provisions should be made to clearly give inbound traffic the right-of-way at the first intersection on the site. This would include stop-sign control of the other approaches and providing signage for inbound drivers (similar to what is used on many shopping center entrances).

The traffic study now includes recommendations for internal drive signing at the two main entrances. Entering traffic shall have the right-of-way with northbound and southbound traffic stop controlled.

6. The design of each end of the raised median on the northern most driveway should be modified to accommodate reasonable turning radii. In particular, the west end of this median should not extend to the very edge of the intersecting driving aisle. Final placement of sidewalk along Mission Road could influence the design of the east end of this median.

The site layout was revised to make accommodations for this comment.

7. The traffic impact study indicates that exiting traffic would operate at poor levels of service. That is primarily due to the traffic volumes on Mission Road. The site-generated traffic volumes, as well as the traffic volumes on the residential streets to the east, don't come close to warranting traffic signals at either driveway. Providing two outbound lanes on each driveway is the best way to mitigate this situation and minimize delay on the site driveways. The site plan shows two outbound lanes at the northern most driveway but only one at the south driveway. A recommendation in the traffic study is to add an outbound lane at this location.

Recommendations made in the traffic study are accommodated in the updated site plan.

8. Curvilinear sidewalk is proposed along Mission Road. The separation between Mission Road and the sidewalk on each site driveway is quite significant. I would encourage you to place these relatively close to Mission Road (5 to 8 feet) so pedestrians are visible to turning traffic and pedestrians don't have to cross behind outbound traffic stopped on the driveway. Bear in mind that exiting drivers will pull up very close to Mission Road in order to maximize their view of oncoming traffic and to lessen the time they are exposed to conflicting traffic as they turn.

The site layout was revised to make accommodations for this comment. Sidewalks cross entrances much closer to Mission Road now.

9. Sidewalk is proposed around the footprints of the two main buildings but it is incomplete. Further, there is no continuity across the two major driveways associated with the building closest to Mission Road. There is no sidewalk along the side of the interior drive where the villas are proposed. The site layout was revised to make accommodations for this comment.

10. It would be preferable to have one-way traffic flow at each of the three major building entrances. Using angle parking where feasible would help reinforce the appropriate travel path.

This recommendation is currently under evaluation for future plans.

11. The curve in the driveway at the northeast corner of the site is very tight. Virtually every driver will encroach into the opposing lane while navigating this curve, particularly traffic traveling towards the back of the site. The inside radius appears to have been abbreviated for parking. That radius should be developed fully and perhaps even increased somewhat.

The site layout was revised to make accommodations for this comment.

12. Parking along a curvilinear driving aisle is problematic in that viewing distances for drivers in the aisle and drivers unparking will be limited. It is important to maintain a low-speed environment to minimize potential conflicts. One way to accomplish that would be by constructing raised crosswalks at strategic locations; in essence a traffic calming strategy.

The site layout was revised to make accommodations for this comment.

13. The abundance of parking along driving aisles, as well as the curvilinear alignment and tight curves, makes it essential that sight lines be protected. Careful placement of potential obstructions such as landscaping and signage is critical.

The site layout was revised to make accommodations for this comment.

14. The applicant should demonstrate how trucks will navigate through the site.

A copy of the truck turning templates is now provided in the Appendix of the report under Existing plus Development conditions.

15. A signing and pavement marking plan should be developed for the site. The interior signing is now shown on Figure 2 of the report.

I will be available to review this matter with you at your convenience.

Very truly yours,

TranSystems Corporation

tumuny. Swenson

TGS:ts:B101130015