

CITY
HALL
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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

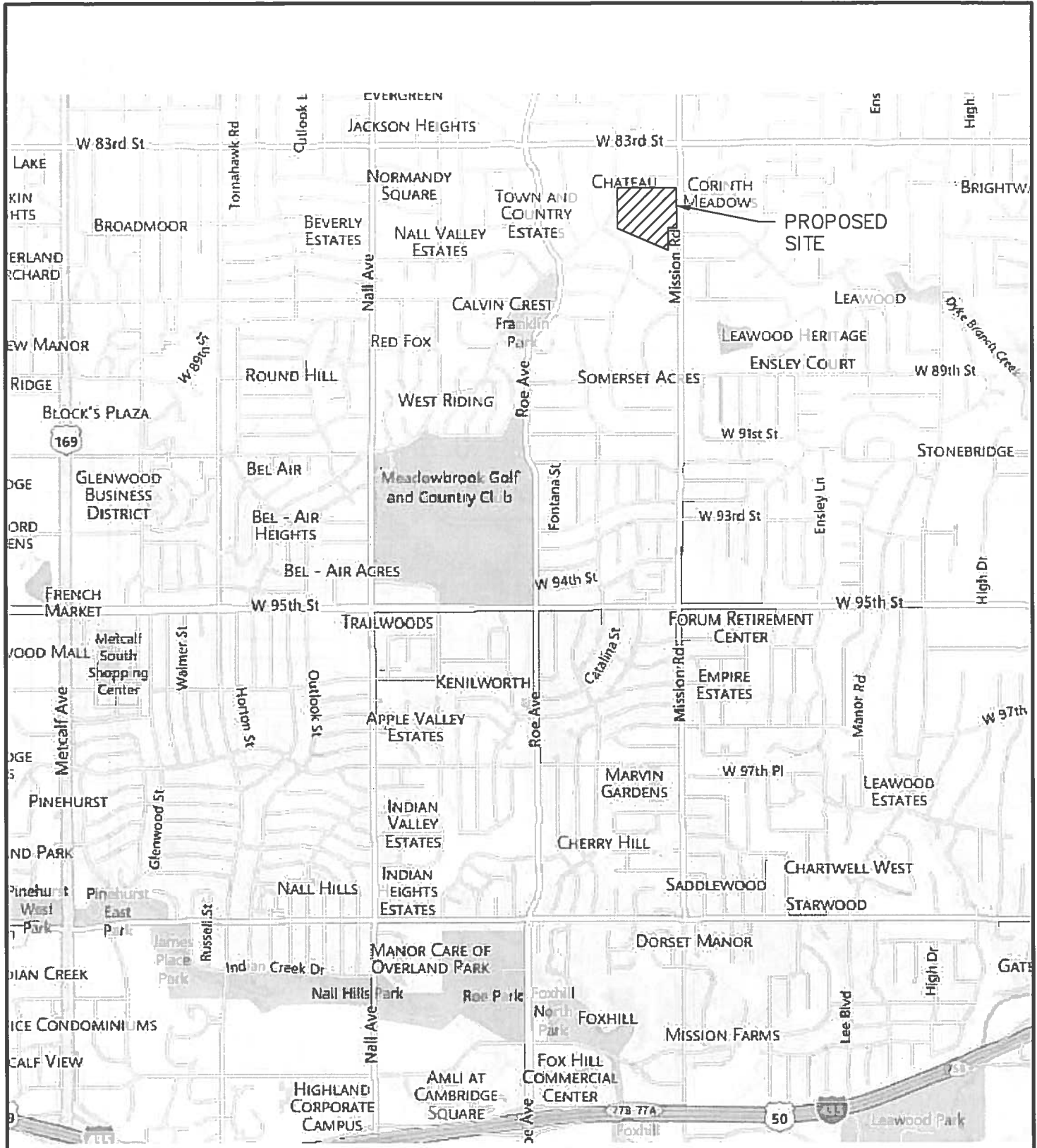
The objective of this study is to evaluate the traffic, roadway conditions and traffic impacts related to the proposed development. The proposed development replaces the closed Mission Valley Middle School that used to have an attendance of approximately 500 students. Existing traffic conditions will 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.



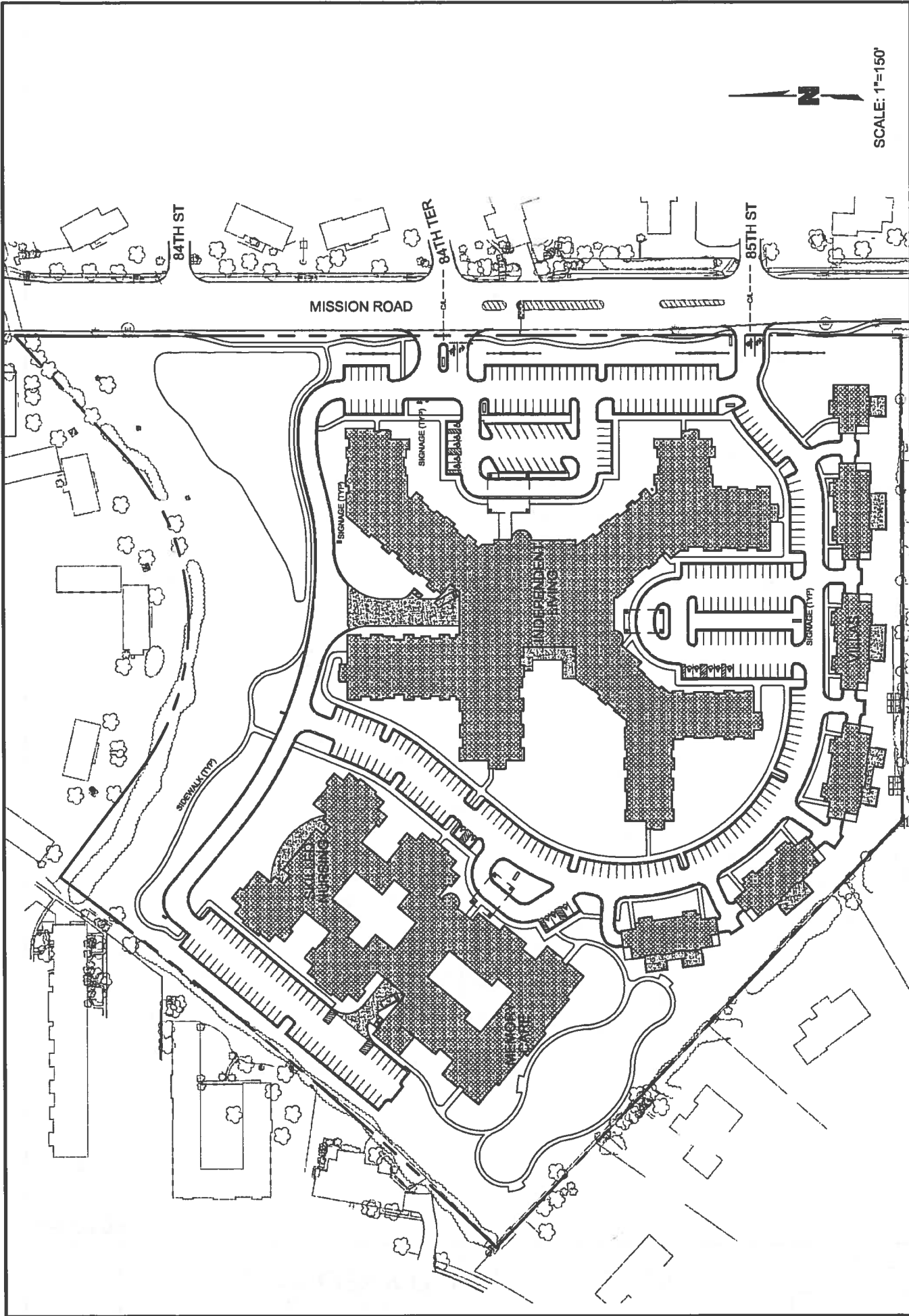
PROJECT NO: 012-2388
 DRAWN BY: JRC

Vicinity Map

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 ASSOCIATES

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FIGURE
 1



SCALE: 1"=150'

FIGURE
2

7301 West 133rd Street
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TEL 913.381.1170
FAX 913.381.1174



MISSION CHATEAU SITE PLAN

PROJECT NO: 012-2388
DRAWN BY: BHL
DATE: 04/05/13

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 (LOS)	Level-of-Service Criteria	
	<u>Stop Control</u> Approach Delay sec/veh	<u>Signal Control</u> Control Delay sec/veh
A	≤ 10	≤ 10
B	>10 and ≤ 15	>10 and ≤ 20
C	>15 and ≤ 25	>20 and ≤ 35
D	>25 and ≤ 35	>35 and ≤ 55
E	>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.

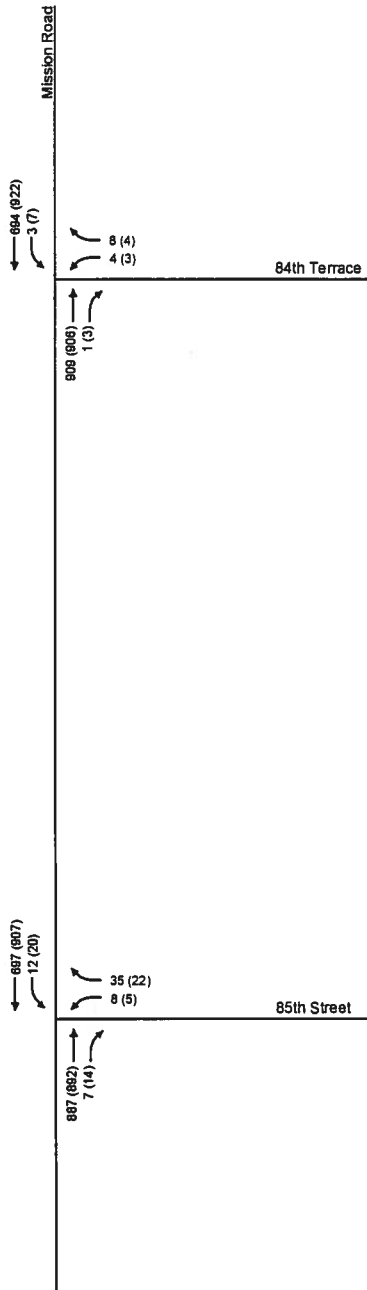
All individual movements at unsignalized intersections are operating at LOS D or better during the AM and PM peak hour periods under existing conditions.

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.



LEGEND

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



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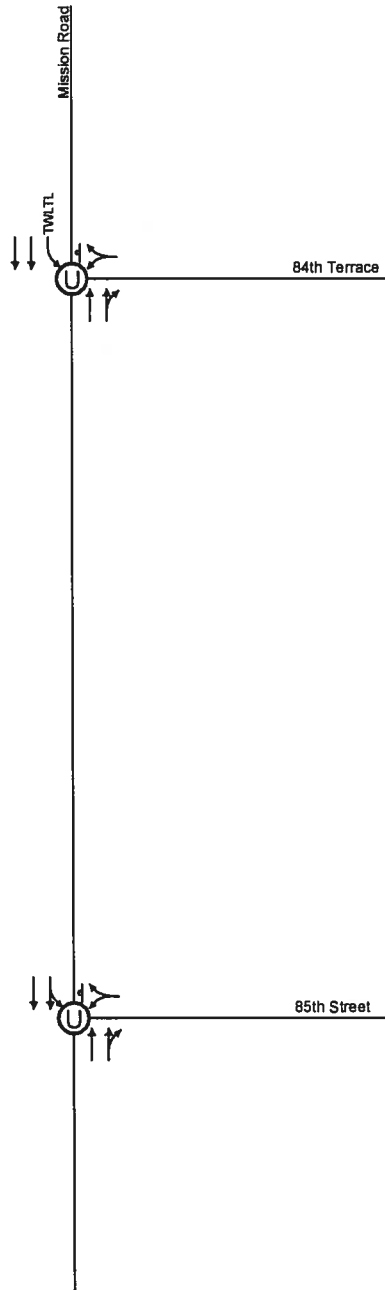
Existing Peak Hour Volumes



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FIGURE

3

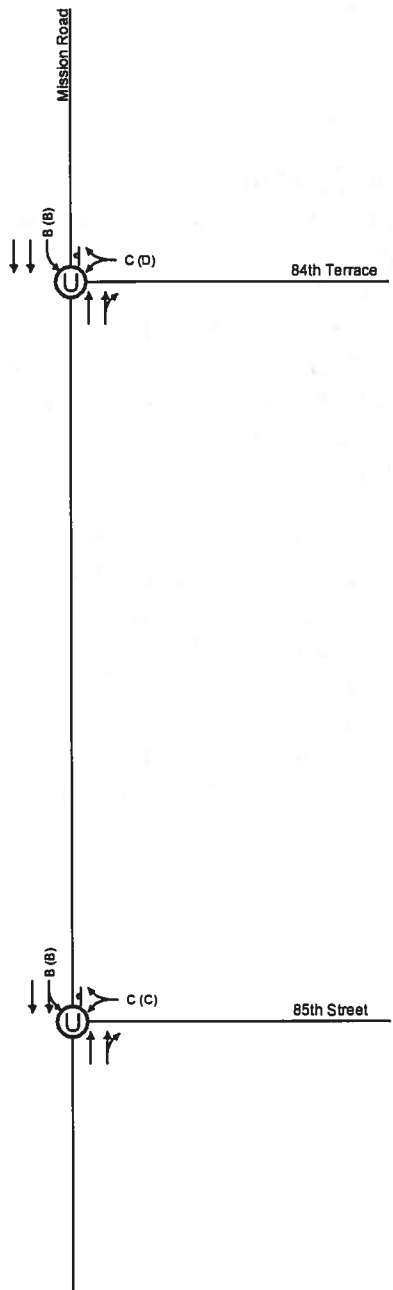


LEGEND

- ⊕ Unsignalized Intersection
- ⊥ Stop Sign
- TWLTL Two Way Left-Turn Lane
- ↪ XX' Turn Bay Storage Length



PROJECT NO: 012-2388	Existing Lane Config. & Traffic Control		7301 West 133rd Street Suite 200 Overland Park, KS 66213-4750 TEL 913.381.1170 FAX 913.381.1174	FIGURE
DRAWN BY: JRC			4	



LEGEND

- Ⓢ Unsignalized Intersection
- ↓ Stop Sign

↖ XX (XX) - AM (PM) Level of Service



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Existing Level of Service



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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.

Table 2: Proposed Development Trip Generation

Daily Trip Generation - Mission Valley									
ITE Code/Page	Land Use	Size		Trip Gen. Avg. Rate/Eq.	Daily Trips	Trip Distribution		Daily 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 Peak Hour Trip Generation									
ITE Code/Page	Land Use	Size		Trip Gen. Avg. Rate/Eq.	AM Peak Hour Trips	Trip Distribution		AM Peak 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 Peak Hour Trip Generation									
ITE Code/Page	Land Use	Size		Trip Gen. Avg. Rate/Eq.	PM Peak Hour Trips	Trip Distribution		PM Peak 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

* - 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/Memory Care Facility as depicted in the site plan

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.

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				PM Peak Hour Comparison			
Previous Land Use				Previous Land Use			
	Enter	Exit	Total		Enter	Exit	Total
School	149	121	270	School	39	41	80
Total	149	121	270	Total	39	41	80
Proposed Land Use				Proposed Land Use			
	Enter	Exit	Total		Enter	Exit	Total
Residential	43	58	101	Residential	48	54	102
Total	43	58	101	Total	48	54	102
Comparison				Comparison			
	Enter	Exit	Total		Enter	Exit	Total
Previous	149	121	270	Previous	39	41	80
Proposed	43	58	101	Proposed	48	54	102
Total	-106	-63	-169	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

Trip Distribution		
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

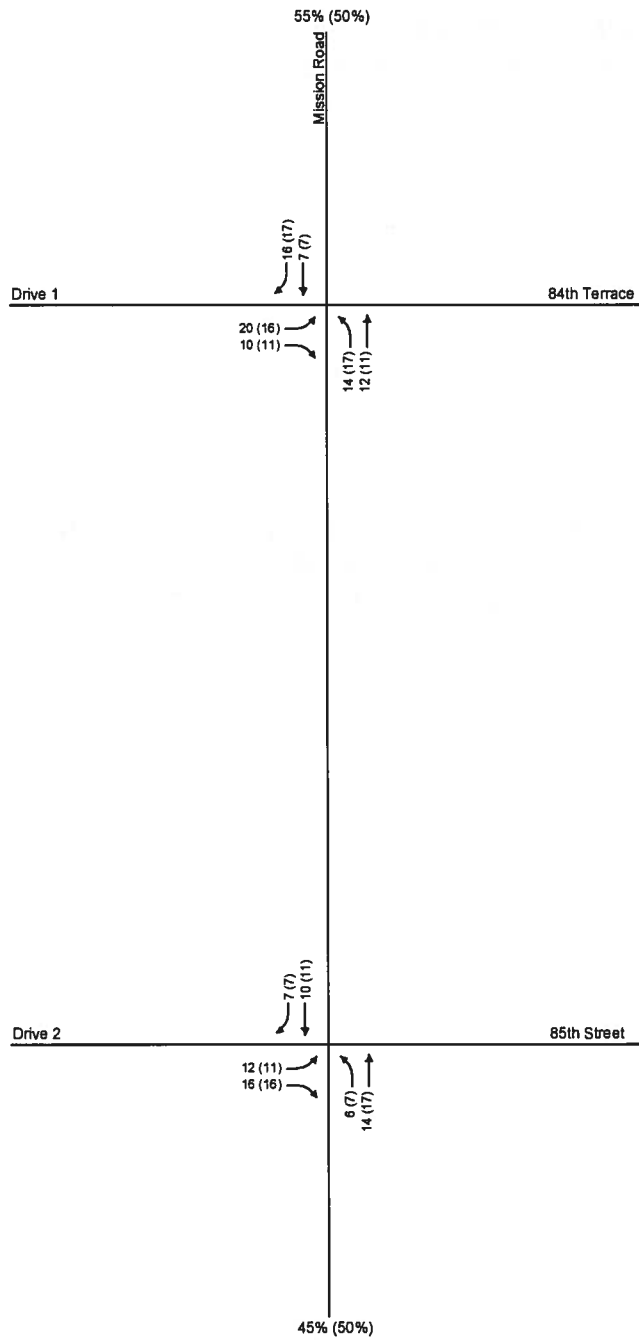
- Ensure that the geometrics of Drive 1 to align with those of the adjacent drive, 84th Terrace.

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.



LEGEND

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



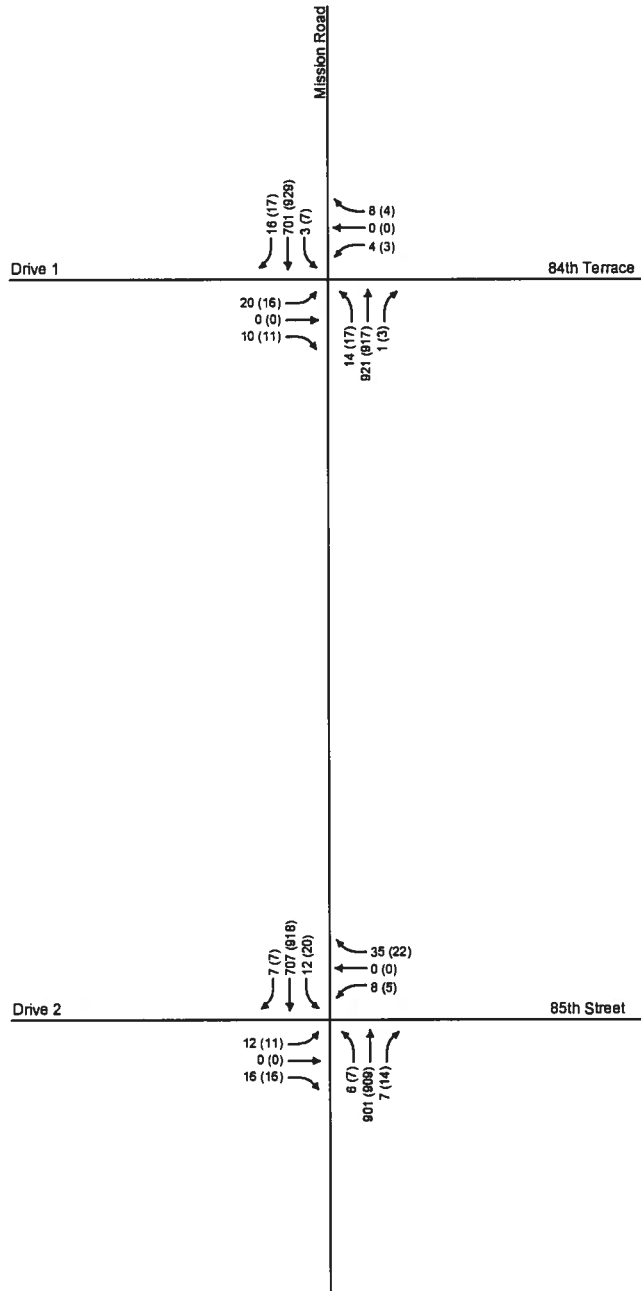
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Existing plus Development
Trip Distribution

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TEL 913.381.1170
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FIGURE
6



LEGEND

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



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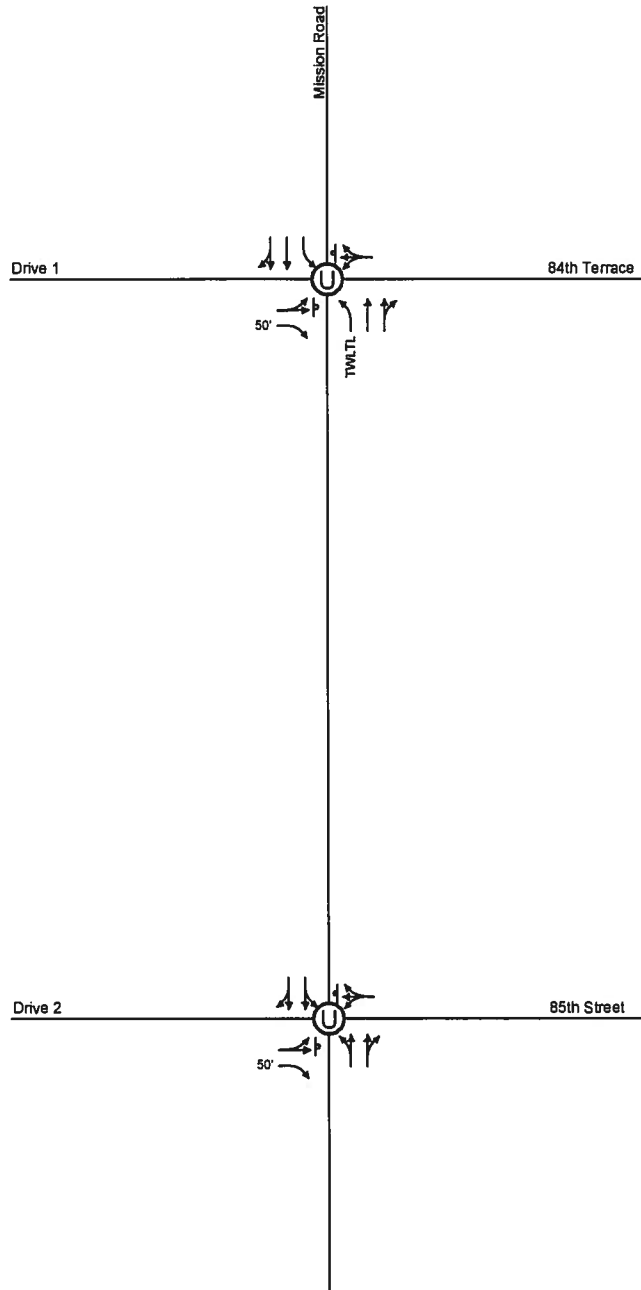
Existing plus Development
 Peak Hour Volumes

OLSSON
 ASSOCIATES

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FIGURE

7



LEGEND

- ⓪ Unsignalized Intersection
- ⊥ Stop Sign
- TWLTL Two Way Left-Turn Lane
- ↩ XX' Turn Bay Storage Length



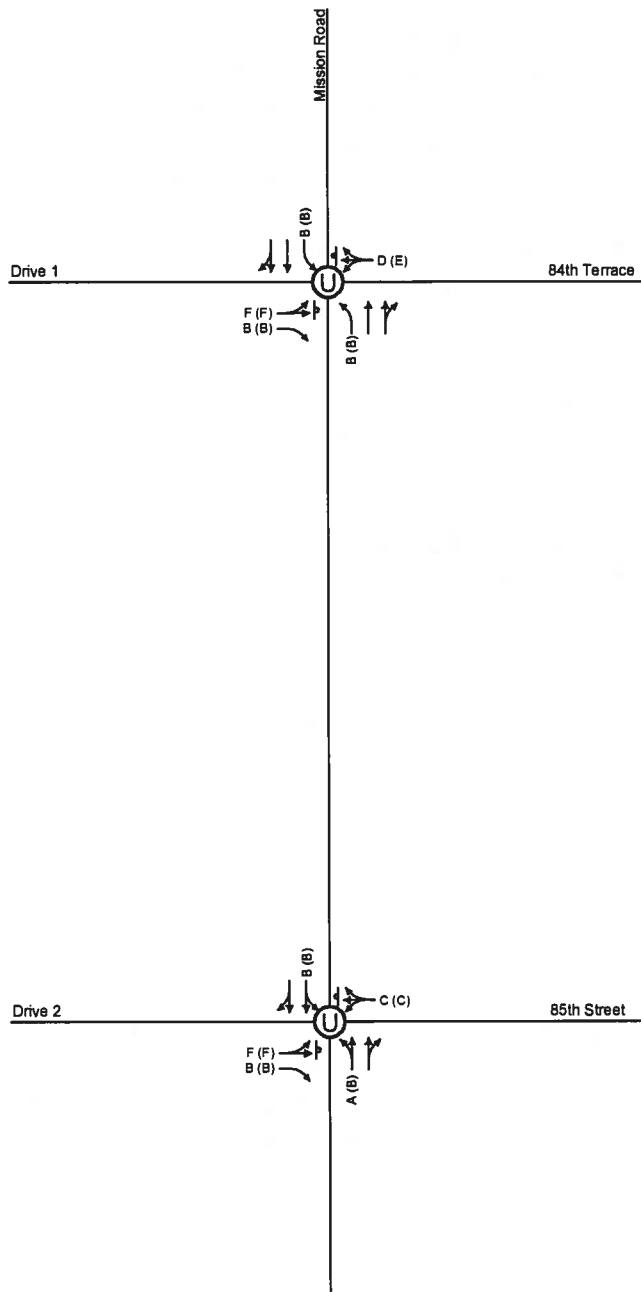
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Existing plus Development
 Lane Config. & Traffic Control



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FIGURE
 8



LEGEND

- ⊕ Unsignalized Intersection
- ⊕ Stop Sign

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



PROJECT NO:	012-2388
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Existing plus Development
Level of Service



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FIGURE
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

Mission Road
84th Terrace

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

Start Time	MISSION RD From North						84TH TERRACE From East						MISSION RD From South						MISSION RD From West											
	Right	Thru	Left	Peds	App Total		Right	Thru	Left	Peds	App Total		Right	Thru	Left	Peds	App Total		Right	Thru	Left	Peds	App Total							
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																														
Peak Hour for Entire Intersection Begins at 07:30 AM																														
07:30 AM	0	191	1	0	192		1	0	1	0	2		0	242	0	0	242		0	0	0	0	0		0	0	0	0	0	
07:45 AM	0	229	0	0	229		4	0	1	0	5		0	224	0	0	224		0	0	0	0	0		0	0	0	0	0	
08:00 AM	0	153	0	0	153		0	0	0	0	0		1	220	0	0	221		0	0	0	0	0		0	0	0	0	0	
08:15 AM	0	121	2	0	123		3	0	2	0	5		0	223	0	0	223		0	0	0	0	0		0	0	0	0	0	
Total Volume	0	694	3	0	697		8	0	4	0	12		1	909	0	0	910		0	0	0	0	0		0	0	0	0	0	
% App. Total	0	99.6	0.4	0			66.7	0	33.3	0	0.1		99.9	0	0	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.758	.375	.000	.761		.500	.000	.500	.000	.600		.250	.939	.000	.000	.940		.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																														
Peak Hour for Each Approach Begins at:																														
	07:30 AM						07:00 AM						07:30 AM						07:00 AM											
+0 mins.	0	191	1	0	192		1	0	0	0	1		0	242	0	0	242		0	0	0	0	0		0	0	0	0	0	
+15 mins.	0	229	0	0	229		3	0	2	0	5		0	224	0	0	224		0	0	0	0	0		0	0	0	0	0	
+30 mins.	0	153	0	0	153		1	0	1	0	2		1	220	0	0	221		0	0	0	0	0		0	0	0	0	0	
+45 mins.	0	121	2	0	123		4	0	1	0	5		0	223	0	0	223		0	0	0	0	0		0	0	0	0	0	
Total Volume	0	694	3	0	697		9	0	4	0	13		1	909	0	0	910		0	0	0	0	0		0	0	0	0	0	
% App. Total	0	99.6	0.4	0			69.2	0	30.8	0	0.1		99.9	0	0	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.758	.375	.000	.761		.563	.000	.500	.000	.650		.250	.939	.000	.000	.940		.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	

Mission Road
84th Terrace

File Name : MISSION RD & 84TH TERRACE (4-6PM)
 Site Code : 00000000
 Start Date : 10/30/2012
 Page No : 2

Start Time	MISSION RD From North						84TH TERRACE From East						MISSION RD From South						MISSION RD From West											
	Right	Thru	Left	Peds	App Total		Right	Thru	Left	Peds	App Total		Right	Thru	Left	Peds	App Total		Right	Thru	Left	Peds	App Total							
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																														
Peak Hour for Entire Intersection Begins at 05:00 PM																														
05:00 PM	0	235	2	0	237		2	0	2	0	4		1	182	0	0	183		0	0	0	0	0		0	0	0	0	0	
05:15 PM	0	263	1	0	264		0	0	0	0	0		1	241	0	0	242		0	0	0	0	0		0	0	0	0	0	
05:30 PM	0	229	1	0	230		1	0	1	0	2		0	243	0	0	243		0	0	0	0	0		0	0	0	0	0	
05:45 PM	0	195	3	0	198		0	0	0	0	1		1	240	0	0	241		0	0	0	0	0		0	0	0	0	0	
Total Volume	0	922	7	0	929		4	0	3	0	7		3	906	0	0	909		0	0	0	0	0		0	0	0	0	0	
% App. Total	0	99.2	0.8	0	100.0		57.1	0	42.9	0	43.8		0.3	99.7	0	0	100.0		0	0	0	0	0		0	0	0	0	0	
PHF	.000	.876	.583	.000	.880		.500	.000	.375	.000	.438		.750	.932	.000	.000	.935		.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																														
Peak 1 Hour for Each Approach Begins at:																														
	05:00 PM						04:15 PM						05:00 PM						04:00 PM											
+0 mins.	0	235	2	0	237		2	0	0	0	2		1	182	0	0	183		0	0	0	0	0		0	0	0	0	0	
+15 mins.	0	263	1	0	264		1	0	1	0	2		1	241	0	0	242		0	0	0	0	0		0	0	0	0	0	
+30 mins.	0	229	1	0	230		0	0	0	0	0		0	243	0	0	243		0	0	0	0	0		0	0	0	0	0	
+45 mins.	0	195	3	0	198		2	0	2	0	4		1	240	0	0	241		0	0	0	0	0		0	0	0	0	0	
Total Volume	0	922	7	0	929		5	0	3	0	8		3	906	0	0	909		0	0	0	0	0		0	0	0	0	0	
% App. Total	0	99.2	0.8	0	100.0		62.5	0	37.5	0	50.0		0.3	99.7	0	0	100.0		0	0	0	0	0		0	0	0	0	0	
PHF	.000	.876	.583	.000	.880		.625	.000	.375	.000	.500		.750	.932	.000	.000	.935		.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	

Mission Road
85th Street

File Name : MISSION RD & 85TH STREET (4-6PM)
 Site Code : 00000000
 Start Date : 11/1/2012
 Page No : 2

Start Time	MISSION RD From North						85TH STREET From East						MISSION RD From South						From West																												
	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total																								
	Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																																														
Peak Hour for Entire Intersection Begins at 05:00 PM																																															
05:00 PM	0	216	6	0	222		6	0	0	0	7	3	3	200	0	0	203		0	0	0	0	0	0	0	0	0	0	0	0																	
05:15 PM	0	253	7	0	260		6	0	1	0	7	3	3	232	0	0	235		0	0	0	0	0	0	0	0	0	0	0	0																	
05:30 PM	0	234	6	0	240		7	0	1	0	8	3	3	245	0	0	248		0	0	0	0	0	0	0	0	0	0	0	0																	
05:45 PM	0	204	1	0	205		3	0	2	0	5	5	5	215	0	0	220		0	0	0	0	0	0	0	0	0	0	0	0																	
Total Volume	0	907	20	0	927		22	0	5	0	27	14	14	892	0	0	906		0	0	0	0	0	0	0	0	0	0	0	0																	
% App. Total	0	97.8	2.2	0	100.0		81.5	0	18.5	0	100.0	1.5	98.5	0	0	0	100.0		0	0	0	0	0	0	0	0	0	0	0	0																	
PIIF	0.00	.896	.714	.000	.891		.786	.000	.625	.000	.844	.700	.910	.910	.000	.000	.913		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.926																	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																																															
Peak Hour for Each Approach Begins at:																																															
05:00 PM												04:00 PM												05:00 PM												04:00 PM											
+0 mins.	0	216	6	0	222		10	0	0	0	14	3	3	200	0	0	203		0	0	0	0	0	0	0	0	0	0	0	0																	
+15 mins.	0	253	7	0	260		4	0	4	0	8	3	3	232	0	0	235		0	0	0	0	0	0	0	0	0	0	0	0																	
+30 mins.	0	234	6	0	240		6	0	3	0	9	3	3	245	0	0	248		0	0	0	0	0	0	0	0	0	0	0	0																	
+45 mins.	0	204	1	0	205		2	0	3	0	5	5	5	215	0	0	220		0	0	0	0	0	0	0	0	0	0	0	0																	
Total Volume	0	907	20	0	927		22	0	14	0	36	14	14	892	0	0	906		0	0	0	0	0	0	0	0	0	0	0	0																	
% App. Total	0	97.8	2.2	0	100.0		61.1	0	38.9	0	100.0	1.5	98.5	0	0	0	100.0		0	0	0	0	0	0	0	0	0	0	0	0																	
PIIF	0.00	.896	.714	.000	.891		.550	.000	.875	.000	.643	.700	.910	.910	.000	.000	.913		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.926																	

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	JSS			Intersection	Mission Road & 84th Terrace			
Agency/Co.	Olsson Associates			Jurisdiction	Prairie Village, KS			
Date Performed	10/30/2012			Analysis Year	Existing			
Analysis Time Period	AM Peak Hour							
Project Description <i>Mission Valley</i>								
East/West Street: <i>84th Terrace</i>				North/South Street: <i>Mission Road</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (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 (veh/h)	0	967	4	7	913	0		
Percent Heavy Vehicles	0	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	2	0	1	2	0		
Configuration		T	TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				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			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		7		24				
C (m) (veh/h)		706		259				
v/c		0.01		0.09				
95% queue length		0.03		0.30				
Control Delay (s/veh)		10.2		20.3				
LOS		B		C				
Approach Delay (s/veh)	--	--	20.3					
Approach LOS	--	--	C					

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JSS			Intersection	Mission Road & 85th Street		
Agency/Co.	Olsson Associates			Jurisdiction	Prairie Village, KS		
Date Performed	10/30/2012			Analysis Year	Existing		
Analysis Time Period							
Project Description <i>Mission Valley</i>							
East/West Street: <i>85th Street</i>				North/South Street: <i>Mission Road</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (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 (veh/h)	0	964	15	24	839	0	
Percent Heavy Vehicles	0	--	--	2	--	--	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	2	0	0	2	0	
Configuration		T	TR	LT	T		
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (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	2	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		24		58			
C (m) (veh/h)		701		335			
v/c		0.03		0.17			
95% queue length		0.11		0.62			
Control Delay (s/veh)		10.3		18.0			
LOS		B		C			
Approach Delay (s/veh)	--	--		18.0			
Approach LOS	--	--		C			

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	JSS			Intersection	Mission Road & 84th Terrace			
Agency/Co.	Olsson Associates			Jurisdiction	Prairie Village, KS			
Date Performed	10/30/2012			Analysis Year	Existing			
Analysis Time Period	PM Peak Hour							
Project Description <i>Mission Valley</i>								
East/West Street: <i>84th Terrace</i>				North/South Street: <i>Mission Valley</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		906	3	7	922			
Peak-Hour Factor, PHF	1.00	0.93	0.75	0.58	0.88	1.00		
Hourly Flow Rate, HFR (veh/h)	0	974	4	12	1047	0		
Percent Heavy Vehicles	0	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	2	0	1	2	0		
Configuration		T	TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				3		4		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.38	1.00	0.50		
Hourly Flow Rate, HFR (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			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		12		15				
C (m) (veh/h)		701		189				
v/c		0.02		0.08				
95% queue length		0.05		0.26				
Control Delay (s/veh)		10.2		25.7				
LOS		B		D				
Approach Delay (s/veh)	--	--	25.7					
Approach LOS	--	--	D					

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JSS			Intersection	Mission Road & 85th Street		
Agency/Co.	Olsson Associates			Jurisdiction	Prairie Village, KS		
Date Performed	10/30/2012			Analysis Year	Existing		
Analysis Time Period	PM Peak Hour						
Project Description <i>Mission Valley</i>							
East/West Street: <i>85th Street</i>				North/South Street: <i>Mission Road</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		892	14	20	907		
Peak-Hour Factor, PHF	1.00	0.91	0.70	0.71	0.90	1.00	
Hourly Flow Rate, HFR (veh/h)	0	980	20	28	1007	0	
Percent Heavy Vehicles	0	--	--	2	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	2	0	0	2	0	
Configuration		T	TR	LT	T		
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				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	2	0	2	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		28		34			
C (m) (veh/h)		688		291			
v/c		0.04		0.12			
95% queue length		0.13		0.39			
Control Delay (s/veh)		10.5		19.0			
LOS		B		C			
Approach Delay (s/veh)	--	--	19.0				
Approach LOS	--	--	C				

NO.	DATE	REVISION DESCRIPTION
1	2019	

NO.	DATE	REVISION DESCRIPTION



- NOTES:**
1. FINISH TEMPERATURE REPRESENTS 88-90 DEGREES F. FINISH TEMPERATURE REPRESENTS 88-90 DEGREES F. FINISH TEMPERATURE REPRESENTS 88-90 DEGREES F.
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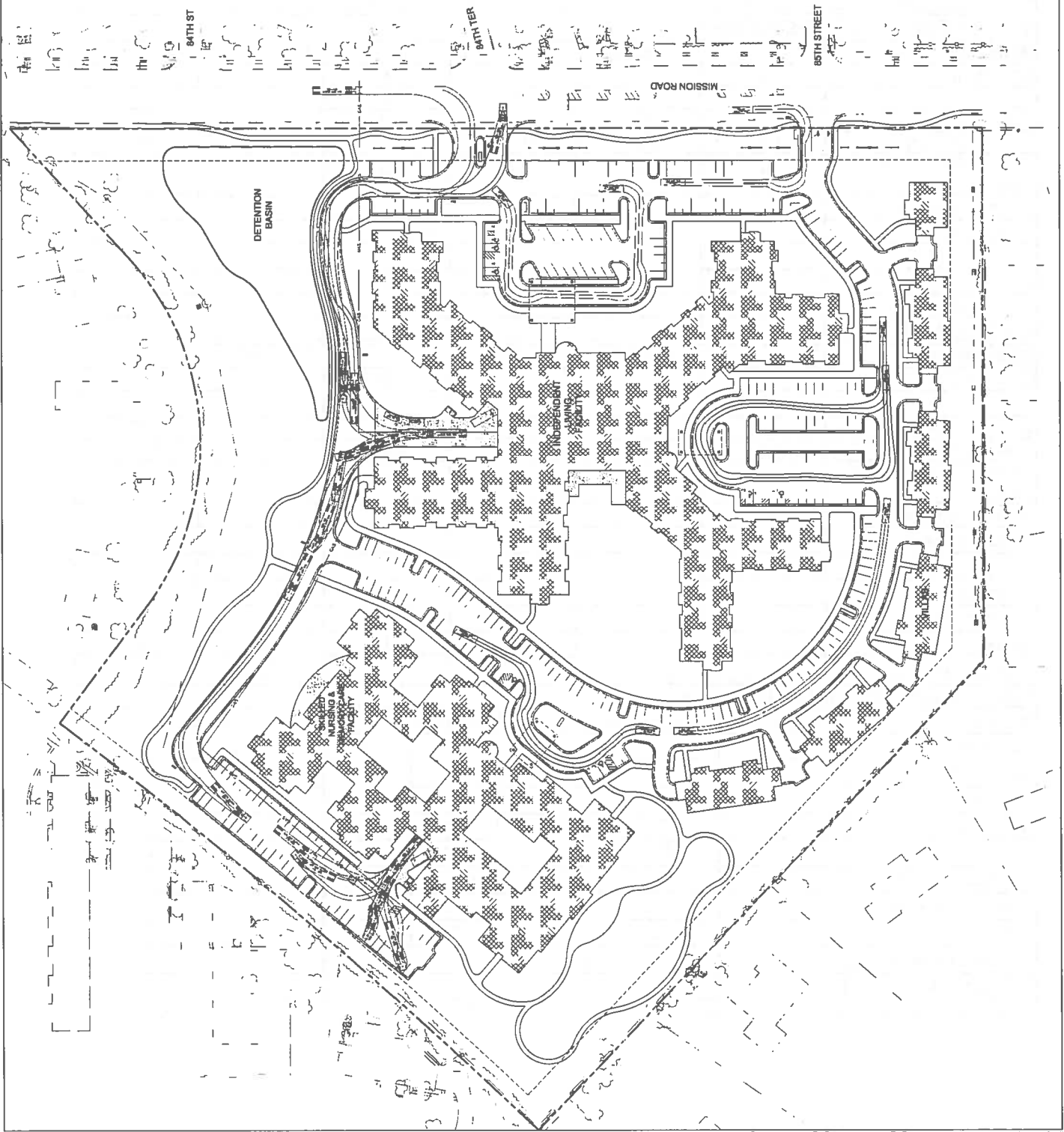
LEGEND

PROPERTY LINE

FIRE TRUCK (27')

W-66

S LUTAL (20')



Daily Trip Generation - Mission Valley

ITE Code/Page	Land Use	Size	Trip Gen. Avg. Rate/Eq.	Daily Trips		Trip Distribution		Daily Trips	
				Enter	Exit	Enter	Exit	Enter	Exit
254/520	Assisted Living *	72	Average	198	50%	50%	99	99	99
252/489	Senior Adult Housing - Attached **	160	Equation	498	50%	50%	249	249	249
251/479	Senior Adult Housing - Detached **	11	Equation	67	50%	50%	34	33	33
620/1222	Nursing Home ***	137	Equation	390	50%	50%	195	195	195
Total				1,153			577	577	576

AM Peak Hour Trip Generation

ITE Code/Page	Land Use	Size	Trip Gen. Avg. Rate/Eq.	AM Peak Hour Trips		Trip Distribution		AM Peak Hour Trips	
				Enter	Exit	Enter	Exit	Enter	Exit
254/521	Assisted Living *	72	Average	13	68%	32%	9	4	4
252/490	Senior Adult Housing - Attached **	160	Equation	32	34%	66%	11	21	21
251/480	Senior Adult Housing - Detached **	11	Equation	32	35%	65%	11	21	21
620/1223	Nursing Home ***	137	Average	24	50%	50%	12	12	12
Total				101			43	58	58

PM Peak Hour Trip Generation

ITE Code/Page	Land Use	Size	Trip Gen. Avg. Rate/Eq.	PM Peak Hour Trips		Trip Distribution		PM Peak Hour Trips	
				Enter	Exit	Enter	Exit	Enter	Exit
254/522	Assisted Living *	72	Average	21	50%	50%	11	10	10
252/491	Senior Adult Housing - Attached **	160	Equation	41	54%	46%	22	19	19
251/481	Senior Adult Housing - Detached **	11	Equation	9	61%	39%	5	4	4
620/1224	Nursing Home ***	137	Average	31	33%	67%	10	21	21
Total				102			48	54	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

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	JMS			Intersection	Mission Road & Drive 1/84th Te			
Agency/Co.	Olsson Associates			Jurisdiction				
Date Performed	03/11/2013			Analysis Year	Ex + Dev			
Analysis Time Period	AM							
Project Description 012-2388								
East/West Street: Drive 1 / 84th Terrace				North/South Street: Mission Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	14	921	1	3	701	16		
Peak-Hour Factor, PHF	0.92	0.94	0.25	0.38	0.76	0.92		
Hourly Flow Rate, HFR (veh/h)	15	979	4	7	922	17		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	2	0	1	2	0		
Configuration	L	T	TR	L	T	TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	20	0	10	4	0	8		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.50	1.00	0.50		
Hourly Flow Rate, HFR (veh/h)	21	0	10	8	0	16		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		Y			N			
Storage		3			0			
RT Channelized			0			0		
Lanes	0	1	1	0	1	0		
Configuration	LT		R		LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LT		R
v (veh/h)	15	7	24			21		10
C (m) (veh/h)	726	698	193			85		592
v/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
LOS	B	B	D			F		B
Approach Delay (s/veh)	--	--	26.3			44.7		
Approach LOS	--	--	D			E		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	JMS			Intersection	Mission Road & Drive 2/85th St			
Agency/Co.	Olsson Associates			Jurisdiction				
Date Performed	03/11/2013			Analysis Year	Ex + Dev			
Analysis Time Period	AM							
Project Description 012-2388								
East/West Street: Drive 2 / 85th Street				North/South Street: Mission Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	6	901	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							
RT Channelized			0			0		
Lanes	0	2	0	0	2	0		
Configuration	LT		TR	LT		TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (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		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		Y			N			
Storage		2			0			
RT Channelized			0			0		
Lanes	0	1	1	0	1	0		
Configuration	LT		R		LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	LTR			LT		R
v (veh/h)	6	24	58			13		17
C (m) (veh/h)	779	692	272			89		624
v/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
LOS	A	B	C			F		B
Approach Delay (s/veh)	--	--	21.8			28.8		
Approach LOS	--	--	C			D		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst				Intersection	Mission Road & Drive 1/84th Te			
Agency/Co.	Olsson Associates			Jurisdiction				
Date Performed	03/11/2013			Analysis Year	Ex + Dev			
Analysis Time Period	PM							
Project Description 012-2388								
East/West Street: Drive 1 / 84th Terrace				North/South Street: Mission Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	17	917	3	7	929	17		
Peak-Hour Factor, PHF	0.92	0.93	0.75	0.58	0.88	0.92		
Hourly Flow Rate, HFR (veh/h)	18	986	4	12	1055	18		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	2	0	1	2	0		
Configuration	L	T	TR	L	T	TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	16	0	11	3	0	4		
Peak-Hour Factor, PHF	0.92	1.00	0.92	0.38	1.00	0.50		
Hourly Flow Rate, HFR (veh/h)	17	0	11	7	0	8		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		Y			N			
Storage		3			0			
RT Channelized			0			0		
Lanes	0	1	1	0	1	0		
Configuration	LT		R		LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LT		R
v (veh/h)	18	12	15			17		11
C (m) (veh/h)	645	694	132			66		543
v/c	0.03	0.02	0.11			0.26		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			77.5		11.8
LOS	B	B	E			F		B
Approach Delay (s/veh)	--	--	35.7			51.7		
Approach LOS	--	--	E			F		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	JMS			Intersection	Mission Road & Drive 2/85th St			
Agency/Co.	Olsson Associates			Jurisdiction				
Date Performed	3/11/2013			Analysis Year	Ex + Dev			
Analysis Time Period	PM							
Project Description 012-2388								
East/West Street: Drive 2 / 85th Street				North/South Street: Mission Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (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 (veh/h)	7	998	20	28	1020	7		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	2	0	0	2	0		
Configuration	LT		TR	LT		TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	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	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		Y			N			
Storage		2			0			
RT Channelized			0			0		
Lanes	0	1	1	0	1	0		
Configuration	LT		R		LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT		LTR		LT		R
v (veh/h)	7	28		34		11		17
C (m) (veh/h)	672	677		223		66		559
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		11.6
LOS	B	B		C		F		B
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.

1. 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.

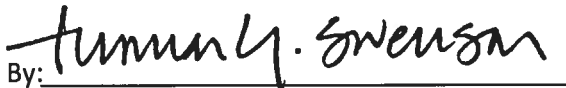
14. The applicant should demonstrate how trucks will navigate through the site.
A copy of the truck turning templates is now provided in the Appendix of the report under Existing plus Development conditions.

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

By: 

Thomas G. Swenson, PE, PTOE

TGS:ts:B101130015

