PLANNING COMMISSION REPORT REGULAR AGENDA

PC Staff Report PP-14-00554

ITEM NO. 3C PRELIMINARY PLAT FOR ALVAMAR INC ONE ADDITION; 1800, 1809, & 2021 CROSSGATE DR (SLD)

PP-14-00554: Consider a Preliminary Plat for Alvamar Inc One Addition, a six lot subdivision containing 51.85 acres, including property located at 1800, 1809, and 2021 Crossgate Dr. The proposed subdivision is proposed to support future residential and recreational uses. Submitted by Paul Werner Architects on behalf of Alvamar Inc, property owner of record.

STAFF RECOMMENDATION:

Staff recommends deferral of the Preliminary Plat of Alvamar Inc One Addition to incorporate the remaining portion of the Jayhawk Golf Training Center Addition, show street improvements to Crossgate Drive and intersection improvements at Crossgate Drive and Bob Billings Parkway and Crossgate Drive and Clinton Parkway and show off site stormwater improvements to the golf course proposed with this development application.

KEY POINTS

- The property includes platted and unplatted land.
- This property includes extending the right-of-way for Crossgate Drive to the north to a cul-desac then extending an access easement north of the cul-de-sac to the existing Woodfield Meadows.
- The proposed preliminary includes 6 lots along the public and private street segments of Crossgate Drive.

SUBDIVISION CITATIONS TO CONSIDER

• This application is being reviewed under the Subdivision Regulations for Lawrence and Unincorporated Douglas County, effective Jan 10, 2012.

ASSOCIATED CASES/OTHER ACTION REQUIRED

- Z-14-00552 request for RM24 zoning.
- Submittal of final plat for administrative approval and recordation.
- City Commission acceptance of dedication of easements and rights-of-way for the Final Plat.

PLANS AND STUDIES REQUIRED

- *Traffic Study* Received by the City. Traffic calming approved for Crossgate Drive and should be included in future development.
- Downstream Sanitary Sewer Analysis Study has been reviewed and accepted.
- *Drainage Study* Study has been reviewed and accepted. Additional information is needed regarding the off-site improvements proposed.
- Retail Market Study Not applicable to request

PUBLIC COMMENT

See attachments with Z-14-00552

ATTACHMENTS

1. Preliminary Plat

2. Traffic Study

3. Applicant's Schematic Master Plan

GENERAL INFORMATION

The existing zoning is summarized in the Staff Report Z-14-00554 for reference.

Proposed Alvamar One (RM24)									
Site Summary									
Gross Area: 51.85 Acres									
Number of Proposed Lots: 6									
Right-of-	Right-of-Way Dedicated: .98 Acres								
	Lot A	Lot Area Density Housing Type				Proposed Density			
LOT	Sauara Foot	Aaroo	24 units/	Apartmonto	Townhomos	Condo	Luxury	τοται	
LUI	Square reet	Acres	Acre	Apartments	Townnomes	Condo	Condo	TUTAL	DU/AC
Lot 1	336,849	7.73	186	120	24			144	18.6
Lot 2	374,153.73	8.59	206	120	24			144	16.8
Lot 3	268,605.69	6.17	148			48		48	7.8
Lot 4	209,951.30	4.82	116	92				92	19.1
Lot 5	754,588.73	7.32	416		48	48		96	5.5
Lot 6	162,489.00	3.73	90				88	88	23.6
TOTAL	2,106,637.45	48.36	1,160	332	96	96	88	612	12.7



The table above summarizes the development potential of the proposed subdivision and provides a comparison of the development intent as noted in the Traffic Study submitted by the applicant.

Proposed Lot 6 includes the current location of the club house. Proposed Lot 6 fully encompasses an existing 2.93 acre platted lot (Lot A, Alvamar Country Club No 2). The new lot for the club house is larger and includes the extension of the right of way Crossgate Drive.

Portions of proposed Lots 1, 2, 3, 4 and 6 also include previously platted property, Lot 1, Jayhawk golf Training Center. Approval of this request will result in a partially platted lot. This lot will need to be replatted in the future or incorporated into this Preliminary Plat prior to development or redevelopment of that parcel.



Figure 1: Alvamar Country Club No. 2

The proposed subdivision extends lot adjacent to existing platted subdivisions. Lots that have a direct view of open space are modified by this proposed application.



Figure 2: Existing Platted Lots

STAFF REVIEW

This property includes developed land including the open space used for Alvamar Golf Couse. The property includes both platted and unplatted land. Historically the golf course open space area has not been required to plat. Building improvements have required subdivision approval as a condition of issuing a building permit. The purpose of this subdivision plat is to establish developable lots for residential development and associated golf course amenities.

Compliance with Zoning Regulations

The proposed lot sizes exceed the minimum 6,000 Sf area size for the proposed RM24 district. All lots must be adjacent to a public street or require a variance. The Preliminary Plat does not note any variance associated with a variance.

Streets and Access

Access to this area is provided by Crossgate Drive. This local street includes public right-of-way and an access easement (Private Street). The proposed plat extends the public portion of the right-ofway to the north as a cul-de-sac with an extended access easement north toward Bob Billings Parkway. A note on the face of the plan states that subdivision will not have new public or private streets. This note should be corrected to show and label public right-of-way. Staff does not support any intent to vacate existing portions of public right-of-way for Crossgate Drive.



The private street segment of Crossgate Drive is an existing condition that arguably is not currently designed to accommodate the proposed density. It does not meet the City street standards.

The current application shows the street segment of Crossgate Drive as a 30' access easement. The benefit of the use of the easement is to provide reduced building setbacks measured from the property line (center of the access easement) and allow buildings to be set closer to the "street" than would be allowed with a public street. The applicant proposes in addition to the 30' of access easement an additional 10' of utility easement on the west side and 20' of utility easement on the east side. This combined space is equal to a public street right-of-way width for a local street.

The plat does not reflect any improvements to Crossgate Drive or the recommended improvements to Bob Billings Parkway. Staff believes the private drive should be enhanced to a city standard to the greatest extend possible, to accommodate the significant issues in traffic. Given the potential conflicts at Bob Billings Parkway and Crossgate Drive, staff believes an exhibit should accompany the plat that shows all street improvements, to assess the appropriateness of the impacts.



Figure 5: Crossgate Drive Public/Private Street Segments

[Existing ROW, New ROW, Private Street]

Regardless of the proposed development, an analysis of the traffic includes recommendations that should be considered for the existing development and include:

- Modification of the signal timing at Clinton Parkway and Crossgate Drive "in favorer of north/south approaches."
- Investigate the dedication of a westbound left-turn lane on Bob Billings Parkway at Crossgate Drive.
- Trim mature trees on the southwest corner of the intersection of Bob Billings Parkway and Crossgate Drive to improve sight distance for northbound traffic movement.

The traffic study states that the added trips from the development will not substantially impact the level of service for the intersection of Clinton Parkway and Crossgate (for the east and west approaches) the north and south approaches "will experience excessive delays with northbound left-turn movement" reduced to a Level of Service F and southbound left-turn movements to Level of Service E. identified specific changes and improvements to Crossgate Drive at the intersections. These improvements include:

Bob Billings Parkway and Crossgate Drive



- Trimming existing trees and shrubs at Bob Billings Parkway to improve sight distance:
- Dedicate a westbound left-turn lane on Bob Billings Parkway at Crossgate Drive with a storage length of a minimum 75' for deceleration. The Desired length of 19-' and a 120' taper length is noted.
- Construction of left and right turn lanes on Crossgate at Bob Billings Parkway are recommended to minimize delay and separate the northbound traffic into left-turn and right-turn lanes.
 - The addition of turn lanes on Crossgate Drive directly impact the abutting lots. This segment of Crossgate Drive is constructed within an access easement. Individual lots and ownership extend to the centerline of the access easement.



Clinton Parkway and Crossgate Drive

Figure 7: Clinton Parkway and Crossgate Drive

• Modification of signal timing at Clinton Parkway to reduce the excessive delay identified in the study.

The plat as proposed does not address how the intersection of Crossgate Drive and Bob Billings Parkway will be addressed.

Development of the site should include public improvement plans that address these requirements.

Utilities and Infrastructure

Development of this area can be adequately served by City sanitary sewer and water. Various plans have included changes to the existing golf course and ponds that are outside of the boundary of the proposed zoning request and this preliminary plat. Any off-site improvements related to storm runoff must be reviewed by the City Stormwater Engineer. Staff recommends the applicant provide more detail regarding plans and changes to the golf course area as part of a Planned Development that shows the proposed development in context to the existing open space areas and development.

Conformance

Additional information is needed to determine conformance with the standards and requirements of the Subdivision Regulations and the Development Code. Staff recommends deferral of this application.





LEGEND:

SCALE: 1" = 200'







SUBDIVISION. GROSS AREA: RIGHTS-OF-WAY

NET AREA: AVG. LOT SIZE TOTAL LOTS:



A TRACT OF LAND LYING IN SECTION 3, TOWNSHIP 13 SOUTH, RANGE 19 EAST OF THE SIXTH PRINCIPAL MERIDIAN, IN THE CITY OF LAWRENCE, DOUGLAS COUNTY, KANSAS, AND BEING DESCRIBED AS FOLLOWS:



THE REPLAT OF JAYHAWK GOLF TRAINING CENTER & ALVAMAR COUNTRY CLUB NO. 2, A REPLAT OF ALVAMAR COUNTRY CLUB AND A PORTION OF THE ALVAMAR GOLF COURSE, ALL IN CITY OF LAWRENCE, DOUGLAS COUNTY, KANSAS

General Notes

ALVAMAR INC 1809 CROSSGATE DRIVE LAWRENCE, KANSAS 66047 ALVAMAR INC.

LANDPLAN ENGINEERING, P.A. 1310 WAKARUSA DRIVE LAWRENCE, KS 66049

LAWRENCE, KS 66047 4. TYPICAL SOIL TYPES: PAWNEE CLAY LOAM, 1 TO 3 PERCENT SLOPES OSKA SILTY CLAY LOAM, 3 TO 6 PERCENT SLOPES SOGN VINLAND COMPLEX, 5 TO 20 PERCENT SLOPES

VINLAND COMPLEX 3 TO 7 PERCENT SLOPES

TOPOGRAPHIC INFORMATION OBTAINED FROM CITY OF LAWRENCE AERIAL MAP, NOVEMBER 2013 EXISTING LAND USE: GOLF COURSE PROPOSED LAND USE: RESIDENTIAL DEVELOPMENT, POOL, TENNIS COURTS, BANQUET HALL

PROPOSAL ZONING RM 24 DEVELOPER IS RESPONSIBLE FOR THE COST OF ANY RELOCATION OF EXISTING UTILITIES, TO SERVE THE PROPOSED 11. ALL NEW TELEPHONE, CABLE TELEVISION AND ELECTRICAL LINES MUST BE LOCATED UNDERGROUND.

Site Summary

	2,258,586 SF /	51.85 AC
Y AREA:	42,677.57 SF /	0.98 AC
	2,215,908.43 SF /	50.87 AC
	369,318.07 SF /	8.48 AC
	· · ·	

Provisions of Financing of Roads, Sewer, Water and other Public Services

THE SUBDIVISION WILL NOT HAVE NEW PUBLIC OR PRIVATE STREETS. THE SUBDIVISION WILL PROVIDE A CONNECTION TO THE EXISTING WATER LINE ON CROSSGATE DRIVE. THIS WATER LINE CONNECTION WILL BE PROVIDED BY PRIVATE 3. THE SUBDIVISION WILL PROVIDE A CONNECTION TO THE EXISTING SANITARY SEWER LINE RUNNING EAST/WEST ALONG THE EAST PLAT BOUNDARY OF ALVAMAR COUNTRY CLUB NO.2. THIS SANITARY SEWER CONNECTION WILL BE PROVIDED BY PRIVATE

FINANCING. THE EAST SIDE OF THE DEVELOP WILL COME FROM A SANITARY SEWER LINE SOUTHEAST OF ALVAMAR OASIS. PROPOSED WATER AND SANITARY SEWER LINE ON SITE IMPROVEMENTS ARE TO BE PROVIDED BY PRIVATE FINANCING AND WILL NOT DEPEND IN ANY WAY ON A VOTE, PETITION OR OTHER COLLECTIVE ACTION OF PROPERTY OWNERS IN THE SUBDIVISION.

Legal Description

BEGINNING AT THE SOUTHWEST CORNER OF LOT 1, WOODFIELD MEADOWS WEST NO. 2, A SUBDIVISION IN THE CITY OF LAWRENCE, AS RECORDED IN PLAT BOOK 15, PAGE 168 IN THE OFFICE OF THE DOUGLAS COUNTY REGISTER OF DEEDS; THENCE SOUTH 85'03'32" EAST, 98.29 FEET; THENCE ON A CURVE TO THE RIGHT WITH A RADIUS OF 1000.00 FEET, AN ARC LENGTH OF 185.24 FEET, A CHORD LENGTH OF 184.97 FEET ON A BEARING OF NORTH 01.56'27" EAST, AND A DELTA OF 10'36'48"; THENCE NORTH 89'11'31" EAST, 135.09 FEET; THENCE SOUTH 24'53'27" EAST, 454.16 FEET; THENCE SOUTH 16°45'48" EAST, 616.36 FEET; THENCE NORTH 76°01'44" EAST, 539.43 FEET; THENCE SOUTH 22°32'12" EAST, 191.54 FEET; THENCE SOUTH 01'14'15" EAST, 427.13 FEET; THENCE SOUTH 51'34'27" EAST, 623.57 FEET; THENCE SOUTH 36'25'35" WEST, 581.50 FEET; THENCE SOUTH 35'20'18" EAST, 442.44 FEET; THENCE SOUTH 54'39'42" WEST, 350.00 FEET; THENCE NORTH 35°20'18" WEST, 376.06 FEET; THENCE NORTH 28°58'17" WEST, 517.99 FEET; THENCE SOUTH 89'23'40" WEST, 147.26 FEET; THENCE SOUTH 73'56'57" WEST, 182.64 FEET; THENCE SOUTH THENCE NORTH 30'36'24" WEST, 86.73 FEET; THENCE ON A CURVE TO THE RIGHT WITH A RADIUS O FEET ON A BEARING OF NORTH 11'07'51" EAST. AND SOUTH 79'22'31" WEST. 59.40 FEET: THENCE SOUTH 38'42'47" EAST. 17.17 FEE 205.19 FEET; THENCE NORTH 37*46'25″ WEST, 89.56 FEET; THENCE SOUTH 85*54'28″ EET; THENCE NORTH 00°58'54" WEST, 183.74 FEET; THENCE NORTH 22°19'35" WEST, 133.54 FEET: THENCE NORTH 73°21'10" EAST, 94.02 FEET; THENCE NORTH 19°27'37" WEST, 267.53 FEET; THENCE NORTH 11°54'15" WEST, 433.96 FEET; THENCE NORTH 06'35'09" EAST, 434.97 FEET; THENCE NORTH 51'01'46" EAST, 111.81 TO THE POINT OF

A Preliminary Plat for



Lawrence, Kansas

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	ALVAMAR INC ONE ADDITION PRELIMINARY PLAT	A PORTION OF SECTION 3, TOWNSHIP 13 SOUTH, RA		DOUGLAS COUNTY, KANSAS			
REV DATE DESCRIPTION	1 2.13.15 Planning Comments						
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of 1 SHEETS



Traffic Impact Study

for

The Proposed Alvamar Inc One Addition

Crossgate Drive,Between Bob Billings Pkwy and Clinton Pkwy

Lawrence, Kansas

Prepared for Paul Werner Architects

Prepared By

Serving Communities Through Excellence Kansas - Missouri - Michigan - California



Mehrdad Givechi, PE, PTOE January 2015

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	Manual, 9 th Edition				

Introduction

Proposed Development

The proposed "Alvamar Inc One Addition" development site is located along Crossgate Drive between Bob Billings Parkway and Clinton Parkway, all nested in the existing Alvamar Golf Courses and clubhouse site, in Lawrence, Kansas (See Location Map, Figure 1 of Appendix I). In addition to maintaining a 36-hole golf course, the proposed plan, as illustrated in the conceptual plan in Figure 2 of Appendix I, calls for reconfiguring a few of the existing golf course holes to make room for the new development consisting of:

- 332 Apartments (ITE Land Use Code 220) 120 units on Lot #1, 120 units on Lot #2 and 92 units on Lot #4;
- 96 Owned Patio Homes / Townhomes (ITE Land Use Code 230) 24 units on Lot #1, 24 units on Lot #2, and 48 units on Lot #5;
- 96 Owned Condos (ITE Land Use Code 230) 48 units on Lot #3 and 48 units on Lot #5;
- 88 Owned Luxury Condos (ITE Land Use Code 233) all on Lot #6;
- A new golf clubhouse on Lot #3 with a number of amenities for use by club members, those playing golf and participants of the special events and tournaments held in the golf course. In addition to the basic amenities (lockers, pro-shop and restaurant) the clubhouse will have additional amenities including (majority of which are designated under ITE Land Use Code 430 "Golf Course"):
 - o A 15,000 square feet banquet / event facility
 - An outdoor snack bar/grill
 - o 2-3 swimming pools
 - o A 6,000 square feet fitness center
 - A 1,200 square feet Kansas Golf Hall of Fame (ITE Land Use Code 580)
 - o 24 extended stay cabins / suites
 - A 4,000 square feet office space, half of which is for the golf course administration use and the other half for general use of an independent tenant. (ITE Land Use Code 710)

<u>Access</u>

Currently, Crossgate Drive runs through the site in the north/south direction providing access to Bob Billings Parkway to the north and Clinton Parkway to the south. The northern half of Crossgate Drive (north of the clubhouse parking lot) is a private street and will be maintained as a private street. In addition, the existing clubhouse parking lot will be reconfigured to provide for a circulatory roadway as depicted in Figure 2 of Appendix I.

Access points to the site will remain at their current locations – at Bob Billings Parkway to the north and Clinton Parkway to the south. No other access points will be provided as the result of this redevelopment.

<u>Purpose</u>

The purpose of this study is to:

- 1. Evaluate the existing operating conditions of traffic at the intersections of
 - a. Clinton Parkway and Crossgate Drive (signalized);
 - b. Bob Billings Parkway and Crossgate Drive (stop controlled); and
 - c. Bob Billings Parkway and Monterey Way (signalized).
- 2. Identify any existing operational and/or safety deficiency(s), if any, at the abovementioned intersections, and recommend mitigation measures as needed.
- 3. Assess impact of the trips generated by the proposed redevelopment on the above-mentioned intersections.
- 4. Recommend off-site improvements (if any) needed as the result of this redevelopment.
- 5. Evaluate the future operating conditions of traffic for Target Year 2030.

Data Collection and Summary

As part of data collection efforts for this study, City of Lawrence was contacted to obtain any available information on turning movement counts, traffic signal phasing scheme and timing plans, street classifications, zoning and etc. Field observations and measurements were also conducted to obtain additional needed data as necessary. The following paragraphs summarize the results of these data collection tasks and field observations.

Roadway Network Geometric & Operating Characteristics

In the vicinity of the development site, as illustrated in Figure 3 of Appendix I,

- Clinton Parkway is a four-lane divided street with raised median and posted speed limit of 45 mph. It is designated as a "Principal Arterial" on the City's <u>Transportation 2040 Major Thoroughfare Map</u>.
- Bob Billings Parkway is a four-lane street with posted speed limit of 40 mph and designated as "Principal Arterial" on the City's <u>Transportation 2040 Major</u> <u>Thoroughfare Map</u>. West of Crossgate Drive, it is a four-lane divided street with a raised median, changing to a four-lane undivided facility with dedicated left-turn lanes at major intersections.
- Crossgate Drive is, generally, a two-lane, two-way street with posted speed limit of 30 mph north of Clinton Parkway. According to the City's <u>Transportation 2040</u> <u>Major Thoroughfare Map</u>, Crossgate Drive is designated as a "Collector" street south of Clinton Parkway and a "Local" street north of Clinton Parkway.
- Monterey Way is a two-lane, two-way street with posted speed limit of 35 mph. It is designated as a "Collector" street on the City's <u>Transportation 2040 Major</u> <u>Thoroughfare Map.</u>
- The intersection of Clinton Parkway and Crossgate Drive is a signalized intersection with the following geometric and operating characteristics:
 - East approach consists of one dedicated left-turn lane with approximate storage length of 325', two through lanes, and one dedicated right-turn lane with approximate storage length of 150'.

- West approach consists of one dedicated left-turn lane with approximate storage length of 265', two through lanes, and one dedicated right-turn lane with approximate storage length of 155'.
- South approach consists of one dedicated left-turn lane with approximate storage length of 90', one through lane, and one dedicated right-turn lane with approximate storage length of 75'.
- North approach consists of two lanes one dedicated left-turn lane, which is the continuation of the through lane upstream and one shared troughright-turn lane with approximate storage length of 90'.
- The signal is fully-actuated with video camera detection and is part of the coordination system along Clinton Parkway with 120 seconds cycle length.
- Left-turn movements for east/west approaches (Clinton Parkway) operate as "protected/permissive" phase with north/south approaches operating as "permissive only".
- The intersection of Bob Billings and Crossgate Drive is a "T" intersection controlled by a stop sign on Crossgate Drive with no dedicated turn lanes on any approach.
- The intersection of Bob Billings and Monterey Way is a signalized intersection with the following geometric and operating characteristics:
 - East approach consists of two through lanes with the outside lane being shared by right-turn movement;
 - West approach consists of one dedicated left-turn lane with approximate storage length of 100' and two through lanes;
 - North approach consists of one shared lane;
 - The signal is isolated fully-actuated with no video camera detection; and
 - Eastbound left-turn movement operates as "protected/permissive" phase.

<u>Zoning</u>

According to the Horizon 2020 (Map 3-2, Lawrence Future Land Use), the designated land use for this site is "Parks, Recreation and Open Space" with adjacent sites designated as "Very Low to Low Density Residential" with an exception of the site to the northwest, which is designated as "Medium to High Density Residential".

The existing zoning for the site is a combination of RS-7, RM-12 and PUD. The proposed zoning for this site is RM-24, which removes the allowed units from the PUD and moves them into a conventional zoning. This zoning does not actually increase the overall allowed number of units for the Alvamar Development.

Manual Traffic Counts

At the time this study was conducted, the University was in winter recess (Christmas and New Year Holidays) and the existing Alvamar golf club courses were closed for the Holidays. Therefore, conducting new traffic counts at the key intersections in the study area would not have provided a representative sample of the traffic volumes for analysis. For the purpose of this study, therefore, most recent and relevant vehicular turning movement counts were obtained from the City's records.

According to these records, the only available counts were for the morning and afternoon peak-hours of typical weekdays for the intersections of Clinton Parkway and Crossgate Drive (dated April 2013) and Bob Billings Parkway and Crossgate Drive (dated February 2012), both of which were taken when University classes were in session. According to these counts, as summarized in Appendix III and illustrated in Figure 4 of Appendix I,

- On a typical weekday, the morning peak occurs between 7:30 and 8:30 with
 - Bob Billings Parkway carrying peak-hour volumes of approximately 1,150 vph (west of Monterey Way) and 1,250 vph (east of Monterey Way). The directional distribution of traffic on Bob Billings Parkway changes from approximately 65% 35% (eastbound westbound) west of Monterey Way to 70% 40% (eastbound westbound) east of Monterey Way.
 - Clinton Parkway carrying peak-hour volumes of approximately 1,350 vph (west of Crossgate Drive) and 1,700 vph (east of Crossgate Drive). The directional distribution of traffic on Clinton Parkway changes from approximately 50% - 50% (eastbound – westbound) west of Crossgate Drive to 60% - 40% (eastbound – westbound) east of Crossgate Drive.

- Crossgate Drive, north of Clinton Parkway, carrying peak-hour volumes of less than 300 vph with directional distribution of approximately 40% - 60% (northbound – southbound).
- On a typical weekday, the afternoon peak occurs between 5:00 and 6:00 with
 - Bob Billings Parkway carrying peak-hour volumes of approximately 1,250 vph (west of Monterey Way) and 1,450 vph (east of Monterey Way) with directional distribution of approximately 45% 55% (eastbound westbound) on both sides of Monterey Way.
 - Clinton Parkway carrying peak-hour volumes of approximately 1,450 vph (west of Crossgate Drive) and 2,050 vph (east of Crossgate Drive) with directional distribution of approximately 45% - 55% (eastbound – westbound) on both sides of Crossgate Drive.
 - Crossgate Drive, north of Clinton Parkway, carrying peak-hour volumes of less than 150 vph with directional distribution of approximately 50% - 50% (northbound – southbound).

The City's records showed no counts for the intersection of Bob Billings Parkway and Crossgate Drive (Private Street). Turning movement counts at this location, therefore, were estimated using the ITE trip generation rates for the existing land use (a 36-hole golf course "Code 430" and 27 patio homes "Code 230). See Figure 4 of Appendix I for estimated volumes and Appendix VI for the ITE trip generation rates.

Evaluation of the Existing Operating Conditions

Volume/Capacity Analysis

A volume/capacity analysis (using Synchro 8 Software and methodologies outlined in the <u>2010 Highway Capacity Manual (HCM) published by the Transportation Research</u> <u>Board</u>) was conducted to determine the level-of-service (LOS) for all movements at the intersections under study during the afternoon peak-hour of a typical weekday. Level-of-service, as defined in the HCM, describes the quality of traffic operating condition and ranges from "A" to "F", with LOS "A" representing the best (most desirable with minimum delay) conditions and LOS "F" the worst (severely congested with excessive delays). The following chart outlines the level-of-service criteria for roundabouts, unsignalized and signalized intersections.

	Control Delay for	Control Delay for	Volume/Capacity	
Level-Of-Service	Unsignalized	Signalized	Ratio for	
	Intersections	Intersections	Roundabouts	
	(seconds/vehicle)	(seconds/vehicle)	(aaSIDRA	
			Criteria)	
A	0 – 10	0 – 10	< 0.6	
В	> 10 – 15	> 10 – 20	0.6 – 0.7	
С	> 15 – 25	> 20 – 35	0.7 – 0.8	
D	> 25 – 35	> 35 – 55	0.8 – 0.9	
E	> 35 – 50	> 55 – 80	0.9 – 1.0	
F	> 50	> 80	> 1.0	

The results of analysis, as shown in Appendix II and summarized in Figure 5 of Appendix I, indicate that, on a typical weekday:

- <u>Under current signal timing plan and phasing scheme (coordinated signal</u> <u>along Clinton Parkway with 120 second cycle length)</u>, the intersection of Clinton Parkway and Crossgate Drive operates at LOS "B" during both morning and afternoon peak-hours with:
 - o LOS "A" for east approach during both morning and afternoon peak-hours;
 - LOS "A" and "B" for west approach during morning and afternoon peakhours, respectively;
 - LOS "C" and "D" for north approach during morning and afternoon peakhours, respectively with southbound left-turn movement operating at LOS "E" during both peak-hours.
 - LOS "D" and "C" for south approach during morning and afternoon peakhours, respectively with northbound left-turn movement operating at LOS "E" during morning peak-hour.

- At the intersection of Bob Billings Parkway and Crossgate Drive, south approach operates at LOS "C" and "B" during morning and afternoon peak-hours, respectively.
- <u>Under optimum signal timing plan and current phasing scheme (50 second</u> <u>cycle length)</u>, the intersection of Bob Billings Parkway and Monterey Way operates at LOS "B" during both morning and afternoon peak-hours with individual movements operating at LOS "B" or higher.

Intersection Sight Distance (ISD) Analysis

In order to evaluate the existing ISD at the intersection of Bob Billings Parkway and Crossgate Drive, the methodology suggested by AASHTO "Green Book" (2011Edition), in conjunction with field observations, were used to calculate required minimum values using

- Posted advisory speed limit of 40 mph on Bob Billings Parkway;
- Passenger cars as design vehicle; and
- 3% approach grade on Crossgate Drive at its intersection with Bob Billings Parkway.

The results, as summarized in Appendix IV, indicate that ISD is slightly restricted on the southwest corner of the intersection. This is because there are a couple of mature evergreen trees in the departure sight triangle (approximately 80' west of Crossgate Drive) that block the line of sight for outbound traffic on Crossgate Drive.

Dedicated Turn Lane Analysis

In order to evaluate the need for dedicated turn lanes at the intersection of Bob Billings Parkway and Crossgate Drive, the following guidelines were reviewed and used as applicable:

- KDOT's "KTRANS Research Report Guidelines for Right-Turn Treatments at Unsignalized Intersections and Driveways", May 1996;
- TRB's "NCHRP Synthesis 225: Left-Turn Treatments at Intersections", 1996; and
- KDOT's Access Management Policy, January 2013.

The results of this evaluation (See Appendix V) indicate that:

• A dedicated westbound left-turn lane on Bob Billings Parkway at Crossgate Drive is marginally warranted.

Reasoning:

Westbound left-turn movement (Morning Peak-Hour)Speed = 40 mphOpposing Volume = 732 vph > 400 vphAdvance Volume = 426 vph > 400 vphLeft-Turn Volume = 9 vph > 7 vph (marginal)Percent Left-Turn = 2% (meets requirements for dedicated left-turn lane at marginal level)Westbound left-turn movement (Afternoon Peak-Hour)Speed = 40 mphOpposing Volume = 560 vph > 400 vphAdvance Volume = 698 vph > 400 vphLeft-Turn Volume = 10 vph > 9 vph (marginal)Percent Left-Turn = 1.5% (meets requirements for dedicated left-turn lane at marginal level)

 The requirements for provision of a dedicated eastbound right-turn lane on Bob Billings Parkway at Crossgate Drive <u>are not met</u>.

Reasoning:

Eastbound right-turn movement (Morning Peak-Hour) Speed = 40 mph Advance Volume (DDHV) = 732 vph Right-Turn Volume = 16 vph < 100 vph (does not meet requirements for dedicated right-turn lane) Eastbound right-turn movement (Afternoon Peak-Hour) Speed = 40 mph

Advance Volume (DDHV) = 560 vph Right-Turn Volume = 13 vph (does not meet requirements for dedicated right-turn lane)

Trip Generation Analysis

The trip generation of a proposed land development project is typically estimated using trip generation rates suggested by the *Institute of Transportation Engineers (ITE), Trip* <u>Generation Manual, 9th Edition</u>. For this analysis, as mentioned earlier, the following ITE Land Use Codes were selected for analysis:

- 220 for "Apartments", 230 for "Patio homes/Townhomes" and "Condos", 233 for "Luxury Condos", with "number of dwelling units" as independent variable;
- 430 for "Golf Course" with "number of holes" as independent variable; and
- 580 for "Museum" (Kansas Golf Hall of Fame) and 710 for "General Office Space" with "Gross Square Foot" as independent variable.

The results, as summarized in Appendix VI, indicate that the proposed development will likely generate the following number of trips:

- On average, 379 trip-ends (120 inbound and 259 outbound) during the morning peak-hour of a typical weekday;
- On average, 462 trip-ends (286 inbound and 176 outbound) during the afternoon peak-hour of a typical weekday; and
- On average, 4,633 trip-ends during 24-hour period of a typical weekday.

<u>Assumptions</u>

- The trips for the entire development site are broken into two components residential and non-residential because they have different distribution patterns during the peak-hours;
- The trips for the golf course includes all trips for the clubhouse amenities as described in the ITE Trip Generation Manual with the exception of trips for Kansas Golf Hall of Fame and the independent office space (~2,000 square feet), which will be additional trips to/from the site;
- The trips for the extended stay cabins / suites are considered "internal" to the site assuming they are intended for the use of the golf course and clubhouse amenities;

 All trips are assumed to be "primary (new)" trips with zero "pass-by" trips. In addition, it is assumed that the "internal capture" rate between the residential component and the non-residential component is zero to account for a "conservative" scenario.

Analysis Time Period

An overview of existing traffic volumes in the study area and their peak characteristics, in conjunction with estimated trips generated from the proposed development, indicate that the most critical peak period will likely occur during the <u>afternoon peak-hour</u> of a typical weekday. For this study, however, both morning and afternoon peak-hours are selected for analysis.

Trip Distribution and Assignment Analysis

The following trip distribution patterns were assumed for this analysis. These patterns, as illustrated in Figures 6 and 7 of Appendix I, are derived from the existing distribution patterns of traffic in the study area with general distribution of

- 58% to/from south to Clinton Parkway; and
- 42% to/from north to Bob Billings Parkway

Residential Component

- 29% to/from west on Clinton Parkway
- 23% to/from east on Clinton Parkway
- 6% to/from south on Crossgate Drive south of Clinton Parkway
- 27% to/from east on Bob Billings Parkway (4% to/from north on Monterey Way)
- 15% to/from west on Bob Billings Parkway

Non-Residential Component

- 23% to/from west on Clinton Parkway
- 25% to/from east on Clinton Parkway
- 10% to/from south on Crossgate Drive south of Clinton Parkway

- 15% to/from east on Bob Billings Parkway (5% to/from north on Monterey Way)
- 27% to/from west on Bob Billings Parkway

Using above trip distribution patterns, trips generated by the proposed development are assigned to individual movements within the study area as illustrated in Figure 8 of Appendix I.

Impact Assessment for "Existing + Proposed Development" Traffic Conditions

Volume/Capacity Analysis

An evaluation of the "Existing + Proposed Development" traffic conditions, as shown in Appendix II and summarized in Figures 9 and 10 of Appendix I, indicates that, on a typical weekday:

- <u>Under current signal timing plan and phasing scheme (coordinated signal</u> <u>along Clinton Parkway with 120 second cycle length)</u>, the intersection of Clinton Parkway and Crossgate Drive will likely operate at:
 - LOS "C" during morning peak-hour. This is a drop from current LOS "B" for the same time period. Moreover, the LOS for the northbound left-turn movement (on Crossgate Drive) will likely drop from "E" to "F" for the same time period; and
 - LOS "B" during afternoon peak-hour. This is the same as the LOS for the current conditions during the same time period with LOS for the southbound left-turn movement (on Crossgate Drive) likely remaining at "E" for the same time period.
- At the intersection of Bob Billings Parkway and Crossgate Drive, the LOS for northbound movement will likely drop from "B" to "C" during the afternoon peakhour.
- <u>Under optimum signal timing plan and current phasing scheme (50 second</u> <u>cycle length)</u>, the intersection of Bob Billings Parkway and Monterey Way will likely operate at current LOS "B" during both morning and afternoon peak-hours

with LOS for the eastbound left-turn movement dropping from "B" to "C" during the afternoon peak-hour.

Dedicated Turn Lane Analysis

As mentioned earlier, currently the requirements for provision of a westbound left-turn lane on Bob Billings Parkway at Crossgate Drive <u>is met at a marginal level</u>. With addition of traffic generated by the proposed development, the requirements for provision of this turn lane are met. It is, therefore, recommended that a dedicated westbound left-turn lane on Bob Billings Parkway be provided at this location. Based on the projected turning movement volumes (See Figure 9 of Appendix I), the required minimum storage length for this lane should be 75' plus appropriate deceleration and taper lengths.

The results of similar turn lane analysis indicates that, with addition of traffic generated by the proposed development, the requirements for provision of a dedicated eastbound right-turn lane on Bob Billings Parkway at Crossgate Drive *is not met* at this location.

Impact Assessment for "Future" Traffic Conditions

Based on the information provided by KDOT (See the last two Exhibits in Appendix I):

- The interchange of K-10 Highway and Bob Billings Parkway will be open to traffic sometime in 2015 (currently under construction); and
- The remaining portion of the South Lawrence Trafficway (connecting Iowa Street east to K-10 Highway) will be completed and open to traffic by the end of 2016.

Upon completion of these two major construction projects, Bob Billings Parkway will potentially carry more traffic. At the time this study was prepared, no information was available on the forecasted future traffic volumes in the proximity of the proposed development site, hence no detail analysis could be performed.

Summary and Recommendations

This study evaluates the existing operating conditions of traffic within the project study area and recommends mitigation measures for any existing operational deficiency(s), if any. It also evaluates impact of the proposed "Alvamar Inc One Addition" development on the intersections under study during the critical analysis period (morning and afternoon peak-hours of a typical weekday) and recommends mitigation measures resulted thereof. In addition, it assesses impact of the future traffic within the project study area for the critical analysis periods.

Existing Traffic Conditions (See Figures 3, 4 & 5 of Appendix I)

- 1. Under the existing geometric and operating conditions, individual movements at all intersections in the study area operate at LOS "C" and higher, except
 - Southbound left-turn movement at the intersection of Clinton Parkway and Crossgate Drive, which operates at LOS "E" during both peak-hours;
 - Northbound left-turn movement at the intersection of Clinton Parkway and Crossgate Drive, which operates at LOS "E" and "D" during morning and afternoon peak-hours, respectively; and
 - South approach at the intersection of Clinton Parkway and Crossgate Drive, which operates at LOS "D".

<u>Recommended Improvement:</u> Consider modifying the signal timing plan at this intersection while maintaining the existing 120 second cycle length for coordination purposes and reassigning the green time in favor of north/south approaches.

 Further investigation indicates that a dedicated westbound left-turn lane on Bob Billings Parkway at Crossgate Drive may be needed at a <u>marginal level</u>.

<u>Recommended Improvement:</u> Under the existing traffic conditions, Provision of this lane is not required but preferred.

 More investigation indicates that the intersection sight distance for the northbound movement at the intersection of Bob Billings Parkway and Crossgate Drive is slightly restricted by a couple of mature evergreen trees on the southwest corner of the intersection.

<u>Recommended Improvement:</u> Trim back or remove the subject trees to clear the departure sight distance (on the southwest corner) from obstruction.

Existing + Proposed Development Project (See Figures 8, 9 & 10 of Appendix I)

In order to provide for safe and efficient traffic operating conditions, the following off-site improvements are recommended as the result of the proposed development project:

1. With added trips generated by the proposed development site, LOS for the intersection of Clinton Parkway and Crossgate Drive (as a whole) will remain at acceptable LOS "C" or higher with reserve capacity for both east and west approaches. The north and south approaches, however, will experience excessive delays with northbound left-turn movement at LOS "F" and southbound left-turn movement at LOS "E".

<u>Recommended Improvement</u>: Modify signal timing plan at this intersection while maintaining the existing 120 second cycle length for coordination purposes and reassigning the green time in favor of north/south approaches.

 With the added trips generated by the proposed development site, the requirements for provision of a dedicated westbound left-turn lane on Bob Billings Parkway at Crossgate Drive are met.

<u>Recommended Improvement</u>: Provide a dedicated westbound left-turn lane on Bob Billings Parkway at Crossgate Drive. This lane should have a <u>minimum</u> storage length of 75' with a desirable deceleration length of 190' and 120' taper length. 3. To minimize delay for the northbound movement at the intersection of Bob Billings Parkway and Crossgate Drive, it is desirable to separate the northbound left-turn and northbound right-turn movements from one another.

<u>Recommended Improvement</u>: Provide a dedicated northbound right-turn lane (or left-turn lane) on Crossgate Drive at Bob Billings Parkway with minimum storage length of 50'.

4. Trees restricting the intersection sight distance at the intersection of Bob Billings Parkway and Crossgate Drive.

<u>Recommended Improvement</u>: Trim back or remove the first two evergreen trees on the southwest corner to clear the departure sight distance from obstruction.

APPENDIX I

Figures



Figure 1 Location Map





FIGURE 3 EXISTING LANE CONFIGURATIONS AND POSTED SPEED LIMITS (DECEMBER 2014)



EXISTING PEAK HOUR TRAFFIC VOLUMES (TYPICAL WEEKDAY, FEB. 2012 AND APR. 2013)



SUMMARY OF L.O.S. FOR EXISTING CONDITIONS (PEAK HOURS OF A TYPICAL WEEKDAY)



(PEAK HOURS OF A TYPICAL WEEKDAY)



(PEAK HOURS OF A TYPICAL WEEKDAY)



(PEAK HOURS OF A TYPICAL WEEKDAY)




(PEAK HOURS OF A TYPICAL WEEKDAY)

10-23 KA-1826-01 Supplement Bob Billings Parkway @ George Williams 2015/ 2025/2035 Estimated Daily Traffic September 5, 2012 2015 1,800 George Williams Ĺ 900 400 200 ← 2,400 300 400 ┙ \rightarrow L T 300 5,800 Ĵ **Bob Billings** t ← 300 2,900 200 200 2,400 → J 200 700



3,100

Bob Billings

300

6,200







EB/WB in PM Peak

1.1/0.9

%Trucks Medium/Heavy



2013 - 2014 Construction

Project work will include relocation of some local roads within the project area.

Project work includes:

- · Construct special embankment within wetlands for both K-10 and relocated 31st Street
- · Relocate and construct Haskell Avenue, Haskell Business Entrance and Horizon Frontage Road
- Relocate and reconstruct a portion of 29th Street
- · Relocate and construct 31st Street west of relocated Haskell Avenue and E 31st Street near E 1750 Road
- · Reconstruct a portion of 35th Street
- Reconstruct portions of Noria Road/E 1750 Road
- · Construct bridge over historic berm on 31st Street
- · Construct K-10 bridges over O'Connell Road

Traffic impacts (may not be concurrent):

- 35th Street temporarily closed from Iowa Street/U.S. 59 to Baker Visitor Center main entrance during 35th Street construction
- · Haskell Avenue closed during north and south end tie-in construction
- Noria Road/E 1750 Road closed from relocated 31st Street to K-10 and access south of K-10 to E 1750 Road is removed
- Short term one lane reduction on northbound Iowa Street / U.S. 59 at K-10 interchange
- Relocated E 31st Street closed from E 1700 Road to E 1750 Road during relocated 31st Street construction
- 31st Street closed between R Street and Louisiana Street during construction of relocated 31st Street west tie-in
- · O'Connell Road closed between 31st and 35th Streets during construction of K-10 bridges over O'Connell Road

Note: As construction progresses, actual work completed may vary from this display. KDOT will continue to provide updates over the life of the project.

- · Complete construction of diamond interchange at Iowa Street/U.S. 59
- · Construct folded diamond interchange at Haskell Avenue
- Relocate and construct Louisiana Street
- Construct hike and bike trails
- Construct noise walls
- Relocate and construct 31st Street east of relocated Haskell Avenue to O'Connell Road (City of Lawrence Project)
- · Construct Douglas County Road 442/E 1750 Road intersection
- · Begin to construct fully directional interchange at Noria Road/E 1750 Road

2016 Construction

Project work includes:

- · Complete construction of the fully directional interchange at Noria Road/E 1750 Road and tie-in to existing K-10 and 23rd Street
- · Complete construction tie-in of K-10 on west side of Iowa Street/U.S. 59, including mill and overlay

- · Existing Louisiana Street closed from Broken Arrow Park south to Wakarusa River
- Noria Road/E 1750 Road closed from Douglas County Road 442 to E 25th Street
- · Temporary closure of Douglas County Road 442 at Noria Road/E 1750 Road
- · Existing K-10 down to one lane in each direction near east interchange
- · Relocated Haskell Avenue and relocated 31st Street open to traffic
- O'Connell Road closed at 31st Street

Traffic impacts (may not be concurrent):

- · Two-way traffic on existing westbound 23rd Street/K-10 (Traffic Stage 1)
- Noria Road/E 1750 Road closed from Douglas County Road 442 to E 25th Street
- Two-way traffic on eastbound 23rd Street and eastbound K-10 during the tie-in of westbound K-10 lanes/ramps (Traffic Stage 2)
- · Brief closures of K-10 at Iowa Street

APPENDIX II

Results of Highway Capacity Analysis

Using

Synchro 8 Software

(HCM 2010 Methodology)

EXISTING CONDITIONS

Queue Length 50th (ft)

15

48

31

67

۰. ٭ 5 ~ Lane Group EBL WBT SBL EBT **WBR** SBR **↑**↑ ¥ Lane Configurations ٦ ۴Þ Volume (vph) 110 608 278 244 148 81 1900 1900 1900 Ideal Flow (vphpl) 1900 1900 1900 Lane Width (ft) 11 11 11 11 16 16 Grade (%) 6% 6% 0% Storage Length (ft) 100 0 0 0 Storage Lanes 1 0 1 0 25 Taper Length (ft) 25 Lane Util. Factor 0.95 0.95 0.95 1.00 1.00 1.00 0.949 Frt 0.966 Flt Protected 0.950 0.970 Satd. Flow (prot) 3319 3206 0 0 1659 1943 Flt Permitted 0.366 0.970 0 Satd. Flow (perm) 639 3319 3206 0 1943 Right Turn on Red Yes Yes Satd. Flow (RTOR) 83 61 Link Speed (mph) 40 40 35 Link Distance (ft) 670 328 355 Travel Time (s) 11.4 5.6 6.9 Peak Hour Factor 0.92 0.92 0.92 0.92 0.92 0.92 Adj. Flow (vph) 120 661 302 88 265 161 Shared Lane Traffic (%) Lane Group Flow (vph) 120 661 390 0 426 0 Turn Type NA NA pm+pt Prot Protected Phases 5 2 6 7 Permitted Phases 2 Detector Phase 5 2 6 7 Switch Phase Minimum Initial (s) 4.0 4.0 4.0 4.0 8.6 Minimum Split (s) 8.6 20.6 20.6 Total Split (s) 9.0 31.0 22.0 19.0 Total Split (%) 18.0% 62.0% 44.0% 38.0% Yellow Time (s) 3.6 3.6 3.6 3.6 All-Red Time (s) 1.0 1.0 1.0 1.0 Lost Time Adjust (s) 0.0 0.0 0.0 0.0 Total Lost Time (s) 4.6 4.6 4.6 4.6 Lead/Lag Lead Lag Lead-Lag Optimize? Yes Yes **Recall Mode** None None None None Act Effct Green (s) 15.4 12.0 15.4 10.8 Actuated g/C Ratio 0.42 0.42 0.29 0.32 v/c Ratio 0.31 0.48 0.39 0.64 Control Delay 9.0 9.1 11.0 15.5 Queue Delay 0.0 0.0 0.0 0.0 Total Delay 9.0 9.1 11.0 15.5 LOS А А В В Approach Delay 9.1 11.0 15.5 Approach LOS В А В

Synchro 8 Light Report Page 1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 95th (ft)	36	83	61		#158	
Internal Link Dist (ft)		590	248		275	
Turn Bay Length (ft)	100					
Base Capacity (vph)	393	2445	1628		831	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.31	0.27	0.24		0.51	
Intersection Summary						
Area Type:	Other					
Cycle Length: 50						
Actuated Cycle Length: 3	7.1					
Natural Cycle: 50						
Control Type: Actuated-U	ncoordinated					
Maximum v/c Ratio: 0.64						
Intersection Signal Delay:	11.2			In	tersection	LOS: B

Intersection Capacity Utilization 50.4% Analysis Period (min) 15 ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Bob Billings Pkwy & Monterey Way

 ø2			
31 s			
<u>ه</u> ر	← ø6	ø7	
9 s	22 s	19 s	

	٠	-	+	•	×	-
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	8	**	4 12		W	
Volume (vph)	135	422	578	250	385	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	16	16
Crado (%)	11	6%	6%		0%	10
Storage Length (ft)	100	070	070	0	0.0	0
Storage Lange	100			0	0	0
Juidye Lalles				U		U
Taper Length (II)	20	0.05	0.05	0.05	20	1 00
	1.00	0.95	0.95	0.95	1.00	1.00
FIL Fil Droke ske d	0.050		0.955		0.968	
FIT Protected	0.950	0010	06/0	•	0.963	•
Satd. Flow (prot)	1659	3319	3169	0	1968	0
FIt Permitted	0.182				0.963	
Satd. Flow (perm)	318	3319	3169	0	1968	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			136		30	
Link Speed (mph)		40	40		35	
Link Distance (ft)		670	328		355	
Travel Time (s)		11.4	5.6		6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adi, Flow (vph)	147	459	628	272	418	130
Shared Lane Traffic (%)	117	107	020	212	110	100
Lane Group Flow (vpb)	1/17	150	000	0	5/18	0
	nm int	4J7	900 NIA	0	Drot	0
Turri Type Drotoctod Dhases	pin+pt	INA 2	INA 2		P101	
FILIEURU PILASES	5	Z	0		1	
Permilled Phases	2	0	,		7	
Detector Phase	5	2	6		/	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	8.6	20.6	20.6		8.6	
Total Split (s)	9.0	33.0	24.0		22.0	
Total Split (%)	16.4%	60.0%	43.6%		40.0%	
Yellow Time (s)	3.6	3.6	3.6		3.6	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.6	4.6	4.6		4.6	
Lead/Lag	Lead		l an		1.0	
Lead-Lag Ontimize?	Vas		Ves			
	None	None	Nono		Nono	
Act Effet Croop (c)	22.0	22.0	17 /		14.2	
Actuated alC Datio	23.9	23.9	17.4		10.3	
Actualed y/C Rallo	0.48	0.48	0.35		0.33	
	0.53	0.29	0.76		0.83	
Control Delay	15.0	8.1	1/.6		29.6	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	15.0	8.1	17.6		29.6	
LOS	В	А	В		С	
Approach Delay		9.8	17.6		29.6	
Approach LOS		А	В		С	
Queue Length 50th (ft)	23	40	111		156	

メ チ チ ト トイ

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 95th (ft)	#50	63	172		#317	
Internal Link Dist (ft)		590	248		275	
Turn Bay Length (ft)	100					
Base Capacity (vph)	276	1982	1373		739	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.53	0.23	0.66		0.74	
Intersection Summary						
Area Type:	Other					
Cycle Length: 55						
Actuated Cycle Length: 49	.9					
Natural Cycle: 55						
Control Type: Actuated-Ur	ncoordinated					
Maximum v/c Ratio: 0.83						
Intersection Signal Delay:	18.5			In	tersection	LOS: B
Intersection Capacity Utiliz	ation 71.6%			IC	CU Level o	f Service C
Analysis Period (min) 15						
" 051 11 1						

95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

Splits and Phases: 4: Bob Billings Pkwy & Monterey Way

ø₂		
33 s		
	← ø6	Ø7
9 s	24 s	22 s

0.2

Intersection

Int Delay, s/veh

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	716	16	9	417	5	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	6	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	778	17	10	453	5	2

Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	796	0	1033	398	
Stage 1	-	-	-	-	787	-	
Stage 2	-	-	-	-	246	-	
Critical Hdwy	-	-	4.14	-	6.84	6.94	
Critical Hdwy Stg 1	-	-	-	-	5.84	-	
Critical Hdwy Stg 2	-	-	-	-	5.84	-	
Follow-up Hdwy	-	-	2.22	-	3.52	3.32	
Pot Cap-1 Maneuver	-	-	822	-	228	601	
Stage 1	-	-	-	-	409	-	
Stage 2	-	-	-	-	772	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	822	-	224	601	
Mov Cap-2 Maneuver	-	-	-	-	224	-	
Stage 1	-	-	-	-	409	-	
Stage 2	-	-	-	-	760	-	

Approach	EB	WB	NB	
HCM Control Delay, s	0	0.3	18.6	
HCM LOS			С	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	273	-	-	822	-	
HCM Lane V/C Ratio	0.028	-	-	0.012	-	
HCM Control Delay (s)	18.6	-	-	9.4	0.1	
HCM Lane LOS	С	-	-	А	А	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

0.4

Intersection

Int Delay, s/veh

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	547	13	10	688	12	10	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	6	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	595	14	11	748	13	11	

Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	609	0	998	304	
Stage 1	-	-	-	-	602	-	
Stage 2	-	-	-	-	396	-	
Critical Hdwy	-	-	4.14	-	6.84	6.94	
Critical Hdwy Stg 1	-	-	-	-	5.84	-	
Critical Hdwy Stg 2	-	-	-	-	5.84	-	
Follow-up Hdwy	-	-	2.22	-	3.52	3.32	
Pot Cap-1 Maneuver	-	-	966	-	240	692	
Stage 1	-	-	-	-	510	-	
Stage 2	-	-	-	-	649	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	966	-	235	692	
Mov Cap-2 Maneuver	-	-	-	-	235	-	
Stage 1	-	-	-	-	510	-	
Stage 2	-	-	-	-	637	-	

Approach	EB	WB	NB	
HCM Control Delay, s	0	0.2	16.5	
HCM LOS			С	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	336	-	-	966	-
HCM Lane V/C Ratio	0.071	-	-	0.011	-
HCM Control Delay (s)	16.5	-	-	8.8	0.1
HCM Lane LOS	С	-	-	А	А
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Morning Peak-Hour

	≯	-	\rightarrow	4	+	×	1	†	1	1	Ļ	-
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	^	1	5	44	1	5	^	1	ሻ	f,	
Volume (vph)	47	602	31	95	492	50	55	20	359	68	19	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	265		155	325		200	0		0	0		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	75			75			0			0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.894	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1665	0
Flt Permitted	0.450			0.358			0.390			0.735		
Satd. Flow (perm)	838	3539	1583	667	3539	1583	726	1863	1583	1369	1665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			73			100		109	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		800			600			150			100	
Travel Time (s)		12.1			9.1			3.4			2.3	
Peak Hour Factor	0.56	0.93	0.79	0.94	0.91	0.78	0.92	0.58	0.90	0.75	0.42	0.79
Adj. Flow (vph)	84	647	39	101	541	64	60	34	399	91	45	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	647	39	101	541	64	60	34	399	91	154	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	35.0	35.0	11.0	35.0	35.0	36.0	36.0	11.0	37.0	37.0	
Total Split (s)	22.0	46.0	46.0	22.0	46.0	46.0	52.0	52.0	22.0	52.0	52.0	
Total Split (%)	18.3%	38.3%	38.3%	18.3%	38.3%	38.3%	43.3%	43.3%	18.3%	43.3%	43.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-3.0	-3.0	-2.0	-3.0	-3.0	
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	87.4	78.6	78.6	97.6	88.0	88.0	16.4	16.4	35.4	16.4	16.4	
Actuated g/C Ratio	0.73	0.66	0.66	0.81	0.73	0.73	0.14	0.14	0.30	0.14	0.14	
v/c Ratio	0.12	0.28	0.04	0.15	0.21	0.05	0.61	0.13	0.74	0.49	0.48	
Control Delay	3.9	10.3	0.6	3.2	6.2	1.4	72.7	44.5	36.0	55.6	20.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	3.9	10.3	0.6	3.2	6.2	1.4	72.7	44.5	36.0	55.6	20.4	
LOS	А	В	А	А	А	А	E	D	D	E	С	
Approach Delay		9.1			5.3			41.1			33.5	
Approach LOS		А			А			D			С	
Queue Length 50th (ft)	10	103	0	12	65	0	44	24	212	66	31	
Queue Length 95th (ft)	15	175	1	30	107	8	89	33	285	94	2	
Internal Link Dist (ft)		720			520			70			20	

Synchro 7 - Light: Report Page 1

EXISTING CONDITIONS

Morning Peak-Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	265		155	325		200						
Base Capacity (vph)	816	2319	1062	722	2595	1180	296	760	581	559	744	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.28	0.04	0.14	0.21	0.05	0.20	0.04	0.69	0.16	0.21	
Intersection Summary												
Area Type: (Dther											
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 38 (32%), Referenced	d to phase	2:EBTL a	and 6:WB	TL, Start	of Green							
Natural Cycle: 85												
Control Type: Actuated-Coor	dinated											
Maximum v/c Ratio: 0.74												
Intersection Signal Delay: 17	.7			In	tersectior	n LOS: B						
Intersection Capacity Utilizat	ion 53.9%			IC	U Level o	of Service	А					
Analysis Period (min) 15												
Splits and Phases: 3: Clin	ton Pkwy	1	С	linton Pkv	vy & Cros	sgate Dr.						
🖬 📭	ø2 (R)					↓	14					
22 s 46	s					52 s						
∮ø5	Ø6 (R)					- - †,	18					
22 s 46	S					52 s						

Afternoon Peak-Hour

	≯	-	\rightarrow	-	-	•	1	†	1	1	Ŧ	-
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	^	1	5	^	1	5	•	1	5	4Î	
Volume (vph)	22	556	63	359	754	33	42	12	277	48	10	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	265		155	325		200	0		0	0		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	75			75			0			0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1714	0
Flt Permitted	0.340			0.371			0.730			0.744		
Satd. Flow (perm)	633	3539	1583	691	3539	1583	1360	1863	1583	1386	1714	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			73			120		22	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		800			600			150			100	
Travel Time (s)		12.1			9.1			3.4			2.3	
Peak Hour Factor	0.91	0.93	0.58	0.84	0.91	0.73	0.85	0.57	0.81	0.68	0.54	0.79
Adj. Flow (vph)	24	598	109	427	829	45	49	21	342	71	19	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	598	109	427	829	45	49	21	342	71	41	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	35.0	35.0	11.0	36.0	36.0	36.0	36.0	11.0	38.0	38.0	
Total Split (s)	24.0	46.0	46.0	24.0	46.0	46.0	50.0	50.0	24.0	50.0	50.0	
Total Split (%)	20.0%	38.3%	38.3%	20.0%	38.3%	38.3%	41.7%	41.7%	20.0%	41.7%	41.7%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-3.0	-3.0	-2.0	-3.0	-3.0	
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	83.3	75.2	75.2	101.9	95.9	95.9	14.5	14.5	38.8	14.6	14.6	
Actuated g/C Ratio	0.69	0.63	0.63	0.85	0.80	0.80	0.12	0.12	0.32	0.12	0.12	
v/c Ratio	0.05	0.27	0.11	0.53	0.29	0.04	0.30	0.09	0.58	0.42	0.18	
Control Delay	4.9	12.6	3.0	5.1	5.1	0.5	51.3	45.7	23.2	55.5	27.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.9	12.6	3.0	5.1	5.1	0.5	51.3	45.7	23.2	55.5	27.6	
LOS	А	В	А	А	А	А	D	D	С	E	С	
Approach Delay		10.9			4.9			27.7			45.3	
Approach LOS		В			А			С			D	
Queue Length 50th (ft)	2	109	0	57	101	0	35	15	136	52	13	
Queue Length 95th (ft)	9	183	3	99	153	1	67	23	158	71	21	
Internal Link Dist (ft)		720			520			70			20	

Synchro 7 - Light: Report Page 1

EXISTING CONDITIONS

Afternoon Peak-Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	265		155	325		200						
Base Capacity (vph)	703	2217	1032	812	2827	1279	532	729	609	542	684	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.03	0.27	0.11	0.53	0.29	0.04	0.09	0.03	0.56	0.13	0.06	
Intersection Summary												
Area Type: (Other											
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 90 (75%), Reference	d to phase	2:EBTL a	and 6:WB	TL, Start	of Green							
Natural Cycle: 85												
Control Type: Actuated-Coor	dinated											
Maximum v/c Ratio: 0.58												
Intersection Signal Delay: 12	.1			In	tersectior	ILOS: B						
Intersection Capacity Utilizat	ion 54.6%			IC	U Level o	of Service	А					
Analysis Period (min) 15												
Splits and Phases: 3: Clin	ton Pkwy	1	С	linton Pkv	vy & Cros	sgate Dr.						
√ ø1	402 (R)				4	ø4					
24 s 🦷	16 s					50 s						
▶ _{ø5}	🕈 ø6 (R)				1	ø8					
24 s	1 6 s					50 s						

EXISTING + DEVELOPMENT TRAFFIC CONDITIONS

	≯	-	+	•	× -	1
Lane Group	FBI	FBT	WBT	WBR	SBI	SBR
Lane Configurations	5	**	A 12		¥	ODR
Volume (vph)	121	666	298	81	244	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	16	16
Grade (%)		6%	6%		0%	10
Storage Length (ft)	100	070	070	0	0,0	0
Storage Lanes	100			0	1	0
Taper Length (ft)	25			0	25	0
Lano Iltil Factor	1 00	0.05	0.05	0.05	1 00	1 00
Earle Offil. 1 detor	1.00	0.75	0.75	0.75	0.049	1.00
Elt Drotoctod	0.050		0.700		0.940	
Fil Plotecleu	0.950	2210	2212	0	0.970	0
Sald. Flow (prol)	1659	3319	3212	0	1941	0
	0.355	0040	0040	•	0.970	•
Satd. Flow (perm)	620	3319	3212	0	1941	0
Right Lurn on Red				Yes		Yes
Satd. Flow (RTOR)			75		63	
Link Speed (mph)		40	40		35	
Link Distance (ft)		670	328		355	
Travel Time (s)		11.4	5.6		6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	132	724	324	88	265	166
Shared Lane Traffic (%)						
Lane Group Flow (vph)	132	724	412	0	431	0
Turn Type	pm+nt	NA	NA	Ŭ	Prot	Ŭ
Protected Phases	5	2	6		7	
Permitted Phases	2	2	U		,	
Detector Phase	<u>ک</u>	2	6		7	
Switch Dhaco	0	Z	U		1	
Switch FlidSe	4.0	4.0	1.0		4.0	
Minimum Calit (s)	4.0	4.0	4.0		4.0	
IVIINIMUM Split (S)	8.6	20.6	20.6		8.6	
Total Split (s)	9.0	31.0	22.0		19.0	
Total Split (%)	18.0%	62.0%	44.0%		38.0%	
Yellow Time (s)	3.6	3.6	3.6		3.6	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.6	4.6	4.6		4.6	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	None	None		None	
Act Effct Green (s)	17 1	17 1	10.4		12.1	
Actuated a/C Ratio	0.44	0.44	0.27		0.21	
v/c Patio	0.44	0.44	0.27		0.51	
Control Dolay	0.33	0.49	0.40		0.07	
Curillul Delay	9.1	9.1	12.3		10.9	
Queue Delay	0.0	0.0	0.0		0.0	
lotal Delay	9.1	9.1	12.3		16.9	
LOS	A	A	В		В	
Approach Delay		9.1	12.3		16.9	
Approach LOS		А	В		В	
Queue Length 50th (ft)	16	55	35		69	

	٠	_	-		5	1			
	-	-		-	•				
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR			
Queue Length 95th (ft)	39	92	65		#167				
Internal Link Dist (ft)		590	248		275				
Turn Bay Length (ft)	100								
Base Capacity (vph)	396	2335	1547		792				
Starvation Cap Reductn	0	0	0		0				
Spillback Cap Reductn	0	0	0		0				
Storage Cap Reductn	0	0	0		0				
Reduced v/c Ratio	0.33	0.31	0.27		0.54				
Intersection Summary									
Area Type:	Other								
Cycle Length: 50									
Actuated Cycle Length: 3	8.8								
Natural Cycle: 50									
Control Type: Actuated-U	ncoordinated								
Maximum v/c Ratio: 0.67									
Intersection Signal Delay:	: 11.9			In	tersection	LOS: B			
Intersection Capacity Utili	zation 51.9%			IC	CU Level o	f Service A			
Analysis Period (min) 15									
# 95th percentile volume exceeds capacity, queue may be longer.									
Queue shown is maxir	num after two	cycles.							

Splits and Phases: 4: Bob Billings Pkwy & Monterey Way

31 s				
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9 s	22 s		19 s	

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	3	**	4 1.		¥	
Volume (vph)	143	455	636	250	385	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	16	16
Grade (%)	••	6%	6%		0%	10
Storage Length (ft)	100	070	070	0	0	0
Storage Lanes	100			0	1	0
Taper Length (ft)	25			Ũ	25	Ŭ
Lane Litil Eactor	1 00	0.95	0.95	0.95	1 00	1 00
Frt	1.00	0.70	0.958	0.70	0.966	1.00
Flt Protected	0 950		0.700		0.964	
Satd Flow (prot)	1650	3310	3170	0	1966	0
Flt Permitted	0.162	5517	5177	0	0.961	0
Satd Flow (norm)	0.103	2210	2170	0	1046	Ο
Dight Turn on Dod	200	2214	5177	Voc	1700	Voc
Sate Flow (DTOD)			111	162	20	162
Jalu. FIUW (KTUK)		40	40		30	
Link Speeu (Inph)		40	40		30 255	
		0/0	328		355	
Travel Time (S)	0.00	11.4	5.6	0.00	6.9	0.00
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	495	691	272	418	143
Snared Lane Traffic (%)	455	105	6/6	-	F / 4	2
Lane Group Flow (vph)	155	495	963	0	561	0
Turn Type	pm+pt	NA	NA		Prot	
Protected Phases	5	2	6		7	
Permitted Phases	2					
Detector Phase	5	2	6		7	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	8.6	20.6	20.6		8.6	
Total Split (s)	9.0	36.0	27.0		24.0	
Total Split (%)	15.0%	60.0%	45.0%		40.0%	
Yellow Time (s)	3.6	3.6	3.6		3.6	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.6	4.6	4.6		4.6	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	None	None		None	
Act Effct Green (s)	26.5	26.5	19.9		18.0	
Actuated g/C Ratio	0 49	0.49	0.37		0.33	
v/c Ratio	0.47	0.31	0.78		0.83	
Control Delay	20.2	8.7	10 3		30.00	
	20.3	0.7	0.0		0.7	
Total Delay	20.2	0.0 Q 7	10.0		20.0	
	20.3	0.7	17.J D		JU.7	
Approach Dolay	C	11 A	10 0		20.0	
Approach LOS		11.4 D	19.3		30.9	
Appilduli LUS	77	D 40	D		177	
Queue Length 50th (ft)	27	48	137		1//	

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Lane Group		EBL	EBT	WBT	WBR	SBL	SBR		
Queue Length	95th (ft)	#67	73	204		#344			
Internal Link D	ist (ft)		590	248		275			
Turn Bay Leng	th (ft)	100							
Base Capacity	(vph)	256	2027	1448		760			
Starvation Cap	Reductn	0	0	0		0			
Spillback Cap	Reductn	0	0	0		0			
Storage Cap R	leductn	0	0	0		0			
Reduced v/c R	atio	0.61	0.24	0.67		0.74			
Intersection Su	immary								
Area Type:		Other							
Cycle Length:	60								
Actuated Cycle	e Length: 54.2	2							
Natural Cycle:	60								
Control Type: /	Actuated-Unc	oordinated							
Maximum v/c F	Ratio: 0.83								
Intersection Sig	gnal Delay: 19	9.9			In	tersection	LOS: B		
Intersection Capacity Utilization 74.4% ICU Level of Service D									
Analysis Period (min) 15									
# 95th percentile volume exceeds capacity, queue may be longer.									

Queue shown is maximum after two cycles.

Splits and Phases: 4: Bob Billings Pkwy & Monterey Way



2.3

Intersection

Int Delay, s/veh

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	716	41	34	417	45	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	6	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	778	45	37	453	49	77

Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	823	0	1102	411	
Stage 1	-	-	-	-	801	-	
Stage 2	-	-	-	-	301	-	
Critical Hdwy	-	-	4.14	-	6.84	6.94	
Critical Hdwy Stg 1	-	-	-	-	5.84	-	
Critical Hdwy Stg 2	-	-	-	-	5.84	-	
Follow-up Hdwy	-	-	2.22	-	3.52	3.32	
Pot Cap-1 Maneuver	-	-	803	-	206	590	
Stage 1	-	-	-	-	402	-	
Stage 2	-	-	-	-	725	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	803	-	193	590	
Mov Cap-2 Maneuver	-	-	-	-	193	-	
Stage 1	-	-	-	-	402	-	
Stage 2	-	-	-	-	680	-	

Approach	EB	WB	NB	
HCM Control Delay, s	0	1	22.7	
HCM LOS			С	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	328	-	-	803	-
HCM Lane V/C Ratio	0.384	-	-	0.046	-
HCM Control Delay (s)	22.7	-	-	9.7	0.3
HCM Lane LOS	С	-	-	А	А
HCM 95th %tile Q(veh)	1.8	-	-	0.1	-

2.2

Intersection

Int Delay, s/veh

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	716	41	34	417	45	71	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	150	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	6	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	778	45	37	453	49	77	

Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	823	0	1102	411	
Stage 1	-	-	-	-	801	-	
Stage 2	-	-	-	-	301	-	
Critical Hdwy	-	-	4.14	-	6.84	6.94	
Critical Hdwy Stg 1	-	-	-	-	5.84	-	
Critical Hdwy Stg 2	-	-	-	-	5.84	-	
Follow-up Hdwy	-	-	2.22	-	3.52	3.32	
Pot Cap-1 Maneuver	-	-	803	-	206	590	
Stage 1	-	-	-	-	402	-	
Stage 2	-	-	-	-	725	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	803	-	197	590	
Mov Cap-2 Maneuver	-	-	-	-	197	-	
Stage 1	-	-	-	-	402	-	
Stage 2	-	-	-	-	692	-	

Approach	EB	WB	NB	
HCM Control Delay, s	0	0.7	22.3	
HCM LOS			С	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	333	-	-	803	-		
HCM Lane V/C Ratio	0.379	-	-	0.046	-		
HCM Control Delay (s)	22.3	-	-	9.7	-		
HCM Lane LOS	С	-	-	А	-		
HCM 95th %tile Q(veh)	1.7	-	-	0.1	-		

Intersection

Int Delay, s/veh

2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	547	63	80	688	45	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	6	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	595	68	87	748	49	55

Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	663	0	1177	332	
Stage 1	-	-	-	-	629	-	
Stage 2	-	-	-	-	548	-	
Critical Hdwy	-	-	4.14	-	6.84	6.94	
Critical Hdwy Stg 1	-	-	-	-	5.84	-	
Critical Hdwy Stg 2	-	-	-	-	5.84	-	
Follow-up Hdwy	-	-	2.22	-	3.52	3.32	
Pot Cap-1 Maneuver	-	-	922	-	184	664	
Stage 1	-	-	-	-	494	-	
Stage 2	-	-	-	-	543	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	922	-	154	664	
Mov Cap-2 Maneuver	-	-	-	-	154	-	
Stage 1	-	-	-	-	494	-	
Stage 2	-	-	-	-	456	-	

Approach	EB	WB	NB	
HCM Control Delay, s	0	1.5	27.8	
HCM LOS			D	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	260	-	-	922	-	
HCM Lane V/C Ratio	0.401	-	-	0.094	-	
HCM Control Delay (s)	27.8	-	-	9.3	0.6	
HCM Lane LOS	D	-	-	А	А	
HCM 95th %tile Q(veh)	1.8	-	-	0.3	-	

1.6

Intersection

Int Delay, s/veh

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	547	63	80	688	45	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	6	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	595	68	87	748	49	55

Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	663	0	1177	332	
Stage 1	-	-	-	-	629	-	
Stage 2	-	-	-	-	548	-	
Critical Hdwy	-	-	4.14	-	6.84	6.94	
Critical Hdwy Stg 1	-	-	-	-	5.84	-	
Critical Hdwy Stg 2	-	-	-	-	5.84	-	
Follow-up Hdwy	-	-	2.22	-	3.52	3.32	
Pot Cap-1 Maneuver	-	-	922	-	184	664	
Stage 1	-	-	-	-	494	-	
Stage 2	-	-	-	-	543	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	922	-	167	664	
Mov Cap-2 Maneuver	-	-	-	-	301	-	
Stage 1	-	-	-	-	494	-	
Stage 2	-	-	-	-	492	-	

Approach	EB	WB	NB	
HCM Control Delay, s	0	1	16.2	
HCM LOS			С	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	424	-	-	922	-	
HCM Lane V/C Ratio	0.246	-	-	0.094	-	
HCM Control Delay (s)	16.2	-	-	9.3	-	
HCM Lane LOS	С	-	-	А	-	
HCM 95th %tile Q(veh)	1	-	-	0.3	-	

"EXISTING + DEVELOPMENT" TRAFFIC CONDITIONS

Morning Peak-Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	† †	1	ľ	<u></u>	1	ľ	•	1	٢	el el	
Volume (vph)	78	602	31	95	492	79	55	30	359	128	35	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	265		155	325		200	0		0	0		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	75			75			0			0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.894	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1665	0
Flt Permitted	0.416			0.372			0.216			0.723		
Satd. Flow (perm)	775	3539	1583	693	3539	1583	402	1863	1583	1347	1665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			101			100		124	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		800			600			150			100	
Travel Time (s)		12.1			9.1			3.4			2.3	
Peak Hour Factor	0.56	0.93	0.79	0.94	0.91	0.78	0.92	0.58	0.90	0.75	0.42	0.79
Adj. Flow (vph)	139	647	39	101	541	101	60	52	399	171	83	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	647	39	101	541	101	60	52	399	171	286	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	35.0	35.0	11.0	35.0	35.0	36.0	36.0	11.0	37.0	37.0	
Total Split (s)	22.0	46.0	46.0	22.0	46.0	46.0	52.0	52.0	22.0	52.0	52.0	
Total Split (%)	18.3%	38.3%	38.3%	18.3%	38.3%	38.3%	43.3%	43.3%	18.3%	43.3%	43.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-3.0	-3.0	-2.0	-3.0	-3.0	
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	87.5	77.2	77.2	86.4	76.7	76.7	24.0	24.0	36.8	24.0	24.0	
Actuated g/C Ratio	0.73	0.64	0.64	0.72	0.64	0.64	0.20	0.20	0.31	0.20	0.20	
v/c Ratio	0.21	0.28	0.04	0.17	0.24	0.10	0.75	0.14	0.72	0.64	0.66	
Control Delay	5.8	10.8	0.7	5.7	10.7	2.6	92.6	37.5	34.1	53.7	31.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.8	10.8	0.7	5.7	10.7	2.6	92.6	37.5	34.1	53.7	31.3	
LOS	A	В	A	А	В	А	F	D	С	D	С	
Approach Delay		9.5			8.9			41.3			39.7	
Approach LOS		А			А			D			D	
Queue Length 50th (ft)	25	104	0	18	85	0	44	34	211	123	116	
Queue Length 95th (ft)	34	180	1	44	150	17	#99	40	278	145	35	
Internal Link Dist (ft)		720			520			70			20	

Synchro 7 - Light: Report Page 1

"EXISTING + DEVELOPMENT" TRAFFIC CONDITIONS

Morning Peak-Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	265		155	325		200						
Base Capacity (vph)	738	2277	1044	690	2262	1048	164	760	668	550	753	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.19	0.28	0.04	0.15	0.24	0.10	0.37	0.07	0.60	0.31	0.38	
Intersection Summary												
Area Type: Ot	her											
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 38 (32%), Referenced	to phase	2:EBTL a	nd 6:WB	TL, Start	of Green							
Natural Cycle: 85												
Control Type: Actuated-Coord	nated											
Maximum v/c Ratio: 0.75												
Intersection Signal Delay: 21.2				In	tersectior	n LOS: C						
Intersection Capacity Utilizatio	n 56.0%			IC	U Level o	of Service	В					
Analysis Period (min) 15												
# 95th percentile volume exc	eeds ca	pacity, qu	eue may	be longer								
Queue shown is maximum	after two	cycles.										
Solits and Phases 3. Clinto	n Pkww	1	C	linton Pkv	W & Cros	snate Dr						
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"EXISTING + DEVELOPMENT" TRAFFIC CONDITIONS

Afternoon Peak-Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	<u></u>	1	ሻ	<u>^</u>	1	7	†	1	5	4	
Volume (vph)	102	556	63	359	754	100	42	12	277	90	22	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	265		155	325		200	0		0	0		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	75			75			0			0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.900	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1676	0
Flt Permitted	0.340			0.358			0.530			0.744		
Satd. Flow (perm)	633	3539	1583	667	3539	1583	987	1863	1583	1386	1676	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			132			120		82	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		800			600			150			100	
Travel Time (s)		12.1			9.1			3.4			2.3	
Peak Hour Factor	0.91	0.93	0.58	0.84	0.91	0.73	0.85	0.57	0.81	0.68	0.54	0.79
Adj. Flow (vph)	112	598	109	427	829	137	49	21	342	132	41	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	598	109	427	829	137	49	21	342	132	123	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	35.0	35.0	11.0	36.0	36.0	36.0	36.0	11.0	38.0	38.0	
Total Split (s)	24.0	46.0	46.0	24.0	46.0	46.0	50.0	50.0	24.0	50.0	50.0	
Total Split (%)	20.0%	38.3%	38.3%	20.0%	38.3%	38.3%	41.7%	41.7%	20.0%	41.7%	41.7%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-3.0	-3.0	-2.0	-3.0	-3.0	
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	76.9	67.4	67.4	94.1	81.7	81.7	19.9	19.9	46.6	19.9	19.9	
Actuated g/C Ratio	0.64	0.56	0.56	0.78	0.68	0.68	0.17	0.17	0.39	0.17	0.17	
v/c Ratio	0.23	0.30	0.12	0.58	0.34	0.12	0.30	0.07	0.50	0.57	0.36	
Control Delay	6.9	16.3	3.7	7.6	9.2	2.0	46.7	39.8	18.3	55.1	18.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	6.9	16.3	3.7	7.6	9.2	2.0	46.7	39.8	18.3	55.1	18.8	
LOS	А	В	А	А	А	А	D	D	В	E	В	
Approach Delay		13.3			8.0			22.8			37.6	
Approach LOS		В			А			С			D	
Queue Length 50th (ft)	17	123	0	78	127	1	34	14	126	95	28	
Queue Length 95th (ft)	39	208	4	137	204	13	63	22	138	109	24	
Internal Link Dist (ft)		720			520			70			20	

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"EXISTING + DEVELOPMENT" TRAFFIC CONDITIONS

Afternoon Peak-Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	265		155	325		200						
Base Capacity (vph)	661	1988	937	753	2408	1119	386	729	704	542	706	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.17	0.30	0.12	0.57	0.34	0.12	0.13	0.03	0.49	0.24	0.17	
Intersection Summary												
Area Type:	Other											
Cycle Length: 120												
Actuated Cycle Length: 12	20											
Offset: 90 (75%), Referen	ced to phase	2:EBTL a	ind 6:WB	TL, Start	of Green							
Natural Cycle: 85												
Control Type: Actuated-Co	pordinated											
Maximum v/c Ratio: 0.58												
Intersection Signal Delay:	14.3			In	tersectior	n LOS: B						
Intersection Capacity Utiliz	zation 56.9%			IC	U Level o	of Service	В					
Analysis Period (min) 15												
Splits and Phases: 3: C	linton Pkwv	1	С	inton Pkv	wv & Cros	ssaate Dr.						
(a)	■ → 12 (R)))			<u> </u>	4	a4					
24 s	46 s	/				50 s						
<u></u> ر ا	€ Ø6 (R)				*	ø8					
24 s	46 s					50 s						

APPENDIX III

Summary of Peak-Hours Traffic Counts

	PEAK AM Count															
Signal		Count AM	Begin	Peak	S	outh Boun	d	V	Vest Boun	d	N	lorth Boun	d	E	East Bound	k
Location		Date	Peak	Volume	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
STREET1	STREET2	COUNTDATE		PEAKTOTAL	SBRT	SBTHRU	SBLT	WBRT	WBTHRU	WBLT	NBRT	NBTHRU	NBLT	EBRT	EBTHRU	EBLT
Bob Billings	MontereyWay	29-Feb-12	7:30	1469	148	0	244	81	278	0	0	0	0	0	608	110
Clinton Pkwy.	Crossgate Dr.	23-Apr-13	7:30	1924	86	19	68	50	492	95	359	20	55	31	602	47

Source: City of Lawrence, Public Works Department, Traffic Engineering Devision

	PEAK PM Count															
Signal		Count PM	Begin	Peak	South Bound			West Bound			Ν	lorth Boun	d	East Bound		
Location		Date	Peak	Volume	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
STREET1	STREET2	COUNTDATE		PEAKTOTAL	SBRT	SBTHRU	SBLT	WBRT	WBTHRU	WBLT	NBRT	NBTHRU	NBLT	EBRT	EBTHRU	EBLT
Bob Billings	MontereyWay	29-Feb-12	17:00	1699	120	0	194	250	578	0	0	0	0	0	422	135
Clinton Pkwy.	Crossgate Dr.	23-Apr-13	17:00	2193	17	10	48	33	754	359	277	12	42	63	556	22

Source: City of Lawrence, Public Works Department, Traffic Engineering Division

APPENDIX IV

Summary of Intersection Sight Distance Analysis Using AASHTO "Green Book", 2011 Edition

Results of Intersection Sight Distance (ISD) Analysis

Intersection of Bob Billings Parkway and Crossgate Drive (Existing Conditions) Lawrence, KS

Parameters

- For eastbound movement on Bob Billings Parkway
 - Approach speed = 40 mph (posted speed limit)
 - Approach grade = +6% (assumed)
- For westbound movement on Bob Billings Parkway
 - Approach speed = 40 mph (posted speed limit)
 - Approach grade = -6% (assumed)
- For northbound movement on Crossgate Drive at its intersection with Bob Billings Parkway
 - Stop controlled
 - Approach grade < 3% (assumed)
- Measured ISD (via plan and field check)
 - o To the west: Approximately 369' for passenger cars
 - To the east: Unrestricted

Required Minimum ISD Calculations (Based on AASHTO "Green Book", 2011 Edition)

- Left turn from Crossgate Drive onto Bob Billings Parkway (controlled by ISD in both directions)
 - o Looking right
 - For passenger cars and 40 mph speed = 475' << unrestricted
 - o Looking left
 - For passenger cars and 40 mph speed = 385' > 369' Marginal
- Right turn from Crossgate Drive onto Bob Billings Parkway (controlled by ISD to the west)
 - For passenger cars and 40 mph speed = 385' > 369'
 Marginal
- Left turn from Bob Billings Parkway onto Crossgate Drive (controlled by ISD to the west)
 - For passenger cars and 40 mph speed = 278' << unrestricted
 OK

ISD Analysis Bob Billings Pkwy & Crossgate Dr.



APPENDIX V

Guidelines for Dedicated Turn-Lanes At Unsignalized Intersections Report No. K-TRAN:KSU-95-5 Final Report

GUIDELINES FOR RIGHT-TURN TREATMENTS AT UNSIGNALIZED INTERSECTIONS AND DRIVEWAYS

Tanweer Hasan Robert W. Stokes Kansas State University Manhattan, Kansas



May 1996

K-TRAN

A COOPERATIVE TRANSPORTATION RESEARCH PROGRAM BETWEEN: KANSAS DEPARTMENT OF TRANSPORTATION THE KANSAS STATE UNIVERSITY THE UNIVERSITY OF KANSAS
Table 7.2 Right-turn treatment guidelines for four-lane highways."

Roadway	I	Roadway Operating Speed (mph)												
DDHV (vph)	40		45		50		55		(50	65			
	Lane	Taper	Lane	Taper	Lane	Taper	Lane	Taper'	Lane	Taper	Lane	Tape		
300						55 55	.75	25	19	9	19	9		
400			145	65	75	30	40	17	16	8	15	8		
500		. 140	95	50	57	25	32	14	14	7	13	7		
600	160	80	65	30	42	18	26	11	12	6	12	6		
800	70	40	37	18	28	12	19	8	11	5	11	5		
1200	25	14	20	10	18	8	14	6	8	4	8	4		
1600	15	8	14	6	13	6	10	5	7	3	7	: 3		
2000	10	6	9	6	9	4	8	4	6	3	6	3		

(Turning Speed = **15** mph)

^a Minimum right-turn design hour volumes (vph) required to warrant right-turn treatments.

1

National Cooperative Highway Research Program

NCHRP Synthesis 225

Left-Turn Treatments at Intersections

A Synthesis of Highway Practice

Transportation Research Board National Research Council


Guidelines for Left-turn Lane at Unsignalized Intersection - Two-lane Roadway















Left-Turn Volume V _L (vph)	4-Lane Undivided Opposing Volume V _o (vph)	4-Lane Divided Opposing Volume V_o (vph)							
≥ 29	Turn lane not warranted	Turn lane not warranted unless $V_a > 400$ vph							
28	unless V _a > 400 vph	422							
26		474							
24		530							
22		589							
20		652 719							
18									
16		793							
14		873							
12	414	962							
10	542	1062							
8	690	1179							
6	867	1319							
4	1094	1499							
2	1429	1762							

Table 4-28. Recommended left-turn lane warrants for four-lane highways

Source: Adapted from Harmelink, M. D. Volume Warrants for Left-Turn Storage Lanes at Unsignalized Grade Intersections, Highway Research Record, No. 211, Highway Research Board, National Research Council, Washington, D.C. (1967), pp. 1-18.

Note: Critical gap = 8.0 seconds, time to turn left = 5.3 seconds

APPENDIX VI

Results of Trip Generation Analysis Using ITE Trip Generation Manual, 9th Edition

Trip Generation Summary - Existing Golf Course Average Weekday Driveway Volumes

Project: Alvamar Inc One Addition				Open Date: 12/28/2						
Alternative: Existing Conditions						A	nalysis	12/28/	2014	
				AM Peak Hour			PM Peak Hour			
	Average Daily Trips Adjacent Street Traffic			t Traffic	Adjace	cent Street Traffic				
ITE Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter		_Total	
430 GOLF 1	644	643	1287	58	16	74	54	51	105	
36 Golf Holes										
Unadjusted Driveway Volume	644	643	1287	58	16	74	54	51	105	
Unadjusted Pass-By Trips	0	0	0	0	0	0	0	0	0	
Internal Capture Trips	0	0	0	0	0	0	0	0	0	
Adjusted Driveway Volume	644	643	1287	58	16	74	54	51	105	
Adjusted Pass-By Trips	0	0	0	0	0	0	0	0	0	
Adjusted Volume Added to Adjacent Streets	644	643	1287	58	16	74	54	51	105	
Total AM Peak Hour Internal Capture = 0 Pe	ercent									

Trip Generation Summary - Existing townhomes/patio homes just S/O BB Pkwy Average Weekday Driveway Volumes

Project: Alvamar Inc One Addition						Ope	n Date:	12/28/2	2014
Alternative: Existing Conditions						А	nalysis	12/28/2	2014
				AM	Peak H	our	PM Peak Hour		
	Avera	ige Daily	Trips	Adjacent Street Traffic			Adjacent Street Traffic		
ITE Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
230 CONDO 1	82	81	163	2	10	12	10	5	15
28 Dwelling Units									
Unadjusted Driveway Volume	82	81	163	2	10	12	10	5	15
Unadjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Internal Capture Trips	0	0	0	0	0	0	0	0	0
Adjusted Driveway Volume	82	81	163	2	10	12	10	5	15
Adjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Adjusted Volume Added to Adjacent Streets	82	81	163	2	10	12	10	5	15
Total AM Peak Hour Internal Capture = 0 Pe	ercent								
Total PM Peak Hour Internal Capture = 0 Pe	ercent								

Detailed Land Use Data For 36 Golf Holes of GOLF 1 (430) Golf Course

Project: Alvamar Inc One Addition

Phase: Existing Golf Course

Description: Crossgate Drive, between Bob Billings Pkwy and Clinton Pkwy

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% 	Use Eq.	Equation	R2
Weekday Average Daily Trips	1287	0	35.74	14.5	54.44	12.12	20	50	50	False		
Weekday AM Peak Hour of Generator	106	0	2.94	2.25	4.72	1.88	22	53	47	False		
Weekday AM Peak Hour of Adjacent Street Traffic	74	0	2.06	0.61	4.52	1.74	19	79	21	False		
Weekday PM Peak Hour of Generator	128	0	3.56	3.42	3.83	1.87	24	43	57	False		
Weekday PM Peak Hour of Adjacent Street Traffic	105	0	2.92	1.67	4.56	1.86	20	51	49	False		
Saturday Average Daily Trips	1463	0	40.63	16	70.83	17.12	19	50	50	False		
Saturday Peak Hour of Generator	165	0	4.59	1.61	7.17	2.73	19	49	51	False		
Sunday Average Daily Trips	1423	0	39.53	18.89	56.61	13.52	19	50	50	False		
Sunday Peak Hour of Generator	159	0	4.43	2.5	7	2.44	19	50	50	False		

Open Date: 12/28/2014

Analysis Date: 12/28/2014

Detailed Land Use Data For 28 Dwelling Units of CONDO 1 (230) Residential Condominium/Townhouse

Project: Alvamar Inc One Addition

Phase: Existing townhomes/patio homes just S/O BB Pkwy

Description: Crossgate Drive, between Bob Billings Pkwy and Clinton Pkwy

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% Exit	Use Eq.	Equation	R2
Weekday Average Daily Trips	163	0	5.81	1.53	11.79	3.11	179	50	50	False	Ln(T) = 0.87 Ln(X) + 2.46	0.8
Weekday AM Peak Hour of Generator	12	0	0.44	0.15	0.97	0.68	196	19	81	False	Ln(T) = 0.82 Ln(X) + 0.15	0.8
Weekday AM Peak Hour of Adjacent Street Traffic	12	0	0.44	0.15	1.61	0.69	213	17	83	False	Ln(T) = 0.80 Ln(X) + 0.26	0.76
Weekday PM Peak Hour of Generator	15	0	0.52	0.18	1.24	0.75	199	64	36	False	T = 0.34(X) + 35.87	0.82
Weekday PM Peak Hour of Adjacent Street Traffic	15	0	0.52	0.18	1.24	0.75	205	67	33	False	Ln(T) = 0.82 Ln(X) + 0.32	0.8
Saturday Average Daily Trips	159	0	5.67	1.17	11.4	3.1	209	50	50	False	T = 3.62(X) + 427.93	0.84
Saturday Peak Hour of Generator	13	0	0.47	0.14	0.93	0.71	228	54	46	False	T = 0.29(X) + 42.63	0.84
Sunday Average Daily Trips	136	0	4.84	1.36	8.56	2.71	209	50	50	False	T = 3.13(X) + 357.26	0.88
Sunday Peak Hour of Generator	13	0	0.45	0.16	1.07	0.7	228	49	51	False	T = 0.23(X) + 50.01	0.78

Open Date: 12/28/2014

Analysis Date: 12/28/2014

Trip Generation Summary - Proposed Conditions Average Weekday Driveway Volumes

F	Project:	Alvamar Inc One Addition						Ope	Open Date:		12/28/2014	
Alte	rnative:	Proposed Conditions						A	nalysis	12/28/	2014	
						AM	l Peak H	our	PM Peak Hour			
			Avera	age Daily	Trips	Adjace	nt Street	Traffic	Adjace	ent Stree	t Traffic	
ITE	Land U	Se	Enter	Exit	<u>Total</u>	Enter	_Exit_	<u>Total</u>	Enter	Exit	<u>Total</u>	
220	APT 1		1104	1104	2208	34	135	169	134	72	206	
	332	Dwelling Units										
230	CONDO	D 1	558	558	1116	14	70	84	67	33	100	
	192	Dwelling Units										
233	LUXCO	NDO 1				11	38	49	30	18	48	
	88	Occupied Dwelling Units										
430	GOLF 1	I	644	643	1287	58	16	74	54	51	105	
	36	Golf Holes										
580	MUSEL	JM 1				0	0	0	0	0	0	
	1.2	Gross Floor Area 1000 SF										
710	OFFICE	EGENERAL 1	11	11	22	3	0	3	1	2	3	
	2	Gross Floor Area 1000 SF										
Unadi	iusted Dri	iveway Volume	2317	2316	4633	120	259	379	286	176	462	
Unadi	iusted Pa	ss-By Trips	0	0	0	0	0	0	0	0	0	
Intern	al Captur	e Trips	0	0	0	0	0	0	1	3	6	
۸			0047	0040	4000	400	050	070	005	470	450	
Adjus	ted Drive	way volume	2317	2316	4633	120	259	379	285	1/3	456	
Adjus	ted Volum	-By Trips	U 2217	U 2216	U 4632	U 120	U 250	U 270	U 285	U 172	U 456	
Aujus		ne Audeu to Aujacent Streets	2317	2310	4033	120	209	319	200	175	400	

Total AM Peak Hour Internal Capture = 0 Percent

Trip Generation Summary - Apartments Average Weekday Driveway Volumes

Project:	Alvamar Inc One Addition	Open Date:	12/28/2014
Alternative:	Proposed Conditions	Analysis	12/28/2014

				AM	Peak Ho	our	PM Peak Hour		
	Average Daily Trips			Adjacer	nt Street	Traffic	Adjacent Street Traffic		
ITE Land Use	Enter	<u>Exit</u>	Total	Enter	Exit	Total	Enter		Total
220 APT 1	1104	1104	2208	34	135	169	134	72	206
332 Dwelling Units									
Unadjusted Driveway Volume	1104	1104	2208	34	135	169	134	72	206
Unadjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Internal Capture Trips	0	0	0	0	0	0	0	0	0
Adjusted Driveway Volume	1104	1104	2208	34	135	169	134	72	206
Adjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Adjusted Volume Added to Adjacent Streets	1104	1104	2208	34	135	169	134	72	206

Total AM Peak Hour Internal Capture = 0 Percent

Trip Generation Summary - Owned Condos/Patio Homes/Townhomes Average Weekday Driveway Volumes

Project: Alvamar Inc One Addition Alternative: Proposed Conditions						Ope A	n Date: malysis	12/28/2 12/28/2	2014 2014
				AM Peak Hour			PM Peak Hour		
	Avera	age Daily	Trips	Adjace	nt Street	Traffic	Adjacent Street Traf		Traffic
ITE Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
230 CONDO 1	558	558	1116	14	70	84	67	33	100
192 Dwelling Units									
Unadjusted Driveway Volume	558	558	1116	14	70	84	67	33	100
Unadjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Internal Capture Trips	0	0	0	0	0	0	0	0	0
Adjusted Driveway Volume	558	558	1116	14	70	84	67	33	100
Adjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Adjusted Volume Added to Adjacent Streets	558	558	1116	14	70	84	67	33	100
Total AM Peak Hour Internal Capture = 0 Pe	ercent								

Trip Generation Summary - Luxury Condos Average Weekday Driveway Volumes

Project:	Alvamar Inc One Addition		Ope	n Date: 12/28/2014
Alternative:	Proposed Conditions		A	nalysis 12/28/2014
			AM Peak Hour	PM Peak Hour
		Average Daily Trips	Adjacent Street Traffic	Adjacent Street Traffic

<u>Enter Exit Total Enter Exit Total Enter Exit Total</u>

233 LUXCONDO 1				11	38	49	30	18	48
88 Occupied Dwelling Units									
Unadjusted Driveway Volume	0	0	0	11	38	49	30	18	48
Unadjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Internal Capture Trips	0	0	0	0	0	0	0	0	0
Adjusted Driveway Volume	0	0	0	11	38	49	30	18	48
Adjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Adjusted Volume Added to Adjacent Streets	0	0	0	11	38	49	30	18	48

Total AM Peak Hour Internal Capture = 0 Percent

ITE Land Use

Trip Generation Summary - Extended Stay Suites/Cabins Average Weekday Driveway Volumes

Project: Alvamar Inc One Addition						Ope	n Date:	12/28/	2014	
Alternative: Proposed Conditions						A	nalysis	12/28/	2014	
				AN	l Peak H	lour	PM Peak Hour			
	Avera	age Daily	Trips	Adjace	nt Stree	t Traffic	Adjacent Street Traffic			
ITE Land Use	Enter	<u>Exit</u>	Total	Enter	<u>Exit</u>	Total	Enter	<u>Exit</u>	<u>Total</u>	
Unadjusted Driveway Volume	0	0	0	0	0	0	0	0	0	
Unadjusted Pass-By Trips	0	0	0	0	0	0	0	0	0	
Internal Capture Trips	0	0	0	0	0	0	0	0	0	
Adjusted Driveway Volume	0	0	0	0	0	0	0	0	0	
Adjusted Pass-By Trips	0	0	0	0	0	0	0	0	0	
Adjusted Volume Added to Adjacent Streets	0	0	0	0	0	0	0	0	0	
Total AM Peak Hour Internal Capture = 0 Per	cent									
Total PM Peak Hour Internal Capture = 0 Per	cent									

Trip Generation Summary - 36-Hole Golf Course Average Weekday Driveway Volumes

Project: Alvamar Inc One Addition						Ope	n Date:	12/28/	2014		
Alternative: Proposed Conditions						A	nalysis	12/28/2	2014		
				AN	AM Peak Hour			PM Peak Hour			
	Avera	age Daily	r Trips	Adjace	nt Street	t Traffic	Adjace	ent Street Traffic			
ITE Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total		
430 GOLF 1	644	643	1287	58	16	74	54	51	105		
36 Golf Holes											
Unadjusted Driveway Volume	644	643	1287	58	16	74	54	51	105		
Unadjusted Pass-By Trips	0	0	0	0	0	0	0	0	0		
Internal Capture Trips	0	0	0	0	0	0	0	0	0		
Adjusted Driveway Volume	644	643	1287	58	16	74	54	51	105		
Adjusted Pass-By Trips	0	0	0	0	0	0	0	0	0		
Adjusted Volume Added to Adjacent Streets	644	643	1287	58	16	74	54	51	105		
Total AM Peak Hour Internal Capture = 0 Pe	rcent										

Trip Generation Summary - KS Golf Hall of Fame Average Weekday Driveway Volumes

Project:	Alvamar Inc One Addition		Ope	n Date: 12/28/2014
Alternative:	Proposed Conditions		A	nalysis 12/28/2014
			AM Peak Hour	PM Peak Hour
		Average Daily Trips	Adjacent Street Traffic	Adjacent Street Traffic

ITE Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
580 MUSEUM 1				0	0	0	0	0	0
1.2 Gross Floor Area 1000 SF									
Unadjusted Driveway Volume	0	0	0	0	0	0	0	0	0
Unadjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Internal Capture Trips	0	0	0	0	0	0	0	0	0
Adjusted Driveway Volume	0	0	0	0	0	0	0	0	0
Adjusted Pass-By Trips	0	0	0	0	0	0	0	0	0
Adjusted Volume Added to Adjacent Streets	0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Trip Generation Summary - General Independent Office Average Weekday Driveway Volumes

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Project: Alvamar Inc One Addition	Open Date: 12/28/2014									
Alternative: Proposed Conditions						A	nalysis	12/28/2	2014	
				AM	Peak H	our	PM Peak Hour			
	Avera	ige Daily	Trips	Adjace	nt Street	Traffic	Adjacent Street Traffic			
ITE Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	
710 OFFICEGENERAL 1	11	11	22	3	0	3	1	2	3	
2 Gross Floor Area 1000 SF										
Unadjusted Driveway Volume	11	11	22	3	0	3	1	2	3	
Unadjusted Pass-By Trips	0	0	0	0	0	0	0	0	0	
Internal Capture Trips	0	0	0	0	0	0	0	0	0	
Adjusted Driveway Volume	11	11	22	3	0	3	1	2	3	
Adjusted Pass-By Trips	0	0	0	0	0	0	0	0	0	
Adjusted Volume Added to Adjacent Streets	11	11	22	3	0	3	1	2	3	
Total AM Peak Hour Internal Capture = 0 Per	cent									
Total PM Peak Hour Internal Capture = 0 Per	cent									

Detailed Land Use Data For 332 Dwelling Units of APT 1 (220) Apartment

Project: Alvamar Inc One Addition

Phase: Apartments

Description: Crossgate Drive, between Bob Billings Pkwy and Clinton Pkwy

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% Exit	Use Eq.	Equation	R2
Weekday Average Daily Trips	2208	0	6.65	1.27	12.5	3.07	210	50	50	False	T = 6.06(X) + 123.56	0.87
Weekday AM Peak Hour of Generator	183	0	0.55	0.1	1.08	0.76	230	29	71	False	T = 0.54(X) + 2.45	0.82
Weekday AM Peak Hour of Adjacent Street Traffic	169	0	0.51	0.1	1.02	0.73	235	20	80	False	T = 0.49(X) + 3.73	0.83
Weekday PM Peak Hour of Generator	222	0	0.67	0.1	1.64	0.85	229	61	39	False	T = 0.60(X) + 14.91	0.8
Weekday PM Peak Hour of Adjacent Street Traffic	206	0	0.62	0.1	1.64	0.82	233	65	35	False	T = 0.55(X) + 17.65	0.77
Saturday Average Daily Trips	2121	0	6.39	2.84	8.4	2.99	175	50	50	False	T = 7.85(X) - 256.19	0.85
Saturday Peak Hour of Generator	173	0	0.52	0.26	1.05	0.74	178	50	50	False	T = 0.41(X) + 19.23	0.56
Sunday Average Daily Trips	1946	0	5.86	3.21	7.53	2.73	182	50	50	False	T = 6.42(X) - 101.12	0.82
Sunday Peak Hour of Generator	169	0	0.51	0.26	1.43	0.75	186	50	50	False		

Open Date: 12/28/2014

Analysis Date: 12/28/2014

Detailed Land Use Data For 192 Dwelling Units of CONDO 1 (230) Residential Condominium/Townhouse

Project:	Alvamar Inc One Addition
Phase:	Owned Condos/Patio Homes/Townhomes

Description: Crossgate Drive, between Bob Billings Pkwy and Clinton Pkwy

	Total	Pass-By	Avg	Min	Max	Std	Avg	_%	%	Use		
Day / Period	Trips	Trips	Rate	Rate	Rate	Dev	Size	Enter	Exit	Eq.	Equation	
Weekday Average Daily Trips	1116	0	5.81	1.53	11.79	3.11	179	50	50	False	Ln(T) = 0.87 Ln(X) + 2.46	0.8
Weekday AM Peak Hour of Generator	84	0	0.44	0.15	0.97	0.68	196	19	81	False	Ln(T) = 0.82 Ln(X) + 0.15	0.8
Weekday AM Peak Hour of Adjacent Street Traffic	84	0	0.44	0.15	1.61	0.69	213	17	83	False	Ln(T) = 0.80 Ln(X) + 0.26	0.76
Weekday PM Peak Hour of Generator	100	0	0.52	0.18	1.24	0.75	199	64	36	False	T = 0.34(X) + 35.87	0.82
Weekday PM Peak Hour of Adjacent Street Traffic	100	0	0.52	0.18	1.24	0.75	205	67	33	False	Ln(T) = 0.82 Ln(X) + 0.32	0.8
Saturday Average Daily Trips	1089	0	5.67	1.17	11.4	3.1	209	50	50	False	T = 3.62(X) + 427.93	0.84
Saturday Peak Hour of Generator	90	0	0.47	0.14	0.93	0.71	228	54	46	False	T = 0.29(X) + 42.63	0.84
Sunday Average Daily Trips	929	0	4.84	1.36	8.56	2.71	209	50	50	False	T = 3.13(X) + 357.26	0.88
Sunday Peak Hour of Generator	86	0	0.45	0.16	1.07	0.7	228	49	51	False	T = 0.23(X) + 50.01	0.78

Open Date: 12/28/2014 Analysis Date: 12/28/2014

Detailed Land Use Data For 88 Occupied Dwelling Units of LUXCONDO 1 (233) Luxury Condominium/Townhouse

Project:	Alvamar Inc One Addition		
Phase:	Luxury Condos	Open Date:	12/28/2014
Description:	Crossgate Drive, between Bob Billings Pkwy and Clinton Pkwy	Analysis Date:	12/28/2014

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% Exit	Use Eq	Equation	R2
Weekday AM Peak Hour of Generator	57	0	0.65	0.58	0.69	0.81	110	32	68	False	T = 0.71(X) - 6.31	0.98
Weekday AM Peak Hour of Adjacent Street Traffic	49	0	0.56	0.5	0.62	0.75	110	23	77	False	Ln(T) = 0.76 Ln(X) + 0.54	0.93
Weekday PM Peak Hour of Generator	57	0	0.65	0.6	0.72	0.81	110	60	40	False		
Weekday PM Peak Hour of Adjacent Street Traffic	48	0	0.55	0.48	0.63	0.74	110	63	37	False	T = 0.78(X) - 25.38	0.99

Detailed Land Use Data For 36 Golf Holes of GOLF 1 (430) Golf Course

Project: Alvamar Inc One Addition

Phase: 36-Hole Golf Course

Description: Crossgate Drive, between Bob Billings Pkwy and Clinton Pkwy

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% 	Use Eq.	Equation	R2
Weekday Average Daily Trips	1287	0	35.74	14.5	54.44	12.12	20	50	50	False		
Weekday AM Peak Hour of Generator	106	0	2.94	2.25	4.72	1.88	22	53	47	False		
Weekday AM Peak Hour of Adjacent Street Traffic	74	0	2.06	0.61	4.52	1.74	19	79	21	False		
Weekday PM Peak Hour of Generator	128	0	3.56	3.42	3.83	1.87	24	43	57	False		
Weekday PM Peak Hour of Adjacent Street Traffic	105	0	2.92	1.67	4.56	1.86	20	51	49	False		
Saturday Average Daily Trips	1463	0	40.63	16	70.83	17.12	19	50	50	False		
Saturday Peak Hour of Generator	165	0	4.59	1.61	7.17	2.73	19	49	51	False		
Sunday Average Daily Trips	1423	0	39.53	18.89	56.61	13.52	19	50	50	False		
Sunday Peak Hour of Generator	159	0	4.43	2.5	7	2.44	19	50	50	False		

Open Date: 12/28/2014 Analysis Date: 12/28/2014

Detailed Land Use Data For 1.2 Gross Floor Area 1000 SF of MUSEUM 1 (580) Museum

Project: Alvamar Inc One Addition

Phase: KS Golf Hall of Fame

Description: Crossgate Drive, between Bob Billings Pkwy and Clinton Pkwy

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% Exit	Use Eq	Equation	R2
Weekday AM Peak Hour of Generator	0	0	0.35				176	40	60	False		
Weekday AM Peak Hour of Adjacent Street Traffic	0	0	0.28				176	86	14	False		
Weekday PM Peak Hour of Adjacent Street Traffic	0	0	0.18				176	16	84	False		
Saturday Peak Hour of Generator	1	0	0.66				176	71	29	False		

Open Date: 12/28/2014 Analysis Date: 12/28/2014

Detailed Land Use Data For 2 Gross Floor Area 1000 SF of OFFICEGENERAL 1 (710) General Office Building

Project: Alvamar Inc One Addition

Phase: General Independent Office

Description: Crossgate Drive, between Bob Billings Pkwy and Clinton Pkwy

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% Exit	Use Eq	Equation	R2
Weekday Average Daily Trips	22	0	11.03	3.58	28.8	6.15	197	50	50	False	Ln(T) = 0.76 Ln(X) + 3.68	0.81
Weekday AM Peak Hour of Adjacent Street Traffic	3	0	1.56	0.6	5.98	1.4	222	88	12	False	Ln(T) = 0.80 Ln(X) + 1.57	0.83
Weekday PM Peak Hour of Adjacent Street Traffic	3	0	1.49	0.49	6.39	1.37	215	17	83	False	T = 1.12(X) + 78.45	0.82
Saturday Average Daily Trips	5	0	2.46	0.59	14.67	2.21	75	50	50	False	T = 2.03(X) + 31.75	0.64
Saturday Peak Hour of Generator	1	0	0.43	0.16	1.77	0.72	90	54	46	False		
Sunday Average Daily Trips	2	0	1.05	0.19	7.33	1.43	75	50	50	False		
Sunday Peak Hour of Generator	0	0	0.16	0.06	1.37	0.44	90	58	42	False		

Open Date: 12/28/2014

Analysis Date: 12/28/2014



Gordon E. Abernathy 1530 St. Andrews Drive Lawrence, KS 66047 February 9, 2015

City of Lawrence Douglas County Planning & Development Services 6 East 6th Street P. O. Box 708 Lawrence, KS 66044

Re: Z-14-00552 Z-14-00553 PP-14-00554 PP-14-00555

Gentlemen:

I would strenuously object to the above requested rezoning requests and preliminary plat requests from Alvamar, Inc. for the following reasons:

- (1) These changes would do away with open green space which is essential for the ecological balance of the area. The golf course, even though designed for a specific use, provides open green space. This should be preserved. Lawrence, a city which prides itself on being "green," certainly shouldn't allow this to happen.
- (2) These requested changes would pack additional residents in an already crowded residential area. The multi-family dwellings, particularly, would detract from the beauty of the green space the golf course provides. Multiple cars, trash carts, etc., brought about by multiple family dwelling space should not be allowed in these areas.
- (3) The city infrastructure, particularly the streets leading into the area, Bob Billings Parkway, Clinton Parkway, and Crossgate Drive, are not adequate to carry the additional traffic that these additional residences would generate. They are inadequate to handle the traffic that exists today; and the City's current practice of calming traffic by installing roundabouts in congested areas would only aggravate the problems.

I would ask the Planning Commission to deny these requested changes.

Respectfully submitted, Gordon E. Abernathy

RECEIVED

FEB 12 2015

City County Planning Office Lawrence, Kansel Lori L. Heasty John B. Patterson 1909 Quail Run Lawrence, KS 66049 (785) 691-5924

RECEIVED

FEB 11 2015

February 11, 2015

City County Planning Office Lawrence, Kansas

Sandra Day City of Lawrence Douglas County Planning & Development Services 6 East 6th Street P.O. Box 708 Lawrence, Kansas 66044

Re: Z-14-00552; Z-14-00553; PP-14-00554; PP-14-00555

Dear Ms. Day:

I am writing you on behalf of my husband and myself in regard to the proposed Application filed by Paul Werner Architects on behalf of Alvamar Inc. to re-zone and re-plat certain properties as described in the above referenced submittals. I want to thank you and the Planning Staff for your assistance in explaining the process to me and the submitted requests before the Planning Commission.

The residential area we live in is part of the Quail's Nest at Alvamar Condominium and is accessed by a private drive directly to the South of Alvamar Country Clubhouse. The private drive is owned by the Homeowner's Association with a shared access off of South Crossgate and is shared by Quail's Nest and Alvamar Country Club. My husband and I live at 1909 Quail Run, which is fronted by the private drive and #one tee box on the private side of the golf course and the back of our condo is close to #9 green on the private side of the golf course.

As I understand it, the Applicant, Paul Werner Architects on behalf of Alvamar Inc. has submitted two re-zoning requests and two corresponding preliminary plats, one of 51.85 acres from RS 7, RM12 & PUD (Alvamar) Districts to RM 24, which then will re-plat said acreage into 6 lots; and then one of 5.18 acres from PUD (Alvamar) to RS7. The area for proposed re-platting is contiguous with our neighborhood, Quail's Nest to the north, is "four doors up" from my home; it also is directly across the street to the east and runs to the south. We will be significantly impacted by any change in zoning that allows for more building, more businesses and more traffic.

The Applicant has requested that "conventional zoning" be used with no "overlay" district requirements. "Overlay" really means "oversight." Therefore, if the proposed application were approved as submitted, then any subsequent re-zoning and preliminary plats would be fairly summarily approved, with little opportunity for input from adjacent property

owners until after the formal process began and perhaps <u>long</u> after the informal discussions with city planners began. There would be no opportunity for input from the City's elected officials.

The carte blanche the Applicant seeks, to reconfigure this area created under a PUD, may never be appropriate in any case, given the care and commitment required to create a PUD in the first place. But the cart blanche now requested should be denied given that it has the potential to recreate an area that is so important to the City at large and to an extremely large group of Lawrence citizens who through their home purchases made lifetime investments in the Alvamar area as it exists today. This is what the Summer 2013 edition of the *Lawrence Business Magazine* wrote:

> Few businesses have as much of an impact on Lawrence as Alvamar. The club boosts 36 holes, a swimming pool and countless real estate holdings. The 36-hole facility covers most of the land from the intersection of Bob Billings Ave and Kasold to the intersection of Clinton Parkway and Wakarusa.

"It's hard to argue the impact of Alvamar," says J. Taylor, Director of Memberships at Alvamar Country Club. "West Lawrence was literally built around the golf courses."

At this time, the Applicant has submitted "concept plans" only, which are admittedly attractive drawings of what could be or might be. But the drawings decidedly are not what necessarily will be; in fact, the Applicant has provided no plans for what is proposed particularly as to what is being done with the re-plat of the 51.85 acres into 6 lots that is so close to our home.

The Applicant has given the planning staff a list of intended development for the 6 lots, which said development includes over 600 dwelling units that range from two 120 unit apartment complexes, condominiums, patio homes, and "luxury" condominiums. However, based on the current Application, if re-zoning and re-platting were to occur even the list of intended development could change as long as the requirements of RM 24 (that is 24 units per acre) are not violated. This means that some 1244 dwelling units could actually be built on these 51.85 acres.

Therefore, this Applicant's requests are completely open-ended in favor of the Applicant and the future purchaser of all the realty owned by Alvamar, Inc. This request also completely eliminates the present requirement (which, as I understand it, has been in place since the creation of the golf course and its environs) to take into consideration the overall PUD of the surrounding area. As we all know this land in question is part of the Alvamar Country Club golf course under a purchase agreement at this time by a known developer's company.

At this time we oppose the Application for re-zoning and re-platting as submitted, particularly with respect to the 51.85 acres, for the following reasons.

1. This area is a mature developed area that was developed over the last four decades as a Planned Unit Development with two 18 hole golf courses and surrounding residential areas that created a blend of uses that benefit our Lawrence community as a whole. Landuse tenets that first gave the green light for the then-innovative PUD, made clear that a PUD must be created for the benefit of the whole community and not for the individual property owner alone. Otherwise the PUD would amount to an illegal spot zoning.

In this case, the original development was part of a PUD and now the proposed Application wishes to change the zoning without recognition of the original PUD and the potential negative impact on all of the other parcels that make up the original PUD, ie Alvamar golf course complex.

Even though the two steps are remote in time, the Applicant seeks to defeat the original requirements imposed upon this PUD by breaking it apart in a way that significantly changes the original Alvamar development and, we contend, does significant harm to property owners within the original development who are nearby the areas proposed for re-platting. The mere passage of time should not remove the care and oversight that the PUD overlay process requires and that the City and its citizens deserve.

2. While original Alvamar development may have contemplated greater number of residential and/or multi family structures, the final development in the proposed 51.85 acres were PUD (Alvamar-for golf course) and RM12. There is nothing that has changed within the original PUD to compel a change in zoning in any part of it. Our residential area is comprised of eight condominiums of some 4000 square feet each with covenants and restrictions that were filed by the original developer to create and maintain the control of the residential area so that it would continue to fit into and enhance the golf course complex and the other residential areas. These declarations were filed for many of the residential areas surrounding Alvamar golf course and those areas adjacent to or directly impacted by the proposed re-zoning and re-platting. Implicit within those covenants and restrictions was the commitment that the owner of the golf course and its environs would not adversely impact our residential enclave. Denying the present re-plat is the only way to guarantee that homeowners and golf course owners will continue their "win-win" relationship established by the rules and requirements of the original PUD.

3. The proposed preliminary plat of the 51.85 acres divides the acreage into 6 lots, with the following number of dwellings suggested:

- Lot 1- 120 apartments and 24 patio homes/condominiums
- Lot 2- 120 apartments and 24 patio homes/condominiums
- Lot 3- golf course and 48 condominiums
- Lot 4- 92 units
- Lot 5- 48 patio homes and 48 condominiums
- Lot 6- 88 "luxury" condominiums

Plus the following additions and/or changes to golf complex facilities: Club house 15,000 sq. ft. facility Outdoor snack bar/grill 2-3 swimming pools Fitness center Golf Hall of Fame 4000 sq. ft. office building with part to be rented to tenant

That is a lot of proposed "concept" development with no objective standards or requirements or other criteria that might help the Staff and the Planning Commission evaluate how it enhances or benefits the existing area. In fact, if this Application were approved, there could be even more dwellings if the land is re-zoned to RM24. Currently, there are no apartments in the area and that was by design by the original developer and controlled through the declarations of each homeowner's association created and filed at the time of development. To allow the potential for this intensive a change to the existing layout of the PUD, is essentially to embolden the Applicant to pack as much development into these locations as is in its financial best interests regardless of the impact upon other areas of the PUD and its environs. To allow the re-plat is to arm the Applicant with the argument that somehow these "concepts" tacitly were approved by this process, so there is no further need for the careful overlay/oversight built in to the regular PUD process.

Lot 6 is adjacent to land owned by the Quail's Nest Homeowner's Association. Currently, the clubhouse is an organic structure that blends into the environment. While my husband and I do not absolutely object to a new structure there with nearby "luxury" condominiums, we fear the impact that "88" condominiums, particularly if they are not owneroccupied and really are 88 apartments occupied by tenants who do not have a financial stake in their home, let alone in the PUD and its environs. In addition, there is no height limitation. Therefore, there could be a seven story structure that blocks views and does not fit within the entire look of the residential/golf complex.

It is our understanding that the majority if not all of Lot 6 is already zoned RM12. If we are truly looking at luxury condominiums, isn't the current zoning adequate and if not, what reason is given to change that zoning other than to just have the right to build more units?

4. Based on the proposed number of at least 600 dwelling units plus the golf complex buildings there is a serious problem with the access and potential increased traffic to this area. This area is the "oasis" in the middle of two 18 hole golf courses. There is one public road in from the South (Crossgate). Crossgate from the North is a private road and is too narrow at this time to accommodate the increased traffic; the private road cannot be widened because of the structures in the way. It was discussed that South Crossgate, the public road, be extended to gain greater access, however, that is still just one road with only one point of egress, which is onto Clinton Parkway. Certainly until such time as it is ascertained that the private road can be

widened to provide the kind of access to Bob Billings Parkway that any kind of good planning requires, the re-plat should be denied for this reason alone.

The proposed number of dwelling units will sharply increase traffic, congestion and change the usage of the neighborhood. In order to accommodate the proposed units in Lot 4 and Lot 5, there will be have to be streets that are accessed off of South Crossgate. The potential burden of that traffic has to be considered in the proposal and it is not at this time. There is no information at all available to the public and what the potential negative impact is.

In our particular case, our homeowner's association owns a private drive that is accessed off of South Crossgate over a mutual access drive for the benefit of our Quail's Nest Condominiums and Alvamar Country Club. Obviously, an increase in traffic will have a negative impact in our access without regard for the increased costs of maintenance we will be forced to bear.

5. The proposed Application also creates a parking issue. Currently, when Alvamar has large golf course tournaments and both courses are used, there is not enough parking. Cars are parked on Crossgate to the South and to the North to accommodate the events. It is hard to contemplate the amount of additional parking that will be required to accommodate the changes in the golf complex plus increase in dwellings.

In summary, my husband and I feel that the proposed Application is truly a redevelopment of the Alvamar Golf Complex and surrounding residential areas. While the overall future purchase of the golf courses is a benefit to Lawrence and the residents, the process that is being used by the Applicant is the incorrect process.

This development began in 1966 and was subsequently developed in stages which resulted in a comprehensive, complex and desirable area, which includes residential properties and multifamily properties of high value along with a nationally recognized golf course. This area deserves to be re-developed through a Planned Urban Development process with an "overlay" to insure that the integrity of the area and the overall integration of the area stays as it was originally intended. This is only accomplished with more defined plans, transparency by the developer and public input. Therefore, we request that the Application for re-zoning and preliminary plat known as *Z-14-00552; Z-14-00553; PP-14-00554; PP-14-00555* be denied as submitted.

In closing, we would like to say that when Bob Billings passed away, 15th Street was renamed to honor his long-term vision and accomplishment with the Alvamar area, which includes more than just the golf courses. In addition, the Honorable Dennis Moore of Kansas placed in the House of Representatives' record a Tribute to the Late Bob Billings of Lawrence, Kansas, which in part states, "There is a quality of life around here (Alvamar) that would not exist if he had not been the active, optimistic, visionary, enthusiastic person he was." "Most notably, Bob Billings designed and developed the Alvamar development, more than 3000 acres

of residential and commercial property, a nationally recognized public golf course and country club complex."

We feel that Bob's legacy can live on through the redevelopment of Alvamar, but the care and oversight that formed this area in its creation must continue. Bob's memory deserves this; so do the citizens surrounding Alvamar, as well as the City at large.

Thank you for your time.

Sincerely,

Lori L. Heasty and John B. Patterson

City of Lawrence Kansas Planning & Development Services

February 18, 2015

Dear Commissioners:

The planning commission should consider the overall outlook for the properties Z-14-00552 ,Z-1400553, PP-14-0054 and PP-14-00555.

It is a well documented fact the number of golfers is declining. Many golf courses across the country have closed due to a lack of funding caused by declining membership and fewer golfers. The game of golf just takes too long for today's fast passed society. Fewer and fewer people have the 6 hours available to play a round of golf.

Recently Alvamar sold part of itself to a local developer under the assumption the new owner would continue to main the golf club. To maintain an 18 hole golf course costs about 1 million dollars a year. The developer needs the zoning changes and resulting revenue stream of property sales to meet the financial obligation he has committed too since course usage will not generate all of the income needed to maintain the golf course. What we are looking at is a continued shrinkage of the golf coarse over the next decade as course revenue continues to fall. The owner will next want to rezone 9 holes of the course for development. Each rezoning is not in the public interest it is in the new owner's financial interest.

If the new owner thinks my comments are not correct than he should be willing to put up a 10 year performance bond that will contribute \$500,000 per year to coarse maintence if golf fees fall short. If the owner fails to produce the other \$500,000 needed to maintain the 18 hole coarse the performance bond would fulfill the owners obligation.

Since KU is involved in this whole ownership change process the University has a great deal of underutilized property on the south east corner of W 15th Street (Bob Billings) and Kasold which the university could make available for residential development. This is based on the assumption that the planning commission what's to have a higher population density west of Iowa Street and east of Wakarusa Drive.

Our Mayor has stated he thinks Lawrence will grow for the foreseeable future. It will be wonderful to have large green spaces in the middle of our growing and prosperous city. Take a look at Chicago and how wonderful the green spaces make the city feel. The planning commission should keep in mind the long term goals of our people and community. I realize you are under a great deal of pressure from developers who are in the business of making money. Let's not let the short term do ill-reputable harm to the livability of our community.

The possibility to delay a decision might be considered since the request closely follows on the heels of the property acquisition. Since the submission has already been prepared by Paul Werner it is obvious the plan was well underway before the property actually changed hands. It is my opinion if the planning commission is really interested in the public good a delay of six months or more would be a prudent course of action.

Respectfully Submitted by:

Richard Fanter 4608 Turnberry Drive Lawrence, Ks 66047 Lawrence Metropolitan Planning Commission c/o Sandra Day, AICP Planner II City of Lawrence PO Box 708 Lawrence, KS 66044

Dear Commissioners:

This letter is written to register the comments of the undersigned concerning item Z-14-00552 scheduled to be considered at the February 23, 2015 meeting of the Planning Commission. We own homes located along the west side of #1 Fairway (Lot 5) on Alvamar's Public Course. The back of our homes look east across #1 and #9 Fairways. The zoning request's Master Plan calls for "residential transition to lower density" along #9 Fairway.

We reviewed materials mailed to us by Sandra Day and also met separately with Ms. Day and Paul Werner.

We believe the Master Plan conceptuals would benefit the Alvamar area and are generally supportive of seeing the plan accomplished. We have several questions and requests we hope the Planning Commission will consider in its discussion of the proposed zoning changes:

- <u>Structure Height</u> –We prefer to have a continued unobstructed view of the land east of our homes. That being said, we otherwise hope and respectfully request that houses built in the area along #9 Fairway east of our homes have a lower profile, preferably not to exceed one story above grade.
- <u>Water Runoff</u> Several underground springs require year-round sump pump operation for a number of our homes. Storm runoff also produces problems. We would like to be assured that construction activities and future structures identified in the Master Plan will involve appropriate engineering solutions to eliminate the possibility of exacerbating our current drainage conditions.
- <u>Traffic/Access</u> We understand the area where the public clubhouse is located may be the site of higher density residential structures that will increase traffic volumes and possibly stress Crossgate Drive particularly at its north entrance intersecting with Bob Billings Avenue. We assume these issues will be addressed and managed.
- <u>Location of #1 Fairway</u> It is our understanding that the #1 tee box may be relocated somewhat to the east of its present location, but that the balance of #1 Fairway would not be moved west and closer to our property lines. We would be concerned with any change that moves #1 Fairway closer to our property lines. Doing so would be inconsistent with the original Alvamar Planned Unit Development and increase the number of errant golf balls flying onto our properties that create personal safety issues.

The Master Plan is understandably non-specific at this stage. We assume this proposal is under consideration for conventional zoning and that this might limit our opportunity to receive additional information and offer feedback once the plan is further defined. Therefore, we prefer that a Planning Development

February 19, 2015 Page 2

Overlay be approved that would provide all parties an opportunity to confirm that the Master Plan concepts are consistent with final build out plans.

In closing, we wish to reiterate our support for the development concepts described within the Master Plan. We believe the concerns we have identified can be satisfactorily resolved and that the project will benefit Alvamar and its neighborhoods.

Thank you for your consideration of our thoughts.

Respectfully submitted,

Marty Smith 1906 Crossgate Dr Lew & Carolyn Phillips 2000 Crossgate Dr

Kay Mueller 1908 Crossgate Dr Steve & Jenni Koger 2004 Crossgate Dr

Pat Webb 1910 Crossgate Dr Bruce Liese, Chair Clay Britton, Vice Chair Members of the Lawrence/Douglas County Planning Commission,

Re: PP-14-00555: consider a Preliminary Plat for Alvamar Inc. Two Addition, a one-lot subdivision containing 5.18 acres with frontage on the north side of Quail Creek Drive. The subdivision is proposed to support future low-density residential development.

Dear Commission Members:

As the neighbors in the area known as the Oasis at Alvamar, located on the south side of Quail Creek Drive and both sides of Quail Creek Court, and on Alvamar Drive we want to thank Thomas Fritzel for deferring the rezoning for the property that is currently part of the Alvamar Golf Course and adjacent to many of our homes. With the tragic loss of one of our neighbors we appreciate his sensitivity to the recent events and his willingness to postpone any action until all of our neighbors can appropriately address our concerns.

We are generally supportive of the efforts being made to enhance the overall financial stability of the Alvamar Golf and Country Club and appreciate the opportunity to continue a productive dialogue with the developers. An open and constructive dialogue with all the homeowners in the affected areas will ensure that the outcome is beneficial not only for the owners of the golf and country club but recognizes and respects the concerns of the existing homeowners. A successful project benefits not just all of us but will be a tribute to the legacy of Bob Billings whose vision for Alvamar should be enhanced and respected.

We realize that nothing will happen tonight that has a direct impact on our neighborhood,

but we want to submit some of our general observations and concerns for the record.

1. If the property is ultimately rezoned it should reflect the density of the surrounding area and be platted in such a way that minimizes the impact on existing homes.

2. The traffic that would be generated if the area under consideration would be developed to the maximum allowed under the requested zoning would affect not just our area but would have a big impact on the homes along St. Andrews, Tam O'Shanter and Quail Creek Drive(s).

3. Much of this area is currently in a flood plain designation so any future development needs to demonstrate that any additional run-off from the new buildings is adequately managed and controlled.

We recognize that this property is not on the agenda for discussion tonight but wanted to have our concerns included in the proceedings of tonight's public hearing. Our concerns are shared by other homeowners in the affected areas that are under consideration. We hope that as this process moves forward their concerns are addressed and accommodated. A successful project will result when all points of view have an opportunity to be heard. And a successful project which keeps Alvamar neighborhoods and Alvamar Golf and Country Club as a viable part of the Lawrence community is a classic win-win scenario.

Mark and Sandy Praeger 360,1 Quail Creek Court

Study Praeger Markhauger

Dale and Connie Friesen 3604 Quail Creek Court
February 23, 2015

ID

Dolph III and Lisa Simons 3608 Quail Creek Court

Make Mitchell Duniter h Mitchell

Mark and Jennifer Mitchell 3609 Quail Creek Court

de

John and Diana Hadl 3700 Quail Creek Court

Jereja Lo Hanna

Teresa Hanna 3706 Quail Creek Court

waraneston

Don and Alice Ann Johnston 3701 Quail Creek Court

Mary Frances Ellis

Paul Carttar and Mary Francis Ellis 3709 Quail Creek Court

Cobert J. Weaver Betsy hkaver

Rob and Betsy Weaver 1589 Alvamar Drive

Bruce Liese, Chair Clay Britton, Vice Chair Members of the Lawrence/Douglas County Planning Commission,

Re: PP-14-00555: consider a Preliminary Plat for Alvamar Inc. Two Addition, a one-lot subdivision containing 5.18 acres with frontage on the north side of Quail Creek Drive. The subdivision is proposed to support future low-density residential development.

Dear Commission Members:

As neighbors in the area known as Alvamar Heights, located on Alvamar Drive, bordering the Alvamar public golf course, we are concerned about the impact of the proposed development along Quail Creek Drive, just to the south of our homes. We have read the letter dated February 23, 2015, from members of the Oasis at Alvamar neighborhood and heartily agree with all the sentiments therein. We emphasize the statement from that letter:

If the property is ultimately rezoned it should reflect the density of the surrounding area and be platted in such a way that minimizes the impact on existing homes.

In addition, we note that on several occasions we have seen the lower part of that parcel underwater after thunderstorms.

Respectfully,

tou Th

Rob and Betsy Weaver 1589 Alvamar Dr.

land,

Lee and Darcy Gerhard 1628 Alvamar Dr.

Mike and Janel Leitch 1636 Alvamar Dr.

Sherry Scott 1640 Alvamar Dr.

Cheryl Troxel 1504 Alvamar Drive Lawrence, KS 66047

Ms. Sandra Day City of Lawrence Douglas County Planning & Development Services 6 East 6th Street P.O. Box 708 Lawrence, Kansas 66044

Re: Z-14-00552; Z-14-00553; PP-14-00554; PP-14-00555

Dear Ms. Day:

I am writing you in regard to the proposed Application filed by Paul Werner Architects on behalf of Alvamar Inc. to re-zone and re-plat certain properties as described in the above referenced submittals.

As I understand it, the Applicant, Paul Werner Architects on behalf of Alvamar Inc. has submitted two re-zoning requests and two corresponding preliminary plats, one of 51.85 acres from RS 7, RM12 & PUD (Alvamar) Districts to RM 24, which then will re-plat said acreage into 6 lots; and then one of 5.18 acres from PUD (Alvamar) to RS7.

The Applicant has requested that "conventional zoning" be used with no "overlay" district requirements. "Overlay" really means "oversight." Therefore, if the proposed application were approved as submitted, then any subsequent re-zoning and preliminary plats would be approved, with little opportunity for input from property owners until after the formal process began and perhaps <u>long</u> after the informal discussions with city planners began.

The carte blanche the Applicant seeks, to reconfigure this area created under a PUD, may never be appropriate in any case, given the care and commitment required to create a PUD in the first place. But the cart blanche now requested should be denied given that it has the potential to recreate an area that is so important to the community at large and to a large group of Lawrence citizens who through their home purchases made investments in the Alvamar area as it exists today.

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could change as long as the requirements of RM 24 are not violated. This means that 1244 dwelling units could actually be built on these 51.85 acres.

At this time I oppose the Application for re-zoning and re-platting as submitted, particularly with respect to the 51.85 acres, for the following reasons.

This area is a mature developed area that was developed over the last four decades as a Planned Unit Development with two 18 hole golf courses and surrounding residential areas that created a blend of uses that benefit the Lawrence community as a whole. Landuse tenets that first gave the green light for the then-innovative PUD, made clear that a PUD must be created for the benefit of the whole community and not for the individual property owner alone.

In this case, the original development was part of a PUD and now the proposed Application wishes to change the zoning without recognition of the original PUD and the potential negative impact on all of the other parcels that make up the original PUD, ie Alvamar golf course complex.

Even though the two steps are remote in time, the Applicant seeks to defeat the original requirements imposed upon this PUD by breaking it apart in a way that significantly changes the original Alvamar development and, we contend, does significant harm to property owners within the original development who are nearby the areas proposed for re-platting. The mere passage of time should not remove the care and oversight that the PUD overlay process requires and that the City and its citizens deserve.

While original Alvamar development may have contemplated greater number of residential and/or multi family structures, the final development in the proposed 51.85 acres were PUD and RM12. There is nothing that has changed within the original PUD to compel a change in zoning any part of it.

This area deserves to be re-developed through a Planned Urban Development process with an "overlay" to insure that the integrity of the area and the overall integration of the area stays as it was originally intended. This is only accomplished with more defined plans, transparency by the developer and public input. Therefore, we request that the Application for re-zoning and preliminary plat known as *Z-14-00552; Z-14-00553; PP-14-00554; PP-14-00555* be denied as submitted.

Thank you for your time.

Sincerely,

Cheryl J Troxel