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711 Kingsland Avenue
Proposed Hotel & Office Development
Tru Hotel by Hilton

Traffic Impact & Parking Study
University City, Missouri

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Executive Summary

Lochmueller Group has completed a traffic impact and parking study for the proposed redevelopment of 711 Kingsland Avenue in University City, Missouri. The 1.648-acre parcel is the location of the former Delmar-Harvard Elementary School and contains two structures; the Delmar building facing Kingsland Avenue and the Harvard building facing Sargent Mike King Drive.

TriStar Companies intends to redevelop the property to provide a new Hilton Tru Hotel (108 rooms) on the eastern portion of the site (following removal of the Delmar building) and renovate the west building (Harvard) to be used as office space (29,987 GSF, 15,836 net SF). The total number of trips generated by the proposed redevelopment would be 92 and 98 trips in the weekday AM and PM peak hours, respectively. The proposed site plan includes access to the site via two drives: one primary full access on the east side of the site; which would be signalized access onto Kingsland Avenue opposite Loop North and one secondary full access drive via Sargent Mike King Drive; located at the northwest corner of the site.

The traffic evaluation resulted in the following conclusions:

- In the existing condition, all the intersections included in the study area function with an overall acceptable level of service during both the weekday morning and afternoon peak hours.
- The primary access onto Kingsland Avenue would be comprised of one inbound lane and one outbound lane with a width of approximately 27 feet. While 40-foot throat depth would be preferred, it is not attainable at this urban location given the retainment of the Harvard Building. The proposed 37 feet of throat depth will be adequate to accommodate the anticipated demand exiting the site.
- The existing intersection of Kingsland Avenue with Loop North should be modified to incorporate the new west leg. In order to accommodate the site's exiting traffic, an additional phase is proposed to be added to the traffic signal. This phase would run concurrently with the phase serving the westbound traffic. In addition, it is recommended that the existing landscaped median along Kingsland Avenue between the Library's drive and Loop North be removed and replaced with a dedicated northbound left turn lane that would accommodate traffic queueing to turn into the site. All the above improvements, coupled with the age of the existing traffic signal, would dictate the need for the entire traffic signal to be replaced.
- It is recommended that traffic exiting the site at the secondary access to Sargent Mike King Drive be placed under STOP control via the installation of signage on the westbound approach. Given the proximity of the City's Police Department, it is prudent to remind those entering Sargent Mike King Drive to yield right-of-way to any emergency vehicles.
- All proposed drives should conform to the sight distance requirements set forth by the American Association of State Highway and Transportation Officials (AASHTO). As part of the design process, care should be given to ensure that signage and/or landscaping does not pose sight distance limitations at any of the proposed access drive locations.
- When the additional traffic from the proposed development is taken into consideration, there is not a need for mitigation on the area road system beyond that recommended at the intersection of Kingsland Avenue and Loop North.

The parking evaluation resulted in the following conclusions:

- The proposed development at 711 Kingsland Avenue would provide 75 parking spaces on-site.
- The proposed development at 711 Kingsland Avenue provides for two complimentary uses in terms of shared parking given that a hotel's parking demand tends to peak in the evenings and overnight hours while an office's parking demand tends to peak during the daytime hours.
- Per University City's parking code, the development at 711 Kingsland Avenue would need to lease an additional 10 off-site parking spaces (85 total spaces on and off-site) to be compliant under a shared parking arrangement (pending conditional use permit approval and assuming all applicable parking space reductions are applied).
- Parking demand at 711 Kingsland Avenue, per ITE parking demand data, would exceed its supply on weekdays at 8:00 AM (5 spaces), 12:00 PM (3 spaces), and 1:00 PM (3 spaces). On weekends, the demand from 711 Kingsland Avenue would exceed the supply at 9:00 PM (2 spaces) and 10:00 PM (14 spaces).
- There is a total of 235 parking spaces within the western portion of Public Parking Lot 4, including the 10 on-street spaces adjacent to the surface lot on the south block of Loop North Drive.
- The current maximum utilization of Lot 4 is 69% at 2:00 PM on a weekday and 86% at 8:00 PM on a Saturday.
- There is currently 9,106 SF of vacant restaurant space within the buildings from 6665-6691 Delmar Boulevard, directly south of Lot 4. Once occupied, the weekday peak parking demand on Lot 4 would occur at 12:00 PM at 91% occupied and on a weekend at 8:00 PM with a demand equal to 110% of the supply.
- If 711 Kingsland Avenue is permitted to use parking spaces on Lot 4 to accommodate its overflow parking demand, the hour with the highest utilization on Lot 4 during a weekday would be 93% at 12:00 PM with 218 of the 235 spaces utilized. On a weekend, the highest utilization on Lot 4 would be 110% at 8:00 PM with an excess demand of 23 spaces (demand of 258, supply of 235).
- The expected parking shortage on Lot 4 during a weekend night at 8:00 PM is the result of future expected demand generated by the current vacancies at 6665 to 6691 Delmar Boulevard. The shortage is not attributable to the overflow demand from 711 Kingsland Avenue. At 8:00 PM on a Saturday evening, the proposed redevelopment's on-site parking supply is adequate.
- There are no hours in which the demand from 711 Kingsland Avenue causes Lot 4 to reach or exceed capacity.
- The analysis demonstrates that a shared parking arrangement would be feasible between 711 Kingsland Avenue and Lot 4.

Introduction

Lochmueller Group has completed a traffic impact and parking study for the proposed redevelopment at 711 Kingsland Avenue in University City, Missouri. The 1.648-acre parcel is the location of the former Delmar-Harvard Elementary School and contains two structures, the Delmar building facing Kingsland Avenue and the Harvard building facing Sargent Mike King Drive. Both structures are currently vacant and have been for some time. TriStar Companies owns 711 Kingsland Avenue and is proposing to build a Tru Hotel (108 rooms) on the eastern portion of the site (following removal of the Delmar building) and renovate the west building (Harvard) to be used as office space (29,987 GSF, 15,836 net SF). **Figure 1** depicts the study location.

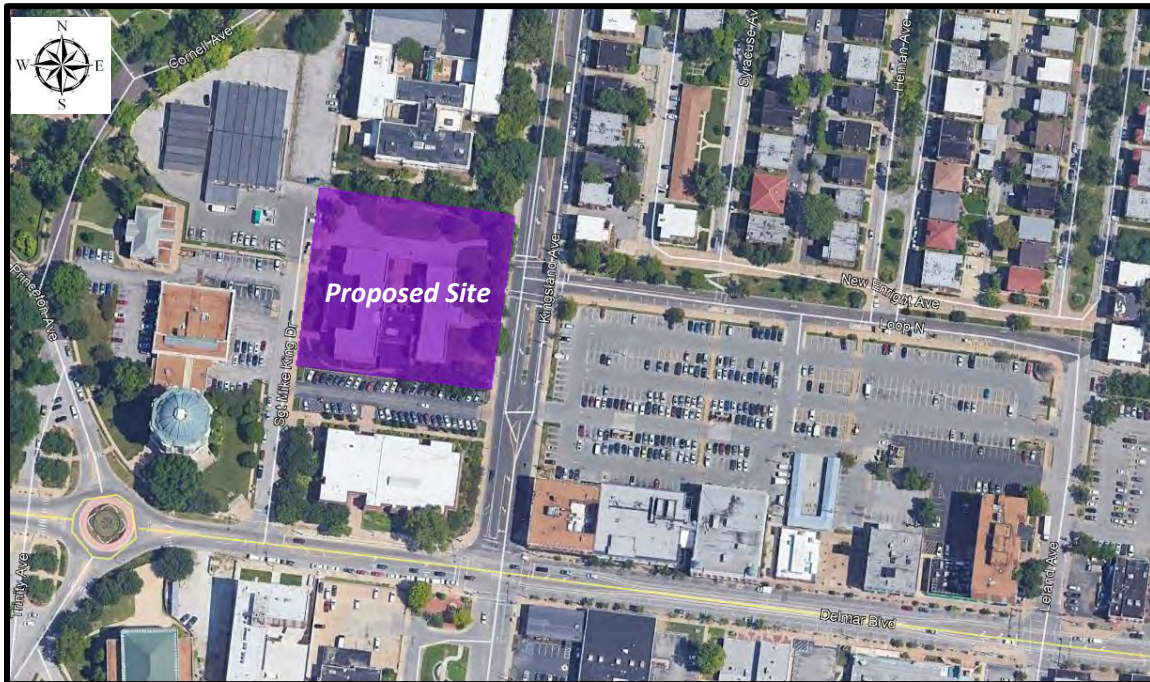


Figure 1. Location of Proposed Tru Hotel Development

711 Kingsland Avenue is bound by the University City Public Library to the south, the Lewis Center at 725 Kingsland Avenue to the north, Sargent Mike King Drive to the west, and Kingsland Avenue to the east (see **Figure 1**) and is within the University City Civic Complex Historic District. The Harvard building will be retained while the Delmar building is slated to be replaced with the Tru Hotel, a Hilton brand. 711 Kingsland Avenue has been vacant since 2011 when the Delmar-Harvard School closed. Since then, it has been owned by the University City School Board until purchased by TriStar Companies in 2019.

711 Kingsland Avenue is currently zoned “PA” Public Activity. TriStar is submitting a Planned Development “PD” District rezoning request which requires review by the Planning Commission and approval by City Council. Since 711 Kingsland Avenue is also within the University City Civic Complex Historic District, the proposed development is reviewed by the Historic Preservation Commission (HPC) as well. This study will provide these governing bodies with the information necessary to evaluate the proposed development with regards to its traffic impacts and parking demands, as well as its conformity with the City of University City’s parking requirements. **Figures 2 and 3** illustrate the preliminary site plan (provided by others).

The subsequent sections of this report will address the traffic and parking implications individually.



Figure 2. Site Rendering (provided by others)

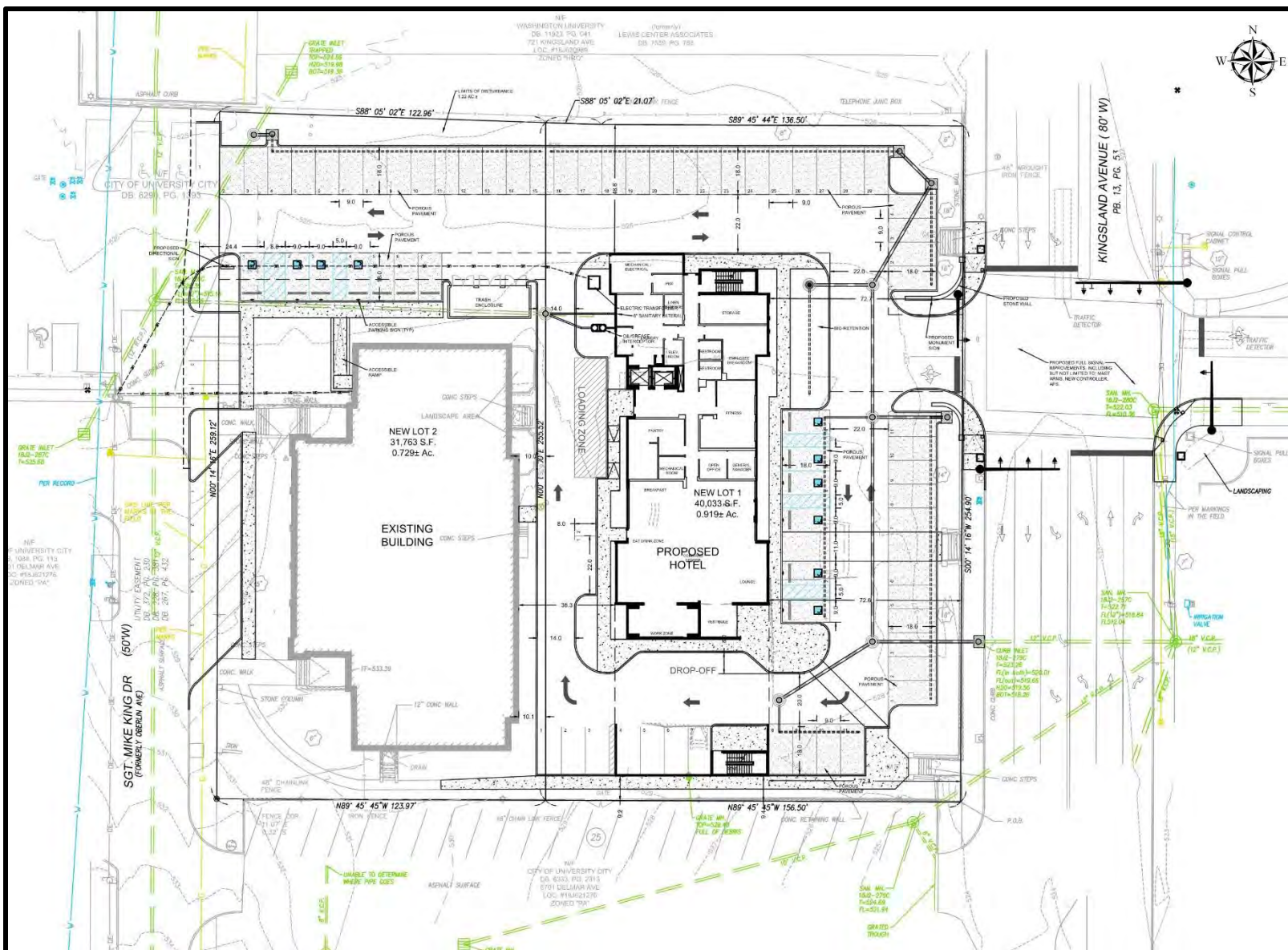


Figure 3. Preliminary Site Plan (provided by others)

Tru Hotel Development
TRAFFIC IMPACT & PARKING STUDY

Traffic Impact Analysis

The purpose of this traffic impact analysis is to summarize the amount of traffic that would be generated by the proposed redevelopment and identify the impacts of the site generated traffic upon the surrounding road system. The analysis will identify existing, no-build, and forecasted operating conditions, thereby providing a measure of the site-generated traffic impacts. The following scenarios will be evaluated:

- 2020 Existing;
- 2020 Forecasted (Existing + full redevelopment);
- 2040 No-Build (Existing + background growth only); and
- 2040 Forecasted (Existing+ full redevelopment + background growth).

The traffic analysis evaluates the feasibility of providing a primary access to the site via Kingsland Avenue at its currently signalized intersection with Loop North. This intersection would be modified to incorporate a new west leg; which would provide access to the development. A secondary point of access is to be provided via Sargent Mike King Drive, at the northwest corner of the site. Given the nature of the development, the traffic impact study focuses on the morning and afternoon peak periods of a typical weekday. These time periods were chosen since they represent the peak periods of operation for the adjacent roads as well as the anticipated hotel and office uses.

Existing Traffic Conditions

To identify the traffic impacts associated with the proposed redevelopment, it was first necessary to quantify roadway, traffic, and operating conditions as they currently exist.

Existing Roadway Network

The study area road system was inventoried to identify existing roadway types, lane configuration, functional classifications, posted speeds, access provisions, and intersection control. The traffic data was collected at the following intersections:

- Delmar Boulevard and Trinity Avenue/Princeton Avenue (roundabout)
- Delmar Boulevard and Sargent Mike King Drive (signalized)
- Delmar Boulevard and Kingsland Avenue (signalized)
- Kingsland Avenue and Library Egress Driveway/Parking Lot 4 (unsignalized)
- Kingsland Avenue and Loop North (signalized)
- Delmar Boulevard and Leland Avenue (signalized)

Immediately east of the proposed site is Kingsland Avenue, which is controlled by St. Louis County Department of Transportation and is categorized as a “major collector” that travels in the north-south direction with a posted speed limit of 30 mph. Adjacent to the site, Kingsland is comprised of two southbound through lanes, a southbound left turn lane into Lot 4, one northbound through lane, and a dedicated northbound right turn lane onto Loop North. North of the site, Kingsland Avenue narrows to one lane in each direction, a center median with dedicated turn lanes at select locations and parking lanes.

The intersection of Kingsland Avenue and Loop North is signalized, with a single dedicated left turn lane on the southbound approach and a dedicated right turn lane on the northbound approach. The access drives to the University City Public Library and Lot 4, which are south of Loop North, comprise an

unsignalized side street stop-controlled intersection with Kingsland Avenue. The intersection of Delmar Boulevard and Kingsland Avenue is signalized with single dedicated northbound, southbound, westbound and eastbound left turn lanes and dedicated southbound and northbound right turn lanes. The southbound approach to the intersection, which is critical to the study, has a single left turn lane, a thru lane, and a single right turn lane.

Delmar Boulevard which is in large part a 2-lane road with on-street parking throughout the study area is controlled by the City of University City and is categorized as a “minor arterial”. Delmar Boulevard, which runs east-west direction, is the “main street” throughout the Delmar Loop, which hosts a number of restaurants and shopping options and is a thriving entertainment destination within the regional area. Due to high pedestrian activity along this stretch of Delmar Boulevard, the posted speed limit is only 20 mph.

Sargent Mike King Drive is a local road that predominantly serves the City Hall, the City Library and the City Police Department. The road has a posted speed limit of 25 mph and is 26 feet wide with angled or head in parking along it at select locations. The intersection of Delmar Boulevard and Sargent Mike King Drive is signalized with a single dedicated eastbound left turn lane. The intersection of Delmar Boulevard and Trinity Avenue/Princeton Avenue is a single lane roundabout and is perceived as the gateway into the Loop from the west. The intersection of Delmar Boulevard & Leland Avenue is signalized with dedicated northbound, southbound, westbound and eastbound left turn lanes.

The existing lane configuration and traffic control at the intersections included in the study area are depicted in **Figure 4**.

Alternative Mode Accommodations

Transit is readily available in the area. The Delmar Loop Transit Center is $\frac{3}{4}$ mile east of the site and serves as the MetroLink station for the Red Line. MetroBus routes 97 (Delmar) and 5 (Green Line) both run adjacent to the subject site. Bus stops for Route 5 are immediately adjacent to the site at Loop North.

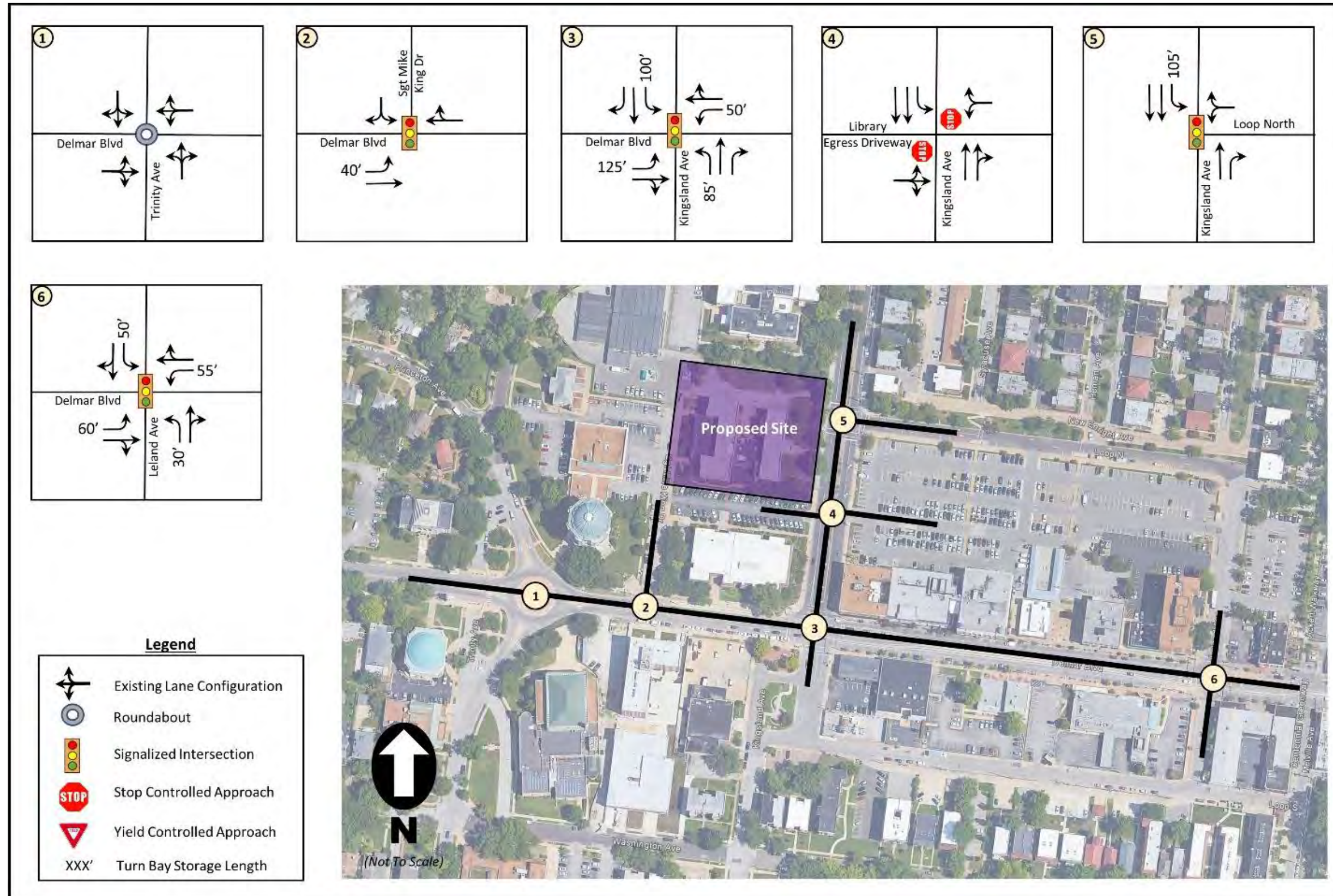
Crosswalks are provided across all legs of the study area’s signalized intersections, except for the east and west legs at Delmar Boulevard and Sargent Mike King Drive. Some of the cross walks however are not clearly visible due to the deterioration in the striping. Continental pedestrian crossings are provided on all the roundabout’s legs, as well. The area’s sidewalks appear to be well maintained and provide convenient access to the multiple facilities in the area.

Kingsland Avenue is a designated Bike Route within the City. Sharrows, however, are not present.

2020 Existing Traffic Volumes

To quantify study area traffic volumes, weekday turning movement counts were performed at the subject intersections, except at the intersection at Delmar Boulevard and Leland Avenue, on Tuesday February 4, 2020 from 7:00 to 9:00 AM, and 4:00 to 6:00 PM. Weekday turning movement counts were performed during the same time periods at the intersection at Delmar Boulevard and Leland Avenue on Tuesday February 18, 2020.

Based on the collected data, the network peak hours were determined to occur from 8:00 AM to 9:00 AM for the weekday morning, and from 5:00 PM to 6:00 PM for the weekday afternoon peak periods. **Figure 5** illustrates the existing traffic volumes at the critical locations included in the traffic analysis.



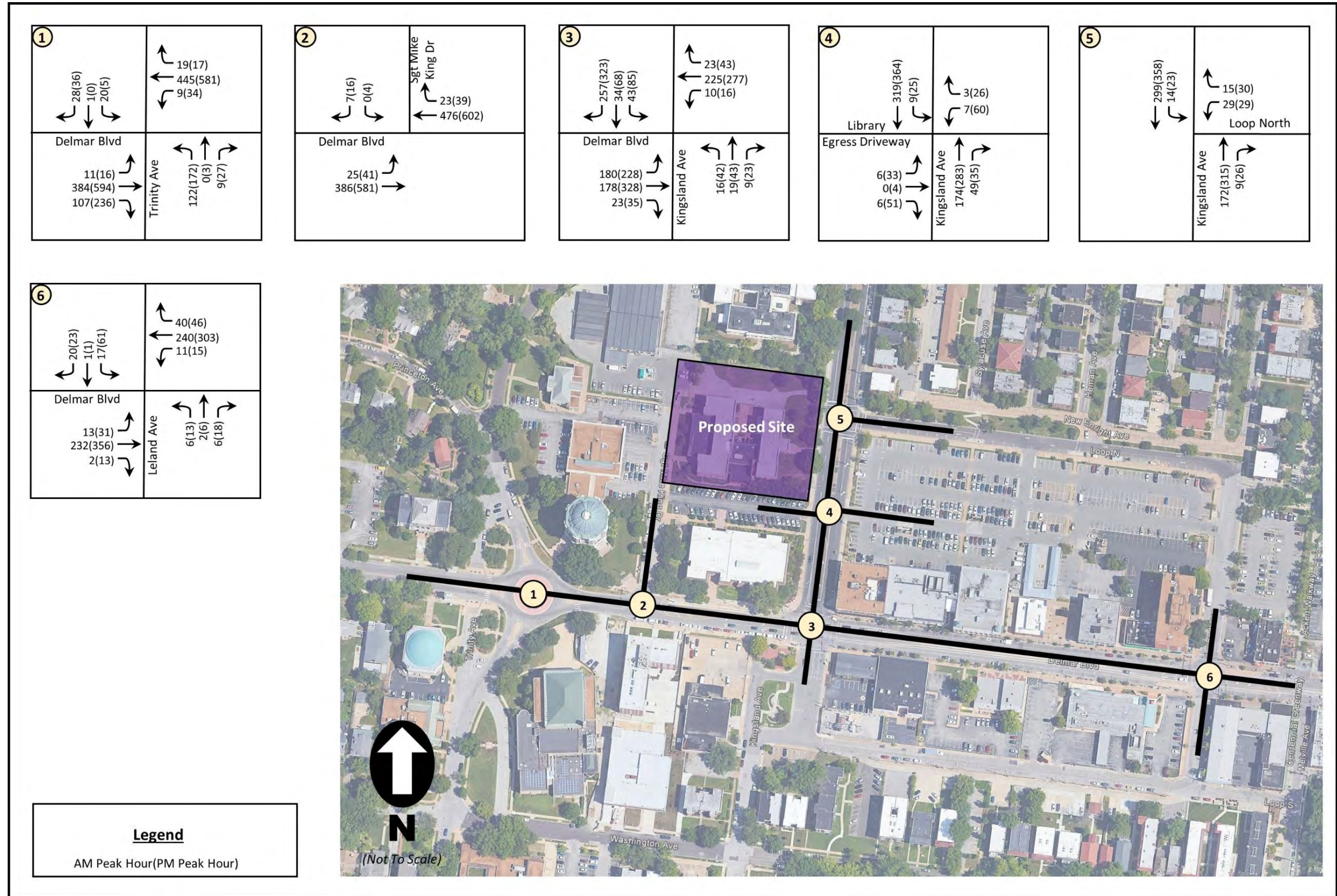


Figure 5. Existing Traffic Volumes

2020 Existing Operating Conditions

The existing traffic operating conditions at the critical study intersections were evaluated based upon the traffic volumes presented in **Figure 5**. The analysis was completed using Synchro 10 traffic modeling software, which is based upon the methodologies outlined in the “Highway Capacity Manual” (HCM) published by the Transportation Research Board.

The performance of a transportation system is quantified by Levels of Service (LOS), which are measures of traffic flow that consider factors such as speed, delay, interruptions, safety, and driver comfort and convenience. There are six levels of service ranging from LOS A (“free flow”) to LOS F (“oversaturated”). LOS C is commonly used for design purposes and represents a roadway with volumes utilizing 70 to 80 percent of its capacity. LOS E is typically considered acceptable for peak period conditions in urban and suburban areas.

Levels of service criteria vary depending upon the roadway component being evaluated. Intersections are most commonly evaluated, since roadway capacity is typically dictated by the number of vehicles that can be served at critical intersections. For intersections, the criteria are based on delay and the type of control (i.e., whether it is signalized or unsignalized). Signalized intersections reflect higher delay tolerances as compared to unsignalized and roundabout locations because motorists are accustomed to, and accepting of, longer delays at signals. For signalized and all-way stop intersections, the average control delay per vehicle is estimated for each movement and then aggregated for each approach and the intersection as a whole. For intersections with partial (side-street) stop control, delay is calculated for the minor movements only (side-street approaches and major road left-turns), since through traffic on the major road is not required to stop. **Table 1** summarizes the thresholds for intersection levels of service, as defined in the Highway Capacity Manual.

Table 1 : Level of Service Definitions		
Level of Service	Control Delay per Vehicle (sec/veh)	
	Signalized	Unsignalized
A	≤ 10	0-10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

The existing operating conditions at the intersections included in the study area are summarized in **Table 2**. As shown, all the intersections within the study area function with an overall acceptable level of service during both peak periods. Furthermore, nearly all the individual approaches operate at a LOS C or better during both the morning and afternoon peak hours. However, it is to be noted that the southbound approach of Leland Avenue to its intersection with Delmar Boulevard does currently operate at a LOS D during the weekday afternoon peak hour.

Table 2. 2020 Existing Operating Conditions				
Intersection/ Approach	Weekday AM		Weekday PM	
	Vehicle LOS (Delay)	95 th Queue (ft)	Vehicle LOS (Delay)	95 th Queue (ft)
<i>Delmar Boulevard and Trinity Avenue/Princeton Avenue (Roundabout)</i>				
Overall Intersection	A (7.1)		B (11.9)	
Eastbound Approach	A (7.0)	50	B (12.8)	175
Westbound Approach	A (7.6)	50	B (11.8)	125
Northbound Approach	A (6.2)	25	B (10.2)	50
Southbound Approach	A (5.9)	< 25	A (7.7)	< 25
<i>Delmar Boulevard and Sargent Mike King Drive (Signalized)</i>				
Overall Intersection	A (2.8)		A (3.7)	
Eastbound Approach	A (1.6)	68	A (2.4)	123
Westbound Approach	A (3.8)	182	A (4.1)	173
Southbound Approach	A (0.0)	< 25	C (24.3)	< 25
<i>Delmar Boulevard and Kingsland Avenue (Signalized)</i>				
Overall Intersection	B (11.6)		B (13.6)	
Eastbound Approach	A (6.0)	100	A (7.7)	130
Westbound Approach	A (9.5)	106	B (12.5)	118
Northbound Approach	C (28.4)	29	C (24.5)	49
Southbound Approach	B (16.8)	60	B (18.9)	90
<i>Kingsland Avenue and Library Egress Driveway/Parking Lot 4 (Side street stop)</i>				
Eastbound Approach	B (11.0)	< 25	B (13.9)	< 25
Westbound Approach	B (11.4)	< 25	C (18.3)	30
Southbound Left	A (7.8)	< 25	A (8.2)	< 25
<i>Kingsland Avenue and Loop North (Signalized)</i>				
Overall Intersection	A (4.2)		A (4.2)	
Westbound Approach	B (14.0)	< 25	B (12.0)	27
Northbound Approach	A (3.3)	35	A (3.8)	64
Southbound Approach	A (3.0)	26	A (3.1)	32
<i>Delmar Boulevard and Leland Avenue (Signalized)</i>				
Overall Intersection	A (5.9)		B (10.4)	
Eastbound Approach	A (1.6)	52	A (4.5)	140
Westbound Approach	A (3.7)	95	A (6.4)	149
Northbound Approach	C (34.9)	< 25	C (28.1)	27
Southbound Approach	C (32.5)	31	D (44.2)	81

Delay presented in seconds per vehicle

Proposed Redevelopment

The proposed redevelopment includes building a hotel on the east side of the site and repurposing the old school building (Harvard Building) into an office building. The hotel will have 108 rooms and will be marketed as Tru Hotel by Hilton. The repurposed west building will have a total area of 29,987 gross square feet (GSF) in the Harvard building; however due to the building's history as a school, the effective leasable square footage (LSF) of 13,942 SF is considerably less than a typical office building (wider corridors, larger restrooms, etc.).

The proposed site plan includes primary access to the site via Kingsland Avenue at its signalized intersection with Loop North. This intersection would be modified to incorporate a new west leg which would be comprised of a single lane approach. A secondary point of access is to be provided via Sargent Mike King Drive, at the northwest corner of the site; Sargent Mike King Drive also has signalized access to Delmar Boulevard.

Trip Generation

The Trip Generation Manual, Tenth Edition, published by the Institute of Transportation Engineers (ITE) was consulted for the trip generation of the proposed development. Land Use Code 310 (Hotel) was used for the hotel building and Land Use Code 710 (General Office Building) was used for the adjacent office building. The site is in a dense multi-use urban area; therefore, ideally this setting should be utilized for both the office and the hotel uses. However, the dense multi-use setting for hotels only had a single study from a location in a dense-multi use urban area. Therefore, the general urban/suburban setting for the hotel was utilized since 25 or more studies were available. The fitted curve equation was used when the R^2 value was greater than 0.85. If the R^2 value was less than 0.85, or no fitted curve equation was provided, the average rate was used. The weekday peak hours of adjacent street traffic during the morning and afternoon was used for the weekday AM and PM peak hour calculations. The proposed trip generation values for the redevelopment of the site are summarized in **Table 3**.

It should be noted that the trip generation for office uses, per the Trip Generation Manual, is based upon gross square footage. Typically, an office building yields at least 85% of leasable floor space as compared to the gross square footage. The proposed renovation of the Harvard building will yield only 55% leasable floor area. Therefore, in order to accurately estimate the trip generation for the office use, an adjusted gross square footage of 16,400 SF was utilized. This adjusted gross square footage correlates to a leasable square footage of 13,942 SF. The justification for this adjustment was the increased allotment to stairways, landings, corridors, mechanical and restrooms in the repurposed building as compared to a purpose-built office building.

Table 3. Proposed redevelopment Trip Generation							
Land Use	Size	Weekday AM			Weekday PM		
		Peak Hour			Peak Hour		
		In	Out	Total	In	Out	Total
Hotel	108 rooms	29	20	49	33	32	65
General Office Building	16,400 GSF	28	5	33	4	18	22
TOTAL NEW TRIPS		57	25	82	37	50	86

Directional Distribution

The site's incremental trip generation was assigned to the study area roadways in accordance with an anticipated directional distribution that reflects prevailing traffic patterns as well as anticipated market area and attractions. The proposed directional distribution percentages are presented in **Table 4**. An aerial image depicting the directional distribution is presented in **Figure 6**. As shown, the majority of the site's trips would be expected to use Delmar Boulevard to access the site.

Table 4. Directional Distribution Percentages Applied to New Trips	
Origin/Destination	Percentage
To/From North via Kingsland Avenue	20%
To/From West via Delmar Boulevard	45%
To/From East via Delmar Boulevard	35%



Figure 6. Directional Distribution Percentages

Some of the vehicles traveling to and from the hotel or office may park in the public parking across Kingsland Avenue (Lot 4). Therefore, the new trips were assigned to the various site access driveways and Lot 4 based upon the directional distribution, ease of access into and out of the site and availability of parking spaces. **Figure 7** illustrates the resulting assignment of the site generated traffic volumes.



Figure 7. Site Generated Traffic Volumes

Site Access Review

The proposed site plan includes access to the site via two drives: one primary full access on the east side of the site; which would be signalized access onto Kingsland Avenue opposite Loop North and one secondary full access drive via Sargent Mike King Drive; located at the northwest corner of the site. The primary access onto Kingsland Avenue would be comprised of one inbound lane and one outbound lane.

The primary access should have approximately 27 feet in width to adequately accommodate one outbound lane of 12 to 13 feet and one inbound lane of 14 to 15 feet. Ideally, per St. Louis County's request the throat depth should be 40 feet in throat depth. However, due to the urban nature of the site as well as the retainment of the Harvard Building, the maximum achievable throat depth is 37 feet. It is our opinion that this throat depth will be adequate to accommodate the anticipated demand exiting the site. Furthermore, based upon the civil engineer's analysis, a WB-40 truck and University City's Fire Department fire truck should be able to navigate into and out of the site via the primary access onto Kingsland Avenue within the 37 feet of throat depth and the proposed corner radii.

The existing intersection of Kingsland Avenue with Loop North would be modified to incorporate the new west leg. In order to accommodate the eastbound traffic, an additional phase is proposed to be added to the traffic signal currently operating at the intersection. This phase would run concurrently with the phase serving the westbound traffic and, hence, should have minimal impact on the traffic conditions at the intersection. In addition, it is recommended that the existing landscaped median along Kingsland Avenue between the Library's drive and Loop North be removed and replaced with a dedicated northbound left turn lane that would accommodate traffic queueing to turn into the site. A dedicated left turn lane with approximately 115 feet of storage is feasible. The addition of the west leg to the intersection, as well as the northbound left turn lane on Kingsland Avenue, coupled with the age of the existing traffic signal at this intersection would dictate the need for the entire traffic signal to be replaced.

It is recommended that traffic exiting the site at the secondary access to Sargent Mike King Drive be placed under STOP control via the installation of signage on the westbound approach. Given the proximity of the City's Police Department, it is prudent to remind those entering Sargent Mike King Drive to yield right-of-way to any emergency vehicles.

Lastly, all proposed drives should conform to the sight distance requirements set forth by the American Association of State Highway and Transportation Officials (AASHTO). As part of the design process, care should be given to ensure that signage and/or landscaping does not pose sight distance limitations at any of the proposed access drive locations.

Internal Circulation Review

A cursory review of the site's internal circulation was performed to verify safe and efficient mobility within the site itself. The proposed mixed-use development would have one east/west two-way drive stemming from the proposed primary access location on Kingsland Avenue on the northeast corner which connects to the secondary access location on Sargent Mike King Drive on the northwest corner of the site. This east/west drive would be connected to two north/south drives creating a network for mobility within the site between the land uses.

In addition, two dedicated pedestrian ways are marked on the site development plan to provide pedestrian access from the Tru Hotel to Kingsland Avenue via the existing stairways. These pedestrian ways through the parking field should be marked with continental striping to heighten awareness for

vehicular traffic that pedestrians are traversing the lot. In addition, the existing sidewalk system in place along the west and south sides of the site would be retained; thereby connecting the proposed office users to Kingsland Avenue and Delmar Boulevard.

A cursory review by the civil engineer confirmed that larger delivery vehicles, inclusive of WB-40 trucks, would be able to navigate into and out of the site and into and out of the designated loading zone and trash enclosures. Furthermore, the civil engineer confirmed that the University Fire Department fire truck could navigate into and around the redeveloped site.

Forecasted Traffic Conditions

The 2020 forecasted scenario represents conditions in 2020 with the redevelopment of 711 Kingsland Avenue in place and fully occupied.

2020 Forecasted Traffic Volumes

The existing traffic volumes reflected in **Figure 5** were combined with the (2020) site generated traffic volumes reflected in **Figure 7**, resulting in the 2020 forecasted traffic volumes illustrated in **Figure 8**. These traffic volumes were the basis of the 2020 forecasted operating conditions.

2020 Forecasted Operating Conditions

The 2020 forecasted operating conditions at the study intersections were using the same methodology applied to the existing conditions to determine the adequacy of the road network to accommodate traffic generated by the proposed redevelopment and identify any mitigation measures that may be necessary. The 2020 forecasted operating conditions are summarized in **Table 5**.

As shown, all the intersections within the study area would continue to function with acceptable levels of service during both peak hours despite the introduction of the development's site generated traffic. All the intersections would continue to operate at LOS B or better during the morning and afternoon peak hours. As identified in the discussion of the existing conditions, the southbound approach of Leland Avenue to the intersection with Delmar Boulevard would continue to operate at LOS D during the afternoon peak hour. However, the increase in vehicular delay on this approach attributable to the forecasted traffic is negligible.

The Kingsland Avenue section between Delmar Boulevard and Loop North was analyzed further to ensure that the vehicular queues at one intersection would not impact those at the adjacent intersection. In particular, the southbound left turning traffic at the intersection of Kingsland Avenue with Delmar Boulevard would be contained in the existing left turn storage bay provided and is not anticipated to overflow into the intersection to its north. Similarly, the northbound left turning traffic at the intersection of Delmar Boulevard and Loop North would be contained in the proposed left turn bay provided for the movement as well. Neither intersections queues are anticipated to interfere with the access from the Library or Parking Lot 4, despite the introduction of the site's traffic to Kingsland Avenue.

Therefore, mitigation of the site's traffic impacts upon the area's road system beyond the modifications to the intersection of Kingsland Avenue and Loop North (addition of west leg, provision of northbound left turn lane, replacement of entire traffic signal) are not necessary.



Figure 8. 2020 Forecasted Traffic Volumes

Table 5. 2020 Forecasted Operating Conditions				
Intersection/ Approach	Weekday AM		Weekday PM	
	Vehicle LOS (Delay)	95 th Queue (ft)	Vehicle LOS (Delay)	95 th Queue (ft)
<i>Delmar Boulevard and Trinity Avenue/Princeton Avenue (Roundabout)</i>				
Overall Intersection	A (7.4)		B (12.8)	
Eastbound Approach	A (7.4)	75	B (13.7)	175
Westbound Approach	A (7.8)	50	B (12.7)	125
Northbound Approach	A (6.4)	25	B (10.7)	50
Southbound Approach	A (6.0)	< 25	A (8.0)	< 25
<i>Delmar Boulevard and Sargent Mike King Drive (Signalized)</i>				
Overall Intersection	A (2.8)		A (4.1)	
Eastbound Approach	A (1.6)	72	A (2.5)	130
Westbound Approach	A (3.9)	189	A (4.6)	185
Southbound Approach	A (0.1)	< 25	C (22.4)	< 25
<i>Delmar Boulevard and Kingsland Avenue (Signalized)</i>				
Overall Intersection	B (11.7)		B (14.0)	
Eastbound Approach	A (6.4)	103	A (8.2)	130
Westbound Approach	A (9.6)	110	B (13.3)	121
Northbound Approach	C (28.2)	29	C (24.4)	49
Southbound Approach	B (17.1)	62	B (19.1)	106
<i>Kingsland Avenue and Library Egress Driveway/Lot 4 (Side street stop)</i>				
Eastbound Approach	B (11.3)	< 25	B (14.7)	< 25
Westbound Approach	B (12.0)	< 25	C (19.8)	33
Southbound Left	A (7.9)	< 25	A (8.3)	< 25
<i>Kingsland Avenue and Loop North/Access to the Site (Signalized)</i>				
Overall Intersection	A (3.4)		A (4.5)	
Eastbound Approach	A (5.8)	< 25	A (9.1)	< 25
Westbound Approach	B (10.8)	29	B (12.7)	33
Northbound Approach	A (2.7)	35	A (4.0)	67
Southbound Approach	A (2.4)	27	A (3.2)	34
<i>Delmar Boulevard and Leland Avenue (Signalized)</i>				
Overall Intersection	A (5.8)		B (10.3)	
Eastbound Approach	A (1.6)	54	A (4.4)	145
Westbound Approach	A (3.8)	102	A (6.5)	155
Northbound Approach	C (34.9)	< 25	C (28.1)	27
Southbound Approach	C (32.5)	31	D (44.2)	81

Delay presented in seconds per vehicle

Year 2040 Traffic Conditions

As a planning exercise, St. Louis County Department of Transportation and the City of University City have requested that the traffic conditions in the year 2040 (20-year design horizon) also be evaluated to ensure that there is not a need for long term remediation in the study area.

2040 Baseline Traffic Volumes

As agreed upon by the reviewing agencies, the annual growth rate of 0.25% was assumed for the study area's traffic volumes. This is primarily because the study area is already built out and therefore is not expected to see significant increase in traffic. **Figure 9** depicts the baseline traffic volumes for 2040, which represent the annual growth rates as applied to the existing traffic volumes illustrated in **Figure 4** previously.

2040 Baseline Operating Conditions

The 2040 Baseline operating conditions at the study intersections were analyzed based upon the 2040 no-build traffic volumes illustrated in **Figure 9**. The same methodology applied to the 2020 conditions was again applied to the 2040 baseline volumes to determine the adequacy of the road network to accommodate general growth in the background traffic already on the road network. The 2040 Baseline operating conditions at the intersections included in the study area are summarized in **Table 6**. As can be seen, all the intersections within the study area function are anticipated to continue to operate at acceptable levels of service during both peak hours of a typical weekday.

2040 Forecasted Traffic Volumes

The 2040 baseline traffic volumes depicted in **Figure 9** were combined with the site generated traffic volumes previously presented in **Figure 6**, resulting in the 2040 forecasted traffic volumes illustrated in **Figure 10**, which represent the basis of the 2040 forecasted conditions analysis.

2040 Forecasted Operating Conditions

The 2040 forecasted operating conditions at the study intersections were analyzed using the same methodology applied to the existing and baseline conditions. The 2040 forecasted operating conditions are summarized in **Table 7**.

As shown, acceptable operating conditions comparable to the year 2040 baseline conditions would be maintained despite the inclusion of the site's traffic. Furthermore, despite the modest growth in background traffic, it is still anticipated that the vehicular queues along Kingsland Avenue between Loop North and Delmar Boulevard would be contained within their designated storage bays. It is not anticipated that further mitigation beyond that recommended at the intersection of Kingsland Avenue and Loop North (addition of west leg, provision of northbound left turn lane, replacement of entire traffic signal) are necessary.

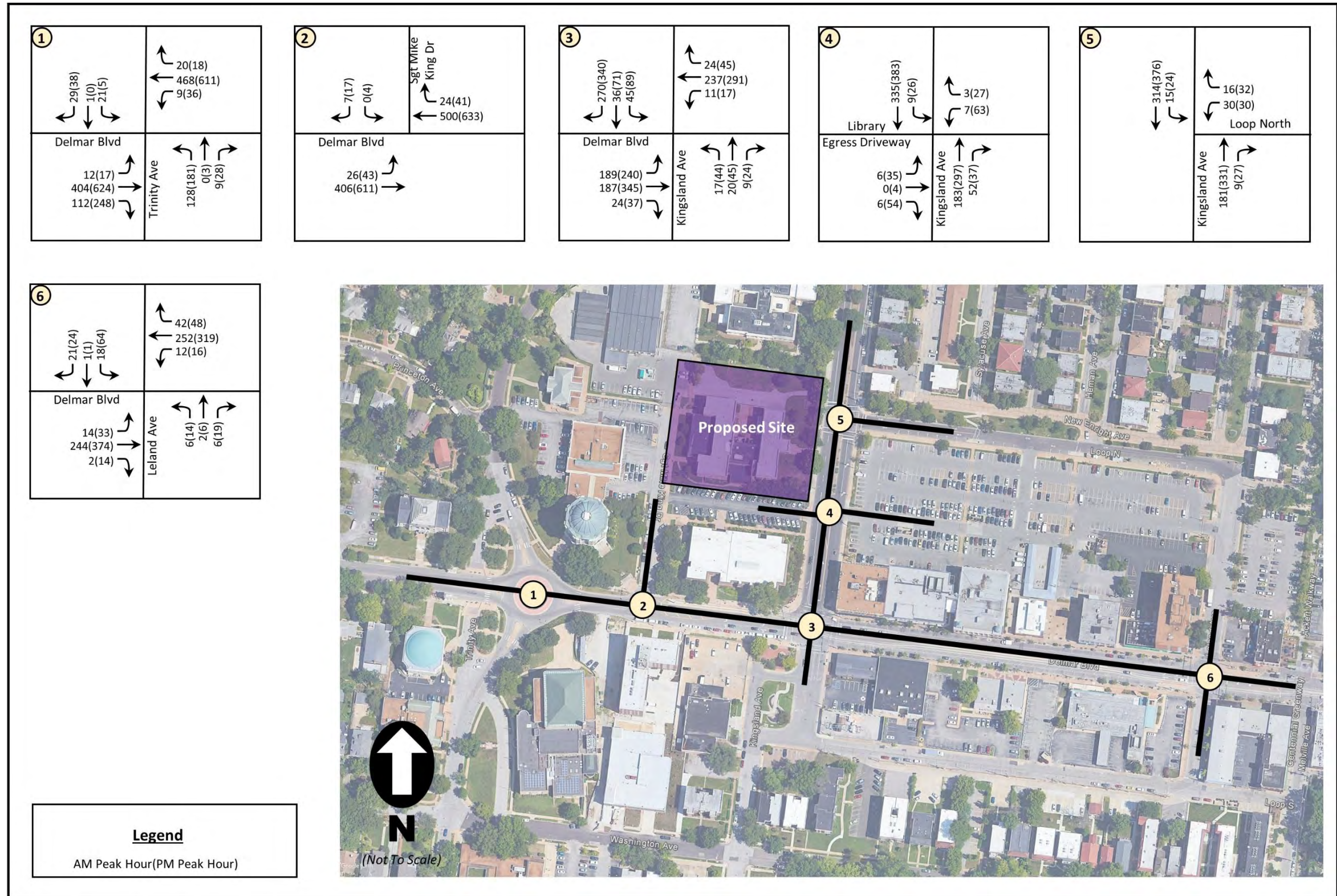


Figure 9. 2040 Baseline Traffic Volumes

Table 6. 2040 Baseline Operating Conditions				
Intersection/ Approach	Weekday AM		Weekday PM	
	Vehicle LOS (Delay)	95 th Queue (ft)	Vehicle LOS (Delay)	95 th Queue (ft)
<i>Delmar Boulevard and Trinity Avenue/Princeton Avenue (Roundabout)</i>				
Overall Intersection	A (7.4)		B (13.2)	
Eastbound Approach	A (7.3)	75	B (14.2)	200
Westbound Approach	A (8.0)	50	B (13.0)	125
Northbound Approach	A (6.5)	25	B (11.1)	50
Southbound Approach	A (6.1)	< 25	A (8.2)	< 25
<i>Delmar Boulevard and Sargent Mike King Drive (Signalized)</i>				
Overall Intersection	A (2.9)		A (3.8)	
Eastbound Approach	A (1.6)	72	A (2.5)	132
Westbound Approach	A (4)	201	A (4.2)	183
Southbound Approach	A (0)	< 25	C (24.0)	< 25
<i>Delmar Boulevard and Kingsland Avenue (Signalized)</i>				
Overall Intersection	B (11.7)		B (13.7)	
Eastbound Approach	A (6.2)	104	A (7.9)	136
Westbound Approach	A (9.7)	111	B (12.9)	122
Northbound Approach	C (28.5)	30	C (24.4)	50
Southbound Approach	B (16.9)	60	B (18.9)	94
<i>Kingsland Avenue and Library Egress Driveway/Lot 4 (Side street stop)</i>				
Eastbound Approach	B (11.2)	< 25	B (14.5)	< 25
Westbound Approach	B (11.5)	< 25	C (19.7)	35
Southbound Approach	A (7.8)	< 25	A (8.3)	< 25
<i>Kingsland Avenue and Loop North (Signalized)</i>				
Overall Intersection	A (4.3)		A (4.3)	
Westbound Approach	B (14.0)	< 25	B (11.8)	27
Northbound Approach	A (3.4)	37	A (4.0)	69
Southbound Approach	A (3.0)	28	A (3.2)	34
<i>Delmar Boulevard and Leland Avenue (Signalized)</i>				
Overall Intersection	A (6.2)		B (10.5)	
Eastbound Approach	A (2.3)	56	A (4.6)	152
Westbound Approach	A (3.8)	101	A (6.6)	161
Northbound Approach	C (34.8)	< 25	C (27.6)	28
Southbound Approach	C (32.6)	33	D (44.2)	83

Delay presented in seconds per vehicle

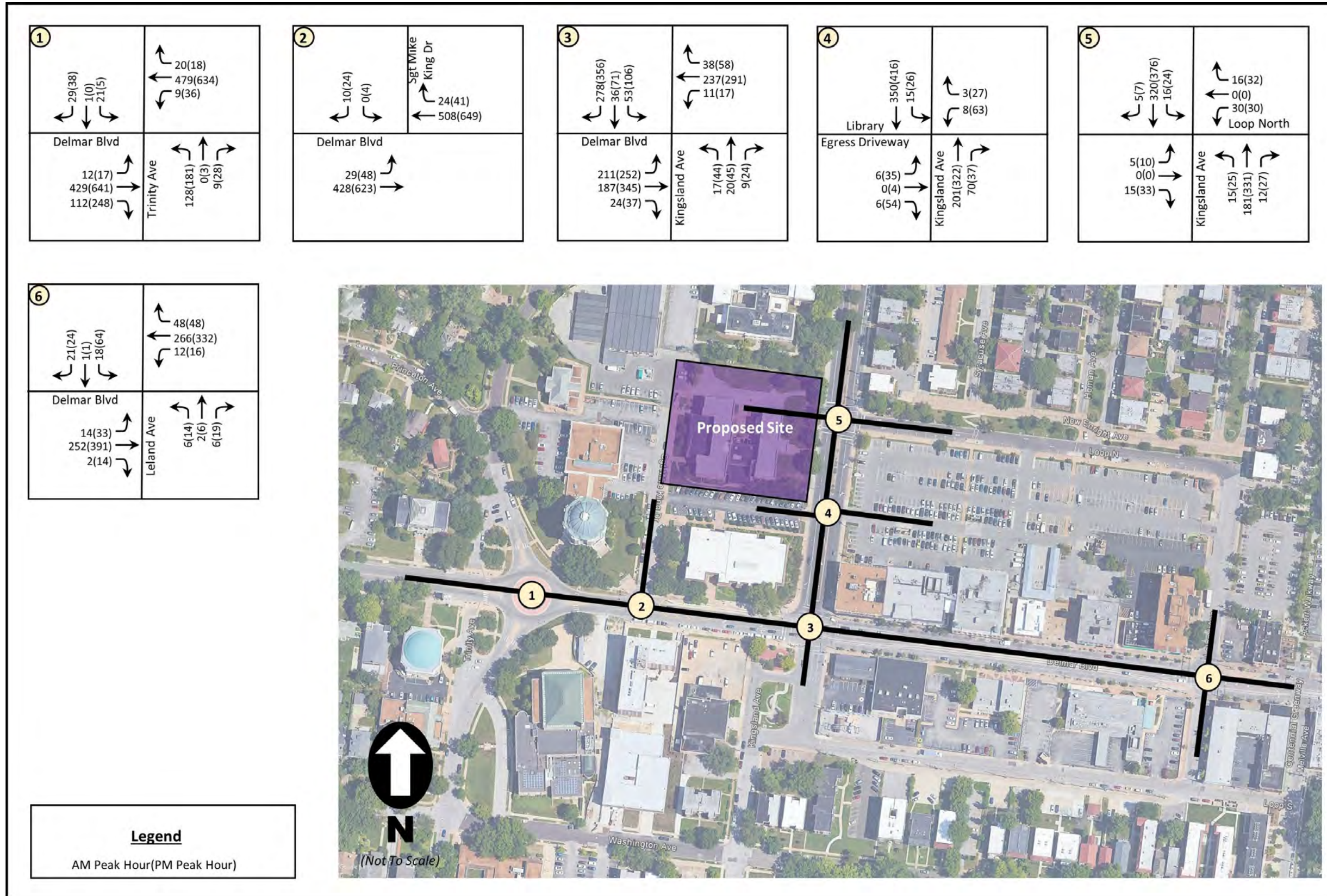


Figure 10. 2040 Forecasted Traffic Volumes

Table 7. 2040 Forecasted Operating Conditions				
Intersection/ Approach	Weekday AM		Weekday PM	
	Vehicle LOS (Delay)	95th Queue (ft)	Vehicle LOS (Delay)	95th Queue (ft)
<i>Delmar Boulevard and Trinity Avenue/Princeton Avenue (Roundabout)</i>				
Overall Intersection	A (7.7)		B (13.8)	
Eastbound Approach	A (7.7)	75	B (14.8)	200
Westbound Approach	A (8.2)	75	B (13.8)	150
Northbound Approach	A (6.7)	25	B (11.4)	50
Southbound Approach	A (6.2)	< 25	A (8.4)	< 25
<i>Delmar Boulevard and Sargent Mike King Drive (Signalized)</i>				
Overall Intersection	A (3.4)		A (4.2)	
Eastbound Approach	A (1.6)	77	A (2.6)	142
Westbound Approach	A (5.0)	207	A (4.7)	195
Southbound Approach	A (0.1)	< 25	C (22.1)	< 25
<i>Delmar Boulevard and Kingsland Avenue (Signalized)</i>				
Overall Intersection	B (11.9)		B (14.2)	
Eastbound Approach	A (6.5)	107	A (8.5)	137
Westbound Approach	A (9.8)	115	B (13.8)	125
Northbound Approach	C (28.4)	30	C (24.3)	50
Southbound Approach	B (17.2)	63	B (19.0)	109
<i>Kingsland Avenue and Library Egress Driveway/Lot 4 (Side street stop)</i>				
Eastbound Approach	B (11.5)	< 25	C (15.4)	< 25
Westbound Approach	B (12.3)	< 25	C (21.5)	38
Southbound Approach	A (7.9)	< 25	A (8.4)	< 25
<i>Kingsland Avenue and Loop North/Access to the Site (Signalized)</i>				
Overall Intersection	A (3.4)		A (4.6)	
Eastbound Approach	A (5.8)	< 25	A (9.1)	< 25
Westbound Approach	B (10.8)	30	B (12.5)	34
Northbound Approach	A (2.8)	38	A (4.1)	72
Southbound Approach	A (2.4)	29	A (3.3)	36
<i>Delmar Boulevard and Leland Avenue (Signalized)</i>				
Overall Intersection	A (6.2)		B (10.4)	
Eastbound Approach	A (2.3)	57	A (4.6)	156
Westbound Approach	A (3.9)	109	A (6.7)	167
Northbound Approach	C (34.8)	< 25	C (27.6)	28
Southbound Approach	C (32.6)	33	D (44.2)	83

Delay presented in seconds per vehicle

Parking Analysis

The parking analysis utilizes an ITE database of land uses to estimate parking demand for the proposed development of 711 Kingsland with respect to its parking supply, conformity with the City of University City's parking requirements, and its anticipated demand. Specifically, the analysis determines to what extent the future parking demand generated by the proposed development can be accommodated by the parking spaces provided on-site and the potential impact of any overflow parking demand upon the nearest public parking lot across the street, Lot 4, behind 6665-6691 Delmar Boulevard. **Figure 11** depicts the location of 711 Kingsland Avenue and its proximity to Lot 4 and nearby landmarks. It is important to note that there is on-street parking along Kingsland Avenue north of Loop North that appears to be relatively unoccupied for most of the day. However, it was decided not to include these spaces in the inventory at this time.

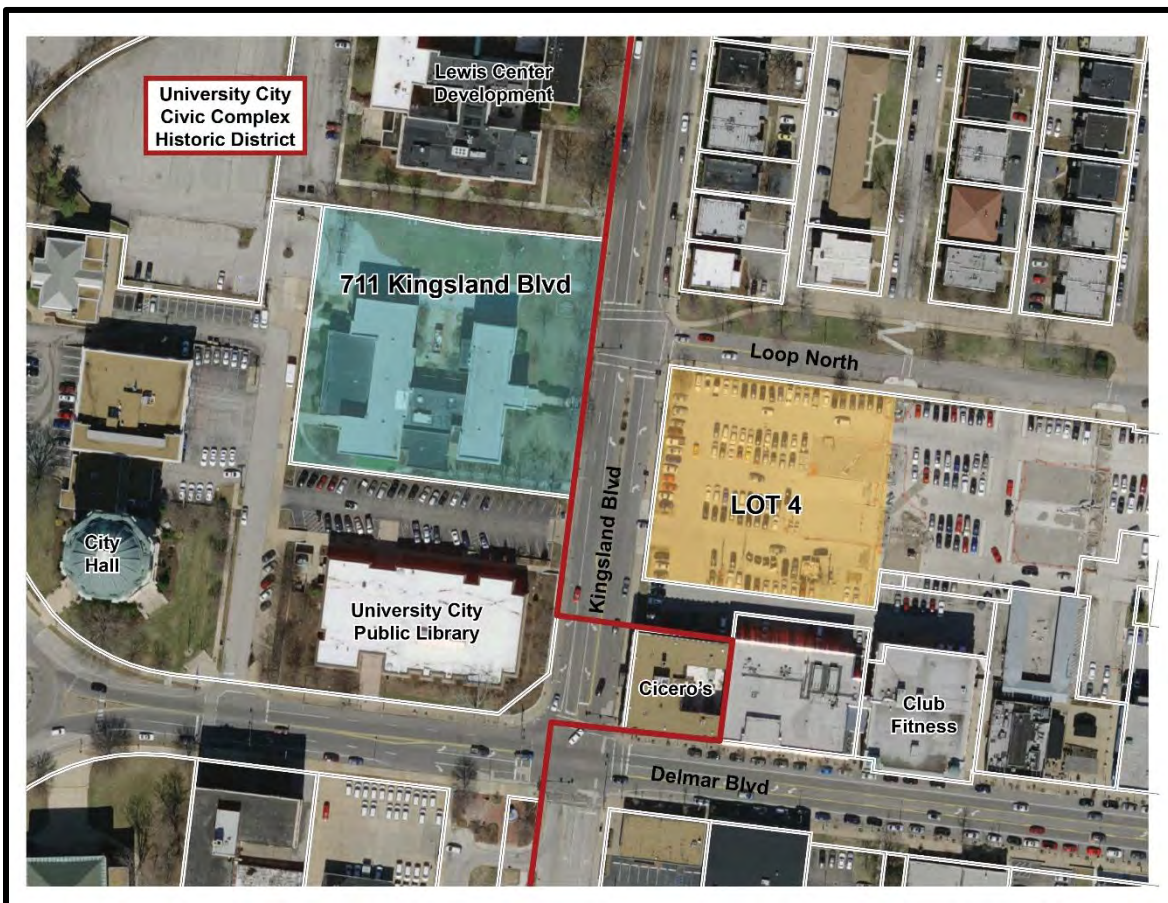


Figure 11. 711 Kingsland Ave Location and Context

University City Code Requirements

University City Planned Developments

As a Planned Development, the proposed redevelopment would require a rezoning of the 711 Kingsland Avenue parcel from PA (Public Activity) to a PD (Planned Development) District. The University City Code (Section 400.720) states that the intent of PD Districts is to relieve a site of conventional zoning standards, such as parking requirements, to facilitate land development and site design that is compatible with the surrounding area and the parcel itself. Section 400.720 pertaining to Planned Development Districts is written as follows:

Section 400.720 Intent and Purpose

The City Council, upon review by the Plan Commission, may, by an ordinance adopted in the same manner as a rezoning is approved, authorize a planned development district when the proposed development or use of a specific tract of land or area warrants greater flexibility, control and density than is afforded under the general regulations of standard zoning districts. These planned development regulations are not intended to allow excessive densities, or the development of incompatible land uses, either within the development, or as the development relates to the general neighborhood. The City Council may, upon proper application, approve a planned development to facilitate the use of flexible techniques of land development and site design by providing relief from conventional zoning standards in order to achieve one (1) or more of the following objectives:

1. Site planning that better adapts to site conditions and its relation to surrounding properties that would not otherwise be possible or would be inhibited under the district regulations applicable to the property;
2. Functional and beneficial uses of open space areas;
3. Preservation of natural features of a development site;
4. Creation of a safe and desirable living environment for residential areas characterized by a unified building and site development program;
5. The proposed development is rational and economical in relation to public utilities and services;
6. Efficient and effective traffic circulation, both within and adjacent to the development site.

University City Parking Requirements

The parking spaces that would be required for the redevelopment at 711 Kingsland Avenue are detailed in City Code Section 400.2130 and 400.2140. These regulations describe the required parking spaces by land use and list exceptions and permitted reductions to those requirements. If 711 Kingsland Avenue is developed as a Planned Development, these parking requirements should guide the determination of the appropriate number of parking spaces for the proposed uses and the application of Council discretion through the Planned Development permitting process.

Table 8 below details the total required parking spaces per City Code Section 400.2140 – Schedule of Off-Street Parking Space Requirements for the proposed development at 711 Kingsland Avenue. For offices, the parking supply ratio required by the City is one space per 300 SF of net floor area. For hotels, the parking supply ratio required by the City is 1.1 spaces per room.

Table 8. Parking Space Requirements for the Proposed Redevelopment per Section 400.2140 of University City Code	
OFFICE	
LEASABLE SQUARE FEET (LSF)	13,942
Parking Requirement Rate	1 space/300 SF
Required Spaces	46
HOTEL	
TOTAL ROOMS	108
Parking Requirement Rate	1.1 spaces/room
Required Spaces	119

Reductions to Off-Street Parking Requirements

University City Code pertaining to off-street parking and loading allows for exceptions to the parking space requirements in **Table 8** above. A shared parking arrangement, granted through a conditional use permit process, is one exception (Section 400.2130.E). **Figure 12** depicts the table provided in Section 400.2130.E of the University City Code and is used to determine the total required spaces for the development under a shared parking agreement. The hotel land use in the proposed development is considered “Lodging” and the office considered “Employment”.

Land Use	Percentage of Required Parking Spaces by Period				
	Monday-Thursday Day and Evening		Friday-Sunday Day and Evening		Nighttime
	6 AM to 5 PM	5 PM to 1 AM	6 AM to 5 PM	5 PM to 1 AM	1 AM to 6 AM
EMPLOYMENT	100%	10%	5%	5%	5%
RETAIL OR SERVICE	75%	75%	100%	90%	5%
RESTAURANT	50%	100%	75%	100%	25%
ENTERTAINMENT and RECREATION	30%	100%	75%	100%	5%
PLACE OF WORSHIP*	5%	25%	100%	50%	5%
SCHOOL	100%	10%	10%	10%	5%
DWELLING	25%	90%	50%	90%	100%
LODGING	50%	90%	75%	100%	100%

*Place of Worship parking needs will be considered on a case by case basis as different faiths gather at different days and times during the week.

Figure 12. Shared Parking Table from University City Code Section 400.2130.E

An additional exception to the off-street parking requirements provided in the City Code is a 10% reduction for a site being within 500 feet of a transit stop or station per Section 400.2130.F. The proposed development at 711 Kingsland Ave is within 500 feet of a bus stop and therefore qualifies for this 10% reduction.

Section 400.2130.F - Exception for Uses Located Near Transit Stations and Stops. For uses located within five hundred (500) feet of a public transit station or stop, the off-street parking requirements may be reduced by ten percent (10%).

[Ord. No. 6989 §1, 4-27-2015]

Through the conditional use permit procedure, the University City Code Section 400.2700.D.2 provides City Council with the discretion to further reduce the total required parking spaces by a maximum of 20%. Based on discussions with the City of University City's Planning Department, the total required parking for the development at 711 Kingsland Ave calculated in this study assumes that the City Council would grant this additional 20% reduction.

Section 400.2700.D.2 Conditional Uses – Review Procedure – City Council Action.

The City Council, in imposing conditions and restrictions, may adjust the standards set forth in this Chapter when it finds such adjustment will be more effective in achieving the spirit and intent of the Chapter. Such adjustments are permitted to be more restrictive or less restrictive, provided that no dimensional regulations or standard shall become less restrictive by a factor of more than twenty percent (20%).

Table 9 applies the Shared Parking Table utilization percentages from **Figure 12** to the required parking spaces per the off-street parking schedule in Section 400.2140 from Table 8. Table 9 also applies reductions to the total required parking as permitted in Sections 400.2130.I and 400.2700.D.2 of the City Code.

Table 9. Projected Parking Space Requirements for the Proposed Redevelopment Assuming a Shared Parking Arrangement					
	Monday-Thursday		Friday-Sunday		Nighttime
	6 AM – 5 PM	5 PM – 1 AM	6 AM – 5 PM	5 PM – 1 AM	1 AM – 6 AM
Employment (% utilized of 53 spaces)	100%	10%	5%	5%	5%
Lodging (% utilized of 119 spaces)	50%	90%	75%	100%	100%
Employment (total spaces utilized by time period)	46	5	2	2	2
Lodging (total spaces utilized by time period)	60	107	89	119	119
Subtotal spaces utilized per time period	106	112	91	121	121
10% reduction for transit (400.2130.I)	(11)	(11)	(9)	(12)	(12)
20% reduction (400.2700.D.2)	(21)	(22)	(18)	(24)	(24)
Total	74	79	64	85	85

The total required parking for 711 Kingsland Avenue per **Table 9** is 85 spaces. The total number of spaces provided on-site is 75 spaces, leaving a 10-space deficit. There is a remedy to this deficit, which allows for an exception to the total parking spaces required on-site based on the site's proximity (within 500 feet) to public parking.

Section 400.2130.C – Exception Where Public Parking is Allocated For Use

The City Council may allow a reduction in the number of on-site parking spaces required when the building served by such parking is located within five hundred (500) feet of a public parking facility or lot, provided a fee is paid to the City for pro rata share of the cost of constructing and maintaining such facility or lot.

Therefore, if granted a conditional use permit for a shared parking arrangement, based on the above analysis, the 10 additional spaces needed for the development at 711 Kingsland Ave could be provided by leasing 10 spaces in the public surface parking lot, Lot 4. Further analysis outlined below demonstrates that allowing the uses at 711 Kingsland Avenue to lease 10 parking spaces on Lot 4 would not cause a shortage but rather would be a prudent use of underutilized parking during the daytime hours. Therefore, the decision to allow 711 Kingsland Avenue to lease the 10 spaces it needs per city requirements would have no impact on the overall availability of parking within Lot 4.

However, if 711 Kingsland Avenue is to be redeveloped as a Planned Development (PD District), then the University City City Code (Section 400.720) states that the site can be relieved of conventional zoning standards, such as the above parking requirements. Under this scenario, should the City desire to use their

discretion to permit 711 Kingsland Avenue to provide only 75 parking spaces, there is a possibility that the petitioner would no longer need to lease 10 additional spaces from the City within a public lot.

Parking Demand Associated with the Redevelopment of 711 Kingsland Avenue

The proposed redevelopment at 711 Kingsland Avenue would provide for a 108-room Tru Hotel by Hilton (replacing the Delmar building) and the renovation of the Harvard building to accommodate office space (13,942 LSF).

The proposed redevelopment's forecasted parking demand was calculated based upon data provided in the ITE Parking Generation Manual (5th Edition). ITE Land Use 710 - General Office for a dense multi-use urban setting was used for the proposed office building. ITE Land Use 310 - Hotel in a general urban/suburban setting using the occupied rooms rate was used for the proposed hotel. While it would have been preferred to also use the dense multi-use urban hotel data, ITE Land Use 310 – Hotel in a dense multi-use urban setting was not sufficient due to a lack of data; therefore, general urban/suburban was used in its place. It is likely that the dense, urban context of the proposed hotel may result in lower real demand ratios than used in this study due to the limited data available.

The anticipated occupancy rate for the proposed hotel was based on the Proposed Hotel Feasibility Study submitted to the City of University City by HVS on February 3, 2020. Figure 1-3 on page 6 of the study most accurately describes the expected occupancy rate for a boutique hotel in St. Louis like the Tru Hotel at 70.2%. This percent is the average occupancy rates from 2019 of 14 hotels including the Moonrise Hotel, Clayton Plaza, Hilton at Frontenac, and the Chase Park Plaza. To be conservative, this study assumes an occupancy rate of 75% for the Tru Hotel. Therefore, 81 rooms were assumed for the peak parking demand calculations.

The Tru Hotel's expected users are young professionals that rely less on personal vehicles and would be more likely to utilize ride-share options, walk, or bike to get to their destinations during their stay at the hotel. Because of its proximity to Washington University and the Loop District, hotel guests would likely be staying at this location because they intend to visit the University and/or the Loop, both of which are within walking distance. For these reasons, the average peak parking demand ratios from ITE were used for each land use type within the development.

Table 10 summarizes the ITE land use types and parking demand ratios used to calculate the proposed development's parking peak demand. ITE data for office uses assumes that on average, 85% of the gross square feet of an office building is leasable. The Harvard building was designed as a school and differs from a typical office building by having much larger areas devoted to stairways, landings, corridors, mechanical rooms, and restrooms. The effective square footage of the Harvard Building is therefore less than that of a typical office building per ITE. In this analysis, the gross square footage of the Harvard Building office space was adjusted to more accurately apply the parking demand ratios provided by ITE.

The actual gross square footage of the Harvard Building is 25,395 square feet. However, only 13,942 square feet or 55% of that gross square footage is leasable office space. Therefore, in order to accurately estimate the parking demand for the office use, an adjusted gross square footage of 16,400 SF was utilized, which correlates to a leasable square footage of 13,942 SF. The justification for this adjustment was the increased allotment to stairways, landings, corridors, mechanical and restrooms in the repurposed building as compared to a purpose-built office building.

ITE Land Use	SF/ Occupied Rooms	WEEKDAYS			SATURDAY			
		Base Ratio	Units	Parking Spaces	Base Ratio	Units	Parking Spaces	
ITE 710 - General Office	16,400	1.63	/ksf GLA	27	N/A	/ksf GLA	N/A	
ITE 310 - Hotel (occupied rooms)	81	0.83	/ksf GLA	67	1.18	/ksf GLA	96	
		Demand:			94	Demand:		96

The ITE Parking Generation Manual provides temporal information pertaining to each land use so that the hourly fluctuations in the redevelopment's parking demand can be determined. **Table 11** tabulates the on-site parking demand at 711 Kingsland Ave as compared to the proposed supply of 75 parking spaces.

As shown in **Table 11**, the proposed redevelopment would experience its highest weekday utilization at 8:00 AM and lunch hours (12:00 PM-1:00 PM). This is to be expected in the morning given the proposed office use and the likely timing of hotel guests checking in and out of the hotel. The noon time peak could be overstated given that the proposed hotel would not have a restaurant use and the ITE data does not differentiate for hotels that do and do not offer eating establishments. At 8:00 AM the parking demand exceeds the site's capacity by 5 spaces and at 12:00 PM and 1:00 PM the demand exceeds the site's capacity by 3 spaces.

On weekends, the parking demand exceeds the site's capacity in the late evening hours from 9:00 PM to 10:00 PM. The proposed development would reach a peak demand of 89 spaces at 10:00 PM: exceeding the site's supply by 14 spaces (119% of the site's 75 space supply).

These parking demand results indicate that a portion of the parking demand associated with 711 Kingsland Avenue's redevelopment would need to be accommodated off-site. Therefore, the availability of parking across Kingsland Avenue in Lot 4 was evaluated.

Table 11. Future Parking Demand On-Site at 711 Kingsland Avenue

Day of Week	Time	Hotel Demand	Office Demand	Subtotal Demand (hotel + office)	711 Kingsland Parking Utilization (75 spaces)	Surplus/ Shortage (711 Kingsland)
Weekday	7:00 AM	67	7	74	99%	1
	8:00 AM	63	17	80	107%	(5)
	9:00 AM	48	25	73	97%	2
	10:00 AM	46	27	73	97%	2
	11:00 AM	44	27	71	95%	4
	12:00 PM	52	26	78	104%	(3)
	1:00 PM	52	26	78	104%	(3)
	2:00 PM	42	26	68	91%	7
	3:00 PM	40	25	65	87%	10
	4:00 PM	39	24	63	84%	12
	5:00 PM	35	0	35	47%	40
	6:00 PM	42	0	42	56%	33
	7:00 PM	50	0	50	67%	25
	8:00 PM	52	0	52	69%	23
	9:00 PM	48	0	48	64%	27
10:00 PM	56	0	56	75%	19	
Saturday	5:00 PM	51	0	51	68%	24
	6:00 PM	61	0	61	82%	14
	7:00 PM	64	0	64	85%	11
	8:00 PM	75	0	75	99%	0
	9:00 PM	77	0	77	103%	(2)
	10:00 PM	89	0	89	119%	(14)

Parking Demand at University City's Public Lot 4 (Western Portion)

The nearest available parking lot is Lot 4, a publicly owned parking lot owned and operated by University City immediately east of Kingsland Avenue between Delmar Boulevard and Loop North and is across the street from the proposed redevelopment. The following analysis assesses the capacity of Lot 4 to absorb the overflow parking demand from the 711 Kingsland Avenue development given existing and future parking demand.

Existing Parking Supply in Lot 4

Lot 4 was divided into eight separate zones (depicted in **Figure 13**). There is a total of 235 spaces within Lot 4, including the on-street parking spaces adjacent to Lot 4 on the south side of Loop North (Zone 1 in **Figure 13**).

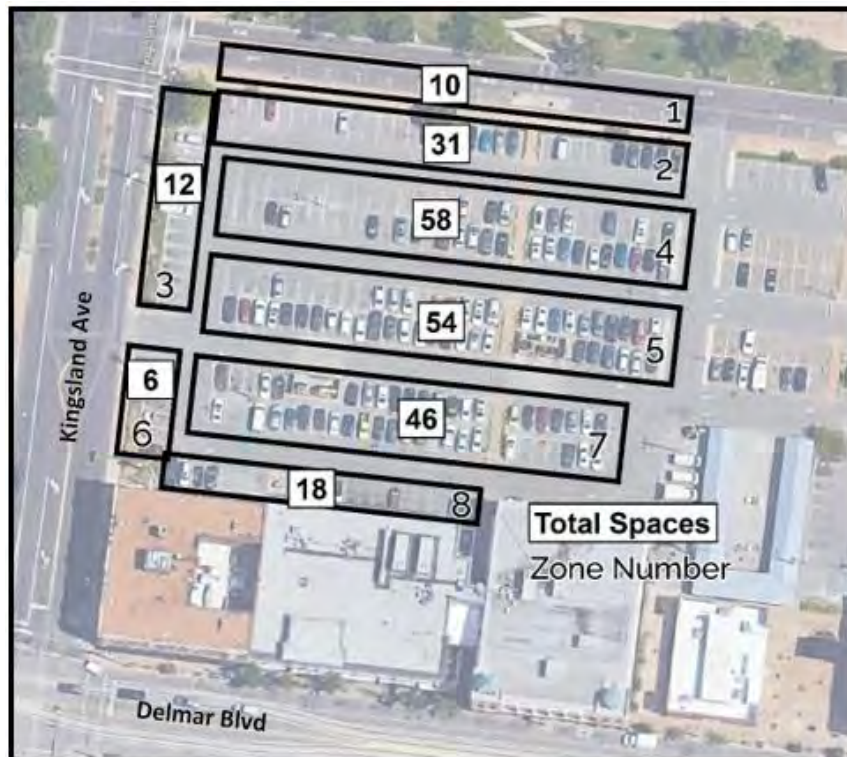


Figure 13. Parking Zones within Lot 4

There are several reserved or restricted spaces within Lot 4. In the east end of Zone 7, there are fourteen reserved spaces for specific tenants or patrons. The west end of Zone 8 includes four spaces restricted to 15-minute parking. Within Zone 8 there are also nine spaces reserved for specific tenants or patrons in the middle and east end of the zone.

Existing Parking Demand in Lot 4

In order to assess Lot 4's existing parking demand, parking utilization counts were conducted on an hourly basis on Saturday, February 1st, 2020, from 5:00 PM to 10:00 PM and Thursday, February 13th, 2020, from 7:00 AM to 10:00 PM. These hours were chosen because they include the peak hours for parking demand for all uses that occupy 6665-6691 Delmar Boulevard as well as the peak times for the hotel and office uses proposed at 711 Kingsland Avenue.

During data collection, the Lewis Center at 725 Kingsland Ave was under construction. It was observed that the workers from this construction site were using the parking spaces in the northern portion of Lot 4 to park their cars during their weekday shift. Based on the data collected and observation, it was determined that about 40 spaces within Lot 4 were being used by construction workers from 7:00 AM to 3:00 PM and approximately 20 spaces were being utilized from 3:00 to 4:00 PM during the weekday data collection period. These spaces were removed from the final utilization counts on Lot 4.

Figures 14 and **15** show the utilization of each zone in Lot 4 at its peak hour during the weekday and Saturday data collection periods, respectively. **Tables 12** and **13** summarize the existing parking utilization in a tabular format for each collection period. It was determined that the peak utilization hour for a typical weekday was observed at 2:00 PM, when the western portion of Lot 4 was 69% utilized with a demand of 161 out of 235 parking spaces in use. The peak utilization hour for Saturday was observed at 8:00 PM with Lot 4 being 86% utilized with 201 of 235 parking spaces in use.

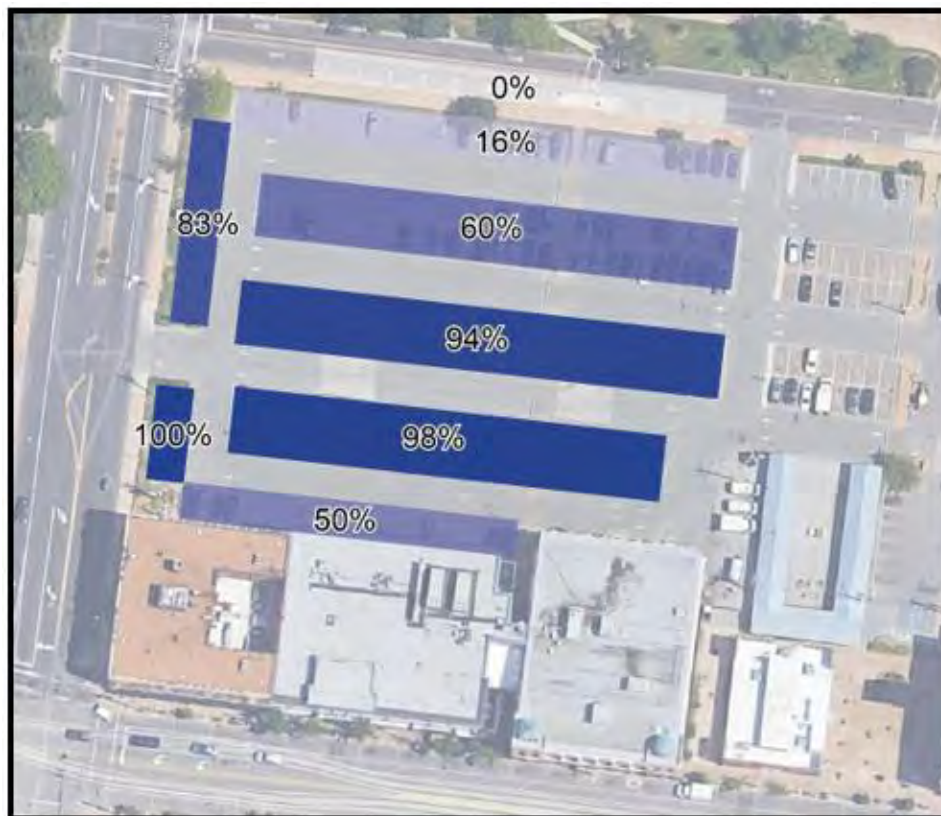


Figure 14. Existing Weekday Peak Parking Demand (2 PM) on Lot 4

Table 12. Existing Weekday Parking Utilization on Lot 4									
Time	Parking Zone								Utilization
	1	2	3	4	5	6	7	8	
Supply	10	31	12	58	54	6	46	18	235
7:00 AM	0%	0%	0%	7%	11%	67%	20%	33%	12%
8:00 AM	0%	0%	0%	16%	30%	50%	63%	50%	28%
9:00 AM	0%	0%	67%	17%	74%	33%	91%	50%	47%
10:00 AM	0%	29%	83%	34%	89%	67%	91%	50%	60%
11:00 AM	0%	29%	83%	41%	96%	83%	89%	50%	64%
12:00 PM	0%	23%	83%	52%	96%	100%	93%	50%	67%
1:00 PM	0%	19%	83%	52%	91%	83%	89%	50%	64%
2:00 PM	0%	16%	83%	60%	94%	100%	98%	50%	69%
3:00 PM	0%	0%	42%	26%	85%	83%	93%	44%	52%
4:00 PM	0%	16%	8%	26%	78%	67%	78%	39%	47%
5:00 PM	0%	16%	8%	33%	74%	67%	76%	44%	48%
6:00 PM	0%	6%	17%	19%	50%	33%	65%	61%	36%
7:00 PM	0%	10%	42%	7%	61%	83%	50%	56%	35%
8:00 PM	0%	10%	25%	3%	54%	50%	46%	56%	30%
9:00 PM	0%	3%	25%	0%	35%	100%	41%	50%	24%
10:00 PM	0%	6%	25%	3%	22%	100%	30%	56%	21%



Figure 15. Existing Saturday Peak Parking Demand (8 PM) on Lot 4

Table 13. Existing Saturday Parking Utilization on Lot 4									
Time	Parking Zone								Utilization
	1	2	3	4	5	6	7	8	
<i>Supply</i>	10	31	12	58	54	6	46	18	235
5:00 PM	0%	39%	33%	38%	57%	83%	70%	56%	49%
6:00 PM	0%	42%	25%	62%	70%	67%	61%	56%	56%
7:00 PM	0%	71%	42%	91%	98%	100%	59%	67%	76%
8:00 PM	10%	84%	100%	90%	98%	100%	78%	83%	86%
9:00 PM	10%	61%	67%	60%	70%	100%	65%	67%	63%
10:00 PM	10%	32%	25%	31%	50%	67%	54%	50%	41%

Future Parking Demand in Lot 4

Public Parking Lot 4 currently provides parking for 6665 Delmar Boulevard, 6677-6685 Delmar Boulevard, and 6687-6691 Delmar Boulevard. In calculating future parking demand in Lot 4, all current vacancies within these buildings were assumed to be occupied. Data pertaining to existing land uses and vacancies was provided by the City of University City. These vacancies include one 7,000 SF restaurant at 6691 Delmar Boulevard and one 2,106 SF restaurant at 6665 Delmar Boulevard. **Table 14** summarizes the land uses and their associated square footages or total units in 6665 to 6691 Delmar Boulevard.

Address	Land Use	Occupied SF	Vacant SF
6665 Delmar Blvd	Gym	12,000 SF	2,106 SF
	Office	16,788 SF	
	Restaurant	4,562 SF	
6677-6685 Delmar Blvd	Office	20,117 SF	
	Restaurant	11,633 SF	
6687-6691 Delmar Blvd	Residential	12 Housing Units	7,000 SF
	Restaurant	1,000 SF	
	Retail	1,000 SF	

The latest edition of the ITE Parking Generation Manual (5th Edition) were used to determine the future parking demand from these vacant restaurant spaces. Both restaurant vacancies were assumed to be occupied in the future by high-turnover, sit-down restaurants that serve lunch and dinner (ITE 932). ITE estimates for dense multi-use urban high-turnover sit-down restaurants were used due to the urban and mixed-use nature of the Loop commercial district. **Table 15** summarizes the vacant spaces' ITE parking demand estimates.

Land Use	SF	WEEKDAYS			SATURDAY		
		Base Ratio	Units	Parking Spaces	Base Ratio	Units	Parking Spaces
ITE 932 - High-Turnover Sit-Down Restaurant	7,000	6.47	/ksf GLA	45	7.19	/ksf GLA	50
ITE 932 - High-Turnover Sit-Down Restaurant	2,106	6.47	/ksf GLA	14	7.19	/ksf GLA	15
Demand:				59	Demand: 65		

The future parking demand of Lot 4, assuming the current restaurant vacancies are occupied, was calculated using the ITE demand temporal estimates aggregated with the data collected hourly for Lot 4's current utilization. **Table 16** shows the anticipated weekday and Saturday parking utilization in Lot 4 assuming all vacancies along Delmar Boulevard between 6665 and 6691 Delmar are occupied.

Table 16. Future Parking Demand on Lot 4 (Pre-Development of 711 Kingsland Avenue)								
Day of Week	Time	Existing Demand	Vacancy (2,106 SF)	Vacancy (7,000 SF)	Future Demand	Lot 4 Parking Supply	Lot 4 Utilization (235 sp)	Surplus/ Shortage
Weekday	7:00 AM	29	0	0	29	235	12%	206
	8:00 AM	66	0	0	66	235	28%	169
	9:00 AM	111	0	0	111	235	47%	124
	10:00 AM	142	4	4	150	235	64%	85
	11:00 AM	150	6	7	163	235	69%	72
	12:00 PM	157	13	45	215	235	91%	20
	1:00 PM	150	13	37	200	235	85%	35
	2:00 PM	161	7	24	192	235	82%	43
	3:00 PM	122	5	15	142	235	60%	93
	4:00 PM	110	5	12	127	235	54%	108
	5:00 PM	112	8	13	133	235	57%	102
	6:00 PM	85	13	26	124	235	53%	111
	7:00 PM	83	14	32	129	235	55%	106
	8:00 PM	71	11	35	117	235	50%	118
	9:00 PM	57	7	28	92	235	39%	143
10:00 PM	49	4	19	72	235	31%	163	
Saturday	5:00 PM	116	10	32	158	235	67%	77
	6:00 PM	132	12	45	189	235	81%	46
	7:00 PM	178	12	50	240	235	102%	(5)
	8:00 PM	201	12	45	258	235	110%	(23)
	9:00 PM	149	8	36	193	235	82%	42
	10:00 PM	97	7	28	132	235	56%	103

For most weekday and weekend hours, Lot 4 has adequate parking supply to accommodate the full occupancy of 6665 to 6691 Delmar Boulevard. However, during the lunch hour of a typical weekday, Lot 4's demand would exceed 90% of its supply. On a Saturday evening, at 7:00 PM and 8:00 PM, Lot 4's demand would exceed supply by 5 and 23 parking spaces, respectively. If the vacancies were filled, this analysis shows there will likely be a parking shortage during these few weekend evening hours.

Forecasted Parking Demand in Lot 4 Assuming Overflow from 711 Kingsland Avenue

Given there is a need for some of the parking demand associated with the redevelopment of 711 Kingsland Avenue to overflow into Lot 4, the future parking demands within Lot 4 were aggregated with the overflow parking demand from across the street to assess the impact of Lot 4 absorbing 711 Kingsland's excess parking demand.

It should be noted that an internal capture adjustment could have been applied to the forecasted parking calculations. Given the hotel and office's proximity to destinations on the Loop, it is reasonable to expect some hotel and office users will walk to businesses served by Lot 4 rather than driving across Kingsland Avenue and parking within Lot 4 itself. However, to be conservative, this adjustment was not applied.

To summarize, the following future parking analysis of Lot 4 assuming it accommodates overflow from 711 Kingsland Avenue is based on these assumptions:

- 711 Kingsland Ave is occupied and fully operational.
- All spaces in buildings 6665 to 6691 Delmar Boulevard are fully leased.
- All 75 parking spaces at 711 Kingsland Ave would be 100% utilized before Lot 4 absorbs overflow parking demand from 711 Kingsland Ave.
- Lot 4 absorbs overflow parking demand from 711 Kingsland Ave until it reaches 100% utilization.

Table 17 summarizes the results of the forecasted parking analysis, applying the assumptions listed above.

Table 17. Future Parking Demand in Lot 4 Assuming Overflow from 711 Kingsland Avenue							
Day of Week	Time	711 Kingsland Demand	Lot 4 Future Demand	Overflow from 711 Kingsland	Forecasted Demand	Lot 4 Parking Utilization	Surplus/ Shortage
Weekday	7:00 AM	74	29	0	29	12%	206
	8:00 AM	80	66	5	71	30%	164
	9:00 AM	73	111	0	111	47%	124
	10:00 AM	73	150	0	150	64%	85
	11:00 AM	71	163	0	163	69%	72
	12:00 PM	78	215	3	218	93%	17
	1:00 PM	78	200	3	203	86%	32
	2:00 PM	68	192	0	192	82%	43
	3:00 PM	65	142	0	142	60%	93
	4:00 PM	63	127	0	127	54%	108
	5:00 PM	35	133	0	133	57%	102
	6:00 PM	42	124	0	124	53%	111
	7:00 PM	50	129	0	129	55%	106
	8:00 PM	52	117	0	117	50%	118
	9:00 PM	48	92	0	92	39%	143
	10:00 PM	56	72	0	72	31%	163
Saturday	5:00 PM	51	158	0	158	67%	77
	6:00 PM	61	189	0	189	80%	46
	7:00 PM	64	240	0	240	102%	(5)
	8:00 PM	75	258	0	258	110%	(23)
	9:00 PM	77	193	2	195	83%	40
	10:00 PM	89	132	14	146	62%	89

Assuming the overflow parking from the redevelopment of 711 Kingsland Ave is accommodated in Lot 4, the hour with the highest utilization during a weekday would be 93% at noon with 218 of the 235 spaces utilized. On a weekend, the highest utilization would be 110% at 8:00PM with an excess demand of 23 spaces; although there would not be any overflow parking from 711 Kingsland Avenue at that time. It is important to note that this weekend utilization peak at 8:00 PM is due solely to the demand associated with the buildings along Delmar Boulevard. The total parking demand from 711 Kingsland at 8:00PM is 75 spaces, which does not exceed its on-site supply. In fact, the provision of a hotel near the restaurants and retail might actually “lessen” the demand on a weekend evening since a portion of the patrons will simply walk over from the hotel.

Most importantly, there are no hours within a typical weekday or weekend evening in which the overflow demand from the redevelopment of 711 Kingsland Avenue causes Lot 4 to reach or exceed capacity. Lot 4 has parking spaces available at the times when the parking demand on the redevelopment site is highest. This analysis demonstrates that a shared parking arrangement would be feasible between 711 Kingsland Avenue and Lot 4 without being detrimental to the existing uses along Delmar Boulevard.

Conclusions

Lochmueller Group has completed the preceding study to address the traffic impact and parking demands for the proposed redevelopment of 711 Kingsland Avenue in University City, Missouri. The 1.648-acre parcel is the location of the former Delmar-Harvard Elementary School and contains two structures; the Delmar building facing Kingsland Avenue and the Harvard building facing Sargent Mike King Drive.

TriStar Companies intends to redevelop the property to provide a new Tru Hotel (108 rooms) on the eastern portion of the site (following removal of the Delmar building) and renovate the west building (Harvard) to be used as office space (29,987 GSF, 15,836 net SF). The total number of trips generated by the proposed redevelopment would be 92 and 98 trips in the weekday AM and PM peak hours, respectively. The proposed site plan includes access to the site via two drives: one primary full access on the east side of the site; which would be signalized access onto Kingsland Avenue opposite Loop North and one secondary full access drive via Sargent Mike King Drive; located at the northwest corner of the site.

The traffic evaluation resulted in the following conclusions:

- In the existing condition, all the intersections included in the study area function with an overall acceptable level of service during both the weekday morning and afternoon peak hours.
- The primary access onto Kingsland Avenue would be comprised of one inbound lane and one outbound lane with a width of approximately 27 feet. While 40-foot throat depth would be preferred, it is not attainable at this urban location given the retainment of the Harvard Building. The proposed 37 feet of throat depth will be adequate to accommodate the anticipated demand exiting the site.
- The existing intersection of Kingsland Avenue with Loop North should be modified to incorporate the new west leg. In order to accommodate the site’s exiting traffic, an additional phase is proposed to be added to the traffic signal. This phase would run concurrently with the phase serving the westbound traffic. In addition, it is recommended that the existing landscaped median along Kingsland Avenue between the Library’s drive and Loop North be removed and replaced with a dedicated northbound left turn lane that would accommodate traffic queueing to turn into

the site. All the above improvements, coupled with the age of the existing traffic signal, would dictate the need for the entire traffic signal to be replaced.

- It is recommended that traffic exiting the site at the secondary access to Sargent Mike King Drive be placed under STOP control via the installation of signage on the westbound approach. Given the proximity of the City's Police Department, it is prudent to remind those entering Sargent Mike King Drive to yield right-of-way to any emergency vehicles.
- All proposed drives should conform to the sight distance requirements set forth by the American Association of State Highway and Transportation Officials (AASHTO). As part of the design process, care should be given to ensure that signage and/or landscaping does not pose sight distance limitations at any of the proposed access drive locations.
- When the additional traffic from the proposed development is taken into consideration, there is not a need for mitigation on the area road system beyond that recommended at the intersection of Kingsland Avenue and Loop North.

The parking evaluation resulted in the following conclusions:

- The proposed development at 711 Kingsland Avenue would provide 75 parking spaces on-site.
- The proposed development at 711 Kingsland Avenue provides for two complimentary uses in terms of shared parking given that a hotel's parking demand tends to peak in the evenings and overnight hours while an office's parking demand tends to peak during the daytime hours.
- Per University City's parking code for conditional use permits, the development at 711 Kingsland Avenue would need to lease an additional 10 off-site parking spaces (85 total spaces on and off-site) to be compliant under a shared parking arrangement (pending conditional use permit approval and assuming all applicable parking space reductions are applied).
- Parking demand at 711 Kingsland Avenue, per ITE parking demand data, would exceed its supply on weekdays at 8:00 AM (5 spaces), 12:00 PM (3 spaces), and 1:00 PM (3 spaces). On weekends, the demand from 711 Kingsland Avenue would exceed the supply at 9:00 PM (2 spaces) and 10:00 PM (14 spaces).
- There is a total of 235 parking spaces within the western portion of Lot 4, included the 10 on-street spaces adjacent to the surface lot on the south block of Loop North Drive.
- The current maximum utilization of Lot 4 is 69% at 2:00PM on a weekday and 86% at 8:00PM on a Saturday.
- There is currently 9,106 SF of vacant restaurant space within the buildings from 6665-6691 Delmar Boulevard. Once occupied, the weekday peak parking demand on Lot 4 would occur at noon at 91% occupied and on a weekend at 8:00 PM with a demand equal to 110% of the supply.
- If 711 Kingsland Avenue is permitted to use parking spaces on Lot 4 to accommodate its overflow parking demand, the hour with the highest utilization on Lot 4 during a weekday would be 93% at 12:00 PM with 218 of the 235 spaces utilized. On a weekend, the highest utilization on Lot 4 would be 110% at 8:00 PM with an excess demand of 23 spaces (demand of 258, supply of 235).
- The expected parking shortage on Lot 4 during a weekend night at 8:00 PM is the result of future expected demand generated by the current vacancies at 6665 to 6691 Delmar Boulevard. The shortage is not attributable to the overflow demand from 711 Kingsland Avenue. At 8:00

- PM on a Saturday evening, the proposed redevelopment's on-site parking supply is adequate.
- There are no hours in which the demand from 711 Kingsland Avenue causes Lot 4 to reach or exceed capacity.
 - The analysis demonstrates that a shared parking arrangement would be feasible between 711 Kingsland Avenue and Lot 4.