Traffic Impact Study

for

Centene Campus Development

Clayton, Missouri

Revised 8.26.2016

CBB TRANSPORTATION ENGINEERS+PLANNERS

prepared for:

City of Clayton

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Executive Summary

Centene Corporation is proposing to develop multiple Sub-districts of land along the south side of Forsyth Boulevard between Hanley Road and Forest Park Parkway and the northwest corner of Hanley Road and Carondelet Avenue in Clayton, Missouri. The proposed Centene Campus development is generally bounded by Forsyth Boulevard to the north, Carondelet Plaza/Carondelet Avenue to the south, Bemiston Avenue to the west and Forest Park Parkway to the east.

Existing Conditions Summary

The intersections within the study area operate at acceptable conditions during the morning and evening rush hours of a typical weekday under existing conditions. The signals along Hanley Road are coordinated and contain the heaviest flows, with the northbound movements favored during the morning peak and the southbound movements favored during the afternoon peak. Consequently, in order to maintain progression, a majority of each traffic signal's green time is allocated to Hanley Road, as opposed to the side street, resulting in certain side street movements operating at less than desirable levels of service.

Despite the majority of the time being allocated to Hanley Road, the southbound approach of Hanley Road at Bonhomme Avenue to Forsyth Boulevard operates at a less than desirable levels during the PM peak hour. Field observations along the corridor revealed extensive queues along Hanley Road during the PM peak hour. Furthermore, the queues were observed originating further to the south on the system, occasionally as far south as Clayton Road. Once the queues to the south begin to dissipate, the queuing on southbound Hanley within the CBD also diminishes.

Proposed Centene Development Summary

It is our understanding that Centene intends to build the overall campus in four Sub-districts. Sub-district 1 consists of 561,915 square feet (SF) of office space and 13,160 SF of ground floor retail; Sub-district 2 consists of 119-units of luxury condo/townhouses, 40,000 SF for the relocation of the Wellbridge health club and 8,000 SF of ground floor retail; Sub-district 3 is comprised of 410,485 SF of office space, a 120-room corporate lodging facility, a 1,000-seat corporate civic auditorium, a 650-seat conference/training area, and 28,140 SF of retail space (assumed to be a 15,145 quality restaurant, 1,500 SF coffee shop, and 11,495 SF of ground floor retail); and Sub-district 4 will consist of 461,020 SF of office space and 7,580 SF of ground floor retail.

It is our understanding that Centene will likely be the main user of the training center, auditorium and corporate lodging facilities resulting in minimal new trip generation for the development. However, from time to time, one or all of these facilities may be made available to the public for certain uses, and Centene will manage the hours of that use.

The full build-out of the Centene Campus Development will contain a total of 1,433,420 SF of office space, 56,880 SF of ground floor retail space (including 40,235 SF of general retail space, an assumed 15,145 SF quality restaurant, and an assumed 1,500 coffee shop), 119 luxury condo/townhouses, a 120-room corporate lodging facility, a 1,000-seat corporate civic auditorium, and a 650-seat training center

Based on the application submitted by the applicant to the City on August 1, 2016, Sub-district 1 will be served by a 616-space parking garage under the office building with two garage entrances (416 spaces served via a right-in/right-out access on Forsyth Boulevard and 200 spaces served via an entrance from the north-south alley). In addition, a new 1,260-space parking garage in the general vicinity of the existing Wellbridge site is also proposed, which will be referenced as the Wellbridge parking garage in this report. The traffic generated by the uses in Subdistrict 1 would utilize the parking spaces provided in the Subdistrict 1 garage as well as the Wellbridge parking garage.

Subdistrict 2 will be served by a 1,754-space parking garage with two entrances. A signalized garage entrance to 1,202 spaces above grade is proposed via Forsyth Boulevard (opposite Lee Avenue), and an unsignalized garage entrance to 552 spaces below grade is proposed via Carondelet Plaza (generally opposite the Ritz Carlton garage access). It should be noted that the abundance of parking spaces provided in Subdistrict 2 will likely be needed to supplement the users in Subdistrict 3.

Sub-district 3 will be served via the existing two-lane roadway that connects Forsyth Boulevard to the Ritz Carlton service drive. A garage entrance is proposed off that service road to serve a 929-space parking garage. The parking spaces provided in Sub-district 3 may not have the ability to accommodate all of the office/retail space in Sub-district 3; therefore, the parking provided in Sub-district 2 will also likely need to serve the users in Sub-district 3.

Sub-district 4 will be served via a single garage entrance to 1,659 parking spaces via Carondelet Avenue. It should be noted that no parking or access changes were submitted for Subdistrict 3 or 4 in the August 1, 2016 submittal.

Based on the site plans provided, the trip generation for the full build-out of the proposed Centene Campus development was estimated. Due to the proximity of the campus with two MetroLink stations, the Metro Bus transfer station, Clayton's walkable Central Business District (CBD) as well as the rapidly growing residential opportunities in the Clayton CBD, reductions were made to account for alternative modes of transportation. The ground floor retail would be expected to house neighborhood retail uses generally used by nearby residents or office tenants and/or pedestrians already along the corridor. Therefore, a 10% trip reduction was applied to the office trips and 50% reduction was applied to the retail/restaurant trips to account for the use of alternative modes of transportation (i.e., transit, bicyclists and/or pedestrians) and/or common trips with the office or other nearby uses; thereby generating fewer vehicular trips. This represents a vehicular trip reduction of 390 trips during the morning and 625 trips during the afternoon.

Furthermore, not all of the ground floor retail trips would represent *new* traffic on the adjacent roadways. Specifically, a significant portion of the traffic attracted to the commercial tenants is already expected to be within the CBD already and already be traveling along the study area roads as part of another trip; i.e., "pass-by" trips. These trips would represent patrons attracted to the site on their way to or from home, work, or another destination. The pass-by trips were assumed to be approximately 50 trips during the morning peak hour and 140 pass-by trips during the afternoon peak hour.

The full build-out of the proposed Centene Campus development is expected to generate 2,145 new trips during the morning peak hour and 2,225 new trips during the afternoon peak hour.

Summary and Recommendations

The additional traffic generated by the full build out of the proposed Centene Campus was aggregated with the base traffic volumes in an effort to develop a forecasted build condition for the surrounding roads. The Build traffic conditions were evaluated and compared to the base conditions.

Several roadway improvements were included in the July 18, 2016 development plans submitted by Centene:

- The Sub-district 1 garage access to Forsyth Boulevard is limited to right-in/right-out only due to the proximity (close spacing) to Hanley Road signalized intersection;
- Signalized access is proposed to the Sub-district 2 garage access as a fourth leg to the Lee Avenue at Forsyth Boulevard intersection;
    - Two lanes are proposed exiting the Sub-district 2 garage (one northbound left-turn lane and one shared left/through/right-turn lane);
- A westbound left-turn lane is proposed on Forsyth Boulevard at Lee Avenue to serve the Sub-district 2 garage.
- A separate eastbound right-turn lane is maintained on Forsyth Boulevard at Carondelet Plaza.
- Signalized access is proposed for the intersection of Forsyth Boulevard with the Sub-district 3 garage access (Ritz Carlton Service Drive)/Metro Lot.
    - A single northbound lane to Forsyth Boulevard is maintained.

The traffic Impact dated July 26, 2016 also recommended some additional improvements to mitigate the proposed Centene Campus Development along Forsyth Boulevard that remain valid with the August 1, 2016 Submittal and include the following:

- A second access to the Sub-district 3 Garage (via Carondelet Plaza) will be needed to help distribute the heavy exiting left-turn traffic and provide acceptable operating conditions. The driveway should provide, at a minimum, a 3-lane cross-section at the intersection with Carondelet Plaza.
- Re-stripe and/or widen Forsyth Boulevard to accommodate two eastbound through lanes from the Ritz Carlton Service Drive/Sub-district 3 Garage/Metro Lot to east of the Forest

Park Parkway Off-Ramp/Bland Avenue. The two eastbound through lanes could taper back to one lane at an adequate distance east of Forest Park Parkway.

- Widen the Forest Park Parkway Off-Ramp/Bland Avenue to provide dual northbound left-turn lanes and a separate northbound right-turn lane at Forsyth Boulevard.
- Construct a southbound right-turn lane on Hanley Road at Carondelet Avenue in conjunction with the Sub-district 4 development.
- Implement signal retiming and optimization program upon completion of development and roadway improvements.
- It is our understanding that a pedestrian circulation plan for the entire Centene Campus is being developed. Because of the spatial distribution of uses as well as parking supply, we anticipate significant pedestrian flows primarily along Hanley Road, Forsyth Boulevard and Carondelet Plaza. Increased pedestrian flows should be accommodated during signal retiming. Grade separated pedestrian facilities, via an elevated walkway or a tunnel, would alleviate heavy pedestrian crossings at signalized intersections.
- It should be acknowledged that Sub-district 3 trip generation methodology assumes that the 650 Seat corporate training Center, the 1000 seat auditorium, and the 120 room corporate lodging uses are predominantly for Centene's internal use only and that there would be no net new trips created by these uses during the morning and evening peak hours of a typical weekday. However, based on information provided by Centene, while Centene will likely be the main user of these uses, it is likely that these uses may be made available to the public from time to time. Additional analysis would need to be completed if concurrent use of the office tower and the other uses during a weekday peak hour are being requested.

The August 1, 2016 submission included a new signalized intersection for the Wellbridge garage entrance at Forsyth Boulevard and also included the relocation of South Lyle Avenue to approximately 70 feet east of the proposed garage entrance.

It is obvious that the amount of parking spaces in that garage would require signalization to function during the evening peak but relocating South Lyle Avenue in very close proximity (approximately 70 feet) to the new signal is undesirable. Several potential re-configurations of the Forsyth Boulevard area are provided for consideration:

1) Realign South Lyle Avenue opposite North Lyle Avenue and signalize.
   a) Provide a westbound left-turn lane on Forsyth Boulevard at the signal.
   b) Eliminate the current South Lyle Avenue roadway.
   c) South Lyle should be four lanes - one inbound and three lanes exiting lanes (two northbound left-turn lanes and one shared through/right-turn lane) to serve Relocated South Lyle Avenue at the approach to Forsyth Boulevard;
   d) Provide garage access via the east-west alleyway behind the garage or from relocated South Lyle Avenue.
2) Align the Wellbridge Parking garage access opposite North Lyle Avenue and signalize.
   a) Provide a westbound left-turn lane on Forsyth Boulevard at the signal.

b) The garage access should be four lanes - (one southbound lane, two northbound left-turn lanes and one shared through/right-turn lane).
c) South Lyle Avenue could remain, but should be constructed midway between the North Lyle Avenue and Lee Avenue signal not as proposed on the 08/01/2016 plans. South Lyle Avenue should be a three lane road – One southbound lane and one northbound left-turn lane and one northbound right-turn lane.

3) Relocate South Lyle Avenue as shown on 08/01/2016 plans and signalize the South Lyle at Forsyth Boulevard as a "T" intersection.
   a) Provide a westbound left-turn lane on Forsyth Boulevard at the signal.
   b) South Lyle should be four lanes - one inbound and three lanes exiting lanes (two northbound left-turn lanes and one right-turn lane) to serve Relocated South Lyle Avenue and the garage at the approach to Forsyth Boulevard;
   c) Provide one right-in/right-out to garage along Forsyth Boulevard between Hanley Road signal and New South Lyle Avenue signal.
   d) Provide Wellbridge garage access via the east-west alleyway behind the garage or from relocated South Lyle Avenue.

In summary, based on the traffic operational analysis as described in the preceding sections of this report, the access and lane configurations on adjacent roadways proposed by Centene Corporation, with the addition of improvements as recommended above, provide adequate capacity to handle the additional trips generated by the proposed development. In addition, as described earlier, resulting from this development as well as anticipated growth expected in the next 20-years, the interchanges on I-170 at Forest Park Parkway and Ladue Road are anticipated to operate at capacity by 2036. Geometric enhancements at the two interchanges, including widening and radii enhancements, are expected to provide additional capacity.

This report would require reconciliation/updates, as needed, based on final set of plans to be submitted by Centene Corporation.

Introduction

CBB has completed a traffic impact study for the proposed Centene Campus Development in downtown Clayton, Missouri. It is our understanding that the Centene Corporation is proposing to develop multiple Sub-districts of land along the south side of Forsyth Boulevard between Hanley Road and Forest Park Parkway and the northwest corner of Hanley Road and Carondelet Avenue. **Figure 1** illustrates the general location of the proposed site relative to the surrounding area. CBB completed this work under the on-call services contract with the City in accordance with parameters discussed with City Staff at the commencement of the study.

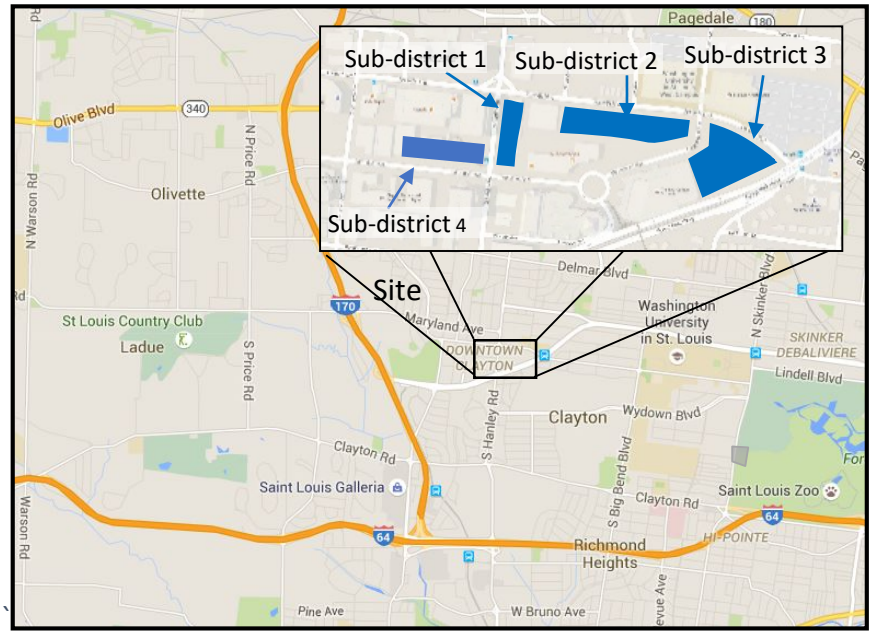

Figure 1: Site Location Map

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The purpose of this study was to identify how much traffic would be generated by the proposed redevelopment; evaluate the ability of motorists to safely enter and exit the site at each access point; determine the impact of the additional trips on the adjacent roads; and recommend improvements, as needed, to mitigate the impact of the additional traffic and provide safe ingress and egress at each access drive. Based on the proposed uses, the focus of this analysis was the AM and PM commuter peak hours of a typical weekday. A separate Technical Memorandum dated August 3, 3016 evaluated impacts related to the post evening peaks (6pm-8pm) associated with the proposed Centene development.

The following report presents CBB's analysis with and without the proposed development. The methodology employed to complete this study, along with the findings and conclusions, are

discussed in greater detail in the subsequent sections. CBB followed current industry standard methods and processes in the completion of our work.

Base Traffic Conditions

In order to identify the traffic impacts associated with the proposed Centene Campus Development, it is essential to understand the pre-development traffic conditions in the area. To that end, it was necessary to perform an operational analysis of the base traffic volumes on the surrounding road system. Therefore, any deficiencies in the current road system will be identified before the traffic generated by the proposed development is added to the system.

Road System

Hanley Road is a major north-south arterial that runs through the Clayton central business district (CBD) and ultimately provides access to Highway 40 (Interstate 64) and locations further south. Hanley Road is owned and maintained by St. Louis County Department of Transportation (SLCDOT). Within the study area, Hanley Road is generally five lanes (two lanes each direction plus a two-way center left-turn lane) from Forsyth Avenue to Carondelet Plaza. Northbound and southbound left-turn lanes are provided at the signalized intersections. An additional southbound lane (dedicated to southbound right-turns only) as well as a northbound merge/acceleration lane is provided along Hanley Road between Maryland Avenue and Forsyth Boulevard. In addition, a third southbound lane is provided between Carondelet Plaza and Shaw Park Drive (dedicated as a through/right-turn lane at Bonhomme Avenue and a short narrow southbound right-turn lane from Bonhomme Avenue to Shaw Park Drive).

The traffic signals along Hanley Road are part of a coordinated system that extends from the CBD to the south towards I-64/Highway 40. Traffic signals located within the study area include the intersections with Forsyth Boulevard, Carondelet Avenue/Carondelet Plaza and Bonhomme Avenue. Pedestrian push button controls and heads are installed at each of those traffic signals. A right-turn-on-red restriction is posted for the dual eastbound right-turn movement from Bonhomme Avenue to Hanley Road.

Forsyth Boulevard is an east-west arterial through the CBD that ties the residential portion of the City with the CBD area, terminating at the signalized intersection with Maryland Avenue, approximately one mile west of Hanley Road. Forsyth Boulevard is owned and maintained by the City of Clayton. Within the study area, Forsyth Boulevard contains two lanes in each direction with on-street parking along both sides of the roadway, transitioning east of Carondelet Plaza/Jackson Avenue to a two-lane road with on-street parking east of the Forest Park Parkway off-ramp/Bland Drive. Separate eastbound and westbound left-turn lanes as well as eastbound and westbound right-turn lanes, albeit relatively short (less than 150 feet long), are provided at the signalized intersection with Hanley Road. Separate eastbound and westbound left-turn lanes as well as an eastbound right-turn lane, are provided at the signalized intersection with Jackson Avenue/Carondelet Plaza. One of the eastbound though lanes terminates as a right-turn lane at

the Ritz Carlton service drive to carry only one through lane under the Forest Park Parkway bridge.

Carondelet Avenue/Carondelet Plaza is a local east-west road within the CBD maintained by the City of Clayton. Carondelet Avenue terminates at Brentwood Boulevard to the west and Hanley Road to the east. Carondelet Plaza continues east of Hanley Road through a roundabout serving the Ritz Carlton and The Plaza in Clayton which provides access onto westbound Forest Park Parkway. Carondelet Plaza continues beyond the roundabout and becomes a north-south road that continues north of Forsyth Boulevard as Jackson Avenue.

Carondelet Avenue is closed to vehicular traffic between Central Avenue and Meramec Avenue in order to accommodate a pedestrian corridor. Carondelet Avenue contains one travel lane in each direction and on-street parking from Bemiston Avenue to Central Avenue. Carondelet Avenue widens to three lanes (one lane each direction plus a center left-turn lane) with on-street parking between Bemiston Avenue and Hanley Road. The intersections of Carondelet Avenue with Central Avenue and Bemiston Avenue are unsignalized with all-way stop control. The eastbound approach of Carondelet Avenue at Hanley Road provides one eastbound left-turn lane, one eastbound through lane and one eastbound right-turn lane.

The westbound approach of **Carondelet Plaza** at Hanley Road provides one left-turn lane, one through lane and a separate right-turn lane. A side-street stop intersection that serves a north-south alleyway is offset approximately 200 feet east of Hanley Road. Carondelet Plaza continues as a two-lane road with a raised center median and on-street parking to the roundabout that serves as the continuation of Carondelet Plaza to the east with access for the Ritz Carlton hotel drop-off/pick-up, Forest Park Parkway westbound on-ramp and The Plaza in Clayton drop-off/pick-up. On the east side of the roundabout, Carondelet Plaza continues as a two-lane road with a raised center median and on-street parking that changes orientation to north-south. At the signalized intersection with Forsyth Boulevard, the northbound approach of Carondelet Plaza provides one left-turn lane and a shared through/right-turn lane.

The southbound approach at the Forsyth Boulevard signal is **Jackson Avenue**, which provides one left-turn lane, one through lane and a separate right-turn lane. Jackson Avenue narrows to the north to become a two-lane road north of Maryland Avenue. Jackson Avenue has all-way stop control at the intersection with Pershing Avenue.

Bonhomme Avenue is an east-west collector road within the CBD maintained by the City of Clayton. Bonhomme Avenue terminates at Brentwood Boulevard to the west and Hanley Road to the east. Within the study area, Bonhomme Avenue is generally a five-lane section (two-lanes in each direction plus a two-way center left-turn lane) with on-street parking, except between Hanley Road and Bemiston Avenue where there is one westbound travel lane. One through, one shared though/right and separate left-turn lanes are provided along Bonhomme Avenue at the signalized intersections with Central Avenue and Bemiston Avenue. At the Bonhomme Avenue approach to Hanley Road, one eastbound left-turn lane and two right-turn lanes are provided. A separate westbound right turn is also provided for the 101 South Hanley parking garage.

Maryland Avenue is an east-west collector road west of Hanley Road that serves the Clayton CBD, while a residential road east of Hanley Road. Within the study area, Maryland Avenue west of Hanley Road is generally a five-lane road (two lanes in each directions plus a two-way center left-turn lane) with on-street parking. The eastbound approach of Maryland Avenue at Hanley Road provides one left-turn lane, a shared left-turn/through lane and a separate right-turn lane, while the westbound approach of Maryland Avenue at Hanley Road provides a single shared left/through/right lane at Hanley Road.

Pershing Avenue is a four-lane median-divided collector road with on-street parking from the signalized intersection at Forest Park Parkway to the signalized intersection with Hanley Road, then narrows to a two-lane median-divided road and terminates at Central Avenue to the west. Eastbound Pershing Avenue provides one left-turn lane, one through lane and a shared through/right-turn lane at the signalized intersection with Hanley Road. Westbound Pershing Avenue provides one left-turn lane, one through lane and one right-turn lane at the signalized intersection with Hanley Road. Eastbound and westbound Pershing Avenue provides a shared left-turn/through lane and a shared through/right-turn lane at the all-way stop intersection with Jackson Avenue. A mid-block signalized pedestrian crossing (push button activated) is also provided along Pershing Avenue, just east of Midvale Avenue. At the signalized intersection with Forest Park Parkway, two lanes are provided for left-turns with a large, channelized right-turn.

Wydown Boulevard is a two-lane median-divided east-west collector with on-street parking and a separate bicycle lane in each direction with median breaks provided at intersections to serve the side-street. Wydown Boulevard is located outside of the CBD and terminates at Hanley Road on the west end and Skinker Boulevard on the east end. Wydown Boulevard provides one left-turn lane and two right-turn lanes at the approach to Hanley Road. Middle Polo Drive continues on the west side of Hanley Road a fourth leg of the signal and serves a relatively small residential area.

Forest Park Parkway is an east-west regional arterial from I-170 into the City of St. Louis. Forest Park Parkway is maintained by the SLCDOT from west of Forsyth Boulevard to east of I-170. MetroLink transit is located between the east-west lanes. As previously noted, a signal serves the intersection with Pershing Avenue. An eastbound off-ramp is provided at Forsyth Boulevard, a westbound on-ramp is provided as one leg of the Carondelet Plaza roundabout, a westbound off-ramp and eastbound on-ramp are provided at Bemiston Avenue, an eastbound off-ramp is provided at Central Avenue, a westbound on-ramp is provided just west of Meramec Avenue via Shaw Park Drive, and a westbound on-ramp and westbound off-ramp are provided at Brentwood Boulevard. Forest Park Parkway has single-lane directional ramps onto I-170 (westbound to northbound ramp, westbound to southbound loop ramp, southbound to eastbound curved ramp and northbound to eastbound curved ramp.

Shaw Park Drive is an eastbound only local road through the CBD that runs parallel to Forest Park Parkway starting at Hanley Road and terminating into Shaw Park, west of Brentwood Boulevard. Shaw Park Drive is owned and maintained by the SLCDOT. Shaw Park Drive is one lane from Hanley Road and then widens to two lanes before Bemiston Avenue as the Forest Park Parkway

westbound off ramp to Bemiston Avenue is merged. At the signalized intersection of Shaw Park Drive and Bemiston Avenue, access is provided for eastbound Forest Park Parkway via an on-ramp over the Parkway. Central Avenue at Shaw Park Drive is a side-street stop control. The signalized intersection of Shaw Park Drive at Meramec Avenue provides one westbound lane terminating as an on-ramp for westbound Forest Park Parkway and one westbound through lane continuing to Brentwood Boulevard. West of the Meramec signal, Shaw Park Drive widens to two lanes and accepts a free flow southbound right-turn lane from Meramec Avenue then widens before Brentwood Boulevard to provide dual westbound left-turns and a shared through/right-turn lane. The intersection of Brentwood Boulevard and Shaw Park Drive is signalized with access to Forest Park Parkway and Shaw Park to the west of Brentwood Boulevard.

Bemiston Avenue is a north-south local road through the CBD that provides access to and from the east on Forest Park Parkway. Bemiston Avenue is owned and maintained by the City of Clayton. Within the study area, Bemiston Avenue is a three-lane road (one lane in each direction plus a two-way center left-turn lane) with on-street parking. As a result, northbound and southbound left-turn lanes are provided at the key intersections. The intersection of Bemiston Avenue and Carondelet Avenue is an all-way, stop-controlled intersection, while the intersection of Bemiston Avenue with Forsyth Boulevard and Bonhomme Avenue are signalized.

Central Avenue is a north-south local road through the CBD that provides direct access from the west on Forest Park Parkway as well as to the west on Forest Park Parkway via Shaw Park Drive (to west of Meramec Avenue). Central Avenue is owned and maintained by the City of Clayton. Within the study area, Central Avenue is generally a four-lane road with a separate southbound left-turn lane provided at Carondelet Avenue and a separate southbound left-turn lane provided at Bonhomme Avenue. The northbound approach of Central Avenue consists of a shared left-turn/though lane, a northbound through lane and a separate northbound right-turn lane, which is fed by the eastbound Forest Park Parkway exit ramp to Central Avenue and a northbound lane from Shaw Park Drive. A single southbound lane is provided on Central Avenue from Bonhomme Avenue to Shaw Park Drive.

The intersection of Central Avenue and Carondelet Avenue is an all-way stop-controlled intersection, while the intersections of Central Avenue at Bonhomme Avenue and Forsyth Boulevard are signalized. It should also be noted that the St. Louis County Courts project is currently under construction and restricts southbound Central Avenue between Bonhomme and Carondelet Avenue to one lane in the interim.

Meramec Avenue is a north-south local road through the Clayton CBD that provides access to the west on Forest Park Parkway at Shaw Park Drive. Meramec Avenue is owned and maintained by the City of Clayton. Meramec Avenue provides two southbound lanes and one northbound lane with on-street parking provided along the west side and a few on-street spaces on the east side. The Metro Parking garage is located in the northeast corner of Meramec Avenue at Shaw Park Drive. Meramec Avenue terminates at Shaw Park Drive with one lane to the Forest Park Parkway westbound on ramp and one lane to Shaw Park Drive westbound.

Brentwood Boulevard is a north-south is a major north-south arterial that runs through the Clayton CBD that provides access to and from the west on Forest Park Parkway and ultimately provides access to Highway 40 (Interstate 64) and locations further south. Within the study area, Brentwood Boulevard is owned and maintained by the City of Clayton. Brentwood Boulevard generally provided three through lanes in each direction from the I-170 overpass through the Forest Park Parkway interchange to Bonhomme Avenue. At Forest Park Parkway, Brentwood Boulevard provides dual northbound left-turn lanes to go west on Forest Park Parkway. The Forest Park Parkway eastbound off-ramp at Brentwood Boulevard provides two eastbound left-turn lanes and a separate eastbound right-turn lane. Walinca Drive is a local Clayton road that is restricted to right-in/right-out at the approach to Brentwood Boulevard.

Interstate 170 and Forest Park Parkway is a free flow interchange that provides northbound and southbound Interstate 170 access to eastbound Forest Park Parkway. Additionally, westbound Forest Park Parkway provides access to northbound and southbound interstate 170. All ramps connecting Forest Park Parkway and Interstate 170 have sharp turns due to physical limitations. The northbound I-170 to eastbound Forest Park Parkway ramp has an advisory turn speed of 25 mph, and the westbound Forest Park Parkway to southbound I-170 loop ramp has an advisory curve speed of 25 mph, while the westbound Forest Park Parkway to northbound I-170 exit ramp has an advisory exit speed of 25 mph and the southbound I-170 exit to eastbound Forest Park Parkway ramp has an advisory exit speed of 20 mph.

Interstate 170 and Ladue Road is a partially cloverleaf interchange that serves northbound I-170 and southbound I-170 at signalized intersections along Ladue Road. Ladue Road is generally five lanes (two lanes in each direction with left-turn lanes striped at signals) near I-170. The northbound I-170 loop ramp has an advisory exit speed of 20 mph and provides a shared left-turn/through lane and a separate right-turn lane at Ladue Road. The southbound approach at the west terminal serves a single building and provides a single shared left/through/right lane. The I-170 northbound off-ramp has an advisory exit speed of 30 mph and provides one left-turn lane, one through lane (to Ladue Crossing) and one right-turn lane at Ladue Road. The southbound approach from Ladue Crossing provides one left-turn lane, one through lane (to northbound I-170).

Base Traffic Volumes

Manual turning movement counts were completed at the following intersections. The counts were performed during the weekday AM peak period (7:00 to 9:00 AM) and the weekday PM peak period (4:00 to 6:00 PM). Based on the counts, the peak hours for analysis were chosen for each intersection to represent a worst-case scenario.

- Central Avenue at Bonhomme Avenue (Signalized);
- Central Avenue at Carondelet Avenue (All-Way Stop);
- Central Avenue at Forsyth Boulevard (Signalized);
- Bemiston Avenue at Bonhomme Avenue (Signalized);
- Bemiston Avenue at Carondelet Avenue (All-Way Stop);
- Bemiston Avenue at Forsyth Boulevard (Signalized);

- Hanley Road at Bonhomme Avenue (Signalized);
- Hanley Road at Carondelet Avenue/Carondelet Plaza (Signalized);
- Hanley Road at Forsyth Boulevard (Signalized);
- Hanley Road at Colorado Avenue (Side-Street Stop);
- Forsyth Boulevard at Lyle Avenue (Side-Street Stop);
- Forsyth Boulevard at Lee Avenue/Proposed Sub-district 2 Garage Access (Signalized);
- Forsyth Boulevard at Jackson Avenue/Carondelet Plaza (Signalized);
- Forsyth Boulevard at Ritz Carlton Service Driveway/ Proposed Sub-district 3 (Garage Access)/ MetroLink Lot (currently Side-Street Stop);
- Forsyth Boulevard at Forest Park Parkway/Bland Drive (Signalized);
- Forest Park Parkway at Pershing Avenue (Signalized);
- Jackson Avenue at Pershing Avenue (All-Way Stop);
- Carondelet Plaza Roundabout (Roundabout); and
- Carondelet Plaza at the north/south alley (east of Hanley Road);

In addition, spot counts (one-hour observations) were also performed during the AM and PM peak hours at the following locations:

- Carondelet Plaza at the Ritz Carlton Parking Garage;
- Carondelet Plaza at the office building garage (west of roundabout);
- Access drives along north-south and east-west alleys; and
- Carondelet Avenue at the existing office building parking garage (7733 Carondelet Avenue).

Since the completion of the original traffic impact study, additional intersections were added to the study area, which include the following intersections:

- Hanley Road at Pershing Avenue (Signalized);
- Hanley Road at Maryland Avenue (Signalized);
- Hanley Road at Wydown Boulevard/Middle Polo Drive (Signalized);
- Shaw Park Drive at South Bemiston Avenue (Signalized);
- Shaw Park Drive at Central Avenue (Side-Street Stop);
- Shaw Park Drive at South Meramec Avenue (Signalized);
- Brentwood Boulevard at Forest Park Parkway Eastbound Off Ramp/Walinca Drive;
- Brentwood Boulevard at Shaw Park Drive/Forest Park Parkway Westbound On-Ramp;
- Forest Park Parkway at I-170 interchange; and
- Ladue Road at I-170 interchange.

The Base Traffic Volumes are summarized in **Exhibit 1**.

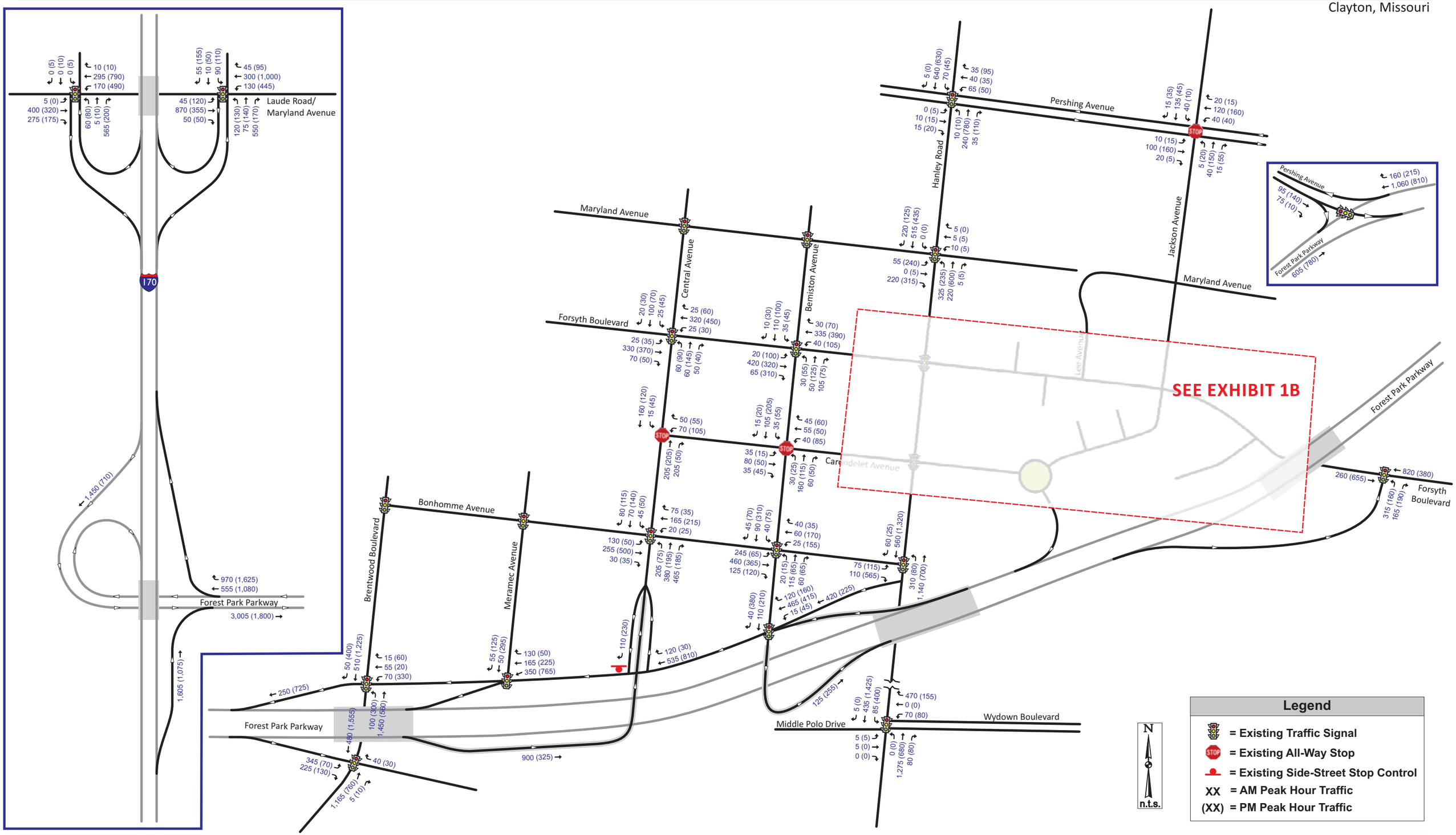
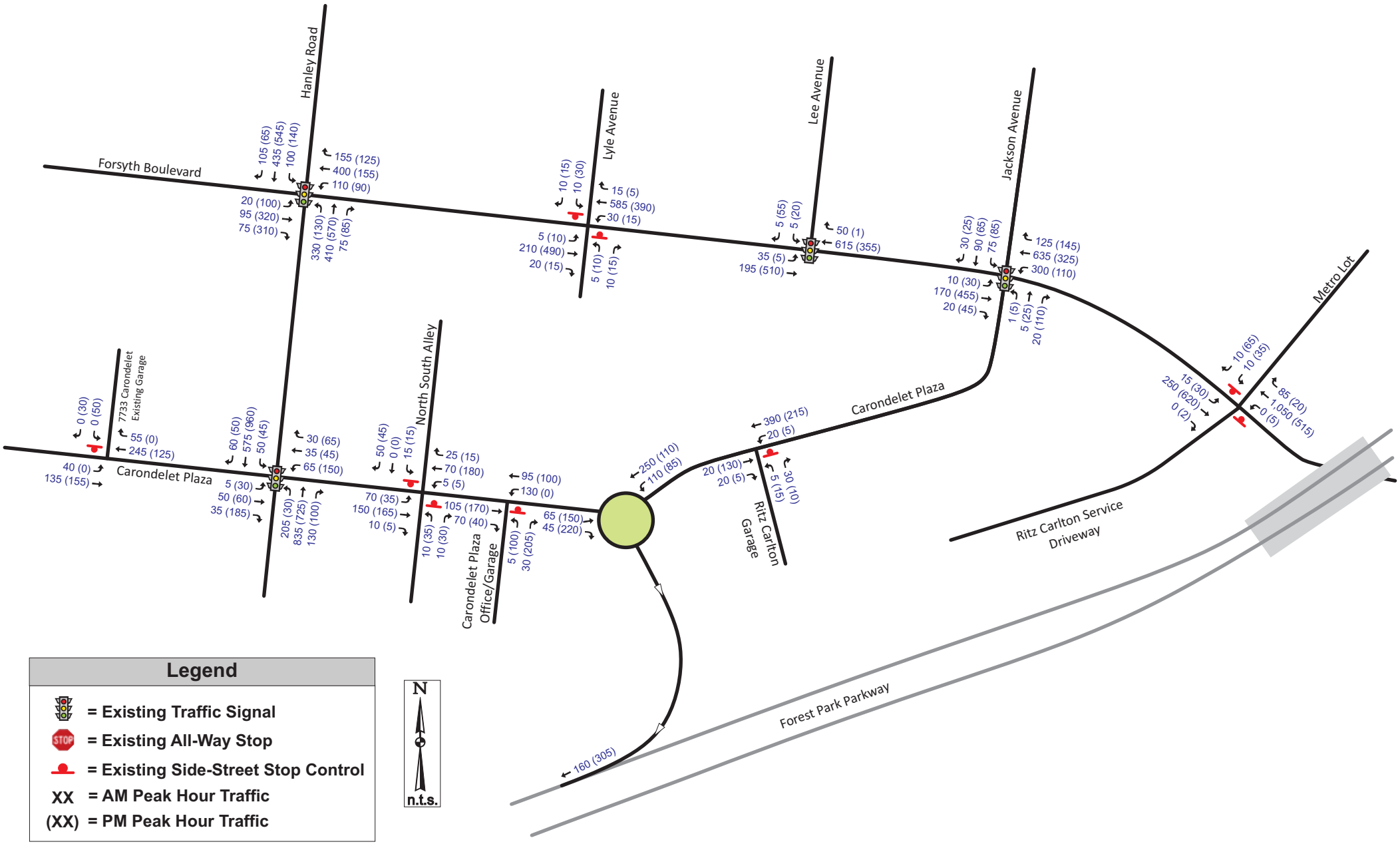


Exhibit 1A: Base Traffic Volumes

Job# 031-16-21
08/25/16

CBB TRANSPORTATION ENGINEERS • PLANNERS



Legend

- = Existing Traffic Signal
- = Existing All-Way Stop
- = Existing Side-Street Stop Control
- XX = AM Peak Hour Traffic
- (XX) = PM Peak Hour Traffic

N

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Exhibit 1B: Base Traffic Volumes

Job# 031-16-21
08/25/16

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Existing Traffic Conditions

The existing operating conditions for the study area intersections were evaluated using SYNCHRO 8, which is based on procedures outlined in the *Highway Capacity Manual* to determine estimates of capacity and operational performance of signalized and unsignalized intersections. Our traffic operations analysis includes measures of effectiveness generated by the SYNCHRO software.

The operating conditions were graded in accordance with six levels of traffic service (Level A "Free Flow" to Level F "Fully Saturated") established by the *Highway Capacity Manual*. Levels of service (LOS) are measures of traffic flow which consider such factors as speed, delay, traffic interruptions, safety, driver comfort, and convenience. Level C, which is normally used for highway design, represents a roadway with volumes ranging from 70% to 80% of its capacity. However, Level D is generally considered acceptable for peak period conditions.

It must also be acknowledged that the perception of acceptable traffic service varies widely by area. Specifically, more delay is usually tolerated in urban areas compared to rural areas. Based on the character of this area, we believe that overall intersection LOS D would be an appropriate target for overall peak period traffic operations.

The thresholds that define levels of service at an intersection are based upon the type of control used (i.e., whether it is signalized or unsignalized) and the calculated delay. For signalized and all-way stop intersections, the average control delay per vehicle is estimated for each movement and aggregated for each approach and the intersection as a whole. At intersections with partial (side-street) stop control, delay is calculated for the minor movements only since motorists on the main road are not required to stop. Furthermore, criteria differ for the two, since control types create different driver expectations. **Table 1** summarizes the level of service thresholds used in this analysis.

Table 1: Level of Service Thresholds

Level of Service (LOS)	**Control Delay per Vehicle (sec/veh)**	
	Signalized Intersections	***Unsignalized Intersections***
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

Each of the study intersections was evaluated using the methodologies described above. The results of the SYNCHRO evaluations are summarized in **Table 2**. Levels of service and average delay for each intersection approach as well as the 95th percentile queue length and the 50th percentile queue length are reported for the weekday AM and PM peak hours. The 95th

percentile queue represents the queue length of which only 5% of the signal's cycles exceed during the peak hour, while the 50th percentile represents the average queues length. The 95th percentile queue length is typically used to size turn bays. The longest queue length for each approach is presented in the table.

As can be seen, operating conditions at the study intersections are generally acceptable during the AM peak hour, but the southbound Hanley Road approach at Bonhomme Avenue currently operates at less than desirable levels of service during the PM peak hour when traffic volumes are heaviest. Conditions at the intersection of Hanley and Bonhomme in the PM are exacerbated by the heavy eastbound right-turn movement. During the PM peak hour, more than 565 vph turn right onto southbound Hanley Road. Dual right-turn lanes are already in place; necessitating the right-turn movement be under signal control (right-turns-on-red are not allowed) in order to safely accommodate pedestrians. However, given the base traffic already traveling along Hanley Road (1,320 vph southbound and 700 vph northbound), there is a limited amount of green time that can be dedicated to the eastbound approach.

The signals along Hanley Road are coordinated and contain the heaviest flows, with the northbound movements favored during the AM peak hour and the southbound movements favored during the PM peak hour. Consequently, in order to maintain progression, a large amount of each signal's green time is allocated to Hanley Road, as opposed to the side streets, resulting in side street movements and/or approaches operating at unacceptable levels of service and/or experiencing long queues.

Despite the majority of the green time being allocated to Hanley Road, the southbound approach of Hanley Road at Bonhomme Avenue operates at less than desirable levels in the PM peak hour. Field observations conducted in 2016 revealed queues on southbound Hanley Road during the PM peak hour originating from south of the CBD area (Forest Park Parkway). Often, the southbound queues extended through the intersection with Bonhomme Avenue but only occasionally backed to Carondelet Avenue/Carondelet Plaza. This is reflected in the poor southbound level of service at Bonhomme Avenue and the better level of service for southbound Hanley Road at Carondelet Avenue/Carondelet Plaza.

It should be noted that the operational analysis shown in Table 2 is the average level of service and represent delays experienced throughout the entire peak hour. Generally, within the Clayton CBD, the peak period in the afternoon lasts 30 minutes or less.

During the PM peak period, the westbound left-turn queue on Carondelet Plaza at the intersection with Hanley Road was occasionally observed to queue beyond the dedicated bay lengths, thereby obstructing motorists attempting to turn north or south from the alley. The westbound queues that blocked the alley were observed to be short lived. At such times, vehicles attempting to exit the alley required a courtesy gap in the traffic or for the signal to cycle. Again, these conditions were generally only observed during the height of the PM peak hour with conditions vastly improved during the remainder of the PM peak period.

Table 2: Traffic Operating Conditions – Base Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Hanley Road & Pershing Avenue – Signalized						
Eastbound Pershing Avenue	C (29.1)	<25	<25	C (28.1)	<25	25 TH
Westbound Pershing Avenue	D (42.2)	50 LT	100 LT	C (30.1)	25 LT	80 LT
Northbound Hanley Road	A (4.2)	35 TH	35 TH	A (8.2)	135TH	245 TH
Southbound Hanley Road	A (3.0)	60 TH	80 TH	A (3.4)	55 TH	75 TH
Overall Intersection	**A (8.7)**	**--**		**A (9.0)**	**--**	
Hanley Road & Maryland Avenue – Signalized						
Eastbound Maryland Avenue	D (45.0)	80 RT	135 RT	D (48.6)	110 TH	180 TH
Westbound Maryland Avenue	D (50.1)	<25	40 TH	E (57.0)	<25	25 TH
Northbound Hanley Road	A (9.7)	30 LT	155 LT	B (10.3)	100 TH	205 TH
Southbound Hanley Road	A (8.6)	60 TH	220 TH	A (9.0)	65 TH	145 TH
Overall Intersection	**B (15.8)**	**--**		**C (21.0)**	**--**	
Hanley Road & Forsyth Boulevard – Signalized						
Eastbound Forsyth Boulevard	C (23.5)	40 TH	65 TH	C (27.8)	120 TH	175 TH
Westbound Forsyth Boulevard	C (32.4)	155 TH	215 TH	C (25.1)	55 TH	90 TH
Northbound Hanley Road	B (16.9)	110 LT	150 LT	C (30.9)	155 TH	275 TH
Southbound Hanley Road	C (28.2)	115 TH	170 TH	C (24.5)	200 TH	270 TH
Overall Intersection	**C (25.0)**	**--**		**C (27.4)**	**--**	
Hanley Road & Carondelet Avenue – Signalized						
Eastbound Carondelet Avenue	C (25.2)	35 TH	75 TH	C (21.7)	45 TH	85 TH
Westbound Carondelet Avenue	C (24.9)	40 LT	80 LT	C (29.6)	100 LT	160 LT
Northbound Hanley Road	B (18.6)	135 TH	200 TH	A (9.7)	75 TH	90 TH
Southbound Hanley Road	C (33.2)	170 TH	240 TH	E (66.4)	165 TH	205 TH
Overall Intersection	**C (24.1)**	**--**		**D (37.6)**	**--**	
Hanley Road & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	B (20.5)	50 LT	95 LT	C (23.7)	195 RT	250 RT
Northbound Hanley Road	B (15.6)	350 TH	515 TH	C (30.9)	250 TH	345 TH
Southbound Hanley Road	D (35.0)	240 TH	310 TH	E (77.2)	525 TH	700 TH
Overall Intersection	**C (21.3)**	**--**		**D (51.3)**	**--**	
Hanley Road & Wydown Boulevard/Middle Polo Drive – Signalized						
Eastbound Wydown Boulevard	D (52.1)	<25	25 TH	D (51.6)	<25	<25
Westbound Wydown Boulevard	D (41.6)	100 RT	150 RT	C (22.6)	60 LT	65 LT
Northbound Hanley Road	A (7.1)	140 TH	215 TH	B (17.9)	250 TH	405 TH
Southbound Hanley Road	A (5.5)	25 LT	65 LT	B (11.2)	250 TH	375 TH
Overall Intersection	**B (14.6)**	**--**		**B (14.0)**	**--**	
Forsyth Boulevard & Forest Park Parkway Eastbound Off-Ramp/Bland Ave – Signalized						
Eastbound Forsyth Boulevard	A (11.0)	55 TH	120 TH	B (10.9)	150 TH	320 TH
Westbound Forsyth Boulevard	D (40.6)	300 TH	645 TH	A (7.0)	65 TH	140 TH
Northbound Forest Park Pkwy	C (23.2)	120 LT	200 LT	C (22.7)	70 LT	115 LT
Overall Intersection	**C (30.1)**	**--**		**B (12.8)**	**--**	

Table 2 (cont.): Traffic Operating Conditions – Base Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Forsyth Boulevard & Metro Lot/Ritz Carlton – Side-Street Stop						
Eastbound Forsyth Boulevard	A (0.7)	<25	<25	A (0.4)	<25	<25
Westbound Forsyth Boulevard	A (0.0)	<25	<25	A (0.1)	<25	<25
Northbound Ritz-Carlton Alley	A (0.0)	<25	<25	A (0.0)	<25	<25
Southbound Metro Parking Lot	C (19.8)	<25	<25	C (14.8)	<25	<25
Forsyth Boulevard & Jackson Avenue/Carondelet Plaza – Signalized						
Eastbound Forsyth Boulevard	A (2.2)	<25	<25	A (2.3)	<25	30 TH
Westbound Forsyth Boulevard	A (3.6)	50 LT	100 LT	A (2.7)	25 TH	40 TH
Northbound Carondelet Plaza	B (19.6)	<25	30 TH	B (16.1)	<25	75 TH
Southbound Jackson Avenue	D (42.9)	60 TH	110 TH	E (58.8)	60 LT	145 LT
Overall Intersection	**A (8.8)**	**--**		**B (10.8)**	**--**	
Forsyth Boulevard & Lee Avenue – Signalized						
Eastbound Forsyth Boulevard	A (0.5)	<25	<25	A (1.8)	25 TH	45 TH
Westbound Forsyth Boulevard	A (0.6)	<25	40 TH	A (1.3)	<25	25 TH
Southbound Lee Avenue	C (34.6)	<25	<25	C (24.7)	<25	55 LT
Overall Intersection	**A (0.9)**	**--**		**A (3.4)**	**--**	
Forsyth Boulevard & Lyle Avenue – Side-Street Stop						
Eastbound Forsyth Boulevard	A (0.2)	<25	<25	A (0.2)	<25	<25
Westbound Forsyth Boulevard	A (0.5)	<25	<25	A (0.4)	<25	<25
Northbound Lyle Avenue	B (11.3)	<25	<25	B (12.1)	<25	<25
Southbound Lyle Avenue	C (15.6)	<25	<25	B (14.2)	<25	<25
Carondelet Plaza & Ritz Garage – Side-Street Stop						
Eastbound Carondelet Plaza	A (0.0)	<25	<25	A (0.0)	<25	<25
Westbound Carondelet Plaza	A (0.5)	<25	<25	A (0.2)	<25	<25
Northbound Ritz-Carlton Garage	A (9.0)	<25	<25	B (10.2)	<25	<25
Carondelet Plaza Roundabout						
Eastbound Carondelet Plaza	A (5.8)	--	20	A (8.9)	--	60
The Plaza in Clayton	A (4.8)	--	<25	A (6.0)	--	<25
Ritz-Carlton Access	A (3.8)	--	<25	A (4.2)	--	<25
Westbound Carondelet Plaza	A (7.2)	--	50	A (5.6)	--	25
Overall Intersection	**A (6.5)**	**--**		**A (7.4)**	**--**	
Carondelet Plaza & Carondelet Office Garage						
Eastbound Carondelet Plaza	A (0.0)	<25	<25	A (0.0)	<25	<25
Westbound Carondelet Plaza	A (4.9)	<25	<25	A (0.0)	<25	<25
Northbound Office Garage	A (9.7)	<25	<25	B (11.0)	<25	<25
Carondelet Plaza & Alleyway – Side-Street Stop						
Eastbound Carondelet Plaza	A (2.6)	<25	<25	A (1.5)	<25	<25
Westbound Carondelet Plaza	A (0.4)	<25	<25	A (0.2)	<25	<25
Northbound Alleyway	B (11.1)	<25	<25	B (12.3)	<25	<25
Southbound Alleyway	A (9.9)	<25	<25	B (10.7)	<25	<25

Table 2 (cont.): Traffic Operating Conditions – Base Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Forest Park Parkway & Pershing Avenue – Signalized						
Eastbound Forest Park Parkway	A (3.4)	30 TH	55 TH	A (2.7)	60 TH	90 TH
Westbound Forest Park Pkwy	A (3.9)	65 TH	115 TH	A (3.2)	55 TH	150 TH
Southbound Pershing Avenue	B (12.7)	<25	35 LT	D (52.6)	60 LT	95 LT
Overall Intersection	**A (4.5)**	**--**		**A (6.8)**	**--**	
Jackson Avenue & Pershing Avenue – All-Way Stop						
Eastbound Pershing Avenue	A (7.9)	--	<25	A (8.7)	--	<25
Westbound Pershing Avenue	A (8.2)	--	<25	A (8.9)	--	<25
Northbound Jackson Road	A (8.4)	--	<25	B (10.7)	--	40 TH
Southbound Jackson Road	A (9.7)	--	25 TH	A (9.1)	--	<25
Overall Intersection	**A (8.7)**	**--**		**A (9.4)**	**--**	
Carondelet Avenue & Existing Garage – Side-Street Stop						
Eastbound Carondelet Plaza	A (1.9)	<25	<25	A (0.0)	<25	<25
Westbound Carondelet Plaza	A (0.0)	<25	<25	A (0.0)	<25	<25
Southbound Office Garage	A (0.0)	<25	<25	A (9.8)	<25	<25
Bemiston Avenue & Forsyth Boulevard – Signalized						
Eastbound Forsyth Boulevard	A (6.8)	35 TH	45 TH	A (5.0)	25 TH	35 TH
Westbound Forsyth Boulevard	A (7.2)	60 TH	70 TH	B (12.0)	105 TH	145 TH
Northbound Bemiston Avenue	B (12.9)	40 TH	80 TH	B (13.5)	50 TH	100 TH
Southbound Bemiston Avenue	B (15.8)	60 TH	85 TH	A (9.4)	30 TH	50 TH
Overall Intersection	**A (9.0)**	**--**		**A (9.9)**	**--**	
Bemiston Avenue & Carondelet Avenue – All-Way Stop						
Eastbound Carondelet Avenue	B (10.9)	--	25 TH	B (10.5)	--	<25
Westbound Carondelet Avenue	A (8.7)	--	<25	A (9.2)	--	<25
Northbound Bemiston Avenue	B (10.2)	--	45 TH	A (9.6)	--	30 TH
Southbound Bemiston Avenue	A (8.9)	--	<25	B (10.7)	--	50 TH
Overall Intersection	**A (9.7)**	**--**		**B (10.0)**	**--**	
Bemiston Avenue & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	A (8.8)	85 TH	140 TH	A (8.8)	45 TH	80 TH
Westbound Bonhomme Avenue	A (2.1)	<25	<25	A (8.9)	50 TH	75 TH
Northbound Bemiston Avenue	D (36.5)	115 TH	185 TH	C (24.9)	60 TH	115 TH
Southbound Bemiston Avenue	C (34.4)	80 TH	145 TH	D (52.7)	300 TH	480 TH
Overall Intersection	**B (15.6)**	**--**		**C (23.6)**	**--**	
Bemiston Avenue & Shaw Park Drive – Signalized						
Westbound Shaw Park Drive	A (5.4)	50 TH	80 TH	B (13.8)	100 TH	145 TH
Southbound Bemiston Avenue	B (18.4)	40 LT	80 LT	B (10.4)	70 LT	125 LT
Overall Intersection	**A (7.7)**	**--**		**B (12.1)**	**--**	

Table 2 (cont.): Traffic Operating Conditions – Base Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Central Avenue & Forsyth Boulevard – Signalized						
Eastbound Forsyth Avenue	A (4.8)	<25	<25	A (8.6)	70 TH	95 TH
Westbound Forsyth Avenue	A (3.8)	<25	<25	A (6.7)	40 TH	50 TH
Northbound Central Avenue	A (8.8)	<25	35 TH	B (11.7)	30 TH	60 TH
Southbound Central Avenue	B (13.9)	35 TH	55 TH	A (7.4)	<25	<25
Overall Intersection	**A (6.3)**	**--**		**A (8.4)**	**--**	
Central Avenue & Carondelet Avenue – All Way Stop						
Westbound Carondelet Avenue	A (9.3)	--	<25	A (9.4)	--	<25
Northbound Central Avenue	A (8.8)	--	45 TH	A (8.1)	--	<25
Southbound Central Avenue	A (8.1)	--	<25	A (8.1)	--	<25
Overall Intersection	**A (8.7)**	**--**		**A (8.4)**	**--**	
Central Avenue & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	B (18.3)	70 RT	130 RT	B (15.2)	140 TH	255 TH
Westbound Bonhomme Avenue	B (19.7)	55 TH	85 TH	A (9.7)	40 TH	50 TH
Northbound Central Avenue	B (18.7)	200 TH	260 TH	C (30.0)	110 TH	155 TH
Southbound Central Avenue	A (8.9)	30 TH	50 TH	C (21.0)	90 TH	135 TH
Overall Intersection	**B (17.8)**	**--**		**B (19.5)**	**--**	
Central Avenue & Shaw Park Drive –Right-In Right-Out						
Southbound Central Avenue	B (11.1)	<25	<25	C (16.3)	--	55 RT
Meramec Avenue & Shaw Park Drive – Signalized						
Westbound Shaw Park Drive	A (2.1)	<25	30 TH	B (17.3)	220 LT	470 LT
Southbound Meramec Avenue	B (13.2)	<25	45 TH	B (13.7)	110 TH	175 TH
Overall Intersection	**A (3.7)**	**--**		**B (16.2)**	**--**	

Table 2 (cont.): Traffic Operating Conditions – Base Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Brentwood Boulevard & Shaw Park Drive & Forest Park Parkway Westbound On-Ramp – Signalized						
Westbound Shaw Park Drive	E (59.3)	50 TH	110 TH	F (87.7)	120 LT	210 LT
Northbound Brentwood Boulevard	A (9.8)	215 TH	220 TH	C (20.3)	65 LT	170 LT
Southbound Brentwood Boulevard	A (7.2)	35 TH	70 TH	B (18.6)	300 TH	365 TH
Overall Intersection	**B (12.5)**	**--**		**C (28.9)**	**--**	
Brentwood Boulevard & Walinca Drive & Forest Park Parkway Eastbound Off-Ramp – Signalized						
Eastbound Forest Park Parkway	F (204.0)	220 LT	320 LT	C (22.6)	25 LT	45 LT
Westbound Walinca Drive	A (3.1)	<25	<25	A (0.6)	<25	<25
Northbound Brentwood Boulevard	A (3.6)	50 TH	65 TH	A (3.5)	<25	50 TH
Southbound Brentwood Boulevard	A (6.1)	30 TH	35 TH	B (13.3)	125 TH	155 TH
Overall Intersection	**D (54.7)**	**--**		**B (10.9)**	**--**	
Ladue Road & I-170 Southbound Ramps – Signalized						
Eastbound Ladue Road	C (32.5)	210 TH	280 TH	C (22.7)	125 TH	175 TH
Westbound Ladue Road	C (27.2)	95 LT	145 LT	A (7.8)	170 LT	270 LT
Northbound I-170 SB Ramps	B (10.2)	85 RT	205 RT	B (17.2)	55 LT	105 LT
Overall Intersection	**C (23.2)**	**--**		**B (12.6)**	**--**	
Ladue Road & I-170 Northbound Ramps & Ladue Crossing – Signalized						
Eastbound Ladue Road	B (15.3)	195 TH	275 TH	C (26.2)	150 TH	215 TH
Westbound Ladue Road	B (13.5)	55 TH	70 TH	B (13.1)	255 TH	440 TH
Northbound I-170 NB Ramps	D (41.3)	190 TH	385 TH	D (38.6)	135 TH	215 TH
Southbound Ladue Crossing	C (24.2)	55 LT	95 LT	C (24.2)	70 LT	115 LT
Overall Intersection	**C (23.8)**	**--**		**C (20.8)**	**--**	

X (XX.X) - Level of Service (Vehicular delay in seconds per vehicle)95th % queue notes: m = 95th % queues may not be experienced due to upstream signal metering, # = 95th % queue exceeds capacity, (LT) = 95th % queue experienced in left-turn lane, (TH) = 95th % queue experienced in through lane, (RT) = 95th % queue experienced in right-turn lane, -- Synchro does not provide 95th % queues

Field observations during the AM peak hour indicate that the northbound left-turn queue from Hanley Road to Bonhomme Avenue and/or Shaw Park Drive controls operations at the intersection with Shaw Park Drive due to the fact that the northbound left-turn movement is the only movement that incurs delays. Additionally, the northbound left-turn queue at Shaw Park Drive contains vehicles that do not perform a left-turn onto Shaw Park Drive but instead move north to perform a left-turn onto Bonhomme Avenue. It should be reiterated that this is an existing condition and only observed during the AM peak hour with conditions vastly improved during the remainder of the day.

Trip Generation of the Proposed Centene Campus Development

As a primary step in this analysis, traffic forecasts were prepared based on the application (submitted by the developer to the City on August 1, 2016) to estimate the amount of traffic that the proposed Centene Campus Development would generate during both the AM and PM peak hours. As previously noted, there are four Sub-districts associated with the proposed Campus Development; therefore, trip generation was estimated for each Sub-district separately. Additionally, the existing office building at 7733 Carondelet Avenue (100,000 SF) would be demolished for Sub-district 4 development. As such, the building size used for trip generation of the proposed office building in Sub-district 4 was reduced by 100,000 SF since the existing use already generates trips on the roadway system.

The trip forecasts were based upon information provided in the "Trip Generation Manual", Ninth Edition, published by the Institute of Transportation Engineers (ITE). This manual, which is a standard resource for transportation engineers, is based on a compilation of nationwide studies documenting the characteristics of various land uses.

It is our understanding that Centene will likely be the main user of the training center, auditorium and corporate lodging facilities resulting in minimal new trip generation for the development. However, from time to time, one or all of these facilities may be made available to the public for certain uses, and Centene will manage the hours of that use.

Although the corporate lodging and training center is intended to be used primarily by Centene, trips were estimated for those uses based on ITE Land Use 310 – Hotel. It should be noted that the description provided by ITE for Land Use 310 Hotel indicates "Hotels are places of lodging that provide sleeping accommodations and supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (pool, fitness room), and/or other retail and service shops." Although the description does not specify the exact amount of banquet or convention facility space, it was assumed that the trip generation associated with the hotel land use includes trip generation for the corporate auditorium space.

Based upon the recommended procedure for estimating trip generation outlined in the "Trip Generation Handbook, A Recommended Practice", published by ITE (March 2001), the average trip rate was utilized for:

- Land Use: 710 – General Office Building for the proposed office space;
- Land Use: 310 – Hotel for the 120-room corporate lodging facility;
- Land Use 931 – Quality Restaurant for the restaurant space in Sub-district 3; and
- Land Use 936 – Coffee/Donut Shop without Drive-Thru for the 1,500 SF of retail space near MetroLink in Sub-district 3

The regression equation was utilized for:

- Land Use: 233 – Luxury Condo/Townhouses for the multi-tenant housing component; and
- Land Use: 820 – Shopping Center for the proposed ground floor retail.

The peak hour of adjacent street traffic (one hour between 7 and 9 a.m.) was utilized for the AM peak hour, and the peak hour of adjacent street traffic (one hour between 4 and 6 p.m.) was utilized for the PM peak hour trip generation.

Based on the strategic location of the proposed Centene Campus Development, users are expected to make use of alternative modes of transportation such as MetroLink, Metro Bus, Clayton's walkable CBD as well as the rapidly growing residential opportunities in the Clayton CBD and surrounding neighborhoods. A 10% trip reduction was applied to the office trips to account for the use of alternative modes of transportation; i.e., transit, bicyclists and/or pedestrians.

In addition, the relatively small amount of retail space on the ground floor would be expected to house neighborhood retail uses generally frequented by nearby residents or office tenants and/or pedestrians already along the corridor. Therefore, it was estimated that 50% of the retail and restaurant trips would be either pedestrian oriented or common with the office or other nearby uses; thereby generating fewer vehicular trips. This represents a vehicular trip reduction of 370 trips during the AM peak hour and 540 trips during the PM peak hour.

It should also be noted that not all of the ground floor retail trips would represent *new* traffic on the adjacent roadways. Specifically, a significant portion of the traffic attracted to the commercial tenants is expected to already be within the CBD traveling along the study area roads as part of another trip; i.e., "pass-by" trips. These trips would represent patrons attracted to the site on their way to or from home, work, or another destination. Based upon statistical data provided by ITE the following pass-by assumptions were made for the retail/restaurant uses:

- Retail trips – 20% AM Pass-By and 34% PM Pass-By;
- Quality Restaurant trips – 0% AM Pass-By and 44% PM Pass-By; and
- Coffee Shop trips – 50% AM Pass-By and 50% PM Pass-By.

The pass-by trips totaled 40 trips during the AM peak hour and 120 trips during the PM peak hour. The trip generation for each Sub-district is summarized in **Table 3.** The full build-out of all four Sub-districts of the proposed Centene Campus Development is expected to generate 2,120 *new* vehicular trips during the AM peak hour and 2,140 *new* vehicular trips during the PM peak hour.

Table 3: Trip Generation – Proposed Centene Campus Development (8/1/2016 Submittal)

Land Use	*Size*	*Total Daily Trips*	*AM Peak Hour*			*PM Peak Hour*		
			In	*Out*	*Total*	*In*	*Out*	*Total*
Subdistrict 1								
General Office Building	561,915 SF	6,200	770	105	875	140	695	835
Ground Floor Retail	13,160 SF	1,815	30	15	45	75	80	155
Subdistrict 2								
Luxury Condo/Townhouses	119 Units	750	15	50	65	40	25	65
Health Club (Relocated Wellbridge)	40,000 SF	0	0	0	0	0	0	0
Ground Floor Retail	8,000 SF	1,315	20	15	35	55	55	110
Subdistrict 3								
General Office Building	410,485 SF	4,530	565	75	640	105	510	615
Hotel	120 rooms	700	40	25	65	35	35	70
Ground Floor Retail	11,495 SF	1,665	25	15	40	65	75	140
Quality Restaurant	15,145 SF	1,360	5	5	10	75	35	110
Coffee Shop	1,500 SF	1,230	80	80	160	30	30	60
Training Center/Civic Auditorium	1,650 Seats*	0	0	0	0	0	0	0
Subdistrict 4								
General Office Building	361,020 SF**	3,980	495	70	565	90	445	535
Ground Floor Retail	7,580 SF	1,270	20	10	30	50	55	105
Sub-Total of Trips		24,815	2,065	465	2,530	760	2,040	2,800
Multi-Modal/Common Trip Reduction (10% Office & 50% Retail/Restaurant)		*(5,805)*	*(270)*	*(100)*	*(370)*	*(210)*	*(330)*	*(540)*
Pass-By Trips (Retail & Restaurant)		*(860)*	*(20)*	*(20)*	*(40)*	*(60)*	*(60)*	*(120)*
Total New Development Trips		**18,150**	**1,775**	**345**	**2,120**	**490**	**1,650**	**2,140**

* Corporate Auditorium trips included in the Hotel land use

** Proposed office space was reduced by 100,000 SF to account for the existing office space currently generating traffic

It should be noted that there was relatively minor adjustments in the size of the land uses from the July 18, 2016 submittal to the August 1 submittal. Therefore, the estimated trip generation is expected to decrease slightly during the peak hours. Specifically, the new trips would decrease by 25 total trips during the AM peak hour and 85 total trips during the PM peak hour.

Since the exact areas for the office and retail space is still fluctuating, CBB kept the trip generation from the original study (Table 4A below) to provide a worst-case traffic scenario.

Table 4: Trip Generation – Proposed Centene Campus Development (7/18/2016 Submittal)

Land Use	*Size*	*Total Daily Trips*	*AM Peak Hour*			*PM Peak Hour*		
			In	*Out*	*Total*	*In*	*Out*	*Total*
Subdistrict 1								
General Office Building	560,915 SF	6,185	770	105	875	140	695	835
Ground Floor Retail	15,115 SF	1,990	30	20	50	80	90	170
Subdistrict 2								
Luxury Condo/Townhouses	135 units	835	20	55	75	50	30	80
Ground Floor Retail	30,350 SF	3,130	45	30	75	130	140	270
Subdistrict 3								
General Office Building	410,485 SF	4,530	565	75	640	105	510	615
Hotel	120 rooms	700	40	25	65	35	35	70
Ground Floor Retail	11,495 SF	1,665	25	15	40	65	75	140
Quality Restaurant	15,145 SF	1,360	5	5	10	75	35	110
Coffee Shop	1,500 SF	1,230	80	80	160	30	30	60
Training Center/Civic Auditorium	1,650 Seats*	0	0	0	0	0	0	0
Subdistrict 4								
General Office Building	361,020 SF**	3,980	495	70	565	90	445	535
Ground Floor Retail	7,580 SF	1,270	20	10	30	50	55	105
Sub-Total of Trips		26,875	2,095	490	2,585	850	2,140	2,990
Multi-Modal/Common Trip Reduction (10% Office & 50% Retail/Restaurant)		*(6,795)*	*(285)*	*(105)*	*(390)*	*(250)*	*(375)*	*(625)*
Pass-By Trips (Retail & Restaurant)		*(1,065)*	*(25)*	*(25)*	*(50)*	*(70)*	*(70)*	*(140)*
Total New Development Trips		**19,015**	**1,785**	**360**	**2,145**	**530**	**1,695**	**2,225**

* Corporate Auditorium trips included in the Hotel land use

** Proposed office space was reduced by 100,000 SF to account for the existing office space currently generating traffic

Trip Distribution

The traffic generated by the development was assigned to the adjoining roadway system based on existing and projected traffic patterns, location of the proposed uses, as well as the proposed access points for the site. The anticipated directional distribution during the AM and PM peak hours for the vehicular trips would be as follows:

- 39% to/from South
  - 25% via I-170/I-64 West on Forest Park Parkway;
  - 9% to/from South via Hanley Road; and
  - 5% to/from South via Brentwood Boulevard.
- 35% to/from North
  - 18% via I-170 – Maryland Avenue/Forsyth Boulevard;

  - 10% to/from North via Local Connections (Hanley Road, North & South Avenue, Forsyth Blvd.); and
  - 7% via North on I-170 via Forest Park Parkway (From West).
- 20% to/from East
  - 13% via Forest Park Parkway (From East);
  - 4% to/from Forsyth Boulevard; and
  - 3% I-64 East (via Hanley Road).
- 6% to/from West
  - 6% via Local Connections (Clayton Road/Ladue Road).

Since Sub-districts 1, 2 and 3 are more conveniently accessible from Forest Park Parkway via Forsyth Boulevard (inbound) and the Forest Park Parkway on-ramp via Carondelet Plaza roundabout (outbound), the trips oriented to those Sub-districts were assumed to favor those access connections to Forest Park Parkway, while trips to and from Sub-district 4 were assumed to favor the connections to Forest Park Parkway via Central and Bemiston Avenue.

Access to the Proposed Site

Subdistrict 1 will be served by a 616-space parking garage under the office building with two garage entrances (416 spaces served via a right-in/right-out access on Forsyth Boulevard and 200 spaces served via an entrance from the north-south alley. In addition, a new 1,260-space parking garage in the general vicinity of the existing Wellbridge site is also proposed, which will be referenced as the Wellbridge parking garage in this memo. The traffic generated by the uses in Subdistrict 1 would utilize the parking spaces provided in the Subdistrict 1 garage as well as the Wellbridge parking garage.

Subdistrict 2 will be served by a 1,754-space parking garage with two entrances. A signalized garage entrance to 1,202 spaces above grade is proposed via Forsyth Boulevard (opposite Lee Avenue), and an unsignalized garage entrance to 552 spaces below grade is proposed via Carondelet Plaza (generally opposite the Ritz Carlton garage access). It should be noted that the abundance of parking spaces provided in Subdistrict 2 will likely be needed to supplement the users in Subdistrict 3.

Sub-district 3 will be served via the existing two-lane roadway that connects Forsyth Boulevard to the Ritz Carlton service drive. A garage entrance is proposed off that service road to serve a 929-space parking garage.

Sub-district 4 will be served via a single garage entrance to 1,659 parking spaces via Carondelet Avenue.

Based on the closer proximity of the Wellbridge garage to Subdistrict 1, the site-generated trips for Subdistrict 1 were now assumed to exclusively utilize the parking garage under the Subdistrict 1 office building and the Wellbridge parking garage. Furthermore, for Subdistrict 1, the site-generated trips were assigned to the garage entrances based on the proportion of spaces per entrance from those driveway locations. The site-generated trips for Subdistrict 2 were assigned

to the Subdistrict 2 garage. The Subdistrict 3 trips were assigned proportionately to the parking spaces available in the Subdistrict 2 and 3 garages. Based on the availability of parking, approximately 65% of the total Subdistrict 3 traffic would access the Subdistrict 2 garage and 35% would access the Subdistrict 3 garage. Again, for the site-generated trips were assigned to the garage entrances based on the proportion of spaces accessible from those driveway locations. As recommended in the July 26, 2016 Traffic Impact Study, the Subdistrict 3 garage should still provide a secondary access to Carondelet Plaza. Subdistrict 4 site-generated trips will continue to be served via the single garage parking spaces.

The site-generated traffic associated with the proposed Centene Campus Development was added to the base traffic volumes (Exhibit 1) to produce the Build Traffic Volumes illustrated in **Exhibit 2**. The Build Traffic Volumes were then reanalyzed using the same methodology applied to the base conditions in order to identify the impacts associated with the proposed development. A comparison of the results from these analyses provides a measure of base and forecasted operating conditions, thereby indicating the potential need for roadway improvements.

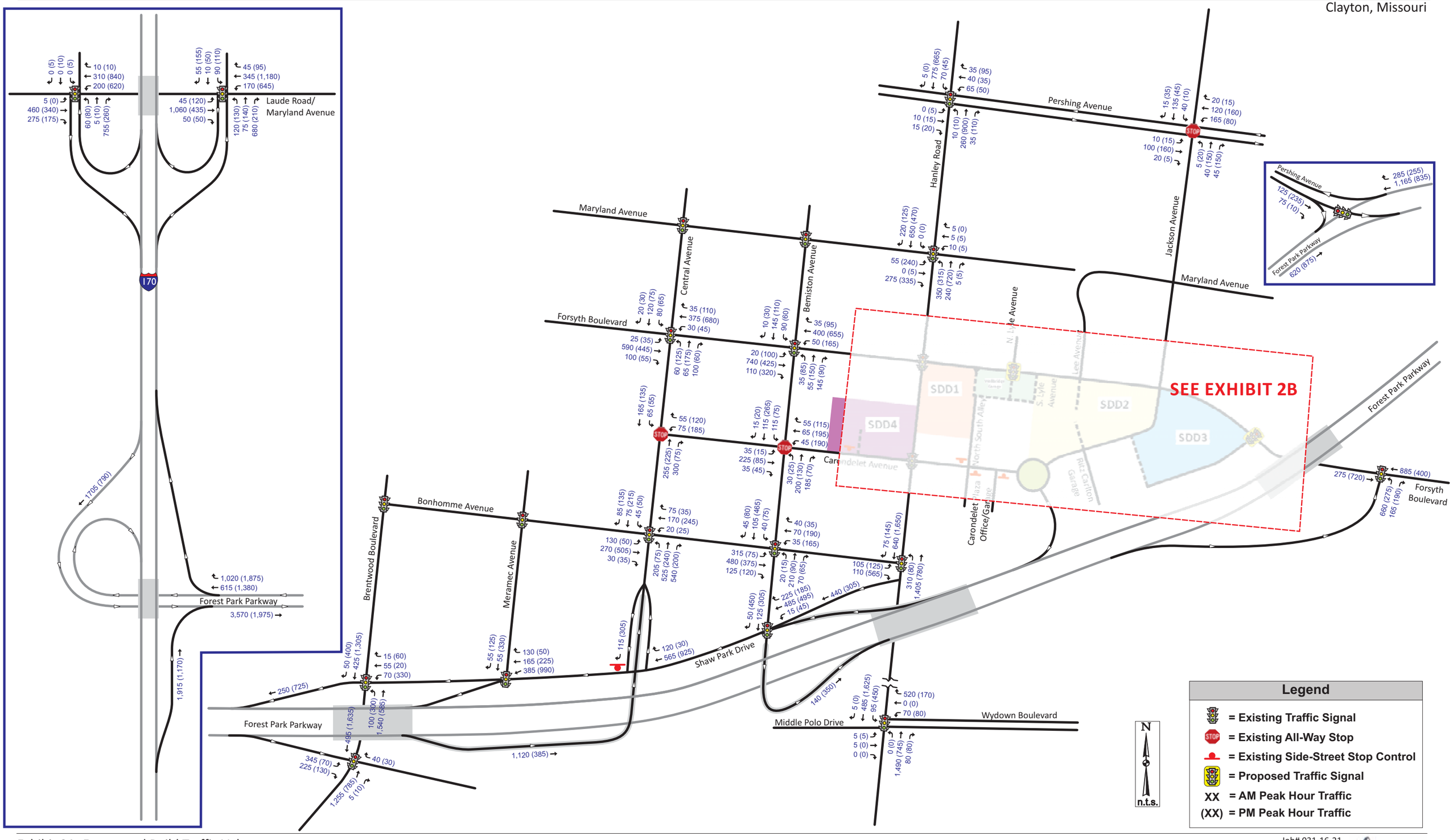
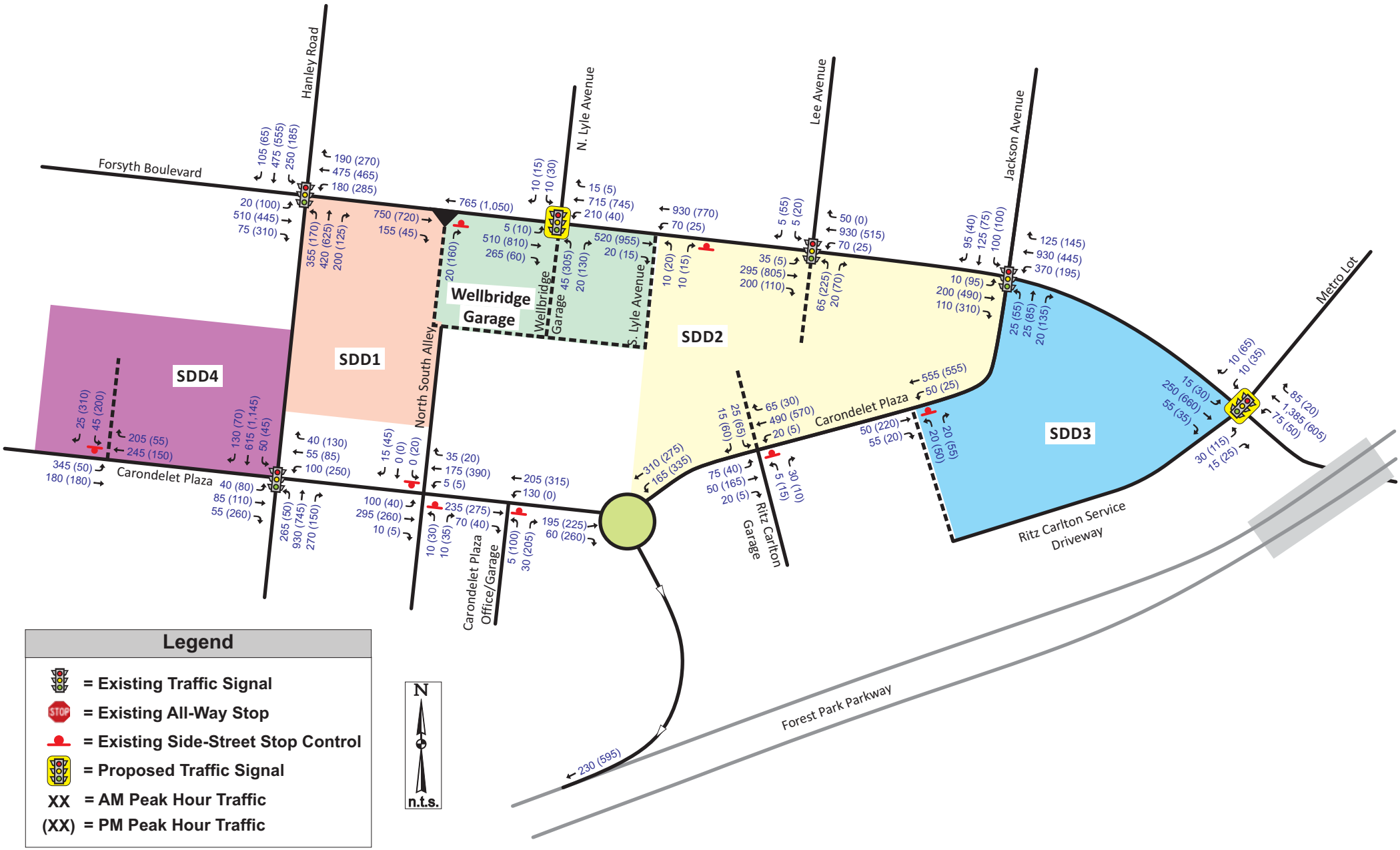


Exhibit 2A: Forecasted Build Traffic Volumes

Job# 031-16-21
08/25/16



Legend

- = Existing Traffic Signal
- = Existing All-Way Stop
- = Existing Side-Street Stop Control
- = Proposed Traffic Signal
- XX = AM Peak Hour Traffic
- (XX) = PM Peak Hour Traffic

Exhibit 2B: Forecasted Build Traffic Volumes

Job# 031-16-21
08/25/16

CBB TRANSPORTATION ENGINEERS+PLANNERS

Build Operating Conditions

The Build traffic conditions were evaluated and compared to the base conditions. Several roadway improvements were included in Centene's plan that was submitted July 18, 2016. The improvements proposed by the applicant are as follows:

- The Sub-district 1 garage access to Forsyth Boulevard is limited to right-in/right-out due to the proximity (close spacing) to Hanley Road;
- Signalized access is proposed to the Sub-district 2 garage access as a fourth leg to the Lee Avenue at Forsyth Boulevard intersection;
    - Two lanes are proposed exiting the Sub-district 2 garage (one northbound left-turn lane and one shared left/through/right-turn lane);
- A westbound left-turn lane is proposed on Forsyth Boulevard at Lee Avenue to serve the Sub-district 2 garage.
- A separate eastbound right-turn lane is maintained on Forsyth Boulevard at Carondelet Plaza.
- Signalized access is proposed for the intersection of Forsyth Boulevard with the Sub-district 3 garage access (Ritz Carlton Service Drive)/Metro Lot.
    - A single northbound lane to Forsyth Boulevard is maintained.

The traffic Impact dated July 26, 2016 also recommended some additional improvements to mitigate the proposed Centene Campus Development along Forsyth Boulevard that remain valid and were assumed for the current evaluations:

- A second access to the Sub-district 3 Garage (via Carondelet Plaza) will be needed to help distribute the heavy exiting left-turn traffic and provide acceptable operating conditions. The driveway should provide, at a minimum, a 3-lane cross-section at the intersection with Carondelet Plaza.
    - It was assumed that the additional access to Carondelet Plaza would serve approximately 50% of the parking spaces in the Sub-district 3 Garage.
- Re-stripe and/or widen Forsyth Boulevard to accommodate two eastbound through lanes from the Ritz Carlton Service Drive/Sub-district 3 Garage/Metro Lot to east of the Forest Park Parkway Off-Ramp/Bland Avenue. The two eastbound through lanes could taper back to one lane an adequate distance east of Forest Park Parkway.
- Widen the Forest Park Parkway Off-Ramp/Bland Avenue to provide dual northbound left-turn lanes and a separate northbound right-turn lane at Forsyth Boulevard.
- Construct a southbound right-turn lane on Hanley Road at Carondelet Avenue in conjunction with the Sub-district 4 development.

The August 1, 2016 submission included a new signalized intersection for the Wellbridge garage entrance at Forsyth Boulevard and also included the relocation of South Lyle Avenue to approximately 70 feet east of the proposed garage entrance.

It is obvious that the amount of parking spaces in that garage would require signalization to function during the evening peak but relocating South Lyle Avenue in very close proximity

(approximately 70 feet) to the new signal is undesirable. Several potential re-configurations of the Forsyth Boulevard area are provided for consideration:

1) Realign South Lyle Avenue opposite North Lyle Avenue and signalize.
   a) Provide a westbound left-turn lane on Forsyth Boulevard at the signal.
   b) Eliminate the current South Lyle Avenue roadway.
   c) South Lyle should be four lanes - one inbound and three lanes exiting lanes (two northbound left-turn lanes and one shared through/right-turn lane) to serve Relocated South Lyle Avenue at the approach to Forsyth Boulevard;
   d) Provide garage access via the east-west alleyway behind the garage or from relocated South Lyle Avenue.
2) Align the Wellbridge Parking garage access opposite North Lyle Avenue and signalize.
   a) Provide a westbound left-turn lane on Forsyth Boulevard at the signal.
   b) The garage access should be four lanes - (one southbound lane, two northbound left-turn lanes and one shared through/right-turn lane).
   c) South Lyle Avenue could remain, but should be constructed midway between the North Lyle Avenue and Lee Avenue signal not as proposed on the 08/01/2016 plans. South Lyle Avenue should be a three lane road – One southbound lane and one northbound left-turn lane and one northbound right-turn lane.
3) Relocate South Lyle Avenue as shown on 08/01/2016 plans and signalize the South Lyle at Forsyth Boulevard as a “T” intersection.
   a) Provide a westbound left-turn lane on Forsyth Boulevard at the signal.
   b) South Lyle should be four lanes - one inbound and three lanes exiting lanes (two northbound left-turn lanes and one right-turn lane) to serve Relocated South Lyle Avenue and the garage at the approach to Forsyth Boulevard;
   c) Provide one right-in/right-out to garage along Forsyth Boulevard between Hanley Road signal and New South Lyle Avenue signal.
   d) Provide Wellbridge garage access via the east-west alleyway behind the garage or from relocated South Lyle Avenue.

Table 5 summarizes the forecasted levels of service and the average vehicular delays for each of the critical intersections during the AM and PM peak hours. These evaluations include some minor timing modifications as well as other minor signal improvements such as split phasing, flashing yellow arrows, etc. The following timing changes were made to reduce delays and queues, while minimizing the impact to the mainline traffic flows:

Signal timing adjustments assumed for the AM peak hour analysis:

- The southbound through along Hanley Road at Forsyth Boulevard was increased by 5 seconds (northbound left-turn time reduced);
- The northbound through along Hanley Road at Bonhomme Avenue was increased by 5 seconds (eastbound time reduced); and
- The northbound approach of Central Avenue at Bonhomme Avenue was increased by 8 seconds (east-west time reduced).

Signal timing adjustments assumed for the PM peak hour analysis:

- The westbound left-turn on Forsyth Boulevard at Hanley Road was increased by 4 seconds (eastbound through time reduced);
- The southbound though on Hanley Road at Carondelet Avenue was increased by 4 seconds (northbound left-turn time reduced);
- The southbound approach of Hanley Road at Bonhomme Avenue was increased by 15 seconds (eastbound time reduced);
- The northbound and southbound approaches of Bemiston Avenue at Bonhomme Avenue were increased by 15 seconds (east-west time reduced);
- The max recall for north-south Bemiston was removed at Forsyth Boulevard, and
- The westbound approach of Shaw Park Drive at Meramec Avenue was increased by 9 seconds (southbound time reduced).

The following minor signal improvement assumptions were also made for both peak hours:

- Northbound and southbound Lee Avenue were assumed to operate under split phasing, based on the shared lane assignment for safety purposes;
- Flashing Yellow Arrows were assumed for all left-turns along Forsyth Boulevard;
- Protected-plus-permitted left-turns were assumed for the north-south approaches of Jackson Avenue/Carondelet Plaza at the intersection with Forsyth Boulevard;
- Based on the extremely close spacing of the Ritz Carlton Service Drive/Sub-district 3 garage/Metro Lot with the Forest Park Parkway off-ramp/Bland Avenue, the new signalized intersection of Forsyth Boulevard with Sub-district 3 access will need to operate using a single traffic controller with the Forest Park Parkway off-ramp/Bland Avenue (essentially as a single intersection) so vehicles are not trapped between the intersections.
- Signalized access to the Metro Lot was assumed.
- Pedestrian accommodations across Forsyth Boulevard are included at all signalized intersections.

Again, the 95th percentile queues presented in Table 4 reflect the queue length of which only 5% of the signal's cycles exceed during the peak hour. This length is typically used to size turn bays. A comparison of the Base Conditions to the Forecasted Build Conditions reveals that additional improvements are needed beyond the improvements proposed by the applicant along Forsyth Boulevard around Sub-district 3 to mitigate the impacts of the proposed development.

The forecasted traffic has a limited effect on the levels of service, delays and queues during the AM peak hour. The overall intersection LOS remains the same for a majority of the study intersections, except as follows:

- **Central Avenue and Carondelet Avenue** degrades from LOS A to B, with an increase in overall delay of less than 2 seconds per vehicle. There are no concerns or need for improvement.
- **Bemiston Avenue and Bonhomme Avenue** degrades from LOS B to C, with an increase in overall delay of less than 6 seconds per vehicle. There are no concerns or need for improvement.
- **Bemiston Avenue and Carondelet Avenue** degrades from LOS A to B, with an increase in overall delay of less than 10 seconds per vehicle. There are no concerns or need for improvement.
- **Bemiston Avenue and Forsyth Boulevard** degrades from LOS A to B, with an increase in overall delay of less than 2 seconds per vehicle. There are no concerns or need for improvement.
- **Forsyth Boulevard and Jackson Avenue/Carondelet Plaza** degrades from LOS A to B, with an increase in overall delay of less than 2 seconds per vehicle. There are no concerns or need for improvement.
- **Jackson Avenue and Pershing Avenue** degrades from LOS A to B, with an increase in overall delay of less than 2 seconds per vehicle. There are no concerns or need for improvement.
- **Forest Park Parkway Off-Ramp at Forsyth Boulevard** - The Forest Park Parkway off-ramp degrades from LOS C to LOS F with an increase in delay of approximately 108 seconds for the northbound approach.
    - To mitigate the impacts of the proposed Centene Campus Development, the Forest Park Parkway Off-Ramp/Bland Avenue needs to be widened to provide dual northbound left-turn lanes and a separate northbound right-turn lane at Forsyth Boulevard.

Table 5: Traffic Operating Conditions – Forecasted Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Hanley Road & Pershing Avenue – Signalized						
Eastbound Pershing Avenue	C (26.3)	<25	<25	C (28.1)	<25	25 TH
Westbound Pershing Avenue	D (41.5)	50 LT	100 LT	C (30.2)	40 LT	80 LT
Northbound Hanley Road	A (3.9)	40 TH	45 TH	A (8.4)	135 TH	280 TH
Southbound Hanley Road	A (3.1)	75 TH	100 TH	A (3.6)	65 TH	80 TH
Overall Intersection	**A (7.8)**	--		**A (9.0)**	--	
Hanley Road & Maryland Avenue – Signalized						
Eastbound Maryland Avenue	C (25.5)	65 RT	85 RT	D (47.5)	110 TH	180 TH
Westbound Maryland Avenue	D (50.1)	<25	40 TH	E (57.0)	<25	25 TH
Northbound Hanley Road	B (15.0)	85 LT	240 LT	B (12.6)	130 TH	265 LT
Southbound Hanley Road	B (12.6)	110 TH	290 TH	B (10.7)	80 TH	160 TH
Overall Intersection	**B (16.1)**	--		**C (21.4)**	--	
Hanley Road & Forsyth Boulevard – Signalized						
Eastbound Forsyth Boulevard	D (41.6)	215 TH	275 TH	D (43.5)	190 TH	255 TH
Westbound Forsyth Boulevard	D (34.4)	195 TH	265 TH	D (41.7)	175 TH	370 LT
Northbound Hanley Road	B (15.4)	90 LT	145 LT	C (27.3)	115 TH	330 TH
Southbound Hanley Road	C (34.2)	165 TH	190 LT	C (26.1)	120 TH	275 TH
Overall Intersection	**C (30.1)**	--		**C (35.0)**	--	
Hanley Road & Carondelet Avenue – Signalized						
Eastbound Carondelet Avenue	C (30.2)	60 TH	110 TH	D (39.2)	100 RT	205 RT
Westbound Carondelet Avenue	C (27.5)	65 LT	115 LT	C (47.9)	180 LT	355 LT
Northbound Hanley Road	C (27.8)	225 TH	305 TH	B (15.1)	115 TH	200 TH
Southbound Hanley Road	C (22.2)	135 TH	210 TH	E (68.6)	260 TH	480 TH
Overall Intersection	**C (26.2)**	--		**D (45.1)**	--	
Hanley Road & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	C (20.9)	55 LT	90 LT	D (40.8)	260 RT	330 RT
Northbound Hanley Road	B (19.4)	435 TH	595 TH	B (18.2)	180 TH	385 TH
Southbound Hanley Road	D (37.9)	265 TH	340 TH	E (69.2)	625 TH	825 TH
Overall Intersection	**C (24.5)**	--		**D (50.2)**	--	
Hanley Road & Wydown Boulevard – Signalized						
Eastbound Wydown Boulevard	D (52.1)	<25	25 TH	D (51.6)	<25	<25
Westbound Wydown Boulevard	C (32.0)	170 RT	225 RT	C (21.3)	60 LT	65 LT
Northbound Hanley Road	B (16.4)	520 TH	825 TH	C (20.7)	285 TH	435 TH
Southbound Hanley Road	A (6.3)	40 LT	95 LT	B (11.3)	260 TH	490 TH
Overall Intersection	**B (17.7)**	--		**B (14.6)**	--	

Table 5 (cont.): Traffic Operating Conditions – Forecasted Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Forsyth Boulevard & Forest Park Parkway Eastbound Off-Ramp/Bland Avenue & Metro Lot/Garage SDD 3 – Signalized						
Westbound Forsyth Boulevard	D (47.7)	665 TH	770 TH	A (9.3)	155 TH	240 TH
Eastbound Forsyth Boulevard	D (43.1)	120 TH	125 TH	C (21.5)	215 TH	260 TH
Northbound Forest Park Pkwy	D (36.6)	255 LT	325 LT	C (32.1)	110 LT	150 LT
Northbound Garage SDD 3	A (0.5)	<25	<25	A (8.7)	<25	40 TH
Southbound Metro Parking Lot	A (0.2)	<25	<25	A (2.4)	<25	<25
Overall Intersection	**C (32.0)**	**--**		**B (12.1)**	**--**	
Forsyth Boulevard & Jackson Avenue/Carondelet Plaza – Signalized						
Eastbound Forsyth Boulevard	A (9.2)	30 TH	50 TH	A (7.9)	40 TH	75 TH
Westbound Forsyth Boulevard	A (3.8)	<25	445 TH	A (7.4)	30 TH	90 TH
Northbound Carondelet Plaza	C (32.2)	<25	55 TH	D (44.8)	135 TH	210 TH
Southbound Jackson Avenue	C (34.7)	105 TH	160 TH	C (31.5)	65 LT	100 LT
Overall Intersection	**B (10.2)**	**--**		**B (14.8)**	**--**	
Forsyth Boulevard & Lee Avenue/Garage SDD 2 – Signalized						
Eastbound Forsyth Boulevard	A (3.1)	<25	35 TH	A (3.1)	30 TH	50 TH
Westbound Forsyth Boulevard	A (0.9)	<25	<25	A (4.3)	35 TH	45 TH
Northbound Garage SDD 2	C (34.2)	35 LT	80 LT	D (43.1)	130 LT	195 LT
Southbound Lee Avenue	A (0.6)	<25	<25	B (12.4)	<25	30 TH
Overall Intersection	**A (3.3)**	**--**		**B (10.3)**	**--**	
Forsyth Boulevard & South Lyle Avenue – Side-Street Stop						
Eastbound Forsyth Boulevard	A (0.0)	<25	<25	A (0.0)	<25	<25
Westbound Forsyth Boulevard	A (0.6)	<25	<25	A (0.2)	<25	<25
Northbound South Lyle Avenue	B (12.3)	<25	<25	B (12.2)	<25	<25
Forsyth Boulevard & North Lyle Avenue/Wellbridge Garage SDD 1 – Signalized						
Eastbound Forsyth Boulevard	A (5.3)	55 TH	125 TH	B (15.6)	125 TH	245 TH
Westbound Forsyth Boulevard	A (2.3)	<25	55 LT	A (8.9)	110 TH	160 TH
Northbound Wellbridge Garage SDD 1	D (44.7)	35 LT	75 LT	D (44.3)	235 LT	345 LT
Southbound North Lyle Avenue	A (1.6)	<25	<25	A (4.4)	<25	<25
Overall Intersection	**A (5.1)**	**--**		**B (18.8)**	**--**	
Carondelet Plaza & Garage SDD 3 – Side-Street Stop						
Eastbound Carondelet Plaza	A (0.0)	--	<25	A (0.0)	--	<25
Westbound Carondelet Plaza	A (1.0)	--	<25	A (0.6)	--	<25
Northbound Garage SDD 3	B (12.6)	--	<25	C (16.1)	--	25 LT
Carondelet Plaza & Ritz Garage/SDD 2 South Garage – Side-Street Stop						
Eastbound Carondelet Plaza	A (5.1)	--	<25	A (2.1)	--	<25
Westbound Carondelet Plaza	A (0.4)	--	<25	A (0.1)	--	<25
Northbound Ritz-Carlton Garage	B (10.2)	--	<25	C (19.3)	--	<25
Southbound SDD 2 South Garage	C (18.3)	--	<25	D (25.1)	--	55 TH

Table 5 (cont.): Traffic Operating Conditions – Forecasted Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Carondelet Plaza Roundabout						
Eastbound Carondelet Plaza	A (8.6)	--	46	C (22.4)	--	165
The Plaza in Clayton	A (6.0)	--	<25	A (9.2)	--	<25
Ritz-Carlton Access	A (4.5)	--	<25	A (4.6)	--	<25
Westbound Carondelet Plaza	A (9.0)	--	80	B (12.6)	--	150
Overall Intersection	**A (8.5)**	**--**		**C (16.4)**	**--**	
Carondelet Plaza & Carondelet Office Garage – Side-Street Stop						
Eastbound Carondelet Plaza	A (0.0)	--	<25	A (0.0)	--	<25
Westbound Carondelet Plaza	A (3.9)	--	<25	A (0.0)	--	<25
Northbound Office Garage	B (11.0)	--	<25	B (13.4)	--	30 RT
Carondelet Plaza & SDD 1 South Garage Alleyway – Side-Street Stop						
Eastbound Carondelet Plaza	A (2.6)	--	<25	A (1.4)	--	<25
Westbound Carondelet Plaza	A (0.2)	--	<25	A (0.1)	--	<25
Northbound Alleyway	B (14.1)	--	<25	C (16.4)	--	<25
Southbound Alleyway	A (9.4)	--	<25	B (15.0)	--	<25
Forest Park Parkway & Pershing Avenue – Signalized						
Eastbound Forest Park Parkway	A (4.1)	35 TH	60 TH	A (3.8)	85 TH	130 TH
Westbound Forest Park Pkwy	A (4.8)	80 TH	140 TH	A (4.1)	70 TH	175 TH
Southbound Pershing Avenue	B (14.9)	<25	45 LT	D (53.2)	100 LT	140 LT
Overall Intersection	**A (5.5)**	**--**		**A (9.4)**	**--**	
Jackson Avenue & Pershing Avenue – All-Way Stop						
Eastbound Pershing Avenue	A (8.3)	--	<25	A (9.4)	--	<25
Westbound Pershing Avenue	B (10.8)	--	50 TH	B (10.2)	--	35 TH
Northbound Jackson Road	A (9.1)	--	<25	B (13.1)	--	70 TH
Southbound Jackson Road	B (10.6)	--	35 TH	A (9.6)	--	<25
Overall Intersection	**B (10.1)**	**--**		**B (11.0)**	**--**	
Carondelet Avenue & Garage SDD 4 – Side-Street Stop						
Eastbound Carondelet Plaza	A (6.7)	--	40 LT	A (1.7)	--	<25
Westbound Carondelet Plaza	A (0.0)	--	<25	A (0.0)	--	<25
Southbound Garage SDD 4	C (19.4)	--	<25	B (12.3)	--	45 RT
Bemiston Avenue & Forsyth Boulevard – Signalized						
Eastbound Forsyth Boulevard	B (10.1)	80 TH	95 TH	B (11.4)	60 TH	290 TH
Westbound Forsyth Boulevard	A (7.0)	60 TH	85 TH	C (29.3)	330 TH	585 TH
Northbound Bemiston Avenue	B (13.9)	55 TH	100 TH	C (21.1)	80 TH	125 TH
Southbound Bemiston Avenue	B (15.9)	80 TH	115 TH	B (14.1)	50 TH	65 TH
Overall Intersection	**B (10.5)**	**--**		**C (20.2)**	**--**	
Bemiston Avenue & Carondelet Avenue – All-Way Stop						
Eastbound Carondelet Avenue	C (21.0)	--	115 TH	B (13.9)	--	40 TH
Westbound Carondelet Avenue	B (11.4)	--	30 TH	C (17.5)	--	115 TH
Northbound Bemiston Avenue	C (24.6)	--	175 TH	B (14.2)	--	60 TH
Southbound Bemiston Avenue	B (12.0)	--	30 TH	C (18.0)	--	110 TH
Overall Intersection	**B (18.9)**	**--**		**C (16.6)**	**--**	

Table 5 (cont.): Traffic Operating Conditions – Forecasted Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Bemiston Avenue & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	B (11.1)	115 TH	165 TH	B (18.3)	75 TH	135 TH
Westbound Bonhomme Avenue	A (4.7)	<25	<25	C (21.2)	75 TH	140 TH
Northbound Bemiston Avenue	D (48.6)	210 TH	320 TH	B (15.3)	55 TH	105 TH
Southbound Bemiston Avenue	D (37.4)	95 TH	160 TH	C (33.8)	380 TH	550 TH
Overall Intersection	**C (20.9)**	**--**		**C (24.2)**	**--**	
Bemiston Avenue & Shaw Park Drive – Signalized						
Westbound Shaw Park Drive	A (5.4)	55 TH	80 TH	B (14.4)	120 TH	170 TH
Southbound Bemiston Avenue	B (17.8)	45 LT	90 LT	B (14.2)	110 LT	180 LT
Overall Intersection	**A (7.8)**	**--**		**B (14.3)**	**--**	
Central Avenue & Forsyth Boulevard – Signalized						
Eastbound Forsyth Avenue	A (5.7)	50 TH	60 TH	B (10.3)	115 TH	145 TH
Westbound Forsyth Avenue	A (4.7)	<25	45 TH	B (10.3)	75 TH	90 TH
Northbound Central Avenue	A (7.4)	<25	35 TH	B (12.9)	45 TH	75 TH
Southbound Central Avenue	B (15.5)	75 TH	100 TH	A (7.4)	<25	<25
Overall Intersection	**A (7.0)**	**--**		**B (10.5)**	**--**	
Central Avenue & Carondelet Avenue – All Way Stop						
Westbound Carondelet Avenue	A (10.0)	--	<25	B (12.6)	--	65 TH
Northbound Central Avenue	B (10.7)	--	80 TH	A (9.3)	--	25 TH
Southbound Central Avenue	A (8.8)	--	<25	A (9.1)	--	<25
Overall Intersection	**B (10.1)**	**--**		**B (10.5)**	**--**	
Central Avenue & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	C (25.2)	80 LT	160 LT	B (15.1)	140 TH	255 TH
Westbound Bonhomme Avenue	C (24.4)	65 TH	95 TH	A (6.1)	25 TH	40 TH
Northbound Central Avenue	B (18.3)	230 TH	300 TH	C (32.3)	130 TH	180 TH
Southbound Central Avenue	A (6.4)	25 TH	45 TH	C (23.9)	140 TH	205 TH
Overall Intersection	**B (19.3)**	**--**		**C (20.4)**	**--**	
Central Avenue & Shaw Park Drive – Right-In Right-Out						
Southbound Central Avenue	B (11.4)	--	<25	C (16.2)	--	75 RT
Meramec Avenue & Shaw Park Drive – Signalized						
Westbound Shaw Park Drive	A (1.9)	<25	30 TH	C (25.4)	385 LT	710 LT
Southbound Meramec Avenue	B (13.4)	<25	45 TH	C (21.3)	150 TH	235 TH
Overall Intersection	**A (3.5)**	**--**		**C (24.3)**	**--**	

Table 5 (cont.): Traffic Operating Conditions – Forecasted Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Brentwood Boulevard & Shaw Park Drive & Forest Park Parkway Westbound On-Ramp – Signalized						
Westbound Shaw Park Drive	E (59.7)	50 TH	110 TH	F (87.7)	120 LT	210 LT
Northbound Brentwood Boulevard	A (9.8)	225 TH	230 TH	C (20.4)	65 LT	175 LT
Southbound Brentwood Boulevard	A (7.2)	35 TH	74 TH	B (18.6)	305 TH	375 TH
Overall Intersection	**B (12.6)**	**--**		**C (29.0)**	**--**	
Brentwood Boulevard & Walinca Drive & Forest Park Parkway Eastbound Off-Ramp – Signalized						
Eastbound Forest Park Parkway	F (204.0)	220 LT	320 LT	C (22.8)	25 LT	45 LT
Westbound Walinca Drive	A (3.1)	<25	<25	A (0.6)	<25	<25
Northbound Brentwood Boulevard	A (3.7)	50 TH	70 TH	A (3.6)	<25 TH	50 TH
Southbound Brentwood Boulevard	A (6.2)	30 TH	35 TH	B (13.3)	125 TH	165 TH
Overall Intersection	**D (54.8)**	**--**		**A (11.0)**	**--**	
Ladue Road & I-170 Southbound Ramps – Signalized						
Eastbound Ladue Road	D (37.6)	255 TH	335 TH	C (23.7)	140 TH	190 TH
Westbound Ladue Road	C (29.6)	110 LT	175 LT	D (38.4)	395 LT	600 LT
Northbound I-170 SB Ramps	C (23.6)	310 RT	565 RT	B (15.5)	55 LT	105 LT
Overall Intersection	**C (30.1)**	**--**		**C (31.7)**	**--**	
Ladue Road & I-170 Northbound Ramps & Ladue Crossing – Signalized						
Eastbound Ladue Road	B (18.5)	290 TH	400 TH	C (30.6)	190 TH	260 TH
Westbound Ladue Road	C (20.5)	90 LT	165 LT	D (35.1)	320 LT	665 LT
Northbound I-170 NB Ramps	E (59.2)	265 TH	475 TH	D (39.4)	150 TH	260 TH
Southbound Ladue Crossing	C (24.2)	55 LT	95 LT	C (24.1)	70 LT	115 LT
Overall Intersection	**C (32.2)**	**--**		**C (33.9)**	**--**	

X (XX.X) - Level of Service (Vehicular delay in seconds per vehicle)95th % queue notes: m = 95th % queues may not be experienced due to upstream signal metering, # = 95th % queue exceeds capacity, (LT) = 95th % queue experienced in left-turn lane, (TH) = 95th % queue experienced in through lane, (RT) = 95th % queue experienced in right-turn lane, -- Synchro does not provide 95th % queues

Similarly, the forecasted conditions in the PM peak hour were compared to the base conditions to evaluate the impact of the proposed Centene Campus Development. The following summarize the intersections that degrade in overall LOS during the PM Peak hour:

- **Central Avenue and Forsyth Boulevard** degrades from LOS A to B, with an increase in overall delay of less than 3 seconds per vehicle. There are no concerns or need for improvement.
- **Central Avenue and Carondelet Avenue** degrades from LOS A to B, with an increase in overall delay of less than 3 seconds per vehicle. There are no concerns or need for improvement.
- **Central Avenue and Bonhomme Avenue** degrades from LOS B to C, with an increase in overall delay of less than 1 seconds per vehicle. There are no concerns or need for improvement.
- **Bemiston Avenue and Carondelet Avenue** degrades from LOS B to C, with an increase in overall delay of less than 7 seconds per vehicle. There are no concerns or need for improvement.
- **Bemiston Avenue and Forsyth Boulevard** degrades from LOS A to C, with an increase in overall delay of less than 11 seconds per vehicle. There are no concerns or need for improvement.
- **Jackson Avenue and Pershing Avenue** degrades from LOS A to B, with an increase in overall delay of less than 2 seconds per vehicle. There are no concerns or need for improvement.
- **Shaw Park Drive at Meramec Avenue** degrades from LOS B to C, with an increase in overall delay of less than 9 seconds per vehicle. There are no concerns or need for improvement.
- **The Carondelet Plaza Roundabout** decrease from overall LOS A to C with an overall increase in delay of approximately 9 seconds per vehicle. There are no concerns or need for improvement.
- **Forsyth Boulevard at Lee Avenue** decrease from LOS A to B with an overall increase in delay of approximately 7 seconds, but a new leg would serve the Subtract 2 garage.
- **Forsyth Boulevard at Ritz Carlton Service/Sub-district 3 Garage/Metro Lot** decreases to overall LOS E, with the Northbound garage and eastbound Forsyth Boulevard approaches operating at LOS F.
    - A single signalized access point to the Sub-district 3 garage will operate very poorly during the PM peak hour. A second access to the Sub-district 3 garage (via Carondelet Plaza) is recommended to distribute the heavy exiting movements during the PM peak hour.
    - The eastbound approach of Forsyth Boulevard at the Ritz Carlton Service Drive/Sub-district 3 Garage/Metro Lot also operates at LOS F due to the heavy eastbound through volume in a single eastbound lane.
    - Forsyth Boulevard should be re-striped and/or widened to accommodate two eastbound through lanes from the Ritz Carlton service drive to east of the Forest Park Parkway Off-Ramp/Bland Avenue. The two eastbound through lanes could taper back to one lane an adequate distance east of Forest Park Parkway.

It should be reiterated that the base condition already reflects poor levels of service and congestion along the Hanley Road corridor during the PM peak hour. Consequently, any additional traffic would exacerbate existing conditions, particularly in the PM peak. Prior to the development of Centene Campus Development, the peak period within the peak hour lasts for approximately 25 to 30 minutes. Following completion of the subject development, it is anticipated that the duration of this congested period could extend by an additional 10 to 15 minutes. Consequently, peak operating conditions within this portion of the CBD would begin to cover the majority, if not eventually the entire, peak hour.

Hanley Road and Bonhomme Avenue: would continue to operate at an undesirable level during the PM peak hour, with the delay and queues for the southbound approach increasing due to the additional traffic from the development. Some green time could be reallocated from eastbound to southbound to improve congestion along Hanley Road, but the southbound approach LOS remains at E. The eastbound approach LOS degrades from LOS C to LOS D. Nevertheless, the southbound queues along Hanley Road would still spill back from Bonhomme Avenue to the intersection with Carondelet.

Hanley Road and Carondelet Plaza: The southbound approach of Hanley is expected to remain LOS E even with a small amount of northbound left-turn time reallocated to southbound Hanley Road. Based on the heavy volumes and less than desirable levels of service for southbound Hanley Road, it is recommended that a separate southbound right-turn lane be constructed with the development of Sub-district 4 to help mitigate the impacts of the proposed Centene development.

The eastbound and westbound approaches of Carondelet Plaza are expected to degrade from LOS C to LOS D with longer queues. The Carondelet Plaza westbound left-turn 95th percentile queues increase from 160 feet to 360 feet, while the average queue is expected to increase from 100 feet to 180 feet.

Although the westbound approach of Carondelet Plaza at Hanley Road would operate at LOS D and have longer queues, CBB evaluated the potential impacts associated with the provision of dual westbound left-turn lanes (one shared with the through lane). Those evaluations did not prove to be beneficial to operations at the intersection or along the corridor as a whole. In order to accommodate this lane configuration, it would be necessary to "split-phase" the traffic signal's operations with respect to Carondelet; i.e., serve eastbound and westbound approaches independently of one another. However, this phasing is not pedestrian friendly and a significant amount of the traffic signal's time would need to be reallocated from Hanley Road through movements in order to provide safe passage for pedestrians crossing Hanley Road. To do so would be more detrimental than beneficial to the operations and progression along Hanley Road, especially during the peak hours.

The north/south alley east of Hanley Road on Carondelet Plaza is expected to operate at acceptable levels of service during both peak hours. However, it should be noted that the

westbound queues on Carondelet Plaza from the signal at Hanley Road, currently and would continue to, occasionally block the north-south left-turn movement from the alley during the PM peak hour. The northbound left-turn and through vehicles have the alternative to turn right and "U-turn" around the roundabout to travel back west on Carondelet Plaza to Hanley Road, and the southbound left-turn vehicles have alternative access to Forsyth Boulevard via the alley to relocated South Lyle Avenue if queues are too long during the PM peak hour.

The other unsignalized access points to Carondelet Plaza (office access and Ritz Carlton garage access) are expected to operate at highly desirable levels of service during both the AM and PM peak hours. Given that these access drives are much farther from Hanley Road, the office driveway may rarely be blocked by the queues extending back from the signal at Hanley Road, but any blockages are expected to be relatively short in duration and should not result in excessive queues into the office garage area. The Ritz Carlton driveway is not expected to be blocked by queues.

Hanley Road and Forsyth Boulevard is expected to degrade from overall LOS C to LOS D during the PM peak hour. The westbound Forsyth Boulevard 95th Percentile queues, specifically the westbound left-turn, will increase from 90 feet to 370 feet. As noted, minor signal timing modifications were made to provide additional time to the westbound left-turn from eastbound Forsyth Boulevard.

It should be noted that the additional traffic generated by Centene Campus Development will have an impact on the westbound approach's level of service and queues, but the approach currently provides separate left and right-turn lanes. Similar to the Hanley Road and Carondelet intersection, the ability to provide dual turn lanes by sharing a through lane would not prove to be beneficial to operations at the intersection since it requires split-phasing which results in long pedestrian crossing times and therefore, negatively impacts Hanley Road operations and progression.

It must be acknowledged that North Lyle Avenue could occasionally be obstructed by westbound queues from the adjacent signalized intersection of Hanley Road at Forsyth Boulevard during the PM peak hour, since it would be blocked by queues longer than 330 feet. Nonetheless, any blockages are expected to be relatively short in duration and should not result in excessive delays or queues along Lyle Avenue. Additionally, if traffic volumes materialize as forecasted additional green time could be requested from St. Louis County to serve Forsyth Boulevard that would still adequately serve Hanley Road.

As previously noted it is undesirable for South Lyle Avenue to remain if the Wellbridge garage and Subdistict 2 garage are signalized since Lyle Avenue could be obstructed by queues from the adjacent signalized intersection during the PM peak hour. Based on the Build Traffic Volumes, approximately 40 vehicles per hour or less are expected to make the northbound left-turn movement from relocated South Lyle Avenue during the PM Peak hour, which represents less than 1 vehicle every minute on average.

Impacts on the I-170 Interchanges at Forest Park Parkway and Ladue Road

This study also included a planning level evaluation of the interchanges along I-170 that serve the City of Clayton – Forest Park Parkway interchange and Ladue Road interchange. Based on trips generated by this development, it is expected that the traffic volumes at the two interchanges would increase by approximately 15% to 20% during the peak hours of a typical weekday. Although our evaluation indicates that the two interchanges would operate below maximum capacity levels in the immediate term, this development and ongoing growth in the region and the City of Clayton is expected to result in travel demand at capacity at the two interchanges. As such, the following capacity enhancements are expected to provide additional capacity at the two interchanges:

- Improve turning radii at the two northbound I-170 ramps at Forest Park Parkway (northbound to eastbound ramp and westbound to northbound ramp). It is anticipated that this would require reconstruction of the trail overpass immediately to the east of the interchange.
- Provide dual westbound left-turn lanes at the Northbound I-170 and Ladue Road intersection.
- Provide dual northbound right-turn lanes at the I-170 and Ladue Road interchange.

Transportation Demand Management

In addition to physical improvements to the road system such as additional pavement and signal timing modifications, the implementation of Transportation Demand Management (TDM) strategies should be pursued by Centene and the City of Clayton. TDM strategies are implementable policies that result in more efficient use of transportation resources. Listed below are several TDM's that should be considered:

- *Flextime* means that employees are allowed flexibility in their daily work schedules such as arrival and departing at non-peak periods. Therefore, the implementation of flextime reduces peak period congestion directly, and can make ridesharing and transit use more feasible.

- *Compressed Workweek* (CWW) means employees work fewer but longer days, such as four 10-hour days each week, or 9-hour days with one day off every two weeks. CWW can reduce total vehicle travel through the creation of shorter work weeks as well as reducing peak period congestion due to the longer work hours.

- *Telework* includes various programs and activities that substitute telecommunications (telephone, fax, email, websites, video connections, etc.) for physical travel. Consequently, vehicle travel is reduced to and from the primary office location.

- *Ridesharing* refers to carpooling, which uses participants' own automobiles. Companies can promote this by providing incentives such as coupons for gas or shorter work hours in exchange for participating in the program.

- The provision of private *Shuttle Services* can be an incentive for employees to use MetroLink as an alternate transportation mode. The proposed Centene Campus Development is in close proximity to the MetroLink station on Central Avenue and Shaw Park Drive. Therefore, if Centene were to provide shuttle services to and from the site, the use of MetroLink would be more attractive to employees, particularly during extreme weather conditions. Shuttles can substitute for part or all of a vehicle trip and can support many other TDM strategies. In addition, the costs associated with this incentive could be offset by involving not only Centene employees and tenants but other nearby office buildings, such as the Interco Tower or The Plaza in Clayton.

- *Incentives* to encourage the use of MetroLink or MetroBus could be applied with the provision of paid or discounted transit passes to employees and tenants of Centene.

- *Parking Fees* for the parking garages could also motivate employees to find alternate modes of transportation to reduce their cost of commuting. Parking fees can complement the paid or discounted transit passes incentive.

TDM, if successfully employed, could mitigate a portion of the proposed development's impact. Therefore, the forecasted traffic operating conditions presented in this report could be considered a worst case scenario since the successful implementation of TDM would reduce the trip generation for the site during peak times, thereby reducing the site's overall traffic impacts.

Design-Year (20-Year) Conditions

Analyses of 20-year design forecasts are intended to identify long-term improvement needs in the area road system. Improvements dictated by background traffic growth and other potential developments are not necessarily the responsibility of any one development and may, in fact, represent regional needs that should be addressed through collective efforts between the agencies and land developers.

20-Year No-Build Volumes

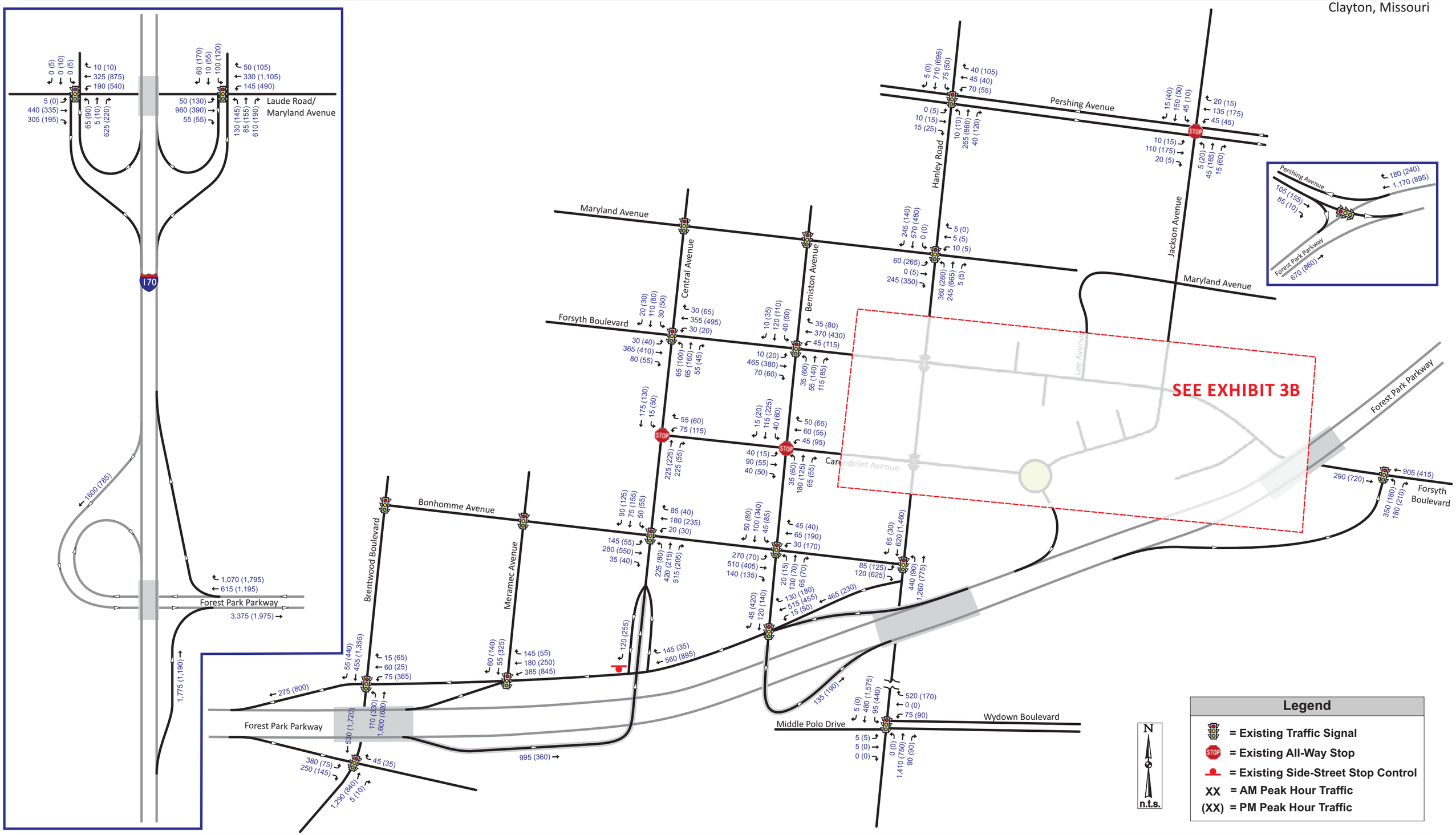
Before analyzing the 20-year future impact of the proposed redevelopment, it was necessary to establish a baseline forecast to reflect the 20-year traffic conditions without the development. To that end, a 20-Year No-Build scenario was developed to evaluate baseline conditions and provide a basis of comparison between the 20-Year No-Build and Build conditions.

Since the Clayton area is mostly built-out, and the future development is primarily infill type, a 0.5% background growth rate beyond the base levels was assumed along the study roadways which represents an overall increase of approximately 10.5%. **Exhibit 3** illustrates the 20-Year No-Build Traffic Volumes (2036).

20-Year No-Build Traffic Conditions (2036)

The 20-Year No-Build Traffic Volumes were reanalyzed using the same methodologies applied to the Base and 2016 Build Traffic Volumes. The forecasted levels of service and average delays at each study intersection for the 20-Year No-Build Conditions are summarized in **Table 6.**

As more traffic (background growth) is added to the system, the conflicting priorities of serving the minor movements (side-streets and mainline left-turns) with acceptable levels of service and maintaining good progression along the primary routes through multiple signals becomes more and more difficult. The southbound approaches of Hanley Road at Bonhomme Avenue and Carondelet Avenue/Carondelet Plaza will continue to degrade during the PM peak hour in the 20-year No-Build conditions. System-level improvements (such as additional though lanes) would be needed along the entire Hanley Road corridor south of Carondelet Avenue, potentially to I-64, in order to provide acceptable levels of service as traffic volumes increase along Hanley Road



Legend

- = Existing Traffic Signal
- = Existing All-Way Stop
- = Existing Side-Street Stop Control
- XX = AM Peak Hour Traffic
- (XX) = PM Peak Hour Traffic

Exhibit 3A: 20-Year No-Build Traffic Volumes (2036)

Job# 031-16-21
08/25/16

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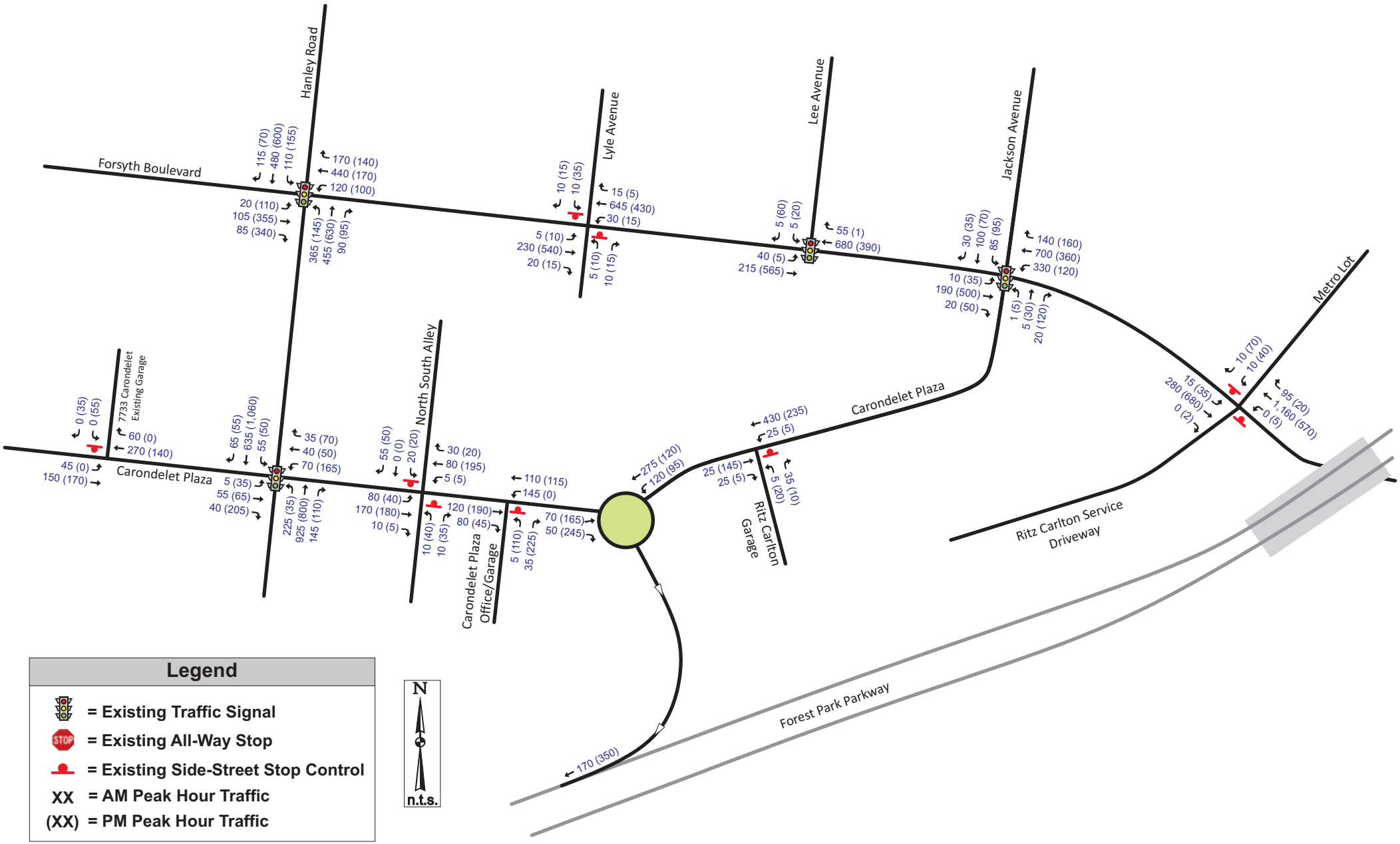

Legend

- = Existing Traffic Signal
- = Existing All-Way Stop
- = Existing Side-Street Stop Control
- XX = AM Peak Hour Traffic
- (XX) = PM Peak Hour Traffic

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Exhibit 3B: 20-Year No-Build Traffic Volumes (2036)

Job# 031-16-21
08/25/16

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Table 6: Traffic Operating Conditions – 2036 No-Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Hanley Road & Pershing Avenue – Signalized						
Eastbound Pershing Avenue	C (26.0)	<25	<25	C (26.1)	<25	<25
Westbound Pershing Avenue	D (42.1)	55 LT	105 LT	C (30.4)	30 TH	65 LT
Northbound Hanley Road	A (4.1)	35 TH	35 TH	A (8.5)	150 TH	285 TH
Southbound Hanley Road	A (3.2)	65 TH	95 TH	A (3.5)	65 TH	85 TH
Overall Intersection	**A (8.5)**	--		**A (9.2)**	--	
Hanley Road & Maryland Avenue – Signalized						
Eastbound Maryland Avenue	D (44.9)	95 RT	145 RT	D (48.3)	125 LT	195 LT
Westbound Maryland Avenue	D (50.1)	<25	40 TH	E (57.0)	<25	25 TH
Northbound Hanley Road	B (14.3)	85 LT	215 LT	B (12.5)	125 TH	245 TH
Southbound Hanley Road	B (10.4)	85 TH	250 TH	B (10.6)	80 TH	205 TH
Overall Intersection	**B (18.2)**	--		**C (22.3)**	--	
Hanley Road & Forsyth Boulevard – Signalized						
Eastbound Forsyth Boulevard	C (23.3)	45 TH	70 TH	C (30.0)	135 TH	195 TH
Westbound Forsyth Boulevard	C (33.7)	175 TH	235 TH	C (25.3)	60 TH	95 TH
Northbound Hanley Road	B (19.9)	140 LT	270 LT	D (38.7)	235 TH	310 TH
Southbound Hanley Road	C (29.3)	200 TH	140 TH	C (25.8)	225 TH	300 TH
Overall Intersection	**C (26.8)**	--		**C (30.8)**	--	
Hanley Road & Carondelet Avenue – Signalized						
Eastbound Carondelet Avenue	C (25.3)	40 TH	80 TH	C (25.7)	45 TH	115 RT
Westbound Carondelet Avenue	C (24.9)	45 LT	85 LT	C (31.1)	110 LT	175 LT
Northbound Hanley Road	C (22.9)	170 TH	250 TH	A (8.1)	65 TH	120 TH
Southbound Hanley Road	D (36.4)	200 TH	275 TH	E (69.1)	190 TH	560 TH
Overall Intersection	**C (27.6)**	--		**D (38.9)**	--	
Hanley Road & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	B (18.4)	60 LT	110 LT	C (23.2)	215 RT	275 RT
Northbound Hanley Road	B (22.1)	430 TH	565 TH	C (34.2)	315 TH	390 TH
Southbound Hanley Road	D (53.1)	270 TH	345 TH	E (75.0)	685 TH	835 TH
Overall Intersection	**C (30.0)**	--		**D (51.1)**	--	
Hanley Road & Wydown Boulevard/Middle Polo Drive – Signalized						
Eastbound Wydown Boulevard	D (52.1)	<25	25 TH	D (51.6)	<25	<25
Westbound Wydown Boulevard	D (41.8)	112 RT	175 RT	C (22.0)	65 LT	70 LT
Northbound Hanley Road	B (10.6)	175 TH	825 TH	C (25.6)	310 TH	450 TH
Southbound Hanley Road	A (6.7)	45 LT	85 LT	B (13.8)	325 TH	390 TH
Overall Intersection	**B (16.9)**	--		**B (17.7)**	--	
Forsyth Boulevard & Forest Park Parkway Eastbound Off-Ramp/Bland Ave – Signalized						
Eastbound Forsyth Boulevard	B (11.0)	65 TH	135 TH	B (14.5)	185 TH	485 TH
Westbound Forsyth Boulevard	E (78.3)	455 TH	740 TH	A (8.2)	80 TH	175 TH
Northbound Forest Park Pkwy	C (24.4)	135 LT	230 LT	C (25.0)	80 LT	125 LT
Overall Intersection	**D (50.5)**	--		**B (15.5)**	--	

Table 6 (cont.): Traffic Operating Conditions – 2036 No-Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Forsyth Boulevard & Metro Lot/Ritz Carlton – Side-Street Stop						
Eastbound Forsyth Boulevard	B (12.4)	<25	<25	A (9.0)	<25	<25
Westbound Forsyth Boulevard	A (0.0)	<25	<25	A (0.1)	<25	<25
Northbound Ritz-Carlton Alley	A (0.0)	<25	<25	A (0.0)	<25	<25
Southbound Metro Parking Lot	C (22.5)	<25	<25	C (16.7)	<25	<25
Forsyth Boulevard & Jackson Avenue/Carondelet Plaza – Signalized						
Eastbound Forsyth Boulevard	A (2.4)	<25	<25	A (2.6)	25 TH	35 TH
Westbound Forsyth Boulevard	A (4.0)	65 TH	220 LT	A (2.9)	30 TH	45 TH
Northbound Carondelet Plaza	B (19.4)	<25	25 TH	B (16.1)	<25	80 TH
Southbound Jackson Avenue	D (44.1)	65 TH	120 TH	E (67.2)	65 LT	170 LT
Overall Intersection	**A (9.3)**	**-**		**B (12.3)**	**--**	
Forsyth Boulevard & Lee Avenue – Signalized						
Eastbound Forsyth Boulevard	A (0.5)	<25	<25	A (1.9)	25 TH	55 TH
Westbound Forsyth Boulevard	A (0.6)	<25	45 TH	A (1.3)	<25	25 TH
Southbound Lee Avenue	C (34.6)	<25	<25	C (24.2)	<25	60 RT
Overall Intersection	**A (0.9)**	**-**		**A (3.4)**	**--**	
Forsyth Boulevard & Lyle Avenue – Side-Street Stop						
Eastbound Forsyth Boulevard	A (0.2)	<25	<25	A (0.2)	<25	<25
Westbound Forsyth Boulevard	A (0.5)	<25	<25	A (0.3)	<25	<25
Northbound Lyle Avenue	B (11.7)	<25	<25	B (12.7)	<25	<25
Southbound Lyle Avenue	C (16.8)	<25	<25	C (15.6)	<25	<25
Carondelet Plaza & Ritz Garage – Side-Street Stop						
Eastbound Carondelet Plaza	A (0.0)	<25	<25	A (0.0)	<25	<25
Westbound Carondelet Plaza	A (0.6)	<25	<25	A (0.2)	<25	<25
Northbound Ritz-Carlton Garage	A (9.1)	<25	<25	B (10.6)	<25	<25
Carondelet Plaza Roundabout						
Eastbound Carondelet Plaza	A (5.8)	--	20	A (8.9)	--	60
The Plaza in Clayton	A (4.8)	--	<25	A (6.0)	--	<25
Ritz-Carlton Access	A (3.8)	--	<25	A (4.2)	--	<25
Westbound Carondelet Plaza	A (7.2)	--	50	A (5.6)	--	25
Overall Intersection	**A (6.5)**	**--**		**A (7.4)**	**--**	
Carondelet Plaza & Carondelet Office Garage – Side-Street Stop						
Eastbound Carondelet Plaza	A (0.0)	<25	<25	A (0.0)	<25	<25
Westbound Carondelet Plaza	A (5.0)	<25	<25	A (0.0)	<25	<25
Northbound Office Garage	A (9.9)	<25	<25	B (11.5)	<25	30 RT
Carondelet Plaza & Alleyway – Side-Street Stop						
Eastbound Carondelet Plaza	A (2.7)	<25	<25	A (1.6)	<25	<25
Westbound Carondelet Plaza	A (0.4)	<25	<25	A (0.2)	<25	<25
Northbound Alleyway	B (11.7)	<25	<25	B (13.0)	<25	<25
Southbound Alleyway	B (10.4)	<25	<25	B (11.4)	<25	<25

Table 6 (cont.): Traffic Operating Conditions – 2036 No-Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Forest Park Parkway & Pershing Avenue – Signalized						
Eastbound Forest Park Parkway	A (4.1)	35 TH	65 TH	A (2.9)	70 TH	105 TH
Westbound Forest Park Pkwy	A (5.0)	80 TH	140 TH	A (3.4)	60 TH	170 TH
Southbound Pershing Avenue	B (14.7)	<25	45 LT	D (53.0)	65 LT	100 LT
Overall Intersection	**A (5.6)**	**--**		**A (7.0)**	**--**	
Jackson Avenue & Pershing Avenue – All-Way Stop						
Eastbound Pershing Avenue	A (8.1)	--	<25	A (9.0)	--	<25
Westbound Pershing Avenue	A (8.5)	--	<25	A (9.4)	--	<25
Northbound Jackson Road	A (8.6)	--	<25	B (11.4)	--	45 TH
Southbound Jackson Road	B (10.2)	--	35 TH	A (9.4)	--	<25
Overall Intersection	**A (9.0)**	**--**		**A (9.9)**	**--**	
Carondelet Avenue & Existing Garage – Side-Street Stop						
Eastbound Carondelet Plaza	A (1.9)	<25	<25	A (0.0)	<25	<25
Westbound Carondelet Plaza	A (0.0)	<25	<25	A (0.0)	<25	<25
Northbound Office Garage	A (0.0)	<25	<25	A (10.0)	<25	<25
Bemiston Avenue & Forsyth Boulevard – Signalized						
Eastbound Forsyth Boulevard	A (7.0)	40 TH	50 TH	A (5.2)	25 TH	40 TH
Westbound Forsyth Boulevard	A (7.4)	70 TH	80 TH	B (13.3)	120 TH	160 TH
Northbound Bemiston Avenue	B (13.2)	45 TH	85 TH	B (14.0)	60 TH	110 TH
Southbound Bemiston Avenue	B (15.9)	65 TH	90 TH	B (10.2)	35 TH	60 TH
Overall Intersection	**A (9.1)**	**--**		**B (10.7)**	**--**	
Bemiston Avenue & Carondelet Avenue – All-Way Stop						
Eastbound Carondelet Avenue	B (11.7)	--	35 TH	B (11.0)	--	<25
Westbound Carondelet Avenue	A (9.1)	--	<25	A (9.7)	--	<25
Northbound Bemiston Avenue	B (11.2)	--	55 TH	B (10.2)	--	35 TH
Southbound Bemiston Avenue	A (9.4)	--	<25	B (11.6)	--	<25
Overall Intersection	**B (10.5)**	**--**		**B (10.7)**	**--**	
Bemiston Avenue & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	A (9.9)	115 TH	170 TH	A (8.8)	50 TH	85 TH
Westbound Bonhomme Avenue	A (1.4)	<25	<25	A (9.4)	55 TH	90 TH
Northbound Bemiston Avenue	D (38.3)	130 TH	210 TH	C (26.4)	65 TH	125 TH
Southbound Bemiston Avenue	D (35.6)	90 TH	105 TH	E (64.4)	345 TH	560 TH
Overall Intersection	**B (16.6)**	**--**		**C (27.4)**	**--**	
Bemiston Avenue & Shaw Park Drive – Signalized						
Westbound Shaw Park Drive	A (6.5)	60 TH	90 TH	B (14.6)	115 TH	165 TH
Southbound Bemiston Avenue	B (18.4)	45 LT	90 LT	B (12.5)	80 LT	150 RT
Overall Intersection	**A (8.9)**	**--**		**B (13.6)**	**--**	

Table 6 (cont.): Traffic Operating Conditions – 2036 No-Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Central Avenue & Forsyth Boulevard – Signalized						
Eastbound Forsyth Avenue	A (5.1)	<25	<25	A (9.2)	85 TH	110 TH
Westbound Forsyth Avenue	A (4.1)	<25	35 TH	A (7.4)	45 TH	65 TH
Northbound Central Avenue	A (8.8)	<25	35 TH	B (12.2)	35 TH	65 TH
Southbound Central Avenue	B (14.0)	40 TH	60 TH	A (7.3)	<25	25 TH
Overall Intersection	**A (6.5)**	**--**		**A (8.9)**	**--**	
Central Avenue & Carondelet Avenue – All Way Stop						
Westbound Carondelet Avenue	A (9.6)	--	<25	A (9.8)		30 TH
Northbound Central Avenue	A (9.3)	--	55 TH	A (8.4)		<25
Southbound Central Avenue	A (8.3)	--	<25	A (8.3)		<25
Overall Intersection	**A (9.1)**	**--**		**A (8.7)**	**--**	
Central Avenue & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	B (19.2)	85 LT	160 LT	B (17.2)	200 TH	265 TH
Westbound Bonhomme Avenue	B (19.2)	60 TH	90 TH	B (10.2)	40 TH	55 TH
Northbound Central Avenue	B (20.0)	285 TH	405 TH	C (28.1)	165 TH	255 TH
Southbound Central Avenue	B (15.8)	45 TH	85 TH	C (29.0)	115 TH	190 TH
Overall Intersection	**B (19.3)**	**--**		**C (21.3)**	**--**	
Central Avenue & Shaw Park Drive – Right-In Right-Out						
Southbound Central Avenue	B (11.4)	--	<25	C (19.2)	--	75 RT
Meramec Avenue & Shaw Park Drive – Signalized						
Westbound Shaw Park Drive	A (2.3)	<25	30 TH	B (10.4)	90 TH	170 TH
Southbound Meramec Avenue	B (13.3)	<25	45 TH	B (14.2)	120 TH	195 TH
Overall Intersection	**A (3.8)**	**--**		**B (11.7)**	**--**	

Table 6 (cont.): Traffic Operating Conditions – 2036 No-Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Brentwood Boulevard & Shaw Park Drive & Forest Park Parkway Westbound On-Ramp – Signalized						
Westbound Shaw Park Drive	E (61.5)	60 TH	125 TH	F (102.8)	145 LT	240 LT
Northbound Brentwood Boulevard	B (10.2)	240 TH	240 TH	B (18.7)	70 LT	195 LT
Southbound Brentwood Boulevard	A (7.7)	55 TH	95 TH	C (24.8)	365 TH	440 TH
Overall Intersection	**B (12.9)**	**--**		**C (34.1)**	**--**	
Brentwood Boulevard & Walinca Drive & Forest Park Parkway Eastbound Off-Ramp – Signalized						
Eastbound Forest Park Parkway	F (244.9)	250 LT	355 LT	C (22.5)	25 LT	60 RT
Westbound Walinca Drive	A (3.7)	<25	<25	A (0.9)	<25	<25
Northbound Brentwood Boulevard	A (3.7)	55 TH	70 TH	A (3.6)	20 TH	55 TH
Southbound Brentwood Boulevard	A (5.9)	30 TH	35 TH	C (24.4)	165 TH	215 TH
Overall Intersection	**E (64.9)**	**--**		**B (17.7)**	**--**	
Ladue Road & I-170 Southbound Ramps – Signalized						
Eastbound Ladue Road	D (35.1)	245 TH	320 TH	C (23.8)	145 TH	200 TH
Westbound Ladue Road	C (29.8)	105 LT	170 LT	C (29.2)	220 LT	350 LT
Northbound I-170 SB Ramps	B (13.9)	155 RT	300 RT	B (17.5)	65 LT	115 LT
Overall Intersection	**C (26.2)**	**--**		**C (26.3)**	**--**	
Ladue Road & I-170 Northbound Ramps & Ladue Crossing – Signalized						
Eastbound Ladue Road	B (17.5)	235 TH	345 TH	C (28.7)	170 TH	240 TH
Westbound Ladue Road	B (16.3)	60 TH	110 LT	B (16.6)	300 TH	445 TH
Northbound I-170 NB Ramps	E (55.5)	255 TH	465 TH	D (39.9)	150 TH	260 TH
Southbound Ladue Crossing	C (24.7)	60 RT	105 RT	C (25.7)	75 LT	125 LT
Overall Intersection	**C (29.9)**	**--**		**C (23.5)**	**--**	

X (XX.X) - Level of Service (Vehicular delay in seconds per vehicle) 95th % queue notes: m = 95th % queues may not be experienced due to upstream signal metering, # = 95th % queue exceeds capacity, (LT) = 95th % queue experienced in left-turn lane, (TH) = 95th % queue experienced in through lane, (RT) = 95th % queue experienced in right-turn lane, -- Synchro does not provide 95th % queues

20-Year Build Traffic Volumes (2036)

The proposed development site-generated trips (with recommended additional access to Carondelet Plaza for Sub-district 3) were aggregated with the 2036 No Build Traffic Volumes (Exhibit 3). **Exhibit 4** reflects the 20-Year Build Traffic Volumes (2036) with the recommended additional access to Carondelet Plaza for Sub-district 3.

20-Year Build Traffic Conditions (2036)

The 2036 Build Traffic Volumes were reanalyzed with the recommend improvements and summarized in **Table 7**. The 20-Year Build AM and PM conditions were compared to the 20-Year No-Build conditions. The site-generated trips can generally be mitigated by the road improvements recommended in this traffic study. The design year Build PM peak hour conditions were compared to the design year No-Build PM peak hour conditions.

Again, the southbound approaches of Hanley Road at Bonhomme Avenue and Carondelet Avenue/Carondelet Plaza will continue to degrade during the PM peak hour 20-year conditions with or without the proposed development.

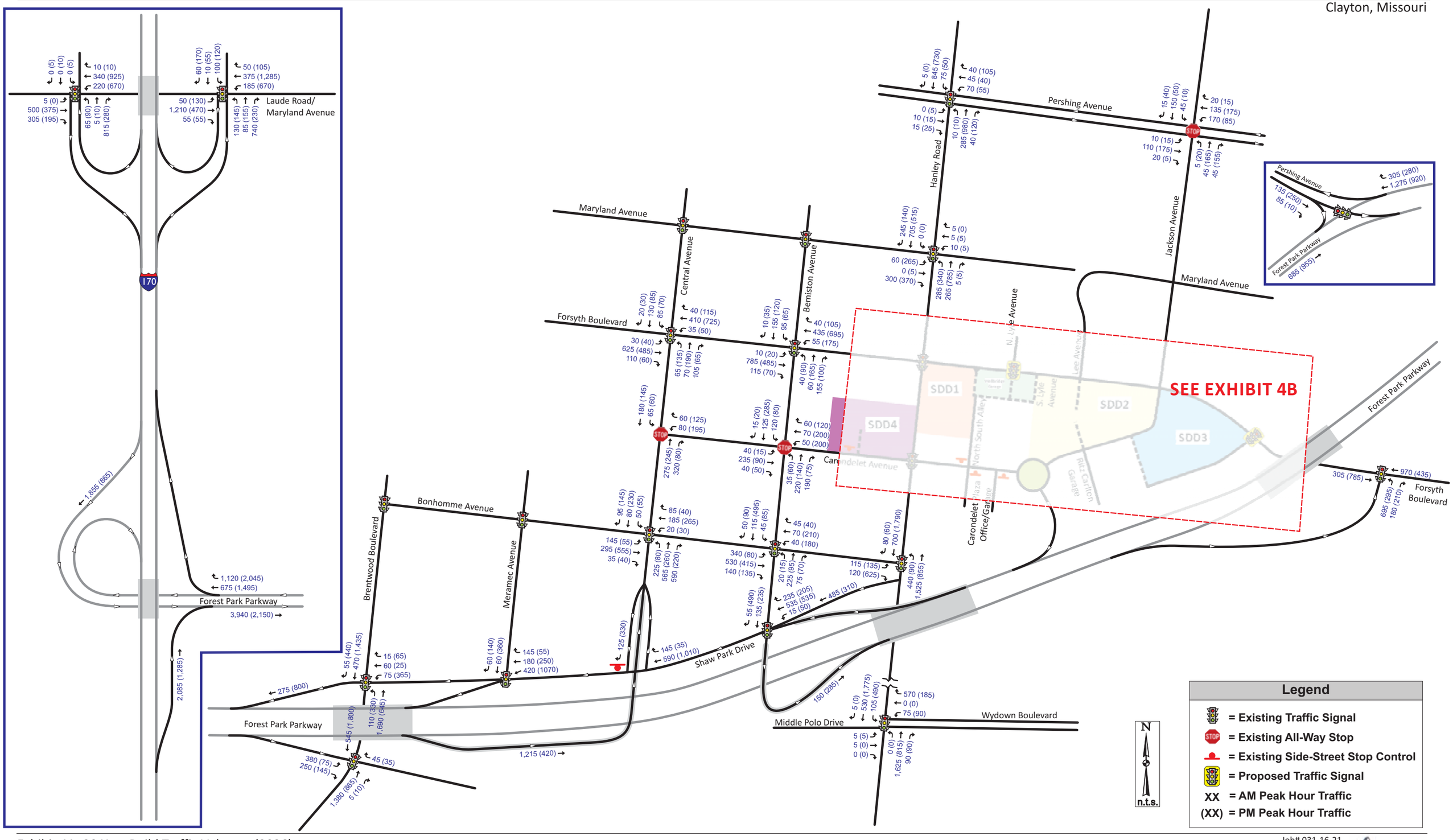
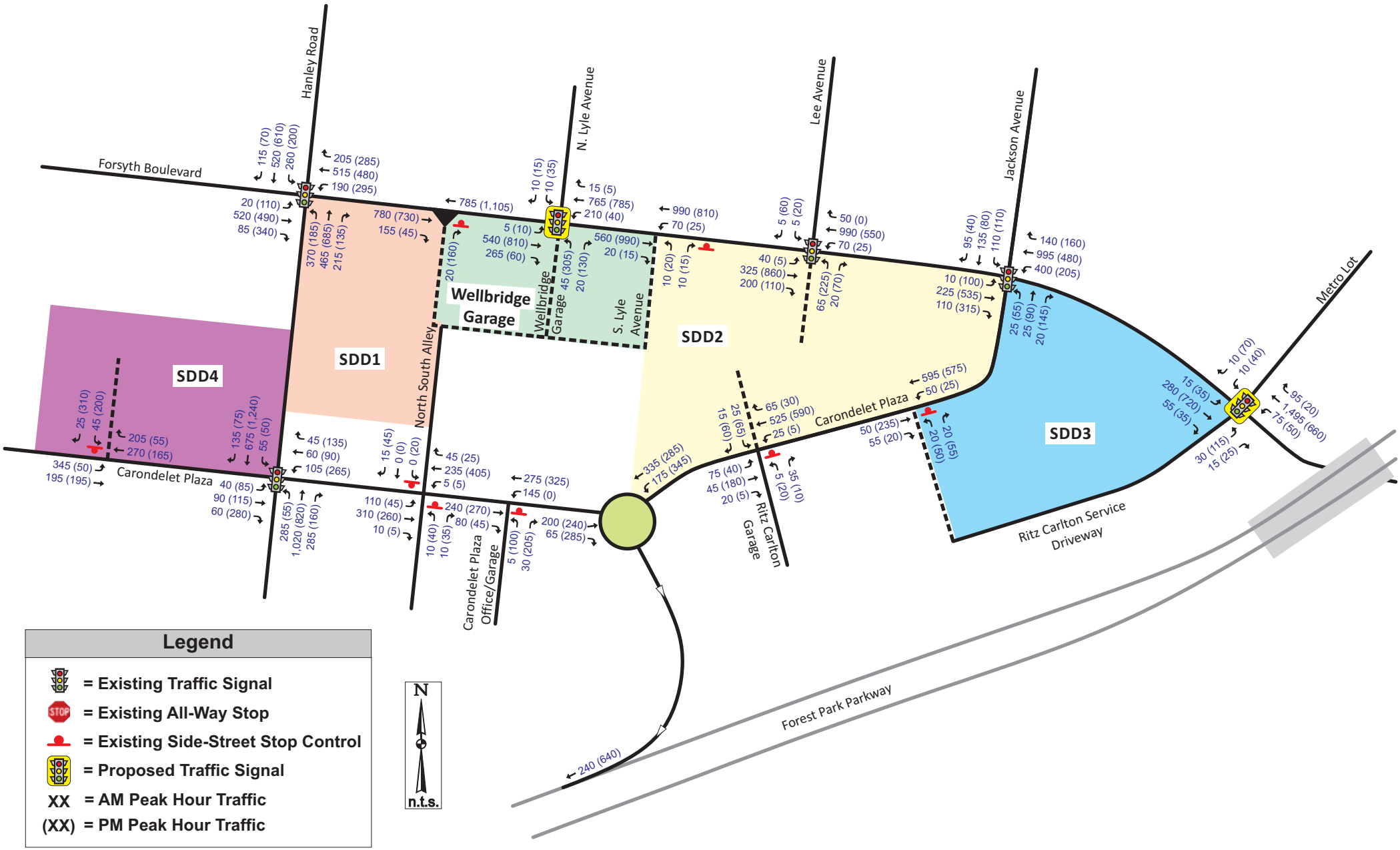


Exhibit 4A: 20-Year Build Traffic Volumes (2036)

Job# 031-16-21
08/25/16

CBB TRANSPORTATION ENGINEERS+PLANNERS



Legend

- = Existing Traffic Signal
- = Existing All-Way Stop
- = Existing Side-Street Stop Control
- = Proposed Traffic Signal
- XX = AM Peak Hour Traffic
- (XX) = PM Peak Hour Traffic

N
n.t.s.

Exhibit 4B: 20-Year Build Traffic Volumes (2036)

Job# 031-16-21
08/25/16

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Table 7: Traffic Operating Conditions – 2036 Build Traffic Volumes

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Hanley Road & Pershing Avenue – Signalized						
Eastbound Pershing Avenue	C (26.0)	<25	<25	C (26.1)	<25	25 TH
Westbound Pershing Avenue	D (42.1)	55 LT	105 LT	C (30.4)	30 TH	65 TH
Northbound Hanley Road	A (4.0)	40 TH	45 TH	A (8.1)	150 TH	320 TH
Southbound Hanley Road	A (3.4)	85 TH	120 TH	A (3.6)	70 TH	90 TH
Overall Intersection	**A (8.1)**	--		**A (8.9)**	--	
Hanley Road & Maryland Avenue – Signalized						
Eastbound Maryland Avenue	C (25.5)	45 RT	55 RT	D (46.7)	125 LT	195 LT
Westbound Maryland Avenue	D (50.1)	<25	40 TH	E (57.0)	<25	25 TH
Northbound Hanley Road	B (10.4)	40 LT	180 LT	B (15.3)	170 TH	295 TH
Southbound Hanley Road	B (12.2)	115 TH	320 TH	B (10.9)	85 TH	200 TH
Overall Intersection	**B (14.6)**	--		**C (22.5)**	--	
Hanley Road & Forsyth Boulevard – Signalized						
Eastbound Forsyth Boulevard	D (40.6)	220 TH	280 TH	D (46.7)	210 TH	275 TH
Westbound Forsyth Boulevard	D (35.9)	215 TH	265 TH	D (52.9)	220 LT	390 LT
Northbound Hanley Road	C (21.9)	130 LT	210 LT	D (42.4)	285 TH	365 TH
Southbound Hanley Road	D (37.3)	180 TH	230 LT	C (30.0)	230 TH	305 TH
Overall Intersection	**C (32.8)**	--		**D (43.4)**	--	
Hanley Road & Carondelet Avenue – Signalized						
Eastbound Carondelet Avenue	C (30.1)	65 TH	115 TH	D (43.5)	125 RT	260 RT
Westbound Carondelet Avenue	C (23.3)	65 LT	115 LT	E (56.1)	190 LT	405 LT
Northbound Hanley Road	D (45.1)	265 TH	375 TH	A (9.8)	90 TH	165 TH
Southbound Hanley Road	C (21.1)	135 TH	210 TH	E (70.1)	535 TH	560 TH
Overall Intersection	**D (35.0)**	--		**D (45.8)**	--	
Hanley Road & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	C (22.4)	60 LT	105 LT	D (43.0)	295 RT	370 RT
Northbound Hanley Road	C (22.5)	540 TH	510 TH	C (29.1)	340 TH	435 TH
Southbound Hanley Road	C (28.8)	250 TH	315 TH	E (70.9)	800 TH	930 TH
Overall Intersection	**C (24.2)**	--		**D (53.9)**	--	
Hanley Road & Wydown Boulevard/Middle Polo Drive – Signalized						
Eastbound Wydown Boulevard	D (52.1)	<25	25 TH	D (51.6)	<25	<25
Westbound Wydown Boulevard	D (33.2)	195 RT	240 RT	C (20.8)	65 LT	70 LT
Northbound Hanley Road	C (24.5)	635 TH	1090 TH	D (37.7)	355 TH	520 TH
Southbound Hanley Road	A (7.1)	50 TH	120 TH	B (14.8)	360 TH	530 TH
Overall Intersection	**C (22.8)**	--		**C (21.3)**	--	

Table 7 (Cont.): Traffic Operating Conditions – Design-Year Build Traffic Volumes (2036)

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Forsyth Boulevard & Forest Park Parkway Eastbound Off-Ramp/Bland Avenue & Metro Lot/Garage SDD 3 – Signalized						
Westbound Forsyth Boulevard	F (92.3)	760 TH	1045 TH	B (10.5)	180 TH	280 TH
Eastbound Forsyth Boulevard	C (33.0)	70 TH	125 TH	C (23.0)	235 TH	300 TH
Northbound Forest Park Pkwy	D (44.0)	130 LT	135 LT	C (31.7)	115 LT	160 LT
Northbound Garage SDD 3	A (0.5)	<25	<25	A (8.3)	<25	40 TH
Southbound Metro Parking Lot	A (0.2)	<25	<25	A (3.3)	<25	<25
Overall Intersection	**D (54.2)**	**--**		**B (12.7)**	**--**	
Forsyth Boulevard & Jackson Avenue/Carondelet Plaza – Signalized						
Eastbound Forsyth Boulevard	A (9.5)	30 TH	50 TH	A (8.0)	45 TH	95 TH
Westbound Forsyth Boulevard	A (4.3)	25 TH	430 TH	A (9.0)	35 TH	115 TH
Northbound Carondelet Plaza	C (31.6)	<25	55 TH	D (45.5)	145 TH	225 TH
Southbound Jackson Avenue	D (35.4)	110 TH	170 TH	C (31.9)	70 LT	105 LT
Overall Intersection	**B (10.5)**	**--**		**B (15.5)**	**--**	
Forsyth Boulevard & Lee Avenue/Garage SDD 2 – Signalized						
Eastbound Forsyth Boulevard	A (4.0)	36 TH	55 TH	A (5.7)	45 TH	85 TH
Westbound Forsyth Boulevard	A (1.0)	<25	<25	A (3.9)	35 TH	45 TH
Northbound Garage SDD 2	C (34.2)	35 LT	80 LT	D (43.1)	130 LT	195 LT
Southbound Lee Avenue	A (0.6)	<25	<25	B (14.2)	<25	35 TH
Overall Intersection	**A (3.6)**	**--**		**B (11.2)**	**--**	
Forsyth Boulevard & South Lyle Avenue – Side-Street Stop						
Eastbound Forsyth Boulevard	A (0.0)	<25	<25	A (0.0)	<25	<25
Westbound Forsyth Boulevard	A (3.6)	<25	<25	A (0.3)	<25	<25
Northbound South Lyle Avenue	A (0.0)	<25	<25	B (12.8)	<25	<25
Forsyth Boulevard & North Lyle Avenue/Wellbridge Garage SDD 1 – Signalized						
Eastbound Forsyth Boulevard	A (4.3)	70 TH	120 TH	B (13.2)	120 TH	140 TH
Westbound Forsyth Boulevard	A (2.0)	<25	50 LT	A (8.0)	145 TH	145 TH
Northbound Wellbridge Garage SDD 1	A (28.2)	<25	30 TH	D (49.8)	235 LT	390 LT
Southbound North Lyle Avenue	A (9.5)	<25	<25	A (6.4)	<25	25 TH
Overall Intersection	**A (3.5)**	**--**		**B (18.3)**	**--**	
Carondelet Plaza & Garage SDD 3 – Side-Street Stop						
Eastbound Carondelet Plaza	A (0.0)	--	<25	A (0.0)	--	<25
Westbound Carondelet Plaza	A (1.0)	--	<25	A (0.6)	--	<25
Northbound Garage SDD 3	B (13.0)	--	<25	C (16.8)	--	25 LT
Carondelet Plaza & Ritz Garage/SDD 2 South Garage – Side-Street Stop						
Eastbound Carondelet Plaza	A (5.3)	--	<25	A (2.1)	--	<25
Westbound Carondelet Plaza	A (0.5)	--	<25	A (0.1)	--	<25
Northbound Ritz-Carlton Garage	B (10.2)	--	<25	C (22.1)	--	<25
Southbound SDD 2 South Garage	C (19.8)	--	<25	D (27.2)	--	55 TH

Table 7 (Cont.): Traffic Operating Conditions – Design-Year Build Traffic Volumes (2036)

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Carondelet Plaza Roundabout						
Eastbound Carondelet Plaza	A (8.9)	--	50	D (28.2)	--	220
The Plaza in Clayton	A (6.2)	--	<25	A (9.8)	--	<25
Ritz-Carlton Access	A (4.5)	--	<25	A (4.7)	--	<25
Westbound Carondelet Plaza	A (9.6)	--	90	B (13.3)	--	160
Overall Intersection	**A (9.1)**	**--**		**C (19.4)**	**--**	
Carondelet Plaza & Carondelet Office Garage – Side-Street Stop						
Eastbound Carondelet Plaza	A (0.0)	--	<25	A (0.0)	--	<25
Westbound Carondelet Plaza	A (3.8)	--	<25	A (0.0)	--	<25
Northbound Office Garage	B (11.2)	--	<25	B (13.7)	--	35 RT
Carondelet Plaza & SDD 1 South Garage Alleyway – Side-Street Stop						
Eastbound Carondelet Plaza	A (2.8)	--	<25	A (2.1)	--	<25
Westbound Carondelet Plaza	A (0.2)	--	<25	A (0.1)	--	<25
Northbound Alleyway	C (15.6)	--	<25	C (19.7)	--	<25
Southbound Alleyway	A (9.8)	--	<25	B (15.9)	--	<25
Forest Park Parkway & Pershing Avenue – Signalized						
Eastbound Forest Park Parkway	A (4.4)	40 TH	75 TH	A (4.2)	100 TH	150 TH
Westbound Forest Park Pkwy	A (5.5)	100 TH	170 TH	A (4.3)	90 TH	190 TH
Southbound Pershing Avenue	B (16.8)	25 LT	55 LT	D (53.2)	105 LT	145 LT
Overall Intersection	**A (6.2)**	**--**		**A (9.5)**	**--**	
Jackson Avenue & Pershing Avenue – All-Way Stop						
Eastbound Pershing Avenue	A (8.6)	--	<25	A (9.7)	--	<25
Westbound Pershing Avenue	B (11.3)	--	55 TH	B (10.8)	--	40 TH
Northbound Jackson Road	A (9.4)	--	<25	B (14.3)	--	85 TH
Southbound Jackson Road	B (11.2)	--	40 TH	B (10.0)	--	<25
Overall Intersection	**B (10.6)**	**--**		**B (11.8)**	**--**	
Carondelet Avenue & Garage SDD 4 – Side-Street Stop						
Eastbound Carondelet Plaza	A (6.7)	--	40 LT	A (1.6)	--	<25
Westbound Carondelet Plaza	A (0.0)	--	<25	A (0.0)	--	<25
Southbound Garage SDD 4	C (20.1)	--	<25	B (12.5)	--	50 RT
Bemiston Avenue & Forsyth Boulevard – Signalized						
Eastbound Forsyth Boulevard	B (10.6)	80 TH	110 TH	A (4.1)	30 TH	55 TH
Westbound Forsyth Boulevard	A (7.7)	75 TH	95 TH	C (24.8)	360 TH	555 TH
Northbound Bemiston Avenue	B (14.3)	60 TH	110 TH	C (21.6)	90 TH	140 TH
Southbound Bemiston Avenue	B (16.7)	110 TH	130 TH	B (14.4)	50 TH	75 TH
Overall Intersection	**B (11.1)**	**--**		**C (17.6)**	**--**	
Bemiston Avenue & Carondelet Avenue – All-Way Stop						
Eastbound Carondelet Avenue	D (25.1)	--	145 TH	C (15.1)	--	45 TH
Westbound Carondelet Avenue	B (12.2)	--	35 TH	C (20.2)	--	135 TH
Northbound Bemiston Avenue	D (32.9)	--	35 TH	C (15.4)	--	70 TH
Southbound Bemiston Avenue	B (12.9)	--	<25	C (21.8)	--	135 TH
Overall Intersection	**C (23.4)**	**--**		**C (19.1)**	**--**	

Table 7 (Cont.): Traffic Operating Conditions – Design-Year Build Traffic Volumes (2036)

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Bemiston Avenue & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	B (12.5)	140 TH	195 TH	B (19.8)	85 TH	175 TH
Westbound Bonhomme Avenue	A (3.7)	<25	<25	C (26.6)	100 TH	225 TH
Northbound Bemiston Avenue	D (52.0)	320 TH	370 TH	B (15.7)	60 TH	110 TH
Southbound Bemiston Avenue	D (39.7)	105 TH	175 TH	C (38.0)	430 TH	665 TH
Overall Intersection	**C (22.5)**	**--**		**C (27.3)**	**--**	
Bemiston Avenue & Shaw Park Drive – Signalized						
Westbound Shaw Park Drive	A (5.9)	65 TH	95 TH	B (15.1)	135 TH	190 TH
Southbound Bemiston Avenue	B (17.9)	50 LT	95 LT	B (15.4)	120 LT	230 LT
Overall Intersection	**A (8.2)**	**--**		**B (15.3)**	**--**	
Central Avenue & Forsyth Boulevard – Signalized						
Eastbound Forsyth Avenue	A (6.4)	70 TH	85 TH	B (11.0)	140 TH	165 TH
Westbound Forsyth Avenue	A (5.1)	<25	50 TH	B (11.1)	85 TH	100 TH
Northbound Central Avenue	A (7.5)	<25	40 TH	B (13.6)	50 TH	85 TH
Southbound Central Avenue	B (14.9)	75 TH	90 TH	A (7.8)	<25	30 TH
Overall Intersection	**A (7.3)**	**--**		**B (11.2)**	**--**	
Central Avenue & Carondelet Avenue – All Way Stop						
Westbound Carondelet Avenue	B (10.4)	--	<25	B (13.5)	--	70 TH
Northbound Central Avenue	B (12.0)	--	95 TH	A (9.7)	--	30 TH
Southbound Central Avenue	A (9.1)	--	<25	A (9.4)	--	<25
Overall Intersection	**B (11.0)**	**--**		**B (11.1)**	**--**	
Central Avenue & Bonhomme Avenue – Signalized						
Eastbound Bonhomme Avenue	C (28.5)	95 LT	185 LT	B (15.6)	165 TH	270 TH
Westbound Bonhomme Avenue	C (26.5)	70 TH	115 TH	A (6.3)	30 TH	40 TH
Northbound Central Avenue	C (21.4)	260 TH	335 TH	C (33.4)	140 TH	200 TH
Southbound Central Avenue	A (6.6)	25 TH	45 TH	C (24.2)	155 TH	220 TH
Overall Intersection	**C (22.0)**	**--**		**C (21.0)**	**--**	
Central Avenue & Shaw Park Drive – Right-In Right-Out						
Southbound Central Avenue	B (11.6)	--	<25	C (17.7)	--	90 RT
Meramec Avenue & Shaw Park Drive – Signalized						
Westbound Shaw Park Drive	A (2.1)	<25	35 TH	C (31.1)	445 LT	815 LT
Southbound Meramec Avenue	B (13.4)	<25	50 TH	C (29.1)	180 TH	310 TH
Overall Intersection	**A (3.6)**	**--**		**C (30.6)**	**--**	

Table 7 (Cont.): Traffic Operating Conditions – Design-Year Build Traffic Volumes (2036)

Intersection/Approach	AM Peak Hour			PM Peak Hour		
	LOS (Delay)	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*	*LOS (Delay)*	*50th % Queue Length (ft)*	*95th % Queue Length (ft)*
Brentwood Boulevard & Shaw Park Drive & Forest Park Parkway Westbound On-Ramp – Signalized						
Westbound Shaw Park Drive	E (61.5)	60 TH	125 TH	F (102.9)	145 LT	240 LT
Northbound Brentwood Boulevard	B (10.3)	240 TH	245 TH	B (18.9)	70 LT	200 LT
Southbound Brentwood Boulevard	A (7.8)	55 TH	95 TH	C (24.9)	365 TH	445 TH
Overall Intersection	**B (13.0)**	**--**		**C (34.2)**	**--**	
Brentwood Boulevard & Walinca Drive & Forest Park Parkway Eastbound Off-Ramp – Signalized						
Eastbound Forest Park Parkway	F (244.9)	250 LT	355 LT	C (22.6)	25 LT	45 LT
Westbound Walinca Drive	A (3.7)	<25	<25	A (0.9)	<25	<25
Northbound Brentwood Boulevard	A (3.8)	60 TH	75 TH	A (3.6)	25 TH	55 TH
Southbound Brentwood Boulevard	A (6.0)	30 TH	35 TH	C (24.5)	135 TH	165 TH
Overall Intersection	**E (65.0)**	**--**		**B (17.9)**	**--**	
Ladue Road & I-170 Southbound Ramps – Signalized						
Eastbound Ladue Road	D (42.8)	290 TH	375 TH	C (24.7)	160 TH	210 TH
Westbound Ladue Road	C (33.8)	130 LT	245 LT	D (38.4)	195 LT	485 LT
Northbound I-170 SB Ramps	C (33.8)	410 RT	735 RT	B (14.8)	65 LT	115 LT
Overall Intersection	**D (37.0)**	**--**		**C (31.4)**	**--**	
Ladue Road & I-170 Northbound Ramps & Ladue Crossing – Signalized						
Eastbound Ladue Road	C (22.7)	355 TH	540 TH	C (37.8)	250 TH	355 TH
Westbound Ladue Road	C (25.9)	125 LT	205 LT	F (85.8)	545 LT	735 LT
Northbound I-170 NB Ramps	F (84.7)	335 TH	555 TH	D (41.1)	165 TH	300 TH
Southbound Ladue Crossing	C (24.7)	60 LT	105 LT	C (25.7)	75 LT	125 LT
Overall Intersection	**D (42.9)**	**--**		**E (64.1)**	**--**	

X (XX.X) - Level of Service (Vehicular delay in seconds per vehicle)95th % queue notes: m = 95th % queues may not be experienced due to upstream signal metering, # = 95th % queue exceeds capacity, (LT) = 95th % queue experienced in left-turn lane, (TH) = 95th % queue experienced in through lane, (RT) = 95th % queue experienced in right-turn lane, -- Synchro does not provide 95th % queues

Summary and Recommendations

Centene Corporation is proposing to develop four Sub-districts of land along the south side of Forsyth Boulevard between Hanley Road and Forest Park Parkway and the northwest corner of Hanley Road and Carondelet Avenue. The proposed Centene Campus development is generally bound by Forsyth Boulevard to the north, Carondelet Plaza/Carondelet Avenue to the south, Bemiston Avenue to the west and Forest Park Parkway to the east.

Based on the site plans submitted on August 1, 2016, the full build-out of the proposed Centene Campus development, including all four Sub-districts, is expected to generate 2,120 new trips during the morning peak hour and 2,140 new trips during the afternoon peak hour. The estimated trip generation for the August 1, 2016 submittal is expected to decrease slightly during the peak hours (25 total trips during the AM peak hour and 85 total trips during the PM peak hour).

However, since the proposed land uses changes were relatively minor for the August 1 submittal and the exact areas for the office and retail space is still fluctuating, CBB analyzed the impacts based on the trip generation from the original study (which was slightly worse) to provide a worst-case traffic scenario. As a result, the Centene Campus development, including all four Sub-districts, was assumed to generate 2,145 new trips during the morning peak hour and 2,225 new trips during the afternoon peak hour.

Several roadway improvements were included in the July 18, 2016 development plans submitted by Centene:

- The Sub-district 1 garage access to Forsyth Boulevard is limited to right-in/right-out only due to the proximity (close spacing) to Hanley Road signalized intersection;
- Signalized access is proposed to the Sub-district 2 garage access as a fourth leg to the Lee Avenue at Forsyth Boulevard intersection;
    - Two lanes are proposed exiting the Sub-district 2 garage (one northbound left-turn lane and one shared left/through/right-turn lane);
- A westbound left-turn lane is proposed on Forsyth Boulevard at Lee Avenue to serve the Sub-district 2 garage.
- A separate eastbound right-turn lane is maintained on Forsyth Boulevard at Carondelet Plaza.
- Signalized access is proposed for the intersection of Forsyth Boulevard with the Sub-district 3 garage access (Ritz Carlton Service Drive)/Metro Lot.
    - A single northbound lane to Forsyth Boulevard is maintained.

The traffic Impact dated July 26, 2016 also recommended some additional improvements to mitigate the proposed Centene Campus Development along Forsyth Boulevard that remain valid with the August 1, 2016 Submittal and include the following:

- A second access to the Sub-district 3 Garage (via Carondelet Plaza) will be needed to help distribute the heavy exiting left-turn traffic and provide acceptable operating conditions.

The driveway should provide, at a minimum, a 3-lane cross-section at the intersection with Carondelet Plaza.

- Re-stripe and/or widen Forsyth Boulevard to accommodate two eastbound through lanes from the Ritz Carlton Service Drive/Sub-district 3 Garage/Metro Lot to east of the Forest Park Parkway Off-Ramp/Bland Avenue. The two eastbound through lanes could taper back to one lane at an adequate distance east of Forest Park Parkway.
- Widen the Forest Park Parkway Off-Ramp/Bland Avenue to provide dual northbound left-turn lanes and a separate northbound right-turn lane at Forsyth Boulevard.
- Construct a southbound right-turn lane on Hanley Road at Carondelet Avenue in conjunction with the Sub-district 4 development.
- Implement signal retiming and optimization program upon completion of development and roadway improvements.
- It is our understanding that a pedestrian circulation plan for the entire Centene Campus is being developed. Because of the spatial distribution of uses as well as parking supply, we anticipate significant pedestrian flows primarily along Hanley Road, Forsyth Boulevard and Carondelet Plaza. Increased pedestrian flows should be accommodated during signal retiming. Grade separated pedestrian facilities, via an elevated walkway or a tunnel, would alleviate heavy pedestrian crossings at signalized intersections.
- It should be acknowledged that Sub-district 3 trip generation methodology assumes that the 650 Seat corporate training Center, the 1000 seat auditorium, and the 120 room corporate lodging uses are predominantly for Centene's internal use only and that there would be no net new trips created by these uses during the morning and evening peak hours of a typical weekday. However, based on information provided by Centene, while Centene will likely be the main user of these uses, it is likely that these uses may be made available to the public from time to time. Additional analysis would need to be completed if concurrent use of the office tower and the other uses during a weekday peak hour are being requested.

The August 1, 2016 submission included a new signalized intersection for the Wellbridge garage entrance at Forsyth Boulevard and also included the relocation of South Lyle Avenue to approximately 70 feet east of the proposed garage entrance.

It is obvious that the amount of parking spaces in that garage would require signalization to function during the evening peak but relocating South Lyle Avenue in very close proximity (approximately 70 feet) to the new signal is undesirable. Several potential re-configurations of the Forsyth Boulevard area are provided for consideration:

1) Realign South Lyle Avenue opposite North Lyle Avenue and signalize.
   a) Provide a westbound left-turn lane on Forsyth Boulevard at the signal.
   b) Eliminate the current South Lyle Avenue roadway.
   c) South Lyle should be four lanes - one inbound and three lanes exiting lanes (two northbound left-turn lanes and one shared through/right-turn lane) to serve Relocated South Lyle Avenue at the approach to Forsyth Boulevard;

d) Provide garage access via the east-west alleyway behind the garage or from relocated South Lyle Avenue.

2) Align the Wellbridge Parking garage access opposite North Lyle Avenue and signalize.
   a) Provide a westbound left-turn lane on Forsyth Boulevard at the signal.
   b) The garage access should be four lanes - (one southbound lane, two northbound left-turn lanes and one shared through/right-turn lane).
   c) South Lyle Avenue could remain, but should be constructed midway between the North Lyle Avenue and Lee Avenue signal not as proposed on the 08/01/2016 plans. South Lyle Avenue should be a three lane road – One southbound lane and one northbound left-turn lane and one northbound right-turn lane.
3) Relocate South Lyle Avenue as shown on 08/01/2016 plans and signalize the South Lyle at Forsyth Boulevard as a "T" intersection.
   a) Provide a westbound left-turn lane on Forsyth Boulevard at the signal.
   b) South Lyle should be four lanes - one inbound and three lanes exiting lanes (two northbound left-turn lanes and one right-turn lane) to serve Relocated South Lyle Avenue and the garage at the approach to Forsyth Boulevard;
   c) Provide one right-in/right-out to garage along Forsyth Boulevard between Hanley Road signal and New South Lyle Avenue signal.
   d) Provide Wellbridge garage access via the east-west alleyway behind the garage or from relocated South Lyle Avenue.

In summary, based on the traffic operational analysis as described in the preceding sections of this report, the access and lane configurations on adjacent roadways proposed by Centene Corporation, with the addition of improvements as recommended above, provide adequate capacity to handle the additional trips generated by the proposed development. In addition, as described earlier, resulting from this development as well as anticipated growth expected in the next 20-years, the interchanges on I-170 at Forest Park Parkway and Ladue Road are anticipated to operate at capacity by 2036. Geometric enhancements at the two interchanges, including widening and radii enhancements, are expected to provide additional capacity.

This report would require reconciliation/updates, as needed, based on final set of plans to be submitted by Centene Corporation.

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