December 19, 2014

Mr. Allan D. Ivie, IV
CEO
Reliance Bancshares, Inc.
10401 Clayton Road
Frontenac, Missouri 63131

RE: Traffic Impact Study
Reliance Bank/Proposed Starbucks
Des Peres, Missouri
CBB Job No. 93-14

Dear Mr. Ivie:

As requested, CBB has completed a traffic impact study pertaining to the proposed redevelopment of the Reliance Bank site in Des Peres, Missouri. The site is located on the north side of Manchester Road between Vinetta Drive and Harwood Road. The location of the site in relation to the surrounding road system is depicted in **Figure 1**.

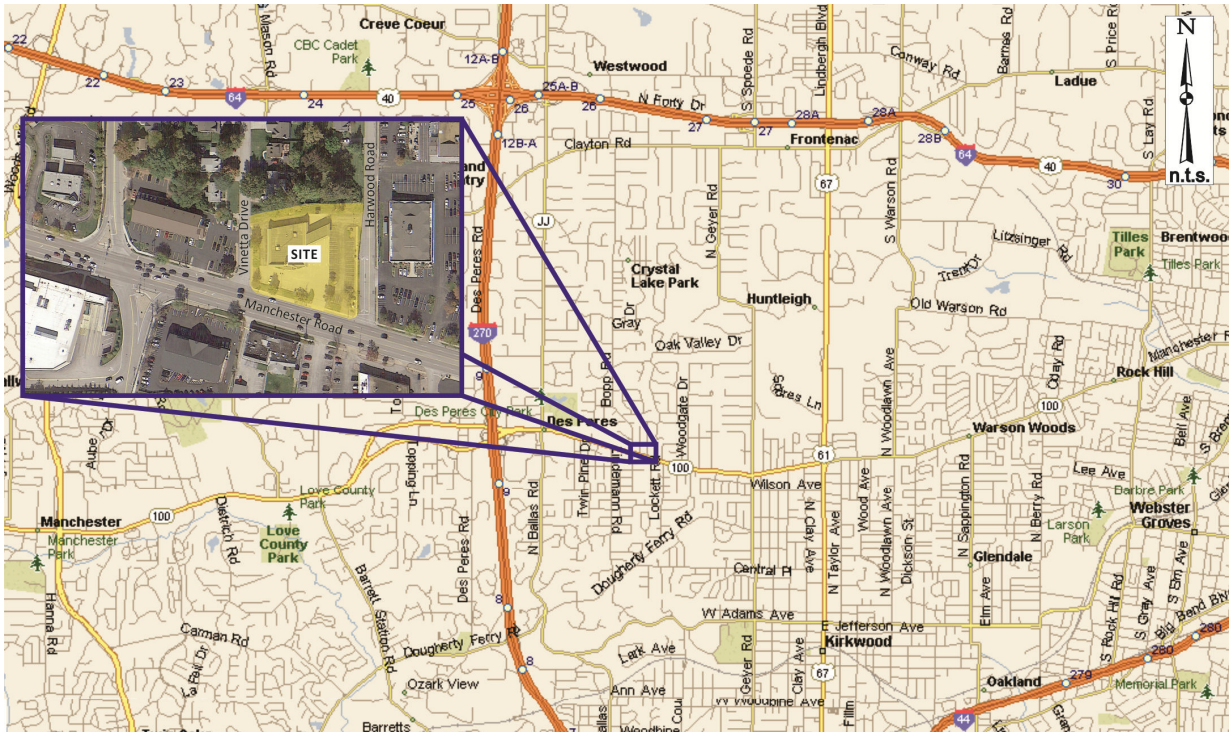

Figure 1: Project Location Map

Based on the site plan provided, the existing Reliance Bank Building would be reconfigured to add a Starbucks and a retail user, thus reducing the bank's use of the building. Access is currently provided via one full access driveway on each of the three adjacent roadways. A schematic of the site plan you provided is shown in **Figure 2**.

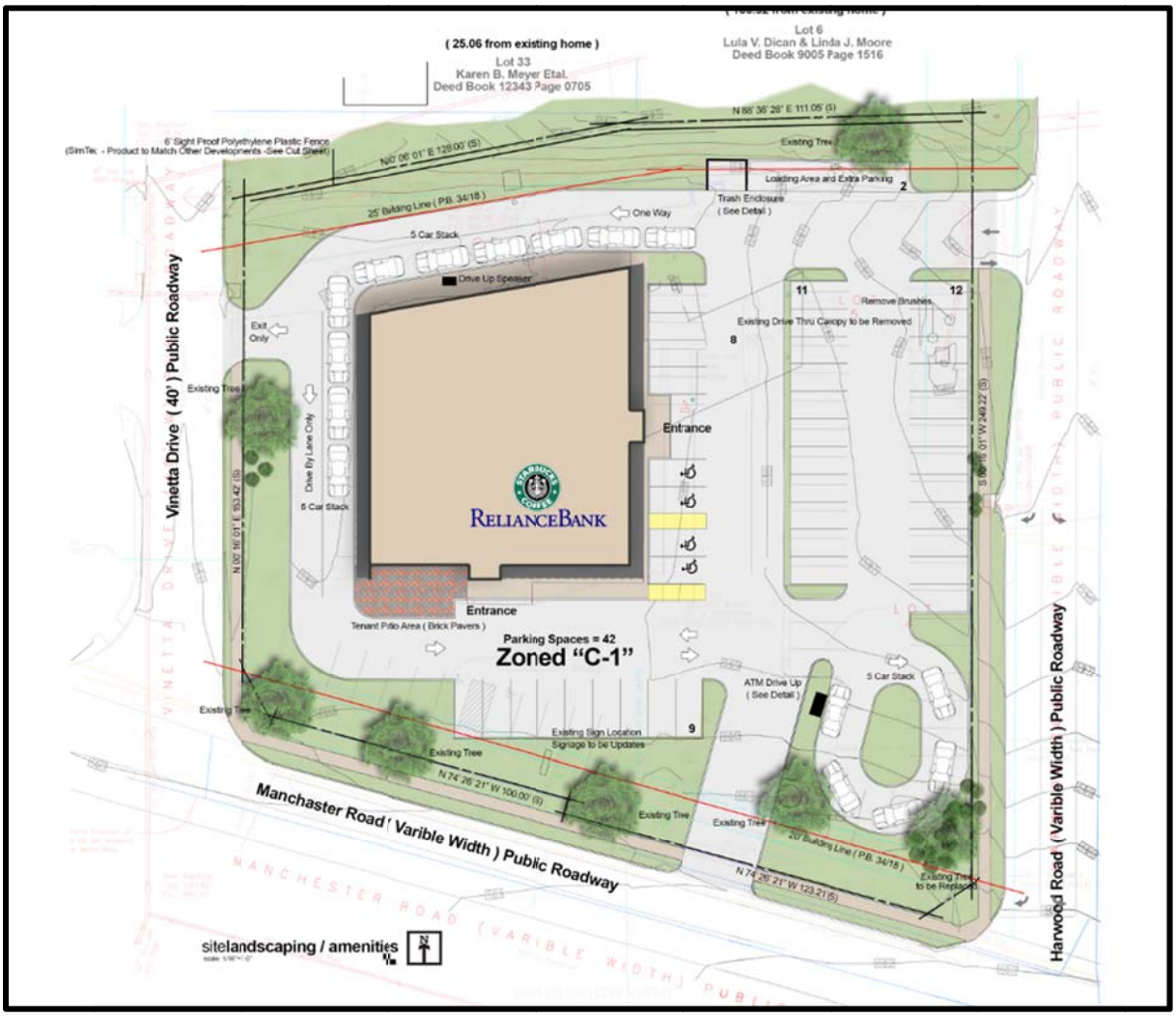

Figure 2: Site Concept Plan (Provided by Others)

The purpose of this study was to determine the number of additional trips that would be generated by the proposed redevelopment of the existing Reliance Bank, evaluate the impact of those trips on the operating conditions for the adjacent roadways, and determine the ability of motorists to safely enter and exit the site. If necessary, roadway improvements (lane additions and/or traffic control modifications) would be recommended to mitigate the impact of the development and to accommodate the additional traffic. The focus of this study was the AM and PM peak hours of a typical weekday.

The following intersections were included in the study:

- Manchester Road with Vinetta Drive;
- Manchester Road with Harwood Dive;
- Manchester Road with the Site Drive;
- Vinetta Drive with the Site Drive; and
- Harwood Drive with the Site Drive.

The following analysis scenarios were considered:

- Existing; and
- Forecasted (Existing plus Proposed Development).

The following report presents the methodology and findings relative to the Existing and Forecasted conditions.

EXISTING CONDITIONS

Area Roadway System: Manchester Road is a principal arterial that runs east-west through the St. Louis metropolitan area maintained by MoDOT as Route 100. The posted speed limit in the study area is 35 miles per hour (mph). Manchester Road has five lanes in the study area: two lanes in each direction with a center two-way left turn lane (TWLTL). Sidewalks are provided on both the north and south sides of Manchester Road with breaks for driveway access. Vertical curbs and storm water drainage are provided along the roadway. Manchester Road has an interchange with Interstate 270 roughly one mile west of the site location.

Vinetta Drive is a north-south local road with access to Manchester Road. Vinetta Drive dead ends approximately 1,000 feet north of Manchester Road. The road serves 26 single-family homes and has driveway access to the Reliance Bank site as well as the commercial lot on the west side containing Re/Max and Farmers Insurance offices. The speed limit along Vinetta Drive is 20 mph. The road has curbs and storm water drainage. Sidewalks are provided on both sides of the roadway adjacent to the retail uses, but no sidewalks are provided further north into the residential area.

Harwood Road is also a north-south local road with access to Manchester Road. The road serves a fairly large residential area and also has driveway access to the Reliance Bank site as well as and a large commercial development in the northeast quadrant of the Manchester Road and Harwood Road intersection. The speed limit along Harwood Road is 20 mph. The road has curbs and storm water drainage. Sidewalks are provided on both sides of the roadway adjacent to the retail uses; further north there is a multi-use path along the east side of the road only.

The intersections of Manchester Road with Vinetta Drive and with Harwood Road are controlled by side-street stops, with free-flow movements along Manchester Road. Access is provided to several businesses on the north and south side of Manchester Road near the subject site. **Figure 3** provides an aerial view of the study area.

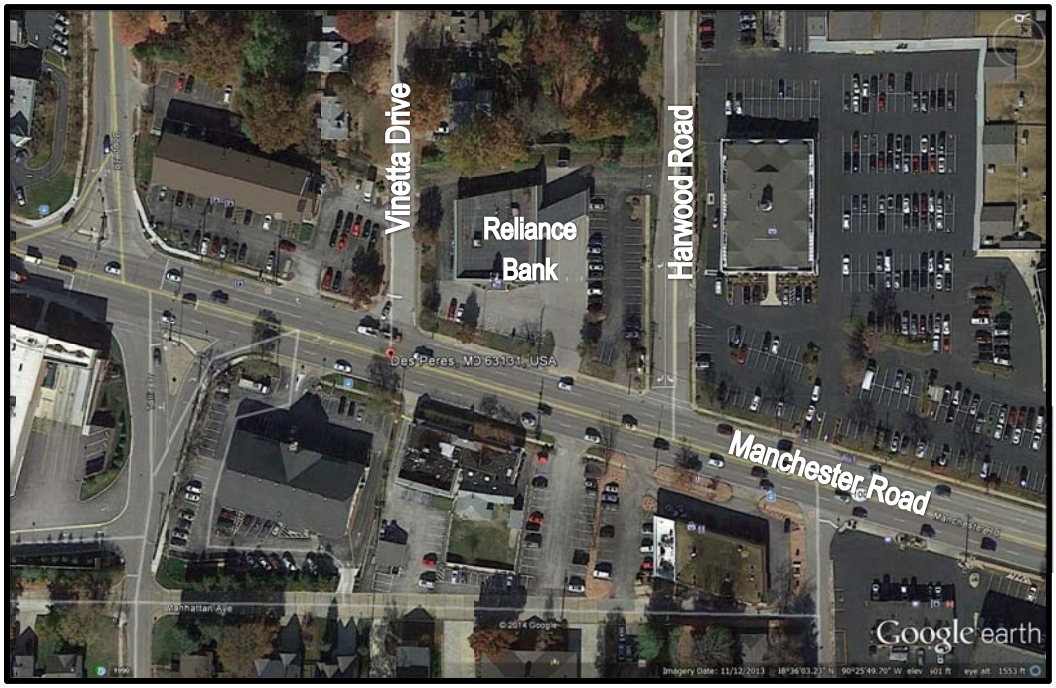

Figure 3: Project Study Area

Existing Traffic Volumes: In order to establish existing traffic conditions, manual traffic counts were conducted at the following intersections during the morning (7:00-9:00 a.m.) and evening (4:00-6:00 p.m.) peak periods the third week of November 2014:

- Manchester Road with Vinetta Drive;
- Manchester Road with Harwood Dive;
- Manchester Road with the Reliance Bank Site Drive;
- Vinetta Drive with the Reliance Bank Site Drive; and
- Harwood Drive with the Reliance Bank Site Drive.

The existing AM and PM peak hour traffic volumes are summarized in **Exhibit 2**.

Based on the traffic data collected, the morning peak hour occurred between 7:30 and 8:30 a.m., and the afternoon peak hour occurred between 4:30 and 5:30 p.m. Given the traffic characteristics in the area and the anticipated trip generation for the proposed development, the peak periods identified would represent a "worst-case scenario" with regards to the traffic impact. That is, if traffic operations are acceptable during these weekday peak hours, it can be reasoned that conditions would be acceptable throughout the remainder of the day.

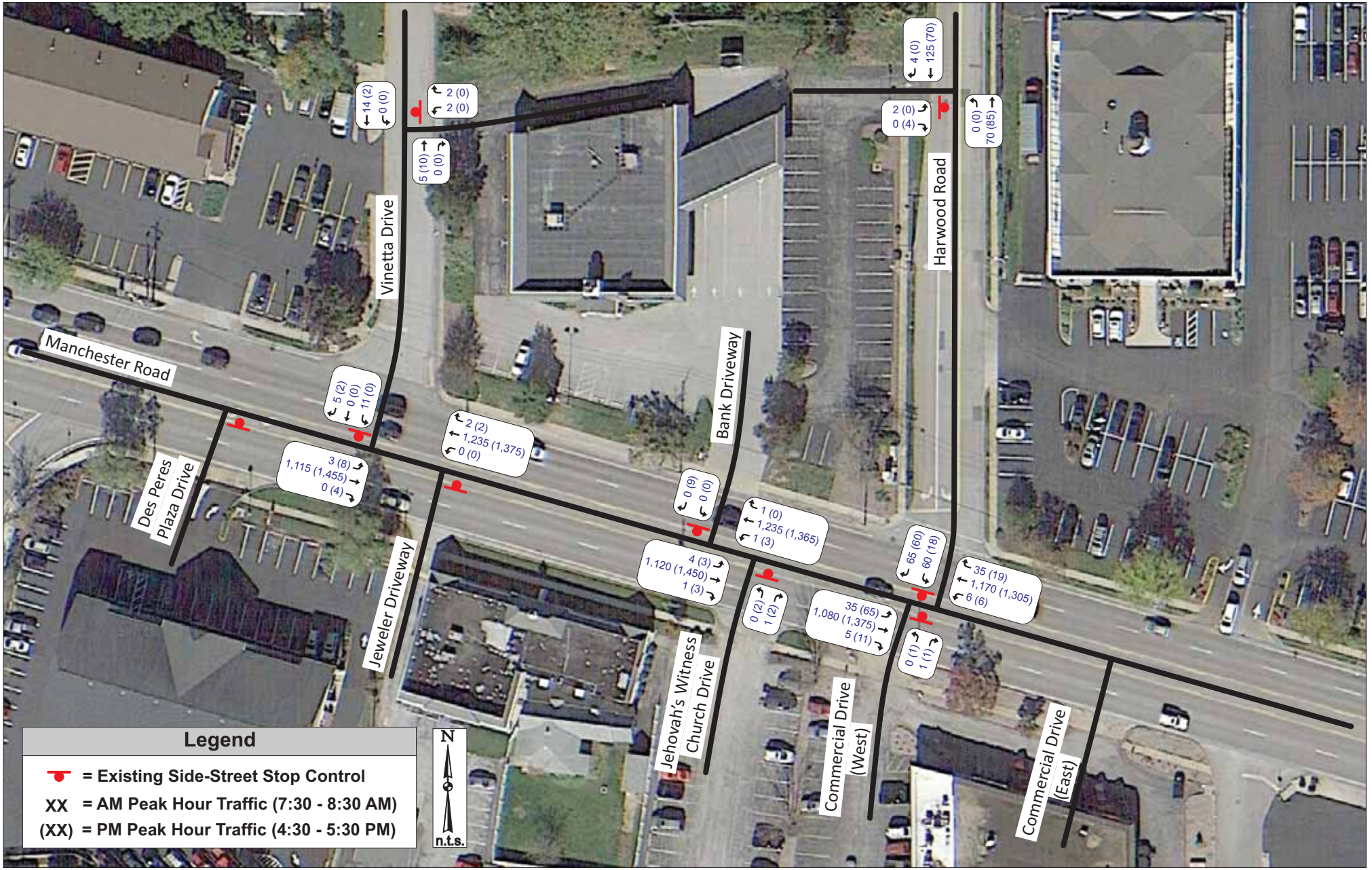

Exhibit 1: Existing Traffic Volumes

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PROPOSED SITE

Proposed Land Use: Based upon the site plan and subsequent information provided by Chiodoni Architects, the existing Reliance Bank Building's interior space would be reconfigured to add a Starbucks and a retail user, thus reducing the bank's use of the building. It is anticipated that a Starbucks restaurant with drive-through (approximately 2,000 square feet) and a retail tenant space of approximately 2,220 square feet would be accommodated within the existing building footprint with the balance of the building square footage occupied by the bank and common lobby areas. A schematic of the site plan provided was previously shown in **Figure 2**. The concept plan depicting the proposed building footprint is shown in **Figure 4.**

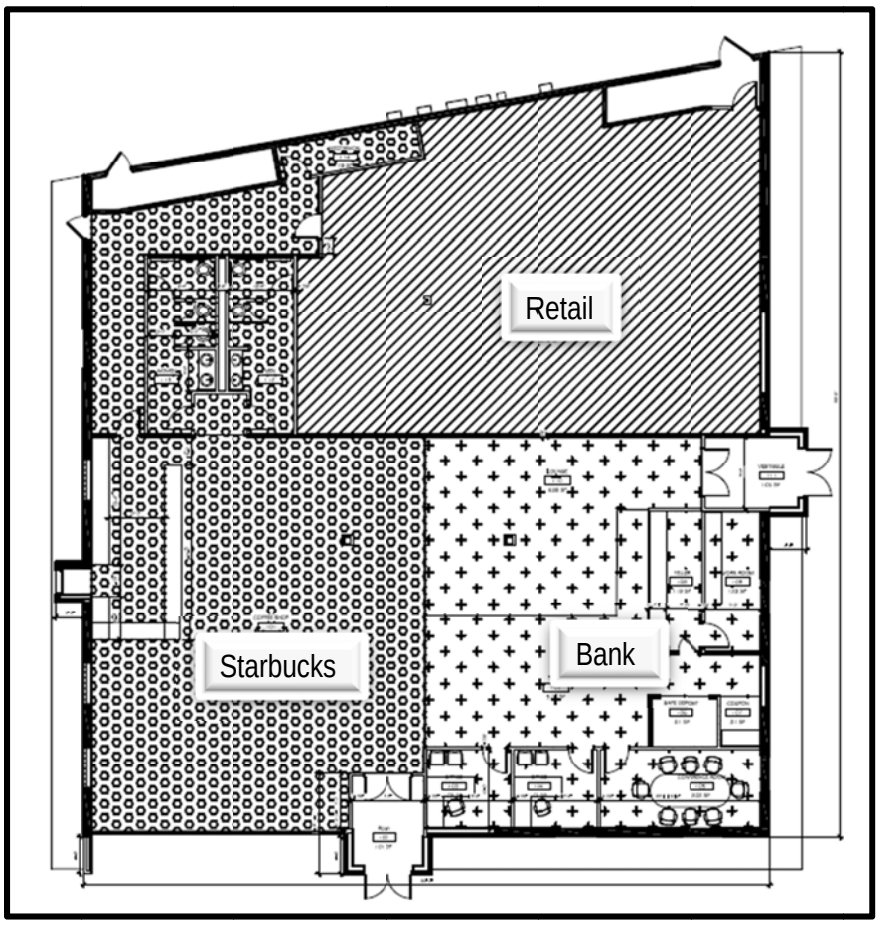

Figure 4: Proposed Reliance Bank Building Footprint

Site Access: As shown on the site plan in **Figure 2**, access to the site is currently provided via one full access driveway on Manchester Road, one full access driveway on Vinetta Drive, and one full access driveway on Harwood Road. The access for the reconfigured building would remain the same as it is today with the exception of the driveway on Vinetta Drive which would be converted to an exit only drive.

Trip Generation: As a primary step in this analysis, forecasts were prepared to estimate the amount of traffic that the proposed development would generate during the weekday AM and PM peak periods. These 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. Estimates for the proposed development were based upon the following land uses:

- Land Use: 820 – Shopping Center
- Land Use: 937 – Coffee/Donut Shop with Drive-Through

A significant portion of these trips would already be traveling along Manchester Road and Harwood Road, (to a much lesser extent) and would stop at this site as part of another trip (i.e., pass-by trips). Pass-by trips are classified as traffic already using the adjacent roadways that are attracted to the site as an intermediate stop on the way to and from other destinations. These pass-by trips create turning movements at the driveways serving the site, but they do not represent new traffic on the adjacent roadways. The statistical information provided in the *Trip Generation Handbook, A Recommended Practice*, published by ITE, supports a pass-by percentage of 34% for retail uses during the afternoon peak hour. The *Trip Generation Handbook, A Recommended Practice*, supports a pass-by percentage of 89% for coffee/donut shops during the morning and afternoon peak hours; however, in an effort to be conservative, a pass-by percentage of 75% was used for the proposed Starbucks during the peak hours. The trip generation estimates for the proposed development, including both new trips and pass-by trips are summarized in **Table 1**. In order to be conservative in our analysis, no reductions were made for common trips, trips that may visit more than one of the tenants in the same trip.

Table 1: Trip Generation Estimate

Land Use	*Size*	*Weekday AM Peak Hour*			*Weekday PM Peak Hour*		
		In	*Out*	*Total*	*In*	*Out*	*Total*
Retail Tenant	2,220 ft²	10	5	15	20	25	45
Coffee Shop w/ drive-through	2,000 ft²	100	100	200	45	45	90
Net Trips		*110*	*105*	*215*	*65*	*70*	*135*
Pass-by Trips		75	75	150	40	40	80
New Trips		35	30	65	25	30	55

[1] Pass by Trips: Retail = 34% PM; Coffee Shop = 75% AM & PM

Although the bank space is being reduced by nearly 65%, it was assumed that the current bank operations (trip levels) would remain essentially the same as they do today. Thus, no reduction was made for the bank trips even though the square footage was reduced significantly. The existing trips to and from the bank were accounted for in the traffic counts completed at the study intersections.

Trip Distribution*:* The site-generated trips were then assigned into and out of the site based upon an estimated directional distribution. Based upon the existing travel patterns in the area, and the proximity to nearby residential and commercial areas, it is anticipated that the distribution of *new* site-generated trips would be as follows:

- To/from the west on Manchester Road 50%
- To/from the east on Manchester Road..... 45%
- To/from the north on Harwood Road 5%

The pass-by trips were assigned in accordance with the existing traffic volumes on Manchester Road and Harwood Road. The site-generated new trips for the weekday AM and PM peak hours are shown in **Exhibit 2,** while the site-generated pass-by trips for the weekday AM and PM peak hours are shown in **Exhibit 3.**

Forecasted (Existing plus Development) Traffic Volumes: The assigned traffic volumes resulting from the trip distribution for the proposed development were then added to the existing traffic volumes to determine the total volumes in the forecasted scenario. The forecasted, or existing plus new trips plus pass-by trips, traffic volumes for the AM and PM peak hours are shown in **Exhibit 4.**

Site Circulation and Queuing: An article published in the ITE Journal, *New Drive-Through Stacking Information for Banks and Coffee Shops*, prepared by Mark Stuecheli, PTP summarizes observed queuing characteristics for coffee shops with drive-through lanes, specifically Starbucks. The study included maximum queue observations at 12 Starbucks during the AM peak hour since coffee shops are busiest during the morning hours. Based on this study, the maximum queue observed for the 12 Starbucks was 13 vehicles which occurred three times during the morning peak hour. The average queues during the morning peak hour were closer to eight vehicles.

CBB collected local data for a Starbucks in University City. Based on our observations, the maximum queue observed was also 13 vehicles which occurred twice during the morning peak hours.

Based on the site plan, there is adequate space available to store at least 13 vehicles queued on-site for the drive-through window, as shown in **Figure 5**. However, queues over ten vehicles may momentarily impede internal circulation and parking maneuvers directly in front

of the building, though the site provides adequate circulation to maneuver around those queues.

The proposed five car queue for the bank ATM machine in the southeast corner of the site is more than adequate.

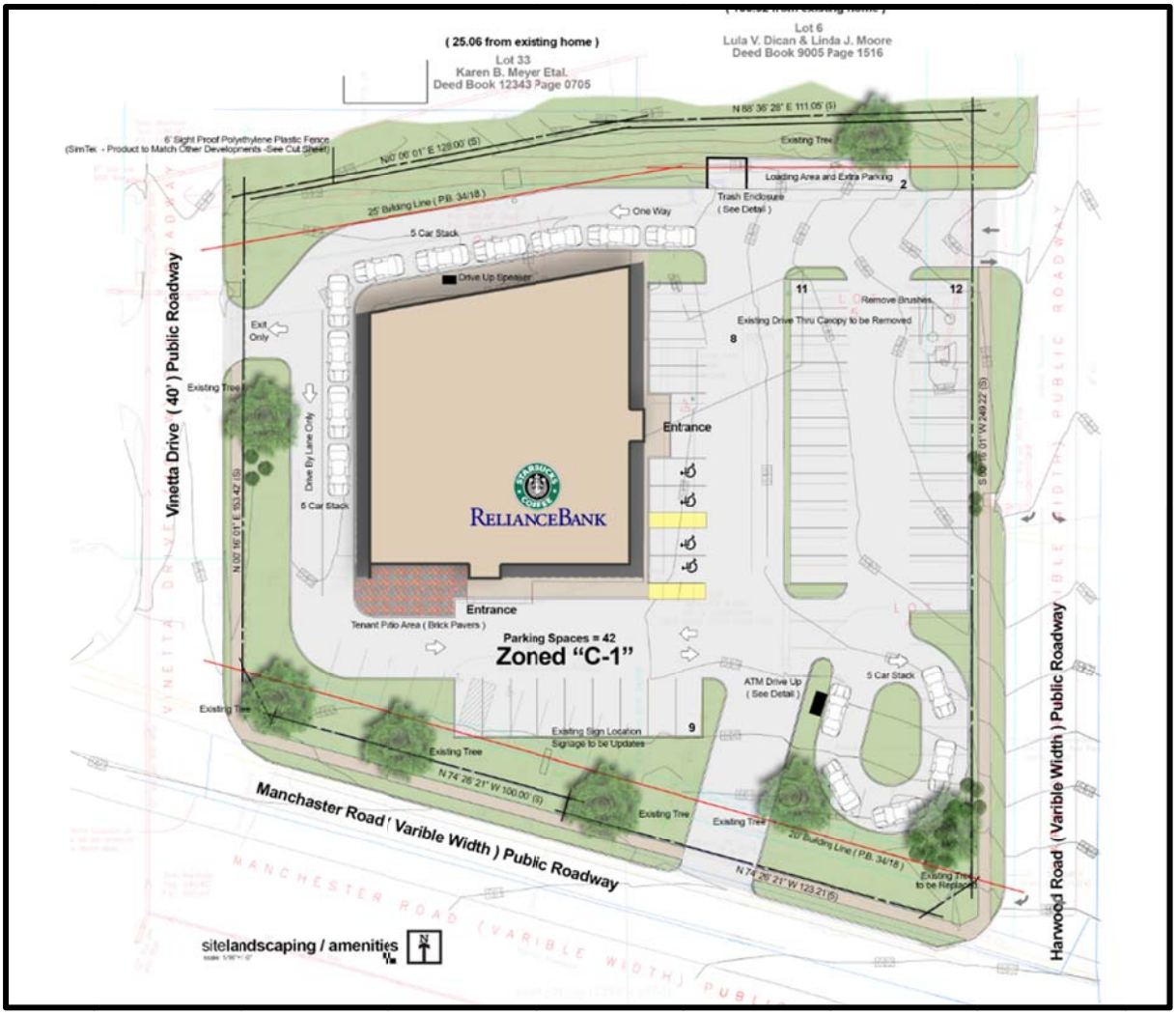

Figure 5: Starbucks and Bank ATM Queue Layout

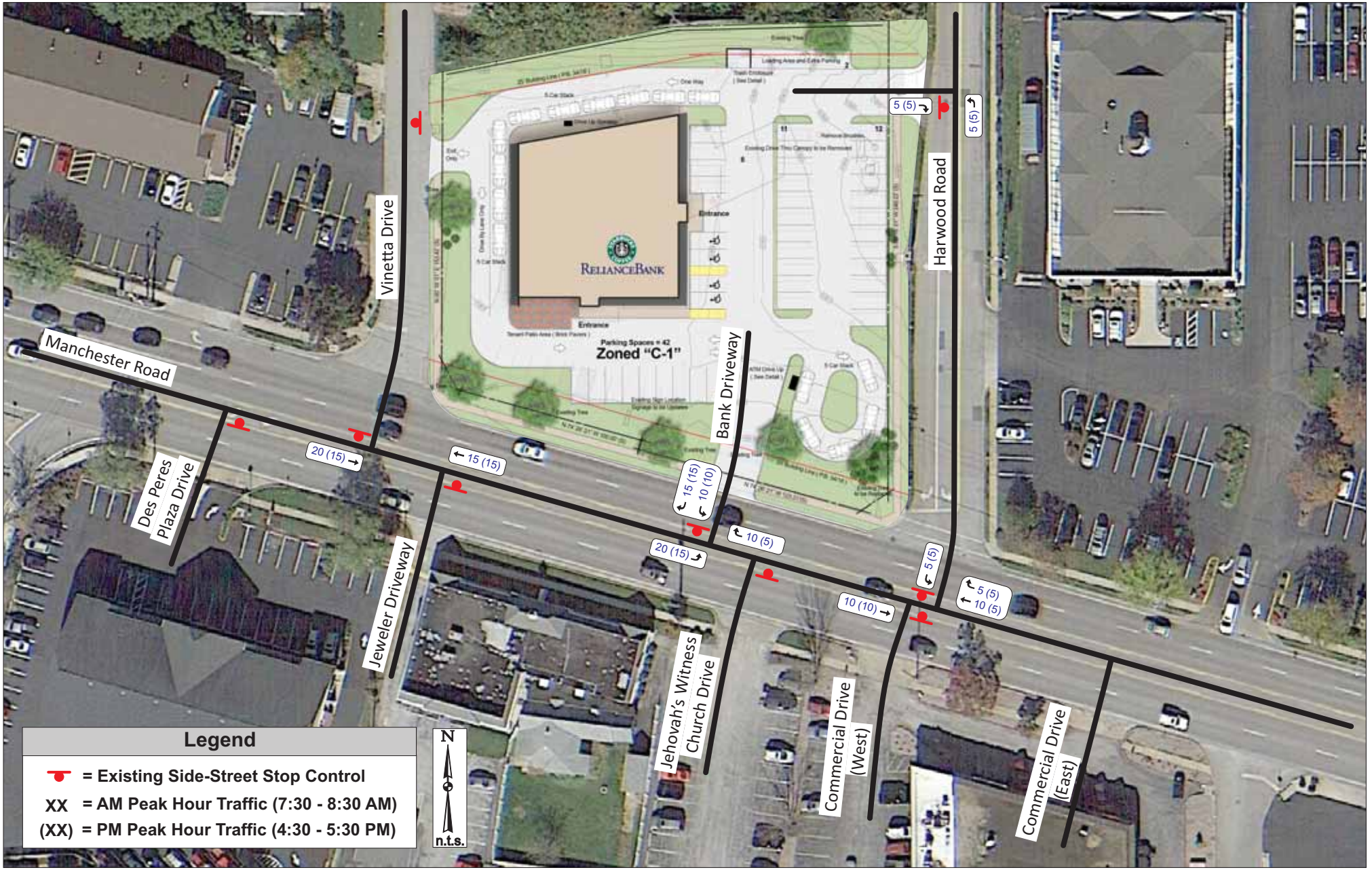

Exhibit 2: Site-Generated New Trips

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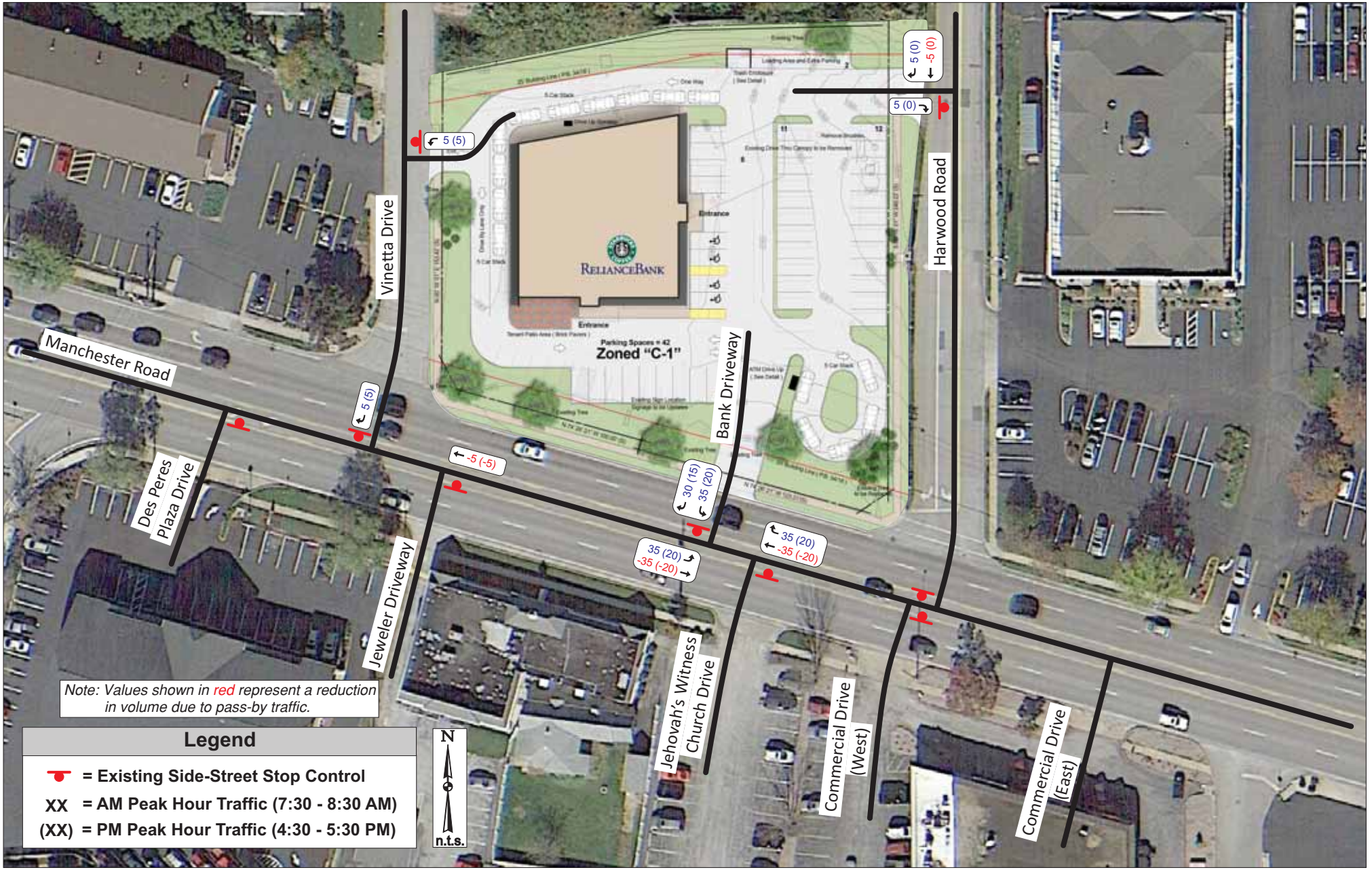

Exhibit 3: Site-Generated Pass-By Trips

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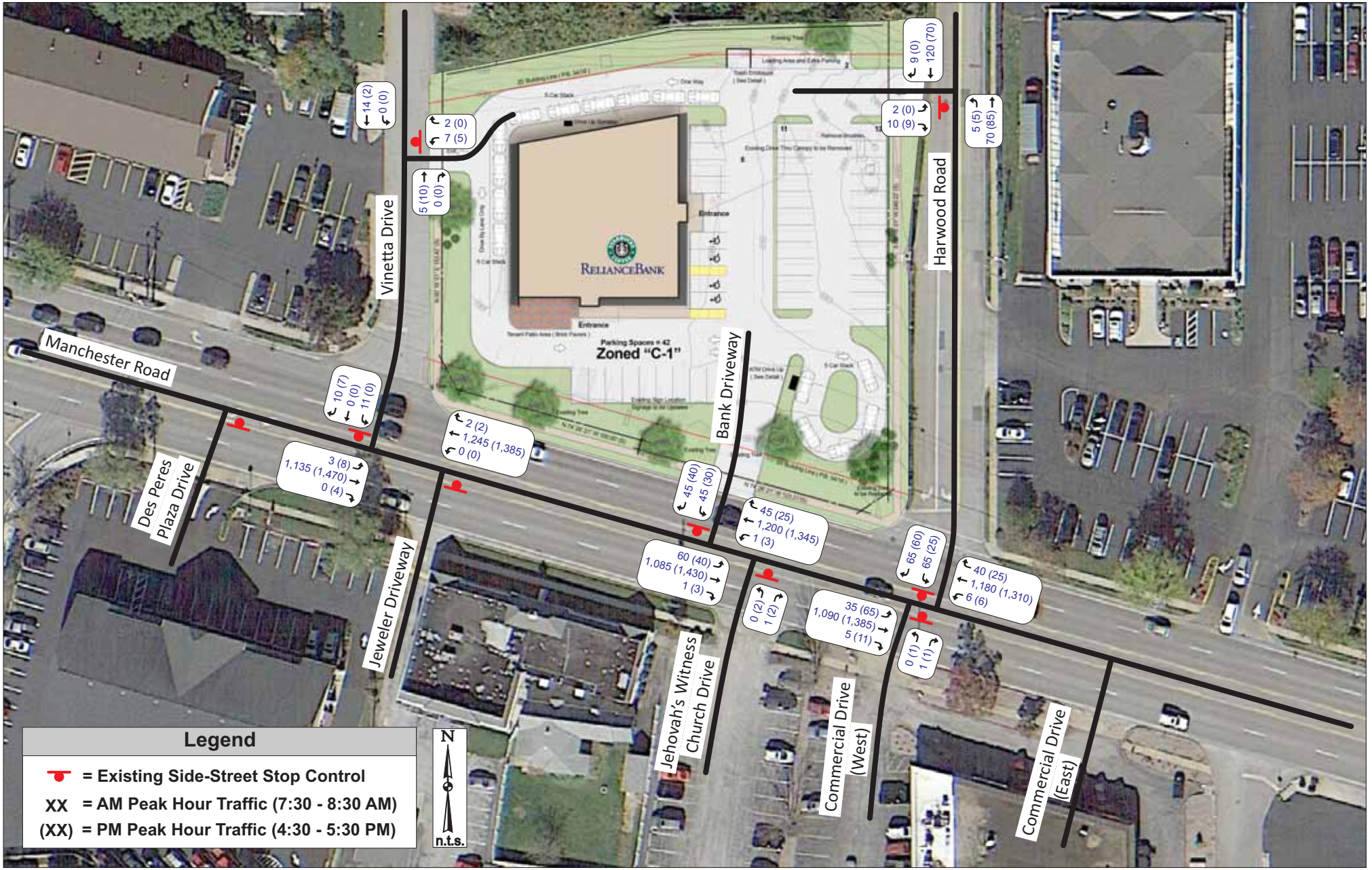

Exhibit 4: Forecasted Build Traffic Volumes

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2014 TRAFFIC ANALYSIS

Study Procedures: The existing and forecasted operating conditions were analyzed using SYNCHRO 8, a macro-level analytical traffic flow model. SYNCHRO is based on study procedures outlined in the *Highway Capacity Manual*, published by the Transportation Research Board. This manual, which is used universally by traffic engineers to measure roadway capacity, establishes six levels of traffic service: Level A ("Free Flow"), to Level F ("Fully Saturated"). 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 often considered acceptable for peak period conditions in urban and suburban areas.

The thresholds that define level 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 then 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.

Level of service is directly related to control delay. At signalized intersections, the level of service criteria differ from that at unsignalized intersections primarily because varying transportation facilities create different driver expectations. The expectation is that a signalized intersection is designed to carry higher traffic volumes, and consequently may experience greater delay than an unsignalized intersection. **Table 2** summarizes the thresholds used in the analysis for signalized and unsignalized intersections.

Table 2: 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

Operating Conditions: The study intersections were evaluated using the methodologies described above. **Table 3** summarizes the results of this analysis, which reflects the existing and forecasted operating conditions and average delay for the study intersections during the weekday AM and PM peak hours.

Table 3: Operating Conditions Summary

Intersection / Approach	AM Peak Hour		PM Peak Hour	
	Existing Conditions	Forecasted Conditions	Existing Conditions	Forecasted Conditions
Manchester Road with Vinetta Drive (Side-Street STOP)				
Eastbound Manchester Road Left-Turn	B (12.2)	B (12.3)	B (12.9)	B (13.0)
Westbound Manchester Road Left-Turn	B (11.3)	B (11.4)	B (13.4)	B (13.5)
Southbound Vinetta Drive Approach	D (27.9)	D (25.8)	C (21.5)	C (17.8)
Manchester Road with Harwood Road (Side-Street STOP)				
Eastbound Manchester Road Left-Turn	B (12.5)	B (12.6)	B (13.6)	B (13.7)
Westbound Manchester Road Left-Turn	B (11.2)	B (11.3)	B (12.9)	B (13.0)
Northbound Commercial Drive Approach	C (22.1)	C (22.4)	D (31.3)	D (31.7)
Southbound Harwood Road Approach	D (33.0)	E (36.4)	C (21.9)	C (24.5)
Southbound Left-Turn Southbound Right-Turn	F (51.4) C (16.1)	F (56.6) C (16.3)	E (39.8) C (16.5)	E (43.3) C (16.6)
Manchester Road with Bank Drive (Side-Street STOP)				
Eastbound Manchester Road Left-Turn	B (12.1)	B (13.2)	B (12.7)	B (13.5)
Westbound Manchester Road Left-Turn	B (11.3)	B (11.1)	B (13.4)	B (13.2)
Southbound Bank Drive Approach	C (21.9)	E (36.2)	C (17.0)	D (341)
Vinetta Drive with Bank Drive (Side-Street STOP)				
Westbound Bank Drive Approach	A (8.5)	A (8.6)	A (8.5)	A (8.6)
Northbound Vinetta Drive Approach	*Free Flow*	*Free Flow*	*Free Flow*	*Free Flow*
Southbound Vinetta Drive Approach	A (<1.0)	A (<1.0)	A (2.4)	A (2.4)
Harwood Road with Bank Drive (Side-Street STOP)				
Eastbound Bank Drive Approach	B (10.2)	A (9.5)	A (8.7)	A (8.7)
Northbound Harwood Road Approach	A (<1.0)	A (<1.0)	A (<1.0)	A (<1.0)
Southbound Harwood Road Approach	*Free Flow*	*Free Flow*	*Free Flow*	*Free Flow*

X (XX.X) - Level of Service (Vehicular delay in seconds per vehicle)

As shown in **Table 3**, all of the movements at the study intersections currently operate at acceptable levels of service during the peak hours with the exception of the southbound left-turn movement onto Manchester Road from Harwood Road.

Specifically, during the AM peak hour, the southbound left-turn movement exiting Harwood Road onto Manchester Road is forecasted to operate at LOS F with 51 seconds of delay per vehicle; during the PM peak hour, the southbound left-turn movement operates at LOS E with 40 seconds of delay per vehicle. This is attributed to the heavy traffic volumes on Manchester Road during the peak hours. Separate left- and right-turn lanes are provided on Harwood Road to accommodate traffic turning onto Manchester Road. Consequently, there are not any further improvements, short of a traffic signal which is not recommended, that would lessen the delay for motorists desiring to turn left from Harwood Road onto Manchester Road. However, it is not unusual for motorists on the side streets to incur longer delays turning onto Manchester Road during the peak hours along the corridor.

As shown in **Table 3**, all of the movements at the study intersections are forecasted to operate at acceptable levels of service during the peak hours with the exception of the southbound left-turn movement onto Manchester Road from Harwood Road during both the AM and PM peak and the southbound left-turn movement onto Manchester Road from the site drive during the AM peak.

Specifically, during the AM peak hour, the southbound left-turn movement exiting Harwood Road onto Manchester Road is forecasted to operate at LOS F with 56 seconds of delay per vehicle (approximately 5 seconds more than existing conditions); during the PM peak hour, the southbound left-turn movement exiting Harwood Road onto Manchester Road is forecasted to operate at LOS E with 43 seconds of delay per vehicle (approximately 3 seconds more than existing conditions). Likewise, during the AM peak hour, the southbound left-turn movement exiting the site onto Manchester Road is forecasted to operate at LOS E with 36 seconds of delay per vehicle. The longer delays for the side-street left-turn movements are due to the heavy traffic volumes on Manchester Road during the peak hours. However, as previously mentioned, patrons of businesses along Manchester Road often expect longer delays due to the nature of the corridor. Furthermore, this delay is not overly excessive and would not negatively the operations along Manchester Road.

SUMMARY

CBB completed the preceding study to address the traffic impacts associated with the redevelopment of the Reliance Bank site located on the north side of Manchester Road between Vinetta Drive and Harwood Road in Des Peres, Missouri. It is anticipated that a Starbucks restaurant with drive-through (approximately 2,000 square feet) and a retail tenant space of approximately 2,220 square feet would be accommodated within the existing building footprint with the balance of the building square footage occupied by the bank and common areas.

Access to the site is currently provided via one full access driveway on Manchester Road, one full access driveway on Vinetta Drive, and one full access driveway on Harwood Road. The access for the reconfigured building would remain the same as it is today with the exception of the driveway on Vinetta Drive which would be converted to an exit only drive.

The proposed development is expected to generate a total of approximately 65 new trips during the Weekday AM peak hour and 55 new trips during the weekday PM peak hour with another 150 pass-by trips and 80 pass-by trips from traffic already using the adjacent roadways during the AM and PM peak hours, respectively.

Based on studies of several Starbucks, the maximum queue observed during the morning peak hour was 13 vehicles with average queues closer to eight vehicles. Based on the site plan, there is adequate space available to store at least 13 queued vehicles on-site for the drive-through window. Additionally, the proposed five car queue for the bank ATM machine is more than adequate.

All of the movements at the study intersections are forecasted to operate at acceptable levels of service during the peak hours with the exception of the southbound left-turn movement onto Manchester Road from Harwood Road during both the AM and PM peak and the southbound left-turn movement onto Manchester Road from the site drive during the AM peak. These left-turn movements are forecasted to operate at LOS E or F during the peak hours due to the heavy traffic volumes on Manchester Road during the peak hours. However, patrons of businesses along Manchester Road often expect longer delays due to the nature of the corridor. Furthermore, this delay exists today and is not excessive and would not negatively impact the operations along Manchester Road. No physical roadway improvements are recommended.

We trust that this traffic study adequately describes the forecasted traffic conditions that should be expected in the vicinity of the proposed redevelopment of the Reliance Bank site in Des Peres, Missouri. If additional information is desired, please feel free to contact Lee Cannon or me in our St. Louis office at 314-878-6644, extension 41 or swhite@cbbtraffic.com.

Sincerely,

Shawn Derai White, P.E., PTOE
Senior Traffic Engineer