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**KLOA**  
Kenig, Lindgren, O'Hara, Aboona, Inc.

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# 1.

## Introduction

This report summarizes the methodologies, results and findings of a traffic impact study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) for the proposed Corporate Reserve residential development to be located north of Woodward Drive opposite Corporate Reserve Boulevard in St. Charles, Illinois. The site is undeveloped land and is bounded by undeveloped land/Great Western Trail to the north, Cardinal Drive with commercial/residential to the east, Woodward Drive to the south, and residential homes/Great Western Trail spur to the west.

The plans call for developing the site to provide approximately 78 single-family homes. Access to the development will primarily be served by a main/full access off Woodward Drive that will align with Corporate Reserve Boulevard, becoming the fourth/north leg of the existing T-intersection. A secondary access will be provided via Cardinal Drive.

The following sections of this report present the following.

- Existing roadway conditions including traffic volumes for the weekday morning and weekday evening peak hours
- A detailed description of the proposed development
- Vehicle trip generation for the proposed development
- Directional distribution of development-generated traffic
- Regional development growth in traffic for Year 2021 conditions
- Future transportation conditions including access to and from the development

Traffic capacity analyses were conducted for the weekday morning and weekday evening peak hours for the following two conditions.

1. Existing Condition - Analyzes the capacity of the existing roadway system using existing peak hour traffic volumes in the surrounding area.
2. Future Condition - This condition projects traffic to Year 2021, which includes buildout of the development plus five years. Included in the future condition are the existing traffic volumes increased by a regional growth percentage of six percent (or one percent per year), and the traffic estimated to be generated by the proposed subject development.

The purpose of this study was to examine existing traffic conditions, assess the impact that the proposed development would have on traffic conditions in the area and determine what geometric and traffic control improvements are necessary to accommodate the projected conditions.

## 2. Existing Conditions

Transportation conditions in the vicinity of the site were inventoried to obtain a basis for projecting future conditions. Three components of existing conditions were considered:

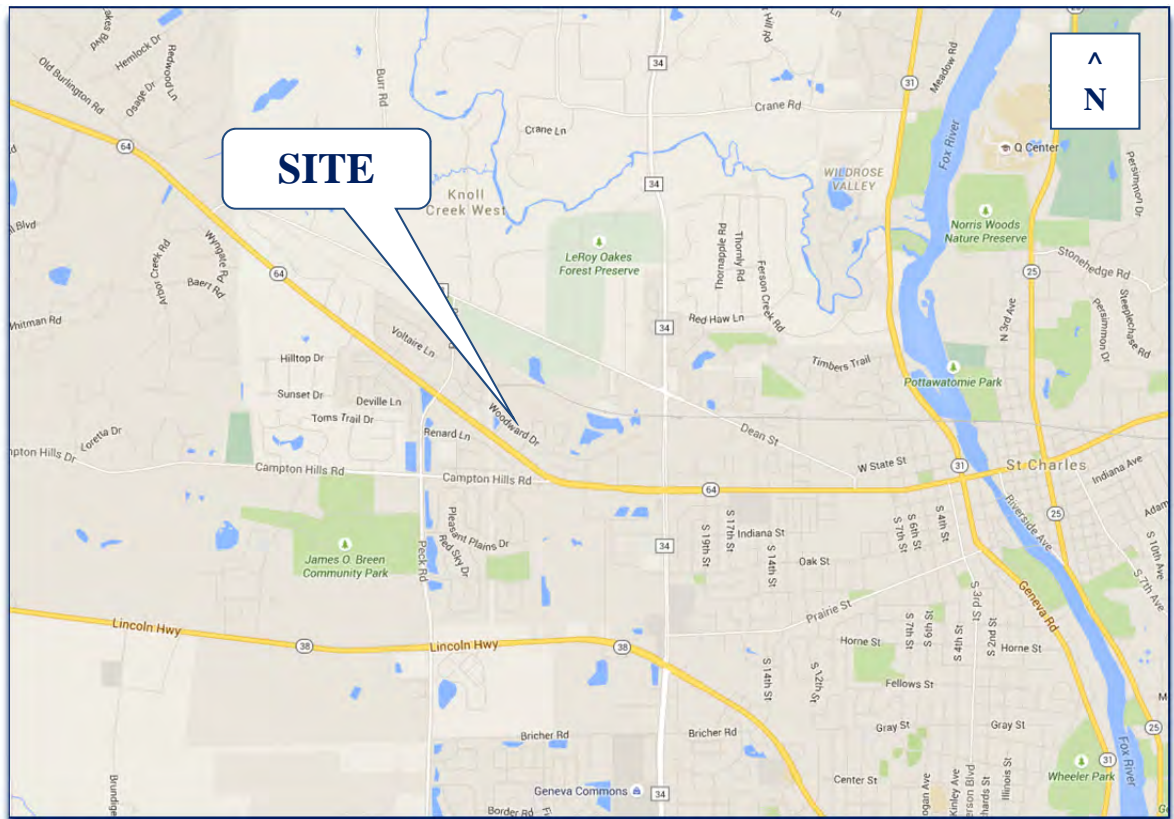
1. The geographic location of the site
2. The characteristics of the adjacent roadway system, including lane geometry and intersection traffic controls
3. The weekday peak-hour traffic volumes at intersections in the vicinity of the proposed development site

### Site Location

As noted previously, the proposed single-family home residential development will be located north of Woodward Drive opposite Corporate Reserve Boulevard in St. Charles, Illinois. The site is undeveloped land and is bounded by undeveloped land/Great Western Trail to the north, Cardinal Drive with commercial/residential to the east, Woodward Drive to the south, and residential homes/Great Western Trail spur to the west.

**Figure 1** shows the site location with respect to the surrounding roadway system.

**Figure 2** shows the concept site plan.



**Figure 1**

## **SITE LOCATION**





Figure 2

## CONCEPT SITE PLAN

## Existing Roadway System Characteristics

The characteristics of the existing roadways that surround the proposed development are illustrated in **Figure 3** and described below.

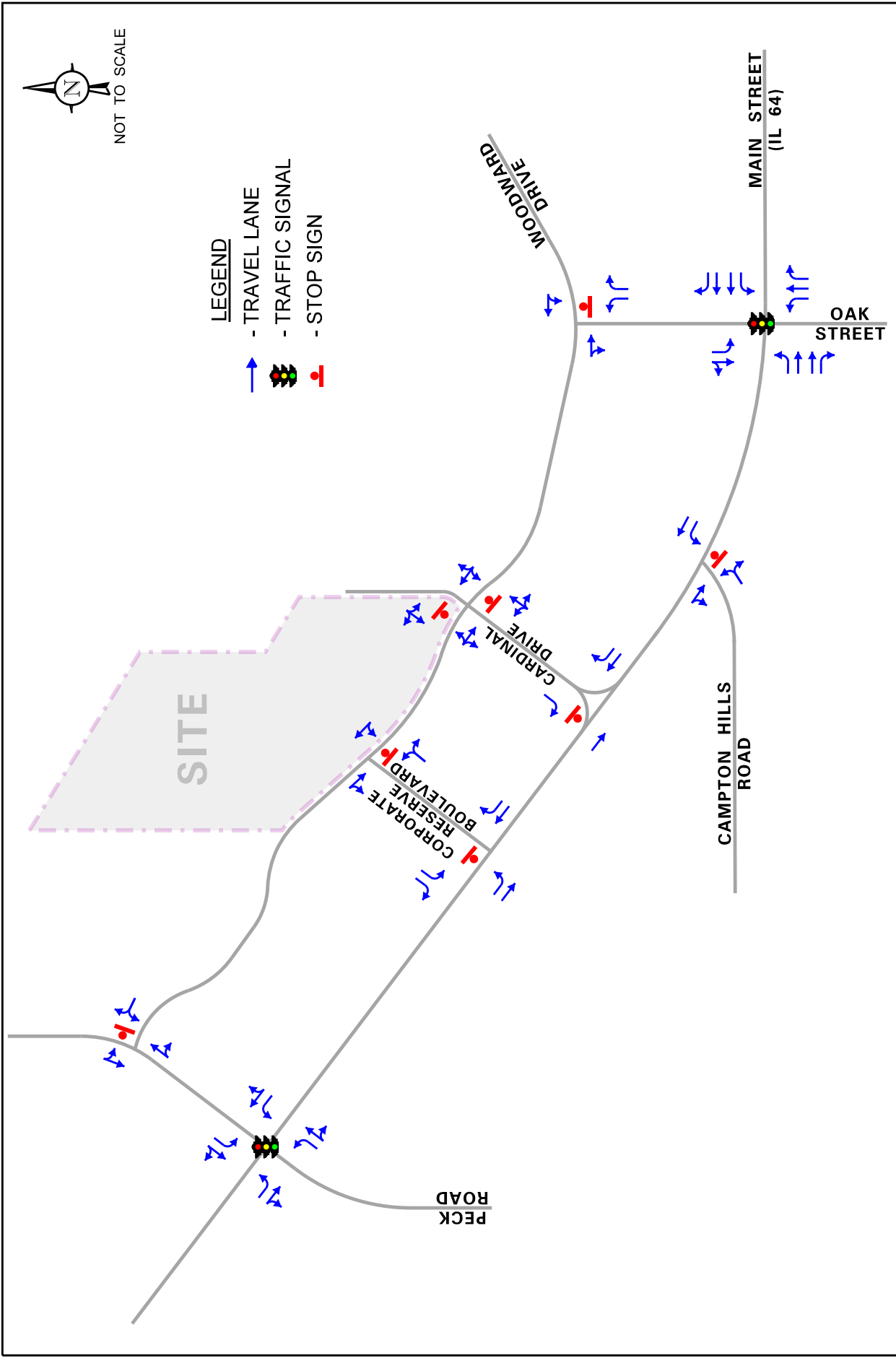
*Woodward Drive* is an east-west collector roadway that is under the jurisdiction of the City of St. Charles and provides one lane in each direction. Sidewalk is provided on the south side of the roadway and a pedestrian/bicycle trail is located on the north side of the roadway. The posted speed limit is 30 mph in the vicinity of the site, and on-street parking is prohibited. Woodward Drive is under stop sign control at its western terminus with Peck Road.

*Corporate Reserve Boulevard* extends from Main Street (IL Route 64) to Woodward Drive, providing one lane in each direction, separated by a landscaped median. The pavement width in each direction is approximately 22 feet wide; therefore, Corporate Reserve Boulevard could be striped to provide two, 11-foot lanes in each direction. At its southbound approach to Main Street, a separate left-turn lane and a right-turn lane are provided. Corporate Reserve Boulevard is under stop sign control at its northern terminus with Woodward Drive and its southern terminus with Main Street and parking is prohibited on both sides of the roadway. Corporate Reserve Boulevard is under the jurisdiction of the City of St. Charles.

*Oak Street* is a two-way collector roadway that is signalized at its intersection with Main Street. Oak Street is under stop sign control at its T-intersection with Woodward Drive, north of Main Street. Parking is prohibited on both sides of the roadway. Oak Street is under the jurisdiction of the City of St. Charles.

*Cardinal Drive* extends from Main Street to Woodward Drive, providing one lane in each direction. At its intersection with Main Street, Cardinal Drive is restricted to right-in/right-out only turning movements. Cardinal Drive is under stop sign control at its northern terminus with Woodward Drive and its southern terminus with Main Street and parking is prohibited on both sides of the roadway. Cardinal Drive is under the jurisdiction of the City of St. Charles. North of Woodward Drive, Cardinal Drive provides access to a commercial development and is a private roadway.

*Peck Road* is a two-way minor arterial roadway that provides one lane in each direction and is signalized at its intersection with Main Street. The posted speed limit is 35 mph, and parking is prohibited on both sides of the roadway. A pedestrian/bicycle trail is located on the west side of the roadway. Peck Road is under the jurisdiction of the City of St. Charles. According to the Illinois Department of Transportation's (IDOT) website, Peck Road carries an average daily traffic (ADT) volume of 4,350 vehicles.



<p><b>PROJECT:</b></p> <p>Corporate Reserve St. Charles, Illinois</p>	<p><b>TITLE:</b></p> <p>Existing Street Characteristics</p>	<p><b>Figure:</b> 3</p>
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*Main Street (IL 64)* is a two-way major arterial and is under the jurisdiction of IDOT. Parking is prohibited on both sides of the roadway, and the posted speed limit is 40 mph. At its signalized intersection with Peck Road to the east, Main Street widens to provide two through lanes in each direction. According to IDOT's website, Main Street carries an ADT volume of 22,400 vehicles in the vicinity of the site.

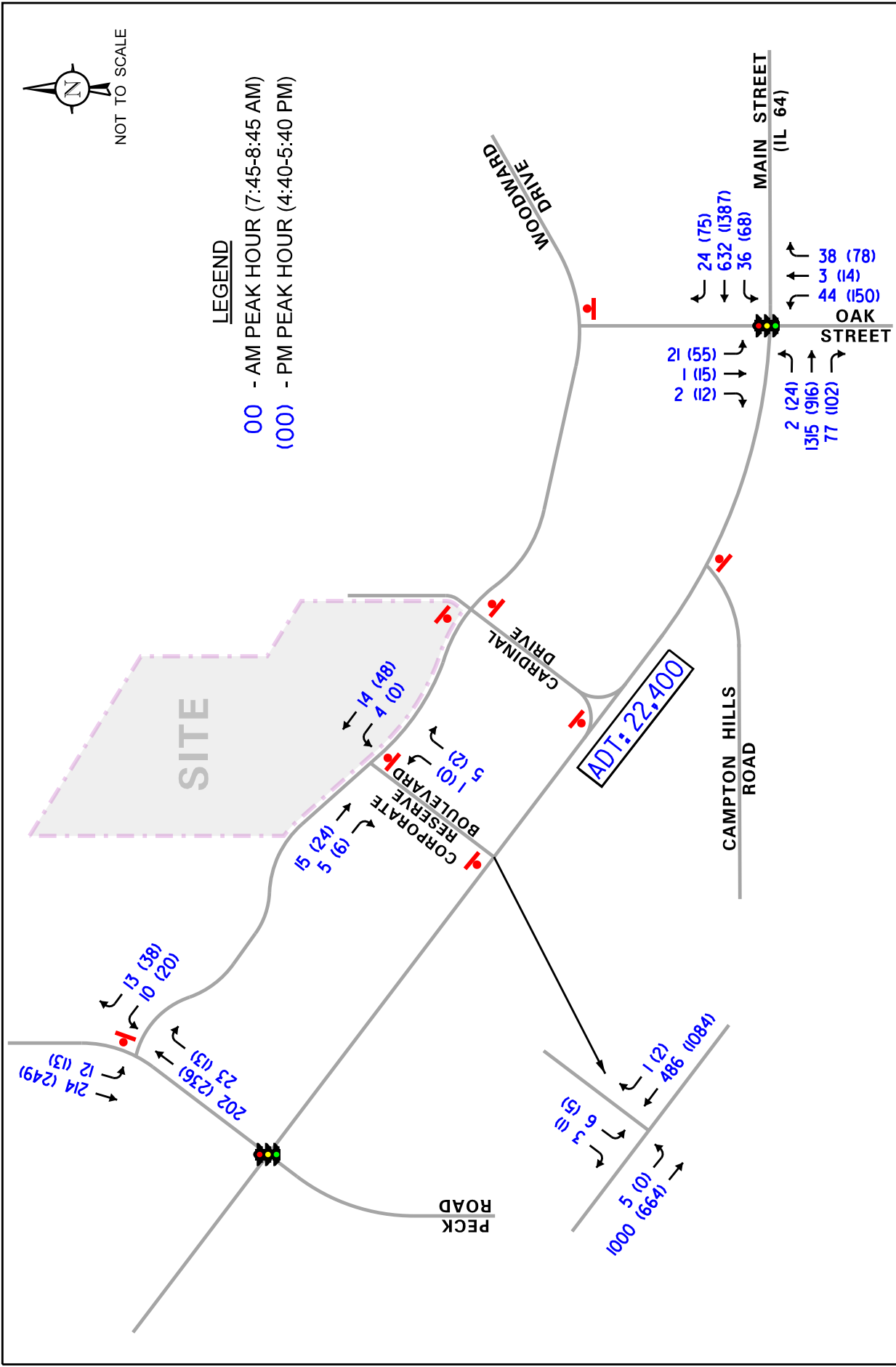
### **Existing Traffic Volumes**

Manual turning movement traffic counts were conducted on Wednesday, May 6, 2015 during the morning (7:00 to 9:00 A.M.) and the evening (4:30 to 6:30 P.M.) at the following four intersections.

- Oak Street and Main Street
- Corporate Reserve Blvd and Main Street
- Corporate Reserve Blvd and Woodward Drive
- Peck Road and Woodward Drive

From the manual turning movement count data, it was determined that the weekday morning peak hour generally occurs between 7:45 and 8:45 A.M. and the weekday evening peak hour generally occurs between 4:40 and 5:40 P.M. These two respective peak hours will be used for the traffic capacity analyses and are presented later in this report. Pedestrian and bicycle activity was observed and was found to be very low at the study intersections.

The existing peak hour vehicle traffic volumes are shown in **Figure 4**.



### 3.

## Traffic Characteristics of the Proposed Development

To evaluate the impact of the subject development on the area roadway system, it was necessary to quantify the number of vehicle trips the overall site will generate during the weekday morning and weekday evening peak hours and then determine the directions from which this traffic will approach and depart the site.

### Proposed Site and Development Plan

The plans call for developing the site to provide approximately 78 single-family homes. An approximate 1.0-acre park is proposed to be located in the southeast corner of the development.

### Development Access

Access to the development will primarily be served by a main/full access off Woodward Drive. A secondary access will be provided via Cardinal Drive. The access drives are proposed as follows.

1. *Main Access and Woodward Drive.* This proposed full access roadway will align with Corporate Reserve Boulevard at its intersection with Woodward Drive becoming the fourth/north leg to this existing T-intersection. The main access will be an extension of Corporate Reserve Boulevard. The boulevard-type extension will provide one lane inbound and one lane outbound under stop sign control. No improvements are proposed or needed on Woodward Drive to provide this proposed access. A curb cut/apron already exists to allow this proposed extension of Corporate Reserve Boulevard north of Woodward Drive. The existing pedestrian/bicycle trail along Woodward Avenue will be located behind the outbound stop sign so that exiting vehicles will come to a complete stop prior to crossing the trail.

2. *Access and Cardinal Drive.* This access is proposed from Cardinal Drive and is considered a minor/secondary access to the development.

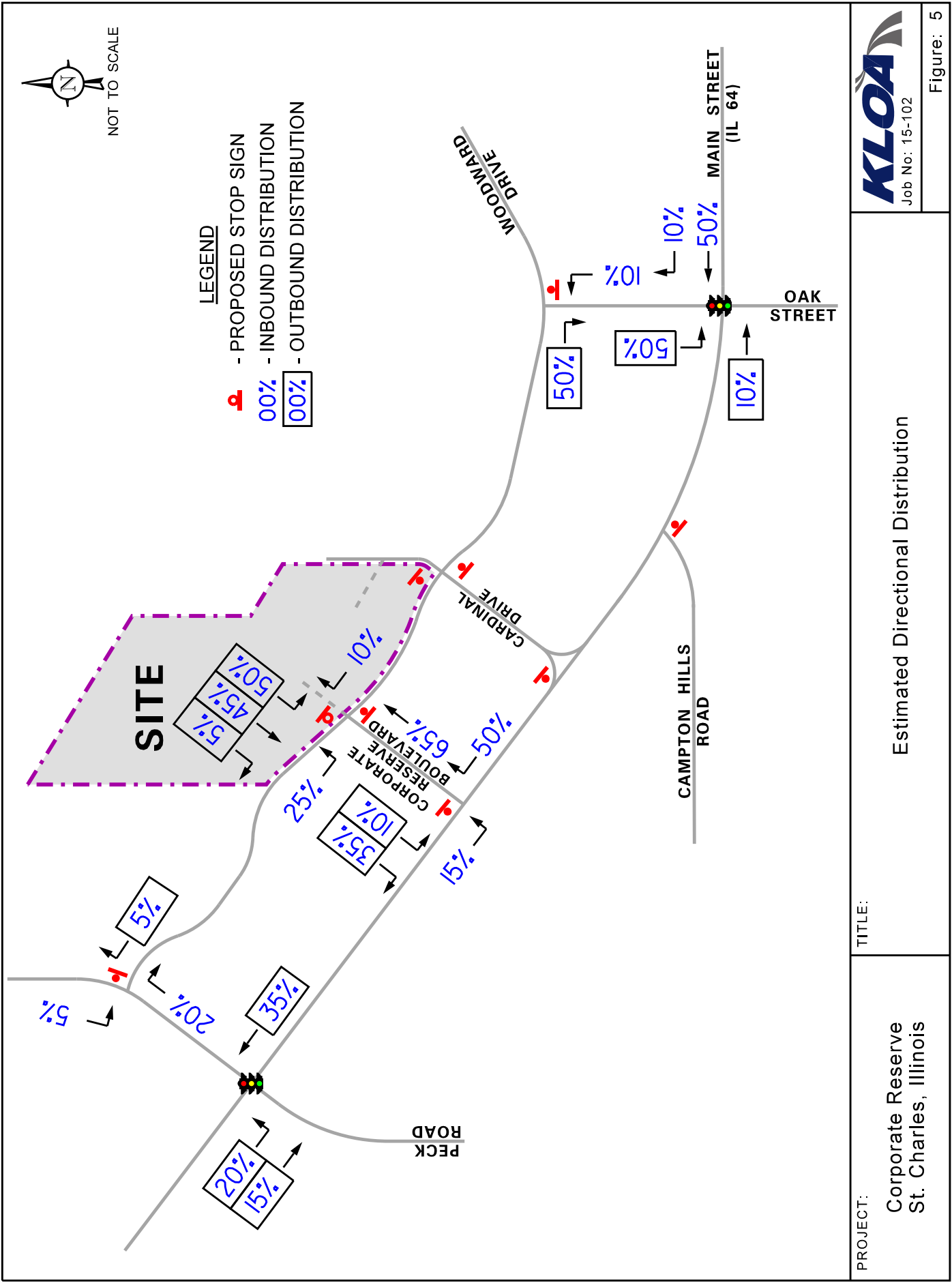
### **Pedestrian Accessibility**

The development proposes continuous sidewalk on both sides of the roadways within the development. As noted, the Great Western Trail is located north of this development. In conjunction with the proposed development, trail connections will be provided that will connect the proposed residential development to the surrounding existing trail system. Further, the existing north-south trail that runs along the west side of the development will be extended south from Woodward Drive to Main Street (IL 64).

These improvements will provide more flexibility and connectivity to the existing trails.

### **Directional Distribution of Site Traffic**

The directional distribution of how traffic will approach and depart the site was estimated based on a combination of existing travel patterns and the location of signalized intersections and the existing roadway characteristics surrounding the site. The estimated directional distribution for the proposed development was established and is illustrated in **Figure 5**.





## Development Traffic Generation

The estimates of traffic to be generated by the development are based upon the proposed land use type and size. The volume of traffic generated was estimated using data published in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9<sup>th</sup> Edition.

**Table 1** tabulates the total trips anticipated from this proposed development for the weekday morning and weekday evening peak hours, in addition to weekday daily (two-way vehicle trips) upon total buildout of the development.

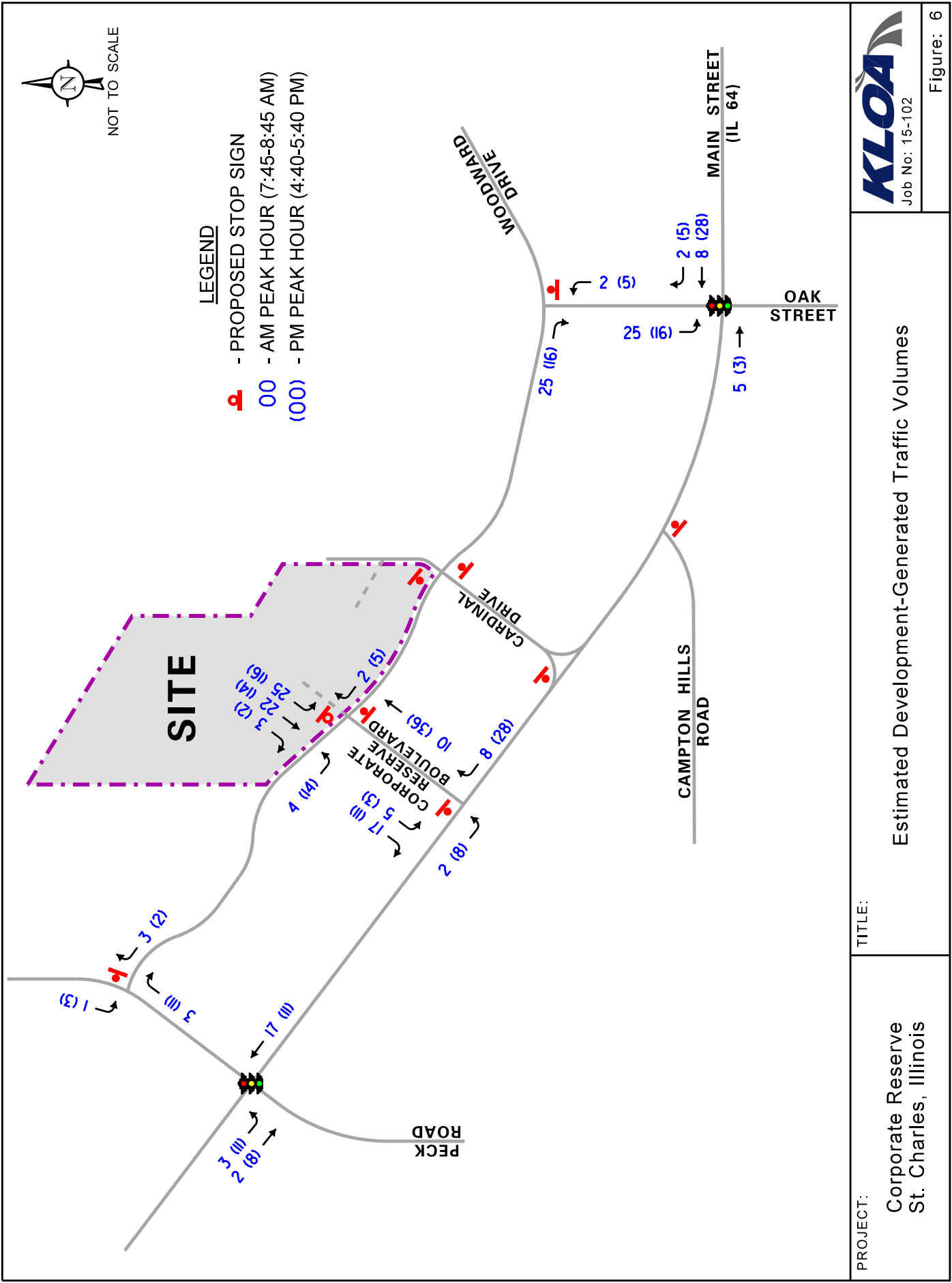
Table 1

### ESTIMATED DEVELOPMENT-GENERATED TRAFFIC VOLUMES

ITE Land- Use Code	Type/Size	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour			Daily Two-Way
		In	Out	Total	In	Out	Total	
210	Single-Family Homes – 78 units	16	50	66	55	32	87	865

## Development Traffic Assignment

The peak hour traffic volumes projected to be generated by the proposed development (refer to Table 1) were assigned to the area roadways based on the directional distribution analysis (Figure 5) and the proposed access and are shown in **Figure 6**. As noted, the proposed access on Cardinal Drive is considered a secondary/minor access roadway to the proposed development. As such, all development-generated traffic was assigned to the main access in alignment with Corporate Reserve Boulevard to provide for a conservative analysis.



## 4.

### Total Projected Traffic Conditions

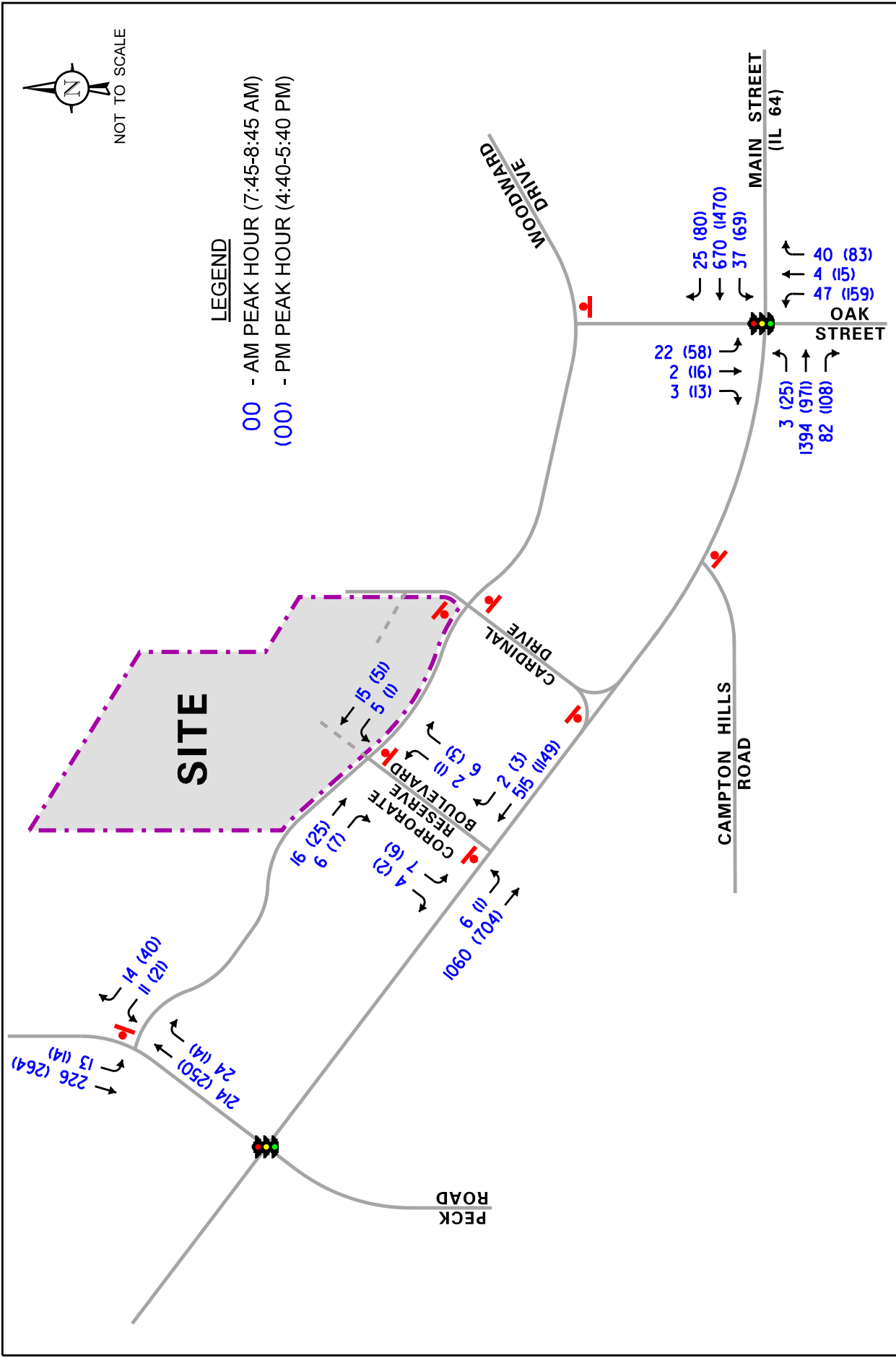
The total projected traffic volumes include the existing traffic volumes increased by a regional growth factor and the traffic estimated to be generated by the proposed subject development.

#### Year 2021 No-Build Traffic Volumes

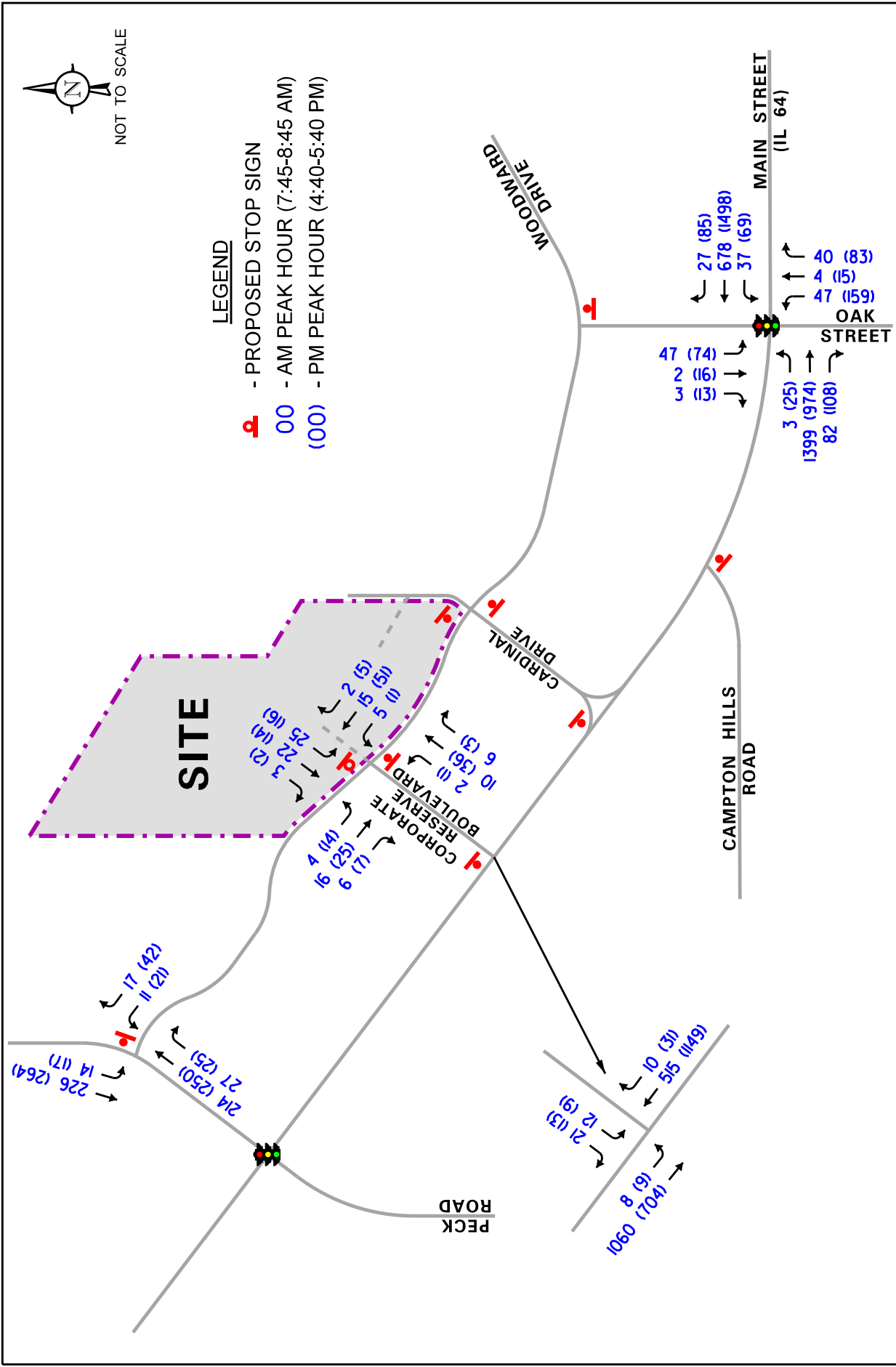
Based on the Chicago Metropolitan Agency for Planning (CMAP) year 2040 population and employment projections, the existing traffic volumes were increased by approximately one percent per year for six years (construction year plus five), to project the year 2021 conditions. **Figure 7** shows the Year 2021 base (no-build) traffic volumes.

#### Total Projected Traffic Volumes

Total projected traffic volumes include the Year 2021 base traffic volumes (Figure 7) and the estimated development-generated traffic volumes (Figure 6). **Figure 8** shows the total projected traffic volumes for Year 2021 conditions.



<p><b>PROJECT:</b></p> <p>Corporate Reserve St. Charles, Illinois</p>	<p><b>TITLE:</b></p> <p>Year 2021 Base Traffic Volumes (No-Build Condition)</p>	<p><b>Figure:</b> 7</p>
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## 5.

# Traffic Analysis and Recommendations

Capacity analyses were performed for the key intersections included in the study area to determine the ability of the existing roadway system to accommodate existing and future traffic demands. Analyses were performed for the weekday morning and weekday evening peak hours for both existing and Year 2021 total traffic conditions.

The traffic analyses were performed using the methodologies outlined in the Transportation Research Board's *Highway Capacity Manual (HCM)*, 2010 and using HCS 2010 analysis software.

The analysis for the existing traffic-signal controlled intersection was accomplished using field observed signal timings and cycle lengths to determine the average overall vehicle delay, volume-to-capacity ratios, and levels of service.

The analyses for the unsignalized intersections determine the average control delay to vehicles at an intersection. Control delay is the elapsed time from a vehicle joining the queue at a stop sign (includes the time required to decelerate to a stop) until its departure from the stop sign and resumption of free flow speed. The methodology analyzes each intersection approach controlled by a stop sign and considers traffic volumes on all approaches and lane characteristics.

The ability of an intersection to accommodate traffic flow is expressed in terms of level of service, which is assigned a letter from A to F based on the average control delay experienced by vehicles passing through the intersection.

Summaries of the traffic analysis results showing the LOS and overall intersection delay (measured in seconds) for both existing (Year 2015) and future (Year 2021) conditions are presented in **Table 2** and **Table 3**, respectively. A discussion of the intersections follows.

Table 2

## CAPACITY ANALYSES RESULTS—EXISTING CONDITIONS

Intersection	Weekday A.M. Peak Hour	Weekday P.M. Peak Hour
	LOS/Delay	LOS/Delay
Oak St and Main St (IL 64) (signalized)	B – 16.9	C – 25.8
Corporate Reserve Blvd and Main St (stop sign)	EBL: A – 8.4 SBL: C – 20.1 SBR: B – 11.4	EBL: B – 10.9 SBL: C – 22.9 SBR: C – 19.9
Corporate Reserve Blvd and Woodward Dr (stop sign)	WBA: A – 7.3 NBA: A – 8.5	WBA: A – 7.3 NBA: A – 8.4
Peck Rd and Woodward Dr (stop sign)	WBA: B – 10.8 SBA/L: A – 7.7	WBA: B – 11.5 SBA/L: A – 7.8

LOS = Level of Service

Delay is measured in seconds.

For signalized intersections, the LOS/Delay represents the intersection as a whole.

EBL = Eastbound left-turn movement

SBL = Southbound left-turn movement

SBR = Southbound right-turn movement

NBA = Northbound approach

WBA = Westbound approach

SBA/L = Southbound approach/left-turn movement delay (shared through/left-turn lane)

Table 3  
CAPACITY ANALYSES RESULTS—FUTURE CONDITIONS

Intersection	Weekday A.M. Peak Hour	Weekday P.M. Peak Hour
	LOS/Delay	LOS/Delay
Oak St and Main St (IL 64) (signalized)	B – 18.2	C – 27.2
Corporate Reserve Blvd and Main St (stop sign)	EBL: A – 8.5 SBL: C – 21.7 SBR: B – 11.9	EBL: B – 11.5 SBL: D – 25.2 SBR: C – 22.3
Corporate Reserve Blvd and Woodward Dr (stop sign)	EBA: A – 7.2 WBA: A – 7.3 NBA: A – 9.1 SBA: A – 9.4	EBA: A – 7.4 WBA: A – 7.3 NBA: B – 10.0 SBA: A – 9.9
Peck Rd and Woodward Dr (stop sign)	WBA: B – 10.9 SBA: A – 7.8	WBA: B – 10.9 SBA: A – 7.8

LOS = Level of Service

Delay is measured in seconds.

For signalized intersections, the LOS/Delay represents the intersection as a whole.

EBL = Eastbound left-turn movement

SBL = Southbound left-turn movement

SBR = Southbound right-turn movement

WBL = Westbound left-turn movement

NBA = Northbound approach

WBA = Westbound approach

EBA = Eastbound approach

SBA = Southbound approach

## **Discussion and Recommendations**

The following summarizes traffic capacity analysis for the study intersections for both existing and projected future conditions.

### **Oak Street and Main Street (IL 64)**

- The analyses were performed based on field observed cycle lengths. A limited amount of greentime is given to Oak Street, with a majority given to Main Street.
- The intersection will continue to operate at an above acceptable level of service for both the weekday morning and weekday evening peak hours for Year 2021 conditions. As such, the proposed development will have a limited impact on the operations at this signalized intersection during peak hour periods.
- Based on the traffic capacity and queuing analyses, no traffic signal or roadway improvements are needed or recommended at this intersection in conjunction with the proposed development.

### **Corporate Reserve Boulevard and Main Street**

- The intersection will continue to operate at acceptable levels of service for both the weekday morning and weekday evening peak hours for Year 2021 conditions.
- Exiting vehicles from the development desiring to travel eastbound on Main Street will most likely use Woodward Drive to access the traffic signal on Oak Street.
- The proposed development will have a limited impact on the operations at this intersection during peak hour periods.
- A cursory review of the projected Year 2021 peak hour traffic volumes show that a traffic signal is not warranted at this intersection.

### **Corporate Reserve Boulevard/Main Access and Woodward Drive**

- The proposed main/full access will align with the existing Corporate Reserve Boulevard becoming the fourth/north leg to this existing T-intersection.
- The main/full access will provide one inbound lane and one lane outbound under stop sign control.
- No improvements are planned or recommended to the existing Corporate Reserve Boulevard to the south or to Woodward Drive.
- The capacity analyses show that this intersection will continue to operate at acceptable levels of service with the addition of the proposed main/full access serving the proposed development.
- The existing pedestrian/bicycle trail along Woodward Avenue will be located behind the outbound stop sign so that exiting vehicles will come to a complete stop prior to crossing the trail.

### **Peck Road and Woodward Drive**

- The capacity analyses show that this intersection will continue to operate at acceptable levels of service under future projected traffic conditions.
- No improvements are proposed or recommended at this intersection in conjunction with the proposed development.

### **Access and Cardinal Drive**

This proposed access on Cardinal Drive will provide one lane in each direction and is considered a secondary/minor access to the development. No traffic control or roadway improvements are proposed or recommended on Cardinal Drive to accommodate this access.



## 6. Conclusion

The Corporate Reserve single-family home residential development is proposed to be located north of Woodward Drive opposite Corporate Reserve Boulevard in St. Charles, Illinois. The plans call for approximately 78 single-family homes. Access to the development will primarily be off of Woodward Drive in alignment with Corporate Reserve Boulevard, with a secondary access off of Cardinal Drive.

Traffic capacity analyses were conducted for both existing (Year 2015) and future (Year 2021) conditions for the weekday morning and weekday evening peak hour periods. The projected traffic volumes include the existing peak hour traffic volumes increased by a regional growth factor and the traffic estimated to be generated by the proposed residential development. No traffic control or geometric improvements are needed or recommended at the existing signalized intersection of Oak Street and Main Street (IL 64), Corporate Reserve Boulevard and Main Street, or Peck Road and Woodward Drive in conjunction with this proposed development.

The intersection of Corporate Reserve Boulevard and Woodward Drive will continue to operate at acceptable levels of service and delay with the addition of the fourth/north leg to the intersection, which will serve as the main access to the proposed development. The access will provide a boulevard style design with one lane inbound and one lane outbound separated by a landscaped median. The outbound lane will be under stop sign control. The stop sign will be located in front of the existing pedestrian/bicycle trail that traverses along the north side of Woodward Drive; therefore, all exiting vehicles will come to a stop before crossing the trail.

In conjunction with this development, pedestrian accessibility and mobility will be enhanced by providing connections between the proposed development and existing surrounding trails. In addition, the existing north-south trail that runs along the west side of the development will be extended south from Woodward Drive to Main Street (IL 64). Further, the development proposes continuous sidewalk on both sides of the roadways within the development.