
YELM HIGHWAY COMMUNITY PARK & FUTURE SCHOOL

Olympia Urban Growth Area of
Thurston County, WA

TRAFFIC IMPACT ANALYSIS (TIA)
February 21, 2023

THURSTON COUNTY
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YELM HIGHWAY COMMUNITY PARK & FUTURE SCHOOL TRAFFIC IMPACT ANALYSIS

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02/21/2023



YELM HIGHWAY COMMUNITY PARK & FUTURE SCHOOL TRAFFIC IMPACT ANALYSIS

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YELM HIGHWAY COMMUNITY PARK & FUTURE SCHOOL TRAFFIC IMPACT ANALYSIS

1. INTRODUCTION

Heath & Associates has been retained to prepare a Transportation Impact Analysis (TIA) for a new proposed community park and future secondary school in what is currently unincorporated Thurston County. This analysis will evaluate and document existing conditions within a defined study area and compare with forecast conditions at buildout phases.

2. PROJECT DESCRIPTION

Yelm Highway Community Park & Future School proposes for the construction of an approximate 60-acre community park located in the Olympia Urban Growth Area of Thurston County. As part of constructing a new community park, this site has also been selected by the Olympia School District to comprise a future secondary school. The School District would require an approximate 20-acre area on the northwesterly portion of the site to accommodate a new school campus, parking, and sporting fields. The subject property is bordered to the north by Yelm Highway SE and situated between Hampton Street SE to the west and Wiggins Road SE to the east, located within tax parcel #'s: 0933000-8002 and -5000. The site is presently occupied with a small berry stand and is primarily agriculture/undeveloped.

Analysis herein entails development to be constructed in two primary phases. Phase 1 involves construction of approximately 30 percent of the community park. Amenities constructed under Phase 1 are to include the restroom/maintenance facilities, a small playground, one to two sporting fields, walking loop, and approximately 40 percent of the parking area. Phase 1 would also have a single primary access by way of the signalized intersection of Yelm Highway SE & Wiggins Road SE. A secondary, non-motorist/emergency vehicle access would be available to the west. Phase 1 will be evaluated under a five-year horizon of 2028.

Phase 2 entails full buildout of the community park and a 1400-student secondary school. Several amenities are planned such as a larger playground area, gardens, spray grounds, dog park, sport courts (2 basketball/6 pickleball), bike park, three full-size sport fields, picnic shelters and more. Primary access under Phase 2 (full build-out) is proposed to occur via Yelm Highway SE's intersections with Hamptons Street SE, Landview Drive SE (right-in, right-out driveway) and Wiggins Road SE. Timing and funding for full build-out is unknown so evaluation herein applies a ten-year horizon.



Figure 1 below depicts a vicinity map, outlining the surrounding roadway system. Figure 2 illustrates a 30% Design site plan, outlining Phase 1 development. Additionally depicted in Figure 2 is a conceptual site plan of full build-out (Phase 2).





PHASE 1: 30% DESIGN



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FULL BUILD-OUT: 100% DESIGN



YELM HIGHWAY COMMUNITY PARK & FUTURE SCHOOL
CONCEPTUAL SITE PLANS: PHASE 1 & FULL BUILD-OUT
FIGURE 2

3. EXISTING CONDITIONS

3.1 Existing Street System

The street network serving the proposed project consists of a variety of roadways. The major roadways and arterials bordering and providing access to the site are listed and described below.

Table 1: Roadway Network

Functional Classification	Roadway	Speed Limit	Lanes	Street Parking	Sidewalk	Bike Facilities
Arterial	Yelm Highway SE	40 mph	4-5	No	Yes	Yes
Major Collector	Wiggins Rd SE	35 mph	2	No	Some	No
Local	Landview Drive SE	25 mph	2	No	Some	No
	Hamptons Street SE	25 mph	2	Yes	Some	No

3.2 Transit Service

A review of the Intercity Transit bus schedule indicates that transit is provided directly north of the subject site on Yelm Highway SE, served via Routes 68 and 94. The nearest stops serving Route 68 are provided along the project frontage on Yelm Highway SE. Route 68–Yelm Highway/Capital Mall– travels from the Capital Mall Station to the Lacey Transit Center. Weekday service is provided from 6:01 AM – 9:50 PM with 30-minute headways. Weekend service is provided from 7:01 AM – 9:50 PM with 30-minute headways.

The nearest stops serving Route 94 are provided at the intersection of Wiggins Road SE & 55th Court SE. Route 94–Boulevard Road/Yelm– travels from the Olympia Transit Center to the Yelm Walmart. Weekday service is provided from 6:04 AM – 9:45 PM with 30-minute headways. Weekend service is provided from 7:01 AM – 9:50 PM with 30-minute headways. Refer to the Intercity Transit Guide for further route information. Some transit activity can be expected from the proposed development given the proximity and available walking connectivity.



3.3 Roadway Improvements

Jurisdictional Improvements

A review of the current City of Olympia 2023-2028 Capital Facilities Plan: Transportation, Thurston County Transportation Improvement Program, City of Lacey's and Tumwater Six-Year (2022-2027) Transportation Improvement Programs indicates that improvement projects are planned in the vicinity of the subject site within the next 6 years. A summary of the projects is provided in the Table below.

Table 2: Transportation Improvement Projects

Name	Location	Improvement	Cost
<u>City of Lacey Transportation Improvement Plan</u>			
Rainier Rd from Yelm Hwy to City Limits	Between Yelm Hwy and south city limits	Improve tapers and storage at intersection and add bike lanes.	\$2,858,000
Yelm Hwy Improvements	Ruddell Rd to Amtrak Bridge	Widen east side for additional NB lane, bike lane, sidewalk and other urban amenities	\$5,000,000
<u>City of Olympia 2023-2028 Preliminary Capital Facilities Plan</u>			
Wiggins Road (Program #0600)	27th Ave to S City Limits	Add sidewalks and bike lanes or a shared use path to at least one side of the street	\$1,500,000
Wiggins & Herman (37th Ave SE) Intersection Imp. (Program #0420)	Intersection	Construct new roundabout. Design is to commence in 2025	Design: \$200,000
<u>City of Tumwater Transportation Improvement Program (2022-2027)</u>			
E Street Extension (#2)	Capitol Blvd to Cleveland Ave	Construct new roadway with sidewalk, illumination, etc.	\$6,600,000
<u>Thurston County Transportation Improvement Program (2023-2028)</u>			
Yelm Hwy SE Pavement Preservation (#6)	Rich Rd SE to Lacey City Limits	Replace the top layer of pavement with reinforced asphalt; Upgrade ped. facilities to ADA requirements	\$3,700,000
Yelm Hwy SE Ped. Improvement Ph. 2 (#18)	Rich Rd to Chehalis Western Trail	Construct ADA accessible crossings via ped. refuge islands; Upgrade curb ramps and sidewalk	\$600,000

Yelm Highway Community Park & Future School Improvements

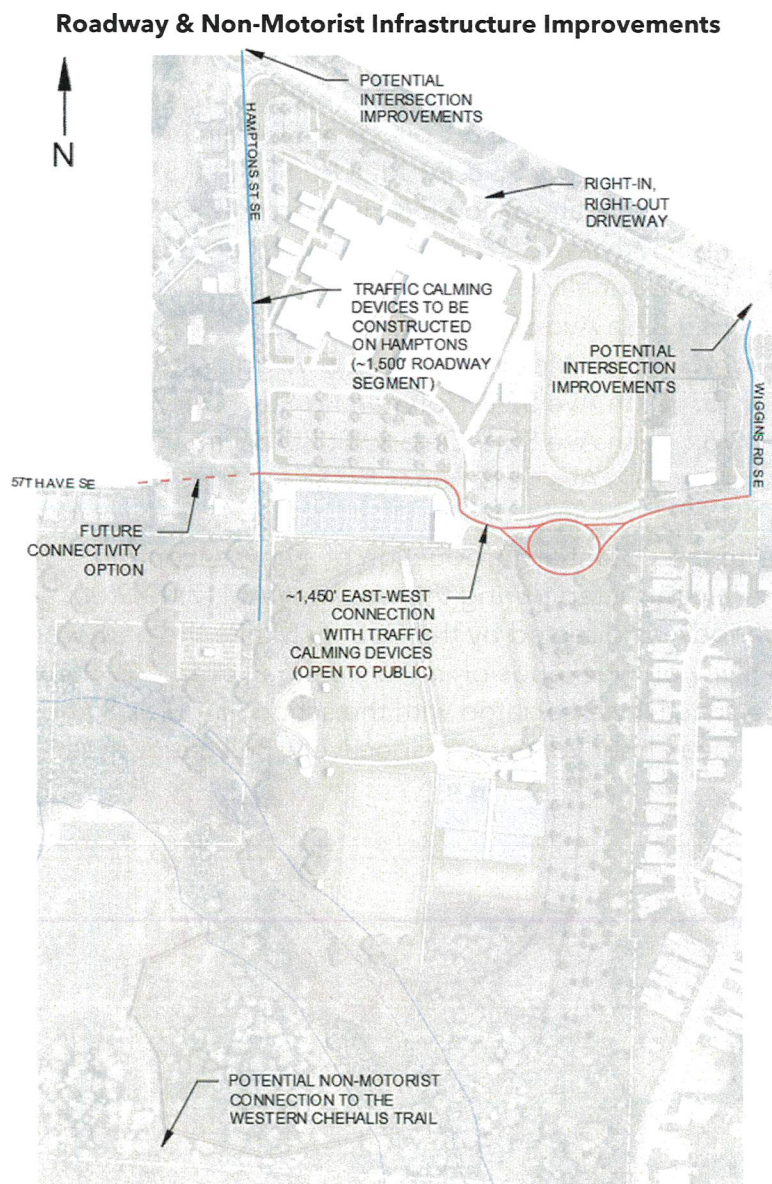
Roadway and intersection improvements are proposed to be constructed as a part of site development. Two forms of traffic calming devices are proposed on Hamptons Street SE south of Yelm Highway SE (~1,500-foot roadway segment). An east-west roadway connection (~1,450-feet) is to be constructed internal to the subject site from Hamptons Street SE to Wiggins Road SE. This roadway will be open to the public and will comprise traffic calming devices. This connection may be extended westerly from Hamptons Street SE in the future, connecting to 57th Avenue SE. Refer to the graphic on the following page for further details.



It should also be noted that the proposed project access at Yelm Highway SE & Landview Drive SE is to be improved and restricted to right-in, right-out turning movements. Lastly, it is expected that a higher form of intersection control (i.e.: signal or roundabout) will be required at the primary access of Yelm Highway SE & Hamptons Street SE given project trip generation. This will be analyzed further herein, and final intersection control should be coordinated with the County.

3.4 Non-Motorist Infrastructure

Yelm Highway SE in the subject site vicinity comprises complete sidewalk and bicycle lanes to facilitate and encourage multi-modal transport. Bicycle and pedestrian connections between the proposed park and Yelm Highway SE are to be provided. Moreover, non-motorist connections will be available between the subject site and the neighborhoods and roadways (Hamptons Street SE; Wiggins Road SE) located west and east of the park. Sidewalk is proposed to be constructed along the east side of Hamptons Street SE and along the west side of Wiggins Road SE adjacent site development. Lastly, a potential future connection may be constructed between the southerly portion of the subject site and the Chehalis Western Trail.



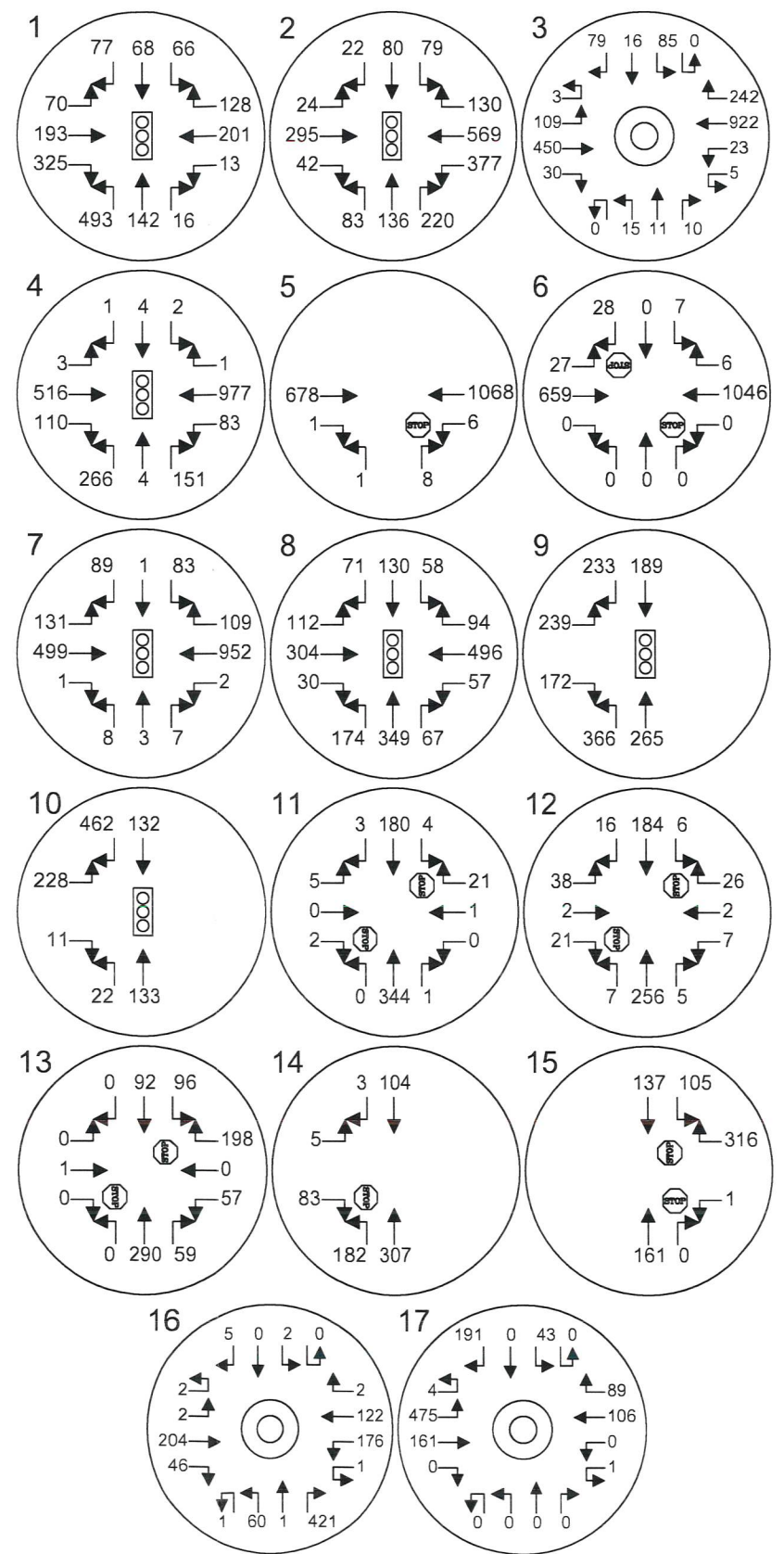
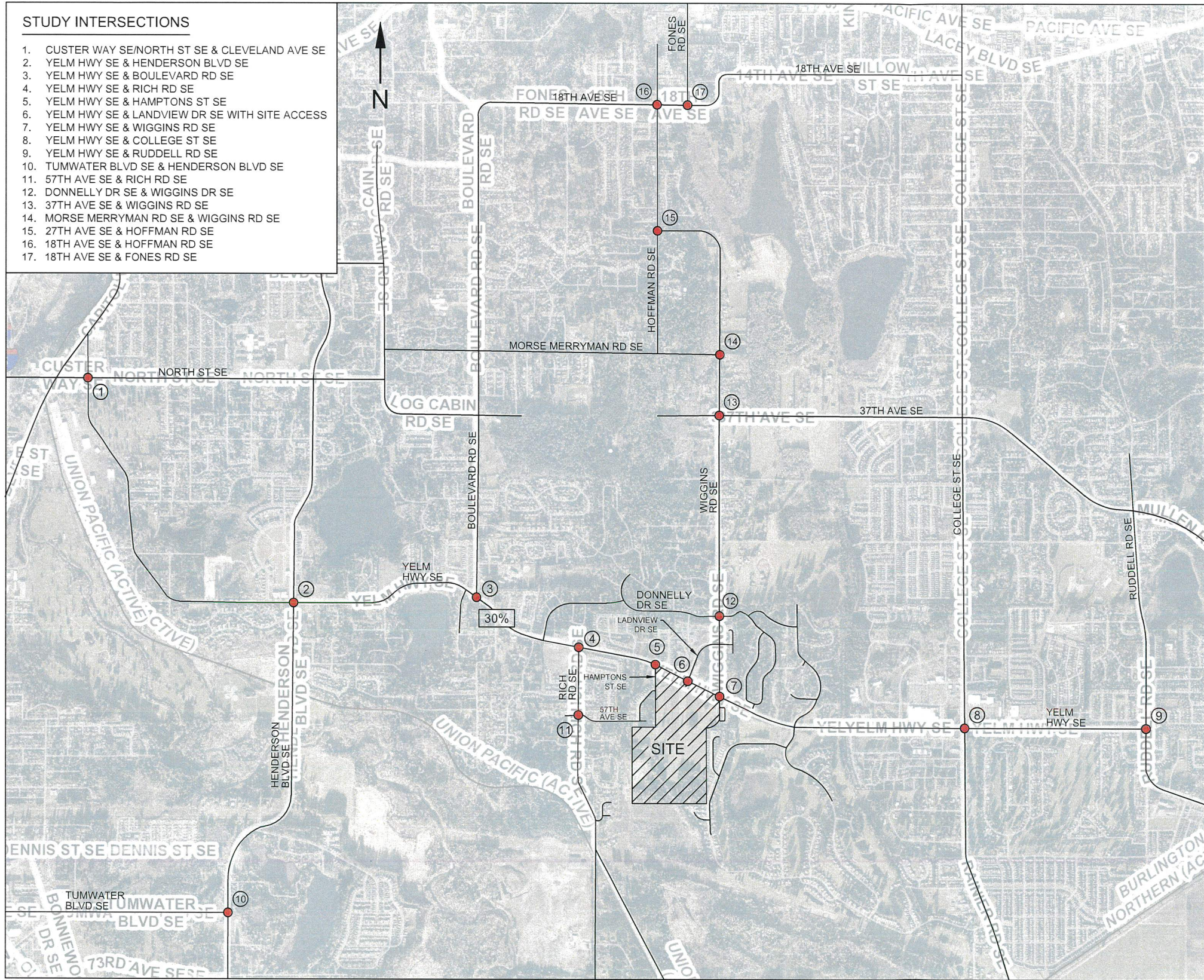
3.5 Existing Peak Hour Volumes

A total of 17 intersections were identified for evaluation during the scoping process with Thurston County. Field counts were conducted in November of 2022 at the intersections outlined below. Also noted is the jurisdiction that each intersection is situated within.

1. Custer Way SE/North St SE & Cleveland Ave SE (11/17/2022) - Tumwater
2. Yelm Hwy SE & Henderson Blvd SE (11/17/2022) - Olympia/Tumwater
3. Yelm Hwy SE & Boulevard Rd SE (11/16/2022) - Thurston Co. (Olympia UGA)
4. Yelm Hwy SE & Rich Rd SE (11/16/2022) - Thurston County (Olympia UGA)
5. Yelm Hwy SE & Hamptons St SE (11/16/2022) - Thurston Co. (Olympia UGA)
6. Yelm Hwy SE & Landview Dr SE (11/16/2022) - Thurston Co. (Olympia UGA)
7. Yelm Hwy SE & Wiggins Rd SE (11/16/2022) - Thurston Co. (Olympia UGA)
8. Yelm Hwy SE & College St SE/Rainier Rd SE (11/15/2022) - Lacey
9. Yelm Hwy SE & Ruddell Rd SE (11/15/2022) - Lacey
10. Tumwater Blvd SE & Henderson Blvd SE (11/17/2022) - Tumwater
11. 57th Ave SE & Rich Rd SE (11/16/2022) - Thurston Co. (Olympia UGA)
12. Donnelly Dr SE & Wiggins Rd SE (11/16/2022) - Thurston Co. (Olympia UGA)
13. 37th Ave SE & Wiggins Rd SE (11/15/2022) - Olympia
14. Morse Merryman Rd SE & Wiggins Rd SE (11/15/2022) - Olympia
15. 27th Ave SE & Hoffman Rd SE (11/15/2022) - Olympia
16. 18th Ave SE & Ontario St SE/Hoffman Rd SE (11/15/2022) - Olympia
17. 18th Ave SE & Fones Rd SE (11/15/2022) - Olympia

With the potential introduction of a new secondary school at this location, field counts were conducted during the weekday AM (7:00-9:00) and PM (4:00-6:00 PM) time periods, as directed by the County. While the park would typically realize peak activity on weekends or in the weekday evenings, the weekday AM would receive peak activity associated with the school. Figures 3 and 4 illustrate weekday AM and PM peak hour volumes, respectively. Full count sheets are included in the appendix.





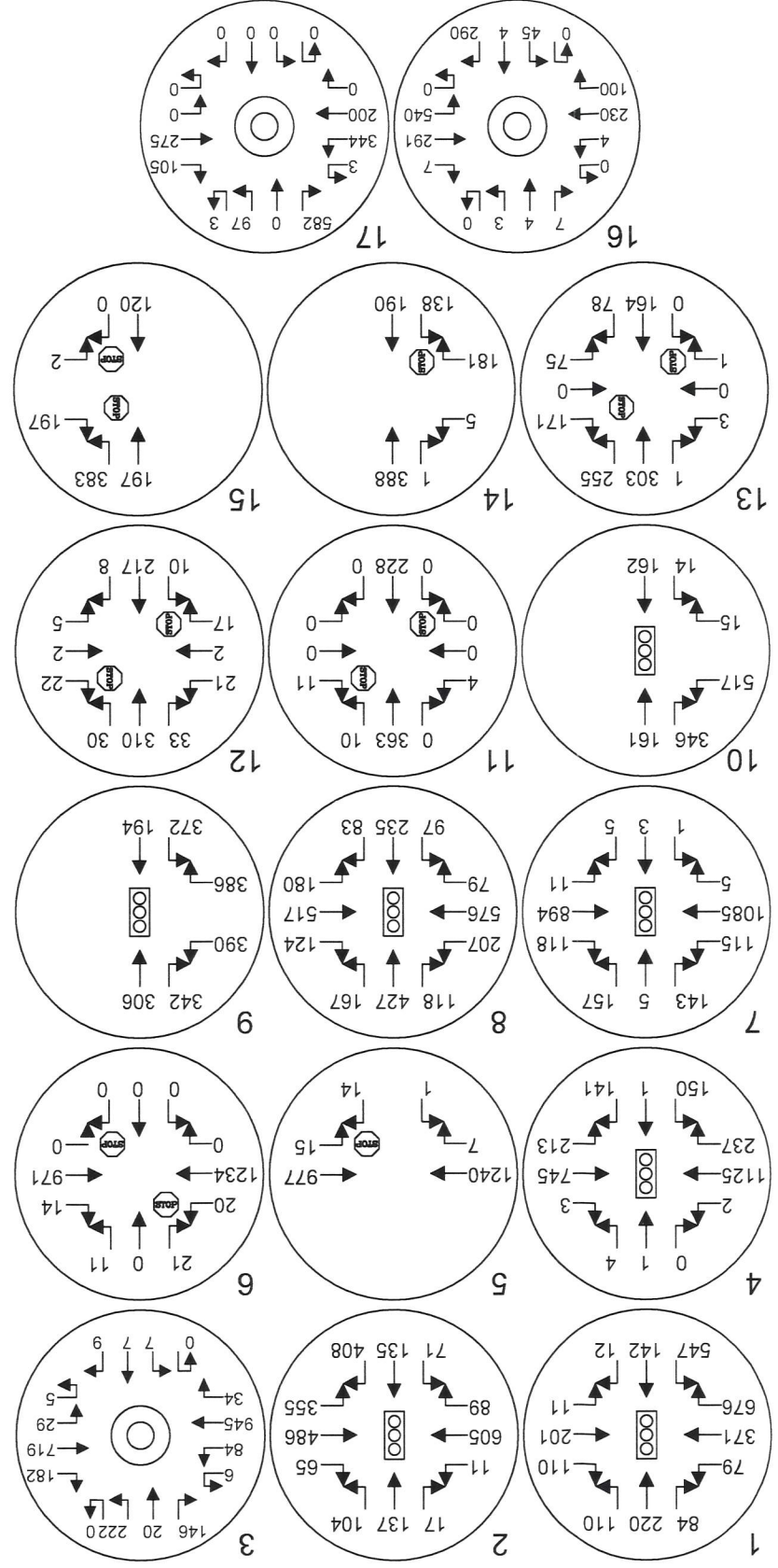
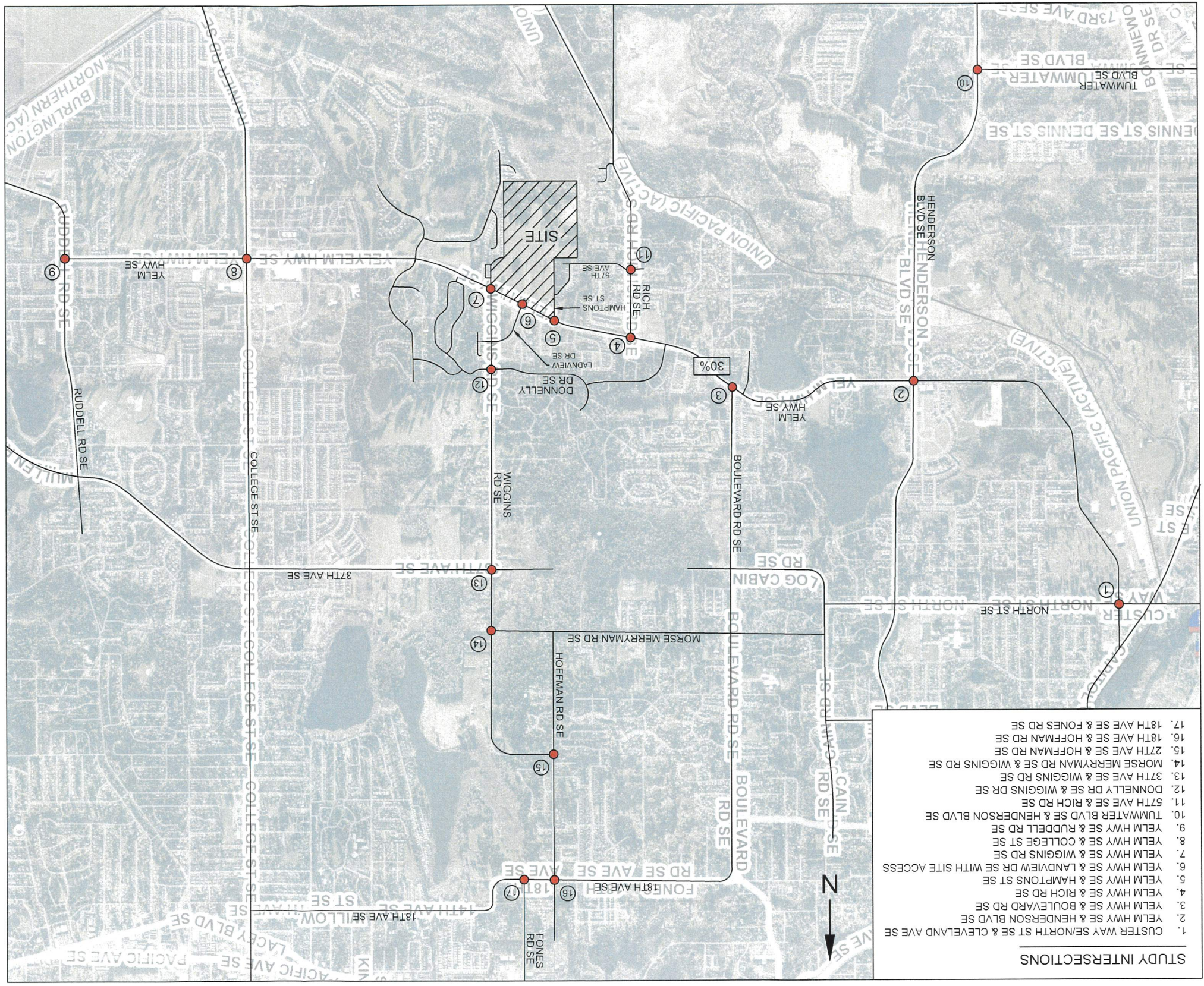


FIGURE 4
EXISTING WEEKDAY PM PEAK HOUR VOLUMES

3.6 Existing Level of Service

Existing intersection delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range¹ for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the 2016 Highway Capacity Manual. Level of service calculations were made through the use of the *Synchro 11* and *SIDRA 9.1* analysis programs. For signalized and roundabout intersections, LOS is determined by the intersection's overall weighted average delay for each approaching leg. Stop-controlled intersections are reported for the highest delayed movement. Table 3 on the following page summarizes baseline AM and PM peak hour LOS delays for the intersections of study.

Moreover, it should be noted that the required study intersections are situated within a variety of jurisdictions (Thurston County; Tumwater; Lacey; Olympia). City and County level of service standards are outlined below.

Thurston County Level of Service Standards: Per the County's Comprehensive Plan, all intersections located within unincorporated urban growth areas has LOS D standard. The adopted LOS standard for roads outside urban growth areas is LOS C. Additional exceptions to LOS standards are provided for regionally identified "Strategy Corridors" such as Yelm Highway SE.

City of Lacey Level of Service Standards: Per the City's Development Guidelines and Public Works Standards, Level of Service Standard "D" generally applies to most intersections.

City of Olympia Level of Service Standards: Per the City's Engineering Design and Development Standards, Level of Service Standard "D" generally applies to most intersections. Roadways and intersections along a designated Strategy Corridor such as Yelm Highway SE may operate with LOS E or greater conditions.

¹ *Signalized Intersections - Level of Service*

Level of Service	Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Highway Capacity Manual, 6th Edition

Stop Controlled Intersections - Level of Service

Level of Service	Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50



City of Tumwater Level of Service Standards: Per the City's Comprehensive Plan, Level of Service Standard "D" generally applies to most intersections. However, LOS E standards apply to intersections within Urban Core Areas or located along Strategy Corridors. This LOS E exception applies to Custer Way SE/North Street SE & Cleveland Avenue SE.

Table 3: Existing Weekday Peak Hour Level of Service

Delays given in seconds per vehicle

Ref. #	Intersection	Control	LOS Standard	Weekday AM		Weekday PM	
				LOS	Delay	LOS	Delay
1	Custer Way SE & Cleveland Ave SE^	Signal	E	B	18.2	C	23.4
2	Yelm Hwy SE & Henderson Blvd SE	Signal	E	C	22.7	C	26.9
3	Yelm Hwy SE & Boulevard Rd SE	RAB*	D	A	6.0	A	6.4
4	Yelm Hwy SE & Rich Rd SE^	Signal	D	B	18.3	C	24.6
5	Yelm Hwy SE & Hamptons St SE	Stop	D	B	11.9	C	15.5
6	Yelm Hwy SE & Landview Dr SE	Stop	D	C	18.1	C	19.7
7	Yelm Hwy SE & Wiggins Rd SE	Signal	D	B	15.0	B	14.5
8	Yelm Hwy SE & College St SE	Signal	D	C	29.3	D	39.2
9	Yelm Hwy SE & Ruddell Rd SE	Signal	D	B	18.8	C	25.4
10	Tumwater Blvd SE & Henderson Blvd SE	Signal	D	A	7.5	B	11.8
11	57th Ave SE & Rich Road SE	Stop	D	B	12.5	C	15.4
12	Donnelly Dr SE & Wiggins Rd SE	Stop	D	B	14.4	B	14.0
13	37th Ave SE & Wiggins Rd SE	Stop	D	C	19.3	F	54.2
14	Morse Merryman Rd SE & Wiggins Rd SE	Stop	D	B	10.1	B	14.0
15	27th Ave SE & Hoffman Rd SE	Stop	D	A	8.1	B	10.2
16	18th Ave SE & Hoffman Rd SE	RAB	D	A	5.9	A	7.0
17	18th Ave SE & Fones Rd SE	RAB	D	A	7.5	A	6.9

*RAB: Roundabout ^HCM 6th Edition Methodology not supported. Lanes, Volumes, Timings output utilized.

Existing Weekday AM and PM Peak Hour: With the exception of 37th Avenue SE (Herman Road SE) & Wiggins Road SE, all study intersections are shown to meet Olympia, Lacey and Thurston County standards operating at LOS D or better under existing weekday peak hour conditions. It should be noted that the City of Olympia's Capital Facilities Plan outlines that a roundabout is proposed to be constructed at 37th Avenue SE (Herman Road SE) & Wiggins Road SE. This improvement will likely improve future service levels at the intersection.



4. FORECAST TRAFFIC DEMAND & ANALYSIS

4.1 Project Trip Generation

Trip generation can be defined by the number of inbound and outbound movements at a specific site within a given hour or an entire day. To estimate trip generation associated with the proposed Yelm Highway Community Park & Future School, three existing community parks (Regional Athletic Complex, Olympia; Rainier Vista Community Park, Lacey; & Yauger Park, Olympia) were sampled in terms of vehicular activity during the weekday AM peak period, weekday PM peak period, and weekend peak period. In addition, as uses such as the proposed spray park and dog park were not included in the sample sites, additional surveys were administered to estimate their respective activity levels. The full sample site trip generation study is attached in the appendix, including all traffic volume count sheets.

As previously noted, the proposed development is to entail two primary phases, which are outlined below. Phase 1 is to comprise a 30% park build and Phase 2 is to encompass full build-out of the community park and include a 1,400-student high school. It should be noted that Phase 2 may entail additional phasing. However, analysis herein for Phase 2 accounts for full build-out. Table 4 below outlines the total estimated trips for the proposed community park under Phase 1 development in addition to full project build-out (Phase 2). Inbound and outbound percentages for the park are based on observed values associated with the park sample site trip generation study. ITE's Trip Generation Manual, 11th Edition was referenced to derive the high school trip rates, which is defined under Land Use Code (LUC) 525 - High School. Average rates were utilized with students as the input variable. Table 4 summarizes anticipated vehicular movements for the weekday AM and PM peak hours and weekend PM peak hour.

Table 4: Project Trip Generation Summary

Phase	Proposed Use	Size	Weekday AM Peak Hour Trips (7:00-9:00 AM)			Weekday PM Peak Hour Trips (4:00-6:00 PM)			Weekend PM Peak Hour Trips (12:00-4:00 PM)		
			In	Out	Total	In	Out	Total	In	Out	Total
1	Community Park: <u>30% Design</u>	~20- acres	15	7	22	30	12	42	20	22	42
2	Community Park: <u>Full Build-out</u>	~60- acres	46	19	65	90	35	125	59	67	126
	High School (LUC 525)	1400 students	495	233	728	94	102	196	106	62	168
Total Site Trips: Full Build (Phase 2)			541	252	793	184	137	321	165	129	294



As illustrated, Phase 1 (30% community park build) is anticipated to generate approximately 22 weekday AM, 42 weekday PM and 42 weekend PM peak hour trips. Full build-out of the community park and secondary school (Phase 2) is anticipated to generate 793 weekday AM, 321 weekday PM and 294 weekend PM peak hour trips.

4.2 Distribution & Assignment

Trip distribution describes the anticipated travel routes to and from the subject development with respect to the surrounding roadway system. All trip distribution utilized herein was derived from site-specific TRPC modeling. Figures 5 and 7 illustrate Phase 1 trip distribution and assignment for the AM and PM peak hours of study, respectively. Phase 1 (30% community park build) access is solely to be provided via Wiggins Road SE, subsequently providing connection to Yelm Highway.

Figures 6 and 8 illustrate full build-out of the community park in addition to the 1,400-student high school (Phase 2). This analysis scenario additionally encompasses Yelm Highway SE access to the site via Hamptons Street SE and via a driveway opposite Landview Drive SE. Yelm Highway SE's intersections with Hamptons Street SE and Landview Drive SE are to function as the primary school accesses. As Yelm Highway SE & Hamptons Street SE is currently stop-controlled, a more significant control type will likely be required for installation at the intersection such as a signal or a roundabout given new project-related trips added to the location. More analysis concerning future potential intersection improvement requirements for Yelm Highway SE & Hamptons Street SE is provided in the following sections.

As previously stated, a portion of school-related traffic is anticipated to utilize the driveway opposite Landview Drive SE, which is proposed to be restricted to right-in, right-out turning movements. The majority of park-related trip generation is anticipated to utilize the Wiggins Road SE access. As an east-west connection will be provided internal to the subject site connecting Hamptons Street SE to Wiggins Road SE, a small portion of interplay between the land uses may occur at the various accesses. It should be noted that school buses are anticipated to enter the site via Yelm Highway SE & Wiggins Road SE and exit the site via Yelm Highway SE & Hamptons Street SE.

Lastly, Figure 9 illustrates weekday AM and PM peak hour volumes at the three primary access intersections under a scenario in which a roundabout is constructed at Yelm Highway SE & Hamptons Street SE. The construction of a roundabout at Yelm Highway SE & Hamptons Street SE will likely yield to a greater portion of inbound school-related traffic accessing the site via the Landview Drive SE access. The roundabout will allow inbound traffic from the east to perform U-Turn maneuvers, subsequently facilitating more convenient access to the right-in, right-out Yelm Highway SE & Landview Drive SE access. No alterations are anticipated at the outlying intersections study intersections under this analysis scenario.



4.3 Future Peak Hour Volumes

A 5-year horizon of 2028 was used to assess future Phase 1 conditions with project-buildout. A 10-year horizon of 2033 was used to assess full park and school build-out (Phase 2). Forecast background volumes were derived by applying 1.5 percent compound annual growth rate to the existing peak hour volumes illustrated in Figures 3 and 4. Existing PM peak hour volumes (November 2022) gathered for this analysis were shown to be lower than Thurston Regional Planning Council (TRPC) 2018 traffic volume data on Yelm Highway SE along the project frontage. However, TRPC estimates indicate an approximate 0.5 percent compound annual population growth rate within the Olympia Urban Growth Area of Thurston County from 2025 to 2035. As such, the 1.5% compound annual growth rate applied to traffic volumes herein is anticipated to sufficiently account for miscellaneous growth and pipeline development in the project area. Forecast 2028 AM and PM peak hour volumes without and with the addition of Phase 1 development are illustrated in Figure 10.

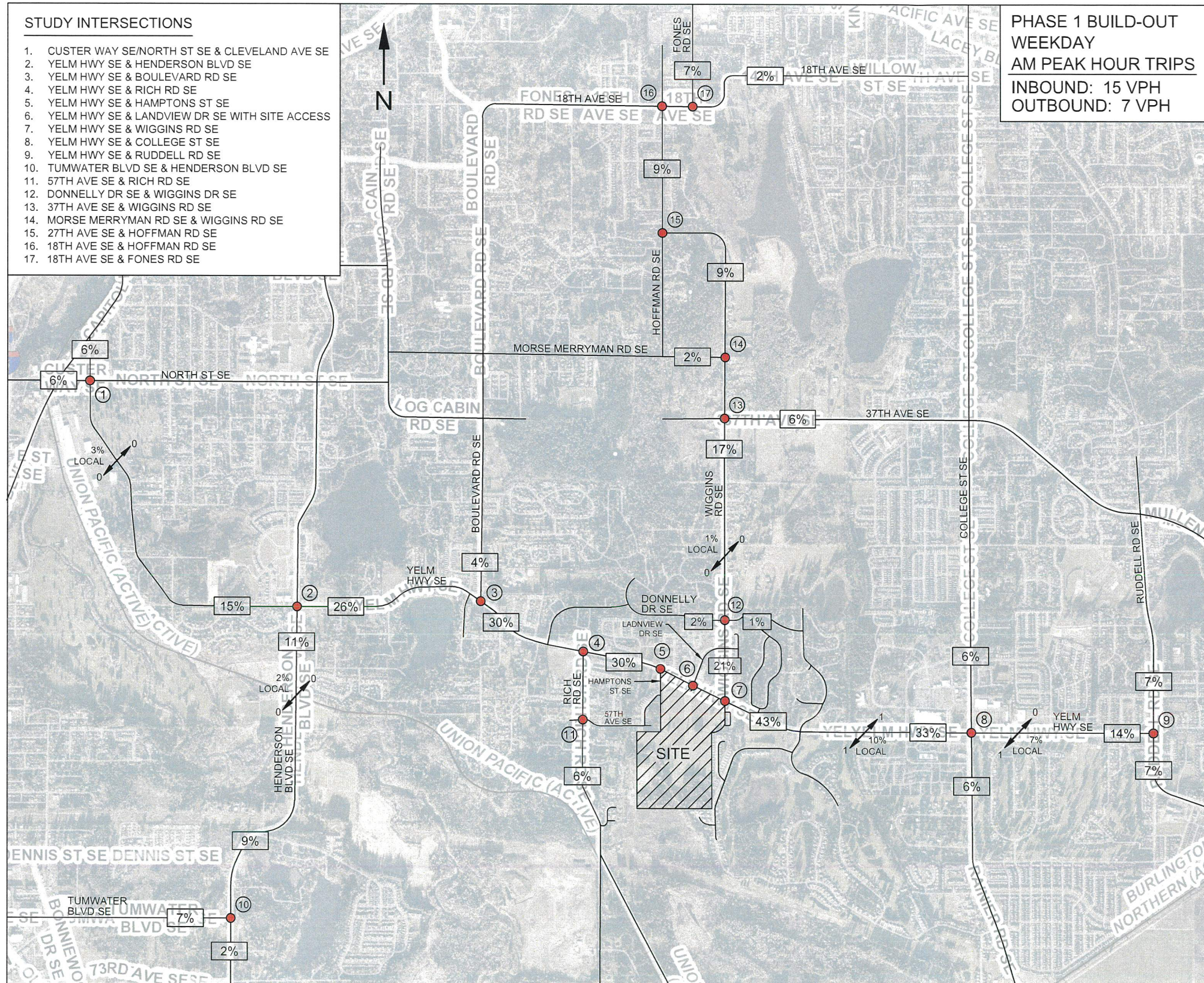
Forecast 2033 AM and PM peak hour volumes without full build-out of the proposed Yelm Highway Community Park & Future School development are illustrated in Figures 11 and 12, respectively. Forecast 2033 AM and PM peak hour volumes with full build-out of the proposed park and high school are depicted in Figures 13 and 14. Existing stop-control is depicted at Yelm Highway SE & Hamptons Street SE within Figures 11 through 14. However, as noted previously, it is anticipated that a higher form of control will be required at the access intersection given future traffic volume growth and project trip generation. As such, Figure 15 depicts forecast peak hour volumes with project at the access intersections under a scenario in which a potential modified control is constructed at Yelm Highway SE & Hamptons Street SE (i.e.: signal vs. roundabout).

Lastly, a scenario encompassing full build-out of the community park with no secondary school component on-site was analyzed. This scenario was created to determine if existing intersection configurations at the three primary access intersections would be adequate under forecast 2033 weekday peak hour conditions should only the park be constructed. Figure 16 depicts full park build-out trip distribution & assignment and forecast 2033 with project volumes at the access intersections.

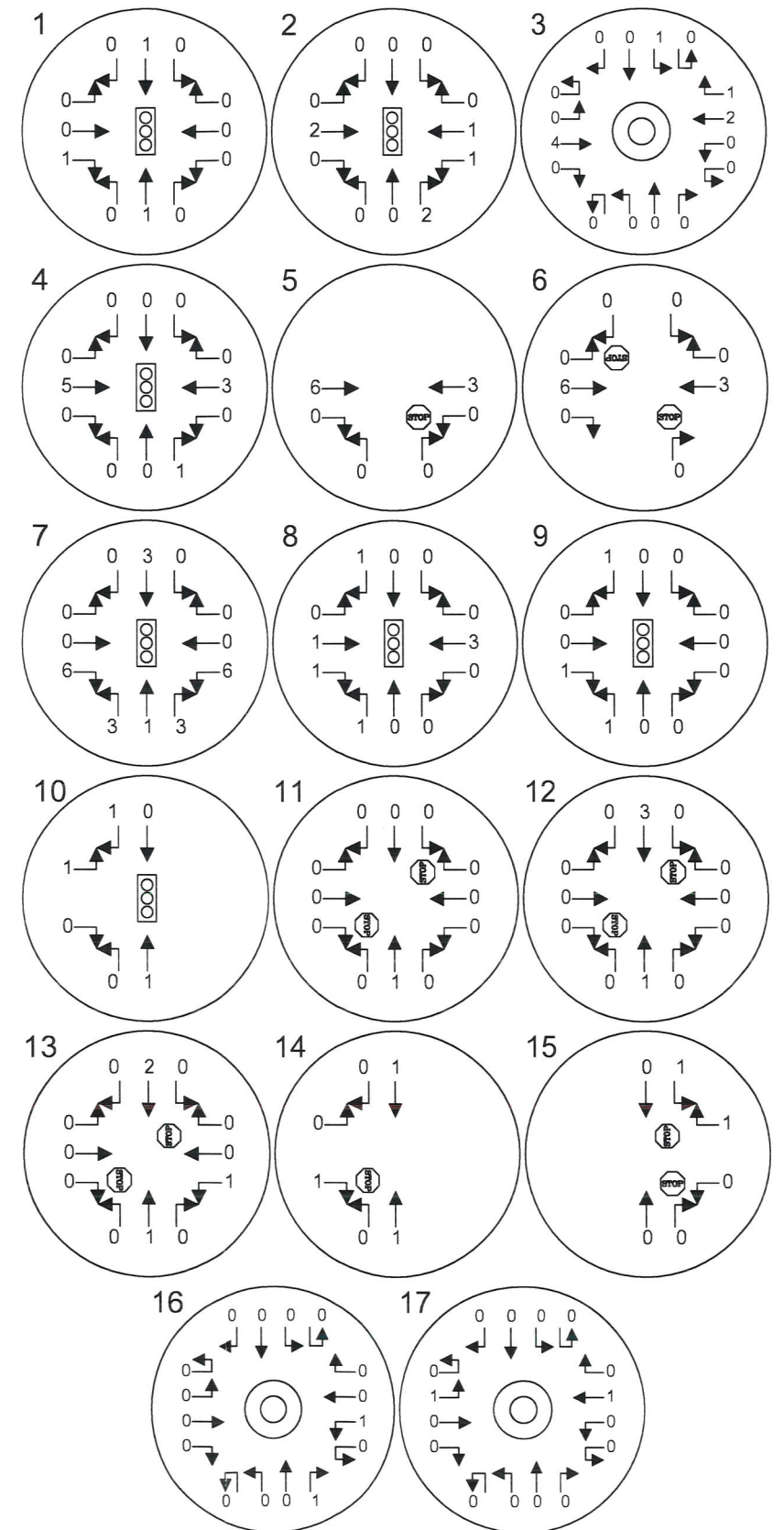


STUDY INTERSECTIONS

1. CUSTER WAY SE/NORTH ST SE & CLEVELAND AVE SE
2. YELM HWY SE & HENDERSON BLVD SE
3. YELM HWY SE & BOULEVARD RD SE
4. YELM HWY SE & RICH RD SE
5. YELM HWY SE & HAMPTONS ST SE
6. YELM HWY SE & LANDVIEW DR SE WITH SITE ACCESS
7. YELM HWY SE & WIGGINS RD SE
8. YELM HWY SE & COLLEGE ST SE
9. YELM HWY SE & RUDELL RD SE
10. TUMWATER BLVD SE & HENDERSON BLVD SE
11. 57TH AVE SE & RICH RD SE
12. DONNELLY DR SE & WIGGINS RD SE
13. 37TH AVE SE & WIGGINS RD SE
14. MORSE MERRYMAN RD SE & WIGGINS RD SE
15. 27TH AVE SE & HOFFMAN RD SE
16. 18TH AVE SE & HOFFMAN RD SE
17. 18TH AVE SE & FONES RD SE

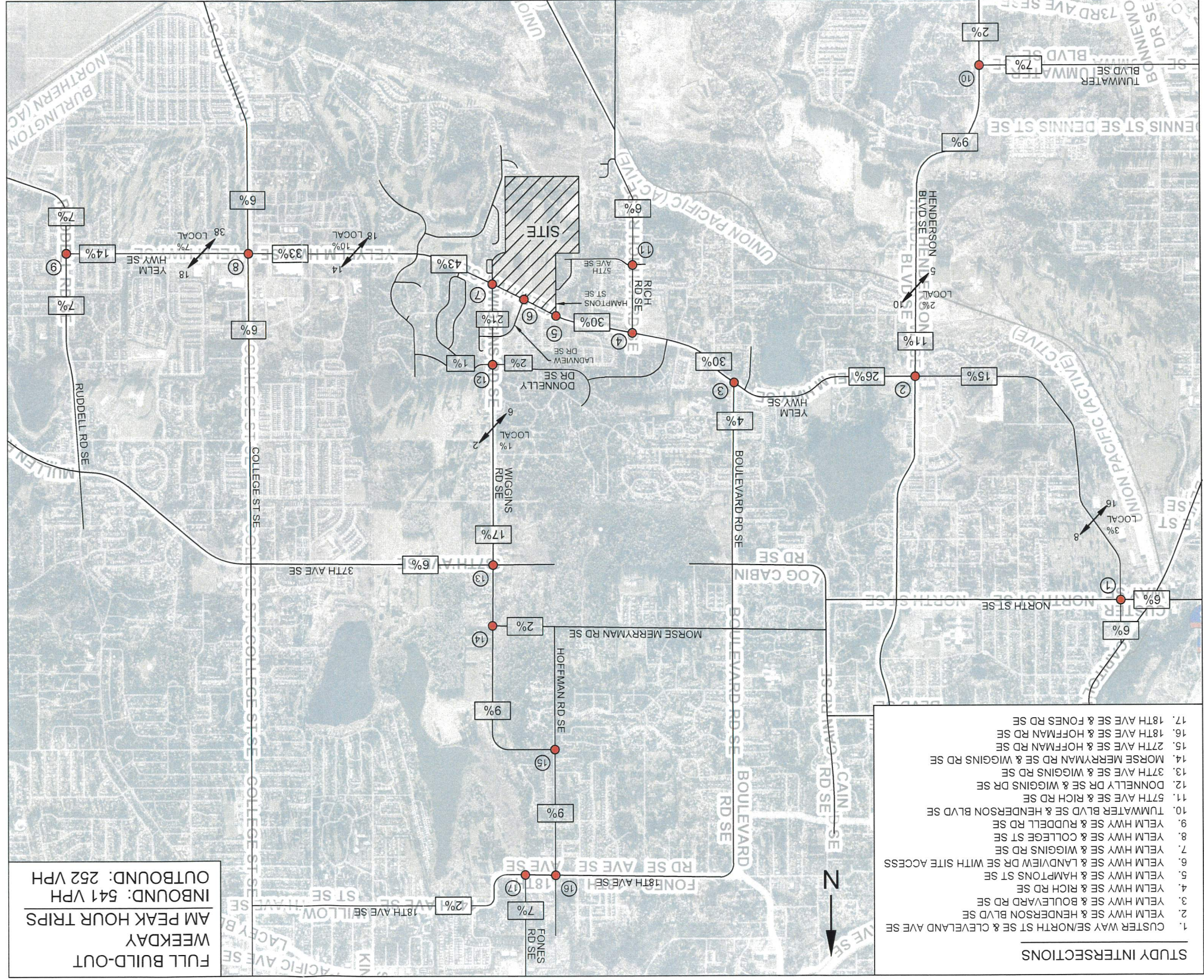


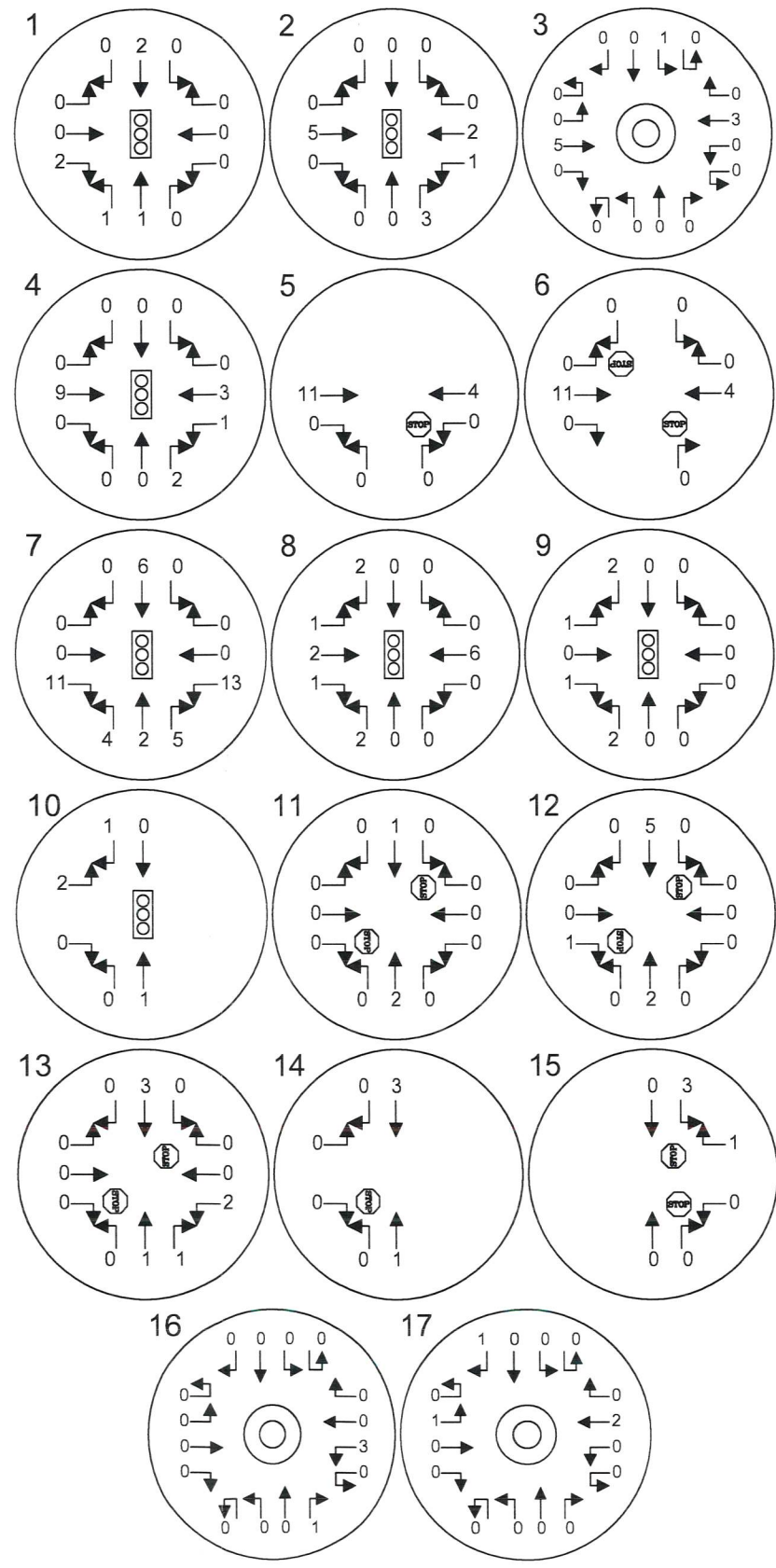
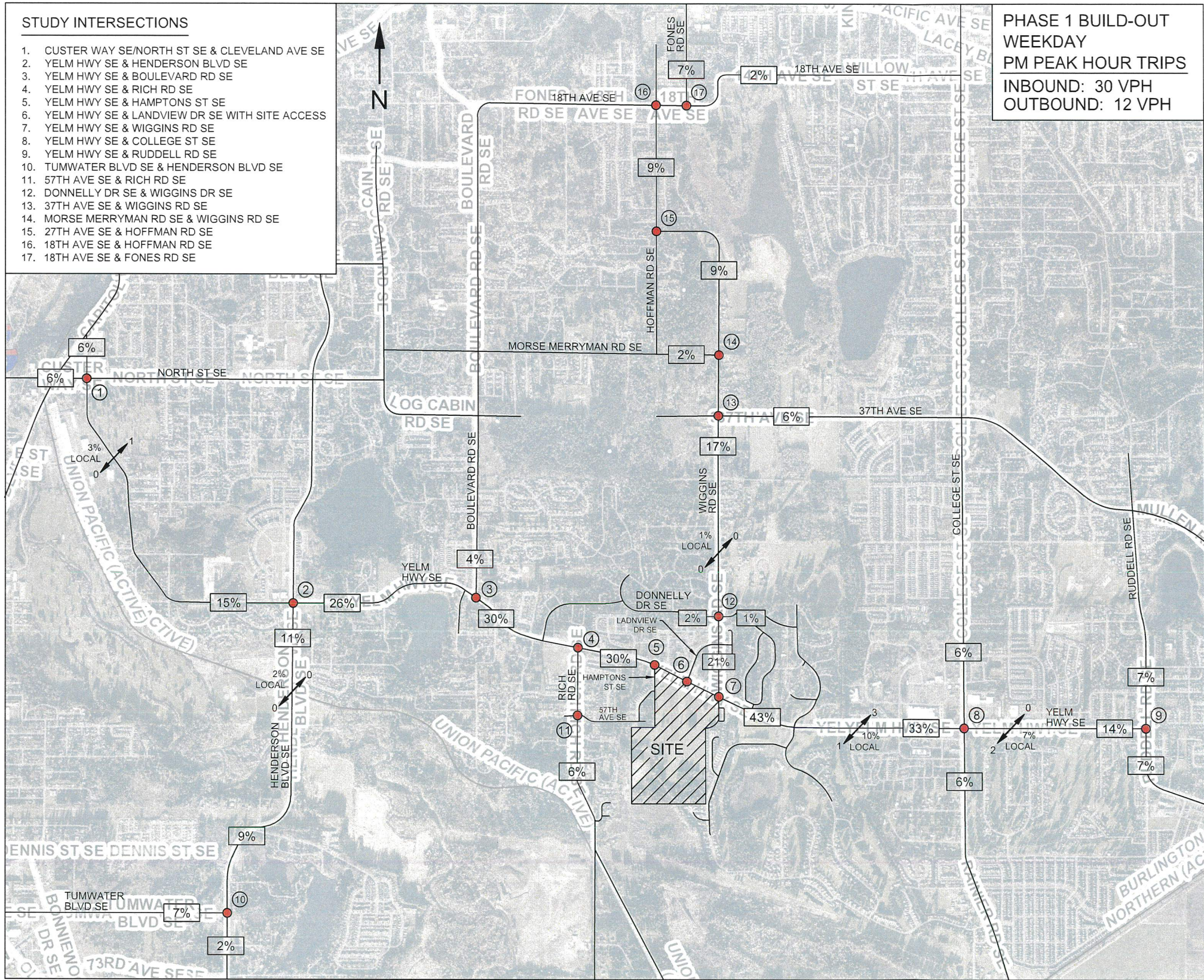
PHASE 1 BUILD-OUT
WEEKDAY
AM PEAK HOUR TRIPS
INBOUND: 15 VPH
OUTBOUND: 7 VPH

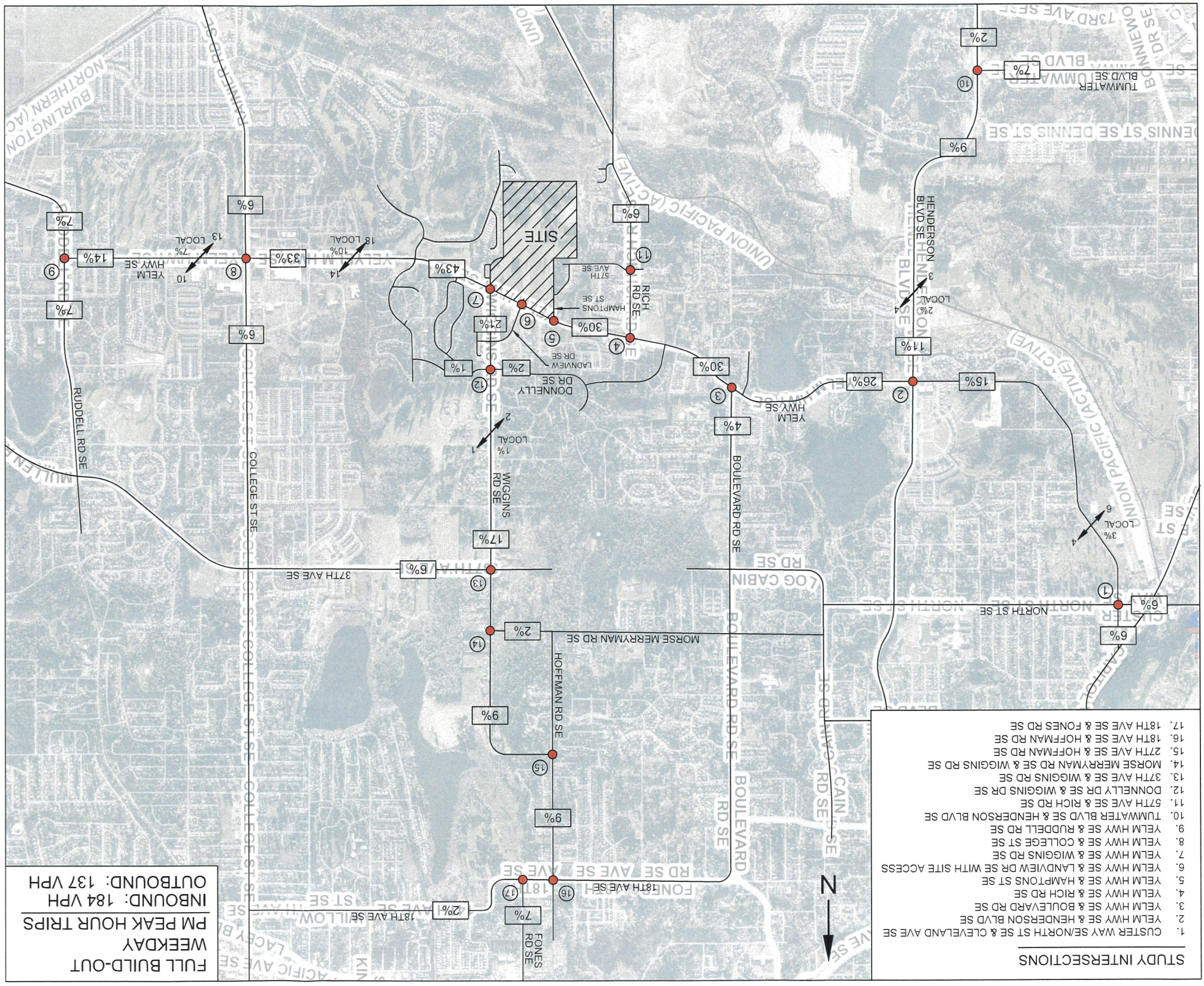


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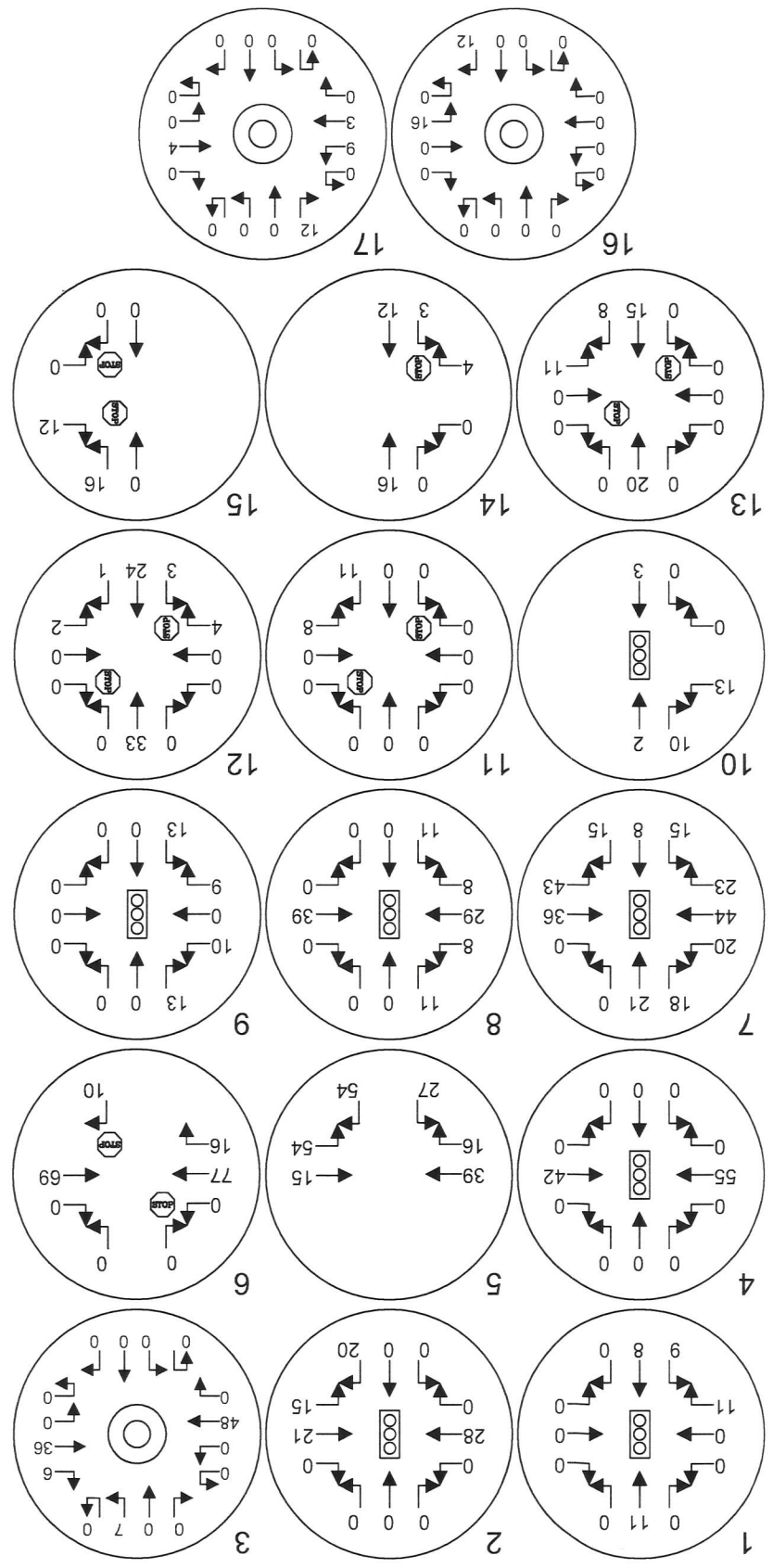
YELM HIGHWAY COMMUNITY PARK & FUTURE SCHOOL
WEEKDAY AM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT: PHASE 1 (30% DESIGN)
FIGURE 5



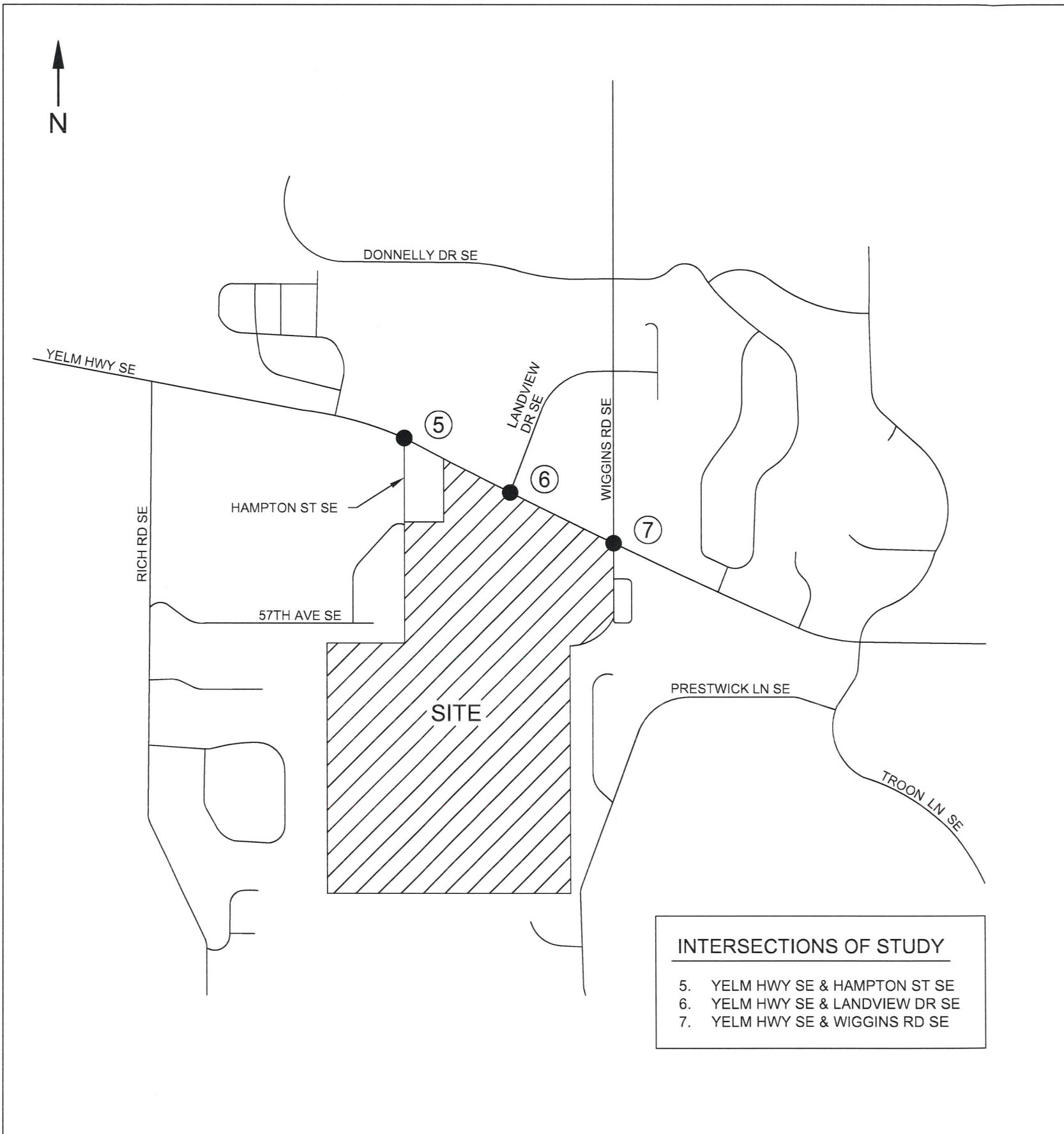




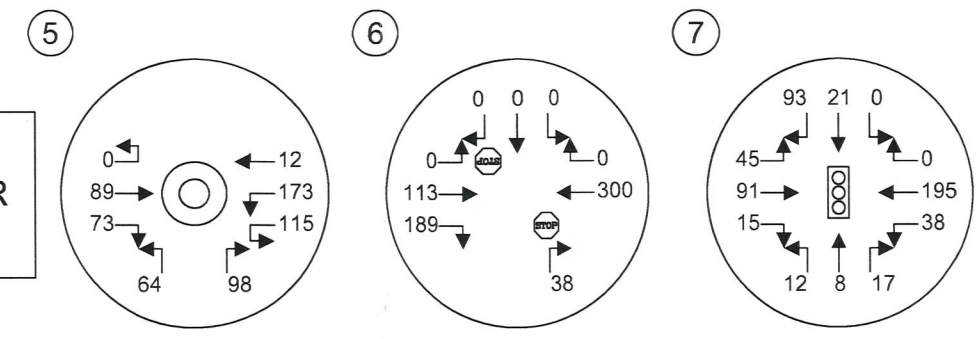
FULL BUILD-OUT
WEEKDAY
PM PEAK HOUR TRIPS
INBOUND: 184 VPH
OUTBOUND: 137 VPH



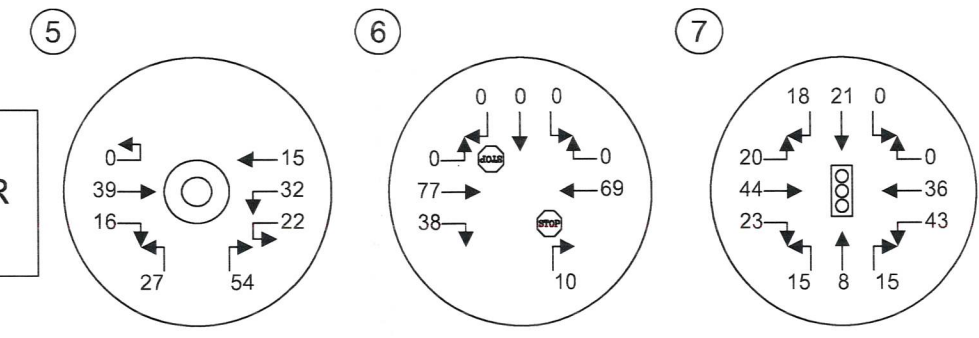
YELM HIGHWAY COMMUNITY PARK & FUTURE SCHOOL
WEEKDAY PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT: FULL BUILD-OUT
FIGURE 8

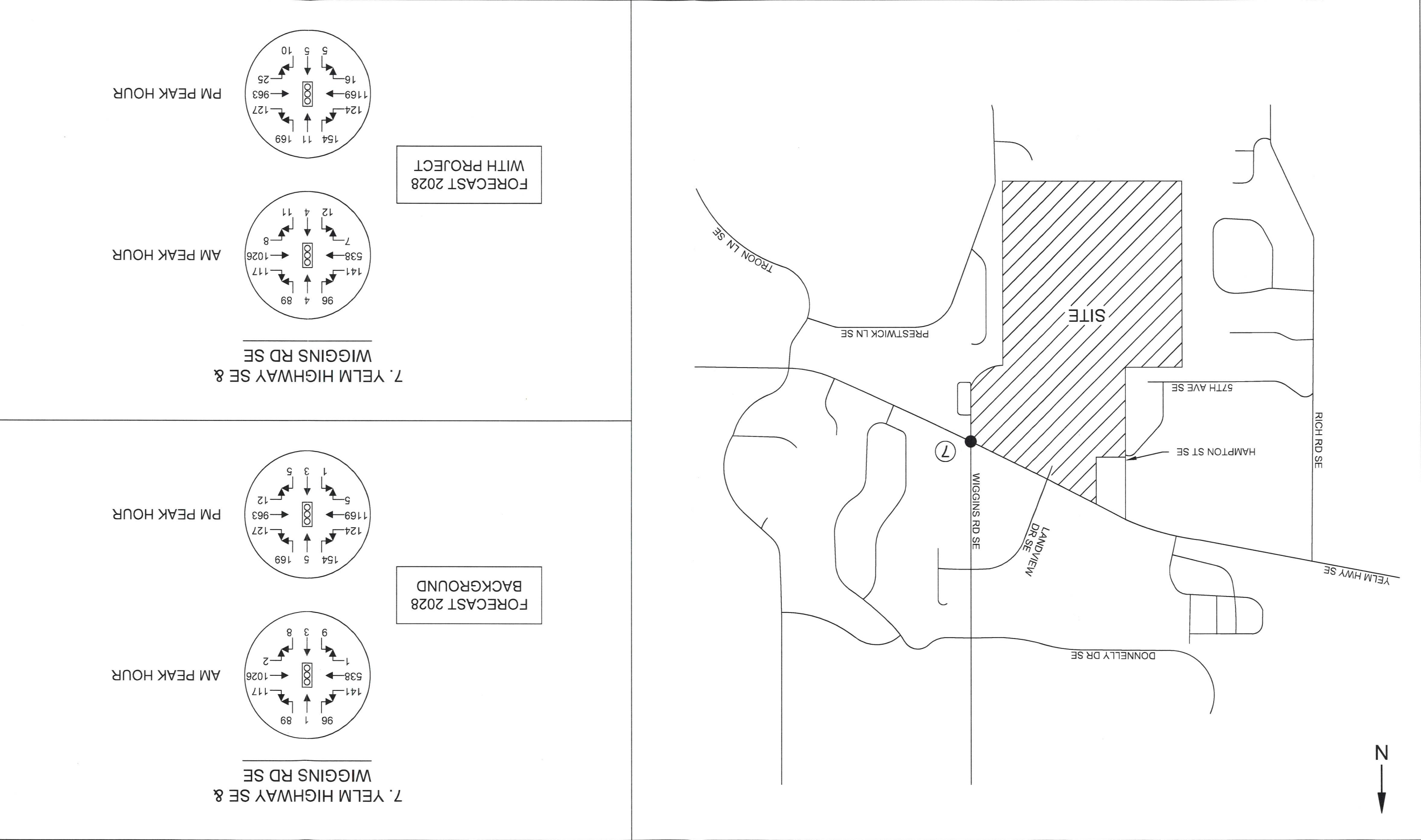


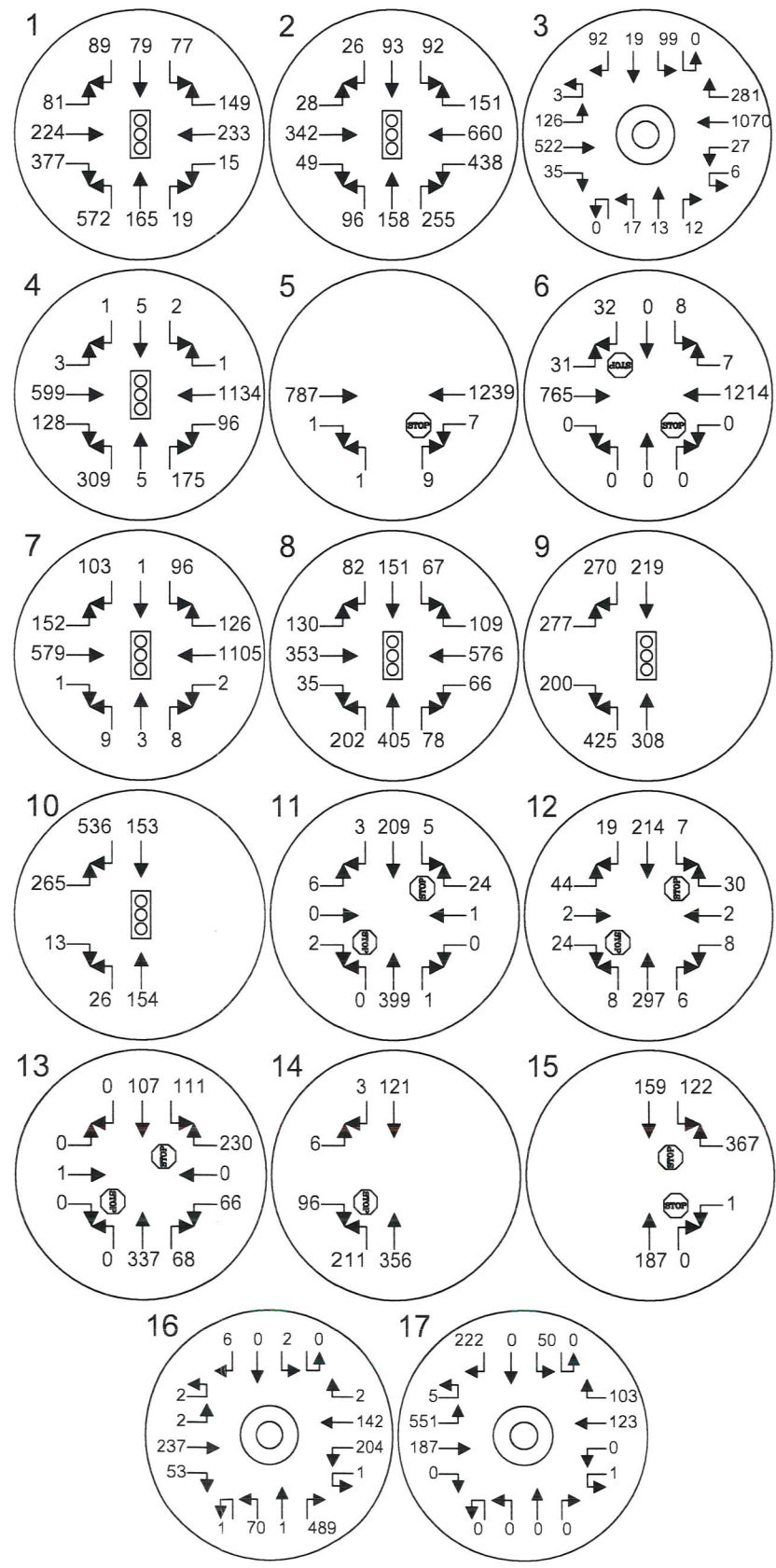
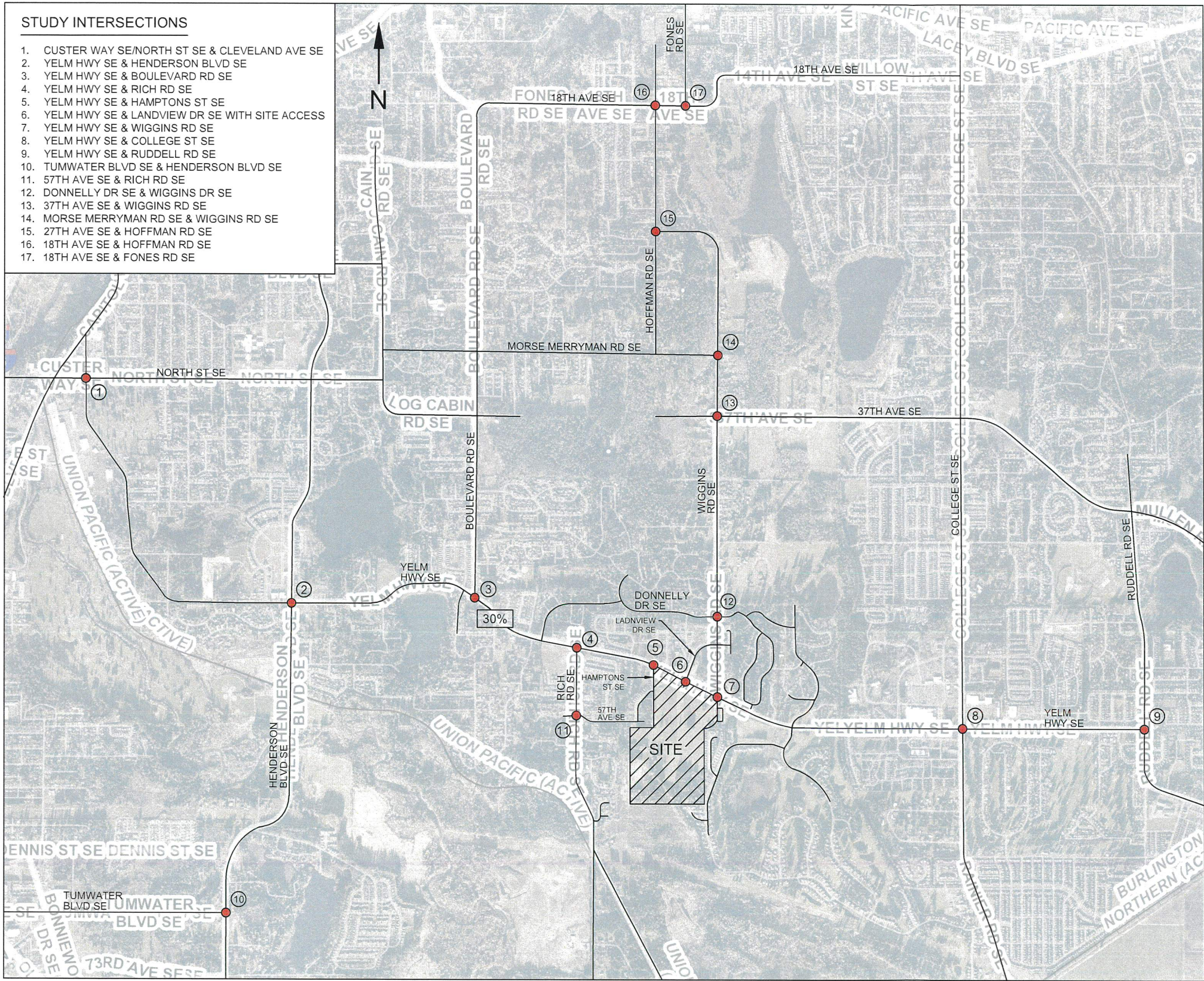
**WEEKDAY
AM PEAK HOUR
VOLUMES**

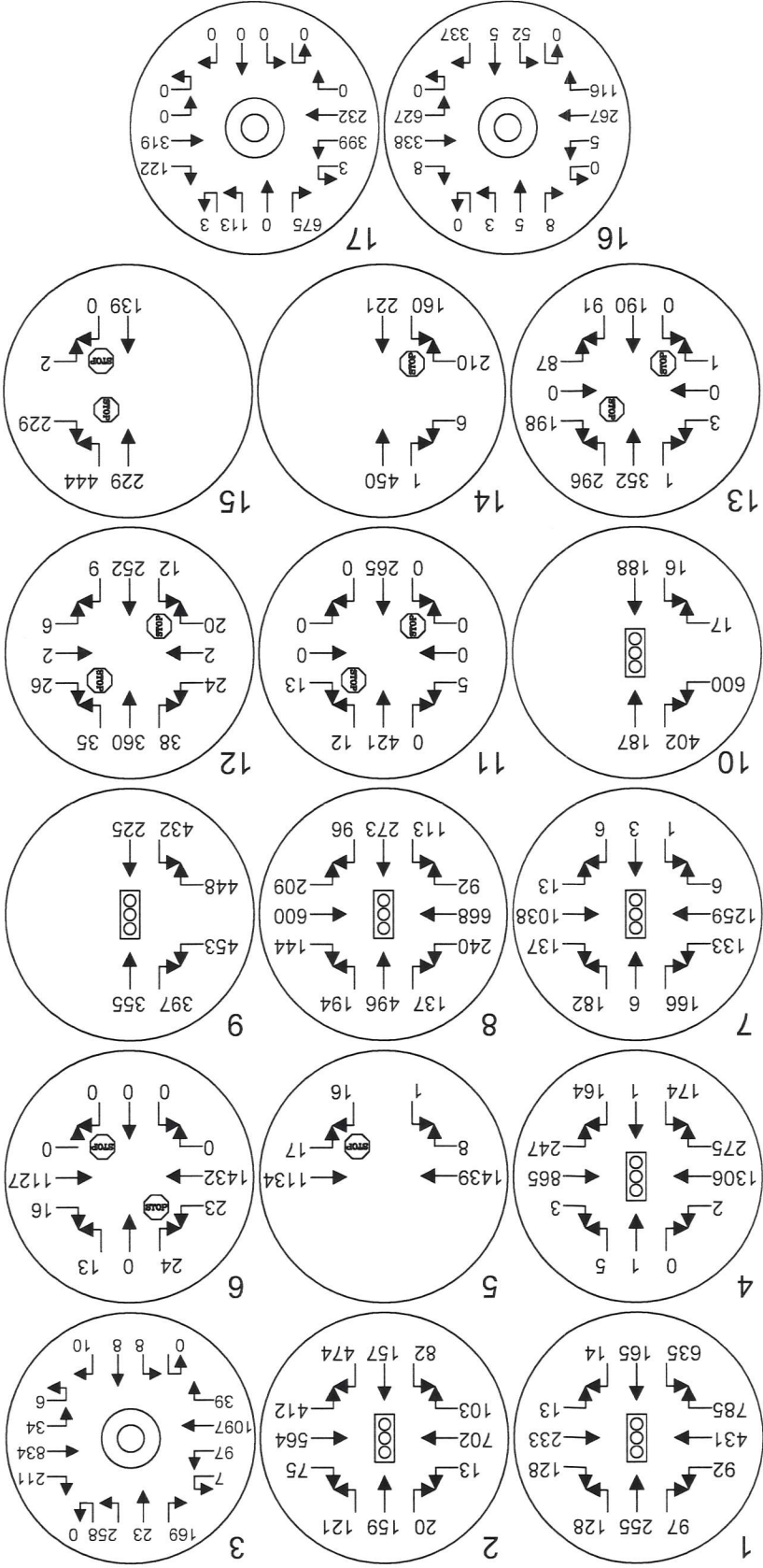
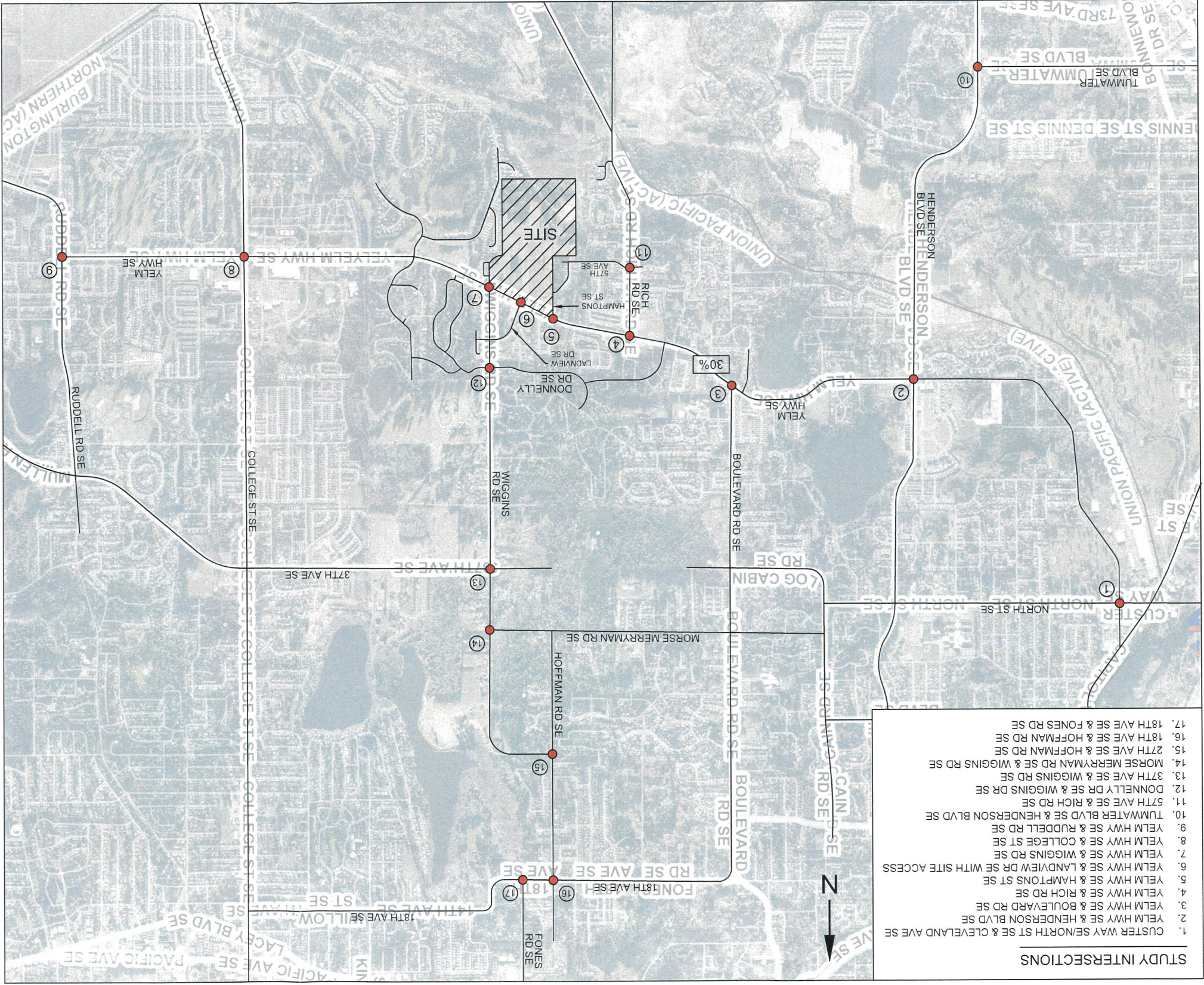


**WEEKDAY
PM PEAK HOUR
VOLUMES**





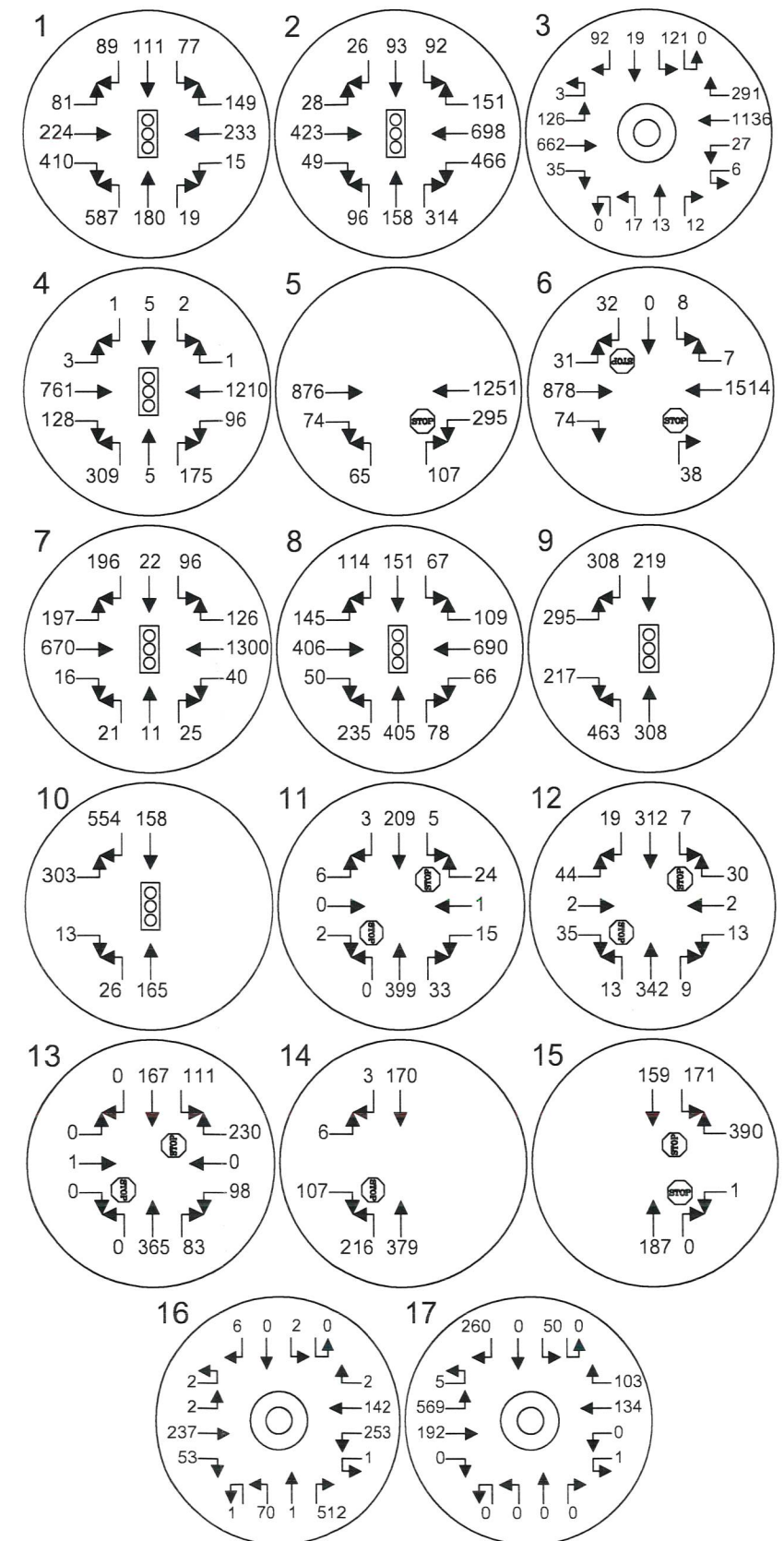
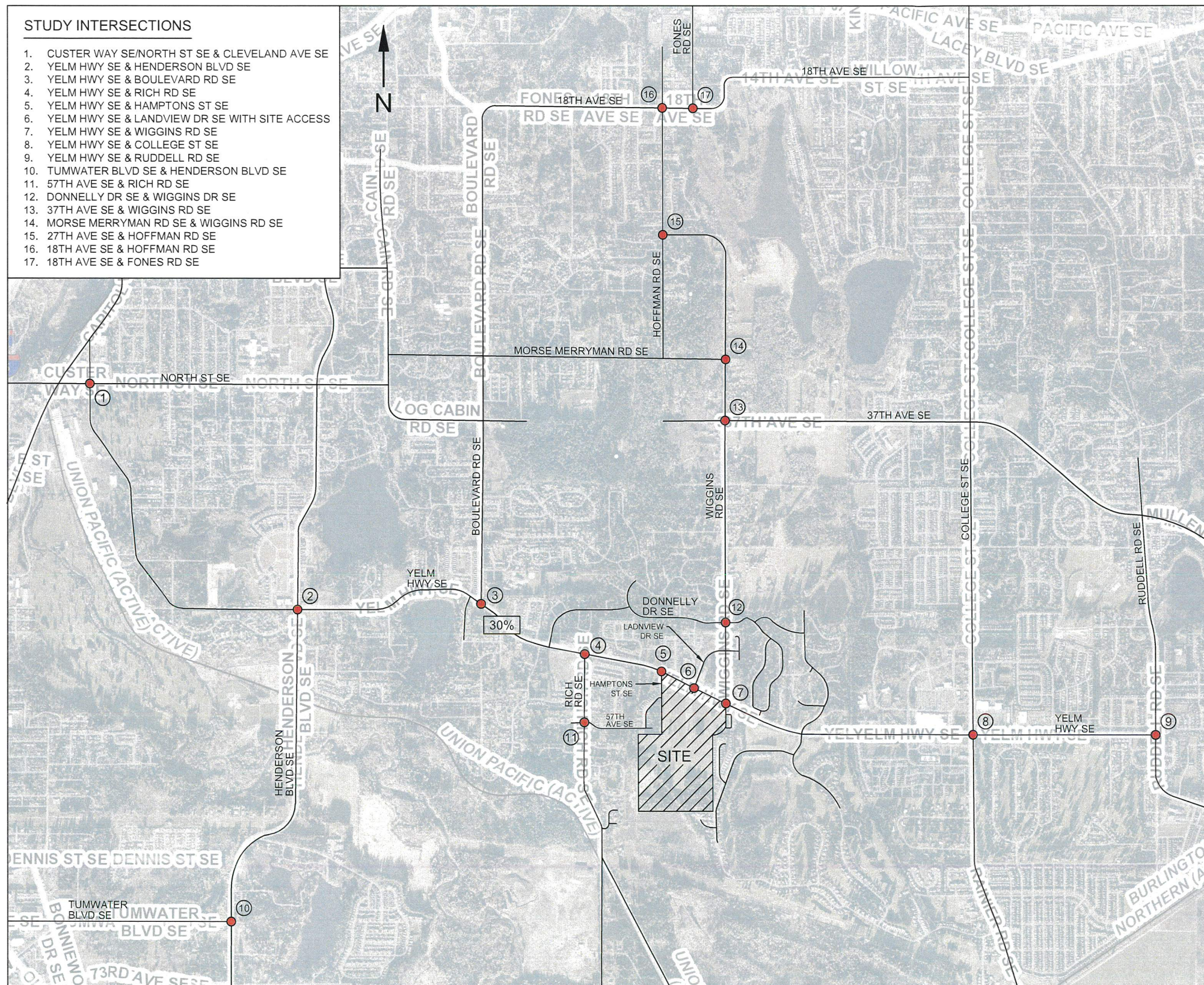


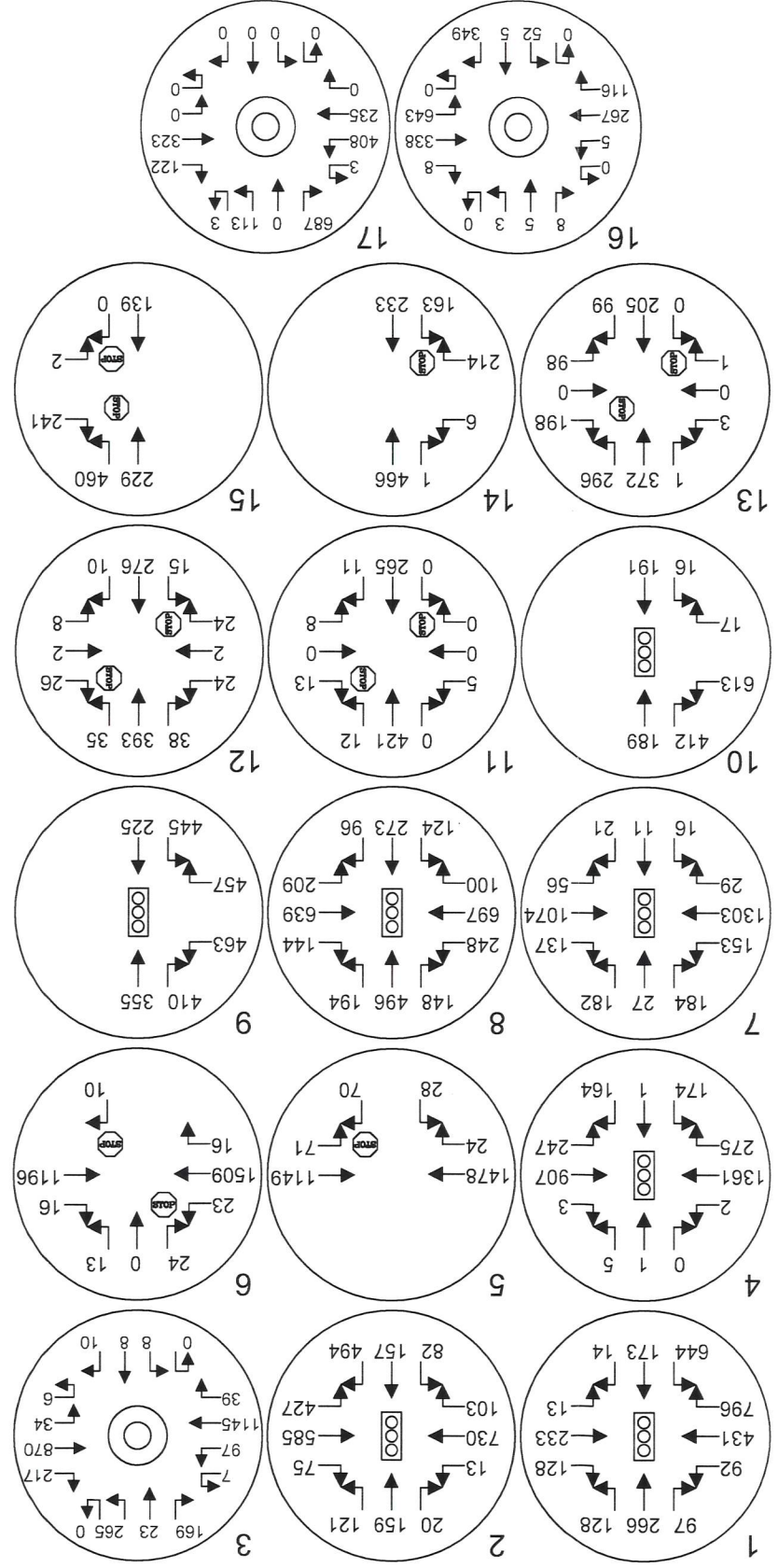
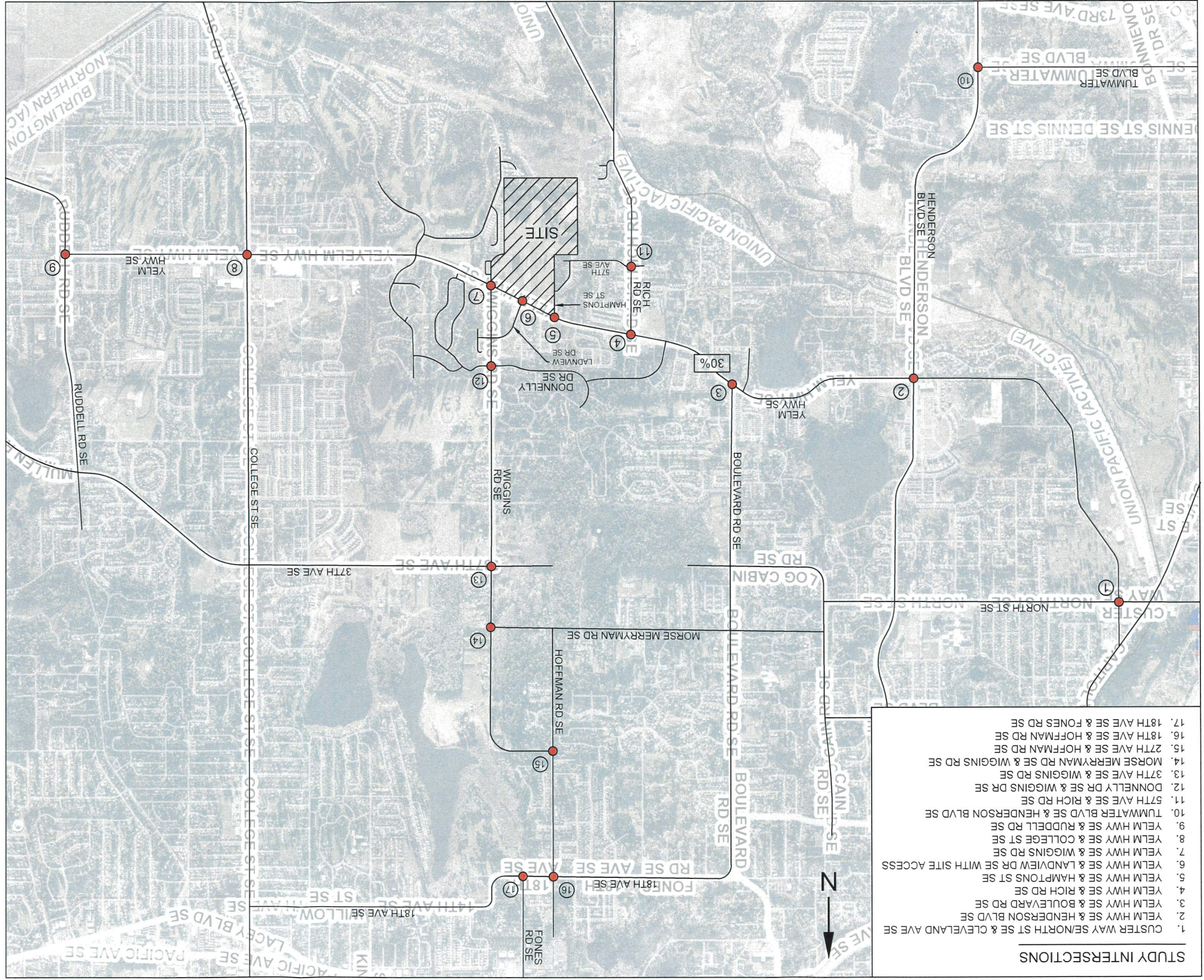


YELM HIGHWAY COMMUNITY PARK & FUTURE SCHOOL
FORECAST 2033 WEEKDAY PM PEAK HOUR BACKGROUND VOLUMES
FIGURE 12

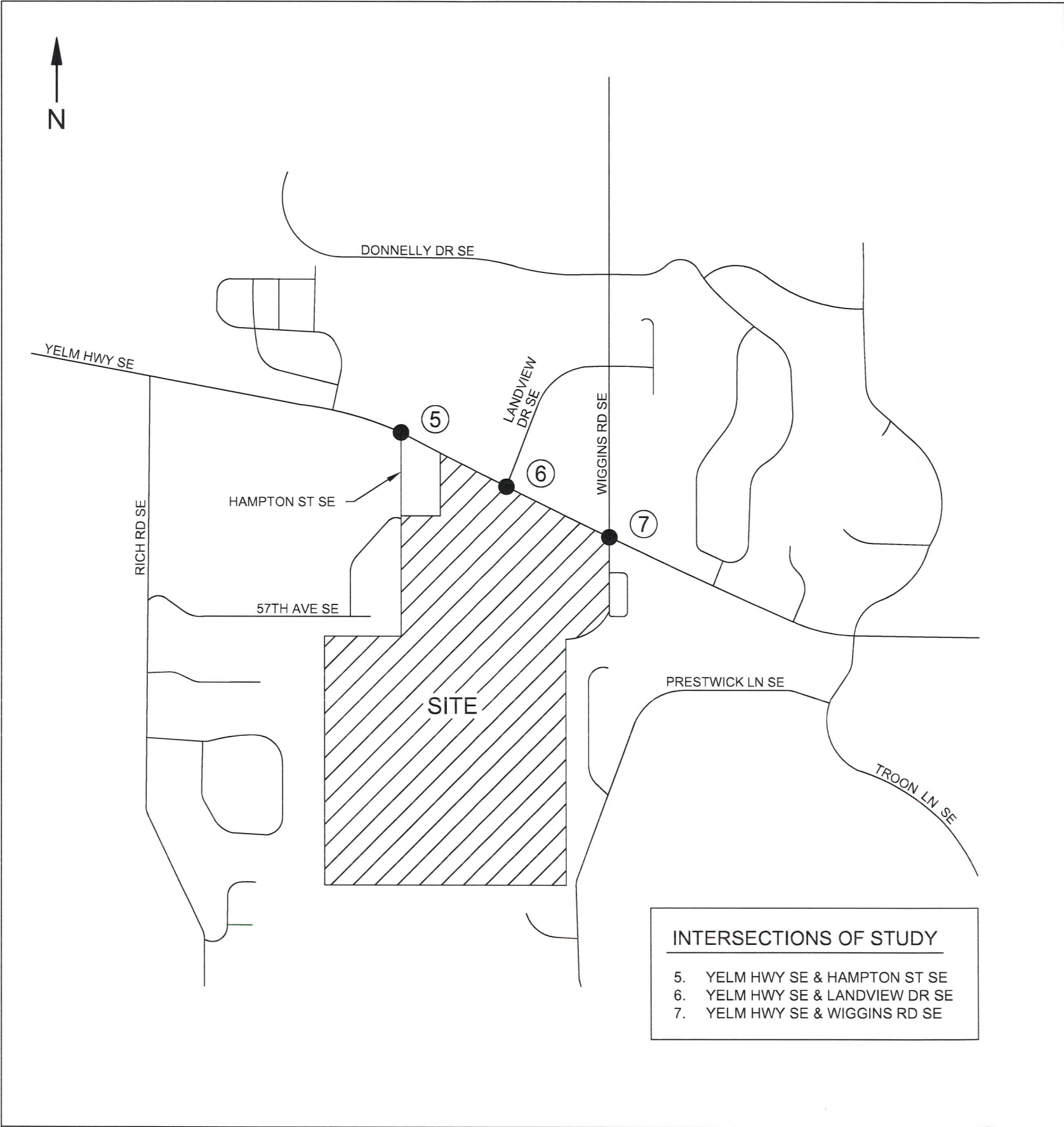
STUDY INTERSECTIONS

1. CUSTER WAY SE/NORTH ST SE & CLEVELAND AVE SE
2. YELM HWY SE & HENDERSON BLVD SE
3. YELM HWY SE & BOULEVARD RD SE
4. YELM HWY SE & RICH RD SE
5. YELM HWY SE & HAMPTONS ST SE
6. YELM HWY SE & LANDVIEW DR SE WITH SITE ACCESS
7. YELM HWY SE & WIGGINS RD SE
8. YELM HWY SE & COLLEGE ST SE
9. YELM HWY SE & RUDDELL RD SE
10. TUMWATER BLVD SE & HENDERSON BLVD SE
11. 57TH AVE SE & RICH RD SE
12. DONNELLY DR SE & WIGGINS RD SE
13. 37TH AVE SE & WIGGINS RD SE
14. MORSE MERRYMAN RD SE & WIGGINS RD SE
15. 27TH AVE SE & HOFFMAN RD SE
16. 18TH AVE SE & HOFFMAN RD SE
17. 18TH AVE SE & FONES RD SE

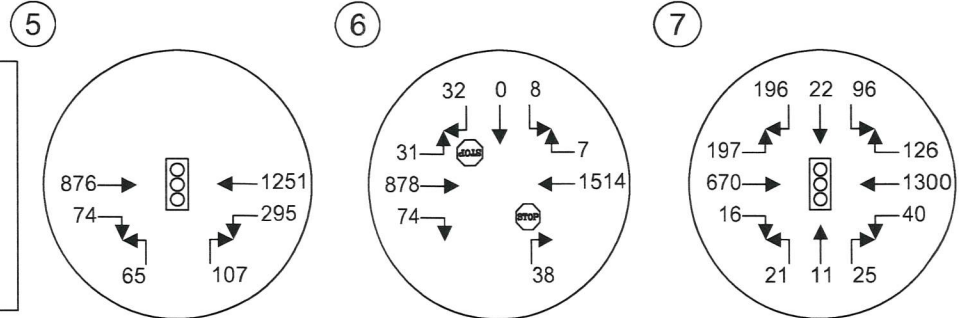




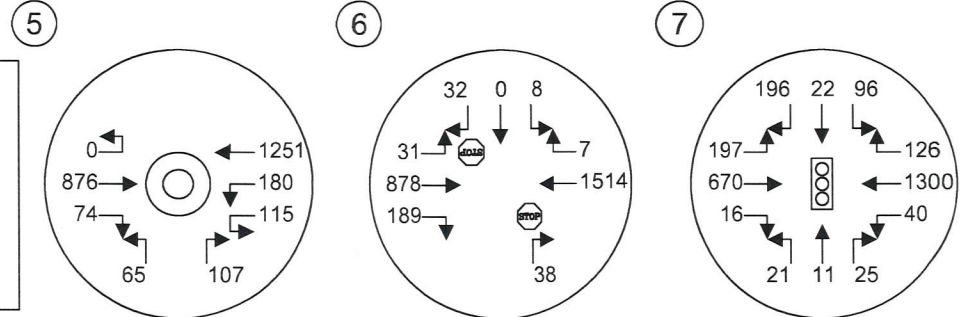
YELM HIGHWAY COMMUNITY PARK & FUTURE SCHOOL
FORECAST 2033 WEEKDAY PM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 14



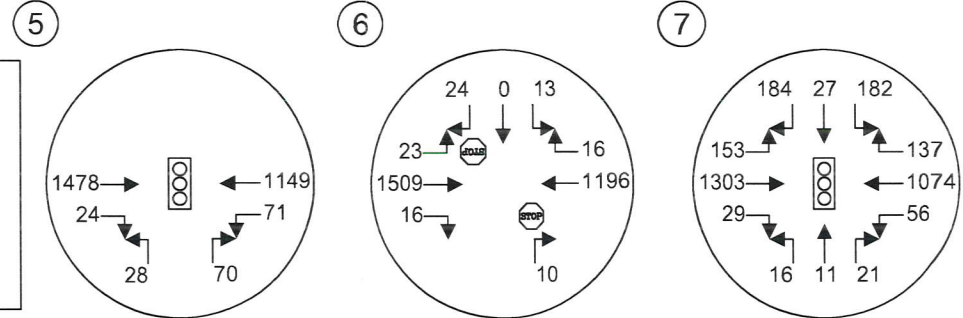
FORECAST 2033
AM PEAK HOUR
WITH PROJECT:
SIGNAL AT
HAMPTONS



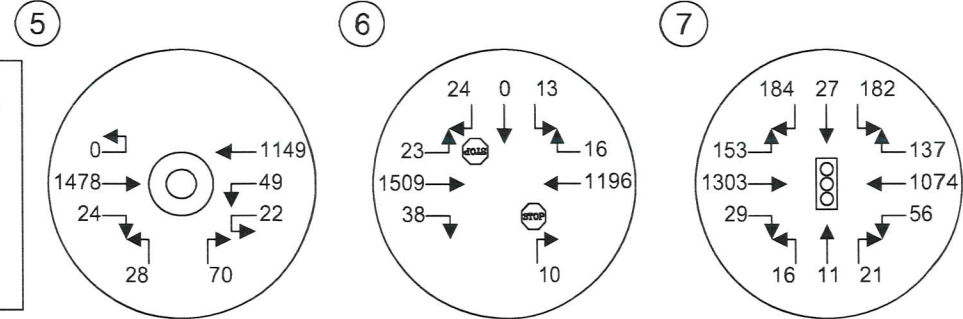
FORECAST 2033
AM PEAK HOUR
WITH PROJECT:
ROUNDBOUT
AT HAMPTONS



FORECAST 2033
PM PEAK HOUR
WITH PROJECT:
SIGNAL AT
HAMPTONS



FORECAST 2033
PM PEAK HOUR
WITH PROJECT:
ROUNDBOUT
AT HAMPTONS



4.4 Future Level of Service

A level of service analysis was made of the future AM and PM peak hour volumes without (background) and with project-generated trips. Results for intersection delay conditions were again determined using the *Synchro 11* and *SIDRA 9.1* analysis programs. Summaries are provided in the following sections for the Phase 1, full build-out (Phase 2), and community park analysis scenarios.

PHASE 1

This analysis alternative, comprising construction of a 30% park build, is anticipated to be built-out by 2028. As overall trip generation and impacts to the surrounding roadway system are lesser for this phase when compared with the following full build-out scenario, only the primary access (Yelm Highway SE & Wiggins Road SE) has been analyzed and modeled for Phase 1. Service levels at the access are outlined below.

Table 5: Forecast 2028 Weekday Peak Hour LOS - Phase 1 (30% Design)

Delays given in seconds per vehicle

Ref. #	Intersection	Control	Peak Hour	<u>Without Project</u>		<u>With Project</u>	
				LOS	Delay	LOS	Delay
7	Yelm Hwy SE & Wiggins Rd SE	Signal	AM	B	16.0	B	16.1
			PM	B	16.0	B	16.9

Forecast 2028 AM and PM peak hour delays are shown to operate at LOS B at the primary park access of Yelm Highway SE & Wiggins Road SE without and with the addition of Phase 1 (30% park design) project traffic. The intersection serving as Phase 1 primary access is shown to meet Thurston County level of service standard of LOS D or better.

It should be noted that a memo providing an operational analysis for Yelm Highway SE & Wiggins Road SE was conducted in 2022 (see appendix). The signal was analyzed under full park build-out conditions (10-year horizon) and explored how the intersection would operate should separate left and through/right lanes at the south leg be constructed. Overall, the memo recommended the lane separation improvement in order to accommodate future growth.



FULL BUILD-OUT: SCENARIO 2

The outlying study intersections and proposed primary access intersections were modeled under forecast 2033 conditions both without and with the addition of full build-out (Phase 2) project-generated traffic. It should be noted that LOS outputs as outlined in Table 6 account for the current Yelm Highway SE & Hamptons Street SE stop-controlled intersection configuration.

Table 6: Forecast 2033 Weekday Peak Hour LOS - Full Build-Out

Delays Given in Seconds per Vehicle

Ref. #	Intersection	Control	Peak Hour	Without Project		With Project	
				LOS	Delay	LOS	Delay
1	Custer Way SE & Cleveland Ave SE	Signal	Weekday AM	C	20.2	C	21.6
			Weekday PM	C	28.2	C	29.0
2	Yelm Hwy SE & Henderson Blvd SE	Signal	Weekday AM	C	26.7	C	28.6
			Weekday PM	C	31.5	C	32.0
3	Yelm Hwy SE & Boulevard Rd SE	RAB	Weekday AM	A	6.3	A	6.5
			Weekday PM	A	6.9	A	7.0
4	Yelm Hwy SE & Rich Rd SE	Signal	Weekday AM	B	19.7	C	22.7
			Weekday PM	C	34.7	D	37.3
5	Yelm Hwy SE & Hamptons St SE	Stop	Weekday AM	B	12.6	F	255.5
			Weekday PM	C	17.6	E	42.2
6	Yelm Hwy SE & Landview Dr SE	Stop	Weekday AM	C	22.2	D	33.2
			Weekday PM	C	24.7	D	27.1
7	Yelm Hwy SE & Wiggins Rd SE	Signal	Weekday AM	B	17.3	C	21.3
			Weekday PM	B	17.7	C	22.1
8	Yelm Hwy SE & College St SE	Signal	Weekday AM	C	32.7	C	34.3
			Weekday PM	D	46.3	D	47.7
9	Yelm Hwy SE & Ruddell Rd SE	Signal	Weekday AM	C	22.1	C	23.3
			Weekday PM	C	30.7	C	31.6
10	Tumwater Blvd SE & Henderson Blvd SE	Signal	Weekday AM	A	8.2	A	8.8
			Weekday PM	B	13.7	B	14.0
11	57th Ave SE & Rich Road SE	Stop	Weekday AM	B	13.7	B	13.9
			Weekday PM	C	17.5	C	17.7
12	Donnelly Dr SE & Wiggins Rd SE	Stop	Weekday AM	C	16.6	C	21.3
			Weekday PM	C	15.8	C	16.8
13	37th Ave SE & Wiggins Rd SE	Stop	Weekday AM	D	29.1	F	69.1
			Weekday PM	F	200.1	F	302.1
14	Morse Merryman Rd SE & Wiggins Rd SE	Stop	Weekday AM	B	10.8	B	11.5
			Weekday PM	C	16.6	C	17.2
15	27th Ave SE & Hoffman Rd SE	Stop	Weekday AM	A	9.4	B	10.7
			Weekday PM	B	14.3	B	14.9
16	18th Ave SE & Hoffman Rd SE	RAB	Weekday AM	A	6.1	A	6.3
			Weekday PM	A	7.3	A	7.4
17	18th Ave SE & Fones Rd SE	RAB	Weekday AM	A	7.7	A	7.7
			Weekday PM	A	7.3	A	7.3



With the exception of two study intersections, forecast 2033 weekday peak hour delays at study intersections 1-17 are shown to operate with acceptable LOS D or better conditions with or without the project. Descriptions of the intersections performing with substandard conditions are outlined below.

Yelm Highway SE & Hamptons Street SE: is shown to operate with LOS F delays with project-generated traffic under forecast AM and PM peak hour conditions. As such, a higher form of intersection control is recommended for construction at the primary school access intersection of Yelm Highway SE & Hamptons Street SE. Two alternate control types are analyzed herein, which entail the construction of either a signal or a roundabout. As previously noted, the construction of a roundabout may result in a redistribution of traffic to the site accesses given the U-Turn maneuver available for inbound school-related traffic from the east. Refer to Figure 15 for peak hour volumes anticipated at the project accesses under forecast with-project conditions in which either a signal or roundabout is constructed at Yelm Highway SE & Hamptons Street SE.

Table 7 below outlines forecast weekday peak hour conditions (full project build-out) under two analysis scenarios at the three primary access intersections. This first scenario entails the construction of a signal at Yelm Highway SE & Hamptons Street SE while the second scenario comprises a roundabout being constructed at the intersection.

**Table 7: Forecast 2033 Weekday Peak Hour LOS -
Signal Vs. Roundabout at Hamptons Street SE**

Delays Given in Seconds per Vehicle

Ref. #	Intersection	Control	Peak Hour	LOS	Delay	<u>With Project:</u>	<u>With Project:</u>
						<u>Signal Scenario</u>	<u>RAB Scenario</u>
5	Yelm Hwy SE & Hamptons St SE	-	Weekday AM	B	17.7	A	6.4
			Weekday PM	A	9.2	A	4.9
6	Yelm Hwy SE & Landview Dr SE	Stop	Weekday AM	D	33.2	D	33.2
			Weekday PM	D	27.1	D	27.1
7	Yelm Hwy SE & Wiggins Rd SE	Signal	Weekday AM	C	21.3	C	21.3
			Weekday PM	C	22.1	C	22.1

As illustrated in Table 7, peak hour delays at all primary access intersections are shown to operate with LOS D or better conditions under forecast full build-out scenarios. Moreover, the construction of either a signal or roundabout at Yelm Highway SE & Hamptons Street SE is anticipated to yield LOS B or better conditions. As such, no intersection deficiencies are anticipated at the primary accesses should improvements occur at Yelm Highway SE & Hamptons Street SE.



37th Avenue SE & Wiggins Road SE: is shown to operate with LOS F delays under existing and forecast without and with project conditions. It should be noted that the City of Olympia's Capital Facilities Plan outlines that a roundabout is proposed to be constructed at the intersection. As such, Table 8 below outlines forecast weekday peak hour conditions under a scenario in which a roundabout is constructed at 37th Avenue SE & Wiggins Road SE.

Table 8: Forecast 2033 Weekday Peak Hour LOS - Signal Vs. Roundabout

Delays Given in Seconds per Vehicle

Ref. #	Intersection	Peak Hour	Control Type	<i>Without Project</i>		<i>With Project</i>	
				LOS	Delay	LOS	Delay
13	37th Ave SE & Wiggins Rd SE	Weekday AM	Stop	D	29.1	F	69.1
			RAB	A	6.4	A	6.6
		Weekday PM	Stop	F	200.1	F	302.1
			RAB	A	7.0	A	7.1

As illustrated in Table 8, the roundabout improvement is anticipated to yield LOS A conditions both without and with project traffic. As such, no intersection deficiencies are anticipated as a result of the development proposal. Payment of traffic impact fees by the development is anticipated to proportionally mitigate the project's impacts.

Yelm Highway SE & Landview Drive SE: is shown to operate with LOS D or better conditions both without or with project-generated traffic. The right-in, right-out driveway is anticipated to meet future LOS standards. Moreover, service levels are anticipated to be acceptable under forecast scenarios in which a roundabout or signal improvement is constructed at the westerly Yelm Highway SE & Hamptons Street SE intersection.

Yelm Highway SE & Wiggins Road SE: is shown to operate with LOS C or better conditions both without and with project-generated traffic. These findings are consistent with a sensitivity analysis previously conducted in January of 2022 for the intersection. The prior analysis recommended constructing separate left and through/right channelization at the southerly leg of the intersection. This improvement is anticipated to further improve service levels and accommodate future growth. Final intersection design should be coordinated with the County.



FULL BUILD-OUT: COMMUNITY PARK ONLY (NO SECONDARY SCHOOL)

As funding and full development plans for the secondary school component on-site are unknown at this time, a forecast scenario was analyzed that encompassed solely the construction of the community park on-site. The main purpose of this scenario was to determine if the three existing access intersections will perform with acceptable service levels should no modifications be made to their current configurations. Table 9 below illustrates forecast 2033 weekday peak hour LOS at the three primary accesses on Yelm Highway SE under full park build-out conditions with no secondary school constructed on-site.

Table 9: Forecast 2033 Weekday Peak Hour LOS with Project-Community Park Full Build-Out (No Secondary School)

Delays Given in Seconds per Vehicle

Ref. #	Intersection	Control	Peak Hour	LOS	Delay
5	Yelm Hwy SE & Hamptons St SE	Stop	Weekday AM	B	12.8
			Weekday PM	C	18.0
6	Yelm Hwy SE & Landview Dr SE	Stop	Weekday AM	C	22.4
			Weekday PM	D	25.4
7	Yelm Hwy SE & Wiggins Rd SE	Signal	Weekday AM	B	17.6
			Weekday PM	C	20.7

Forecast 2033 conditions accounting for full community park build-out with no secondary school on-site are shown to operate with LOS D or better delays, meeting LOS standards. As previously noted, all primary accesses were modeled as currently configured. It should also be noted that all project-generated traffic was assigned to the primary park access at Yelm Highway SE & Wiggins Road SE as the other two accesses are intended to primarily serve the school. However, non-motorist connections would be available to/from the west via Hamptons Street SE.

Overall, this analysis scenario indicates that improvements (i.e.: signal; roundabout) at the Yelm Highway SE & Hamptons Street SE intersection are not warranted upon solely full build-out of the community park. This evaluation suggests that mitigation at Yelm Highway SE & Hamptons Street SE is predicated upon development of the secondary school component on-site. Regardless, it is recommended that improvements to the south leg of the Wiggins Road SE & Yelm Highway SE signal be constructed as a part of community park development, simultaneous with other frontage improvements. Moreover, it is recommended that right-of-way be allocated at Yelm Highway SE & Hamptons Street SE to accommodate future intersection improvements.



4.5 Queuing Analysis

The proposed 1,400-student high school on-site is anticipated to generate a queuing demand associated with student pick-up and drop-off. As such, two high schools currently located within the Olympia School District were observed in terms of their existing queuing operations. These two schools, Capital High School and Olympia High School, were determined to be similar in their similar in operation and location to that of the proposed school. The two schools were observed over two days and maximum queues associated with arrival/dismissal drop-off and pick-up were recorded. The maximum recorded total queue for each school over the observation timeframe is outlined in Table 10 below. Additional information is attached in the appendix of this report regarding queuing observations at the two sample site high schools.

Table 10: Existing High School Sample Site Queuing Observations

School	Size (Students)	Date of Observation	Max. Observed Queue (Vehicles)	Max. Queue Rate (Vehicles per 1,000 students)
Capital High School	1257	1/10/2023	20 (Occurred at 3:20 PM)	15.91
		1/11/2023	26 (Occurred at 2:35 PM)	20.68
Olympia High School	1610	1/10/2023	44 (Occurred at 3:20 PM)	27.33
		1/11/2023	55 (Occurred at 2:35 PM)	34.16
Average Rate*				27.42

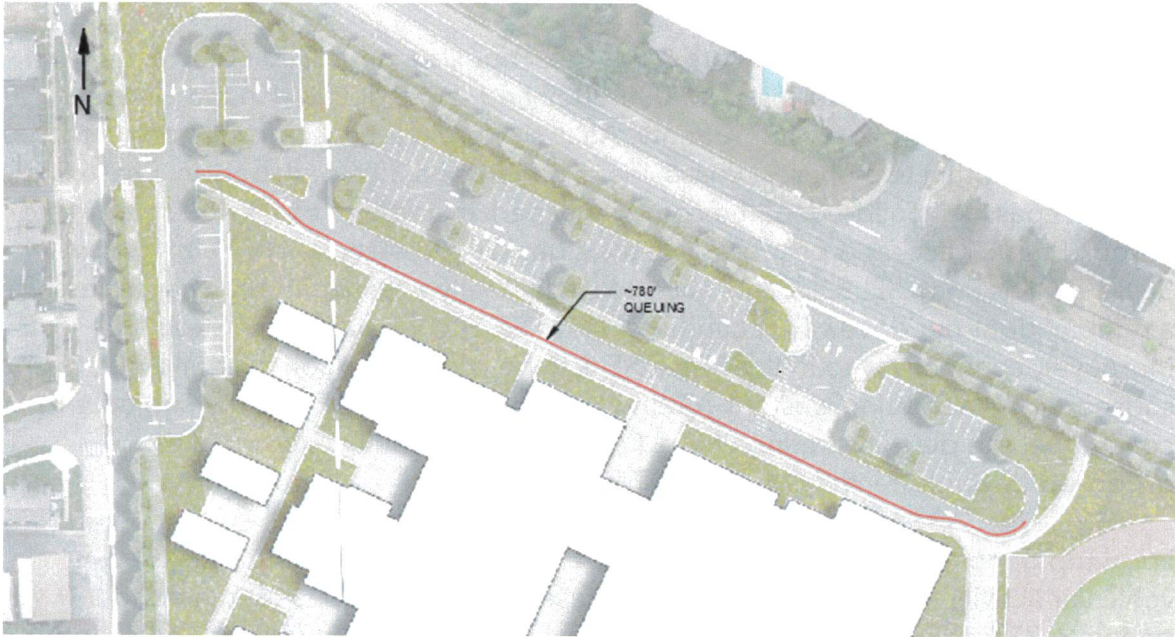
*Utilizes maximum queue observation for each school (1/11/2023)

As shown above, Capital High School and Olympia High School were observed to generate maximum queue rates of 20.68 and 34.16 vehicles queued per thousand students, respectively. Therefore, the two high school sample sites were observed to generate an average maximum queue rate of 27.42 vehicles per thousand students. It should be noted that this derived rate represents a conservative estimate as it was derived from the maximum observed queue over the two-day study period for each school. Moreover, observations of the two existing high schools indicated that peak queuing occurred for a short duration (~15 to 20 minutes).

The data can be applied to the proposed future high school on-site. With a proposed enrollment of 1400-students, the school on-site may be anticipated to generate a queue of approximately 38 vehicles (27.42 rate x 1.4 thousand students = 38.39 vehicles). Assuming that each vehicle queued on-site would require approximately 20-feet of storage, the maximum queue length estimated on-site may total approximately 760-feet.



Figure 17: On-Site Secondary School Queuing



The graphic above depicts available queuing on-site within the northerly parking lot allocated to accommodate student pick-up/drop-off. As illustrated above, approximately 780-feet of queuing is available. With an estimated queuing capacity of 760-feet, queuing demands generated by the school on-site are anticipated to be accommodated.

4.6 Project Access & Sight Distance

As shown in the 30% Design site plan (see Figure 2), Phase 1 access is proposed via a connection to Wiggins Road SE, subsequently providing signalized access to Yelm Highway SE. Full build-out of the park is to comprise additional access via Hamptons Street SE and via a right-in, right-out driveway opposite Landview Drive SE. This expanded access routing is to subsequently provide access to Yelm Highway SE (at Hamptons Street SE) and Rich Road SE (at 57th Avenue SE). All newly proposed accesses and roadways are to be designed in accordance with County and City standards.



5. CONCLUSIONS & MITIGATION

The Yelm Highway Community Park & Future School is a proposed 60-acre community park (tax parcel #'s: 0933000-8002 and -5000) located in the Olympia Urban Growth Area of Thurston County. Analysis herein accounts for the project to be constructed within two phases. Phase 1 is to comprise a 30% park design. Phase 2 is to encompass full build-out of the community park in addition to a 1,400-student high school. Phase 1 access is proposed via the signalized intersection of Yelm Highway SE & Wiggins Road SE. Full build-out is to additionally entail Yelm Highway access via a right-in, right-out driveway at Landview Drive SE and via Hamptons Street SE. Moreover, connectivity to 57th avenue SE is to be provided upon full build-out, subsequently facilitating westerly routing to/from Rich Road SE and the subject site. A conceptual site plan illustrating Phase 1 (30% Build) and full build-out of the proposed development is provided in Figure 2.

Local trip generation data and ITE data were utilized in determining estimated vehicular activity for the project. In total, Phase 1 of the project is estimated to generate 22 weekday AM (15 in / 7 out), 42 weekday PM (30 in / 12 out) peak hour trips and 42 weekend PM (20 in / 22 out) peak hour trips. Upon full build-out of the park and secondary school on-site (Phase 2), approximately 793 weekday AM (541 in / 252 out), 321 weekday PM (184 in / 137 out) and 294 weekend PM (165 in / 129 out) peak hour trips are anticipated to occur.

Existing weekday peak hour level of service (LOS) is summarized in Table 3. With the exception of 37th Avenue SE & Wiggins Road SE, all intersections of study are shown to operate with delays in the LOS D or better range. Forecast analysis included a compound annual growth rate of 1.5 percent. A five-year horizon of 2028 was utilized for Phase 1 forecast weekday peak hour analysis at the primary access intersection of Yelm Highway SE & Wiggins Road SE. The signalized intersection was shown to function with LOS B delays under forecast 2028 with project conditions, indicating stable operations.

A 10-year horizon of 2033 was utilized for forecast analysis upon full build-out (Phase 2) of the Yelm Highway Community Park & Future School development. Forecast 2033 weekday peak hour level of service without and with the addition of project-generated traffic is provided in Table 6. With the exception of Yelm Highway SE & Hamptons Street SE (modeled to entail existing stop control) and 37th Avenue SE & Wiggins Road SE, all intersections of study are shown to operate with LOS D or better delays during weekday peak hours without or with the addition of project-generated traffic.



As such, all but the two outlined intersections are shown to meet the various jurisdictional LOS standards. Given failing forecast service levels at Yelm Highway SE & Hamptons Street SE, it is recommended that either a roundabout or signal be constructed at the access intersection. As shown in Table 7, these higher forms of control types are anticipated to yield acceptable forecast service levels at the intersection. Moreover, the City of Olympia's Capital Facilities Plan proposes for the construction of a roundabout at 37th Avenue SE & Wiggins Road SE. *SIDRA 9.1* modeling indicates that the proposed roundabout project will improve future 2033 service levels at the intersection to LOS A conditions.

Accounting for the recommended access improvements and proposed City intersection improvements, no operational deficiencies are identified at the study intersections under forecast conditions.

Based on the analysis above, the following mitigation is required for the Yelm Highway Community Park & Future School project.

1. Pay Traffic Impact Fees (TIF) as required by Thurston County and per SEPA mitigation fee requirements. TIF will be assessed based on Phase 1 and full buildout (Phase 2) of the proposed Yelm Highway Community Park & Future School project. Exacts fees and calculations will be determined by the County at the time of building permit issuance.
2. Construct improvements to the south leg of the Wiggins Road SE & Yelm Highway SE signal to accommodate separate left- and right-turn lanes. Improvements may be of benefit to occur during Phase 1 construction, simultaneous with other frontage improvements. Modifications to the signal timing and phasing may also be necessary.
3. Construct an intersection improvement in the form of either a signal or roundabout at Yelm Highway SE & Hamptons Street SE. Preliminary analysis herein indicates acceptable forecast service levels should either control type be chosen. Final design should be coordinated with the County. It should be noted that acceptable service levels were found at the intersection under forecast conditions should solely the community park on-site be constructed. As such, mitigation may be predicated upon full build-out of the secondary school.
4. Construct a public street jogging east-west through the subject site, connecting from Hamptons Street SE to Wiggins Road SE. Additionally, this connection may be required to extend westerly from Hamptons Street SE to 57th Avenue SE. Traffic calming devices will be required along this east-west connection to reduce travel speeds. The form and location of these devices should be coordinated with the County.



5. Install two traffic calming devices along Hamptons Street SE south of Yelm Highway SE. The form and location of these devices should be coordinated with the County.
6. Construct non-motorist infrastructure between the subject site and existing roadways in the vicinity of the subject site including: Yelm Highway SE, Hamptons Street SE and Wiggins Road SE.

No other mitigation is identified at this time.

