



Whipple Consulting Engineers, Inc.

December 8, 2022
W.O. No. 2022-3185

City of Spokane
Department of Engineering Services
801 W. Spokane Falls Boulevard
Spokane, WA 99201

Attn: Inga Note, P.E.,

Re: **Victory Heights, A Residential Development**
2929 W Thorpe Road, Spokane, WA
Trip Generation & Distribution Letter

Parcel No. 25253.0005,
25353.0006, 25253.0008,
25253.0009, 25351.0001,
25351.0004, 25351.0005,
25351.0026, 25351.0601,
25351.0602, 25351.0603,
25354.0029, 25354.0030,
25354.0031, 25354.0032,
25354.0033, 25254.0034,
25254.0101

Dear Ms. Note,

The purpose of this document is to provide a Trip Generation and Distribution Letter (TGDL) for the proposed Victory Heights residential development as shown on Figure 2, Preliminary Site Plan. This letter will follow the standards for doing Trip Generation and Distribution Letters as required by the City of Spokane and the Institute of Transportation Engineers (ITE).

PROJECT DESCRIPTION

The project proposes to develop 177.27 ac +/- comprised of 18 parcels into a 1,003-lot residential subdivision that is anticipated to include 220 townhomes and 783 single-family homes within phases shown in Table 1. The project site has 7 existing residential homes on the site. The project proposes to build multiple public roads within the site with connections to Thorpe Road and 41st Avenue. The anticipated build out year is 2032. Please see Figure 2, Preliminary Site Plan. The project proposes to have eight (8) phases. The proposed phases along with the number of lots in each phase is shown in Table 1.

Table 1: Phase and Lot Plan

Lot/Phase	
Phase	Lots
I	116
II	54
III	119
IV	195
V	236
VI	83
VII	103
VIII	97
Total	1003

VICINITY / SITE PLAN

The site is currently zoned as Residential Single Family (RSF). The surrounding area is zoned as Residential Single Family (RSF) and Residential Multi-Family (RMF). The project site is located in a portion of NW ¼, Section 36, T25N., R42E., W.M. The parcel numbers for the project are 25253.0005, 25353.0006, 25253.0008, 25253.0009, 25351.0001, 25351.0004, 25351.0005, 25351.0026, 25351.0601, 25351.0602, 25351.0603, 25354.0029, 25354.0030, 25354.0031, 25354.0032, 25354.0033, 25254.0034, and 25254.0101. The surrounding area is residential and undeveloped land uses.

TRIP GENERATION AND DISTRIBUTION

Trip Types

The proposed use is a planned residential development; Institute of Transportation Engineers (ITE) has developed data regarding various trip types that all developments experience. These are found in several places; however, for this analysis the *Trip Generation Manual 11th Edition* as well as the *Trip Generation Handbook* were used to develop the criteria for this analysis.

Generally, all existing and proposed developments will be made up of one or more of the following four trip types: new (destination) trips, pass-by trips, diverted trips, and shared (internal trips). In order to better understand the trip types available for land access a description of each specific trip type follows.

New (Destination) Trips - These types of trips occur only to access a specific land use such as a new retail development or a new residential subdivision. These types of trips will travel to and from the new site and a single other destination such as home or work. This is the only trip type that will result in a net increase in the total amount of traffic within the study area. The reason primarily is that these trips represent planned trips to a specific destination that never took trips to that part of the city prior to the development being constructed and occupied. This project will develop new trips.

Pass-by Trips - These trips represent vehicles which currently use adjacent roadways providing primary access to new land uses or projects and are trips of convenience. These trips, however, have an ultimate destination other than the project in question. They should be viewed as customers who stop in on their way home from work. An example would be on payday, where an individual generally drives by their bank every day without stopping, except on payday. On that day, this driver would drive into the bank, perform the prerequisite banking, and then continue on home. In this example, the trip started from work with a destination of home, however on the way, the driver stopped at the grocery store/latte stand and/or bank directly adjacent to their path. Pass-by trips are most always associated with commercial/retail types of development along major roadways. Therefore, for this project pass-by trips will not be considered.

Diverted (Linked) Trips - These trips occur when a vehicle takes a different route than normal to access a specific facility. Diverted trips are similar to pass-by trips, but diverted trips occur from roadways which do not provide direct access to the site. Instead, one or more streets must be utilized to get to and from the site. For this project, no diverted trips are anticipated.

Shared Trips - These are trips which occur on the site where a vehicle/consumer will stop at more than one place on the site. For example, someone destined for a certain shop at a commercial site may stop at a bank just before or after they visit the shop that they went to the site to visit. This trip type reduces the number of new trips generated on the public road system and is most commonly used for commercial developments. Since the project has only one land use and no cross-access driveways with other land uses, no shared trips were considered.

Trip Generation Characteristics for the Proposed Project

As noted earlier, trip generation rates for the AM & PM peak hours are determined by the use of the *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE). The purpose of the *Trip Generation Manual* is to compile and quantify empirical data into trip generation rates for specific land uses within the US, UK, and Canada.

Proposed Land Uses

For the proposed 783 Single Family Units, Land Use Code LUC#210 Single Family Detached, was used to establish the number of potential trips generated by the proposed land use. Based upon Section 4.4 in Trip Generation Handbook, the fitted curve equation was used to calculate new project trips. The fitted curve equation and the anticipated number of AM & PM peak hour trips for the proposed land use are shown in Table 2.

Table 2-Trip Generation Rates for LUC # 210 Single Family Detached Housing

Dwelling Units	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ Fitted Curve Equation / Unit	Directional Distribution		Vol. @ Fitted Curve Equation / Unit	Directional Distribution	
		26% In	74% Out		63% In	37% Out
783	485	126	359	688	433	255
Average Daily Trip Ends (ADT)				Fitted Curve Equation		
Units	Fitted Curve Equation	ADT		AM – Ln(T) = 0.91 Ln(x) + 0.12		
783	-	6,702		PM – Ln(T) = 0.94 Ln(x) + 0.27		
				ADT – Ln(T) = 0.92 Ln(x) + 2.68		
				T = Trips/units, x = Dwelling Units		

For the proposed 220 townhomes, Land Use Code LUC#215 Single Family Attached, was used to establish the number of potential trips generated by the proposed land use. Based upon Section 4.4 in Trip Generation Handbook, the fitted curve equation was used to calculate new project trips. The fitted curve equation and the anticipated number of AM & PM peak hour trips for the proposed land use are shown on Table 3.

Table 3-Trip Generation Rates for LUC # 215 Single Family Attached Housing

Dwelling Units	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ Fitted Curve Equation / Unit	Directional Distribution		Vol. @ Fitted Curve Equation / Unit	Directional Distribution	
		31% In	69% Out		57% In	43% Out
220	115	36	79	129	74	55
Average Daily Trip Ends (ADT)				Fitted Curve Equation AM – T = 0.52(x) – 5.70 PM – T = 0.60(x) – 3.93 ADT – T = 7.62(x) – 50.48 T = Trips/units, x = Dwelling Units		
Units	Fitted Curve Equation	ADT				
220	-	1,626				

Table 4- Trip Generation Summary (Figure 3 & 4)

Land Use Code (LUC)	AM Peak Hour			PM Peak Hour		
	Vol. per LUC	Directional Distribution		Vol. per LUC	Directional Distribution	
		In	Out		In	Out
LUC 210 Single Family Detached – 783 Units	485	126	359	688	433	255
LUC 215 Single Family Attached – 220 Units	115	36	79	129	74	55
Total	600	162	438	817	507	310
Average Daily Trip Ends (ADT)						
Land Use Code (LUC)	Fitted Curve	ADT				
LUC 210 Single Family Detached – 783 Units	-	6,702				
LUC 215 Single Family Attached – 220 Units	-	1,626				
Total	-	8,328				

As shown on Table 4, the proposed development is anticipated to generate a total of 600 trips in the AM peak hour with 162 trips entering the site and 438 trips exiting the site. In the PM peak hour, the proposed development is anticipated to generate a total of 817 trips, with 507 trips entering the site and 310 trips exiting the site. The proposed development is anticipated to generate a total of 8,328 average daily trip ends to/from the site.

TRIP DISTRIBUTION

As shown on the site plan, the site will be accessed via multiple public road connections to Thorpe Road and a public road connection to 41st Avenue. (See Figure 2 Site Plan) It is anticipated that the residents of the site will generally use the following roadways:

Thorpe Road is generally an east/west, two-way, 2-lane urban collector and urban minor arterial and urban major collector. Thorpe Road extends east from Westbow Boulevard as an urban collector arterial to Grove Road where it then continues east as an urban minor arterial through Abbott Road, Assembly Road, Trainor Road, and Highway 195 before becoming an urban major collector and turning into 23rd Avenue. Thorpe Road primarily serves light industrial and low-density residential land uses in the project area. The posted speed limit on Thorpe Road in the project area is 30 MPH.

State Route 195 is generally a north/south, two-way, 4-lane highway. State Route 195 extends south from Interstate 90 at Exit 279 and goes through 16th Avenue, Thorpe Road and the Cities of Spangle, Freedom, Plaza, Rosalia, Thornton, Cashup, Steptoe, Colfax, Pullman, Johnson, Colton, and Uniontown before merging with State Route 95. The posted speed limit on State Route 195 within the study area is 55mph.

Inland Empire Way is generally a north/south, two-way, 2-lane urban minor arterial and urban minor collector that extends south from Sunset Boulevard through 16th Avenue, 23rd Avenue, and Oak Street before terminating with a Cul-de-sac. Inland Empire Way primarily serves residential and commercial land uses in the project area. The posted speed limit on Inland Empire Way in the project area is 30 MPH.

Assembly Road is generally a north/south, two-way, 2-lane rural major collector. Assembly Road extends from south Thorpe Road through 40th Avenue, Gunthers Road, and Hallett Road before terminating at Morning Lane. Assembly Road serves residential land uses. The speed limit on Assembly Road is 35 MPH.

Garden Springs Road is generally an east/west, two-way, 2-lane urban major collector and local access road. That extends south from the end of Rustle Road over I-90 and through Grandview Avenue and Assembly Road before turning north at Abbott Road, and then goes underneath I-90, as a local access road, before transitioning into Lawton Road. Garden Springs Road serves low-density residential and institutional land uses. The posted speed limit on Garden Springs Road in the project area is 25 MPH.

Rustle Street is generally a north/south, two-way, 2-lane urban major collector that extends south from Sunset Highway through I-90 west bound off ramp and then transitions into Garden Springs Road at the I-90 Bridge. Rustle Street serves commercial and lodging land uses. The posted speed limit on Rustle Street in the project area is 25 MPH.

Sunset Highway/Boulevard is generally an east/west, two-way, 2-,3-, &4-lane urban principal arterial that extends east from Highway 2 interchange through Lewis Street, Geiger Boulevard, Rustle Street, Lindeke Street, Inland Empire Way, and 4th Avenue before transitioning into 2nd and 3rd Avenues. Sunset Highway/Boulevard serves residential, commercial, and industrial land uses. The posted speed limit on Sunset Highway/Boulevard in the project area is 40 MPH.

Government Way is generally a north/south two-way, two-lane urban minor arterial that extends north from Milton Street through Sunset Boulevard, 7th Avenue, and Hartson Avenue,

then curves northwest through Riverside Avenue, and Greenwood Road within the study area. Government Way serves residential and institutional land uses. The speed limit on Government Way is 30 MPH.

Geiger Boulevard is generally a northeast/southwest, two-way, 2-lane urban minor arterial. Geiger Boulevard extends southwest from Sunset Highway, passing under US Route 2, through Grove Road/Flightline Boulevard, Electric Road and Thomas Mallen Road, Geiger Boulevard then curves west before terminating at Hayford Road. Geiger Boulevard primarily serves industrial uses. The posted speed limit on Geiger Boulevard in the project area is 45 MPH.

Abbott Road/Lawton Road is generally a north/south, two-way, 2-lane local access road that extends north in the project area from Thorpe Road through Winsor Road and I-90 eastbound off ramp before going underneath Interstate 90 and curving west, becoming Lawton Road, through Garden Springs Road and Ball Road before terminating at Geiger Boulevard. Abbott Road generally serves light industrial and low-density residential land uses in the project area. The posted speed limit on Abbott Road in the project area is 25 MPH.

Grove Road is generally a north/south, two-way, two-lane urban minor arterial from Geiger Boulevard to 53rd and a rural minor collector from 53rd Avenue to Cheney Spokane Road. Grove Road extends southeast as an urban minor arterial from Geiger Boulevard, passing over Interstate 90 and continues south, until it curves east to meet Cheney-Spokane Road in Marshall, Washington. Grove Road primarily serves residential and agricultural uses. The posted speed limit on Grove Road in the project area is 35 MPH.

41st Avenue is generally an east/west, two-way access road that extends west from the project boundary through Trainor and Dorset Roads before terminating at Santiago Road. 41st Avenue is currently undeveloped east of Trainor Road and serves residential land uses. The speed limit on 41st Avenue is 25 MPH.

Dorset Road is generally a north/south, two-way, 2-lane local access road. Dorset Road extends south from 41st Avenue through 44th Avenue, 47th avenue, Hallett Lane, and 5th Avenue before terminating at a residential driveway to the southeast. Dorset Road serves residential land uses. The speed limit on Dorset Road is 25 MPH.

40th Avenue is generally an east/west, two-way, 2-lane residential access road. 40th Avenue extends east from Assembly Road to San Diego Road. 40th Avenue serves residential land uses. The speed limit on 40th Avenue is 25 MPH.

Hallett Road is an east/west two-way, two-lane urban & rural major collector that extends from Westbow through Thomas Mallen Road, Spotted Road, Mack Road, Grove Road, Abbott Road, Assembly Road, Plymouth Road, Vanderlin Road, Mayweather Road to Dorset Road. The area along Hallett Road is generally residential and agricultural. The posted speed limit for Hallett Road is 45 MPH, except for a segment between Assembly Road and Dorset Road which is 35 MPH, and in the Windsor Elementary school zone, where the speed limit is 20 MPH when children are present.

Trainor Road is generally a north/south, two-way, 2-lane residential access road that is currently undeveloped and extends south from Thorpe Road and terminates at 41st Avenue. Thorpe Road serves rural and residential land uses. The speed limit on Trainor Road is 25 MPH.

Interstate 90 (I-90) is generally an east/west, two-way, 4-lane interstate freeway. I-90 is a transcontinental freeway, extending from Seattle, Washington to Boston, Massachusetts. The posted speed limit on I-90 within the study area is 60 mph.

U.S Highway 2 is an east/west state highway. Highway 2 extends west from Interstate 90 through Airway Heights, Wenatchee, and Monroe before terminating at an intersection with Interstate 5. Within the study area Highway 2 is a two-way, two-lane highway. Within the study area Highway 2 serves commercial, retail, and industrial uses. The posted speed limit on Highway 2 is 45 MPH.

Considering many factors such as the surrounding transportation facilities, typical commuting patterns, existing development in the area, previous studies in the area, and the ADT of surrounding roadways the traffic for the proposed development, the entering and exiting distribution can be found in Figures 3 & 4 AM & PM Trip Distribution Percentages as a graphical representation.

Existing Transit System

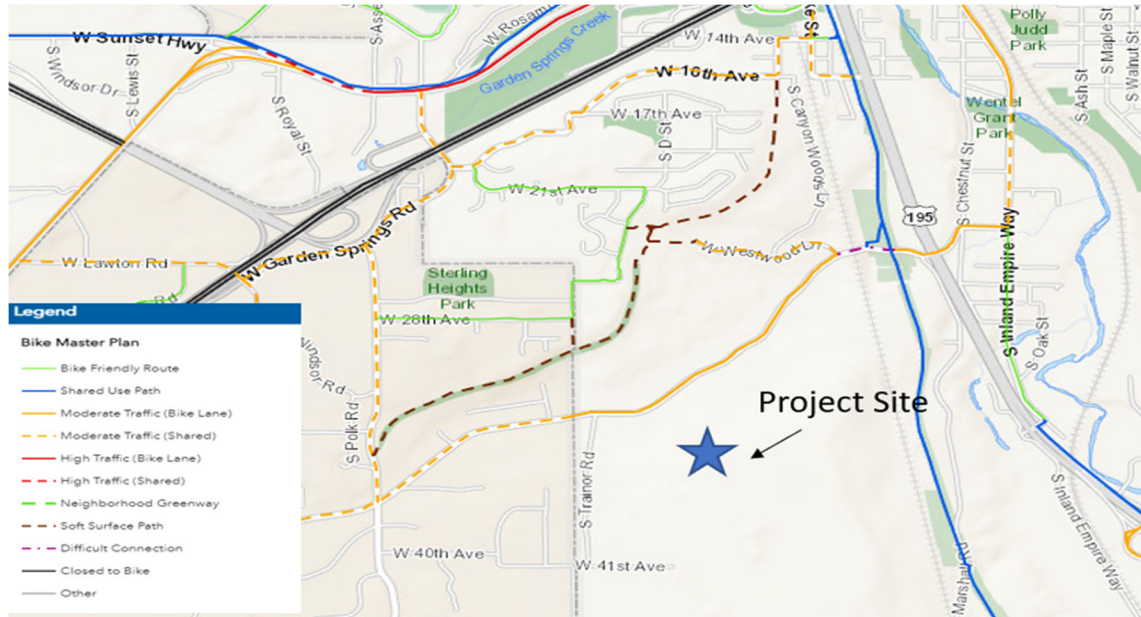
The existing bus routes nearest the project site are Routes 60 & 61. The nearest bus stops from the project site to the route is 2.94 miles using Thorpe, Assembly, Garden Springs, and Rustle Roads. The bus stops are located at the intersection of Sunset Boulevard and Rustle Street. Please see the attached route map.



Source: Spokane Transit Authority

Existing Bike System

Fish Lake Trail is a dedicated bike trail within the study area. Although no direct access from Thorpe Road is available, 16th Avenue, Grandview Avenue, Inland Empire Way, Garden Springs Road, Assembly Street, Rustle Street, and a portion of Thorpe Road are assigned as shared roadways. There are bike lanes along Sunset Boulevard from Royal Street to Government Way within the study area. Please see the City of Spokane Bike Plans map.



Source: City of Spokane Bike Plans

TRAFFIC IMPACT FEE

The City of Spokane municipal code has established transportation impact fees under Spokane Municipal Code Title 17 Chapter 17D.045. The proposed project is within the South Service Area and as such is subject to the current Impact Fee Schedule. Table 2 calculates the anticipated impact fee for the proposed project. The City of Spokane is currently in the process of adjusting their impact fee within the area. The anticipated fee that we understand will range from \$7,000 to \$12,000 per unit. For comparison these rates are added to Table 5.

Table 5 –Proposed Land Use Impact Fee

Land Use	LUC	Quantity	Unit of Measure	Fee per unit	Fee
LUC # 210 Single Family	210	1,003	dwelling	\$1,206.58	\$1,210,199.74
LUC # 210 Single Family	210	1,003	dwelling	\$7,000	\$7,021,000.00
LUC # 210 Single Family	210	1,003	dwelling	\$12,000	\$12,036,000.00

It is noted that the fee schedule is subject to change and the amount due at the time of the building permits may be higher or lower than the current fee. As shown in Table 2, the proposed

project under the current fee schedule is anticipated to generate an impact fee ranging from \$1,210,199.74 to \$12,036,000.

Impacted Intersections > 20 PM Peak Hour Trips

The trip distribution as a result of the proposed project has identified the following affected intersections.

- US 195/Thorpe Road
- 41st Avenue/Dorset Road
- 40th Avenue/Assembly Road
- Abbott Road/Thorpe Road
- Grove Road/Hallett Road
- Thorpe Road/Hallett Road
- Sunset Boulevard/Government Way
- Garden Springs Road/Assembly Road
- Geiger Boulevard/Flightline Boulevard
- Grove Road/I-90 Interchange
- Sunset Boulevard/Rustle Street

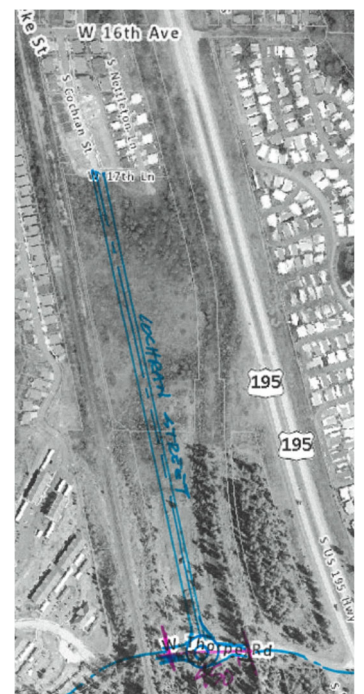
ROUTE DISCUSSION – TRAVEL TIME

To better understand future resident travel patterns we completed a travel time analysis. With the multitude of routes to/from the development as well as your start/finish destination within the development the travel times will vary. For a travel time analysis, we utilized Google Maps Traffic Data set to a typical Wednesday at approximately 7:30 AM. As the greatest travel time is through the WSDOT Ramp Meters only outbound routes were included. The starting locations are at either the lower end of the development (approx. 2929 W Thorpe) or the upper location at the east end of 41st Avenue. For this exercise Sacred Heart hospital was chosen for the AM destination given its downtown location and use of local access roads.

Routes

1. EB Thorpe to SR 195 to I-90 to Division Street
2. EB Thorpe to SR 195 to Inland Empire Way to 3rd Ave to Steven St
3. EB Thorpe to Cochran Street to 16th Ave to Sunset to 3rd Ave. to Steven St.*
4. WB Thorpe to Assembly to Sunset to 3rd Ave. to Steven St.
5. WB Thorpe to Grove Rd to I-90 to Division Street.

*The use of Cochran Street alignment located between the two Thorpe Tunnels provides a quick route and avoids the Thorpe Road & SR 195 congestion and avoids using the J-turn or having to go through the WSDOT Ramp Meter at I-90. See concept route.



From the measured routes the following table summarizes the measured routes.

Table 6 - Travel Time Summary

Travel Time Summary	Measured				Adjusted			
	Lower		Upper		Lower		Upper	
Route	Miles	Time (min)	Miles	Time (min)	Miles	Time (min)	Miles	Time (min)
EB Thorpe to SR 195 to I-90*	4.7	9	6.4	14	4.7	14	6.4	19
EB Thorpe to SR 195 to IEW	4.7	13	6.5	18	4.7	13	6.5	18
EB Thorpe to Cochran To 16th to Sunset**	5.1	14	6.9	19	5.1	12	6.9	17
WB Thorpe to Assembly to Sunset	6.2	16	6.5	18	6.2	16	6.5	18
WB Thorpe to Grove Rd to I-90 *	8	13	8.3	16	8	18	8.3	21
* Indicates Ramp meter add 5 minutes								
**Route through Cochran Street subtract 2 min								

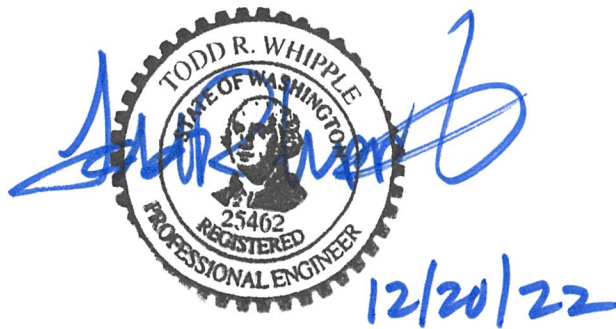
As shown in Table 6, the best route for the lower end of the development along Thorpe Road would be through a Cochran and the second-best route would be through Inland Empire Way. The best route for the upper end of the development at the end of 41st Avenue would be Cochran as well with a tie for second being Inland Empire Way and Assembly to Sunset.

CONCLUSIONS AND RECOMMENDATIONS

It is anticipated that the proposed project will generate 600 AM peak hour trips and 817 PM peak hour trips. Therefore, we recommend that the project pay the City of Spokane Traffic Impact Fee at the time of the building permits, and that the project should be allowed to move forward. Due to the growing number of developments within the area additional analysis may be required. We would expect to meet with the City of Spokane, and Washington State Department of Transportation to coordinate these efforts as the project moves forward.

Should you have any questions related to this document please do not hesitate to contact us at (509) 893-2617.

Sincerely,
WHIPPLE CONSULTING ENGINEERS, INC.



Todd R Whipple, P.E.

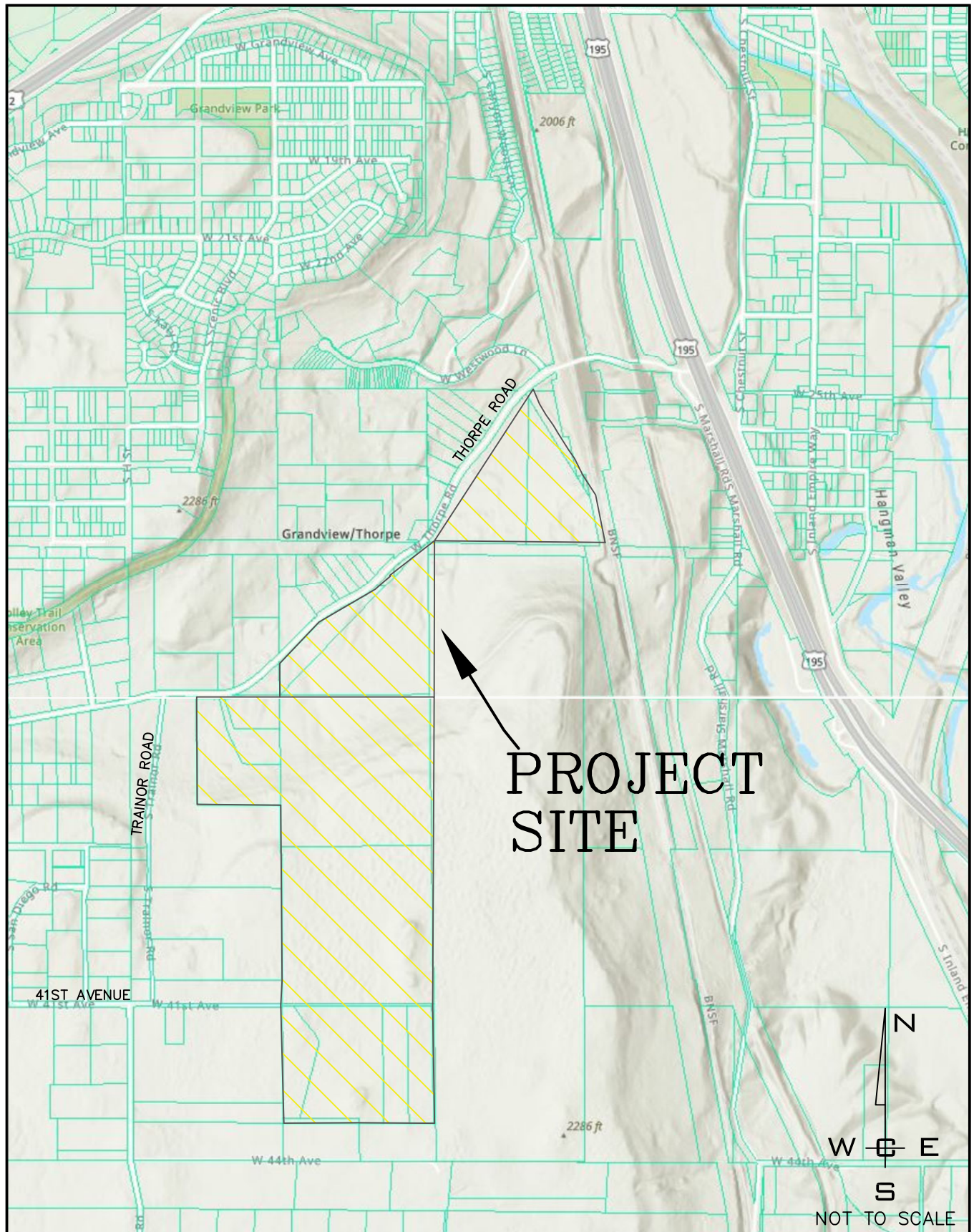
TRW/mtr

encl. Appendix (Vicinity Map, Preliminary Site Plan, Trip Dist. %)

cc: Sponsor
File

APPENDIX

1. Vicinity Map
2. Site Plan
3. AM Trip Distribution by Percentage
4. PM Trip Distribution by Percentage
5. Routes Miles & Times



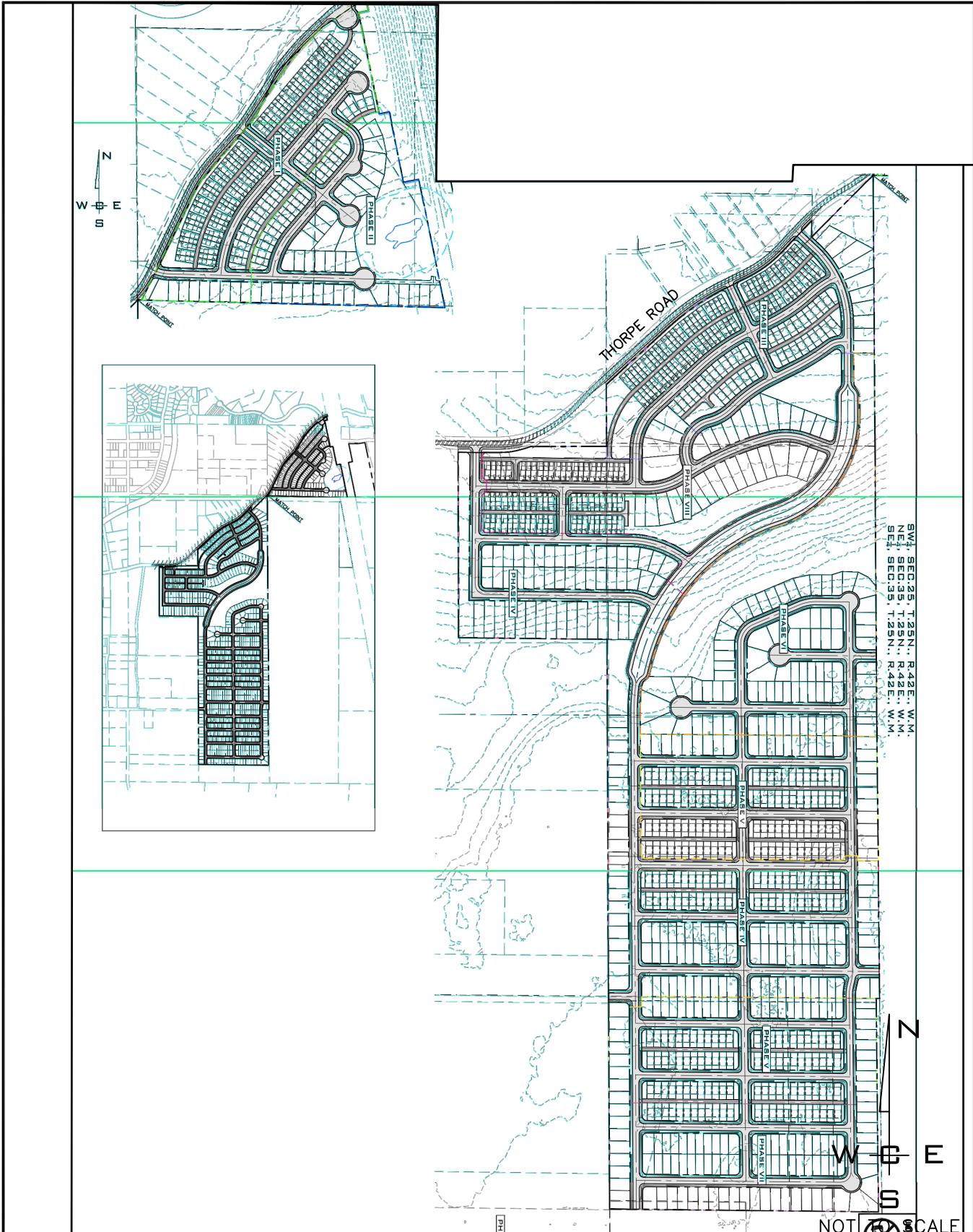
PROJ #: 22-3185
 DATE: 11/15/22
 DRAWN: MTR
 APPROVED: TRW

TRIP GENERATION & DISTRIBUTION
VICTORY HEIGHTS
2929 W THORPE ROAD
SPOKANE, WASHINGTON

FIGURE 1

VICINITY MAP

WCE
 WHIPPLE CONSULTING ENGINEERS
 CIVIL AND TRANSPORTATION ENGINEERING
 21 SOUTH PINES ROAD
 SPOKANE VALLEY, WASHINGTON 99206
 PH: 509-893-2617 FAX: 509-926-0227



SW 1/4 SEC. 25, T. 25N., R. 42E., W.M.
 NE 1/4 SEC. 35, T. 25N., R. 42E., W.M.
 SE 1/4 SEC. 35, T. 25N., R. 42E., W.M.

PROJ #: 22-3185
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 APPROVED: TRW

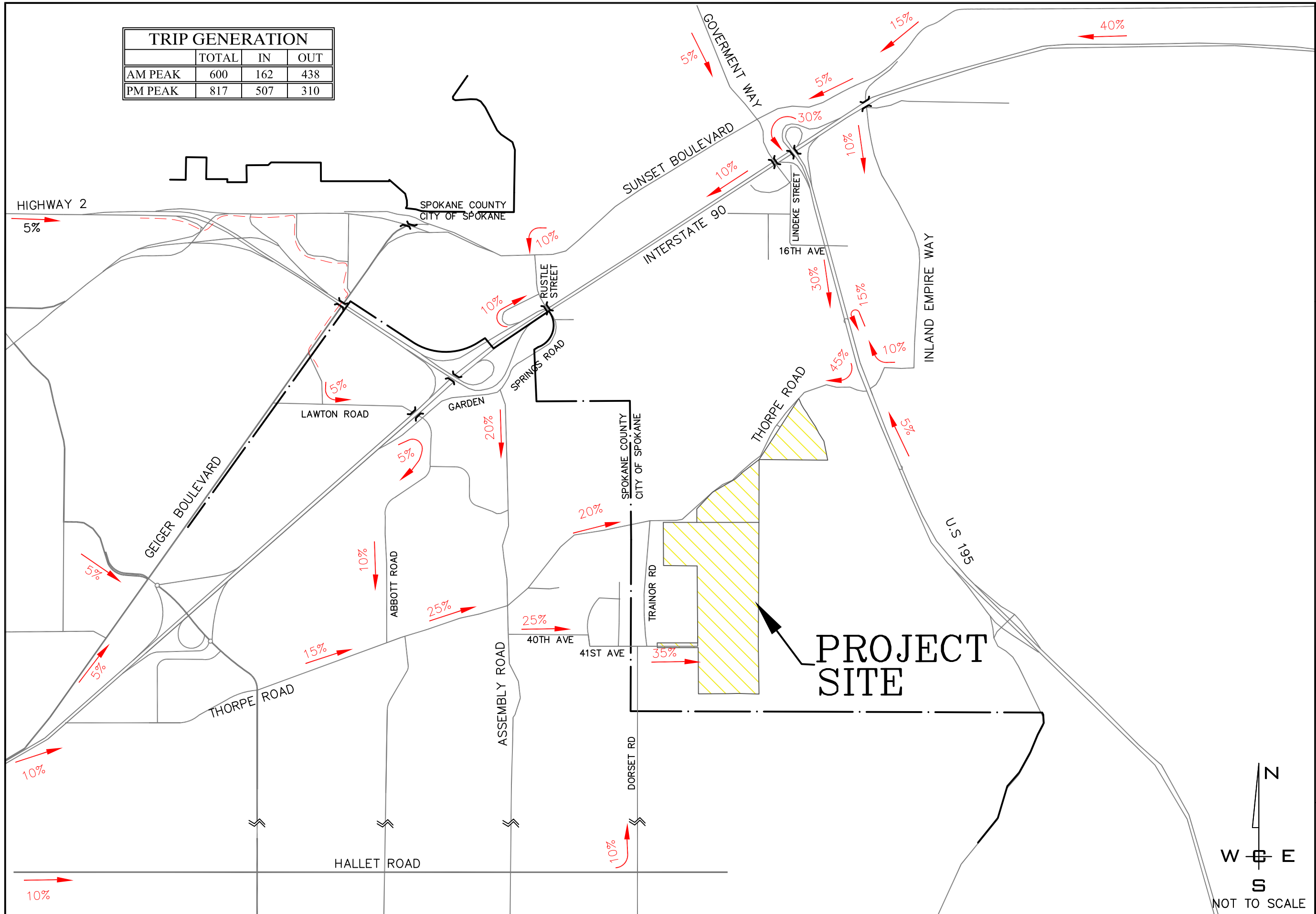
**TRIP GENERATION & DISTRIBUTION
 VICTORY HEIGHTS
 2929 W THORPE ROAD
 SPOKANE, WASHINGTON**

WCE
 WHIPPLE CONSULTING ENGINEERS
 CIVIL AND TRANSPORTATION ENGINEERING
 21 SOUTH PINES ROAD
 SPOKANE VALLEY, WASHINGTON 99206
 PH: 509-893-2617 FAX: 509-926-0227

FIGURE 2

PRELIMINARY SITE PLAN

TRIP GENERATION			
	TOTAL	IN	OUT
AM PEAK	600	162	438
PM PEAK	817	507	310



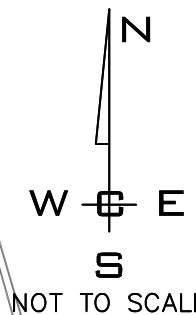
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TRIP GENERATION AND DISTRIBUTION
VICTORY HEIGHTS
 2929 W THORPE ROAD
 SPOKANE, WASHINGTON

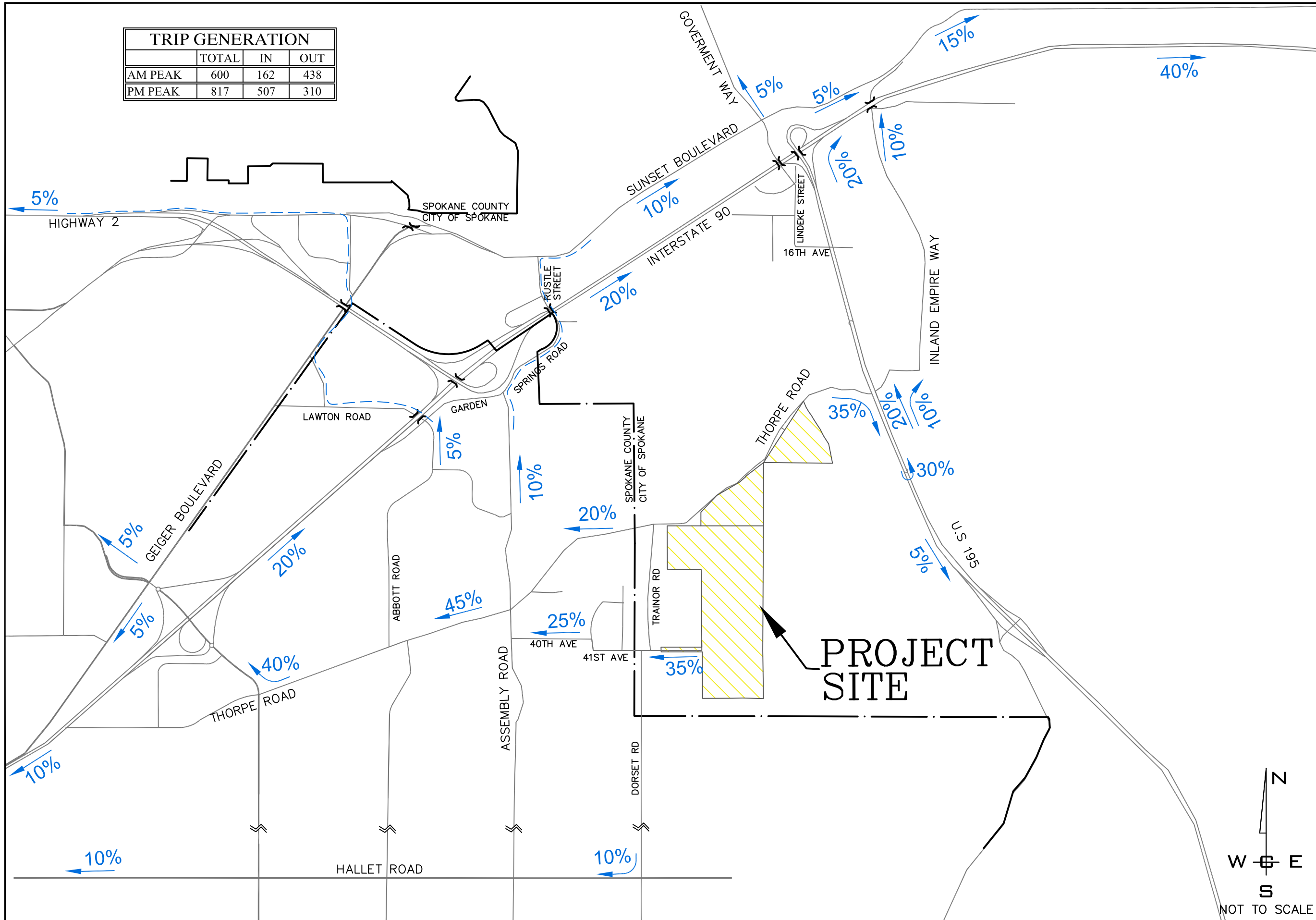
ENTERING TRIP DISTRIBUTION

FIGURE

3



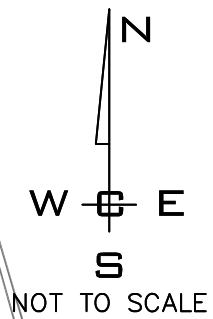
TRIP GENERATION			
	TOTAL	IN	OUT
AM PEAK	600	162	438
PM PEAK	817	507	310

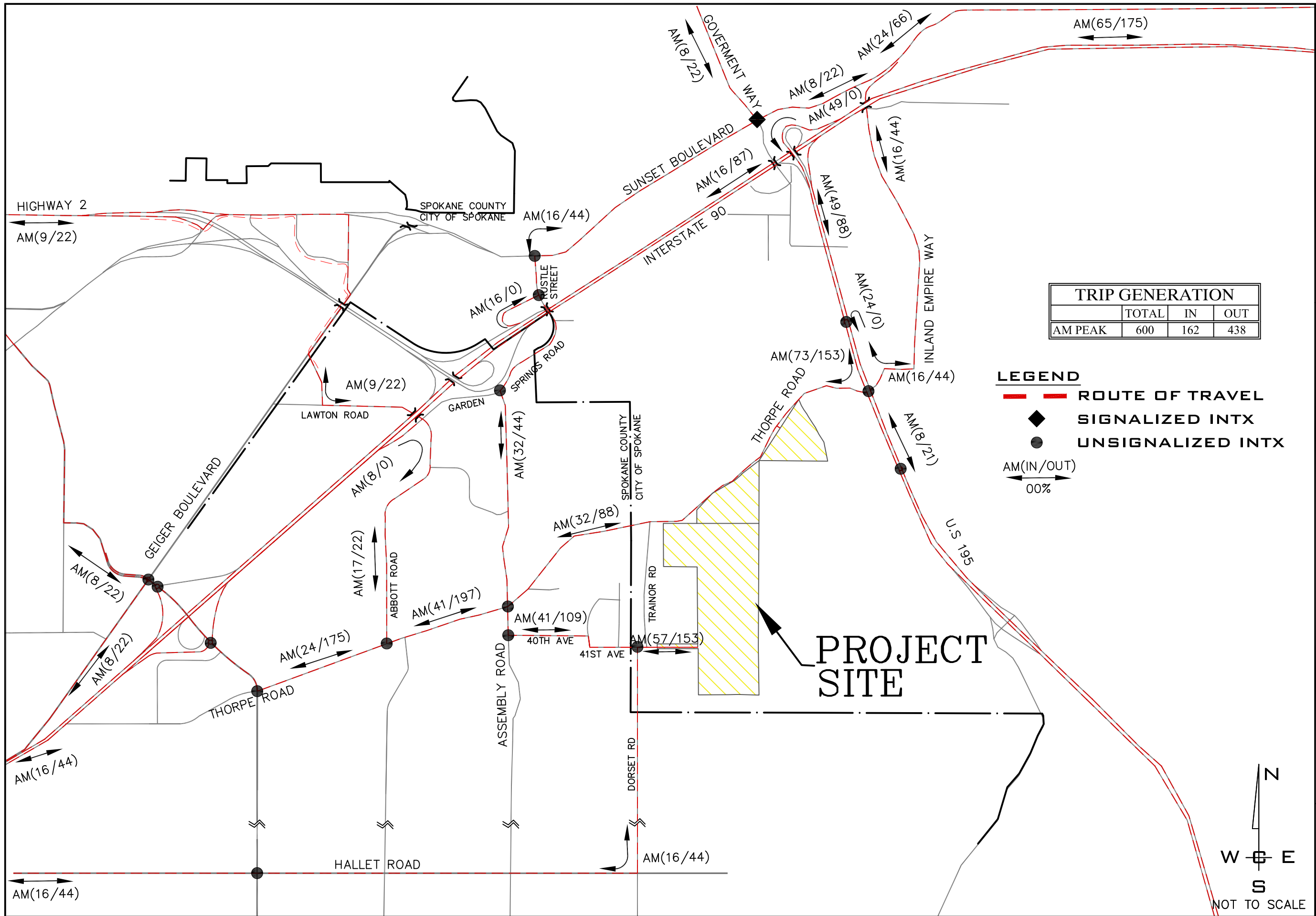


PROJ #: 22-3185
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 DRAWN: MTR
 APPROVED: TRW

TRIP GENERATION AND DISTRIBUTION
VICTORY HEIGHTS
 2929 W THORPE ROAD
 SPOKANE, WASHINGTON
 EXITING TRIP DISTRIBUTION

FIGURE
4





TRIP GENERATION			
	TOTAL	IN	OUT
AM PEAK	600	162	438

- LEGEND**
- ROUTE OF TRAVEL
 - ◆ SIGNALIZED INTX
 - UNSIGNALIZED INTX
 - AM(IN/OUT)
 - 00%

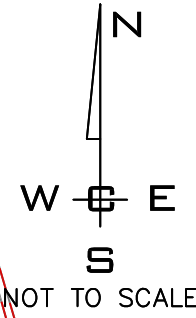


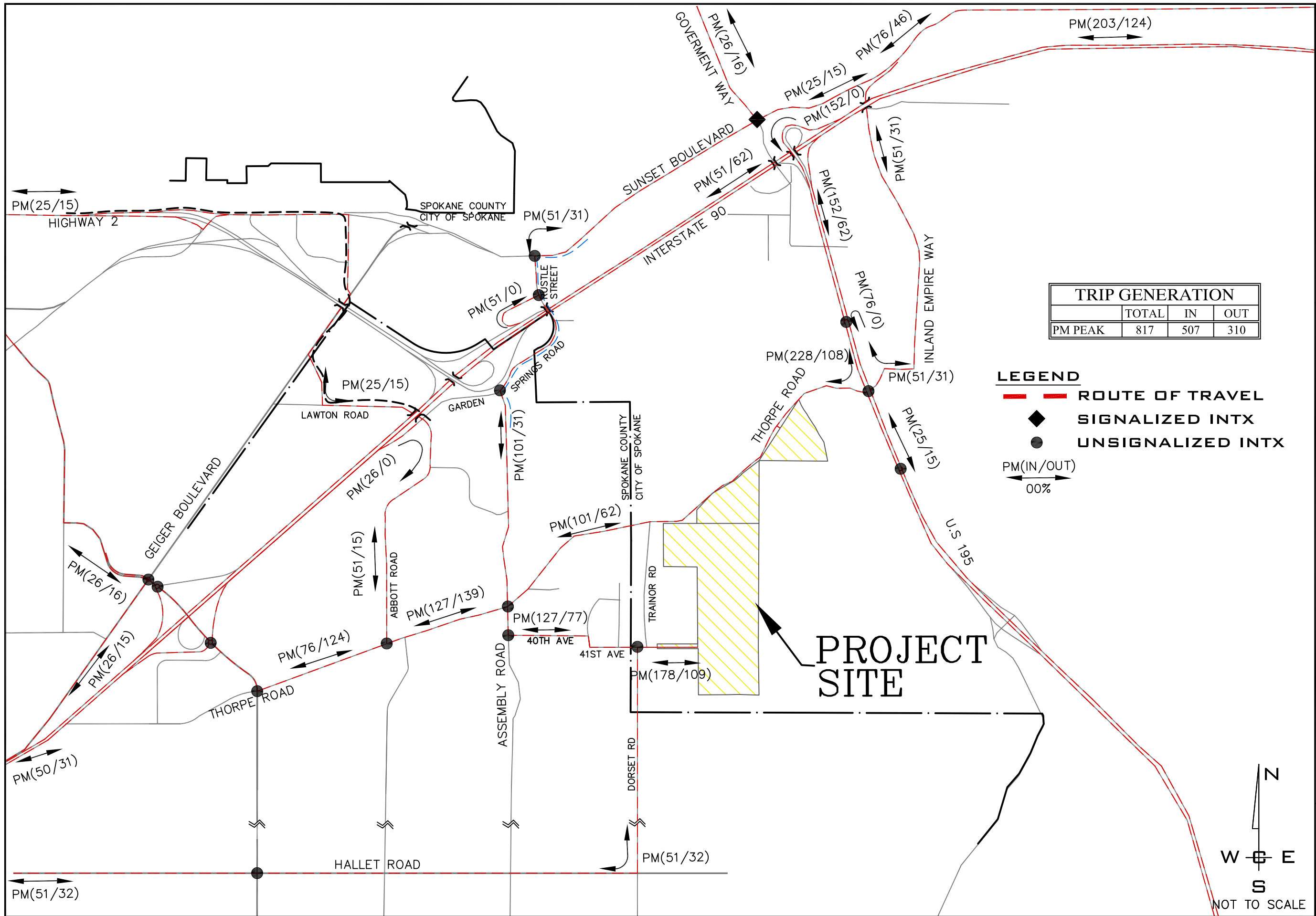
WHIPPLE CONSULTING ENGINEERS
 21 S. PINES ROAD
 SPOKANE VALLEY, WA 99206
 PH: 509-893-2617 FAX: 509-926-0227

PROJ #: 22-3185
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 APPROVED: TRW

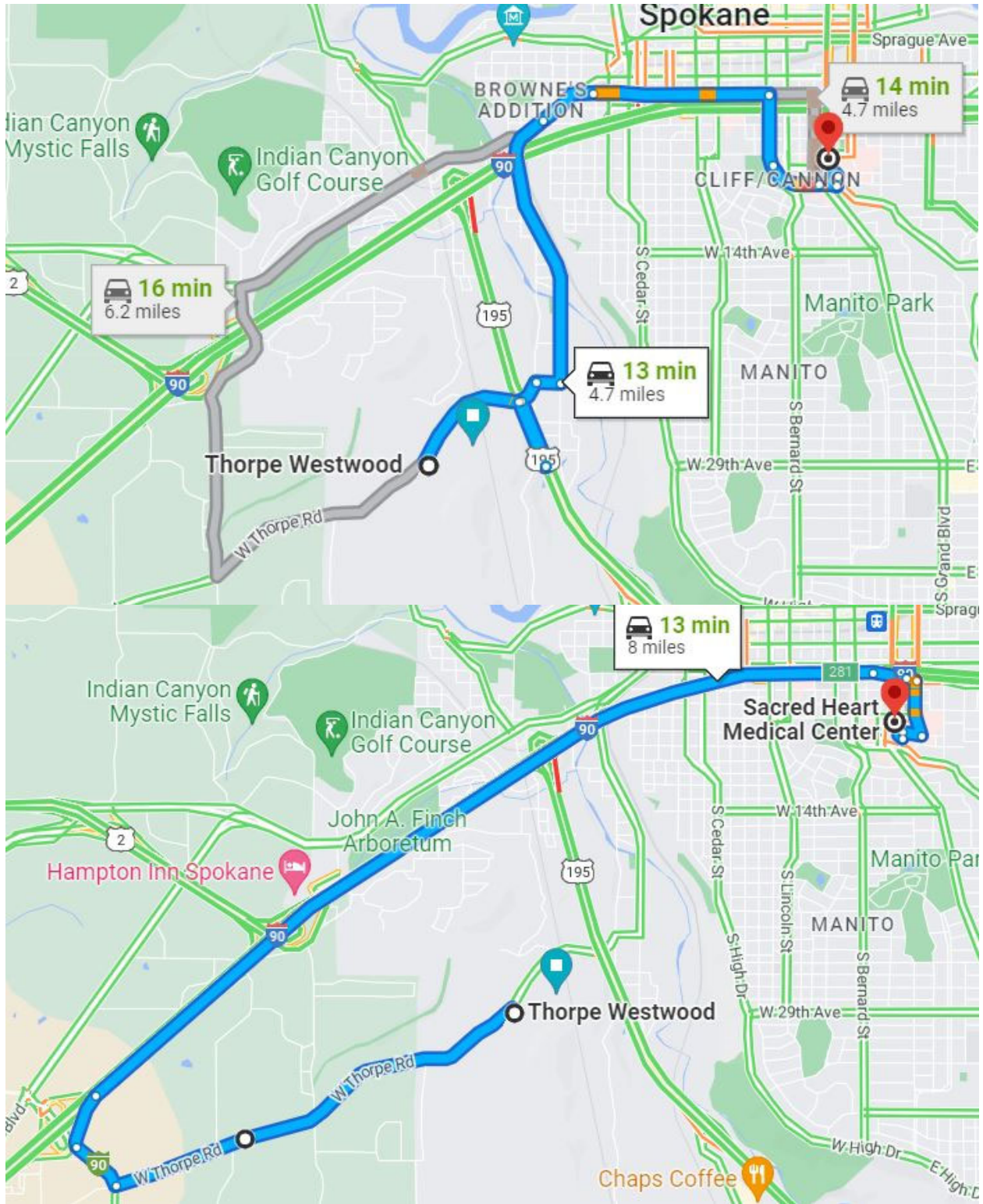
TRIP GENERATION AND DISTRIBUTION
VICTORY HEIGHTS
 2929 W THORPE ROAD
 SPOKANE, WASHINGTON
 AM TRIP DISTRIBUTION

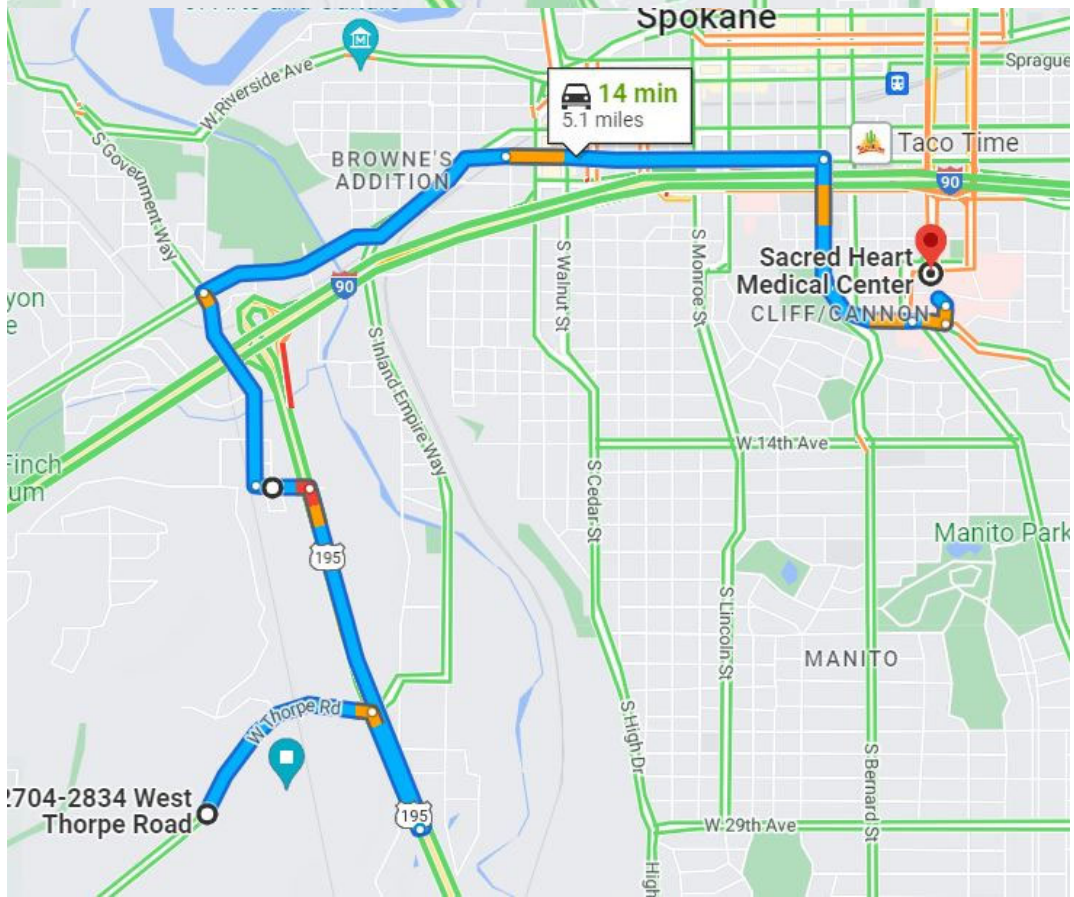
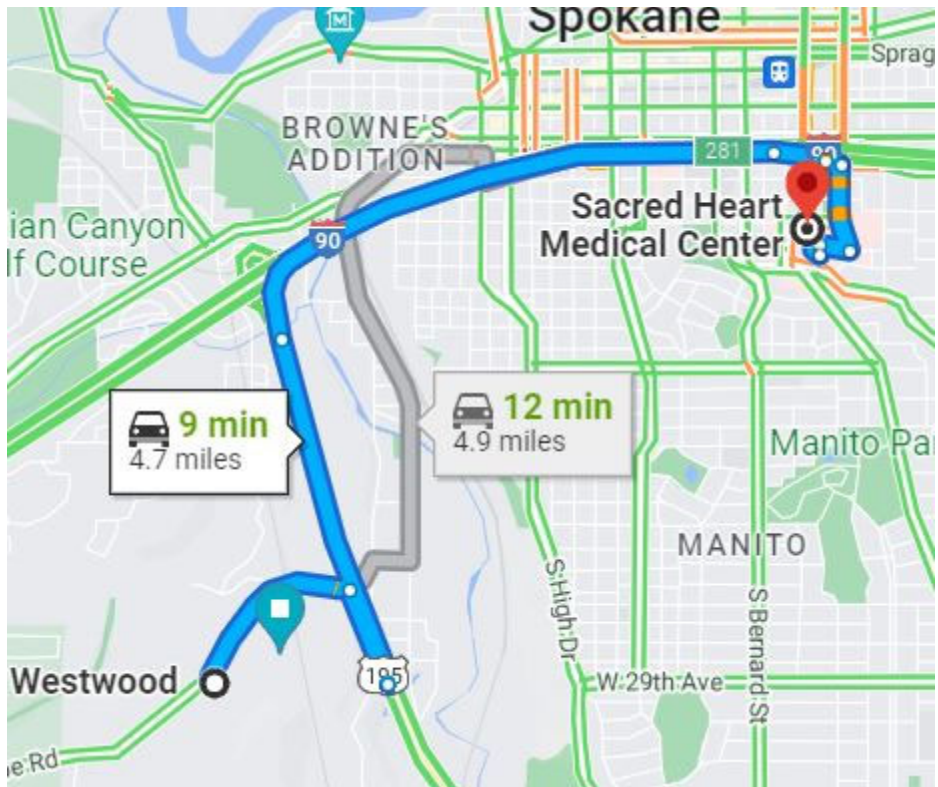
FIGURE
5

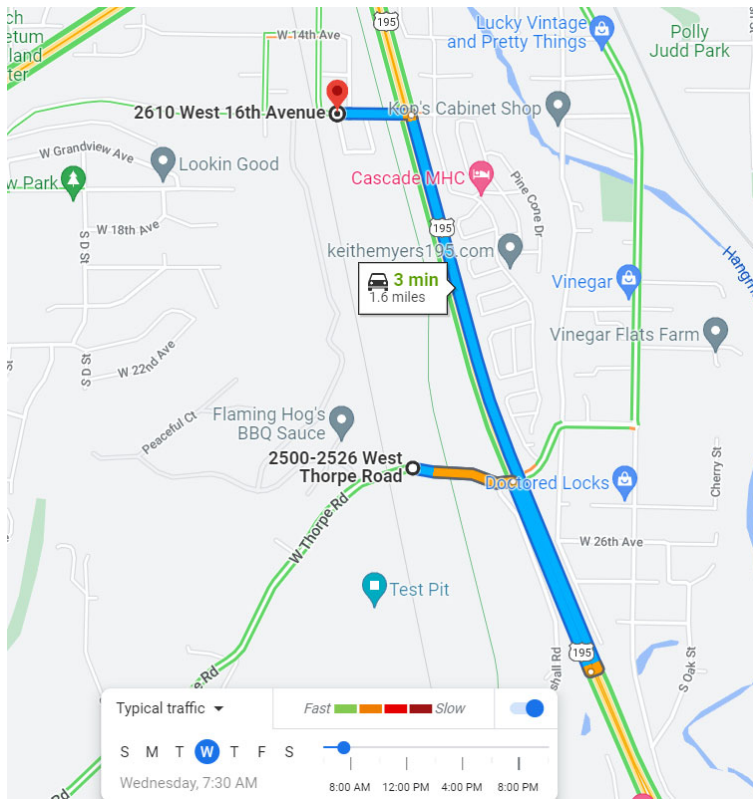




Lower Routes







Upper Routes

