Traffic Impact Analysis

For

Painted Hills PRD

Spokane Valley, Washington

September 14, 2016

2013-1166

TRAFFIC IMPACT ANALYSIS

Painted Hills PRD

Spokane Valley, Washington

September 14, 2016

2013-1166

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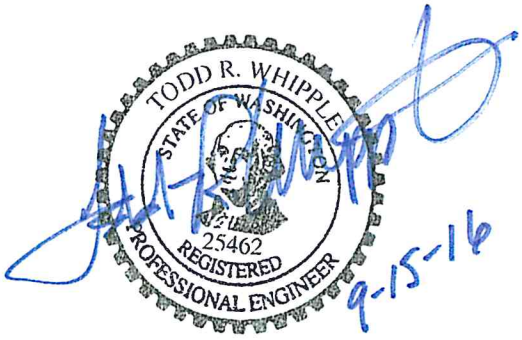
This report has been prepared by the staff of Whipple Consulting Engineers, Inc. under the direction of the undersigned professional engineer whose seal and signature appears hereon.



Todd R. Whipple, P.E.

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EXECUTIVE SUMMARY

This Traffic Impact analysis has been prepared to supplement the SEPA process for the proposed Painted Hills planned residential development (PRD) the following traffic impact analysis has been completed and includes the following land uses: 52 Cottage Style Single Family Lots, 206 Single Family Residential Lots, 42 Estate Type Single Family Lots, 228 Apartment Units, a commercial development and a mixed use commercial/residential development.

1. The City of Spokane Valley and the Washington State Department of Transportation (WSDOT) have established Level of Service (LOS) D as the minimum acceptable level of service at signalized intersections and level of service E at unsignalized intersections within the study area.

2. The project proposes to develop 99.7 acres +/- into the following: 52 Cottage Style Single Family Lots, 206 Single Family Residential Lots, 42 Estate Type Single Family Lots, 228 Apartment Units, and a commercial development complex, the north development is anticipated to include a total of 13,400 SF of commercial buildings with 52 apartment units located above the retail space in the mixed use. The South development is anticipated to include 9,000 sf of retail space and a 4,000 sf quality restaurant.

3. The development timeline is anticipated to be as follows: Years 2015 and 2016 PRD approval, Year 2017 the PRD development is anticipated to be a continuous build over a seven to eight-year span of time with complete buildout by the year 2025. Please see Figure 2A for an anticipated order of construction.

4. The PRD is anticipated to have 3 public Accesses (1 on Dishman-Mica Road, and 2 on Madison Road), 2 private roadway accesses on Madison Road, 2 commercial driveways (1 Thorpe Road, 1 Dishman-Mica Road), and 1 apartment driveway on Dishman-Mica Road. The PRD is anticipated to have a total of 8 points of access on and off the existing transportation system.

5. The project site lies within the SE ¼ of Section 33, T25N R44E W.M., within the City of Spokane Valley, Washington. And is located north of Thorpe Road, east of Dishman-Mica Road, and west of Madison Road. A vicinity map is included as Figure 1.

6. The project site is currently listed on the comprehensive plan and zoned Residential 3. The parcels to be developed by the project are 45336.9191, 44041.9144, 45334.9135, 45334.0110, 45334.0109, 45334.0108, 45334.0114, 45334.0113, and 45334.0106. Please see Figure 2, Site Plan.

7. The project study area intersections were identified through a neighborhood traffic scoping meeting and discussions with the City of Spokane Valley, the Washington State Department of Transportation (WSDOT), and Spokane County. The study encompasses twelve existing intersections and eight proposed intersections.

    - 32nd Ave & University Rd (AM & PM)
    - Dishman-Mica Rd & University/Schafer Rd (AM & PM)

- 32nd Ave & Bowdish Rd (AM & PM)
- Dishman-Mica Rd & Bowdish Rd (AM & PM)
- Dishman-Mica Rd & Apt. Access (AM & PM) (Proposed)
- Dishman-Mica Rd & Sundown Dr. (AM & PM) (Proposed)
- Dishman-Mica Rd & S. Comm. Access (AM & PM) (Proposed)
- Dishman-Mica Rd & Thorpe Rd (AM & PM)
- Thorpe Rd & Comm. Access (AM & PM) (Proposed)
- 16th Ave & Pines Rd (AM & PM)
- 16th Ave & SR 27 (AM & PM)
- 32nd Ave & Pines Rd (AM & PM)
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- Madison Rd & 44th Ave (AM & PM) (Proposed)
- Madison Rd & Thorpe Rd (AM & PM)
- 32nd Ave & SR 27 (AM & PM)
- 32nd Ave & Evergreen Rd (AM & PM)
- 32nd Ave & Sullivan Rd (AM & PM)

8. This traffic impact analysis follows the City of Spokane Valley Standard for Traffic impact analysis which utilizes level of service analysis for the year 2015 (existing) to establish a baseline of performance and identify any existing concerns in the exiting transportation system. Buildout year scenarios (2025) both with and without the project to determine traffic concurrency or to determine if the added trips of the project on the transportation system would reduce the scoped intersections level of service below the standard.

9. Per the City of Spokane Valley Street Standards 3.3.4.6 the buildout year +5 analysis scenario was included as the project is expected to take more than 6 years to complete. The buildout year plus 5 years (2030) both with and without the project will ensure that any proposed mitigation would maintain level of service after buildout.

10. Per the City of Spokane Valley Street Standards 3.3.4.6 the buildout year +20 analysis scenario of the mitigated intersection was <u>not</u> included as the proposed year 2025 mitigation at an unsignalized intersection (16th Avenue & Pines Road) does not involve the installation or modification to an intersection controlled with a traffic signal or roundabout.

11. An Additional analysis of Peak Hours and cut-through traffic per public comment were included in the public involvement section to respond to a concern that the Midilome East residents had. This additional analysis is not a part of traffic concurrency but is a service provided to the public for their information.

12. Conclusion

Based upon the analysis, field observations, assumptions, methodologies and results which are provided in the body of this report, it is concluded that the development of the proposed project

will generate new trips on the existing transportation system and that those trips while affecting level of service will generally not degrade LOS below concurrency levels, except at the intersection of 16th Avenue & Pines Road. Additionally, any queue deficiencies that have been identified will carry through the scenarios from the existing condition to the future conditions. It is important to remember that the proposed project only adds to an already existing condition. These conclusions were reached and have been documented within the body of this report.

Existing Condition

- There are no Level of Service deficiencies identified for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan.
- There are four existing queue deficiencies identified at two of the scoped intersections that have acceptable levels of service. The deficiency occurs when the anticipated queue exceeds the available storage space. A review of the City of Spokane Valley Transportation improvement projects (TIP), shows that there are no public improvement projects identified to mitigate the discrepancies at the following intersections and movements:
    - 16th Avenue & State Route 27, EB Thru, WB Thru
    - 32nd Avenue & State Route 27, WB left, WB Thru

Year 2025, Buildout, without the project, with background projects

- There is a Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, as the southbound approach experienced 64 seconds of average delay, for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan. The intersection can be returned to an acceptable level of service by signalizing the intersection and pairing the signal timing with the signal at 16th Avenue & State Route 27.
- There are five future queue deficiencies identified at three intersections. These deficiencies were identified as the result of the background growth rate and the background projects as identified at scoping. A review of the City of Spokane Valley Transportation improvement projects (TIP), shows that there are no public improvement projects identified to mitigate the discrepancies at the following intersections and movements:
    - 16th Avenue & State Route 27, EB Thru, WB Thru
    - 32nd Avenue & Pines Road, EB Thru
    - 32nd Avenue & State Route 27, WB Thru, WB Left Turn

Year 2025, Buildout, with the project, with background projects

- **Left Turn Lane Analysis, At Project Accesses on; Dishman Mica Road, Thorpe Road, and Madison Road**
    - The intersection of Dishman-Mica Road & Sundown Drive warrants a southbound left turn lane

- The proposed intersections along Madison Road do not warrant left turn lanes, however the City of Spokane valley has designated Madison Road as a collector roadway, which has a 3-lane typical format.
- After discussions with the developer a portion of Dishman-Mica Road and Madison along the project frontage are proposed to include a TWLTL for the project accesses.

- **Left and Right Turn Warrant analysis at Study Area Intersections**

  - The Intersection of 16th Avenue & Pines Road northbound right turn movement meets the right turn lane, 100 vehicles in the PM Peak hour, rule of thumb in the Year 2025 With the project, however because of the close proximity of intersections, the signal controls, and the operation of the northbound approach as a left right. So the addition of a right turn lane would still operate as before, rendering any improvement as moot.

  - The intersection of 32nd Avenue & Pines Road northbound right turn movement meets the rule of thumb and the project anticipates adding trips to the movement. Therefore, a northbound right turn lane will be considered.

- There is a Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, as the southbound approach has 96.2 seconds of average delay, for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan.
- The Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, originally caused by the background trips and worsened by this project, can be mitigated and brought back to an acceptable level of service by signalizing the intersection and pairing the signal timing with the signal at the intersection of 16th Avenue & State Route 27
- There are five future queue deficiencies at three intersections with two of those intersections operating at acceptable levels of service. These deficiencies were the result of the background growth rate and the background projects as identified within this study and are only incrementally worsened or kept the same by this project. A review of the City of Spokane Valley Transportation improvement projects (TIP), shows that there are no public improvement projects identified to mitigate the discrepancies at the following intersections and movements:
  - 16th Avenue & State Route 27, EB Thru, WB Thru
  - 32nd Avenue & Pines Road, EB Thru
  - 32nd Avenue & State Route 27, WB Thru, WB Left Turn

Year 2030, Buildout Plus 5 Years, without project, with background projects

- There is a Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, as the southbound approach has 95.0 seconds of average delay, for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan.

- There are five queue deficiencies identified at three intersections. These deficiencies were identified as the result of the background growth rate and the background projects as identified at scoping. A review of the City of Spokane Valley Transportation improvement projects (TIP), shows that there are no public improvement projects identified to mitigate the discrepancies at the following intersections and movements:
    - 16th Avenue & State Route 27, EB Thru, WB Thru
    - 32nd Avenue & Pines Road, EB Thru
    - 32nd Avenue & State Route 27, WB Thru, WB Left Turn

Year 2030, Buildout Plus 5 Years, with project, with background projects

- There is a Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, as the southbound approach has 133.7 seconds of average delay, for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan.
- The Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, originally caused by the background trips and worsened by this project, can be brought back to an acceptable level of service signalizing the intersection and pairing the signal timing with the signal at the intersection of 16th Avenue & State Route 27
- There are five future queue deficiencies at three intersections with two of those intersections operating at acceptable levels of service. These deficiencies were the result of the background growth rate and the background projects as identified within this study and are only incrementally worsened or kept the same by this project. A review of the City of Spokane Valley Transportation improvement projects (TIP), shows that there are no public improvement projects identified to mitigate the discrepancies at the following intersections and movements:
    - 16th Avenue & State Route 27, EB Thru, WB Thru
    - 32nd Avenue & Pines Road, EB Thru
    - 32nd Avenue & State Route 27, WB Thru, WB Left Turn

Recommendations

Based upon the conclusions within this study the proposed project is recommended to provide the following;

- frontage improvements to Dishman-Mica Road, Thorpe Road, and Madison Road per the City of Spokane Valley development process
- A two-way-left-turn-lane north of the Chester Creek Bridge to the property boundary with appropriate taper.
- Bicycle and pedestrian facilities per the City of Spokane Valley Bicycle and Pedestrian Master Plan along the site frontage.
- a northbound right turn lane be considered at the intersection of 32nd Avenue & Pines Road. Coordination with the City of Spokane Valley and the Central Valley School District will be required.
- We also recommend that when warranted by the development conditions that the project contribute its participating percentage in a project to signalize the intersection of 16th Avenue & Pines Road.

INTRODUCTION

Introduction, Purpose of Report and Study Area

This traffic impact analysis is required by the City of Spokane Valley as part of the traffic concurrency and SEPA process for the proposed Painted Hills planned residential development (PRD). The proposed development includes 52 Cottage Style Single Family Lots, 206 Single Family Residential Lots, 42 Estate Type Single Family Lots, 228 Apartment Units, and a commercial development and a mixed use commercial/residential development (4.26 ± ac), with a total of 99.7 acres +/-. Please see Figure 1-Vicinity Map and Figure 2-Preliminary Site Plan.

The purpose of this analysis is to review, assess, and identify the potential traffic related impacts that the proposed project may have on the transportation network and where possible minimize any impact. This TIA will be completed in accordance with the current traffic guidelines from the City of Spokane Valley, Washington State Department of Transportation (WSDOT), Spokane County, and the Institute of Transportation Engineers (A Recommended Practice – Traffic Access and Impact Studies for Site Development, 2010).

Site Location and Development Description

The proposed development is located on approximately 99.7 acres +/-. The site was previously a privately held golf course open to the public. The site is proposed to be separated into six (6) different land uses within the PRD. A description of each proposed land use is provided below.

Cottages Style Single Family (Townhouses)
The 52 "Cottage Style Single Family Lots" are intended to be a combination of cottage style homes and common wall buildings or townhouses within a gated community, which is located at the north end of the project site. The lots are accessed by a single gated access from Madison Road to the east that runs east/west, and also a gated emergency fire access road at the west end that leads into the Single Family Residential development.

Single Family Residential
The 206 Single Family Residential lot development lies in the middle of the site, and also makes up a majority of the site in land area, besides the open space. It has three main accesses: two from Madison Road to the east and one from Dishman-Mica Road to the west. The development has two north/south internal roads, as well as 5 east/west internal roads each with a traffic circle in the middle to provide traffic calming throughout the development.

Estate Type Single Family (Large Lot Single Family Residential)
The 42 Estate Type Single Family lots are large, single family residential lots located at the south end of the project site. There is a single gated access road from Madison Road to the east that runs east/west. The Estate Type Single Family also has an internal loop road that makes a rectangular loop off the proposed main road. There is also a gated emergency fire access road at the northwest corner that runs north into the southern traffic circle of the Single Family Residential development.

Multi-Family Residential
The 228-unit apartment complex is located at the northwest end of the project site. There may be two accesses for this development: one to/from Dishman-Mica Road to the west, via a new alignment out to Wilbur Road, and one to/from an internal project road located to the south. As apartment complexes differ in design, the internal circulation, building locations, and parking will be provided under a separate submittal.

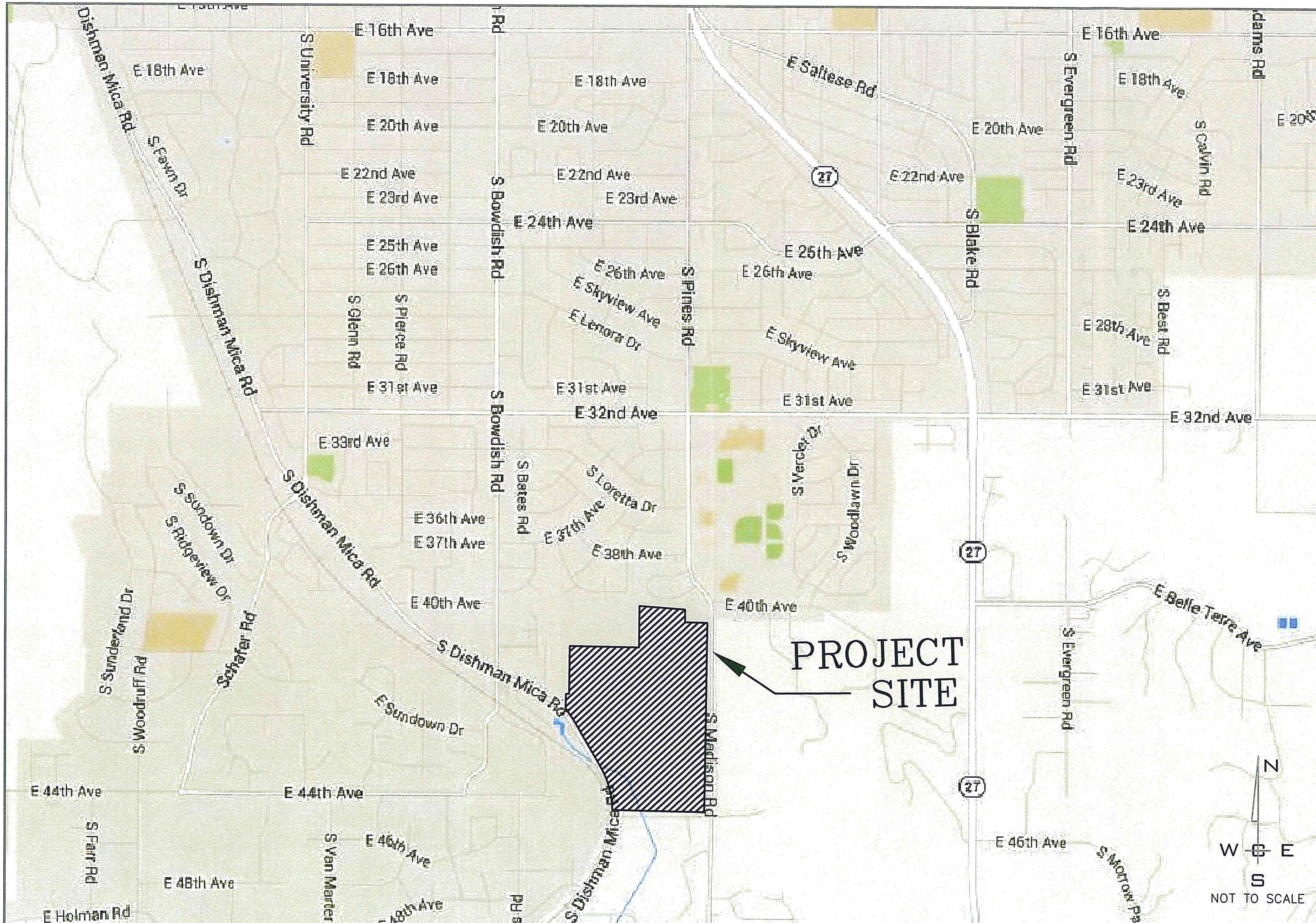
Commercial
The 4.26 acre (26.4 KSF) commercial development is located along Dishman-Mica Road and at the southwest end of the project site. The area is divided by Chester Creek into northern and southern areas. The northern area is proposed to include 13.4 ksf of retail space with an access driveway on Dishman Mica Road and an Access to Sundown Drive. The southern commercial development is anticipated to contain 9.0 ksf of retail development and a 4.0 ksf Restaurant, with access to Thorpe Road

Apartments (Mixed Use)
The 52 apartment units are proposed to be located over the retail space of the commercial development. There may be a single access from Dishman-Mica Road or an internal access to the proposed road as the apartments will use the commercial development access.

Development Open Spaces
The proposed development is anticipated to have approximately 30 acres in open space spread incorporates flood control facilities. The 10-acre open space of the development will not only include the park setting at the south but also a trail system that weaves through every corner of the development.

Project Access to Existing Transportation System
The PRD is anticipated to have 3 public Accesses (1 on Dishman-Mica Road, 2 on Madison Road), 2 private roadway accesses on Madison Road, 3 commercial driveways (1 Thorpe Road, 2 Dishman-Mica Road) , and 1 apartment driveway on Dishman-Mica Road. The PRD is anticipated to have a total of 9 points of access on and off the existing transportation system.

PRD Development Timeline
The development timeline is anticipated to be as follows: Years 2015 and 2016 PRD approval, Year 2017 the PRD development is anticipated to be a continuous build over a seven to eight-year span of time with complete buildout by the year 2025. Please see Figure 2A for an anticipated order of construction.



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PROJ #: 13-1166
DATE: 03/25/15
DRAWN: RMA
APPROVED: TRW

TRAFFIC IMPACT ANALYSIS
PAINTED HILLS PRD
MADISON ROAD & THORPE ROAD
SPOKANE VALLEY, WASHINGTON

VICINITY MAP

FIGURE
1

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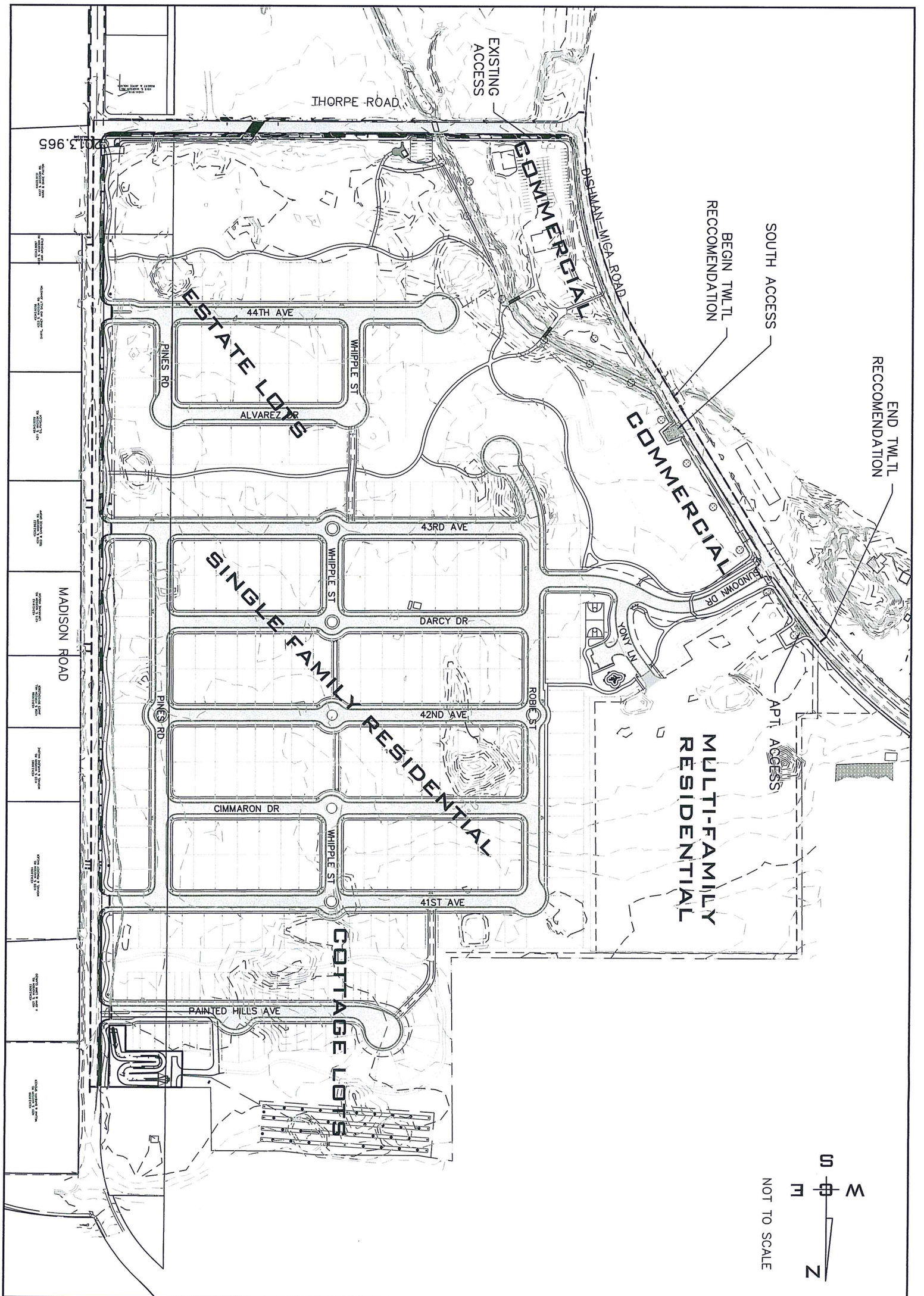

FIGURE 2

TRAFFIC IMPACT ANALYSIS
PAINTED HILLS PRD
MADISON ROAD & THORPE ROAD
SPOKANE VALLEY, WASHINGTON

PRELIMINARY SITE PLAN

PROJ #: 13-1166
DATE: 12/14/15
DRAWN: BNG
APPROVED: TRW

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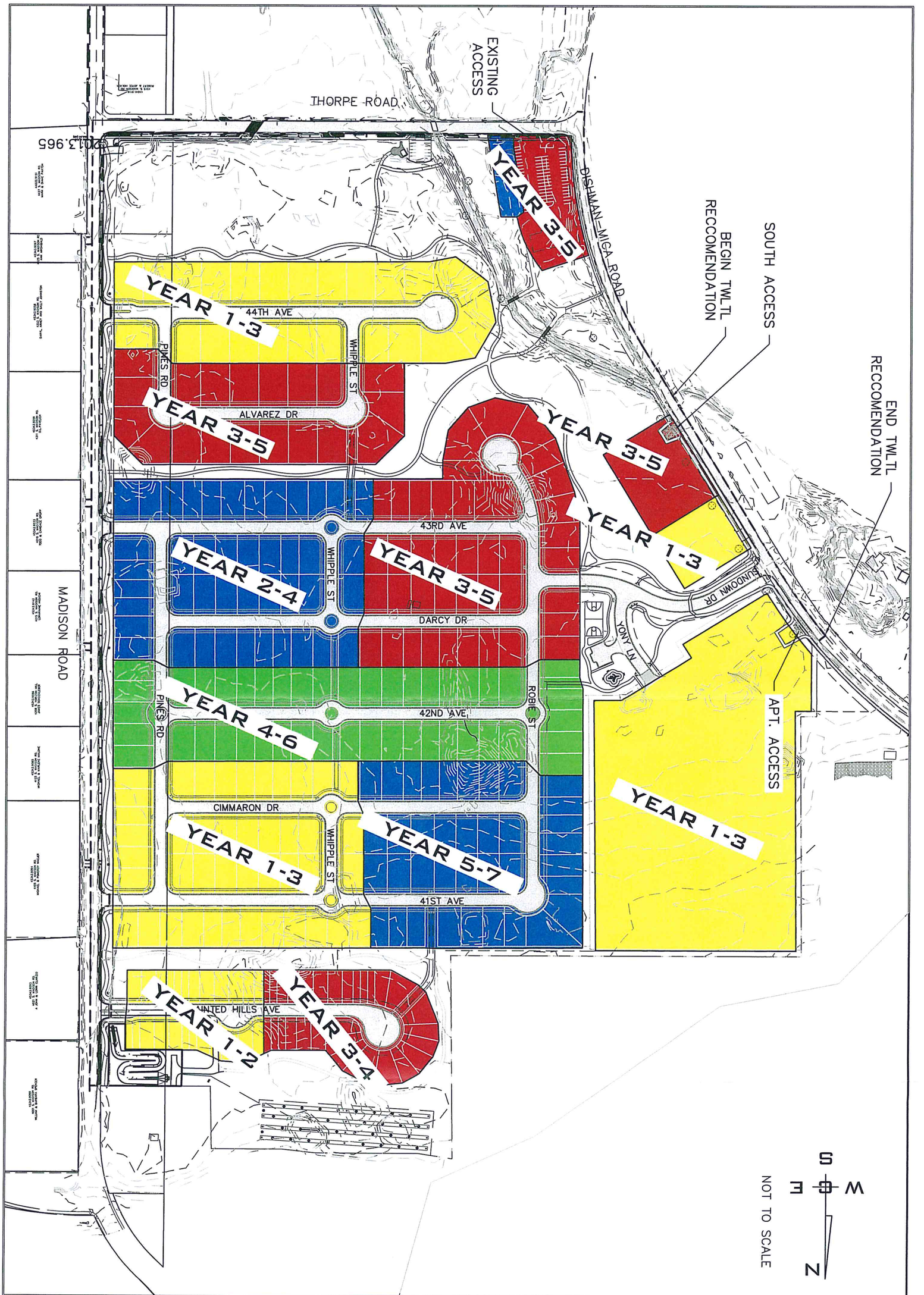

FIGURE 2A

TRAFFIC IMPACT ANALYSIS
PAINTED HILLS PRD
MADISON ROAD & THORPE ROAD
SPOKANE VALLEY, WASHINGTON

DEVELOPMENT TIMELINE

PROJ #: 13-1166
DATE: 12/14/15
DRAWN: BNG
APPROVED: TRW

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Existing Conditions within the Study Area

Land Use & Zoning

The site is located north of Thorpe Road east of Dishman-Mica Road and west of Madison Road in a portion of the SE ¼ of Section 33, T25N R44E W.M., within Spokane Valley, Washington. A vicinity map is included as Figure 1. The project site is currently zoned as Residential 3, and is the previous Painted Hills General Commercial/ Golf Course Site. The parcels to be developed by the project are 45336.9191, 44041.9144, 45334.9135, 45334.0110, 45334.0109, 45334.0108, 45334.0114, 45334.0113, and 45334.0106. Please see Figure 2-Site Plan.

Existing Roadways

The overall transportation network in this area consists of a state route, urban principle arterials, collectors, and local access roads.

Dishman-Mica Road extends south, southeast from Sprague Avenue to State Route 27, Approximately 7.4 miles in length. Dishman-Mica Road is a northwest/southeast two-way, two- and five-lane minor-principal arterial. Dishman-Mica Road is an arterial that serves the residential neighborhoods that extend from Sprague Avenue to Bowdish Road. Dishman-Mica Road intersects with 8th Avenue, 16th Avenue, 32nd Avenue, University/Schafer Road and Bowdish Road with small commercial uses located at or near the intersections of 16th Avenue, University Road and Bowdish Road. Dishman-Mica Road then winds through a rural area before intersecting with State Route 27. Within the study area the posted speed limit on Dishman-Mica Road is 45 MPH.

University Road is a north/south, two-way, 2-, 3-, 4-, & 5-lane minor arterial that serves a large residential area south of Interstate 90. It runs south from Nora Avenue, and crosses several major arterials, until it intersects with Dishman-Mica Road. University Road, between Mission Avenue and Sprague Avenue is a three-lane roadway. From Sprague Avenue to 4th Avenue, it changes to become a five-lane roadway. South of 4th Avenue to Dishman-Mica Road, it reduces to a four-lane roadway and continues to Dishman-Mica Road where the roadway transitions into Schafer Road. Dishman-Mica Road is posted at 35 MPH speed limit within the study area. The University Road section includes bike lanes from 16th Avenue to Mission Avenue, and sidewalks for pedestrians from Dishman-Mica Road to Mission Avenue.

Schafer Road is a north/south, two-way, 2-lane, collector that serves a large residential area south of Dishman-Mica Road. Schafer Road runs south from Dishman-Mica Road to 44th Avenue. Schafer Road, between Dishman-Mica Road and 44th Avenue is a two lane roadway with shoulders, but no sidewalk or bike lanes. Schafer Road is posted at 35 MPH within the study area.

Bowdish Road is a north/south, two-way, 2-lane, minor arterial serving a large residential area south of Interstate 90. Bowdish Road runs south from Mission Avenue, and crosses several major arterials, until it intersects with Sands Road. Bowdish Road, between Mission Avenue and Dishman-Mica Road is a two-lane roadway. South of Dishman-Mica Road, Bowdish Road

crosses the Union Pacific Railway and becomes a local access roadway. Sands Road branches off of Bowdish Road and continues the arterial to 44th Avenue. Bowdish Road is posted at 25 MPH on the local access portion, and is posted on the minor arterial as 35 MPH.

State Route 27 is a north/south, two-way, 2-, 3-, 4-, & 5-Lane State Highway. State Route 27 extends south from Spokane Valley to Pullman, Washington and serves the many small farming communities of the Palouse. Within the City of Spokane Valley, State Route 27 follows the Pines Road alignment between Trent Avenue and 16th Avenue. South of 16th Avenue, State Route 27 shifts to the Blake road alignment serves the surrounding urban residential uses to 32nd Avenue where it serves a small cluster of commercial uses at the intersection of State Route 27 & 32nd Avenue. From Trent Avenue to 16th Avenue the posted speed limit is 35 MPH. From 16th Avenue to the 41st Avenue Alignment the posted speed limit is 45 MPH, beyond 41st Avenue SR 27 generally has a speed limit of 55 MPH.

16th Avenue is an east/west, two-way, 2- & 3-lane minor arterial that extends east from Bluff Drive (west of Dishman-Mica Road). Through the City of Spokane Valley to Shamrock Street (South of Shelley Lake). 16th Avenue generally serves residential land uses and commercial land uses located at the intersections of arterials. The posted speed limit on 16th Avenue is 35 MPH with the exception of the University Elementary, the McDonald Elementary, and the Evergreen Jr. High School zones where the posted speed limit is 20 MPH with beacons. The 16th Avenue Road section from Dishman-Mica Road to Sullivan Road includes sidewalks and bike lanes.

32nd Avenue is an east/west, two-way, 2-, 3- & 4-lane principle arterial. 32nd Avenue extends east from Dishman-Mica Road to Sullivan Road and serves mostly urban residential uses, but also provides access for commercial uses and University High School. The posted speed limit is 35 MPH with the exception of University High School zone where the speed limit is 20 MPH when children are present. The 32nd Avenue Road section has sidewalk from Dishman-Mica Road to SR 27, and bike lanes from University Road to SR 27. Additional sidewalk and bike lanes are from Evergreen Road to Best Road.

Pines Road is a north/south two-way, 2-, 3-, & 5-lane state route and collector that extends south from Trent Avenue to 40th Avenue. From 16th Avenue to 32nd Avenue Pines Road is a proposed Collector. From 32nd Avenue, to 40th Avenue Pines Road is a collector. Pines Road serves residential uses and a commercial land use located on the northwest corner of Pines Road & 32nd Avenue. The speed limit on Pines Road is 35 MPH, with the exception of the South Pines Elementary school zone where the speed limit is 20 MPH with flashing beacons. The Pines Road Roadway section includes sidewalk along its entire length, and includes bike lanes from 22nd avenue to 32nd Avenue.

Evergreen Road is a north/south, two-way, 2-, 3-, 5- & 6-lane urban principle arterial. Evergreen Road extends south from Indiana Avenue to 32nd Avenue and intersects with eight other minor and major arterials in the City of Spokane Valley. From Indiana Avenue to Interstate 90 Evergreen Road has six-lanes. From Interstate 90 to 4th Avenue, Evergreen Road is a five-lane road. From 4th Avenue to 16th Avenue, Evergreen is a three-lane road. From 16th Avenue to 32nd Avenue Evergreen Road is a two-lane roadway The area surrounding Evergreen Road is generally single family residential uses and small pockets of commercial uses located at or near

the arterial intersections. The posted speed limit on Evergreen is 35 MPH. Evergreen Road includes sidewalk from 32nd Avenue to 24th Avenue and from 16th to Indiana. Evergreen Road has a bike lane from 32nd Avenue to Sprague Avenue.

Sullivan Road is a north/south, two-way, 2-, 3- & 5-lane urban principal arterial that extends south from Wellesley Avenue to just beyond 32nd Avenue. Sullivan Road serves East Valley High School and Central Valley High School, residential, and commercial uses. The posted speed limit is 35 MPH. The Sullivan Road Roadway section includes sidewalk and bike lanes from 16th Avenue to 32nd Avenue, and sidewalk from 16th Avenue to Wellesley Avenue.

Madison Road is a north/south, two-way, 2-lane collector road that extends south from the intersection of Pines Road & 40th Avenue, which is northeast of the site, through Thorpe Road, until eventually changing into Mohawk Drive. Madison Road is posted at 35 MPH and provides access to residential roads on its east and west side. Madison Road has no Sidewalk or bike lanes.

Thorpe Road is an east/west, two-way, 2-lane collector road that extends east from Dishman-Mica Road to Madison Road. Thorpe Road generally serves commercial land uses. The posted speed limit on Thorpe Road is 35 MPH.

Study Area Intersections

The project study area intersections were identified through a neighborhood traffic scoping meeting and discussions with the City of Spokane Valley, Spokane County, and the Washington State Department of Transportation (WSDOT). The scope of the study encompasses the AM and PM peak hours of twelve existing intersections and five proposed intersections.

- 32nd Ave & University Rd
- Dishman-Mica Rd & University/Schafer Rd
- 32nd Ave & Bowdish Rd
- Dishman-Mica Rd & Bowdish Rd
- Dishman-Mica Rd & Apt Access (Proposed)
- Dishman-Mica Rd & Sundown Dr. (Proposed)
- Dishman-Mica Rd & Comm. Access (Proposed)
- Dishman-Mica Rd & Thorpe Rd
- Thorpe Road & Comm. Access.
- 16th Ave & Pines Rd
- 16th Ave & SR 27
- 32nd Ave & Pines Rd
- Madison Rd & Painted Hills Ave (Proposed)
- Madison Rd & 41st Ave (Proposed)
- Madison Rd & 43rd Ave (Proposed)
- Madison Rd & 44th Ave (Proposed)
- Madison Rd & Thorpe Rd
- 32nd Ave & SR 27
- 32nd Ave & Evergreen Rd
- 32nd Ave & Sullivan Rd

Traffic Control and Descriptions

32nd Avenue & University Road is a signalized intersection. The intersection has the following lane configuration: the east and westbound approaches have a left-through lane, a through-right lane, and two receiving lanes that immediately reduces to one lane. The north and southbound approaches have a left turn lane, a through lane, a through-right lane, and two receiving lanes.

Dishman-Mica Road & University/Schafer Road is a signalized intersection. The intersection has the following lane configuration: The Dishman-Mica Road westbound approach has a left turn lane, a through lane, a through-right lane, and a single receiving lane. The Dishman-Mica Road eastbound approach has a left turn lane, a through lane, a right turn lane, and two receiving lanes. The Schafer Road northbound approach has a left turn lane, a through-right lane, and a single receiving lane. The University Road southbound approach has a left turn lane, a through lane, a right turn lane, and two receiving lanes.

32nd Avenue & Bowdish Road is a signalized intersection. The intersection has the following lane configuration: the east and westbound approaches have a left turn lane, a through-right lane, and a single receiving lane. The north and bound approaches have a left-through-right lane, and a single receiving lane.

Dishman-Mica Road & Bowdish Road is a signalized intersection. The intersection has the following lane configuration: The Dishman-Mica Road eastbound & westbound approaches have a left turn lane, a through-right lane, and a single receiving lane. The Bowdish Road northbound approach has a left-through-right lane, and a single receiving lane. The Bowdish Road southbound approach has a left-through lane, a right turn lane, and a single receiving lane.

Dishman-Mica Road & Thorpe Road is an unsignalized "T" type intersection with stop control on the Thorpe Road. The intersection has the following lane configuration: the westbound approach has a left-right turn lane, and a single receiving lane. The northbound approach has a through-right lane, and a single receiving lane. The southbound approach has a left-through lane, and a single receiving lane.

16th Avenue & Pines Road is an unsignalized intersection with stop control on Pines Road. The intersection has the following lane configuration: The eastbound approach has a through-right lane, and a single receiving lane. the westbound approach has a left-through lane, and two receiving lanes. The northbound approach has a left-right turn lane, and a single receiving lane. The southbound approach has a left-through-right lane, and no receiving lanes.

16th Avenue & State Route 27 is a signalized intersection. The intersection has the following lane configuration: The eastbound approach has a left-through lane, a right turn lane, and a single receiving lane. The westbound approach has a left-through-right lane and a single receiving lane, with an additional channelized right turn lane that yields to northbound traffic. The northbound & southbound approaches have a left turn lane, a through lane, a through-right lane, and two receiving lanes.

32nd Avenue & Pines Road is a signalized intersection. The intersection has the following lane configuration: all approaches have a left turn lane, a through-right lane, and a single receiving lane.

Madison Road & Thorpe Road is an unsignalized 2-way stop control intersection. There is one stop sign on the eastbound approach and the opposing driveway is obligated to stop on the approach. The intersection has the following lane configuration: the eastbound approach has a left-through- right turn lane, and a single receiving lane. The Westbound approach is a private driveway and includes a left-through-right lane and a single receiving lane The northbound and south bound approaches have a left-through-right lane, and a single receiving lane.

32nd Avenue & State Route 27 is a signalized intersection. The intersection has the following lane configuration: The eastbound approach has a left turn lane, a through lane, a through-right turn lane, and a single receiving lane. the westbound approach has a left turn lane, a through-right lane, and two receiving lanes. The north and southbound approaches have a left turn lane, a through lane, a through-right lane, and two receiving lanes.

32nd Avenue & Evergreen Road is an unsignalized intersection with stop control on Evergreen Road. The intersection has the following lane configuration: The eastbound approach has a left turn lane, a through-right lane, and a single receiving lane. the west, and northbound approaches have a left-through-right lane, and a single receiving lane. The Southbound approach has a right turn lane, a left-through lane, and a single receiving lane.

32nd Avenue & Sullivan Road is an unsignalized "T" type intersection with stop control on 32nd Avenue. The intersection has the following lane configuration: the eastbound approach has a left-right turn lane, and a single receiving lane. The northbound approach has a left-through lane, and a single receiving lane. The southbound approach has a through lane, a right turn lane, and a single receiving lane. There was a westbound approach that was a driveway entrance but has been blocked off for several years.

Traffic Safety

For the intersections within the study area accident report summaries were received from City of Spokane Valley and WSDOT. Generally, accidents are documented by type of occurrence, such as property damage or injury. No fatalities were reported for the study intersections during the last three years.

$$Rate\ per\ MEV = \frac{number\ of\ accidents\ in\ three\ years\ X\ 1\ million}{PM\ Peak\ hour\ volume\ X\ 10\ \ X\ 365\ X\ 3\ years}$$

Equation 4-2 of ITE manual of traffic engineering studies (fourth edition) (modified given the available data, for 3 years and utilizes PM peak hour volumes ~ 10% of ADT)

In this analysis accidents are measured based on frequency per million entering vehicles (MEV). This ratio is a function of the average daily traffic entering the intersection and the annual frequency of accidents. This method of analysis is also considered as an "exposure" analysis. This method of analysis is used to identify areas that need further review. A typical review threshold for accidents at an intersection is 1.00 accidents per MEV. The accident data for the intersections within the study area are shown in Table 1.

Table 1 – Accident Data for Intersections within the Study Area

ACCIDENT DATA								
Intersection	**2011**		**2012**		**2013**		**INTX**	**Per**
	PDO	**INJ**	**PDO**	**INJ**	**PDO**	**INJ**	**ADT**	**MEV**
32nd Ave & University Rd	1	0	1	0	0	0	10,120	0.18
Dishman-Mica Rd & University/Schafer Rd	0	0	2	0	0	2	9,570	0.38
32nd Ave & Bowdish Rd	2	1	2	0	0	0	12,660	0.36
Dishman-Mica Rd & Bowdish Rd	1	2	0	0	0	1	8,190	0.45
Dishman-Mica Rd & Thorpe Rd	0	0	0	0	0	0	4,690	0.00
16th Ave & Pines Rd	4	0	2	2	3	1	10,430	**1.05**
16th Ave & SR 27	1	1	1	2	1	0	13,160	0.41
32nd Ave & Pines Rd	1	0	2	1	2	0	12,510	0.44
Madison Rd & Thorpe Rd	0	0	0	0	0	0	2,190	0.00
32nd Ave & SR 27	1	0	0	0	0	0	16,960	0.11
32nd Ave & Evergreen Rd	0	0	0	0	0	0	10,570	0.00
32nd Ave & Sullivan Rd	0	0	0	0	0	0	7,090	0.00

As shown in the table above most intersections within the study area do not meet or exceed the threshold for further review. However, the intersection of 16th Avenue & Pines Road does exceed the threshold for further analysis.

16th Avenue & Pines Road

A review of the accident data shows that 9 of the 12 accidents reported were accidents that occurred at an angle, typical of a T-bone accident or a failure to yield the ROW by a turning or thru vehicle. The other accidents include a rear-end collision, a fixed object, and a pedestrian incident. For the accidents that occur at an angle, 6 out of the 9 accidents occurred when a SB through vehicle entered the intersection.

Traffic Volumes and Peak Hours of Operation

Traffic counts were collected as required by scoping under the direction of WCE in the months of January through March 2015, however for technical reason associated with the requirements of chapter 3 of the COSV Road standards they were mostly recounted in October 2015. Counts were completed at the following intersections for the peak hour (AM/PM) time listed below:

- 32nd Ave & University Rd (AM & PM)
- Dishman-Mica Rd & University/Schafer Rd (AM & PM)
- 32nd Ave & Bowdish Rd (AM & PM)
- Dishman-Mica Rd & Bowdish Rd (AM & PM)
- Dishman-Mica Rd & Thorpe Rd (AM & PM)
- 16th Ave & Pines Rd (AM & PM)*
- 16th Ave & SR 27 (AM & PM)*
- 32nd Ave & Pines Rd (AM & PM)
- Madison Rd & Thorpe Rd (AM & PM)
- 32nd Ave & SR 27 (AM & PM)
- 32nd Ave & Evergreen Rd (AM & PM)
- 32nd Ave & Sullivan Rd (AM & PM)

The peak hour from these counts are shown on Figures 3 and 4. The raw data for these counts are located in the technical appendix. * intersections volume balanced given proximity.

Public Transit and School Bus Transportation

The Spokane Transit Authority (STA) currently provides service routes to this area. Key Bus stops are located at the following intersections: 16th Avenue & Pines Road, 32nd Ave Avenue & University Road, 32nd Avenue & Pines Road, 32nd Avenue & SR 27, and 32nd Avenue & Evergreen Road. There are additional stops located along the STA routes located about every quarter mile. The STA Stop at the intersection of 32nd Avenue & Pines Road is the closest to the project and is located approximately 3,160 feet +/- or 0.6 mi from the projects northern border on Madison Road.

The Central Valley School District currently provides student bus service to the area.

Public Involvement

On March 3, 2015 a community and traffic scoping meeting was held at the Chester Elementary School located at 3525 S Pines Road, Spokane Valley, WA 99206. The following is a list of questions and concerns raised by the community at the meeting, and our responses at that time.

The responses provided here, are compiled from the meeting notes and are paraphrased for clarity and brevity. Additional information/responses from the traffic study or other source have been provided in order to answer the publics comment to the best of our ability.

Community Meeting

The project was presented as depicted in the preliminary site plan of the TGDL. All phases of the project were described, the proposed units of each phase were stated and the accesses were described. During the pre-amble & opening, Todd Whipple noted the following: That this is an outright permitted use, which this project will not go before city council, but will go before the hearing examiner.

- Question: Who is the developer?

The developer is Dave Black.

- Question: Why was this meeting scheduled on a Tuesday night when no City Council members can attend?

We picked this night, with no intention to not allow Council members to attend. ***City staff wanted it noted here: that after the meeting had been scheduled. They requested that the meeting be moved to a non council night, Since the meeting had already been advertised it would have required another reschedule and confusion to the public.***

- Question: If this is not the right venue to discuss school overload issues, then what is?

If one would like to present his or her concerns about overloading school issues, then he or she is more than welcome to attend the hearing that comes later after these meetings. One is also encouraged to write a letter to the school district, because they will be able to give one a more accurate answer.

- Question: Why are there four accesses to the project to/from Madison Road and only one to/from Dishman-Mica Road?

We tried to keep all of the commercial and apartment development on Dishman-Mica Road.

- Question: Based on the International Fire Code, are you not allowed to place 30 lots on a single access?

We have met with the Fire Department and we have a modified map (attached) that will allow us emergency accesses as required, we did not change the plan for this meeting as this was the plan that was advertised.

- Question: What plan do you have to mitigate the fire safety issue around the Painted Hills area when you are proposing to introduce about 1,300 cars into the mix?

We do not have an answer for this at this time, but the question has been noted. Following up with the agencies, a specific fire safety issue was not identified at this time. If a member of the public has a specific fire safety concern, then we recommend that he/she take that specific concern to the Commissioners of Fire Districts #1 and #8.

- Question: With the current zoning of R3 for this Painted Hills area, don't you have to leave about 30% of the acreage for open space?

According to Spokane Valley zoning codes, if we stay with the R3 zoning, then we are not required to leave any open space at all. However, a Planned Residential Development (PRD) is required to have 30% open space; therefore, we have left 30% open.

- Question: How will this area, all of a sudden, not become a flood plain?

This area is technically only a flood plain, because it is Compensatory Storage. Compensatory Storage means that water that comes onto your land (or this site) sits there and filters through the ground. We will be working with the City and FEMA to address this issue.

- Question: What do you do with the flood plain?

We have to take every drop of water that comes to the site, and we will be coming up with ways to collect it and discharge it into the ground.

- Question: Is this area an AE Zone?

Yes, this area is an AE zone as it relates to Compensatory Storage. We can discharge the water throughout the site in many different ways.

- Question: All of these forms of discharging are shown on the FEMA map?

Yes they are located on the FEMA map.

- Question: When do we all get the chance to ask the questions we want to ask?

We will talk to the developers after this meeting. Your only chance may come at the Hearing. However, we currently do not know when the Hearing will be.

- Question: Will there be notices sent out about these meetings?

Yes, there will be notices sent out about these meetings.

- Question: Since the school district is not allowed to project how many new kids will be coming out of this new development, as they must give an exact amount, when will this bond go up?

We will move through the process this year. As of this moment, it is projected that the development will be built out over the next 5 to 10 years depending on market conditions, as well as other factors. (Checked with the developer buildout may be completed in 10-15 years.)

Traffic

- Question: Are the accesses off of Madison Road set in stone or can they be changed?

This is our proposal as of now and it is set to be designed this way unless traffic provisions do not allow us to do so.

- It was addressed that the school hours are outside of the AM & PM peak hours.

WCE Completed counts around the three schools here are those results: Traffic counts are usually done between 6:30-9:30AM & 3:30-6:30PM. The commuter traffic is where the peak hour is located, not generally during school hours. Tube counts were placed around each of the three schools (Chester Elementary, Horizon Middle, and University High) with the peak hours reported as follows:

Type of Peak Hour	High School		Middle School		Elem. School	
	Vol.	Time	Vol.	Time	Vol.	Time
AM Commuter	806	7:00AM	269	7:15AM	179	7:15AM
AM School	806	7:00AM	269	7:15AM	179	7:15AM
PM School	788	2:15PM	209	2:30PM	139	2:30PM
PM Commuter	966	5:00PM	210	5:00PM	140	5:00PM

As the above table shows, the AM Commuter & AM School peak hours occur at the same time for the High School, Middle School, and Elementary School. The traffic volumes are shared between AM commuters and school travelers, due to the identical peak hour.
Unlike the AM peak hour traffic, the PM Commuter traffic is higher than the PM School traffic for the High School, Middle School, and Elementary School. The traffic volumes are not shared between PM commuters and school travelers, because the peak hours occur at different times. Therefore, if we mitigate or maintain an acceptable level of service for the PM peak hour commuter, the time of greatest impact, then we also mitigate or maintain an acceptable level of service for the other peak hours.

- Question: Who is conducting the Traffic Impact Analysis? Are there going to be turn lanes put in on Dishman-Mica & Madison Road, due to this project?

WCE will be conducting the Traffic Impact Analysis. There will most likely be a widening of these streets for this project.

- Question: Will you take into account that Thorpe Road floods and closes sometimes during the spring?

Yes, we will. This will be considered and included in our flood control plans and reports. This will not be addressed in this report.

- Question: If the study shows that center turn lanes will need to be added to Madison Road, will that be funded by the developer?

Yes, the developer will fund that work.

- Question: Will you be adding a 3-way stop at Madison Road & 40th Avenue? Recently, walking down on 38th Avenue, we were not able to cross the street due to the high volume of traffic.

The concern has been submitted to the City of Spokane Valley Traffic Engineer.

- Question: Will you be studying Woodlawn Road as well? For some reason, people are cutting through Woodlawn Road in order to get to 32nd Avenue.

WCE will study Woodlawn Cut through for the neighborhood, that study is included here:

Tube counters were placed on Woodlawn Road at 32nd Avenue and 40th Avenue, per the public's request. We have reviewed the counts at both ends of the Woodlawn Road, we have considered the 15 single family residences located to the south of 40th Avenue and after considering the trips from those residents a difference of entering and exiting trips can be seen. This difference during the three peak hours are trips that travel between 32nd Avenue & 40th Avenue and are as follows:

> **In the AM peak hour beginning at 7 AM there may possibly be 79 southbound cut-through trips and 38 northbound cut-through trips. For the 2 PM peak hour there may be 66 southbound cut-through trips and 57 northbound cut-through trips. For the 5 PM peak hour there may be 39 southbound cut-through trips and 29 northbound cut-through trips.**

As some of these trips primarily coincide with the School Peak hours, the reasons for these trips may be from congestion on 32nd Avenue in front of the High School, or from parents that are picking up and dropping off students at the middle or elementary schools, desiring a northbound orientation. However, this type of tube count study is limited as trips will sometimes double back on the anticipated route

Therefore, a video of each end of Woodlawn was conducted simultaneously. A member of the staff then reviewed the tapes noting vehicle type, color, and time to identify vehicle. During the AM peak hour there were 5 cut-through trips identified, and in the PM peak hour there were 7 cut-through trips identified.

Considering this information and given the volumes of traffic counted on Woodlawn Road there is no roadway capacity issue as a local access roadway can support the traffic volumes counted. Therefore, we must conclude that the main concern is speeding on Woodlawn Road, an element that we have not measured, and is not a part of this study. From our experience not all cut-through traffic speeds through a cut-through route. But speeding can be done by even those that live within the neighborhood. Therefore, we are going to leave this as an enforcement issue with the City of Spokane Valley.

We recommend that the neighborhood association invite a representative of the Spokane Valley Police department to attend one of their meetings in order to discuss the speeding issue. We also recommend that the neighborhood association talk to the public works director, and the traffic engineer of the City of Spokane Valley to discuss how they may incorporate traffic calming measures that will not interfere with road maintenance, such as curb extensions or traffic circles.

- Question: As a board member of Midlome East (neighborhood association), we have tried to talk to the agencies about the high traffic volumes on Woodlawn Road for the last 10 years, and have gotten nowhere. Will this issue get addressed?

We are aware of some of the issues with cut-through traffic. We will talk to the jurisdictions about this issue and see how they would like us to proceed.

- Question: Why is Pines Road shown as a Minor route for a portion of the road instead of a Major route throughout?

This issue will be addressed through the traffic counts, which will give us the necessary data to possibly consider Pines Road a major route throughout.

- Question: Will the developer pay for the mitigations?

The developer will pay for anything that he breaks (yes, he will mitigate to project impacts).

- There was a comment that someone lived on Woodlawn Road and eventually moved due to the extremely high traffic volumes.

This comment has been noted, Counts of Woodlawn do not seem excessive for a roadway utilized as a collector in the City of Spokane Valley.

- There was a comment that the intersection of Pines Road & 24th Avenue should be included in this study due to the high amount of people who travel through this intersection.

This comment has been noted; however, the agencies did not include this intersection into the study.

- Question: How long does the traffic study last?

Traffic studies are based on traffic counts. Counts are done on Tuesdays, Wednesdays, & Thursdays during the previously mentioned peak hours. These days have proven to be the most reliable and most accurate for showing true traffic volumes on the streets. In commercial areas, counts are performed from 10AM to 2PM. We do not count Sundays, unless there is a church problem. We can do a combination of tube counts and individual counts.

- There was a comment made that Chester School, on Thursdays, starts at 10:10AM.

This comment has been noted. See the previous response with regard to school peak hours.

- There was a comment made that tomorrow at 6PM, there is a community vision meeting at Mirabeau.

Our advice was to pay close attention to Growth Management and Growth Management meetings.

- Question: When will the traffic study start?

The traffic counts will begin next week.

- Question: Is each intersection scoped only counted once?

Yes, once in the AM and once in the PM.

- Question: Will the congestion, due to the school traffic on Pines Road, be accounted for in the traffic counts?

If the congestion falls within the time that the counts occur, then yes it will be counted in.

- Question: Will you count pedestrians?

Pedestrians were counted at the intersections. For the signalized intersections the pedestrians are grouped and queued at the corner where they push the crosswalk button and then cross the roadway this action is call a pedestrian call by the traffic software and is included as such. For pedestrians at an unsignalized intersection pedestrians are recorded, but are not used by the traffic software to model the intersection.

- Question: Where can we go to affect change?

One can go to the Growth Management meeting and participate in the Growth Planning Processes, and one can also attend the Hearing and speak to the Hearing Examiner.

- Question: How do you calculate the traffic volumes based on the number of new units to be installed?

Prior to this meeting, WCE turned in a Trip Generation & Distribution Letter to the jurisdictions that allowed us to have this meeting. We use the ITE Trip Generation Manual 9th Edition.

- Question: Can you describe an intersection? What is an intersection to you?

An intersection is where two streets come together or when a driveway and a street come together.

- Question: How many apartment projects are going in? How many people are there going to be? Who is paying the taxes on this new project to help build the new schools?

There is only the one apartment complex that is being proposed. There is also a mixed-use apartment land use. Studies show that about 1.77 people live in each unit. Also, the owner of the apartment complex pays property taxes that go to help fund the local schools.

- Question: If we live on 32nd Ave & McDonald Street and it is already hard for us to get onto 32nd Ave, doesn't it make sense that this problem will only get worse?

When we perform the traffic counts on certain intersections, we will calculate Level of Service for each intersection. Level of Service is based on a letter grade A-F, with F being the worst case. Todd Whipple then described the Levels of service with the delays and experiences of the driver.

- Question: Will you be studying where there are children school crosswalks?

A review of school crosswalks was not included, as this review would be between the school district and the City of Spokane Valley.

- Question: If it is decided that Madison Road needs further expansion, how will the traffic flow operate during construction?

The road will most likely not be closed if under construction, but after talks with the school districts and the City, construction will most likely be conducted throughout normal traffic hours.

- Question: Who decides which intersections will be counted in the study?

The agencies of the City of Spokane Valley, Spokane County, and WSDOT. You can also contact the City to see when the scoping meeting will take place in order to be a part of that.

- Question: What is your goal for LOS when conducting a traffic study?

It depends on the intersection and the Level of Service. If further mitigation has to be done to fix an intersection than that will occur. However, if the jurisdictions decide that, for instance, at

an intersection where a Level of Service "E" is existing and will continue to be this way, there might not be any change.

- Question: Are there any plans to run 40th Avenue over to Highway 27?

There used to be plans or Right-of-way, but there are no such plans anymore.

- Question: Are you planning for sidewalks & streetlights on Dishman-Mica Road & Madison Road?

Yes, as part of the frontage improvements to the streets, sidewalks and streetlights will be added or improved.

- Question: For the cottages, will there be one or two accesses?

There will be two accesses.

- Question: Are you familiar with Robie Street? Is there any chance that there could be access to the cottages using Robie Street?

WCE is not familiar with this intersection, but this question of an additional access to the north has been noted. ***After finding Robie Street, it was determined that the development will not pursue an access to the north.***

- Question: If from the traffic study, it is found that the intersection of 32nd Ave & Pines Road becomes highly congested, what is your solution?

We do not have a solution at this time. Through further study, it is our responsibility to find a solution if there happens to be a high congestion problem.

- Question: Will any changes that come from the traffic study be done before or after the construction?

Any changes in traffic will be concurrent with construction.

- Question: How far out, geographically, is the study responsible for?

The City of Spokane Valley & Spokane County have standards that we follow when performing the study. They will tell us which intersections to study, and before the study is completed, further intersections could be studied based on previous observations & data.

- Question: What would be needed to expand Dishman-Mica Road from two lanes to four lanes from University Road to Madison Road?

It would take a large additional traffic impact in order to expand the road in these areas.

- Question: Could you add a traffic count on the intersection of Woodlawn Road & 40th Ave?

Please see previous response regarding the additional traffic study to Woodlawn Road.

- Question: How much increase in traffic volume would warrant the installation of a new traffic signal?

Once intersections move towards a LOS "F", we move to a section called "Warrants". If an intersection moves towards two to four warrants, then a traffic signal could be installed.

- Question: How long is the time span for the traffic study, as the volume will grow over time as developments go up?

We will perform the traffic study for each phase of construction, and if a certain phase requires work to be done to improve a traffic problem, then the work will be done during that phase.

- There was a comment made that it seems like a conflict of interest for WCE to say that "we" are performing the traffic study.

The jurisdictions make the developer hire a traffic engineer to perform the study. The traffic engineer turns the work into the City, who then reviews it and makes necessary comments. Then, the traffic engineer makes the changes and eventually the City accepts the study as their own traffic study for the developer and his or her project, all as part of the SEPA and concurrency process.

- Question: How many cars does it take to determine a certain Level of Service?

LOS is determined by average delay, not the numeric number of cars waiting or using an intersection.

- Question: How many phases will there be for this project?

At this time, WCE has not decided the number of phases for the proposed project.

- Question: Living on Dishman-Mica Road, I'm wondering how long the left turn lanes would be off of the proposed center turn lane, because some turns are tight and short?

Left turns lanes are usually no less than 100 feet long, and not longer than 300 feet.

- Question: Do you consider projects that have already been approved by the County into your study?

Yes, we do consider these background projects into our traffic study. Further analysis is performed on projects that have been approved, but not fully built out. We treat all background projects to be fully built out to account for the most conservative results. Please see the background project section of this report.

- Question: Are you aware that there are developments along Madison Road that have been previously permitted by the County?

Please see the background project section of this report.

Note: WCE observed that many of the school congestion questions were from directly affected parents and seniors, that have a history of leaving and returning to their residence from 9 AM to 3 PM. WCE believes that this non-commuter perspective has skewed their perspective of the Peak hour. This being said the provided tube counts have established the peak traffic around the schools.

LEVEL OF SERVICE

Level of service (LOS) is an empirical premise developed by the transportation profession to quantify driver perception for such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles afforded to drivers who utilize the transportation network. It has been defined by the Transportation Research Board in the *2010 Highway Capacity Manual*. This document has quantified level of service into a range from "A" which indicates little, if any, vehicle delay, to "F" which indicates significant vehicle delay and traffic congestion that may lead to system breakdown due to volumes that may exceed capacity.

Signalized Intersections

For signalized intersections, research has determined that average delay per vehicle is the best available measure of level of service. The following tables identify the relationships between level of service and average stopped delay per vehicle. City of Spokane Valley (Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan), and WSDOT have adopted level of service D as the minimum acceptable level for all signalized intersections.

Level of Service Criteria and Descriptions - Signalized

LOS	Delay Range (sec)	General Description
A	10	• Very low delay at intersection. • All signal cycles clear. • No vehicles wait through more than one signal cycle.
B	10 to 20	• Operating speeds beginning to be affected by other traffic. • Short traffic delays at intersections. • Higher average intersections delays resulting from more vehicles stopping.
C	20 to 35	• Operating speeds and maneuverability closely controlled by other traffic. • Higher delays at intersections than for LOS B due to a significant number of vehicles stopping. • Not all signal cycles clear the waiting vehicles.
D	35 to 55	• Tolerable operating speeds, but long traffic delays occur at intersections • The influence of congestion is noticeable. • Many vehicles stop and the proportion of vehicles not stopping declines. • The number of signal cycle failures, for which vehicles must wait through more than one signal cycle are noticeable.
E	55 to 80	• Speeds are restricted, very long traffic delays are experienced and traffic volumes are near capacity. • Traffic flow is unstable, any interruption, no matter how minor, will cause queues to form and service to deteriorate. • Traffic signal cycle failures are frequent occurrences.
F	80	• Extreme delays resulting in long queues which may interfere with other traffic movements • Stoppages of long duration and speeds may drop to zero. • Vehicle arrival rates are greater than capacity. • Considered unacceptable by most drivers.

Unsignalized Intersections

The calculation of level of service (LOS) at an unsignalized one/two-way stop-controlled intersection is examined in the Transportation Research Board's *2010 Highway Capacity Manual*. For unsignalized intersections, level of service is based on the delay experienced by each movement and approach within the intersection. The concept of delay as presented for unsignalized intersections in the Highway Capacity Manual is based on the amount of time a vehicle must spend at the intersection. Vehicles passing straight through the intersection on the major (uncontrolled) street experience no delay at the intersection. On the other hand, vehicles which are turning left from the minor street, because they must yield the right of way to all right turning vehicles, all left turning vehicles from the major street and all through vehicles on both the minor and major streets, must spend more time at the intersection. Levels of service are assigned to individual movements within the intersection, and are based upon the delay experienced by each movement or approach.

The Transportation Research Board has determined what levels of service for unsignalized intersections should be, by designating level of service A through F, where level of service A represents a facility where no vehicle in any movement is delayed very long and level of service F which represents a facility where there is excessive delay for the average vehicle in at least one movement in the intersection. City of Spokane Valley (Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan), and WSDOT have adopted level of service E for all unsignalized intersections within the study area.

Level of Service Criteria and Descriptions - unsignalized

LOS	Delay Range (sec)	Expected Delay to Minor Street Traffic	General Description
A	10	Little to No Delay	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in the queue.
B	10 to 15	Short Traffic Delays	• Some drivers begin to consider the delay an inconvenience • Occasionally there is more than one vehicle in the queue.
C	15 to 25	Average Traffic Delays	• Many times there is more than one vehicle in the queue. • Most drivers feel restricted, but not objectionably so.
D	25 to 35	Long Traffic Delays	• Often there is more than one vehicle in the queue. • Drivers feel quite restricted.
E	35 to 50	Very Long Traffic Delays	• Represents conditions in which, demand is near or equal capacity. • There is almost always more than one vehicle in the queue. • Drivers find the delays approaching intolerable levels.
F	50	Stop-and-Go Condition Delays Generally Longer than Acceptable	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection

All level of service analyses described in this report were performed in accordance with the procedures described above. As a final note, the Highway Capacity Manual (HCM) analysis and procedures are based upon worst case conditions. Therefore, most of each weekday and the weekends will experience traffic conditions better than those described within this document, which are only for the peak hours of operation.

Existing Level of Service and Traffic Analysis

The existing levels of service at the existing intersections were calculated using the methods from the *2010 Highway Capacity Manual* as implemented in Synchro, *version 9 - Build 902*. The existing levels of service for the intersections within the study area are summarized on the following table. The existing traffic volumes used for this report are shown on Figures 3 & 4.

Table 2 – Year 2015 Existing Intersections Levels of Service

INTERSECTION (S)ignalized (U)nsignalized		AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
32nd Ave & University Rd***	S	11.5	B	11.4	B
Dishman-Mica Rd &University/Schafer Rd***	S	15.7	B	16.5	B
32nd Ave & Bowdish Rd***	S	13.1	B	11.7	B
Dishman-Mica Rd & Bowdish Rd***	S	12.0	B	11.1	B
Dishman-Mica Rd & Thorpe Rd***	U	10.7	B	10.4	B
16th Ave & Pines Rd (AM* PM***)	U	20.2	C	32.4	D
16th Ave & SR 27(AM* PM***)	S	27.7	C	25.5	C
32nd Ave & Pines Rd***	S	23.5	C	17.7	B
Madison Rd & Thorpe Rd**	U	11.0	B	9.5	A
32nd Ave & SR 27***	S	19.6	B	23.0	C
32nd Ave & Evergreen Rd(AM* PM***)	U	10.6	B	17.7	C
32nd Ave & Sullivan Rd(AM* PM***)	U	11.1	B	12.1	B

Intersections Counted: * January 2015, ** March 2015, *** October 2015

Intersection Level of Service - Deficiency Evaluation

There are no deficiencies identified for intersection level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan.

Intersection Movement Queue –Deficiency Evaluation for Existing Condition

The existing queue deficiencies are identified on Table 3 and are described as follows; all noted intersections are currently functioning at acceptable levels of service. All volumes are calculated and are not observed.

- The EB thru approach of the intersection of 16th Avenue & Highway 27 where the existing queue of 462 feet exceeds the available space of 60 feet by 402 feet.

- The WB thru approach of the intersection of 16th Avenue & Highway 27 where the existing queue of 258 feet exceeds the available space of 170 feet by 88 feet.

- The WB left turn approach of the intersection of 32nd Avenue & Highway 27 where the existing queue of 191 feet exceeds the available space of 150 feet by 41 feet.

- The WB thru approach of the intersection of 32nd Avenue & Highway 27 where the existing queue of 373 feet exceeds the available space of 165 feet by 208 feet.

Table 3 – Existing PM Peak Intersection Individual Movement Queue Lengths 95th Percentile

INTERSECTION (A)vailable Lane Storage (Q)ueue within the Storage Lane		**EB**			**WB**			**NB**			**SB**		
		L	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**
32nd Ave & University Rd	A		345			582		100	400		100	265	
	Q		105			81		27	26		81	34	
Dishman-Mica Rd & University/Schafer Rd	A	150	1,213	1,213	60	1,978		130	280		90	550	550
	Q	30	248	46	53	70		81	58		46	98	0
32nd Ave & Bowdish Rd	A	200	590		200	990			445			280	
	Q	9	282		32	155			98			119	
Dishman-Mica Rd & Bowdish Rd	A	100	863		100	680			360			290	135
	Q	17	158		26	84			90			80	0
Dishman-Mica Rd & Thorpe Rd	A					1,303						700	
	Q					10						5	
16th Ave & Pines Rd*	A				60				662			300	
	Q				5				50			147.5	
16th Ave & SR 27*	A		**60**	60		**170**		240	3,708		325	630	
	Q		**462**	17		**262**		49	170		131	181	
32nd Ave & Pines Rd*	A	240	490		240	980		130	425		160	700	
	Q	24	434		41	273		38	64		43	86	
Madison Rd & Thorpe Rd	A		1,303						400				
	Q		7.5						2.5				
32nd Ave & SR 27*	A	170	900		**150**	**165**		200	460		265	1,240	
	Q	121	221		**191**	**373**		159	101		74	138	
32nd Ave & Evergreen Rd	A	100									75	315	
	Q	17.5									17.5	42.5	
32nd Ave & Sullivan Rd	A		600										
	Q		40										
A = Available Space (ft) Q = 95th Percentile Queue Length					Apparent Deficiency								

*A graphical exhibit of these Queue lengths are shown on Figures 13A through 13c.

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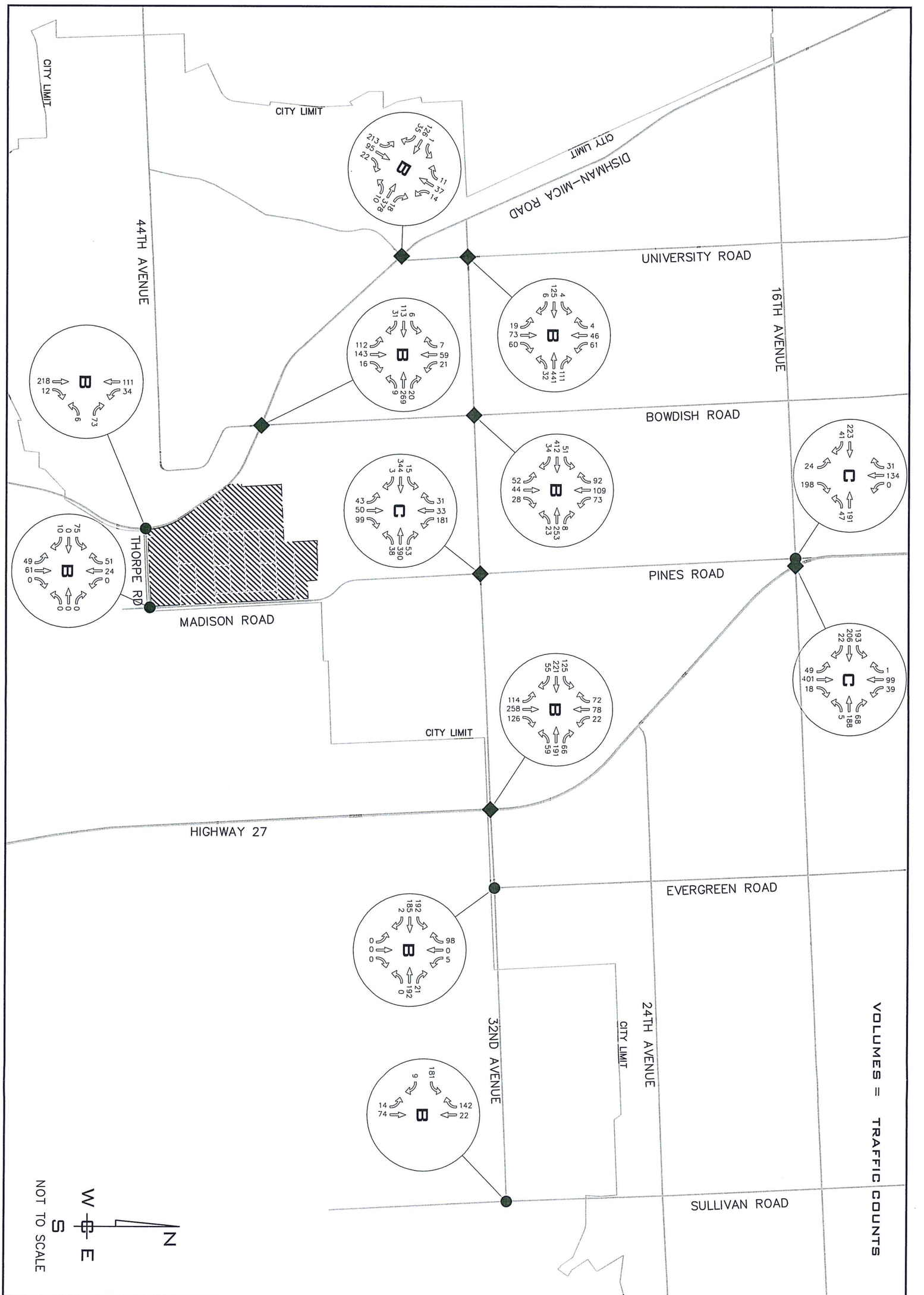

FIGURE 3

TRAFFIC IMPACT ANALYSIS
PAINTED HILLS PRD
MADISON ROAD & THORPE ROAD
SPOKANE VALLEY, WASHINGTON

2015 AM TRAFFIC VOLUMES & LOS

PROJ #: 13-1166
DATE: 12/14/15
DRAWN: BNG
APPROVED: TRW

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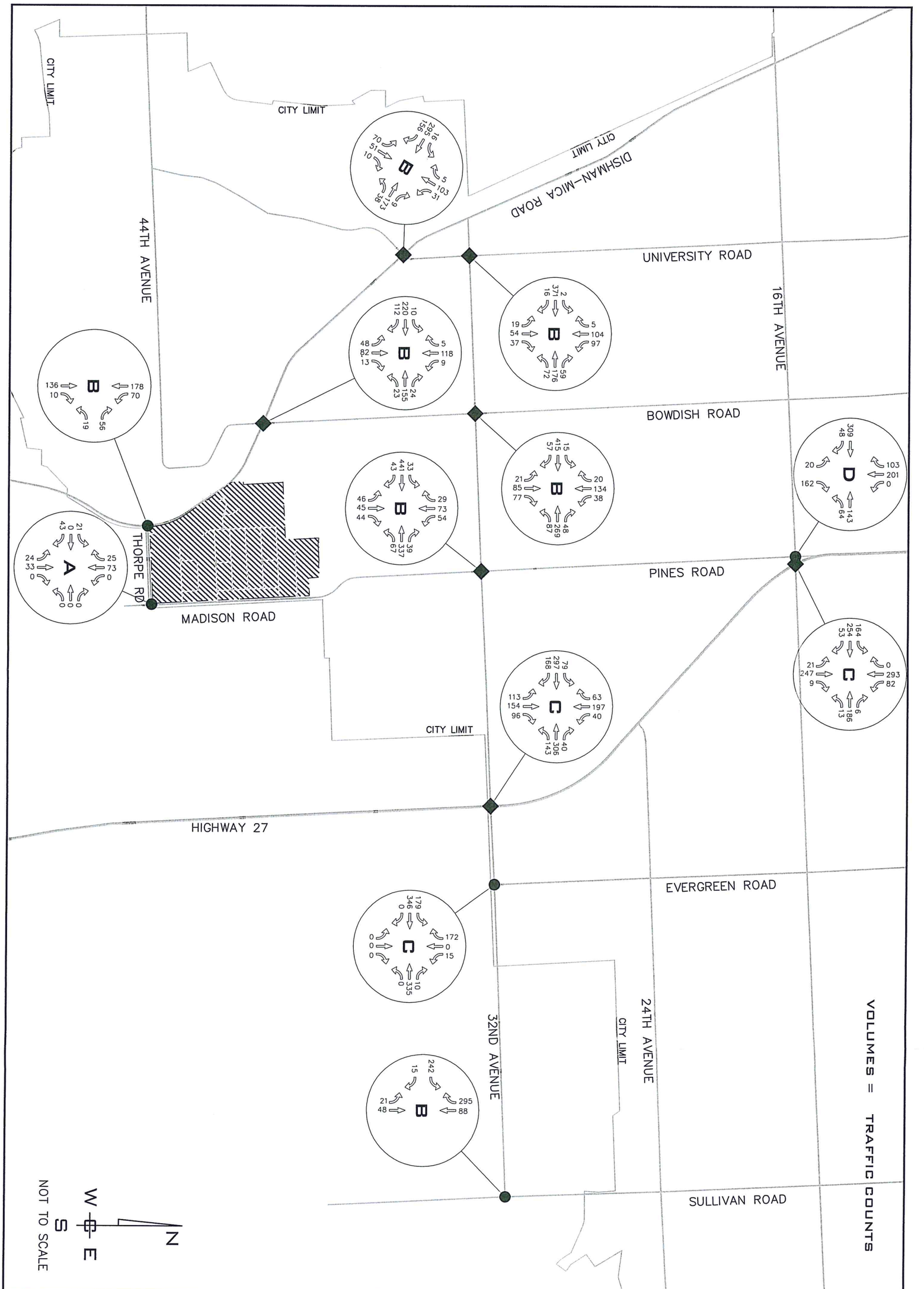

FIGURE 4

TRAFFIC IMPACT ANALYSIS
PAINTED HILLS PRD
MADISON ROAD & THORPE ROAD
SPOKANE VALLEY, WASHINGTON

2015 PM TRAFFIC VOLUMES & LOS

PROJ #: 13-1166
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Background Traffic Growth

Background traffic growth is an anticipated increase in traffic volume from year to year. As the existing land uses that surround a transportation facility mature, an increase in traffic results may be due to either an increase in drivers per household or a household's purchase of an additional vehicle. Many things can cause an increase in the traffic volumes of a facility. The objective of the background traffic growth rate is to anticipate what the traffic volumes may be in the future. The background traffic growth rate for an area or street is determined by means of physical counts collected by local governmental agencies. The counts are compared on a yearly basis and a rate of increase is calculated from the data.

For the study area, the background growth rate was determined by the City of Spokane Valley to be 1.1% per year. Based on a ten-year build out (2025), compounded annually, the total increase in traffic is anticipated to total 11.6%. For the buildout plus 5 years (2030) the total increase in traffic is anticipated to total 17.8%.

Background Project Traffic

In addition to the increase in background growth, background projects that have already been approved or have made application and vested before this project have been included. The following projects have been scoped by the City of Spokane Valley, Spokane County, and WSDOT.

Table 4 – Background projects and Vested AM & PM Trips

Background Project	**Remaining Lots/ units**	**AM Peak Hour Trips**			**PM Peak Hour Trips**		
		Total	**In**	**Out**	**Total**	**In**	**Out**
Paxton Addition	13 lots	10	3	7	13	8	9
The Creek at Chester	44 lots	33	9	24	44	29	15
Pine Valley Ranch Apts.	132 units	69	14	55	90	59	31
Elk Ridge Heights	78 lots	59	15	44	79	51	28
Total Vested	-	**171**	**41**	**130**	**226**	**147**	**83**

Since the traffic from these background projects are not currently included in the existing traffic counts/volumes, the AM & PM trips anticipated from these developments are added to the future projected traffic volumes. Please see the anticipated increase of traffic due to the build out of these background projects per intersection on Figures 5 & 6.

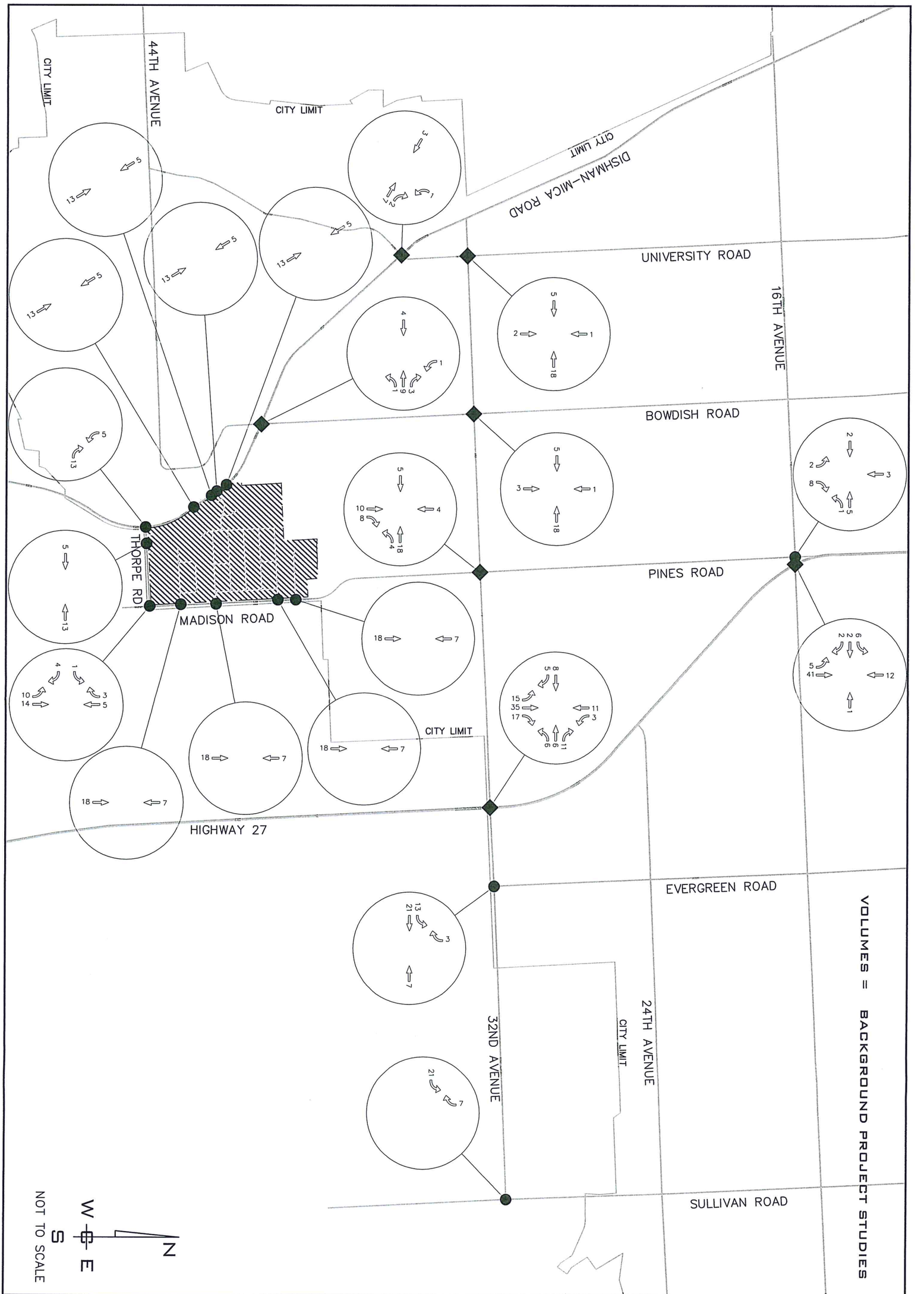

FIGURE 5

TRAFFIC IMPACT ANALYSIS
PAINTED HILLS PRD
MADISON ROAD & THORPE ROAD
SPOKANE VALLEY, WASHINGTON

AM BACKGROUND TRIPS

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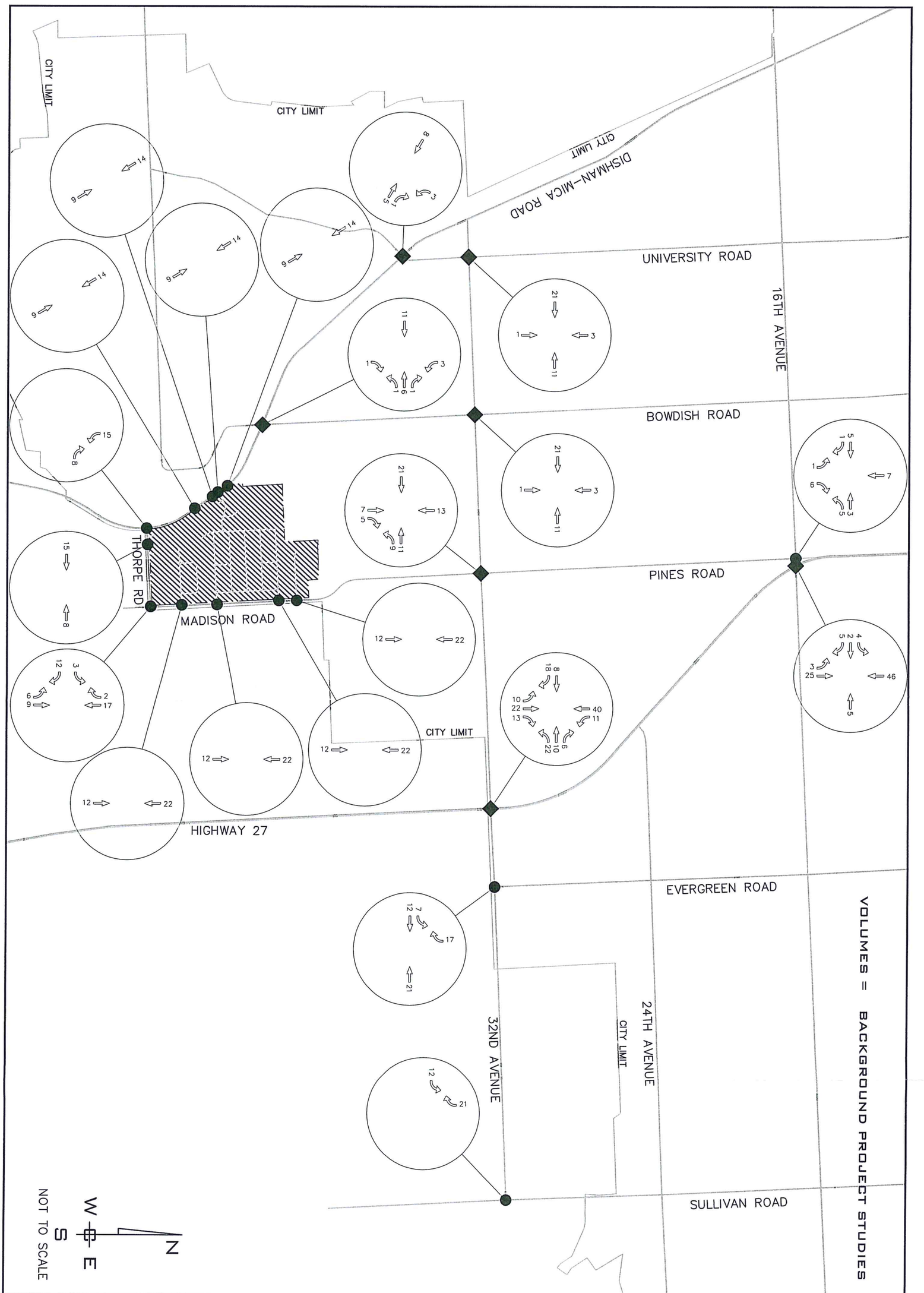

FIGURE 6

TRAFFIC IMPACT ANALYSIS
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SPOKANE VALLEY, WASHINGTON

PM BACKGROUND TRIPS

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TRIP GENERATION AND DISTRIBUTION

Trip generation rates for the AM and PM peak hours are determined by the use of the *Trip Generation Manual, 9th 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.

For the proposed development that includes 52 Cottage Style Single Family Lots, 206 Single Family Residential Lots, 42 Estate Type Single Family Lots, 228 Apartment Units, and two areas of commercial development (north-south). The north area includes 13,400 sf (13.4 KSF) of Retail area as well as 52 apartment units proposed to be located above the retail area. The south area includes 9,000 sf (9.0 ksf) of retail area and a 4,000 sf (4.0 KSF) Quality Restaurant. The ITE Trip Generation Land Use Code (LUC) for each land use is listed below in Table 5.

Table 5 – Description of Land Use Code

Description	Number of Units / KSF	Land Use Code (LUC)
Cottage Style Single Family Lots	52 Units	Residential Townhouses – 230
Single Family Residential	206 Units	Single Family Residential – 210
Single Family Residential Estate Type	42 Units	Single Family Residential – 210
Apartments	228 Units	Apartments – 220
Apartments (mixed use) (North)	52 units	Apartments – 220
Commercial Development (North)	13.4 KSF	Shopping Center – 820
Commercial Development (South)	9.0 KSF	Shopping Center – 820
Existing Restaurant (South)	4.0 KSF	Quality Restaurant - 931

Cottage Style Single Family Lots

For the 52 Cottage Style Single Family lots, Land Use Code #230, Residential Condominium/Townhouses was used to determine the trips generated by the proposed land use. The trips generated by the cottage Style Single Family land use are shown in Table 6.

Table 6 - Trip Generation Rates for Cottage Style Single Family Lots LUC #230 Residential Townhouses

Number of Lots	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 0.44 trips/ Unit	Directional Distribution		Vol. @ 0.52 trips/ Unit	Directional Distribution	
		17% In	83% Out		67% In	33% Out
52	23	4	19	28	19	9
Average Daily Trip Ends (ADT)						
Lots	Rate	ADT				
52	5.81	303				

As shown in Table 6, in the AM peak hour the land use is anticipated to generate 23 new trips, with 4 new trips entering the site, and 19 new trips exiting the site. In the PM peak hour, the land use is anticipated to generate 28 new trips; with 19 new trips entering the site, and 9 new trips exiting the site. The land use is anticipated to have an Average Daily Trips (ADT) of 303 trips to/from the site per day.

Single Family Residential

For the 206 single family units, Land Use Code #210, Single Family Residential, was used to determine the trips generated by the proposed land use. The trips generated by the single family residential land use are shown in Table 7.

Table 7 - Trip Generation Rates for Single Family Lots LUC #210 Single Family Residential

Number of Lots	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 0.75 Trips/Unit	Directional Distribution		Vol. @ 1.0 Trips/Unit	Directional Distribution	
		25% In	75% Out		63% In	37% Out
206	155	39	116	206	130	76
Internal	0	0	0	5	3	2
New	155	39	116	201	127	74
Average Daily Trip Ends (ADT)						
Lots	Rate	ADT				
206	9.52	1,962				

As shown in Table 7, in the AM peak hour the land use is anticipated to generate 155 new trips, with 39 new trips entering the site, and 116 new trips exiting the site. In the PM peak hour the land use is anticipated to generate 201 new trips; with 127 new trips entering the site, and 74 new trips exiting the site. The land use is anticipated to have an Average Daily Trips (ADT) of 1,962 trips to/from the site per day.

Estate Type Single Family Lots – Single Family Residential

For the 42 Estate Type Single Family lots, Land Use Code #210, Single Family Residential, was used to determine the trips generated by the proposed land use. The trips generated by the Estate type lots land use are shown in Table 8.

Table 8 - Trip Generation Rates for Estate Type Single Family Lots LUC #210 Single Family Residential

Number of Units	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 0.75 Trips/Unit	Directional Distribution		Vol. @ 1.0 Trips/Unit	Directional Distribution	
		25% In	75% Out		63% In	37% Out
42	32	8	24	42	26	16
Average Daily Trip Ends (ADT)						
Units	Rate	ADT				
42	9.52	400				

As shown in Table 8, in the AM peak hour the land use is anticipated to generate 32 new trips, with 8 new trips entering the site, and 24 new trips exiting the site. In the PM peak hour, the land use is anticipated to generate 42 new trips; with 26 new trips entering the site, and 16 new trips exiting the site. The land use is anticipated to have an Average Daily Trips (ADT) of 400 trips to/from the site per day.

Apartments – Multi-Family Residential

For the 228-unit Multi-Family Apartment Complex, Land Use Code #220, Apartment was used to determine the trips generated by the proposed land use. The trips generated by the apartment land use are shown in Table 9.

Table 9 - Trip Generation Rates for Apartment Units LUC #220 Apartment

Number of Units	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 0.51 Trips/Unit	Directional Distribution		Vol. @ 0.62 Trips/Unit	Directional Distribution	
		20% In	80% Out		65% In	35% Out
228	117	23	94	142	92	50
Internal	0	0	0	4	2	2
New	117	23	94	138	90	48

Average Daily Trip Ends (ADT)		
Units	Rate	ADT
228	6.65	1,517

As shown in Table 7, in the AM peak hour the land use is anticipated to generate 117 new trips, with 23 new trips entering the site, and 94 new trips exiting the site. In the PM peak hour the land use is anticipated to generate 137 new trips; with 89 new trips entering the site, and 48 new trips exiting the site. The land use is expected to have an Average Daily Trips (ADT) of 1,517 trips to/from the site per day.

52 Apartments (Mixed Use) – Multi-Family Residential

For the Multi-Family Apartment Units (Mixed Use) located above the commercial development, Land Use Code #220, Apartment was used to determine the trips generated for the proposed land use. The trips generated by the Apartment (Mixed Use) land use are shown in Table 10.

Table 10 - Trip Generation Rates for LUC #220 Apartment (Mixed Use)

Number of Units	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 0.51 Trips/Unit	Directional Distribution		Vol. @ 0.62 Trips/Unit	Directional Distribution	
		20% In	80% Out		65% In	35% Out
52	27	5	22	33	21	12
Internal	0	0	0	1	1	0
New	27	5	22	32	20	12

Average Daily Trip Ends (ADT)		
Units	Rate	ADT
52	6.65	346

As shown in Table 10, in the AM peak hour the land use, above the commercial development, are anticipated to generate 27 new trips, with 5 new trips entering the site, and 22 new trips exiting the site. In the PM peak hour the land use is anticipated to generate 33 new trips; with 21 new trips entering the site, and 12 new trips exiting the site. The land use is anticipated to have an Average Daily Trips (ADT) of 346 trips to/from the site per day.

Commercial

For the 13,400 sf (13.4 KSF) retail area of the north area Land Use Code #820, Shopping Center was used to determine the trips generated by the proposed land use. The trips generated by the north commercial development land use are shown in Table 11.

Table 11 - Trip Generation Rates for LUC #820 Shopping Center (North)

Thousand Square Feet KSF (Max)	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 0.96 Trips/KSF	Directional Distribution		Vol. @ 3.71 Trips/KSF	Directional Distribution	
		62% In	38% Out		48% In	52% Out
13.4	13	8	5	50	24	26
Internal	0	0	0	10	4	6
Driveway	13	8	5	40	20	20
Pass By	-	-	-	14	7	7
New	13	8	5	26	13	13
Average Daily Trip Ends (ADT)				PM Pass-by 34% per ITE Trip Handbook Table 5.6		
KSF	Rate	ADT				
13.4	42.7	573				

As shown in Table 11, in the AM peak hour the land use is anticipated to generate 13 new trips, with 8 new trips entering the site, and 5 new trips exiting the site. In the PM peak hour, the land use is anticipated to generate 26 new trips; with 13 new trips entering the site, and 13 new trips exiting the site. The land use is anticipated to have an Average Daily Trips (ADT) of 573 trips to/from the site per day.

For the 9,000 sf (9.0 KSF) retail area of the south area Land Use Code #820, Shopping Center was used to determine the trips generated by the proposed land use. The trips generated by the north commercial development land use are shown in Table 12.

Table 12 - Trip Generation Rates for LUC #820 Shopping Center (South)

Thousand Square Feet KSF (Max)	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 0.96 Trips/KSF	Directional Distribution		Vol. @ 3.71 Trips/KSF	Directional Distribution	
		62% In	38% Out		48% In	52% Out
9.0	9	6	3	34	16	18
Average Daily Trip Ends (ADT)						
KSF	Rate	ADT				
9.0	42.7	385				

As shown in Table 12, in the AM peak hour the south land use is anticipated to generate 9 new trips, with 6 new trips entering the site, and 3 new trips exiting the site. In the PM peak hour, the south land use is anticipated to generate 22 new trips; with 10 new trips entering the site, and 12 new trips exiting the site. The south land use is anticipated to have an Average Daily Trips (ADT) of 385 trips to/from the site per day.

For the 4,000 sf (4.0 ksf) Restaurant Land Use Code #931 Quality Restaurant was used to determine the trips generated by the proposed land use. The trips generated by the proposed land use are shown in Table 13.

Table 13 - Trip Generation Rates for LUC #931 Quality Restaurant (South)

Thousand Square Feet KSF (Max)	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 0.81 Trips/KSF	Directional Distribution		Vol. @ 7.49 Trips/KSF	Directional Distribution	
		50% In	50% Out		67% In	33% Out
4.0	4	2	2	30	20	10

Average Daily Trip Ends (ADT)		
KSF	Rate	ADT
4.0	89.95	360

As shown in Table 13, in the AM peak hour the land use is anticipated to generate 4 new trips, with 2 new trips entering the site, and 2 new trips exiting the site. In the PM peak hour, the land use is anticipated to generate 30new trips; with 20 new trips entering the site, and 10 new trips exiting the site. The land use is anticipated to have an Average Daily Trips (ADT) of 360 trips to/from the site per day.

New Trips

The proposed development new trips generated on the transportation system are shown in the table below.

Table 14 – New Trips Generation Summary

Land Use Code (LUC)	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. per LUC	Directional Distribution		Vol. per LUC	Directional Distribution	
		In	Out		In	Out
LUC #230 Townhouses (Cottage Style) (Table 6)	23	4	19	28	19	9
LUC #210 Single Family Residential (Table 7)	155	39	116	201	127	74
LUC #210 SFR (Estate Lots) (Table 8)	32	8	24	42	26	16
LUC #220 Apartment (Table 9)	117	23	94	138	90	48
LUC #220 Apartment (mixed use) (Table 10)	27	5	22	32	20	12
LUC #820 Shopping Center (Table 11)	13	8	5	40	20	20
LUC #820 Shopping Center (Table 12)	9	6	3	34	16	18
LUC #931 Quality Restaurant (Table 13)	4	2	2	30	20	10
Total	380	95	285	545	338	207

Average Daily Trip Ends (ADT)		
Land Use Code (LUC)	Rate	ADT
LUC #230 Townhouses (Cottage Style) (Table 6)	-	303
LUC #210 Single Family Residential (Table 7)	-	1,962
LUC #210 SFR (Estate Lots) (Table 8)	-	400
LUC #220 Apartment (Table 9)	-	1,517
LUC #220 Apartment (mixed use) (Table 10)	-	346
LUC #820 Shopping Center (Table 11)	-	573
LUC #820 Shopping Center (Table 12)		385
LUC #931 Quality Restaurant (Table 13)		360
Total	-	5,846

As shown in Table 14, in the AM peak hour the land uses of the project is anticipated to generate 380 new trips, with 95 new trips entering the site, and 285 new trips exiting the site via the eight access opportunities previously noted. In the PM peak hour, the land uses of the project are anticipated to generate 545 new trips; with 338 new trips entering the site, and 207 new trips

exiting the site via the eight access opportunities previously noted. The land uses of the project are anticipated to have an Average Daily Trips (ADT) of 5,846 trips to/from the site per day, via the 9 access opportunities previously noted.

Pass-by Trips

The pass-by trips, as shown on Table 11, is a trip that is currently on the adjacent roadway and turns into the land use as a matter of convenience on the way to their final destination (work/home). The proposed development pass-by trips generated on the transportation system are shown in the table below. Please see the map of pass-by trips on Figure 9.

Table 15 – Pass-by Trips Generation Summary

Land Use Code (LUC)	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. per LUC	Directional Distribution		Vol. per LUC	Directional Distribution	
		In	Out		In	Out
LUC #820 Shopping Center (Table 11) (north)	-	-	-	14	7	7

As shown in Table 13, in the AM peak hour the commercial development is not anticipated to generate pass-by trips. In the PM peak hour, the commercial development is anticipated to generate 14 pass-by trips; with 7 pass-by trips entering the site, and 7 pass-by trips exiting the site.

Internal Trips

The internal trip is a trip that is generated within the proposed land uses when a vehicle/consumer will stop at more than one place on the site or within the PRD. The internal trip generation was established using the methodology set forth in ITE Trip Generation Handbook Chapter 7. The proposed development internal trip generation on the internal road network between the Single Family Residential, Apartments, and north Commercial land uses are summarized in the table below.

Table 16 – Internal Trips Generation Summary

Land Use Code (LUC)	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. per LUC	Directional Distribution		Vol. per LUC	Directional Distribution	
		In	Out		In	Out
LUC #210 Single Family Residential (Table 7)	0	0	0	5	3	2
LUC #220 Apartment (Table 9)	0	0	0	4	2	2
LUC #220 Apartment (mixed use) (Table 10)	0	0	0	1	1	
LUC #820 Shopping Center (Table 11) (north)	0	0	0	(10)	(4)	(6)

Table 16, shows that there is no anticipated internal trip in the AM peak hour between land uses. In the PM peak hour Table 16 Shows that the 6 trips out of the shopping center go into the single family and Multi-Family Residential land uses and vice versa that the 4 trips into the shopping center came from the Single and Multi-Family Land uses.

Trip Distribution Characteristics for the Proposed Project

Considering many factors such as the development surrounding the proposed project, the general commuter traffic in the area, the geography in the vicinity of the site, and the existing transportation facilities in the surrounding area, the following distribution from the proposed project applies:

Cottages Style Single Family (Townhouses)
It is anticipated that 100% of the trips will go to/from the north via Madison Road towards 32nd Avenue. At 32nd Avenue, traffic will follow the existing traffic patterns of the intersection, In the AM peak hour from the intersection of 32nd Avenue & Pines Road 57% of the trips will be traveling to/from the east, 29% of the trips will be traveling to/from the north, and 14% of the trips will be traveling to/from the west. Please see Figure 7A in the appendix. In the PM peak hour from the intersection of 32nd Avenue & Pines Road 44% of the trips will be traveling to/from the east, 32% of the trips will be traveling to/from the north, and 24% of the trips will be traveling to/from the west. Please see Figure 8A in the appendix.

Estate Type Single Family
It is anticipated that 50% of the trips will go to/from the north on Madison Road towards 32nd Avenue, and 50% of the trips will go to/from the south on Madison Road towards Thorpe Road, then towards Dishman-Mica Road, where 45% of trips go to/from the north, and 5% of trips go to/from the south. Please see Figures 7B and 8B in the appendix.

> At the intersection of Dishman-Mica Road & Bowdish Road In the AM peak hour 5% will go to/from the north 31% will go to/from the west and 9% will go to/from the south. In the PM peak hour 5% will go to/from the north 38% will go to/from the west and 2% will go to/from the south.
>
> At the intersection of 32nd Avenue & Pines Road In the AM peak hour 9% will go to/from the west, 16% will go to/from the north and 25% will go to/from the east. In the PM peak hour 12% will go to/from the west, 16% will go to/from the north and 22% will go to/from the east.

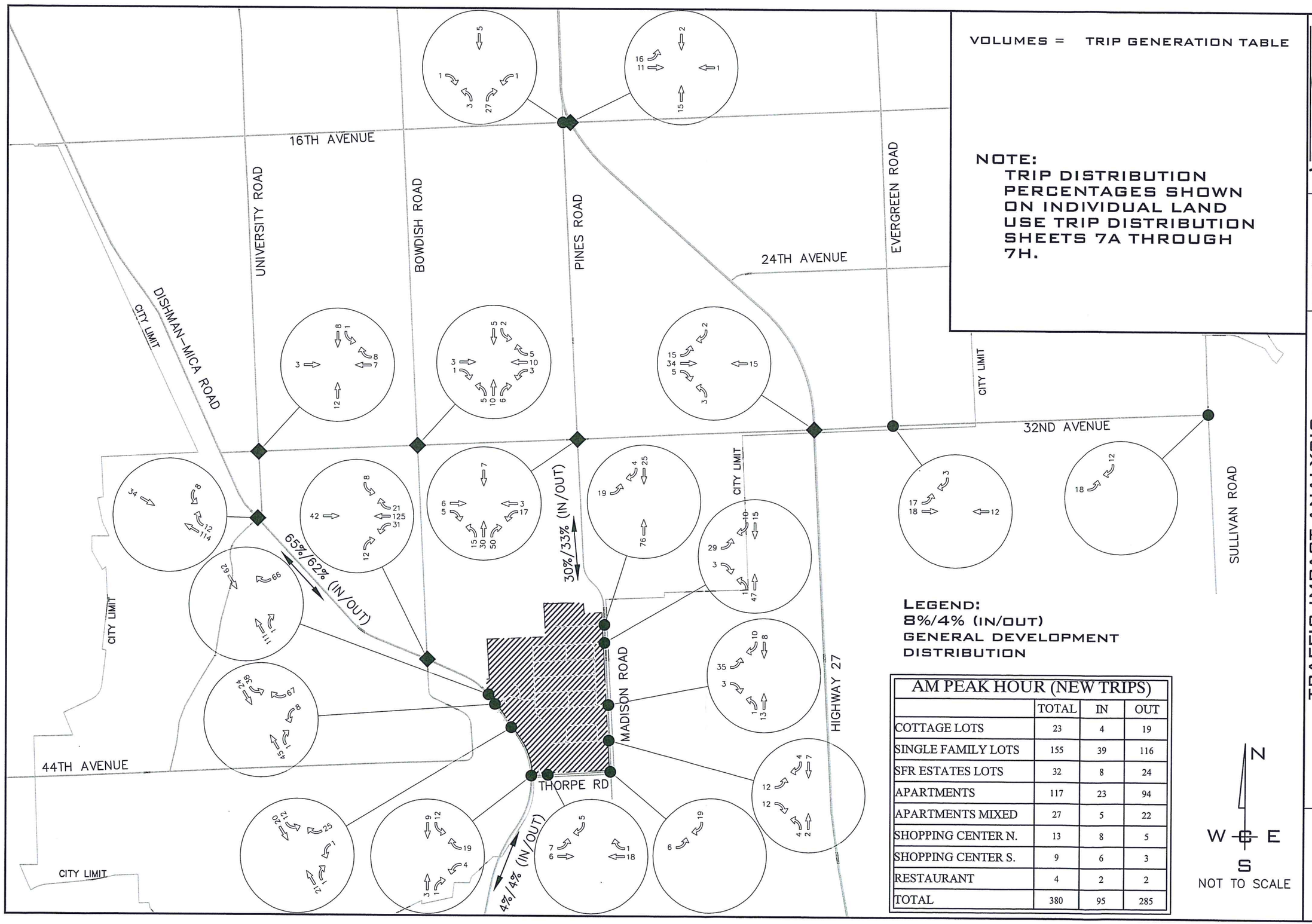
Single Family Residential
It is anticipated that the trips will be split 50/50 with half of the trips going to Madison Road, and half of the trips going to Dishman-Mica Road where 45% go to/from the north and 5% go to/from the south. Please see Figures 7C and 8C in the appendix.

> At the intersection of Dishman-Mica Road & Bowdish Road In the AM peak hour 5% will go to/from the north 31% will go to/from the west and 9% will go to/from the south. In the PM peak hour 5% will go to/from the north 38% will go to/from the west and 2% will go to/from the south.
>
> At the intersection of 32nd Avenue & Pines Road In the AM peak hour 9% will go to/from the west, 16% will go to/from the north and 25% will go to/from the east. In the

PM peak hour 12% will go to/from the west, 16% will go to/from the north and 22% will go to/from the east.

Apartments - Apartments (Mixed Use) –Land uses Commercial

It is anticipated that 100% of the trips will go to/from Dishman-Mica Road, where 5% of trips go to/from the south, and 5% of trips will go east around to Madison Road and 90% of trips go to/from the north, where in the AM peak hour 11% will go to/from the north 61% will go to/from the west and 18% will go to/from the south. In the PM peak hour 10% will go to/from the north 76% will go to/from the west and 4% will go to/from the south. Beyond this distribution trips will follow existing traffic patterns. For Apartments Please see Figures 7D and 8D in the appendix. For Apartments (Mixed Use) please see Figures 7E and 8E in the appendix. For Commercial Please see Figures 7F and 8F in the appendix.



VOLUMES = TRIP GENERATION TABLE

NOTE:
TRIP DISTRIBUTION PERCENTAGES SHOWN ON INDIVIDUAL LAND USE TRIP DISTRIBUTION SHEETS 7A THROUGH 7H.

LEGEND:
8%/4% (IN/OUT)
GENERAL DEVELOPMENT DISTRIBUTION

AM PEAK HOUR (NEW TRIPS)			
	TOTAL	IN	OUT
COTTAGE LOTS	23	4	19
SINGLE FAMILY LOTS	155	39	116
SFR ESTATES LOTS	32	8	24
APARTMENTS	117	23	94
APARTMENTS MIXED	27	5	22
SHOPPING CENTER N.	13	8	5
SHOPPING CENTER S.	9	6	3
RESTAURANT	4	2	2
TOTAL	380	95	285

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PROJ #: 13-1166
DATE: 12/14/15
DRAWN: BNG
APPROVED: TRW

TRAFFIC IMPACT ANALYSIS
PAINTED HILLS PRD
MADISON ROAD & THORPE ROAD
SPOKANE VALLEY, WASHINGTON

AM PEAK HOUR TRIP DISTRIBUTION

FIGURE
7

16TH AVENUE
UNIVERSITY ROAD
BOWDISH ROAD
PINES ROAD
EVERGREEN ROAD
24TH AVENUE
32ND AVENUE
DISHMAN–MICA ROAD
CITY LIMIT
SULLIVAN ROAD
MADISON ROAD
THORPE RD
HIGHWAY 27
44TH AVENUE
61%/62% (IN/OUT)
31%/29% (IN/OUT)
4%/5% (IN/OUT)

VOLUMES = TRIP GENERATION TABLE

NOTE:
TRIP DISTRIBUTION PERCENTAGES SHOWN ON INDIVIDUAL LAND USE TRIP DISTRIBUTION SHEETS 8A THROUGH 8F.

LEGEND:
6%/8% (IN/OUT)
GENERAL DEVELOPMENT DISTRIBUTION

PM PEAK HOUR (NEW TRIPS)

	TOTAL	IN	OUT
COTTAGE LOTS	28	19	9
SINGLE FAMILY UNITS	201	127	74
SFR ESTATE LOTS	42	26	16
APARTMENTS	138	90	48
APARTMENTS MIXED	32	20	12
SHOPPING CENTER N.	40	20	20
SHOPPING CENTER S.	34	16	18
RESTAURANT	30	20	10
TOTAL	545	338	207

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TRAFFIC IMPACT ANALYSIS
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MADISON ROAD & THORPE ROAD
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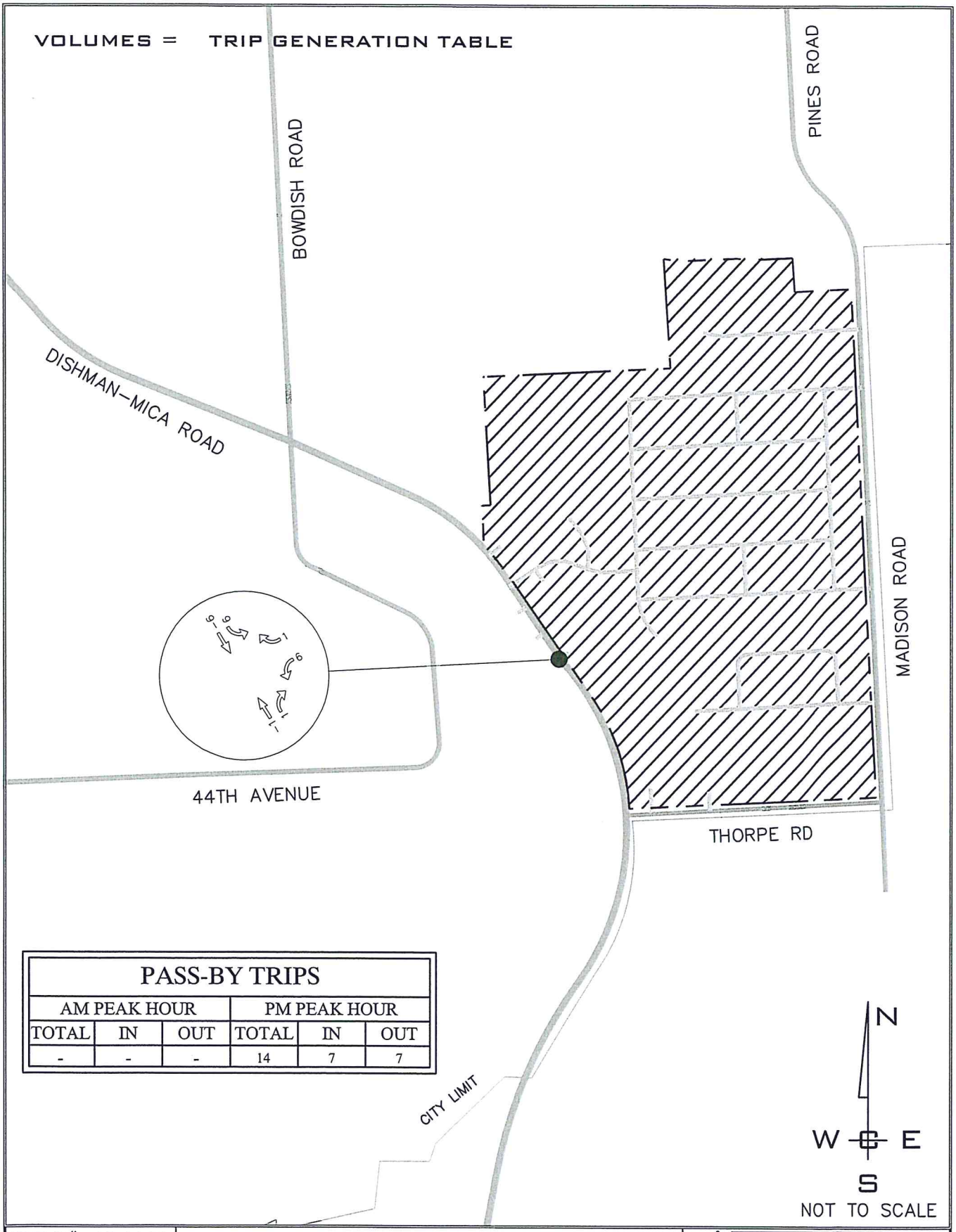
PM PEAK HOUR TRIP DISTRIBUTION

FIGURE
8

VOLUMES = TRIP GENERATION TABLE



PASS-BY TRIPS					
AM PEAK HOUR			PM PEAK HOUR		
TOTAL	IN	OUT	TOTAL	IN	OUT
-	-	-	14	7	7

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TRAFFIC IMPACT ANALYSIS
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FIGURE 9

PM PASS-BY TRIPS

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FUTURE YEAR TRAFFIC IMPACT ANALYSIS

Future Year Traffic Impact Analysis

Level of service calculations for the buildout Year (2025) & the buildout year plus 5 years (2030) conditions assumed that the existing traffic volumes as shown on Figures 3 & 4 experience an increase above the year 2015 volumes at the established background rate. Two scenarios were examined for the year 2025 (buildout) analysis, as well as the 2030 buildout year plus 5 years. The first scenario assumes that the development has not moved forward and analyzes the scoped intersections with the background growth rate and the background project trips. The second scenario assumes that the development has moved forward to completion and is builtout. The scenario analyzes the scoped intersections with the background growth rate, the background projects, and the project trips. These scenarios will allow a determination to be made of what the future conditions may be with and without the project.

Year 2025 Buildout without the Project, with the Background Projects

This scenario assumes that the development has not moved forward and the background projects have been completed. The traffic volumes for this condition include the existing traffic, as shown on Figures 3 & 4 multiplied by the background growth rate, plus the traffic from the original background projects as shown on Figures 5 & 6. Please see Figures 10 & 11 for the traffic volumes used for this scenario. A summary of the level of service results are shown in the following table.

Table 17 - Year 2025 Levels of Service, without the Project, with the Background Projects

INTERSECTION	(S)ignalized (U)nsignalized	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
32nd Ave & University Rd	S	12.2	B	11.9	B
Dishman-Mica Rd & University/Schafer Rd	S	16.4	B	17.2	B
32nd Ave & Bowdish Rd	S	15.2	B	13.5	B
Dishman-Mica Rd & Bowdish Rd	S	12.8	B	11.8	B
Dishman-Mica Rd & Thorpe Rd	U	11.3	B	10.9	B
16th Ave & Pines Rd • Paired Signalized Intersections	U (S)	26.2 (30.5)	D (C)	**66.4** (33.7)	**F** (C)
16th Ave & SR 27 • Paired Signalized Intersections	S	33.6 (42.3)	C (D)	30.3 (28.4)	C (C)
32nd Ave & Pines Rd	S	27.0	C	21.9	C
Madison Rd & Thorpe Rd	U	12.1	B	9.9	A
32nd Ave & SR 27	S	22.3	C	28.2	C
32nd Ave & Evergreen Rd	U	11.2	B	23.6	C
32nd Ave & Sullivan Rd	U	12.0	B	13.2	B

Intersection Level of Service - Deficiency Evaluation

Without the project there is a deficiency identified for intersection level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan, at the intersection of 16th Avenue & Pines Road. The deficiency in LOS can be remedied by Signalizing the intersection and pairing the signal timing with the intersection of 16th Avenue & Highway 27, given their close proximity.

Intersection Movement Queue - Deficiency Evaluation for 2025 Without the Project

The queue deficiencies are identified on Table 17 and described as follows; These deficiencies are solely based upon the Background trips (unmitigated) reported within this report. All noted intersections are anticipated to function at acceptable levels of service.

Year 2015 Existing vs. Year 2025w-o Proj,

16th Avenue & State Route 27

- The EB through approach as reported is expected to go from a queue length of 462 feet to a queue length of 586 feet or an increase of 124 feet. And the reported queue exceeds the available space by 526 feet.
- The WB thru approach as reported is expected to go from a queue length of 262 feet to a queue length of 310 feet or an increase of 48 feet. And the reported queue exceeds the available space by 140 feet.

32nd Avenue & Pines Road

- The EB through approach as reported is expected to go from a queue length of 434 feet to a queue length of 562 feet or an increase of 128 feet. And the reported queue exceeds the available space by 72 feet.

32nd Avenue & State Route 27

- The WB through approach as reported is expected to go from a queue length of 373 feet to a queue length of 470 feet or an increase of 97 feet. And the reported queue exceeds the available space by 305 feet.
- The WB left turn approach as reported is expected to go from a queue length of 191 feet to a queue length of 246 feet or an increase of 55 feet. And the reported queue exceeds the available space by 96 feet.

Table 18 – Year 2025 PM Peak W-O the Project, Intersection Queue Lengths 95th Percentile

INTERSECTION (A)vailable Lane Storage (Q)ueue within the Storage Lane		EB			WB			NB			SB		
		L	T	R	L	T	R	L	T	R	L	T	R
32nd Ave & University Rd	A		345			582		100	400		100	265	
	Q		127			98		29	30		88	38	
Dishman-Mica Rd & University/Schafer Rd	A	150	1,213	1,213	60	1,978		130	280		90	550	550
	Q	32	291	49	56	80		89	64		53	109	0
32nd Ave & Bowdish Rd	A	200	590		200	990			445			280	
	Q	10	403		37	190			111			135	
Dishman-Mica Rd & Bowdish Rd	A	100	863		100	680			360			290	135
	Q	18	187		30	96			106			96	0
Dishman-Mica Rd & Thorpe Rd	A					1,303						700	
	Q					12.5						5	
16th Ave & Pines Rd*	A				60				662			300	
	Q				5				117.5			265	
16th Ave & SR 27*	A		**60**	60		**170**		240	3,708		325	630	
	Q		**586**	27		**310**		60	209		150	234	
32nd Ave & Pines Rd*	A	240	**490**		240	980		130	425		160	700	
	Q	26	**562**		49	327		42	83		48	108	
Madison Rd & Thorpe Rd	A		1,303						400				
	Q		10						2.5				
32nd Ave & SR 27*	A	170	900		**150**	**165**		200	460		265	1,240	
	Q	136	276		**246**	**470**		190	137		97	187	
32nd Ave & Evergreen Rd	A	100									75	315	
	Q	25									30	70	
32nd Ave & Sullivan Rd	A		600										
	Q		55										
A = Available Space (ft) Q = 95th Percentile Queue Length					Apparent Deficiency								

*A graphical exhibit of these Queue lengths are shown on Figures 13A through 13c.

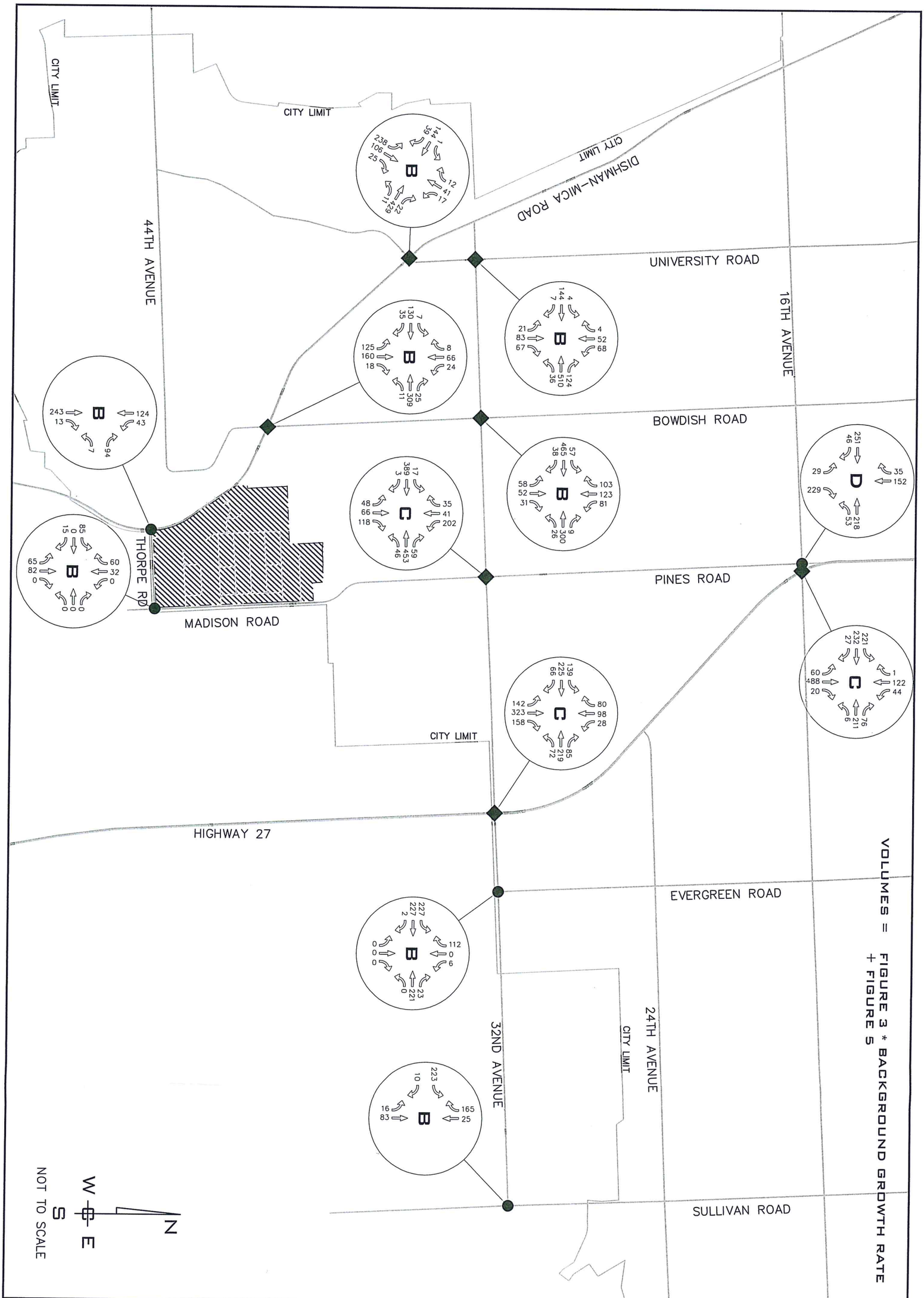

FIGURE 10

TRAFFIC IMPACT ANALYSIS
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SPOKANE VALLEY, WASHINGTON

2025 AM W/O PROJECT VOLUMES & LOS

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DATE: 12/14/15
DRAWN: BNG
APPROVED: TRW

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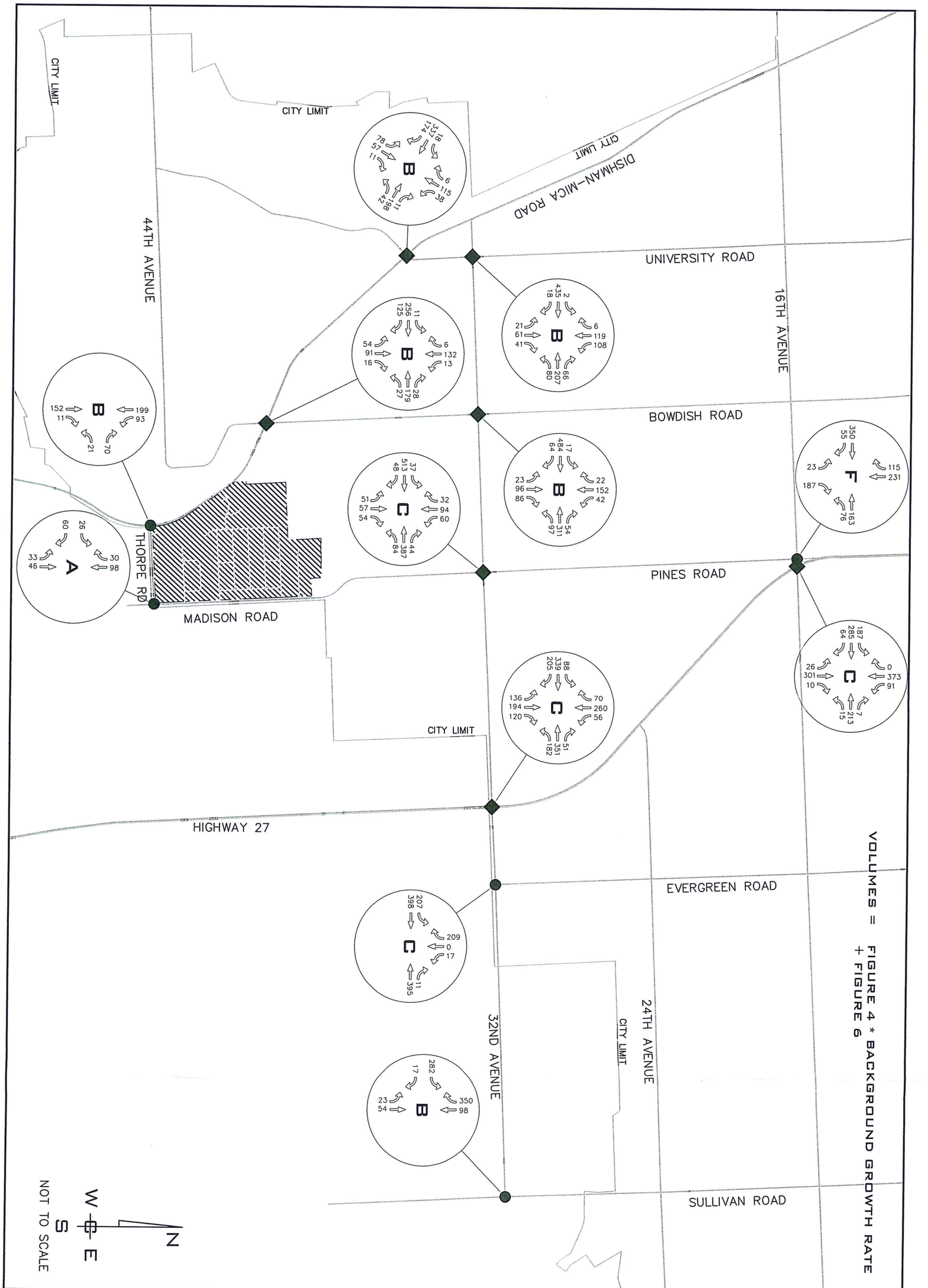

FIGURE 11

TRAFFIC IMPACT ANALYSIS
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SPOKANE VALLEY, WASHINGTON

2025 PM W/O PROJECT VOLUMES & LOS

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Year 2025 with the Project, with the Background Projects

This scenario assumes that the development has moved forward to completion and the background projects have been completed. The traffic volumes for this condition include the traffic volumes, as shown on Figures 10 & 11, plus the project trips as shown on Figures 7 & 8. Please see Figures 12 & 13 for the traffic volumes used for this scenario. A summary of the level of service results are shown in the following table.

Table 19 - Year 2025 Levels of Service, with the Project, with the Background Projects

INTERSECTION	(S)ignalized (U)nsignalized	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
32nd Ave & University Rd	S	12.4	B	12.4	B
Dishman-Mica Rd & University/Schafer Rd	S	16.9	B	18.3	B
32nd Ave & Bowdish Rd	S	15.6	B	14.7	B
Dishman-Mica Rd & Bowdish Rd	S	15.7	B	13.3	B
Dishman-Mica Rd & Apt. Access	U	13.2	B	10.4	B
Dishman-Mica Rd & Sundown Drive	U	12.6	B	10.8	B
Dishman- Mica Rd & S. Comm. Access	U	11.5	B	11.3	B
Dishman-Mica Rd & Thorpe Rd	U	11.9	B	11.9	B
Thorpe Rd & Comm. Access	U	9.0	A	9.1	A
16th Ave & Pines Rd	U	27.3	D	**99.2**	**F**
• Paired Signalized Intersections	(S)	(31.1)	(C)	(34.8)	(C)
16th Ave & SR 27	S	35.9	D	31.3	C
• Paired Signalized Intersections		(44.6)	(D)	(28.6)	(C)
32nd Ave & Pines Rd	S	32.3	C	26.0	C
• NB Right Turn		(27.6)	(C)	(24.7)	(C)
Madison Rd & Painted Hills Ave.	U	11.1	B	10.8	B
Madison Rd & 41st Ave.	U	10.7	B	10.5	B
Madison Rd & 43rd Ave.	U	10.5	B	10.2	B
Madison Rd & 44th Ave.	U	9.7	A	9.6	A
Madison Rd & Thorpe Rd	U	12.4	B	10.4	B
32nd Ave & SR 27	S	23.2	C	29.8	C
32nd Ave & Evergreen Rd	U	11.6	B	26.1	D
32nd Ave & Sullivan Rd	U	12.3	B	13.5	B

Intersection Level of Service - Deficiency Evaluation

With the project there continues to be a deficiency identified for intersection level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan, at the intersection of 16th Avenue & Pines Road. The deficiency in LOS can be remedied by signalizing the intersection and pairing the signal timing with 16th Avenue & Highway 27. We therefore recommend that the project contribute its proportionate share to the signal. The cost of the signal is anticipated at $475,000 - $500,000. the proportionate share should be included in the conditions of approval.

Intersection Movement Queue - Deficiency Evaluation for 2025 with the project

The queue deficiencies are identified on Table 19 and described as follows; These deficiencies are solely based upon the proposed project as documented within this report. All noted intersections are anticipated to function at acceptable levels of service, except for the intersection of 16th Avenue & Pines Road

.

Year 2025 w-o Proj. vs. Year 2025 w- Proj.,
16th Avenue & State Route 27

- The EB through approach as reported is expected to go from a queue length of 586 feet to a queue length of 645 feet or an increase of 59 feet. And the reported queue exceeds the available space by 526 feet.
- The WB thru approach as reported is expected to go from a queue length of 310 feet to a queue length of 319 feet or an increase of 9 feet. And the reported queue exceeds the available space by 149 feet.

32nd Avenue & Pines Road

- The EB through approach as reported is expected to go from a queue length of 562 feet to a queue length of 708 feet or an increase of 146 feet. And the reported queue exceeds the available space by 218 feet.

32nd Avenue & State Route 27

- The WB through approach as reported is expected to go from a queue length of 470 feet to a queue length of 497 feet or an increase of 27 feet. And the reported queue exceeds the available space by 305 feet.
- The WB left turn approach as reported is expected to go from a queue length of 246 feet to a queue length of 238 feet or a decrease of 8 feet. And the reported queue exceeds the available space by 88 feet. (The decrease may be in part to the models adjustment of green time to the EB left turning movement (w/ the added trips), the correlating effect increases the WB left green time.)

Table 20 – Year 2025 PM w- project Intersection Movement Queue Lengths 95th Percentile

INTERSECTION (A)vailable Lane Storage (Q)ueue within the Storage Lane		**EB**			**WB**			**NB**			**SB**		
		L	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**
32nd Ave & University Rd	A		345			582		100	400		100	265	
	Q		131			102		29	37		93	45	
Dishman-Mica Rd & University/Schafer Rd	A	150	1,213	1,213	60	1,978		130	280		90	550	550
	Q	31	480	60	54	106		84	67		71	110	0
32nd Ave & Bowdish Rd	A	200	590		200	990			445			280	
	Q	11	444		41	208			122			151	
Dishman-Mica Rd & Bowdish Rd	A	100	863		100	680			360			290	135
	Q	18	367		34	158			111			110	0
Dishman-Mica Rd & Apt. Access	A						100						
	Q						5						
Dishman-Mica Rd & Sundown Dr.	A				150						150		
	Q				5						10		

Table 20 (continued)

INTERSECTION (A)vailable Lane Storage (Q)ueue within the Storage Lane		EB			WB			NB			SB		
		L	T	R	L	T	R	L	T	R	L	T	R
Dishman-Mica Rd & S Comm.						50							
	Q					5							
Dishman-Mica Rd & Thorpe Rd	A					1,303						700	
	Q					20						10	
Thorpe Rd & Comm. Access	A											50	
	Q											2.5	
16th Ave & Pines Rd	A				60				662			300	
	Q				5				272.5			347.5	
16th Ave & SR 27*	A		**60**	60		**170**		240	3,708		325	630	
	Q		**645**	27		**319**		60	213		149	238	
32nd Ave & Pines Rd*	A	240	**490**		240	980		130	425	150	160	700	
	Q	28	**708**		112	358		69	97	6	66	183	
Madison Rd & Painted Hills Ave	A		100					50					
	Q		0					0					
Madison Rd & 41st Ave	A		100					50					
	Q		2.5					0					
Madison Rd & 43rd Ave	A		100					50					
	Q		2.5					0					
Madison Rd & 44th Ave	A		100										
	Q		2.5										
Madison Rd & Thorpe Rd	A		1,303						400				
			15						2.5				
32nd Ave & SR 27*	A	170	900		**150**	**165**		200	460		265	1,240	
	Q	137	281		**238**	**497**		199	140		95	194	
32nd Ave & Evergreen Rd	A	100									75	315	
	Q	27.5									35	82.5	
32nd Ave & Sullivan Rd	A		600										
	Q		57.5										
A = Available Space (ft) Q = 95th Percentile Queue Length					Apparent Deficiency								

*A graphical exhibit of these Queue lengths are shown on Figures 13A through 13c.

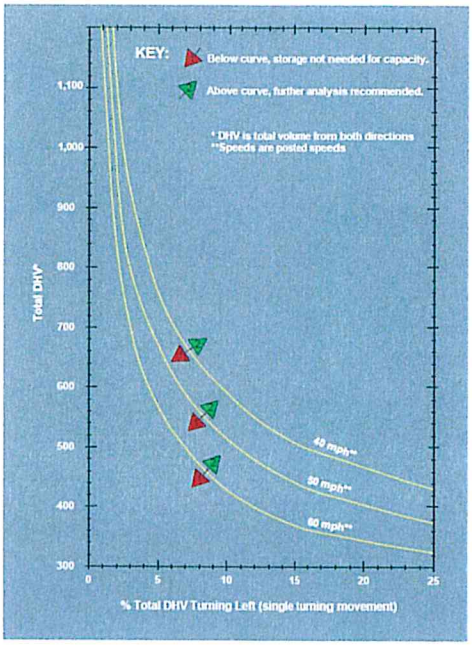
There are no new deficiencies identified with the proposed project, only the extension of known deficiencies.

Left Turn Analysis at Proposed Project Accesses on Dishman-Mica Road, Thorpe Road & Madison Road along Project Frontage

Per the request of the City of Spokane Valley we have analyzed the proposed accesses to determine if a left turn is warranted based upon the WSDOT design manual Exhibit 1310-7a. The results are summarized here and the exhibits are shown in the appendix:

Table 21 - Left Turn Analysis at Proposed Project Accesses.

Intersection:	Results
Dishman-Mica Road & Apt. Access	NA – no left turns allowed (RI-RO)
Dishman-Mica Road & Sundown Drive	Plots above the line and warrants left turn lane
Dishman-Mica Road & N. Comm. Access	Plots below the line
Dishman-Mica Road & S. Comm. Access	Plots below the line
Thorpe Road & Comm. Access	Plots below the line
Madison Road & Painted Hills Avenue	Plots below the line
Madison Road & 41st Avenue	Plots below the line
Madison Road & 43rd Avenue	Plots below the line
Madison Road & 44th Avenue	Plots below the line



Left-Turn Storage Guidelines: Two-Lane, Unsignalized
Exhibit 1310-7a

As shown in the results only the intersection of Dishman-Mica Road & Sundown Drive meets the threshold to consider a left turn storage lane.

Based upon these results and discussions with the developer regarding the developments frontage improvements, we recommend that on Dishman Mica Road a Two-Way-Left-Turn-Lane (TWLTL) be provided to accommodate the proposed access roads and driveways. The TWLTL is proposed to begin north of the Chester Creek Bridge and end before the extension of the project boundary. Additionally, based upon the City of Spokane Valleys classification of Madison Road as a collector we recommend that that the developer includes the widening of Madison Road for a future TWLTL. These recommendations are incorporated with the analysis of the intersections.

Study Area Intersections Left and Right Turn Warrants

Per the request of the City of Spokane Valley a review of directly impacted left & right turn movements of the study intersections was completed for the Year 2025 with the project in the AM and PM peak hours. The left and right turn movements of each intersection were screened using a rule of thumb consideration to identify potential turn lane needs. The rule of thumb is a

movements that exceeded a volume of 300 vehicles for a left turn movement, and 100 vehicles for a right turn movement. This rule of thumb is only used as an indicator, as the decision to install a turn lane is based upon multiple variables including Intersection Level of Service, Signal Timing, Pedestrian needs, and Movement Queue.

Table 21A Turn Analysis at Study Area Intersections

Intersection	AM Peak Hour		PM Peak Hour		Existing Condition	Recommendation
	Mvmt	Trips	Mvmt	Trips		
32nd Ave. & University Rd.	WB Rt SB Lt	132 69	WB Rt SB Lt	70 114	Shared Rt & Thru Turn Lane	None
Dishman-Mica Rd & University/Schafer	WB RT SB Lt	34 25	WB Rt SB Lt	34 18	50' Full Flare Turn Lane	None
32nd Ave & Bowdish	WB Lt WB Rt NB Lt NB Rt SB Lt	29 14 63 37 83	WB Lt WB Rt NB Lt NB Rt SB Lt	103 58 25 89 48	Turn Lane No Turn Lane No Turn lane Slight Flare No Turn lane	None
Dishman-Mica Rd & Bowdish	WB Lt WB Rt NB Rt SB Lt	42 46 30 32	WB Lt WB Rt NB Rt SB Lt	31 43 27 35	Turn Lane No turn lane. Slight Flare No Turn Lane	None
Dishman-Mica Rd & Thorpe Rd	WB Rt NB Rt SB Lt	113 14 55	WB Rt NB Rt SB Lt	103 18 139	Shared Lt & Rt No Turn Lane No Turn Lane	None
16th Ave. & Pines Rd	WB Lt NB Rt	54 256	WB Lt NB Rt	81 202	No Turn Lane Slight Flare	See 2025 W-OProj Recommendation
16th Ave & Hwy 27	EB Lt	237	EB Lt.	194	Shared Lt & Thru	none
32nd Ave. & Pines Rd	EB Rt WB Lt NB Lt NB Rt	8 63 63 168	EB Rt WB Lt NB Lt NB Rt	71 133 64 83	No turn lane. Turn Lane Turn Lane No Turn lane	See Below
Madison & Thorpe	EB Lt SB Rt	91 79	EB Lt SB Rt	47 44	No Turn Lane No Turn Lane	None
32nd Ave. & State Route 27	EB Lt EB Rt NB Lt SB Rt	154 71 145 82	EB Lt EB Rt NB Lt SB Rt	92 213 149 77	Turn Lane Turn Lane Turn Lane 50' Full Flare	None
32nd Ave. & Evergreen Rd	EB Lt SB Rt	244 115	EB Lt SB Rt	214 223	Turn Lane Turn Lane	None
32nd Ave. & Sullivan Rd	EB Lt SB Rt	241 177	EB Lt SB Rt	294 370	Shared Lt & Rt Turn Lane	None

The Intersection of 16th Avenue & Pines Road northbound right turn movement meet the rule of thumb in the Year 2025 with the project, however because of the close proximity of intersections, the signal controls the operation of the northbound approach. So the addition of a right turn lane would still operate as before, rendering any improvement as moot.

The intersection of 32nd Avenue & Pines Road northbound right turn movement meets the rule of thumb and the project anticipates adding trips to the movement. Therefore, considering the installation of a right turn movement; per the intersection level of service analysis the intersection is anticipated to function at Level of Service "C" for both the AM and PM Peak Hours and With and Without the Project. Considering that the PM Peak Hour Queue length would extend 174 feet and the number of conflicting movements we would ask the City of Spokane Valley to consider allowing the project to install a northbound right turn lane at the intersection at the end of the development. The proposed right Turn lane would include the following:

1. Obtain Row from Central Valley School District
2. Provide plans to…
    a. Relocate Signal Cabinet and Power Cabinet
    b. Relocate SE traffic pole and Foundation
    c. Relocate Existing Power Pole, and power supply.
    d. Re Run Wires for all Signal Poles.
    e. Relocate existing storm drainage hooded catch basin
    f. Adjust pedestrian ramps on NE and SE Corners
    g. Provide new channelization striping on 32nd Avenue and Pines Road
    h. Provide new Signage for Right turn lane.
    i. Provide new Sidewalk along proposed Right Turn Lane
3. Relocate Existing Avista Power Poles
    a. Consider the change to intersection Lighting
    b. All lighting must stay out of the operational limits of the overhead power lines.

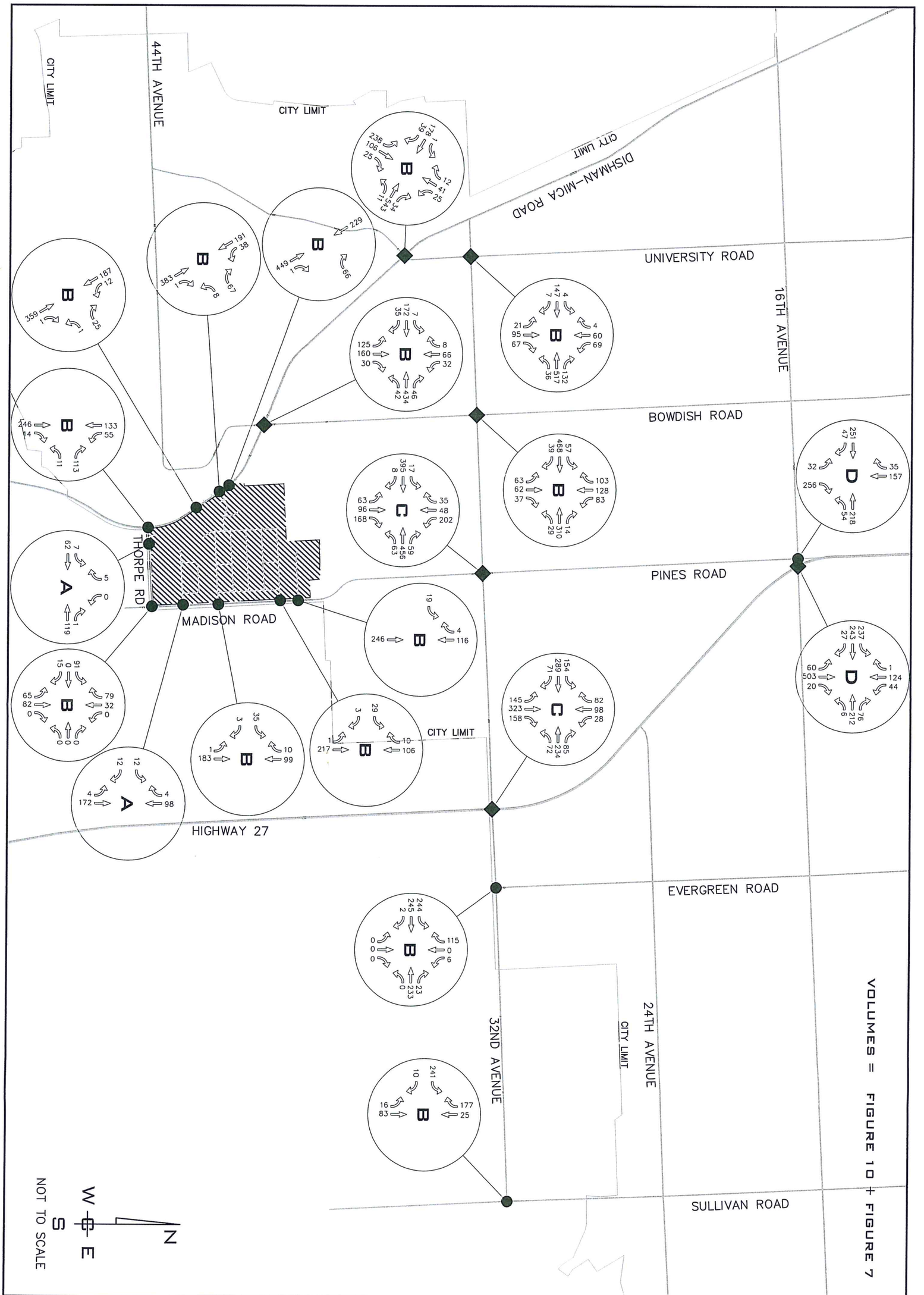


FIGURE 12

TRAFFIC IMPACT ANALYSIS
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MADISON ROAD & THORPE ROAD
SPOKANE VALLEY, WASHINGTON

2025 AM W/ PROJECT VOLUMES & LOS

PROJ #: 13-1166
DATE: 12/14/15
DRAWN: BNG
APPROVED: TRW

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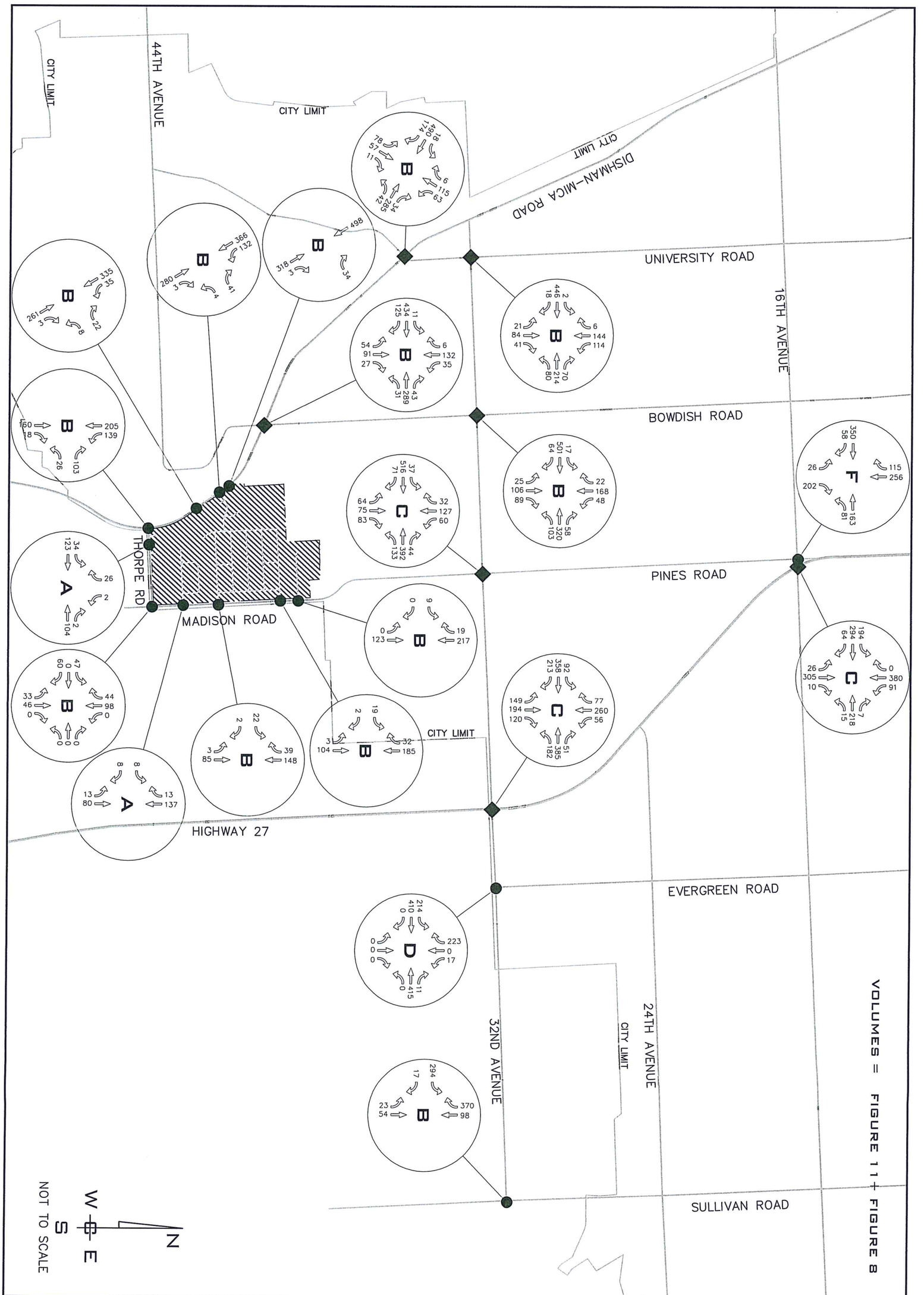

FIGURE 13

TRAFFIC IMPACT ANALYSIS
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2025 PM W/ PROJECT VOLUMES & LOS

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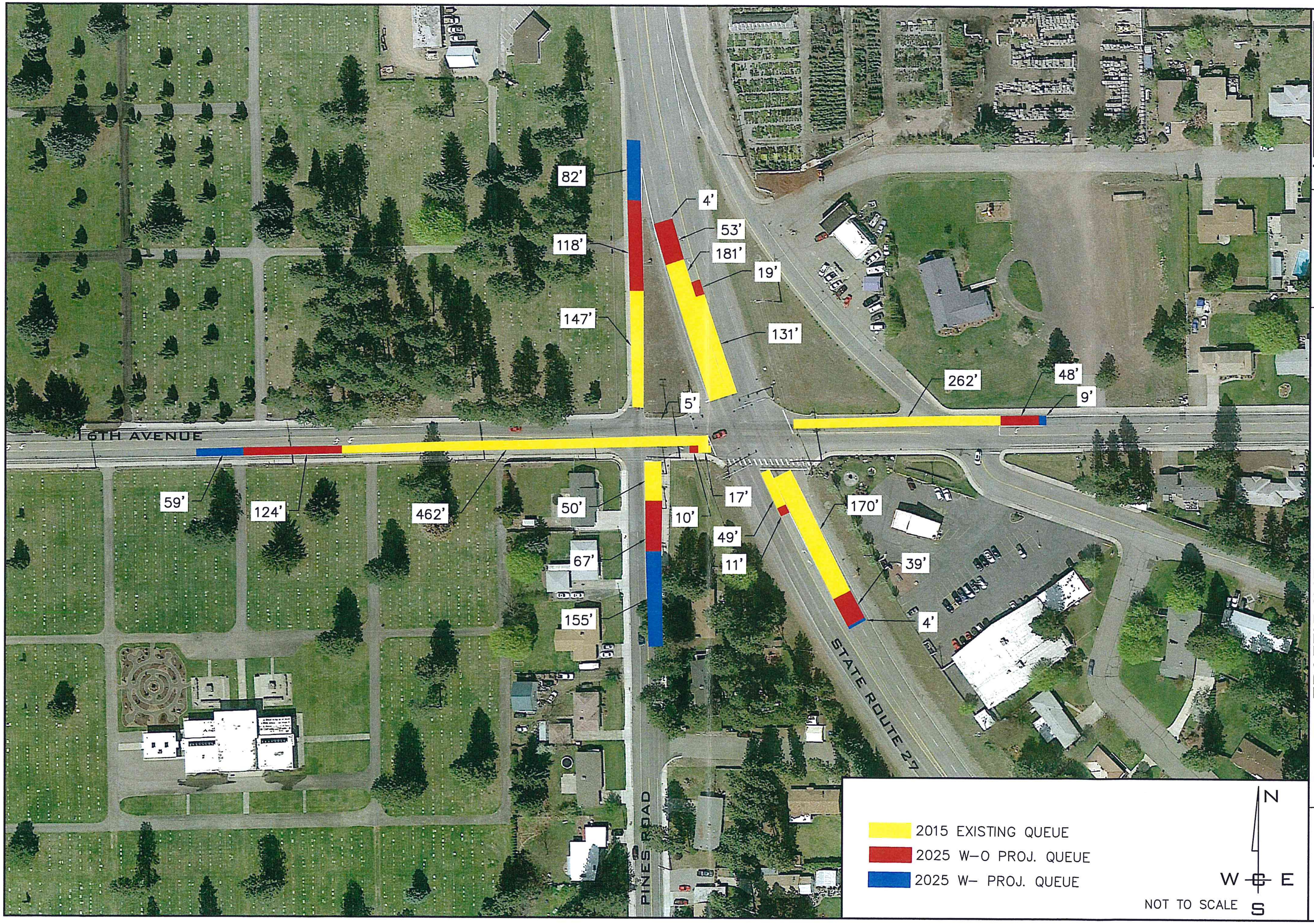

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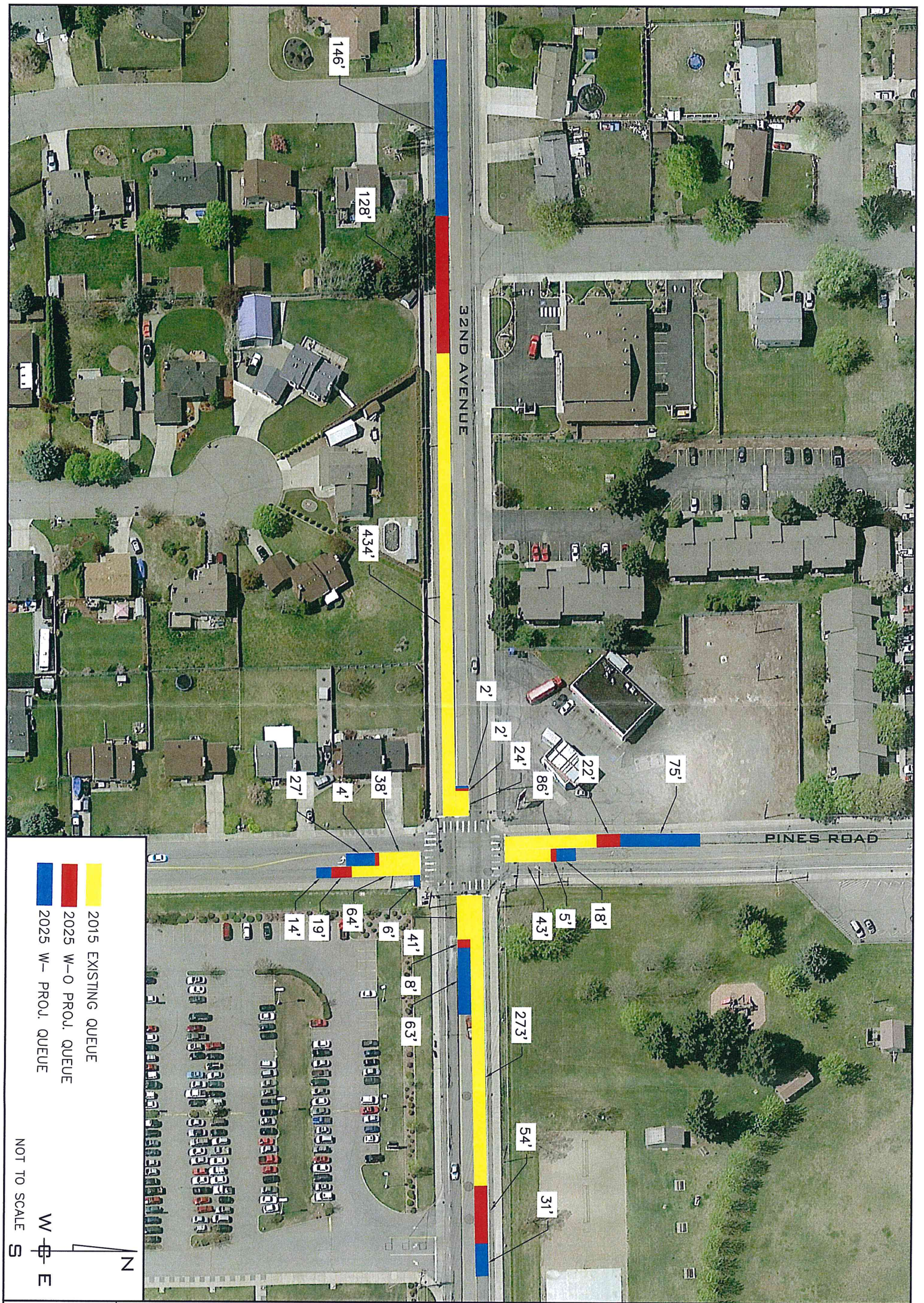
TRAFFIC IMPACT ANALYSIS
PAINTED HILLS PRD
MADISON ROAD & THORPE ROAD
SPOKANE VALLEY, WASHINGTON

QUEUE SUMMARY EXHIBIT

FIGURE
13A



TRAFFIC IMPACT ANALYSIS
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MADISON ROAD & THORPE ROAD
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QUEUE SUMMARY EXHIBIT

FIGURE 13B

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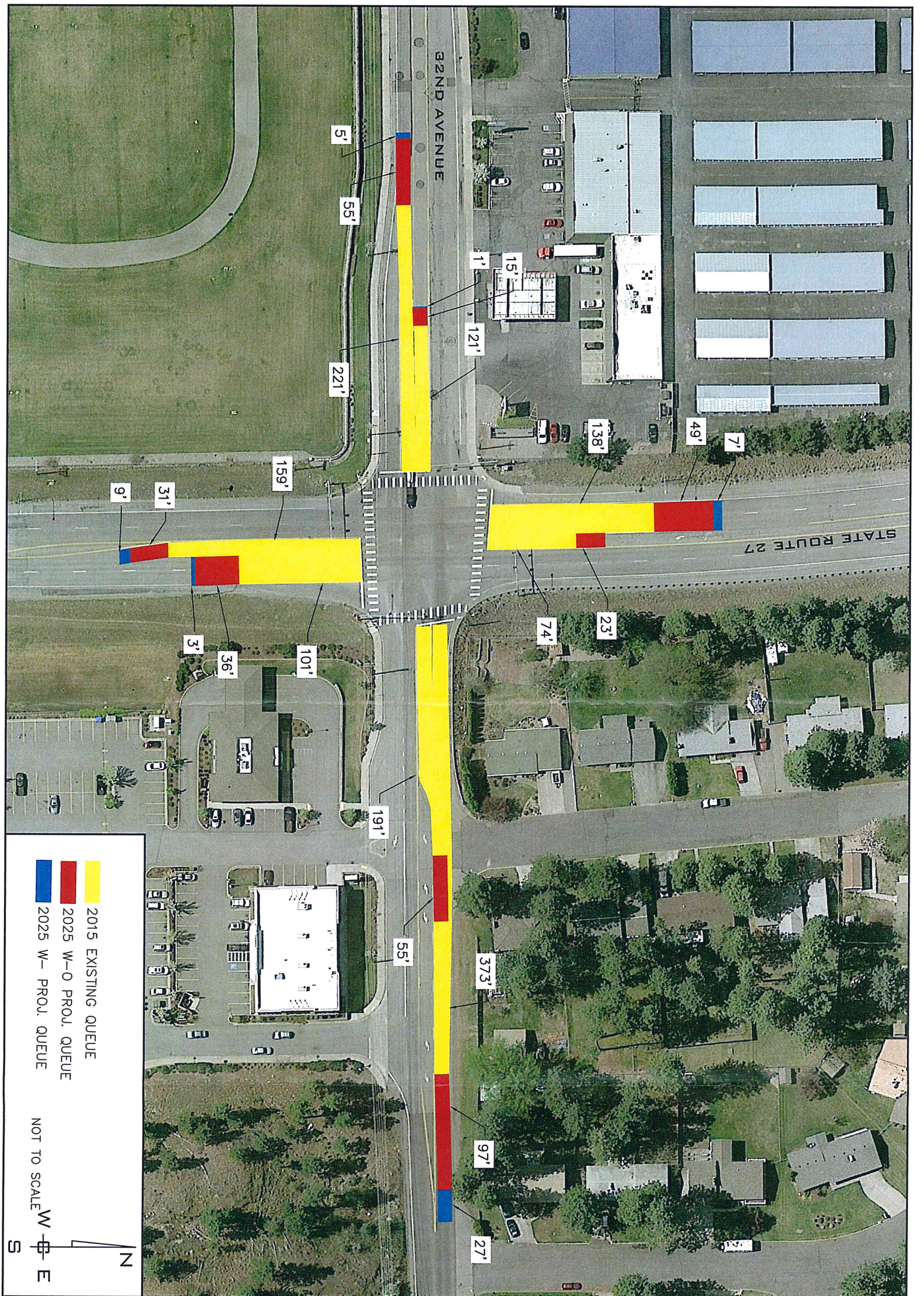

TRAFFIC IMPACT ANALYSIS
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MADISON ROAD & THORPE ROAD
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QUEUE SUMMARY EXHIBIT

FIGURE 13C

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Year 2030 Buildout plus 5 years without the Project, with the Background Projects
This scenario assumes that the development has not moved forward, the background projects have been completed and five years have passed. The traffic volumes for this condition include the existing traffic, as shown on Figures 3 & 4 multiplied by the background growth rate, plus the traffic from the original background projects as shown on Figures 5 & 6. Please see Figures 14 & 15 for the traffic volumes used for this scenario. A summary of the level of service results are shown in the following table.

Table 22 - Year 2030 Buildout Plus 5, Levels of Service, without the Project

INTERSECTION (S)ignalized (U)nsignalized		AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
32nd Ave & University Rd	S	12.4	B	12.2	B
Dishman-Mica Rd & University/Schafer Rd	S	16.8	B	17.6	B
32nd Ave & Bowdish Rd	S	16.5	B	14.7	B
Dishman-Mica Rd & Bowdish Rd	S	13.4	B	12.1	B
Dishman-Mica Rd & Thorpe Rd	U	11.6	B	11.2	B
16th Ave & Pines Rd • Paired Signalized Intersections	U (S)	30.8 (30.8)	D (C)	**99.9** (35.2)	**F** (D)
16th Ave & SR 27 • Paired Signalized Intersections	S	37.4 (46.7)	D (D)	32.8 (28.7)	C (C)
32nd Ave & Pines Rd	S	28.8	C	24.6	C
Madison Rd & Thorpe Rd	U	12.4	B	10.1	B
32nd Ave & SR 27	S	23.4	C	30.0	C
32nd Ave & Evergreen Rd	U	11.5	B	27.1	D
32nd Ave & Sullivan Rd	U	12.3	B	13.9	B

Intersection Level of Service - Deficiency Evaluation

Without the project there is a deficiency identified for intersection level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan, at the intersection of 16th Avenue & Pines Road. The deficiency in LOS can be remedied by signalizing the intersection and pairing the signal timing with 16th Avenue & Highway 27.

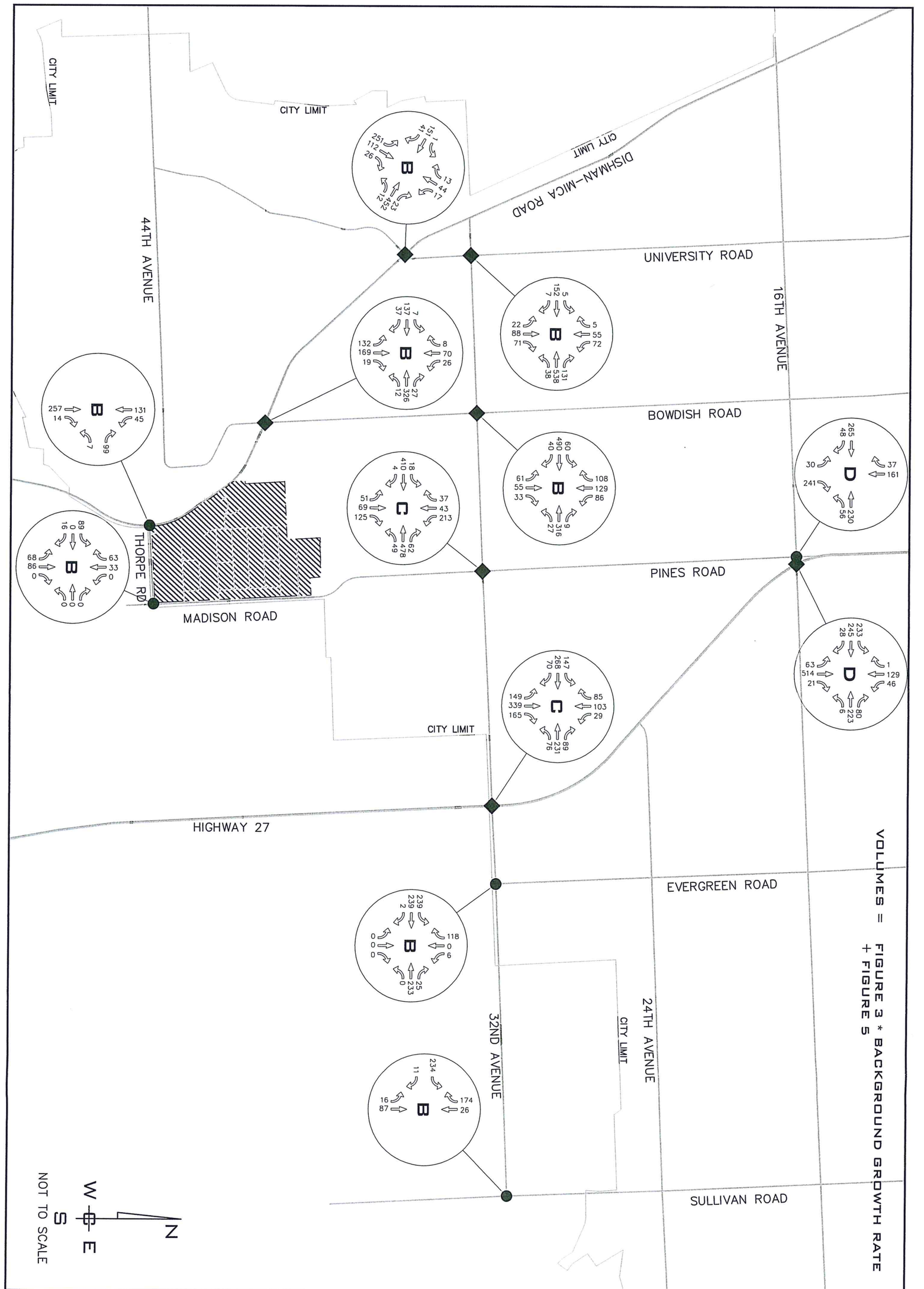

FIGURE 14

TRAFFIC IMPACT ANALYSIS
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2030 AM W/O PROJECT VOLUMES & LOS

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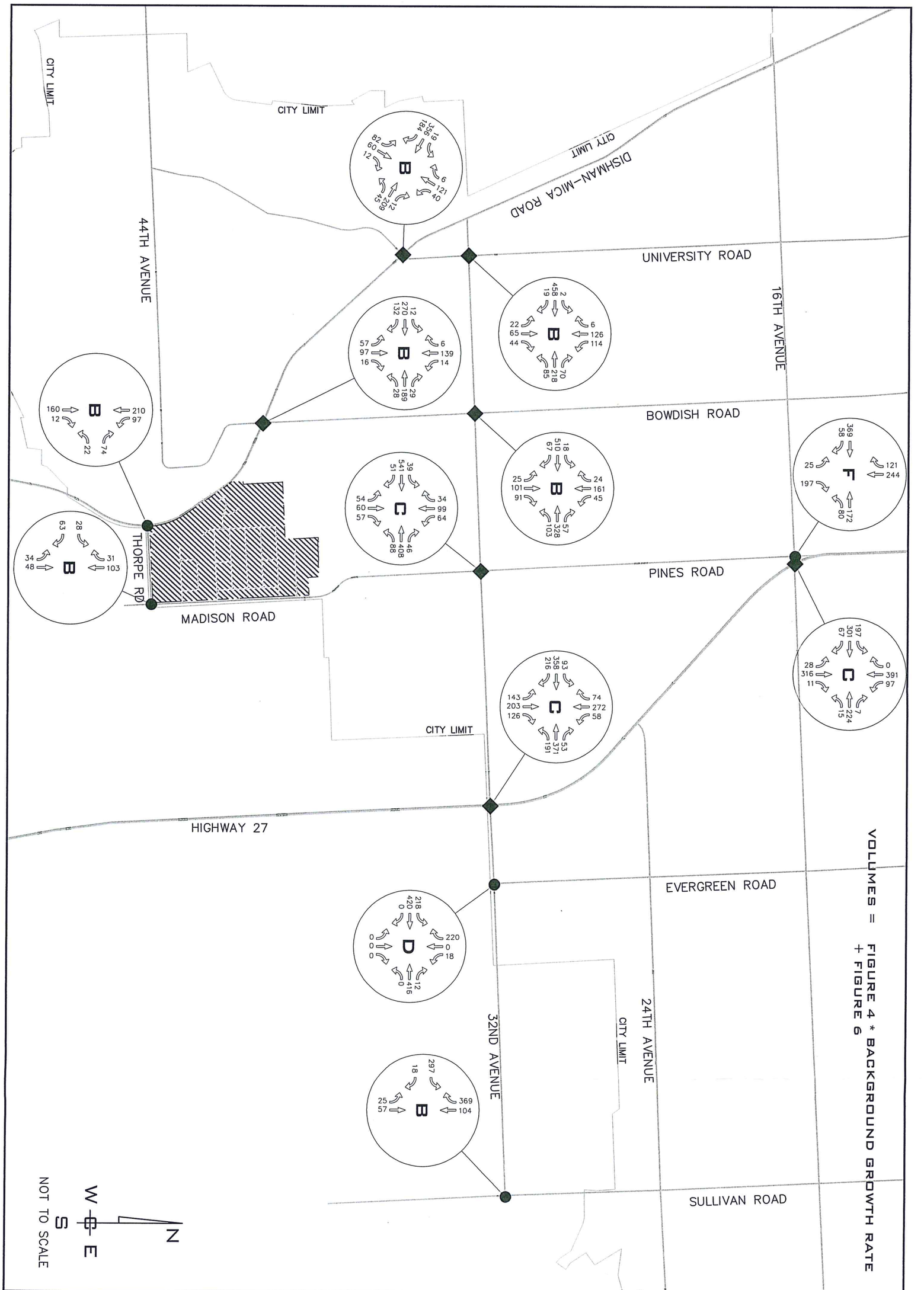

FIGURE 15

TRAFFIC IMPACT ANALYSIS
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2030 PM W/O PROJECT VOLUMES & LOS

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Year 2030 Buildout Plus 5 Years with the Project, with the Background Projects

This scenario assumes that the development has moved forward to completion and the background projects have been completed and five years have passed. The traffic volumes for this condition include the existing traffic, as shown on Figures 14 & 15, plus the project trips as shown on Figures 7 & 8. Please see Figures 16 & 17 for the traffic volumes used for this scenario. A summary of the level of service results are shown in the following table.

Table 23- Year 2030 Buildout Plus 5 Levels of Service, with the Project

INTERSECTION (S)ignalized (U)nsignalized		AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
32nd Ave & University Rd	S	12.7	B	12.8	B
Dishman-Mica Rd & University/Schafer Rd	S	17.3	B	18.9	B
32nd Ave & Bowdish Rd	S	16.9	B	16.0	B
Dishman-Mica Rd & Bowdish Rd	S	16.9	B	14.0	B
Dishman-Mica Rd & Apt. Access	U	13.4	B	10.5	B
Dishman-Mica Rd & Sundown Drive	U	12.9	B	10.9	B
Dishman- Mica Rd & S. Comm. Access	U	11.6	B	11.5	B
Dishman-Mica Rd & Thorpe Rd	U	12.2	B	12.2	B
Thorpe Rd & Comm. Access	U	9.1	A	9.1	A
16th Ave & Pines Rd • Paired Signalized Intersections	U (S)	32.3 (31.4)	D (C)	**141.2** (36.7)	**F** (D)
16th Ave & SR 27 • Paired Signalized Intersections	S	40.7 (49.3)	D (D)	34.3 (29.0)	C (C)
32nd Ave & Pines Rd • NB Right Turn lane	S	34.9 29.2	C (C)	26.9 27.1	C (C)
Madison Rd & Painted Hills Ave.	U	11.2	B	10.9	B
Madison Rd & 41st Ave.	U	10.8	B	10.6	B
Madison Rd & 43rd Ave.	U	10.6	B	10.2	B
Madison Rd & 44th Ave.	U	9.7	A	9.8	A
Madison Rd & Thorpe Rd	U	12.8	B	10.6	B
32nd Ave & SR 27	S	24.3	C	31.9	C
32nd Ave & Evergreen Rd	U	11.8	B	30.3	D
32nd Ave & Sullivan Rd	U	12.6	B	14.2	B

Intersection Level of Service - Deficiency Evaluation

With the project there continues to be a deficiency identified for intersection level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan, at the intersection of 16th Avenue & Pines Road. The deficiency in LOS can be remedied by signalizing the intersection and pairing the signal timing with 16th Avenue & Highway 27.

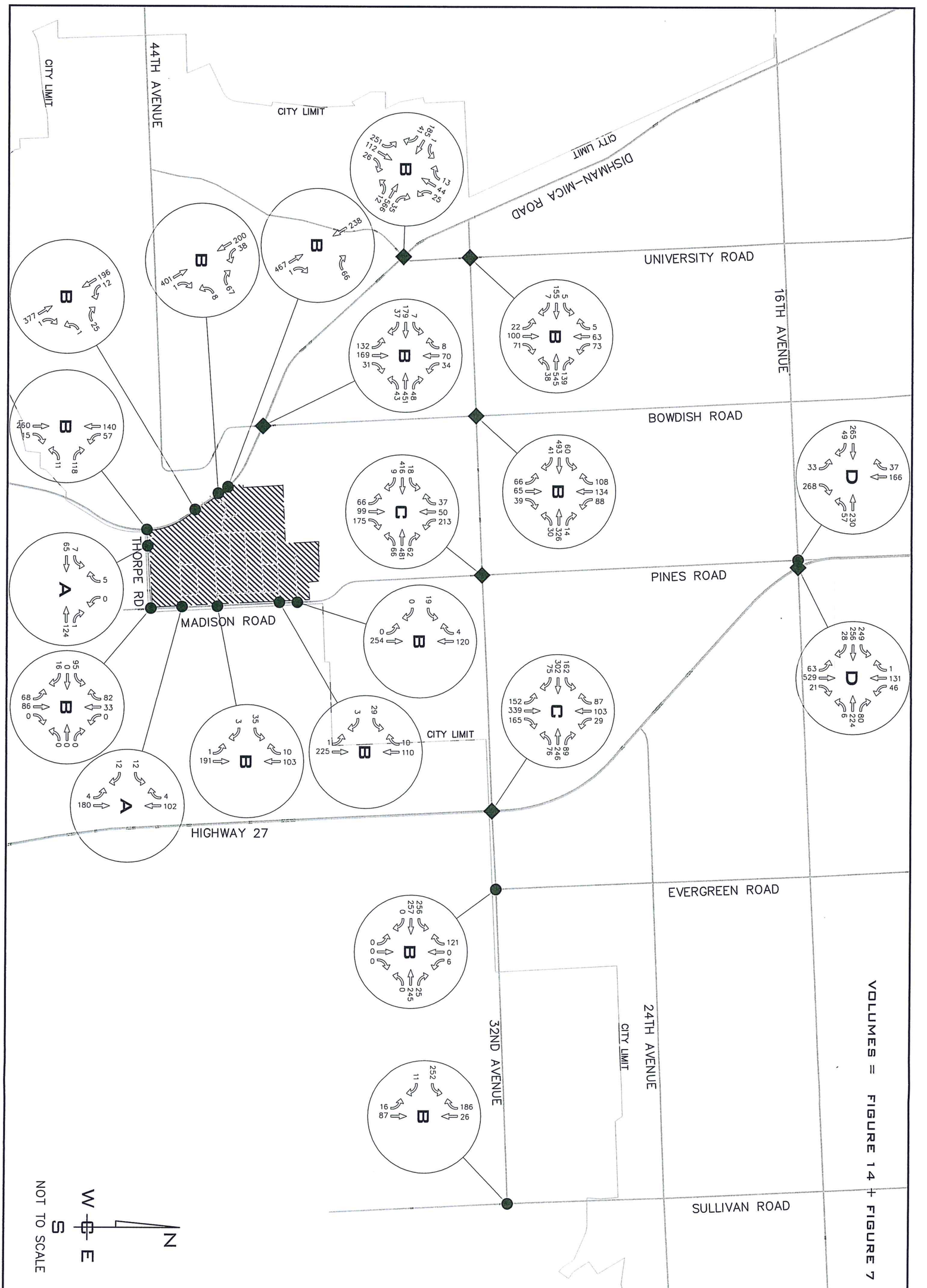

FIGURE 16

TRAFFIC IMPACT ANALYSIS
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SPOKANE VALLEY, WASHINGTON

2030 AM W/ PROJECT VOLUMES & LOS

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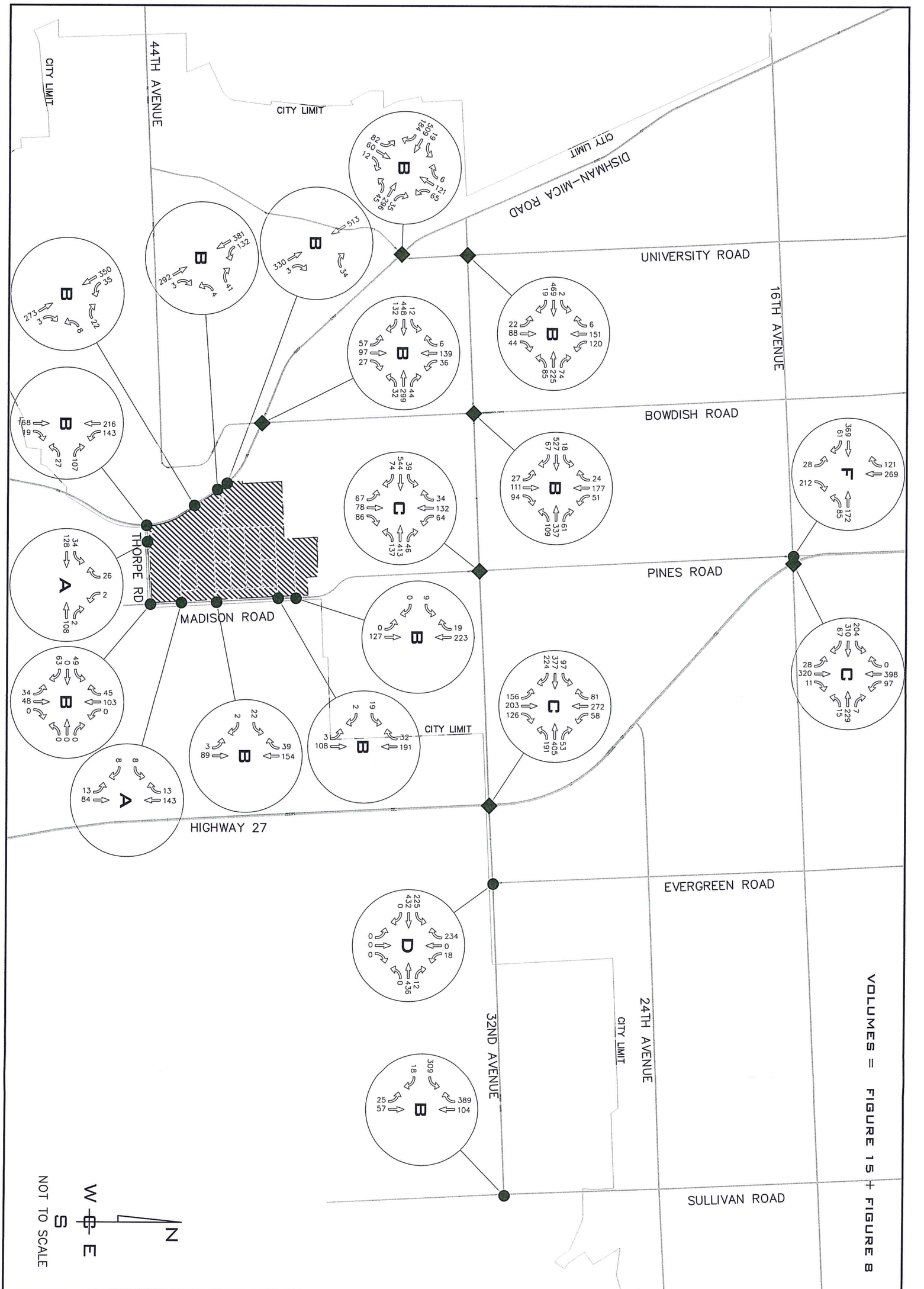

FIGURE 17

TRAFFIC IMPACT ANALYSIS
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SPOKANE VALLEY, WASHINGTON

2030 PM W/ PROJECT VOLUMES & LOS

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Conclusions

Based upon the analysis, field observations, assumptions, methodologies and results which are provided in the body of this report, it is concluded that the development of the proposed project will generate new trips on the existing transportation system and that those trips while affecting level of service will generally not degrade LOS below concurrency levels, except at the intersection of 16th Avenue & Pines Road. Additionally, the queue deficiencies identified, carry through the scenarios from the existing condition to the future conditions, and the project only adds to an already existing condition. This conclusion was reached and has been documented within the body of this report.

Existing Condition

- There are no Level of Service deficiencies identified for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan.
- There are four queue deficiencies identified at two of the scoped intersections that have acceptable levels of service, there is no public improvement project identified to mitigate these discrepancies.
    - 16th Avenue & State Route 27, EB Thru, WB Thru
    - 32nd Avenue & State Route 27, WB left, WB Thru

Left Turn lanes on Dishman Mica Road, Thorpe Road, and Madison Road

- The intersection of Dishman-Mica Road & Sundown Drive warrants a southbound left turn lane
- Based upon the results and discussions with the developer Dishman-Mica Road & Madison are proposed to include a TWLTL for the project accesses.

Study Area Intersections Left and Right Turn Warrants

The Intersection of 16th Avenue & Pines Road northbound right turn movement meet the rule of thumb in the Year 2025 With the project, however because of the close proximity of intersections, the signal controls the operation of the northbound approach. So the addition of a right turn lane would still operate as before, rendering any improvement as moot.

The intersection of 32nd Avenue & Pines Road northbound right turn movement meets the rule of thumb and the project anticipates adding trips to the movement. Therefore a northbound right turn lane will be considered.

Year 2025, Buildout, without project, with background projects

- There is a Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan. The deficiency in LOS can be remedied by signalizing the intersection and pairing the signal timing with 16th Avenue & Highway 27.
- There are five queue deficiencies identified at three intersections. These deficiencies were identified as the result of the background growth rate and the background projects as identified at scoping. There is no public improvement project identified to mitigate these discrepancies. Please see the analysis for the details of the found discrepancies.
    - 16th Avenue & State Route 27, EB Thru, WB Thru
    - 32nd Avenue & Pines Road, EB Thru
    - 32nd Avenue & State Route 27, WB Thru, WB Left Turn

Year 2025, Buildout, with project, with background projects

- There is a Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan.
- The Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, originally caused by the background trips and worsened by this project, can be brought back to an acceptable level of service by signalizing the intersection and pairing the signal timing with 16th Avenue & Highway 27.
- These are the same five queue deficiencies previously identified at three intersections with two of those intersections operating at acceptable levels of service. These deficiencies were the result of the background growth rate and the background projects as identified within this study and are only incrementally worsened or kept the same by this project. There is no public improvement project identified to mitigate these discrepancies. Please see the analysis for the details of the found discrepancies.
    - 16th Avenue & State Route 27, EB Thru, WB Thru
    - 32nd Avenue & Pines Road, EB Thru
    - 32nd Avenue & State Route 27, WB Thru, WB Left Turn

Year 2030, Buildout Plus 5 Years, without project, with background projects

- There is a Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan. The deficiency in LOS can be remedied by signalizing the intersection and pairing the signal timing with 16th Avenue & Highway 27.
- There are five queue deficiencies identified at three intersections. These deficiencies were identified as the result of the background growth rate and the background projects as identified at scoping. There is no public improvement project identified to mitigate these discrepancies. Please see the analysis for the details of the found discrepancies.

- 16th Avenue & State Route 27, EB Thru, WB Thru
- 32nd Avenue & Pines Road, EB Thru
- 32nd Avenue & State Route 27, WB Thru, WB Left Turn

Year 2030, Buildout Plus 5 Years, with project, with background projects

- There is a Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, for level of service as described in Chapter 3 of the Spokane Valley Street Standards, and the Level of Service Table 4.3 of the City of Spokane Valley Comprehensive Plan.
- The Level of Service deficiency identified at the intersection of 16th Avenue & Pines Road, originally caused by the background trips and worsened by this project, can be brought back to an acceptable level of service by signalizing the intersection and pairing the signal timing with 16th Avenue & Highway 27.
- There are the same five queue deficiencies previously identified at three intersections with two of those intersections operating at acceptable levels of service. These deficiencies were the result of the background growth rate and the background projects as identified within this study and are only incrementally worsened or kept the same by this project. There is no public improvement project identified to mitigate these discrepancies. Please see the analysis for the details of the found discrepancies.
  - 16th Avenue & State Route 27, EB Thru, WB Thru
  - 32nd Avenue & Pines Road, EB Thru
  - 32nd Avenue & State Route 27, WB Thru, WB Left Turn

Recommendations

Based upon the conclusions within this study the proposed project is recommended to provide the following;

- frontage improvements to Dishman-Mica Road, Thorpe Road, and Madison Road per the City of Spokane Valley development process
- A two-way-left-turn-lane north of the Chester Creek Bridge to the property boundary with appropriate taper.
- Bicycle and pedestrian facilities per the City of Spokane Valley Bicycle and Pedestrian Master Plan along the site frontage.
- a northbound right turn lane be considered at the intersection of 32nd Avenue & Pines Road. Coordination with the City of Spokane Valley and the Central Valley School District will be required.
- We also recommend that the development contribute a proportionate share of the cost of the proposed signal at the intersection of 16th Avenue & Pines Road.