RAY-FREYA ALTERNATIVES ANALYSIS

Final Report

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City of Spokane

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1.0 INTRODUCTION

1.1 Project History

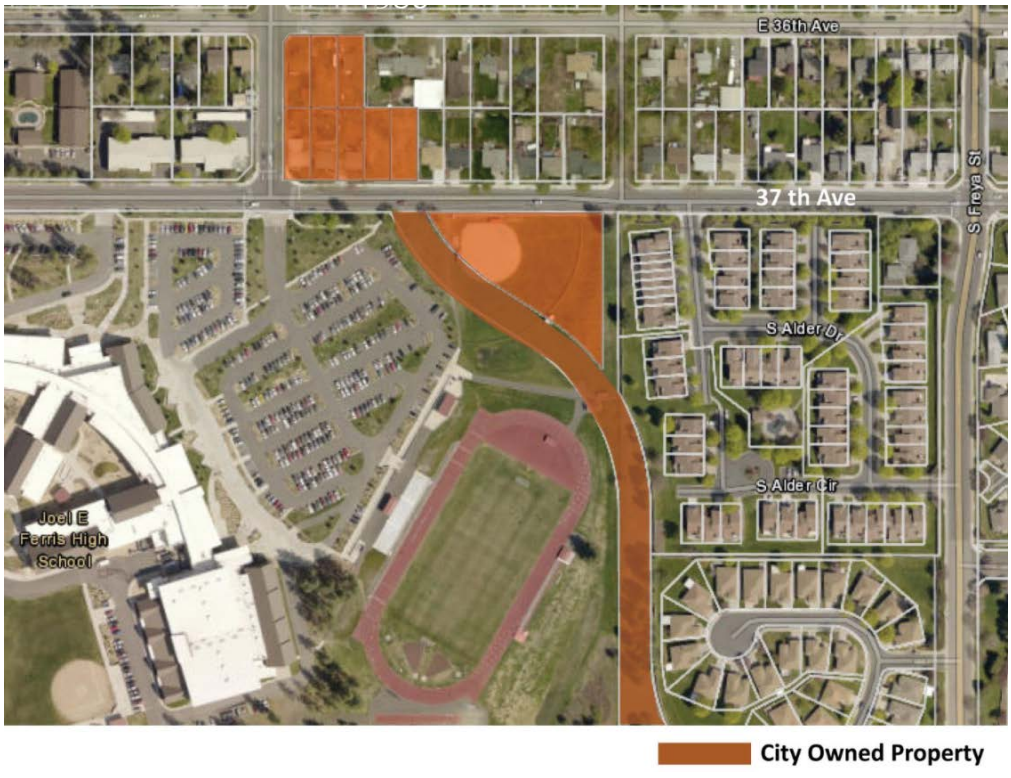
Since 1966 the City's Arterial Street Plan called for a more direct connection between Ray Street and Freya Street. This connection would shift traffic from Ray at 37th to Freya, and was designed to ease traffic congestion and improve the flow between the two arterials.

At the request of Spokane Public Schools, in 1986 the City Council passed a resolution to approve a diagonal alignment for the future cross-over connection, in order to avoid bisecting the Ferris High School campus with a north-south roadway on the Ray Street alignment. The Ray-Freya Crossover was added to the 1986 Arterial Street Plan.

Figure 1 - 1986 Arterial Street Plan

In the late 1980's the City began acquiring homes on the northeast corner of 37th/Ray Street to provide right-of-way for the future crossover. Property owned by the City is shown in orange on the map. The later reconstruction of the Ferris High School campus was designed around this city-owned right-of-way.

Figure 2 – City owned property



Starting in 2009 the city began the process to establish transportation impact fees. These fees are paid by developers upon permitting and are used to fund roadway capacity improvements. Each part of the city has a list of future transportation improvements and a corresponding fee.

The South District initially had a long list of future roadway projects. But in 2011 the City Council removed the Ray-Freya crossover from the impact fee program, due to council member and citizen concern over the route. But even though it was removed from the impact fee project list, the Ray-Freya Crossover remained on the Arterial Street Plan as a future connection.

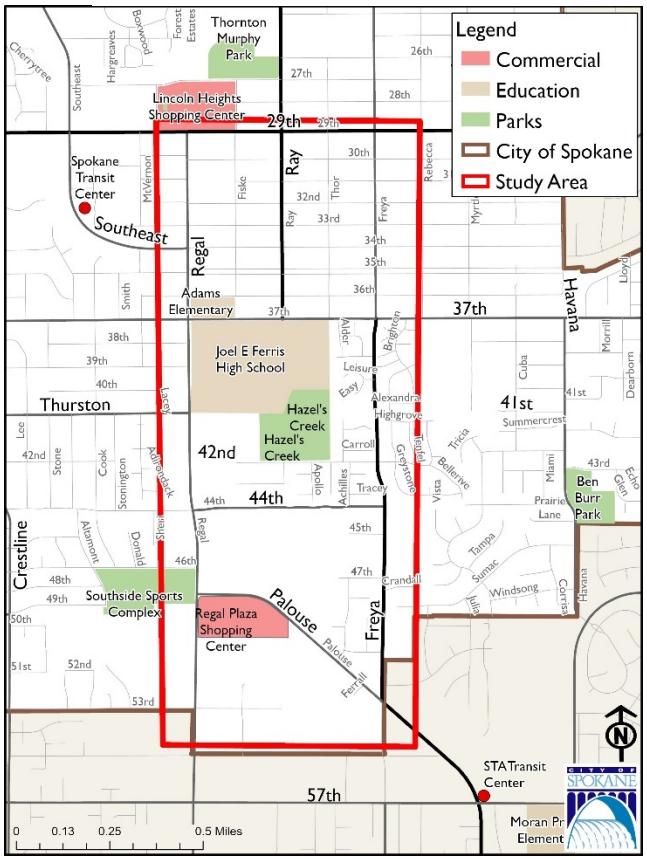
During the 2017 update of the Comprehensive Plan's Transportation Chapter, the City Council voted to remove the Ray-Freya Crossover from the Arterial Street Plan. However, recognizing the need for transportation improvements in the area, they agreed to fund a study of alternative improvements.

1.2 Project Purpose

The purpose of the study is to evaluate alternative improvements for the intersections of 37th/Ray and 37th/Freya. The overall study area is shown in Figure 3 The study goals are as follows:

- Estimate 20 year traffic growth
- Evaluate future conditions on Freya, Ray, and Regal.
- Develop alternatives to improve traffic flow and shift traffic from the Regal corridor to the Freya corridor.
- Select improvements for the intersections of 37th/Ray and 37th/Freya.
- Evaluate other network improvement needs.
- Develop a list of bicycle and pedestrian improvements.

Figure 3 - Project Study Area



2.0 CURRENT CONDITIONS AND PLANNED IMPROVEMENTS

This section documents the current roadway, bicycle and pedestrian (non-motorized), and transit conditions for the study area. It also documents improvements in and around the study area that were planned independent of this study.

2.1 Roadway

2.1.1 Existing Roadway Network

The City's TR 12 Arterial Network Map can be found in Chapter 4 of the Comprehensive Plan. This map shows the 20-year plan for arterial streets in the city. Figure 4 below shows the existing intersection control type for each of the 13 study area intersections.

2.1.2 Current Roadway Conditions

Turning movement counts for the AM and PM peak hours from 2017/2018 were analyzed at the 13 study area intersections. Turning movements at the 37th Avenue / Ray St intersection were also analyzed for the release hour of Ferris High School. Figure 5 and Figure 6 map existing AM and PM peak hour traffic volumes on roadway segments derived from turning movements.

Synchro 10 software was used to conduct the operations analysis of the study area intersections. Table 1 summarizes the operational analysis results for existing conditions, including overall level of service (LOS) and delay in seconds for all study intersections for the AM and PM peak hours. For this part of the city, LOS E is allowed at signalized and unsignalized intersections. Appendix F provides printout results of the traffic operations analysis.

Table 1 – Summary of Existing AM/PM Intersection Operations

Intersection	Control Type	LOS (AM / PM)	Delay (seconds) (AM / PM)
E 29th Ave & SE Blvd	Signal	C / C	20.8 / 27.1
E 29th Ave & S Regal St*	Signal	C / D	20.1 / 44.7
E 29th Ave & S Ray St	Signal	C / C	31.0 / 27.5
E 29th Ave & S Freya St	4-Way Stop	E / E	38.2 / 40.0
SE Blvd & S Regal St*	Signal	A / A	10.0 / 7.8
E 37th Ave & S Regal St	Signal	C / C	24.2 / 27.6
E 37th Ave & S Ray St	4-Way Stop	C / C	20.0 / 17.3
E 37th Ave & S Freya St	4-Way Stop	D / C	34.0 / 17.6
E 44th Ave & S Regal St	Signal	B / B	19.0 / 17.4
E 44th Ave & S Freya St	2-Way Stop	C / C	2.5 / 3.4
Palouse Hwy & S Regal St	Signal	B / C	15.2 / 20.1
Palouse Hwy & S Freya St	4-Way Stop	B / C	14.8 / 18.3
E 57th Ave & S Regal St	Signal	C / C	24.4 / 26.5

* Intersection settings do not comply with HCM 6th Ed.; uses SYNCHRO delay and reported LOS

Study Focus Intersections

Figure 4 – Existing Intersection Control Types

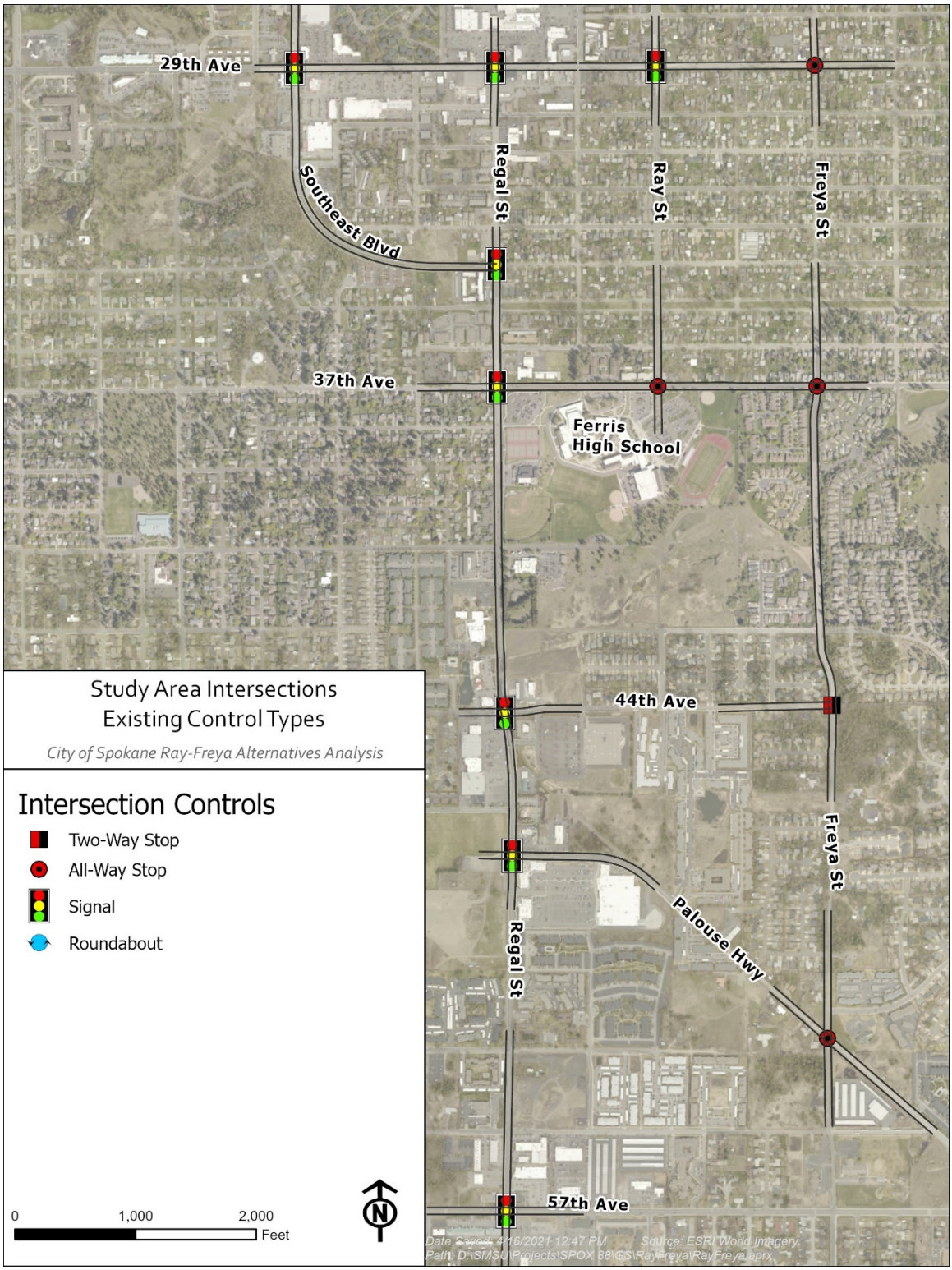


Figure 5 – Existing AM Peak Hour Directional Volumes

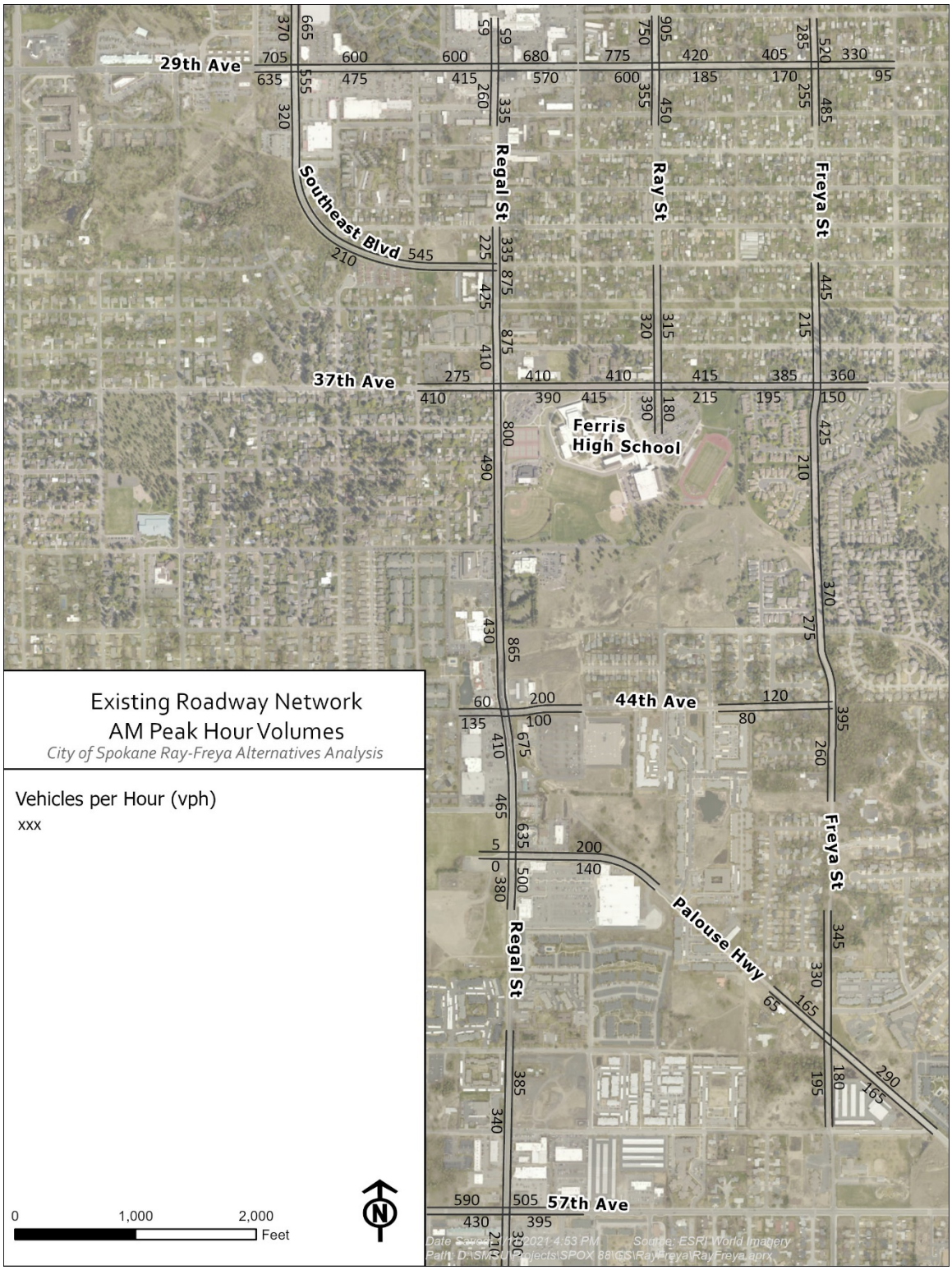
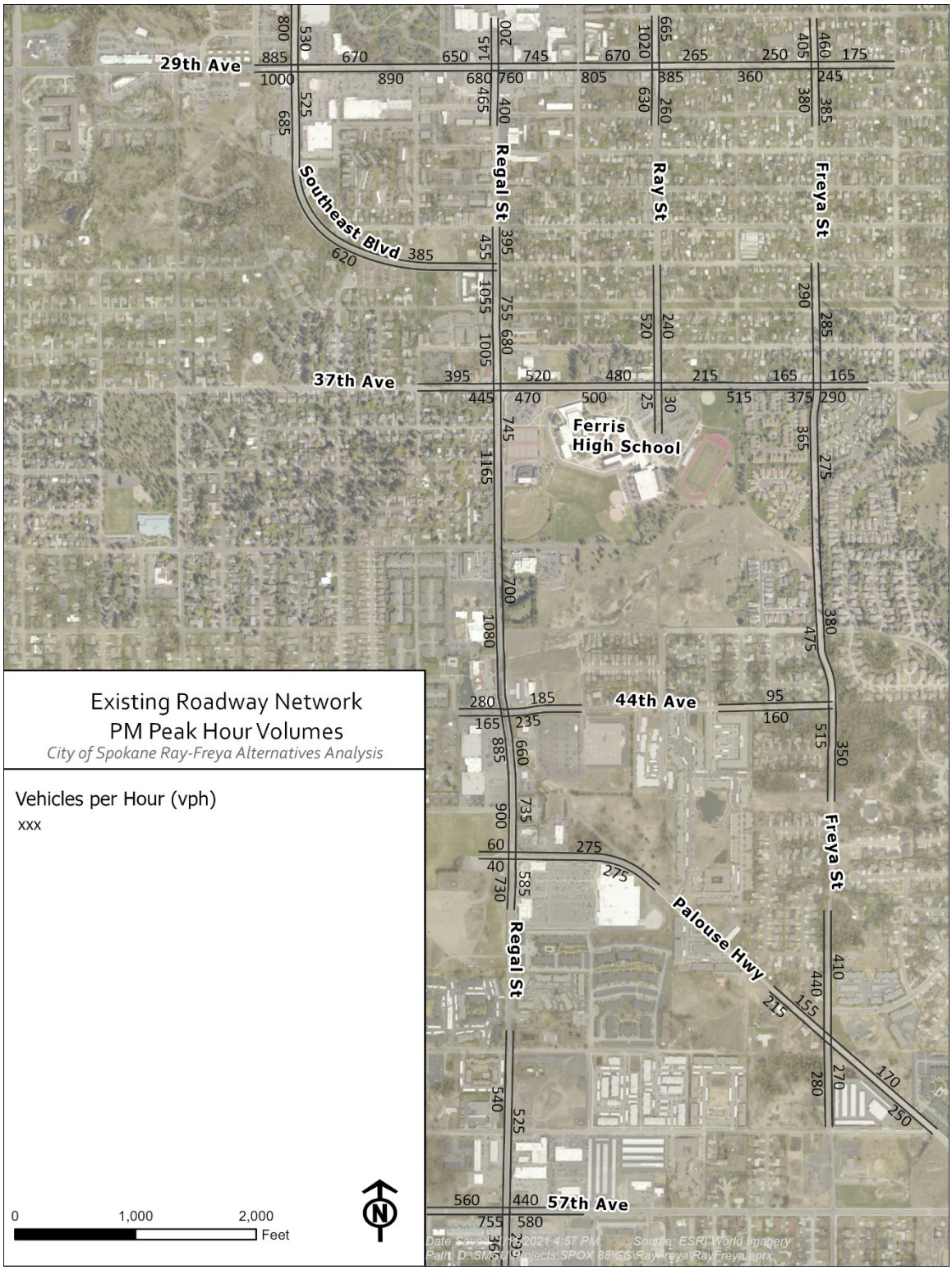


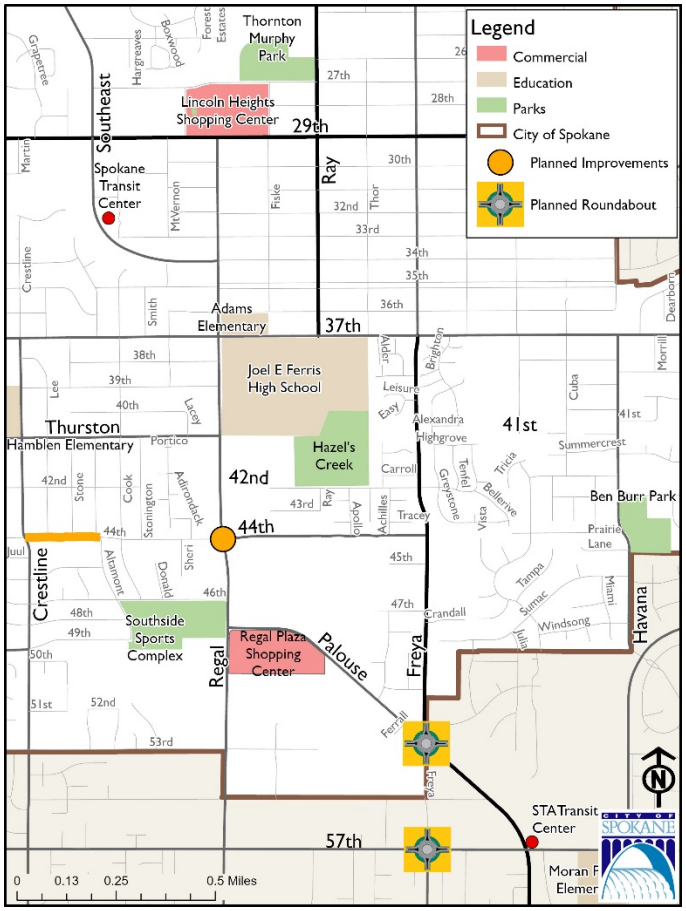
Figure 6 – Existing PM Peak Hour Directional Volumes



2.1.3 Planned Roadway Improvements

The City has identified several improvement projects within the study area. These are listed as part of the Transportation Impact Fee program, with the intent to partially fund them with developer collected fees.

Figure 7 - Planned Roadway Improvements



44th Avenue Paving. This City project will pave 44th Avenue between Crestline Street and Altamont Street. The road is currently dirt. This project is tentatively scheduled for 2022.

44th/Regal Intersection. This City project will modify the south leg of the intersection to provide two northbound travel lanes. The far side already has two receiving lanes. This will allow more northbound vehicles to pass through the signal during the green phase. Timeframe is within 20 years.

Freya/Palouse Roundabout. This City project will build a roundabout to replace the existing four-way stop. The design phase is expected to start in 2022.

57th/Freya Roundabout. This County project will build a roundabout to replace the existing two-way stop. The county received a state grant to fund design and construction. It is expected to be built in 2023.

2.2 Non-Motorized

2.2.1 Existing Non-Motorized Conditions

Only some parts of the study area have non-motorized facilities. Sidewalks have been built along most of the arterials but gaps still remain on South Freya, Palouse Highway and parts of 44th Avenue. Many of the local streets are also missing sidewalk.

Bike lanes were added on 37th Avenue from Regal Street to Havana Street during the street reconstruction in approximately 2017.

A shared-use pathway was built along 44th Avenue from Thor Street to Freya Street when that street was extended in 2013. Then in 2015 the 44th Avenue pathway was extended eastward to Havana Street and Ben Burr Park with a water line project.

2.2.2 Planned Nonmotorized Improvements

Planned improvements identified through the City's Bicycle Master Plan and/or conditioned through development projects are described below.

Palouse Highway Pathway. This existing pathway will be extended westward through the Radio Park apartments site and Southeast Sports Complex to connect to Altamont Street. The bicycle plan also shows an extension eastward to Freya Street. East of Freya it will cross into Spokane County and continue to the Ben Burr Trail and STA Moran Station Park & Ride.

Enhanced Regal Street Crosswalk. The Radio Park Apartments/Retail project is conditioned to build an enhanced crosswalk along their project frontage on Regal Street. This will provide a walking connection between the site and the Target complex to the east, along with improved transit stop access.

Crossover Pathway. This bicycle plan shows a shared-use pathway along the crossover alignment from 37th/Thor to 44th/Freya.

Freya Street Bike Lanes. Bike lanes are planned along Freya Street from 37th south to approximately 42nd where they would connect with the Crossover and 44th Avenue Pathways.

Thornton-Murphy Park pathway. The bicycle plan includes a pathway through Thornton Murphy Park that will connect to a designated bike route on Fiske Street. The Fiske Street route will continue south across 29th Avenue towards Ferris High School.

2.3 Transit

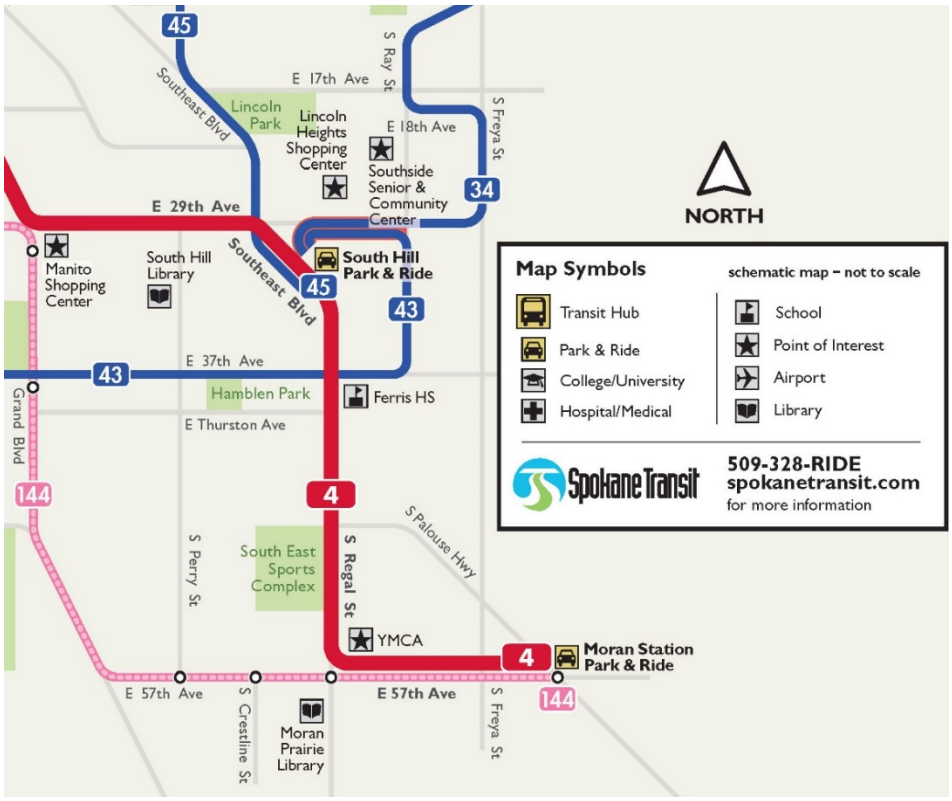
2.3.1 Existing Transit Service and Facilities

The study area is served by several different Spokane Transit Authority (STA) bus routes and contains the South Hill Park & Ride (SE Blvd between 29th Ave and Regal St), which is a significant transfer center. The Moran Station Park & Ride lies just outside the study area at E 57th Ave and Palouse Hwy. A map of study area transit routes is provided as Figure 8. Table 2 provides more detail for each route.

Table 2 – Existing Study Area Transit Routes and Characteristics

Route	Name	Type	Description
4	Five Mile to Moran Prairie via Downtown	Frequent	To/From downtown via Regal/29th/Grand, with 15-minute peak period/day service
34	Freya	Basic	Connects South Hill Park & Ride with the Spokane Community College via 29th/Freya
43	Lincoln/37th Ave	Basic	To/From downtown, providing service along 37th and the western South Hill area
45	Perry District	Basic	To/From downtown via SE Blvd/Perry
144	South Express	Express	To/From downtown via 57th/Grand/Bernard

Figure 8 – Existing Study Area Transit Service and Facilities



Source: Spokane Transit Authority

Route 4 is a major north/south route for the City, serving as a backbone to many neighborhoods, including the study area. Routes 4 and 43 directly serve Ferris High School, which is a heavy user of the routes when school is in session along with the park and rides. Routes 34, 45, and 144 are more on the periphery of the study area; however, they provide important connections into the City.

Only Route 43 currently travels through a focus intersection of the study, using the north and west legs of the 37th / Ray St intersection. However, there are no stops at this intersection; passengers, particularly to/from Ferris High School, must use stops at 37th / Regal St.

2.3.2 Future Transit Service

No service currently travels along S Freya St south of E 29th St; however, STA has stated they are considering a future route on the corridor. Any route using south Freya would likely have a southern terminus at the Moran Station Park & Ride and would travel along Palouse Hwy, S Freya St, and/or E 37th Ave in the study area.

3.0 FUTURE CONDITIONS AND ALTERNATIVES ASSESSMENT

3.1 Future Conditions

The project team worked with the Spokane Regional Transportation Council (SRTC) to use their regional travel demand model in developing traffic volume forecasts for the Year 2040. The SRTC model incorporates regional travel characteristics, projected future land use growth, and planned transportation improvements to provide peak hour traffic estimates. Model growth between the calibrated base year (2010) and the modeled future year (2040) is applied to the existing traffic data summarized in Section 2 using industry standards to develop what are known as post-processed traffic forecasts.

The SRTC model contains some, but not all, of anticipated new development in and around the study area. Some of this development could be accounted for elsewhere in the SRTC model, while some may not be included. Post-processed traffic forecasts were compared to anticipated traffic generation and distribution of known future developments to determine whether the developed forecasts account for this new growth. If they were found to not account for the new trips, forecasts were adjusted accordingly. The following new developments were reviewed during this process:

Table 3 – Pending Study Area Developments Reviewed

Development	Location
200 unit apartment building	61st/Ben Burr Road
Palouse Prairie (Ben Burr) Apartments	North of 61st/Ben Burr Road
Commons on Regal	55th/Regal
Garden District	Near 29th/Southeast Blvd
Hilby Station 2 Apartments	Palouse Highway east of Freya
Radio Park Apts & Retail (KXLY)	Regal/Palouse Highway
Moran View Estates	65th/Ben Burr Road
Palouse Trails Apartments	Palouse Hwy e/o Regal
Southridge PUD	29th e/o Havana
Trickle Creek 3rd and 4th	Between Havana and Glenrose
Twisted Willows	Between Havana and Glenrose

Appendix E provides more detail on the travel demand modeling and post-processing exercises.

3.2 Alternatives and Operational Analysis

Four initial future alternatives were tested in the 2040 SRTC model using the above process:

2040 No Build – only previously planned transportation projects are included

Alternative 1 – Signalizing 37th/Ray St and 37th/Freya St

Alternative 2 – 37th/Ray Roundabout and Signalized 37th/Freya St

Alternative 3 – Original Crossover Concept

The 2040 No Build alternative serves as a baseline for what future traffic conditions are estimated to be without any improvements to the focus intersections of 37th/Ray St and 37th/Freya St. Only previously programmed improvements are included in this alternative, which allows for comparisons with other alternatives to see what impact their improvements have on improving traffic flow and shifting traffic from the Regal corridor to the Freya corridor.

Although the original crossover concept (Alternative 3) has been removed from consideration as stated in the introduction, it was included to compare the effectiveness of new alternatives to this original alternative. As a note, this alternative was tested with a signalized 37th/Ray St intersection; however, a roundabout could be considered as well.

As described in the next chapter, two additional alternatives were added for analysis after showing the results of analyzing the initial future alternatives to the public and receiving feedback:

Alternative 4 – Roundabouts at both 37th/Ray St and 37th/Freya St

Alternative 5 – Converting 37th/Ray St into a Signalized T-Intersection and Signalized 37th/Freya St

Alternative 4 used reassigned traffic forecasts from Alternative 2 for its analysis given the similarities between the two alternatives, while Alternative 5 used reassigned traffic forecasts from Alternative 1.

The following subsections provide design details and traffic operations analysis results for each of the six future alternatives. All alternatives assume traffic forecasts are for the Year 2040. Operations analysis was conducted using the Synchro 10 software for stop controlled and signalized intersections, while the Sidra 6 software was used to analyze roundabouts. Appendix F provides printout results of the traffic operations analysis.

3.2.1 2040 No Build

As noted above, the 2040 No Build alternative incorporates only programmed improvements to the roadway network and does not include any improvements at the two focus intersections. Analysis of this alternative provides a baseline against which the other alternatives can be assessed against to judge their impact.

For the study area and nearby surroundings, the future traffic forecasts and analysis in this study incorporated the conversion of both Palouse Hwy/Freya St and 57th/Freya St[1] intersections from stop-controlled to being roundabouts in 2040. These improvements are retained in all alternatives as well.

Figure 9 and Figure 10 map forecasted directional AM and PM peak hour traffic volumes on roadway segments for the 2040 No Build derived from forecasted turning movements. Table 4 summarizes the operational analysis results for the 2040 No Build, including overall LOS and delay in seconds for all study intersections for the AM and PM peak hours. It also provides the operations summary of existing conditions to compare against. Appendix F provides printout results of the traffic operations analysis.

[1] The E 57th & S Freya St intersection was not part of the operations analysis for this study but was a part of the travel demand model roadway network.

Figure 9 – 2040 No Build AM Peak Hour Directional Volumes

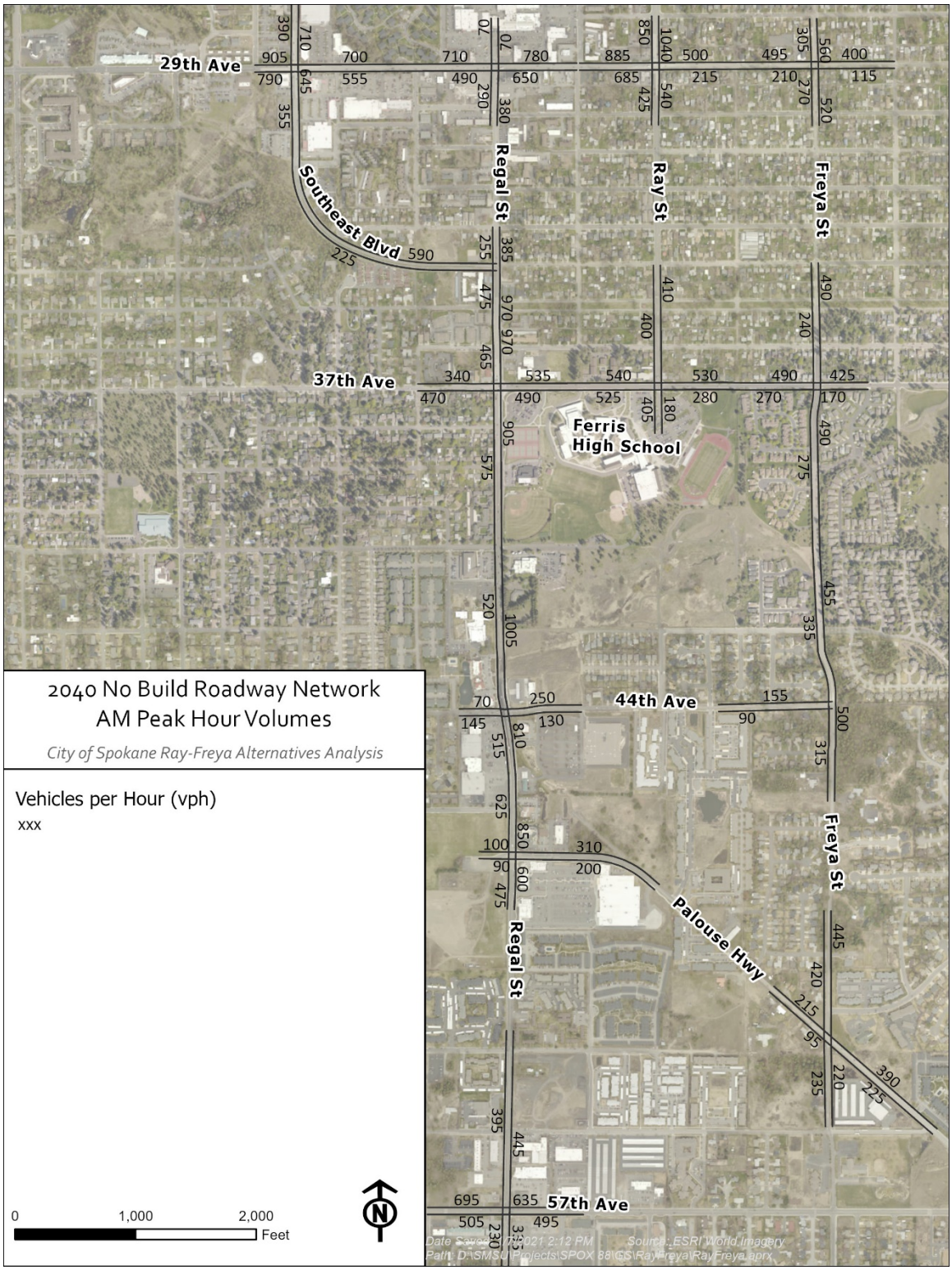


Figure 10 – 2040 No Build PM Peak Hour Directional Volumes

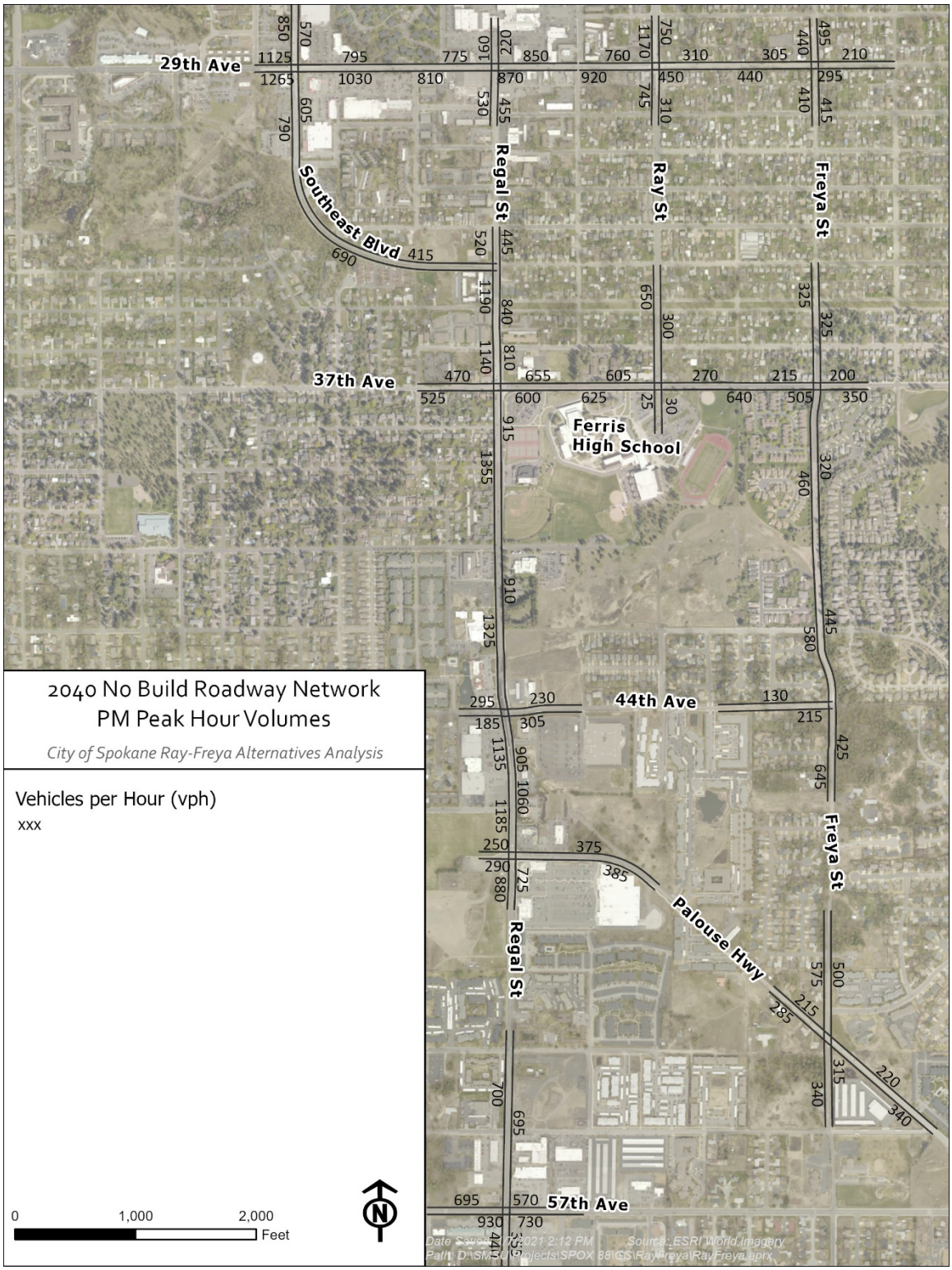


Table 4 – Summary of 2040 No Build AM/PM Intersection Operations

Intersection	Control Type	LOS (AM / PM)	Delay (seconds) (AM / PM)	Existing LOS (AM / PM)	Existing Delay (seconds) (AM / PM)
E 29th Ave & SE Blvd	Signal	C / D	21.6 / 48.7	C / C	20.8 / 27.1
E 29th Ave & S Regal St*	Signal	C / D	22.1 / 35.3	C / D	20.1 / 44.7
E 29th Ave & S Ray St	Signal	D / D	40.8 / 39.1	C / C	31.0 / 27.5
E 29th Ave & S Freya St	4-Way Stop	F / F	67.1 / 84.4	E / E	38.2 / 40.0
SE Blvd & S Regal St*	Signal	A / A	8.3 / 8.2	A / A	10.0 / 7.8
E 37th Ave & S Regal St	Signal	C / D	27.0 / 43.1	C / C	24.2 / 27.6
E 37th Ave & S Ray St	4-Way Stop	C / D	24.2 / 26.2	C / C	20.0 / 17.3
E 37th Ave & S Freya St	4-Way Stop	E / C	38.2 / 19.3	D / C	34.0 / 17.6
E 44th Ave & S Regal St	Signal	C / C	23.5 / 23.0	B / B	19.0 / 17.4
E 44th Ave & S Freya St	2-Way Stop	C / D	2.9 / 6.1	C / C	2.5 / 3.4
Palouse Hwy & S Regal St	Signal	C / E	24.6 / 58.6	B / C	15.2 / 20.1
Palouse Hwy & S Freya St	Roundabout	A / A	4.9 / 5.8	B / C	14.8 / 18.3
E 57th Ave & S Regal St	Signal	D / E	39.1 / 60.7	C / C	24.4 / 26.5

* Intersection settings do not comply with HCM 6th Ed.; uses SYNCHRO delay and reported LOS

Study Focus Intersections

Intersection Control Change from Existing

For the school release hour, the 37th/Ray St intersection operates at LOS B with 14.2 seconds of delay.

3.2.2 Alternative 1

Alternative 1, shown in Figure 11, involves starting with the 2040 No Build scenario and signalizing both the 37th/Ray St and 37th/Freya St intersections to allow traffic to more efficiently shift between S Ray St and S Freya St.

The footprints of both intersections would generally stay the same. These intersections were improved with conduits and junction boxes when 37th Avenue was rebuilt. So they can allow for relatively quick installation of signals. Both intersections would include bike lanes where the conflict zones are marked in green. Alternative 1 also includes a shared-use path on the south side of 37th Avenue between Ray and Thor. This requires shifting the softball practice field a short distance to the south.

Figure 11 – Alternative 1 Layout

Figure 12 and Figure 13 map forecasted directional AM and PM peak hour traffic volumes on roadway segments for Alternative 1 derived from forecasted turning movements. These maps also illustrate the change in volume between Alternative 1 and the 2040 No Build as a result of the improvements described above.

Table 5 summarizes the operational analysis results for Alternative 1, including overall LOS and delay in seconds for all study intersections for the AM and PM peak hours. It also provides the operations summary of the 2040 No Build to compare against. Appendix F provides printout results of the traffic operations analysis.

Table 5 – Summary of Alternative 1 AM/PM Intersection Operations

Intersection	Control Type	LOS (AM / PM)	Delay (seconds) (AM / PM)	2040 No Build LOS (AM / PM)	2040 No Build Delay (seconds) (AM / PM)
E 29th Ave & SE Blvd	Signal	C / D	21.7 / 49.9	C / D	21.6 / 48.7
E 29th Ave & S Regal St*	Signal	C / C	21.7 / 33.9	C / D	22.1 / 35.3
E 29th Ave & S Ray St	Signal	D / D	36.6 / 37.0	D / D	40.8 / 39.1
E 29th Ave & S Freya St	4-Way Stop	F / F	79.6 / 93.6	F / F	67.1 / 84.4
SE Blvd & S Regal St*	Signal	A / A	8.6 / 8.2	A / A	8.3 / 8.2
E 37th Ave & S Regal St	Signal	C / D	31.4 / 42.7	C / D	27.0 / 43.1
E 37th Ave & S Ray St	Signal	B / B	15.4 / 15.6	C / D	24.2 / 26.2
E 37th Ave & S Freya St	Signal	B / B	12.2 / 10.6	E / C	38.2 / 19.3
E 44th Ave & S Regal St	Signal	C / C	22.4 / 22.3	C / C	23.5 / 23.0
E 44th Ave & S Freya St	2-Way Stop	C / E	2.8 / 7.2	C / D	2.9 / 6.1
Palouse Hwy & S Regal St	Signal	C / D	22.6 / 48.2	C / E	24.6 / 58.6
Palouse Hwy & S Freya St	Roundabout	A / A	4.8 / 5.8	A / A	4.9 / 5.8
E 57th Ave & S Regal St	Signal	D / E	38.2 / 57.1	D / E	39.1 / 60.7

* Intersection settings do not comply with HCM 6th Ed.; uses SYNCHRO delay and reported LOS

Study Focus Intersections

Intersection Control Change from Existing

For the school release hour, the 37th/Ray St intersection is estimated to have a LOS B with 15.2 seconds of delay – a very slight degradation in delay compared to the 2040 No Build.

Figure 12 – Alternative 1 AM Peak Hour Directional Volumes and Change vs 2040 No Build

Figure 13 – Alternative 1 PM Peak Hour Directional Volumes and Change vs 2040 No Build

3.2.3 Alternative 2

Alternative 2 changes 37th/Ray to a roundabout and signalizes 37th/Freya. As in Alternative 1, the footprint of 37th/Freya would stay the same. The roundabout will minimize the impact to the high school traffic flow as the existing driveway can remain in place. Two or three of the city-owned homes at the corner of 37th/Ray will need to be removed.

Both intersections would include bike lanes where the conflict zones are marked in green. Alternative 2 also includes a shared-use path on the south side of 37th Avenue between Ray and Thor. This requires shifting the softball practice field a short distance to the south.

Figure 14 – Alternative 2 Layout

Figure 15 and Figure 16 map forecasted directional AM and PM peak hour traffic volumes on roadway segments for Alternative 2 derived from forecasted turning movements. These maps also illustrate the change in volume between Alternative 2 and the 2040 No Build as a result of the intersection improvements described above.

Table 6 summarizes the operational analysis results for Alternative 2, including overall LOS and delay in seconds for all study intersections for the AM and PM peak hours. It also provides the operations summary of the 2040 No Build to compare against. Appendix F provides printout results of the traffic operations analysis.

Table 6 – Summary of Alternative 2 AM/PM Intersection Operations

Intersection	Control Type	LOS (AM / PM)	Delay (seconds) (AM / PM)	2040 No Build LOS (AM / PM)	2040 No Build Delay (seconds) (AM / PM)
E 29th Ave & SE Blvd	Signal	C / D	21.6 / 48.9	C / D	21.6 / 48.7
E 29th Ave & S Regal St*	Signal	C / C	20.5 / 32.2	C / D	22.1 / 35.3
E 29th Ave & S Ray St	Signal	C / D	33.2 / 35.5	D / D	40.8 / 39.1
E 29th Ave & S Freya St	4-Way Stop	F / F	75.9 / 86.7	F / F	67.1 / 84.4
SE Blvd & S Regal St*	Signal	A / A	8.3 / 8.0	A / A	8.3 / 8.2
E 37th Ave & S Regal St	Signal	D / D	36.1 / 53.3	C / D	27.0 / 43.1
E 37th Ave & S Ray St	Roundabout	A / A	5.8 / 4.8	C / D	24.2 / 26.2
E 37th Ave & S Freya St	Signal	B / B	12.1 / 10.8	E / C	38.2 / 19.3
E 44th Ave & S Regal St	Signal	C / C	22.2 / 21.9	C / C	23.5 / 23.0
E 44th Ave & S Freya St	2-Way Stop	C / E	2.8 / 7.0	C / D	2.9 / 6.1
Palouse Hwy & S Regal St	Signal	C / D	22.6 / 46.6	C / E	24.6 / 58.6
Palouse Hwy & S Freya St	Roundabout	A / A	4.8 / 5.8	A / A	4.9 / 5.8
E 57th Ave & S Regal St	Signal	D / E	38.6 / 57.5	D / E	39.1 / 60.7

* Intersection settings do not comply with HCM 6th Ed.; uses SYNCHRO delay and reported LOS

Study Focus Intersections

Intersection Control Change from Existing

For the school release hour, the E 37th Avenue & S Ray St intersection is estimated to have a LOS A with just under 2 seconds of delay – an improvement over the 2040 No Build.

Figure 15 – Alternative 2 AM Peak Hour Directional Volumes and Change vs 2040 No Build

Figure 16 – Alternative 2 PM Peak Hour Directional Volumes and Change vs 2040 No Build

3.2.4 Alternative 3 – Original Crossover Concept

Alternative 3 is the original crossover concept. While this concept was no longer under consideration for the project, it was included to compare the effectiveness of new alternatives to this original alternative.

This concept involves a new "crossover" road segment that makes a diagonal connection between the south leg of the 37th/Ray intersection (where the eastern Ferris High School parking lot entrance is today) and S Freya St north of E 44th Ave. This alternative was tested with a signalized 37th/Ray intersection; however, a roundabout could have been considered too.

This concept requires use of all of the corner parcels owned by the city at 37th/Ray.

Figure 17 – Alternative 3 – Original Concept Layout

Figure 18 and Figure 19 map forecasted directional AM and PM peak hour traffic volumes on roadway segments for Alternative 3 derived from forecasted turning movements. These maps also illustrate the change in volume between Alternative 3 and the 2040 No Build as a result of the improvements described above. Note that volumes for the new "crossover" were estimated by taking into account changes in travel patterns projected by the SRTC travel demand model and forecasts developed for other alternatives, including the 2040 No Build.

Table 7 summarizes the operational analysis results for Alternative 3, including overall LOS and delay in seconds for all study intersections for the AM and PM peak hours. It also provides the operations summary of the 2040 No Build to compare against. Appendix F provides printout results of the traffic operations analysis.

Table 7 – Summary of Alternative 3 (Original Concept) AM/PM Intersection Operations

Intersection	Control Type	LOS (AM / PM)	Delay (seconds) (AM / PM)	2040 No Build LOS (AM / PM)	2040 No Build Delay (seconds) (AM / PM)
E 29th Ave & SE Blvd	Signal	C / D	22.0 / 50.3	C / D	21.6 / 48.7
E 29th Ave & S Regal St*	Signal	C / D	21.2 / 36.4	C / D	22.1 / 35.3
E 29th Ave & S Ray St	Signal	D / D	48.6 / 48.9	D / D	40.8 / 39.1
E 29th Ave & S Freya St	4-Way Stop	F / F	56.1 / 79.6	F / F	67.1 / 84.4
SE Blvd & S Regal St*	Signal	A / A	8.4 / 8.1	A / A	8.3 / 8.2
E 37th Ave & S Regal St	Signal	C / D	23.4 / 38.8	C / D	27.0 / 43.1
E 37th Ave & S Ray St	Signal†	B / B	18.6 / 15.0	C / D	24.2 / 26.2
E 37th Ave & S Freya St	4-Way Stop	C / B	19.5 / 14.3	E / C	38.2 / 19.3
Crossover & S Freya St	2-Way Stop	C / C	1.9 / 2.0	-	-
E 44th Ave & S Regal St	Signal	C / C	21.1 / 21.8	C / C	23.5 / 23.0
E 44th Ave & S Freya St	2-Way Stop	E / F	3.7 / 11.3	C / D	2.9 / 6.1
Palouse Hwy & S Regal St	Signal	C / D	20.8 / 37.8	C / E	24.6 / 58.6
Palouse Hwy & S Freya St	Roundabout	A / A	4.8 / 6.0	A / A	4.9 / 5.8
E 57th Ave & S Regal St	Signal	D / E	37.0 / 56.0	D / E	39.1 / 60.7

* Intersection settings do not comply with HCM 6th Ed.; uses SYNCHRO delay and reported LOS

† Intersection was analyzed with a traffic signal; however, a roundabout would be a feasible option as well

Study Focus Intersections

Intersection Control Change from Existing

New Intersection

No school release hour was analyzed for this alternative, as not enough travel data was available to estimate this time period.

Figure 18 – Alternative 3 (Original Concept) AM Peak Hour Directional Volumes and Change vs 2040 No Build

Figure 19 – Alternative 3 (Original Concept) PM Peak Hour Directional Volumes and Change vs 2040 No Build

3.2.5 Alternative 4

As shown in Figure 20, Alternative 4 uses the traffic projections from Alternative 2, but offsets the 37th/Ray roundabout to the east, removes the south leg of the roundabout and moves the main entrance to the Ferris High School parking lot to the west as a driveway accessing E 37th Ave. It also changes the 37th/Freya intersection to a roundabout rather than a traffic signal.

The offset roundabout requires removal of all the city-owned rental homes on the corner of 37th/Ray. It also requires purchase of one or two homes at the corner of 37th/Freya in order to fit a roundabout at that intersection.

Alternative 4 also includes a shared-use path on the south side of 37th Avenue between Ray and Thor. This requires shifting the softball practice field a short distance to the south.

Figure 20 – Alternative 4 Layout

Because the traffic projections are comparable to Alternative 2, no volume comparison maps are provided. Table 8 summarizes the operational analysis results for Alternative 4. These results are the same as Alternative 2 as well, except for the S Ray St and S Freya St intersections with E 37th Ave. The table includes overall LOS and delay in seconds for all study intersections for the AM and PM peak hours. It also provides the operations summary of the 2040 No Build to compare against. Appendix F provides printout results of the traffic operations analysis.

Table 8 – Summary of Alternative 4 AM/PM Intersection Operations

Intersection	Control Type	LOS (AM / PM)	Delay (seconds) (AM / PM)	2040 No Build LOS (AM / PM)	2040 No Build Delay (seconds) (AM / PM)
E 29th Ave & SE Blvd	Signal	C / D	21.6 / 48.9	C / D	21.6 / 48.7
E 29th Ave & S Regal St*	Signal	C / C	20.5 / 32.2	C / D	22.1 / 35.3
E 29th Ave & S Ray St	Signal	C / D	33.2 / 35.5	D / D	40.8 / 39.1
E 29th Ave & S Freya St	4-Way Stop	F / F	75.9 / 86.7	F / F	67.1 / 84.4
SE Blvd & S Regal St*	Signal	A / A	8.3 / 8.0	A / A	8.3 / 8.2
E 37th Ave & S Regal St	Signal	D / D	36.1 / 53.3	C / D	27.0 / 43.1
E 37th Ave & S Ray St	Roundabout (3-legs)†	A / A	9.3 / 10.0	C / D	24.2 / 26.2
E 37th Ave & S Freya St	Roundabout	A / A	2.7 / 2.1	E / C	38.2 / 19.3
E 44th Ave & S Regal St	Signal	C / C	22.2 / 21.9	C / C	23.5 / 23.0
E 44th Ave & S Freya St	2-Way Stop	C / E	2.8 / 7.0	C / D	2.9 / 6.1
Palouse Hwy & S Regal St	Signal	C / D	22.6 / 46.6	C / E	24.6 / 58.6
Palouse Hwy & S Freya St	Roundabout	A / A	4.8 / 5.8	A / A	4.9 / 5.8
E 57th Ave & S Regal St	Signal	D / E	38.6 / 57.5	D / E	39.1 / 60.7

* Intersection settings do not comply with HCM 6th Ed.; uses SYNCHRO delay and reported LOS

† The south leg to/from Ferris High School was removed and a driveway added west of the roundabout

Study Focus Intersections

Intersection Control Change from Existing

For the school release hour, the intersection is estimated to have a LOS A with nearly 6 seconds of delay – an improvement over the 2040 No Build, but slightly more delay than Alternative 2. One concern during school arrival and release time was the short queuing distance between the roundabout and the relocated school driveway.

3.2.6 Alternative 5

As shown in Figure 21, Alternative 5 uses the traffic projections from Alternative 1, but removes the south leg of the 37th/Ray St traffic signal, creating a signalized T-intersection with a curve that prioritizes travel between S Ray St and E 37th St to the east. The entrance of the eastern Ferris High School parking lot is split into two driveways accessing E 37th Ave: one west of the intersection and the other east. The 37th/Freya intersection does not change from Alternative 1, remaining a traffic signal.

Alternative 5 also includes a shared-use path on the south side of 37th Avenue between Ray and Thor. This requires shifting the softball practice field a short distance to the south. Some of the city parcels at 37th/Ray would be needed.

Figure 21 – Alternative 5 Layout

Because the traffic projections are comparable to Alternative 1, no volume comparison maps are provided. Table 9 summarizes the operational analysis results for Alternative 5. These results are the same as Alternative 1 as well, except for the 37th/Ray intersection. The table includes overall LOS and delay in seconds for all study intersections for the AM and PM peak hours. It also provides the operations summary of the 2040 No Build to compare against. Appendix F provides printout results of the traffic operations analysis.

Table 9 – Summary of Alternative 5 AM/PM Intersection Operations

Intersection	Control Type	LOS (AM / PM)	Delay (seconds) (AM / PM)	2040 No Build LOS (AM / PM)	2040 No Build Delay (seconds) (AM / PM)
E 29th Ave & SE Blvd	Signal	C / D	21.7 / 49.9	C / D	21.6 / 48.7
E 29th Ave & S Regal St*	Signal	C / C	21.7 / 33.9	C / D	22.1 / 35.3
E 29th Ave & S Ray St	Signal	D / D	36.6 / 37.0	D / D	40.8 / 39.1
E 29th Ave & S Freya St	4-Way Stop	F / F	79.6 / 93.6	F / F	67.1 / 84.4
SE Blvd & S Regal St*	Signal	A / A	8.6 / 8.2	A / A	8.3 / 8.2
E 37th Ave & S Regal St	Signal	C / D	31.4 / 42.7	C / D	27.0 / 43.1
E 37th Ave & S Ray St	Signal (T-intersection)†	B / B	11.5 / 11.7	C / D	24.2 / 26.2
E 37th Ave & S Freya St	Signal	B / B	12.2 / 10.6	E / C	38.2 / 19.3
E 44th Ave & S Regal St	Signal	C / C	22.4 / 22.3	C / C	23.5 / 23.0
E 44th Ave & S Freya St	2-Way Stop	C / E	2.8 / 7.2	C / D	2.9 / 6.1
Palouse Hwy & S Regal St	Signal	C / D	22.6 / 48.2	C / E	24.6 / 58.6
Palouse Hwy & S Freya St	Roundabout	A / A	4.8 / 5.8	A / A	4.9 / 5.8
E 57th Ave & S Regal St	Signal	D / E	38.2 / 57.1	D / E	39.1 / 60.7
E 37th Ave & West School Driveway	2-Way Stop†	D / D	29.8 / 30.6	-	-
E 37th Ave & East School Driveway	2-Way Stop†	B / C	14.7 / 15.6	-	-

* Intersection settings do not comply with HCM 6th Ed.; uses SYNCHRO delay and reported LOS

† The south leg to/from Ferris High School was removed and driveways added east and west of the intersection

Study Focus Intersections

Intersection Control Change from Existing

For the school release hour, the intersection of 37th/Ray is estimated to have a LOS B with nearly 11 seconds of delay – an improvement over both the 2040 No Build and Alternative 1. The western school driveway is expected to function at LOS D for the NB left turn. The eastern school driveway is expected to function at LOS B. The school departure analysis used a PHF of 0.7 for the school driveway. The analysis for the west school driveway assumes a single stage left turn movement. It's possible that some drivers will use the TWLTL and make a two-stage left turn.

3.3 Comparing and Assessing the Results

This section compares and assesses the operational analysis results of the previous section. A comparison of the LOS results for the AM and PM peak hours of all alternatives and the existing condition is provided in Table 10, while a comparison of changes in overall intersection delay for the AM and PM peak hours of improvement alternatives versus the 2040 No Build is provided in Table 11. These tables provide color-coding to help highlight where there are improvements in operations versus where there are degradations, and to what degree.

It should be noted that this table does not account for the potential to shift from vehicular to walking and biking through the construction of the crossover pathway and other connections. While this is not likely to change the student driver trips, it may influence how many students are dropped off or picked up by parents, and thus reduce the congestion during peak school times.

Table 10 – Comparison of AM/PM Peak Hour LOS for All Alternatives

Intersection	LOS (AM / PM)						
	Existing	2040 No Build	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
E 29th Ave & SE Blvd	C / C	C / D	C / D	C / D	C / D	C / D	C / D
E 29th Ave & S Regal St*	C / D	C / D	C / C	C / C	C / D	C / C	C / C
E 29th Ave & S Ray St	C / C	D / D	D / D	C / D	D / D	C / D	D / D
E 29th Ave & S Freya St	E / E	F / F	F / F	F / F	F / F	F / F	F / F
SE Blvd & S Regal St*	A / A	A / A	A / A	A / A	A / A	A / A	A / A
E 37th Ave & S Regal St	C / C	C / D	C / D	D / D	C / D	D / D	C / D
E 37th Ave & S Ray St	C / C	C / D	B / B	A / A	B / B	A / A	B / B
E 37th Ave & S Freya St	D / C	E / C	B / B	B / B	C / B	A / A	B / B
E 44th Ave & S Regal St	B / B	C / C	C / C	C / C	C / C	C / C	C / C
E 44th Ave & S Freya St	C / C	C / D	C / E	C / E	E / F	C / E	C / E
Palouse Hwy & S Regal St	B / C	C / E	C / D	C / D	C / D	C / D	C / D
Palouse Hwy & S Freya St	B / C	A / A	A / A	A / A	A / A	A / A	A / A
E 57th Ave & S Regal St	C / C	D / E	D / E	D / E	D / E	D / E	D / E

* Intersection settings do not comply with HCM 6th Ed.; uses SYNCHRO delay and reported LOS

Study Focus Intersections

Comparison Legend

LOS Improvement vs 2040 No Build: minor major

LOS Degradation vs 2040 No Build: minor major

Table 11 – Comparison of Change in AM Peak Hour Delay for Improvement Alternatives vs 2040 No Build

Intersection	Change in Delay (seconds)				
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
AM					
E 29th Ave & SE Blvd	0.1	0.0	0.4	0.0	0.1
E 29th Ave & S Regal St*	-0.4	-1.6	-0.9	-1.6	-0.4
E 29th Ave & S Ray St	-4.2	-7.6	7.8	-7.6	-4.2
E 29th Ave & S Freya St	12.5	8.8	-11.0	8.8	12.5
SE Blvd & S Regal St*	0.3	0.0	0.1	0.0	0.3
E 37th Ave & S Regal St	4.4	9.1	-3.6	9.1	4.4
E 37th Ave & S Ray St	-8.8	-18.4	-5.6	-14.9	-12.7
E 37th Ave & S Freya St	-26.0	-26.1	-18.7	-35.5	-26.0
E 44th Ave & S Regal St	-1.1	-1.3	-2.4	-1.3	-1.1
E 44th Ave & S Freya St	-0.1	-0.1	0.8	-0.1	-0.1
Palouse Hwy & S Regal St	-2.0	-2.0	-3.8	-2.0	-2.0
Palouse Hwy & S Freya St	-0.1	-0.1	-0.1	-0.1	-0.1
E 57th Ave & S Regal St	-0.9	-0.5	-2.1	-0.5	-0.9
PM					
E 29th Ave & SE Blvd	1.2	0.2	1.6	0.2	1.2
E 29th Ave & S Regal St*	-1.4	-3.1	1.1	-3.1	-1.4
E 29th Ave & S Ray St	-2.1	-3.6	9.8	-3.6	-2.1
E 29th Ave & S Freya St	9.2	2.3	-4.8	2.3	9.2
SE Blvd & S Regal St*	0.0	-0.2	-0.1	-0.2	0.0
E 37th Ave & S Regal St	-0.4	10.2	-4.3	10.2	-0.4
E 37th Ave & S Ray St	-10.6	-21.4	-11.2	-16.2	-14.5
E 37th Ave & S Freya St	-8.7	-8.5	-5.0	-17.2	-8.7
E 44th Ave & S Regal St	-0.7	-1.1	-1.2	-1.1	-0.7
E 44th Ave & S Freya St	1.1	0.9	5.2	0.9	1.1
Palouse Hwy & S Regal St	-10.4	-12.0	-20.8	-12.0	-10.4
Palouse Hwy & S Freya St	0.0	0.0	0.2	0.0	0.0
E 57th Ave & S Regal St	-3.6	-3.2	-4.7	-3.2	-3.6

* Intersection settings do not comply with HCM 6th Ed.; uses SYNCHRO delay and reported LOS

Study Focus Intersections

Comparison Legend

Delay vs 2040 No Build: >0 >5 >10 >15 >20 seconds decrease in delay

Delay vs 2040 No Build: >0 >5 >10 >15 >20 seconds increase in delay

Taking into account the operational analysis results and the above comparisons, the following are assessments of each alternative to aid in making a recommendation.

3.3.1 2040 No Build

S Regal St Corridor Intersections

Without any improvements at S Regal St intersections or the study focus intersections, traffic continues to increase along the S Regal St corridor. Under 2040 No Build conditions, the LOS is projected to degrade for the AM and/or PM peak hour at the following intersections:

- E 37th Ave (PM)
- E 44th Ave (AM and PM)
- Palouse Hwy (AM and PM)
- E 57th Ave (AM and PM)

For nearly every intersection and peak hour, delay increases as well. The Palouse Hwy and E 57th Ave intersections are estimated to add roughly 35-40 seconds of delay under 2040 No Build conditions in the PM peak hour, largely due to additional expected development around the southern portion of the study area.

Study Focus Intersections

Under existing conditions, both study focus intersections operate with acceptable levels of delay. Under 2040 No Build conditions, the AM peak hour of this intersection degrades to LOS E, but is still an acceptable LOS. The PM peak hour of the 37th/Ray St intersection also degraded to LOS D.

Other Study Area Intersections

Most intersections along E 29th Ave also see degradation in LOS and increase in delay under 2040 No Build conditions, particularly in the PM peak hour. Improving the Palouse Hwy/Freya St intersection to a roundabout helps the intersection absorb new development trips and achieve LOS A. This improvement may also assist some of the improvement alternatives in drawing traffic to/from S Freya St rather than S Regal St, as the nearby Palouse Hwy/Regal St intersection shows some of the best delay improvements with alternatives implemented at the study focus intersections.

Conclusion

Many intersections continue to operate with acceptable levels of delay under 2040 No Build conditions for one or both peak hour periods. However, several of these intersections, especially during the PM peak hour, degrade to LOS E. While this is an acceptable overall LOS, there are locations that could experience long queues or LOS F on select movements.

3.3.2 Alternative 1

Travel Patterns

Small to moderate decreases are projected along S Regal St for both the AM and PM peak hours for this alternative, while small increases are projected for S Ray St and the entirety of S Freya St in the study area. Moderate increases are projected for E 37th Ave in between the two focus intersections.

Impacts on the S Regal St Corridor Intersections

Little to no change in LOS was found for the S Regal St intersections, with both the E 29th Ave and Palouse Hwy intersections improving a grade in the PM peak hour. The AM and PM peak hour delay at these corridor intersections similarly did not change very much except for a 10-second reduction in delay for the PM peak hour at the Regal St/Palouse Hwy intersection.

Impacts on Study Focus Intersections

Upgrading the intersection control at both S Ray St and S Freya St intersections with E 37th Ave resulted in operational improvements in both the AM and PM peak hours for these two study focus intersections, with all peak hours at both intersections improving to LOS B as a result of modest to significant decrease in delay.

Impacts on Other Study Area Intersections

The 44th/Freya St intersection degrades from LOS D to LOS E in the PM peak hour, but this is because the 2040 No Build conditions at this intersection are nearly LOS D anyway. These observations are true in all improvement alternatives except Alternative 3. Also worth noting is additional delay at the E 29th Ave & S Freya St intersection in both peak hours (AM: +12.5 seconds, PM: +9.2 seconds); however, the intersection was already found to have LOS F in the 2040 No Build.

Conclusion

This alternative appears to facilitate some crossing over between S Ray St and S Freya St via E 37th Ave, pulling a small amount of traffic from S Regal St. It also appears to facilitate more travel along the entirety of S Freya St, despite failing operations at 29th/Freya St, suggesting that this alternative alone does not create a “crossover”. Signal timing and phasing could be implemented to force this movement further, but this would likely only impact operations for S Freya St intersections at E 29th Ave and E 37th Ave and not induce demand to shift from S Regal St.

3.3.3 Alternative 2

Travel Patterns

Small to moderate decreases are projected along S Regal St south of E 37th Ave for both the AM and PM peak hours for this alternative, but more significant reductions are projected north of E 37th Ave. This results in higher increases along E 37th Ave east of S Regal St and along S Ray St north of E 37th Ave compared to changes observed for Alternative 1. Like Alternative 1, projected volumes along S Freya St have a small to moderate increase over the 2040 No Build south of E 37th Ave, while to the north there is mostly little to no growth.

Impacts on the S Regal St Corridor Intersections

The LOS results for Alternative 2 are very similar to the results of Alternative 1 for the S Regal St intersections: little to no changes in LOS, with both the E 29th Ave and Palouse Hwy intersections improving a grade in the PM peak hour. The AM and PM peak hour delay at these corridor intersections was also similar to Alternative 1, with little change for the most part and a 12-second reduction in delay for the PM peak hour at the Regal/Palouse Hwy intersection.

The key difference is moving from LOS C to LOS D for the AM peak hour at the E 37th Ave intersection as a result of adding 9 seconds of delay compared to the 2040 No Build. This is likely due to the travel pattern shift noted above, as 10 seconds of delay is also added to the PM peak hour at this intersection, though no change in LOS. Specifically, an increase in northbound right turns, which is currently a shared through-right lane, and westbound left turns could be the cause of this change.

Impacts on Study Focus Intersections

Upgrading the E 37th Ave intersections of S Ray St to a roundabout and S Freya St to a traffic signal resulted in significant operational improvements in both the AM and PM peak hours for these two study focus intersections, with all peak hours at both intersections improving to LOS A as a result of significant decreases in delay.

Impacts on Other Study Area Intersections

As with Alternative 1, the 44th/Freya St intersection degrades from LOS D to LOS E in the PM peak hour, but this is because the 2040 No Build conditions at this intersection are nearly LOS D anyway. These observations are true in all improvement alternatives except Alternative 3. Additional delay is also observed at the 29th/Freya St intersection in both peak hours; however, to a lesser extent than Alternative 1 and the intersection was already found to have LOS F in the 2040 No Build.

Also worth noting are slightly more pronounced reductions in delay in both peak hours for the 29th/Ray St intersection, as well as an improvement from LOS D to LOS C in the AM peak hour. This is likely due to the travel pattern shift noted earlier, which involves more north/south through travel and less turning traffic between the north and west legs of the intersection.

Conclusion

This alternative appears to facilitate some crossing over between S Ray St and S Freya St, pulling a small amount of traffic from S Regal St south of E 37th Ave. However, it has the greatest impact of all alternatives in pulling trips from S Regal St north of E 37th Ave and E 29th Ave between S Regal St and S Ray St onto S Ray St compared to Alternative 1. It also appears to have slightly less increase along S Freya St north of E 37th Ave compared to Alternative 1. If chosen, this alternative may warrant signal timing and/or phasing changes, or other improvements, to accommodate the change in travel patterns at the 37th/Regal St intersection.

3.3.4 Alternative 3 - Original Crossover Concept

Because this concept is not being considered and is instead for comparison purposes, an in-depth review of the operations results is not being provided. Instead, some key observations and notable differences for this alternative include:

- The operational analysis confirms that the “crossover” is the most effective concept in achieving the goal of reducing traffic along S Regal St, at least south of E 37th Ave, and

moving it to the newly connected S Ray St and S Freya St corridor for both AM and PM peak hours. Moderate reductions appear on S Regal St south of E 37th Ave accompanied by moderate to high increases along S Ray St and S Freya St south of its intersection with the "crossover". There are also moderate to high reductions in traffic along Palouse Hwy, E 37th Ave, and S Freya St north of its intersection with the "crossover" and even north of E 37th Ave.

- Although not tested, a roundabout at 37th/Ray St could further direct traffic to/from S Ray St given the results of Alternative 2, which could decrease traffic on S Regal St north of E 37th Ave and along E 29th Ave. Reductions on these two segments were likely not observed for Alternative 3 as it was tested because the signal and its orientation for the E 37th/Ray St intersection would likely not provide those travel patterns with any travel time savings. Additionally, these trips may be to/from the commercial areas along E 29th Ave and would not be impacted by the improvements provided by the "crossover".
- Delay is reduced at the 29th/Freya intersection, whereas all other alternatives increase delay compared to the 2040 No Build. However, the intersection continues to have a LOS F for both AM and PM peak hours.
- The LOS is severely impacted for the 44th/Freya intersection, with LOS shifting from C/D in the No Build to E/F for the AM and PM peak hours, respectively.
- Operations at both study focus area intersections improve like the other alternatives, but to the smallest extent amongst all alternatives.
- The reduction in the PM peak hour delay at the Regal/Palouse Hwy intersection is almost twice as much as the other alternatives.
- It is the only alternative that reduces delay at the 37th/Regal St intersection for both the AM and PM peak hours, whereas all other alternatives add delay in the AM peak hour and either add or barely reduce delay in the PM peak hour.
- Despite being the most effective concept to divert traffic off S Regal St, it does not solve the issues of traffic congestion and delay along S Regal St in the study area. Instead, it likely would delay some of the traffic impacts along the corridor. S Regal St remains an important commercial corridor, of which many trips cannot be diverted. Although with the addition of appropriate bicycle and pedestrian facilities, some of these trips can be shifted away from vehicles.

3.3.5 Alternative 4

All observations regarding the operations of Alternative 2 hold true for Alternative 4 except for the S Ray St and S Freya St intersections with E 37th Ave because of the described changes in improvements at these intersections. The following summarizes the impacts of these changes.

Impacts on the E 37th Ave & S Ray St Intersection

Removing the south leg and moving the school's parking lot driveway west does not impact the LOS of the intersection, as it remains LOS A as it is in Alternative 2. Delay is only minorly impacted, with slightly less reduction in delay compared to the 2040 No Build when comparing Alternative 4 to Alternative 2 for both the AM and PM peak hours.

Impacts on the E 37th Ave & S Freya St Intersection

Converting this intersection to a roundabout changes the LOS from LOS B to LOS A for both the AM and PM peak hours; however, the major change is in delay. The AM peak hour is estimated to see nearly 36 seconds less of delay compared to the 2040 No Build – a nearly 10-second improvement over Alternative 2. The PM peak hour is estimated to see over 17 seconds less of delay compared to the 2040 No Build – twice the improvement compared to Alternative 2.

Conclusion

This alternative involves a minor change to 37th/Ray St and a major change to 37th/Freya St compared to Alternative 2. From the perspective of the S Ray St intersection, removing the south leg and moving the school's driveway still results in excellent LOS and low delay, with a slight reduction in improvement compared to Alternative 2. From the perspective of the S Freya St intersection, making this intersection a roundabout further improves its operations compared to Alternative 2.

Choosing all or part of Alternative 4 over Alternative 2, or vice versa, depends on other non-operational factors such as safety, cost, right-of-way availability, and impacts to non-motorized modes.

3.3.6 Alternative 5

All observations regarding the operations of Alternative 1 hold true for Alternative 5 except for the 37th/Ray St intersection because of the described changes in improvements at this intersection. The following summarizes the impacts of the changes.

Impacts on the E 37th Ave & S Ray St Intersection

No impacts to the LOS of this intersection are estimated to occur as a result of the changes, as it remains LOS B as it is in Alternative 1. Delay is minorly impacted, with a slightly greater reduction in delay compared to the 2040 No Build when comparing Alternative 5 to Alternative 1 for both the AM and PM peak hours. This is because the turning movements from the school parking lot are split outside of the intersection, with some of those trips no longer impacting operations at the intersection.

Conclusion

Both Alternative 1 and Alternative 5 improve operations at 37th/Ray St, with Alternative 5 having slightly less delay due to removing the school traffic from the south leg. Choosing one over the other depends on the expected safety of the new school driveways. Alternative 5 is expected to shift slightly more traffic than Alternative 1.

3.4 Non-Motorized Improvements

The study evaluated a variety of non-motorized improvements for the area.

3.4.1 Shared Use Pathway Improvements

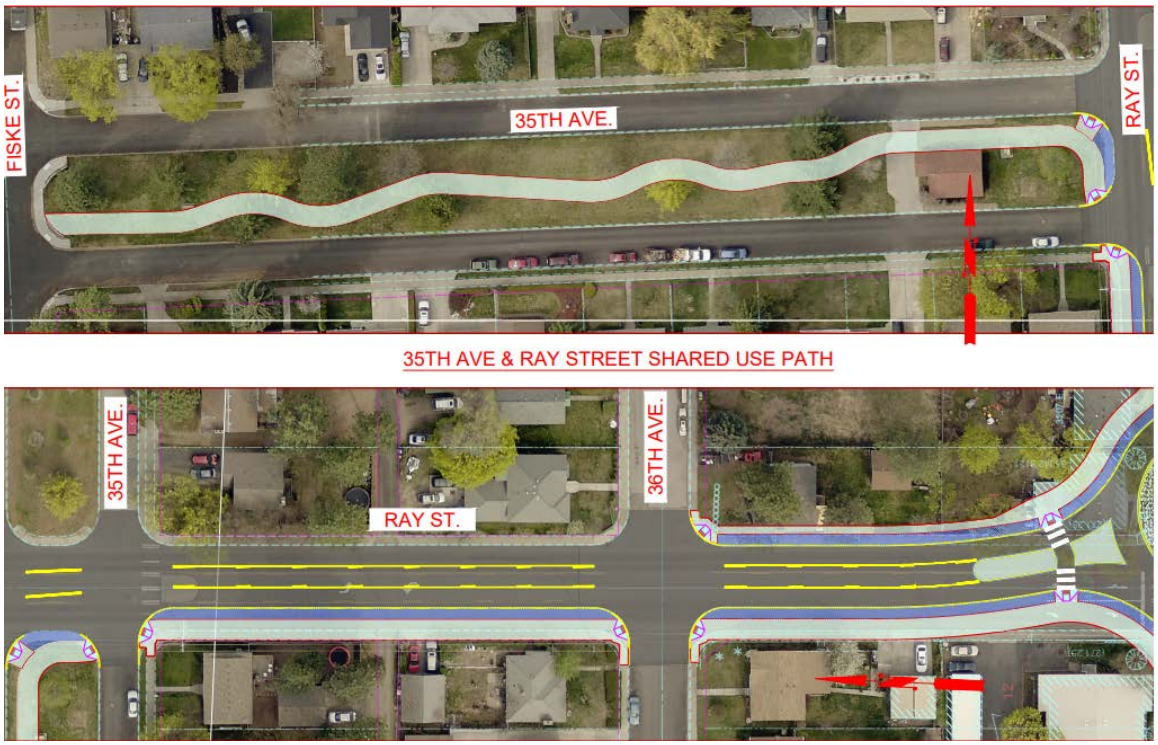
Shared-use pathways are often a preferred facility type for walkers and cyclists. This section describes the pathway concepts that were considered in this study.

Ray-Freya Crossover Pathway - Shared-use Pathway on the crossover alignment and the 37th Avenue frontage between Ray Street and Thor Street. The south end connects to Freya Street and continues as a sidepath to 44th Avenue. A midpoint connection would be made into the Hazel's Creek Area. The Freya pathway could also continue south from 44th Avenue down to Palouse Highway, on the west side of the street.

Figure 22 – Ray-Freya Crossover Pathway

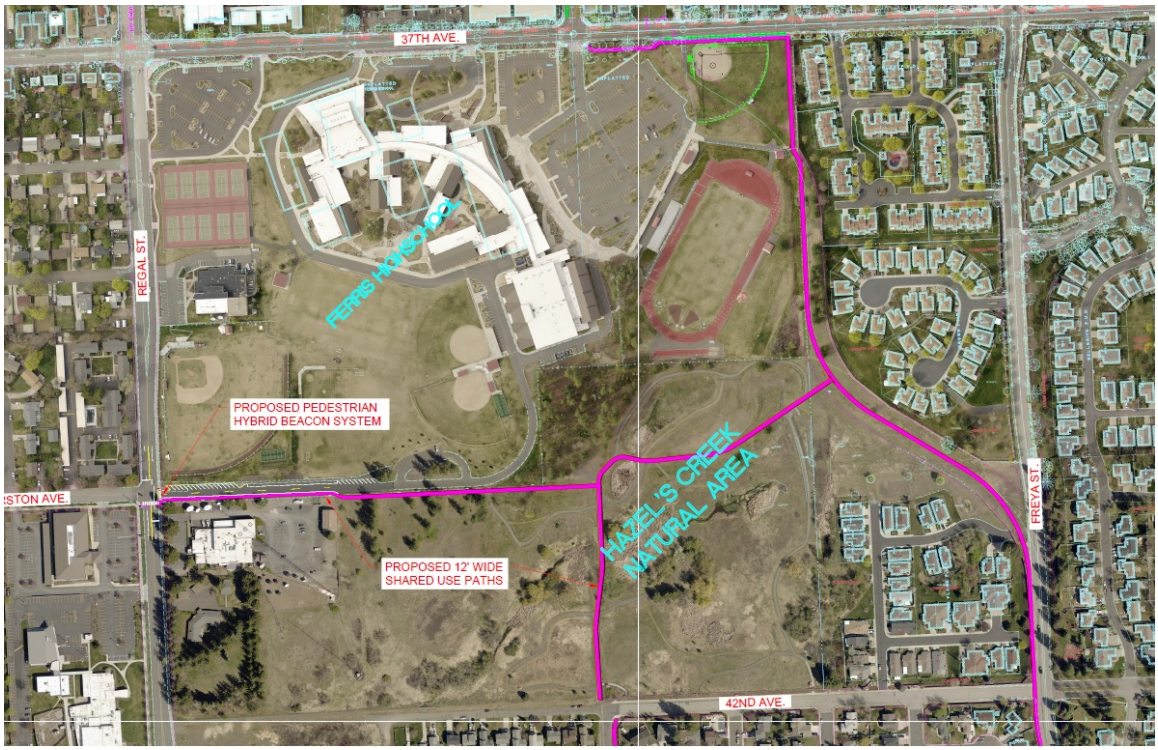
Ray Street Pathway - Shared-use pathway along the west side Ray Street continuing north from 37th Avenue to 35th Avenue. Then a shared-use pathway down the median to Fiske Street. Fiske Street will likely need a pedestrian hybrid beacon at 29th Avenue to provide a safe crossing point. North of 29th Avenue, Fiske Street will connect to the future Thornton Murphy Park shared-use pathway.

Figure 23 – Ray Street Pathway



Hazel's Creek Pathway and Regal/Thurston Connection - Shared-use pathway from Regal Street at Thurston Avenue, heading east through school or broadcast station property to Hazel's Creek. This concept will require right-of-way acquisition or an easement agreement for the pathway. Install a Pedestrian Hybrid Beacon at Regal/Thurston to provide a safe crossing location to the neighborhood west of Regal Street. Pave existing soft-surface pathways through Hazel's Creek to provide an east-west route from Regal/Thurston to the crossover pathway. Also pave a route to the south on the Ray Street alignment to 42nd Avenue. Paving in the Hazel's Creek area can be accomplished if the pathways follow existing routes and do not disturb the stormwater facilities.

Figure 24 – Hazel's Creek Pathway and Regal/Thurston Connection



3.4.2 Other Non-Motorized Improvements

Other non-motorized improvements identified for the study area are listed below.

- Designate 39th Avenue as a future greenway route, including a pathway through Hamblen Park.
- Improve Fiske Street as a greenway route from 35th to 27th, including an enhanced crosswalk at 29th Avenue.
- Complete the sidewalk on 44th Avenue east of Regal Street.
- Use leading pedestrian interval phasing on the signals.
- Use green bicycle lane markings through conflict zones in intersections.

4.0 PUBLIC ENGAGEMENT

4.1 Ferris High School Outreach

Virtual meetings were held in Spring 2020 with representatives from Ferris High School and Spokane Public Schools to learn how Ferris High School users (students, staff, school buses, and visitors) impact and are impacted by the adjacent roadways and intersections. Preliminary results of analyzing the first three alternatives were also shared to obtain feedback as they relate to Ferris High School, and if any other alternatives should be considered.

4.1.1 Existing Travel Patterns

The primary takeaways from the interviews regarding existing travel patterns of the school include:

- Peak travel times are typically 30 minutes before and after school, with the school release period (2:30-3:00pm) being the busiest.
- School buses use S Regal St to enter the campus via a bus-only drive and exit turning right-only onto E 37th Ave. For the school release, buses depart at 2:35pm and primarily travel east through the E 37th Ave & S Ray St intersection, with some turning onto S Ray St.
- Private vehicle drop-offs/pick-ups occur along E 37th Ave in the passenger loading lane in front of the school, adjacent to the staff parking lot. Anecdotally, this type of access to the school is increasing while bus ridership has been slowly decreasing.
- Overall, there is ample parking available. Staff primarily use the staff lot and the west parking lot, and arrive/depart sporadically. In the afternoon, they usually have departed by 3:00/3:30pm. The west parking lot is also used by parents who are picking up children from Adams Elementary School, which is at the northeast corner of 37th/Regal St and releases students at 3:00pm. Students primarily use the east parking lot; however, most parking for indoor after-school activities occurs in the west parking lot. Outdoor activities typically do not attract much traffic.
- A unique aspect of the school's travel patterns is that the number of students driving to school increases as the school year goes on, as more students obtain their driver's license. In general, a large portion of the drivers coming to/from the school are novice drivers.
- Most bicycle and pedestrian activity is oriented towards the 37th/Regal St intersection, using the west entrance of the school. This is largely due to the STA bus stop at this intersection, which a lot of students use. Use of the STA bus stop has also been increasing due to more kids participating in work release programs. The school boundary also extends north of I-90. Many school choice students come from the north.
- The school has not had many issues with non-school traffic. The only concern is during snow events, where eastbound traffic on E 37th Ave that turns northbound onto S Ray St can misjudge the slight hill at the intersection.
- School officials find that the site works well overall and has enough capacity for the school to grow, so no new buildings or site changes are planned.

4.1.2 Alternatives Feedback

In general, school officials thought most of the alternatives presented would work well. The following are specific observations for each of the alternatives. These observations are focused on 37th/Ray since that intersection has the most impact on the school.

Alternative 1 – Traffic Signals

Traffic signals are the easiest for novice drivers to navigate. The main concern of signalizing the 37th/Ray St intersection would be possible backups along E 37th Ave between Ferris High School and Adams Elementary School. Queuing into the east parking lot during school release is not much of a concern, as this already occurs and the parking lot is designed for this.

Alternative 2 – Roundabout and Traffic Signal

Interest in a roundabout, but concern as to how well novice drivers would navigate it and yield to pedestrians. Would likely require an educational program targeted towards students.

Alternative 3 – Original Crossover Concept with Traffic Signal

Main concerns would be possibility of increased speeds on S Ray St and the cutting off/removal of the sports fields. The fields are not only used for school sports, but also by the community, connecting them to the school. If any of the entry/exit driveways for the school would need any movement restricted, it would need to be done with infrastructure and not striping. Students would likely disobey striped restrictions.

Alternative 4 – Two Roundabouts

Interest in a roundabout, but concern as to how well novice drivers would navigate it and yield to pedestrians. Would likely require an educational program targeted towards students. Also concern over modifying school driveways.

Alternative 5 – Curve with Signal

Preferred over the roundabout but still concerns with modifying the school driveways and how that impacts internal circulation.

Shared Use Paths

The shared use path on the crossover alignment that is part of all the alternatives was supported. There was some concern about monitoring the trail; however, people already use this area as a path so opening it up and making it more established would likely be better anyway, in addition to providing better bicycle and pedestrian connectivity.

School personnel generally supported building a Pedestrian Hybrid Beacon at the intersection of Regal/Thurston. But had mixed feelings about running a pathway east from that intersection to Hazel's Creek. They would prefer to keep students separate from other users of the pathway system, which is why city staff developed an alternative routing the pathway onto the adjacent television state property. The city would need to purchase or establish as easement to utilize this route.

While the school interviews primarily focused on Ferris High School, the pathways could also be used by Adams Elementary students. Students walk to Adams from the neighborhood south of 42nd and north of Palouse Highway, which includes the Copper Hill Apartments, the Greystone subdivision (Bellerive Lane) and the Berkeley Woods subdivision south of 42nd.

4.2 Public Meeting #1 and Survey

Public Meeting #1 was held on February 17th, 2021. It was an online format using WebEx Events. Peak attendance was approximately 50 people. Staff gave a presentation and fielded questions using the chat box.

A survey was released along with the meeting notice and was open from 2/10/21 to 3/4/21. It received 143 responses. The survey covered a broad range of topics including existing areas of concern, how people travel through the study area, questions about the three preliminary alternatives, bicycle and pedestrian issues and transit service. The full survey results are available in Appendix C.

The primary takeaways from the survey are presented in this section.

- The top areas of concern include 29th/Regal, a lack of safe bike/ped crossings and Regal south of 44th.
- A large percentage of respondents ranked the original crossover concept as the "best solution".
- The majority of respondents live in Lincoln Heights (24.2%) and Southgate (33.9%)

Figure 25 – Survey #1 Ranking of Alternatives

	THIS IS THE BEST SOLUTION	THIS IS A GOOD SOLUTION.	NEUTRAL	THIS IS NOT A GOOD SOLUTION.	THIS IS A TERRIBLE IDEA.	TOTAL
No improvements	8.05% 7	8.05% 7	19.54% 17	18.39% 16	45.98% 40	87
Alt #1 - Signals at 37th/Ray and 37th/Freya	21.62% 24	28.83% 32	20.72% 23	22.52% 25	6.31% 7	111
Alt #2 - Roundabout at 37th/Ray and signal at 37th/Freya	25.23% 28	35.14% 39	12.61% 14	16.22% 18	10.81% 12	111
Original Concept - crossover street from Ray/37th to Freya	46.43% 52	6.25% 7	12.50% 14	14.29% 16	20.54% 23	112

The survey also included comment boxes for citizen suggestions on the improvements. These comments were used to refine the alternatives for the 2nd public meeting and survey. The following were common responses.

- Roundabout at 37th/Freya
- Crossover concept with a roundabout
- 2nd entrance for Ferris High School student lot
- 4 lanes on Regal Street south of 44th Avenue

- Connect 42nd Avenue to Regal Street
- More enhanced and/or controlled crosswalks, particularly on Regal
- More shared-use pathways, protected bike lanes and bike routes on quiet streets
- Fill the sidewalk gaps
- Use leading pedestrian interval phasing on the signals

4.3 Public Meeting #2 and Survey

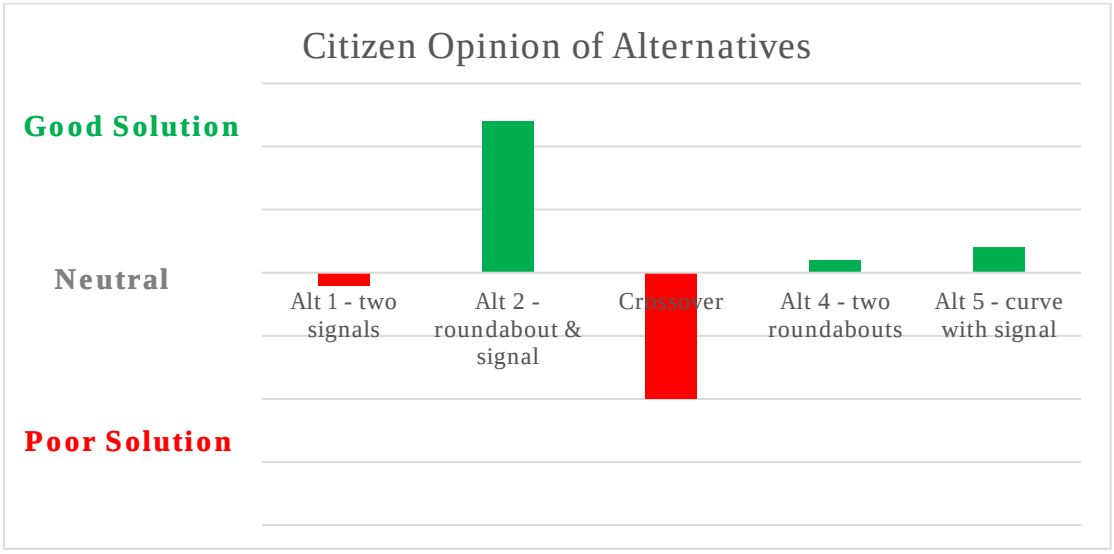
Public Meeting #2 was held on June 16th, 2021. It was an online format using WebEx Events. Peak attendance was approximately 30 people. Staff gave a presentation and fielded questions using the chat box.

A survey was released along with the meeting notice and was open from 6/11/21 to 6/27/21. It received 61 responses. This survey was more focused with the ability to rank each alternative independently and provide opinions on the proposed non-motorized improvements. The full survey results are available in Appendix D.

The primary takeaways from the survey are presented in this section.

- Alternative 2 (Roundabout and Signal) received the most "Good Solution" votes. Alternatives 4 and 5 were the next highest ranking.
- All of the pathway concepts were ranked between "Good Solution" and "Neutral", with the Crossover Pathway receiving the most "Good Solution" votes.
- The majority of respondents live in Lincoln Heights (27.6%) and Southgate (44.8%).

Figure 26 – Survey #2 Opinion of Alternatives



The survey also included comment boxes for citizen suggestions on the improvements. These comments were used to select the preferred alternatives. The following were common responses.

- The new pathways are a big improvement and would be well utilized.
- Against roundabout due to safety concerns.
- Roundabouts are better than signals.
- Leave Hazel's Creek wetlands alone.
- Keep the original crossover.
- Enhanced crosswalk at Regal/Thurston is a good idea.

4.4 Other Outreach Efforts

In addition to the public meetings and survey, staff presented to a variety of other city committees. Those dates are listed below.

- Public Infrastructure Environment and Sustainability Committee 12/14/2020, 1/25/21, 3/22/21 and 6/28/21.
- Plan Commission Transportation Subcommittee 2/2/21, 10/5/21
- Southgate Neighborhood Council Meeting 4/14/21
- Bicycle Advisory Board 3/24/21

5.0 RECOMMENDATIONS

5.1 Ray-Freya Intersections

Based on the results of the analysis and public input, the recommendation is for **Alternative 2, Roundabout and Signal**. This would install a roundabout at 37th/Ray in approximately the same location of the 4-way stop intersection. A signal would be installed at the intersection of 37th/Freya. This alternative allows for a moderate shift in traffic from the Regal corridor to Freya corridor, as the roundabout will allow a steady traffic flow and minimal delay at 37th/Ray.

The roundabout will minimize the impact to the high school traffic flow as the existing driveway can remain in place. Two or three of the city-owned homes at the corner of 37th/Ray will need to be removed. But the city owns additional vacant lots at this corner and could make those parcels available for redevelopment after the project. City staff would need to look at ways to emphasize pedestrian safety during the roundabout design process, which could include RRFBs on a couple of the approaches. This alternative includes a the shared-use pathway on the south and west sides of the intersection to connect people northward.

The traffic signal at 37th/Freya should match the existing footprint of the intersection, with one modification to stripe a bike lane through the intersection rather than the existing shared lane. The bike lanes should be defined with green paint at the conflict points.

If for some reason the roundabout at 37th/Ray cannot move forward, the next best option is **Alternative 5, Curve and Signal**. This configuration is expected to shift a slightly smaller amount of traffic from the Regal corridor to the Freya corridor. It would require changes to the school driveways and traffic pattern. This option also removes more homes from the corner of 37th/Ray.

5.2 Local Street Connections

Lack of street connectivity is one of the contributing factors to arterial congestion in this area. There are several "superblocks" between Regal and Freya where no cross-connections exists. This pushes short local trips to the arterials and discourages bicycle and pedestrian modes. The figure below shows several street connections that should be completed with development of adjacent parcels.

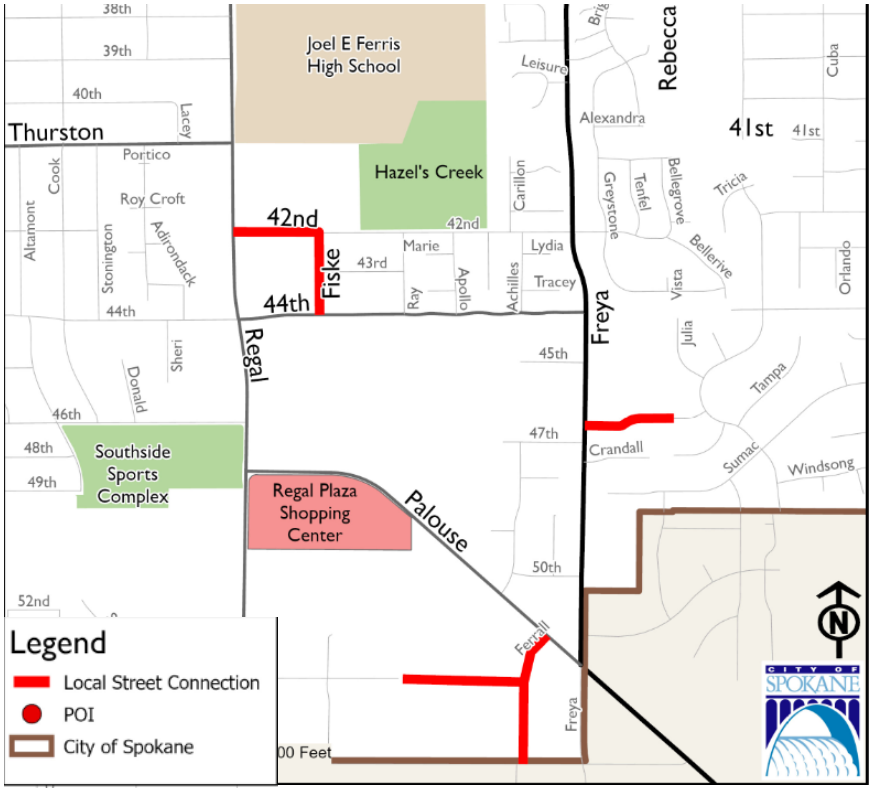
42nd Avenue and Fiske Street – This would allow 42nd Avenue to extend the full ½ mile from Regal to Freya. The intersection at Regal should be limited to right-in, right-out unless Regal can be widened to include a center turn lane. The sidewalk on 42nd Avenue is already in place and utilized by pedestrians and cyclists. Fiske Street should be connected through from 42nd to 44th to provide circulation for future development of the parcel between Regal and Fiske.

47th Avenue east of Freya Street – This neighborhood including the Ashton Heights, Windsong and Bellerive plats has subdivided in a pattern dominated by cul-de-sacs and private roads. There is only one access point out to Freya at 51st Avenue. To improve both vehicular and non-motorized circulation, it is recommended to dedicate and build 47th Avenue from Freya Street to Myrtle Street at the time that property develops.

53rd Avenue and Ferrall Street – The existing development pattern sends most of the traffic out to Regal Street. It is recommended to continue 53rd Avenue eastward to the Ferrall Street cul-de-sac as those adjacent parcels develop. Ferrall Street should be extended to the south to provide

another connection to 55th Avenue. This will provide for more equal traffic distribution from the dense housing developments to the Regal and Freya arterials. The extension of 53rd also enhances the bicycle and pedestrian network by providing access to the Palouse Highway pathway via Ferrall Street.

Figure 27 – Recommended Local Street Connections



5.3 Non-Motorized

Staff received a substantial amount of feedback on non-motorized improvements through the public outreach efforts and also discussion with the Bicycle Advisory Board.

The following are recommendations for improvements within the study area. Some of these may be accomplished along with the proposed traffic improvements to 37th/Ray and 37th/Freya. Others will be separate projects. Several will require updates to the Comprehensive Plan to change the proposed bike route classification.

- Shared-use Pathway on the crossover alignment and the 37th Avenue frontage between Ray Street and Thor Street. The south end connects to Freya Street and continues as a sidepath to 44th Avenue. A midpoint connection would be made into the Hazel's Creek Area.
- Shared-use pathway along the west side Ray Street continuing north from 37th Avenue to 35th Avenue. Then a shared-use pathway down the median to Fiske Street.

- Shared-use pathway from Regal Street at Thurston Avenue, heading east through school or broadcast station property to Hazel's Creek. Install a Pedestrian Hybrid Beacon at Regal/Thurston.
- Pave the existing soft-surface pathways through Hazel's Creek to provide an east-west route from Regal/Thurston to the crossover pathway. Also pave a route to the south on the Ray Street alignment to 42nd Avenue.
- Shared-use pathway on the west side of Freya Street from 44th Avenue down to Palouse Highway.
- Designate 39th Avenue as a future greenway route, including a pathway through Hamblen Park.
- Complete the sidewalk on 44th Avenue east of Regal Street.
- Use leading pedestrian interval phasing on the signals.

5.4 Transit

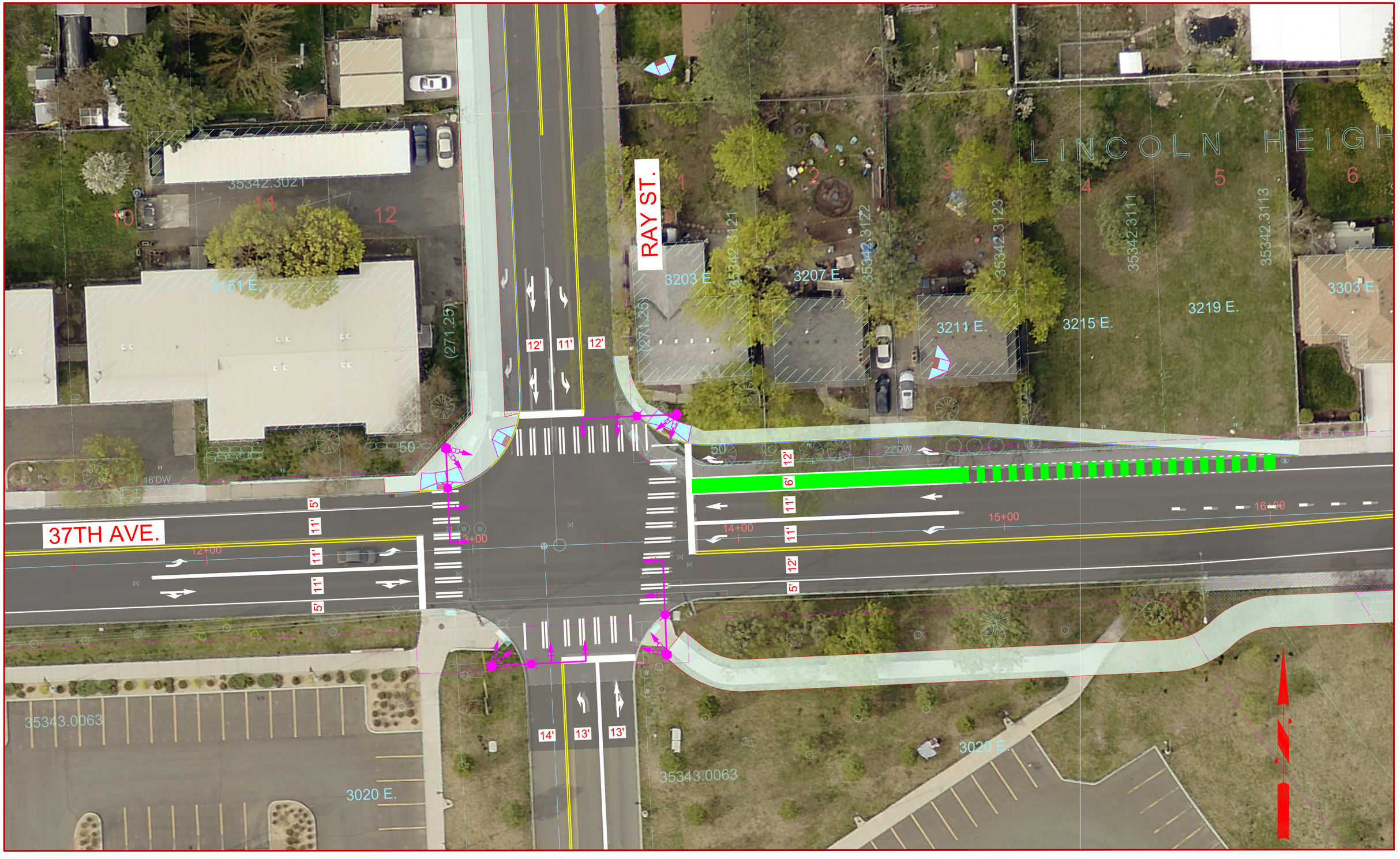
Change to transit service is dependent on many variables. STA is exploring a new route that would start at the Moran Station Park and Ride, run up Palouse Highway, Freya and 37th Avenue, eventually ending in downtown. This route was considered for 2022 service but was not part of the final recommendation. However, with further density the transit demand will grow and City staff should work closely with STA when designing road improvements in these areas to plan for future bus stops. Specific locations include:

- Intersection of Palouse/Freya
- Intersection of 44th/Freya
- Intersection of 37th/Freya
- Intersection of 37th/Ray

APPENDIX A – CONCEPT DRAWINGS OF ALTERNATIVES

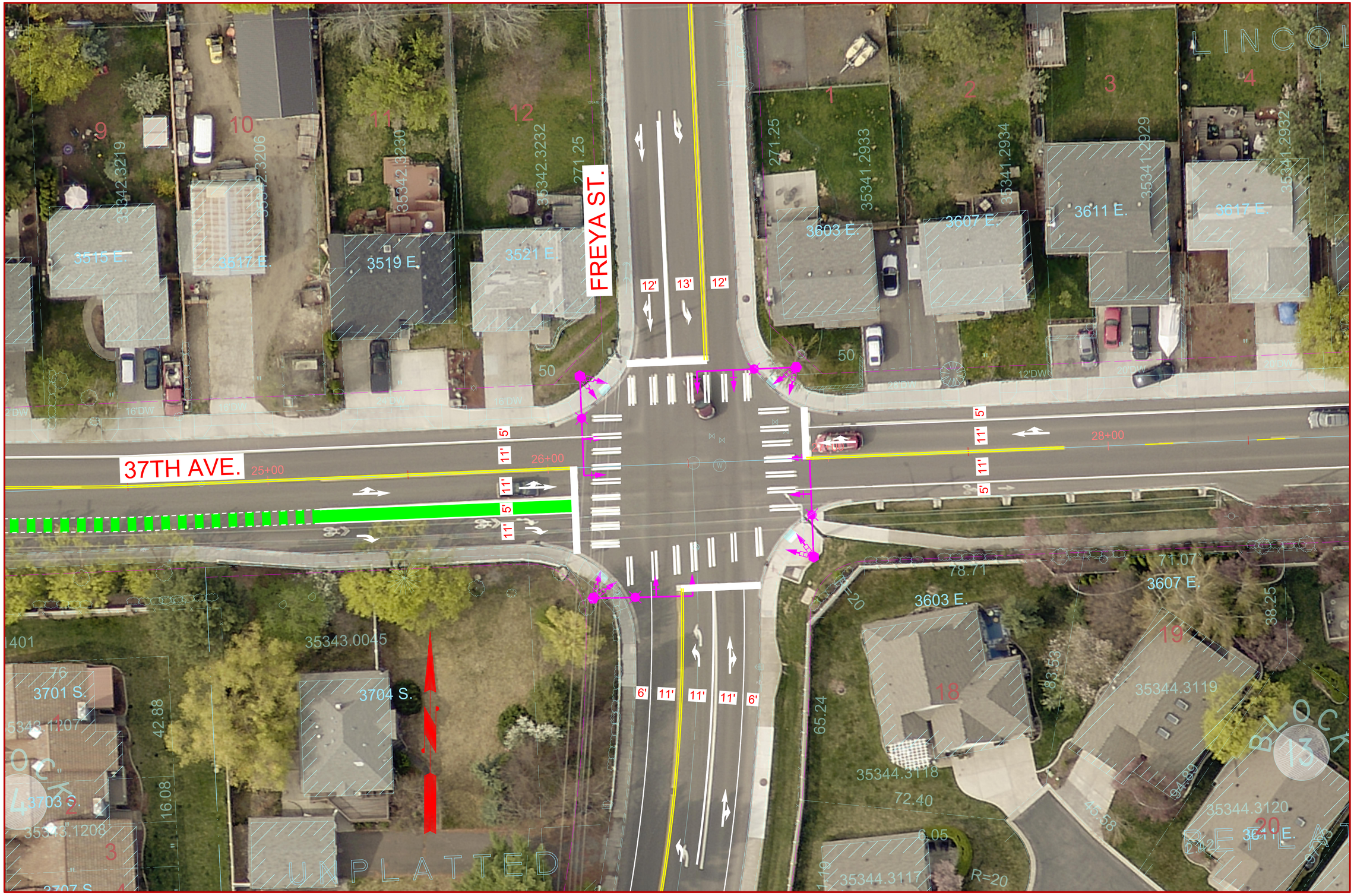
ALTERNATE 1


RAY ST.
THOR ST.
FREYA ST.
37TH AVE.
LINCOLN HEIGHTS ADDITION
LINCOLN HEIGHTS
UNPLATTED
WILLOW GLEN PUD
REPLAT LOTS 1 & 2
12' WIDE SHARED USE WITH
6' MIN. PLANTED BUFFER
SOFTBALL FIELD
RELOCATED 10'± SOUTH
12' WIDE SHARED USE
PATH SOUTH AND
EAST TO FREYA ST.



37TH & RAY - PROPOSED SIGNAL - ALTERNATE 1

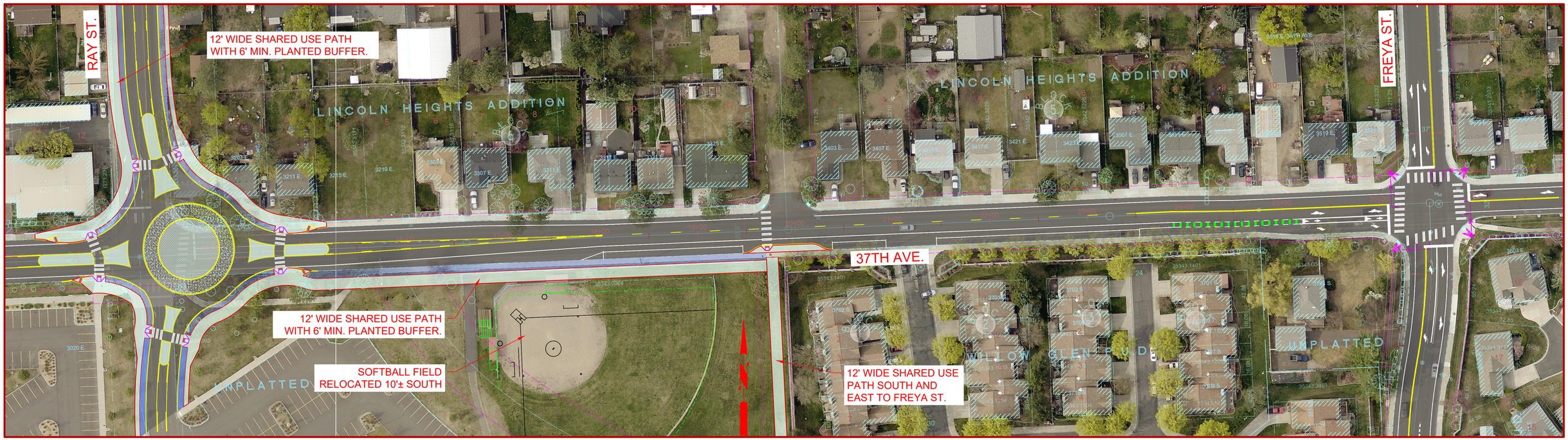
NTS

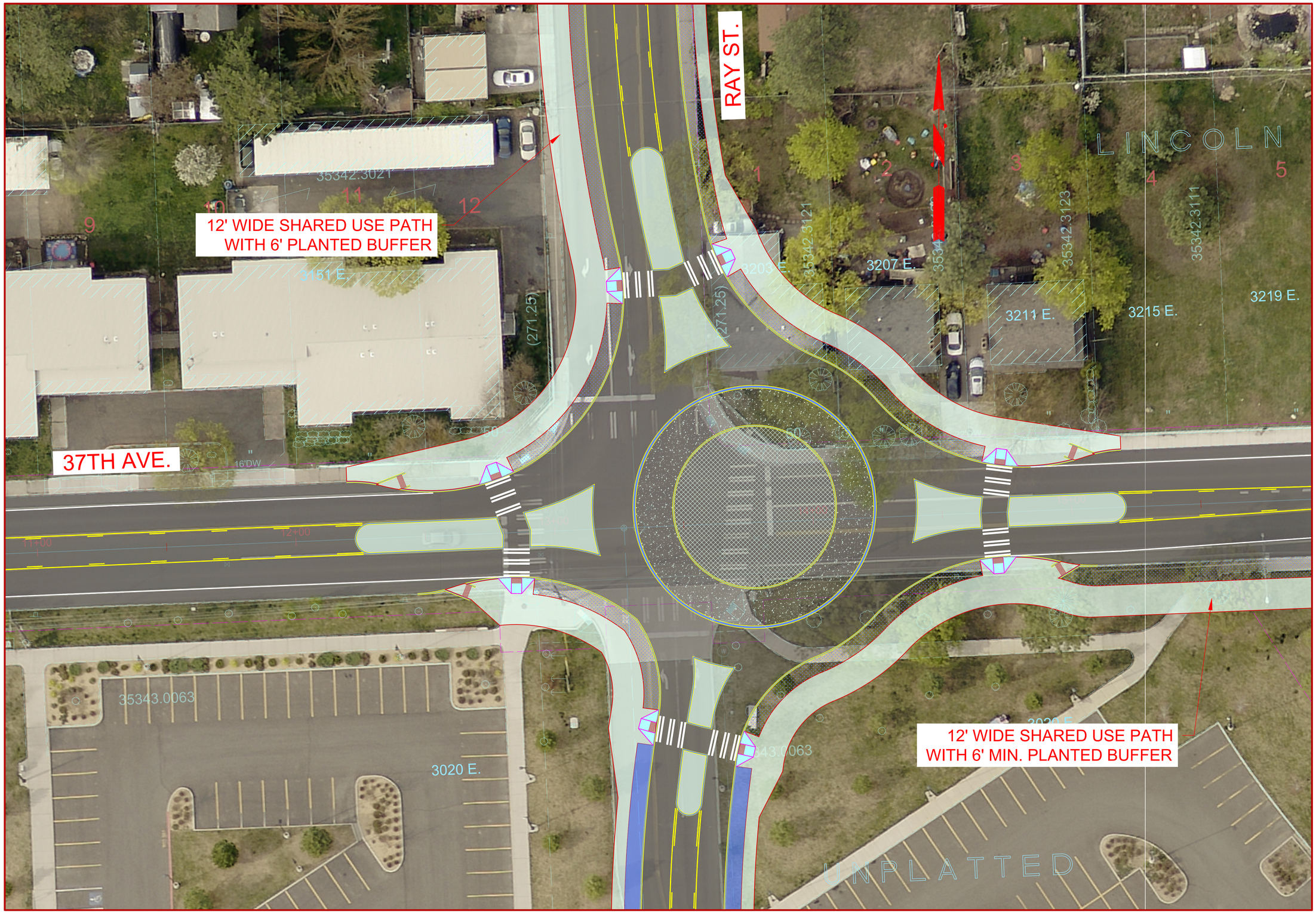


37TH & FREYA - PROPOSED SIGNAL - ALTERNATE 1

NTS

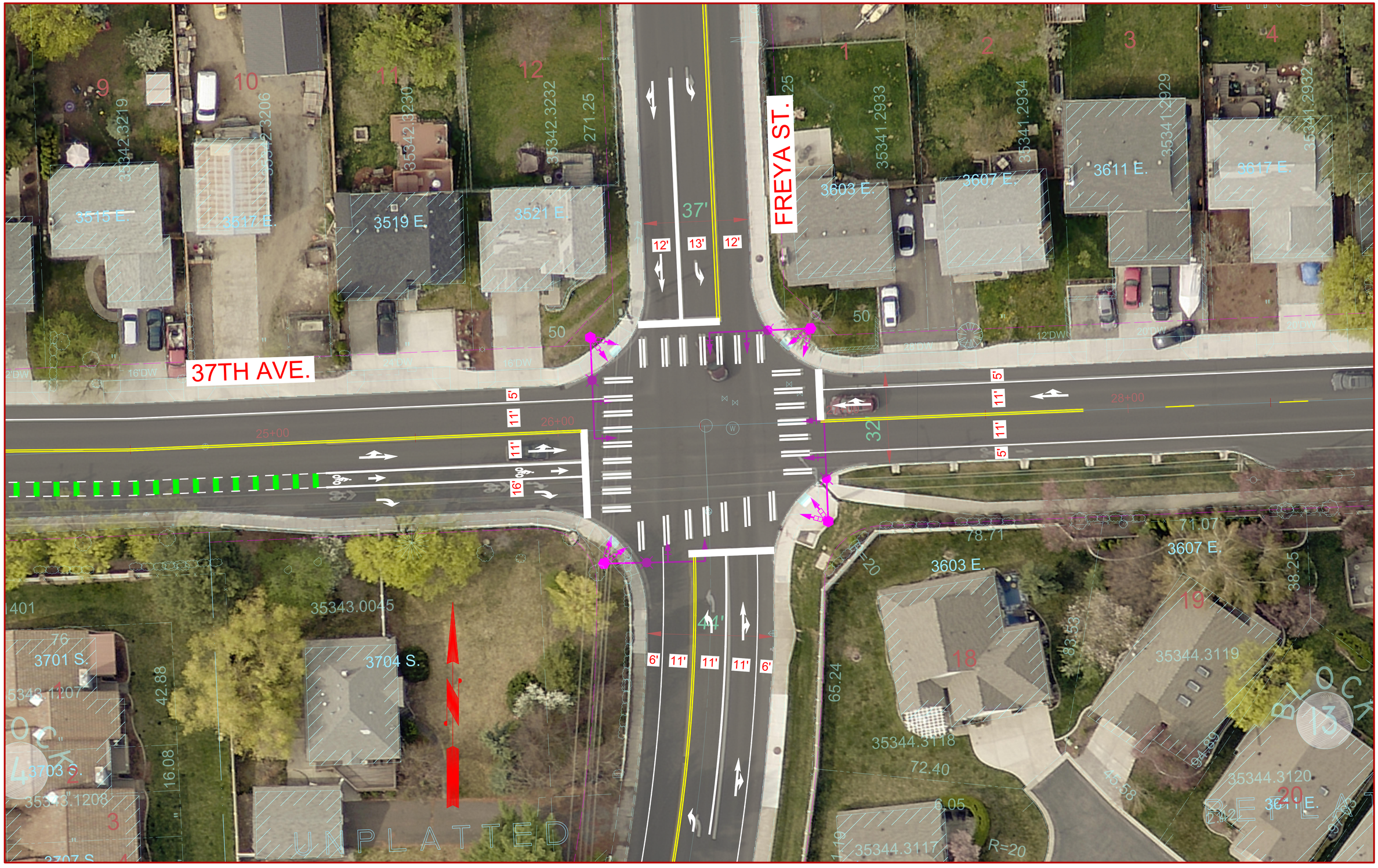
ALTERNATE 2


RAY ST.
12' WIDE SHARED USE PATH
WITH 6' MIN. PLANTED BUFFER.
LINCOLN HEIGHTS ADDITION
LINCOLN HEIGHTS ADDITION
FREYA ST.
37TH AVE.
12' WIDE SHARED USE PATH
WITH 6' MIN. PLANTED BUFFER.
SOFTBALL FIELD
RELOCATED 10'± SOUTH
12' WIDE SHARED USE
PATH SOUTH AND
EAST TO FREYA ST.
UNPLATTED
WILLOW GLEN PUD
UNPLATTED



37TH & RAY - PROPOSED ROUND ABOUT - ALTERNATE 2

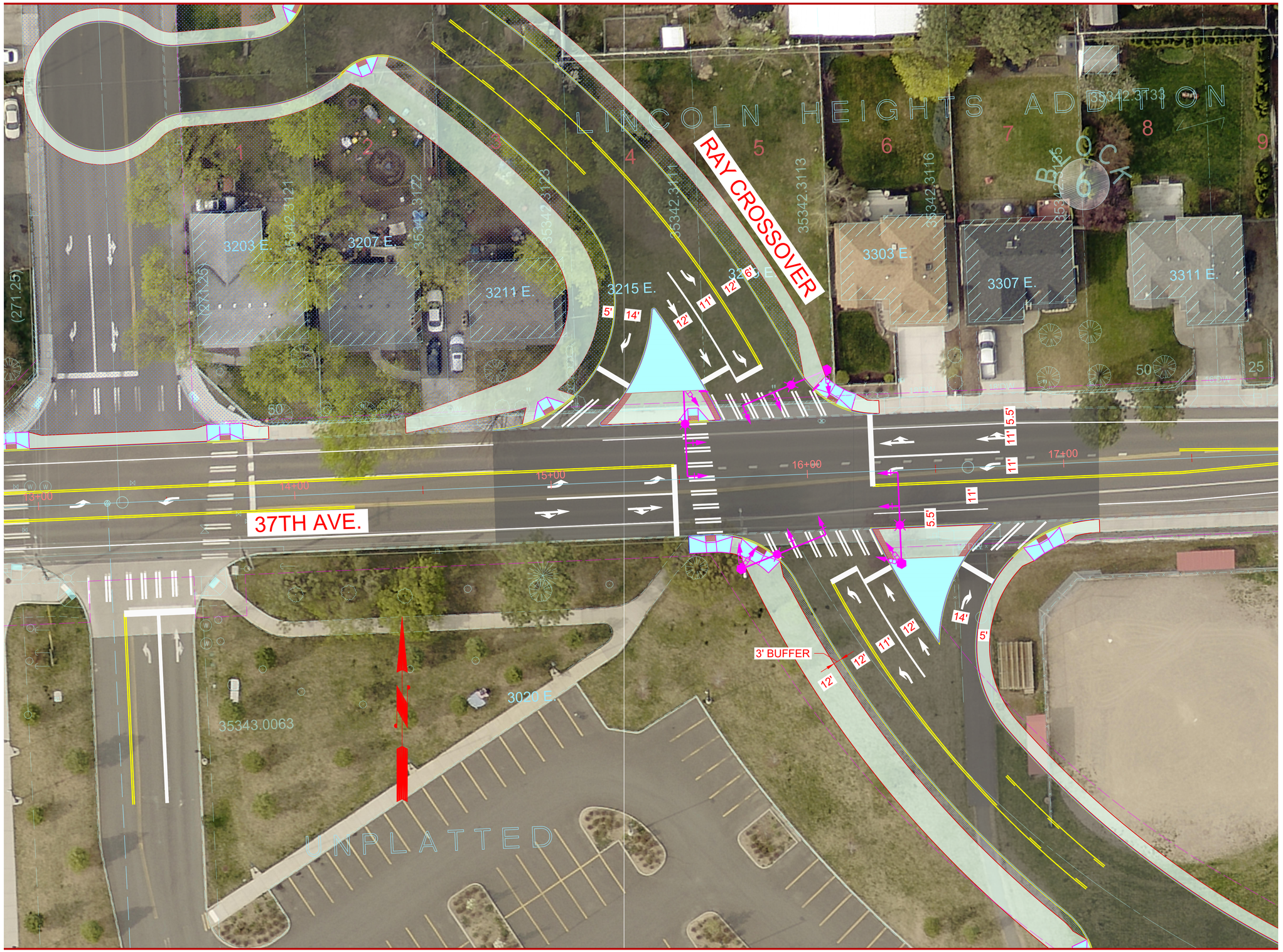
NTS



37TH & FREYA - PROPOSED SIGNAL - ALTERNATE 2

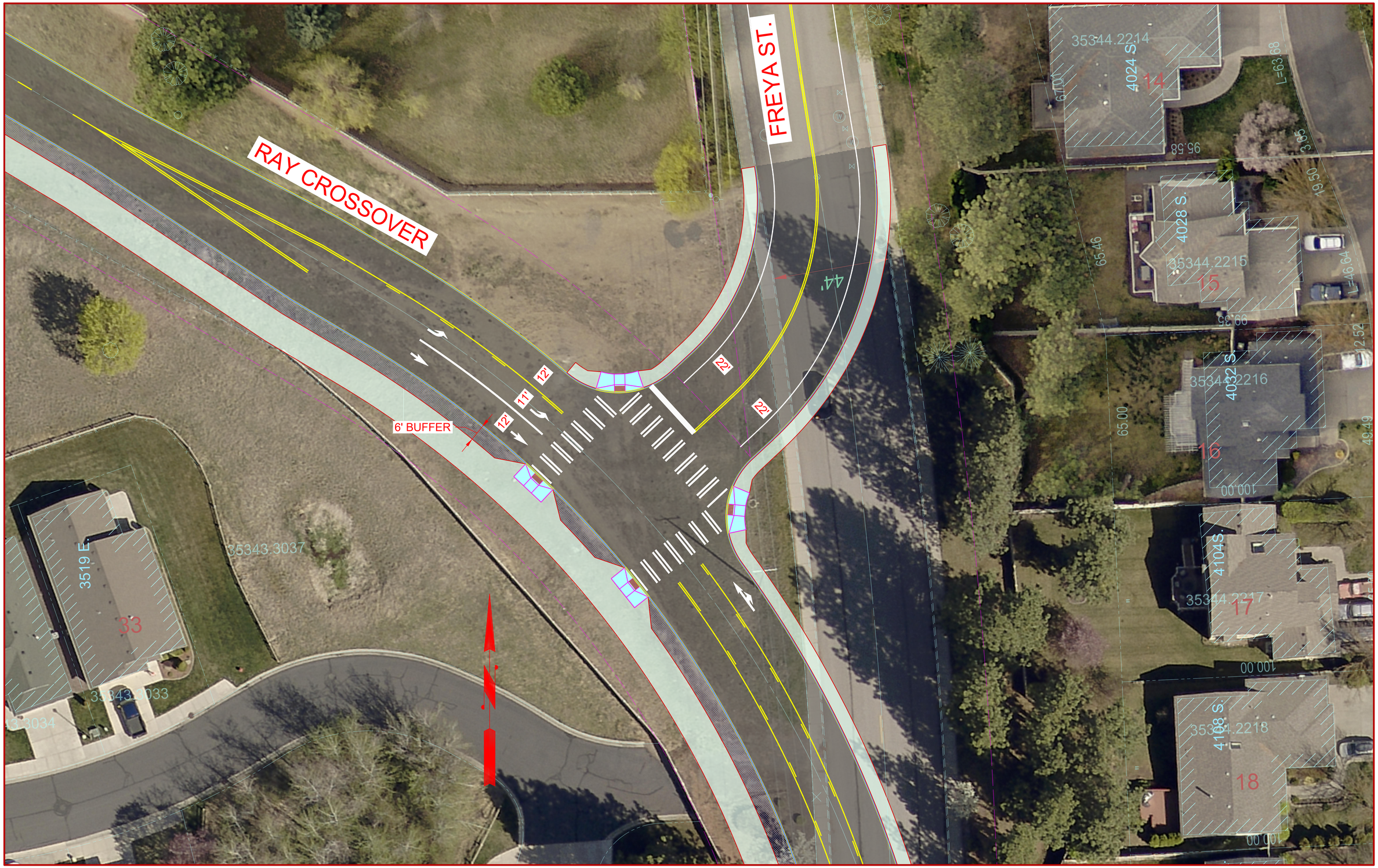
NTS

ORIGINAL CONCEPT



37TH & RAY CROSSOVER - PROPOSED SIGNAL - ORIGINAL CONCEPT

NTS



RAY CROSSOVER & FREYA - ORIGINAL CONCEPT

NTS

OVERALL VIEW

SPOKANE
PUBLIC WORKS DIVISION
INTEGRATED CAPITAL MANAGEMENT

SHOWN DATA IS APPX. EXTRACTED FROM GIS DATA, NOT TO BE USED FOR DESIGN OR CONSTRUCTION.

37th Ave @ Ray & Freya
PROJECT #
37TH TO FREYA
Alternate 4

SHEET 1 OF 1

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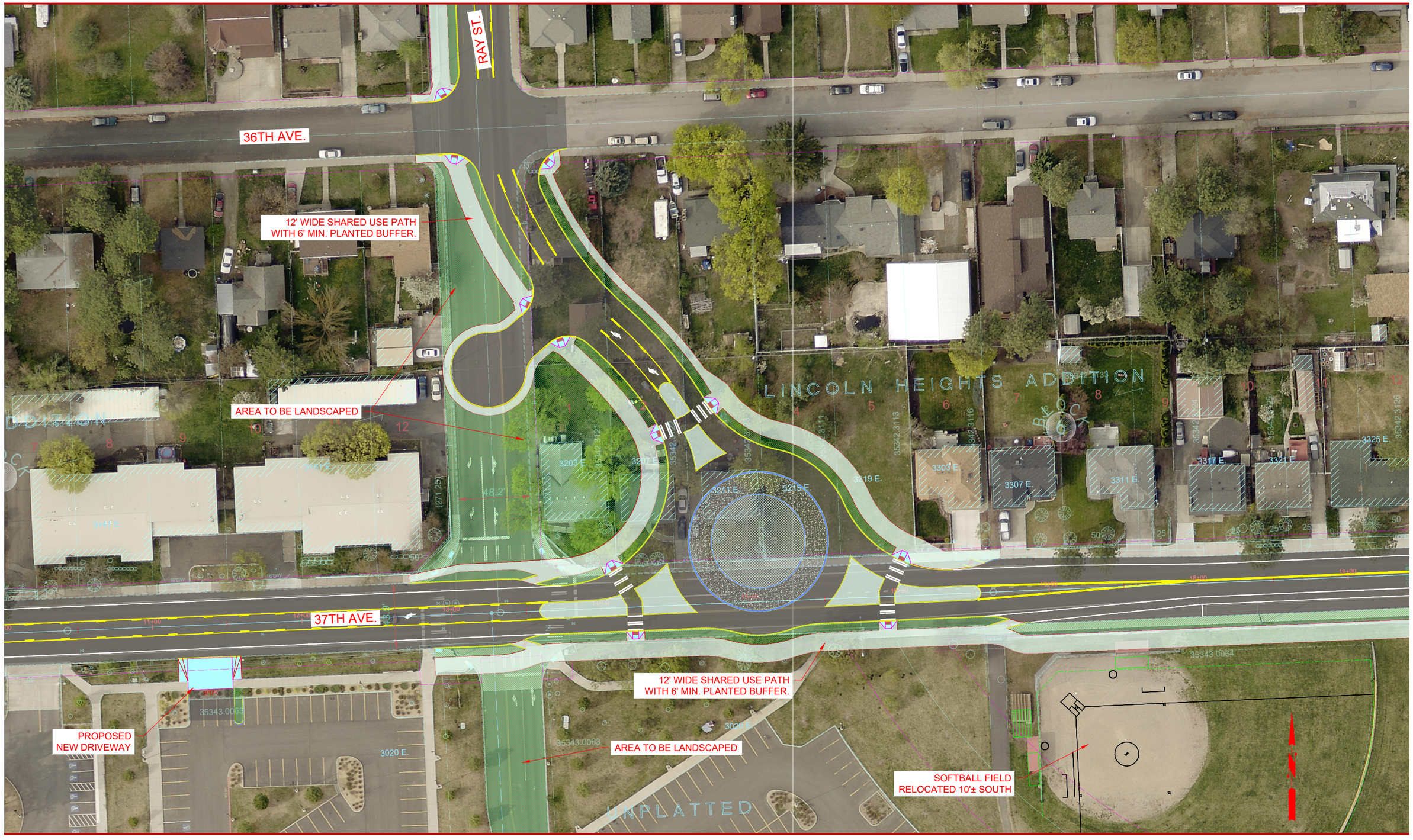
ALTERNATE 4


RAY ST.
36TH AVE.
12' WIDE SHARED USE PATH
WITH 6' MIN. PLANTED BUFFER.
AREA TO BE LANDSCAPED
LINCOLN HEIGHTS ADDITION
3203 E.
3207 E.
3211 E.
3215 E.
3219 E.
3303 E.
3307 E.
3311 E.
3317 E.
3321 E.
3325 E.
37TH AVE.
12' WIDE SHARED USE PATH
WITH 6' MIN. PLANTED BUFFER.
PROPOSED
NEW DRIVEWAY
AREA TO BE LANDSCAPED
3020 E.
SOFTBALL FIELD
RELOCATED 10'± SOUTH
UNPLATTED

ALTERNATE 4


FREYA ST.
37TH AVE.
3518 E. 36TH AVE
LINCOLN HEIGHT
DDITION
UNPLATTED
REPLAT LOTS
BLOCK
3511 E.
3515 E.
3517 E.
3519 E.
3521 E.
3603 E.
3607 E.
3611 E.
3617 E.
3623 E.
3707 E.
3701 S.
3703 S.
3704 S.
3707 S.
3709 S.
3603 E.
3607 E.
3611 E.
3615 E.
3619 E.
3606 E.
3712 S.
3708

OVERALL VIEW

PUBLIC WORKS DIVISION
INTEGRATED CAPITAL MANAGEMENT

SHOWN DATA IS APPX. EXTRACTED FROM GIS DATA, NOT TO BE USED FOR DESIGN OR CONSTRUCTION.

37th Ave @ Ray & Freya
PROJECT #
37TH TO FREYA
Alternate 5

SHEET 1 OF 1

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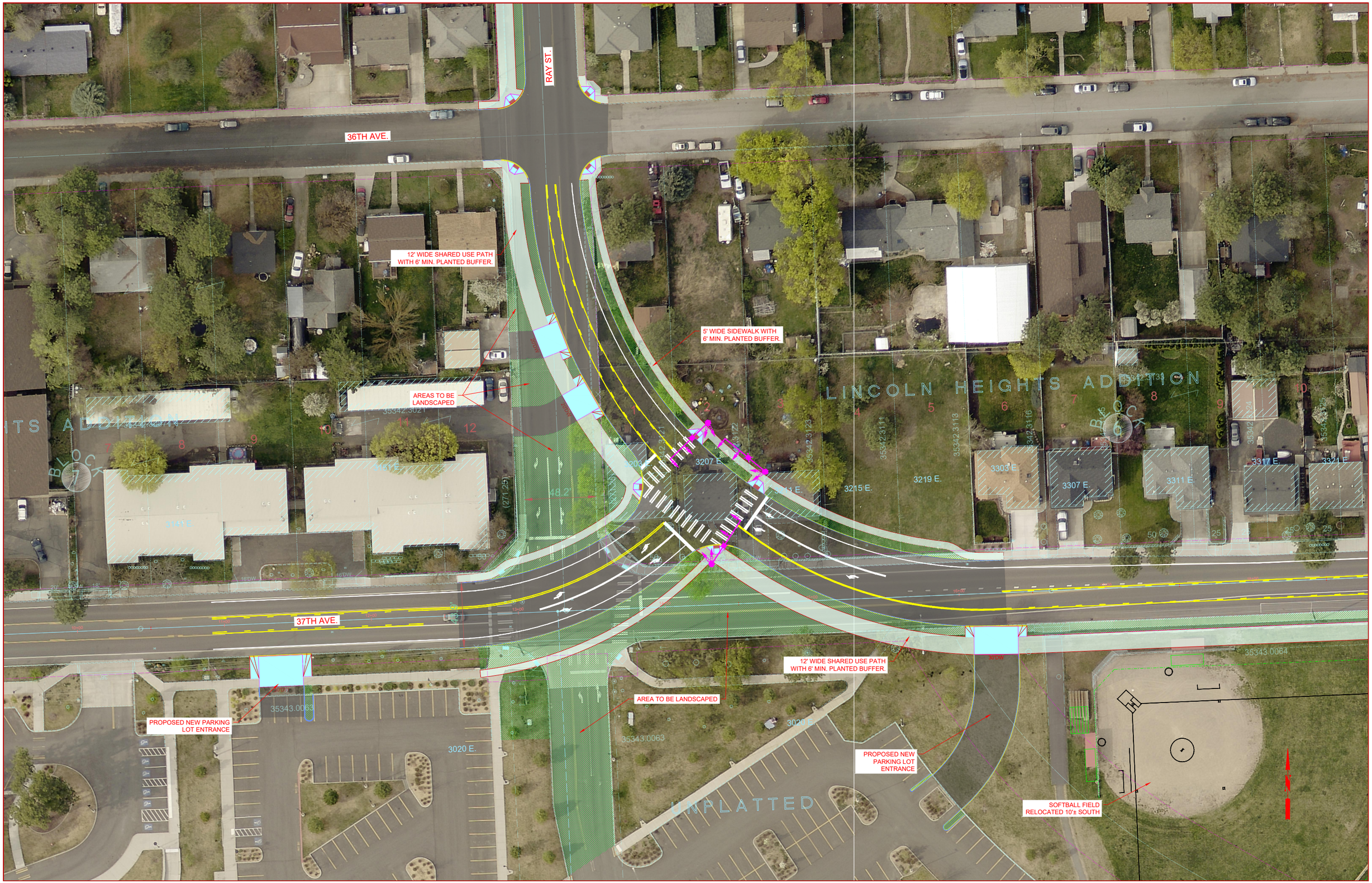
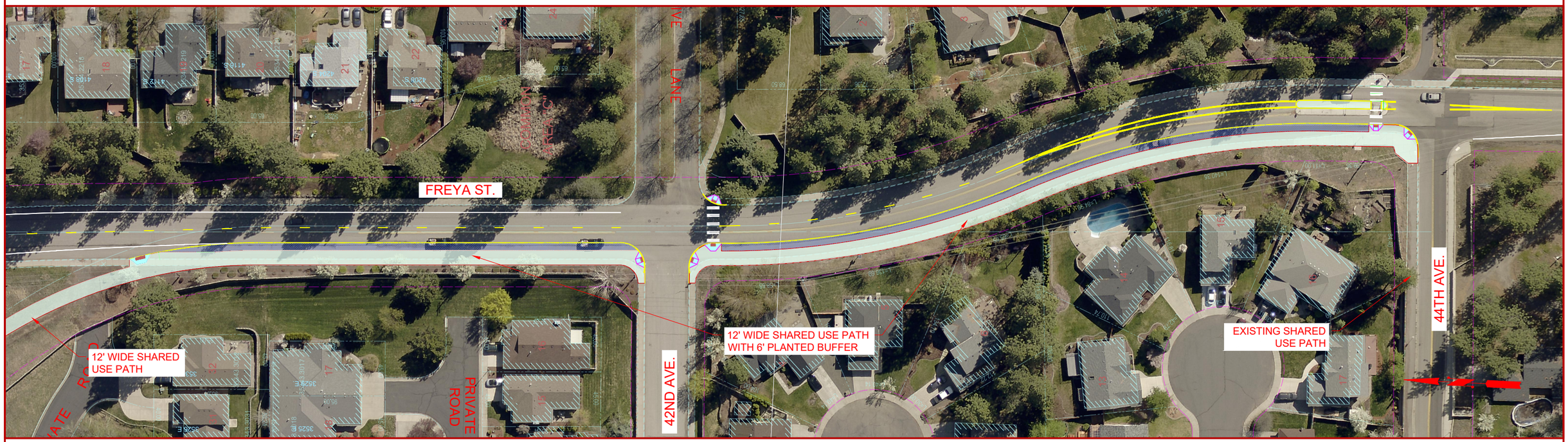
ALTERNATE 5


RAY ST.
36TH AVE.
37TH AVE.
12' WIDE SHARED USE PATH WITH 6' MIN. PLANTED BUFFER.
5' WIDE SIDEWALK WITH 6' MIN. PLANTED BUFFER.
AREAS TO BE LANDSCAPED
PROPOSED NEW PARKING LOT ENTRANCE
AREA TO BE LANDSCAPED
12' WIDE SHARED USE PATH WITH 6' MIN. PLANTED BUFFER.
PROPOSED NEW PARKING LOT ENTRANCE
SOFTBALL FIELD RELOCATED 10'± SOUTH
LINCOLN HEIGHTS ADDITION
UNPLATTED
3207 E.
3215 E.
3219 E.
3303 E.
3307 E.
3311 E.
3317 E.
3321 E.
3020 E.
35343.0063
35343.0064

APPENDIX B – CONCEPT DRAWINGS OF NON-MOTORIZED IMPROVEMENTS



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PUBLIC WORKS DIVISION
INTEGRATED CAPITAL MANAGEMENT

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37th Ave @ Ray & Freya

PROJECT #

37TH TO FREYA

Alternate 1 & 2 - Trail

37TH AVE.

REGAL ST.

FERRIS HIGHSCHOOL

PROPOSED PEDESTRIAN
HYBRID BEACON SYSTEM

THURSTON AVE.

PROPOSED 12' WIDE
SHARED USE PATHS

HAZEL'S CREEK
NATURAL AREA

42ND AVE.

FREYA ST.

OVERVIEW MAP

PUBLIC WORKS DIVISION
INTEGRATED CAPITAL MANAGEMENT

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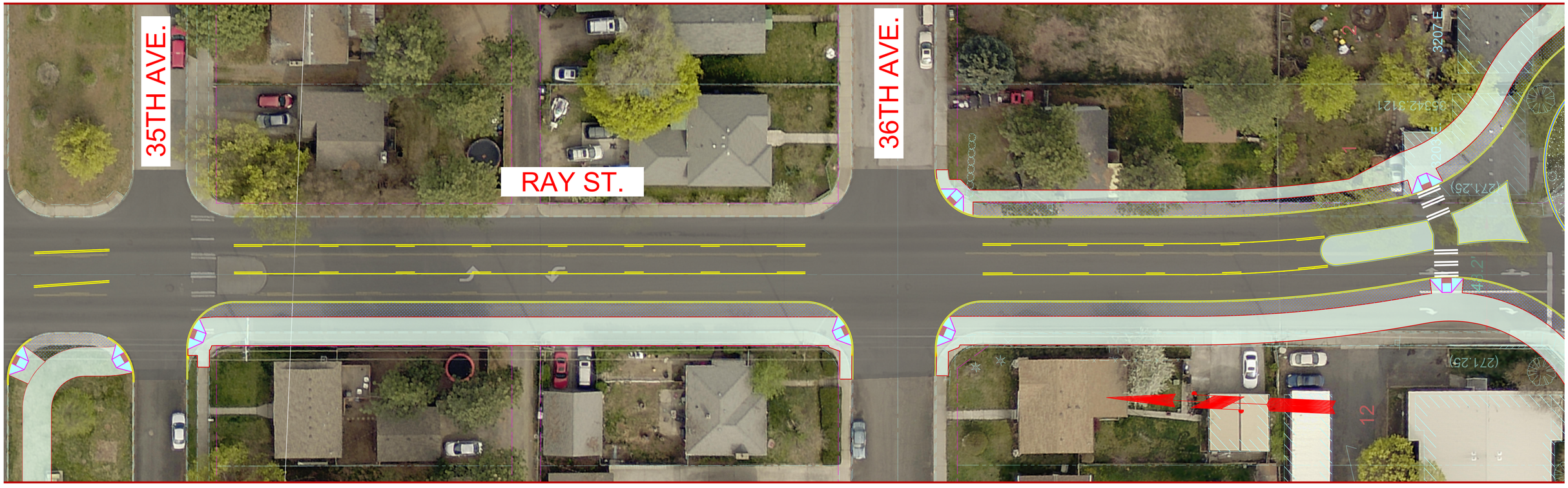
HAZELS CREEK SHARED USE PATH

PROJECT #

HAZEL CREEK NATURAL AREA

12' PATH & PEDESTRIAN HYBRID BEACON - OPTION 1



35TH AVE & RAY STREET SHARED USE PATH

APPENDIX C – SURVEY #1 RESULTS

Summary of Ray-Freya Alternatives Survey Results

Survey was available from 2/10/21 to 3/4/21

143 respondents. Comments sections are summarized.

Q1 Please tell us about your interactions with Regal, Ray or Freya Streets between 57th and 29th Avenues.

ANSWER CHOICES		RESPONSES	
None of the above		0.70%	1
I live nearby.		82.52%	118
I work nearby.		9.79%	14
I shop nearby.		56.64%	81
I attend school nearby.		10.49%	15
I drive through this area on a regular basis.		81.82%	117
I walk through this area on a regular basis.		34.97%	50
I bike through the area on a regular basis.		22.38%	32
I use public transit through the area on a regular basis.		2.80%	4
Other (please specify)	Responses	14.69%	21
Total Respondents: 143			

Q2 How do you travel through the study area?

ANSWER CHOICES		RESPONSES	
To/From I-90		62.68%	89
To/From downtown		52.11%	74
To/From other areas north of 29th Avenue		77.46%	110
To/From areas south of 57th Avenue		64.08%	91
To/From areas west of Regal Street		73.94%	105
To/From areas east of Freya Street		59.86%	85
within the study area		61.27%	87
Other (please specify)	Responses	11.27%	16
Total Respondents: 142			

Q3 What do you think are the top four transportation problems within the study area?

	BIGGEST PROBLEM	SECOND BIGGEST PROBLEM	THIRD BIGGEST PROBLEM	FOURTH BIGGEST PROBLEM	TOTAL
Congestion at 29th/Regal	47.83% 33	15.94% 11	18.84% 13	17.39% 12	69
Lack of safe bicycle/pedestrian crossings	52.73% 29	14.55% 8	9.09% 5	23.64% 13	55
Congestion/ too few lanes on Regal between 44th and 57th	42.86% 24	21.43% 12	21.43% 12	14.29% 8	56
Congestion at 37th/Regal	25.49% 13	21.57% 11	19.61% 10	33.33% 17	51
Congestion at 37th/Ray	21.43% 12	26.79% 15	23.21% 13	28.57% 16	56
Lack of pedestrian facilities	27.27% 12	20.45% 9	31.82% 14	20.45% 9	44
Lack of bicycle facilities	26.19% 11	23.81% 10	26.19% 11	23.81% 10	42
Congestion at 37th/Freya	21.43% 9	45.24% 19	11.90% 5	21.43% 9	42
Congestion at 29th/Freya	20.00% 8	35.00% 14	22.50% 9	22.50% 9	40
Congestion at 44th/Regal	24.24% 8	30.30% 10	24.24% 8	21.21% 7	33
Lack of transit service on Freya	29.17% 7	12.50% 3	8.33% 2	50.00% 12	24
Congestion at 57th/Regal	21.74% 5	13.04% 3	26.09% 6	39.13% 9	23
Congestion at 29th/Ray	13.33% 4	26.67% 8	30.00% 9	30.00% 9	30
Congestion at Palouse Hwy/Regal	13.33% 4	16.67% 5	43.33% 13	26.67% 8	30
Congestion at Freya/Palouse Hwy	5.26% 1	10.53% 2	52.63% 10	31.58% 6	19

Other concerns in the comments

- Lack of controlled crosswalks on Regal between 37th and 44th
- Speed of traffic on Freya, difficult to turn onto Freya
- SB merge after 44th/Regal
- Lack of turn signals at 29th/Regal

Q4 What do you think of the alternatives proposed for the study area?

	THIS IS THE BEST SOLUTION	THIS IS A GOOD SOLUTION.	NEUTRAL	THIS IS NOT A GOOD SOLUTION.	THIS IS A TERRIBLE IDEA.	TOTAL	WEIGHTED AVERAGE
No improvements	8.05% 7	8.05% 7	19.54% 17	18.39% 16	45.98% 40	87	3.86
Alt #1 - Signals at 37th/Ray and 37th/Freya	21.62% 24	28.83% 32	20.72% 23	22.52% 25	6.31% 7	111	2.63
Alt #2 - Roundabout at 37th/Ray and signal at 37th/Freya	25.23% 28	35.14% 39	12.61% 14	16.22% 18	10.81% 12	111	2.52
Original Concept - crossover street from Ray/37th to Freya	46.43% 52	6.25% 7	12.50% 14	14.29% 16	20.54% 23	112	2.56

Comments

- Remove the bypass lane from the roundabout
- Suggest roundabout at 37th/Freya
- Keep crossover but with roundabout at 37th/Ray
- Eliminate slip lanes from Alternative #1
- Eliminate sharrows, use bike lanes
- Paved trail route through Hazel's Creek
- Protected bike lanes
- Sidewalk should be wider around roundabout to accommodate bikes
- Better pedestrian access to Hazel's Creek for those coming from north of 37th Avenue
- Leading pedestrian interval on the signal
- Concern over high school students using roundabout

Q5 Are there other traffic flow improvements you would like to see us consider within the study area?

- Signal at 29th/Freya
- 4 lanes on Regal
- Turn lanes/protected phasing for 29th/regal
- Modify phasing at 29th/Ray, turn signal going west
- Sidewalks and bike lanes on Freya south from 37th to 57th
- Better crosswalks on 37th and on Regal.
- Turn lane on Regal near Ferris
- Better pedestrian access to Hazel's Creek for those coming from north of 37th Avenue
- Leading pedestrian interval on the signals

- Roundabout at 37th/Freya
- Local street connection on 42nd Avenue and a crosswalk
- Improve sight distance at 44th/Freya
- Crossover concept with roundabout
- Second entrance for Ferris student lot

Q6 When accessing the study area as a bike rider, which of the following statements reflects your experience?

ANSWER CHOICES		RESPONSES	
I don't have a reason, desire, or ability to ride a bike in the study area.		32.03%	41
I comfortably ride a bike on the shared-use pathways along Palouse Highway and 44th Avenue. I feel unsafe using on-street bike lanes.		0.00%	0
I comfortably ride a bike on shared-use pathways and on streets with bike lanes such as 37th Avenue. I feel unsafe on roadways without striped bike lanes.		0.00%	0
I comfortably ride my bike anywhere at anytime.		0.00%	0
I would be interested in riding a bike in the study area if it was more comfortable, accessible, and safer.		46.09%	59
I do not ride a bike across or along 29th Avenue, but I would if it was more comfortable, accessible, and safer.		0.00%	0
Other (please specify)	Responses	21.88%	28
TOTAL			128

Q7 When accessing the study area as a bike rider, which of the following statements reflects your experience regarding facilities?

ANSWER CHOICES		RESPONSES	
I comfortably ride a bike on the shared-use pathways along Palouse Highway and 44th Avenue. I feel unsafe using on-street bike lanes.		13.93%	17
I comfortably ride a bike on shared-use pathways and on streets with bike lanes such as 37th Avenue. I feel unsafe on roadways without striped bike lanes.		27.87%	34
I comfortably ride my bike anywhere at any time.		4.10%	5
I do not have a desire to ride a bike anywhere at any time.		31.97%	39
I do not ride a bike across or along 29th Avenue, but I would if it was more comfortable, accessible, and safer.		0.00%	0
Other (please specify)	Responses	22.13%	27
TOTAL			122

Q8 Please rank your support of the following improvements for bike riders.

	1	2	3	4	5	6	7	8	TOTAL	SCORE
Continuation of Palouse Highway shared use path (south side) to the Ben Burr Trail.	25.71% 18	21.43% 15	21.43% 15	8.57% 6	10.00% 7	4.29% 3	5.71% 4	2.86% 2	70	5.94
Shared-use pathway along the Ray-Freya Crossover alignment from 37th Avenue to 44th Avenue.	20.29% 14	15.94% 11	21.74% 15	23.19% 16	5.80% 4	5.80% 4	4.35% 3	2.90% 2	69	5.72
Shared-use pathway on Freya from 37th to 57th	18.46% 12	24.62% 16	12.31% 8	7.69% 5	7.69% 5	15.38% 10	9.23% 6	4.62% 3	65	5.32
Striped 6' bike lanes on Freya from 37th to 57th.	7.81% 5	26.56% 17	9.38% 6	10.94% 7	15.63% 10	10.94% 7	9.38% 6	9.38% 6	64	4.83
Striped bikes lanes on 37th west of Regal	16.42% 11	5.97% 4	16.42% 11	13.43% 9	8.96% 6	11.94% 8	20.90% 14	5.97% 4	67	4.58
Crosswalk at 37th/Thor Street with paved bike route north to 35th.	6.25% 4	6.25% 4	10.94% 7	12.50% 8	25.00% 16	20.31% 13	9.38% 6	9.38% 6	64	4.11
More bicycle connections into the Ferris High School campus	13.04% 9	5.80% 4	5.80% 4	10.14% 7	5.80% 4	7.25% 5	13.04% 9	39.13% 27	69	3.41
Extension of 53rd Avenue eastward to Freya (low volume shared roadway)	3.17% 2	0.00% 0	4.76% 3	14.29% 9	19.05% 12	17.46% 11	22.22% 14	19.05% 12	63	3.17

Q9 What other bicycle improvements would you like to see in the study area.

- Extend shared-use path on 44th to Regal and further west to Crestline
- More shared-use pathways
- Curb separated or protected facilities
- Neighborhood greenways and signage, low-stress routes on quiet roads
- Better locations to cross Regal
- Connect SE Blvd bike lanes to 37th and the Crestline corridor
- HAWK crossing for Ray and Freya
- Bike lanes on Freya and 44th
- Leading pedestrian intervals at signalized intersections
- Connection from city to Ben Burr Trail

Q10 When using transit in the study area, which of the following describes your experience?

ANSWER CHOICES		RESPONSES	
I don't have a reason, desire, or ability to access transit in the study area.		60.48%	75
I normally access the bus route on Regal Street.		7.26%	9
I normally access the bus route on 29th Avenue.		8.06%	10
I normally access the bus route on Ray Street between 32nd and 35th Avenues.		0.00%	0
I normally use the Moran Station Park and Ride (57th/Palouse Hwy) to access the bus.		4.03%	5
I do not access bus stops on 29th Avenue, but I would if they were more comfortable, accessible, and safer.		8.87%	11
I would ride a bus route that used Freya from 37th to 57th.		7.26%	9
Other (please specify)	Responses	18.55%	23
Total Respondents: 124			

Q11 Please respond regarding your interest in the proposed route 46?

ANSWER CHOICES		RESPONSES	
I have no interest in the new transit route.		55.00%	66
I would ride the new route to downtown.		20.83%	25
I would ride the new route to connect to other transit routes.		12.50%	15
I would board the bus at the Moran Station Park and Ride.		6.67%	8
I would board the bus on Freya between 50th and 44th Avenues.		4.17%	5
I would board the bus at 37th/Freya or 37th/Regal.		11.67%	14
I would move from an existing transit route to this route.		4.17%	5
I would move from using my personal vehicle for the work commute to riding this route.		2.50%	3
I would use the route if a stop was at a different location.		0.83%	1
Other (please specify)	Responses	15.83%	19
Total Respondents: 120			

Q12 If you live within the City of Spokane please select your neighborhood.

ANSWER CHOICES		RESPONSES	
Audubon/Downriver		0.00%	0
Balboa/South Indian Trail		0.00%	0
Bemiss		0.00%	0
Browne's Addition		0.81%	1
Chief Garry		0.00%	0
Cliff-Cannon		0.81%	1
Comstock		4.84%	6
East Central		5.65%	7
Emerson/Garfield		0.00%	0
Five Mile Prairie		0.81%	1
Grandview/Thorpe		0.00%	0
Hillyard		0.00%	0
Latah/Hangman		0.81%	1
Lincoln Heights		24.19%	30
Logan		0.81%	1
Manito/Cannon Hill		4.03%	5
Minnehaha		0.00%	0
Nevada Heights		0.00%	0
North Hill		0.81%	1
North Indian Trail		0.00%	0
Northwest		0.00%	0
Peaceful Valley		0.00%	0
Riverside		0.00%	0
Rockwood		3.23%	4
Shiloh Hills		0.81%	1
Southgate		33.87%	42
West Central		0.00%	0
West Hills		0.00%	0
Whitman		0.00%	0
City of Cheney		0.00%	0
City of Spokane Valley		0.81%	1
Spokane County		10.48%	13
Other (Millwood, Liberty Lake, Airway Heights, Idaho)	Responses	7.26%	9
TOTAL			124

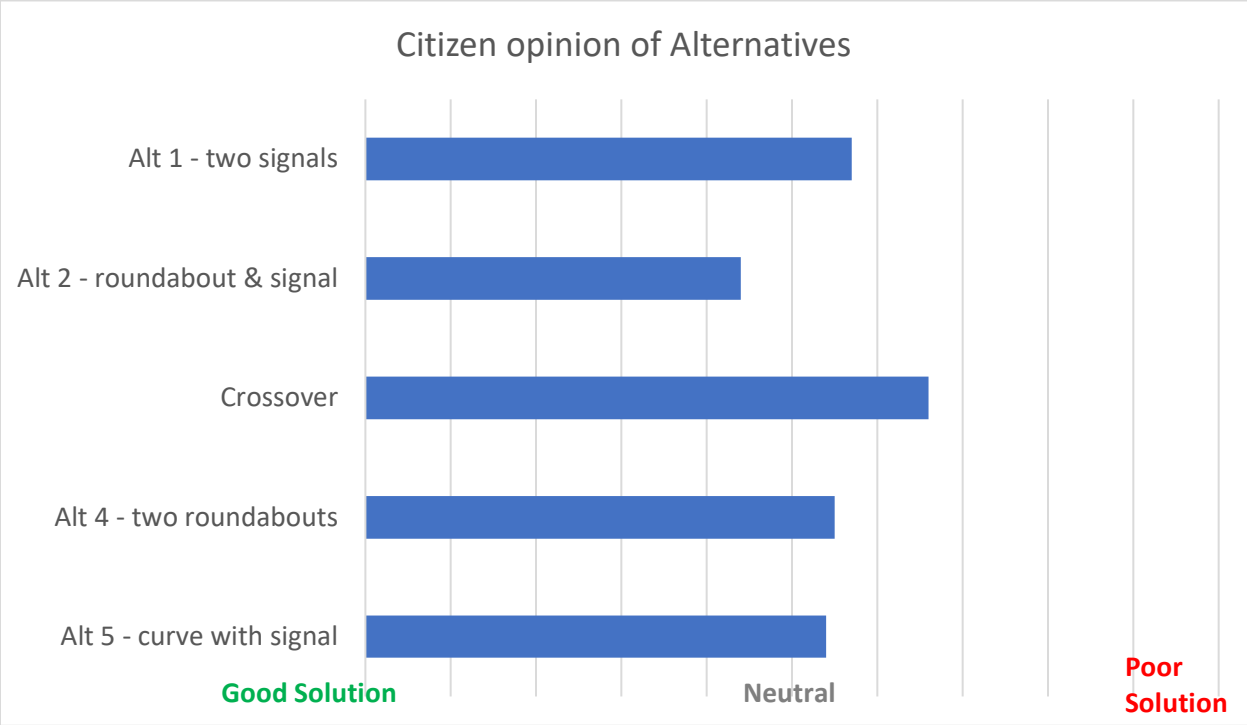
APPENDIX D – SURVEY #2 RESULTS

Summary of Ray-Freya Alternatives Survey #2 Results

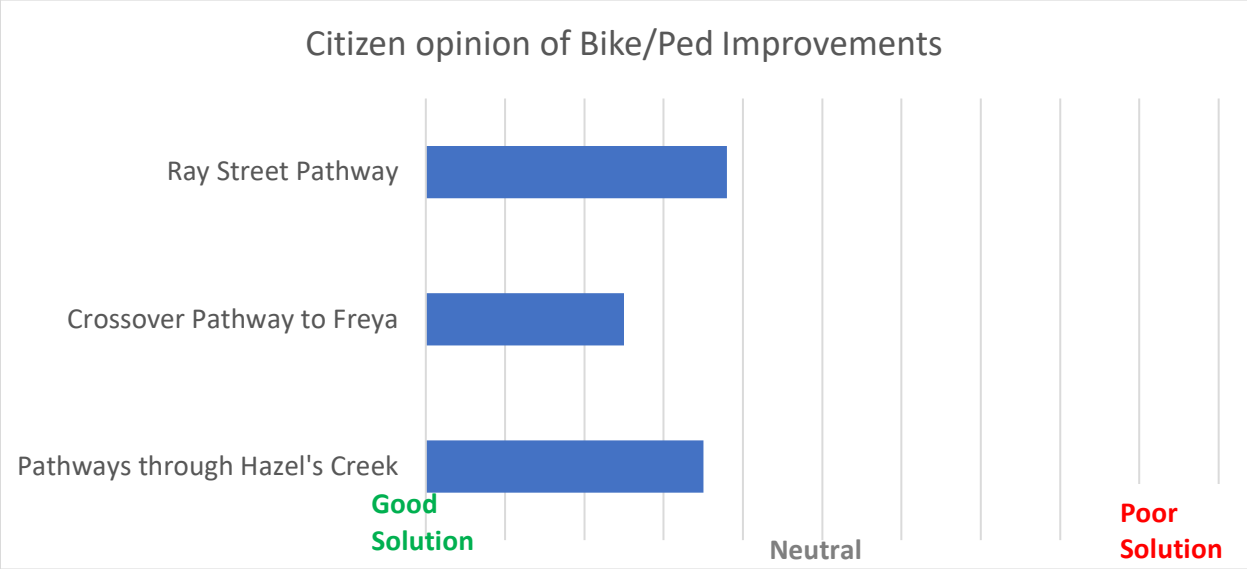
Survey was available from 6/11/21 to 6/27/21

61 respondents. Comments sections are summarized.

Q1-Q5 What is your opinion of the alternatives.



Q6-Q8 What is your opinion of the bicycle improvements?



Q9 Do you have any comments?

- Prefer off-street trails.
- Why not 2 roundabouts with alternative 2?
- Leave the Hazel's Creek wet lands alone.
- Bike lanes must be separated with more than paint. Separate bikes and cars.
- Hazel's Creek pathway is a good design. Suggest marked crosswalk at 37th/Thor since some kids walk that way already. Also extend 20 mph speed zone to Freya.
- Using Thor to get to 35th would be more attractive than Ray Street. Walkers might like a paved pathway on 35th. But people like to play in the grass with their pets too.
- Really like Hazel's Creek pathway.
- Against roundabout at 37th/Ray because of safety concerns with children.
- Pathway would be well used.
- Don't put a highway alongside Glen Willow Neighborhood.
- Freya needs improvements from Palouse Highway to 57th Avenue or else it won't be as attractive to shift traffic from Regal.
- Concern about 51st/Freya intersection and difficulty to turn left.
- Keep the original crossover.
- All-way stops are a poor solution. Roundabouts would be better than signals. Desperately need a shared-use pathway from 44th to 55th to make the area more usable for residents.
- Suggest connection (pathway?) on 42nd instead of through Hazel's Creek. Agree with crosswalk at Regal/Thurston. Don't want pedestrian traffic through Hazel's Creek.
- Like the original crossover and pathway. Including the bike/ped pathway through Hazel's Creek.
- Shared-use pathways are a big improvement from 1st round of alternatives.
- The Hazel's Creek pathway concept with be wonderful for walkers and bicyclists. Prefer offset roundabout at 37th/Ray and traffic signal at 37th/Freya and offset entrances for Ferris.
- Appreciate the plans for a crosswalk at Regal/Thurston and shared-use pathways in Hazel's Creek. Favor original crossover concept.
- Would like bike lanes in both directions on Freya from 37th to 57th.
- Roundabout at 37th/Ray with crossover concept design?

Q10 If you live within the City of Spokane please select your neighborhood.

ANSWER CHOICES		RESPONSES	
Audubon/Downriver		3.45%	2
Balboa/South Indian Trail		0.00%	0
Bemiss		0.00%	0
Browne's Addition		0.00%	0
Chief Garry		0.00%	0
Cliff-Cannon		1.72%	1
Comstock		3.45%	2
East Central		3.45%	2
Emerson/Garfield		0.00%	0
Five Mile Prairie		0.00%	0
Grandview/Thorpe		0.00%	0
Hillyard		0.00%	0
Latah/Hangman		0.00%	0
Lincoln Heights		27.59%	16
Logan		0.00%	0
Manito/Cannon Hill		1.72%	1
Minnehaha		0.00%	0
Nevada Heights		0.00%	0
North Hill		0.00%	0
North Indian Trail		0.00%	0
Northwest		1.72%	1
Peaceful Valley		0.00%	0
Riverside		0.00%	0
Rockwood		1.72%	1
Shiloh Hills		1.72%	1
Southgate		44.83%	26
West Central		0.00%	0
West Hills		0.00%	0
Whitman		0.00%	0
City of Cheney		0.00%	0
City of Spokane Valley		0.00%	0
Spokane County		8.62%	5
Other (Millwood, Liberty Lake, Airway Heights, Idaho)	Responses	0.00%	0
TOTAL			58

APPENDIX E – TRAVEL DEMAND MODELING AND TRAFFIC FORECASTING SUMMARY

The project team worked with the Spokane Regional Transportation Council (SRTC) to use their regional travel demand model in developing traffic volume forecasts for Year 2040. The SRTC model incorporates regional travel characteristics, projected future land use growth, and planned transportation improvements to provide future traffic estimates. Model traffic growth between the calibrated base year (2015) and the modeled future year (2040) is applied to the existing traffic data summarized in Section 2 using industry-accepted guidance from the Transportation Research Board (TRB) to develop what are known as post-processed traffic forecasts. These forecasts were used in the operations analysis to estimate future conditions. The following provides greater detail on the modeling process for this study.

SRTC Model Changes

The project team coordinated with SRTC to implement refinements to both 2015 and 2040 travel demand models to better reflect existing and expected future road network conditions. These refinements included:

<u>2015 Base Models</u>

- Minor network adjustments on study area roadway links and along the Ray/Thor/Freya corridors between the study area and I-90 to better represent travel speeds, turn restrictions, and other network characteristics
- Intersection geometry corrections to E 37th Ave & S Freya St
- Delay adjustments at:
    - E 37th Ave & S Ray St
    - E 37th Ave & S Freya St
    - E 44th Ave & S Freya St

<u>2040 Base No-Build Models</u>

- 2015 Base refinements
- Upgraded Palouse Hwy & S Freya St to a roundabout (currently planned) and adjusted delays accordingly
- Upgraded E 57th Ave & S Freya St to a roundabout (currently planned) and adjusted delays accordingly

<u>2040 Alternatives 1 & 2</u>

- 2015 Base and 2040 Base No-Build refinements
- Converted E 37th Ave & S Ray St to a signalized intersection (Alt 1) / roundabout (Alt 2) with dedicated left, through, and right turn lanes for southbound and westbound approaches to reduce capacity restrictions as much as possible to determine true demand of the Ray/Freya transition versus restricted demand
- Converted E 37th Ave & S Freya St to a signalized intersection

- Upgraded E 37th Ave between S Ray St and S Freya St to a 4-lane facility to reduce capacity restrictions as much as possible to determine true demand of the Ray/Freya transition versus restricted demand

2040 Alternative 3 – Original Crossover Concept

- 2015 Base and 2040 Base No-Build refinements
- Extended S Ray St southeast to S Freya St, creating a T-intersection with S Freya St north of this new facility having the stop control
- Signalized E 37th Ave & S Ray St / Crossover intersection with channelized right turns
- Added a new connector between the zone that contains Ferris High School and the new crossover facility
- Downgraded the classification and speed of S Freya St between E 37th Ave and the new crossover facility

SRTC executed these travel demand model scenarios and provided them to the project team to extract results and conduct analyses.

Post-Processing and Refinement

Initial post-processed turning movement forecasts were developed for the AM and PM peak hours of each future scenario (2040 No-Build and all three alternatives) using TRB's National Cooperative Highway Research Program Report (NCHRP) 765 procedures. This process involves using formulas to apply calculated growth between 2015 base year and 2040 forecast models to existing turning movement counts to develop a forecast. Because the SRTC travel demand model was calibrated using daily volumes at the link level using regional screenlines, the growth of peak hour travel demand model turning movements could not be used. Rather, the rate used to grow existing turning movement counts was based on the non-directional growth in daily volume of each movement's to and from links. The growth was balanced between all legs of the intersection using an iterative process.

Results from the above process were imported into Synchro to review imbalances between intersections and compare against existing counts. Imbalances are calculated by aggregating the number of vehicles coming into an approach of an intersection and subtracting the volumes expected to arrive at that approach from the upstream intersection. The more land use and entry/exit points in between the two intersections, the greater the chance and justification of an imbalance in between. This process assumed that although turning movement volumes at intersection might change between existing and all future year scenarios, the difference between intersections for each direction would remain relatively the same unless land use changes occurred adjacent to the roadway link. SRTC travel demand model land use changes between 2015 and 2040 helped identify where changes in imbalances might be appropriate, along with a review of aerials to identify where these changes might occur in relation to the road network.

With the information above mapped, the turning movements for each future year scenario (2040 Base and Alternatives 1-3) were refined to align more closely with existing counted imbalances unless land use changes justified a change. This process was executed for both AM and PM peak hours and began first with the 2040 Base scenario. Once this scenario was refined, the alternatives were adjusted and reviewed against the 2040 Base.

The refinement process for each scenario also included the following:

- Reviewing differences between SRTC travel demand model scenarios, both percent and numerical changes, using overall volumes as well as select link analysis
- Directional screenlines at several locations in the study area
- Identifying turning movements that were lower in 2040 scenarios than existing counts and using tools above to determine if this was justified or not
- Known attractions that were not expected to change, such as Ferris High School, were monitored to ensure trips in/out did not substantially change
    - The crossover alternative (Alternative 3) maintained the same ins/outs but accounted for changes in travel patterns

Adjustments for Known Study Area Developments

The SRTC model contains some, but not all, of anticipated new development in and around the study area. The draft traffic forecasts, derived by the post-processing and refinement process described above, were compared to anticipated traffic generation and distribution of known future developments to determine whether the developed forecasts account for this new growth. If they were found to not account for the new trips, forecasts were adjusted accordingly. The following new developments were reviewed during this process:

- 200 unit apt building at 61st Ave & S Ben Burr Rd
- Ben Burr Apartments (Palouse Prairie Apartments, just north of the ones above)
- Commons on Regal (55th Ave & Regal)
- Garden District (SE of 29th & SE Blvd)
- Hilby 2 (off Palouse Hwy e/o Freya)
- KXLY (off Regal s/o Palouse Hwy)
- Moran View Estates (65th Ave e/o S Ben Burr Rd)
- Palouse Trails Apartments (Palouse Hwy e/o Regal)
- Southridge PUD (29th e/o Havana)
- Trickle Creek 3rd & 4th
- Twisted Willows (42nd/43rd e/o Havana)

Additional Alternatives

Alternative 4 and Alternative 5 are variations of Alternative 2 and Alternative 1, respectively. They were developed as a result of public and stakeholder input after the initial travel demand modeling and post-processing procedures were conducted. No new travel demand modeling or post-processing was conducted for Alternative 4 and Alternative 5; rather, volumes from their related alternatives were manually adjusted to account for changes in turning movements as a result in the geometrical changes to the E 37th Ave & S Ray St intersection.