1.0 PURPOSE OF AND NEED FOR PROPOSED ACTION

This chapter provides a summary description of the project area and the proposed actions by the City of Missoula, the Montana Department of Transportation, and the Federal Highway Administration. This chapter also provides a definition of the specific purpose of the proposed project and the need for the proposed improvements.

This chapter explains the purpose the proposed project is intended to serve in the community; the operational deficiencies that need to be addressed to make this facility function as intended; the additional benefits to the traveling public that could be gained from improvements in this corridor; and ends with a compilation of goals and objectives that were developed by the public and were used to develop the alternatives presented in Chapter 2 of this document.

1.1 Project Area Description

As illustrated in Figure 1-1, the proposed project is located in western Montana, in the City and County of Missoula. The proposed project lies entirely within the city limits.

The proposed project consists of approximately 1.5 miles of Russell Street from Mount Avenue on the southern end to West Broadway Street on the northern end. The existing roadway varies in width from two to four lanes including turn lanes at some intersections, and includes a two-lane bridge over the Clark Fork River.

The proposed South 3rd Street improvements extend approximately one mile from Reserve Street on the west to Russell Street on the east. The existing roadway varies in width but generally includes one travel lane in each direction and turn lanes at some intersections.

Existing Conditions of Transportation Facilities

Russell Street

Russell Street is a north-south principal arterial connecting Higgins Avenue / 39th Street to West Broadway Street (and Railroad Street further to the north) in west-central Missoula. As illustrated in Figure 1-2, the section of Russell Street under study from Mount Avenue/South 14th Street to West Broadway Street varies from two to four lanes with turn lanes. Currently, traffic signals are located on Russell Street at its intersections with Mount Avenue/South 14th Street, South 5th Street, South 3rd Street, and West Broadway Street. The signalized intersections along the corridor have pedestrian crossing facilities, including pedestrian signals, and are handicapped accessible (with curb ramps at all crossings).

There are no exclusive bike lanes and limited pedestrian facilities along Russell Street between Mount Avenue/South 14th Street and West Broadway Street. There are intermittently paved shoulders from Mount Avenue/South 14th Street to South 3rd Street, and gravel shoulders from South 3rd Street to West Broadway Street. The existing Russell Street Bridge has sidewalks on both sides.

Figure 1-1
Project Location Map

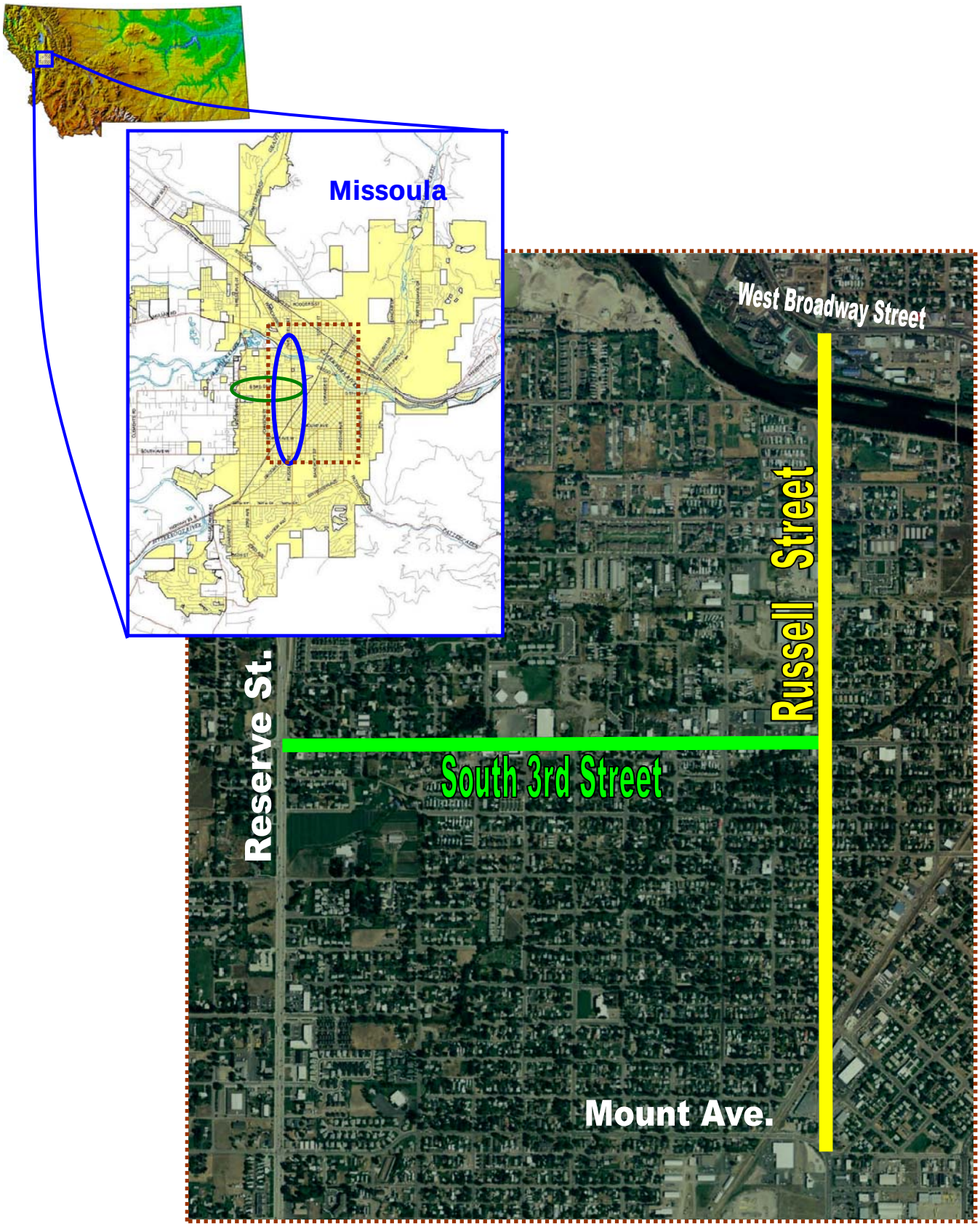
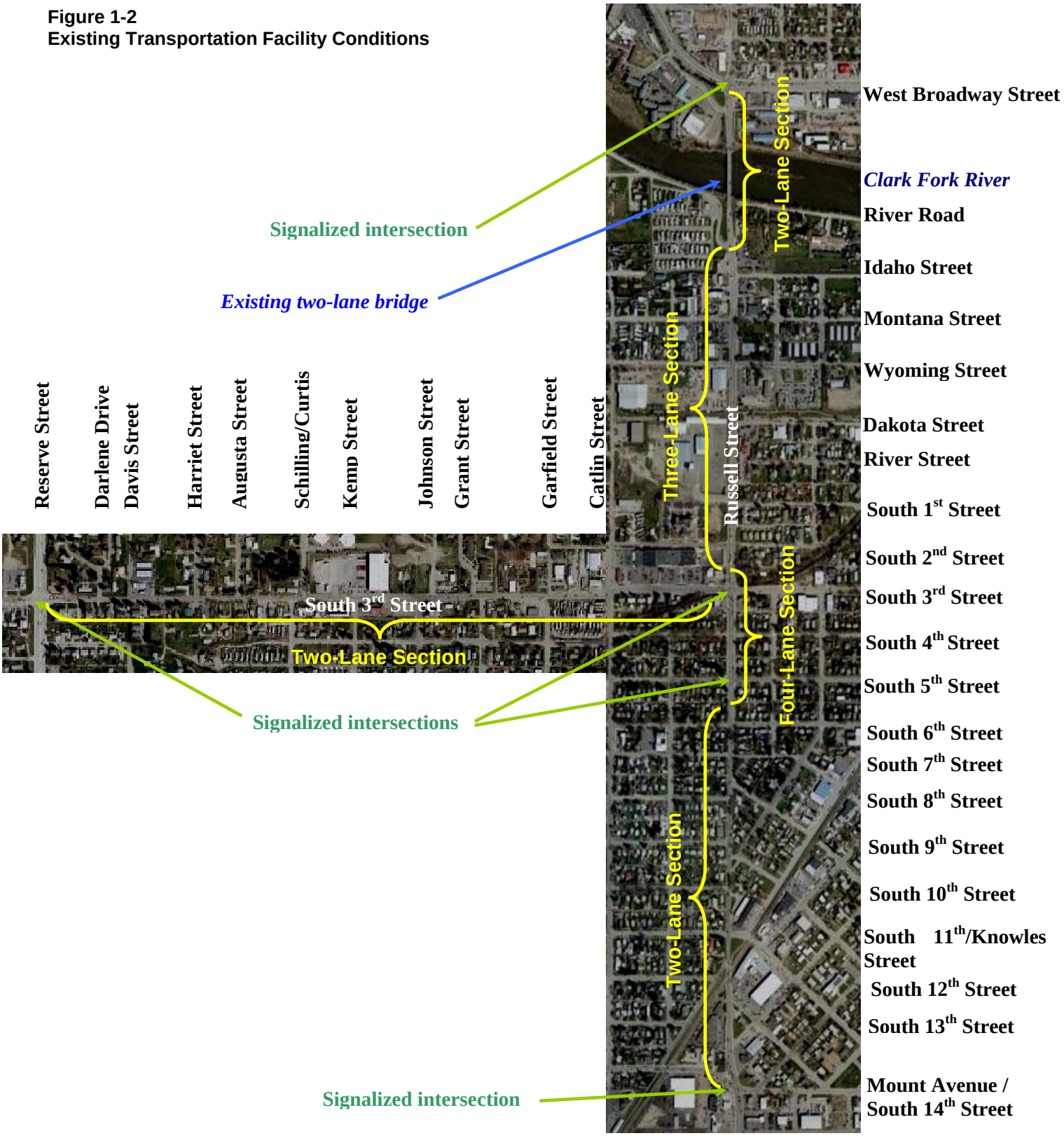


Figure 1-2
Existing Transportation Facility Conditions



The existing Russell Street Bridge, formally known as the Lincoln-Russell Bridge, was built in 1957. The bridge consists of two, 12± foot lanes and two, 4.0± foot raised sidewalks adjacent to the roadway. The existing bridge is approximately 420 feet long with four 105 foot spans over the approximately 407-foot bottom width channel. The structure is supported by three in-stream piers. The existing vertical clearance between the Russell Street Bridge and the 100-year flood elevation at the south abutment is approximately 4.0 feet. Runoff from the existing Russell Street Bridge currently drains into the Clark Fork River. The bridge footings support the interior piers and are approximately 10 feet wide by 34± feet long with a thickness of approximately 7.0 feet. Each abutment cap is supported by a wall resting on two pads that are approximately 3.0 by 14± feet wide with a thickness of approximately 4.0 feet.

South 3rd Street

South 3rd Street is an east-west minor arterial connecting Clements Road to South Higgins Avenue in west-central Missoula. As illustrated in Figure 1-2, the section of South 3rd Street under study from Reserve Street to Russell Street is approximately one mile in length and consists of an approximately 24 foot wide, two-lane section of roadway with intermittent paved shoulders, and no bicycle or pedestrian facilities, except for crosswalks at two un-signalized intersections and at the intersections with Curtis and Catlin Streets. There are traffic signals at the intersections of South 3rd Street at Reserve Street and Russell Street.

1.2 Proposed Action

Based on priorities established through the metropolitan transportation planning process, the City of Missoula, in cooperation with the Montana Department of Transportation and the Federal Highway Administration, initiated a study to evaluate alternatives to address the current and projected safety and mobility concerns on Russell Street and South 3rd Street. The general proposed action under consideration includes vehicular capacity improvements, accommodation of alternative transportation modes, transit pullouts, sidewalks, curb & gutter, boulevards, bicycle lanes, and stormwater drainage. Signalization of key intersections, as well as the potential for construction of roundabout traffic control is also under consideration with this proposed action.

1.3 Purpose of the Proposed Action

Given the physical location and functional designations of the Russell Street and South 3rd Street routes, the high traffic volumes, crash history, and multi-modal use of the corridors, **the purpose of this proposed project is to provide substantive safety and mobility improvements for all modes of travel in the Russell Street and South 3rd Street corridors.** Discussions in the following section outline the extent of the need for such improvements.

1.4 Need for the Proposed Action

The need for a transportation improvement project is generally established through an examination of characteristics such as capacity and forecast travel demand, crash history, lack of roadway network linkages, inadequate transit accessibility or bicycle and pedestrian facilities, or

outdated design features. In their Technical Advisory (6640.8A), the Federal Highway Administration outlines several different issues or problems that may be used to substantiate the need for improvements.

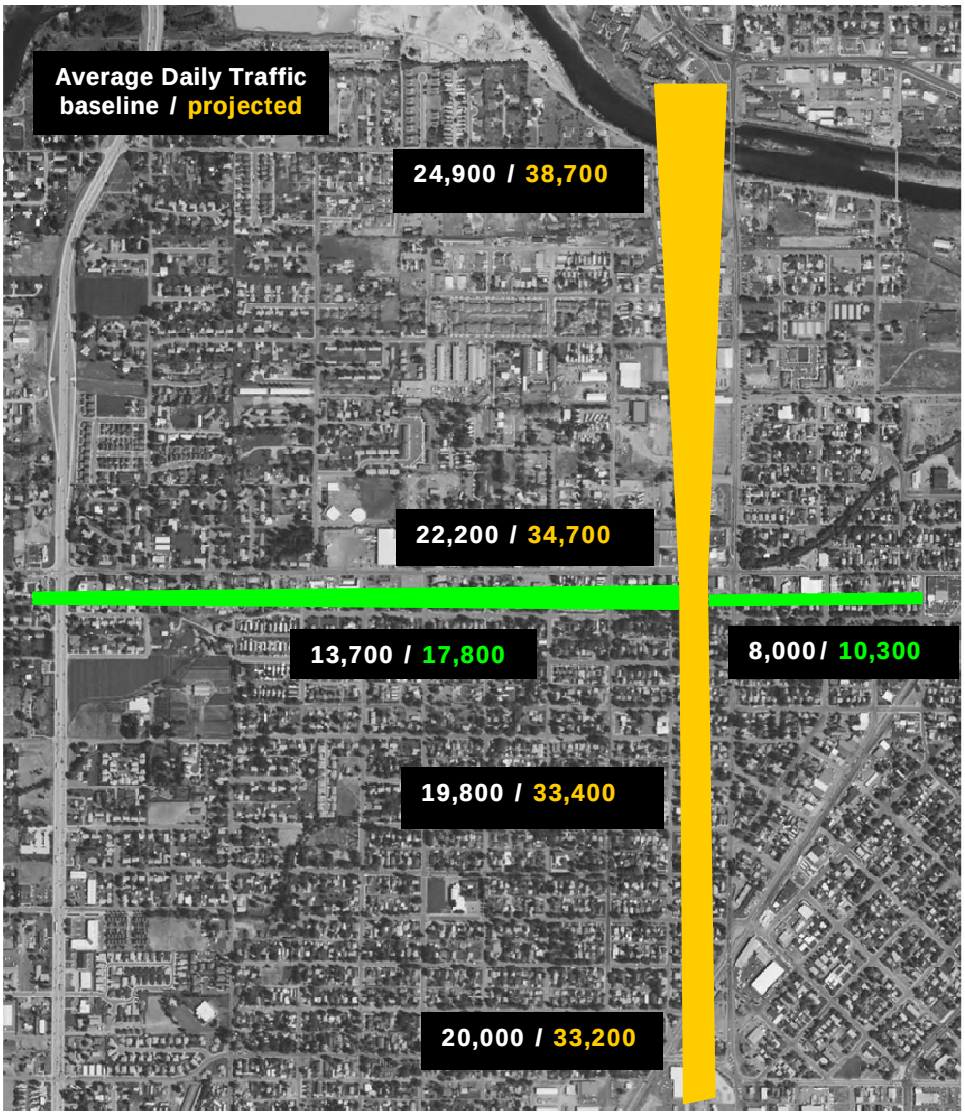
The need for improvements in these two corridors is based on a lack of future system capacity and lack of sidewalk continuity.

If these two issues can be addressed, additional benefits can also be gained in the following areas: vehicular, pedestrian, and bicycle safety; trail connectivity; improved transit service; and upgrades to an aging bridge structure. These needs and benefits are discussed below.

Vehicle Capacity and Level of Service

Russell Street currently experiences high levels of congestion during the morning and evening peak periods (or rush hours). As illustrated in Figure 1-3, traffic volumes counted on Russell Street in 2009 ranged from 19,800 average annual daily traffic south of South 3rd Street to 24,900 vehicles at the south end of the Russell Street Bridge. With no transportation improvements, this range of traffic volumes is projected to increase to 33,200 and 38,700 vehicles respectively by the year 2035, which exceeds the traffic volumes that were projected in the 1996 Missoula Transportation Plan Update. Both the 1996 Missoula Transportation Plan Update and the 1999 Missoula Transportation Plan Update listed Russell Street as the number two

Figure 1-3
Existing and Projected Traffic Volumes on Russell and South 3rd



Note: Projected volumes on Russell Street represent a constrained No Build condition.

priority for major improvement projects to remedy capacity-related problems. Russell Street continued to be listed in the 2004 Missoula Transportation Plan Update, but the Update did not prioritize projects as did previous reports.

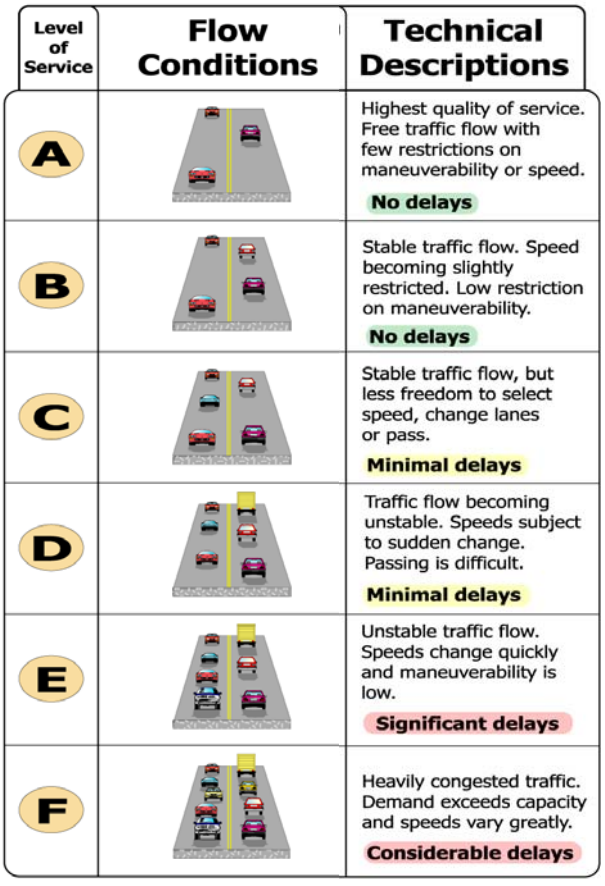
South 3rd Street is one of several east-west arterials south of West Broadway Street that provides important roadway links between the major north-south arterials and also serves adjacent residential and commercial areas. Traffic volumes counted on South 3rd Street in 2001 ranged from 8,000 vehicles just east of Russell Street to 13,700 vehicles just west of Russell Street. Because traffic growth was relatively flat between 2001 and 2009 on South 3rd Street, these same volumes were used as the baseline for the traffic analysis update. These traffic volumes are projected to increase to 10,300 and 17,800 vehicles respectively by the year 2035. Both the 1996 Missoula Transportation Plan Update and the 1999 Missoula Transportation Plan Update listed South 3rd Street as the number one priority for major improvement projects to remedy capacity related problems. The 2004 Missoula Plan Update did not prioritize projects, but continued to list South 3rd Street as a key project.

Maintaining adequate capacity for the multiple travel modes that use principal arterials is key to maintaining an efficiently functioning roadway system.

It should be noted that the Missoula Area Metropolitan Planning Organization completed an update to the Long Range Transportation Plan in 2009 while the Draft Environmental Impact Statement was in public circulation. The Long Range Transportation Plan provides traffic projections through the year 2035 which provide the basis for the updated traffic analyses in this Final Environmental Impact Statement. The 2008 Envision Missoula Survey also reports that the highest percentage of survey respondents rank "Expand Roadway Capacity" as their dominant choice of transportation improvements for Missoula.

Traffic conditions on transportation facilities are commonly defined using the Level of Service concept. As shown in Figures 1-4 and 1-5, the *Highway Capacity Manual* defines Level of Service based on average travel speed, percent time delay, intersection delay, and capacity utilization to provide a qualitative assessment of the driver's experience. Six Level of Service categories ranging from A to F are used to describe

Figure 1-4
Mainline Level of Service Definitions



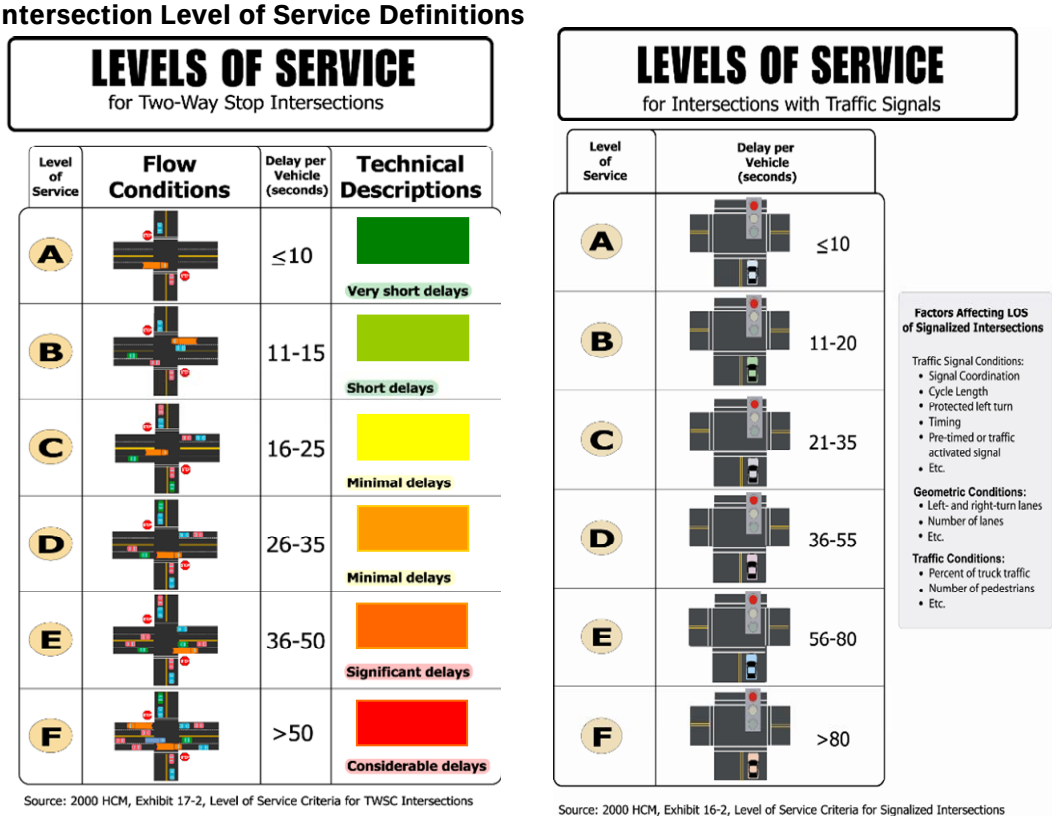
Source: 2000 HCM, Exhibit 20-2, Level of Service Criteria for Two-Lane Highways.

traffic operations. Level of Service A represents the best conditions and Level of Service F represents the worst. The existing facility does not provide adequate capacity to accommodate current traffic volumes during peak periods. If no improvements are made, traffic congestion in the corridor will worsen and the peak periods (or morning and evening "rush hours") will extend in duration by the year 2035. In particular, intersection operations on Russell Street are anticipated to degrade to Level of Service F at several locations, meaning drivers will experience substantial delays at these locations. Russell Street will not be capable of accommodating increased traffic volumes in the future without both mainline capacity and intersection improvements which may include signals, roundabouts, and/or turn lanes at many locations.

Recognizing that a Level of Service A is not always achievable in every corridor due to physical constraints and excessive cost, each state establishes minimum thresholds or benchmarks they strive to achieve on a given type of facility. Benchmark Level of Service values identified in the *Montana Road Design Manual* (MDT 2006) are C or better for urban principal and urban minor arterials and D or better for collectors. While not optimal, these Level of Service benchmarks offer minimal delays and are generally acceptable in light of higher costs and impacts associated with achieving a higher Level of Service.

For intersections, Level of Service is defined in terms of delay or the amount of time the average driver spends waiting at a signal or for a gap in traffic. This delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to intersection traffic control (stop signs or signals), geometrics, traffic and incidents. Levels of Service for intersections are defined to represent reasonable ranges of delay.

Figure 1-5
Intersection Level of Service Definitions

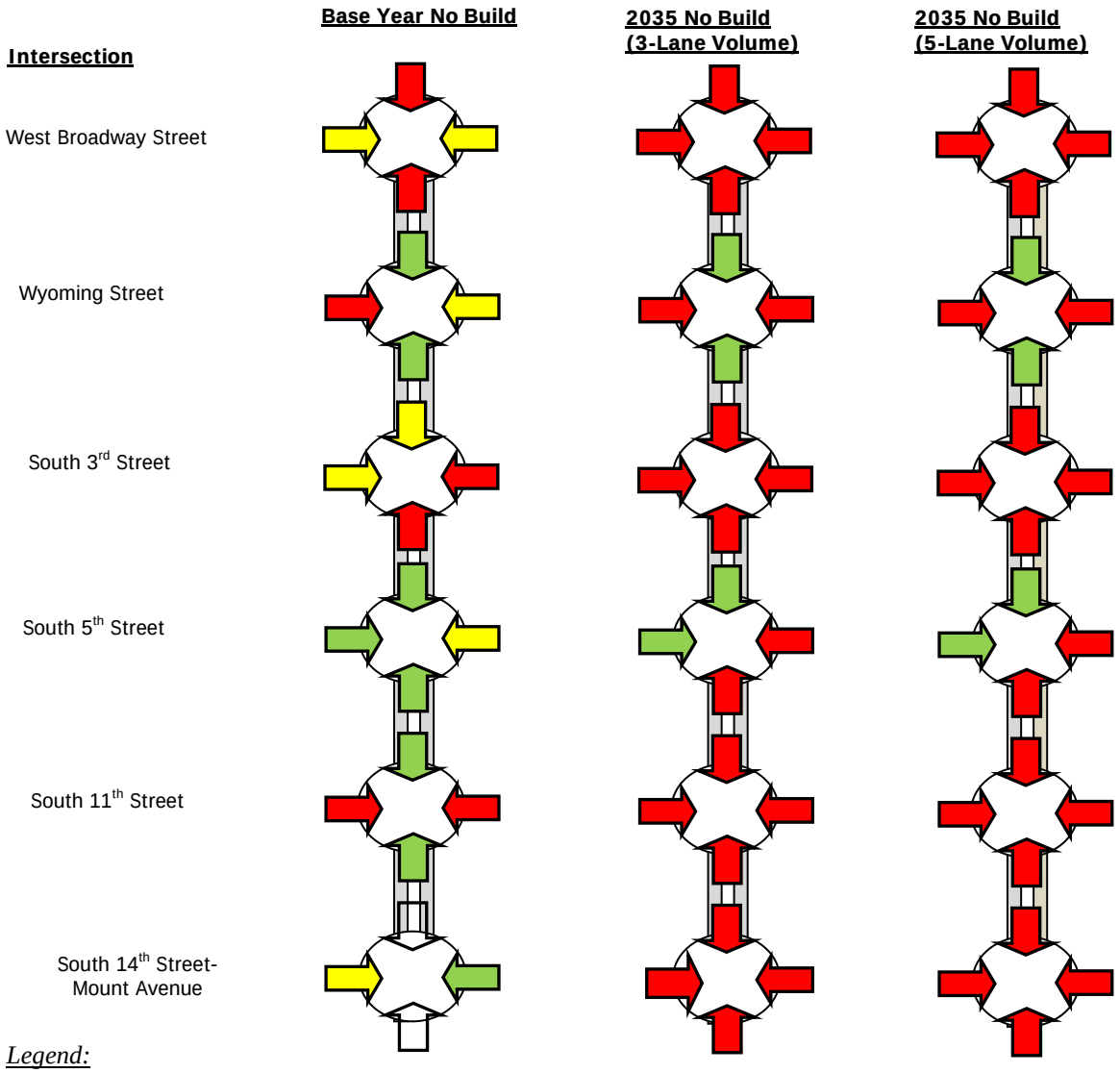


The targeted Level of Service for intersections, according to Montana Department of Transportation, is C for urban principal (Russell Street) and minor arterials and D for collectors (South 3rd Street). In addition to these general requirements, the City of Missoula specified a minimum Level of Service of D for South 5th Street, South 6th Street, Wyoming Street, and Catlin Street. The goal for this project is to provide Level of Service C on Russell Street and South 3rd Street.

As illustrated in Figures 1-6 and 1-7, both Russell Street and South 3rd Street have intersections that currently have inadequate operating conditions. It should also be noted that these congested conditions result in more idling time, and higher levels of vehicle emissions which have substantial air quality implications. This concern is discussed further in Chapters 3 and 4 of this document.

As depicted in Figure 1-6, both signalized and un-signalized intersections along Russell Street are currently failing to achieve the targeted Level of Service. During the *Russell Street Traffic Analysis Update* (see Appendix G for a summary), future traffic projections for year 2035 were generated for both a three-lane scenario and a five-lane scenario. Figure 1-6 illustrates that as the area population grows (under either future traffic volume scenario), traffic in the Russell Street corridor is expected to increase, and operating conditions are expected to decline without mainline capacity and intersection improvements.

Figure 1-6
Russell Street Level of Service

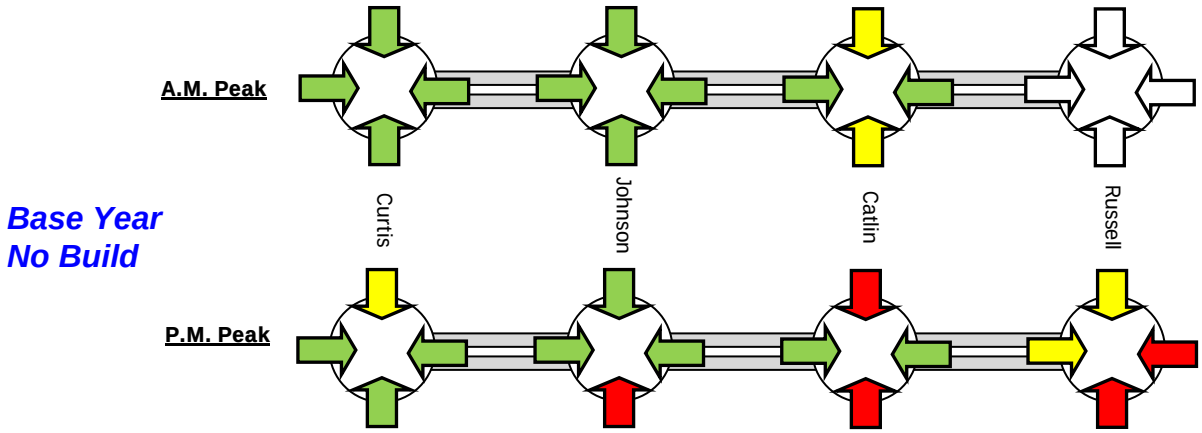


Legend:

- Level of Service C or Better
- Level of Service D
- Level of Service E or F
- Data not available.

Source:
Kittelson & Associates, Inc.
Traffic Analysis Update, 2009

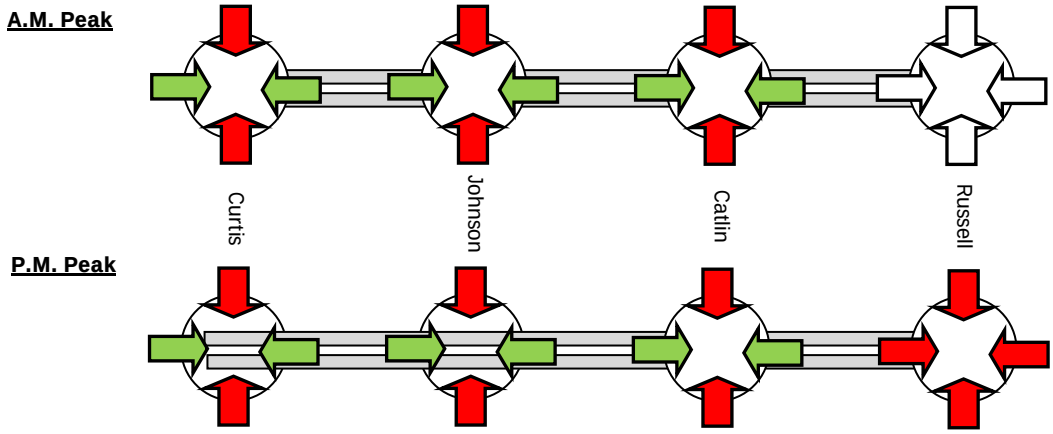
Figure 1-7
South 3rd Street Level of Service



Base Year No Build

As indicated in the graphic above, the intersection operations on South 3rd Street at Catlin Street (in the P.M. peak hour) and Russell Street currently operate at poor levels.

By the year 2035, the intersection operations are anticipated to deteriorate to failing levels throughout the South 3rd Street corridor between Reserve Street and Russell Street, if no improvements are made.



2035 No Build

Source:
DOWL HKM, 2010
Analysis originally prepared based on 2001 data, reforecast to 2009, then projected to 2035.

Legend:

- Level of Service C or Better
- Level of Service D
- Level of Service E or F
- Data not available.

Pedestrian and Bicycle Facilities

In addition to carrying cars and trucks, many of the city's roadways are important corridors for non-motorized travel. A network of trails that intersect with the roadway network also serves pedestrians and bicyclists. Pedestrian/bicycle routes can be accommodated in a variety of ways, but Russell Street is particularly important in fulfilling those needs in Missoula due to its continuous north-south linkage through this portion of the community. South 3rd Street plays a similar role in an east-west fashion.

According to the *2001 Missoula Non-Motorized Transportation Plan*, the purpose of bicycle lanes is to indicate, by providing a defined space on the roadway, to both motorists and bicyclists that bicyclists belong on the road. Signed and striped bicycle lanes are the preferred bikeway design choice for principal arterials, minor arterials, and collectors with high volumes of traffic. Cyclists utilize combinations of bicycle routes to form systems for travel throughout the city; therefore, facilities should be provided to make the systems truly multi-modal. According to the American Association of State Highway and Transportation Officials', *Guide to the Development of Bicycle Facilities*, the preferred width ranges from four to five feet depending on traffic speeds and volumes, and whether on-street parking is permitted.

Bike lanes help define road space, decrease the stress level of bicyclists riding in traffic, encourage bicyclists to ride in the correct direction of travel, and signal motorists that cyclists have a right to the road. Bike lanes help to better organize the flow of traffic and reduce the chance that motorists will stray into cyclists' path of travel. In addition, several real-time studies (where cyclists of varying abilities and backgrounds ride and assess actual routes and street conditions) have found that cyclists are more comfortable and assess a street as having a better level of service for them where there are marked bike lanes present.

In summary, bike lanes do the following:

- support and encourage bicycling as a means of transportation;
- help define road space;
- promote a more orderly flow of traffic;
- encourage bicyclists to ride in the correct direction, with the flow of traffic;
- give bicyclists a clear place to be so they are not tempted to ride on the sidewalk;
- remind motorists to look for cyclists when turning;
- signal motorists that cyclists have a right to the road;
- reduce the chance that motorists will stray into cyclists' path of travel;
- make it less likely that passing motorists swerve toward opposing traffic; and/or
- decrease the stress level of bicyclists riding in traffic.

While the City has designated several arterials, including Russell Street, as a bicycle route, they do not necessarily include dedicated bicycle lanes. Well-designed facilities encourage proper behavior and decrease the likelihood of crashes. Numerous studies have shown that dedicated bicycle lanes improve safety and promote proper riding behavior.

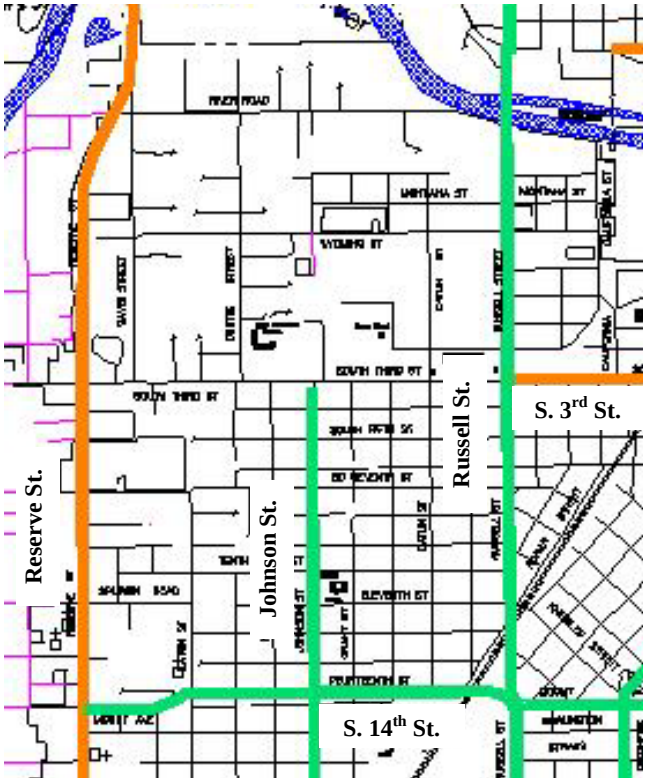
Current bicycle and pedestrian facilities are inconsistent throughout the Russell Street and South 3rd Street corridors. Sidewalks or paved shoulders are provided in limited areas, while pedestrian routes are discontinuous or nonexistent in others. These pedestrian facilities also do not meet the current requirements of the Americans with Disabilities Act. This poor condition, inaccessibility, and inconsistency in the route discourages pedestrian travel or requires that they walk on the roadway in several portions of the corridor. There are also several areas where worn paths can be found on the roadway shoulder or lawns giving evidence of bicycle and pedestrian use even in the absence of a formal facility.

Numerous comments were received during project scoping and public information meetings which emphasized the importance of a safe and enjoyable means for bicycle and pedestrian travel within this project corridor. The 1996 Missoula Transportation Plan Update recommends that a cohesive network of bicycle facilities be developed in the urban portions of Missoula to accommodate the safe and efficient travel of bicyclists. The Plan Update also identifies a need for improvement of sidewalks and pedestrian facilities, particularly for disabled persons and those who depend on sidewalks within Missoula. The 2004 Missoula Transportation Plan Update, although not explicit echoes these recommendations. Together, these planning efforts and the expressed opinion from public participants in this project development process, have identified the clear desire to improve bicycle and pedestrian facilities within this corridor.

According to the City of Missoula *Bike Lane / Route Map* (illustrated in Figure 1-8), the entire length of Russell Street from Mount Avenue to West Broadway Street is considered a bicycle route; however, neither Russell Street nor South 3rd Streets have bicycle lanes, and the inconsistent paved width may cause bicyclists to ride in traffic.

More explicit detail of the size and location of current facilities is discussed in Chapter 3 of this document.

Figure 1-8
City of Missoula Bike Lane / Route Map



Bike lanes shown in **orange**,
Bike routes shown in **green**.

1.5 Additional Benefits of Improvements

Intermodal Relationships

Both Russell Street and South 3rd Street are served by the Mountain Line bus system, as illustrated in Figure 1-9.

Route 2 (shown in pink) serves Russell Street from South 5th Street to West Broadway Street.

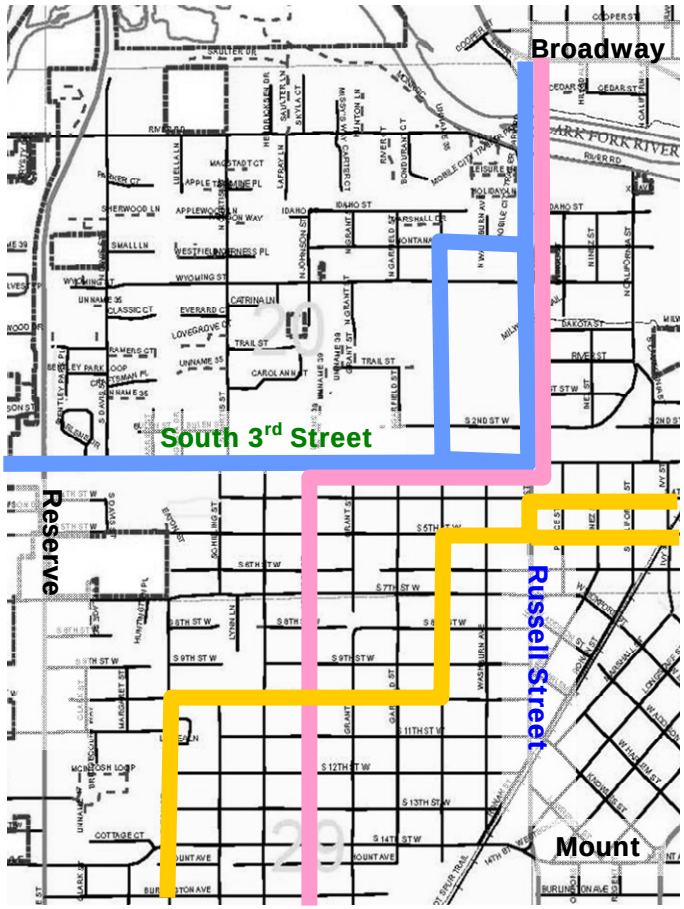
Route 9 (shown in blue) serves Russell Street from South 3rd Street to West Broadway Street, and South 3rd Street throughout the project area from Russell Street to Reserve Street.

Route 8 (shown in gold) serves Russell Street from South 5th Street to South 3rd Street.

The 1996 Missoula Transportation Plan Update identified a need for bus service throughout the Russell Street corridor.

Substantial improvements in capacity along Russell Street and South 3rd Street would improve the efficiency of transit routes utilizing these corridors, and provide a more attractive service for transit riders. And the inclusion of bicycle lanes, sidewalks, and bus stop or pullout locations, would improve the overall intermodal relationships as well.

Figure 1-9
Mountain Line Bus Routes in Project Area



☆Updated Route Map
Source: Mountain Line web page September 2009

Safety Performance

During the period from July 1, 2004 through June 30, 2007, there were a total of 289 crashes on Russell Street. Crashes at intersections accounted for 219 of those, while crashes between intersections on Russell Street contributed another 70 crashes to the total. 89 crashes involved injuries, again with the majority (70) occurring at intersections, and 19 occurring between intersections. There were no fatal crashes. The percentage of in-intersection or intersection related crashes (76.5 percent) on Russell Street is substantially higher than the statewide average of 55.3 percent for the same types of crashes in a similar urban setting.

As shown in Table 1.1 the predominant crash types on Russell Street were rear-end (61 percent), followed by right-angle (23 percent), and left turn (11 percent). The calculated crash rate for Russell Street excluding the intersection crashes is 2.15 per million vehicle miles traveled, which is lower than the national average crash rate of 6.17 crashes per million vehicle miles traveled. The statewide crash rate in Montana for urban areas with a population greater than 5,000 is 5.66 per million vehicle miles traveled. Of the 289 crashes on Russell Street, eight involved a bicycle or pedestrian which is about 2.8 percent of the crashes on Russell Street. Of all the urban crashes in the State of Montana, pedestrian/bicycle crashes account for two percent.

Table 1.1
Crash Types on Russell Street (July 1, 2004 - June 30, 2007)

Crash Type	Total Number	Percentage of Total
Rear End	176	60.9%
Right Angle	67	23.2%
Left Turn	33	11.4%
Other	13	4.5%
Total	289	100%

Source: Montana Department of Transportation, 2007

During the period from July 1, 2004 through June 30, 2007, there were a total of 122 crashes within the South 3rd Street study area. Crashes at intersections accounted for 79 of those, while crashes between intersections accounted for 43. There were 41 injury crashes, with 28 occurring at intersections, and 13 between intersections. There were no fatal crashes. The percentage of in-intersection or intersection related crashes (63 percent) on 3rd Street is substantially higher than the statewide average of 55.3 percent for the same types of crashes in a similar urban setting.

As illustrated in Table 1.2 the predominant crash types on South 3rd Street were rear-end (54.9 percent), right-angle (22.1 percent), and left turn (11.5 percent). The calculated crash rate for South 3rd Street excluding the intersection crashes is 3.69 per million vehicle miles traveled. The statewide crash rate in Montana for similar urban areas is 5.66 per million vehicle miles traveled. Of the 122 crashes on South 3rd Street, eight involved a bicycle or pedestrian which is about 2.5 percent of the crashes on South 3rd Street. Of all the urban crashes in the State of Montana, pedestrian/bicycle crashes account for two percent.

Table 1.2
Crash Types on South 3rd Street (July 1, 2004 - June 30, 2007)

Crash Type	Total Number	Percentage of Total
Rear End	67	54.9%
Right Angle	27	22.1%
Left Turn	14	11.5%
Other	14	11.5%
Total	122	100%

Source: Montana Department of Transportation, 2007.

Structural Deficiencies

The Russell Street Bridge over the Clark Fork River was constructed in 1957. The structure is a two-lane steel structure that does not meet current Montana Department of Transportation design standards or seismic bridge codes. The bridge consists of a 24 foot wide travel surface with two raised, four foot sidewalks immediately adjacent to the travel lanes. The bridge is typically congested at peak hours (for a period of 2 to 3 hours) and traffic is adversely affected by the inefficiency of the intersection of West Broadway Street and Russell Streets. The *Missoula Non-Motorized Transportation Plan* identifies the bridge as needing to better accommodate bicyclists and pedestrians, and traffic projections indicate that the bridge does not provide enough carrying capacity to facilitate the traffic needs at the Russell Street and West Broadway Street intersection.

Based on a bridge inspection conducted in 2008 the existing structure has a Sufficiency Rating of 55.3 on a scale of 0 to 100, and was determined to be functionally obsolete and eligible for rehabilitation. The structure is currently programmed for re-inspection in July 2010.

The sufficiency rating for a bridge structure is based on its structural adequacy and safety, necessity for public use, serviceability, and functional obsolescence. The rating is used to determine a structure's adequacy, both with regard to its load-carrying capabilities and its ability to accommodate the volume of traffic the road serves. The ratings are developed by the Federal Highway Administration and are one of the parameters used in allocating federal funding for the Highway Bridge Replacement and Rehabilitation Program. They provide a basis for establishing eligibility and priority for replacing or rehabilitating bridges. In general, the lower the rating (on a scale from 0 to 100), the higher the priority.

View of Russell Street Bridge steel structure

1.6 Goals and Objectives

During the project development process, regulatory agencies, an Advisory Committee established for this project, and the general public were asked to provide input on the proposed project. That input was used to develop a series of goals and objectives, which are outlined below. The goals (in bold text below) are broad statements of desired characteristics for corridor improvements. These goals were used to help develop the initial range of alternatives. The objectives (bulleted items below) are more detailed design concepts to be incorporated into the proposed project's final design, if feasible.

The goals and objectives developed through the process included:

Improve safety and mobility

- Provide adequate travel lanes and turn lanes to accommodate projected demand at an acceptable level of service
- Provide designated lanes/facilities for safe bicycle and pedestrian use
- Widen the bridge over the Clark Fork River to accommodate additional vehicle lanes and bicycle/pedestrian facilities
- Provide design and traffic control measures to improve safety

Improve multi-modal access and mobility

- Provide trail linkages within and across the Russell Street and South 3rd Street corridors
- Provide grade-separated bicycle and pedestrian crossings of Russell Street
- Provide facilities compliant with the Americans with Disabilities Act
- Provide adequate space for bus stops and pullouts in the corridors
- Explore the use of roundabouts to improve on the safety of turn movements and access to adjacent homes and businesses

Minimize impacts

- Reduce the adverse environmental impacts of transportation on the corridor
- Address air quality and water quality issues related to the current transportation infrastructure in the corridor
- Mitigate unavoidable impacts

Maintain Community Character

- Develop a transportation facility that maintains or enhances a sense of the residential and commercial neighborhoods within the corridor
- Provide aesthetically pleasing design elements such as a landscaped boulevard

2.0 ALTERNATIVES ANALYSIS

The following chapter documents the alternatives development and evaluation process utilized to identify the Preferred Alternatives. In an effort to identify the optimal investment in these travel corridors while recognizing the values and concerns expressed by the public, the City of Missoula, Montana Department of Transportation, and Federal Highway Administration utilized a collaborative and objective process to develop alternatives and determine the degree to which those alternatives satisfied the specific purpose and need of improving safety and mobility in the corridor. The more general goals of minimizing impacts and maintaining community character also provided guidance in the refinement of the alternatives and development of preliminary design details.

The alternatives development process was iterative and involved two major evaluation stages. The first stage involved the exploration of the No Build and several Build alternatives with varying capacity and intersection control measures on both Russell Street and South 3rd Street. A preliminary evaluation of impacts necessitated a further refinement of those alternatives that best met the safety and mobility needs. Those alternatives were refined and evaluated again for their ability to provide targeted safety and mobility improvements, to compare their preliminary impacts, and to assess their cost-effectiveness.

This chapter steps through the process in chronological order, starting with a summary of how and why the alternatives were developed, moving through description of the alternatives, discussing the alternatives evaluation process, identifying the Preferred Alternatives, and ending with a discussion of the goals and objectives used to further refine and evaluate the alternatives.

2.1 Development of Alternatives

An Advisory Committee was formed to provide citizen input to the City of Missoula, Montana Department of Transportation, and Federal Highway Administration. A list of the members of the Advisory Committee is provided in Chapter 7 – Comments and Coordination. Advisory Committee members were charged with the responsibility of acting as a liaison between their constituents and the project team. They were also active in the outreach, preparation, and attendance of the public meetings. Advisory Committee members spent considerable time discussing critical project issues, participating in twelve meetings from late 2000 to early 2002. This committee was disbanded upon development and evaluation of alternatives.

In addition, as part of the formal National Environmental Policy Act and Montana Environmental Policy Act processes, an initial Public Scoping Meeting was held on November 16, 2000 and seven additional public meetings were held prior to the publication of the Draft Environmental Impact Statement. The seven additional public meetings included a four-day, community workshop hosted by Dan Burden of *Walkable Communities* and further meetings to discuss and refine alternatives. Public input from these meetings covered a wide range of issues that affected all travel modes and were dispersed throughout the study area and beyond.

Stephens Avenue was reconstructed in the late 1990's, and has been referred to by the public as an example of what the community expects for a roadway reconstruction project in Missoula. The Stephens Avenue corridor includes landscaping, raised medians, left turn storage, bicycle lanes, sidewalks, boulevards, and pedestrian crossings. Initial project alternatives for Russell Street and South 3rd Street were developed based on forecast travel demand and congestion levels, bike/pedestrian corridor travel and crossing safety, issues raised in the public involvement process, and efforts to avoid known physical constraints within the corridors. Throughout the public involvement process, participants expressed a desire that improvements in the Russell Street and South 3rd Street corridors include bicycle facilities, sidewalks, bus turnouts, curbs and gutters for stormwater management, river trail system access to the roadway, illumination, landscaping, and pedestrian crossing facilities. The inclusion or exclusion of these elements will determine the width and functionality of the facilities, and define the overall feel of the corridors.

During the development and evaluation of alternatives, small modifications were made to the design concepts in an attempt to satisfy the goals and objectives outlined in Chapter 1. As outlined in the following section, the No Build and two Build alternatives on Russell Street fail to satisfy Purpose and Need. The two remaining alternatives were considered viable, but additional modifications were determined to be desirable to further minimize impacts and improve the conceptual design. Only one of these alternatives was able to minimize impacts to protected historic resources at South 5th Street and is identified as the Preferred Alternative. Specific design elements of the Preferred Alternatives are discussed in Section 2.5. Other options considered early in the process, but eliminated for various reasons, are discussed in Section 2.6.

Background on Consideration of Roundabouts

One of the objectives of this project as discussed in Chapter 1 – Purpose and Need, included the development of alternatives to "explore the use of roundabouts to improve on the safety of turn movements and access to adjacent homes and commercial buildings." The roundabout concept is relatively new to Montana, but this form of intersection control is becoming more common in western states and has been used throughout the world for many years. Even with broader use across the country, there are frequent misperceptions on roundabouts. The following provides some background information on what this intersection concept entails. More can be read about roundabouts from *Roundabouts: An Informational Guide* (See List of Technical Reports in the Table of Contents of this document, and Appendix A for a summary).

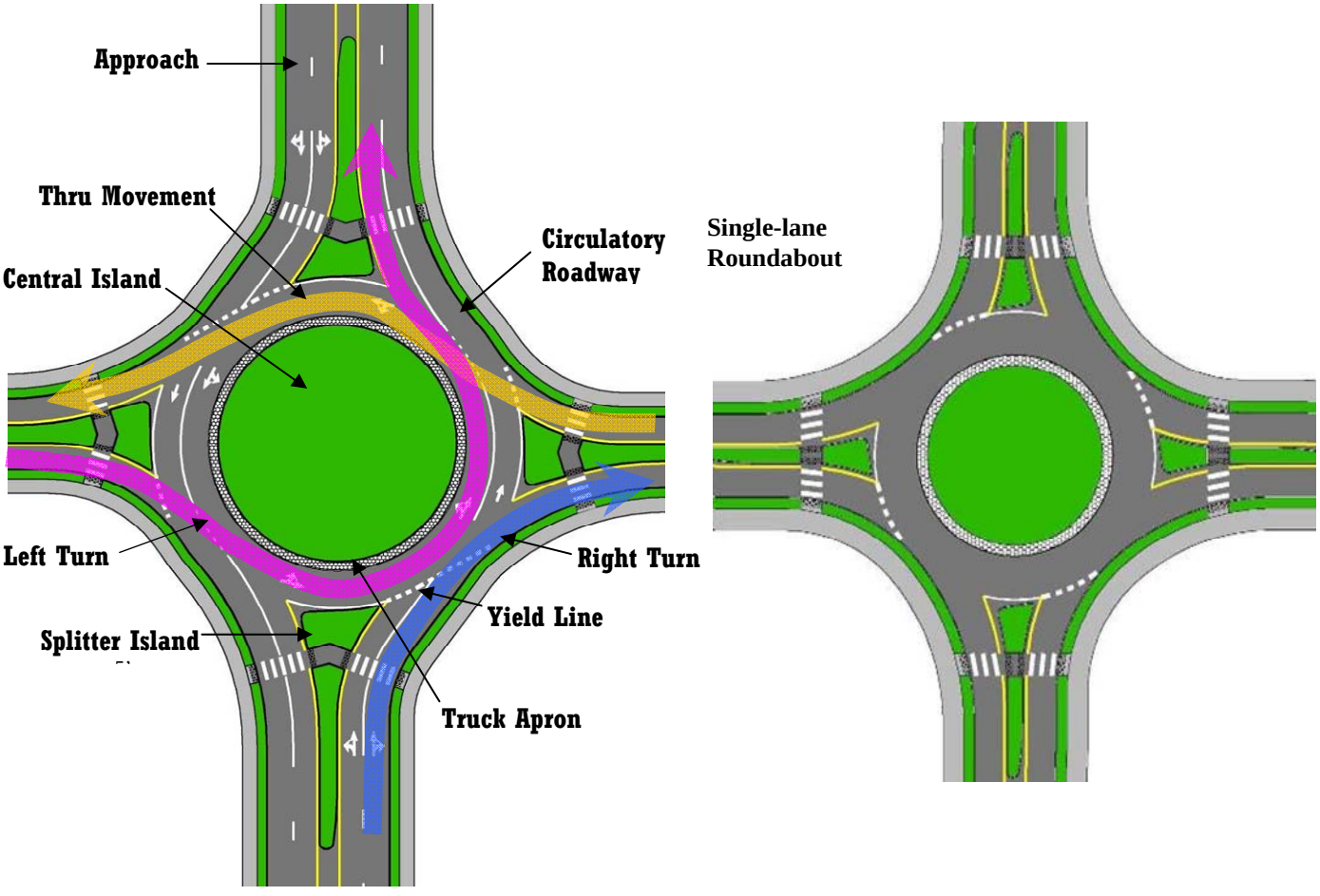
Roundabouts are <u>not</u> the same as a "rotary" or "traffic circle"

A roundabout is not the same as the older-style rotary or traffic circle like those found in some east coast and European cities. Although the United States was home to the first one-way rotary system in the world (implemented around New York City's Columbus Circle in 1904), traffic circles had fallen out of favor in this country by the 1950s. Older traffic circles, located primarily in the northeastern states, encountered serious operational and safety problems, including the tendency to lock up at higher volumes.

Based in large part on this country's experience with the older and existing traffic circles built prior to 1990, the modern roundabout has been notably less popular in the United States than abroad. The modern roundabout has been successful in several countries in Europe and Australia, where the roundabout has changed the practice of intersection design. Just in the last decade, communities in the United States have experimented with the modern roundabout, and based on their success, there has been a growing interest in their development across the country.

The main difference between older style rotary or traffic circles and roundabouts is in how traffic enters the circle and which vehicle has the right-of-way. Figure 2-1 illustrates the typical features of a modern roundabout. With roundabouts, drivers wishing to enter must yield to vehicles already in the circle. With many of the older traffic circles, drivers inside the circle must yield to the vehicles entering the circle. Roundabouts can be designed to handle fire trucks, buses, and various sizes of emergency vehicles, as well as truck and trailer combinations. To accommodate these larger vehicles, the center island of a roundabout is often built with a gradually sloped and flat curb, called a truck apron.

Figure 2-1
Typical Roundabout Features



Modern roundabouts range in size from mini-roundabouts (with outside diameters as small as 50 feet), to compact roundabouts (with outside diameters between 98 to 115 feet), to large, often multilane, roundabouts up to 492 feet in diameter with more than four entries, and two-bridge grade-separated roundabouts, located over or under freeways.

Roundabouts also differ from traffic calming islands often seen in neighborhoods where the intent is to slow traffic speeds in residential areas and reduce crashes.

Background on Consideration of Turn Lanes

The initial traffic analysis conducted for this Environmental Impact Statement indicated that additional turn lanes would be beneficial in achieving safety and capacity improvements at major intersections in the Russell Street corridor. Public comment on the Draft Environmental Impact Statement challenged the assertion that additional turn lanes would result in safety improvements. The following provides a summary of national research on the safety benefits of turn lanes at at-grade intersections which provides the rationale for their inclusion in the proposed project.

The Federal Highway Administration report, Safety Effectiveness of Intersection Left- and Right-Turn Lanes (FHWA-RD-02-089, July 2002) includes recommendations based on the research on the effectiveness of turn lane improvements on at-grade intersections. The conclusions and recommendations include the following:

Added left-turn lanes are effective in improving safety at signalized and unsignalized intersections in both rural and urban areas. Installation of a single left-turn lane on a major-road approach would be expected to reduce total intersection crashes at rural unsignalized intersections by 28 percent for four-leg intersections and by 44 percent for three-leg intersections. At urban unsignalized intersections, installation of a left-turn lane on one approach would be expected to reduce crashes by 27 percent for four-leg intersections and by 33 percent for three-leg intersections. At four-leg urban signalized intersections, installation of a left-turn lane on one approach would be expected to reduce crashes by 10 percent. Installation of left-turn lanes on both major-road approaches to a four-leg intersection would be expected to increase, but not quite double, the resulting effectiveness measures for total intersection crashes.

Added right-turn lanes are effective in improving safety at signalized and unsignalized intersections in both rural and urban areas. Installation of a single right-turn lane on a major-road approach would be expected to reduce total intersection crashes at rural unsignalized intersections by 14 percent and crashes at urban signalized intersections by four percent. Right-turn lane installation reduced crashes on individual approaches to four-leg intersections by 27 percent at rural unsignalized intersections and by 18 percent at urban signalized intersections. Only limited results were found for right-turn lane installation at three-leg intersections. Installation of right-turn lanes on both major-road approaches to a four-leg intersections would be expected to increase, but not quite double.

2.2 Description of Alternatives

The following is a description of the No Build, the five Build alternatives developed for Russell Street, and the four Build alternatives developed for South 3rd Street. Preceding the descriptions of individual alternatives are summaries of several design features, access modifications, or minor intersection realignments that would be components of any of the Build alternatives in these corridors.

Design options were also developed for the Bitterroot Branch Trail and the Milwaukee Corridor Trail crossings of Russell Street. Those options were screened, and the most preferable is presented as a component of all of the Russell Street Build alternatives.

Specific Design Elements Common to All Build Alternatives

To support the stated Purpose and Need for the proposed project, the Advisory Committee recommended nine design features that would be common to all Build alternatives. The common features are:

- The existing Russell Street Bridge would be removed and replaced with four lanes over the Clark Fork River to provide adequate capacity for projected traffic volumes. The proposed bridge concept is a 4-span, approximately 450 foot long structure. The proposed bridge supports would be in the same location longitudinally in the river as the existing piers. The new bridge profile and low chord would be higher than the existing bridge resulting in a larger hydraulic opening.
- Bicycle lanes would be included to improve multi-modal transportation in the corridors.
- Sidewalks would be constructed along both sides of each route to improve pedestrian comfort and safety.
- Grade separated pedestrian/bicycle crossings would be provided for the Milwaukee Corridor Trail and Bitterroot Branch Trail systems as they cross Russell Street.
- Curb and gutter would be included to improve stormwater management.
- Street lighting would be included to improve aesthetics and safety.
- Landscaped boulevards would be constructed on both sides of Russell Street and South 3rd Street between the curb and sidewalk to improve aesthetics.
- Bus pullouts would be incorporated into the final design along Russell Street north of South 3rd Street, and along South 3rd Street from Russell Street to Reserve Street, and can be accommodated within the bike lane/boulevard section without requiring additional right-of-way.
- On-street parking within the City right-of-way is currently prohibited along Russell Street and South 3rd Streets. Parking restrictions would be enforced in these areas.

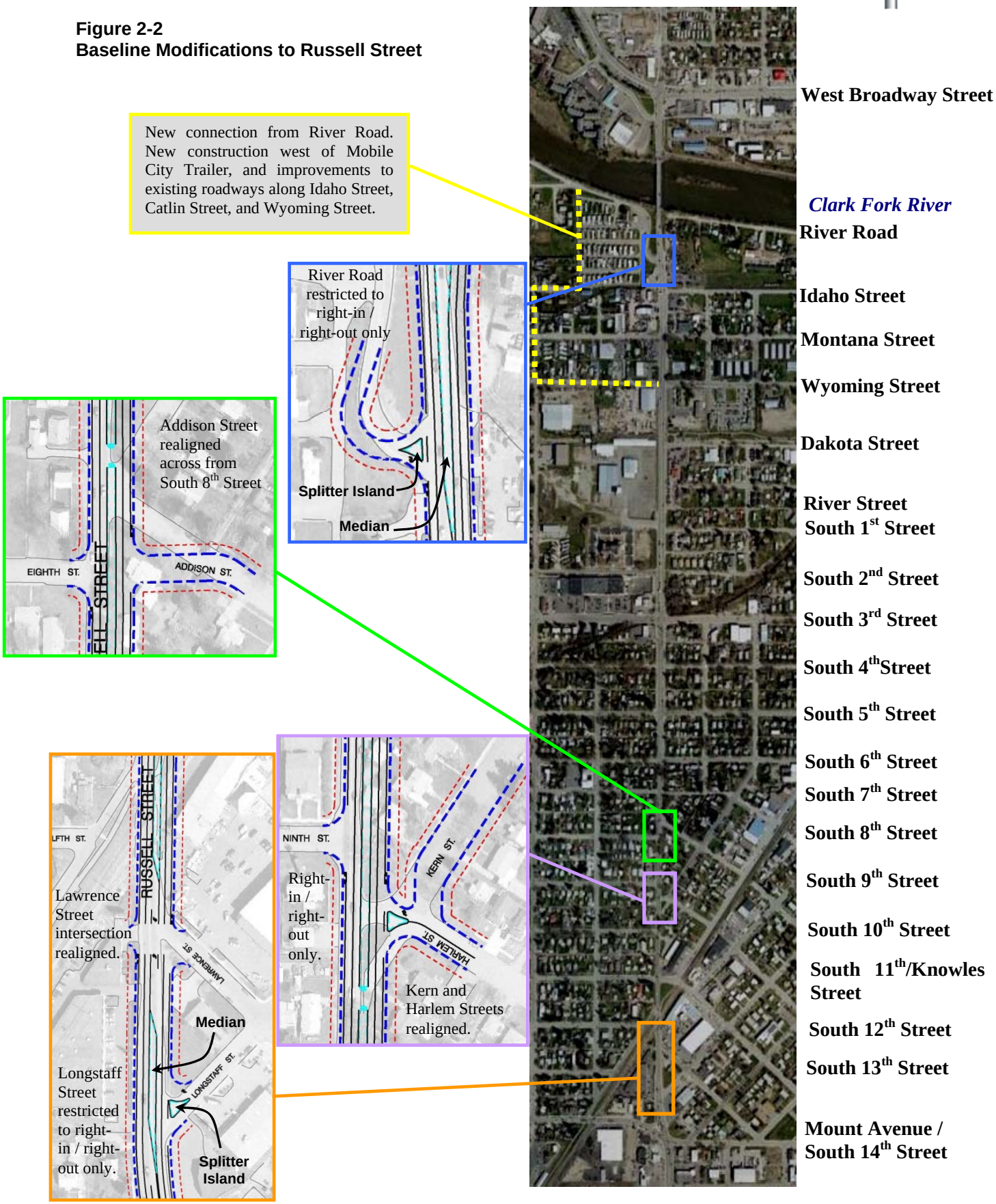
Raised medians were also identified as one of the treatments to improve pedestrian crossings, reduce conflict points at driveways and minor cross streets, and provide aesthetic improvements with landscaped areas. Raised medians provide refuge in the center of the street so pedestrians can cross one direction of traffic at a time. Each alternative has different amounts of raised median, as noted in each individual description. The length of landscaped median will depend on the number of access points desired, and the length of turn movements required at those access points.

Access at driveways and cross streets affected by raised medians would be provided for by entering right-turns and exiting right-turns. Motorists desiring to turn left would be accommodated through u-turns at the open intersections, at roundabouts, or by turning in advance of the access point and routing around the block The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

All Build alternatives would also include the following alignment and access improvements, as depicted in Figure 2-2:

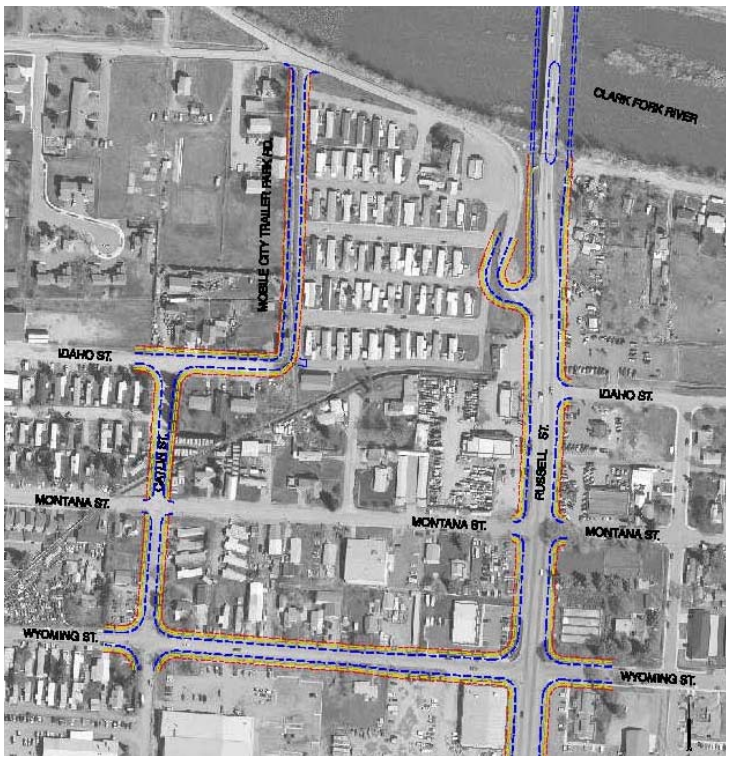
- Longstaff Street would be restricted to a right-in and right-out only connection with Russell Street.
- Lawrence Street would be realigned to a right-angle intersection with Russell Street.
- Access to Russell Street from Harlem Street and Kern Street on the east side of Russell Street would be restricted to a right-in and right-out only connection.
- Addison Street would be realigned to a right-angle intersection with Russell Street opposite from South 8th Street.
- Curb and gutter sections measuring 2.0± feet wide would be constructed on both sides of Russell Street and South 3rd Street with gutters located immediately inside the curb and would provide a functional width of 5.5± feet for the bicycle lane.
- Where space is adequate along the proposed right-of-way, landscaped boulevards would be constructed on both sides of Russell Street and South 3rd Street between the curb and proposed sidewalk. Landscaping would also be included in center medians and roundabouts as appropriate.
- Knowles Street would be shifted slightly to the north to match with South 11th Street on the west.

Figure 2-2
Baseline Modifications to Russell Street



- River Road would generally remain in its current configuration with minor intersection modifications and a restricted right-in and right-out connection with Russell Street. In addition, right-of-way would be purchased for the construction of a new link between River Road and Idaho Street that would become part of the River Road connection to Russell Street via Wyoming Street. The connection would include a newly constructed section of road running north-south adjacent to the western boundary of Mobile City Trailer Park between existing River Road and Idaho Street. It would also include reconstructed sections of Idaho Street between the new road along the western border of the Mobile City Trailer Park and Catlin Street; Catlin Street between Idaho Street and Wyoming Street; and Wyoming Street between Catlin Street and Russell Street.

Figure 2-3
Proposed River Road Connection



Trail Connections

The Build Alternatives also include three trail connections that cross the Russell Street corridor. The following trail connections would be made.

Bitterroot Branch Trail Connection

The Bitterroot Branch Trail connection is located at the intersection of the Bitterroot Branch Trail and Russell Street south of the intersection of Russell Street and South 11th Street/Knowles Street. Under the Build Alternatives, the Bitterroot Branch Trail Crossing would be constructed

as a tunnel under Russell Street. The tunnel crossing would be constructed in approximately the same location as the existing trail crossing. The existing trail alignment would be modified to connect to the tunnel structure crossing.

Milwaukee Corridor Trail Connection

The Milwaukee Corridor Trail connection is located where Dakota Street intersects with Russell Street. The trail ends a short distance from the east side of Russell Street and currently trail users cross Russell Street at the Wyoming Street intersection. Under the Build Alternatives, the Milwaukee Corridor Trail Crossing would be constructed as a tunnel under Russell Street. The tunnel crossing would be constructed in approximately the same location as where the existing trail terminates on the east side of Russell Street. The existing trail alignment would be modified to connect to the tunnel structure crossing.

Shady Grove (River Trail System) Trail Connection

The Shady Grove Trail connection is located parallel to the east side of Russell Street north of the bridge. The trail turns east and extends approximately one-half mile along the riverfront to Burton Street. Reconstruction of the Russell Street Bridge would include extension of the Shady Grove Trail westward under the bridge and construction of connections to the sidewalks on both sides of Russell Street.

These trail connections are depicted in Chapter 4, Section 4.5 – Parks and Recreation Impacts.

During early scoping and project development, it was determined that pedestrian/bicycle tunnels would be preferable to an overpass structure, or to an at-grade crossing. If during final design, it appears that geotechnical conditions, or underground utilities would prohibit construction of the intended under-crossings, these crossings could be redesigned as an overpass. It would not be desirable, and it is not intended that these trail crossings would be left as at-grade crossings if the corridor is reconstructed.

Russell Street Alternatives:

Originally, the No Build (Alternative 1) and three Build alternatives were identified for Russell Street, Alternatives 2 and 3 with roundabouts, and Alternative 4 with traffic signals. During the process of analyzing the three Build alternatives, it became apparent that another alternative that has four travel lanes, a median/center turn lane, and roundabouts at the major intersections should be included as a viable alternative. There were two-lane facilities (Alternatives 2 and 3) and a four-lane facility with signals (Alternative 4) but a four-lane facility with roundabouts was lacking. This four-lane alternative was added and identified as Alternative 5. Further modifications were made to Alternative 5 (and analyzed separately as Alternative 5-Refined) during later stages of analysis and are discussed in Section 2.4.

Table 2.1 provides an overview of the Russell Street alternatives, and the sections that follow provide more detailed descriptions and graphical representations of the various alternatives.

Table 2.1
Russell Street Alternatives – Overview of Major Features

	Alt. 1 (No Build)	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Number of Vehicular Lanes:					
Mount to South 8th	2	2	2+	4+	4+
South 8th to South 5th	2	2+	2+	4+	4+
South 5th to South 3rd	4	4	4	4+	4+
South 3rd to the bridge	2+	2+	2+	4+	4+
The bridge to W. Broadway	2	4	4	4+	4+
Intersection Control:					
Signals	✓			✓	
Roundabouts		✓	✓		✓
Design Elements:					
Sidewalks		✓	✓	✓	✓
Bike lanes		✓	✓	✓	✓
Boulevards		✓	✓	✓	✓
Curb/Gutter		✓	✓	✓	✓
Lighting		✓	✓	✓	✓
Bus Pullouts		✓	✓	✓	✓

Notes: 2+ denotes a two-lane section with a center turn lane/raised median
4+ denotes a four-lane section with a center turn lane / raised median
Source: HKM Engineering., 2007

Alternative 1 – No Build

Alternative 1 is the No Build Alternative and would provide no improvements to Russell Street or the existing Russell Street Bridge. Routine maintenance would continue in accordance with City, County, and state policies. Figure 2-4 illustrates the No Build Alternative and the following provides a summary of the major features:

Lane Configuration:

Two travel lanes from Mount Avenue/South 14th Street to South 5th Street
Four travel lanes from South 5th Street to South 3rd Street
Two travel lanes and a center turn lane from South 3rd Street to Russell Street Bridge
Two travel lanes from Russell Street Bridge to West Broadway Street

Signalized Intersection Control at:

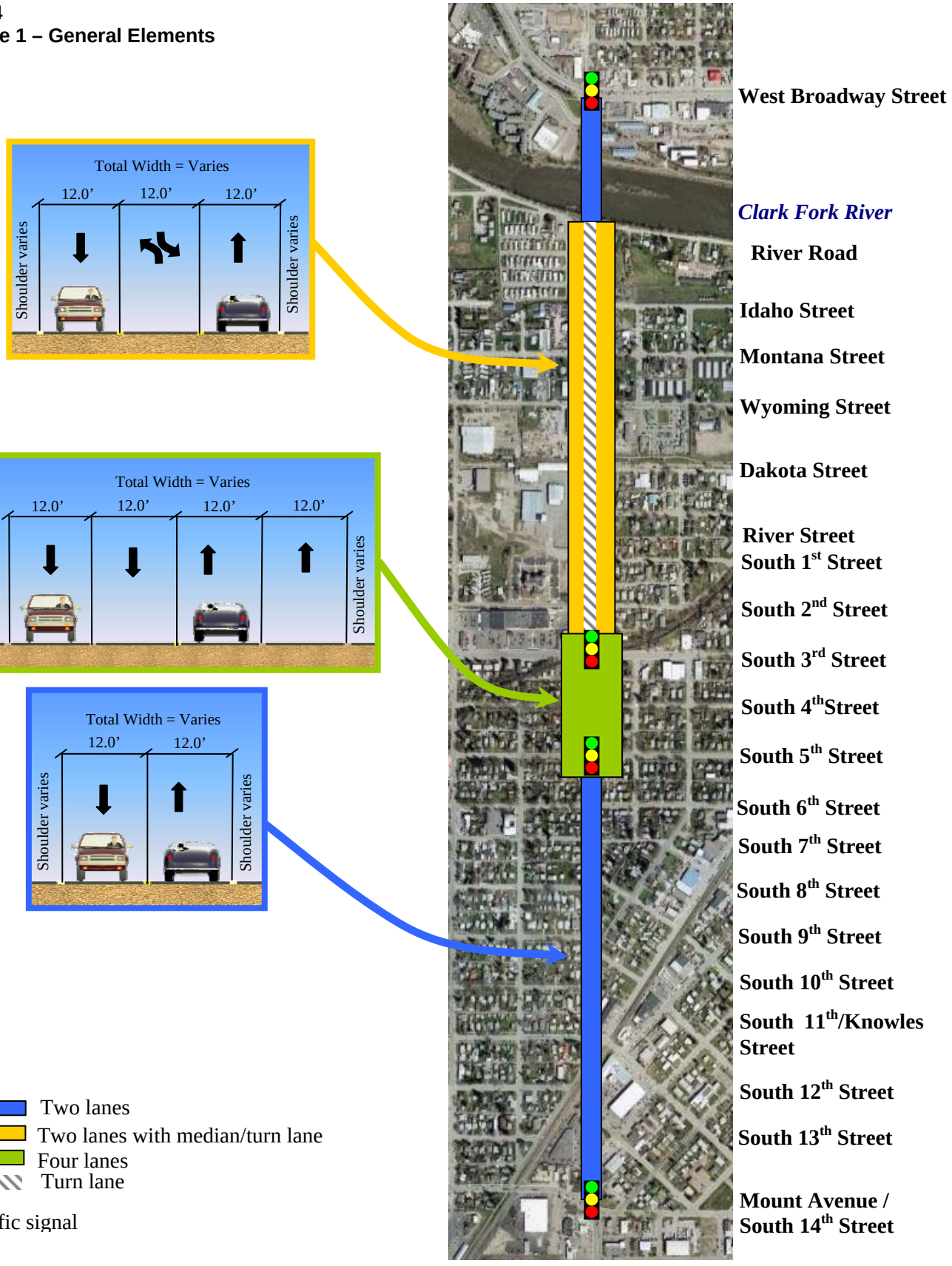
Mount Avenue/South 14th Street
South 5th Street
South 3rd Street
West Broadway Street

All other streets intersecting Russell Street are, and would continue to be, controlled by stop signs.

Center turn lane between:

South 3rd Street and the Russell Street Bridge

Figure 2-4
Alternative 1 – General Elements



Alternative 2
2 / 2+ / 4 Lanes with Roundabouts

Alternative 2 is very similar to the existing condition in lane configuration but includes the use of roundabouts at select intersections and limited use of raised medians to control through traffic and increase the functionality of the intersections and roundabouts.

Figure 2-5 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Two travel lanes from Mount Avenue/South 14th Street to South 5th Street
Four travel lanes from South 5th Street to South 3rd Street
Two travel lanes from South 3rd Street to Wyoming Street
Four travel lanes from Wyoming Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

Mount Avenue/South 14th Street
South 5th Street
South 3rd Street
Wyoming Street

Single-Lane Roundabouts at:

South 11th Street

Signal Control at:

West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

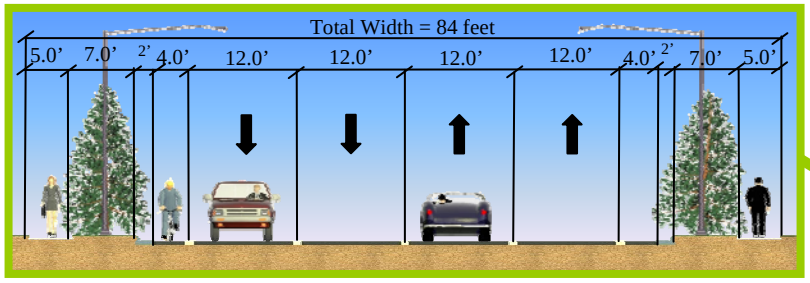
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

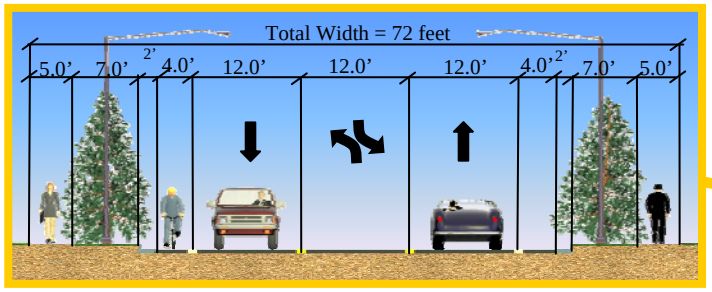
Alignment:

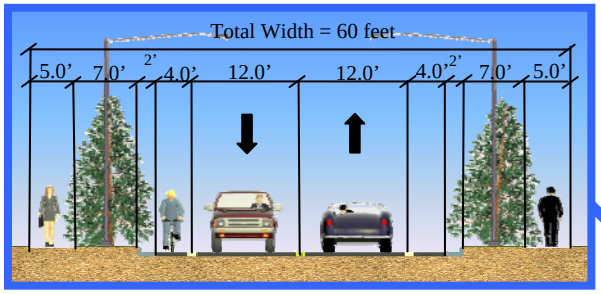
The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on historic and recreational properties protected under Section 4(f) of the U.S. Department of Transportation Act, as discussed later in this document.

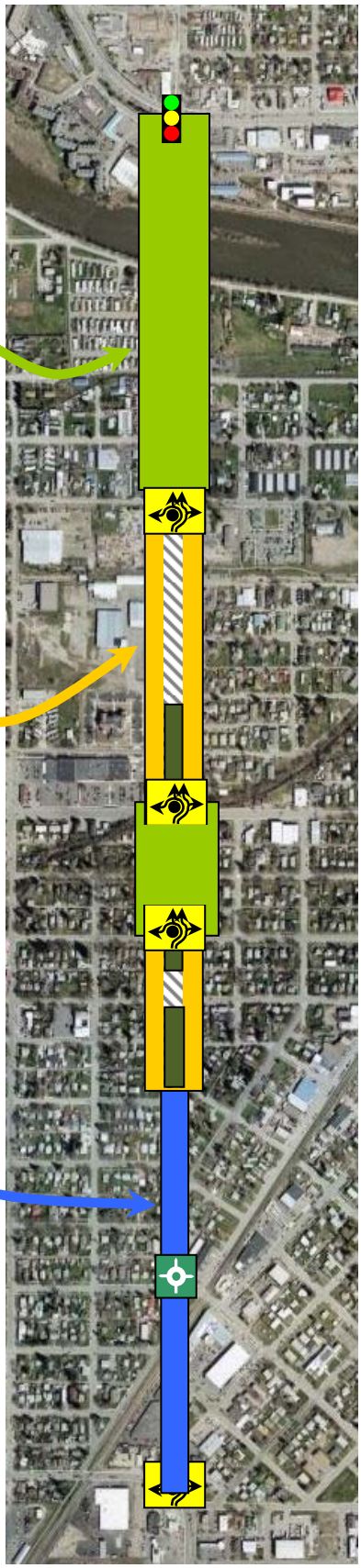
Figure 2-5
Alternative 2 – General Elements

All graphics in this document are conceptual and not intended to reflect final design details.
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.
Preliminary design details are provided in Figure 2-16









West Broadway Street

Clark Fork River

River Road

Idaho Street

Montana Street

Wyoming Street

Dakota Street

River Street

South 1st Street

South 2nd Street

South 3rd Street

South 4thStreet

South 5th Street

South 6th Street

South 7th Street

South 8th Street

South 9th Street

South 10th Street

South 11th/Knowles Street

South 12th Street

South 13th Street

Mount Avenue / South 14th Street

Key:

- Two lanes
- Two lanes with median/turn lane
- Four lanes
- Raised median
- Turn lane
- Traffic signal
- Single Lane Roundabout
- Double Lane Roundabout

Alternative 3

2+/4 Lanes with Roundabouts

Alternative 3 is similar to Alternative 2 in terms of lane configuration and intersection control but includes twice the length of raised median as compared to Alternative 2, and adds a median between Mount Avenue to South 8th Street. Figure 2-6 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Two travel lanes from Mount Avenue/South 14th Street to South 5th Street
Four travel lanes from South 5th Street to South 3rd Street
Two travel lanes from South 3rd Street to Wyoming Street
Four travel lanes from Wyoming Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

Mount Avenue/South 14th Street
South 5th Street
South 3rd Street
Wyoming Street

Single-Lane Roundabouts at:

South 11th Street

Signal Control at:

West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

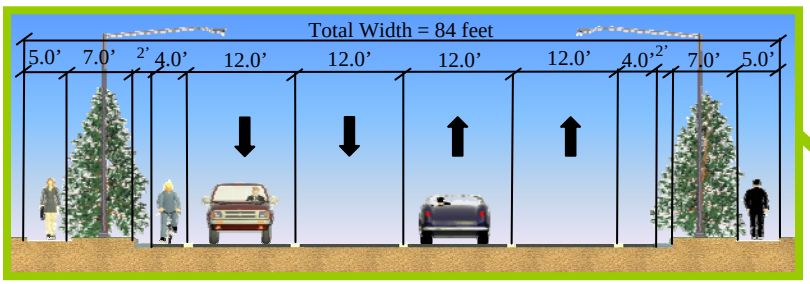
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

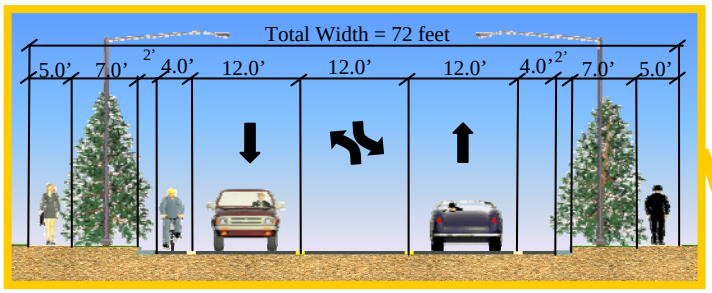
Alignment:

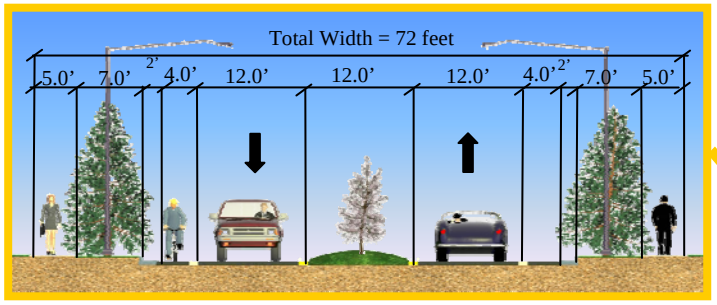
The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on properties protected under Section 4(f) of the U.S. Department of Transportation Act of 1966, as discussed later in this document.

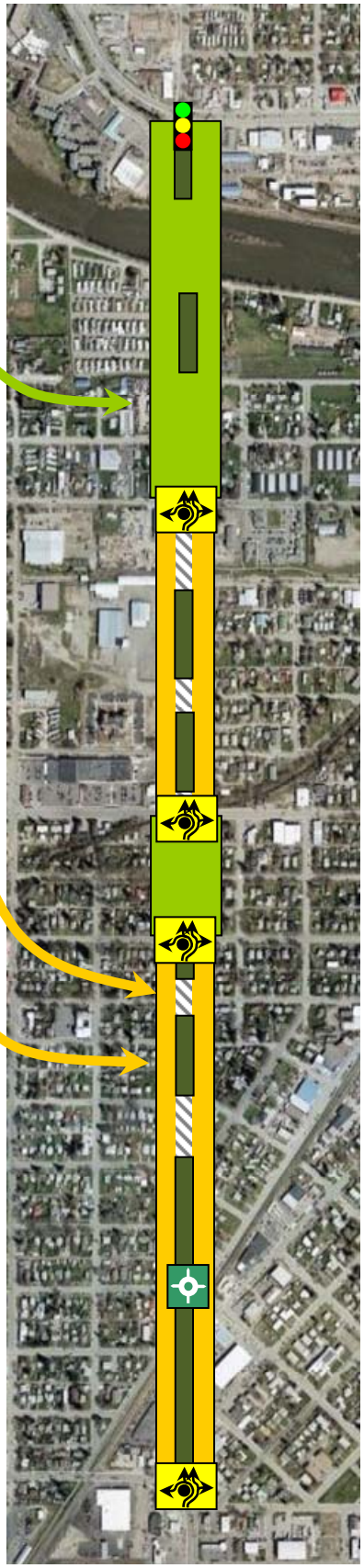
Figure 2-6
Alternative 3 – General Elements

All graphics in this document are conceptual and not intended to reflect final design details.
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.
Preliminary design details are provided in Figure 2-17.









West Broadway Street

Clark Fork River

River Road

Idaho Street

Montana Street

Wyoming Street

Dakota Street

River Street

South 1st Street

South 2nd Street

South 3rd Street

South 4thStreet

South 5th Street

South 6th Street

South 7th Street

South 8th Street

South 9th Street

South 10th Street

South 11th/Knowles Street

South 12th Street

South 13th Street

Mount Avenue / South 14th Street

Key:

- Two lanes with median/turn lane
- Four lanes
- Raised median
- Turn lane
- Traffic signal
- Single Lane Roundabout
- Double Lane Roundabout

Alternative 4

4+ Lanes with Signals

Russell Street would have four travel lanes (two southbound and two northbound) plus a center turn lane or raised median throughout the corridor. Major intersections would be controlled by signals.

Figure 2-7 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Four travel lanes from Mount Avenue/South 14th Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

none

Single-Lane Roundabouts at:

none

Signal Control at:

Mount Avenue/South 14th Street (existing)
South 5th Street (existing)
South 3rd Street (existing)
Wyoming Street
West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs

Raised median / Center turn lane:

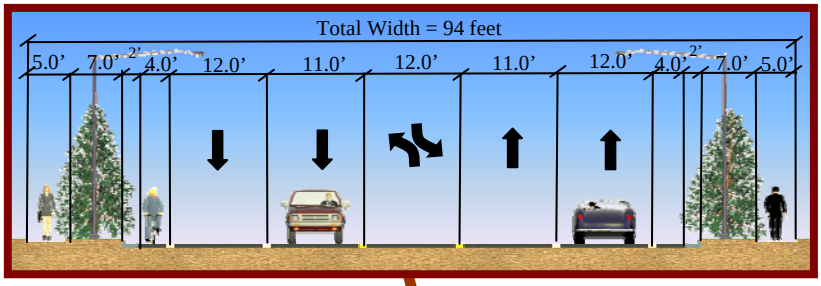
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

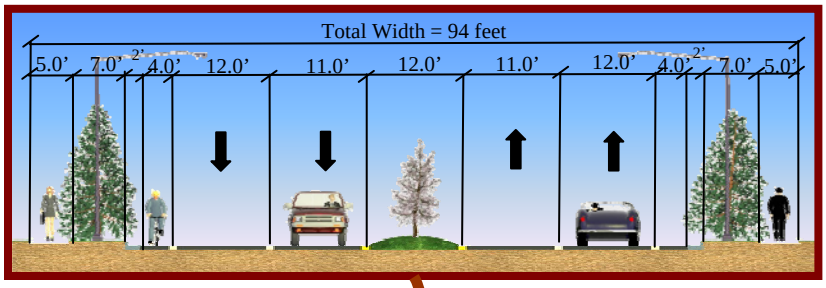
Alignment:

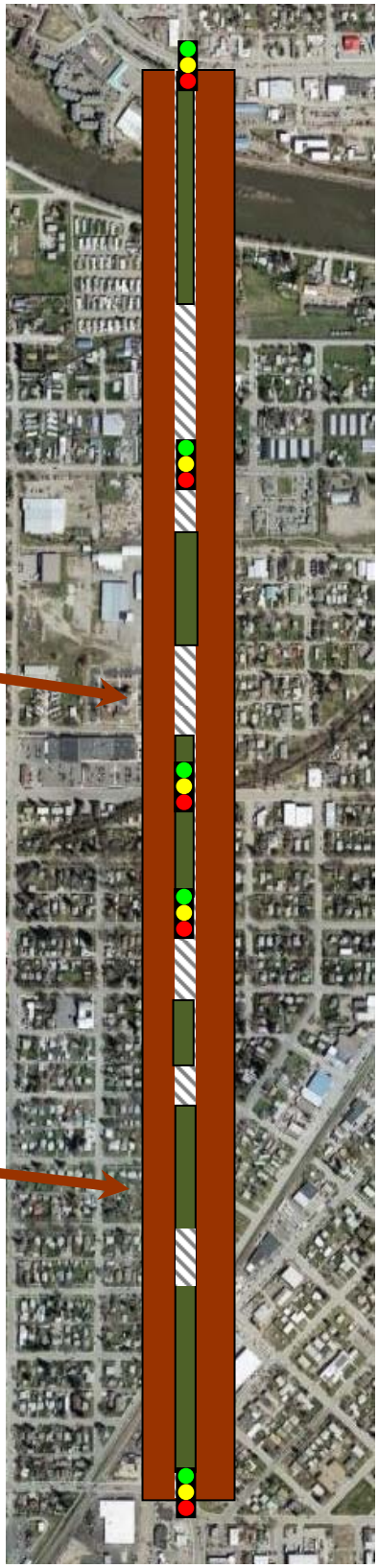
The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on properties protected under Section 4(f) of the U.S. Department of Transportation Act of 1966, as discussed later in this document.

Figure 2-7
Alternative 4 – General Elements

All graphics in this document are conceptual and not intended to reflect final design details.
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.
Preliminary design details are provided in Figure 2-18.







West Broadway Street

Clark Fork River

River Road

Idaho Street

Montana Street

Wyoming Street

Dakota Street

River Street
South 1st Street

South 2nd Street

South 3rd Street

South 4thStreet

South 5th Street

South 6th Street

South 7th Street

South 8th Street

South 9th Street

South 10th Street

South 11th/Knowles Street

South 12th Street

South 13th Street

Mount Avenue / South 14th Street

Key:

Four lanes with median/turn lane
Raised median
Turn lane

Traffic signal

Alternative 5

4+ Lanes with Roundabouts

Alternative 5 is identical to Alternative 4 in terms of lane configuration (two southbound and two northbound, with raised medians and center turn lanes) on Russell Street. However, the major intersections would be controlled by roundabouts instead of traffic signals. The West Broadway Street intersection would remain signalized. Like Alternative 4, raised medians would be used throughout the Russell Street corridor to enhance the flow of through traffic. Figure 2-8 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Four travel lanes from Mount Avenue/South 14th Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

Mount Avenue/South 14th Street
South 5th Street
South 3rd Street
Wyoming Street
South 11th Street

Single-Lane Roundabouts at:

none

Signal Control at:

West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

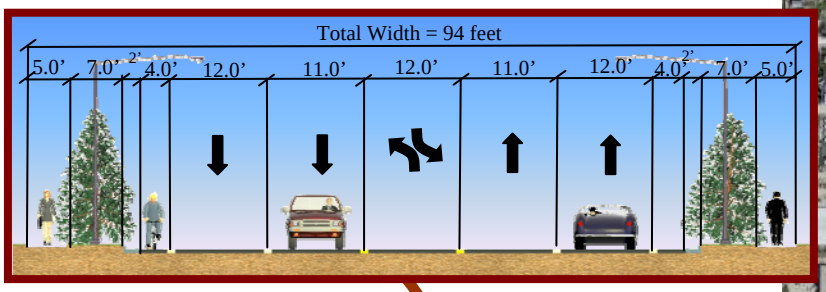
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

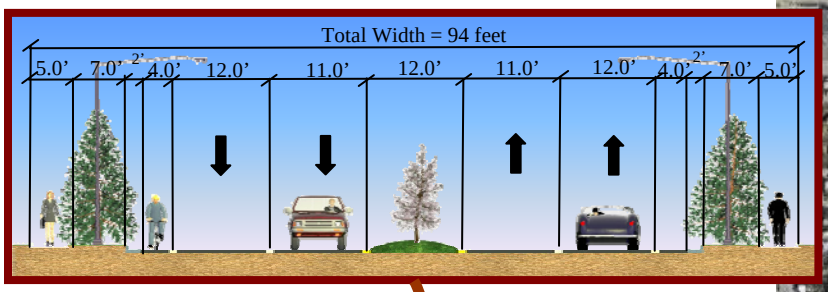
Alignment:

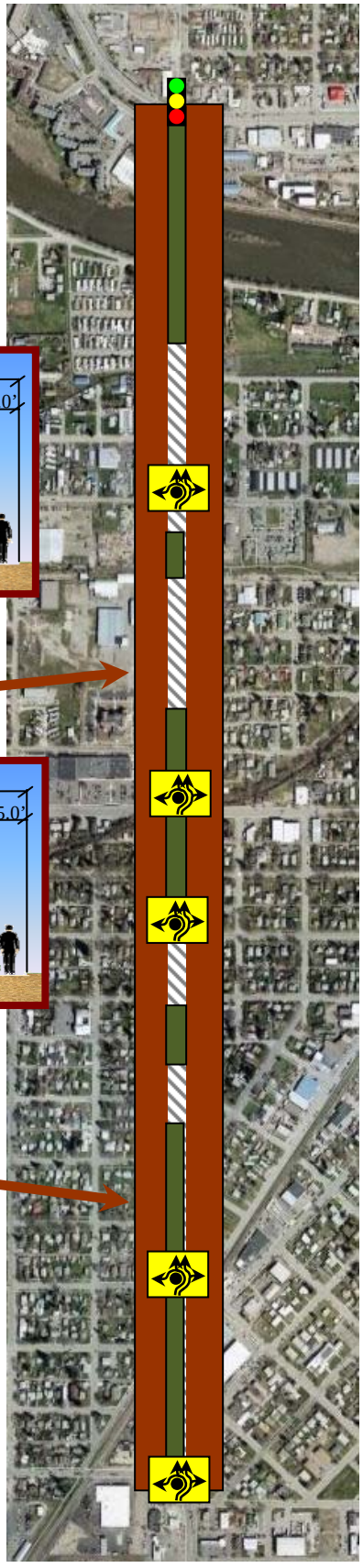
The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on properties protected under Section 4(f) of the U.S. Department of Transportation Act of 1966, as discussed later in this document.

Figure 2-8
Alternative 5 – General Elements

All graphics in this document are conceptual and not intended to reflect final design details.
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.
Preliminary design details are provided in Figure 2-19.







West Broadway Street

Clark Fork River

River Road

Idaho Street

Montana Street

Wyoming Street

Dakota Street

River Street

South 1st Street

South 2nd Street

South 3rd Street

South 4thStreet

South 5th Street

South 6th Street

South 7th Street

South 8th Street

South 9th Street

South 10th Street

South 11th/Knowles Street

South 12th Street

South 13th Street

Mount Avenue / South 14th Street

Key:

Four lanes with median/turn lane

Raised median

Turn lane

Traffic signal

Double Lane Roundabout

South 3rd Street Alternatives:

Table 2.2 provides an overview of the South 3rd Street alternatives, and the sections that follow provide more detailed descriptions and graphical representations of the proposed improvements.

Table 2.2
South 3rd Street Alternatives – Overview of Major Features

	Alt. A (No Build)	Alt. B	Alt. C	Alt. D	Alt. E
Number of Vehicular Lanes:					
Reserve St. to Russell St.	2	2	2+	3+	2+
Intersection Control:					
Signals	✓			✓	✓
Roundabouts		✓	✓		
Design Elements:					
Sidewalks		✓	✓	✓	✓
Bike lanes		✓	✓	✓	✓
Boulevards		✓	✓	✓	✓
Curb/Gutter		✓	✓	✓	✓
Lighting		✓	✓	✓	✓
Bus Pullouts		✓	✓	✓	✓

Notes: 2+ denotes a two-lane facility with a center turn lane / raised median
3+ denotes a three-lane facility (2 eastbound, 1 westbound) with a center turn lane / raised median
Source: HKM Engineering Inc., 2007

For South 3rd Street Alternatives C, D, and E, raised medians would be added wherever practicable. Access at driveways and minor cross streets affected by the raised medians will be restricted to entering right-turns and exiting right-turns. Motorists desiring to turn left would be accommodated through u-turns at the open intersections, at roundabouts, or by turning in advance of the access point and routing around the block.

Alternative A
No Build

Alternative A is the No Build Alternative and would provide no improvements to South 3rd Street. Routine maintenance would continue in accordance with City and State policies. The following provides a summary of the major features:

Lane Configuration:

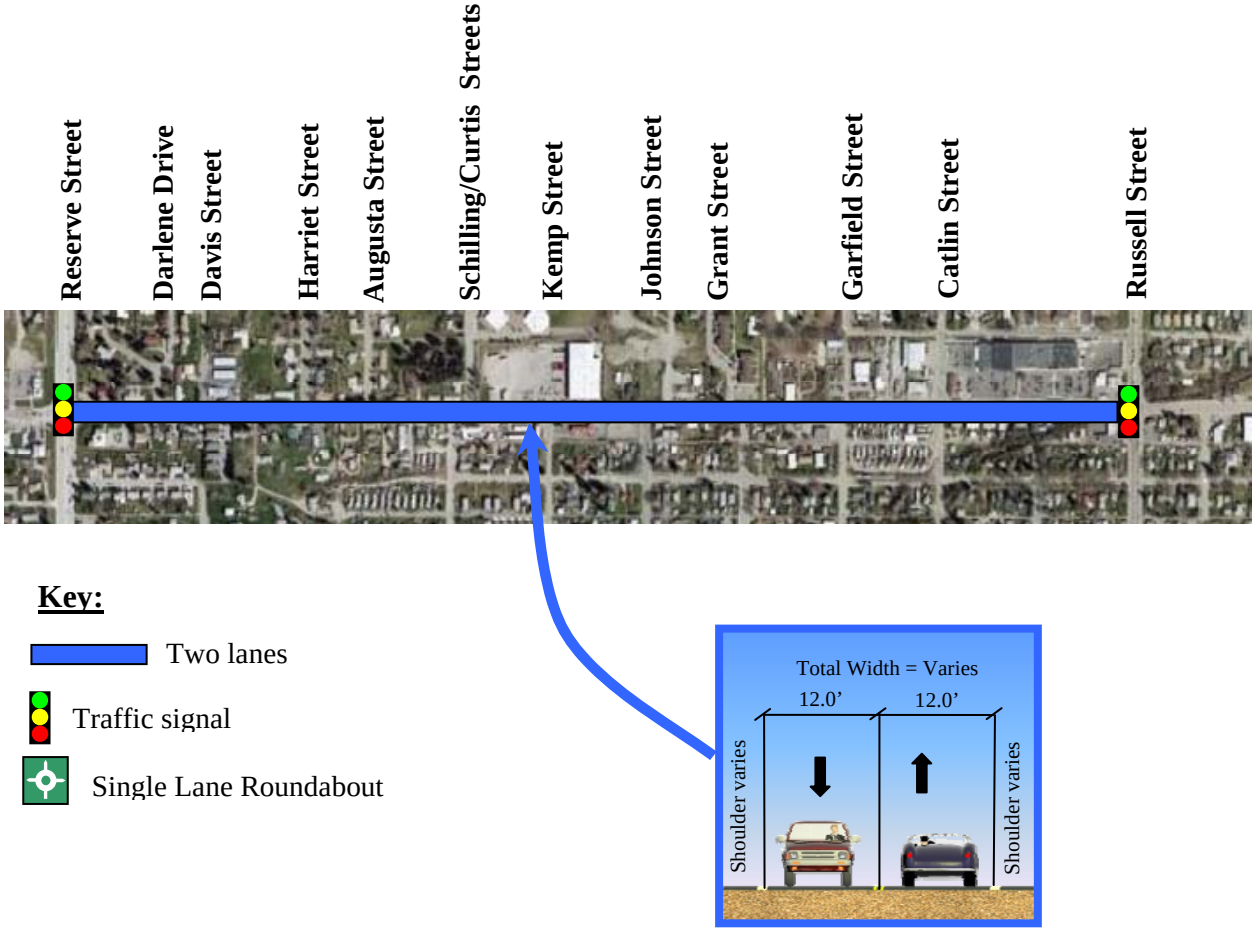
Two travel lanes from Reserve Street to Russell Street

Signalized Intersection Control at:

Reserve Street
Russell Street
All other streets intersecting South 3rd Street are, and would be controlled by stop signs.

There are no raised medians or center turn lanes.

Figure 2-9
Alternative A – General Elements



All graphics in this document are conceptual and not intended to reflect final design details.

Alternative B

2 Lanes with Roundabouts

Alternative B has the same lane configuration as Alternative A (existing conditions/No Build), but includes bicycle lanes, boulevards, sidewalks, and roundabouts at select intersections.

Figure 2-10 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

Schilling Street/Curtis Street
Johnson Street
Catlin Street

Signal Control at:

Reserve Street (existing)

All other streets intersecting South 3rd Street would be controlled by stop signs.

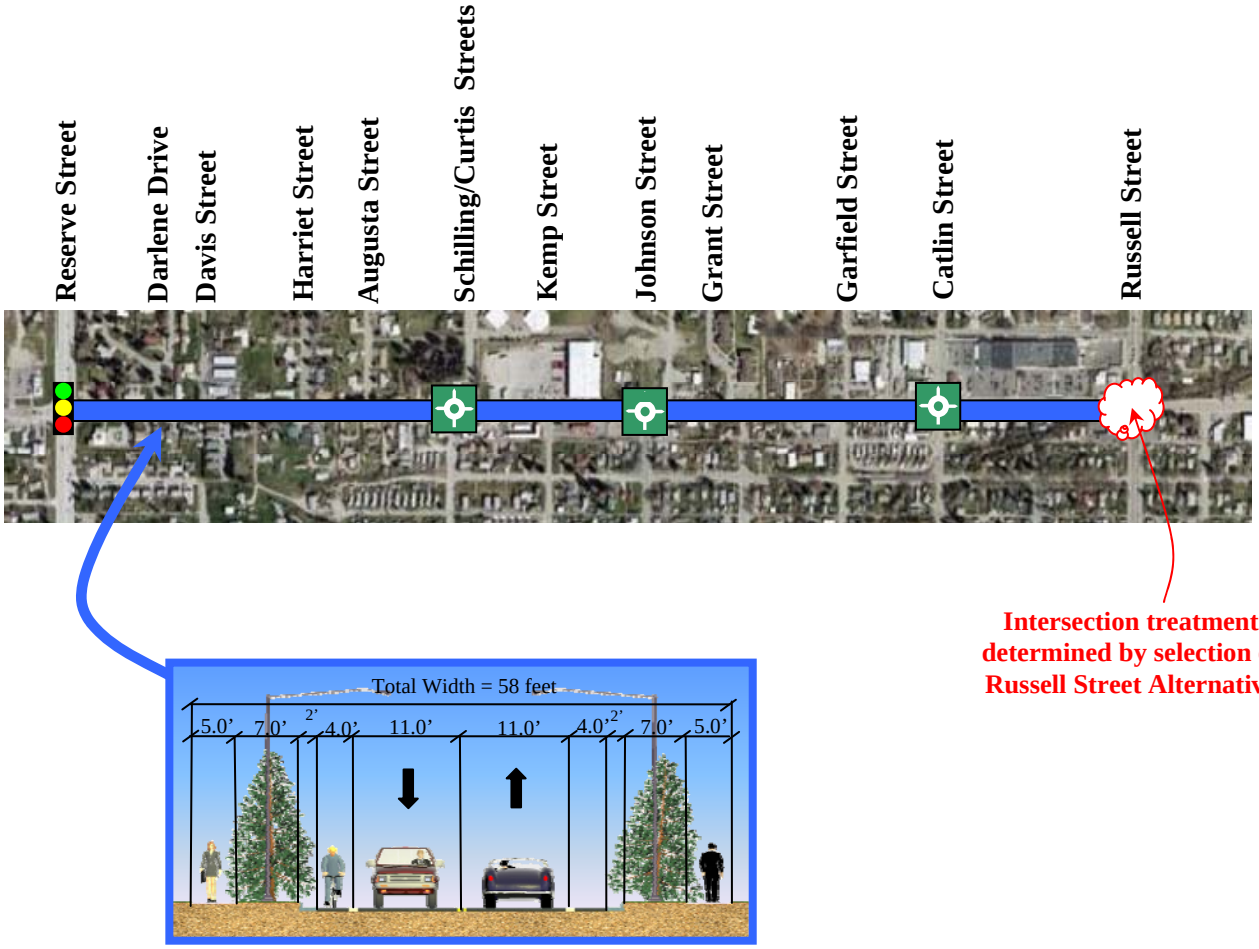
Raised median / Center turn lane:

None included in this alternative.

Alignment:

The existing alignment would be shifted to accommodate one-lane roundabouts at Curtis Street/Schilling Street, Johnson Street, and Catlin Street. The shift in alignment would minimize impacts on adjacent properties.

Figure 2-10
Alternative B – General Elements



All graphics in this document are conceptual and not intended to reflect final design details.
Preliminary design details are provided in Figure 2-20.

Key:

Two lanes

Traffic signal

Full Single Lane Roundabout

3-Leg Single Lane Roundabout

Alternative C

2+ Lanes with Roundabouts

Alternative C includes two travel lanes (one in each direction), roundabouts at select intersections, and the use of raised medians through a majority of the corridor to control through traffic and increase the functionality of the intersections and roundabouts.

Figure 2-11 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

Schilling Street/Curtis Street
Johnson Street
Catlin Street

Signal Control at:

Reserve Street (existing)

All other streets intersecting South 3rd Street would be controlled by stop signs.

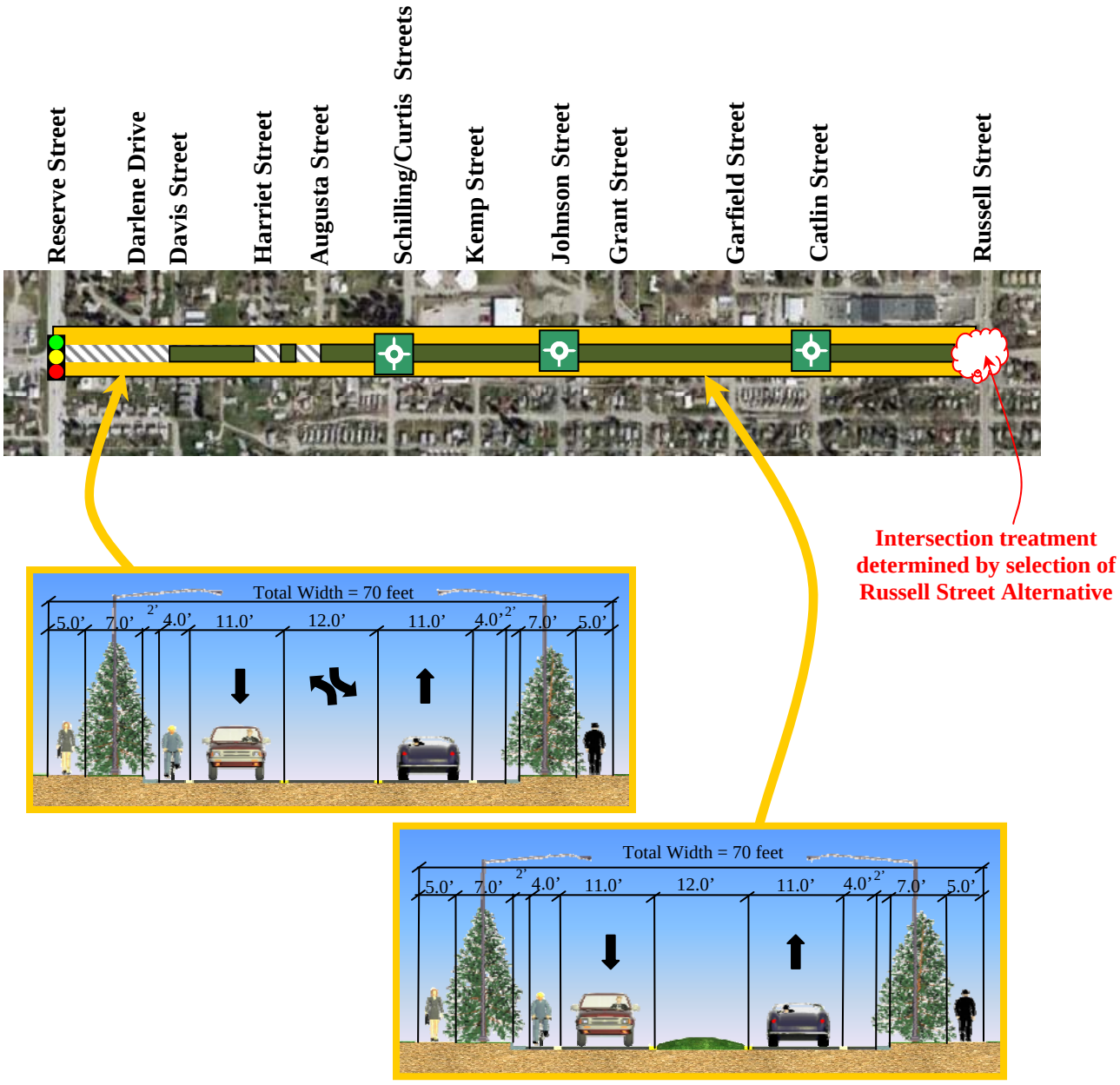
Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The existing alignment would be shifted to accommodate one-lane roundabouts at Curtis Street/Schilling Street, Johnson Street, and Catlin Street. The shift in alignment would minimize impacts on adjacent properties.

Figure 2-11
Alternative C – General Elements



Key:

Two lanes with median/turn lane

Raised median

Turn lane

Traffic signal

Full Single Lane Roundabout

3-Leg Single Lane Roundabout

All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design. Preliminary design details are provided in Figure 2-21.

Alternative D

3+ Lanes with Signals

Alternative D would include one eastbound lane, but two westbound lanes due to the close proximity of the proposed traffic signals. The length of the additional lanes and tapers for the proposed signals at the Curtis Street/Schilling Street, Johnson Street and Catlin Street intersections on South 3rd Street overlapped, thus becoming efficient to convert the overlapping tapers into a second westbound travel lane between Reserve Street and Russell Street.

Figure 2-12 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Three travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

None

Signal Control at:

Reserve Street (existing)
Schilling Street/Curtis Street
Johnson Street
Catlin Street

All other streets intersecting South 3rd Street would be controlled by stop signs.

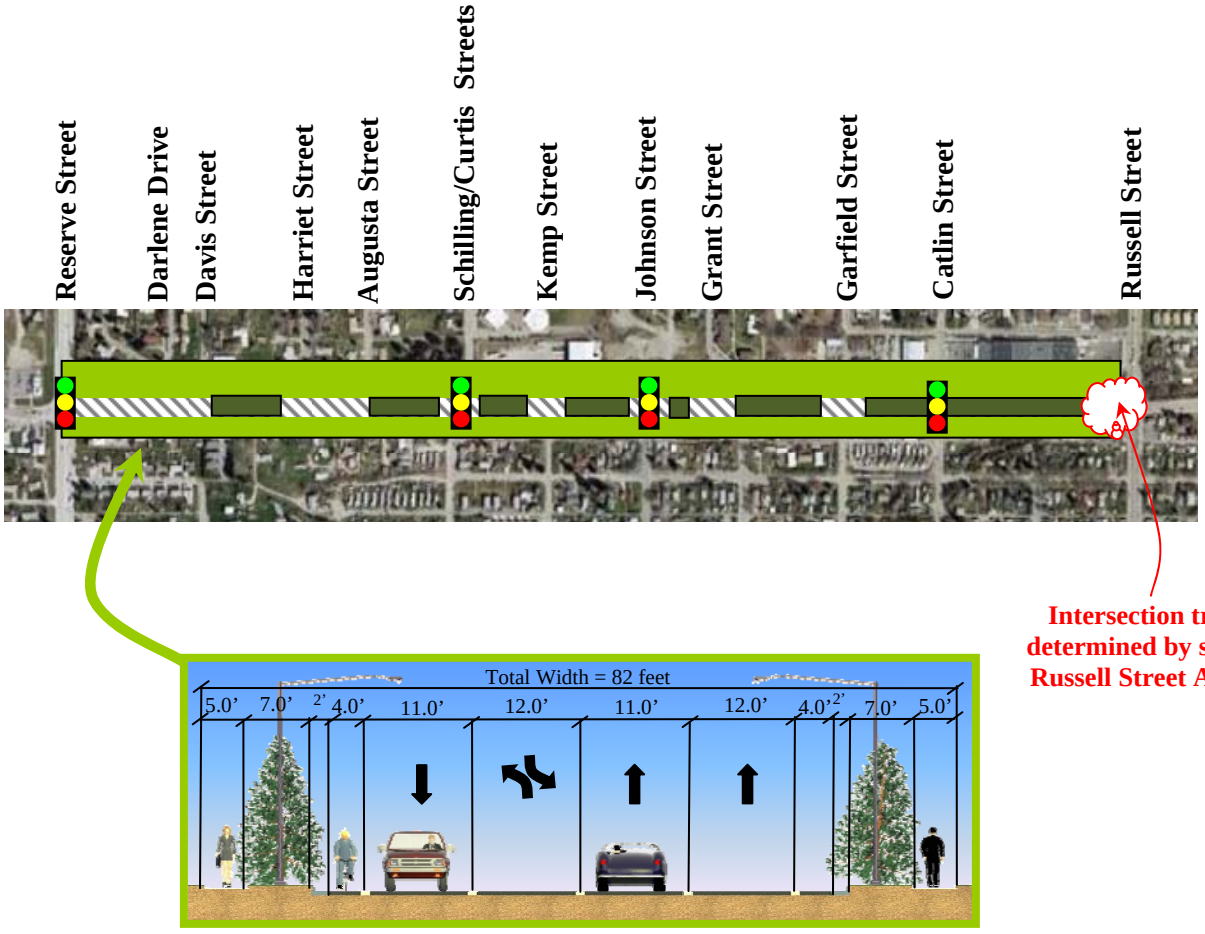
Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The proposed alignment would generally follow the centerline of the existing alignment.

Figure 2-12
Alternative D – General Elements



Key:

Three lanes with median/turn lane

Raised median

Turn lane

Traffic signal

All graphics in this document are conceptual and not intended to reflect final design details.
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.
Preliminary design details are provided in Figure 2-22.

Alternative E

2+ Lanes with Signals

Alternative E includes two travel lanes (one in each direction), the use of raised medians and center turn lanes, and signalized intersections.

Figure 2-13 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

None

Signal Control at:

Reserve Street (existing)
Schilling Street/Curtis Street
Johnson Street
Catlin Street

All other streets intersecting South 3rd Street would be controlled by stop signs.

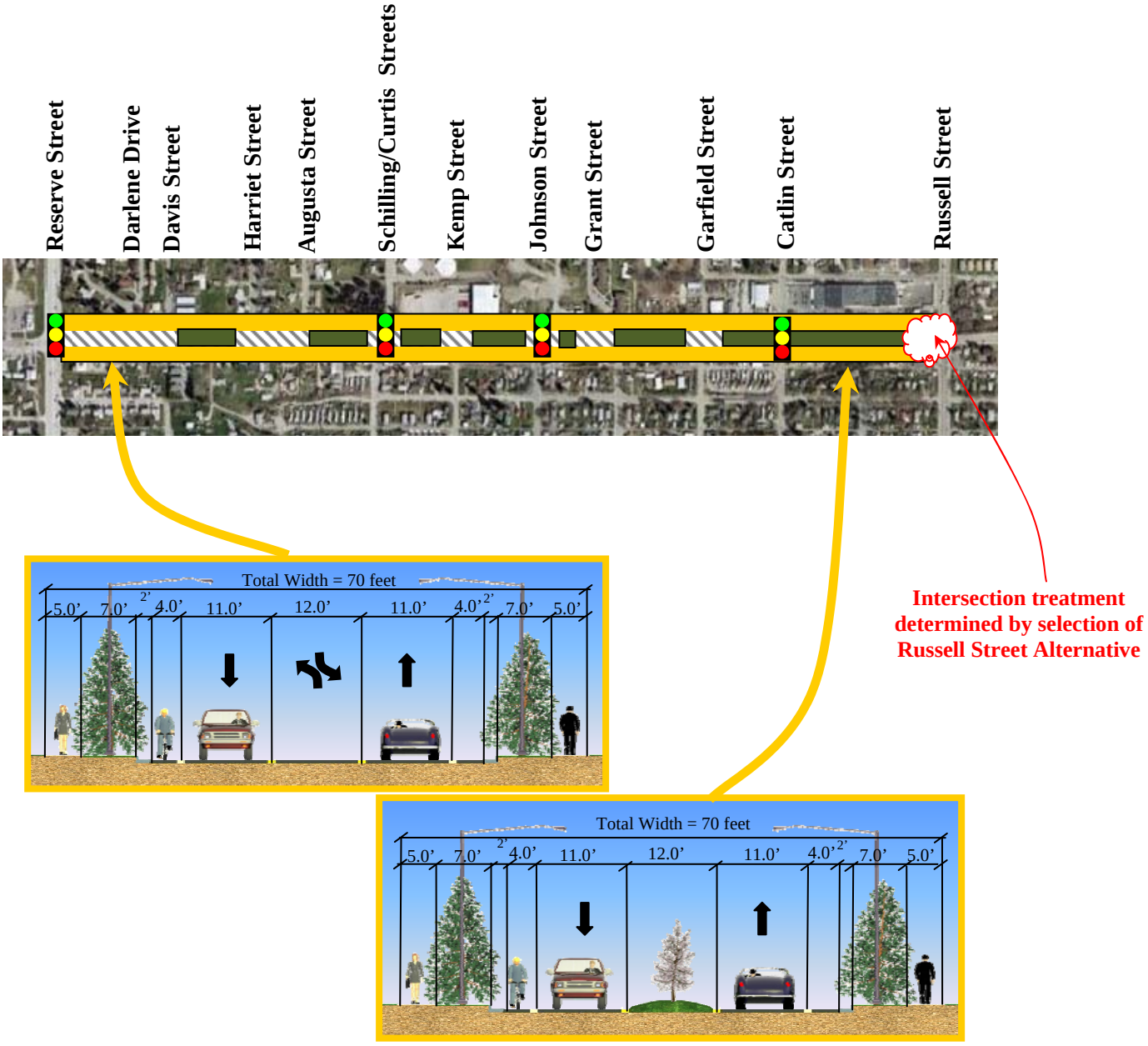
Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The proposed alignment would generally follow the centerline of the existing alignment.

Figure 2-13
Alternative E – General Elements



Key:

- Two lanes with median/turn lane
- Raised median
- Turn lane
- Traffic signal

All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design. Preliminary design details are provided in Figure 2-23.

2.3 Analysis of Alternatives

Chapter 1 of this Environmental Impact Statement outlined the overall need for improvements in the Russell Street and South 3rd Street corridors, as well as the purpose of the proposed improvements. As further articulation of the purpose and need for the proposed project, the chapter also provided a comprehensive list of goals and objectives developed through extensive coordination with the Advisory Committee and other agency and public participants over the past several years. Those goals and objectives were used to develop the alternatives presented above, and are used to evaluate the alternatives in the following section.

Based on the goals and objectives, the criteria are organized to evaluate the ability of each alternative to:

- Improve safety and capacity
- Improve multi-modal access and mobility
- Minimize impacts
- Maintain community character

The guiding principle in the development and evaluation of alternatives is to provide safety and mobility improvements first, then look for opportunities to minimize impacts and maintain community character. The following sections provide an accounting of the degree to which each alternative satisfies the broad purpose and need, and the more specific goals and objectives.

Improve Safety and Capacity

Four criteria were developed to evaluate the safety and capacity advantages of the alternatives. Table 2.3 provides a matrix of the alternatives compared to these criteria.

Table 2.3
Safety and Capacity Evaluation Matrix

	Alternatives									
Criteria	**1**	**2**	**3**	**4**	**5**	**A**	**B**	**C**	**D**	**E**
Provide adequate travel lanes and turn lanes to accommodate projected demand at the target Level of Service	O	O	O	✓	✓	O	✓	✓	✓	✓
Provide designated lanes/facilities for bicycle and pedestrian use	O	✓	✓	✓	✓	O	✓	✓	✓	✓
Widen the bridge over the Clark Fork River to accommodate additional travel lanes and bicycle/pedestrian facilities	O	✓	✓	✓	✓	-	-	-	-	-
Provide design and traffic control measures to improve safety	O	✓	✓	✓	✓	O	✓	✓	✓	✓

Key: ✓ = Satisfies the criteria O = Does not adequately satisfy the criteria

As depicted in Table 2.3, all Build alternatives provide designated bike and pedestrian facilities, widen the bridge over the Clark Fork River, and include design and traffic control measures to improve safety. The Build alternatives differ, however, in their ability to accommodate projected travel demand and improve safety.

Roadway safety is generally a function of the geometric design of the roadway, the interaction of different modes of travel, and the congestion levels a driver and/or pedestrian or bicyclist experiences. The crash history in the Russell Street and South 3rd Street corridors reveals that most vehicle crashes occur at congested intersections along these routes. All Build alternatives provide for the dedication of bicycle lanes, inclusion of sidewalks, and some type of intersection control and cross-walks at major intersections. These elements alone provide an improvement in both vehicular and pedestrian/bicyclist safety by reducing conflict between these different modes of travel. All the Build Alternatives also help lower speeds through the following design improvements:

- Narrowed travel lanes and overall cross-section*
- Street-side landscaping
- Landscaped medians
- Multiple controlled intersections with pedestrian crosswalks and refuges

Through the inclusion of design elements to reduce conflicts and reduce speeds, all Build alternatives promote some safety benefits. Safety is also a function of congestion levels, which are improved to varying degrees by the Build alternatives.

The Traffic Analysis Update conducted in 2009 provided a detailed safety analysis comparing each Build Alternative on Russell Street to a respective No Build condition (three-lane and five-lane volume projections) for Russell Street in 2035. Table 2.4 provides a comparison of Build Alternatives to the No Build Alternative under the two forecast volume scenarios on Russell Street. The data is shown as a percentage of predicted motor vehicle average crash frequency as compared to the No Build Alternative.

Table 2.4
Safety Comparison Summary for Predicted Crash Conditions on Russell Street

	3-Lane Volume Scenario			5-Lane Volume Scenario		
	Alt 1	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 4**	**Alt 5-R**
Percentage of Crashes Compared to Alternative 1 (No Build)	100%	67%	65%	100%	70%	63%

Source: Russell Street Traffic Analysis Update. Kittelson and Associates, 2009.

As shown in Table 2.4, Alternatives 2, 3 and 5-Refined would yield the largest reduction in crash frequency as compared to the base prediction. Given that the volumes are lower (approximately 3,000 to 5,000 vehicles per day) under the three-lane alternatives, Alternatives 2 and 3 are predicted to have lower absolute average crash frequencies than Alternatives 4 and 5-Refined.

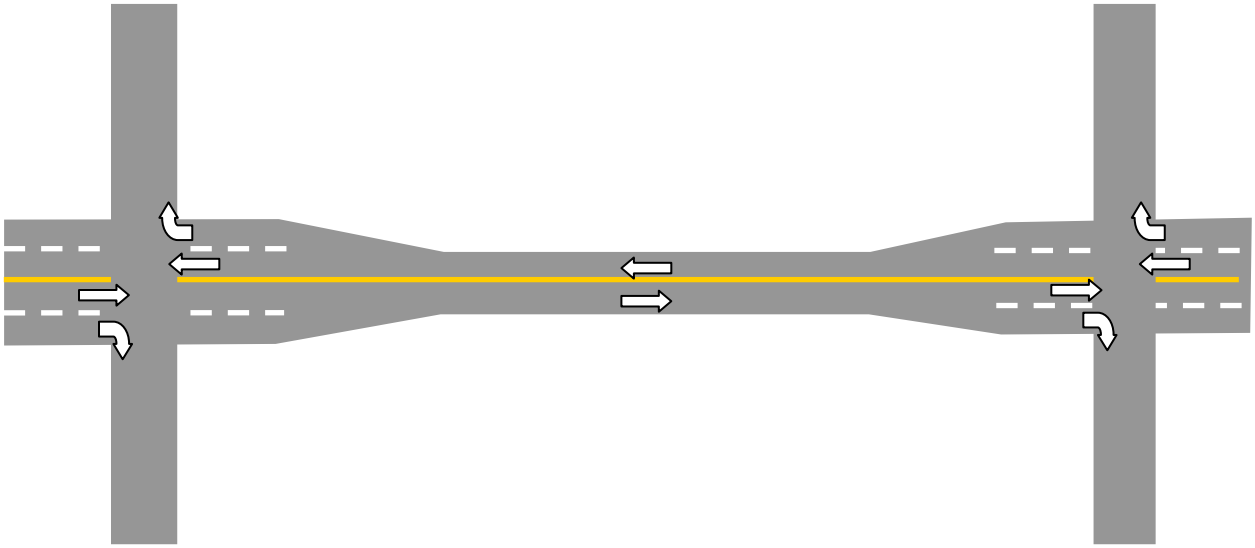
* The proposed project includes the narrowest lanes permissible under current design standards for the interior lanes (in accordance with American Association of State Highway Transportation Officials guidance for this type of facility), but 12 foot lanes in the exterior to maintain an adequate buffer between vehicles and bicyclists.

However, with traffic diverted to other routes because of a lack of capacity on Russell Street, it is possible that crashes will shift to other routes.

The above safety analysis focuses primarily on motor vehicle crashes because there are currently no predictive models for pedestrian and bicyclist crashes with motor vehicles at roundabouts. Generally though, the predictive models for non-auto crashes are proportional to the predicted average crash frequency of motor vehicle crashes.

As noted in Chapter 1 of this document, congestion is traditionally described in terms of the Level of Service experienced by the traveler (refer to Figure 1-4). As noted in the sections above, Russell Street Alternatives 2 and 3 have one travel lane in each direction. Initial Level of Service calculations showed that several of the major intersections could not meet the targeted Level of Service C goal on Russell Street, and in fact dropped to failing levels. To improve the Level of Service, through lanes were added to increase the capacity of each approach until the overall Level of Service of the major intersections met the Level of Service C goal. This process was followed for all of the Build alternatives. The result was that several intersections required two travel lanes for the through movement. These additional through lanes, where appropriate, were then merged into one lane just downstream of the intersection. As illustrated in Figure 2-14, this creates an "hourglass effect" on the roadway where it bulges at the intersections and narrows along the mainline between.

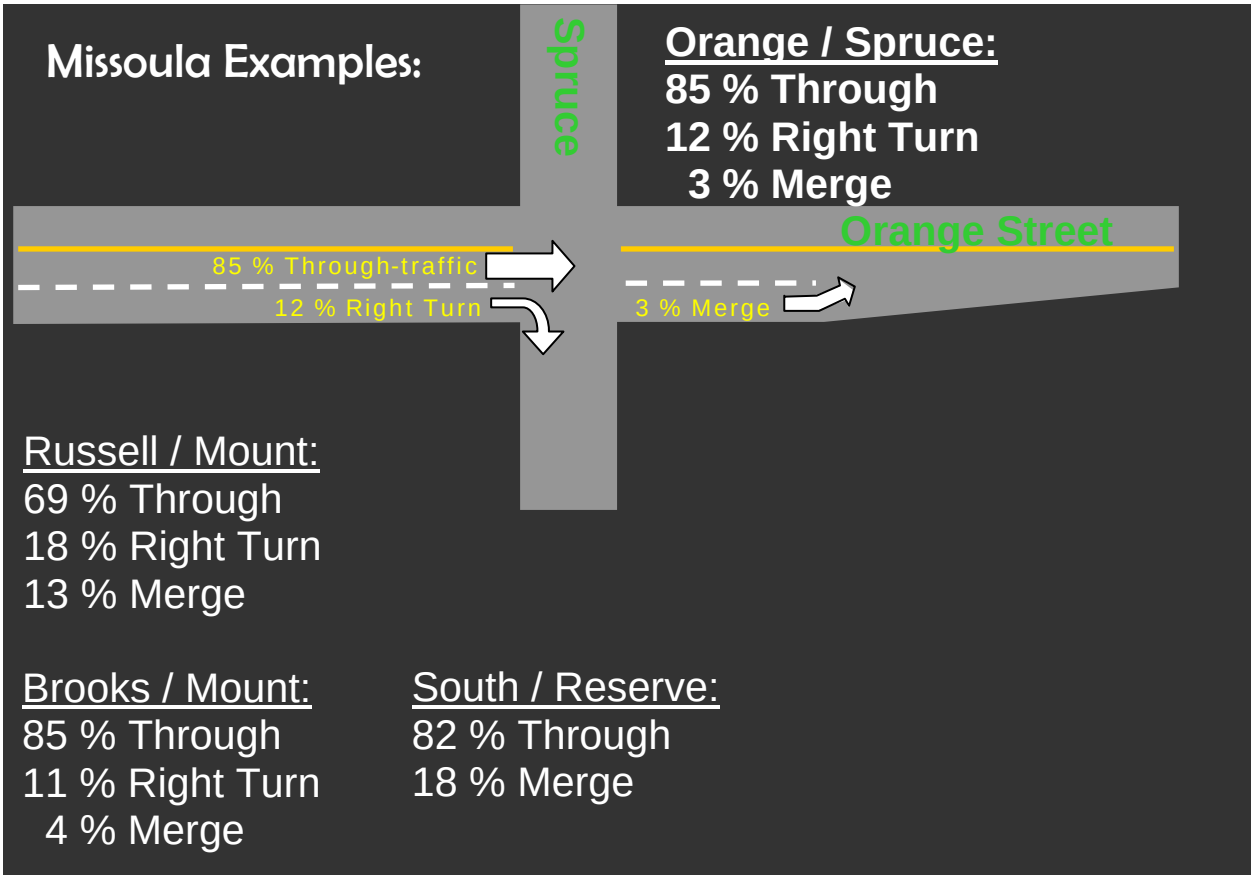
Figure 2-14
Hourglass Effect



At first appearance, this configuration was projected to accommodate the future demand. However, the assumption was that the through traffic would balance out between both lanes as they moved through the intersection (e.g. 50 percent in the interior lane, and 50 percent in the exterior lane). Montana Department of Transportation staff collected field data from across the state to validate this assumption but found that most motorists will not use the exterior lane when they know it will be dropped less than 1,500 feet downstream of the intersection.

Observations by City of Missoula and Montana Department of Transportation staff in Missoula indicate that drivers do not make use of both lanes equally. A count of westbound traffic on South Avenue at Reserve Street showed that 82 percent of the through traffic remained in the inside travel lane and the remainder of traffic used the outside lane. Figure 2-15 illustrates this scenario.

Figure 2-15
Typical Lane Utilization Imbalance



Source: Montana Department of Transportation - Traffic and Safety Bureau. 2005

Level of Service analysis was conducted based on existing and forecast traffic volumes, as well as the "hourglass effect" noted above. Table 2.5 provides the results of the Multi-Modal Level of Service analysis conducted for intersection and corridor segment operations under existing and forecast conditions for the No Build and four Build alternatives on Russell Street.

The Traffic Analysis Update provided an overall operational and safety analysis summary, repeated here in Table 2.5. The overall performance results are summarized by the major intersections and the corridor segments using a relative ranking system of "Good," "Fair," and "Poor." If a performance measure is rated "Good," for a given alternative or option it can be concluded that the analysis found it to be relatively good or superior to other alternatives/options; however, it doesn't necessarily mean that it is absolutely good or acceptable per agency standard. Likewise, if a performance measure is rated "Poor," for a given alternative or option it can be

concluded that the analysis found it to be relatively poor or inferior to other alternatives/options; however, it doesn't necessarily mean that it is absolutely poor or unacceptable per agency standards.

As summarized in Table 2.5, Alternative 1 has the most "Poor" ratings and Alternative 4 has the most "Good" ratings of all the analyzed alternatives and options. In addition, Alternatives 2 and 3 have more "Poor" ratings than "Good" ratings; whereas, Alternative 5-Refined has more "Good" ratings than "Poor" ratings.

Table 2.5
Overall Performance Measure Results

Performance Measure		Alternatives				
		1	2	3	4	5-Ref.
Major Intersections	Safety	○	●	●	◖	●
	Automobile	○	○	○	●	◖
	Pedestrian	○	◖	◖	●	○
	Bicycle	○	○	○	●	◖
Corridor Segments	Safety	○	◖	◖	●	●
	Automobile	◖	○	○	●	◖
	Pedestrian	○	◖	◖	●	●
	Bicycle	○	◖	◖	●	◖
	Transit	○	◖	◖	◖	◖

● = Good ◖ = Fair ○ = Poor

***Source**: Russell Street Traffic Analysis Update, Final Report*, Kittelson & Associates, August 2009.

Each of the Build Alternatives are anticipated to be improvements over the No Build Alternative. Generally, the alternatives with roundabouts do not rate as well as those with traffic signals for automobiles, bicycles, and pedestrians at the major intersections; however, they operate better in regards to safety. In addition, the alternatives with three lanes do not rate as well as those with five lanes along the corridor segments.

The Traffic Analysis Update included new traffic counts, an updated traffic demand model, and new design year (2035 vs. original study design year of 2025) and as a result of that revision, none of the alternatives will meet the Level of Service targets used to evaluate performance for the 2025 design year for the new 2035 conditions. As such, the alternatives were re-evaluated and the alternative that best meets the purpose and need and objectives of the project was identified as the preferred alternative. To quantify the corridor operation over time, a lifespan analysis was performed for each build alternative to identify when the facility under the given improvements begins to reach a capacity limit.

Without further improvements, Alternatives 2 and 3 experience severe congestion in 2010 (assuming the project were constructed by that time), Alternative 5-Refined would reach congested levels by 2012, and Alternative 4 has the longest lifespan by operating within the targeted Level of Service range up to 2023.

The lifespan of each alternative may be extended if the traffic projections are not realized as anticipated per the local travel demand model and Long Range Transportation Plan. For a reduction in traffic projections to occur, changes in current land use, mode split, population growth, and/or culture would need to occur. In addition, enhancements can be made to each of the build alternatives to increase their anticipated lifespan. Applying similar enhancements to each Build Alternative does not change the relative ranking of each alternative, nor does it elevate any of the alternatives to a level where it would meet the design year criteria for the year 2035. These enhancements are discussed further in Section 2.5 of this Chapter.

Improve Multi-Modal Access and Mobility

The Build alternatives on Russell Street and South 3rd Street satisfy the evaluation criteria for this group by providing:

- Trail linkages within and across both corridors,
- Grade-separated bike and pedestrian crossings of Russell Street,
- Facilities compliant with the Americans with Disabilities Act, and
- Adequate space for bus stops and pullouts in the corridors, where appropriate.

In response to public comment, analysis was conducted to provide a deeper understanding of the multimodal access and mobility improvements. As summarized in Appendix G, a combined intersection and segment Level of Service for transit, bicycle, and pedestrian mode is derived based on several inputs for the No Build and Build conditions for the Russell Street corridor. The analysis provides a relative comparison between the alternatives.

Alternatives 4 and 5-Refined achieve the overall highest bicycle Level of Service for the corridor with a LOS "E." Specifically, these alternatives performed better due to less traffic volume in the outermost lane next to the bike lane and for Alternative 4, signalized intersections perform better than roundabouts.

Each of the Build Alternatives performs better for the pedestrian Level of Service than the existing and No Build conditions, based largely on the addition of a continuous sidewalk and buffer (bike lane and landscape area with trees) from the travel lanes. Pedestrian Level of Service also generally performs better at signalized intersections than at roundabouts due to pedestrians being able to cross the intersection under a controlled crossing (i.e., pedestrian signal with walk and flashing don't walk symbols) versus at roundabouts where pedestrians must negotiate a gap in the traffic stream or wait for a vehicle to yield and allow the pedestrian to cross. However, if in the future, pedestrian crossings at the roundabouts are signalized (*Note: This topic is currently being researched at the national level to identify guidelines for providing signalized traffic control for pedestrian crossings at roundabouts*), the pedestrian Level of Service at the roundabouts may be slightly better than at a typical signalized intersection due to the crossing distance being shorter than at a typical signalized intersection.

The transit amenities and service are planned to be the same under all future conditions, and is projected to be LOS "D" for each of the Build Alternatives.

Minimize Impacts

In accordance with the goals and objectives, every Build alternative on Russell Street and South 3rd Street includes:

- Reasonable flexibility in design standards by providing minimum widths as outlined in American Association of State Highway Transportation Officials guidelines,
- A design that reduces congestion and idling time to minimize vehicular impact on air quality,
- Stormwater designs to improve water quality runoff entering the Clark Fork River through the use of Best Management Practices, and
- Mitigation for unavoidable impacts (as outlined in Chapter 4).

Maintain Community Character

Throughout the public involvement process, participants have expressed a concern that Russell Street not turn into another Reserve Street. Reserve Street has four travel lanes and a center turn lane, and little landscaping. There are negative impressions of the pavement width, lack of landscaping, high speeds, and the perception of inadequate bicycle and pedestrian facilities. Because of the public input on the design aspects to be incorporated into the Russell Street Corridor, preliminary design elements are based on context sensitive solutions. Attempting to adhere to public preference and the goals and objectives identified in Chapter One, general baseline parameters had to be set for Russell and South 3rd Streets. According to *An Institute of Transportation Engineers (ITE) Proposed Recommended Practice: Context Sensitive Solutions in Designing Major Urban Thoroughfares*, Russell Street and South 3rd Street can both be characterized as arterial urban thoroughfares. Table 2.6 provides a comparison of general parameters for urban thoroughfares to features of the No Build and Build alternatives on Russell Street.

Table 2.6
Parameters for General Urban Thoroughfares in Residential and Commercial Areas under Constrained Conditions

Feature	ITE Recommended	Current Conditions	Build Alternatives 2035
Roadside Width:	16.5 feet	Varies	12 foot minimum
Traveled Way:			
Target Speed (mph)	35 mph	35 mph	35 mph
No. of Through Lanes	4 to 6	2 to 4	2 to 4
Lane Width	10 to12 feet	12 feet	11 to12 feet
Median Width	14 to16 feet	none	12 feet
Bike Lanes:	5 to 6 feet	none	5.5 feet
Traffic Volume (vpd)	10,000-40,000	19,800 - 24,900	37,300 – 43,000
Intersections:			
Roundabouts	Urban single-lane roundabouts should be considered at intersections on arterial avenues with less than 20,000 entering vehicles per day.		

Source: Institute of Transportation Engineers (ITE)
Note: 2035 traffic volumes are for the five-lane Build scenario.

According to the Institute of Transportation Engineers, specific deviations from these parameters are allowed under constrained conditions. Specifically, the following variations are allowed:

- Roadside Width can be reduced to 12 feet in commercial areas and nine feet in residential areas which allows for a five foot sidewalk.
- Median Width can be reduced to a minimum of 10 feet on arterial thoroughfares.
- The Institute of Transportation Engineers also recommends no more than four through lanes in residential areas.

In the context of this mixed-use corridor, many public participants also suggested the use of guidance provided under the "Complete Streets" concept to provide safe, comfortable, and convenient facilities for pedestrian, bicyclist, motorist, and transit users of all ages and abilities. The following graphics illustrate conditions on an urban arterial before the application of Complete Streets design concepts, and an illustration of how the facility would appear and operate after application of the design concepts.

Source: *National Complete Streets Coalition*, completestreets.com

Based on the criteria outlined in Table 2.6, and the goals outlined in the Complete Streets concept, each of the Build Alternatives fulfill the goal of maintaining community character through the inclusion of a balanced mix of transportation amenities on a multi-lane facility. Each of the Build alternatives on both Russell Street and South 3rd Street provide aesthetically pleasing design elements in the form of landscaped boulevards. With the exception of Alternative B on South 3rd Street, each of the Build alternatives include raised medians to allow for landscaping in the center of the roadways. Alternatives 2, 3, and 5 on Russell Street, and Alternative C on South 3rd Street include longer stretches of median for landscaping as compared to other alternatives.

With regard to a recognition of the commercial nature of the northern portion, and respect for the varied residential/commercial nature of the southern portion of the Russell Street corridor, all

Build alternatives provide amenities and design elements to improve multi-modal mobility and access to homes and commercial buildings while still providing aesthetic improvements.

Summary Comparison of Impacts

To assist decision-makers and the public in understanding the environmental choices among Build alternatives, a comparison of the environmental impacts of the Build alternatives is included in Tables 2.7 and 2.8 below. Graphic illustrations of the alternatives and their impacts are also provided in Figures 2-16 through 2-23, following the tables. The details of the impacts and proposed mitigation are documented in Chapter 4 of this Environmental Impact Statement.

Table 2.7
Summary of Impacts on Russell Street

Section	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Mount Avenue to South 11th Street	• 3 Commercial Buildings • 3 4(f) Properties • 0.89 acres new right-of-way	• 3 Commercial Buildings • 3 4(f) Properties • 0.99 acres new right-of-way	• 2 Commercial Buildings • 2 4(f) Properties • 0.73 acres new right-of-way	• 1 Homes • 3 Commercial Buildings • 3 4(f) Properties • 1.02 acres new right-of-way
South 11th Street to South 3rd Street	• 9 Homes • 4 Commercial Buildings • 4 4(f) Properties • 1.22 acres new right-of-way	• 9 Homes • 4 Commercial Buildings • 4 4(f) Properties • 1.43 acres new right-of-way	• 11 Homes • 5 Commercial Buildings • 2 4(f) Properties • 1.65 acres new right-of-way	• 17 Homes • 5 Commercial Buildings • 5 4(f) Properties • 2.01 acres new right-of-way
South 3rd Street to Wyoming Street	• 3 Commercial Buildings • 1 4(f) Property • 0.63 acres new right-of-way	• 3 Commercial Buildings • 1 4(f) Property • 0.67 acres new right-of-way	• 1 4(f) Property • 0.93 acres new right-of-way	• 2 Commercial Buildings • 1 4(f) Property • 0.84 acres new right-of-way
Wyoming Street to Russell Street Bridge	• 1 Commercial Building • 0.80 acres new right-of-way	• 1 Commercial Building • 1.00 acres new right-of-way	• 1 Commercial Building • 0.64 acres new right-of-way	• 1 Commercial Building • 0.98 acres new right-of-way
Russell Street Bridge to West Broadway	• 2 Commercial Buildings • 1 4(f) Property • 0.80 acres new right-of-way	• 2 Commercial Buildings • 1 4(f) Property • 0.78 acres new right-of-way	• 2 Commercial Buildings • 1 4(f) Property • 0.64 acres new right-of-way	• 2 Commercial Buildings • 1 4(f) Property • 0.79 acres new right-of-way
Totals	• **9 Homes** • **13 Commercial Buildings** • **9 4(f) Properties** • **4.34 acres new right-of-way**	• **9 Homes** • **13 Commercial Buildings** • **9 4(f) Properties** • **4.87 acres new right-of-way**	• **11 Homes** • **10 Commercial Buildings** • **6 4(f) Properties** • **4.59 acres new right-of-way**	• **18 Homes** • **13 Commercial Buildings** • **10 4(f) Properties** • **5.65 acres new right-of-way**

Notes:
Right-of-way estimates are planning-level and dependent upon final right-of-way negotiations.
Section 4(f) properties include historic as well as park and recreational resources. Their inclusion indicates a "use" as defined in Section 4.14 of this FEIS.

Table 2.8
Summary of Impacts on South 3rd Street

Section	Alternative B	Alternative C	Alternative D	Alternative E
Reserve Street to Russell Street	• 1 Home • 4 Commercial Buildings • 2.38 acres of new right-of-way	• 1 Home • 4 Commercial Buildings • 2.77 acres of new right-of-way	• 0 Homes • 3 Commercial Buildings • 3.62 acres of new right-of-way	• 0 Homes • 3 Commercial Buildings • 2.63 acres of new right-of-way

Note:
Right-of-way estimates are planning-level and dependent upon final right-of-way negotiations.

Preliminary Cost Estimate

Table 2.9 compares the costs of the Build alternatives under consideration for the Russell Street and South 3rd Street projects.

Table 2.9
Preliminary Estimated Costs of the Build Alternatives

	Construction Engineering	Construction	Right-of-Way	Design Fee	Total Construction & Right-of-Way
Russell Street					
Alternative 2	$4.2 million	$33.7 million	$8.1 million	$2.3 million	$48.3 million
Alternative 3	$4.2 million	$33.9 million	$8.4 million	$2.3 million	$48.8 million
Alternative 4	$4.0 million	$32.0 million	$6.9 million	$2.1 million	$45.0 million
Alternative 5	$4.4 million	$35.5 million	$10.3 million	$2.4 million	$52.6 million
South 3rd Street					
Alternative B	$1.0 million	$7.6 million	$3.0 million	$0.6 million	$12.2 million
Alternative C	$1.1 million	$8.1 million	$2.9 million	$0.6 million	$12.7 million
Alternative D	$1.1 million	$8.1 million	$2.7 million	$0.6 million	$12.5 million
Alternative E	$1.0 million	$7.6 million	$2.2 million	$0.6 million	$11.4 million

Note: These planning level estimates are in 2009 dollars and include an assumption for phased construction. If the project were constructed in phases, it would be possible to construct the segment from West Broadway Street to approximately South 3rd Street at a cost of approximately $25.0 million in the year 2012. The project sponsor will continue to seek funding and prioritize Surface Transportation Program-Urban (STPU) funds for subsequent phases and accumulate those funds over the next several years to ensure funding of the project.

Utility relocations are estimated at $1.1 million on Russell Street, and $700,000 on South 3rd Street for each alternative. Right-of-way estimates are also planning-level and dependent upon final right-of-way negotiations.

Alternative 2 – 2+ Lanes with Roundabouts

Lane Configuration:

Two travel lanes from Mount Avenue/South 14th Street to South 5th Street
Four travel lanes from South 5th Street to South 3rd Street
Two travel lanes from South 3rd Street to Wyoming Street
Four travel lanes from Wyoming Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

Mount Avenue/South 14th Street
South 5th Street
South 3rd Street
Wyoming Street

Single-Lane Roundabouts at:

South 11th Street

Signal Control at:

West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on historic and recreational properties protected under Section 4(f) of the U.S. Department of Transportation Act, as discussed in Chapter 5 of this document.

Residential Impacts under Alternative 2

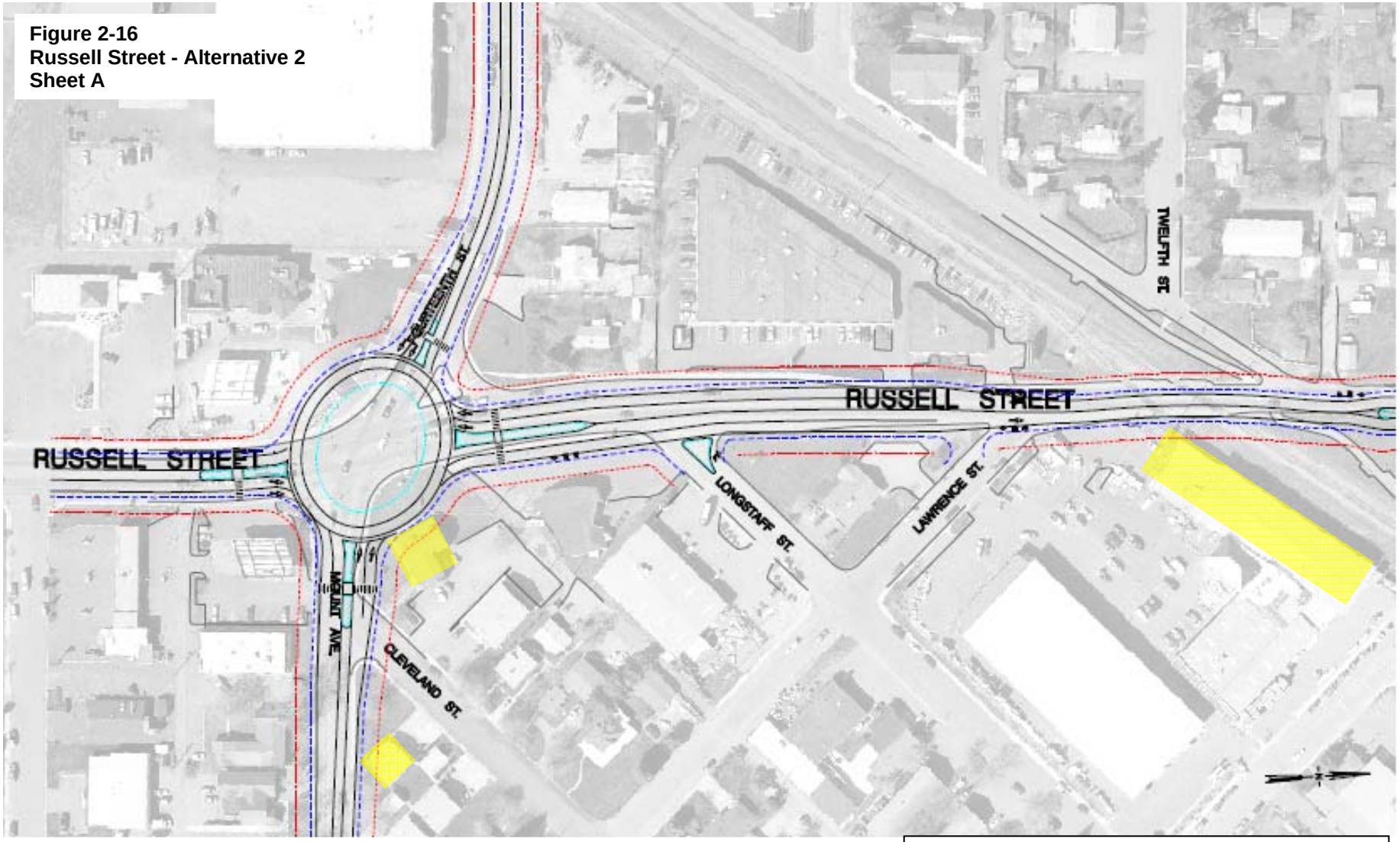
Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1508 5th St. 1445 5th St. 1501 5th St. 1509 5th St. 824 Russell St. 1000 Russell St. 1010 Russell St. 935 Kern St. 941 Kern St.	521 Russell St. 1425 5th St. 802 Russell St. 738 Russell Street	1431 3rd St. 1436 4th. St. W 1501 4th St. W 1439 4th St. W 1500 11th St. W	1427 2nd St. W 1510 S. 5th St. 1439 5th St. 1502 6th St. W 1501 6th St. W 808 Russell St. 1500 7th St. W 820 Russell St. 1016 Kern St.	1501 S. 7th St. 915 Russell St. 1500 8th St. W 1501 9th St. W 1135 10th St. W 1501 S. 10th St. 1501 11th St. 1501 Russell St.

Commercial Impacts under Alternative 2

Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1500 Broadway St. 1440 Broadway St. 1400 Wyoming St. 1515 Wyoming St. 121 Russell St. 403 Russell St. 500 Russell St. 501 Russell St. 1440 5th St. 1035 Ronan St. Montana Rail Link 1204 Mount Ave. (Previously 1208 Mount Ave.) 1520 Russell St.	1407 River Rd. 1503 Montana St. (Previously 1503 Russell St.) 140 Russell St. Mount and Russell St.	1427 W. Broadway St. 1451 Broadway St. 1120 Russell St.	1540 Broadway St. 215 Russell St. 1007 Mount Ave.	1417 3rd St. 1440 Russell St.

* "Direct Impact" implies that the existing structure is in conflict with the proposed construction limits. This does not necessarily mean that further avoidance measures cannot be explored or that the entire parcel would need to be acquired.

Figure 2-16
Russell Street - Alternative 2
Sheet A



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-16
Russell Street - Alternative 2
Sheet B

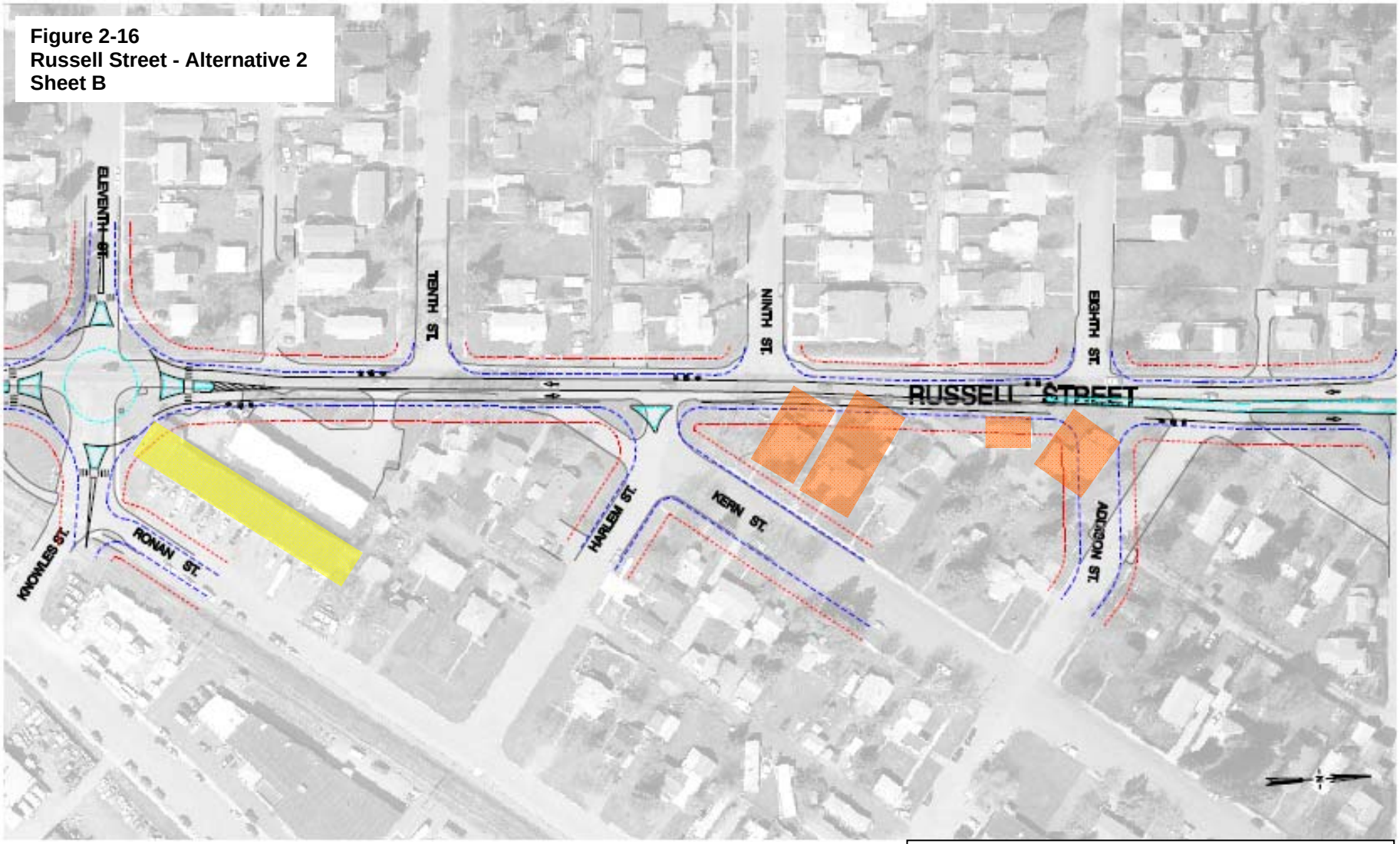


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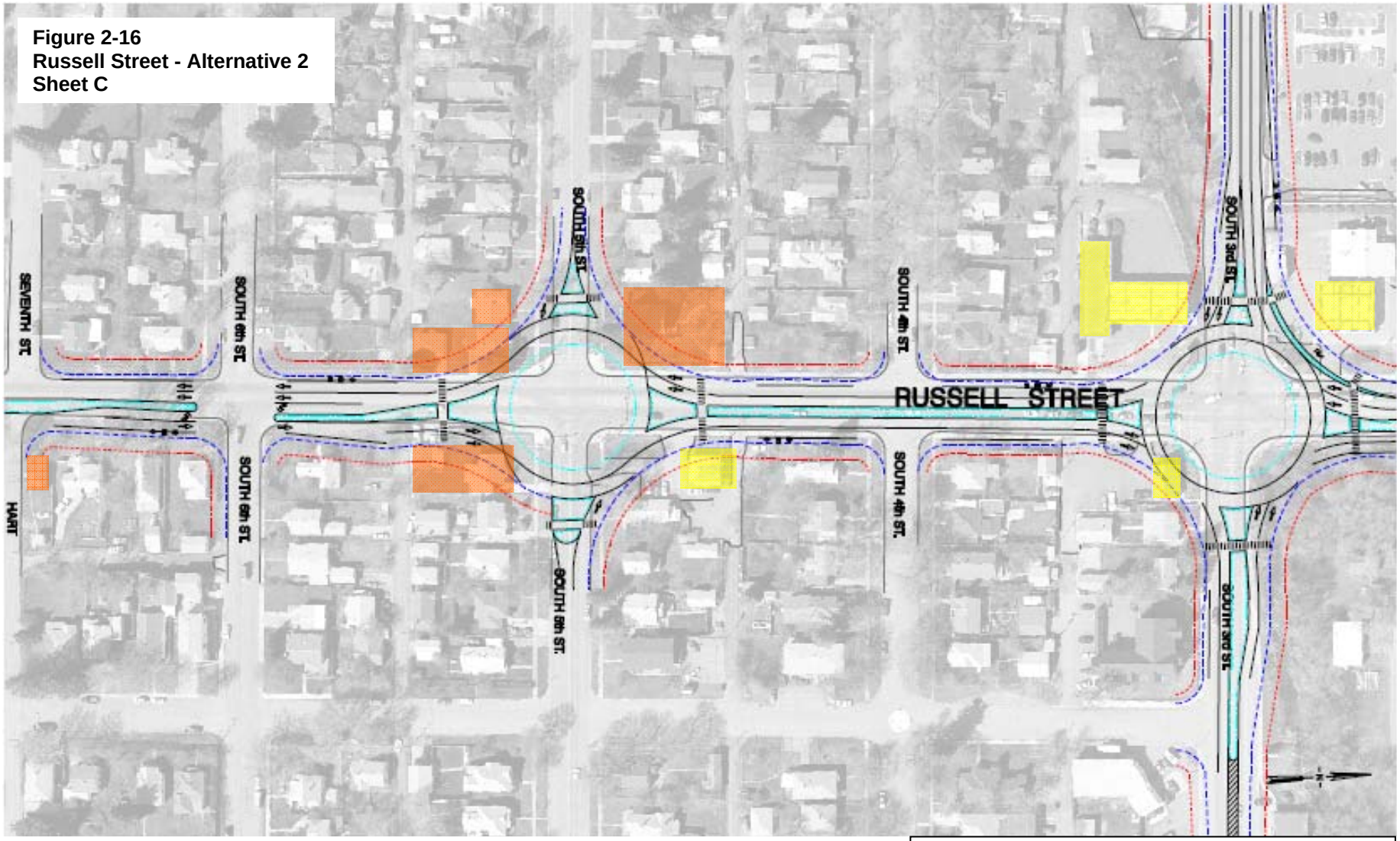
Figure 2-16
Russell Street - Alternative 2
Sheet C



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-16
Russell Street - Alternative 2
Sheet D

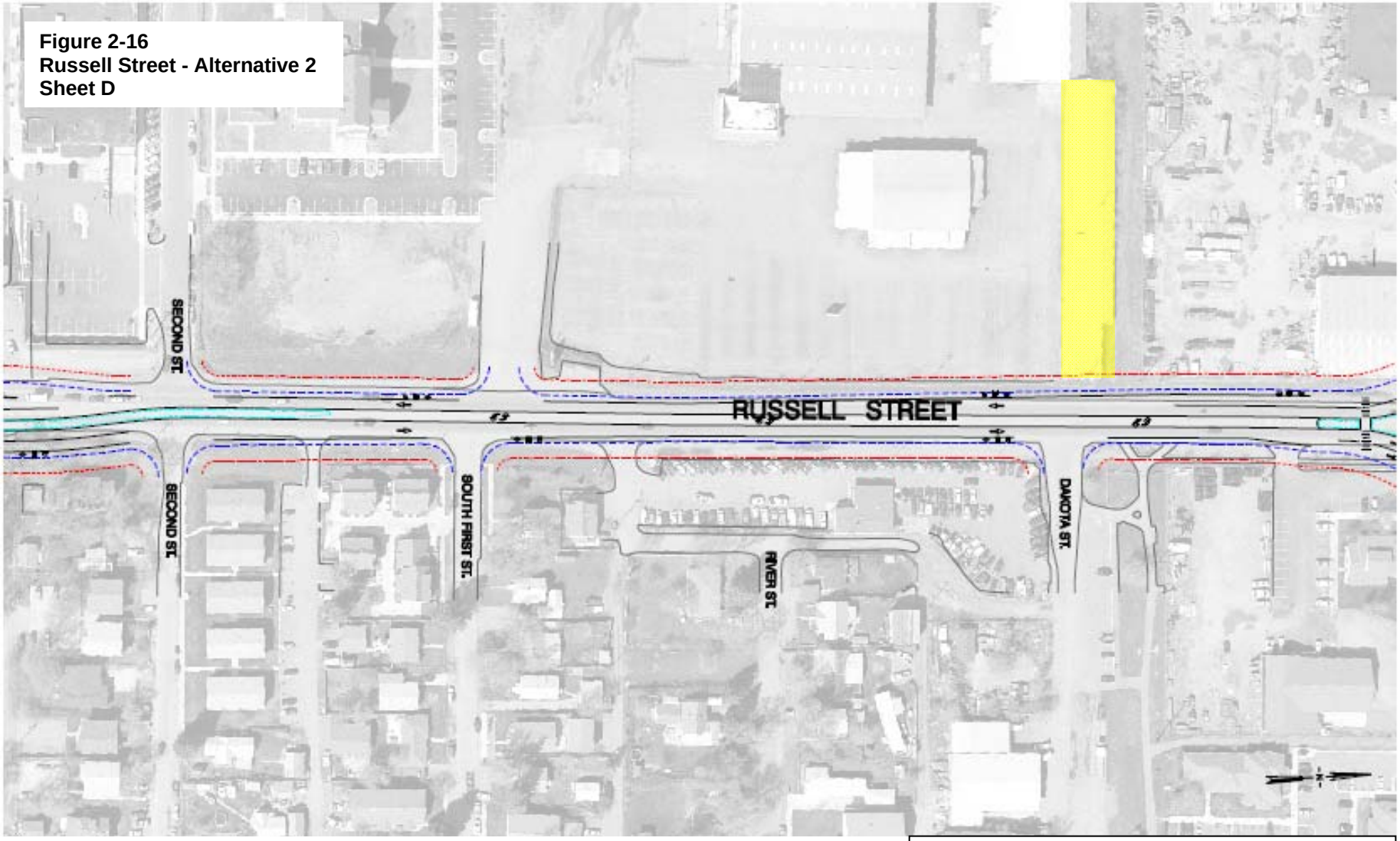


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Figure 2-16
Russell Street - Alternative 2
Sheet E

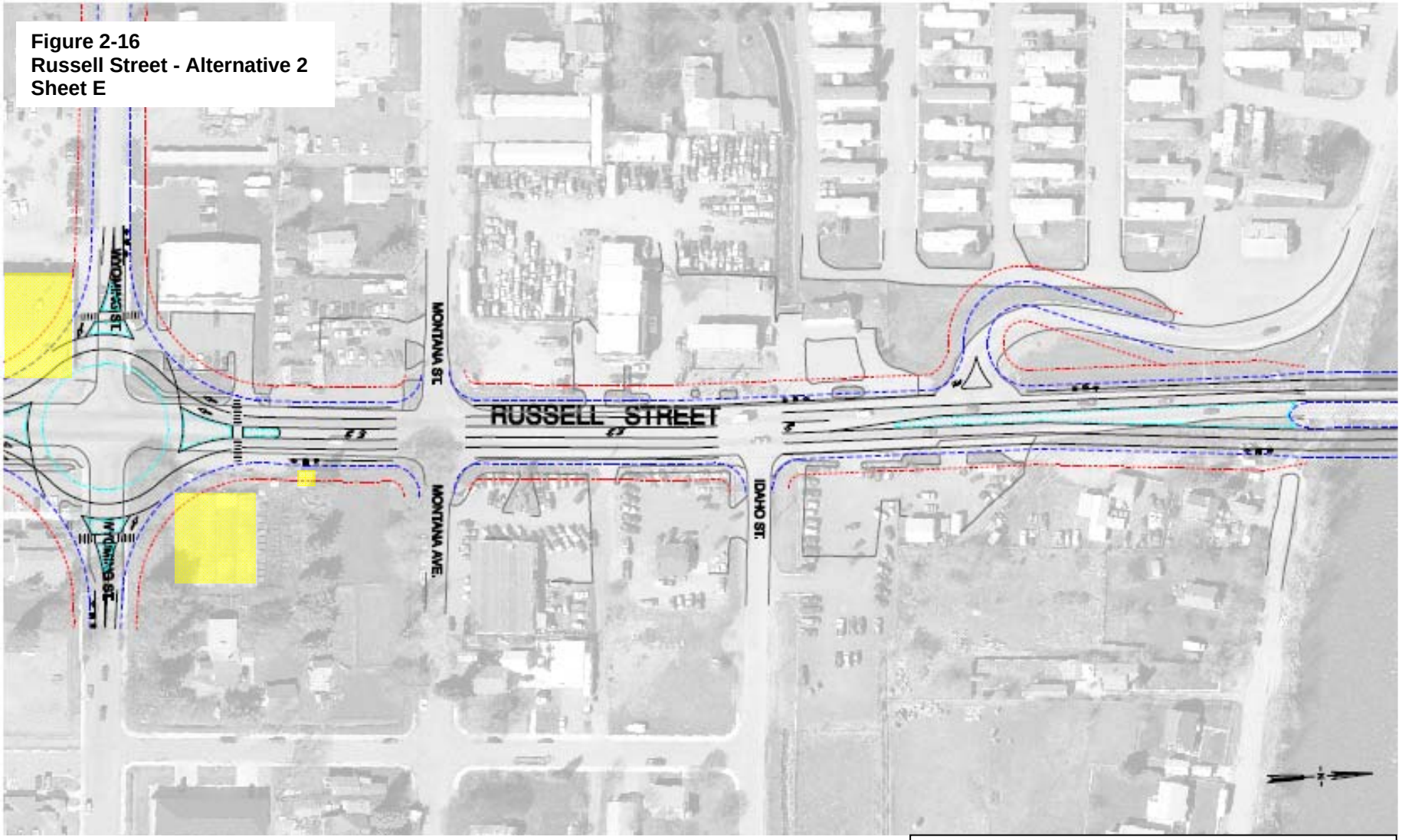

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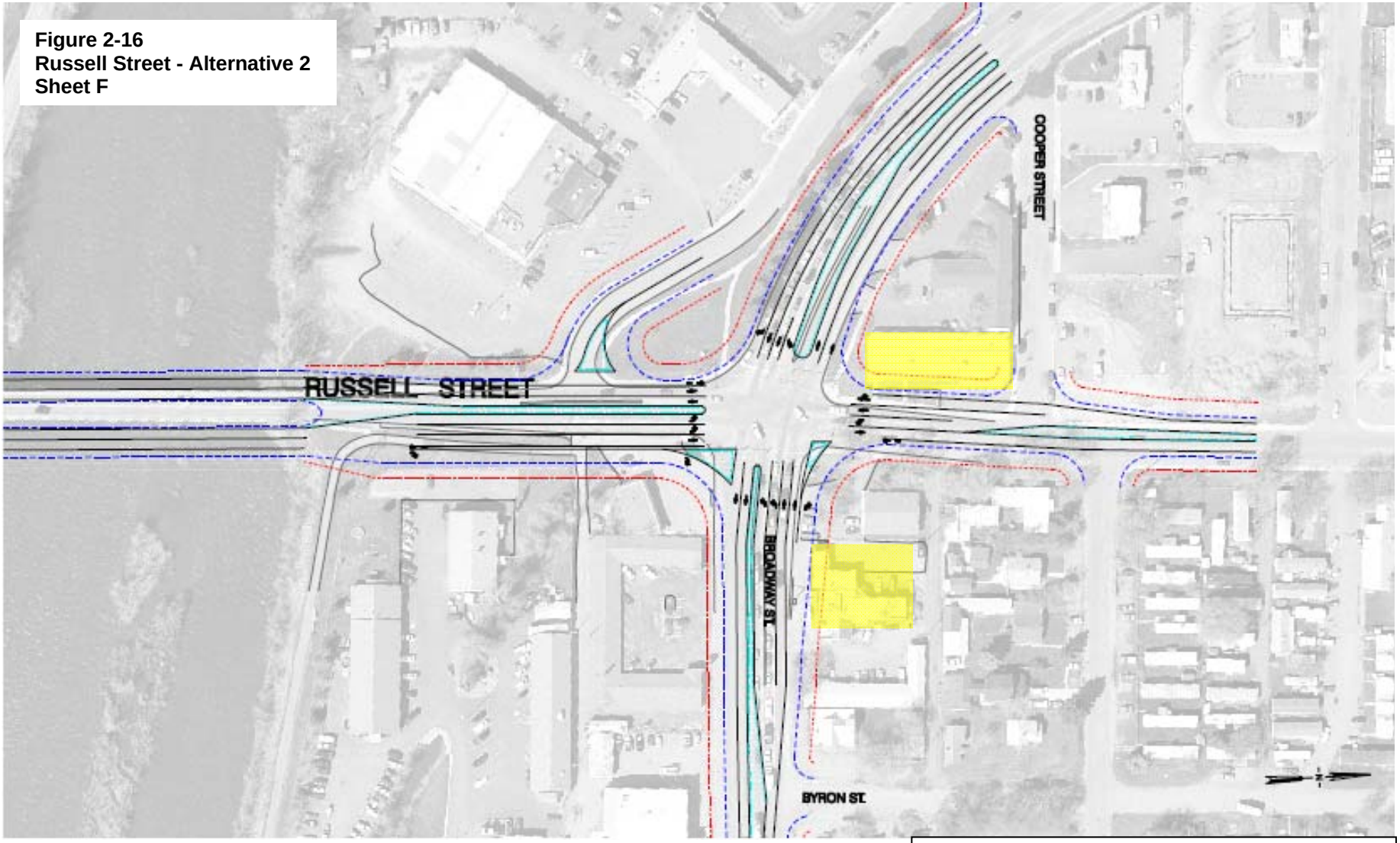
Figure 2-16
Russell Street - Alternative 2
Sheet F



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Alternative 3 - 2+/4 Lanes with Roundabouts

Lane Configuration:

Two travel lanes from Mount Avenue/South 14th Street to South 5th Street
Four travel lanes from South 5th Street to South 3rd Street
Two travel lanes from South 3rd Street to Wyoming Street
Four travel lanes from Wyoming Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

Mount Avenue/South 14th Street
South 5th Street
South 3rd Street
Wyoming Street

Single-Lane Roundabouts at:

South 11th Street

Signal Control at:

West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on properties protected under Section 4(f).

Residential Impacts under Alternative 3

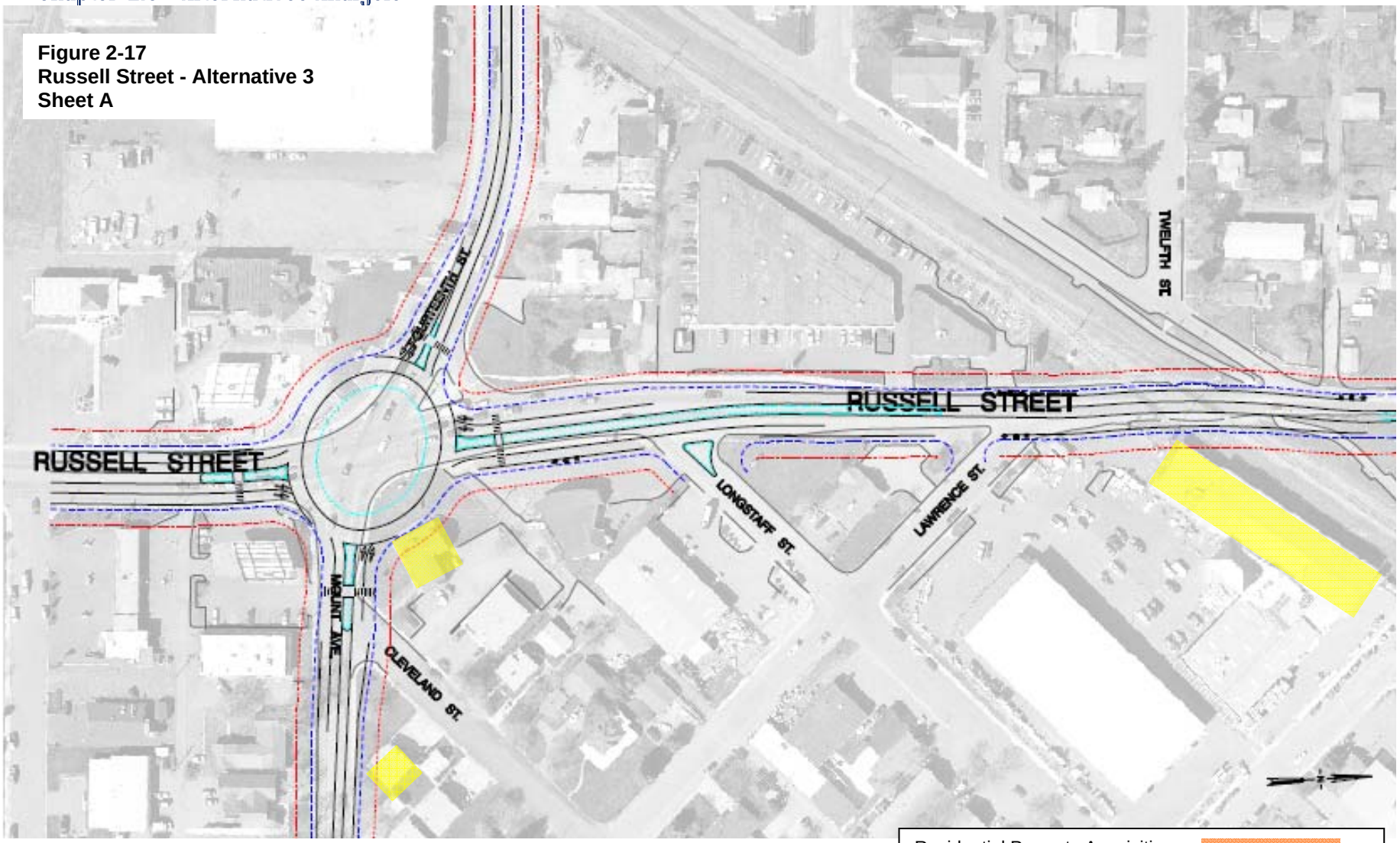
Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1508 5th St.	1016 Kern St.	1431 3rd St.	1510 S. 5th St.	1501 S. 7th St.
1445 5th St.	521 Russell St.	1436 4th. St. W	1439 5th St.	915 Russell St.
1501 5th St.	1425 5th St.	1501 4th St. W	1502 6th St. W	1500 8th St. W
1509 5th St.	802 Russell St.	1439 4th St. W	1501 6th St. W	1501 9th St. W
824 Russell St.		738 Russell St.	808 Russell St.	1135 10th St. W
1000 Russell St.		915 Kern St.	1500 7th St. W	1501 S. 10th St.
1010 Russell St.		1500 11th St. W	820 Russell St.	
935 Kern St.			1012 Kern St.	
941 Kern St.			1501 11th St.	

Commercial Impacts under Alternative 3

Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1500 Broadway St.	1120 Russell St.	1427 W. Broadway St.	1540 Broadway St.	1417 3rd St.
1440 Broadway St.	1407 River Rd.	1451 Broadway St.	215 Russell St.	1516 12th St.
1400 Wyoming St.	1503 Montana St. (Previously 1503 Russell St.)	Mount and Russell St.	1427 2nd St. W	1500 Russell St.
1515 Wyoming St.	140 Russell St.		1440 Russell St.	
121 Russell St.			1007 Mount Ave.	
403 Russell St.				
500 Russell St.				
501 Russell St.				
1440 5th St.				
1035 Ronan St.				
Montana Rail Link				
1204 Mount Ave. (Previously 1208 Mount Ave.)				
1520 Russell St.				

* "Direct Impact" implies that the existing structure is in conflict with the proposed construction limits. This does not necessarily mean that further avoidance measures cannot be explored or that the entire parcel would need to be acquired.

Figure 2-17
Russell Street - Alternative 3
Sheet A



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-17
Russell Street - Alternative 3
Sheet B

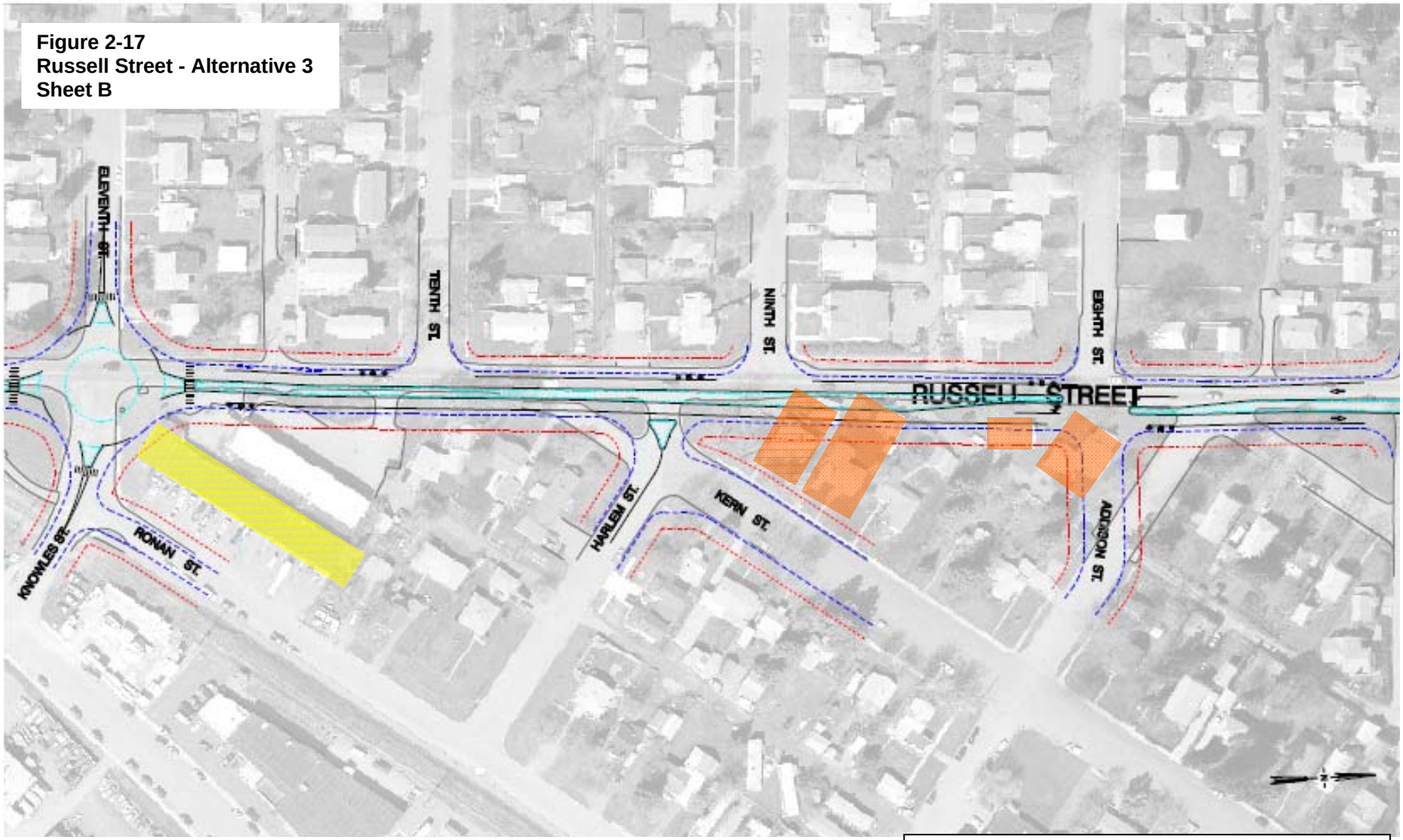


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Figure 2-17
Russell Street - Alternative 3
Sheet C

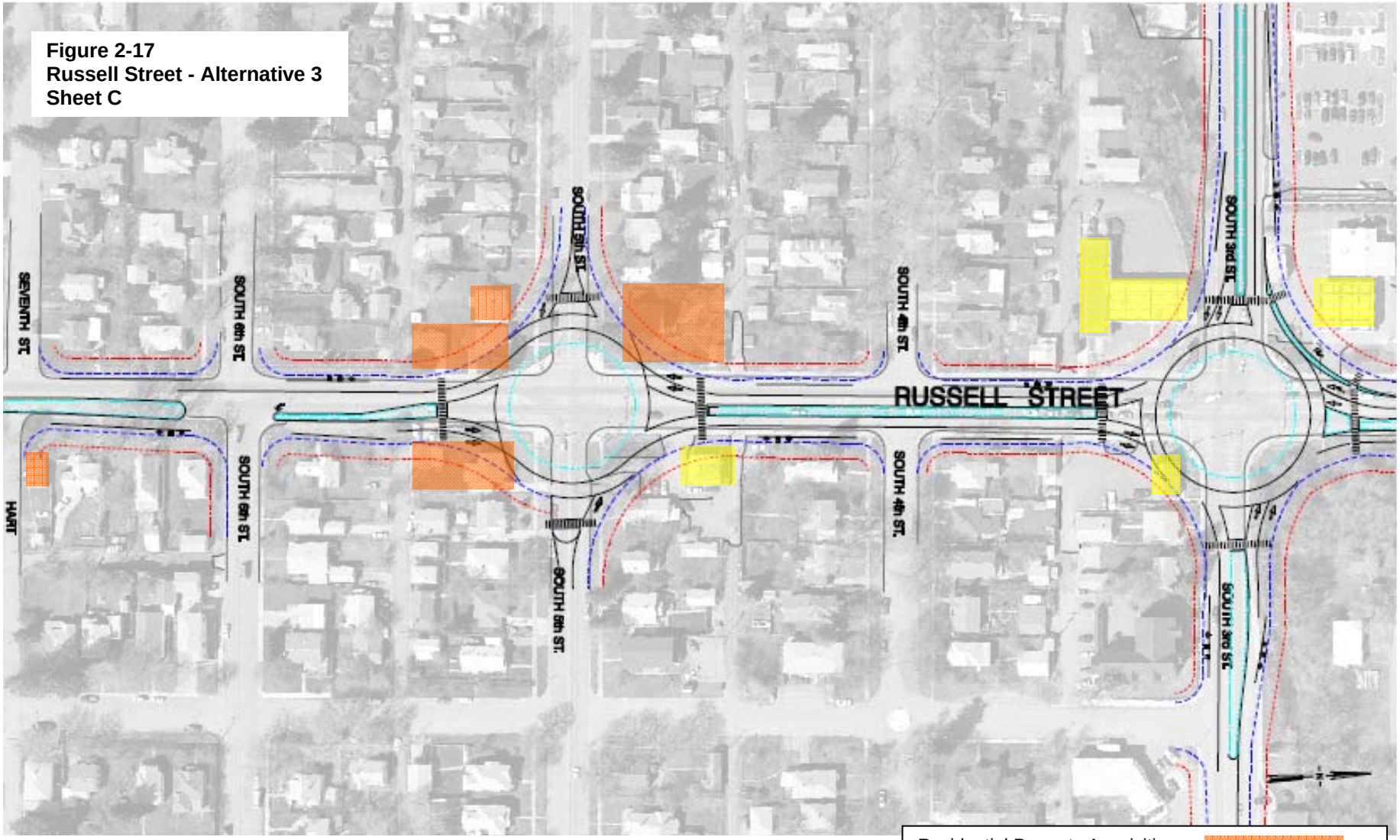

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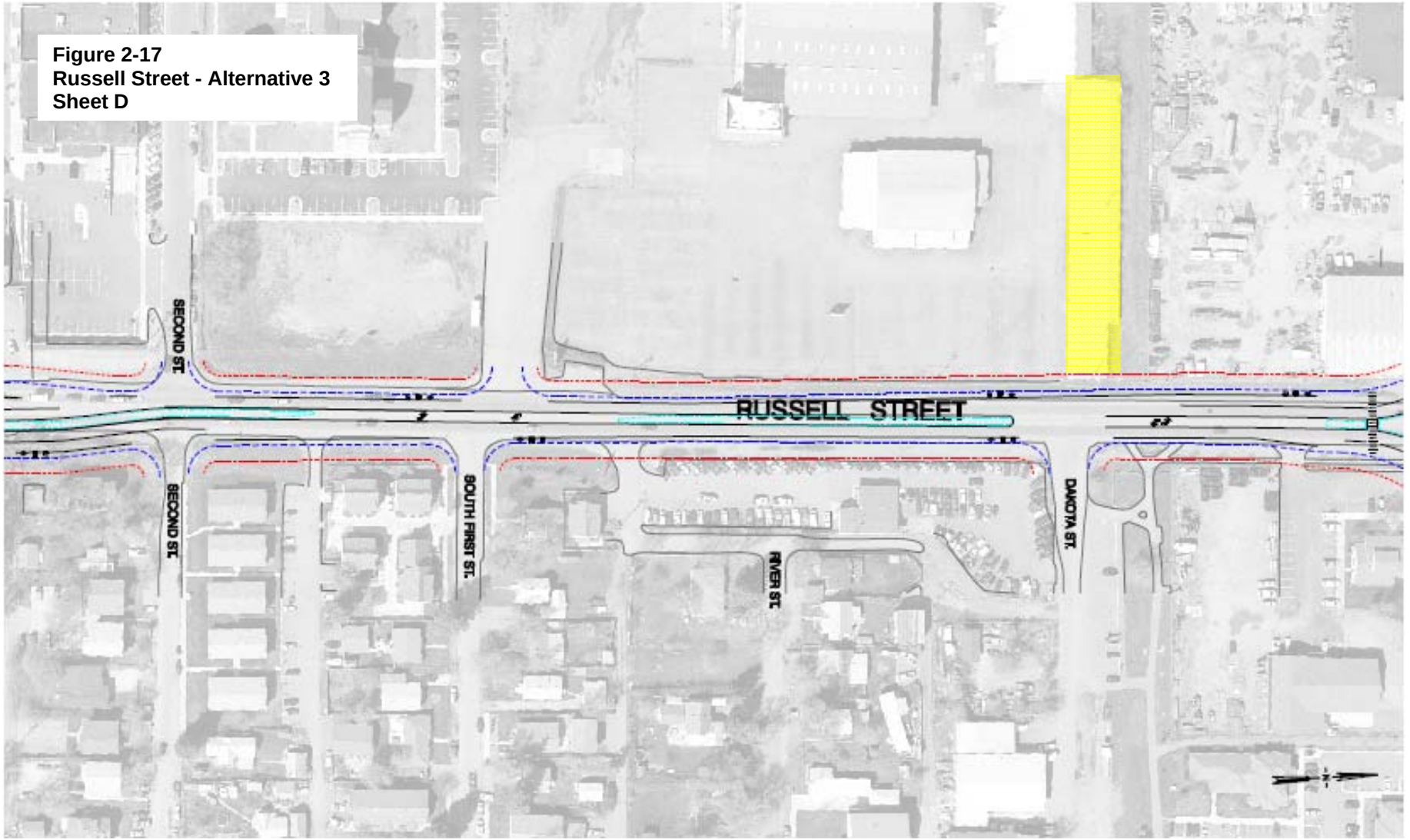
Figure 2-17
Russell Street - Alternative 3
Sheet D



Residential Property Acquisition

Commercial Property Acquisition

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Figure 2-17
Russell Street - Alternative 3
Sheet E

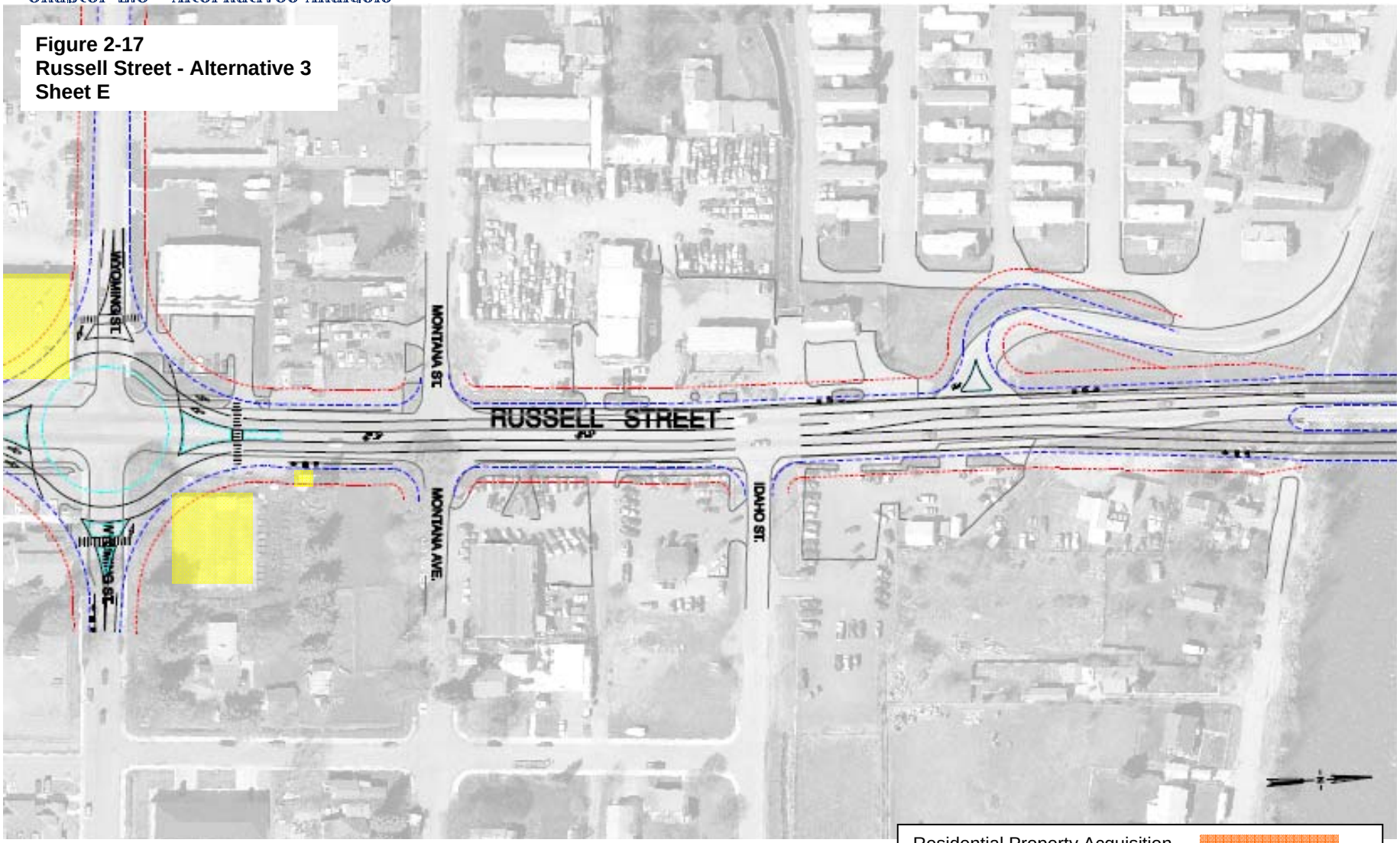

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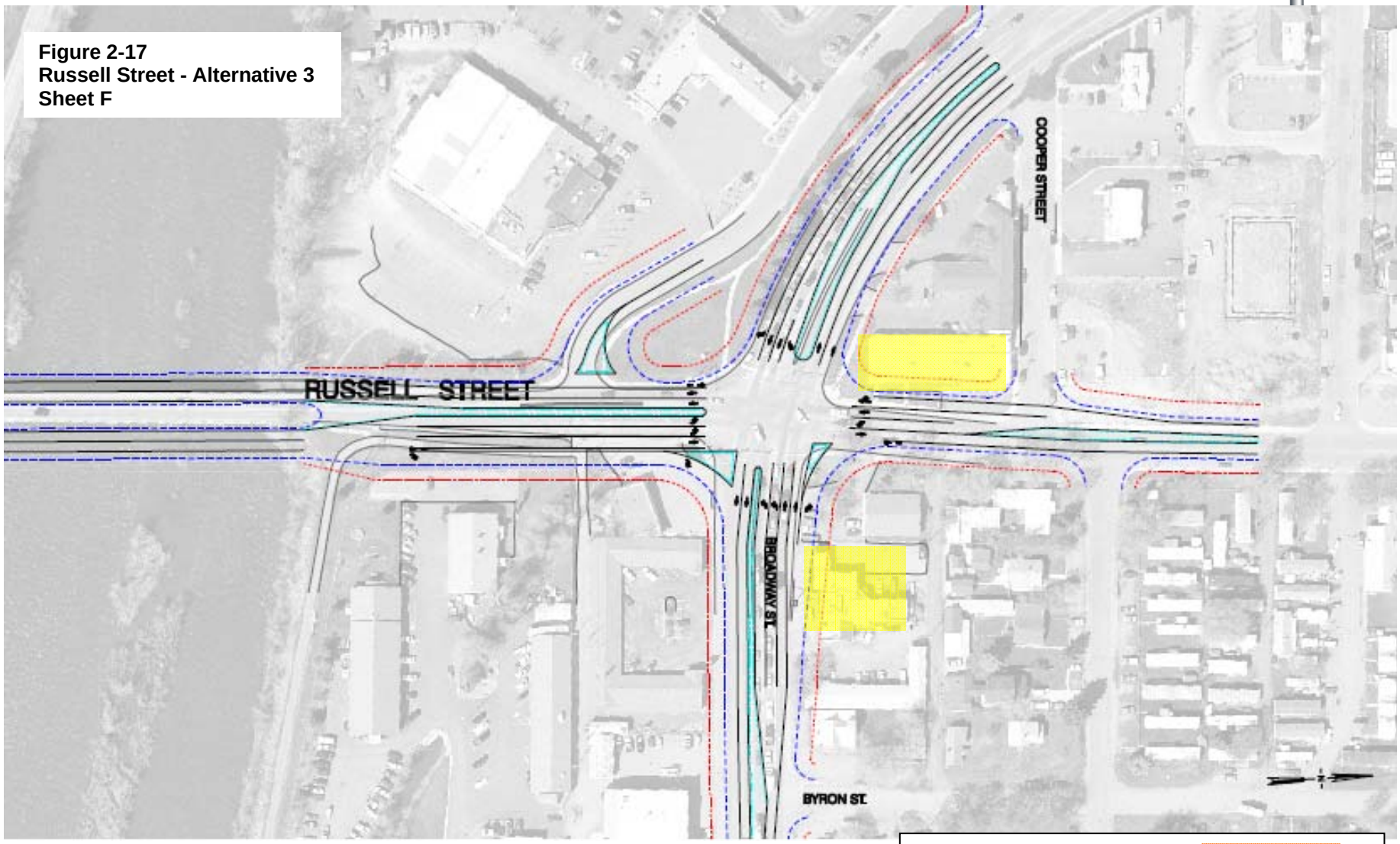
Figure 2-17
Russell Street - Alternative 3
Sheet F



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Alternative 4 - 4+ Lanes with Signals

Lane Configuration:

Four travel lanes from Mount Avenue/South 14th Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

none

Single-Lane Roundabouts at:

none

Signal Control at:

Mount Avenue/South 14th Street (existing)
South 5th Street (existing)
South 3rd Street (existing)
Wyoming Street
West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on properties protected under Section 4(f).

Residential Impacts under Alternative 4

Full Acquisition*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
521 Russell St. 1445 5th St. 802 Russell St. 824 Russell St. 1000 Russell St. 1010 Russell St. 915 Kern St. 935 Kern St. 941 Kern St. 1012 Kern St. 1016 Kern St.	820 Russell St. 1436 S. 4th St	1439 4th St. W 738 Russell St. 808 Russell St. 1501 11th St.	1431 3rd St. 1501 4th St. W 1502 6th St. W 1501 6th St. W 1500 7th St. W 1500 8th St. W 1501 10th St. 1500 11th St. W 1501 5th St.	915 Russell St. 1501 1500 ½ 7th St. 1501 9th St. W 1135 10th St. W 1501 Russell St. 1500 14th St. W 1516 & 1516 1/2 12th

Commercial Impacts under Alternative 4

Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1440 Broadway St. 1500 Broadway St. 1400 Wyoming St.. 500 Russell St 501 Russell St. 1440 S. 5th St.. 1120 Russell St. 1035 Ronan St. Montana Rail Link 1204 Mount Ave. (Previously 1208 Mount Ave.)	1407 River Rd. 1503 Montana St. (Previously 1503 Russell St.) 121 Russell St. 1515 Wyoming 1451 W. Broadway Mount and Russell St. 1440 S. 5th St.	1427 W. Broadway	403 Russell St. 1440 Russell St. 1540 W. Broadway 1437 1st St. W 1007 Mount Ave.	140 Russell St. 1417 S. 3rd St. 100 Russell St. 1520 Russell St. 1427 2nd St.

* "Direct Impact" implies that the existing structure is in conflict with the proposed construction limits. This does not necessarily mean that further avoidance measures cannot be explored or that the entire parcel would need to be acquired.

Figure 2-18
Russell Street - Alternative 4
Sheet A

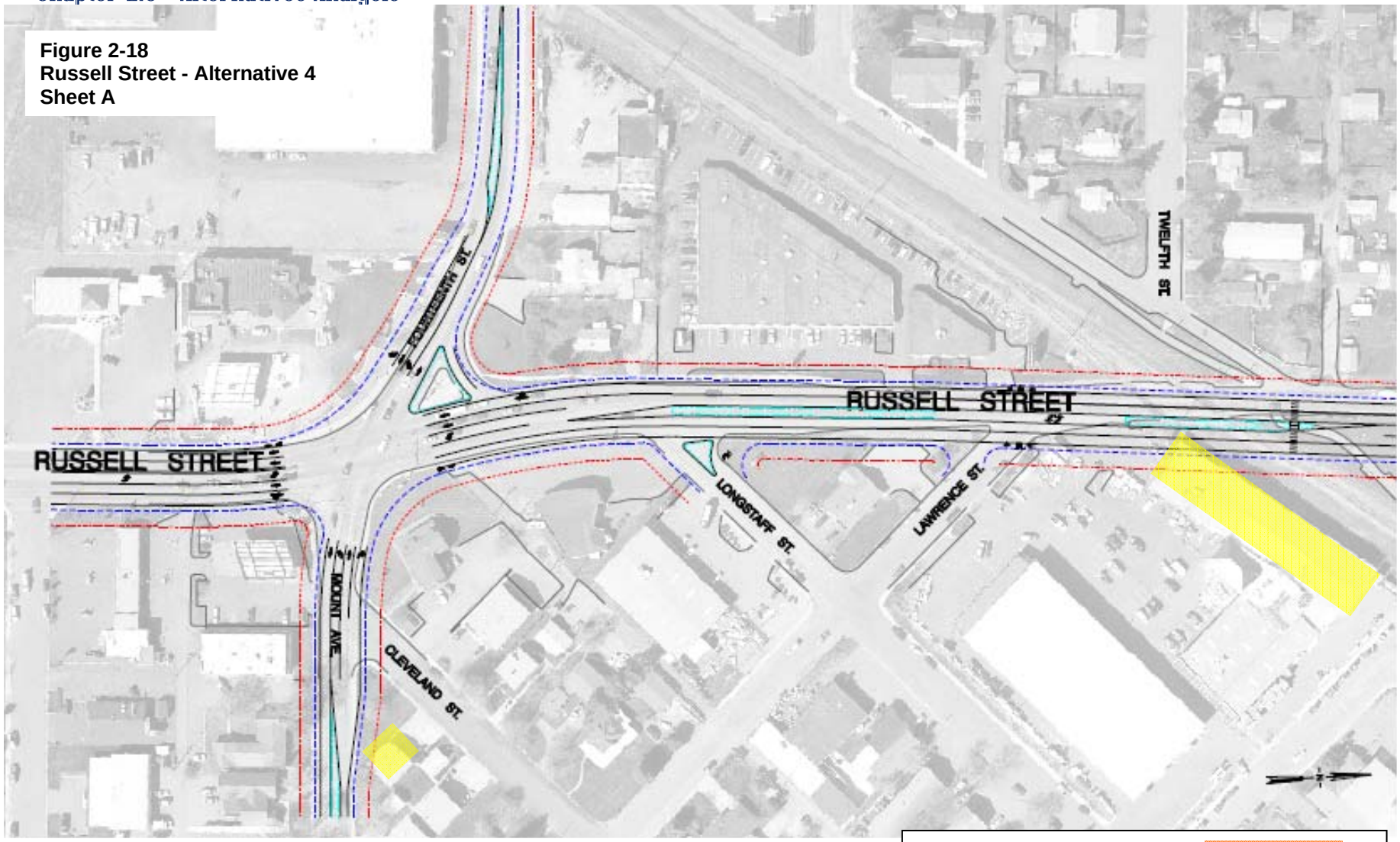

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Figure 2-18
Russell Street - Alternative 4
Sheet B

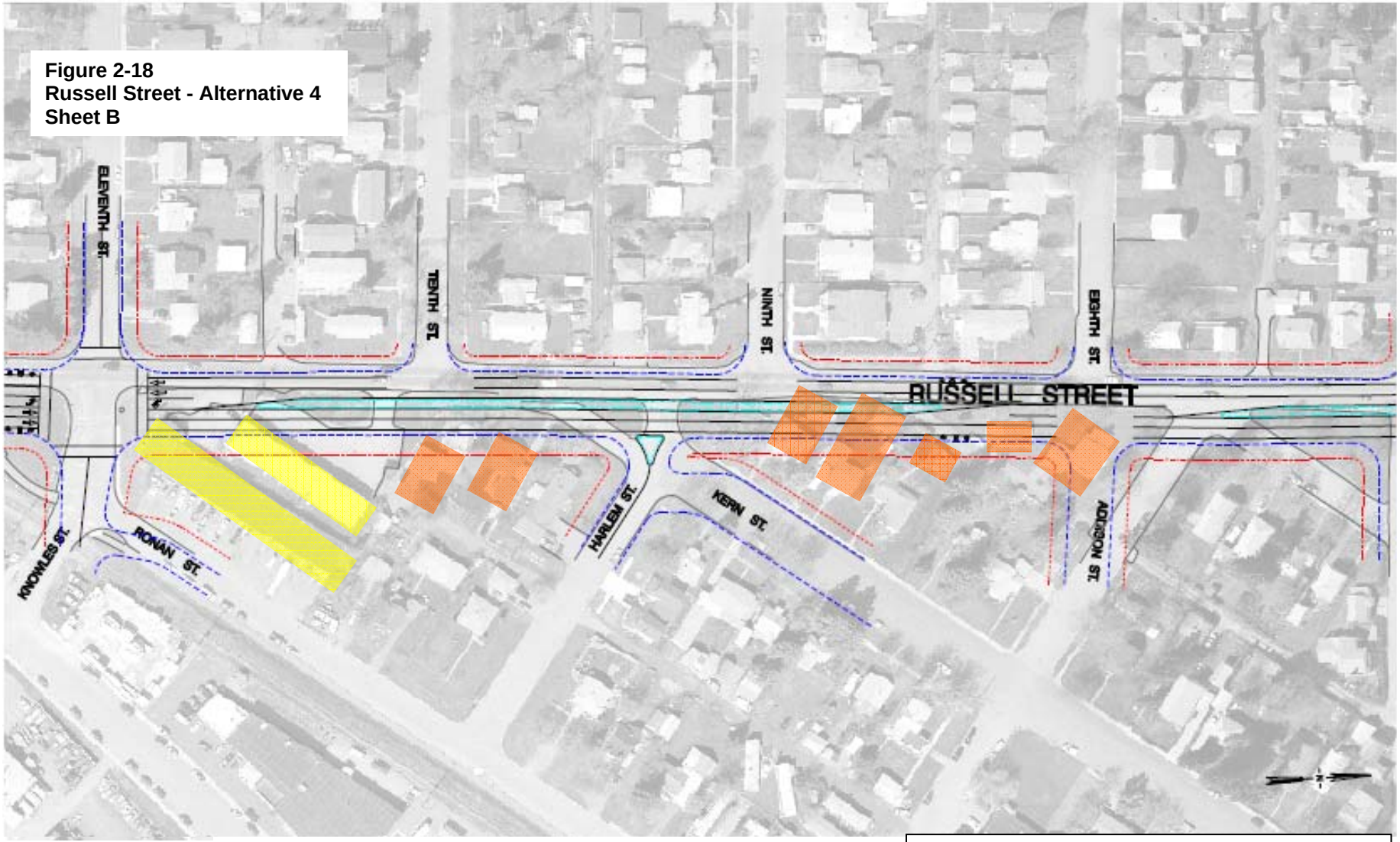

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Figure 2-18
Russell Street - Alternative 4
Sheet C

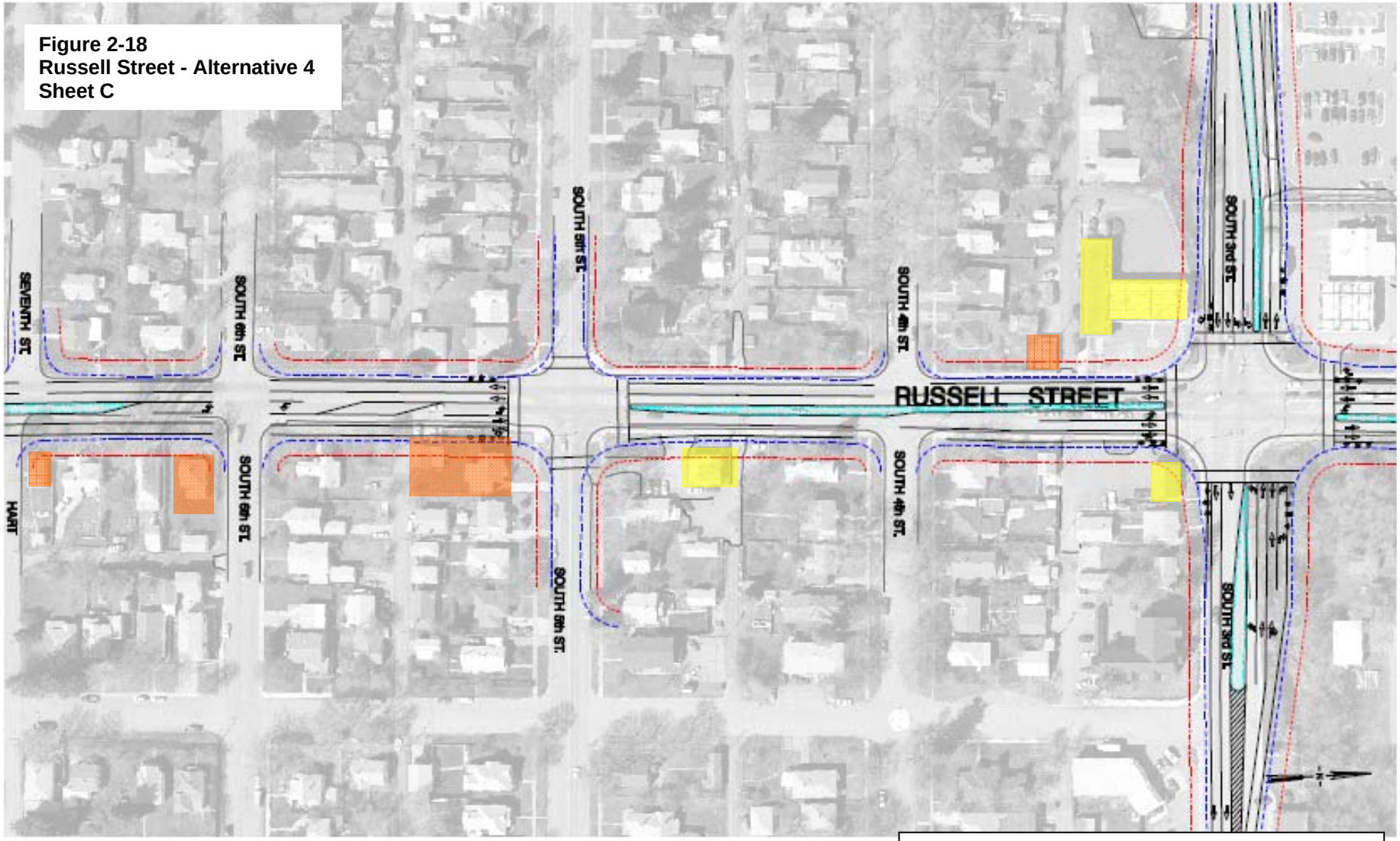

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Figure 2-18
Russell Street - Alternative 4
Sheet D

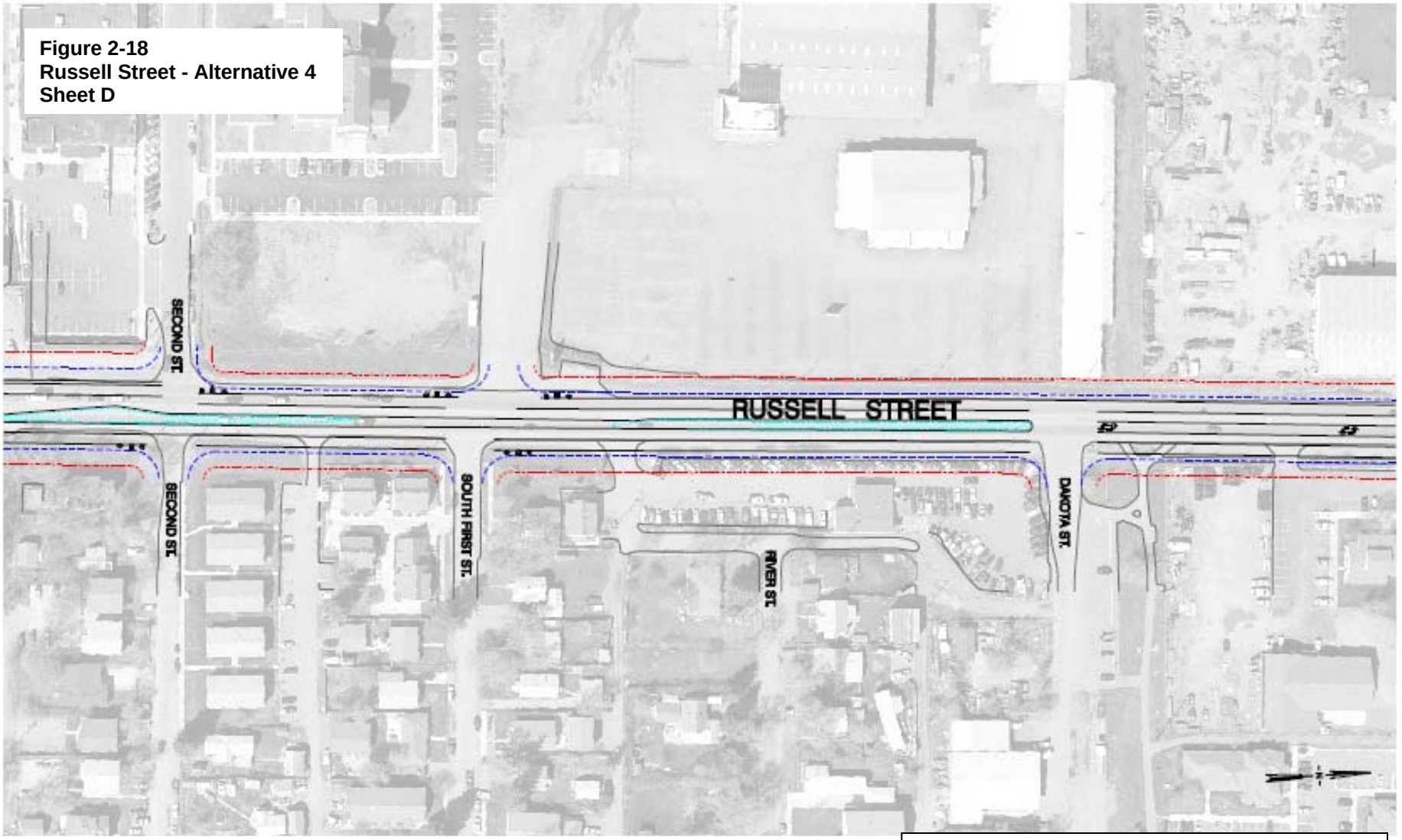

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Figure 2-18
Russell Street - Alternative 4
Sheet E

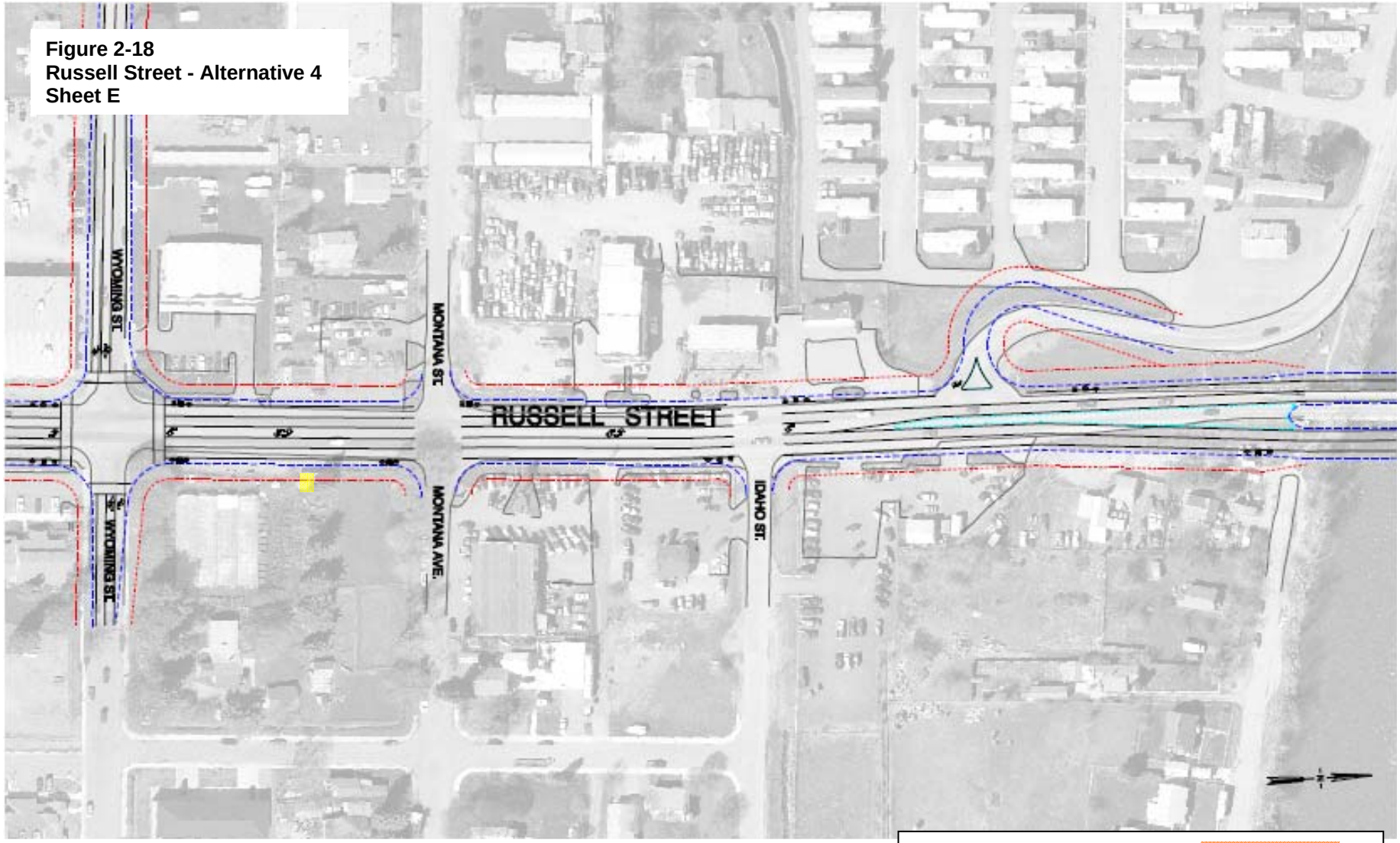

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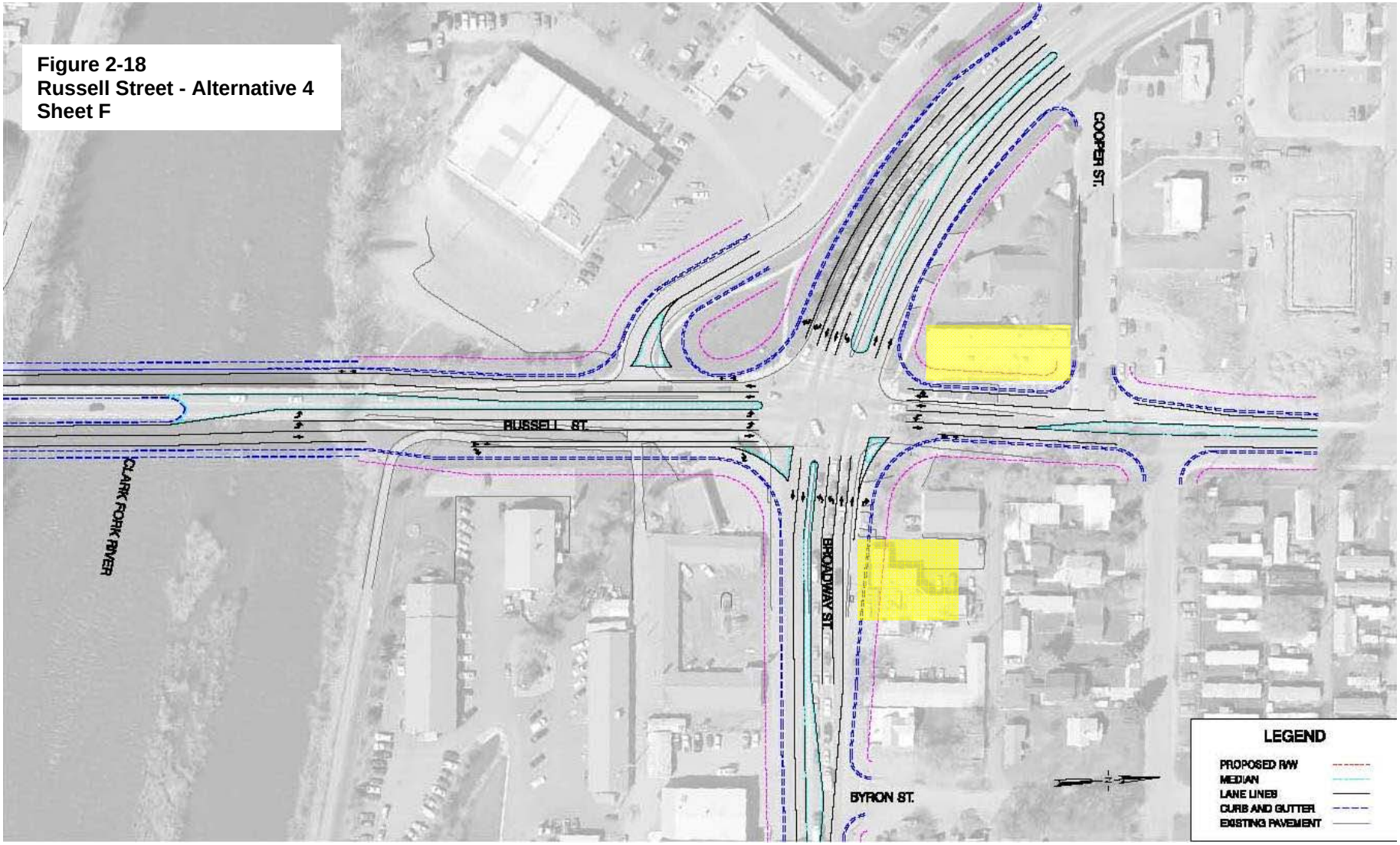
Figure 2-18
Russell Street - Alternative 4
Sheet F



Residential Property Acquisition

Commercial Property Acquisition

All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alternative 5 - 4+ Lanes with Roundabouts

Lane Configuration:

Four travel lanes from Mount Avenue/South 14th Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

Mount Avenue/South 14th Street
South 5th Street
South 3rd Street
Wyoming Street
South 11th Street

Single-Lane Roundabouts at:

none

Signal Control at:

West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on properties protected under Section 4(f).

Residential Impacts under Alternative 5

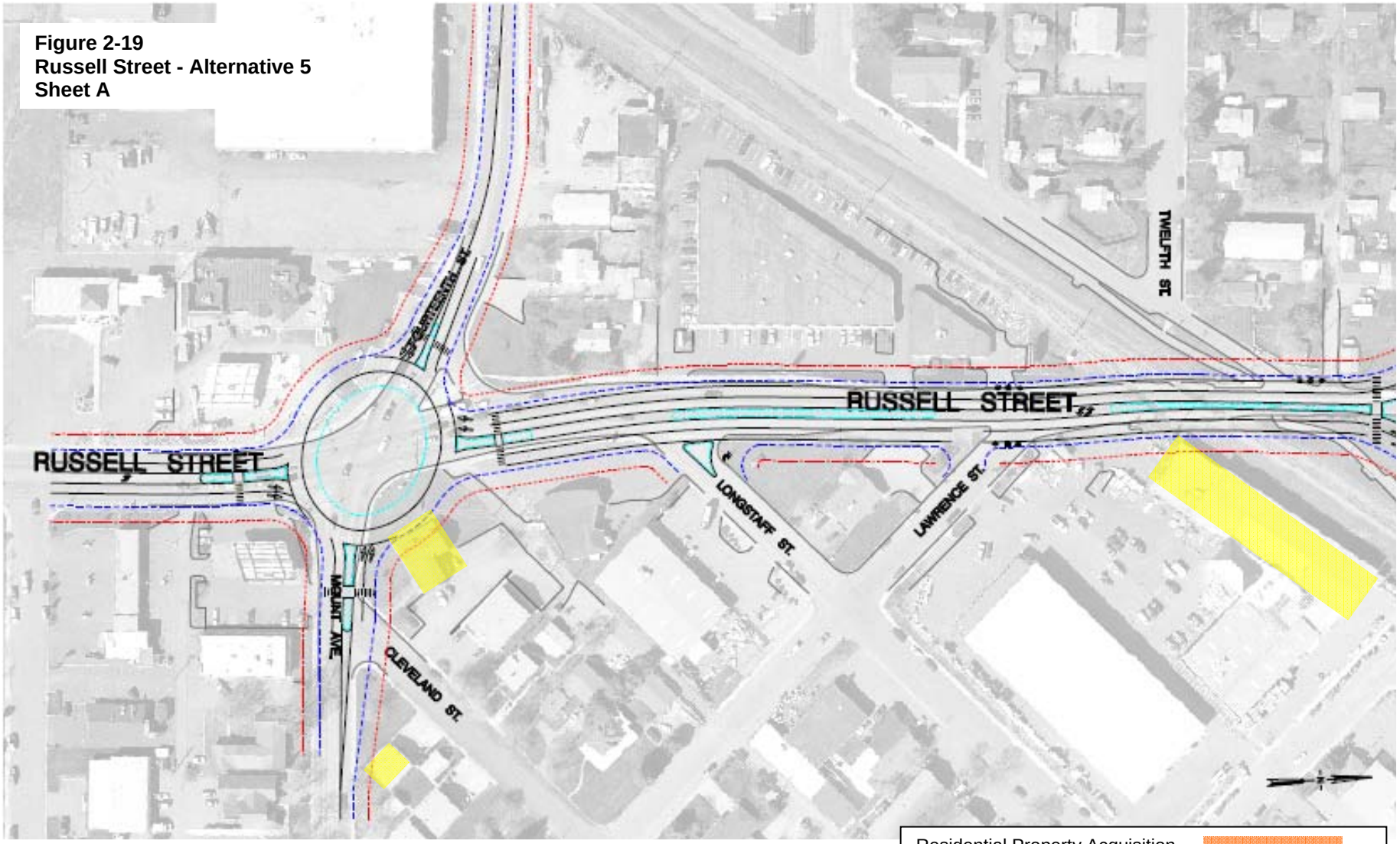
Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1508 5th St. 1439 5th St. 1445 5th St. 1501 5th St. 1509 5th St. 802 Russell St. 820 Russell St. 824 Russell St. 1000 Russell St. 1010 Russell St. 915 Kern St. 935 Kern St. 941 Kern St. 1012 Kern St. 1016 Kern St. 1520 11th St. 1500 11th St. W 1501 11th St.	808 Russell St. 738 Russell St. 521 Russell St.	1431 3rd St. 1436 4th. St. W 1501 4th St. W 1501 S. 10th St.	1439 4th St. W 1510 S. 5th St. 1502 6th St. W 1501 6th St. W 1501 Russell St.	1405 S. 5th St. 1500 7th St. W 915 Russell St. 1500 8th St. W 1501 9th St. W 1135 10th St. W

Commercial Impacts under Alternative 5

Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1500 Broadway St. 1440 Broadway St. 1400 Wyoming St. 1515 Wyoming St. 403 Russell St. 500 Russell St. 501 Russell St. 1440 5th St. 1120 Russell St. 1035 Ronan St. Montana Rail Link 1204 Mount Ave. (Previously 1208 Mount Ave.) 1520 Russell St.	1407 River Rd. 1503 Montana St. (Previously 1503 Russell St.) 140 Russell St. 121 Russell St. 1425 5th St. 1516 12th St.	1427 W. Broadway St. 1451 Broadway St. Mount and Russell St.	1540 W. Broadway 1440 Russell St.	215 Russell St. 1437 1st St. W 1427 2nd St. W 100 Russell St. 1007 Mount Ave.

* "Direct Impact" implies that the existing structure is in conflict with the proposed construction limits. This does not necessarily mean that further avoidance measures cannot be explored or that the entire parcel would need to be acquired.

Figure 2-19
Russell Street - Alternative 5
Sheet A



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-19
Russell Street - Alternative 5
Sheet B

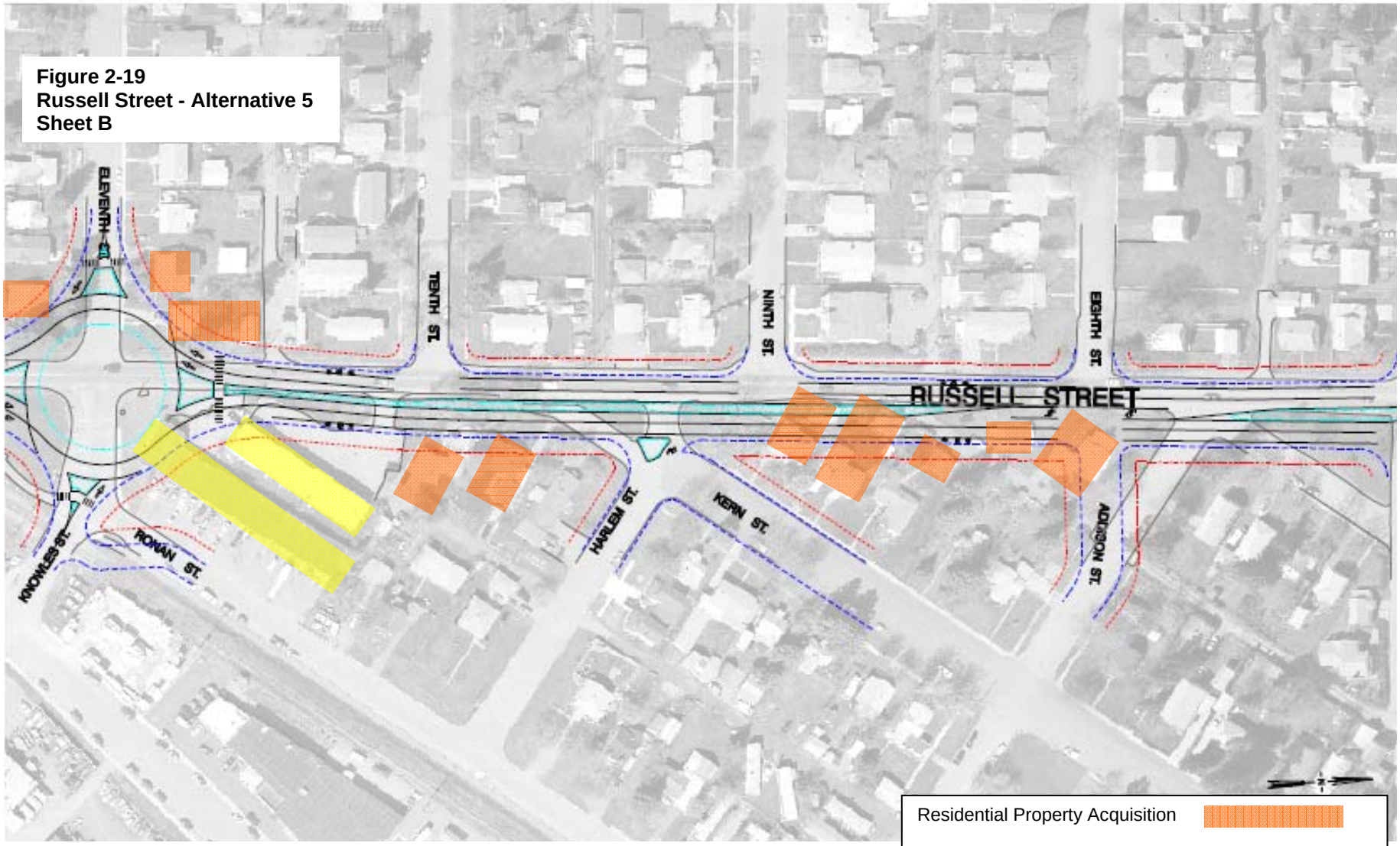


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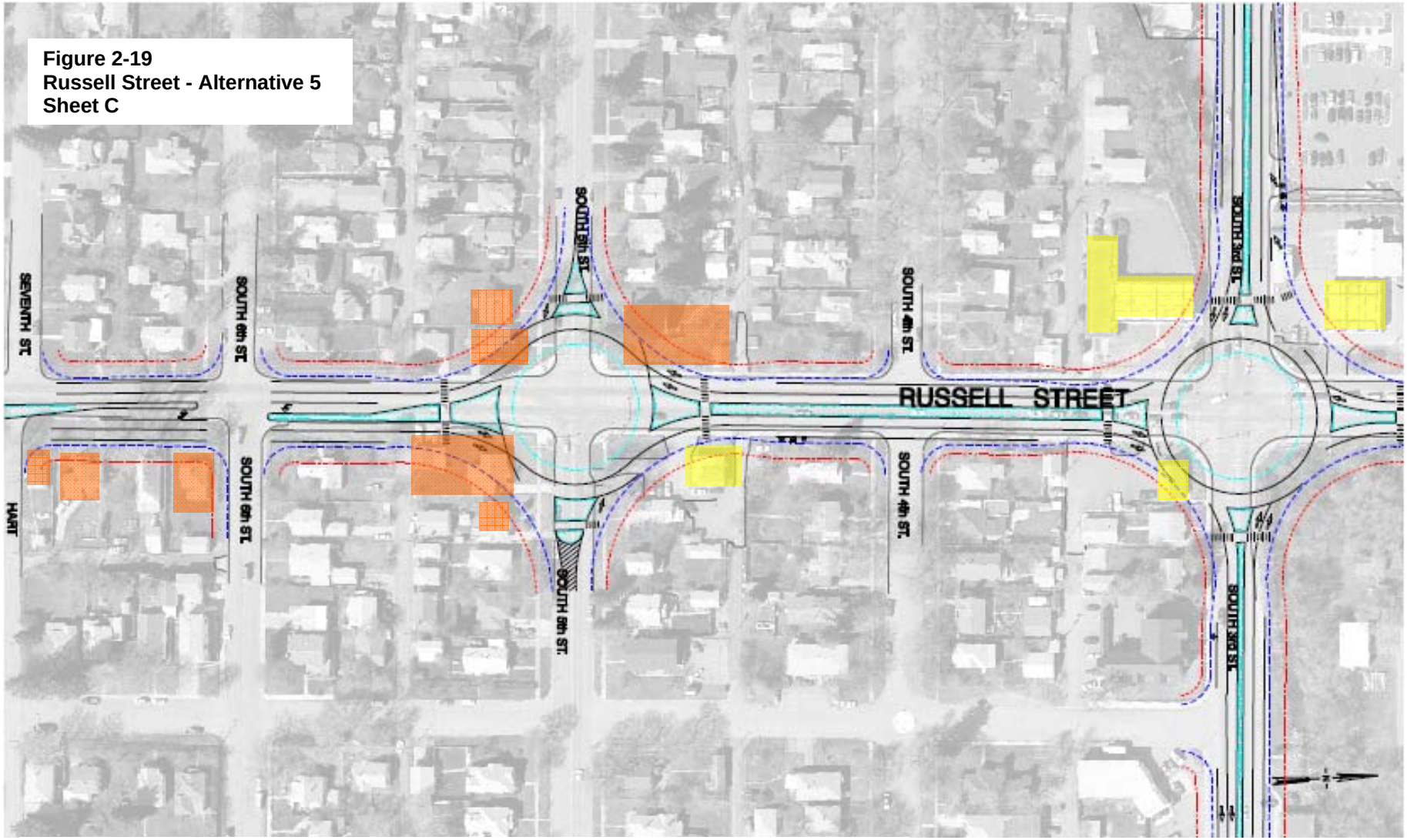
Figure 2-19
Russell Street - Alternative 5
Sheet C



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Residential Property Acquisition

Commercial Property Acquisition

Figure 2-19
Russell Street - Alternative 5
Sheet D

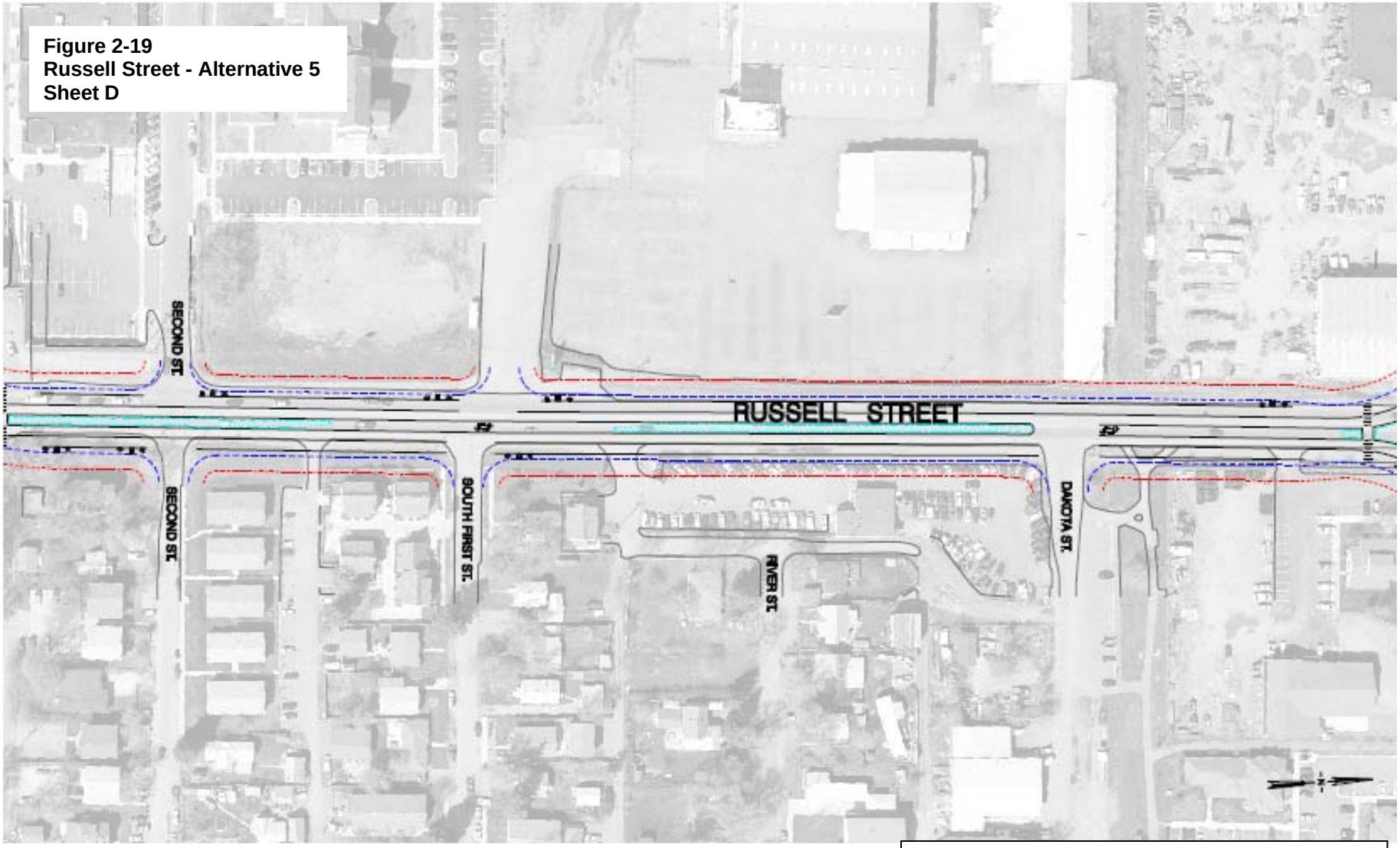

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Figure 2-19
Russell Street - Alternative 5
Sheet E

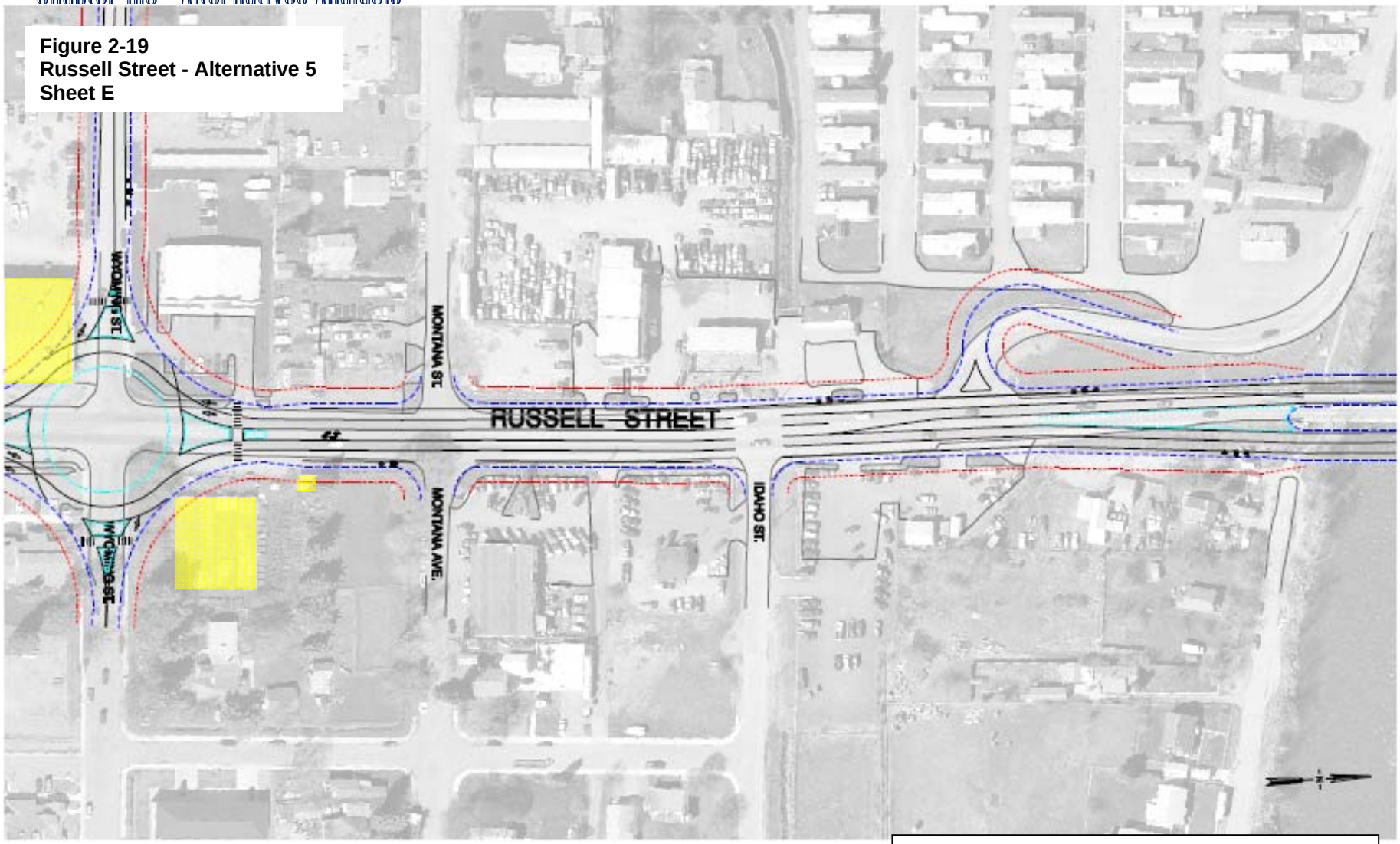

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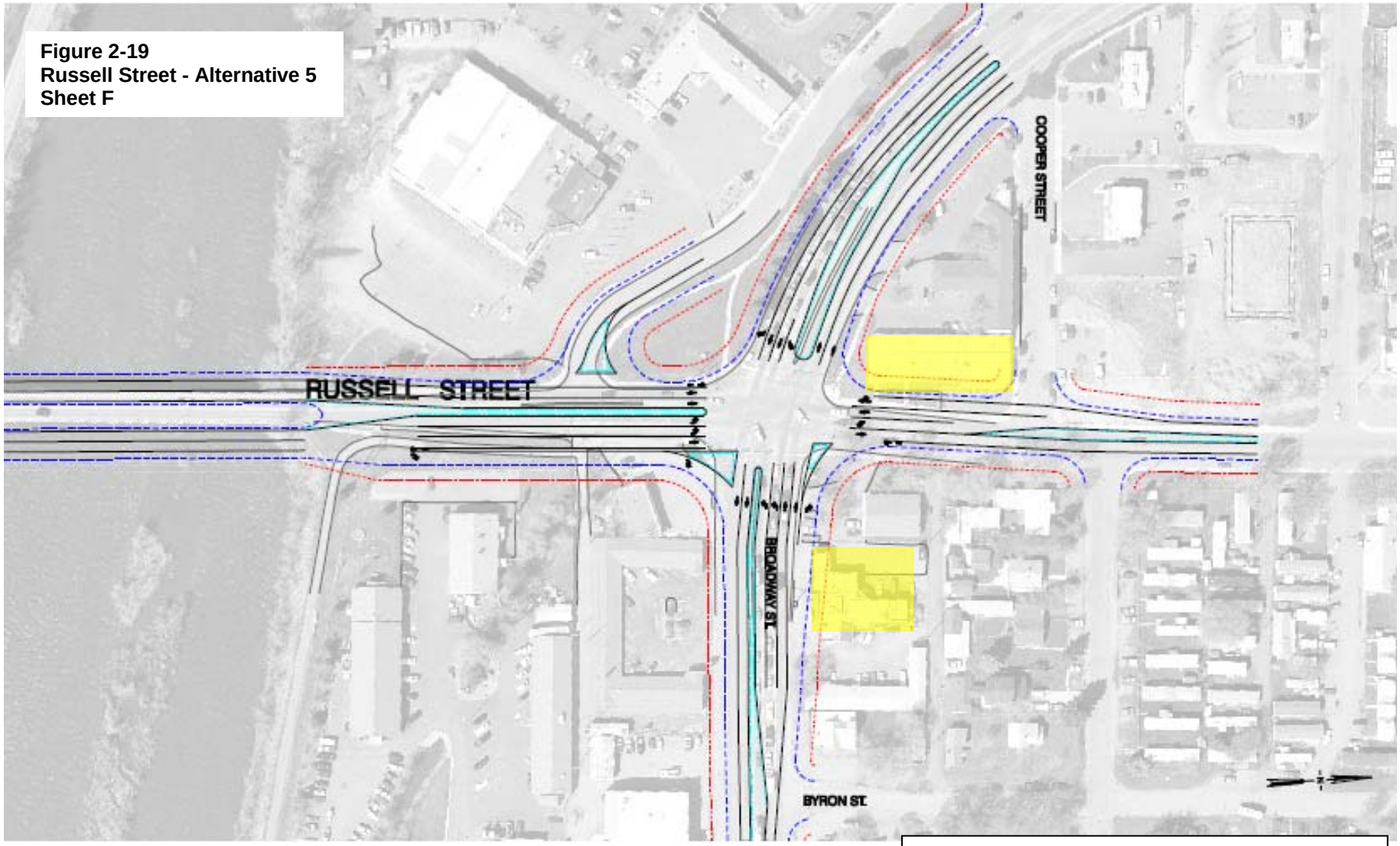
Figure 2-19
Russell Street - Alternative 5
Sheet F



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alternative B - 2 Lanes with Roundabouts

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

Schilling Street/Curtis Street
Johnson Street
Catlin Street

Signal Control at:

Reserve Street (existing)

All other streets intersecting South 3rd Street would be controlled by stop signs.

Raised median / Center turn lane:

None included in this alternative.

Alignment:

The existing alignment would be shifted to accommodate one-lane roundabouts at Curtis Street/Schilling Street, Johnson Street, and Catlin Street. The shift in alignment would minimize impacts on adjacent properties.

Residential Impacts under Alternative B

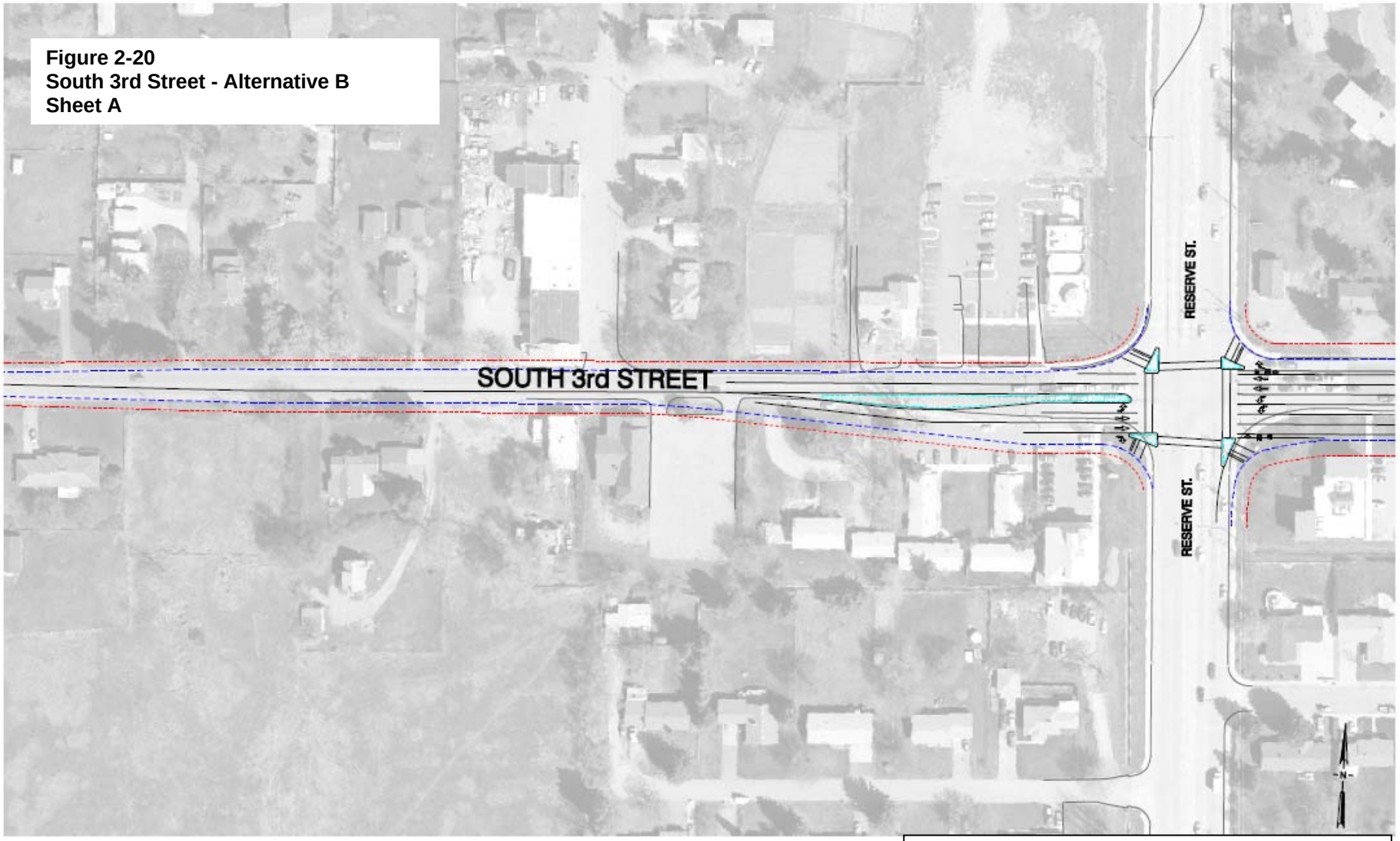
Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
2204 3rd St.	1701 3rd St. 2601 3rd St.	2415 3rd St.	1701 3rd St. 417 Curtis St. 1602 Grant St.	1701 3rd St.

Commercial Impacts under Alternative B

Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1939 3rd St.	2340 3rd St.	1301 3rd St. 1655 3rd St.	1318 3rd St. 1819 3rd St.	2207 3rd St. 3210 3rd St. W
2135 3rd St.	2600 3rd St.			
1616 3rd St. 520 Shillings St. (Previously 2140 4th St.)		2539 3rd St.	1855 3rd St. 2115 3rd St.	2316 3rd St. W 2422 3rd St.

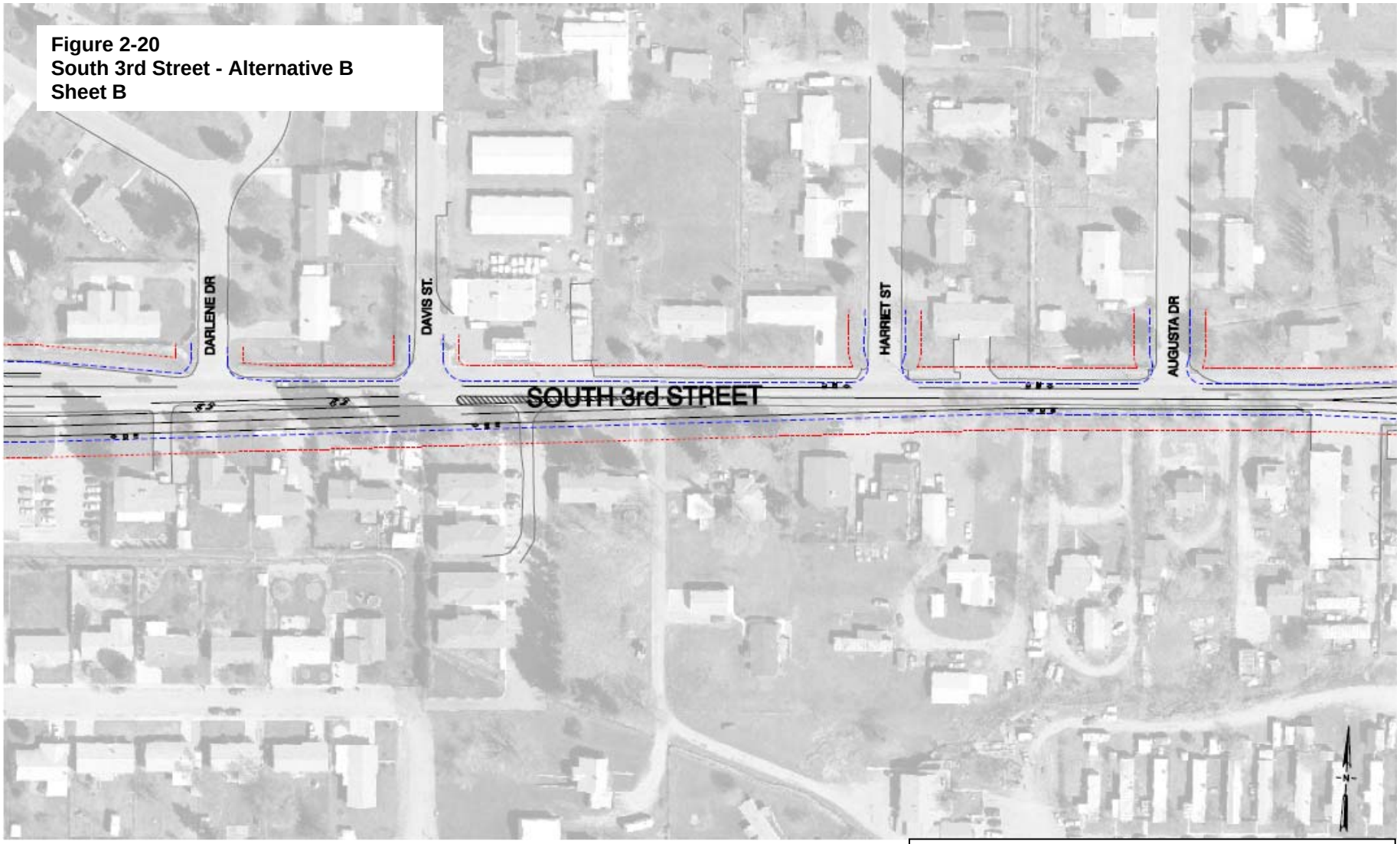
* "Direct Impact" implies that the existing structure is in conflict with the proposed construction limits. This does not necessarily mean that further avoidance measures cannot be explored or that the entire parcel would need to be acquired.

Figure 2-20
South 3rd Street - Alternative B
Sheet A



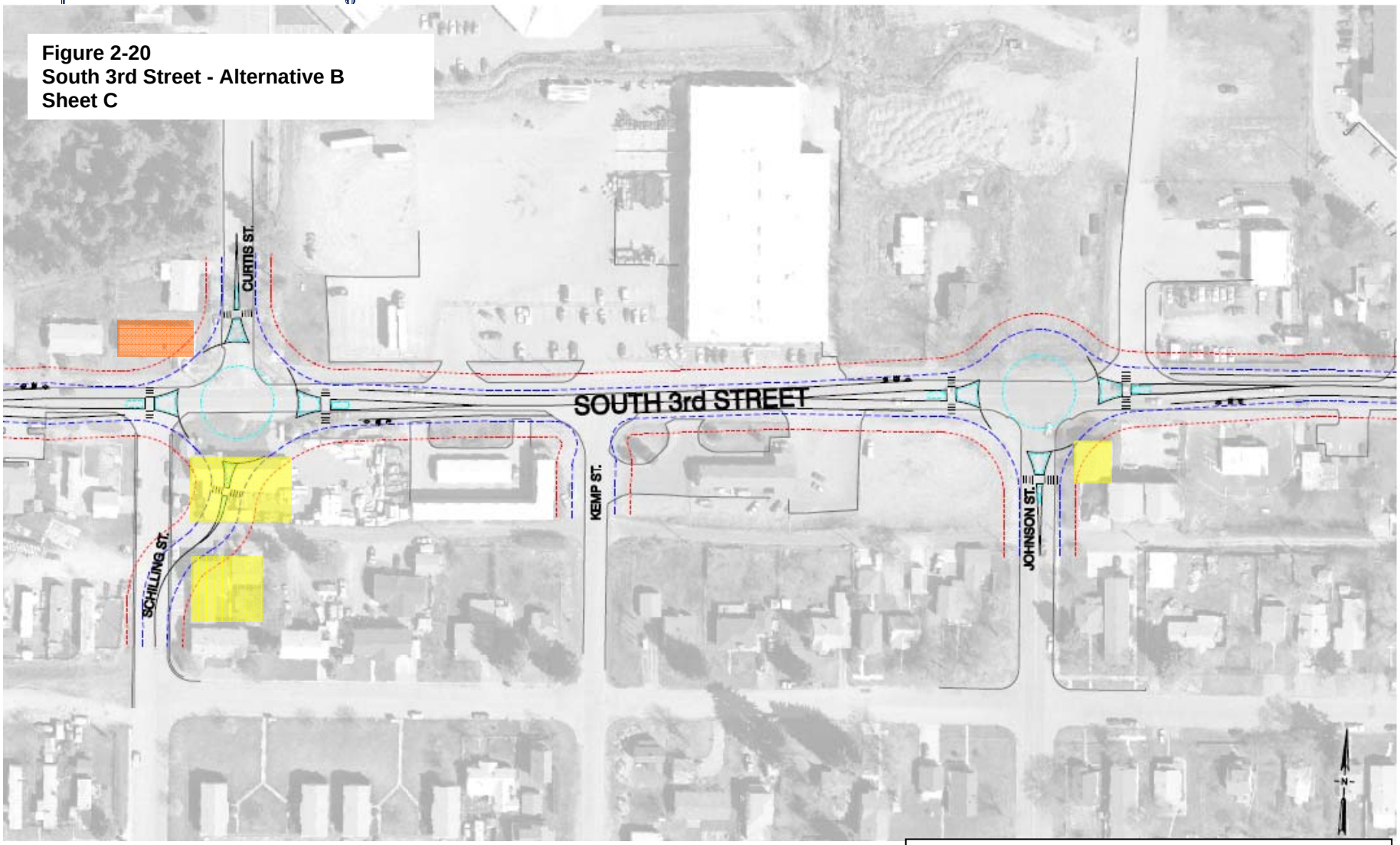
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-20
South 3rd Street - Alternative B
Sheet B



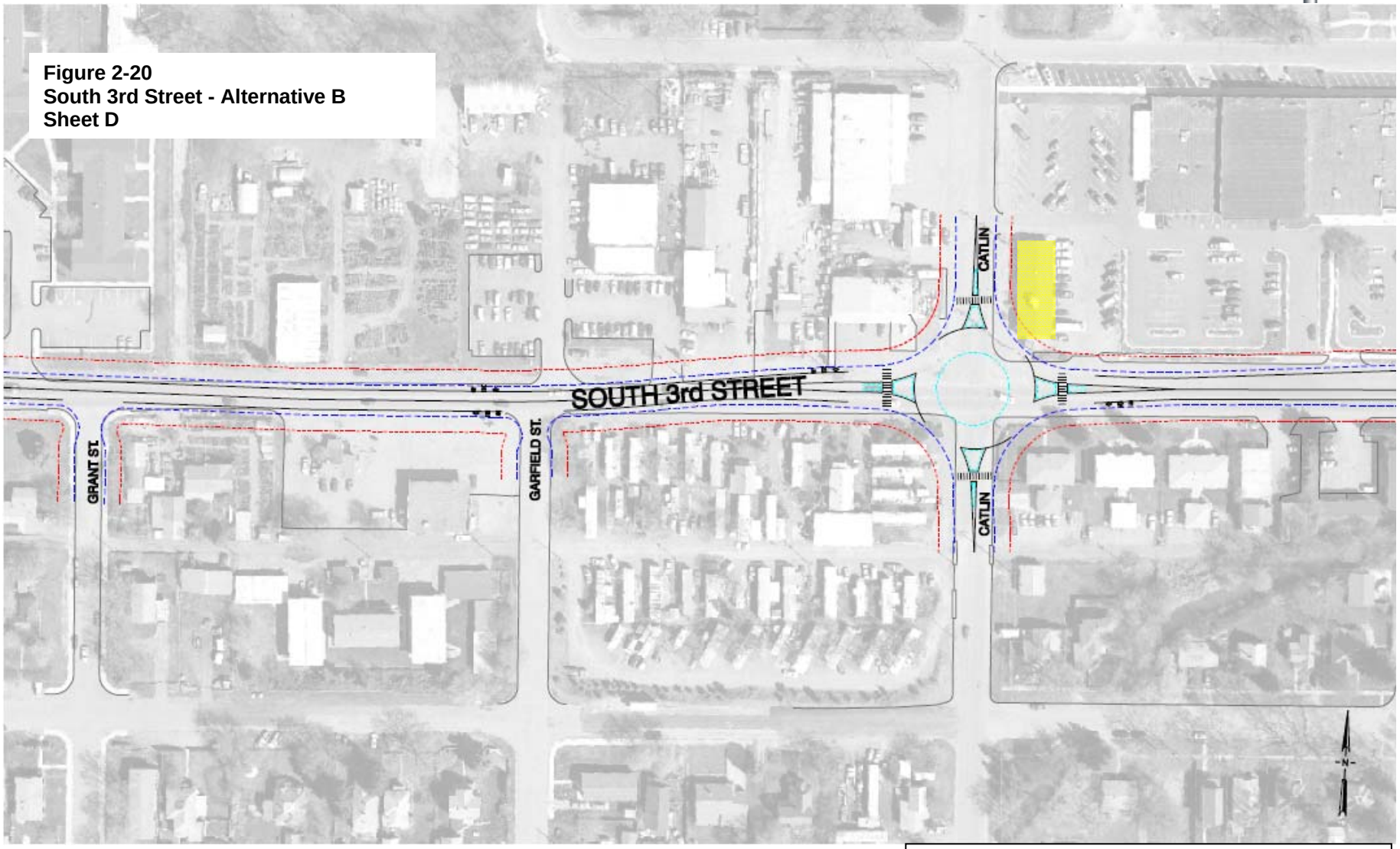
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-20
South 3rd Street - Alternative B
Sheet C



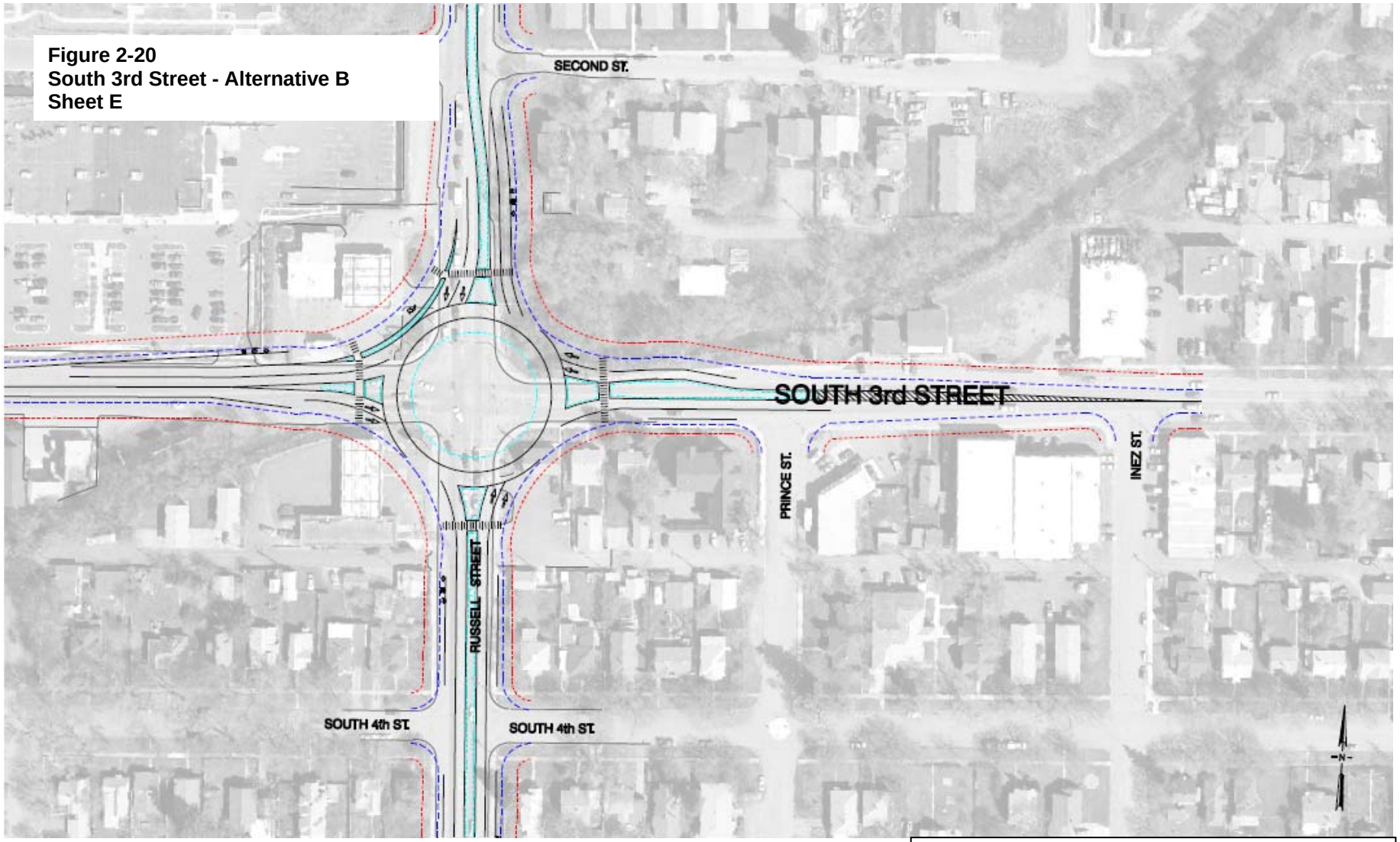
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-20
South 3rd Street - Alternative B
Sheet D



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-20
South 3rd Street - Alternative B
Sheet E



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alternative C - 2+ Lanes with Roundabouts

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

Schilling Street/Curtis Street
Johnson Street
Catlin Street

Signal Control at:

Reserve Street (existing)

All other streets intersecting South 3rd Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The existing alignment would be shifted to accommodate one-lane roundabouts at Curtis Street/Schilling Street, Johnson Street, and Catlin Street. The shift in alignment would minimize impacts on adjacent properties.

Residential Impacts under Alternative C

Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
2204 3rd St.	1701 3rd St.	1701 3rd St.	417 Curtis St.	1701 3rd St.
	2601 3rd St.	1602 Grant St.		1910 3rd St.
		2415 3rd St.		2224 3rd St.
				2422 3rd St.

Commercial Impacts under Alternative C

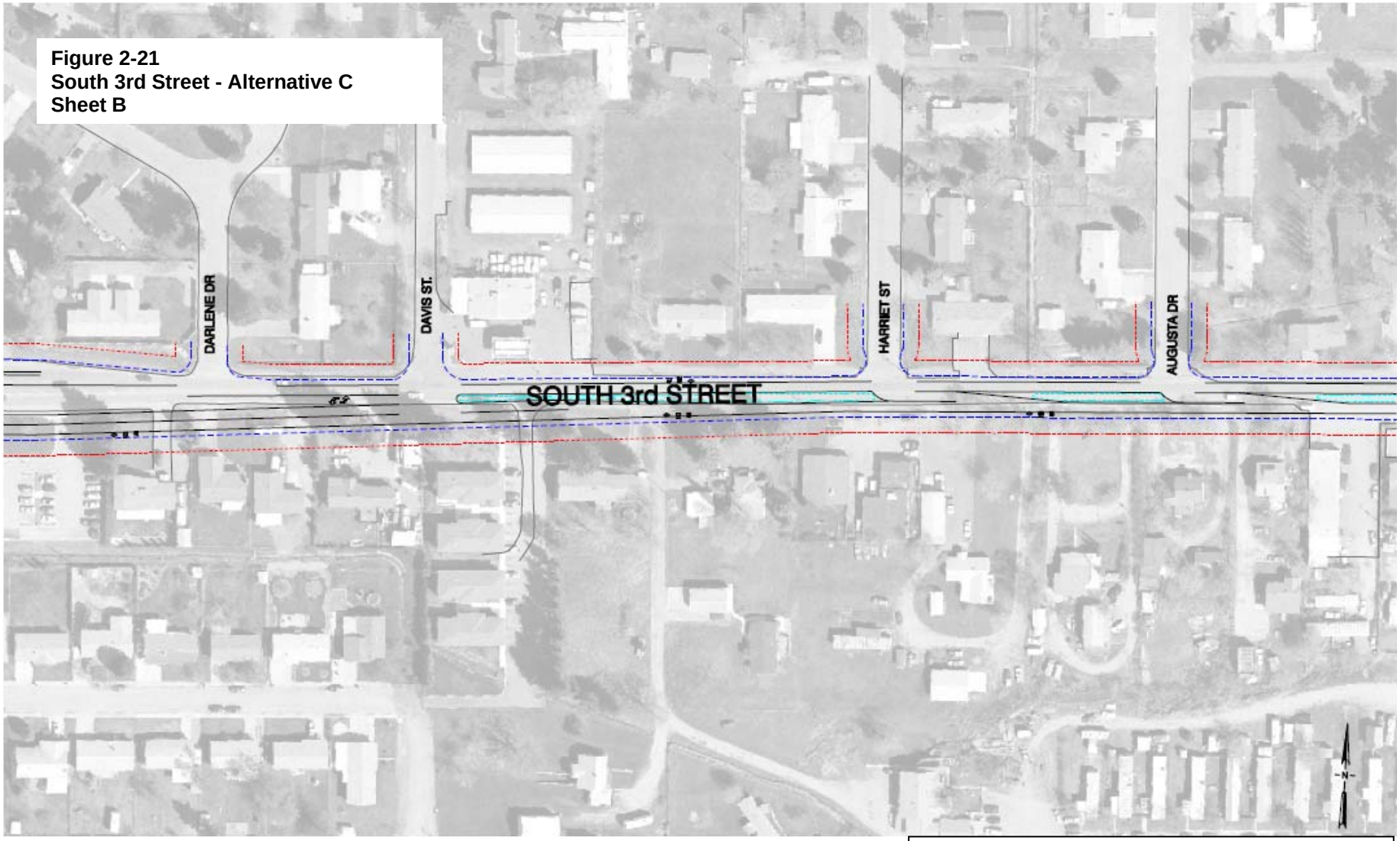
Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1939 3rd St.	520 Shillings St. (Previously 2140 4th St.)	1301 3rd St.	1290 3rd St.	1920 3rd St.
2135 3rd St.	2340 3rd St.	1819 3rd St.	1541 3rd St.	2002 3rd St.
1318 3rd St.	2600 3rd St.	1855 3rd St.	1655 3rd St.	2310 3rd St.
1616 3rd St.		2539 3rd St.	2115 3rd St.	2316 3rd St.
			2207 3rd St.	

* "Direct Impact" implies that the existing structure is in conflict with the proposed construction limits. This does not necessarily mean that further avoidance measures cannot be explored or that the entire parcel would need to be acquired.

Figure 2-21
South 3rd Street - Alternative C
Sheet A

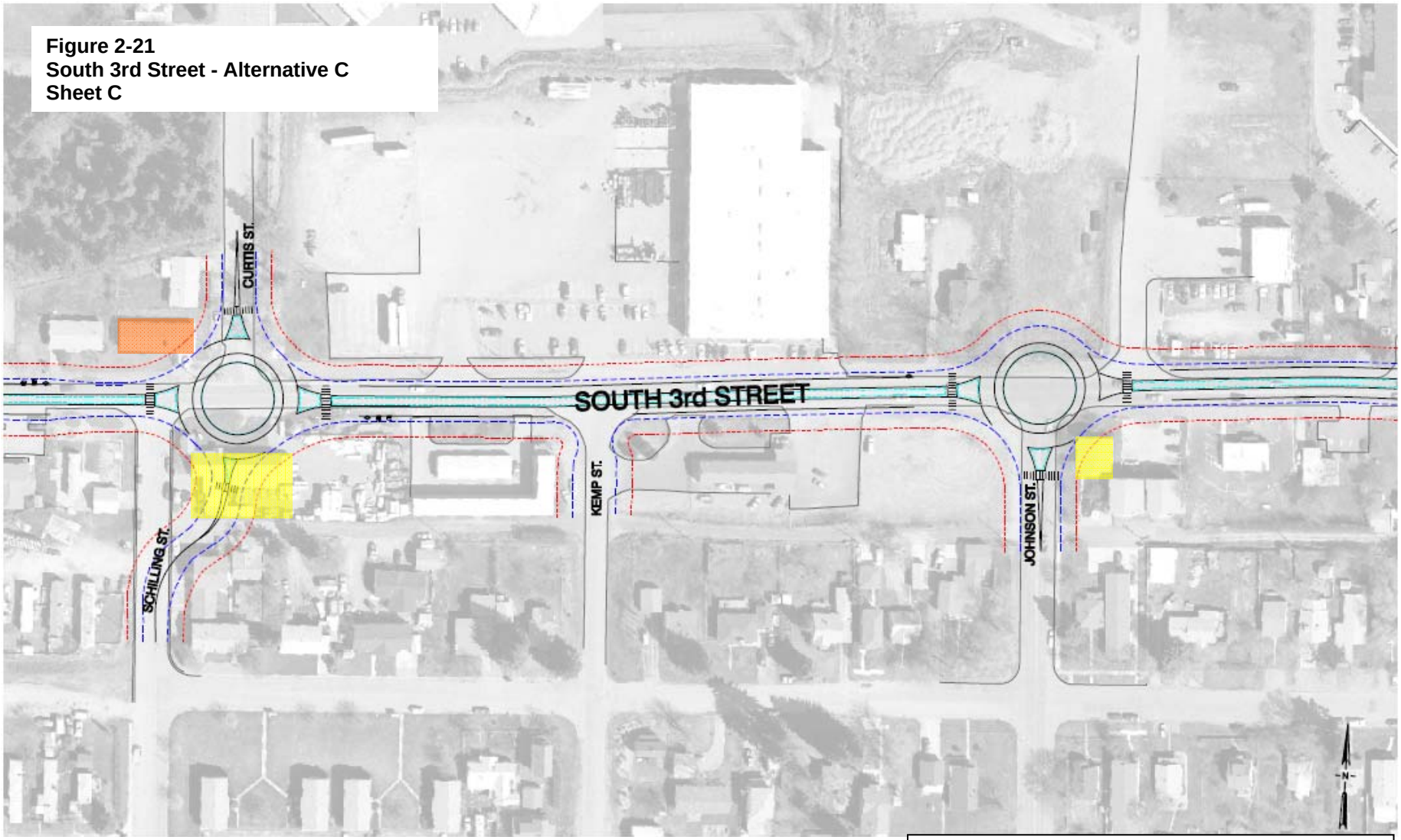
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-21
South 3rd Street - Alternative C
Sheet B



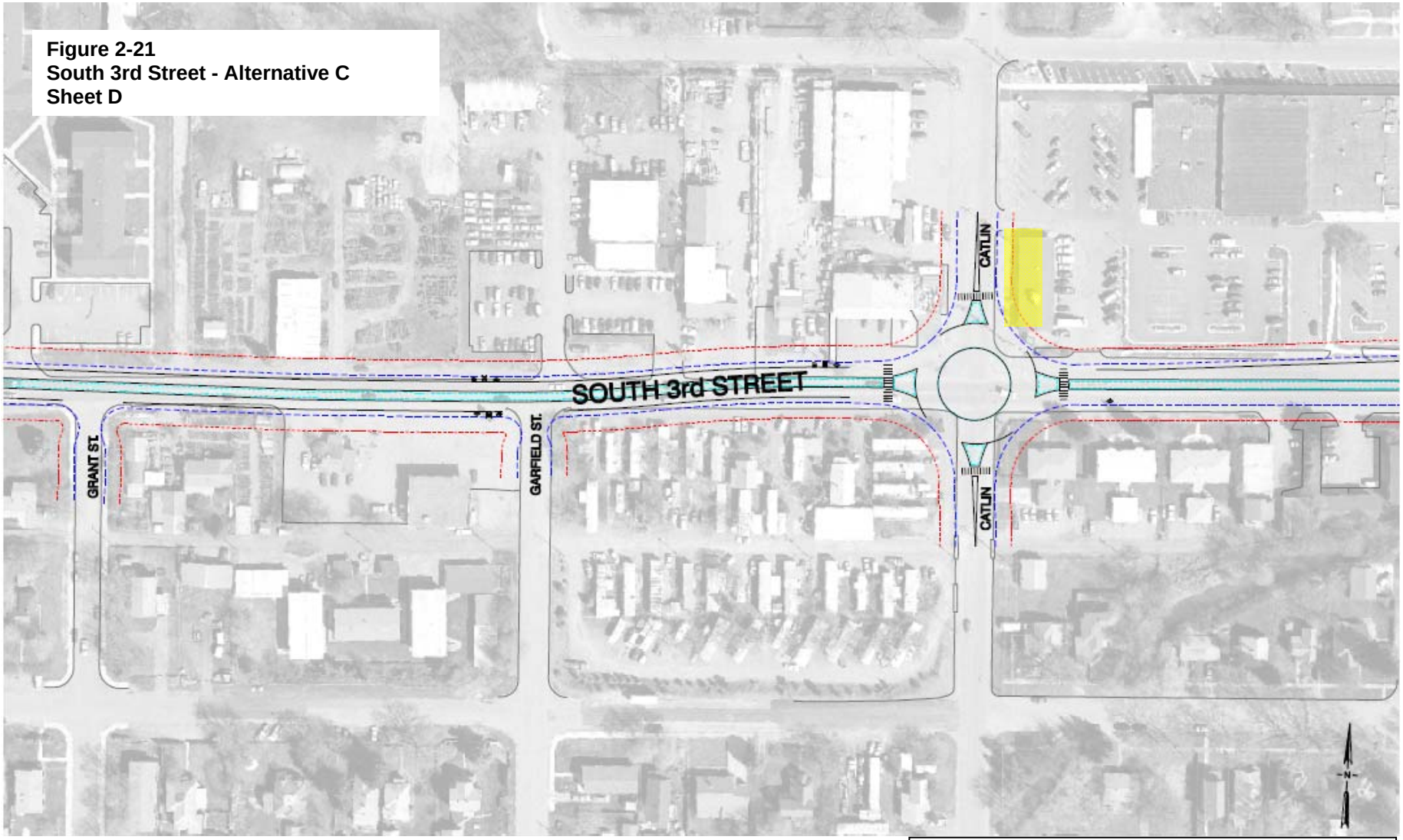
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-21
South 3rd Street - Alternative C
Sheet C



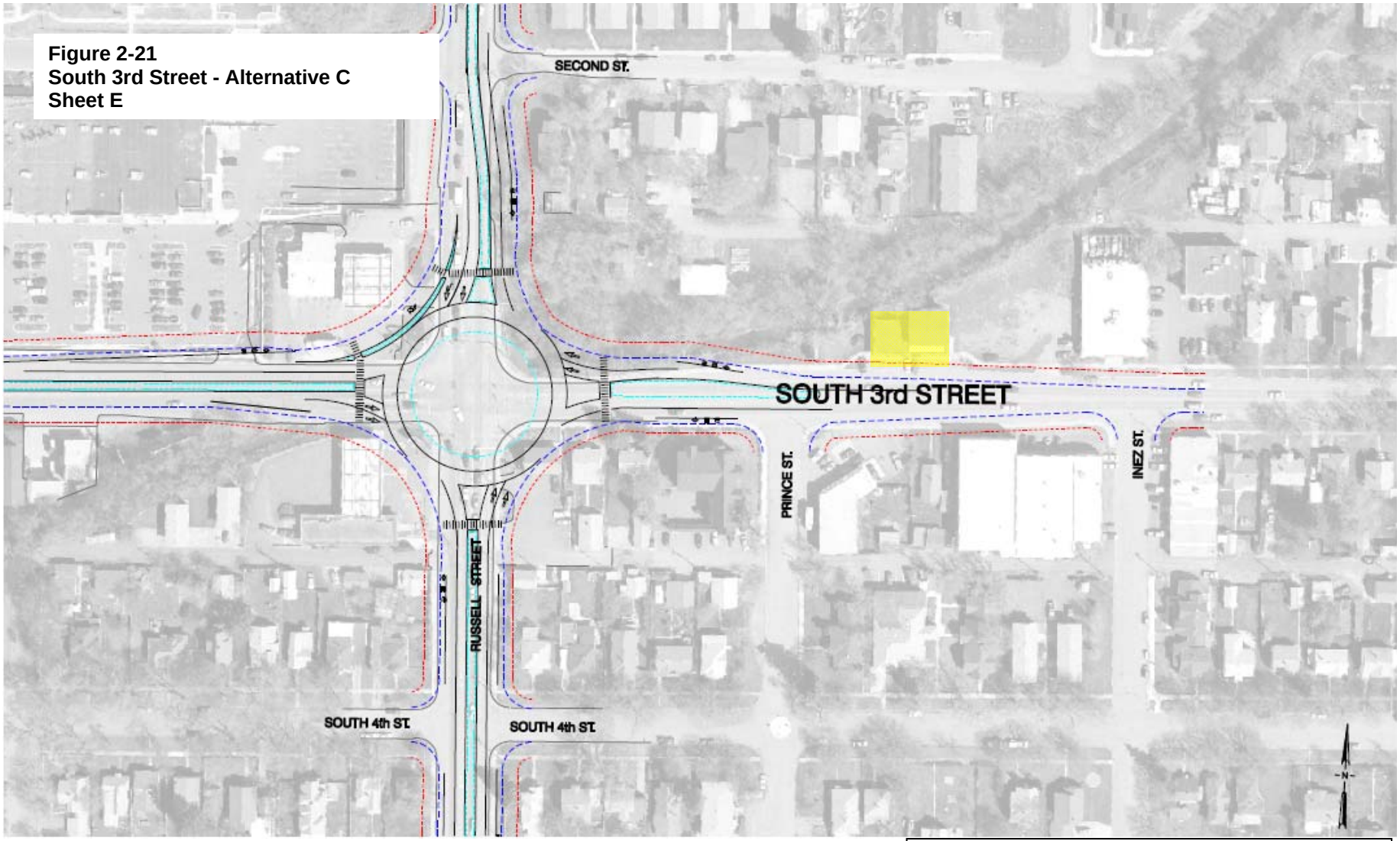
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-21
South 3rd Street - Alternative C
Sheet D



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-21
South 3rd Street - Alternative C
Sheet E



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alternative D - 3+ Lanes with Signals

Lane Configuration:

Three travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

None

Signal Control at:

Reserve Street (existing)
Schilling Street/Curtis Street
Johnson Street
Catlin Street

All other streets intersecting South 3rd Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The proposed alignment would generally follow the centerline of the existing alignment.

Residential Impacts under Alternative D

Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
	1701 3rd St.	1701 3rd St.	1701 3rd St.	1701 3rd St.
	2601 3rd St.	1602 Grant St.	417 Curtis St.	2422 3rd St.
		1910 3rd St.	2224 3rd St.	
		2204 3rd St.	2213 3rd St.	
		2415 3rd St.		
		2539 3rd St.		

Commercial Impacts under Alternative D

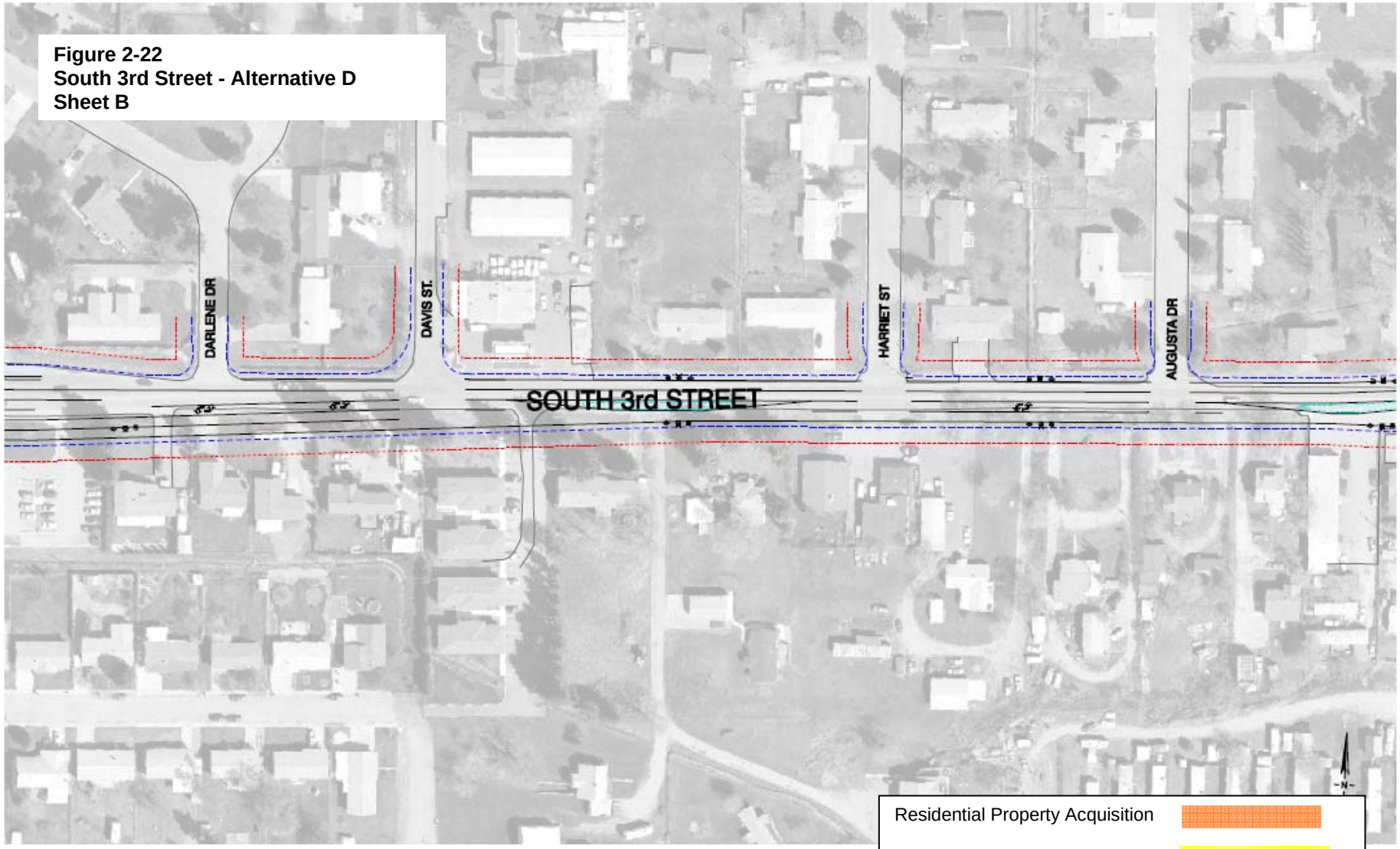
Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1318 3rd St.	1939 3rd St.	1301 3rd St.	1290 3rd St.	2002 3rd St.
1819 3rd St.	2207 3rd St.	1855 3rd St.	1541 3rd St.	2249 3rd St.
2135 3rd St.	2340 3rd St.	1920 3rd St.	2115 3rd St.	2310 3rd St. W
	2600 3rd St.	1616 3rd St.	520 Shillings St. (Previously 2140 4th St.)	2316 3rd St.
			2221 3rd St.	1655 3rd St.

* "Direct Impact" implies that the existing structure is in conflict with the proposed construction limits. This does not necessarily mean that further avoidance measures cannot be explored or that the entire parcel would need to be acquired.

Figure 2-22
South 3rd Street - Alternative D
Sheet A

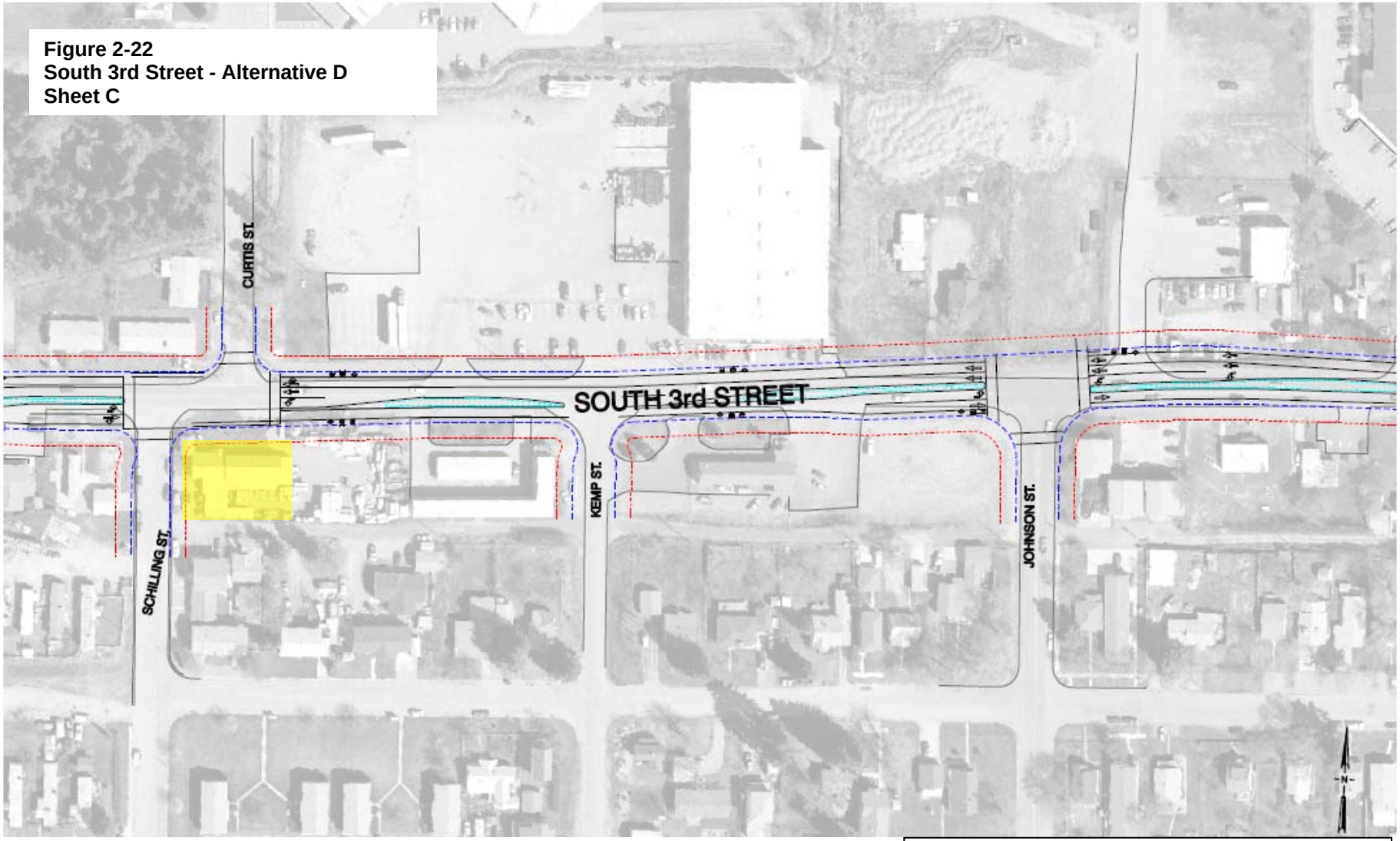
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-22
South 3rd Street - Alternative D
Sheet B



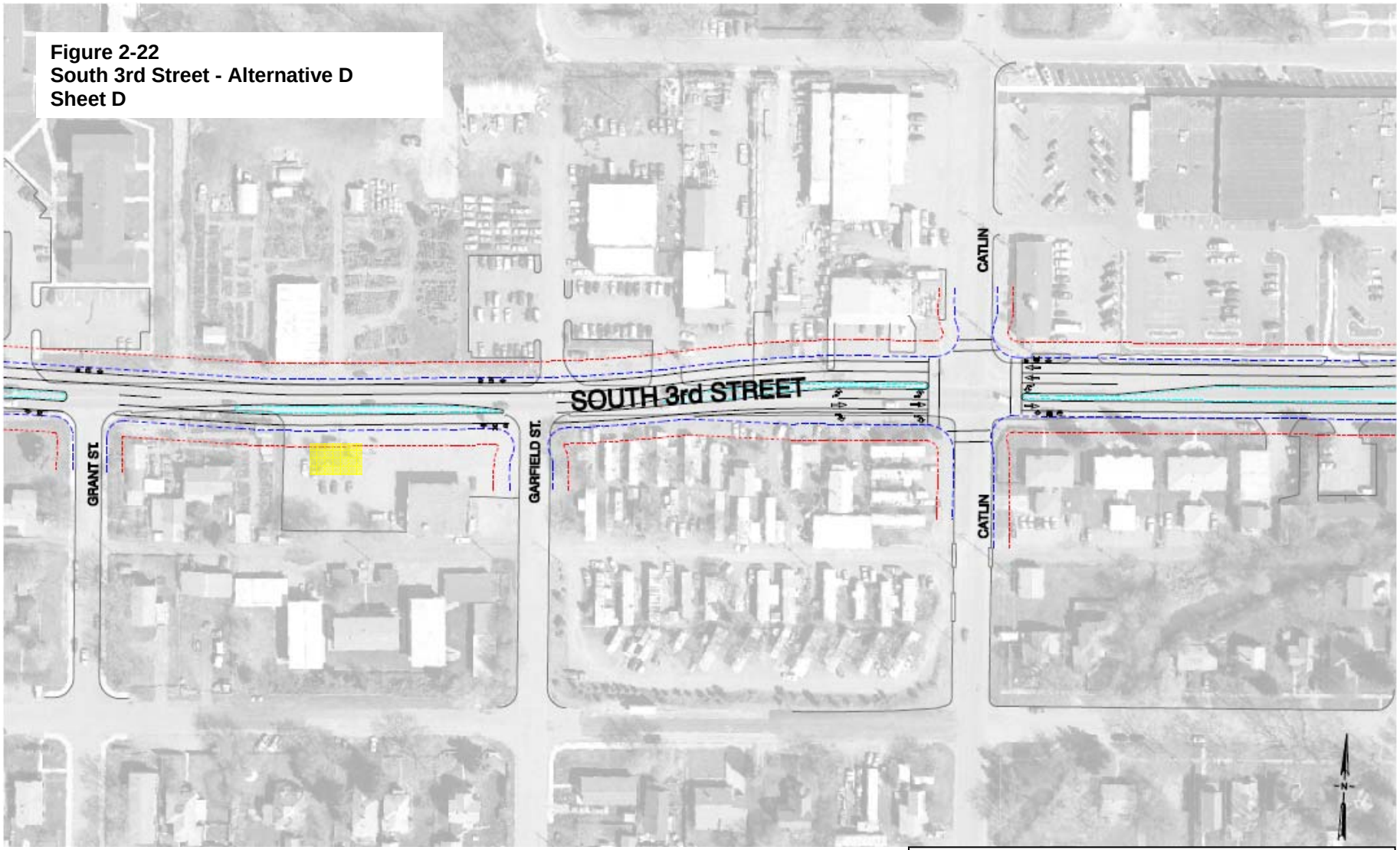
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-22
South 3rd Street - Alternative D
Sheet C



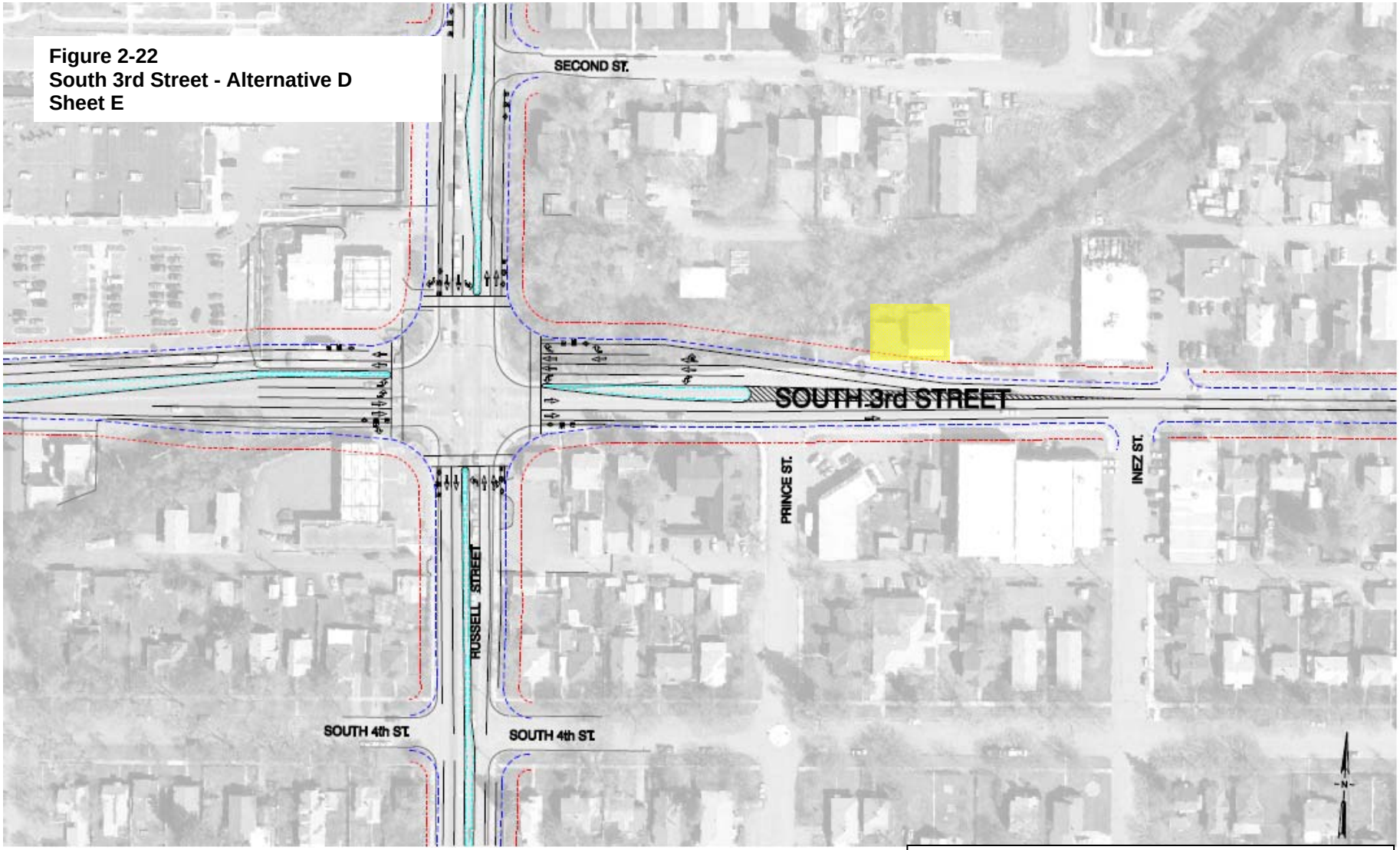
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-22
South 3rd Street - Alternative D
Sheet D



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-22
South 3rd Street - Alternative D
Sheet E



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alternative E - 2+ Lanes with Signals

Alternative E includes two travel lanes (one in each direction), the use of raised medians and center turn lanes, and signalized intersections.

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

None

Signal Control at:

Reserve Street (existing)
Schilling Street/Curtis Street
Johnson Street
Catlin Street

All other streets intersecting South 3rd Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The proposed alignment would generally follow the centerline of the existing alignment.

Residential Impacts under Alternative E

Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
	1701 3rd St.	1701 3rd St.	1701 3rd St.	1701 3rd St.
		1602 Grant St.	417 Curtis St.	1910 3rd St.
	2601 3rd St.	2415 3rd St.		2204 3rd St.
		2539 3rd St.		2422 3rd St.

Commercial Impacts under Alternative E

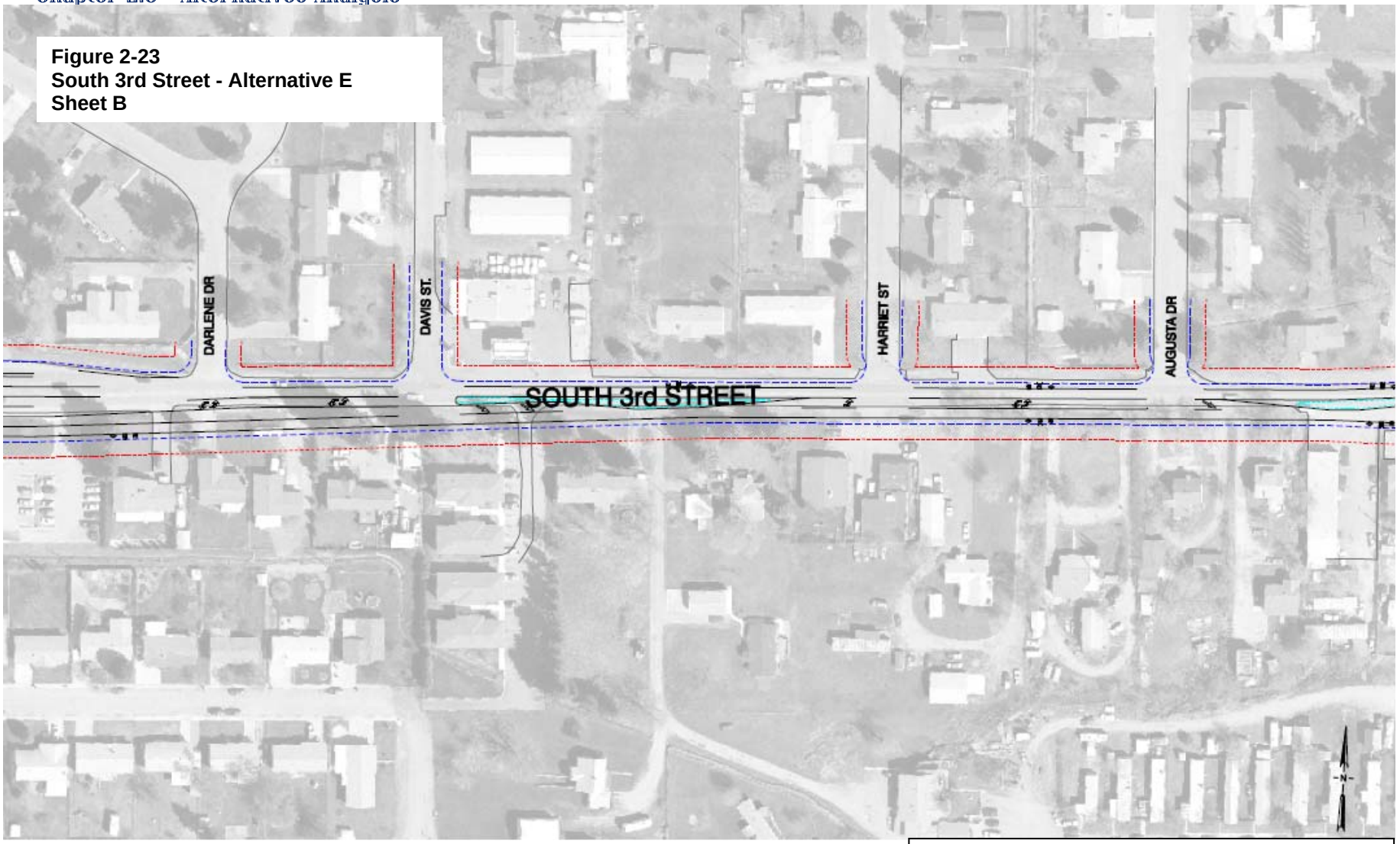
Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1318 3rd St.	1939 3rd St.	1301 3rd St.	1290 3rd St.	1601 3rd St.
1819 3rd St.	2207 3rd St.	1616 3rd St.	1541 3rd St.	1655 3rd St.
2135 3rd St.	2340 3rd St.		2115 3rd St.	1855 3rd St.
	2600 3rd St.		2221 3rd St	1920 3rd St.
			520 Schillings St. (Previously 2140 4th St.)	2002 3rd St.
				2249 3rd St.
			.	2310 3rd St. W
				2316 3rd St.

* "Direct Impact" implies that the existing structure is in conflict with the proposed construction limits. This does not necessarily mean that further avoidance measures cannot be explored or that the entire parcel would need to be acquired.

Figure 2-23
South 3rd Street - Alternative E
Sheet A

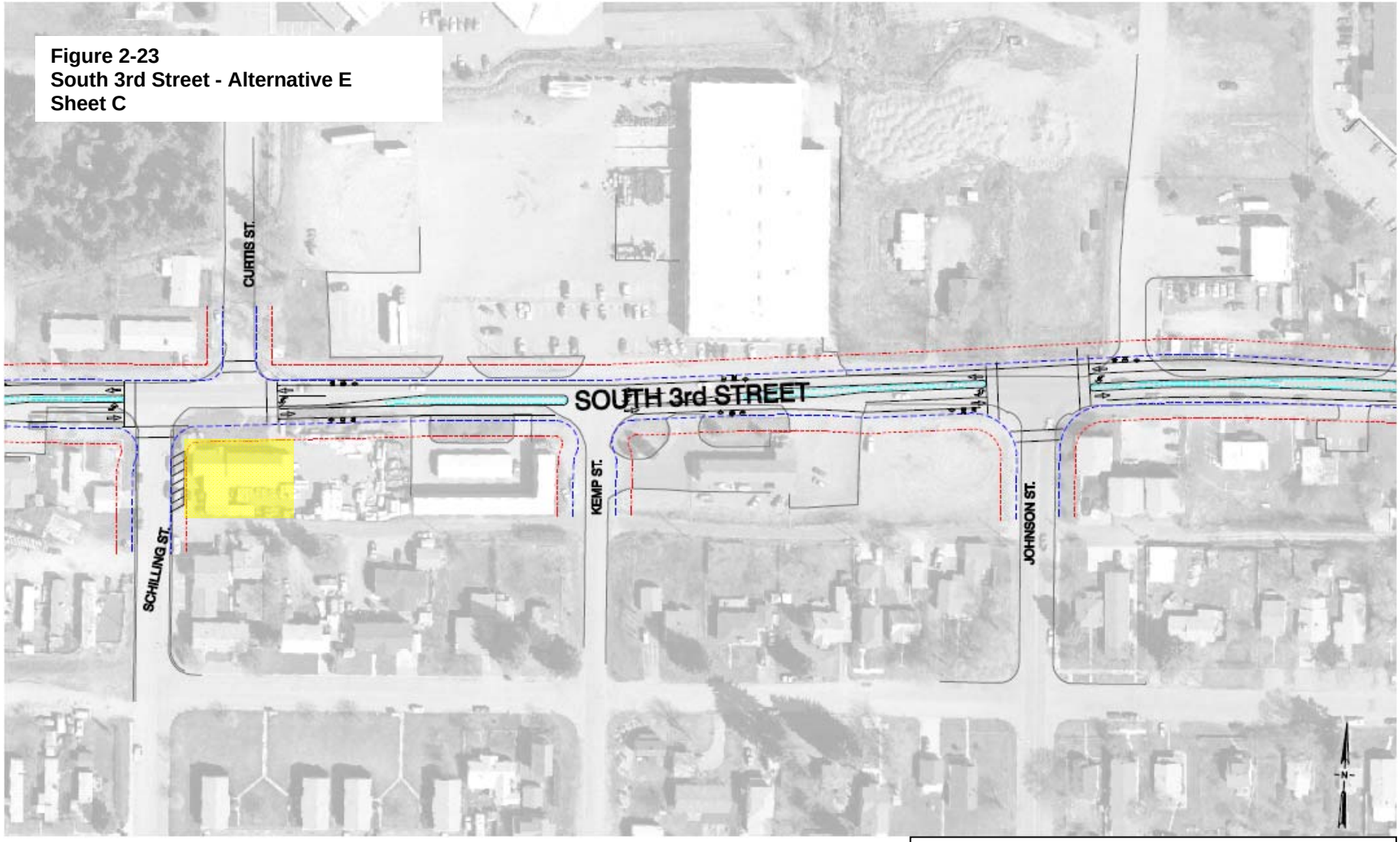
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-23
South 3rd Street - Alternative E
Sheet B



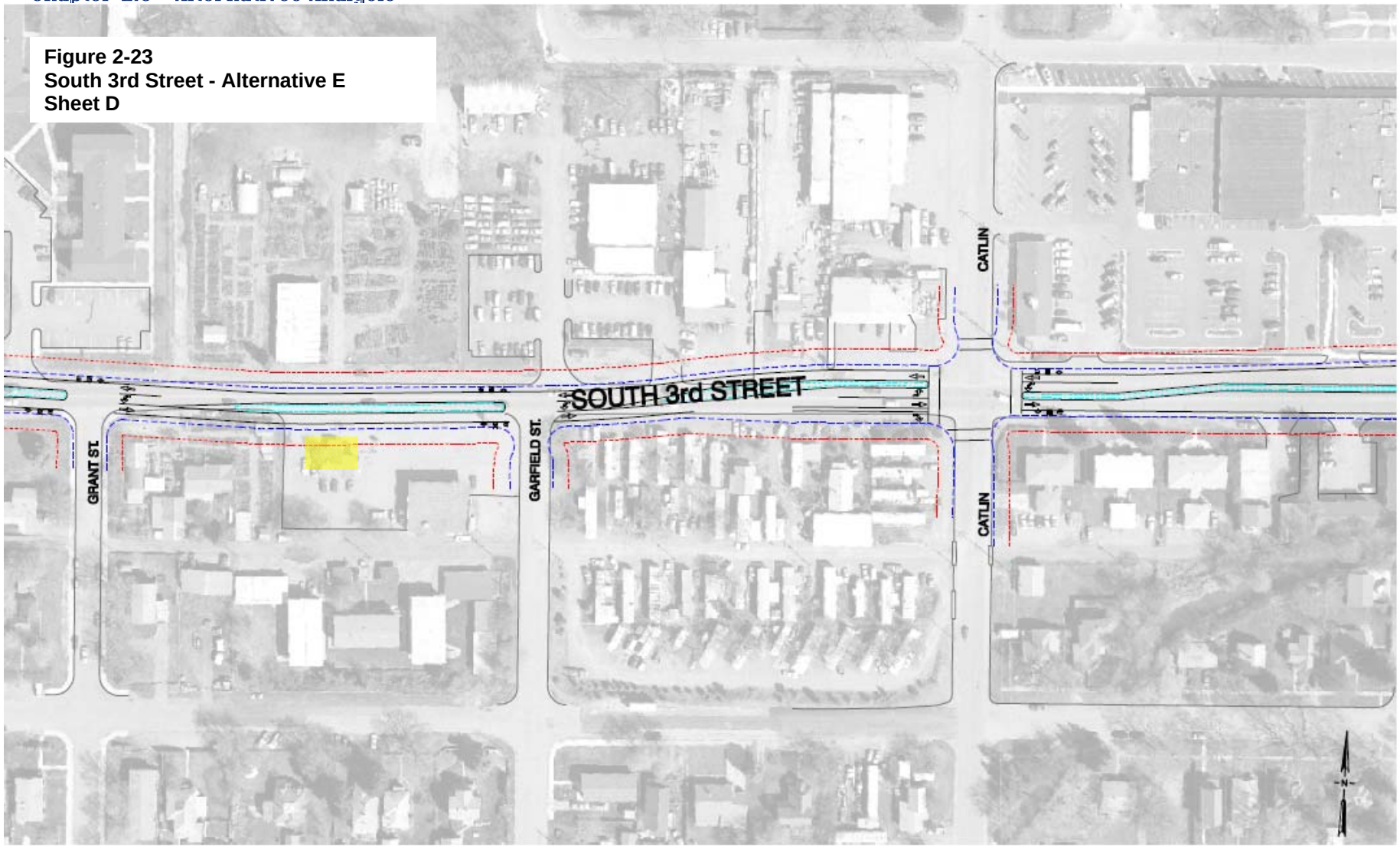
All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-23
South 3rd Street - Alternative E
Sheet C



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-23
South 3rd Street - Alternative E
Sheet D

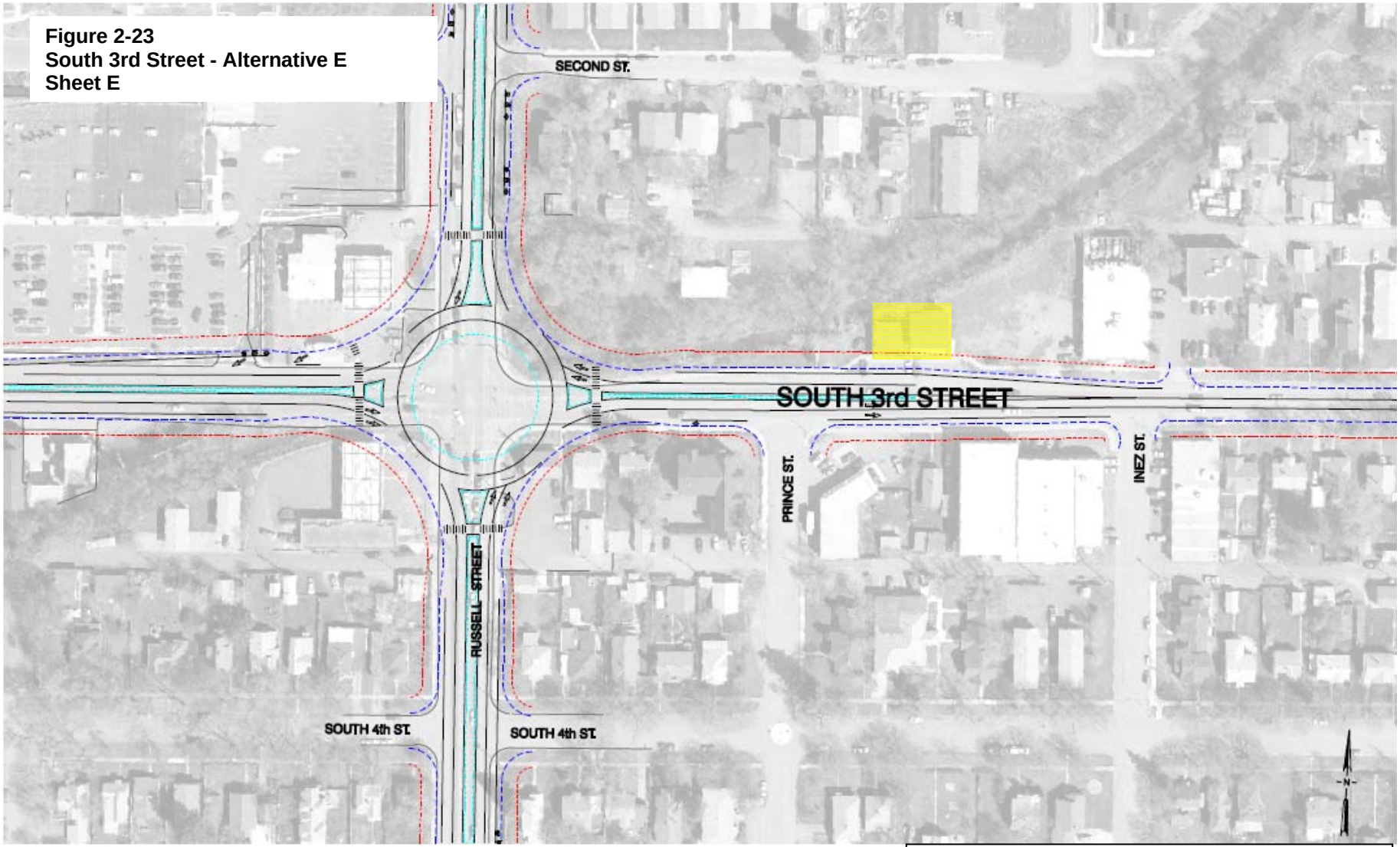


Residential Property Acquisition

Commercial Property Acquisition

All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-23
South 3rd Street - Alternative E
Sheet E



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

2.4 Identification of the Preferred Alternatives

During early project development and through the analysis outlined in the previous section, Russell Street Alternative 5, and South 3rd Street Alternative C initially appeared to best satisfy the purpose and need, as well as the community driven goals to maintain community character through the use of roundabouts and landscaping treatments. However, when two alternatives similarly satisfy a project purpose and need, the alternative with less impact on the Section 4(f) resource must be selected. In this case, both Alternatives 4 and 5 generally satisfy purpose and need, but Alternative 4 has less impact and was identified as the Preferred Alternative. The Draft Environmental Impact Statement identified Alternative C as the Preliminary Preferred Alternative on South 3rd Street. Further analysis using an updated analysis methodology and the 2035 projections suggests that the roundabouts may begin to experience severe congestion soon after completion. (See analysis in Appendix G.) For this reason, Alternative E (with signalized intersections) has been selected as the Preferred Alternative for South 3rd Street.

This section provides a summary of the alternative selection process, the attempts to refine the Build Alternatives to minimize impacts, and the ultimate decision to select Alternative 4 on Russell Street and Alternative E on South 3rd Street as the Preferred Alternatives.

Selection Process

According to guidance provided by the Federal Highway Administration, an alternative must first meet the stated purpose and need for the proposed project to be considered "reasonable" and worthy of further evaluation. In this case, the purpose and need of the proposed project is to provide substantive safety and mobility improvements for all modes in the Russell Street and South 3rd Street corridors.

If an alternative satisfies the purpose and need, it can be forwarded for evaluation of other factors such as cost, environmental impacts, and public support. In this case, planning level cost estimates were prepared, a planning-level design was prepared to compare impacts, and public support is gauged by the degree to which the alternatives satisfy the evaluation criteria developed through Advisory Committee and public participation. Table 2.10 provides a summary of the results of this evaluation process.

Table 2.10
Screening Summary

Alternative	Screen 1	Screen 2			*Final Recommendation*
	Meets Purpose and Need	Multimodal	Minimizes Impacts	Maintains Character	
1	**No**	--	--	--	*Must Forward*
2	**No**	--	--	--	***Eliminate***
3	**No**	--	--	--	***Eliminate***
4	Yes	Yes	Yes	Yes	*Forward*
5	Yes	Yes	Yes	Yes	*Forward*
A	**No**	--	--	--	*Must Forward*
B	Yes	Yes	Yes	Yes	*Forward*
C	**No***	Yes	Yes	Yes	*Forward**
D	Yes	Yes	Yes	Yes	*Forward*
E	Yes	Yes	Yes	Yes	*Forward*

*Note: Alternative C appeared to satisfy Purpose and Need in the DEIS using the 2025 traffic projections. Traffic projections generated for the Traffic Analysis Update for the year 2035 exceed the capacity of the Alternative C based on new national analysis methodologies which better correlate with US driving characteristics.

Based on the analysis presented earlier in this chapter, as well as input from the public, the City of Missoula, Montana Department of Transportation, and Federal Highway Administration eliminated two alternatives from further consideration on Russell Street. Alternatives 2 and 3 do not provide the necessary capacity and safety improvements to warrant the substantial investment that would be required in design, right-of-way acquisition, and construction of the two lane facilities proposed under these alternatives. Due to the high degree of interest in these alternatives from the public, they were reviewed at a preliminary level to see if they could be justified in light of a substantial savings in cost or minimization of impact to the neighboring properties. As demonstrated earlier in this chapter, their costs are not extraordinarily different than other more effective alternatives, and their impacts are similar to or greater than Alternative 4 which satisfies all other goals and objectives.

Under year 2025 traffic projections, all of the South 3rd Street alternatives appeared to satisfy the Purpose and Need for the proposed project. In the Draft Environmental Impact Statement, Alternatives B and C were noted as providing a higher Level of Service for a longer period of time as compared to Alternatives D and E. The operational advantage, as well as the inclusion of roundabout intersection control in Alternatives B and C, made these two alternatives more desirable given the level of public support for the roundabout options. The *Traffic Update Memo* prepared in 2010 utilized an updated traffic analysis methodology including a more accurate reflection of driver characteristics in roundabouts in the US. The modeling results based on this adjustment indicate that the single-lane roundabouts proposed on South 3rd Street would become highly congested, producing long queues of traffic upstream and downstream of the roundabout intersections long before the new design year of 2035. Further discussion of this analysis and a change in the Preferred Alternative on South 3rd Street follows in this section.

In a continuing effort to satisfy the public desire to construct major arterials in a fashion different from that of Reserve Street, and to develop a system of roundabouts in the two intersecting

corridors, the City of Missoula, Montana Department of Transportation, and Federal Highway Administration refined the conceptual design of Alternative 5 to see if impacts could be further minimized and forward this alternative as the Preferred. Those efforts are outlined below.

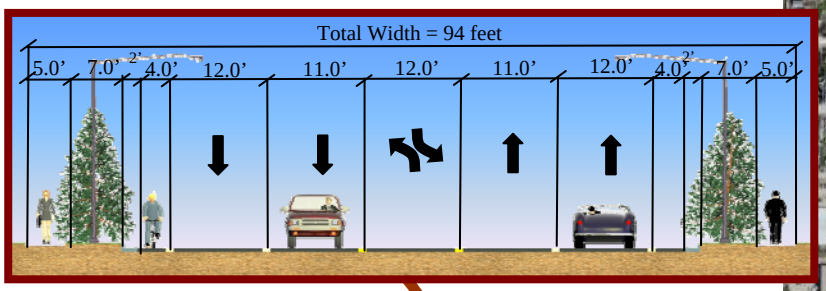
Refinement of Alternative 5

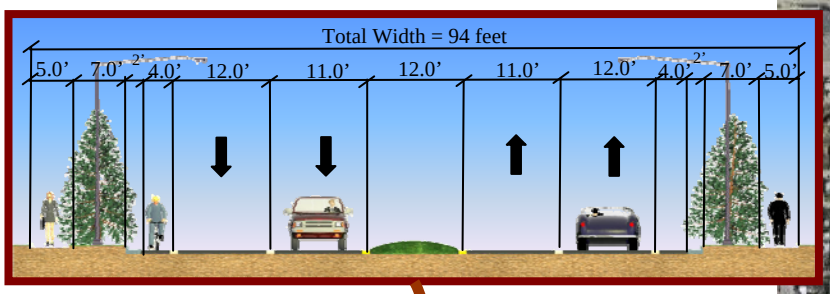
The following modifications were made to Alternative 5 on Russell Street, as illustrated in Figure 2-24 and shown in preliminary design detail in Figure 2-25.

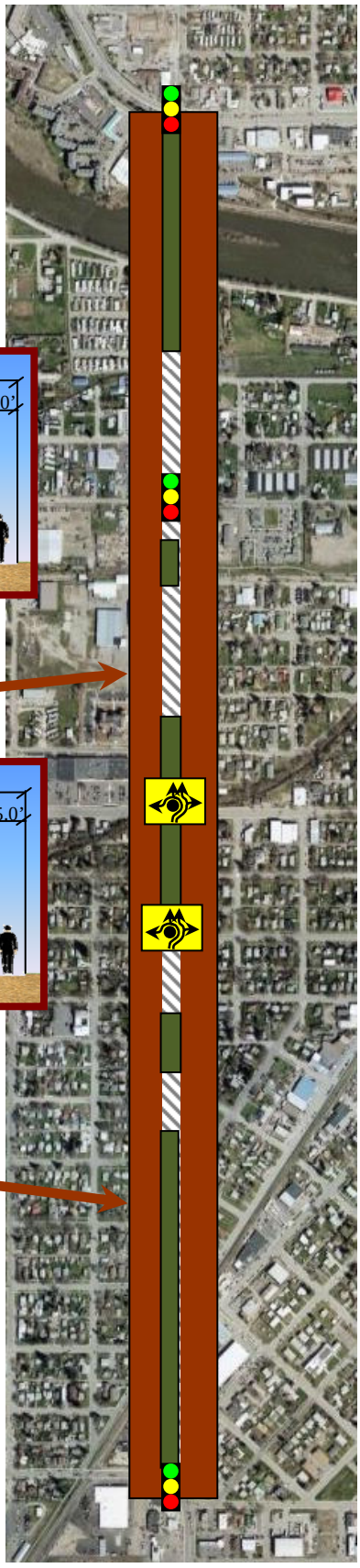
- To reduce the right-of-way requirements and costs associated with building a roundabout, the existing traffic signal would be left in place at Mount Avenue/South 14th Street.
- In order to minimize impacts to surrounding properties protected by Section 4(f), the proposed roundabouts at South 5th Street and South 3rd Street were reduced in size as compared to previous alternatives.
- Considerable time was spent investigating the potential of installing a roundabout at the South 11th Street/Knowles Street intersection. Due to the constraints of surrounding development, including properties protected by Section 4(f) of the Transportation Act, design modifications were necessary that hindered the ability of the roundabout intersection to provide optimal operation. Therefore, the intersection would remain a stop-controlled condition under this alternative.
- A traffic signal was selected for Wyoming Street because of the substantial right-of-way that would need to be acquired with a roundabout, and the potential operational issue of having a roundabout in close proximity to the signal at West Broadway Street.
- Improvements to the Russell Street and West Broadway Street intersection are limited to those turning movements on West Broadway Street that are affected by the Russell Street improvements such as double left-turn lanes westbound on West Broadway Street turning south onto Russell Street and one westbound right-turn lane north onto Russell Street. Other improvements to the West Broadway Street portion of the intersection are not part of this project at this time.

Figure 2-24
Alternative 5 – Refined
General Elements

All graphics in this document are conceptual and not intended to reflect final design details.
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.
Preliminary design details can be found in Figure 2-25.







West Broadway Street

Clark Fork River

River Road

Idaho Street

Montana Street

Wyoming Street

Dakota Street

River Street

South 1st Street

South 2nd Street

South 3rd Street

South 4thStreet

South 5th Street

South 6th Street

South 7th Street

South 8th Street

South 9th Street

South 10th Street

South 12th Street

South 13th Street

Mount Avenue / South 14th Street

Key:

Four lanes with median/turn lane
Raised median
Turn lane

Traffic signal

Double Lane Roundabout

Residential Impacts under Alternative 5 Refined

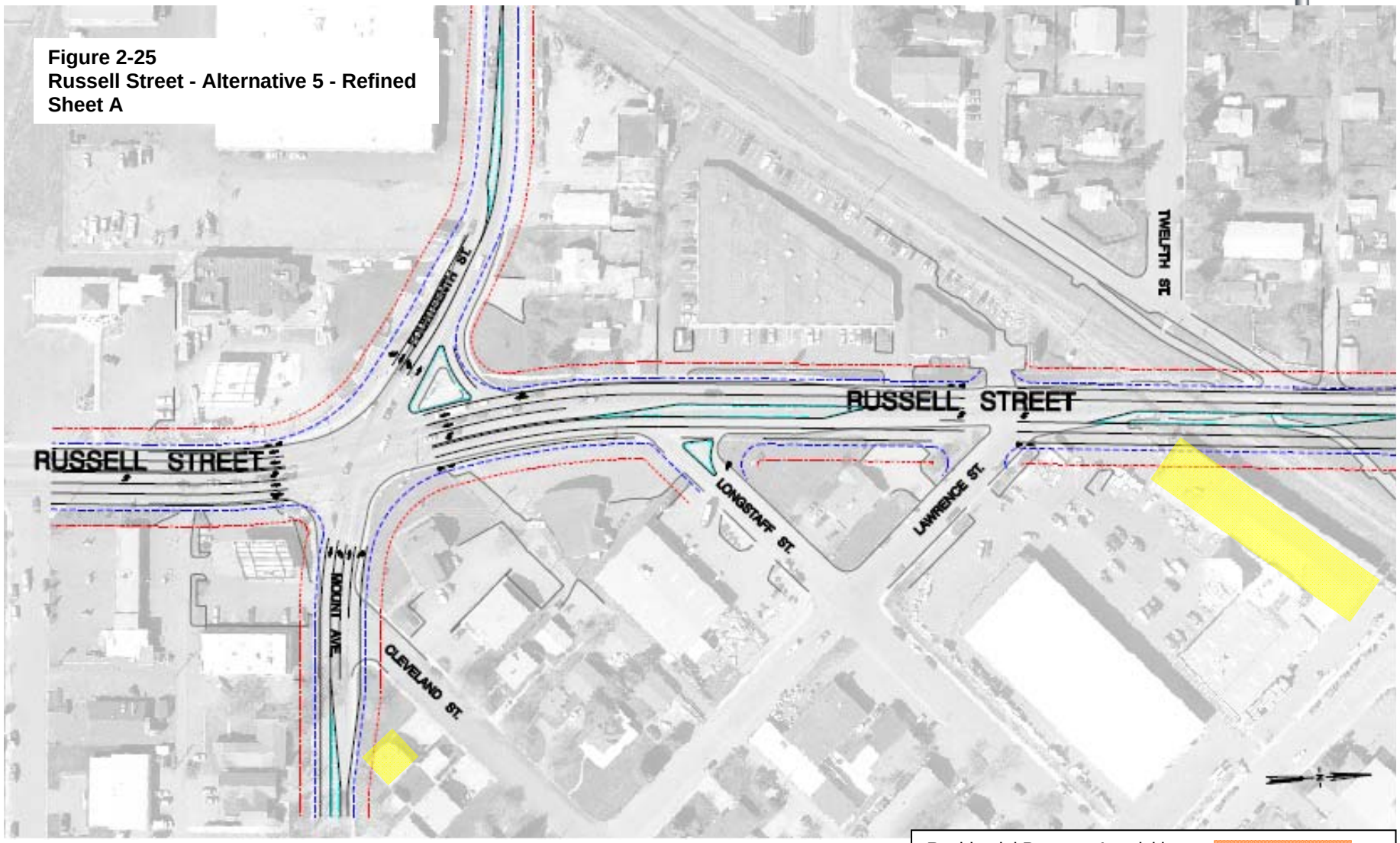
Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1439 4th St. W	1431 3rd St.	1427 2nd St. W	1501 5th St.	1501 &1500 1/2 S. 7th St.
1445 5th St.	1436 4th. St. W	1508 5th St.	1502 6th St. W	915 Russell St.
824 Russell St.	1439 5th St.	808 Russell St.	1501 6th St. W	1501 9th St. W
1000 Russell St.	738 Russell St.	1500 11th St. W	1500 7th St. W	1501 Russell St.
1010 Russell St.	802 Russell St.	1501 11th St.	1500 8th St. W	1500 14th St. W
915 Kern St.	820 Russell St.	521 Russell St.	1135 10th St. W	
935 Kern St.			1501 S. 10th St. 1516 & 1516 1/2 12th	
941 Kern St.				
1012 Kern St.				
1016 Kern St.				

Commercial Impacts under Alternative 5 Refined

Direct Impact*	Less than 5 feet from structure	5 to 10 feet from structure	10 to 15 feet from structure	15 to 20 feet from structure
1500 Broadway St.	1407 River Rd.	1427 W. Broadway St.	1540 W. Broadway	140 Russell St.
1440 Broadway St.	1515 Wyoming St.	1451 Broadway St.	1437 1st St. W	100 Russell St.
1503 Montana St. (Previously 1503 Russell St.)	121 Russell St.	501 Russell St.	1007 Mount Ave.	1417 3rd St.
1400 Wyoming St.	Mount and Russell St.	1440 Russell St.		1520 Russell St.
500 Russell St.				
1425 5th St.				
1440 5th St.				
1120 Russell St.				
1035 Ronan St.				
Montana Rail Link 1204 Mount Ave. (Previously 1208 Mount Ave.)				

* "Direct Impact" implies that the existing structure is in conflict with the proposed construction limits. This does not necessarily mean that further avoidance measures cannot be explored or that the entire parcel would need to be acquired.

Figure 2-25
Russell Street - Alternative 5 - Refined
Sheet A



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Figure 2-25
Russell Street - Alternative 5 - Refined
Sheet B

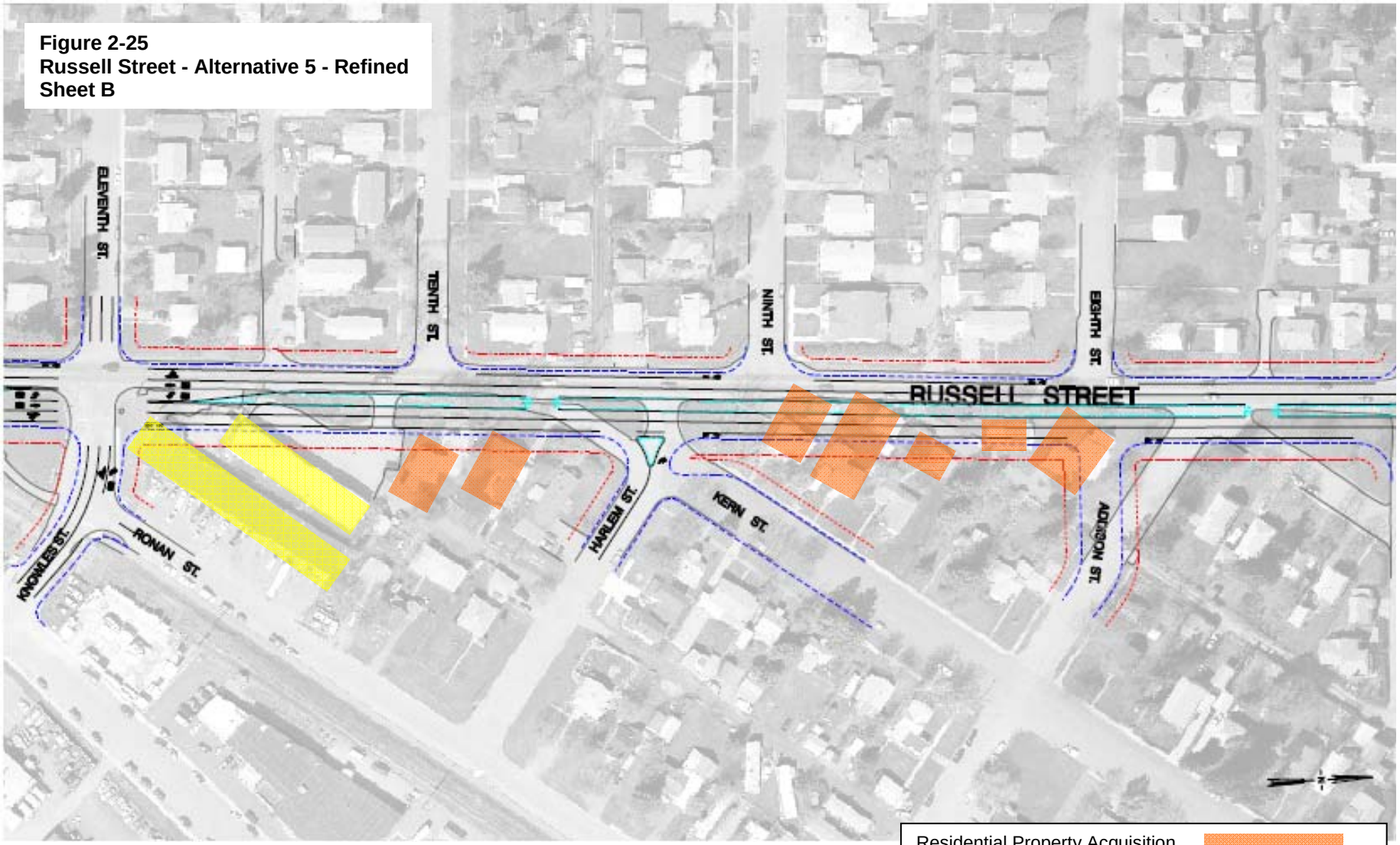


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Figure 2-25
Russell Street - Alternative 5 - Refined
Sheet C

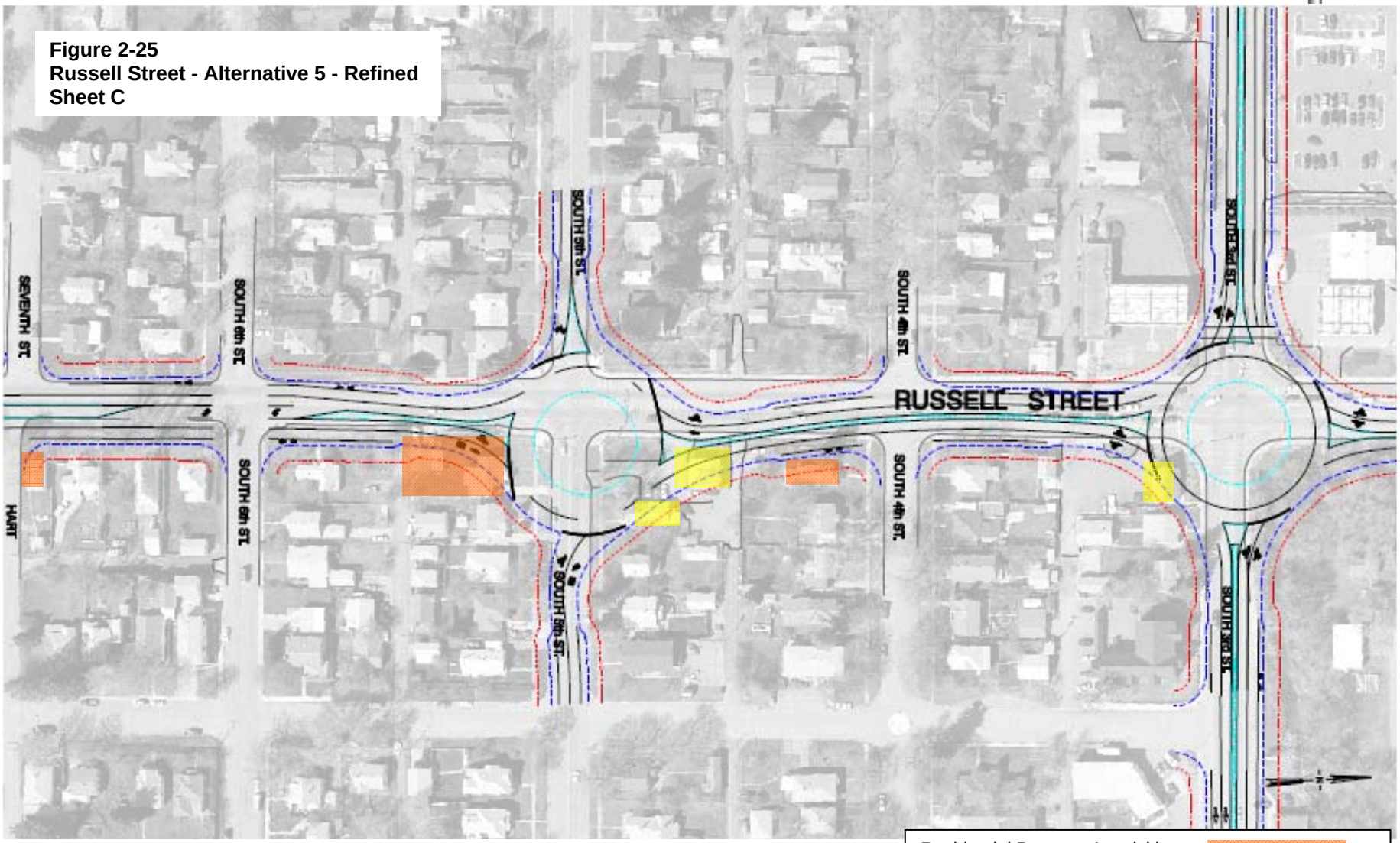

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Figure 2-25
Russell Street - Alternative 5 - Refined
Sheet D

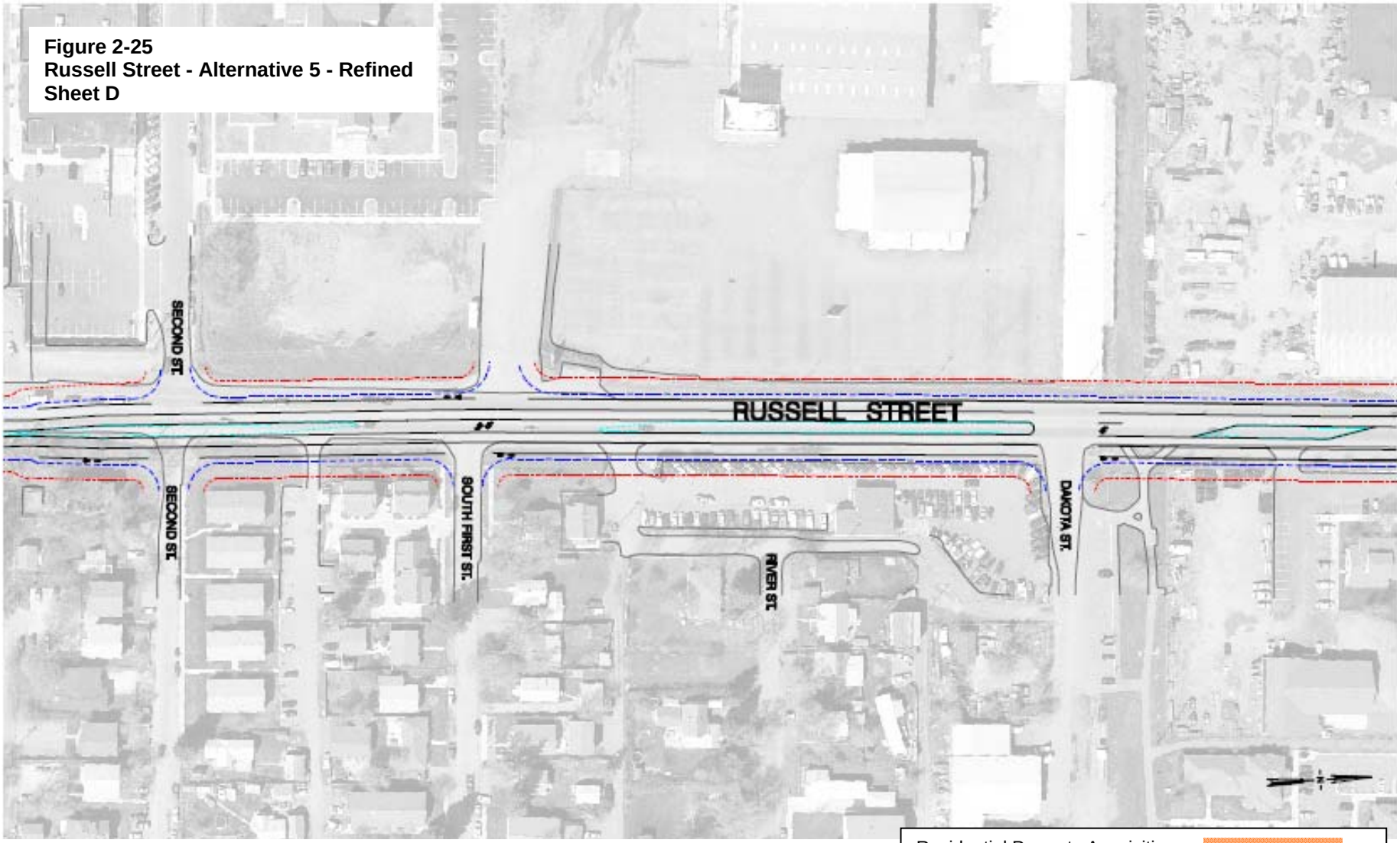

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Figure 2-25
Russell Street - Alternative 5 - Refined
Sheet E

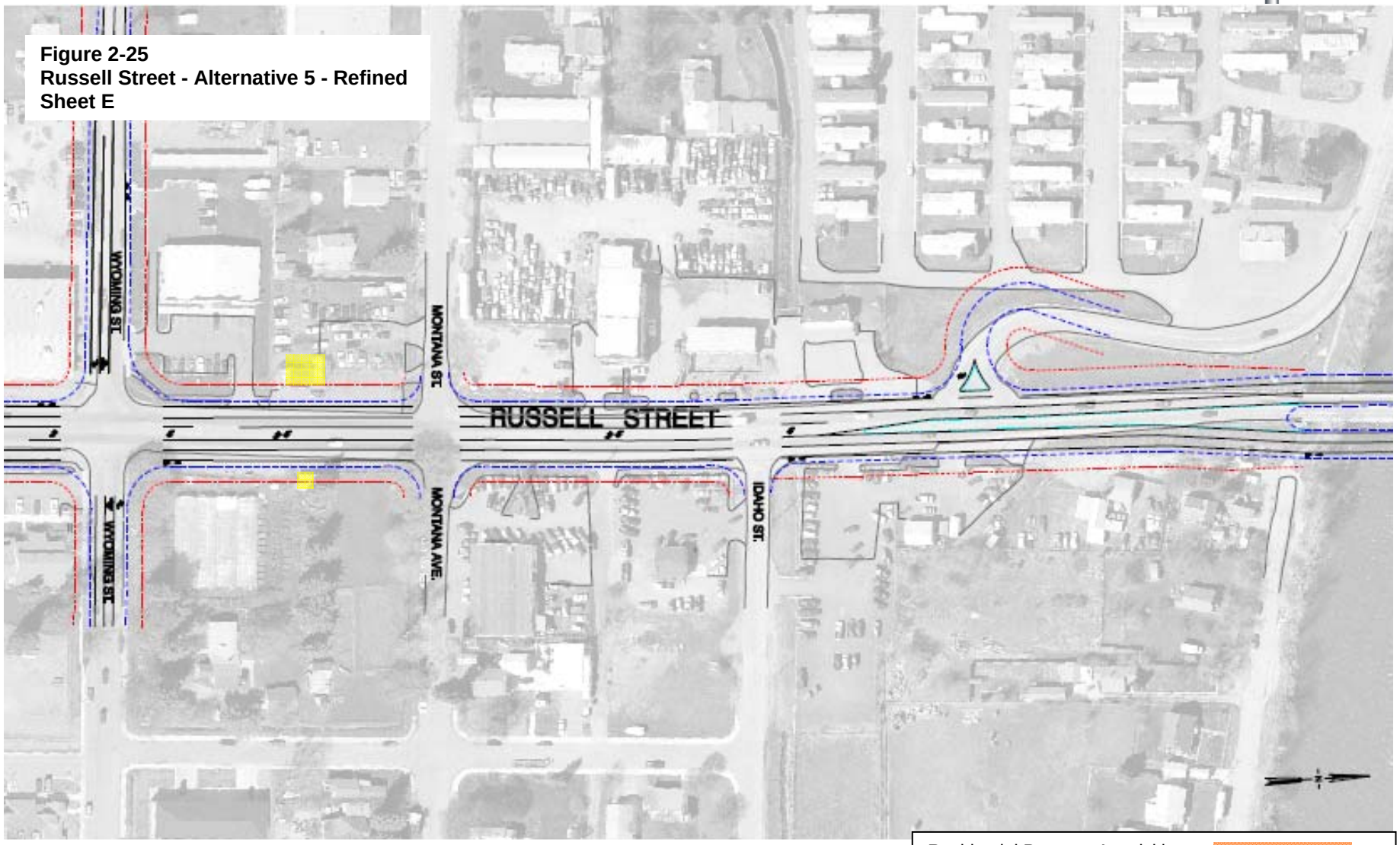

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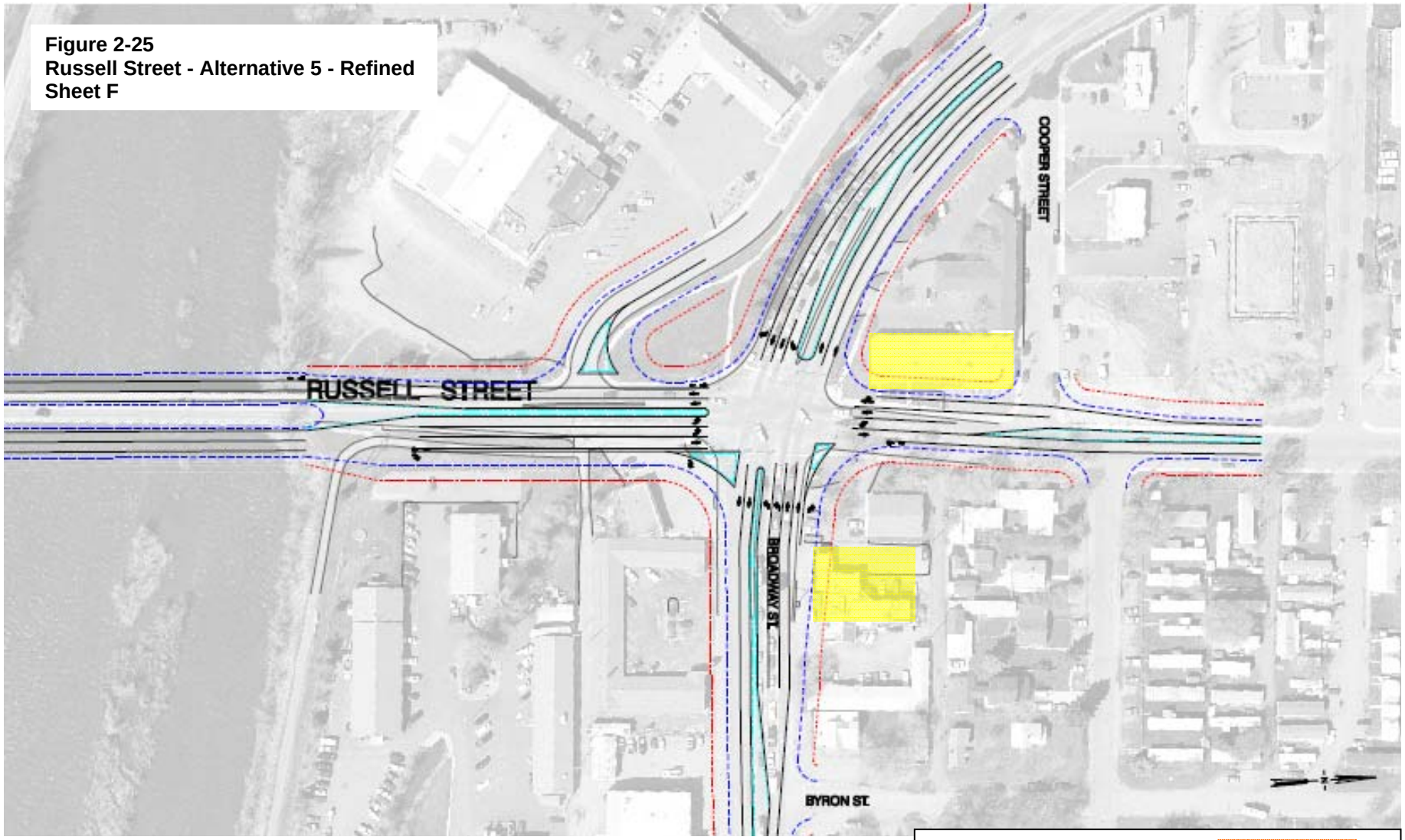
Figure 2-25
Russell Street - Alternative 5 - Refined
Sheet F



All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Table 2.11 provides a summary of impacts from the forwarded Build Alternatives that meet the Purpose and Need.

Table 2.11
Impact Comparison of the Forwarded Alternatives on Russell Street

Section	Alternative 4	Alternative 5	Alternative 5 (Refined)
Mount Avenue to South 11th Street	• 2 Commercial Buildings • 2 4(f) Properties • 0.73 acres new right-of-way	• 1 Homes • 3 Commercial Buildings • 3 4(f) Properties • 1.02 acres new right-of-way	• 2 Commercial Building • 2 4(f) Properties • 0.71 acres new right-of-way
South 11th Street to South 3rd Street	• 11 Homes • 5 Commercial Buildings • 2 4(f) Properties • 1.65 acres new right-of-way	• 17 Homes • 5 Commercial Buildings • 5 4(f) Properties • 2.01 acres new right-of-way	• 10 Homes • 5 Commercial Buildings • 4 4(f) Properties • 1.71 acres new right-of-way
South 3rd Street to Wyoming Street	• 1 4(f) Property • 0.93 acres new right-of-way	• 2 Commercial Buildings • 1 4(f) Property • 0.84 acres new right-of-way	• 1 4(f) Property • 0.63 acres new right-of-way
Wyoming Street to Russell Street Bridge	• 1 Commercial Building • 0.64 acres new right-of-way	• 1 Commercial Building • 0.98 acres new right-of-way	• 2 Commercial Buildings • 0.67 acres new right-of-way
Russell Street Bridge to West Broadway	• 2 Commercial Buildings • 1 4(f) Property • 0.64 acres new right-of-way	• 2 Commercial Buildings • 1 4(f) Property • 0.79 acres new right-of-way	• 2 Commercial Buildings • 1 4(f) Property • 0.66 acres new right-of-way
Totals	• **11 Homes** • **10 Commercial Buildings** • **6 4(f) Properties** • **4.59 acres new right-of-way**	• **18 Homes** • **13 Commercial Buildings** • **10 4(f) Properties** • **5.65 acres new right-of-way**	• **10 Homes** • **11 Commercial Buildings** • **8 4(f) Properties** • **4.38 acres new right-of-way**
Cost Estimate	**$45.0 million**	**$52.6 million**	**$46.5 million**

Note: These planning level estimates are in 2009 dollars. If the project were constructed in phases, it would be possible to construct the segment from West Broadway Street to approximately South 3rd Street at a cost of approximately $25.0 million in the year 2012. The project sponsor will continue to seek funding and prioritize Surface Transportation Program-Urban (STPU) funds for subsequent phases and accumulate those funds over the next several years to ensure funding of the project. Utility relocations are estimated at $1.1 million on Russell Street, and $700,000 on South 3rd Street for each alternative. Right-of-way estimates are also planning-level and dependent upon final right-of-way negotiations.

Section 4(f) properties include historic as well as park and recreational resources. Their inclusion indicates a "use" as defined in Section 4.14 of this FEIS.

Change in Preferred Alternative on South 3rd Street

During preparation of the *Traffic Analysis Update* which was conducted for the Russell Street corridor, it became necessary to update the traffic projections and Level of Service analysis for South 3rd Street as well. During the South 3rd Street update, the analysis revealed that the single lane roundabouts proposed on South 3rd Street would begin to fail before the design year of 2035. The analysis in the *South 3rd Street Traffic Update Memo* (included in Appendix G) identifies a year of failure of 2016 for the Catlin Street intersection, 2024 for the Johnson Street intersection, and 2028 for the Curtis Street intersection. The analysis indicates that the intersections fail due to the high demand of westbound traffic along South 3rd Street, which impedes the southbound traffic from entering the roundabout. Similarly, the small volume of northbound traffic entering the roundabout appears to add to the already substantial delay for the westbound traffic attempting to enter the roundabout. The high volumes of traffic trying to enter the roundabouts exceeds the ability of the roundabout to accommodate the approaching traffic, thus leading to excessive queues backing through adjacent intersections resulting in a gridlock situation. Further analysis showed that the use of signalized control on South 3rd Street extended the design life of the project until 2035. Table 2.12 provides a summary comparison of selected intersection Level of Service values for Alternatives C and E in 2035.

Table 2.12
South 3rd Street Alternative C and E Comparison (2035 LOS)

Intersection	Alternative C	Alternative E
Catlin	F	E
Johnson	F	C
Curtis	D	C

Source: DOWL HKM, 2009.

Because of the substantive improvement in Level of Service on South 3rd Street utilizing signalized intersection control, the roundabout Alternatives have been eliminated. Both Alternatives D and E provide substantive operational improvements for a longer period of time than the roundabout intersection alternatives. Alternative D (with two westbound lanes) has a larger footprint and requires nearly 40 percent more right-of-way and would cost approximately 10 percent more than Alternative E, for similar operational improvements. For these reasons, the Preferred Alternative on South 3rd Street was changed from Alternative C to Alternative E.

Selection of the Preferred Alternatives

Based on the fact that Alternative 4 satisfies the purpose and need to improve safety and mobility within the corridor, has fewer Section 4(f) impacts, and less overall impact as compared to Alternative 5 and the refined Alternative 5, the four-lane roadway improvement with signalized intersections proposed under Alternative 4 for Russell Street is identified as the Preferred Alternative.

Alternative 5 (refined) was vigorously explored as the locally preferred alternative due in large part to community preference for roundabout intersection control and the expressed desire for a roadway improvement project like Stevens Avenue. During detailed analysis, it became

apparent that Alternative 5 (even through refinement) would impose an impact on protected historic properties within the corridor that could be avoided with other alternatives. Due to unavoidable impacts to the historic properties at South 5th Street, Alternative 5 has been advanced for detailed consideration but ultimately not identified as the preferred alternative due to impacts to historic resources. However, the City of Missoula remains committed to providing the necessary roadway safety and capacity improvements while providing a facility that is aesthetically pleasing and enhances the existing characteristics of the surrounding area.

The modeling conducted for the *Russell Street Traffic Analysis Update* identified several locations where the addition of a right or left turn lane could extend the operation life of the Russell Street improvements. The most immediate benefits are anticipated with the addition of turn lanes in the northern portion of the corridor at Russell Street and West Broadway Street. An additional right turn lane from eastbound West Broadway Street onto southbound Russell Street, as well as an additional left turn lane from northbound Russell Street on to westbound West Broadway Street have been incorporated into the preliminary design in this Final Environmental Impact Statement. These modifications are shown in Figure 2-18. These modifications can be accommodated within existing or already planned right-of-way and do not result in additional impacts not already disclosed in the Draft Environmental Impact Statement.

The analyses of Russell Street and South 3rd Street were conducted as two separate studies based on current transportation engineering practices. Signalized intersections and roundabouts operate and experience capacity failure differently. When a roundabout experiences capacity failure it can be catastrophic, leading to gridlock. This gridlock is typified by extensive queues on one or more legs and stagnate flows within the roundabout. When the internal roundabout traffic fails to circulate, waiting vehicles can no longer enter the intersection, even if their destination leg is not congested. Roundabouts in series, such as evaluated on South 3rd Street, negatively impact each other as the queues build between them, effectively blocking the entire corridor.

A traffic signal has the ability to interrupt the mainline queue and introduce gaps for crossing traffic, allowing the minor leg traffic through the intersection. This metering effect of signalization allows the intersection to continue to function with increased delay, in comparison to the roundabout that has no ability to meter traffic during very high volume times of day.

Single-lane roundabouts were dismissed on Russell Street because they would not operate acceptably under current traffic conditions. Roundabout enhancements to improve operations would involve adding more lanes which is not feasible or practical because multi-lane roundabouts require additional right-of-way impacts to Section 4(f) resources. Signalized intersections bring the intersection capacity closer to accommodating the projected 2035 design year volumes while minimizing impacts and meeting the Purpose and Need. Signalized intersections allow greater flexibility than roundabouts to improving the intersection operations with the addition of left- or right-turn lanes.

As noted above, Alternative C was identified as the Preliminary Preferred Alternative on South 3rd Street in the Draft Environmental Impact Statement. Subsequent analyses conducted in 2010

indicate that the proposed single-lane roundabouts fail to provide sufficient capacity in the design year of 2035. The 3rd Street roundabout alternatives experience capacity failure beginning in 2016 while the signalized alternatives operate through the 2035 design year. (See *South 3rd Street Traffic Update Memo,* in Appendix G.) This analysis confirmed that Alternative E on South 3rd Street continues to satisfy the Purpose and Need as well as the general Goals and Objectives established for the project. Alternative E also minimizes right-of-way impacts and provides improved safety as compared to the No Build condition. For these reasons, Alternative E has been identified as the Preferred Alternative on South 3rd Street.

Based on the analysis conducted for the Draft Environmental Impact Statement, subsequent analysis of 2035 traffic projections, and comments from the Public Hearing and formal comment period, the City of Missoula, Montana Department of Transportation, and Federal Highway Administration have identified Alternative 4 on Russell Street and Alternative E on South 3rd Street as the Preferred Alternatives. The analysis in Chapter 4 represents the impacts and mitigation for these two alternatives.

2.5 Specific Design Elements of the Preferred Alternatives

The nine design features recommended by the Advisory Committee would be fully incorporated into any alternative identified as the Preferred Alternative. The common features are:

- The existing **Russell Street Bridge** would be removed and replaced in the same general location with four lanes over the Clark Fork River to provide adequate capacity for projected traffic volumes and necessary hydraulic capacity.
- **Bicycle lanes** would be included to improve multi-modal transportation in the corridors. Bicycle lanes measuring approximately 5.5 feet wide measured from the face of the curb would be constructed on both sides of Russell Street and South 3rd Street. The proposed bicycle lanes would be delineated from motorized traffic by a solid white painted stripe and would be clearly marked as bicycle lanes.
- **Sidewalks** measuring approximately 5.0 feet wide would be constructed along both sides of Russell Street and South 3rd Street.
- **Grade separated pedestrian/bicycle crossings** would be provided for the Milwaukee Corridor Trail, Bitterroot Branch, Shady Grove, and River Front Trail systems as they cross Russell Street.
- **Curb and gutter** as well as drywells/sumps would be included to improve stormwater management.
- **Street lighting** would be included to improve aesthetics and safety.
- **Landscaped boulevards** would be constructed on both sides of Russell Street and South 3rd Street between the curb and sidewalk, as well as medians in both corridors, to improve aesthetics.

- **Bus pullouts** would be incorporated into the final design along Russell Street north of South 3rd Street, and along South 3rd Street from Russell Street to Reserve Street. The transit system currently does not serve Russell Street south of South 5th Street, so no pullouts are planned for that portion of the corridor.
- On-street parking within the City right-of-way is currently prohibited along Russell Street and South 3rd Streets. **Parking restrictions would be maintained** in these areas.

As with all other Build alternatives, the Preferred Alternative includes the following alignment and access modifications:

- Longstaff Street would be restricted to a right-in and right-out only connection with Russell Street.
- Lawrence Street would be realigned to a right-angle intersection with Russell Street with left turn storage on Russell Street.
- Access to Russell Street from Harlem Street and Kern Street on the east side of Russell Street would be restricted to a right-in and right-out only connection.
- Addison Street would be realigned to a right-angle intersection with Russell Street opposite from South 8th Street. Addison Street and South 8th Street would be restricted to right-in and right-out only connections with Russell Street.
- Knowles Street would be shifted slightly to the north to match with South 11th Street on the west.
- River Road would generally remain in its current configuration with minor intersection modification and a restricted right-in and right-out connection with Russell Street. In addition, right-of-way would be purchased for the construction of a new link between River Road and Idaho Street that would become part of the River Road connection to Russell Street via Wyoming Street. The connection would include a newly constructed section of road running north-south adjacent to the western boundary of Mobile City Trailer Park between existing River Road and Idaho Street. It would also include reconstructed sections of Idaho Street between Catlin Street and the new road along the western border of Mobile City Trailer Park; Catlin Street between Idaho Street and Wyoming Street; and Wyoming Street between Catlin Street and Russell Street.

As noted previously, the Traffic Analysis Update included recommendations for design enhancements that could extend the service life of the proposed improvements. Two modifications that are anticipated to have near-term benefits without resulting in any additional impacts include extending the storage length for the northbound and westbound left-turn lanes on Russell Street and West Broadway Street, and inclusion of a second eastbound right-turn lane on West Broadway Street. These turn lanes are shown in Figure 2-18 (Sheet F).

Russell Street –Preferred Alternative:

Russell Street Alternative 4 is the Preferred Alternative with two southbound and two northbound travel lanes, raised medians and center turn lanes, and the use of signal control at select intersections on Russell Street.

Figure 2-26 illustrates the major features of this alternative, and the following provides a summary. (Figure 2-18 provides a more detailed illustration of the proposed improvements on Russell Street.)

Lane Configuration:

Four travel lanes from Mount Avenue/ South 14th Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

none

Single-Lane Roundabouts at:

none

Signal Control at:

Mount Avenue/South 14th Street (existing)
South 5th Street (existing)
South 3rd Street (existing)
Wyoming Street
West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs.

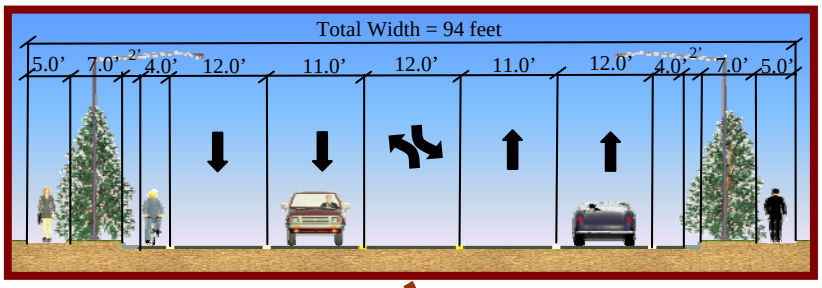
Raised median / Center turn lane:

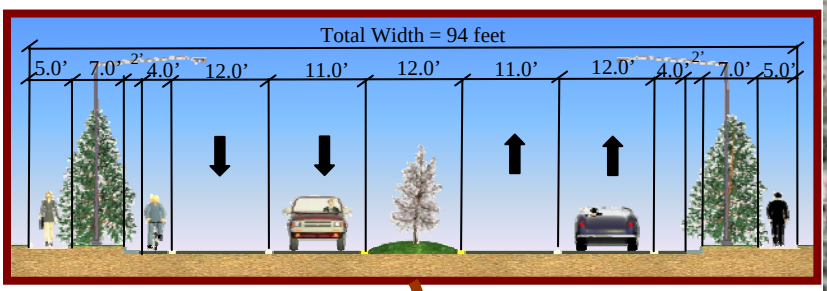
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

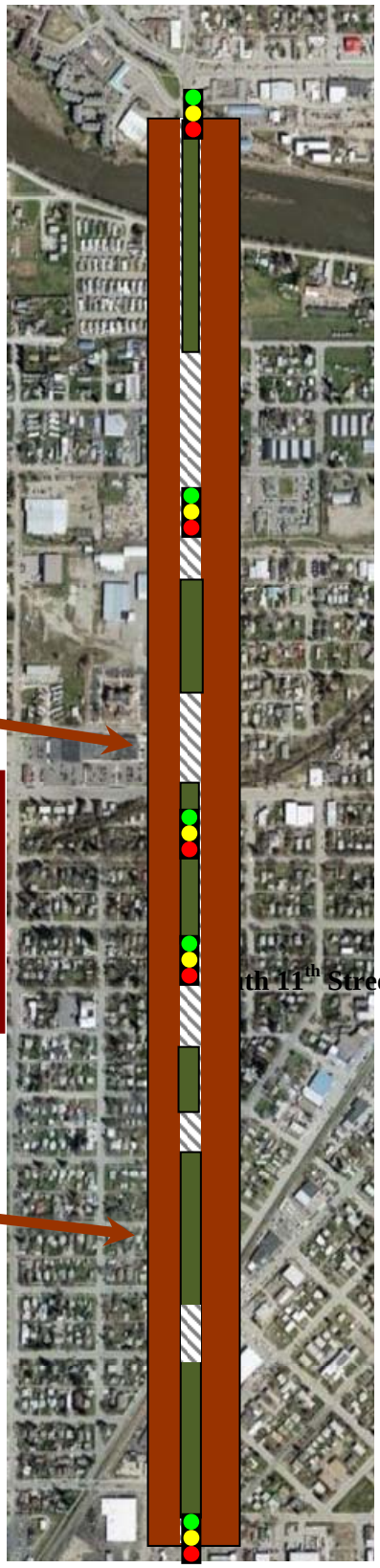
Alignment:

The alignment of Russell Street in the southern segment would shift to the east to minimize the impact on properties protected under Section 4(f) of the U.S. Department of Transportation Act of 1966, as discussed later in this document.

Figure 2-26
Russell Street Preferred Alternative (Alt. 4) – General Elements







West Broadway Street

Clark Fork River

River Road

Idaho Street

Montana Street

Wyoming Street

Dakota Street

River Street

South 1st Street

South 2nd Street

South 3rd Street

South 4thStreet

South 5th Street

South 6th Street

South 7th Street

South 8th Street

South 9th Street

South 10th Street

South 11th/Knowles Street

South 12th Street

South 13th Street

Mount Avenue / South 14th Street

All graphics in this document are conceptual and not intended to reflect final design details.
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Key:

Four lanes with median/turn lane
Raised median
Turn lane

Traffic signal

South 3rd Street –Preferred Alternative:

Alternative E is the Preferred Alternative on South 3rd Street and includes two travel lanes (one in each direction), signals at select intersections, and the use of raised landscaped medians, as appropriate.

Figure 2-27 illustrates the major features of this alternative, and the following provides a summary. (Figure 2-23 provides a more detailed illustration of the Preferred Alternative on South 3rd Street.)

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

Two-Lane Roundabouts at:

none

Single-Lane Roundabouts at:

none

Signal Control at:

Reserve Street (existing)
Schilling Street/Curtis Street
Johnson Street
Catlin Street
Russell Street (as determined by the Russell Street Preferred Alternative)

All other streets intersecting South 3rd Street would be controlled by stop signs.

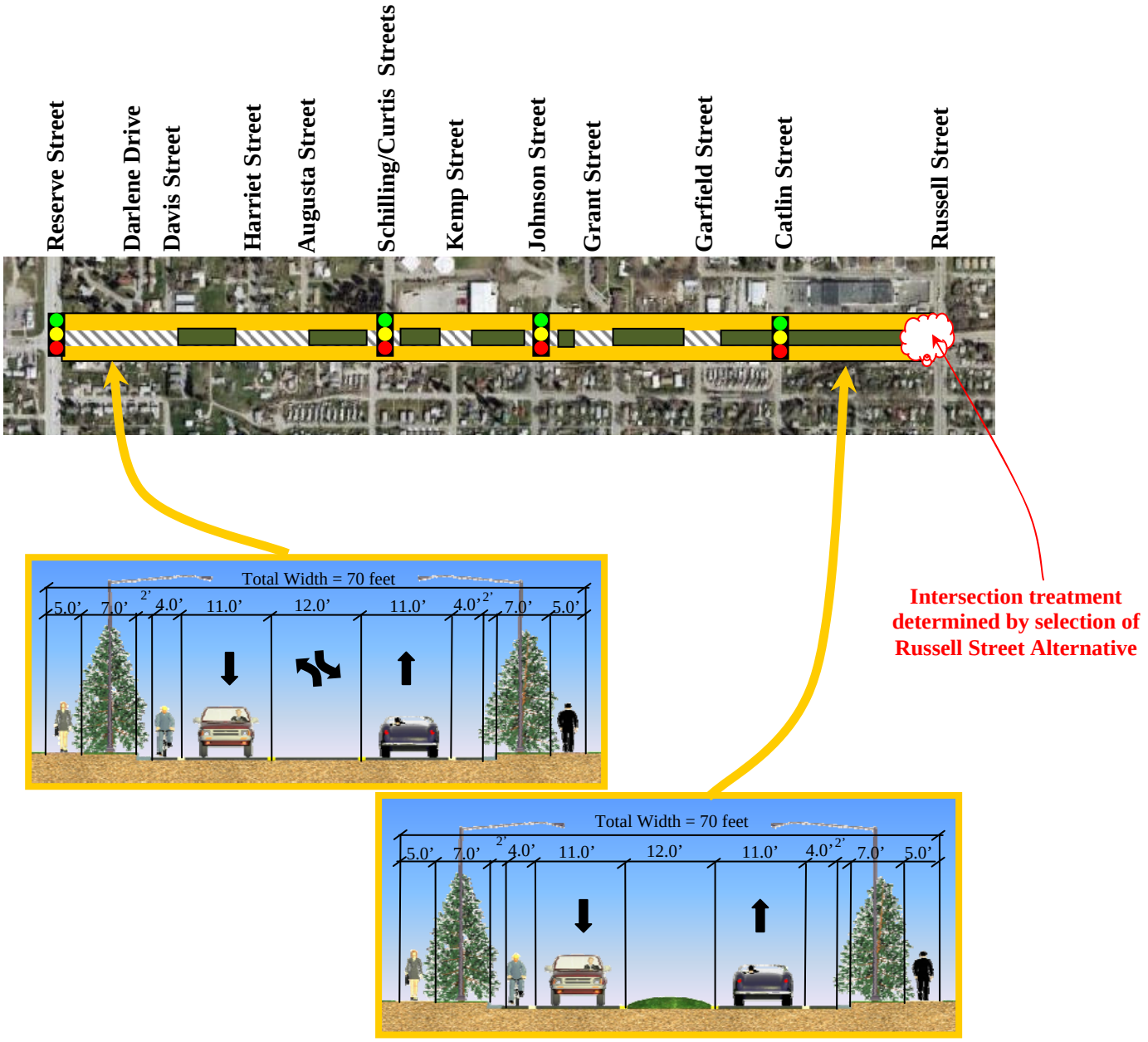
Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The proposed alignment would generally follow the centerline of the existing alignment.

Figure 2-27
South 3rd Street Preferred Alternative (Alt. E) – General Elements



Key:

Two lanes with median/turn lane

Raised median

Turn lane

Traffic signal

All graphics in this document are conceptual and not intended to reflect final design details. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

2.6 Other Alternatives Considered but Eliminated

Several alternatives were suggested through the public involvement process that were not carried forward into detailed analysis. These alternatives and the reasons for their elimination by the City of Missoula, Montana Department of Transportation, and Federal Highway Administration are discussed in this section.

Transportation System Management:
Transportation System Management strategies focus on improving roadway efficiency, and typically overlap with Intelligent Transportation System technologies. The primary purpose of Transportation System Management is to "get the most out of the existing system" through cost effective improvements such as adding auxiliary lanes in heavily congested portions of a corridor, adding turn lanes at congested intersections, or optimizing signal timing throughout a corridor. Other options might include fringe parking, ridesharing, and High Occupancy Vehicle (HOV) lanes.

The Federal Highway Administration has indicated in their Technical Advisory (TA 6640.8A) that these limited construction alternatives are "usually relevant only for major projects proposed in urbanized areas over 200,000 in population." Due to the relatively limited population size of Missoula, the short length of the roadway improvement project, and the diversity of commuting trips in this corridor, it was determined that a Transportation System Management alternative would not provide the necessary improvements in capacity to eliminate the need for other investments in capacity expansion. It is feasible, however, that efficiencies can be gained through better signal timing or the use of turn lanes at key intersections along both Russell Street and South 3rd Street, and may be explored further if improvement projects progress in these corridors.

Transportation Demand Management:
Transportation Demand Management refers to programs designed to maximize the people-moving capability of the transportation system by increasing the number of persons in a vehicle, or by influencing the time of, or need to, travel. These transportation planning strategies are typically aimed at traffic congestion relief and air quality management through the reduction of single-occupant vehicle use. These efforts are generally implemented by:

- Employers at individual worksites
- Organized groups of employers, referred to as Transportation Management Associations (TMAs)
- Quasi-public organizations that serve as the focal point of programs

Missoula in Motion (MIM), the Missoula Ravalli Transportation Management Association (MR TMA), and the Associated Students of the University of Montana (ASUM) serve as the Transportation Demand Management coordinators within the Missoula metropolitan area.

Transportation Demand Management is an integral part of the regional transportation planning process, and the Missoula 2008 Long Range Transportation Plan Update identified over $16 million allocated towards these programs. As a component of the Long Range Transportation

Plan, these strategies are accounted for in the regional travel demand model, and cannot independently address the purpose and need for improvements in the Russell Street and South 3rd Street corridors. Investment in these strategies will continue to be an important part of the transportation solution in Missoula, and will be used in conjunction with the proposed capacity improvements as part of this project.

Four-Lane Russell Street:
The Advisory Committee and general public participants involved in the scoping process considered a four-lane road with no median on Russell Street. A four-lane road with no median or center turn lane is considered less safe than most other lane configurations on this type of roadway. Motorists waiting to make left turns delay traffic. Other motorists then pull out into the outside lane to pass the vehicle waiting to turn left, which leads to an increase in the number of conflicts and traffic crashes. In addition, it is more difficult for pedestrians to cross a wide roadway without medians. The Advisory Committee concluded that this lane configuration did not meet the project purpose and need because it did not safely improve the movement of pedestrians and traffic through the project corridors, and therefore recommended to the Federal Highway Administration that it be eliminated.

West Broadway Street Flyover:
Attendees at public scoping meetings suggested an elevated roadway (flyover) for the West Broadway Street and Russell Street intersection. The Advisory Committee considered the potential cost and environmental impacts on the Clark Fork River and the associated riparian area to be too great based on the substantial increase in the intersection footprint. Incorporating a flyover ramp would add $16 to $20 million to the construction costs, increase right-of way impacts, as well as have a negative impact on the pedestrian and bicycle environment at the intersection due to the structure footprint relative to those facilities. The flyover bridge would have to begin over the Clark Fork River in order to get up and over the intersection with West Broadway Street. This would necessitate a wider bridge over the Clark Fork River and increased riparian impacts and right-of-way impacts. The proposed bridge foot print cannot be reduced and still satisfy traffic lane capacity, pedestrian, and bike needs.

Continuous Two-Way Left-Turn Lanes:
Attendees at public scoping meetings suggested using raised medians instead of continuous two-way left-turn center lanes. Continuous two-way left-turn center lanes throughout the corridor were not considered in further detail because the public wanted raised medians with landscaping to improve the look and feel of the corridor to meet the goals of the project. The raised medians coupled with short segments of two-way left turn lanes and left-turn storage pockets at certain locations provide nearly the same opportunities for motorists to turn left as two-way left-turn center lanes. Raised medians provided a greater margin of safety by separating the different directions of traffic when compared to the continuous two-way left-turn center lanes.

Partial Closure of Russell Street:
Attendees at public scoping meetings suggested closure of Russell Street north of the intersection of West Broadway Street and Russell Street as an option for improving traffic congestion at that intersection. Closure of the north leg of the intersection would result in only a modest decrease

in volume entering from the north. The through-movements would likely enter West Broadway Street at another location and result in an increase in turning movements from West Broadway onto Russell Street. Based on these considerations and that the link does not affect the recommendations for improvements within the remainder of the Russell Street corridor, this design option has not been considered in any detail in this process.

I-90 / Russell Street Interchange:
Public comments on project alternatives suggested connecting Russell Street to Interstate 90. This connection was not considered in detail because it is outside the scope of the Russell Street and South 3rd Street reconstruction project. The scope of the project includes improvement of traffic congestion and conditions on Russell Street from Mount Avenue/South 14th Street to West Broadway Street. Connection of Russell Street to Interstate 90 is more appropriately considered in the metropolitan transportation planning process, which includes areas outside the Russell Street and South 3rd Street project area.

East-West Underpass Connection of River Road:
The public scoping meetings addressed the current access difficulties for residents in the River Road area. Attendees at scoping meetings proposed to connect River Road west of Russell Street to River Road east of Russell Street (underneath the Russell Street Bridge). This connection was eliminated from detailed study. The Interdisciplinary Team concluded that the costs were too high and environmental impacts on the Clark Fork River, the associated riparian area, and fisheries resources would increase if the bridge were constructed to a height that could accommodate a road crossing underneath Russell Street, and a berm were constructed adjacent to the Clark Fork River. Continually pumping water out from behind the berm and maintaining the pumping equipment would add life-long costs to the project. Lowering the elevation of River Road below the bridge to provide adequate vehicle clearance would create a safety problem if a vehicle became trapped under the bridge during a flood. Raising the elevation of the bridge in order to accommodate River Road traffic below the bridge is not feasible because bridge elevation is constrained by the existing Russell Street and West Broadway Street intersection.

Smaller bridge over the Clark Fork River:
The bridge design is based on existing and forecast traffic demand, as well as bicycle and pedestrian needs. Narrowing the bridge structure will decrease capacity and impact operation of both Russell Street and the intersection with West Broadway Street.

2.7 Construction Phasing and Funding Strategies

The total costs for the proposed project will ultimately differ from the planning level estimates presented in this document.

Phasing

The Metropolitan Planning Organization (MPO) receives approximately $2.0 million dollars per year that can be accumulated under the anticipated annual allocations, and would have to seek additional funding to cover the remaining costs beyond regular funding sources. Based on

currently available funds, reconstruction of Russell and South 3rd Streets as proposed in this Environmental Impact Statement would likely be phased over time. Construction projects would be programmed and completed as funds become available over the next several years.

Prior to finalizing a Record of Decision, the entire project would need to be included in the fiscally constrained portion of the conforming Long Range Transportation Plan and, in addition, include in the approved Transportation Improvement Program at least one subsequent phase, which includes final design, right-of-way, utility relocation or construction.

During the public comment period on the Draft Environmental Impact Statement, concerns were raised that during the development of the separate project phases, changes in the character of the corridor from infill development, redevelopment, or transportation demand management strategies included in the Long Range Transportation Plan, could affect the traffic forecasts used to establish the Purpose and Need for the project. Following the completion of this National Environmental Policy Act / Montana Environmental Policy Act document, appropriate state and federal rules and regulations will guide the future consideration and development (as deemed appropriate) of any re-evaluations to this document. The consideration of when to prepare a re-evaluation will be based on requirements at 40 CFR 1502.9(c), 23 CFR 771.129, and ARM 18.2.247 which include provisions for considering the emergence of significant new circumstances or information that has bearing on the proposed action or its impacts on environmental considerations. Conditions possibly meriting re-evaluation will be reviewed prior to construction of the separate project phases in accordance with federal guidelines as noted above, and, if necessary, a re-evaluation of the Environmental Impact Statement would be conducted to determine if the document remains valid for the proposed project (pursuant to the state and federal regulations cited above). If no substantial changes have occurred, the project would proceed under the approved decision document.

Funding

Through the Missoula area metropolitan transportation planning process, Russell Street has been prioritized as the number one priority for federal and state funds provided through the Surface Transportation Program-Urban funding program. Additional federal, state, and local funding prioritized through the metropolitan transportation planning process includes Congestion Mitigation and Air Quality funding, Bridge funding, Enhancement funding, and local funds. Also, a congressionally directed earmark was provided for this project through the most recent federal transportation funding bill, the Safe, Accountable, Flexible, Efficient Transportation Equity Act –A Legacy for Users.

The total cost of the preferred alternatives for Russell Street and South 3rd Street in year of expenditure dollars is approximately $56 million. The city recently amended their Long Range Transportation Plan (LRTP), in order to provide local funding for the estimated $11.5 million needed for the construction of South 3rd Street. As a result, the city's current Transportation Improvement Plan (TIP, FFY 2011-2015) and amended 2008 LRTP include a combination of available and planned revenue sources, which collectively provide fiscal constraint for the construction of the preferred alternatives for both Russell Street and South 3rd Street projects.

The project sponsor will continue to seek funding and prioritize Surface Transportation Program-Urban (STPU) funds for subsequent phases and accumulate those funds over the next several years to ensure funding of the project.

Missoula Federal Fiscal Year 2011-2015 Transportation Improvement Program

Project	**Amount Reserved**
1st Phase	
South 3rd Street (Reserve to Russell)	$2,000,000 (Local funding)
Russell Street (South 3rd Street to West Broadway Street)	$17,795,800 (Surface Transportation Program-Urban)
Milwaukee Trail West	$550,000 (Surface Transportation Program - Enhancement)
Russell Street Bridge	$5,542,400 (Bridge)
Russell Street	$6,275,500 (Earmark)

2008 Missoula Long Range Transportation Plan

2nd Phase	**Amount/Source identified**
South 3rd Street (Reserve to Russell)	$9,500,000 (Local funding- 2008 LRTP amendment #2)
Russell Street (Mount Avenue to South 3rd Street)	$7,000,000 (Future Earmark - City)
	$6,600,000 (Local funding)
	Surface Transportation Program - Urban funds Accrue annual allocations @ 1,829,439/yr starting in 2015 to complete project.

**Other potential federal aid funding source, Surface Transportation Program - Enhancement*