Memorandum:

Bend Central District MMA

To: Wendy Robinson, City of Bend

From: Matt Hastie, Andrew Parish, Darci Rudzinski - Angelo Planning Group

Copy: Rod Cathcart and Devin Hearing, Oregon Department of Transportation; members of the Project Team and Technical Advisory Committee.

Date: April 11, 2014

Re: **Tech Memo #8 - MMA Summary Report**

Table of Contents

Tables & Figures

1. Project Overview

Introduction

The City of Bend has been awarded a Transportation and Growth Management (TGM) grant in order to develop a plan for the Bend Central District Multi-Modal Mixed Use Area (MMA). An MMA designation may be applied by local governments to downtowns, town centers, main streets, or other areas where the local government determines that there is:

- Potential for high-quality connectivity to and within the area by modes of transportation other than the automobile;
- A denser level of development of a variety of commercial and residential uses than in surrounding areas;
- A desire to encourage these characteristics through development standards; and
- An understanding that increased automobile congestion within and around the MMA is accepted as a potential trade-off.

This project builds on work previously completed for the Bend Central Area Plan (CAP) and focuses specifically on an area between the Bend Parkway and 4th Street and between approximately Revere and Burnside Streets. The (MMA) Plan to be prepared as part of this effort, will recommend improved connections for people traveling in the area by foot, bike, bus, car, or freight truck. It also will look at ways to develop the area in the future to include a combination of housing, businesses, shops and other uses to create a distinct and vibrant district. The project will define a potential MMA boundary and will include amendments to the Bend General Plan (comprehensive plan), Transportation System Plan (TSP), and Development Code to implement the MMA. While a primary purpose of this project is to lay the groundwork for establishing an MMA, applying an MMA in this area is not a foregone conclusion.

Contents of This Memo

This document is a summary of the technical memoranda generated as part of the Bend MMA effort, listed in Table 1, intended to provide a concise background on the project so far. Selected portions of the original documents are found in the appendices to this memo and complete versions can be obtained from the City of Bend. In summarizing and compiling the results of the earlier memos, a number of changes have been made to reflect comments received from project advisory committees and other community members. To the extent this document differs from those memos, the information in this document is more up-to-date and represents current ideas about the MMA and recommendations related to it.

TABLE 1. BEND MMA MEMORANDA TO DATE

Memo	Title	Date
1	Existing Conditions	November 21, 2013
2	Future Conditions	November 21, 2013
3	Goals & Objectives	November 20, 2013
4	Land Use Assumptions & MMA Boundary Alternatives	November 27, 2013
5	Multi-Modal Level of Service	January 21, 2014
6	Summary of Impacts of MMA on Land Use	January 21, 2014
7	Urban Design Character of the Bend Central District MMA	January 21, 2014

Technical memoranda and other project materials can be obtained from the City of Bend.

Study area boundary map and description

Figure 1 shows the location of the Bend Central District (BCD). The BCD is adjacent to Bend's existing downtown core. It is roughly 206 acres in size, bounded by the Bend Parkway (OR 97) to the west, NE Revere Avenue to the north, NE Fourth Street to the east, and the rail line to the south. This area is similar to the "3rd Street Corridor" described in the Bend Central Area Plan, but it does not include areas to the north of NE Revere Avenue or south across the railroad tracks. And while it is centered on the 3rd Street Corridor, it should be considered as a larger planning district that encompasses more than just the area along 3rd Street.

The BCD is predominantly zoned for commercial and industrial land uses. These zoning designations support 3rd Street's former role as US Highway 97, before the Parkway was built. However, these zoning designations may not allow the development flexibility needed to support the recommendations and vision in the Central Area Plan and the BCD project. This project will consider new zoning designations that will more fully support the goals and objectives identified for the BCD.

More information about existing conditions including comprehensive plan designations, zoning, and land uses can be found in Section 4 of this memo and in Technical Memorandum #1.

Planning and Public Outreach Process

The MMA planning process is being conducted through a collaborative effort among City of Bend and Oregon Department of Transportation (ODOT) staff, a consulting team, Project Team (PT), a Technical Advisory committee (TAC), the City's Planning Commission, City Council and other community members. City and ODOT staff are working with the consulting team to evaluate conditions in the study area and formulate land use and transportation recommendations. Two advisory committees – the PT and TAC- meet on a regular basis to review and advise on key findings and recommendations. Other community members also provide input on these options and recommendations via the project Website, public workshops and other means. Staff and the consultant team take all of this feedback into account as they further refine project recommendations. Ultimately, the City's Planning Commission and City Council will review recommendations by staff and decide if and how to implement them.

The City of Bend established a public involvement program for the Bend Central District MMA project to ensure that the public, local businesses, residents and other stakeholders are educated about multimodal mixed-use areas (MMAs) and have multiple opportunities to participate in the project's decision-making process.

The outreach process, goals, and messaging are outlined below.

Goals of the Public Involvement Plan

The City of Bend and Oregon Department of Transportation (ODOT) are committed to an approach that:

- Provides early and ongoing opportunities for stakeholders to raise issues and concerns that can be considered through equitable and constructive two-way communication between the consultant team and the public.

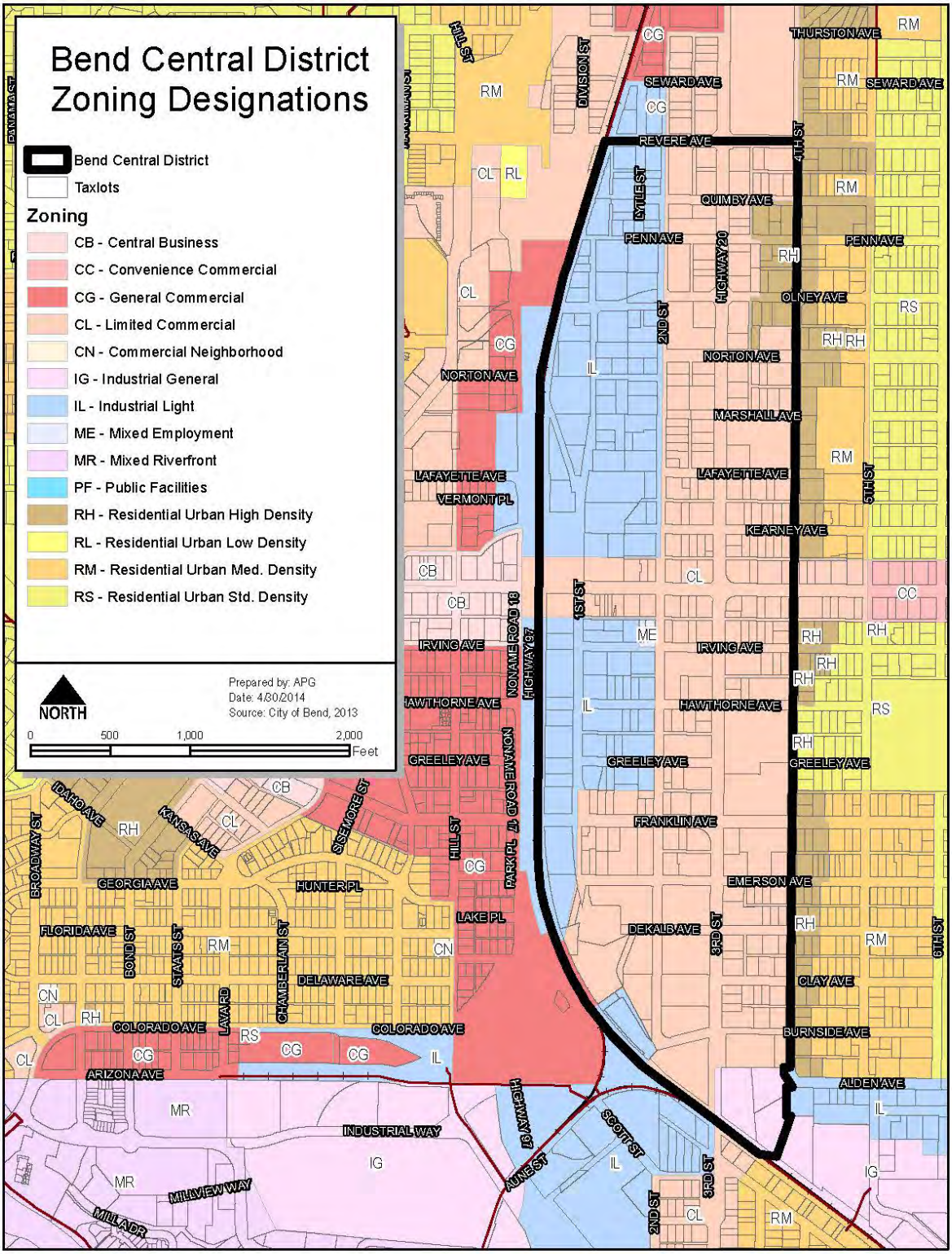
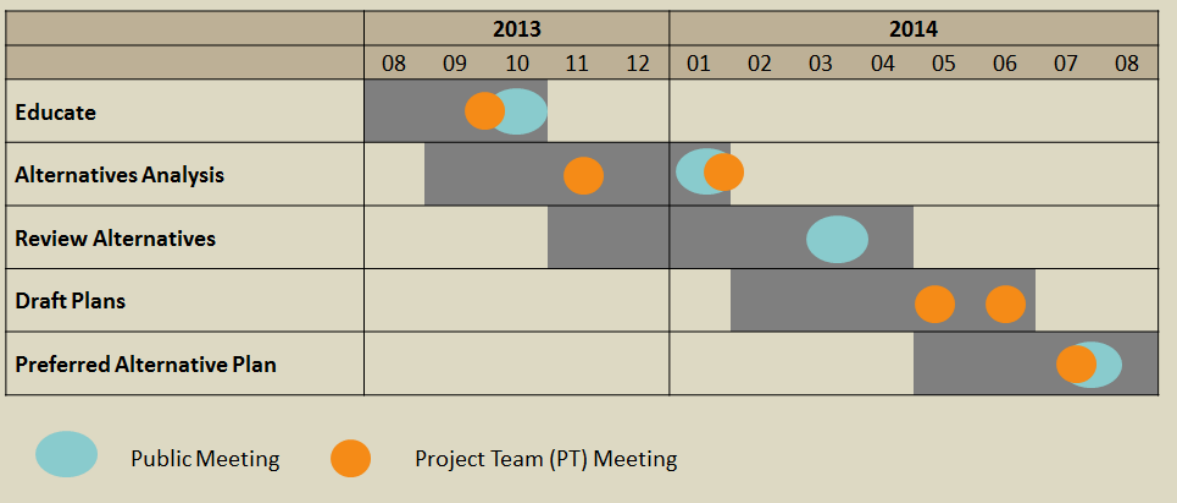


FIGURE 1. BEND CENTRAL DISTRICT BOUNDARY AND ZONING DESIGNATIONS

FIGURE 2. PUBLIC OUTREACH PROCESS



- Encourages the participation of all stakeholders regardless of race, ethnicity, age, disability, income, or primary language by offering alternative accommodations, as needed (e.g. translation services, activities for children at community meetings, accessible meeting facilities).
- Promotes fair treatment so that no group of people (racial, ethnic, or a socioeconomic group) bears a disproportionate share of the negative environmental consequences resulting from a program or policy.
- Ensures that public contributions are considered in the decision making process and can influence the agency's decision.

Public Outreach Events to Date

As of this writing, the following public outreach events have taken place:

- **Project Team and Technical Advisory Committee Meetings**. The Project Team (PT) includes interested citizens, property and business owners and groups that advocate for, or serve as networking places for, these traditionally under-served communities. The Technical Advisory Committee (TAC) includes local and state public agency staff from the City of Bend, Oregon Departments of Transportation and Land Conservation and Development (DLCD and ODOT). These groups have met three times and also have helped co-host the public meetings described below. Rosters for the committees are available from the City of Bend.
- **Community workshops and events.** To date, three community workshops have been held. The first was a public workshop held on October 24, 2013 where participants reviewed and commented on project goals and objectives and overall land use and other project assumptions. The second public event was held on January 7, 2014 at City Hall where participants reviewed and commented on updated land use assumptions and possible MMA boundary recommendations. The third public event was held on March 20, 2014 at the Bend Police

Station where participants reviewed and helped evaluate different transportation network options and strategies.

- **Articles in local papers.** Short media releases or articles were prepared at key milestones and sent to local media outlets. The Bend Bulletin has published several pieces about the project, including an editorial column, letters to the editor and an announcement for the third public meeting.

- **Meeting flyers:** City staff posted meeting flyers in a variety of public gathering places and local businesses in advance of each public workshop to help encourage people to attend these events.

- **Meeting announcements:** The City sent e-mails announcing each public meeting to people who have expressed an interest in the project and provided their contact information, including people who have attended previous project meetings and/or commented via the project Website or e-mail. The City also sent e-mail announcements to a variety of community group representatives and encouraged them to inform their constituents about the meetings. In advance of the third public workshop, the City also mailed postcard announcements to all property owners in the Central District study area and published a notice about the meeting in the Bend Bulletin.

- **Translation, special accommodations, and graphics:** translation services and other special accommodations were available upon request at all meetings (provided through City or partner agencies).

- **Stakeholder Interviews.** On Thursday, October 24, 2013 eight stakeholders were interviewed for the project. Each stakeholder was selected by the City of Bend to represent key issues, businesses, or organizations within the project area. The interviews were intended to update stakeholders and solicit their opinions about key recommendations in the 2008 Central Area Plan related to future development and transportation improvements in the area. The meetings also served as an opportunity to update participants about the Central District planning process and solicit their advice about other people or groups that should be involved in the process.

2. Project Goals and Objectives

The Goals and Objectives for the Bend Central District MMA have guided development, design and evaluation of the multi-modal mixed use area (MMA) transportation and land use concepts and will continue to inform recommendations about whether and how to implement future plans for the MMA

area. Two types of goals and objectives have been established for the project. *Project Goals and Objectives* focus on establishing the MMA and ensuring a comprehensive and meaningful public involvement process. The *Study Area Goals and Objectives* focus on the design of the transportation system, mix of land uses, urban design concepts and parking strategy.

Project Goals & Objectives

Multimodal Mixed-Use Area

- Establish a proposed boundary for the Bend Central District Multimodal Mixed-Use Area (MMA).
- Identify goals and objectives for the MMA that will promote development and redevelopment of a mix of uses and guide design and construction of an efficient, safe and convenient transportation system for all modes, including vehicles, transit, bicycles and pedestrians.
- Enable development of at least 500 new housing units, including affordable housing, within the Bend Central District, at an average development density of at least 12 dwelling units per acre.
- Develop and execute a public involvement and education plan with a focus on the purpose, potential use, impacts and implications of implementing an MMA.
- Establish an implementation plan that includes draft amendments to the City's General Plan, Transportation System Plan and Development Code.

Public Involvement

- Use a variety of strategies to educate and involve the public throughout the duration of the project to solicit ideas, solutions and comments on draft work products. Strategies include advisory committee meetings, use of a Project Website, media releases, public meetings and workshop, stakeholder interviews and communication or presentations to community groups and business and property owners.
- Ensure that the public involvement plan provides for fair treatment and meaningful involvement of all citizens, with the broadest participation possible, including opportunities for involvement of disadvantaged populations.
- Form a Technical Advisory Committee and Project Team to provide oversight and guidance for city staff and consultants and to contribute technical information and local knowledge to the project.

Study Area Goals & Objectives

Transportation

- Ensure an appropriate balance between traffic mobility, congestion and the ability to meet land use and development goals in the area, consistent with community goals and priorities.
- Ensure high-quality connectivity to, from and within the area for all travel modes (vehicles, pedestrians, bicyclists, transit), improving links with the employment/industrial district to the north, the Historic Downtown Core, and the Mill District to the south.

- Develop a set of future transportation-related performance measures, including targets for the share of bicycling, walking and transit trips within or to and from the planning area.
- Support a system of different types of streets with accompanying cross-section designs, access control and improvement concepts to implement the City's Transportation System Plan (TSP).
- Plan for safe, comfortable crossings of 3rd Street at signalized intersections for pedestrians and cyclists with a full range of ages and physical abilities.
- Plan for safe, comfortable crossings of Olney, Revere, Franklin and Greenwood Avenues at key intersections within the Central District.
- Identify strategies to provide for strong connectivity within the Central District, including creating a combination of shared use pathways, walkways along all streets, as well as connecting roads that were previously vacated, and consider incorporating alleys into the walking network where available.
- Address implementation of city and/or ODOT access management policies (e.g., driveway consolidation, access off side streets, etc.). Consider the use of alleys where available in the creation of an overall delivery network for the district.
- Develop an overall stormwater management program for the district that maximizes available public properties, including alleyways for stormwater management. The stormwater management program should maximize the use of the central Oregon stormwater guidelines aimed at reducing impervious surface area, use of bio-retention, and creation of a stormwater system that is addressed through efficient roadway and lot designs.
- Incorporate recommendations for a way-finding program or strategies that will assist people in locating key destinations within and outside the Bend Central District, no matter what mode of travel they choose.
- Incorporate transportation demand management strategies into the MMA plan (e.g., carpooling, telecommuting, flexible work schedules, etc.) as part of land use planning approval requirements.
- Integrate city-wide bicycle and pedestrian planning recommendations in to the MMA plan.
- Incorporate Bend's unique character and culture in recommendations for public improvements.
- Identify a cost-effective, politically feasible transportation network and associated improvements.
- Utilize existing right of way to the extent practical
- Enhance east/west travel
- Further assess and consider implementing transportation and other improvements in the 3rd Street Corridor, as appropriate:

- Consider revitalization of 3rd Street into a two-way, tree-lined boulevard with on-street parking, bicycle lanes, planter strips, and wide sidewalks fronting active retail opportunities.
- Evaluate the potential need and support for turning 2nd and 4th Streets into a one-way couplet system that helps focus the movement of traffic, with 3rd Street becoming a "great street" with centers of higher-density, mixed use development.
- Assess the potential benefits, costs and viability of transforming 2nd, 3rd, and 4th Streets into "green streets" that incorporate storm water treatment facilities within the public right-of-way.

Land Use & Urban Design

- Establish a mix of land uses in the Bend Central MMA that supports greater levels of pedestrian activity, associated with shopping, dining, working and living in the area.
- Ensure a variety of residential development types possibly including low to mid-rise multifamily, high rise multifamily, housing over ground-floor retail or commercial uses, and areas of live/work units.
- Identify a network of open spaces such as gathering places, linear green spaces, pocket parks or other small open spaces, and trails that connect to and within the Bend Central MMA.
- Explore limiting or prohibiting low-intensity uses within the MMA.
- Plan for a transition from higher densities and building heights in the area to the residential neighborhood east of 4th Street by limiting building heights and development intensities in this area.
- Meet MMA requirements associated with residential density.
- Incorporate Bend's unique character and culture in future public and private improvements.
- Identify strategies to overcome potential barriers to future development or redevelopment in the Central District.
- Ensure that urban form and design is consistent with the Performance Guidelines for the Bend Central District as established in the Central Area Plan (See Appendix A).

Parking Strategy

Establish a parking strategy for the MMA that includes the following elements:

- Identify potential locations for shared public parking facilities that can serve multiple projects and reduce the overall need for parking and for parking on specific sites within the district (e.g., office users parking during the day and residents, visitors or others using retail business on evenings and weekends).

- Evaluate the potential for implementing modified parking standards that reduce parking requirements in the MMA and encourage more trips by foot, bicycle or transit.
- Address on-street and off-street parking needs and requirements in the Bend Development Code.
- Ensure that surface parking lots incorporate landscaping, pedestrian pathways and other features to enhance their attractiveness and use for multiple purposes.

3. MMA Boundary Summary

MMA Intent and Requirements

The Multimodal Mixed-Use Area (MMA) designation was established as a way for cities to identify areas that are appropriate for compact, walkable, mixed use development, and where it is possible for some state traffic restrictions to be lifted to help achieve those goals. The City's Central Area Plan, completed in 2006, identifies the Central District as a future mixed-use area with a combination of housing, shopping, other commercial services, some industrial use, and improved facilities for transit, walking, and bicycling. Promoting a mix of different activities (housing, shopping, other businesses and parks) can allow people to walk or bicycle to meet more of their daily needs and ultimately reduce traffic and congestion.

Revitalizing the Central District is part of a larger strategy to:

- Use land within the City and public resources more efficiently
- Reduce the need to expand the City's urban growth boundary
- Increase the opportunity for people to meet a variety of daily needs within the Central District or nearby
- Strengthen connections between the Downtown, the Central District and other surrounding parts of Bend

Designation and application of a MMA requires cities to adopt a number of different design and development standards to attempt to ensure a future pattern of mixed use development within the MMA boundaries, consistent with the intent of a MMA. The following table summarizes those requirements.

TABLE 2. MMA REQUIREMENTS

◉	An MMA must meet each requirement in this column		
☐	MMA Boundary *(10)(b)(A)*		
☐	MMA entirely within a UGB *(10)(b)(B)*		
☐	Adopted plans & regulations that allow specified uses and require certain development standards: *(10)(b)(C)*		
	◉	An MMA must meet each requirement in this column	
	☐	Allow a concentration of a variety of uses, including: *(8)(b)(A)*	
		◉	An MMA must meet each requirement in this column
		☐	Allow medium to high density residential development at 12 units per acre or more *(8)(b)(A)(i)*
		☐	Allow offices or office buildings *(8)(b)(A)(ii)*
		☐	Allow retail stores and services *(8)(b)(A)(iii)*
		☐	Allow restaurants *(8)(b)(A)(iv)*
		☐	Allow public open space or private open space open to the public *(8)(b)(A)(v)*
	☐	Allow civic or cultural uses *(8)(b)(B)*	
	☐	Allow core commercial area with multi-story buildings *(8)(b)(C)*	
	☐	Require buildings and building entrances to be oriented to streets *(8)(b)(D)*	
	☐	Require street connections & crossings to access center *(8)(b)(E)*	
	☐	Require pedestrian-centric network of streets & ways within center *(8)(b)(F)*	
	☐	Require one or more transit stops in areas with transit service *(8)(b)(G)*	
	☐	Limit or prohibit low-intensity uses e.g. drive through services *(8)(b)(H)*	
☐	Do not require off-street parking, or require less parking than other areas *(10)(b)(D)*		
☐	Located at least ¼ mile from an interchange, adopted in an IAMP, or with concurrence *(10)(b)(E)*		
	◉	An MMA must meet at least one requirement in this column	
	☐	Located at least ¼ mile from an ramp terminal intersection *(10)(b)(E)(i)*	
	☐	Located within the area of, and consistent with an adopted IAMP *(10)(b)(E)(ii)*	
	☐	Written concurrence with the MMA provided by the mainline facility provider *(10)(b)(E)(iii)*	

Given the above requirements, application of an MMA would have a number of different implications for existing and future land uses within the Central District and the boundaries of a potential MMA.

- Allow for a wide range of retail, commercial, office and other uses. This is generally consistent with the vision established in the CAP and consistent with the types of uses allowed throughout the existing CL (Limited Commercial) zone. Meeting this requirement would broaden the set of uses currently allowed in areas zoned as Light Industrial but generally would provide enhanced opportunities for existing and future property owners in those areas. For example, industrial users could establish associated retail uses and light industrial uses could continue to be

allowed, including uses such as software development, computer sales and repair, bicycle and manufacture sales, beverage and food production and others.

- Provide for a medium to high density housing and allow for residential development at a density of 12 housing units per acre or higher. This also is consistent with the CAP recommendations, which assumed housing development at substantially higher densities. Along the eastern edge of the BCD, this would represent a shift in density but would be consistent with or at a potentially lower density than currently allowed in the existing area zoned for high density residential between Norton and Quimby Avenues.

- Require less parking than in other areas. This would represent a shift in comparison to current development patterns but likely would be necessary to achieve the development projections assumed in the CAP. Reducing minimum requirements would likely benefit many property owners from a redevelopment cost perspective and would not preclude private property owners from providing more parking than required. Unless the City establishes relatively aggressive maximum off-street parking requirements or requires construction of parking structures, requiring less parking in the MMA by itself would not be expected to adversely impact existing property owners.

- Assume a balance of land use and mobility goals. The City (and residents, workers and visitors) would accept a higher degree of congestion in this area as a trade-off for the ability to meet the land use goals and vision described here. It should be noted that some congestion can be beneficial by increasing exposure to local businesses and improving safety conditions for all travelers (drivers, pedestrians, bicyclist, transit users and others).

- Limit or prohibit low-intensity or low-density land uses such as drive-throughs. Depending on where the MMA boundary is located, this could make some existing businesses or land uses non-conforming. Depending on how this requirement is implemented, it also would potentially limit the ability of some existing low-intensity uses (industrial uses) to expand in the future. At the same time, industrial uses are allowed within an MMA as long as they are not the predominant use. In addition, the CAP envisions a shift away from those types of uses to some degree.

In addition to these impacts, provisions associated with the proximity of the MMA boundary to a state highway interchange are important. If an MMA is located within one-quarter mile of an interchange, the Oregon Department of Transportation (ODOT) must concur with the designation. This can represent another layer of complexity for establishing the MMA. At the same time, ODOT staff has noted that this may not be a significant issue and they currently do not see any major barriers to establishing an MMA in relatively close proximity to existing interchanges in the area (at Revere and Colorado Avenues). This may be particularly true in the vicinity of the Colorado interchange where development within the MMA may have a minimal influence on operations the interchange. This and other issues are reflected in the discussion of MMA boundary alternatives in the following section of this memo.

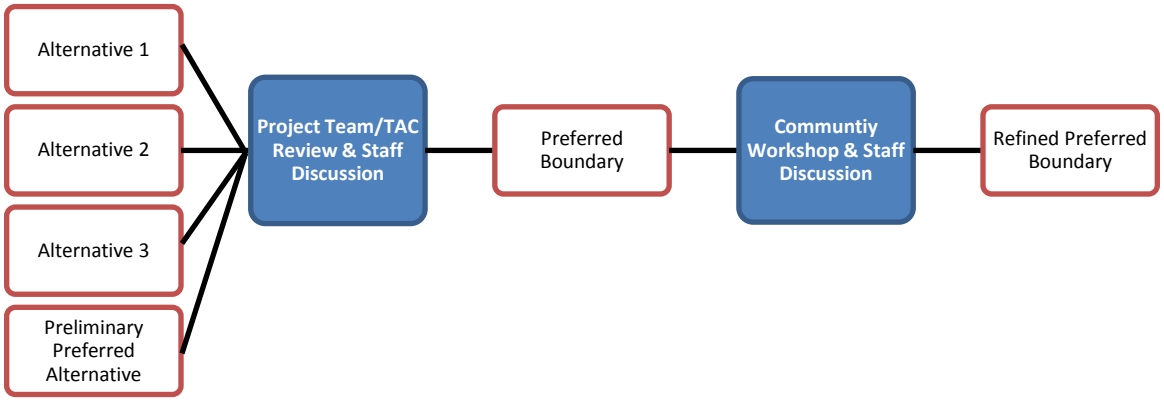
MMA Boundary Alternatives and Recommended Boundary

One of the tasks in this study is to identify and assess up to three MMA boundary alternatives and then recommend a preferred alternative. Based on the discussion in the previous section, the following factors have been considered in identify and comparing different MMA boundary alternatives:

1. Current or future new requirements associated with the types of land uses that must be allowed within a MMA
2. Proximity to the interchanges
3. Balance between congestion/mobility standards and limitations on future development
4. Relative impact on existing low intensity or auto-oriented uses
5. Areas prime for redevelopment
6. Transit coverage, frequency of service, and location of existing and planned transit stops and routes

Three different alternatives were initially identified and evaluated by the consulting team and City and ODOT staff. The team also recommended a preferred boundary and reviewed this assessment and recommendation with the Project Team and TAC. Based on this discussion, the group refined the preferred boundary recommendation and presented it to community members at the second public workshop. Based on the workshop results, the recommended boundary has been further refined. A summary of the initial options, evaluation and refined recommendations follows.

FIGURE 3. PREFERRED MMA BOUNDARY SELECTION PROCESS



Initial MMA Boundary Alternatives and Preliminary Preferred Boundary

The following table summarizes the initial boundary alternatives, including opportunities and constraints associated with each alternative. Maps of the initial boundary alternatives are included in Appendix B.

TABLE 3. BOUNDARY ALTERNATIVES OPPORTUNITIES AND CONSTRAINTS

Alternative	*Opportunities*	*Constraints*
Alternative 1: Entire BCD Study Area	Encompasses entire BCD – most comprehensive geographic impact	Within ¼ mile of 2 interchanges requiring ODOT concurrence Includes functioning industrial land May not be reasonable to expect intensity in whole area May result in more non-conforming uses
Alternative 2: Central Location - 3rd Street Corridor between approximately Olney Avenue at the north end and Emerson or DeKalb Avenue to the south	Encompasses most of 3rd street within BCD (Olney to Dekalb) Outside interchange area so no ODOT concurrence required. Focuses mixed uses development in a more concentrated area. May result in fewer non-conforming uses/impacts to existing low intensity uses	May limit land use or development goals by focusing on a limited area May result in the need to plan for more significant transportation improvements to meet mobility requirements and accommodate future auto trips Potentially less effective in achieving the CAP goals for a vibrant mixed use area in the northern and southern portions of the BCD
Alternative 3: Southern Location – area south of approximately Kearney Avenue	Encompasses most of 3rd street within BCD (North of Greenwood to southern end of study area) Requires ODOT concurrence with only 1 interchange area Focuses mixed uses development in a more concentrated area with most redevelopment potential May result in fewer non-conforming uses and/or impacts to existing low intensity land; results in fewer impacts on light industrial users north of Kearney Avenue	Requires ODOT concurrence with 1 interchange area May limit land use or development goals by focusing on a limited area May result in the need to plan for more significant transportation improvements to meet mobility requirements and accommodate future auto trips May be less effective in maximizing development potential in the BCD or in achieving the goals of the CAP for the area as a whole (but may be more effective in a more concentrated area)
Alternative 4: Preliminary Preferred – BCD study area boundary at southern end; at northern end, includes most of the study area, except the northwest corner	Maximizes redevelopment potential within the area, particularly along 3rd Street, by encompassing the majority of the Central District study area. Requires ODOT concurrence but reduces the area within one-quarter mile of the northern interchange. May result in fewer non-conforming uses and/or impacts to existing low intensity land uses in the northwest corner of the Central District; results in fewer impacts on light industrial users in that area and responsive to concerns from property owners in that area.	Requires ODOT concurrence with 1 interchange area

More information about the boundary alternatives and the refinement process, including maps of the four preliminary options can be found in Technical Memorandum #4 at and in the summary of the public workshop conducted on January 9.

Refined Recommended Boundary

As noted above, the preliminary boundary alternative was refined based on review by the PT and TAC and further refined based on results of the second public workshop. The boundary map is included on the following page. In refining and recommending a boundary, City and ODOT staff and the consulting team considered the comments and issues listed in Table 4.

TABLE 4. COMMENTS ON MMA BOUNDARIES AND RESULTING REFINEMENTS

Comment/Consideration	*Resulting Refinement*
The area north of Revere also should allow for opportunities for mixed use development. Transportation improvements or conditions north of Revere also may warrant application of MMA provisions in that area to better balance mobility and development goals.	Shifting the boundary north is not recommended for the following reasons: • The location of the railroad, parkway and local streets will make it difficult to meet MMA connectivity requirements. • Most uses north of the Revere are either large-scale commercial uses that area unlikely to transition to other uses (e.g., large grocery stores) or smaller industrial users that could be adversely impacted by the MMA requirements • Major transportation improvements are no longer assumed in this area to help address traffic operation needs
Transportation improvements and the urban design character should be relatively consistent on both sides of 4th Street	Rather than expanding the boundary to include the area due east of 4th Street, the team recommends: • Maintain the boundary along 4th Street • Assume transportation improvements will be made to both sides of 4th Street. • Establish height and density requirements along the west side of 4th Street to ensure a relatively consistent character of development on both sides of the street. • Consider future design and development standards that would apply to both sides of 4th Street.
Consider whether the boundary should include or exclude industrial areas between Revere and Norton Avenues in the vicinity of 1st Street.	Local businesses in the area proposed to be outside the boundary initially expressed concerns about being within the MMA; those businesses have not objected to the current proposed boundary. Therefore, not revision is recommended at this time.

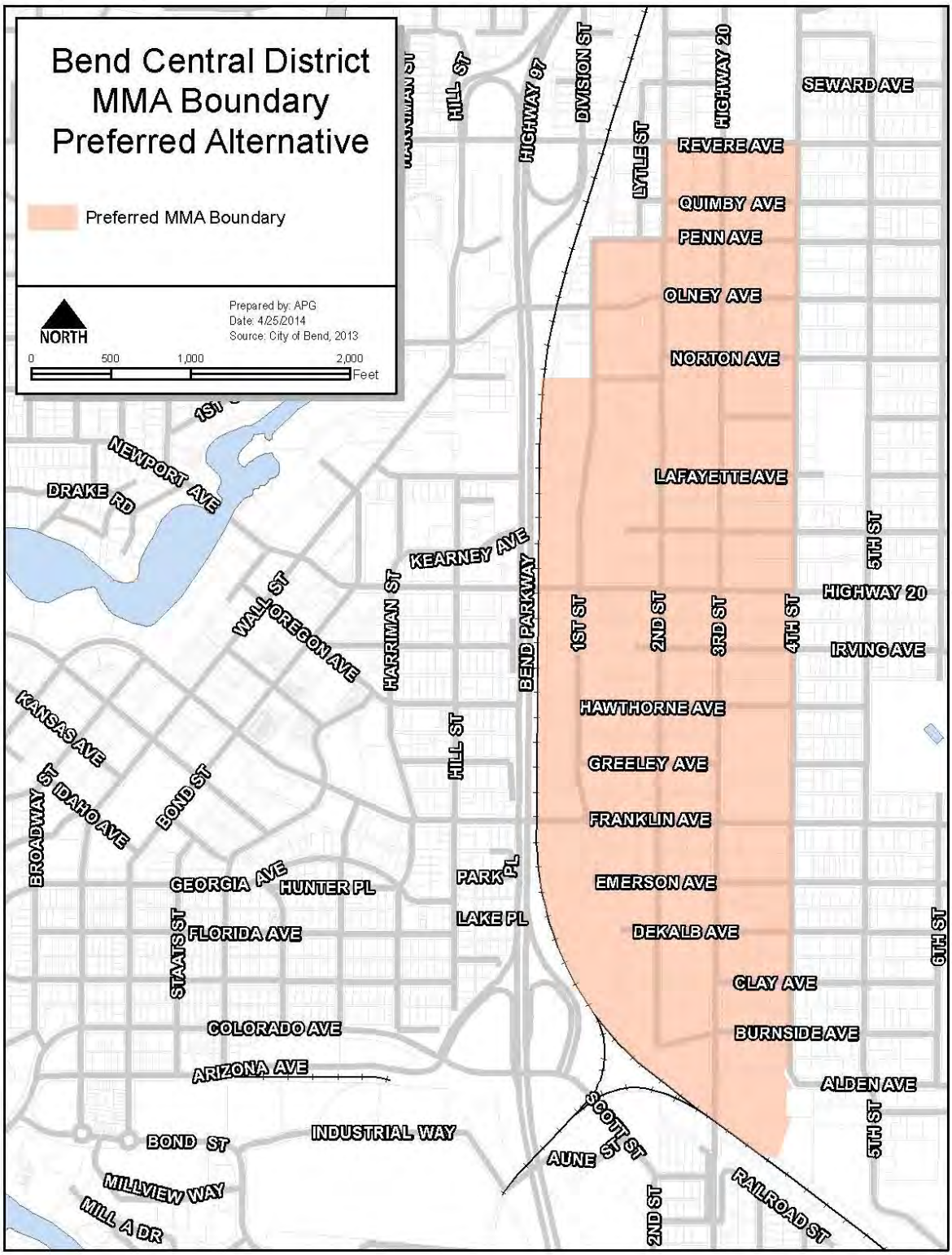


FIGURE 4. MMA BOUNDARY PREFERRED ALTERNATIVE

4. Existing and Future Land Use Assumptions and Conditions

The City of Bend and the Central District are expected to grow and intensify in the coming years. The City is expected to continue to attract new residents who are drawn to the many qualities that make Bend a great place to live – outstanding recreational opportunities, diverse economic opportunities, a thriving food and beverage scene, good schools and parks, community-oriented residents and business owners and a great overall quality of life.

As part of the overall growth projected for the City and region, the Central Area Plan envisions future growth and change in the Central District as well. Currently, the area is home primarily to a mix of auto-oriented and lower density commercial and industrial uses. Many of these businesses are likely to remain in the area for the foreseeable future. However, given the area's proximity to Downtown, its relationship to key transportation and other public facilities, and opportunities for future redevelopment of land in the area, the Central District represents longer-term potential for more intensive development and redevelopment that will help accommodate a portion of the city's future housing and employment needs.

Existing Land Use Conditions

Existing uses in the BCD consist primarily of commercial and industrial developments that were built before current development code standards (including building heights, densities, parking, and building setbacks) were adopted. As a result, many developments are auto-oriented, particularly along 3rd Street, and are set back significantly from the street. In addition, large surface parking lots are often located between the street and buildings. Existing uses in the BCD include a large chain grocery store, several automobile lots, fast food restaurants, hotels/motels and other regional highway type businesses and industries. Recent (within the last five years or less) developments include:

- Jack in the Box Restaurant - Completed in 2010
- A new Walgreens at 3rd and Franklin Streets, currently under construction
- Hawthorne Transit Station at Hawthorne and 3rd Streets, completed in 2011
- An indoor court facility
- Several other small-scale commercial/retail uses, some of which have located in existing buildings but with a change of use (e.g., Kombucha Mama, Bend Velo and others)

Because this district is fairly long and linear, it contains a variety of development types and character. The more developed areas are found along 3rd Street where it intersects with the east/west streets of Greenwood Avenue and Franklin Avenue, carrying traffic into downtown or across the Deschutes River.

The Bend Parkway and railroad run north/south to the west of 3rd Street, acting as a barrier between the BCD and downtown. Direct access under the Parkway and railroad tracks is restricted primarily to the east/west connections of Greenwood, Franklin, Olney, and Revere Avenues. The limited access has contributed to a concentration of commercial development along those east-west connections. The intersection of Greenwood Avenue and 3rd Street is a key gateway opportunity for the BCD, as commercial development along Greenwood Avenue is in the early stages of revitalization.

The area between 1st and 2nd/3rd Streets has been informally referred to as the "Railroad District"; industrial land uses in this area include a lumber yard, a retail heating oil distributor and other large parcel operations which were historically located near the railroad for easy freight services.

Urban Form. As noted above, the BCD is primarily an automobile-dependent commercial and light industrial corridor centered on the north-south running 3rd Street. Most of the development in this area seems to have been built from 10-50 years ago and is typified by large parking lots and commercial buildings set far from the street.

Revere Ave., Olney Ave., Greenwood Ave., and Franklin Ave. are key east-west connectors between the BCD and Downtown Bend. More intense commercial activity has emerged at the intersections of these roads with 3rd Street and westward towards the city center. A large strip center at 3rd and Revere houses an Albertsons and Rite Aid and a similar center with a Safeway and Ace Hardware anchors the southern end of the BCD at 3rd and Franklin. Under-crossings of the Bend Parkway (Highway 97) and the railroad tracks on these roads are poorly configured and somewhat distantly spaced (by approximately ¼ mile).

The western edge of the BCD abuts railroad tracks and elevated portions of Highway 97. 1st and 2nd Avenues are lined with light industrial uses such a natural gas distributors, storage units, and recycling facilities. These also tend to be 1-2 story structures with lower aesthetic appeal and lots of land allocated to parking and maneuvering. Areas such as this nonetheless are functional and frequently useful as a buffer between the highway/railroad and commercial uses along 3rd Street. They also provide a wide range of goods and services that are important to residents and businesses in Bend as well as a number of hotels and other businesses oriented to visitors. There also is a pocket of residentially zoned land between 3rd and 4th Streets in the northern portion of the study area (between Quimby and Norton Avenues). East of 4th Ave and outside the BCD, uses quickly transition to single family residential, schools, parks and other similar uses.

Overall the Central District offers relatively few visual focal points or examples of urban design that are not auto-oriented. The presence of sidewalks varies from continuous (along 3rd Street) to disconnected and distantly spaced (along 1st and 2nd Streets and some of the cross streets). Crossings of major roads are infrequent and potentially hazardous, particularly along 3rd Street and Greenwood. Bicycling is similarly challenging and disconnected. There also are very few street trees or other landscaping, including parking area landscaping, in certain portions of the area (e.g., along 3rd Street and a number of east/west streets, particularly west of 3rd Street).

VIEW LOOKING SOUTH ON 3RD STREET UNDERNEATH RAILROAD

SMALLER COMMERCIAL STRUCTURES (HERE AT 3RD AND IRVING) ARE SET DEEP FROM THE STREET AND FRONTED BY ABUNDANT OFF-STREET PARKING.

STRIP DEVELOPMENT, SUCH AS HERE AT 3RD AND REVERE, IS PREVALENT THROUGHOUT THE CENTRAL DISTRICT.

LIGHT INDUSTRIAL AND DISTRIBUTION PREVAILS ALONG 1ST AND 2ND AVENUES NEXT TO THE BEND PARKWAY AND RAILROAD TRACKS.

Future Land Use Vision (Central Area Plan)

General Vision. The Central Area Plan (CAP) describes the future vision for the Bend Central District as:

> *"… a new mixed-use area in the Bend Central District that will fill in missing spaces and provide greater density feeding onto a "new" 3rd Street. Because the 3rd Street re-invention will carry less automobile traffic, it can transition into a boulevard with greater levels of pedestrians socializing in community plazas, dining in local restaurants, shopping in a variety of mid-sized businesses, and working in a variety of professional offices. 3rd Street will become a passageway through medium to high density, compact, mixed-use residential areas with cafes and shops; it will be a street full of public spaces linking with the employment/industrial district to the north, the employment/office districts in Bend Central, the Historic Downtown Core via Greenwood and Franklin Avenues, and the Mill District to the south…"*

Redevelopment. The CAP identifies a number of large-scale redevelopment opportunity sites within the BCD, most of which are located along 3rd Street. Those sites were identified based on market data and pressures available at that time. Market conditions have changed in the district since the CAP was completed in 2007 and may not support the same intensity or types of developments or redevelopments that were identified at that time. In addition, the City is facing challenges in providing the level of infrastructure (water and sewer facilities) that would be needed to support this level of development. As a result, redevelopment assumptions and projections may be refined as part of the Central District planning process.

Urban Form. In terms of urban character, the BCD is envisioned to become a hub of employment, retail and residential uses that includes:

- Reinvention of 3rd Street as a pedestrian-friendly corridor
- Mixed-use, close-in neighborhood
- Higher densities and taller signature structures
- Activity centers with unique green spaces and public places
- Effective connections to the Historic Downtown Core via all modes of transportation
- Vibrant street-level uses along East-West corridors connecting 3rd Street to the Historic Core

The CAP identified a detailed list of "performance guidelines" for future development in the BCD to ensure consistency with this vision. Those guidelines generally include the following elements:

- Making the BCD a "new town in town" that will draw people and activity into the district during all seasons and all times of day.

- Connections (visual, vehicle, pedestrian) within the district and to adjacent districts.
- Defined civic spaces and landscaping throughout the district that create gathering spots and pathways.
- Buildings that relate to their context in terms of scale, mass and design. Buildings should also be active on the ground floor and help to define the streets.

The CAP also identifies the BCD as a "tall building" district and includes specific recommendations for height (100 to 150 feet, generally) and floor area limitations intended to provide opportunities for development of taller, more slender buildings. Per the tall building standards, buildings should be placed with their long dimension in an east/west orientation in order to create and maintain view corridors. Buildings should also be set back from property lines on the east and west to allow positioning of taller buildings to minimize view blockage on or from neighboring properties.

Updated Future Land Use and Urban Design Assumptions

A number of changes are recommended to the CAP land use assumptions, consistent with city staff and stakeholder concerns about the intensity and height of development assumed in the CAP. While the overall concept for the BCD has not changed since adoption of the Central Area Plan, the densities and building heights originally envisioned for this district may no longer be suitable given changes in market conditions and current infrastructure needs and challenges. In general, four to six-story buildings may be a more suitable target in much of the planning area, in comparison to the taller buildings described in the Central Area Plan.

Table 4 compares assumptions from the CAP with proposed Central District MMA development projections. The table also includes information about historic (2003) development levels from the CAP. The updated development projections represent the following adjustments:

- Reduced the number of projected housing units from approximately 1,330 to 800, consistent with the assumption of fewer residential "towers" and lower height limitations and also consistent with the assumption that at least 500 housing units will be planned for the MMA.
- Reduced the amount of projected retail development by approximately 20%, consistent with a general decrease in development intensity but assuming that the vision for ground floor retail in a significant amount of the project area continues to represent the vision for the Central District.
- Reduced the amount of projected office development by approximately 40%, consistent with the decrease in development intensity and assumed building heights.
- Kept the amount of light industrial constant in comparison to the CAP assumptions.

TABLE 5. CAP AND CENTRAL DISTRICT HOUSING AND EMPLOYMENT PROJECTIONS

	2003	2030 CAP	2030 BCD MMA
Households	60	1,329	802
Office (employees)	1,857	4,007	2,226
Retail (employees)	1,169	1,895	1,517
Light Industrial (employees)	783	876	876

The current land use vision for the area assumes the following:

- Along 1st Street, a combination of light industrial, infill, and live/work uses will provide employment lands and help buffer areas to the east from noise, sight, and pollution impacts of the Parkway and railroad. The northern portion of 1st may remain more heavily industrial. Structures here will be predominately 1-3 stories in height.

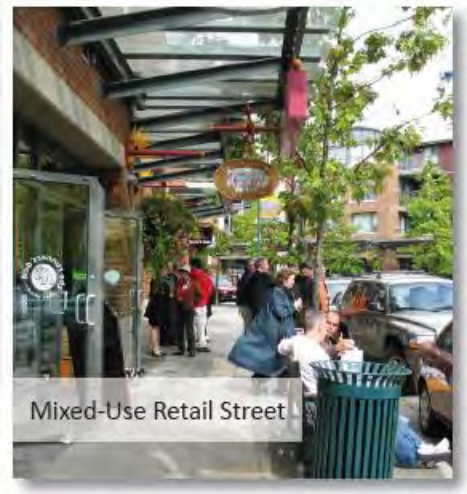
- 2nd Street will host a mix of office, residential, and small-scale retail uses. This area could lend itself to a significant amount of redevelopment and is likely to be where the bulk of higher density residential uses are located, with retail uses on the ground floor in some cases. Commercial or office uses may locate here as well if there is enough traffic to support the commercial uses and if the market sees the office uses as compatible with the residential. These uses could support lodging establishments along 3rd Street. Buildings will range from 3-6 stories and possibly taller in some locations. Some parking will be underground structured, or tuck-under.
- 3rd Street will likely continue to include larger scale commercial uses, particularly in the short to medium-term. In the longer term, uses are expected to transition to a mix of commercial, retail and residential, particularly in the southern portion of the area and in closer proximity to direct connections to Downtown (e.g., from somewhere north of Hawthorne to somewhere south of Franklin). Buildings along 3rd Street are likely to vary from one to four or six stories with taller buildings located in redeveloped areas, primarily in the southern portion of the District.

- The District's highest-density mixed-use will line 3rd Street. Multi-family housing and/or office uses will occupy the floors above ground-story retail, restaurant, and service office uses. These Small lots may be transformed into public open spaces and parks, providing gathering spaces along this busy commercial corridor.


Mixed-use Apartment Complex

- On 4th Street, land uses will be primarily residential with some office and smaller scale, ground floor retail uses mixed in and helping serve the neighborhood to the east. Housing will include a mix of multi- and single-family housing. Development here will be limited to at most three stories to transition between taller 3rd Street development and existing homes east of 4th. By emphasizing residential uses, street traffic will be lighter as most commercial movements stays on 2nd and 3rd.

- Along East/West Streets land uses would be primarily commercial or office uses along the busier sections of Greenwood and Franklin, potentially with ground floor retail uses and upper floor housing in some future developments. On other east/west streets, there would be a mix of residential, small-scale retail and some commercial or possibly office mixed in where it front's one of the north/south streets.


Mixed-Use Retail Street

Urban Design Framework

The MMA is a tool that will allow the Central District to meet the city's development objectives for the area and grow in a more sustainable, human-friendly manner that provides transportation, housing, employment, and recreational opportunities for a growing number of people. It will require decades of public and private investment to realize this vision. The framework for the BCD provides general guidance on land uses, transportation networks, key activity nodes, green space, and built character. Future projects of all sizes and scopes should be vetted against the vision outlined in the framework, which reflects many of the aspirations of the public and stakeholders for the District.

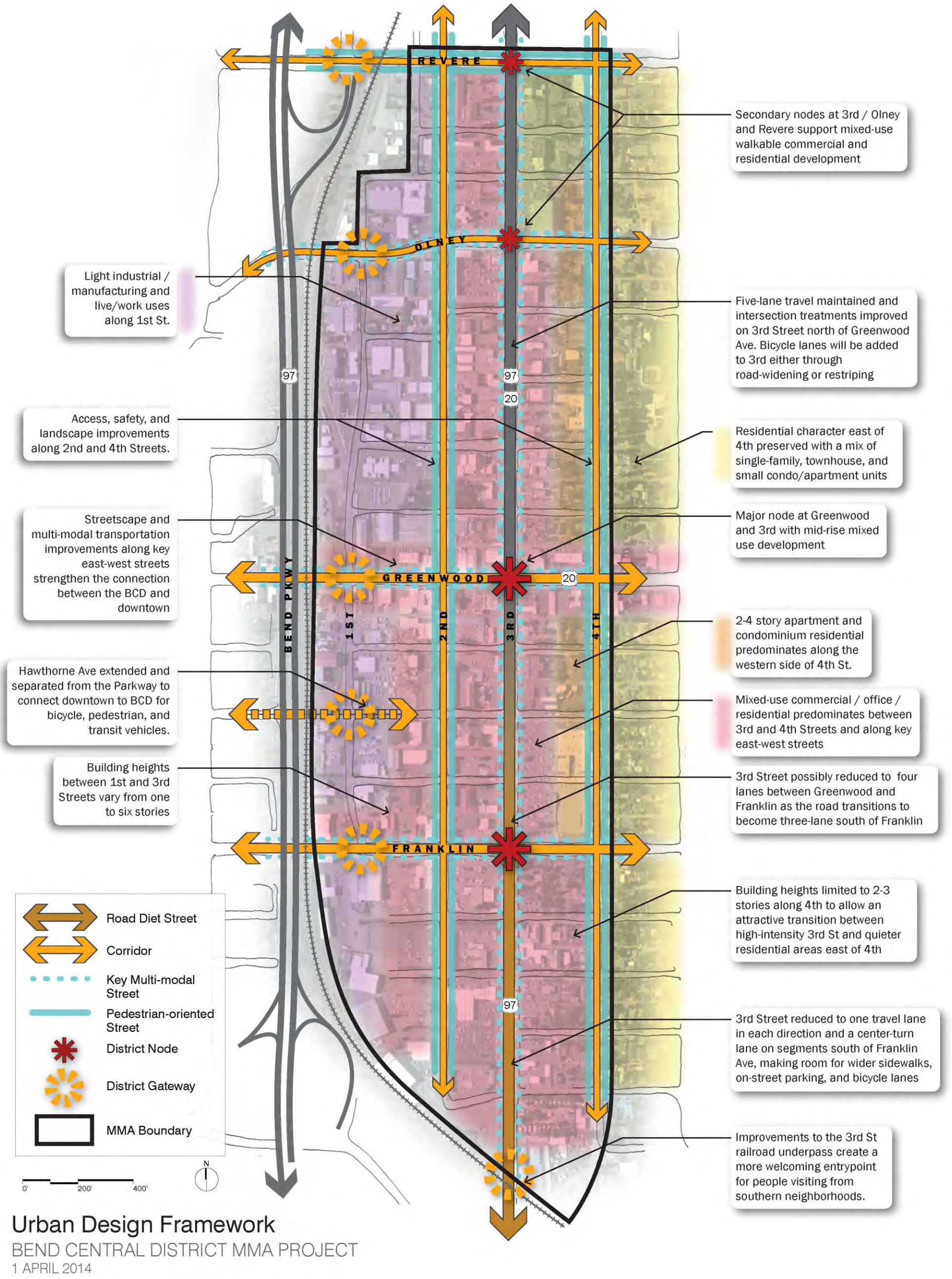


FIGURE 5. URBAN DESIGN FRAMEWORK

The illustration shown here depict a concept vision for the overall building massing and open spaces in the District and a vision of the types of lively street activities and mix of uses possible on 3rd Street after it is reduced to three lanes. The highest intensity uses in the BCD are concentrated on 3rd Street and the main east-west streets (Revere, Olney, Greenwood, and Franklin). Building heights up to six stories are possible along these streets, with heights tapering down to 1-3 stories.

FIGURE 6. URBAN DESIGN VISUALIZATION

Land Use Implementation

Changes to the Bend General Plan and Development Code (including new zoning designations) will likely be needed in order to implement the land use vision for the BCD and to comply with requirements for an MMA in this area. Those amendments may include a new mixed-use zone for the BCD that allows the appropriate mix of uses and building design needed to achieve the established vision. The CAP Land Use Regulatory Recommendations memo provided a preliminary assessment of the types of plan and code amendments that may be needed. Specific recommendations regarding plan and code amendments for implementing the MMA will be provided as part of this project. The following table provides a brief summary of how initial recommendations relate to the types of uses envisioned in the BCD and related MMA requirements.

TABLE 6. COMPARISON TABLE: PROPOSED ZONE DISTRICT AND MMA REQUIREMENTS

MMA Requirement	Compliance Notes
Allow medium to high density residential development at 12 units per acre or more	Multi-family, single-family attached and cottage cluster housing would be allowed, consistent with this requirement. Minimum density requirements could be established but are not explicitly required by the MMA provisions.

MMA Requirement	Compliance Notes
Allow offices or office buildings	Offices and Clinics would be permitted commercial uses. Government - point of service, uses which could administration offices, also would be a permitted Public & Institutional use.
Allow retail stores and services	Retail Sales and Service uses, with size limitations, would be permitted.
Allow restaurants	Restaurants/Food Services without drive-throughs would be permitted, although new drive-through restaurants may be prohibited, consistent with MMA requirements.
Allow public open space or private open space open to the public	Parks and Open Space uses would be permitted as Public & Institutional uses.
Allow civic or cultural uses	Public & Institutional uses would be permitted outright, including schools – including daycares, colleges and vocational schools - clubs and religious institutions, and government uses ("point of service" uses, such as libraries or permitting offices; "limited point of service" uses, which include equipment yards, are prohibited).
Allow core commercial area with multi-story buildings	Multi-storied buildings would be permitted throughout the district, with heights ranging from one to six or eight stories. Heights would be limited to 2-3 stories on the west side of 4th Street to provide a transition to the neighborhood to the east. Building heights and other characteristics could vary by "sub-district" within the larger BCD district.
Require buildings and building entrances to be oriented to streets	All buildings would be required to have an entrance that faces the street, or that is visible to the street and connected by a direct and convenient walkway.
Require street connections & crossings to access center	Pursuant to existing city Transportation Improvement Standards, street improvements anywhere within the City must comply with the TSP. Subsequent sections of this memo describe proposed transportation facility improvements in the BCD. The City's existing requirements, such as those related to street alignment and connectivity (3.4.200.K) and sidewalks and bicycle lanes (3.4.200. L) should be reviewed for consistency with project recommendations.
Require pedestrian-centric network of streets & ways within center	Walkways will be required to provide direct and convenient pedestrian circulation between developments and neighborhoods. Walkways also must conform to the standards in Chapter 3.1, Access, Circulation and Lot Design.
Require one or more transit stops in areas with transit service	This requirement isn't necessary to codify. The Hawthorne Station is located within the Preliminary Preferred Alterative MMA boundary; seven Cascade East Transit (CET) bus lines leave from this primary transit center. Bus lines 1 (South Third Street), 4 (North Third Street) and 5 (Wells Acres Road) provide north/south travel through the area. Allowed uses also should include transit facilities, including pullouts, shelters, waiting areas, benches, information and directional signs or structures, and lighting.

MMA Requirement	Compliance Notes
Limit or prohibit low-intensity uses e.g. drive through services	Several auto oriented and low-intensity uses may be prohibited in the BCD. These include drive-through restaurants, auto oriented Retail Sales and Service,[1] Retail Sales and Service uses over 20,000 sq ft, Commercial Storage (outdoor and mini-storage), and outdoor Entertainment and Recreation. Government public works yards and vehicle storage also may be prohibited. The City also may consider eliminating or limiting the following new[2] uses: • Retail Sales and Service (auto dependent) (C)[3] • Warehouse (P) • Transportation, Freight and Distribution (C) • Wholesale Sales (more than 75% of sales are wholesale) (P) • Manufacturing and Production - greater than 5,000 sq. ft. (C)
Do not require off-street parking, or require less parking than other areas	To satisfy this MMA requirement, the City will need to reexamine minimum parking requirements as applied within the proposed MMA boundary.

These potential zoning provisions are described in more detail in Tech Memo #6 and will be further analyzed and refined during subsequent tasks in this study.

In addition, the MMA requirement related to minimizing off-street parking requirements is expected to require further analysis and discussion. Areas to explore and discuss include:

- Lowering or eliminating minimum off-street parking standards within the district, based on the availability of on-street parking and existing surface lots.
- Further analyzing actual parking demand in the MMA as a means to recalibrate parking standards.
- Examining the potential adverse impacts to density that currently allow unlimited surface parking to meet code requirements for off-street parking.
- Considering a floor area bonus for below grade parking.
- Relaxing requirements within the CAP-MCEN zone (or specific areas within the MMA) for the on-street parking credit,[4] off-site parking and/or shared parking.
- Modifying minimum standards by use or size within the CAP-MCEN zone.
    - Waive parking requirement for small restaurant/café/deli uses.
    - Eliminate parking requirements for uses that are (a) 750 square feet or less and (b) fronted by curb space that provides on-street parking.

[1] The City definition: "Automobile-oriented use means automobiles and/or other motor vehicles are an integral part of the use, such as drive-up, drive-in, and drive-through facilities."

[2] Note that existing uses could be grandfathered and renovations/rebuilds allowed under prescribed conditions.

[3] The City definition: "Automobile-dependent use means automobiles and/or other motor vehicles are served by the use and the use would not exist without them, such as vehicle repair, gas station, car wash or auto and truck sales."

[4] Under existing code, off-street required spaces may be met through on-street parking spaces at a 1 for 1 exchange, up to 50 percent of the requirement (3.3.300.B).

- Streamline definition of "commercial uses" to parallel the CBD and establish one parking requirement for all commercial uses (nine standards currently apply to non-CBD areas, pursuant to Table Table 3.3.300).
- Reduce minimum parking requirements that apply to any development that has more than one use. Current code requires parking for each individual use, as opposed to a "mixed use" parking standard.

5. Transportation Conditions, Analysis and Improvements

Existing Conditions

Existing System Characteristics

Throughout the study area, road widths and speeds vary. The major roadways in the area have sidewalks lining both sides of the road. Local roads, however, have intermittent or nonexistent sidewalks throughout the area. The major roadways mostly prohibit on-street parking, while the local streets, particularly those running north-south, have street widths that allow for informal parking. In some cases, streets are narrow and vehicles park partially on curbs or sidewalks. Cyclists use striped shoulders on streets such as NE Franklin Avenue, but on most streets there is no dedicated space for bicycles throughout the study area. More information about the pedestrian and bicycling facilities can be found in the Bicycle and Pedestrian System section below.

Between 1st Street and 2nd Streets, several east-west local streets have been vacated, such as Lafayette Avenue, Greeley Avenue, and Irving Avenue. This leaves 1st Street somewhat isolated and disconnected from the larger Central District grid. Also, 1st Street is not developed south of Franklin Street, where the right-of-way (less than 60 feet) is incomplete. There also are gaps in the sidewalk system on 1st Street. In some locations, there are sidewalks on one side of the street and in others there are no sidewalks. 2nd Street has not been developed between Quimby Avenue and Revere Avenue, and currently features trees and formal and informal parking lots.

Arterials such as Revere, Olney, Greenwood, and Franklin Avenues connect to the historic downtown core via underpasses below the Bend Parkway. Greenwood and Franklin Avenues also feature narrow underpasses of the BNSF tracks and portions of Franklin in that area include dedicated bike lanes, while Olney and Revere Avenues feature at-grade crossings. For all these connections except Olney Avenue, there is no dedicated space for cyclists, requiring either a shared lane or use of narrow separated sidewalks. The Olney crossing is also sub-standard with gaps in both the sidewalk and striped bike lane. It has also been noted that the under-crossings have issues with flooding during major storms.

Pavement Conditions

Bend utilizes a Pavement Condition Index (PCI) that visually evaluates the surface conditions and assigns an index number. Scoring is based on characteristics such as the presence of potholes, cracking, weathering, asphalt bleeding, uneven pavement, and wheel rutting, etc. According the Bend Central Area Plan, the city has made an effort to devote resources to preserving or improving the pavement surfaces. While most major roads (arterials and collectors) in the Central District are in good condition, some facilities, most notably Greenwood Avenue, have been rated only fair. Residents note that local streets in the area exhibit worse conditions on average. Additionally, ODOT staff has indicated that the

pavement condition along 3rd Street is fair or better. More information is available in Technical Memo #1. It should be noted that this information is based on data from approximately 2006 and pavement conditions in specific areas may have changed since that time.

Access Management

As Bend contemplates a different travel environment throughout the district, access to land parcels must be balanced with the ability to efficiently move through traffic, including freight, and minimize pedestrian conflict. One tool for achieving this is access management, typically using infrastructure like median controls, driving spacing and consolidation, intersection spacing and so on to minimize turns.

Along state highways such as US 97 and US 20, access is commonly controlled by ODOT through the purchase of access rights. New access to/from a state highway is provided consistent with the standards adopted in the Oregon Highway Plan (OHP) for each highway classification, its location within an urban or rural area, and its posted speed. These standards apply along US Highway 97/20, which bisects the study area, and the Bend Parkway, which forms the western edge of the district and provides key access points for regional through-travel.

As an Expressway in an urban area, the access spacing standard for the Bend Parkway is 2,640 feet. 3rd Street is posted at 35 mph through the study area, and Greenwood Avenue is posted at 25 mph.

The City of Bend has established access management standards and policies in its development code which specifies that lots and parcels in all zones shall be allowed one access point. This access point must be on the street of lower classification if the lot abuts two streets. A lot may have a second access if it will improve internal circulation, and the access may be conditioned on being a shared driveway or right-in/right-out only.

Existing Traffic Volumes and Operations

Data on traffic volumes and operations was taken from analysis conducted as part of the 2007 Bend Central Area Plan. Traffic counts were taken during the peak travel hour period during a typical weekday, generally between 4:00 PM and 6:00 PM. They were collected during the month of January in 2007, and then adjusted as part of the Bend Central Area Plan analysis by a seasonal factor of 1.4102 to reflect peak seasonal volumes. The 30th highest hourly volumes were developed using assumptions and methodologies published by the ODOT Transportation Planning Analysis Unit (TPAU) in its Analysis Procedures Manual. The resulting traffic volumes can be viewed in Tech Memo #3. It is recognized that the 2007 data may not match current conditions.

Existing Intersection Operations

Two measures were used to assess the performance of intersections in the Bend Central Area: volume-to-capacity (v/c ratio), which estimates the proportion of available capacity that is being used, and average delay, which estimates how long the average vehicle must wait to get through an intersection.

The data gathered, when seasonally factored to estimate a 30th highest hour condition per TPAU procedures, indicates that several intersections along 3rd Street currently exceed either the ODOT or City of Bend v/c standard. Signalized ramp terminals for the Bend Parkway currently meet standards, indicating that queuing back onto the mainline of the Parkway may not currently be an issue.

Analysis determined that the intersections of 4th Street/ Franklin Avenue and Colorado Avenue/Bend Parkway NB ramps, both two-way stop controlled intersections, exceed the City of Bend and ODOT operational standards for worst movement. Both of the all way stop intersections at 4th Street/Revere Avenue and 4th Street/Olney Avenue also exceed standards for overall average delay. These two intersections may be near the point where they should a roundabout or other control treatment should be considered. The stop-controlled intersection at Bend Parkway northbound and Colorado Avenue is also reaching the point where vehicles are experiencing high delays, particularly those attempting to make a southbound left from the off-ramp. Though this intersection is outside the BCD and may not connect directly to the district, consideration of an MMA means that interchange ramps within a quarter mile of the area should be assessed for operational and safety conditions.

Freight Movement and Designations

Continued efficient movement of freight within the Central District is important to the City, the region and the state. Third Street (US 97/US 20) is an Oregon Highway Plan Freight Route, an Oregon Freight Plan Strategic Freight Corridor, part of the National Network (federal truck route designation) and a Reduction Review Route. It is designated to carry wide trucks (up to 14') and long trailers (up to 62'). Freight movement is particularly important north of Greenwood. These highways also serve as "Paired Routes" with Interstate 84 meaning that when there is construction work on one of these east/west routes, the MCTD will work with the trucking stakeholders to notify them that they should use the other route until the highway is open again. Third Street also serves as an alternate route to the Bend Parkway for trucks.

Freight movement will need to be considered in identifying, planning for and implementing improvements along 3rd Street and the portion of Greenwood that serves as US 20. Such improvements will have to be reviewed by the ORS 366.215 stakeholder group before the plan is completed or prior to final design, particularly if they may impact the capacity of these roads for freight movement.

Safety Considerations in the Central District

Technical Memorandum 1 documented existing conditions, various safety programs and metrics, including:

- City of Bend Multimodal Traffic Safety Program
- Critical crash rates on the Bend Parkway
- 2012 safety priority index system (SPIS) locations along on US 97
- Excess proportion of specific crash types at key intersections in the study area

The memo documented no significant safety issues on the Bend Parkway through the study area. The Parkway segments analyzed were under the statewide average (average rate of 2.56) for that facility's classification of Urban Principal Arterial. The top 10% of SPIS locations for the State of Oregon in 2012 were reviewed, and none were located on US 97.

On 3rd Street, the City's Multimodal Traffic Safety Program documented a combination of design issues and pedestrian and cyclist behaviors that have led to mode conflicts in that area. For example, cyclists

are often observed riding on sidewalks where bike lanes don't exist. This creates potential conflicts with pedestrians or bicyclists riding the wrong way.

Another safety concern identified was jaywalking midblock by pedestrians. In a transit survey, 3rd Street was specifically identified as needing more frequent pedestrian crossings. Because buses are infrequent and there are very few signalized or other formal pedestrian crossings on 3rd Street, riders often cross the five-lane road mid-block to catch a bus, creating potential conflicts with other road users. Another safety challenge is the underpasses pedestrians and cyclists use to cross the Bend Parkway. Cyclists tend to share the path rather than take the road, but poor lighting, narrow right of way, and short sight distances can lead to conflicts between the users.

Bend Multimodal Traffic Safety Program Recommendations

In 2012, the City of Bend began its Multimodal Traffic Safety Program to screen and evaluate the transportation system and look at countermeasures to reduce crashes. The following crash trends and countermeasures were identified in the city's 2012-2014 program intersections within the study area. These intersections should be included in consideration of transportation treatments to improve the 3rd Street Corridor.

Trend 1: 3rd Street/ Franklin Avenue

Crash trends indicate that red light running and right turn hooks involving bikes are issues at this intersection. Identified countermeasures include Dutch intersection treatments for bikes and updated signal timing and phasing.

Trend 2: 1st Street/ Greenwood Avenue

Crash trends indicate northbound and eastbound angle crashes. The identified countermeasure is curb extensions on the south side of the intersection.

Trend 3: Revere Avenue/ Division Street/ Bend Parkway NB

Crash tends include incidents involving permitted left turns, rear end crashes in the share left/ through lane, and red light running. Countermeasures include protected-only phasing (and potentially new signal timing) and a road diet to separate left turns and reduce passing maneuvers.

Crash Reduction Analysis for Excess Proportion Locations

To supplement the City's work in its Multimodal Traffic Safety Program, the existing conditions analysis in Technical Memo 1 documented excess proportion of specific crash types analysis at key intersections in the study area. The analysis flagged three intersections and identified potential safety improvements at these three locations. The locations described further in this section, and crash modification factors (CMFs) are used to estimate crash reductions from potential mitigations.

3rd Street/Greenwood Avenue

The intersection of 3rd Street at Greenwood Avenue experienced an excess proportion of turning crashes. Roughly half of these crashes occurred within the intersection, and half on the intersection

approaches. Of the eight turning movement collisions recorded between 2008 -2012, three of them occurred within the intersection. The intersection already provides dedicated left turn lanes and protected left turn phasing, so no adjustments are recommended to the signal.

Turning crashes on the intersection approaches can be mitigated with access management, which benefits multiple crash types in addition to turning movement crashes. The CMF available for access management looks at the reduction of access points per mile between existing and future configurations.

To analyze this for the study intersection, access points between the study intersection and its nearest neighboring intersection were tallied and extrapolated to represent a one-mile segment. Then, access points were evaluated for potential closure (i.e. if a business had more than one access point, it was reduced to one) to determine a future scenario. Using these metrics, a CMF of 0.79 was calculated for Greenwood Avenue and 0.81 for 3rd Street. Applying this to the crash types at the study intersection over a five year period shows a potential reduction of two crashes on Greenwood Avenue and one crash on 3rd Street.

TABLE 7. CRASH MODIFICATION ESTIMATES FOR 3RD/GREENWOOD

Roadway	Existing Driveway Density (driveways/mi)	Proposed Driveway Density (driveways/mi)	CMF	Existing Crash Frequency (Five Year Total)	Mitigated Crash Frequency (Five Year Total)	Net
Greenwood Avenue	63[1]	38[3]	0.79	11	9	-2
3rd Street	57[2]	36[4]	0.81	6	5	-1

Notes
[1] Based on 10 driveways per 0.16 miles
[2] Based on 8 driveways per 0.14 miles
[3] Based on 6 driveways per 0.16 miles
[4] Based on 5 driveways per 0.14 miles
Crashes included in the table only include those that are recorded on the intersection approaches

8th Street/Greenwood Avenue

The excess proportion of specific crash types analysis indicated an overrepresentation of rear-end collisions at the intersection of 8th Street and Greenwood Avenue. Of the 24 crashes recorded between 2008 and 2012, 16 of them were rear-end, with 50% of these occurring on the east leg of the intersection. Of the eight rear-end collisions on the east leg of the study intersection for the five year study period of 2008-2012, two were injury crashes and the other six property damage only crashes. This area transitions from a median divided, limited-access roadway surrounded by undeveloped land to an undivided area with many access points. This change in environment may cause drivers to not anticipate queued vehicles at this signal, resulting in rear-end collisions.

Rear-end collisions on the east leg of this intersection can be mitigated with advanced queue warning systems, helping to alert drivers who may not be aware of the upcoming signal that they should expect

to encounter the back of a queue. The CMF available for advanced queue warning applies a single factor for each severity type.

The CMF for advanced queue warning is 0.84 for injury collisions and 1.16 for property damage only (PDO). This indicates that the treatment reduces severe crashes, but increases property damage only crashes. Using these two CMFs, the injury collisions would experience a small reduction (so small it doesn't represent even one less crash per five year period), but PDO collisions would experience an increase of one crash over a five year period.

No CMF is available to allow analysis of advanced signal warning signs.

3rd Street/Revere Avenue

The intersection of 3rd Street at Revere Avenue experienced an excess proportion of rear-end crashes, mostly on the north and south legs of the intersection. Rear-end crashes can occur from driver slowing down to access driveways. Of the 22 crashes recorded from 2008 to 2012, 16 of them were rear-end collisions.

Access management benefits multiple crash types in addition to rear-end crashes. The crash modification factor (CMF) available for access management looks at the reduction of access points per mile between existing to a future configuration. Similar to the 3rd Street/Greenwood Avenue intersection, this location was analyzed by reviewing the access points at this intersection within in the nearest block and extrapolating these values to represent a one-mile segment. Then, access points were evaluated for potential closure (i.e. if one business had more than one access point, it was reduced to one) to determine a future scenario. Using these metrics, a CMF of 0.74 was calculated for Revere Avenue and 0.87 for 3rd Street. Applying this to the crash types at the study intersection over a five year period shows a potential reduction of zero crashes on Revere Avenue and one crash on 3rd Street. Although this does provide some reduction, the benefit is likely not high enough to outweigh the costs associated with reducing access.

Future Transportation Conditions

Baseline Analysis

As part of this project, the consultant team completed a baseline analysis of future transportation conditions. The baseline analysis considered land use projections consistent with the General Plan, as well as land use assumptions from the CAP. They indicated that five signalized intersections and five unsignalized intersections are forecast to exceed performance targets in 2030 with current General Plan land use in place and no transportation improvements. The analysis can be considered conservative, given the nature of the 2007 data used as a starting point. All intersections along 3rd Street that were analyzed for the CAP exceed standards, and most study intersections along 4th Street do as well.

Both northbound ramp terminal intersections for the Bend Parkway (at Revere and Colorado Avenues) exceeded standards, while the southbound terminals did not. Because operations at these northbound ramp terminals may indicate queuing issues from the northbound off-ramp back onto the mainline of the Bend Parkway, further discussion is warranted.

- **Revere Avenue/Bend Parkway NB Ramps.** The northbound off-ramp has a shared through/left and a right-turn only at its approach to the intersection. The right-turn only lane experiences the most operational issues under 2030 conditions, with about 58 seconds of average delay and a lane v/c of 0.97. This suggests that vehicles using the off-ramp may occasionally wait through multiple cycles, particularly as the right turn lane is striped to only about 50 feet. This increases the risk of queues accumulating and extending to the mainline.
- **Colorado Avenue/Bend Parkway NB Ramps.** This intersection is assumed to remain unsignalized under 2030 baseline conditions. The current configuration includes a northbound off-ramp that loops and tees into Colorado Avenue from the north, where it has a left-turn only and a right-turn only lane and is stop-controlled. The east-west Colorado Avenue approaches are uncontrolled. The southbound left movement from the off-ramp is forecast to experience very large average delays (likely in excess of three minutes) due to the lack of gaps in cross traffic and a forecast queue of vehicles waiting to make an eastbound left turn from Colorado Avenue onto the northbound on-ramp. Although only 30 vehicles are forecast to make this southbound left from the off-ramp, the significant average delay and left-turn lane storage length of about 250 feet may lead to lane-blocking and queue spillback to the mainline.

Results of the baseline analysis under the CAP assumptions are summarized in the following two tables.

TABLE 8. BASELINE SIGNALIZED INTERSECTION OPERATIONS, 2030 30TH HIGHEST HOUR

Intersection	Overall V/C ratio	Average Control Delay (sec/veh)	Exceeds City Standards?	Exceeds State Standards?
Revere Avenue/Parkway SB Ramps	0.83	20.6		No
Revere Avenue/Parkway NB Ramps	**0.92**	27.8		Yes
Revere Avenue/3rd Street	**1.22**	> 80.0		Yes
Olney Avenue/3rd Street	**1.15**	> 80.0		Yes
Greenwood Avenue/3rd Street	**1.42**	> 80.0		Yes
Franklin Avenue/3rd Street	**1.11**	81.1		Yes
Colorado Avenue/Parkway SB Ramps	0.74	26.0		No

Source: Bend Central Area Plan, 2007
Intersections not meeting targets shown in **bold**

TABLE 9. BASELINE UNSIGNALIZED INTERSECTION OPERATIONS, 2030 30TH HIGHEST HOUR

Intersection	Control Type	WORST MOVEMENT			OVERALL	
		Movement	V/C ratio	Average Delay (sec/veh)	V/C Ratio	Average Delay (sec/veh)
4th Street/Revere Avenue	AWSC	EBTR	> 1.0	> 80.0	> 1.0	**> 80.0**
4th Street/Olney Avenue	AWSC	WBTR	> 1.0	> 80.0	0.92	**> 80.0**
4th Street/Greenwood Avenue	TWSC	SBR	0.56	30.0	0.61	3.0
3rd Street/Hawthorne Avenue	TWSC	EB	**0.71**	**> 80.0**	0.63	2.7
4th Street/Hawthorne Avenue	TWSC	EB	0.18	11.7	0.28	4.1
4th Street/Franklin Avenue	TWSC	NB	**0.87**	**> 80.0**	0.47	10.5
Colorado Avenue/Parkway NB Ramps	TWSC	SBL	**> 1.0**	**> 80.0**	> 1.0	> 80.0

Source: Bend Central Area Plan, 2007
Intersections not meeting targets shown in **bold**

Additional information about this analysis, as well as projected baseline conditions related to bicycle, pedestrian, transit and other public facilities is found in Tech Memo #2.

Bicycle and Pedestrian Facilities

Bicycle and pedestrian facilities in the Central District area consist of dedicated bicycle lanes, bikeways (shared roadways), multi-use paths, and sidewalks. These systems are more fully described in Technical Memo #1 for this project. Key bicycle and pedestrian facility issues for the Central District include:

- Lack of bicycle connections between the 3rd Street corridor and downtown Bend due to the barrier formed by the Bend Parkway and the BNSF tracks. Existing connections via Greenwood Avenue or Franklin Avenue are narrow, dark, and unappealing, and feature facilities that must be shared by people walking and biking. As the mix of uses in the Central District evolves, there will likely be more demand for non-motorized access to and from downtown. Also, as the OSU-Cascades campus is developed in western Bend, demand for multi-modal connections to the west from the BCD will significantly increase.
- The pedestrian environment along 3rd Street features curb-tight sidewalks, frequent driveways, and inconsistent pavement conditions. With denser and more diverse land uses in the Central District, the existing conditions on 3rd Street and other auto-oriented facilities may expose more people to uncomfortable and/or unsafe walking conditions.

Transit

As part of the Bend MPO's Public Transit Plan[5], several corridors within the Central District are identified as having potential as part of future transit routes. The following corridors were subject to a screening evaluation to help identify the most transit-supportive segments within the MPO area:

- Revere Avenue
- Neff Road

[5] Accessed at http://www.bendoregon.gov/index.aspx?page=759 on October 8, 2013

- Greenwood Avenue
- Hawthorne Avenue
- Franklin Avenue
- 3rd Street
- 8th Street

Screening criteria included current and future population and employment density, development potential, facility constraints (including future traffic congestion), and concentrations of transit-reliant demographic groups. The screening process designated three "Definite Corridors" within the Central District: 3rd Street, Greenwood Avenue, and Franklin Avenue (west of 3rd Street). These are the most densely developed corridors and/or have the greatest development potential and connect key destinations that generate transit demand.

Multi-Modal Level of Service Analysis

In addition to the baseline analysis, the team also conducted a "Multi-Modal Level of Service" (MMLOS) analysis of five transportation options, including a "no-build" option and four other alternatives that were developed during the CAP process and are described in the following table. A fifth "Hybrid" option, not considered during the CAP process was identified after the MMLOS analysis was conducted. It is not included in Table 10 but is described on pages 42 and 44-45 and illustrated in Figure 7. An MMLOS analysis of this alternative will be included in a subsequent Tech Memo (#9).

In addition to the elements summarized in the table, a new connection along Hawthorne between the BCD and Downtown was assumed. No changes to the existing number of lanes on major east/west streets (Franklin, Greenwood, Olney and Revere) were assumed but improvements to intersections throughout the study area were anticipated. The alternatives also are illustrated in a series of maps found in Appendix C. Additional assumptions about the options are described in Tech Memo #5.

Table 10. Summary of Existing and Assumed Alternative Transportation Networks

	No-Build	Alt. 1: 2nd/3rd Street Couplet	Alt. 2: Expanded Grid	Alt. 3: 2nd/4th Street Couplet	Alt. 4: 3rd Street Enhancement
3rd Street	• 4 motor vehicle lanes with center-turn lane • Signed for 35 mph • No bike facilities • Narrow sidewalks with no buffer • No on-street parking	• Converted to one-way NB with two motor vehicle lanes • 35 mph assumed • 6-foot bike lane with 3-foot buffer • Widened sidewalks (8-foot) • On-street parking; • Narrowed crossing distance	• 3 motor vehicle lanes • 30 mph assumed • 5-foot bike lanes • Widened sidewalks, with planted buffer • On-street parking; • Narrowed crossing distance	• 3 motor vehicle lanes • 25 mph speed assumed • Bike lanes • Widened sidewalks • Potential on-street parking	• Maintains 4-lane cross-section, but reduces lane widths • 35 mph assumed • Widens right-of-way to add bicycle lanes and widened sidewalks • No on-street parking • Streetscape enhancement
2nd Street	• 2 motor vehicle lanes • No bike facilities • Partial sidewalks	• Converted to one-way SB (2 lanes) • 35 mph assumed • SB bike lane • Widened sidewalks • SB transit will need to run on either 2nd or 4th	• No bike lanes • Potential widening to expand motor vehicle capacity (2 lanes with turn lanes at key locations) • 30 mph assumed • Retains existing on-street parking • Intersection upgrades	• No bike lanes • 35 mph assumed • Retain on-street parking on one side • Widened sidewalks on both sides • Intersection upgrades	No change
4th Street	• 2 motor vehicle lanes • No bike facilities • Partial sidewalks	• No change			

Note: NB = Northbound; SB = Southbound

The MMLOS analysis showed significant differences in motor vehicle, bicycle, and pedestrian performance among the networks analyzed. The following are key findings from the assessment.

- Motor vehicle LOS analysis shows that several concepts, either grid or couplet, can potentially provide adequate motor vehicle capacity, with intersections operating at LOS D or better. Spreading north-south volume across multiple facilities allows for those facilities, including 3rd Street, to carry fewer motor vehicle lanes, creating opportunities for significant improvements to the bicycle and pedestrian environment.
- For couplet and grid concepts that spread traffic to multiple north-south facilities, design challenges exist at the north end of the study area where multiple facilities must merge back to 3rd Street. North of Revere Avenue, the grid's interface with 4th Street and with Studio Road may require some realignment along with roundabouts or signals. This could impact existing land uses and structures in these areas.
- A new Hawthorne Avenue connection from downtown will be a key low-stress east-west connection that will significantly improve bicycle and pedestrian connectivity through the area. Sidewalks should be completed on Hawthorne through the Central District, along with a bicycle treatment appropriate to the moderate vehicle volumes forecast for Hawthorne.
- 3rd Street is currently signed at 35 mph and likely has even higher prevailing speeds. In alternatives where 3rd Street was modeled with lower speeds, the bicycle LOS benefited significantly from the reduced speeds and some reduced volumes due to routing changes.

The following table also summarizes results of the MMLOS analysis, which is further described in Tech Memo #5 and in Appendix D of this memo.

TABLE 11. GENERALIZED LOS BY MODE RELATIVE TO NO-BUILD

Mode / Street	No-Build	Alt. 1: 2nd/3rd Street Couplet	Alt. 2: Expanded Grid	Alt. 3: 2nd/4th Street Couplet	Alt. 4: 3rd Street Boulevard
MOTOR VEHICLE					
3rd, 2nd, and 4th Streets	High north-south volumes on 3rd Street, with some diversion to 4th Street	Generally improved relative to No-Build	Generally improved relative to No-Build	Generally improved relative to No-Build	Generally improved relative to No-Build
BICYCLE					
3rd Street	E-F	C	D	B	B
2nd Street	A-B	B	E	E	A
4th Street	A-D	A-B	E	E	A
PEDESTRIAN					
3rd Street	C	B	A-B	A	C
2nd Street	A	C	B-C	B-C	A
4th Street	A-B	A	B-C	B-C	A

Note: Shading indicates change relative to No-Build (green = improvement; red = degradation).

Potential Bicycle, Pedestrian and Transit Improvement Strategies

The MMLOS analysis presented above, along with additional assessment of existing multimodal conditions, was used to identify the types of street and intersection design treatments needed to improve safety and comfort for all travel modes in each alternative. The following text and Table 12 describe a multimodal design toolbox of treatments that could be applied on 2nd, 3rd, and 4th Streets as well as east-west streets within the District to enhance conditions for pedestrians, cyclists, transit users and others.

Pedestrian

No-Build Pedestrian level-of-service on 3rd Street is generally LOS C, and LOS C or D on Greenwood and Olney Avenues. Recommended improvements to improve pedestrian conditions and safety along 3rd Street and other streets throughout the district include widening sidewalks, which in many cases lack sufficient clearance for wheelchairs and other mobility devices, and providing accessibility (curb) ramps at all intersections and driveways. Corner curb radii can be tightened at many intersections to prevent excessive turning speeds, expand the pedestrian area, and reduce pedestrian crossing distances (see #28 in the design toolbox –Table 12). Curb bulb-outs and pedestrian-scale wayfinding signage are other elements that will help make pedestrians more visible to other road users and ensure a safer and at times faster walking trip.

The level-of-service analyses reflect segment-level conditions but do not account for the difficulty of crossing the major arterial streets in the District. Signalized intersection spacing along 3rd Street in the core of the District is over a quarter-mile between Franklin and Greenwood Avenues, and over a third-mile between Greenwood and Olney Avenues. There are no designated crossings west of 3rd Street on Olney, Greenwood, or Franklin Avenues, and signalized intersection spacing on Greenwood Avenue is over 0.4 miles between 3rd and 8th Streets. These distances require lengthy out-of-direction travel to reach a traffic signal and crosswalk, and some users cross at unprotected crossings.

In addition, 3rd Street, Greenwood Avenue (west of 3rd), and Franklin Avenue are current transit streets and Greenwood Avenue east of 3rd Street is a proposed future transit street. Bus riders require crossings to access the stop in the opposite direction. Notwithstanding additional signalization that is included in various alternatives, placing high-visibility pedestrian crossings at intermediate intersections or high-demand mid-block locations between signals would provide safe and convenient crossing locations for pedestrians, bicyclists, and transit riders. Raised crosswalks, Rectangular Rapid Flash Beacons (RRFB), and overhead or in-pavement indicators are examples of treatments that should be used to maximize visibility of these crossings, particularly on wide, higher-speed streets such as 3rd Street and Greenwood Avenue. On wider, multi-lane streets such as 3rd Street in alternatives 2, 3, and 4 and on Greenwood Avenue, a pedestrian refuge island can be provided in conjunction with a street median or turn lanes, reducing the pedestrian crossing distance.

This photo of 3rd Street at Franklin (looking north) illustrates the need for streetscape improvements, access management (fewer driveways), wider sidewalks, and more frequent designated pedestrian crossings.

Source: SERA

Bicycle

Most bicycle improvements are recommended along 3rd Street, but in some alternatives additional improvements on 2nd or 4th are recommended, such as connections from the existing bike network. Some type of bicycle facility improvement is recommended on all north/south and all major east/west streets in the area. Basic striped bike lanes provide cyclists with dedicated right-of-way but a minimal degree of separation from other traffic. Depending on adjacent traffic speeds, higher degrees of separation are desirable where traffic volumes or speed are higher, such as a buffer between the bike and travel lanes (e.g., Alternative 1). Such separation is desirable in other alternatives as well, particularly those that assume a speed limit of 35 mph. Other infrastructure elements, such as bike boxes and left-turn bike boxes at intersections, improve visibility and alert drivers to the presence of cyclists. This is particularly critical at intersections with high turn movements. Wayfinding and "Share the Road" signage may also help develop a sense of caution among all road users.

Transit

All four alternatives assume improved transit operations and comfort. Bus bulb-outs located at bus stops will help improve visibility for both bus drivers and passengers waiting to board and also enhance the attractiveness/comfort of transit use. Pedestrians and other road users will see a clear indication that riding transit is easy, pleasant, and accessible. Shelters should also be provided at moderate-to-high

volume stops, including transit and walking information; shelter capacity should be increased at projected high-demand stops.

As described above, pedestrian crossings are needed to provide access between transit stops in either direction, which on 3rd Street are frequently located between signalized intersections; locating stops either at the near or far side of intersections is typically preferred, except where high-demand activity centers are served. Crossings are also needed on Franklin and Greenwood, and along 2nd Street in Alternative 1.

A particular conflict point for transit passengers exists on the eastern half of Hawthorne Avenue (between 3rd and 4th Streets), which serves as an on-street transit center. Passengers cross Hawthorne mid-block to transfer between bus routes, while vehicles may egress the Safeway parking lot eastbound onto Hawthorne and have limited visibility of pedestrians crossing the street between buses. Right-turns onto eastbound Hawthorne could be prohibited at this parking lot egress and one or more raised, high-visibility crossings could be installed across the eastern portion of this block to provide designated crossing locations.

TABLE 12. ALTERNATIVE MULTI-MODAL TRANSPORTATION IMPROVEMENTS

Type	Map ID	Design Treatment and Brief Description	Alt 1: 2nd/3rd Street Couplet	Alt 2: Expanded Grid	Alt 3: 2nd/4th Street Couplet	Alt 4: 3rd Street Boulevard
	1	**Pedestrian safety islands.** Recommended to limit pedestrian exposure in intersections or crossings with 3+ traffic lanes.	✓	✓ (2nd/3rd)	✓ (3rd)	✓ (3rd)
	2	**Sidewalk expansion.** Provide sidewalk capacity to comfortably meet pedestrian demand.	✓ (2nd/3rd)	✓ (3rd)	✓ (2nd, 3rd, 4th)	✓ (3rd)
	3	**Planted buffer.** Provide separation from motor vehicle traffic.	✓ (2nd/3rd)	✓ (3rd)	✓ (3rd)	✓ (3rd)
	4	**Bulb-outs/curb extensions**. Visually and physically narrow roadway. Often used in conjunction with on-street parking.	✓ (3rd)	✓ (3rd)	✓ (3rd)	
	5	**Highly visible, mid-block crosswalk.** Meet high demand for pedestrian crossings between intersections.	✓ (2nd/3rd)	✓ (3rd)	✓ (3rd)	✓ (3rd)
	6	**Raised crosswalks.** Visually and/or physically emphasize crossing locations on non-state highway facilities.	✓ (2nd/3rd)	✓	✓ (2nd, 4th)	✓ (3rd)
	7	**Accessibility ramps.** Required at all intersections & mid-block crossings.	✓	✓	✓	✓

Type	Map ID	Design Treatment and Brief Description	Alt 1: 2nd/3rd Street Couplet	Alt 2: Expanded Grid	Alt 3: 2nd/4th Street Couplet	Alt 4: 3rd Street Boulevard
	8	**Rectangular Rapid Flash Beacon (RRFB).** Increase visibility of high-demand unsignalized ped. crossings of higher-speed, multi-lane roadways, e.g., 3rd, Greenwood, etc.	✓	✓ (3rd)	✓	✓ (3rd)
	9	**Bike lane (no buffer).** Standard bike lane with no additional separation from vehicle travel lanes (appropriate for moderate-volume roadways and vehicle speeds of approx. 25-30 mph).		✓ (Acceptable on 3rd)	✓ (Acceptable on 3rd)	Not desirable on 3rd Street with 35 mph speed
	10	**Buffered bike lane (e.g., Thermoplastic, Planters, Striping).** Provide additional separation/protection for cyclists on higher-volume and/or speed roadways, e.g., ≥ 30 mph.	✓ (Recommended on 2nd/3rd with 35 mph speed)	✓ (Desirable on 3rd with 30 mph speed)	✓ (Desirable on 3rd with 25 mph speed)	✓ (Recommended on 3rd with 35 mph speed)
	11	**Bike corrals.** Serve bike parking demand; often converted from on-street parking and/or implemented in conjunction with curb extensions.	✓ (2nd & 3rd)	✓ (2nd & 3rd)	✓ (3rd)	
	12	**Bike boxes.** Increase visibility of bicyclists at major intersections and/or with high turning movements. Federal approval is required for implementation.	✓ (2nd & 3rd)	✓ (3rd)	✓ (3rd)	✓ (3rd)
	13	**Left turn bike boxes.** Facilitate bicycle left-turns without crossing motor vehicle lanes.	✓ (2nd & 3rd)	✓ (3rd)	✓ (3rd)	✓ (3rd)
	14	**Bus bulb-outs.** Increase transit stop visibility/comfort/capacity and minimize bus delay.	✓ (2nd & 3rd)	✓ (3rd)	✓ (3rd)	✓ (3rd)PP
	15	**"Share the road signs", other bike and pedestrian signage**	✓ (2nd & 3rd)	✓ (2nd & 3rd)	✓ (2nd & 3rd)	✓ (2nd & 3rd)
	16	**Narrow travel lanes.** Reduce motor vehicle speeds; need to balance with freight mobility needs and space between vehicles and bicycles.	✓ (2nd & 3rd)	✓ (2nd, 3rd, and 4th)	✓ (2nd, 3rd, and 4th)	✓ (3rd)
	17	**Street narrowing.** Narrow curb-to-curb distance, e.g., to increase right-of-way for sidewalks.				✓ (3rd)
	18	**New signalized intersections and/or additional signalized control or upgrades at key**	✓ (2nd & 3rd)		✓ (2nd & 4th)	

Type	Map ID	Design Treatment and Brief Description	Alt 1: 2nd/3rd Street Couplet	Alt 2: Expanded Grid	Alt 3: 2nd/4th Street Couplet	Alt 4: 3rd Street Boulevard
		intersections.				
	19	**Advanced vehicle stop lines.** Increase separation from pedestrian crossings. (Could be coordinated with bike boxes).	✓	✓	✓	✓
	20	**On-street parking.** Support local businesses, calm traffics, and separate pedestrians from vehicle lanes.	✓ (2nd & 3rd)	✓ (3rd)	✓ (2nd, 3rd, and 4th)	✓
	21	**Managed access.** Consolidate driveways to reduce turning movement locations (increases bicycle and pedestrian safety).	✓ (2nd & 3rd)	✓ (3rd)	✓ (3rd)	✓ (3rd)
	22	**Stormwater management features.** Filters runoff, calms traffic, beautifies streetscape.	✓ (2nd & 3rd)	✓ (3rd)	✓ (3rd)	✓ (3rd)
	23	**General Streetscaping.** Calms traffic and increases pedestrian comfort.	✓ (2nd & 3rd)	✓ (3rd)	✓ (3rd)	✓ (3rd)
	24	**Speed humps or other traffic calming.** Reduce vehicles speeds, increases driver awareness. Can be applied 4th Ave in some alternatives and to east-west residential streets or other streets that primarily serve local traffic at low speeds.	✓ (4th)	✓ (4th)	✓	✓ (4th)
	25	**Parklets**. Expand restaurant/café seating, create public spaces, add buffer between sidewalk and vehicle lanes.	✓ (2nd & 3rd)	✓ (3rd)	✓ (2nd, 3rd, 4th)	✓ 2nd & 4th (Future Potential)
	26	**Mini roundabout.** Calm/ manage traffic at neighborhood street intersections where volumes do not warrant a stop sign.	✓ (4th)	On 4th Street assuming increased vehicle traffic to the District	On 2nd & 4th Streets (possible)	On 4th Street assuming increased vehicle traffic to the District
	27	**Large roundabouts.** Slow turning vehicle speeds, forcing greater awareness of pedestrians where intersections meet the City's roundabout design criteria.	✓	✓ (2nd, 4th)	✓	✓

Type	Map ID	Design Treatment and Brief Description	Alt 1: 2nd/3rd Street Couplet	Alt 2: Expanded Grid	Alt 3: 2nd/4th Street Couplet	Alt 4: 3rd Street Boulevard
	28	**Reduce curb radii at intersections.** Reduce turning speeds and shorten pedestrian crossing distances. Examples: 3rd & Franklin, Greenwood, Olney; 4th & Olney, Franklin; 2nd & Greenwood, Olney	✓	✓	✓	✓
	29	**Overpass or underpass.** Provide low-traffic volume over- or under-crossing on Hawthorne of BNSF railroad tracks and Bend Parkway, as an alternative to improvement of Franklin and Greenwood underpasses.	✓	✓	✓	✓

Potential locations of the improvements described in the table above are illustrated on a series of maps found in Tech Memo #5 and in Appendix E

Overall Evaluation of Transportation Network Options

City staff and the consulting team used the information above in combination with a subset of the project Goals and Objectives to evaluate and compare the four transportation network options. In the process of doing so, the group identified a fifth "Hybrid" network option which was also evaluated against the criteria. The first four options are summarized in Table 10. The Hybrid option includes the following characteristics, described in more detail on pages 44-45 and shown in Figure 7:

- 3rd Street
  - Five lanes north of Greenwood, transitioning to three lanes between Greenwood and Franklin
  - 4 or 5-foot bicycle lanes included throughout study area
  - On-street parking and pedestrian enhancements, including widened sidewalks and/or planted buffers in 3-lane sections
- 2nd and 4th Streets
  - One travel lane in each direction
  - Bike lanes and on-street parking, plus a seven-foot sidewalk
  - Curb extensions at intersections
  - Additional right-of-way, as needed acquired through pedestrian easements

Not all of the goals and objectives identified for the project lend themselves to a comparison of different transportation options. Some goals and objectives are better suited to determining how best to implement a preferred alternative or for other evaluative purposes. The following table describes the evaluation criteria, their relationship to the goals and objectives and the measures used to assess them.

TABLE 13. PROJECT OBJECTIVES, CRITERIA, AND MEASUREMENTS

Objective	*Criteria*	*Measurement*
Promote development and redevelopment of a mix of land uses	Transportation network supports land use pattern	*Qualitative assessment of whether a given transportation network alternative appears to be relatively more or less effective at supporting land use goals*
Create an efficient, safe and convenient transportation system for all modes, including vehicles, transit, bicycles and pedestrians	Transportation network maximizes performance for all modes of travel compared to other options	*Individual comparisons of multi-modal level of service results for vehicles, bicycles and pedestrians – applied to north/south and east/west streets*
Ensure a balance between traffic mobility and congestion	Transportation network results in an acceptable level of delay on average for all intersections in the district.	*Comparison of average District-wide intersection LOS and total vehicle delay*
Ensure high-quality connectivity within the area for all travel modes	Transportation network creates new connections for vehicles, pedestrians, bicyclists and transit users	*Relative increase in number of additional or enhanced connections within the study area based on toolkit recommendations*
Plan for safe, comfortable crossings of 3rd Street at signalized intersections for pedestrians and cyclists with a full range of ages and physical abilities. (*; assumes worse LOS will affect crossing safety to some degree*)	Transportation network includes safe crossings, based on the character of the intersections and vehicle delay/performance	*Comparison of crossing improvements recommended in each alternative, coupled with potential vehicle LOS at 3rd Street intersections*
Plan for safe, comfortable crossings of Olney, Revere, Franklin and Greenwood Avenues at key intersections within the Central District.	Transportation network includes safe crossings, based on the character of the intersections and vehicle delay/performance	*Comparison of crossing improvements recommended in each alternative, coupled with potential vehicle LOS at noted intersections*
Identify a cost-effective, politically feasible transportation network and associated improvements.	The transportation network results in relatively less costly improvements compared to other alternatives	Very rough comparison of expected cost of improvements
Utilize existing right of way to the extent practical	Transportation network option required relatively less right-of-way for new facilities compared to other options	*Relative need for new ROW generated by each option*
Enhance east/west travel opportunities	Transportation network option improves east-west travel options and performance compared to other options	*Compare MMLOS results for east/west streets*

Results of the staff/consultant team evaluation of the options are summarized in the Table 13 below.

TABLE 14. TRANSPORTATION ALTERNATIVES EVALUATION MATRIX

Objective/Criteria	**Alt 1:** 2nd/3rd St. Couplet		**Alt 2:** Expanded Grid		**Alt 3:** 2nd/4th St. Couplet		**Alt 4:** 3rd St. Streetscape Improvement		**Alt 5:** Hybrid	
Overall performance (*overall MMLOS*)	**N/S**	**E/W**	**N/S**	**E/W**	**N/S**	**E/W**	**N/S**	**E/W**	**N/S**	**E/W**
• Vehicle	H-	H	H	H	M	M	H	M+	H	H-
• Pedestrian	L+	M	M	M	L+	M	M	L+	M	M+
• Bicycle	M	M	M+	M+	M	M	M	L	M	M

Additional Criteria	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Mobility/congestion balance (*intersection LOS*)	H	H	H	H	H
High quality connectivity – all modes (*number of new or enhanced internal connections*)	M+	H	M+	M	M+
Safe, comfortable pedestrian crossings of 3rd St. (*number of proposed crossings, expected intersection vehicle LOS*)	M	H	M	M-	M-
Safe, comfortable pedestrian crossings of other streets (*number of proposed crossings, expected intersection vehicle LOS*)	M	H	M+	H	H
Pedestrian-supportive land uses (*relationship between pedestrian improvements, land use*)	L	H	L	M	M+
Supportive of land use mix					
Cost effective, financially feasible (*rough comparison of relative costs to implement*)	**L**	**M**	**L**	**L**	**M+**
Use of existing right-of-way (*relative need for new ROW acquisition*)	**L**	**H**	**L**	**L**	**H**
Enhance east/west travel (*MMLOS comparison for east/west streets*)	**M**	**M**	**M**	**L+**	**M+**

In addition the staff and consultant team evaluation of the options, the team conducted a public workshop on May 20, 2014 to ask community members to engage in a similar evaluation exercise. The meeting is structured as a "workshop," with a presentation followed by small group discussions where participants compared the five different transportation options against the evaluation criteria. After the comparison, each group was asked to identify a preferred option. They also were asked to identify any changes to one of the options presented that might make them more likely to support it. During the discussion, they also were asked to comment anything else the team should be considering in comparing and evaluating the alternatives or other ideas for meeting transportation needs in the area.

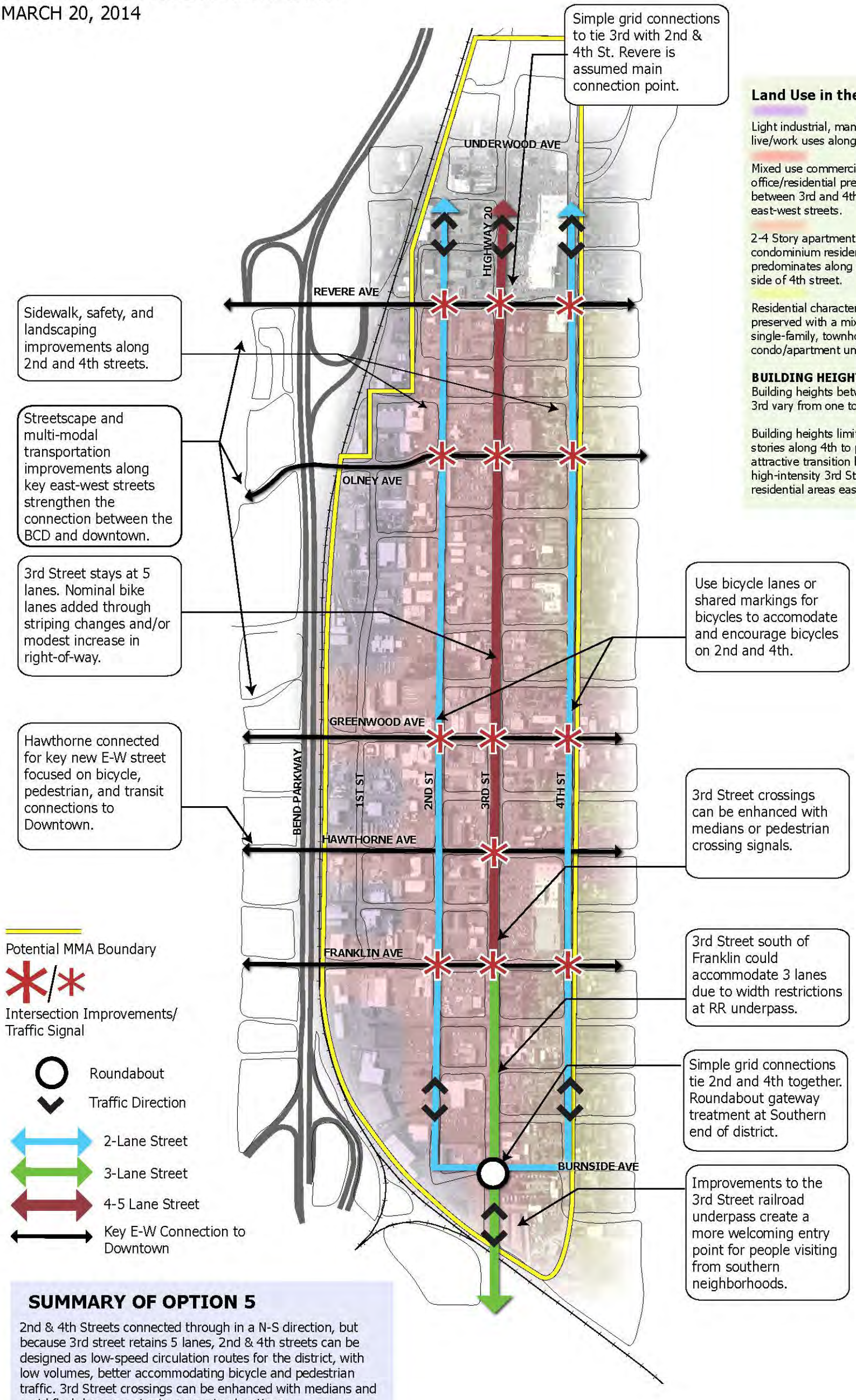
The majority of small groups at the workshop recommended Option 5 (Hybrid) as their preferred options with one group each supporting options 2 and 3. A wide variety of comments were provided related to refinement and implementation of the options. A detailed summary of these comments and the workshop results is a available on the project Website.

Based on the results of the staff/consultant team evaluation of the options, feedback from the Project Team and TAC and the results of the March 20 Public Workshop, City and ODOT staff and the consulting team recommend Option 5 (Hybrid) as the preferred option for further evaluation in subsequent tasks. This option assumes the following key features:

- North of Greenwood Avenue, 3rd Street will continue to include five lanes (two travel lanes in each direction and a center turn lane, possibly with a median in some locations). It also will include bicycle lanes which will require restriping and/or possible modest right-of-way acquisition.
- South of Franklin Avenue, 3rd Street will continue to include three lanes (one travel lane in each direction and a center turn lane, possibly with a median in some locations). It also will include bicycle lanes, improved pedestrian facilities and possibly on-street parking in some locations.
- 3rd Street will likely transition from five lanes to three lanes somewhere between Greenwood and Franklin.
- Long-term improvements to 2nd and 4th Streets will include bike lanes and on-street parking, plus a seven-foot sidewalk. In the shorter term, interim improvements that can be accommodated within the roadway may be phased in and may not include all of these elements.
- On-street parking would not have to be contiguous on both sides of the street on 2nd and 4th Streets but could be interrupted by planting areas or other features in some locations where wider sidewalks or planting areas are desirable and appropriate and/or where less right-of-way is available.
- Intersections throughout the study area and particularly at crossings of major north/south and east/west streets will be improved to better facilitate bicycle and pedestrian movements and crossings. Intersection configurations will be based in part on the results of traffic analysis to be conducted during the next step of the project.
- 2nd Street will continue directly north to Revere in the existing right-of-way but likely won't continue north from there.
- Traffic movement between 3rd Street and 2nd and 4th Streets will be via basic street grid connections throughout the study area.
- There will be opportunities to travel between 3rd and 4th Streets north of Revere (e.g., at Underwood) but large connections similar to those envisioned in the Expanded Grid network alternative, are not assumed.
- Assumed travel speeds on 2nd and 4th will be 25 mph; travel speeds on 3rd will be either 35 mph.
- The Hawthorne connection to Downtown will accommodate bikes, pedestrians and transit. Cars also likely will be accommodated but will be discouraged to some degree via roadway design and lower travel speeds. This likely would result in removal of the existing connection to the Bend Parkway in this location.
- For modeling purposes, traffic controls at intersections with assumed improvements will generally be signals but that would not preclude use of roundabouts at selected locations in the future if the City were to determine that is appropriate
- A roundabout on 3rd Street at the southern end of the study area is assumed.

Transportation Option 5: Hybrid

BEND CENTRAL DISTRICT MMA PROJECT
MARCH 20, 2014



Land Use in the BCD

Light industrial, manufacturing, and live/work uses along 1st Street.

Mixed use commercial/ office/residential predominates between 3rd and 4th and along key east-west streets.

2-4 Story apartment and condominium residential predominates along the western side of 4th street.

Residential character east of 4th is preserved with a mix of single-family, townhouse, and small condo/apartment units.

BUILDING HEIGHTS
Building heights between 1st and 3rd vary from one to six stories.

Building heights limited to 2-3 stories along 4th to provide an attractive transition between high-intensity 3rd St. and quieter residential areas east of 4th.

SUMMARY OF OPTION 5

2nd & 4th Streets connected through in a N-S direction, but because 3rd street retains 5 lanes, 2nd & 4th streets can be designed as low-speed circulation routes for the district, with low volumes, better accommodating bicycle and pedestrian traffic. 3rd Street crossings can be enhanced with medians and rapid flash beacons at minor crossing locations.

FIGURE 7. TRANSPORTATION OPTION 5 MAP

6. Next Steps

This memorandum summarizes work conducted to date on this project. The next step is to further evaluate the preferred transportation and land use option described in the previous section. A two-step process will be used to do that:

- Use the regional traffic model maintained by the Oregon Department of Transportation (ODOT) to project future traffic volumes within and around the study area based on future land use assumptions and the basic configuration of roads in the Central District.
- Evaluate traffic conditions and impacts on vehicle, bicycle and pedestrian traffic in more detail using the multi-modal level of service tool for all streets and intersections in the study area.
- Test specific options for design of roadways or intersections using the detailed local transportation model.

Based on this traffic analysis and building on work completed to date on the project, the team also will recommend a boundary for a potential multi-modal mixed use area (MMA) that could be applied in this area and will prepare a preliminary draft MMA Plan that includes the following elements:

- Illustrative map and accompanying narrative which explains and supports the MMA Plan, including:
    - MMA boundary description
    - Summary of future land use assumptions
    - Urban design recommendations and illustrations
- Recommendations to enhance multi-modal conditions and performance through amendments to the TSP, General Plan and Code, including:
    - Near term pedestrian and bicycle projects
    - Potential typology for complete street guidelines
    - Enhanced east-west bicycle and pedestrian connectivity
    - Parking requirements and management
    - Transportation demand management (TDM) strategies
    - Development code strategies
    - Further monitoring of state highway conditions by the City and ODOT (if needed to address potential significant safety or mobility issues)
- Preliminary recommendations for implementation, including initial guidance related to:
    - Next steps in planning process
    - Future cost estimating and funding strategy
    - Redevelopment process
    - Design and construction of specific improvement projects
    - City/private sector partnership opportunities

After preparation of these documents, city and ODOT staff and the consulting team will review the results with the Project Team (PT) and Technical Advisory Committee (TAC). Feedback will be incorporated into a Preferred MMA Boundary Map, MMA Plan and draft and final draft amendments to the City's General Plan, Transportation System Plan and Development Code. These materials will be further reviewed and refined through meetings with the PT, TAC, the Bend Planning Commission, the Bend City Council and other community members.