Design and Connectivity Plan for North 7th Avenue Corridor

Bozeman, Montana

October 24, 2006

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Chapter 1
Introduction

North 7th Avenue is a vital part of the City of Bozeman. It serves as a major circulation corridor and is home for a variety of businesses that contribute to the vitality of the community. However, important as it is today, its full potential is unrealized and issues remain. Some of those issues include its effectiveness in connecting with other parts of the city and the types of uses and degree of intensity of development that may occur. The goal of this plan is to develop a framework plan that addresses technical questions about the area, while providing a vision for the future. A key goal is to establish a distinct identity for the corridor and the subareas within it.

Description

North 7th Avenue is an established entryway corridor that extends from I-90 south to Main Street. In the city's rating system, this is a Class II corridor which is automobile-oriented; however, it has the potential to become more pedestrian-oriented while serving its arterial function. The scale of the street, and the character of uses emerging along it, are ones that are conducive to pedestrian activity, at least for the area south of the highway. This is in part because parcel sizes are comparatively smaller here than on some of the newer, outlying corridors. This means that there are opportunities to redevelop in ways that can be more appealing to pedestrians and bicyclists. While 7th Avenue itself is the central spine of the corridor, it is important to consider a broader area as the full corridor. The streets and properties stretching from 5th Street to 8th Street therefore are integrated into these considerations.

North 7th Avenue can play the following roles:

- Neighborhood service center
- Economic generator
- Gateway
- Complement to the Fairgrounds
- Complement to downtown
- Connector to Montana State University

Plan components to be considered in redeveloping North 7th Avenue as a particular place with an identifiable character:

- Automobile circulation
- Bicycle circulation
- Development patterns
- Landscape opportunities
- Pedestrian circulation
- Public transit
- Wayfinding

Design Objectives

The design objectives for the corridor were defined through a public process during the development of the City's 2005 *Design Objectives Plan Update* (the update to the 1992 Design Objectives Plan), which outlines a general character for the area. The objectives in that plan are organized in the following three categories:

Neighborhood Level Objectives

- Maintain views of the mountains to the east and south.
- Expand a landscape median to soften the hardscape.
- Promote installation of street trees.
- Establish small pockets of public and private open space.
- Minimize visual clutter along the corridor.
- Accommodate pedestrians and bicyclists.
- As this is a primary entryway for first-time visitors, provide signage that indicates areas of interest such as the University, the Museum of the Rockies and Downtown.

Site Level Objectives

- Encourage the rehabilitation and redevelopment of parcels that are underutilized or do not meet current standards.
- Establish a stronger relationship between buildings and the street by providing pedestrian connections and orienting buildings to the street.
- Incorporate pedestrian amenities and landscaping in existing developments as well as in new ones.
- Incorporate public art in small pocket parks and plazas.

Building Level Objectives

- Promote designs that add interest as seen from the road while establishing a sense of relatedness to the region overall.
- Encourage buildings of two or more stories to increase density.

Plan Process

The development of the plan included active public participation in a series of workshops. In these workshops participants defined and/or commented on physical, cultural and economic issues, assets and opportunities that would enhance connectivity throughout the North 7th Avenue study area. This input helped to establish a clear vision for the North 7th Avenue Corridor. Other stakeholders and interested parties contributed ideas in small focus groups and interviews. The plan also builds upon information provided in the Greater Bozeman Area Transportation Plan 2001 Update, the Bozeman 2020 Community Plan and the Design Objectives Plan Update.

How the Plan Should be Used

This plan should serve as a formal policy document related to improvements along North 7th Avenue. It should be used when planning improvements along the corridor, and as a means for recruiting businesses in the area. In addition it should serve as a roadmap for private property owners, investors and individual businesses in planning individual projects, such that they will help to reinforce the overall vision for the area.

The purpose of this plan is:

- To provide a design framework plan for improvement projects along the corridor that will enhance connectivity for the pedestrian, bicyclist and automobile,
- To illustrate the vision for the plan,
- To provide implementation strategies and funding mechanisms.

In the time between now and implementation, concepts addressed in this plan will need to be reviewed for possible phasing ideas. In that time, options will need to be weighed and needs will need to be balanced. The Bozeman Area Transportation Plan Update may be an ideal time in which these goals can start to be addressed. Of course, some concepts in the plan will be a challenge to implement. At these times, a committment will be required from all involved parties.

Existing Conditions

North 7th Avenue is primarily auto-oriented at present and is not conducive to pedestrian activity. The development patterns that have occurred on the commercial strip have resulted in buildings that are set back from the street with parking in front. Many of these conditions are identified on the Design Issues map on the following page. Although there have been efforts to beautify the corridor through streetscape and landscape improvements in the past, it still falls short of being a pedestrian or bike-friendly environment.

Traffic Conditions

As a primary entrance to the Bozeman area, North 7th Avenue carries a range of vehicles on it, from compact cars to interstate type tractors and trailers. The construction of Oak Street has helped alleviate some of the streets on North 7th Avenue by creating a connection to North 19th Avenue, another major avenue in the area, however traffic flow along the corridor is still heavy. The intersection at Oak Street is relatively new and, due to its connective nature, contains the highest traffic volume along the corridor. Major intersections such as 7th and Main, 7th and Mendenhall, and 8th and Main are all in close proximity to each other. The queues that occur due to this proximity back traffic flow into adjacent intersections. Similar delays also occur at the intersection of Durston, Peach and 7th. Other modes of traffic, such as bicycles and pedestrians, are minimal. Hostile environments for pedestrians and bicyclists exist, such as the multiple turn lanes of the on ramps at I-90. Even in town, pedestrian activity on North 7th Avenue is limited to short distance trips within certain segments of the corridor.

The following issues were identified in the Design Objectives Plan Update and in this plan's public outreach efforts.

Some Specific Issues

- Difficult pedestrian crossing at I-90
- Pedestrian crossings where people feel safe are few
- Poorly defined walkways along the highway and within properties
- School zone crossings are dangerous
- Key intersections are poorly defined, making for difficult pedestrian crossings
- Discontinuity in sidewalks
- Lack of bicycle commuter lanes
- Incomplete bicycle route
- Public wayfinding signs are sparse and difficult to read
- Lack of cross-property access between parcels
- Many curb cuts, which disrupt sidewalks and encourage multiple turning movements that inhibit traffic flow
- Left turn at Durston difficult
- Drainage issues at Durston
- Buildings set back from the street, thereby failing to provide interest at the sidewalk
- Lack of boulevard grass between the sidewalk and street
- Poor maintenance and dusty
- Poor lighting
- Provide proper lighting and stop lights for large truck traffic on inlets and outlets
- Improper tie-ins with Main, South 8th and Babcock

Design Issues Map

The Design Issues Map identifies the primary issues within the study area. These were defined by the citizens of Bozeman in the first public workshop.

Chapter 2
Design Framework

A goal is to enhance the corridor as a destination for entertainment and dining activities.

This section provides an overview of recommended enhancements along the corridor. Circulation, development opportunities and street improvements are addressed. Improvements are suggested and specific for several subareas that are defined. More detailed recommendations and design schematics are also provided.

Corridor Goals

A basic goal is to have an active and exciting corridor that is attractive, with a distinct character. A strategy for achieving this is to improve the experience for the user by creating safe, attractive walkways and streets, and by providing buildings and landscaping that are of interest to users and passersby. Several key strategies should be followed:

1. Provide a distinct identity for the corridor.

The corridor should express its identity as a vibrant center of unique activities in a livable, walkable setting. A consistent scheme of landscape and streetscape elements should be used to express this unified identity. This includes a coordinated set of street furnishings, lights and paving designs. Also where there is an opportunity, enhance the streetscape with public art. These features should be designed such that the character of the corridor is distinctly different than that of the downtown historic district.

2. Develop the corridor as a focus for commercial and entertainment activities that serve residents and visitors alike.

Encourage dining and entertainment uses to locate along the corridor, especially in clusters where a distinct identity can be reinforced. Also promote accommodations and conference uses.

3. Strengthen the corridor as a neighborhood service center.

New development along the corridor should be "double-fronted," relating to the neighborhoods as well as the avenue. This will present opportunities for businesses that serve residents to be accessible directly, especially by pedestrians, thereby reducing vehicle miles traveled. Also, provide landscape buffers where development is less complementary to residential neighborhoods.

4. Provide mixed use development.

Some residential uses should be mixed with commercial activities along the corridor, helping to make North 7th Avenue a neighborhood in its own right. A development configuration could include commercial services on the main

A streetscape element, such as a transit shelter, can provide a public art opportunity. These creative solutions can provide a distinct identity to the corridor.

The feasibility of enhancing or providing new connections across I-90 need to be addressed. This could potentially be achieved by rehabilitating the bridge at 7th or providing a new underpass at the proposed recreational trail.

level fronting the corridor, with residential uses above and behind.

5. Clearly define gateways at key locations along the corridor.
Entries should be distinctively landscaped and well-signed so that you clearly know, "*you have arrived.*"

6. Improve auto, bicycle and pedestrian circulation along the corridor.
Improve streets, bikeways, sidewalks and trails to allow safe navigation and access to the corridor and through it. The street system should be fine-tuned: intersection improvements should be implemented to facilitate traffic movement and pedestrian safety. Select intersections should also be renovated to enhance function and safety. Emphasis should be placed on bicycle and pedestrian circulation and connectivity. Community participation with regard to Montana Department of Transportation and Federal decisions about the corridor is imperative.

7. Provide pedestrian connections to adjacent neighborhoods.
Provide pedestrian connections from adjacent residential neighborhoods that allow for easy access to and from activities in the area.

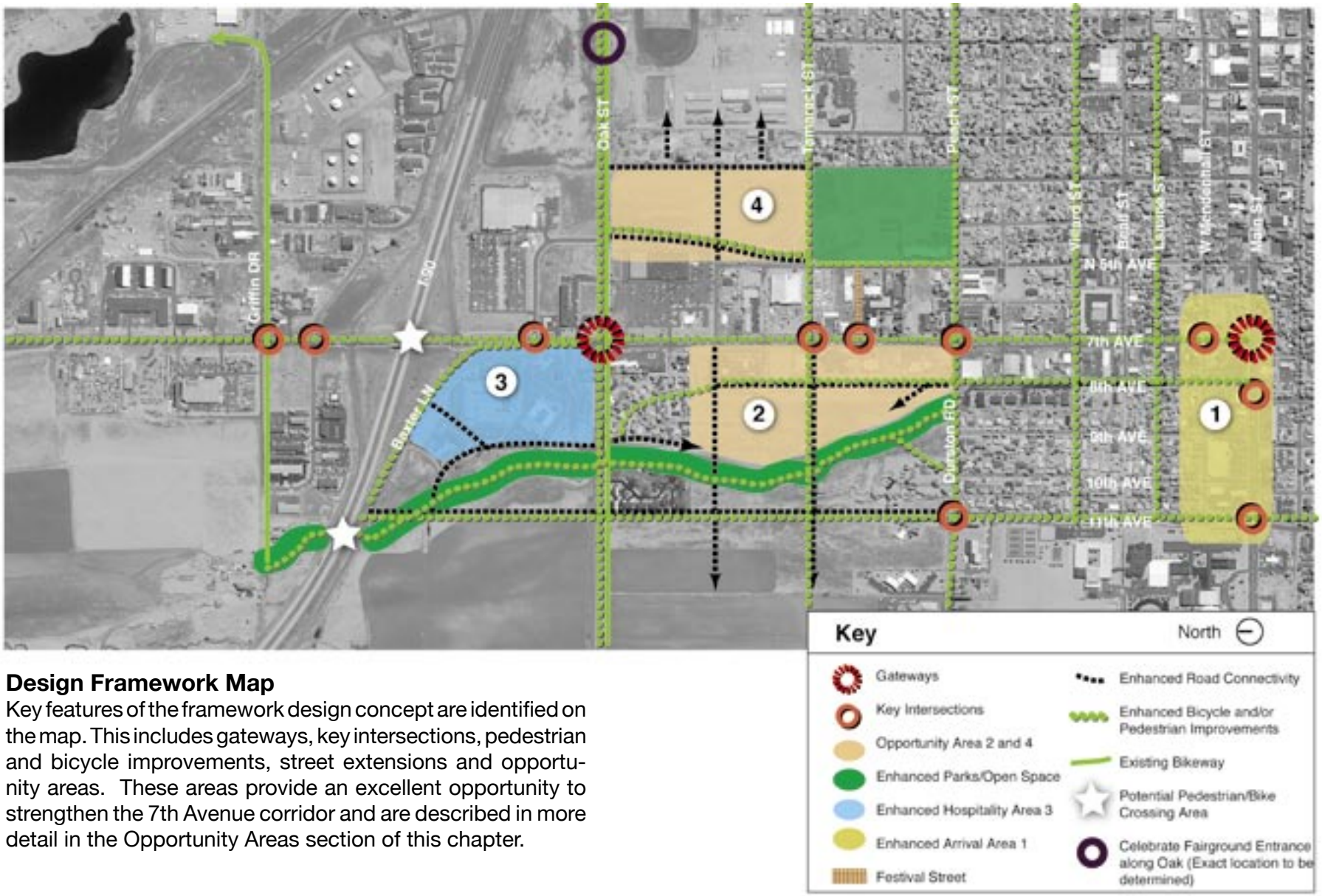
8. Establish a wayfinding system.
This should have a consistent graphic character and yet indicate a hierarchy of wayfinding. Information should be presented strategically to identify key places and routes.

9. Guide new development along the corridor such that it improves the aesthetic experience.
The *Design Objectives Plan* contains guidelines for new development along the corridor. Application of these guidelines will help strengthen the appearance, character and feel of development along the corridor.

10. Coordinate public and private improvements.
Public and private improvements should be coordinated so that investments are maximized. For example, completing a link in a public walkway may occur when an adjacent property redevelops.

11. Strengthen connections between complementary uses.
Strengthen the connections between the hospitality subarea & the fairgrounds, the High School & residential neighborhoods across North 7th, and the High School & residential neighborhoods across Main St. Also improve connections between residential neighborhoods that are adjacent to the corridor.

12. Provide flexible public space along the corridor.
Active public spaces should be located along the corridor to animate the street and to make it different from other areas in town. Provide a festival lot or festival street, which can serve as a street at times or be closed off for festivals at key locations. One is proposed at Aspen Street.



Design Framework Map

Key features of the framework design concept are identified on the map. This includes gateways, key intersections, pedestrian and bicycle improvements, street extensions and opportunity areas. These areas provide an excellent opportunity to strengthen the 7th Avenue corridor and are described in more detail in the Opportunity Areas section of this chapter.

The big idea is to think of the "corridor" as being several blocks wide with 7th as the central spine.

Corridor Design Synthesis

In this section several over arching design opportunities and improvements are identified and more detailed concepts are presented. Topics addressed include: traffic & circulation, the physical design of the street, development patterns & land use, and wayfinding. Several opportunity sites are illustrated that synthesize a vision for subareas within the corridor.

The Street Design

The basic image of the street design is a green, tree-lined street where pedestrians are buffered from the traffic lanes. The proposed street designs seek to balance the needs of pedestrians, bicyclists and automobile users. They accommodate current and proposed traffic demands and provide alternative design solutions to accommodate these demands.

A challenge is to balance the functional needs for the mix of circulation modes that can occur along the street. Ideally, pedestrians, bicyclists and motorists will all be able to move safely and efficiently along the corridor. Another challenge is to enhance the corridor as a key entry into the city and celebrate arrival at the crossroads of 7th and Main. This can be achieved with landscaping, public art and street furnishings. The corridor should also serve local businesses as a parking resource.

On North 7th Avenue, an updated traffic analysis should be completed to assess the current traffic impacts before street design improvements are undertaken. Any traffic flow improvements should enhance pedestrian crossings at gateways and key intersections.

Street Section

The overall width of the existing right-of-way limits the ways in which the circulation modes may be included. This dimension varies along 7th Avenue. It's central section is wider (90 to 100 feet) and the northernmost section is wider still (approximately 150 feet.) The road section is more constrained at the southern end, which further challenges the options available there. Through the public process several street options were considered and discussed. The preferred street sections are presented here. They illustrate design solutions for the different areas.

In determining the preferred street section the primary issue of how to accommodate on-street parking and a designated bicycle commuter lane was addressed. The existing right-of-way can accommodate both continuously, if a narrower travel lane is adopted.

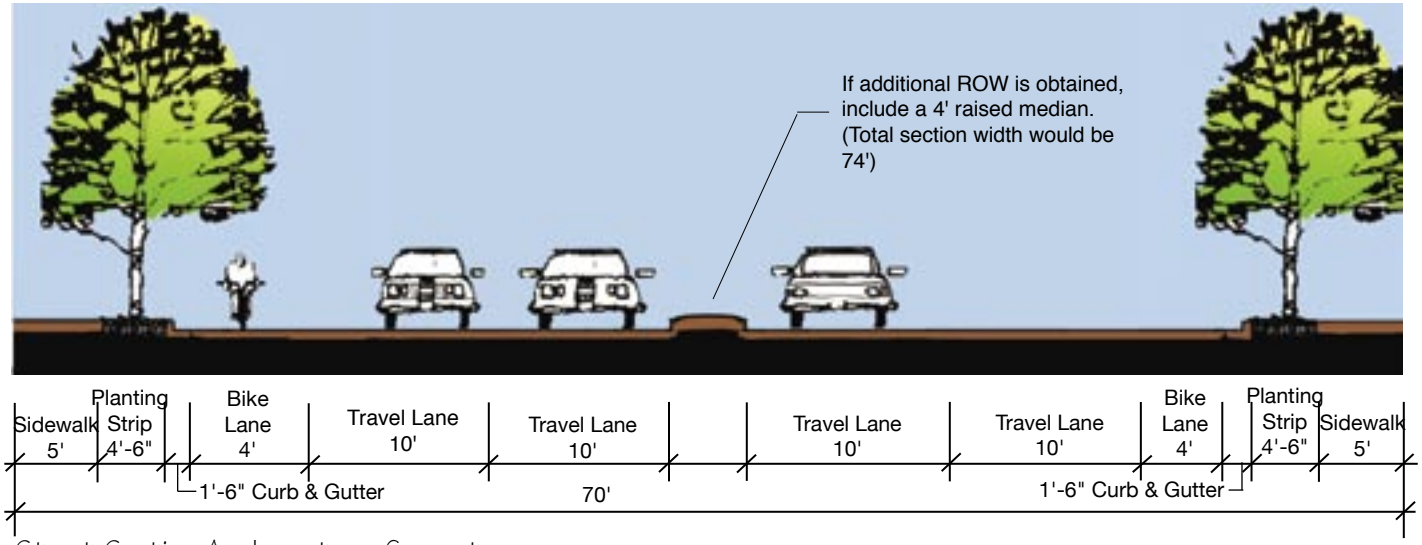
These alternative street sections are also directly related to slowing traffic to 20 MPH, roundabouts to increase traffic flow and conversion of North 7th to its primary purpose of being a mixed use neighborhood that includes retail, office and residentail uses with empha-

sis on pedestrian safety and convenience to all community members. To achieve these street sections will require negotiations with the Montana Department of Transportation. The proposed combination will result in an effective integration of pedestrian, bicycle and vehicular traffic.

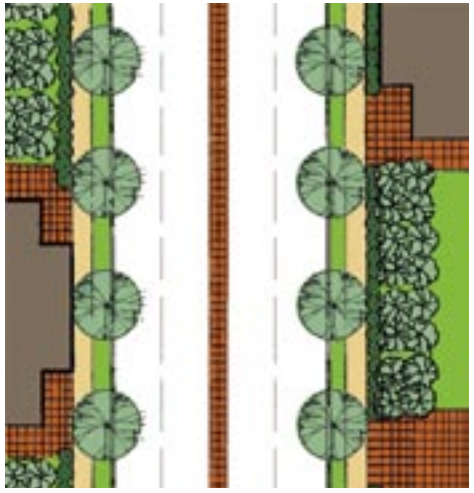
The following street sections illustrate ideal conditions. It is recognized that in some instances private property extends into the areas shown for public sidewalks and landscaping. In these circumstances unique solutions should be sought to enhance both the private property's character and the public's aspirations for connectivity and visual character consistent with the goals of the North 7th Avenue Connectivity Plan.

Other street sections and intersection options that were considered are located in the Appendix for reference purposes.

Street Area Map
The corridor is organized conceptually into three areas, which reflect different design opportunities related to street width.They are characterized by differing right-of-way widths and building placement. The street section changes within each of these areas. Note Area A improvements will be phased.



Street Section A - Long-term Concept



Plan A - 70' (+/-) Section. This street section will need to be phased

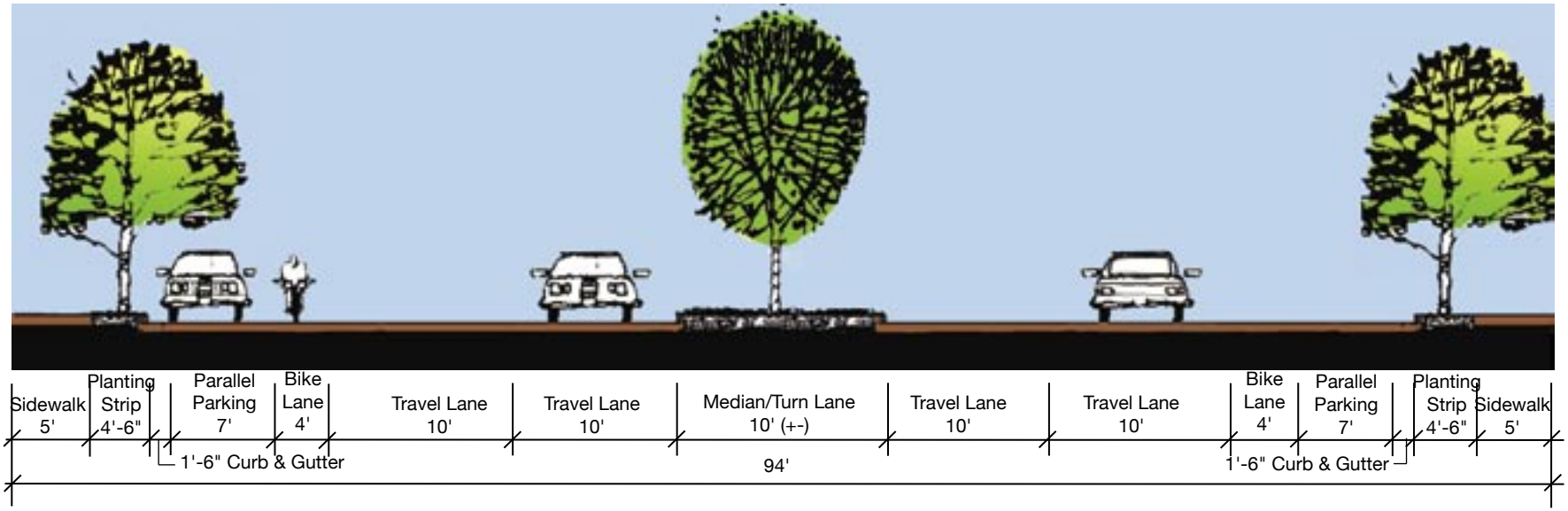
AREA A

The vision for this area is to provide a pedestrian and bicycle friendly environment where the sidewalk is buffered from the street by a tree-lined planting strip. Improvements in this area should be addressed in two phases. The first phase includes enhanced crosswalks, turn lane improvements and a detailed engineering study. The study would address both traffic flow and design implications of the proposed roundabouts.

This portion of the study area stretches from Main to Beall and is defined by the narrowest street section. A variety of building setbacks occur, but most are located on small lots and are oriented to the street. While the space here is very constrained, the goal is to establish a buffer between sidewalks and travel lanes. Attached sidewalks exist at the curb edge. Several surface lots are located in front of the buildings. In many instances these lots abut the edge of the sidewalk with little buffering, these issues should be addressed.

Street Section A

This section provides four travel lanes (two in each direction). Separate bike lanes would be provided. Sidewalks are separated from the curb with a planting strip, which buffers pedestrians. There is no on-street parking and there is not a dedicated turn lane. This option could apply to the southernmost portion of the corridor, near the intersection with Main Street. Additional ROW will need to be obtained for the islands located at intersections associated with Phase II roundabout installation.



Street Section B - 90' Cross Section (Between Beall Street and Durston Road)

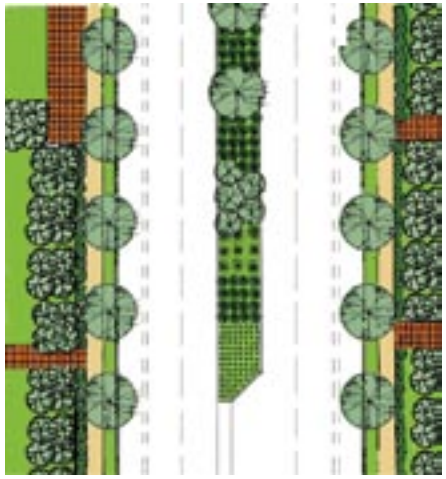
AREA B

The vision for this area is to provide a pedestrian and bicycle friendly environment that is enhanced by a tree-lined street. Trees would be located in both the planting strip and the median. The pedestrian would be buffered from automobiles by both a planting strip and parallel parking lane. To further enhance the corridor experience, a mid block bump-out should be provided.

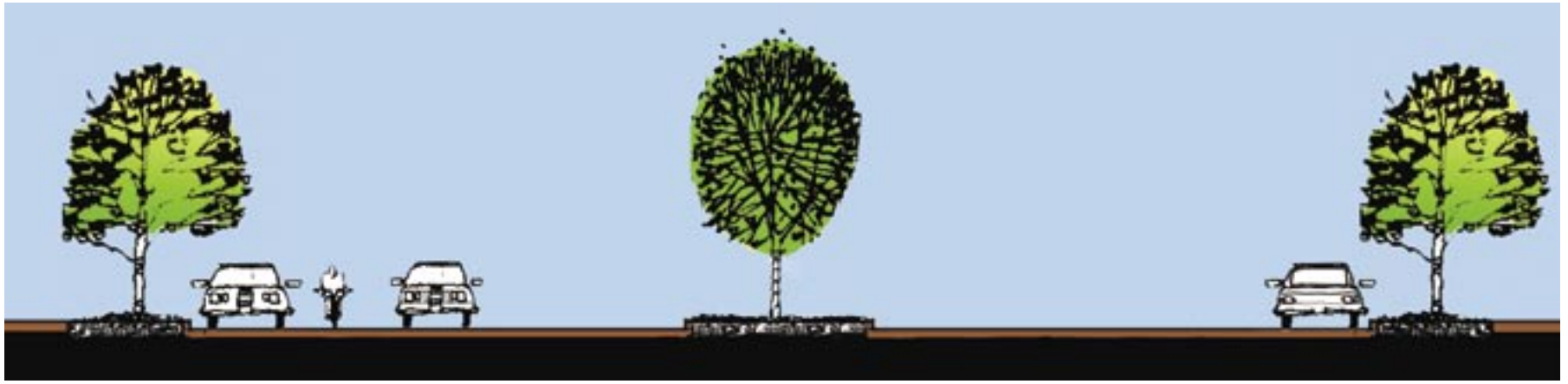
This portion of the study area is defined by a wider street section, and some planted medians have been provided. Many strategies, both public and private, will be needed to enhance and maintain the landscaped median. Within Area B, a variety of building setbacks occur. Most of the buildings in this area are located on larger lots and are oriented to the street. Sidewalks are discontinuous. Several large surface lots are located in front of the buildings. In many instances these lots abut the edge of the sidewalk with some areas of landscaping provided as a buffer.

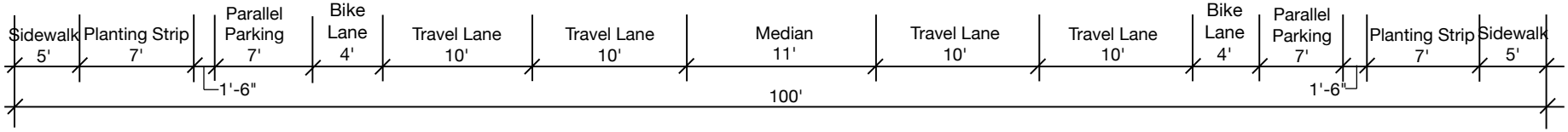
Street Section B

There are four travel lanes, two bike lanes and parallel parking is provided on both sides of the street. A median would be in the center, but would be replaced in part with a dedicated turn lane at key intersections. A narrow planting strip is provided. An additional 4' of ROW will need to be obtained to meet the street section. If this is not feasible, on-street parking will need to be revisited.

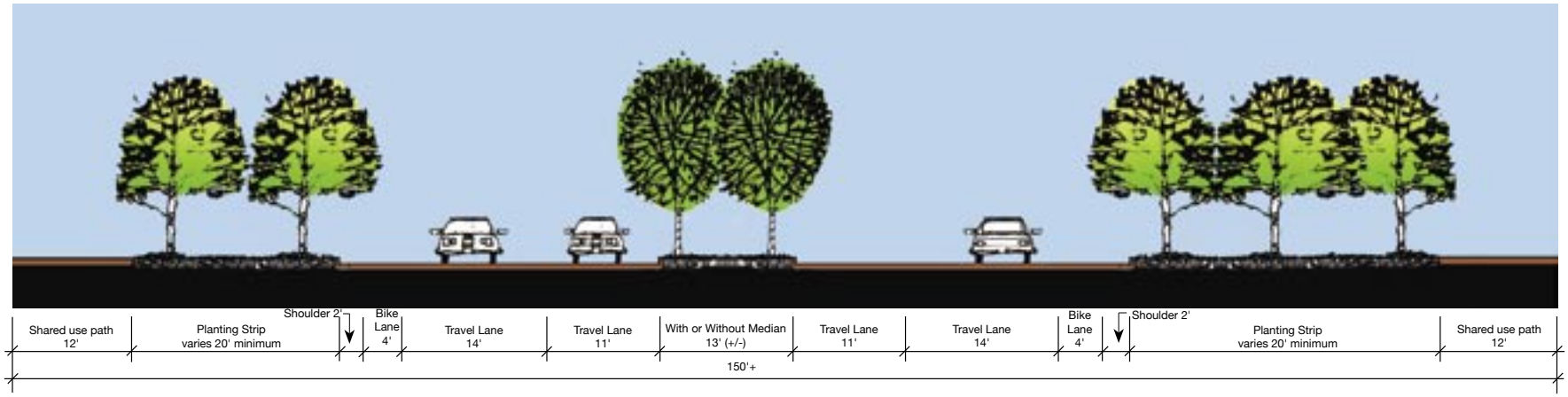


Plan B - 94' (+) ROW





Street Section B - 100' Cross Section (Between Durston Road and I-90)



Street Section C - 150' + Section

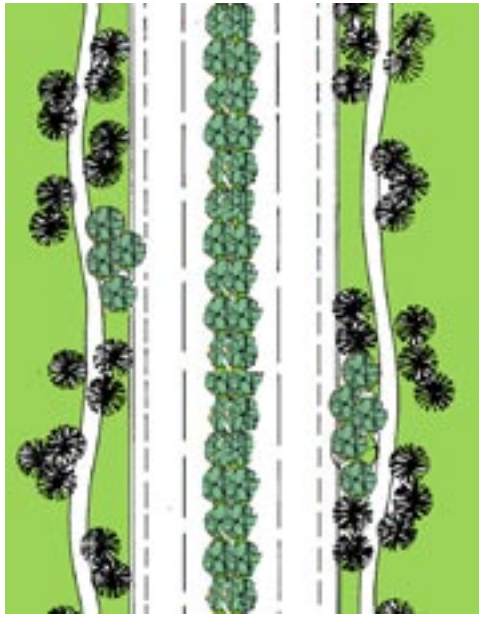
AREA C

The goal for this area is to maintain a rural image. A greater planting strip can be realized because of the generous right-of-way. The vision is to provide clusters of trees along the sidewalk edge. A street median would be provided to announce ones arrival into Bozeman.

This portion of the study area is defined by a wide street section. Many strategies, both public and private, will be needed to enhance and maintain the landscaped median. Within Area C, buildings are set back significantly from the street. Most of the buildings in this area are located on larger lots and some are oriented to the street while others are oriented to the interior of the lot. Several large surface lots are located in front of the buildings. These lots are set back from the street right-of-way, with some areas of landscaping provided as a buffer.

Street Section C

In this area there will be four travel lanes. A striped bike lane will be provided and will continue to the jurisdictional boundary. The plan recommends that the bike lane would continue from the jurisdictional boundary to Spring Hill Road. The street can accommodate a median. To accomodate pedestrians and bicyclists off street, a detached shared use path would be provided. It is intended the trail would be used by those working and staying in the area and would link to other trail systems. It is not intended to connect across I-90 unless the highway bridge is rehabilitated to accommodate foot and bike traffic.



Plan C - 150' + ROW. The sidewalk can meander or be straight.

Landscape improvements on private properties along the corridor are encouraged. The design concept for the street includes the future planting of street trees in planting strips.

A consistent scheme of landscape and streetscape elements should be used to express a unified identity. A palette of ornamental grasses, shrubs and trees should be used.

Planted Areas

Planted Median

Planted medians should be installed where space permits along the corridor; they provide benefits that are both functional and decorative. Some of the benefits include: an enhanced corridor experience, pedestrian refuge areas at crosswalks, visual continuity, defined traffic lanes and reduced turning movements.

Planting Strips

This is the portion of the street section that is located between the sidewalk and street curb, in some cases it occurs on both sides of the sidewalk. Planting strips should be provided continuously along the corridor and be enhanced with landscaping, light fixtures and paving material when feasible. When they are adjacent to the street they should meet these planting standards:

- 2' and less in width - these areas should be paved with brick pavers, decorative concrete, or other approved material.
- 2' up to 5' in width - plantings should not exceed 3' in height; the city forester may consider street trees on a case-by-case basis.
- 5' and greater in width - these areas should be planted to a minimum of 60%; the remaining area should be paved with brick pavers, decorative concrete, or other approved material.
- See city forester for appropriate planting materials.

Intersection Improvements

Pedestrian and vehicular conflicts along 7th Avenue should be resolved.

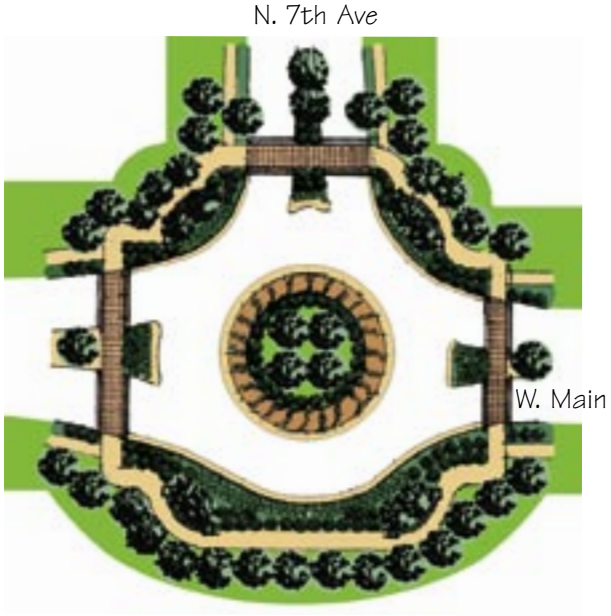
In many locations it is a challenge to cross the street because the crosswalk is ill-defined and the crossing distance is extensive. In order to improve pedestrian safety, intersections should be enhanced with defined crosswalks and pedestrian islands should be located at the center median when feasible.

It is also important to resolve impeded vehicular circulation. This is mostly caused by left turn movements along 7th and the difficult intersection at 7th and Main. Discontinuous streets also impede traffic flow. The lack of identity and arrival at several intersections is also an issue. Turning lanes should be provided to accommodate left turn movements and the intersection of 7th and Main Street should be redefined as a primary Gateway and arrival into the center of the city. This is a great opportunity and one that should not be overlooked. There are two options presented for these improvements, which are presented as two phases of execution.

Area A Gateway at 7th and Main

Phase 1 Improvements

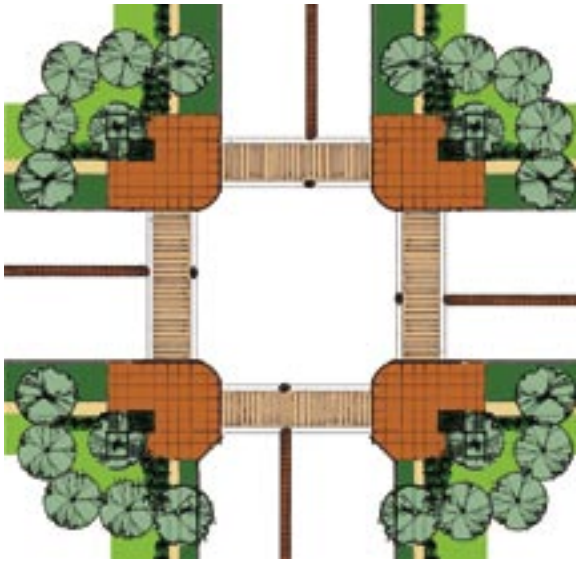
The gateway at 7th and Main is realized in two phases. Phase 1 improvements include enhanced crosswalks and turn lane improvements.



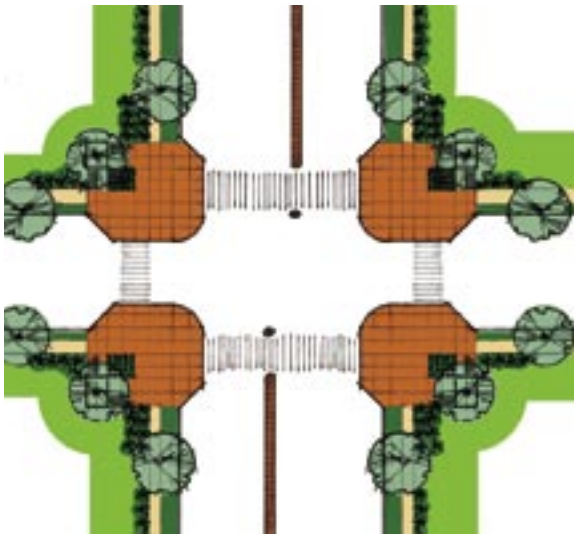
Area A Gateway at 7th and Main

Phase 2 Improvements

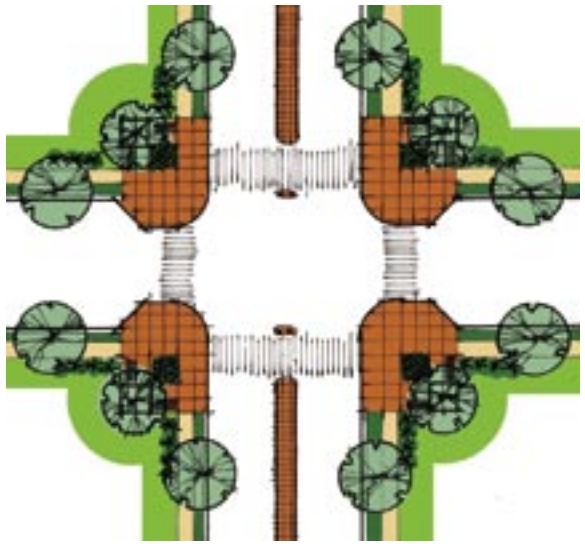
Phase 2 improvements include a roundabout at the following intersections: 7th & Main, 7th & Mendenhall and 8th and Main (see opportunity site #4). The roundabout configuration provides the following benefits: enhances connectivity, minimizes traffic delay, reduces accidents, slows traffic speed, defines shorter pedestrian crossings and provides ample landscaping opportunities. See Appendix B for roundabout images and discussion.



N. 7th Ave



N. 7th Ave



N. 7th Ave North

Area B Gateway Intersections
Gateway intersections improvements include: defined crosswalks with decorative paving or colored concrete, island refuge areas when feasible, wayfinding and turn lane improvements defined by a paved median neckdown. Bulb-outs occur at parallel parking lanes.

Area B & C (90-100' ROW) Key Intersection Improvements
Key intersections improvements include: defined crosswalks with painted strips, island refuge areas when feasible, and turn lane improvements defined by a paved median neckdown. Bulb-outs occur at parallel parking lanes.

Area A (70' ROW) Key Intersection Improvements
Key intersections improvements include: defined crosswalks with painted strips, island refuge areas when feasible, a paved or landscaped median with low plantings.

All street sketches reflect appropriate size to accommodate the turning radius of large trucks expected to travel along the corridor.

Street Components

Crosswalks

Crosswalks at gateways should be clearly defined with a paving material or treatment that contrasts in color and texture with that of the asphalt street. Key intersection crosswalks should be defined by a contrasting color; painted strips would also be appropriate.

Bulb-outs

Bulb-outs should be provided at intersections where parallel parking is anticipated. They provide the following benefits: slow traffic at the intersection, shorten the crossing distance for pedestrians, define the parking lane and allow for additional streetscape furnishings and enhancements. Bulb-outs also enhance ADA compliance.

Public Transit Stops

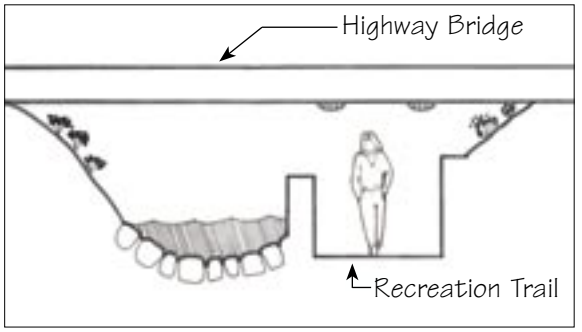
The location of public transit stops will be coordinated with the public transit provider.

I-90 Improvements

Pedestrian and bicycle crossing at I-90 is unsafe. The following improvements should be considered; a separate overpass, a trail underpass and/or a walkable and bike-able path at the existing highway bridge.

Crosswalks should be defined.

Curb ramps should be provided at all crosswalks.



An I-90 underpass that connects the proposed recreational trail to the regional system to the north of the highway should be considered. Due to environmental and highway constraints the trail would potentially need to be built below water level.

Providing pedestrian connections to the corridor is an important consideration and should be provided.

Delineated pedestrian connections through parking areas should be provided.

Pedestrian Improvements

The existing circulation system is substandard because it is in disrepair, interrupted by numerous curb cuts and parking areas, and discontinuous in many locations. Areas where improvements have been made should be integrated into the new system when feasible.

The corridor should be enhanced as a place for pedestrians to encourage use from adjacent neighborhoods and promote the development of a mix of uses. Making the corridor a place for dining and entertainment will encourage the visitor to walk from the hospitality area to the corridor for activity and serve as a destination for citizens for a variety of purposes.

Pedestrian connections should be enhanced throughout the development.

Pedestrians should find the walking experience along the corridor to be pleasant. This should be a continuous experience with numerous opportunities to be enjoyed along the way. Pockets of landscaping should be created that divide long walking distances into shorter segments and provide sheltered and/or enhanced areas for people to rest. Public art projects could be a focus in these areas. They could also serve as future transit stops. A buffer should also be provided between the pedestrian and automobile with landscaping and/or parallel parking from the street and landscaping along surface parking lots where they occur.

Enhanced recreational trails and secondary connections to and from the corridor through development should also occur. The following standards should apply:

Sidewalks

- Continuous brushed concrete
- All sidewalks will be separated from the curb by a minimum 3' planting strip
- Minimum 5' clear walking zone
- Decorative paving at intersections and pocket areas.

Recreational Trails

- Appropriate surfaces should be installed
- Minimum 12' clear shared use path
- Contemplative areas at key locations

Bicycle Improvements

The overall study area should be enhanced as a place for bicyclists to encourage use from adjacent neighborhoods as well as visitors to the corridor area. These types of bicycle ways should be considered:

Bicycle Lanes

These are paved ways reserved for bicyclists, but constructed as a part of the street. Typically, bike lanes are defined by a painted strip and signs. These are to be located on North 7th Avenue as well as on the east-west arterial cross-streets.

Bicycle Routes

These are streets in which bicyclists share the travel lane with automobiles. Ideally, the travel lane is wider than those designated only for automobiles so that the motorists have room to safely pass.

Recreational Trails

These are improved paths for shared use purposes. These trails are shared by pedestrians and bicyclists, and if desired, the trail can be split to accommodate the slower traffic.

The plan promotes the inclusion of bicycle lanes on North 7th, therefore bicycle amenities should be provided.

A recreational trail is proposed to run parallel to the corridor. This should accommodate a variety of users.

Public street and surface parking lots can be converted into festival lots for special events.

Public spaces can enhance the pedestrian experience along the corridor.

Public Spaces

One of the key elements that can enhance connectivity along the corridor for pedestrians is to provide small pockets of active public space along the street. This can include: outdoor eating areas, transit stops, art sites, and plazas. Public spaces are encouraged in redevelopment areas as well; this could include recreational fields and park land. Flexible public spaces that serve two functions can be provided as well.

Festival Streets and Lots

A flexible public space can be promoted through a festival street or surface lot. These areas serve as fully functional streets or surface lots most of the time, but may be closed off for special events. They are often delineated with special paving and bollards. At event times they are closed to traffic and function as a public gathering space. Special events such as markets, concerts or other festivals transform the street. They often include landscaping at the edge to provide shade for the events and power supplies at key locations.

Streetscape Improvements

Streetscape improvements benefit the entire area, not just the businesses along the corridor. As the image for the corridor improves, those visiting, living and working in the area will feel more favorably about it and return for numerous reasons.

The following elements should be included in the streetscape improvements.

Decorative Paving

A textured paving with a muted earth-toned color should be used to identify special pedestrian areas; this includes intersections and other places defined for pedestrians. A heavy-duty, modular, interlocking paver or stamped, dyed concrete may be used. Including public art in the paving design or in the layout as an accent should be considered.

Lighting

The existing cobra lights primarily illuminate the roadway and intersections for vehicular safety. There is no such lighting that has been designed for the pedestrian, although there are a few improvements that occur on private property.

New low-scale light should be installed along the street. A new cobra light should be installed in the landscaped median. A uniform design should be used for pedestrian lighting throughout the area. The light standards and luminaries should be a simple hooked or s-neck style. The color and material should be similar to that used downtown; this will

The combination of streetscape elements can create a vibrant and exciting corridor.

New low-scale light should be installed along the street.

Decorative paving would be used to identify special areas.

provide continuity to the street system. Banners should also be provided to enhance and celebrate the corridor experience. They can also identify current events and festivals.

- Pedestrian lighting maximum 14' in height
- Automobile lighting height should meet highway standards
- Lamps should be directed downward and shielded to reduce impacts on the night sky as per City of Bozeman requirements.

Street Trees & Landscaping

Street trees exist in some locations and provide relief to the existing corridor. The vision for the corridor is to provide a boulevard image that will help to establish a distinct identity for this area of the city.

A variety of tree species should be used to provide a range of seasonal colors and to protect the entire set from being decimated by a single disease. Where the ROW is limited, tree grates should be installed.

Landscape improvements should be installed throughout the corridor. This includes the gateways, medians, planting strips, and pocket areas. A high plains and rocky mountain planting palette that considers seasonal variety, native plants and drought tolerant species should be used (invasive species should be avoided).

Maintenance is often a challenge; many hands have been involved with installation and maintenance throughout Bozeman. It is anticipated that a partnership between the public and private investors will be required to effectively install and maintain landscaping throughout the North 7th Avenue Corridor.

Street Furniture

Public street furnishings are nonexistent and should be installed throughout the corridor. Such items should be located in areas where they can be clustered with other street furnishings and located in the appropriate areas. Areas to consider include gateways, mid-block pedestrian areas (bulb-outs or other), and places where special events may occur. There should be one area defined per block and if the block exceeds 300' in length there should be two areas installed. These areas should be located an equal distance apart when feasible. They should include benches, waste receptacles, future transit shelters and bike racks. A simple, contemporary, black metal strap design would be appropriate.

Locate street furniture at gateways, mid-block pocket points, and places where special events may occur.

Public Art

The city should continue to increase its public exposure of the arts in the community. Public art serves as a stimulus to the quality of the local environment and helps to showcase regional talent. Public art projects should be used to enhance locations throughout the corridor and should be integrated into the streetscape experience. In many cases the art can be both functional and decorative.

Public art shown here is both functional and decorative.

Wayfinding

Public wayfinding is essential for the efficient operation of the city. The system helps to guide visitors, as well as local residents who are infrequent users. A good system should present information in a logical sequence, such that the reader is presented the appropriate level of detail in the appropriate location. In order to improve the ability of the users to locate and read these signs, they should all be of a distinct uniform design, in terms of graphics and sign materials.

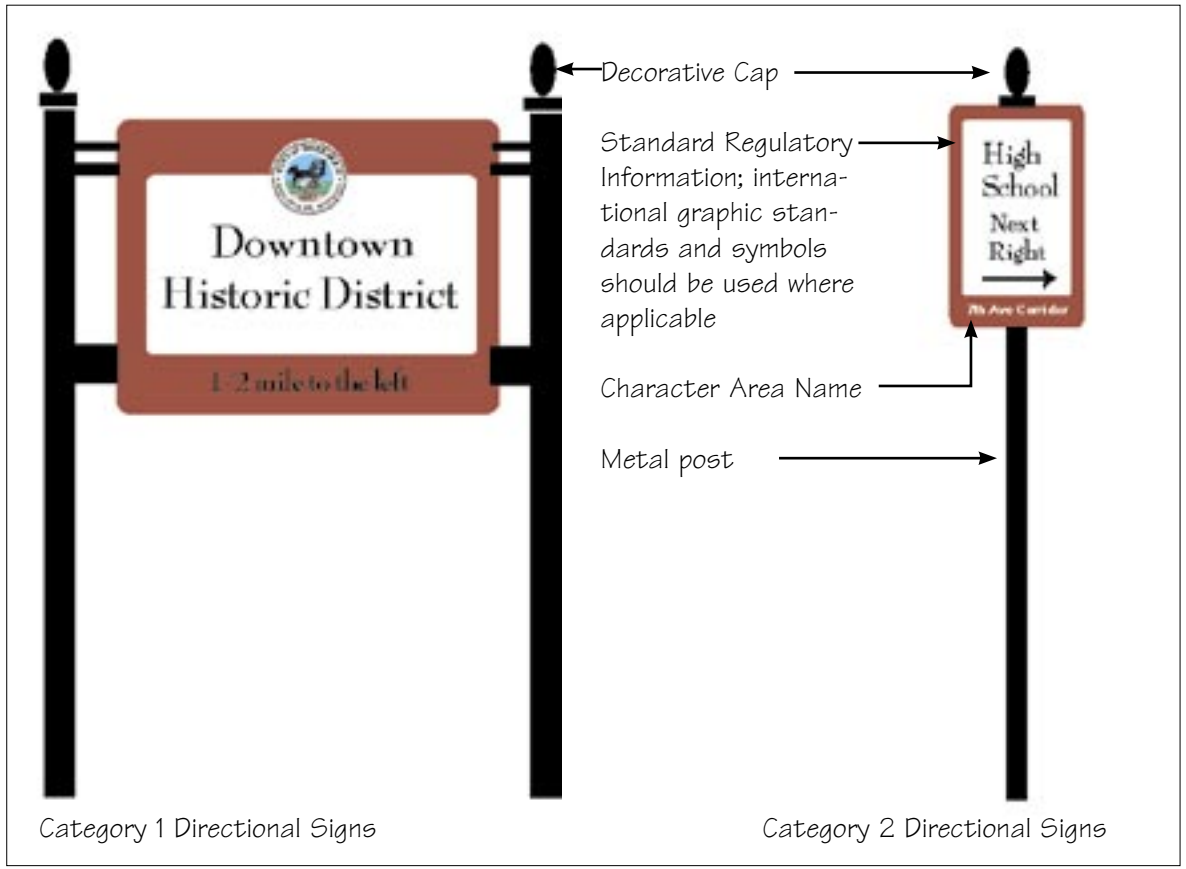
Sign types that should be provided include:

- Directional Signs. These are street signs that identify connections to important destinations and signify arrival. These sign types could be separated into two categories.

  Category 1: These signs signify arrival or close proximity to special places. This includes downtown and campus. They are larger and more prominent than Category 2 signs.

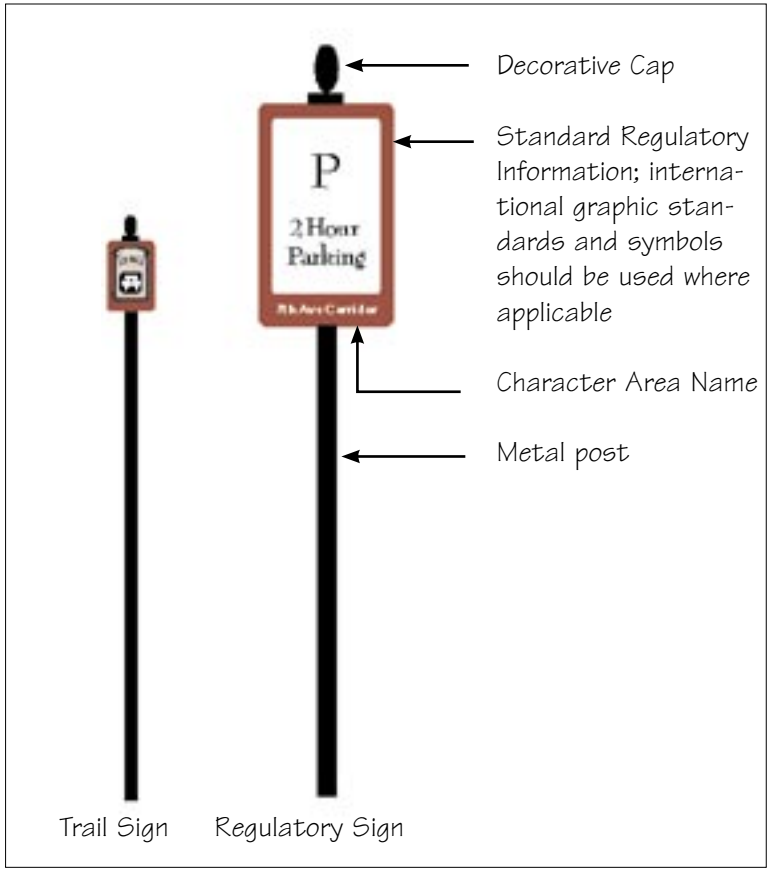
  Category 2: These signs provide directions to public facilities, schools and public parking, for example.

- Regulatory Signs. These are street signs that indicate restrictions on traffic and parking as well as basic health and safety concerns. These signs will comply with MUTCD standards. Signs that limit park-



The sign system uses a standard metal panel as a base. The background frame color would be consistent throughout the area. The city logo could be used on larger signs. The panels should be scaled to match those of standard traffic and parking regulatory signs. A decorative cap could be used that employs graphic elements from the city logo.

A decorative cap option is to use the rope graphic that encircles the city logo. This could also be used in the paving pattern that surrounds the gateway roundabout.



Informational and interpretive sign design can be presented creatively. Interpretive signs reflect topics of interest to passersby.

ing hours, restrict traffic flow and set speed limits are among the signs in this category.

- Informational signs. These are pedestrian-oriented signs that include interpretive signs and location directories. The content of these signs can include photographs, maps, sketches and text.

Parking

Parking along the corridor is located on surface lots, most of which front 7th Avenue. There are several locations where a surface lot has been improved, but in most cases they are unimproved and directly abut the sidewalk. Surface parking should be located at the rear or interior of a site and should be enhanced with landscaping. In all circumstances, it should be buffered from the pedestrian. Where there is an opportunity, consider a festival lot for a parking area.

A landscape buffer should be provided at the edge of a parking area. The interior of the lot should also be landscaped to mitigate the visual impact of the surface lot. Pedestrian paths through parking areas can also be landscaped to enhance the connection.

Roundabout

Mixed use commercial building with plaza

Residential units

Opportunity Areas

Within the overall framework, several opportunity areas are identified on the Framework Map. Schematic concepts for each area are provided; they illustrate both public and private projects.

As improvements occur along the corridor, adequate parking may become an issue. If this occurs, a parking strategy should be defined to address the issue.

Area 1. Gateway Opportunity

North 7th Avenue terminates at Main Street in this area. The focus of this area is to celebrate arrival at the center of town and to improve automobile and pedestrian circulation. This is a key connectivity area to locations throughout the city.

The gateway is proposed in two phases. The second phase is shown here and includes the installation of three roundabouts. This area is enhanced with several public open space amenities as well as public art sites.

Redevelopment is anticipated since several adjoining sites will be impacted by the improved intersections. The plan shows a mix of uses with retail space along the street edge to enhance the pedestrian experience. Residential infill is also anticipated on the interior lots. Parking is located on-street and to the interior of the blocks.

Key Features:

- Celebrate arrival and improve circulation and connectivity with landscaped roundabouts
- Visual corridor terminates at outdoor public open space
- Buildings anchor the corners and frame the street and outdoor public open space
- Enhanced streetscape
- Mixed of uses is provided
- Parking is located to the interior of the lot

Area 1. Gateway Opportunity: Phase 2

The images reflect appropriate design character for infill and trail opportunities in Area 2.

Rehabilitated commercial corridor storefront

Residential units

Mixed use commercial building

Recreational trail

Area 2. Redevelopment Opportunity

This area includes a significant amount of undeveloped private lands, nearby residential units, and commercial property along 7th Avenue. The area is also enhanced with a natural water course.

The design concept for this area is to redevelop parcels along North 7th Avenue with a mix of uses that are double-fronted. Residential units could be located along lots to the rear, within the undeveloped parcel. The street grid would also be extended and enhance connectivity to the corridor, providing convenient access to the enhanced commercial area. A recreational trail is also envisioned along the creek.

Key Features:

- Buildings anchor the corners and frame the street
- Small outdoor plazas and public open space provide visual enhancements and activity along the corridor
- Enhanced streetscape
- Recreational trail and enhanced creek bed
- Extended street grid
- Increased residential density to support commercial corridor with views that overlook the recreational trail and peaks in the distance
- Double-fronted commercial development
- Parking located to the interior of the lot
- Enhanced connectivity throughout

Area 2. Redevelopment Opportunity

The images reflect appropriate design character for infill and trail opportunities in Area 3.

Area 3. Redevelopment Opportunity

This area includes a significant amount of undeveloped private lands, commercial property along 7th Avenue and Oak Street, residential neighborhoods and the fairgrounds.

The framework design concept is to redevelop the area with a new neighborhood center that provides a mix of uses including medium to high density residential units that frame playing fields and park land. The street grid would be extended to enhance connectivity to North 7th Avenue and the fairgrounds. Oak Street would also be enhanced with streetscape improvements to encourage links between the hospitality area and the fairgrounds. There is a lot of potential in this area to be a vibrant and exciting part of the community. Other parcels that orient to the corridor should also be improved with a mix of uses. The large retail, "big box" should provide new prominent entries on all facades.

Key Features:

- Commercial buildings anchor the corners and frame the street
- Increased residential density to support commercial corridor
- Enhanced streetscape
- Extended street grid
- Playing fields or park land
- Parking located to the interior of the lot
- Enhanced connectivity throughout
- Enhanced visual terminus at 5th is realized with a new entry plaza at the "big box"
- Festival Street on Aspen

Area 3. Redevelopment Opportunity

Area 4. Enhanced Hospitality Opportunity

This area primarily serves the visitor to Bozeman. Hotels and services are located here. Currently, the hotels present independent fronts to the passerby and access is confusing.

A shared outdoor activity area that could overlook outdoor public open space and the mountains beyond, could be developed in the hospitality area.

The area has the potential to become a hospitality campus with access to the corridor and recreational trails. Two primary entries could be provided: one off of Oak Street and the other off of Baxter Lane. The entry off of Oak could provide a park land approach. The entry off of Baxter could provide a plaza approach. Pedestrian connections to the corridor, fairgrounds and the recreational trail would be enhanced for visitor use. Curb cuts would need to be limited on Baxter to make this easier for the pedestrian to navigate to these areas.

The hotels could be double-fronted and orient to the proposed greenway and recreational trail to the west. An outdoor area could be shared and used for special events.

Portions of the existing parking areas and hotel entries could be enhanced as festival lots that could be used during special events. This campus could provide an active and exciting stay in the city.

Key Features:

- Hospitality Campus
- Enhanced entries and streetscape
- Greenway street extension
- Recreational access
- Festival lot/plazas
- Enhanced connectivity throughout
- Shared outdoor activity area

Area 4. Redevelopment Opportunity

Shown here are appropriate infill examples for mixed use and residential buildings types in the corridor area. Locations for these building types are shown on the Opportunity Area Maps.

Chapter 3
Implementation

Successful implementation requires a coordinated effort between public and private entities. It requires vision, investment and commitment from a broad base within the community: private citizens, public officials and all city departments. The implementation strategy must include tools that result in a balanced mix of public and private action.

This chapter provides a strategy for implementing the recommendations contained in the Design and Connectivity Plan for North 7th Avenue. Residents and property owners must recognize that although the plan suggests improvement projects throughout the corridor, a number of variables will determine which of those projects can be executed as illustrated. Most likely, some of the improvement projects will be constructed differently than what is shown in the plan. Flexibility in the implementation of specific recommendations should be anticipated and is vital to the success of the plan and the future of the corridor.

Implementation will occur using a variety of tools. Public capital investments will be used for street and streetscape improvements (within existing public rights-of-ways) and also to leverage private investment. The design illustratively contained in the plan will influence improvements throughout the study area.

Administrative Actions

The Design and Connectivity Plan for North 7th Avenue outlines a framework for improvements in a manner that provides clear direction for action, but with sufficient flexibility in the recommendations, which allows the city to respond to changing conditions. The recommendations also position the city to benefit from existing public resources. The Design and Connectivity Plan for North 7th Avenue implementation strategy employs the following approach:

- Use public sector resources (land, parking, financing) to create public/private development opportunities.
- Align existing city policies, regulations and development standards with provisions of the plan.
- Use public financing to facilitate additional public and private investment.
- Commit sufficient staff resources to assure successful implementation of the plan.

In general, high priority should be given to those projects and improvements that support specific public and private actions and development that is consistent with the vision and goals of the community.

Tool: Inter-Departmental Coordination

The Planning Department should annually generate a list of capital improvement projects for the corridor. These projects should be coordinated with all other city departments and should reflect the goals and recommendations of the plan.

Tool: Expedited Planning and Building Entitlement Process

The city should establish a process whereby review and approval of corridor improvements that reflect the planning vision be given priority and expedited timing.

For such projects, the city will commit to a stipulated period for completing review and approval. The period should be less than the current average period of time required for completing review and approval. This approach assures private developers that desirable projects, which reflect the vision of the community, will be completed within a reasonable period of time.

Regulatory Actions

Tool: Zoning Amendments

There are several existing development standards that may require review and amending in order to fulfill the vision of the plan. This mostly concerns allowing for commercial/office mixed use in residential areas.

Tool: Urban Renewal District

The City commission currently seeks to establish an Urban Renewal District consistent with the Design and Connectivity Plan for North 7th Avenue Corridor. Special Improvement Districts may be necessary to address specific areas related to North 7th Avenue that include neglected landscapes.

Financing Actions

The following key funding mechanisms should be explored to fund and/or contribute to the implementation of recommendations contained in the Design and Connectivity Plan for North 7th Avenue:

Tool: Community Transportation Enhancement Program (CTEP)

The Community Transportation Enhancement Program (CTEP) is a Montana program that funds transportation-related projects designed to strengthen the cultural, aesthetic, and environmental aspects of Montana's intermodal transportation system. The CTEP allows for the implementation of a variety of nontraditional projects. Recommended improvements could be addressed under the following categories:

- Pedestrian and bicycle facilities
- Scenic or historic highways programs
- Landscape and other scenic beautification
- Control and removal of outdoor advertising
- Environmental mitigation due to highway runoff or habitat connectivity

Tool: Business Improvement Districts

This mechanism allows property owners within a defined area to assess themselves to finance improvements that will benefit all property owners within that defined area. Construction bonds may be issued based on the income stream projected from the assessment. This tool enables construction of improvements that can benefit a broader area and should be used to:

- Construct expanded streetscape enhancements throughout the corridor.
- Install wayfinding signage and gateway improvements.

Tool: Impact Fee Capital Improvement Program (IFCIP)

The city's IFCIP is a potential source for constructing public infrastructure improvements including water, sewer, storm water, and streets. The IFCIP generally includes a variety of federal, state and local funding sources designated to fund such improvements with the priorities and criteria for allocation of IFCIP funding established by the City of Bozeman in the context of an annual budget document.

Tool: Brownfield Assessment and Cleanup Program

EPA's Brownfields Program provides direct funding for brownfields assessment, cleanup, revolving loans, and environmental job training. To facilitate the leveraging of public resources, EPA's Brownfields Program collaborates with other EPA programs, other federal partners, and state agencies to identify and make available resources that can be used for brownfields activities. In addition to direct brownfields funding, EPA also provides

technical information on brownfields financing matters. Brownfield redevelopment projects should be considered for former industrial sites, including gas stations using underground tanks. The North 7th Avenue Corridor may be a viable site for such efforts.

Tool: General Obligation Bonds

General Obligation Bonds are funded by an assessment that is approved by the voters. Income from the assessment is used to retire the bonds. These are generally used for larger projects and should be considered for:

- Major park improvements

Tool: Montana Treasure State Endowment Program

The Treasure State Endowment Program (TSEP) is a state-funded program created in 1992 as a result of Legislative Referendum 110. It is designed to help solve serious health and safety problems and assist communities with the financing of public facilities projects. The program helps local governments with constructing or upgrading drinking water systems, wastewater treatment facilities, sanitary or storm sewer systems, solid waste disposal and separation systems, and bridges. The Montana Department of Commerce (MDOC) encourages local officials, staff and engineers to consider whether TSEP funds could help finance a local infrastructure project.

Tool: Grants

Key grants may be awarded by federal and state agencies for public improvements that meet the guidelines for specific programs. Noteworthy grants are for housing projects, arts & humanities, water resource improvements and enhancements for alternative modes of transportation. Other grants may come from private foundations, typically for smaller projects. These may include:

- Montana Arts Council (public art)
- State Recreational Trails Program (recreational trail)
- Montana Renewable Resource Grant and Loan program (creek & associated wetlands)
- Federal and State Land & Water Conservation Fund (creek)
- State Community Development Block Grant (housing low and moderate-income families)

Tool: Property Tax Increment

The City Commission currently seeks to establish a Tax Increment Financing District consistent with the Design and Connectivity Plan for North 7th Avenue Corridor. Tax increment financing is a viable tool for consideration. Tax revenues that exceed the base evaluation are paid into a separate fund overseen by the URA and are used to pay debts incurred by the authority. Tax increments are based on an increase in assessed valuation, not on an increase in taxes due only to rising mill levies.

Tool: Surface Transportation Program - Urban Funds (STPU)

The Montana Department of Transportation (MDT) allocates funds annually for surface transportation improvements throughout the state. Each year Montana receives Federal funds from the Transportation Equity Act for the 21st Century. The money provided by MDT is approximately 87% federally funded and 13% state funded. The state funded portion is taken from the state Special Revenue Account, which is mainly funded by fuel taxes and GVW fees. The STPU funds are used primarily for major street construction, reconstruction and traffic operation projects on the designated Urban Highway System.

Tool: Surface Transportation Program - Hazard Elimination Funds (STPHS)

The purpose of the Federal Hazard Elimination program is identify hazardous locations throughout the states highway system, assign priorities for the correction of these hazards and implement their improvements.

Projects eligible for funding under the hazard elimination program include any safety improvement project on any public road, public surface facility or any publicly owned bicycle or pedestrian pathway or trail as well as any traffic calming measure. The MDT safety Bureau selects the projects by identifying high hazard sites through the analysis of accident reports. The cost of the improvement is then compared to the safety benefits of the action and prioritized. Projects are funded based on this prioritization until the annual funds are exhausted.

Prioritization Criteria

The recommendations for phasing of actions, projects and improvements in the corridor should be considered to be dynamic and could be changed in response to plans and projects by other agencies, proposed private development and other public funding opportunities that present opportunities to combine efforts and maximize benefits.

While specific actions or projects are identified, some of these might be modified as opportunities are presented. However it is important that the fundamental concepts of the plan are adhered to by the city.

If the city needs to reassess the priority of a recommended action, project or improvement, then it should use the following criteria. Those projects that meet several of the following criteria should be given the highest priority for near-term implementation.

Economic

- Projects that generate funding to cover portions of the improvement costs
- Projects that leverage funding/investment from other sources
- Grant funding is available to cover portions of improvement costs
- Projects that are part of a larger capital improvement project such that cost savings will be realized
- Funding for maintenance of the improvement is available
- Projects that generate balanced employment opportunities for the community

Public Benefits

- Projects that improve North 7th Avenue connectivity such that it provides a direct benefit to local residents and visitors
- Projects that enhance the visual aspect of the corridor
- Projects that improve alternate modes of transportation

Relationship to Other Projects

- Projects that support desired public or private development
- Projects that provide opportunities to connect with existing or future public improvements
- Projects that will function upon their completion without later phases of construction required for this phase to perform adequately

Compliance with Policies and Plans

- Projects that help to accomplish goals of the community that are set forth in the Design and Connectivity Plan for North 7th Avenue
- Projects that fit within current strategic plans of the city and community organizations
- Projects that are within the administrative oversight capacity of the implementing entity

Alternative Implementation Roles for the City

There are various potential approaches for implementation, which vary in the degree to which the city actively participates in a specific project. The alternative roles are:

Alternative A: Direct Implementation by the City

In this approach, the city directs the project, and is responsible for funding, scheduling and construction. For example, the city may install a wayfinding sign package, with funds derived from public sources.

Alternative B: Joint Venture or Partnership with Other Entities (Public or Private)

In this approach, the city joins forces with another organization or a private entity, in which the participating parties each contribute some resources and have some degree of responsibility for implementation. For example, the city may joint venture with a private developer to construct a project that would include a transit shelter along with privately owned commercial and residential space.

Alternative C: Incentives provided by the City

In this approach, the city may offer an increase in density, or some other flexibility in development regulations as a means of encouraging another partner to take action in keeping with the plan.

Alternative D: Regulatory provisions that permit or accommodate desired development

In this approach, the city would assure that zoning regulations permit the uses set forth in the plan in the designated areas.

The extent to which the city should participate in a project should be determined by following two general overall considerations:

- potential impact/effect on financial capacity of the city related to funding both development costs and ongoing management, maintenance and operation costs, in particular near-term and long-term risk to the city General Fund
- potential impact/effect on administrative capacity of the city related to undertaking development activity and ongoing management, maintenance and operational responsibilities

In considering the appropriate approach to implement recommended projects, these basic factors that should be addressed:

- Is public financing available for the project?
- Will public financial participation leverage other public or private sector funding?
- Will the public sector or the private sector implement the project more efficiently, cost effectively and in a timely manner?

Recommended Participation Levels

In applying the criteria and considerations described above, the implementation approaches for some of the key projects in the plan are listed in this table:

	Direct City Implementation	Partnership Other Entities	Encouragement Incentives	Regulatory Provisions
Streetscape Improvements	X	X	X	
Multi-modal trail	X	X	X	
Wetland/Creek Improvements	X	X	X	
Infrastructure Improvements	X	X	X	
Bridge/underpass	X			
Commercial/Retail			X	X

Appendix A

Alternative Street Sections

Alternative street sections are noted below. These solutions were not preferred over those presented in Chapter 2, but are shown here for reference.

In the concept for these alternatives, the study area is envisioned as a shared use path arterial corridor distributed on three parallel streets. Bicycle commuter lanes would then be accommodated on the streets that run parallel to 7th Avenue. An emphasis would also be placed on the inclusion of bicycle lanes along east-west arterials that cross 7th Avenue.

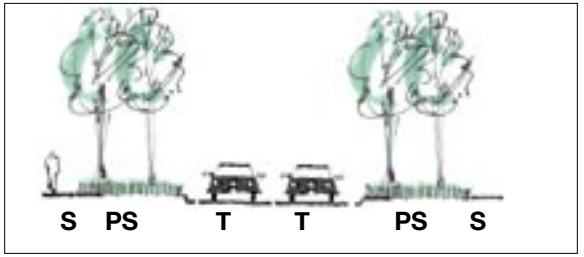
The following key applies:

- S - Sidewalk;
- PS - planting strip;
- T - travel lane;
- M - median;
- M/TL - median and turn lane;
- PB - pedestrian and bike path;
- P - parking

AREA A

Street Design A.1

This street section provides four travel lanes separated by a median. Due to width of the section, no dedicated turn lane would be provided. No on street parking or bicycle lane would be provided, either. The sidewalks would be buffered from the drive lanes by a planting strip. This option could apply to the southern end of the corridor, near where the intersection with Main Street occurs.



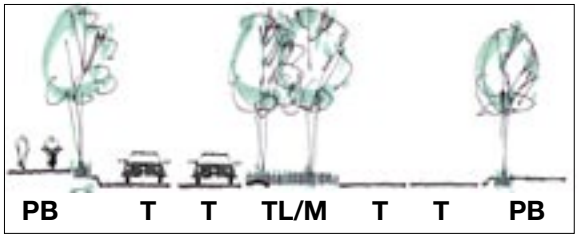
Street Design A.2

This section provides two travel lanes (in one direction). These would be shared by motorists and bicyclists. Sidewalks are separated from the curb with a significant planting strip, which buffers pedestrians. There is no on-street parking and there is not a dedicated turn lane. This option could apply to the southernmost portion of the corridor, near the intersection with Main Street, and requires a reversal of the one-way road system.

AREA B

Street Design B.1

In this section, four travel lanes are provided. A generous median and dedicated turn lane would separate the directions. On street parking would be provided. The sidewalk is separated from the drive lanes and parking by a planting strip. The width of the planting strip would be variant, depending upon the ROW width.



Street Design B.2

In this option, there are again four travel lanes. A median would be in the center, but would be replaced with a dedicated turn lane at key intersections. A detached bike and pedestrian trail would be provided. A small planting strip would be provided.

Appendix B

Modern Roundabouts

Modern roundabouts (roundabouts), are replacing signalized intersections across the country. These roundabouts are being used because they offer increased safety for pedestrians and bicyclists. They also slow traffic and prevent heavy traffic surges at high traffic times.

Many municipalities have experienced a decrease in the number of accidents and an increase in traffic safety as a result of roundabouts. Travel around a roundabout requires a decreased speed, often between 15 and 25 miles per hour, to navigate the turning radius. This reduced speed is one of the reasons roundabouts are so successful. However, there are other potential issues related to roundabouts that should be considered.

One concern with roundabouts may be the lessened level of traffic control at peak times. Signalized intersections can increase overall capacity of an intersection, and are often preferred during peak hours for their ability to assign priorities to major street operations. Whereas roundabouts maintain a continuos traffic flow without favoring one direction of traffic over another.

A benefit of signalized intersections is that they allow emergency vehicles to pass rapidly through busy intersections. With a roundabout, traffic continues through the intersection until it is safe to pull over and let the emergency vehicle pass. Although this process may cause delays for the emergency vehicle, it is safer than a signalized intersection.

Although there are benefits to a signalized intersection, roundabouts have been found to reduce the amount and severity of traffic accidents by limiting the amount of conflict points. Conflict points occur at places in the intersection where an accident has an increased possibility of occurring, such as cross traffic points, merge and divergence areas, and queues. The main reason for increased safety and fewer accidents is that all vehicles within the roundabout travel within three miles per hour of the same speed. Overall, accidents may be reduced by up to 39%, injury accidents by up to 76%, and fatal accidents by up to 90% over traditional signalized intersections.

Accidents involving vehicles and pedestrians are also reduced with roundabouts. The geometries of roundabouts contribute to this by lowering traffic speeds and allowing for the option of yielding rather than stopping. The yield at roundabouts also simplifies the decision making process of the driver. The only decision that needs to be made is whether to stop for oncoming traffic or pedestrians or slow down to maneuver through the intersection. The addition of yield signs also increases a driver's awareness of the intersection.

Roundabouts also increase pedestrian safety by locating the crosswalks away from traffic conflict points. Another benefit is that pedestrians do not need to wait for a crosswalk signal, as all traffic is required to yield to pedestrians. Slower vehicle speeds on the approach and within the roundabout give cyclists the option to commingle with

traffic. If a bicyclist is uncomfortable riding with traffic through the intersection he/she may choose to dismount and walk the bicycle through the crosswalk.

Islands, which are often an element of a roundabout design, also add to pedestrian safety by providing refuge points for pedestrians, giving them the ability to cross one lane of traffic at a time, and reducing the speed of drivers before entering the roundabout.

Even with all of the advantages of roundabouts, the financial implications may be discouraging, since the initial construction costs of roundabouts may be higher than a signalized intersection. However, roundabouts offer several cost reductions over the life of the intersection. Lower speeds contribute to less noise and congestion, as well as vehicle emissions being reduced due to a lower amount of idle time. The overall cost of accidents is reduced, and the only continuous maintenance costs are of landscaping, illumination, and the occasional sign replacement.

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Appendix C

N.7th Avenue Corridor Traffic

North 7th Avenue is classified as a Principal Arterial street within the Bozeman Urban Planning Area. It is also a Federal Aid Urban Route (U-1207) and the Montana Department of Transportation (MDT) oversees operational changes and improvement projects on this facility. Because North 7th Avenue has direct access to Interstate 90 on the north, it is a major entryway to the City of Bozeman.

North 7th carries 4 thru traffic lanes with auxiliary turn lanes at intersections and a raised median exists along the majority of the corridor. There are seven key intersections along the corridor and eight traffic signals, including two associated with the Interstate I-90 Interchange ramps. Current (2006) average daily traffic (ADT) volumes on the corridor range from 17,500 ADT north of Main Street to 22,000 ADT north of Oak Street. The section of roadway north of I-90 carries approximately 11,400 ADT. Historically, traffic volumes on North 7th have varied up and down over the past ten years. The corridor segment north of Main Street had an ADT of 15,200 in 1997, which increased to 2006 levels by the year 1999, but then fell to an ADT of 14,900 in the year 2002. Similar traffic volume variations occurred on other segments of North 7th Avenue due to shifts in area growth and alternative transportation facilities, most notably North 19th Avenue.

When North 7th Avenue was the principal entrance to the Bozeman area, it carried a high percentage of commercial traffic with large interstate type tractors and trailers. After North 19th was constructed, the percentage of heavy vehicles declined dramatically until the present time where less than 1% of the traffic south of Oak Street is composed of heavy trucks. Other modes such as bikes and pedestrians are minimal. Pedestrian activity on North 7th is limited to short distance trips within certain segments of the corridor.

The 2001 Transportation Plan indicated that year 2020 traffic on the north 7th corridor would range between 14,000 ADT north of I-90 to 34,300 ADT north of Oak and approximately 22,700 ADT north of Main Street, or between 30% and 50% greater than existing volumes.

The majority of key intersection within the corridor operate at a level of service “C” or better on the average, but there are a number of intersection movements that become somewhat congested during peak hour periods. Operations at the intersection of North 7th and Main Street are influenced by the close proximity of three signalized intersections: North 7th and Main, North 7th and Mendenhall, and Main Street and North 8th Avenue. The North 7th and Main intersection is a “T” type intersection, since the south leg of N 7th is offset to the west. The predominant traffic flow is associated with thru traffic on Main Street, but heavy eastbound left-turn movements combined with southbound right and left turns from North 7th create numerous conflicts. Long traffic queues which back into the adjacent intersections, which in-turn creates additional congestion and conflicts. In addition, there are a number of commercial approaches near and between all three intersections that create additional conflicts. The traffic signals at these intersections are very old and do not meet all current traffic signal standards.

The intersection of Durston, Peach and North 7th Avenue provides acceptable LOS on the North 7th approaches, but delay on the Durston and Peach Street approaches creates extensive queues during peak hour conditions. Peach Street has a one lane approach, while Durston has two lanes. Because of the high volume of eastbound left-turns on

Durston, the outside lane serves as a second left-turn lane and also accommodates thru and right-turning traffic. The traffic signals at this intersection are also old and do not meet current standards.

The Oak Street intersection is relatively new and currently has four lanes on each approach, which includes two thru lanes with both right and left turn lanes. This intersection has the highest traffic volume of any intersection on North 7th Street, with approximately 35,000 vehicles entering on the average day. All movements operate at a LOS "C" of better during the peak hour periods, but the reserve capacity at this intersection is limited. North of this intersection, limited access approaches to commercial properties on both sides of North 7th creates additional traffic demand at the Oak intersection. In particular, prohibition of left-turns from the west side of North 7th creates a huge demand for southbound U-turns at Oak Street, which substantially impacts intersection operations.

The I-90 Interchange Ramp intersections are also relatively new and provide ample capacity for current traffic demand. However, multiple turn lanes from and to the ramps create a rather hostile environment for pedestrians and bicyclists.

North of the I-90 Interchange, there are two higher volume side streets. Wheat Drive is directly north of the I-90 westbound ramps and serves as an access to several motels and restaurants. It is unsignalized and because of high traffic volumes on N. 7th and the demand for turning movements, it operates at a LOS less than "C" while having numerous conflicts due to vehicle queues to the north and south. The intersection with Griffin Drive is located immediately to the north of Wheat Drive. While this intersection is signalized, turning traffic and a limited number of traffic lanes create delay and long vehicles queues during peak hour periods.

The only segment of North 7th Avenue that currently has parking is between Oak Street and Beall Street, approximately 9 blocks. Limited width of the street section south of Beall to Main Street is insufficient for parking lanes, but adequate for bike lanes.

Improvements

Improvements to the corridor relative to traffic operations can only be defined in general terms due to the design complexities that will need to be addressed for individual intersections. Recommendation for both short term and long term improvements are directed toward improving safety and efficiency along the corridor and at individual intersections.

A homogeneous treatment of intersections and accesses along the corridor will promote uniform travel speeds and defined turning movements at key intersections. Landscaped medians and boulevards, minimum widths lanes, and defined access points will aid in calming traffic by providing visual definition of appropriate speeds. Streetscape features between intersections will provide a better pedestrian environment and limit mid-block conflicts with pedestrians. Well defined intersection geometry that focuses on pedestrian crossing locations and minimizes crossing distances will improve safety.

At the Main Street – North 7th Avenue intersection, the ultimate intersection improvement would involve construction of roundabouts at North 8th Avenue, North 7th Avenue, and Mendenhall. Various alternatives were conceived for use at this location, but high turning movement volumes and low speed urban operations at these intersections are particularly well suited to the use of roundabouts. Because roundabouts require substantially more area within the intersection, there would be substantial land use impacts involved, particularly at the Main and N. 7th intersection. Therefore, roundabout development in this portion of the corridor is considered to be a long term improvement project. Any future redevelopment projects proposed near these intersections should be conditioned on eventual development of the roundabout intersections. In the short term, all three intersections should be upgraded to provide raised medians, protected pedestrian crossings and new traffic signal equipment. (as conceptualized in the attached figure) These improvements would minimize existing access conflicts, increase vehicular storage, maximize signal efficiency, provide safer pedestrian crossings, and generally improve the appearance.

The Durston Road intersection will require additional approach traffic lanes on Peach Street and on Durston. Protective/permissive left-turn phasing could be implemented to

improve the overall efficiency of the intersection. Improved geometrics on the intersection corners and better defined pedestrian crossings will enhance the overall safety.

The efficiency of the Oak and North 7th Avenue intersection is somewhat dependent upon the access control features to commercial developments on both sides of North 7th north of the intersection. Alternative access from and circulation within the commercial property west of N. 7th would alleviate some of the traffic demand at the Oak Street intersection.

The Griffin and Wheat intersections, on the northern end of the corridor, require an extensive analysis to determine the types of improvements that will minimize conflicts and improve efficiency. Whatever from of traffic control deemed appropriate will require limited access conditions at the Wheat Drive intersection due to its proximity with the I-90 westbound ramp and Griffin intersections.

Pedestrian and bike facilities on the northern end of the corridor will need to be defined. Considering the high traffic speeds and volumes associated with the interstate ramp intersections a separate path would be preferred over a shared facility crossing I-90.