

# Wheat Ridge Bicycle and Pedestrian Master Plan Phase III Conceptual Designs and Costs

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## Introduction

Demonstrating their continued support for expanding travel options for its citizens, the City has prepared Phase III of the Bicycle and Pedestrian Master Plan for the City of Wheat Ridge. This summary provides an overview of the City's planning efforts to date and the tasks that will be included in this phase, the status of this effort, and the next steps that need to be completed to fully implement bicycle and pedestrian facilities within the City.

## Previous Planning Efforts

The City completed Phase I of the Bicycle and Pedestrian Master Plan in 2007. The focus of that effort was to conduct an inventory of existing bicycle and pedestrian facilities and to identify future routes based on input from the public and City staff and integration with the Parks Master Plan. The products from Phase I include a series of 22 maps documenting the existing bicycle and pedestrian facilities, including classification, signage, and amenities, along with a citywide map showing existing and proposed bicycle/pedestrian routes.

Subsequently, the City adopted an updated Comprehensive Plan (*Envision Wheat Ridge*) in October 2009, including a Transportation Structure Plan component. The Transportation Structure Plan expanded on Phase I of the Bicycle and Pedestrian Master Plan by recommending that the City develop standard cross-sections for principal corridors that would accommodate all modes of transportation and identified implementation of the Bicycle and Pedestrian Master Plan as an important step.

The Comprehensive Plan also identified three priority locations for multi-modal improvements:

- ▶ Wadsworth Boulevard
- ▶ 38<sup>th</sup> Avenue (Main Street area)
- ▶ Kipling Street

Two of these corridors, Wadsworth Boulevard and Kipling Street, are primarily controlled by CDOT. The portion of 38<sup>th</sup> Avenue that was identified is included under a separate planning process. Therefore, these corridors have not been included in this planning effort.

The City completed and adopted Phase II of the Bicycle and Pedestrian Master Plan in August 2010. That phase defined the framework for a practical and comprehensive bicycle and pedestrian network throughout the City that promotes safe, sustainable, and healthy travel options for residents and visitors.

Aspects of the Phase II include the following:

- ▶ Identifies key origins and destinations for bicyclists and pedestrians,
- ▶ Identifies regional routes (both existing and proposed) surrounding Wheat Ridge,
- ▶ Refines the proposed routes (identified in the Phase I) to ensure connectivity with the key origins and destinations and regional routes,
- ▶ Develops multi-modal standard roadway cross-sections that accommodate all modes of transportation,
- ▶ Identifies specific bicycle and pedestrian facility types for each of the proposed routes,
- ▶ Evaluates and prioritizes the proposed routes, and
- ▶ Identifies potential funding sources to implement the Plan.

### *Phase III Overview*

The City received a grant from LiveWell Wheat Ridge in 2010 to complete the first portion of Phase III of the Bicycle and Pedestrian Master Plan. LiveWell Wheat Ridge is a community coalition funded by LiveWell Colorado. LiveWell Wheat Ridge implements policies, environmental changes, and programs to increase residents' access to active community environments and fresh fruits and vegetables to promote healthy living and to prevent and reduce obesity.

In 2011, the City included funding in its Capital Investment Program (CIP) to complete the next portion of Phase III.

The primary objective of Phase III of the Wheat Ridge Bicycle and Pedestrian Master Plan is to complete conceptual designs with cost estimates for all of the identified corridors throughout the City. Table 1 shows the corridor segments that have been completed to date along with the status of the corridor's implementation. The ranking is from Phase II.

These corridor segments were selected because they were each identified as high priority corridors in Phase II of the Bicycle and Pedestrian Master Plan, were completely located in City right-of-way, and are not included in other planning efforts.

Phase II of the Wheat Ridge Bicycle and Pedestrian Master Plan includes standard cross-sections and general design guidelines. For this phase, these cross-sections and design guidelines were applied to the corridors in order to evaluate the feasibility of implementation and to define the conceptual designs and construction cost estimates for each corridor. The City's aerial imagery and GIS information that includes parcel lines, curb and gutter, pavement limits, etc. was utilized as the base mapping for this effort.

As a starting point, the cross-sections identified in the Bicycle and Pedestrian Master Plan were utilized to develop the initial conceptual design for each corridor. After

reviewing the relative impacts, in particular the need for additional right-of-way and encroachment into existing improvements, for each corridor, it was determined that more context sensitive options, with modifications to the standard cross-section, would be beneficial.

A Mid-cost Option was developed first for each corridor that implements as much of the cross-section identified in the Master Plan as possible while keeping within the existing rights-of-way of the corridor. When very short segments of additional right-of-way are necessary to prevent substandard design, then some acquisition is shown. As a first step in modifying the typical cross-section, the travel lane widths are reduced. The second step is to reduce the widths of the buffer/amenity zones. As a last step, the widths of the bike lanes or sidewalks are reduced. The conceptual design plans in Appendix B reflect this option.

Next, a Low-cost Option was prepared that, in most cases, provides bicycle facilities and maintains the existing level of pedestrian facilities. In some cases, small gaps in the existing pedestrian facilities could be closed; however larger gaps would remain since the improvements would likely be removed if the other options were later implemented. This option generally consists of restriping to narrow the travel lanes in order to add bike lanes with minimal improvements to the pedestrian facilities.

Lastly, the full implementation option was prepared that is considered the High-cost Option. This option does include minor modifications, typically to the travel lane widths to minimize the amount of right-of-way acquisition that is necessary. Rarely, the buffer/amenity zones widths are also modified.

Table 2 summarizes the conceptual costs of the various options for each of the corridors.

### *Next Steps*

The intent of this phase of the Bicycle and Pedestrian Master Plan is to identify the feasibility and develop conceptual designs and cost estimates for the corridors identified in Phase II. The following list provides a summary of future actions the City should consider taking to continue to implement the desired bicycle and pedestrian improvements.

- ▶ Develop conceptual designs and construction cost estimates for the remaining corridors from Phase II of the Bicycle and Pedestrian Master Plan. These designs and costs will include Low, Mid, and High-cost Options as appropriate.
- ▶ Investigate funding sources to begin implementation of the plan.
- ▶ Implement the Low-cost Option for the priority corridors as funds become available due to the low cost and the positive impact of designating bicycle facilities.
- ▶ Implement the Mid-cost Option for the priority corridors by pursuing various funds options.

Table 1 – Corridor Segment Status

Proposed Route	From	To	Rank	Status
Pierce Street	26 <sup>th</sup> Avenue	44 <sup>th</sup> Avenue	1	Phase III completed
32 <sup>nd</sup> Avenue (East)	Sheridan Boulevard	Wadsworth Boulevard	6	Phase III completed
32 <sup>nd</sup> Avenue (Central)	Wadsworth Boulevard	Kipling Street	6	Phase III completed

Table 2 – Corridor Segment Conceptual Costs Estimates, \$1,000

Proposed Route	From	To	Low-cost	Mid-cost	High-cost
Pierce Street	26 <sup>th</sup> Avenue	44 <sup>th</sup> Avenue	\$116	\$4,146	\$4,967
32 <sup>nd</sup> Avenue (East)	Sheridan Boulevard	Wadsworth Boulevard	\$88	\$4,734	\$5,585
32 <sup>nd</sup> Avenue (Central)	Wadsworth Boulevard	Kipling Street	NA	\$4,848	\$5,847

## *Pierce Street from 26<sup>th</sup> Avenue to 44<sup>th</sup> Avenue*

The existing conditions for Pierce Street consist of varying sections of curb and gutter, shoulders, and roadside ditches between 26<sup>th</sup> Avenue and 38<sup>th</sup> Avenue. The existing roadway sections of Pierce Street north of 38<sup>th</sup> Avenue consist of curb and gutter. Sidewalks exist at some locations, but typically have a substandard width. On-street parking is allowed for the majority of the corridor. Over 60% of Pierce Street has 50-feet of right-of-way, with the remainder being 60-feet or less.

According to the City of Wheat Ridge's Comprehensive Plan (*Envision Wheat Ridge*), Pierce Street is classified as a Collector. Initially, a *2-Lane Collector with Bike Lanes (Cross Section C2B)* standard roadway section, which has a 61-foot right-of-way, was applied to this corridor as a starting point.

For the Mid-cost Option, the standard cross-section was modified using as many of the desired design elements as possible while remaining within the existing right-of-way. As can be seen from the design spreadsheet in Appendix C, areas with sidewalks that were at least 5 feet wide were often retained with the buffer/amenity zone being reduced where necessary. The on-street parking is also eliminated with this option.

For the Low-cost Option, the design was further modified to utilize the existing pedestrian facilities, even when they are substandard. In addition, this option does not close any existing gaps in the pedestrian facilities. This option does not include the addition of any buffer/amenity zones along the corridor. Some of the on-street parking was preserved in this option and is shown on the design spreadsheet as being added parking because it would be formally designated by the bike lane striping.

For the High-cost Option, the standard cross-section was modified slightly by reducing the travel lane widths along the entire corridor to 10-feet, which reduces the necessary right-of-way width to 57-feet. The addition of the bike lanes and the buffer/amenity zones eliminates the on-street parking.

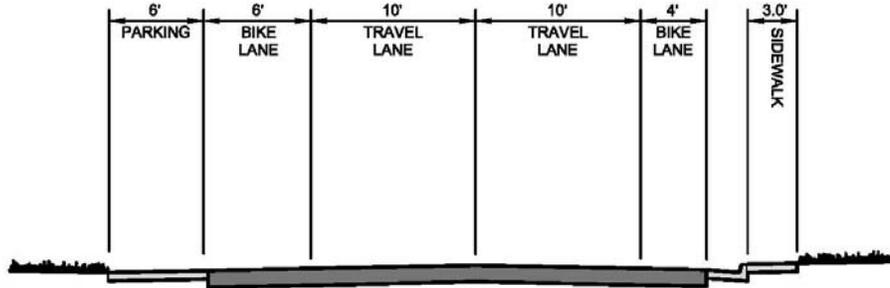
It was assumed that the existing pavement would remain in place with very little new asphalt being necessary for the Mid-cost and High-cost options.

Existing Pierce Street

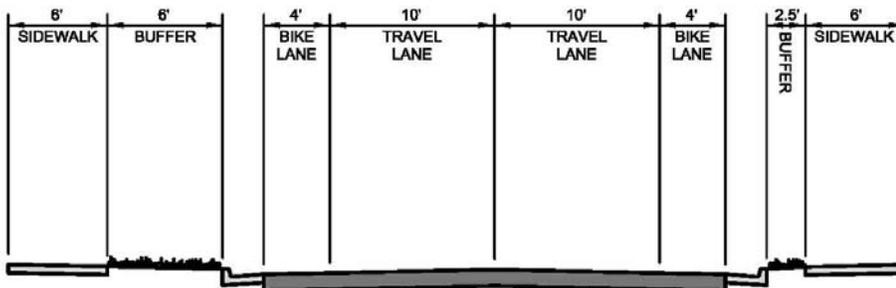




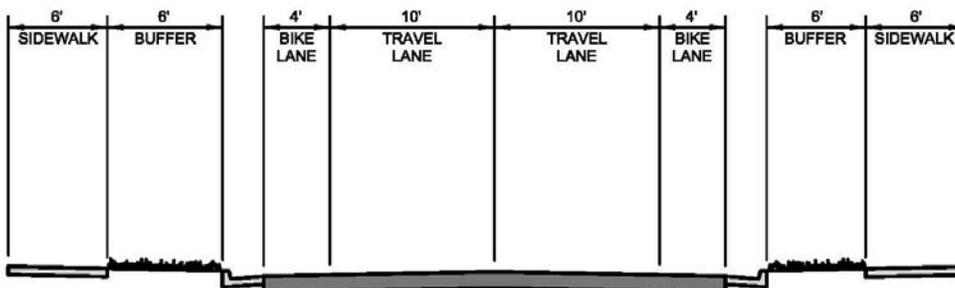
### Pierce Street



Typical Low-Cost Option



Typical Mid-Cost Option



Typical High-Cost Option

### ***32<sup>nd</sup> Avenue (East) from Sheridan Boulevard to Wadsworth Boulevard***

The existing conditions for the eastern portion of 32<sup>nd</sup> Avenue predominately consist of curb and gutter and 4-foot wide attached sidewalks. On-street parking is not permitted on the eastern portion of 32<sup>nd</sup> Avenue. All of 32<sup>nd</sup> Avenue within this corridor has at least 60-feet of right-of-way.

According to the City of Wheat Ridge's Comprehensive Plan (*Envision Wheat Ridge*), 32<sup>nd</sup> Avenue is classified as a Minor Arterial, which would typically require that a *3-Lane Arterial with Bike Lanes (Cross Section A3B)* standard roadway section should be applied to this corridor. However, this standard cross-section requires 72-feet of right-of-way. This would require the complete elimination of some of the design elements in order to fit the 3 lane section into the existing right-of-way. In addition, this portion of the corridor has slower speeds and low traffic volumes, so it was decided to utilize a *2-Lane Collector with Bike Lanes (Cross Section C2B)* to develop the Mid-cost Option.

For the Mid-cost Option, the standard cross-section was modified slightly by reducing the travel lane widths along the entire corridor to 10-feet, which reduces the necessary right-of-way width to 57-feet. As can be seen from the design spreadsheet in Appendix C, all of the design elements are fully implemented, except near the major intersections where the buffer/amenity zones were reduced. In addition, except at those intersections, the street is shifted north by three feet in order to reduce the impact to some of the adjacent properties along the south right-of-way. Several properties have buildings that are very close to the right-of-way.

For the Low-cost Option, the design was further modified to utilize the existing sidewalks, even though they are narrow and attached. Therefore, this option does not include the addition of any buffer/amenity zones along the corridor. In addition, the bike lanes are narrow or are eliminated at some street intersections to allow for turn lanes.

For the High-cost Option, the A3B cross-section was used and modified slightly by reducing the travel lane widths along the entire corridor to 10-feet, which reduces the necessary right-of-way to 67-feet, reducing the amount of right-of-way that must be acquired.

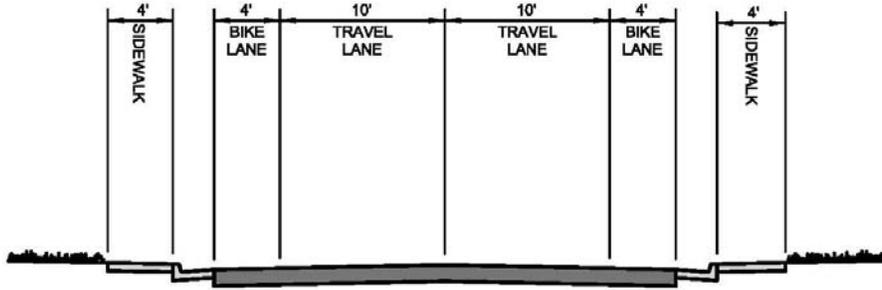
It was assumed that the existing pavement would remain in place with some additional asphalt being necessary for the Mid-cost Option and an additional lane of asphalt being necessary for the High-cost Option.

Existing 32<sup>nd</sup> Avenue

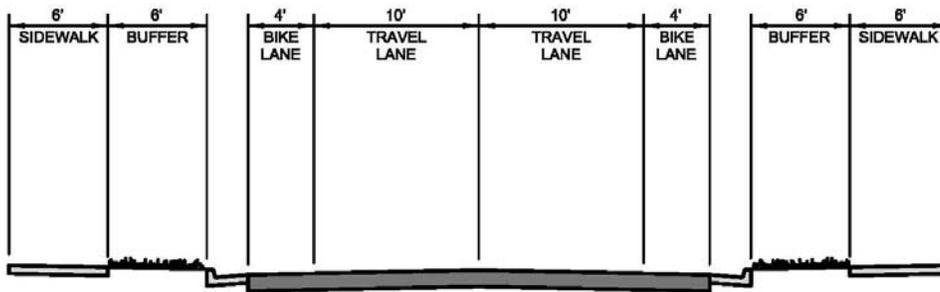




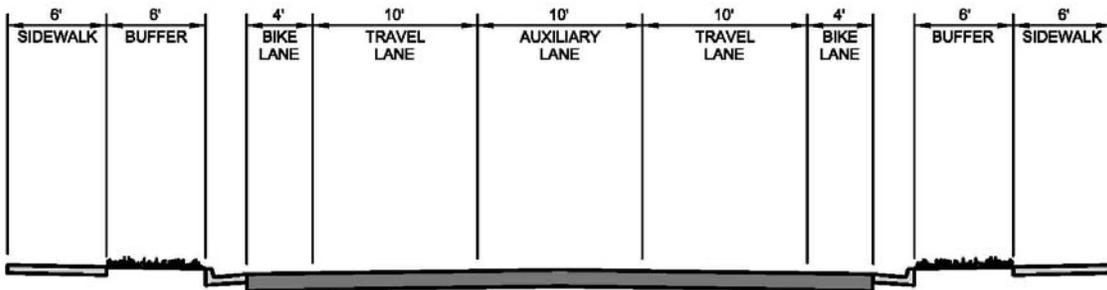
### 32nd Avenue (East)



Typical Low – Cost Option



Typical Mid – Cost Option



Typical High – Cost Option

### ***32<sup>nd</sup> Avenue (Central) from Kipling Street to Wadsworth Boulevard***

The existing conditions for the central portion of 32<sup>nd</sup> Avenue consist of varying sections of curb and gutter, shoulders, and roadside ditches. Sidewalks exist at some locations and vary in width from 4-feet to 10-feet. The majority of this corridor is bordered by Crown Hill Open Space Park and Crown Hill Cemetery on the south side. On-street parking is allowed along some portions of the corridor. Most of the corridor has at least 60-feet of right-of-way.

According to the City of Wheat Ridge's Comprehensive Plan (*Envision Wheat Ridge*), 32<sup>nd</sup> Avenue is classified as a Minor Arterial. Initially, it was determined that a *3-Lane Arterial with Bike Lanes (Cross Section A3B)* standard roadway section, which has a 72-foot right-of-way, would be applied to this corridor to develop the initial conceptual design.

For the Mid-cost Option, the standard cross-section was modified by reducing the travel lane widths along the entire corridor to 10-feet, which reduces the necessary right-of-way width to 67-feet. As can be seen from the design spreadsheet in Appendix C, at locations with an existing right-of-way width of 65-feet, the buffer/amenity zones were reduced slightly. In other locations with 60-feet of right-of-way, the buffer/amenity zones were significantly reduced. The existing multi-use path on the south side is preserved east of Dudley Street. In addition, west of Garrison Street, the sidewalk was eliminated from the south side since a multi-use path already exists nearby in the Crown Hill Open Space. The addition of the bike lanes eliminates the on-street parking.

Because of the widely varying sections, a low cost option was not possible with this corridor.

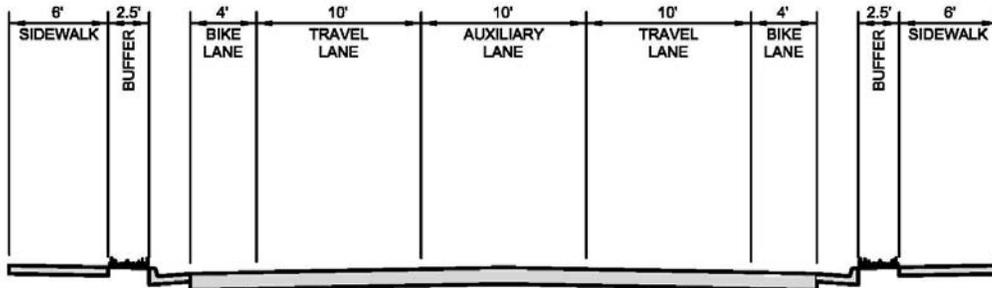
For the High-cost Option, the design is very similar to the Mid-cost Option except that additional right-of-way will be required to provide for the full-width buffer/amenity zones.

It was assumed that the existing pavement would remain in place for 32<sup>nd</sup> Avenue west of Dudley Street and that 32<sup>nd</sup> Avenue would be widened as required. The existing pavement east of Dudley Street was anticipated to be fully removed and replaced in order to address potential grading and drainage issues adjacent to the trail along the Crown Hill Cemetery.

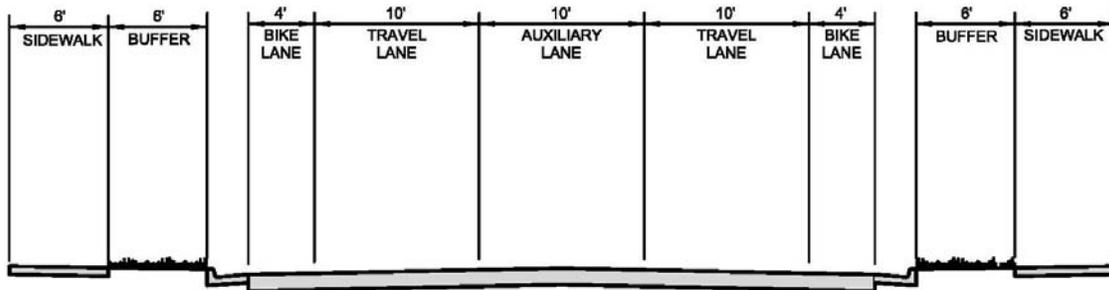
### Existing 32<sup>nd</sup> Avenue



### 32nd Avenue (Central)



Typical Mid – Cost Option



Typical High – Cost Option

## Appendices Discussion

The following abbreviations are used throughout the Appendices:

- SY - Square Yards
- LF - Lineal Feet
- SF - Square Feet
- ROW - Right-of-Way
- W - West side of Street
- E - East side of Street
- C/G - Curb and Gutter



# Appendix A

## Conceptual Cost Estimates

## Conceptual Cost Estimate Discussion

Quantities for the following items need to be input into the spreadsheet:

Asphalt Mat – Removal & New

Concrete Sidewalk – Removal & New

Curb & Gutter – Removal & New

Sod – Buffer zones at least 5' in width

Pattern Concrete – Buffer zones less than 5' in width

Sidewalk Ramps

Pavement Marking Tape – 4" & 8"

Quantities for the following items will be calculated by the spreadsheet:

Removal of Landscape Areas – Based on the area of earthwork less the removal areas of asphalt mat, concrete sidewalk, and curb & gutter. This is the disturbed area less the removed hardscape.

Earthwork – Fine Grade – Based on the area of sod, new asphalt, sidewalk, pattern concrete, sidewalk ramps, and curb & gutter. This is disturbed area.

Soil Preparation – Based on the area of sod.

Deciduous Ornamental Tree – Based on area of sod and 210 SF/tree. This assumes a 6' buffer width and 35' spacing. With a 5' buffer width, the spacing would increase to 42'.

Reconditioning & Proofrolling – Based on the area of earthwork less the area of sod. This is the total hardscape area.

Ornamental Bench, Trash Receptacle, & Bike Rack – Based on area of sod at 6' wide and pattern concrete at 2.5' wide and 1,000' spacing for facilities. Areas with narrower planted buffers or wider amenity zones will cause a slight variation in the spacing.

Pedestrian Light – Calculated similar to the benches, but with a 150' spacing.

Sanitary Facility – Based on one half the number of benches.

Water Tap – Based on one half the number of benches.

Lawn Irrigation – Based on the area of sod.

The Other Construction costs are based on typical percentages except for the Low-cost Options. Since these are basically restriping and signage projects, the percentages for some of the items are considerably different.



# Appendix B

## Conceptual Design Plans

## Design Plans Discussion

The design plans reflect the Mid-cost Option. During the initial discussion of Phase III, it was decided by City Staff that the Mid-cost Option was the most likely to be implemented in the long-term.

Although the High-cost Options are generally only 20% - 25% higher than the Mid-cost Option, the impact of obtaining the necessary additional right-of-way makes that option less desirable.

The Low-cost Option is basically the striping and signage from the other options, a separate design was not prepared.

# Appendix C

## Design Spreadsheets



# Appendix D

## Data Spreadsheets