

The River South Greenway Master Plan



January 18, 2010

DENVER
OFFICE OF COMMUNITY DEVELOPMENT

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THE GREENWAY FOUNDATION

Planning, Building, Protecting and Enhancing Communities, Parks, Trails and Waterways
Since 1974

December 18, 2009

On behalf of the Board of Directors of the Greenway Foundation, it is my pleasure to present the River South (RISO) Greenway Master Plan. The RISO plan stands on its own as a vision for the South Platte River in Denver, and is also a part of a larger planning and implementation effort.

Following on three decades of collaboration with local, regional, state and federal agencies, and in particular with the City and County of Denver, the Greenway Foundation has undertaken one of the most ambitious planning efforts for the South Platte River corridor to date. In 2008, the focus was on the River North (RINO) Greenway Master Plan, encompassing the 3.5 mile section of the River from City of Cuernavaca Park downstream to the north City boundary with Adams County. The result is the implementable RINO Greenway Master Plan.

In 2009, a group of funders joined together to create the RISO Plan, encompassing the remaining 7 miles of the River in Denver from the City boundary with Arapahoe County on the south, downstream to 20th Street. Colorado Water Conservation Board, Urban Drainage and Flood Control District, Denver Public Works, Denver Parks and Recreation, Denver Water and the Greenway Foundation helped fund this Plan.

Goals of the RISO plan included creating a plan based on direct interaction with public and private stakeholders as well as ideas and comments drawn from public meetings. In addition, excursions were scheduled to explore the River, its banks, trails and parks on foot, bicycles and via motorized tours. Finally, two separate tours of the River itself via kayaks took place to provide a clear understanding of the environmental and recreational magic of the South Platte.

The RISO Greenway Master Plan includes the Central Platte Valley and Confluence Park. As Mayor John Hickenlooper noted in his letter in the RINO plan, "the City can strive for the same passion as we have in the Central Platte Valley, an area that has been transformed from an eyesore into one of the most popular public places in Denver while serving as an economic stimulus for development and redevelopment."

The South Platte River is Denver's greatest natural resource. Bold recommendations for its renewal, accessibility and maintenance -- and for new parks and open space along the River -- are contained in this plan. The River's time has come. We must make every effort to preserve and improve this irreplaceable amenity.

Next steps include finding resources for implementation, refining and prioritizing projects and bringing the South Platte River in Denver to its full potential. Our team has worked hard to develop this plan. We are ready to work even harder to make its vision a reality!

Sincerely,

Jeff Shoemaker
Executive Director

"A river is more than an amenity, it is a treasure" Justice WM. O Douglas

The Greenway Foundation is supported in part by the Scientific and Cultural Facilities District as well as a gift from the Estate of Robert V. and Billie Mae Behrent.

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Renewing Our Vision....

In June of 1974, the City and County of Denver and the Greenway Foundation partnered to initiate improvements to the blighted South Platte River, with the intent of transforming the area into celebrated public open space. Fifteen months later, as part of a Labor Day Weekend celebration, the initial phase of Confluence Park was dedicated and several miles of multi-use recreational trails were opened to the public. Subsequently, numerous additional projects were undertaken to remove debris from the South Platte River.

Cities across the United States have reinvested in public infrastructure along their urban waterways, understanding that the development of new parks, open spaces and greenway corridors can act as a central, unifying theme in their successful redevelopment. To that end, the purposeful redevelopment of Denver's greatest natural resource, the South Platte River, is a key component in Denver's effort to create a sustainable city where people want to live, work and play in an urban environment.

The deliberate transformation of the South Platte River to celebrated public space has paid many dividends to the City and County of Denver and has contributed greatly to the redevelopment of Lower Downtown, which now enjoys some of the highest land values in the state.

The River South Greenway Master Plan seeks to continue valuable public investment along the South Platte River, allowing our City's "greatest natural resource" to realize the many benefits of a healthy, connected and attractive urban waterway.



Chapter 1: The River South Greenway Master Plan

A. Purpose and Mission of the Plan

Purpose

A collaborative and focused effort between private and public partners over the past 35 years has resulted in the creation of the South Platte River Greenway, as well as the implementation of environmental and recreational improvements along the River's numerous tributaries. In addition, a collective investment of more than \$80 million from public and private entities has sparked more than \$5 billion in economic resurgence throughout the 10.5 miles of riverfront in Denver -- 3.5 miles in the River North (RINO) Corridor and 7 miles in the River South (RISO) Corridor. This resurgence encompasses a variety of development improvements, including residential, retail, commercial, entertainment and sports arena projects.

The Greenway Foundation and the City and County of Denver Parks and Recreation Department (DPR), recognizing the need for a renewed vision for the South Platte River, partnered in March 2008 to develop the River North Greenway Master Plan. The purpose of this plan was to build upon the greenway improvements initiated in the 1970s and identify opportunities to renew a future vision for the South Platte River Greenway. The River North Greenway Master Plan was completed in March 2009, focusing on the three and one-half miles of the South Platte River within the RINO Corridor.

The Greenway Foundation and DPR, with the additional support and engagement of the Colorado Water Conservation Board (CWCB), the Urban Drainage and Flood Control District (UDFCD), Denver Public Works (DPW) and Denver Water (DW), initiated a collaboration to create the River South Greenway Master Plan in April 2009. The River South Greenway Master Plan establishes a new, contemporary vision for the remaining reach of the River. The plan also recommends guidelines for parks; recreational, environmental and flood control enhancements; expanded public open space; aesthetic enhancements and improved water quality within the River's channel.

Mission

The mission of the River South Greenway Master Plan is to initiate an ongoing, collaborative effort between citizens, property owners, City and County of Denver agencies, the Urban Drainage and Flood Control District, the Greenway Foundation and additional public and private organizations committed to a healthy South Platte River. The City and County of Denver and the Greenway Foundation will continue their historic partnership, in cooperation with RISO funding partners, in championing the South Platte River and its tributaries in areas proximate to the River. The partners will also explore and identify additional partnerships and funding opportunities for planning, design and analysis of the River's environmental systems, as well as the construction of publicly accessible parks, open space and River Corridor infrastructure and amenities.

B. Goals

1. *Create a River-focused urban environment that is **healthy, habitable and connected**.
2. *Promote **ecosystem restoration through sustainable, natural systems design**. Establish goals for improved water quality, habitat creation, fishing and River stability.
3. ***Augment existing successful parks and venues** along the Central Platte Valley by creating new, diversified activity centers along the RISO Greenway Corridor.
4. *Create a parks/open space-oriented model for urban living that **reflects the history of Denver**.
5. ***Enhance the safety** of the River corridor and surrounding areas.
6. *Utilize existing and proposed parks as the organizing elements that **create a sense of place and a community focal point**. These will also increase property values, economic vitality and development opportunities along adjacent transportation corridors.

7. *Create a **regional gateway to downtown Denver** and a series of neighborhood gateways that reflect their unique character.
8. *Establish the RISO Greenway Corridor as a **destination for entertainment, recreation and commercial and residential amenities**.
9. ***Connect neighborhoods and public facilities** by providing access to local businesses and entertainment venues and by **creating Greenway street connections or fingers** to adjacent communities and regional trail corridors.
10. **Encourage multiple, alternative transportation opportunities**, including rail, bicycle, pedestrian and boating.
11. **Make the River edge more accessible** through additional ADA access points.
12. **Provide a local, nationally recognized destinations for boaters and anglers** with varying skill levels and abilities.



13. **Improve native fish passage** throughout the South Platte River Corridor.
14. **Improve aquatic and terrestrial habitat to sustain wildlife** movement, food and shelter and improve fishing throughout the South Platte River Corridor.
15. **Improve water quality to allow for safe, swimmable, human contact** by designing improvements to reduce the impact of point, non-point and thermal pollution sources.



Recommendations such as this Major River Gateway concept were made as part of the RINO Greenway Master Plan and are applicable to the RISO Greenway Master Plan.

16. Consider the adoption of an **adaptive management approach to reducing trash** in the South Platte River through metropolitan Denver.
17. **Implement the RINO and RISO Greenway Master Plans** by identifying and fostering project partners.
18. Assure that all recreational, habitat, access and other **proposed improvements maintain or improve the flood control capacity and stability** of the South Platte River.

* Denotes Goals that were included in the River North Greenway Master Plan are also being recommended in the River South Greenway Master Plan. See Chapter 2 for an explanation of how this plan was developed with stakeholder and public involvement.

C. The River South Greenway Vision

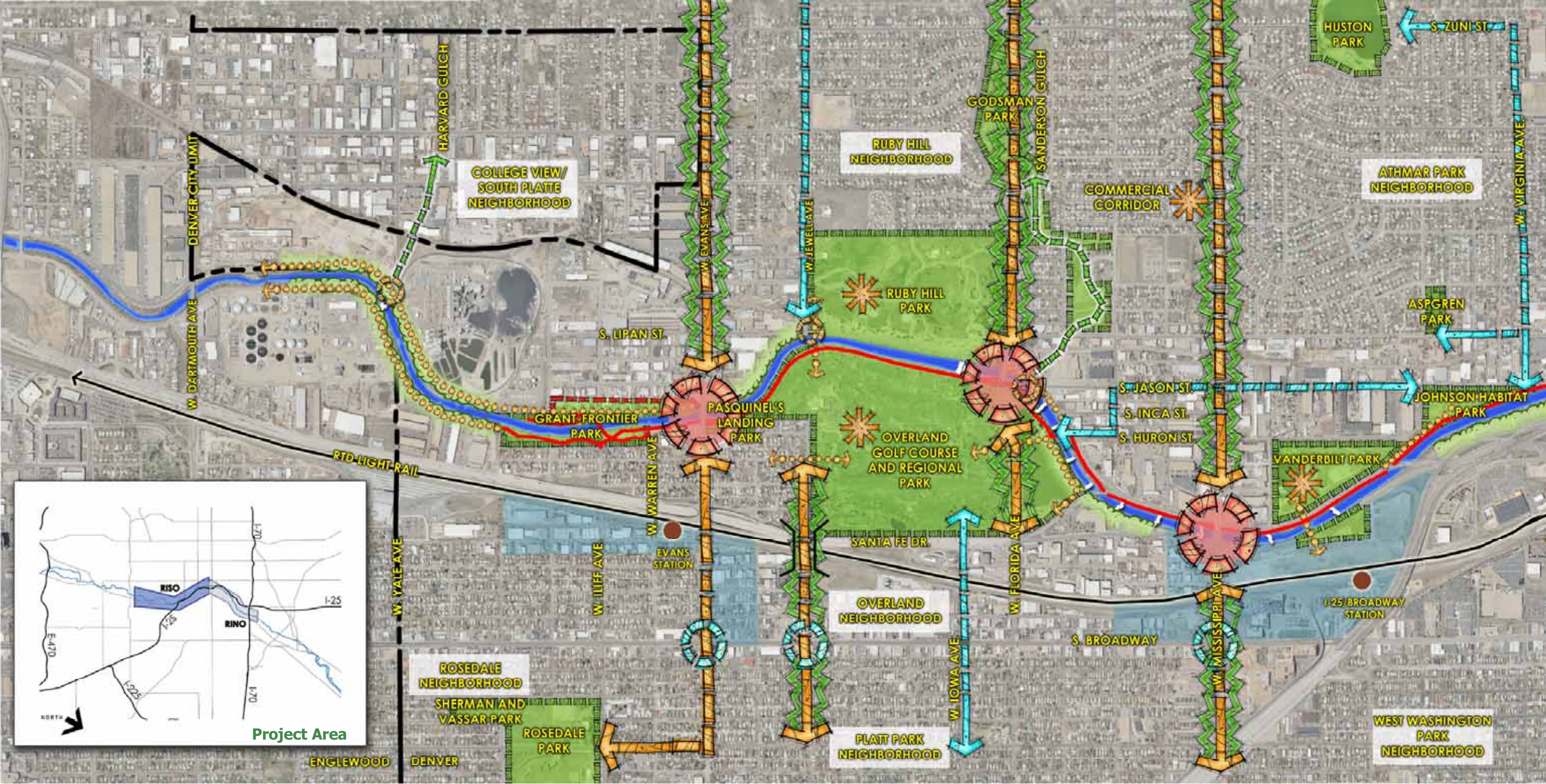
The Vision Plan Map demonstrates major concepts that were developed early in the RISO Greenway master planning effort. Important concepts such as connectivity, gateways and water recreation and how they are incorporated within the South Platte River Corridor help to define the vision and provide guidance when identifying master plan proposals.

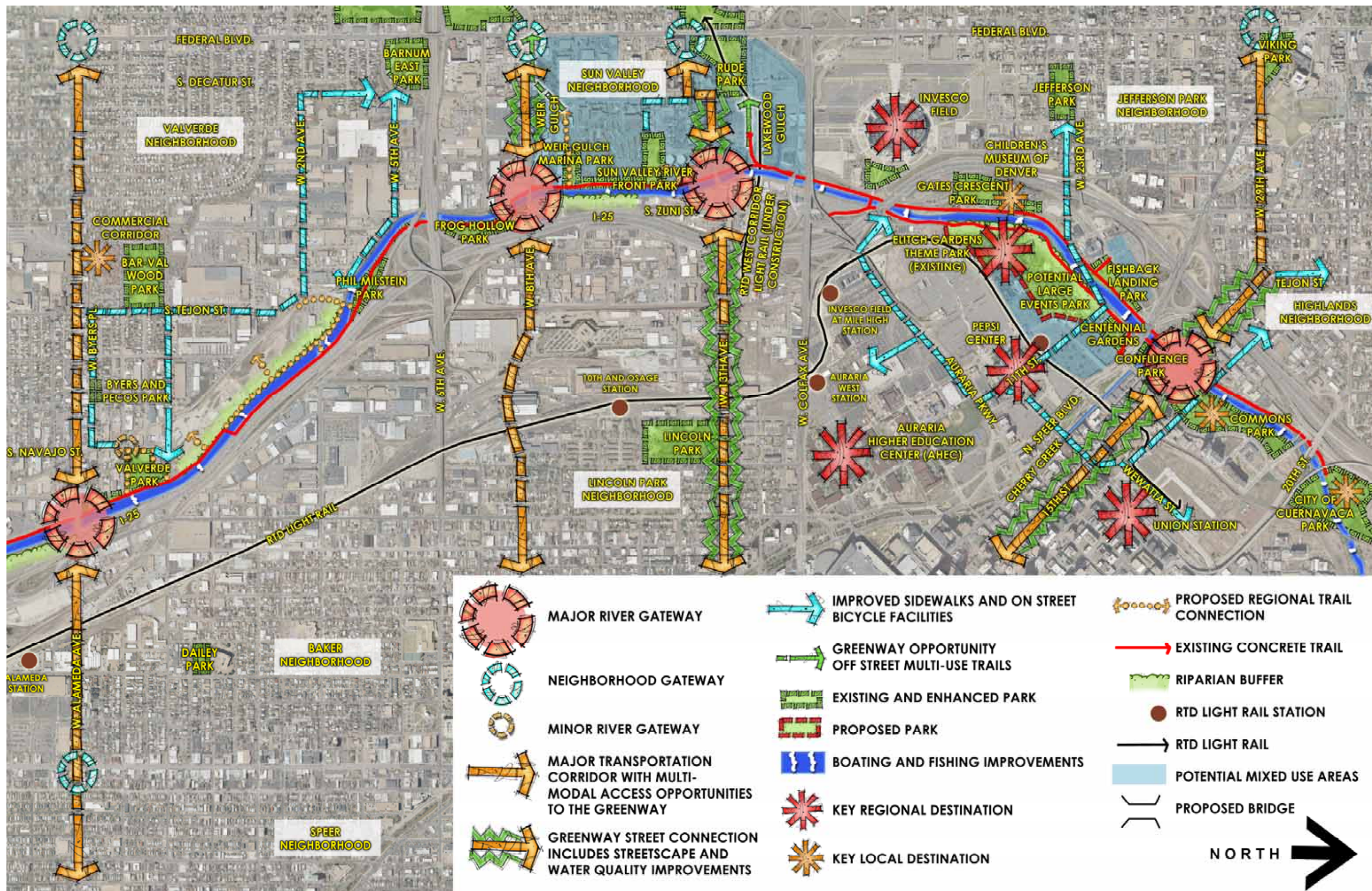
The Vision Plan Map's intent is to provide possible improvements for consideration in future parks, recreation, open space and transportation planning efforts.



Improving water quality to make the River swimmable and boatable for users with varied skill levels is a major goal of the RISO Greenway Master Plan.

THE RIVER SOUTH GREENWAY VISION





D. The Plan

The City and County of Denver's Department of Community Planning and Development estimates that by the year 2025, the population within the RISO area (W. Dartmouth Avenue downstream north to 20th Street and between Broadway and Federal Boulevard) is projected to experience a 30 percent increase of 20,100 people from approximately 62,600 people to nearly 82,700 people.

This growth estimate necessitates continued public investment in the South Platte River and investigation into the changes new urban development will pose to the River's character, health and stability. Implementing this plan will help create and improve parks, open space and related amenities that meet user needs and provide guidance for future development. Furthermore, this investment should be regarded as a significant opportunity for Denver to continue the South Platte River Corridor's renaissance.

The natural progression of development beyond the Central Platte Valley calls for the creation of places for people to live, work and play along the River. Denver can ensure the highest and best use of the real estate adjacent to the South Platte River within both the RINO and RISO Corridors by strategically planning for an interconnected, well planned and visually attractive use of River frontage. The River North Greenway Master Plan identified, described and provided a vision for three distinct planning areas for the South Platte River between 20th Street and the northern city limits. These planning areas include, from south to north, the Urban Greenway Corridor, the Denver Coliseum/National Western Entertainment Area and the Northern Platte Valley Regional Park.

Four planning areas were identified as parts of the River South Greenway Master Plan:

- Southern Platte Valley Regional Park (W. Dartmouth Avenue (southern city limits) to W. Mississippi Avenue)
- Commercial Greenway Corridor (W. Mississippi Avenue to S. Tejon Street)
- Urban Greenway Corridor (S. Tejon Street to W. 13th Avenue)
- Central Platte Valley Event District (W. 13th Avenue to 20th Street)

Southern Platte Valley Regional Park

This planning area extends from the southern city limits to W. Mississippi Avenue. The southernmost portion of the South Platte River between W. Dartmouth Avenue and W. Evans Avenue is dominated by industrial use to the west and a mix of single family homes, businesses and a major north-south transportation corridor to the east. City parks and open space, including Grant-Frontier Park, Pasquinel's Landing Park, Ruby Hill Park, Overland Pond Park, Overland Golf Course and the Aqua Golf pond and Miniature Golf complex, dominate the area north of W. Evans Avenue.

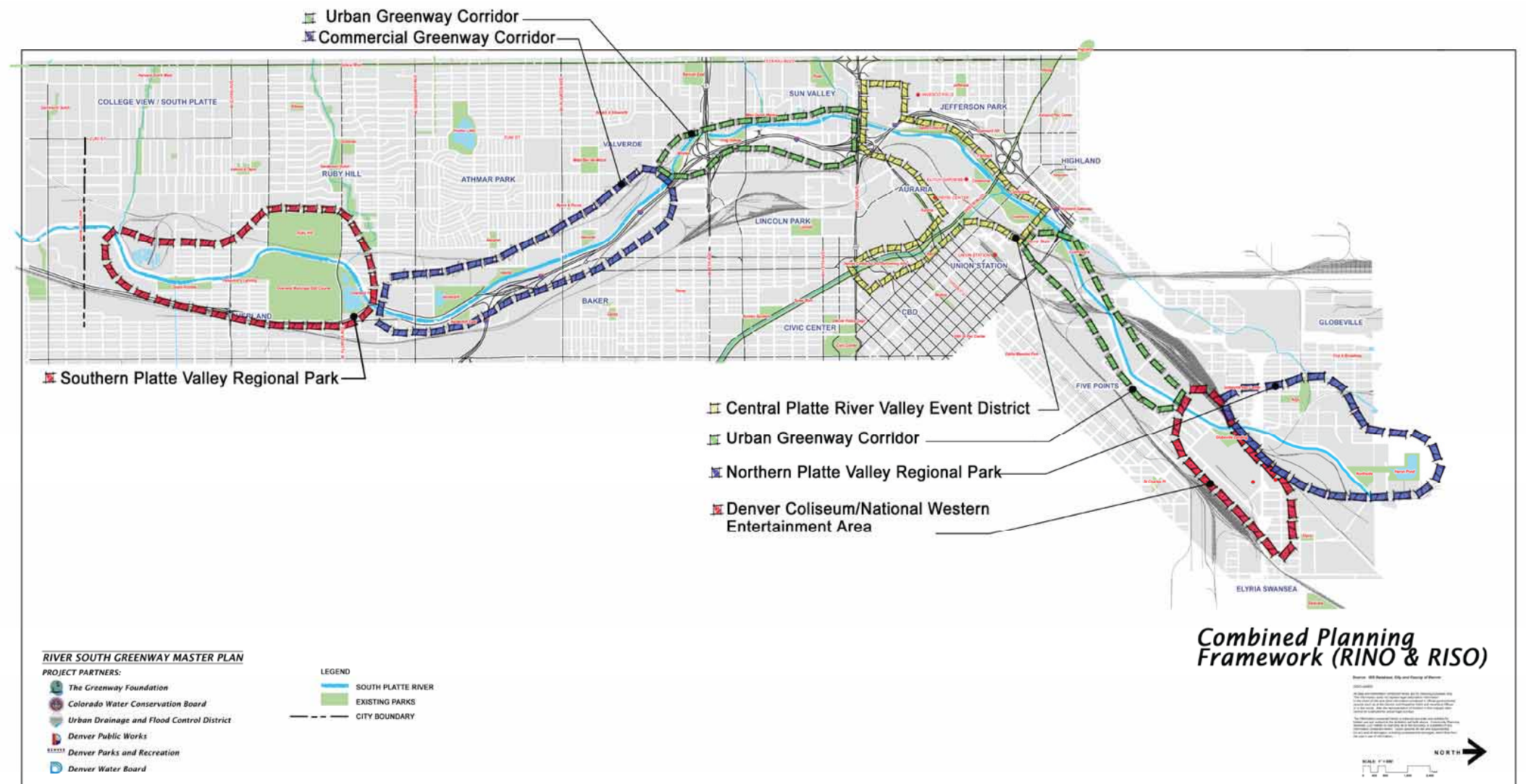
The vision for this reach of the River is to create a regional park that serves as an anchor for the South Platte River Greenway, as well as a gateway into the City and County of Denver. Providing greater connectivity between the existing parks; expanding

Grant-Frontier Park west of its current location; and re-programming Overland Golf Course to create the Southern Platte Valley Regional Park and complement the Central Platte Valley Event District (see description pages 8 and 9) currently functioning as a centrally located anchor on the River.

The Southern Platte Valley Regional Park will also provide needed additional park and recreation amenities for the West Washington Park Neighborhood and other nearby neighborhoods, as well as amenities for future developments planned around the Alameda, Broadway and Evans RTD Light Rail stations. Safe bicycle and pedestrian connections between these neighborhoods, parks within the neighborhoods and the Southern Platte Valley Regional Park are essential.

Commercial Greenway Corridor

The Commercial Greenway planning area extends between W. Mississippi Avenue and S. Tejon Street. Santa Fe Drive, Interstate 25 and commercial businesses border this area of the River. Three parks are located in this reach: Vanderbilt Park, Johnson Habitat Park, and Valverde Park. The vision for the Commercial Greenway Corridor is to increase visual and physical connectivity between Vanderbilt Park, Johnson Habitat Park and the River and to lessen the visual and noise impacts caused by Santa Fe Drive and Interstate 25. Closing the existing on-ramp to southbound Santa Fe Drive located between Vanderbilt Park and Johnson Habitat Park and replacing it with continuous open space and trails would create safe connections between the parks. Access and parking for both parks and the Greenway can be added at the future park maintenance facility scheduled to replace the old Denver Animal Shelter. Aes-



thetic improvements and noise reduction along the Greenway will be accomplished by creating canyons that are comprised of a series of noise mitigation and separation walls that have the look of a natural sandstone canyon. The canyon walls, referred to as the "Santa Fe Canyons," will be placed on both sides of the River between the southern Santa Fe Drive bridge near Aqua Golf and the existing northern Santa Fe Drive bridge over the South Platte River near Vanderbilt Park.

Urban Greenway Corridor

The Urban Greenway Corridor planning area is located between S. Tejon Street and W. Colfax Avenue to the north. The area is characterized by a mixture of commercial and residential uses to the west and Interstate 25 to the east. Phil Milstein Park, Frog Hollow Park and Weir Gulch Marina Park are within this reach. The vision for the Urban Greenway Corridor is to provide a greater residential community focus on the River by improving access and connectivity between the River, Sun Valley residences and neighborhoods farther to the west. The plan calls for creating a Sun Valley "riverfront park" between Weir Gulch and Lakewood Gulch. In addition, the park will extend up Weir Gulch and Lakewood Gulch to provide green, open-space connections into the Sun Valley neighborhood, Rude Park and the proposed Regional Transportation District (RTD) and Platte Valley Trolley stations. Significant landscape buffering, noise abatement and ecosystem enhancement is proposed for the area between Interstate 25 and the River to improve the communities' experience along the River and in the parks.

Central Platte Valley Event District

The Central Platte Valley Event District extends between W. Colfax Avenue and 20th Street. This planning area includes a diverse mixture of regional destinations, including Invesco Field at Mile High, Gates Crescent Park, the Children's Museum of Denver, Elitch Gardens Theme Park, Centennial Gardens, Downtown Aquarium-Denver, Pepsi Center, Fishback Landing Park, Confluence Park and REI. In addition, the Cherry Creek Greenway provides a non-motorized connection to the LoDo business district and its complement of unique restaurants, retail shops and office complexes.

Currently, the area around Confluence Park is the most active and energetic location along the South

Platte River and it is a major destination for countless residents and visitors. The Confluence Park boat chutes and access to the River's edge within the park provide a place where people can recreate in the River or watch others do so. The REI flagship store provides a high-traffic anchor for Confluence Park, with many shoppers taking time to enjoy the River before they depart the area. The vision for this area is to extend the existing vitality and energy that characterizes Confluence Park to the north and south along the River. This can be accomplished by improving physical and visual connectivity between the different commercial venues, the Greenway and the parks, and by adding trip generators such as a Platte Valley Trolley museum and an outdoor children's exploration park at the Children's Museum of Denver. Should Elitch Gardens Theme Park ever relocate, mixed-use redevelopment, including a large event park, could expand across the street from Fishback Landing Park and on the east side of the River. A key element in the proposed vision for the Central Platte Valley Event District is expanded boating and fishing opportunities throughout the River corridor for beginners and skilled participants alike.

E. Summary of Recommendations

The planning process, which included the collection of significant public and stakeholder input, as well as the identification and analysis of existing conditions, resulted in the following six general recommendations for the River South Greenway Master Plan. Refer to the recommendation maps on pages 12 to 18 and typical sections on pages 19 to 28. Artist renderings illustrating the potential look of these recommendations are included in Chapter 4. A more detailed discussion for each recommendation is provided in Chapter 4.

- ◆ **River Health** - River channel improvements should increase the stability, health, sustainability and accessibility of the South Platte River.
 - In a manner that improves the natural condition to the best extent possible, rehabilitate the areas of the River that have been adversely affected by urbanization and encroachment.
 - Lay back the existing bank slopes where possible, and increase the width of the emergent flood bench and riparian areas, thereby

improving the riverbank stability, water quality and riparian habitat. This would create a riparian buffer; capture stormwater runoff; and improve water quality, riparian vegetation, wildlife habitat and recreation opportunities between development and the River to increase pervious land outside of the 100-year floodplain.



Fishing in the South Platte River through the RISO Greenway Corridor.

- Whenever possible, improve aquatic habitat by creating low-flow channels, meanders, riffles, vegetative bank shading, fish refuge areas and enhanced fish passage.
- Create and consolidate open-air stormwater detention facilities to reduce flooding and provide wetlands for wildlife habitat, stormwater filtration and recreation opportunities.
- Realign and daylight existing storm sewer outfalls to enhance water quality and provide additional riparian vegetation and wildlife habitat.
- Install a real-time water quality monitoring station at Confluence Park focusing on pathogens identified as causes of impairments to beneficial use.
- Establish an adaptive management approach to reducing trash on the South Platte River. Include users, stewards, officials and regulators as part of the solution to the trash challenge.

- ◆ **Transportation and Roadways** - The purpose of the River South (RISO) Greenway Master Plan is to identify proposed conceptual improvements to the South Platte River Greenway corridor. The scope of the RISO Plan does not include nor consider transportation planning protocols beyond existing bicycle and pedestrian master plans previously completed by the City and County of Denver. In order to identify potential locations for bicycle and pedestrian connections from neighborhoods, parks and businesses, the Plan makes visionary recommendations for desirable lateral, on-street bicycle and pedestrian improvements, such as identifying potential bicycle and pedestrian routes that connect into the South Platte River regional trail. In addition, specific recommendations for several roadways (narrowing, moving, abandoning, etc.) have been made. The Plan's intent is to provide the appropriate agencies with possible on-street bicycle and pedestrian roadway improvements to consider during future transportation planning and improvement efforts and to determine if and what type of bicycle and pedestrian enhancements should be made in order to improve connectivity to the South Platte River Greenway. Cross reference to city wide multi-modal plan (Denver Parks and Recreation and Public Works joint effort) beginning in 2010.

Many of the existing roadways located immediately adjacent and parallel to the South Platte River restrict the possibility of expanding open space, laying back riverbanks, providing additional habitat and initiating recreational improvements to the Greenway. Interstate 25 and Santa Fe Drive act as physical barriers by either prohibiting access or by making access for cyclists and pedestrian unsafe. Interstate 25 and Santa Fe Drive also create noise levels that can greatly diminish the users' quality of experience along the Greenway. The following actions, from south to north, will reduce the negative impact of roadways and provide safer access between neighborhoods and businesses and the Greenway. All proposed roadway closures or relocations that are recommended in this Master Plan will require further study.

- Between W. Dartmouth Avenue and W. Wesley Avenue, realign South Platte River Drive to the west away from the River as far as possible.

- Designate South Platte River Drive east as a bike route between Grant-Frontier Park east and the existing bicycle/pedestrian bridge over the River just south of W. Dartmouth Avenue.
- If and when private properties fronting South Platte River Drive are acquired, remove South Platte River Drive west between W. Wesley Avenue and W. Evans Avenue.
- Provide new curb and gutter on South Platte River Drive between W. Florida Avenue and Santa Fe Drive.
- Close South Platte River Drive (one-way) between Overland Pond Park and Aqua Golf pond between W. Florida Avenue and Santa Fe Drive.
- Redesign W. Florida Avenue as a Greenway street connection with native trees, shrubs and grasses from the River to Santa Fe Drive. Provide for safe bicycle and pedestrian access between Overland Pond Park and the Aqua Golf pond with an at-grade crossing at W. Florida Avenue and the Overland Golf Course by adding a pedestrian refuge island, paved crosswalk utilizing specialty pavement material such as stamped concrete, and signage.
- Close W. Exposition Avenue south of S. Jason Street (located between Vanderbilt Park and Johnson Habitat Park), S. Huron Street and the ramp to southbound Santa Fe Drive. Create a new roadway alignment and connection between S. Huron Street and S. Jason Street along the southern edge of the future Denver Parks and Recreation maintenance facility. The new connection would be located on the old Denver Animal Shelter property.
- CDOT to close South Platte River Drive between W. Alameda Avenue and W. Cedar Avenue per the Valley Highway Environmental Impact Statement Phase II. Note Phase II has not been programed by CDOT as of publication of this Master Plan.
- Develop distinctive neighborhood gateway features at key roadway intersections that function to improve visibility, way finding and

safe access to the River (see Vision Plan Map on pages 6 to 7).

- Coordinate efforts with the Platte Valley Trolley to increase opportunities for public use and to further develop trolley stops, trolley maintenance facilities, and educational opportunities.

◆ **Public River Edge** - Maintain a public River edge throughout the South Platte River Corridor. Roads, trails and promenades will provide the separation between public and private areas.

◆ **Parks and Public Open Space** - As the population and recreation demand increases, existing and proposed parks and open space should increase recreation opportunities within the RISO Greenway.

- Re-energize existing parks by improving and adding amenities that meet user needs and by providing greater access to the River's edge.
- Introduce people to nature and the River by emphasizing it as a natural amenity and recreational resource for boating, tubing and fishing and by making the River's edge accessible wherever possible.
- Meet cultural needs by including park and public open space amenities that reflect diverse cultures and local neighborhoods. This can be expressed through art, architecture and landscape improvements.
- Minimize the use of potable water by reducing the amount of Kentucky bluegrass sod that is currently growing in existing Greenway parks. Irrigated turf and landscapes should be converted to natural areas of native trees, shrubs and grasses that require little or no supplemental irrigation. Reduction of irrigated grasses will also decrease the need for chemical fertilizers and herbicides that contribute to poor water quality in the South Platte River and its tributaries.
- Collaborate with and support the local arts community by incorporating public art along the Greenway and in parks and open spaces.

- Enhance a vibrant Central Platte Valley Event District (CPVED) through park and public open space improvements and nationally recognized on-water events and activities. The CPVED will become a nationally recognized destination and model for integrating major venues (i.e., Invesco Field at Mile High, Pepsi Center, Coors Field, Children's Museum of Denver and Downtown Aquarium-Denver) with on-water activities such as boating and fishing, sustainable River design and expanded open spaces and parks that meet user needs.
- Create a Southern Platte Valley Regional Park (SPVRP) by developing a re-use park and recreation plan for Overland Golf Course and through greater connectivity between Overland Golf Course, Grant-Frontier Park, Pasquinel's Landing Park, Ruby Hill Park, Overland Pond Park and the Aqua Golf pond. The SPVRP will function as a regional park anchor and gateway for the south end of the South Platte River Greenway. It will also complement the existing complex of parks located in the Central Platte Valley Event District and the Northern Platte Valley Regional Park proposed in the River North Greenway Master Plan (see Combined Planning Framework on page 8).
- Develop an interactive educational sign system that interprets the cultural and ecological history of RISO.

◆ **Multi-Use Trails and River Connections** - Multi-use trails should improve safe access to the RISO Greenway from neighborhoods and businesses. Trails should incorporate "green" design and best management practices (BMP's) that reduce stormwater runoff into the River.

- Revise the regional trail standard to include a 12-foot wide, multi-use regional trail and replace existing 8- and 10-foot trails wherever possible to meet this standard. Develop a 4-foot minimum width, soft surface jogging trail parallel to the multi-use trail. Fill in missing regional trail segments and provide safe lateral connections from the RISO Greenway to neighborhoods.

- Provide multi-modal, alternative transportation opportunities by completing multi-use trail connections from the RISO Greenway and to existing and proposed RTD light rail stations, including the future Federal Boulevard station to be located in Rude Park and to key destinations such as downtown Denver.
- Develop gateways at strategic locations along the Greenway to improve access and visibility and reinforce the River's sense of arrival and sense of place (see Vision Plan Map on pages 6 to 7).
- Enhance the Platte Valley Trolley stop at Confluence Park (see proposed concept plan on page 11).

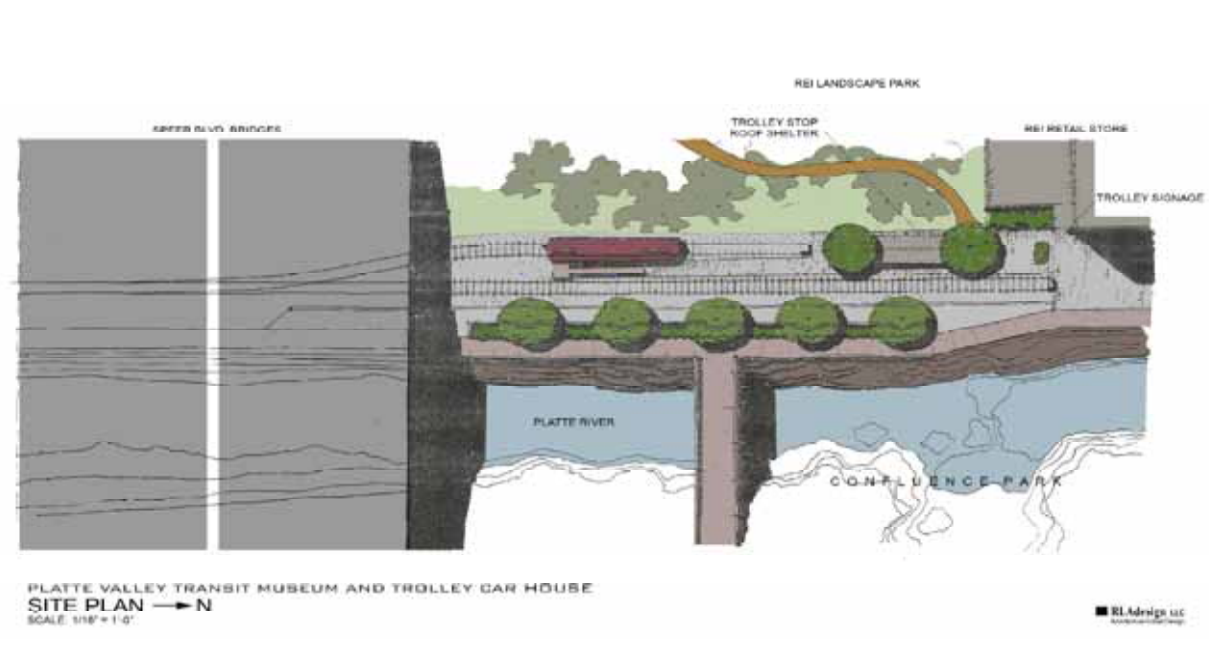
◆ **In-River Recreation** – The River shall become a safe and nationally recognized recreational amenity for citizens through the development of boating and fishing opportunities for a variety of skills and physical abilities.

- Improve water quality so that human contact, including swimming, is safe.



- Combine in-channel stabilization and water quality improvements, such as drop structures, with recreational boating and fishing opportunities.
- Increase opportunities for River-edge interaction that is accessible to persons with diverse physical abilities. Access should include boat put-ins and take-outs and fishing access.
- Provide areas where Greenway users can safely observe water recreation enthusiasts.

Proposed Platte Valley Trolley stop improvements at Confluence Park.



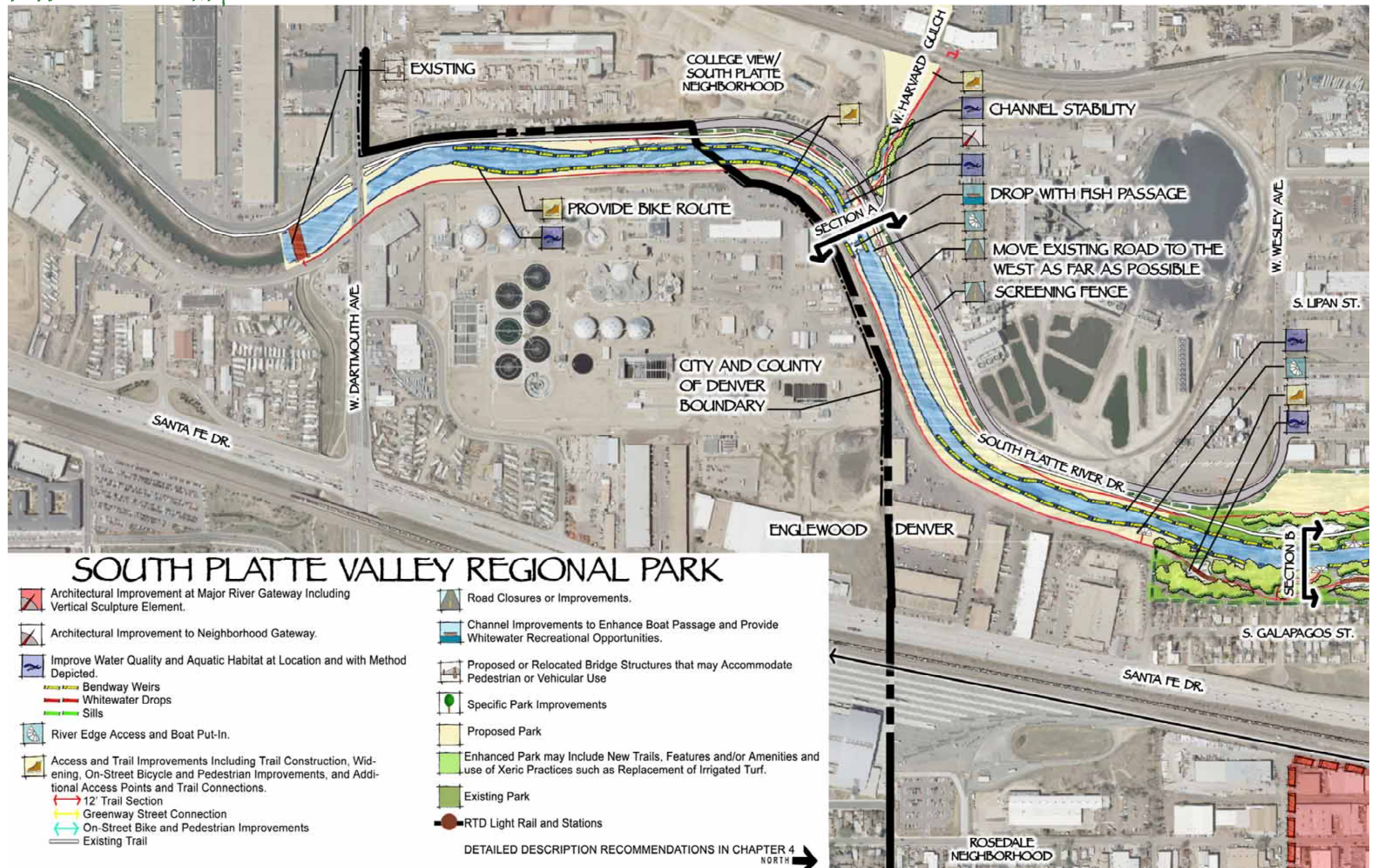
♦ **Safety and Security** – The South Platte River Greenway should be a safe and inviting place for citizens to recreate, exercise and use as an alternative form of transportation.

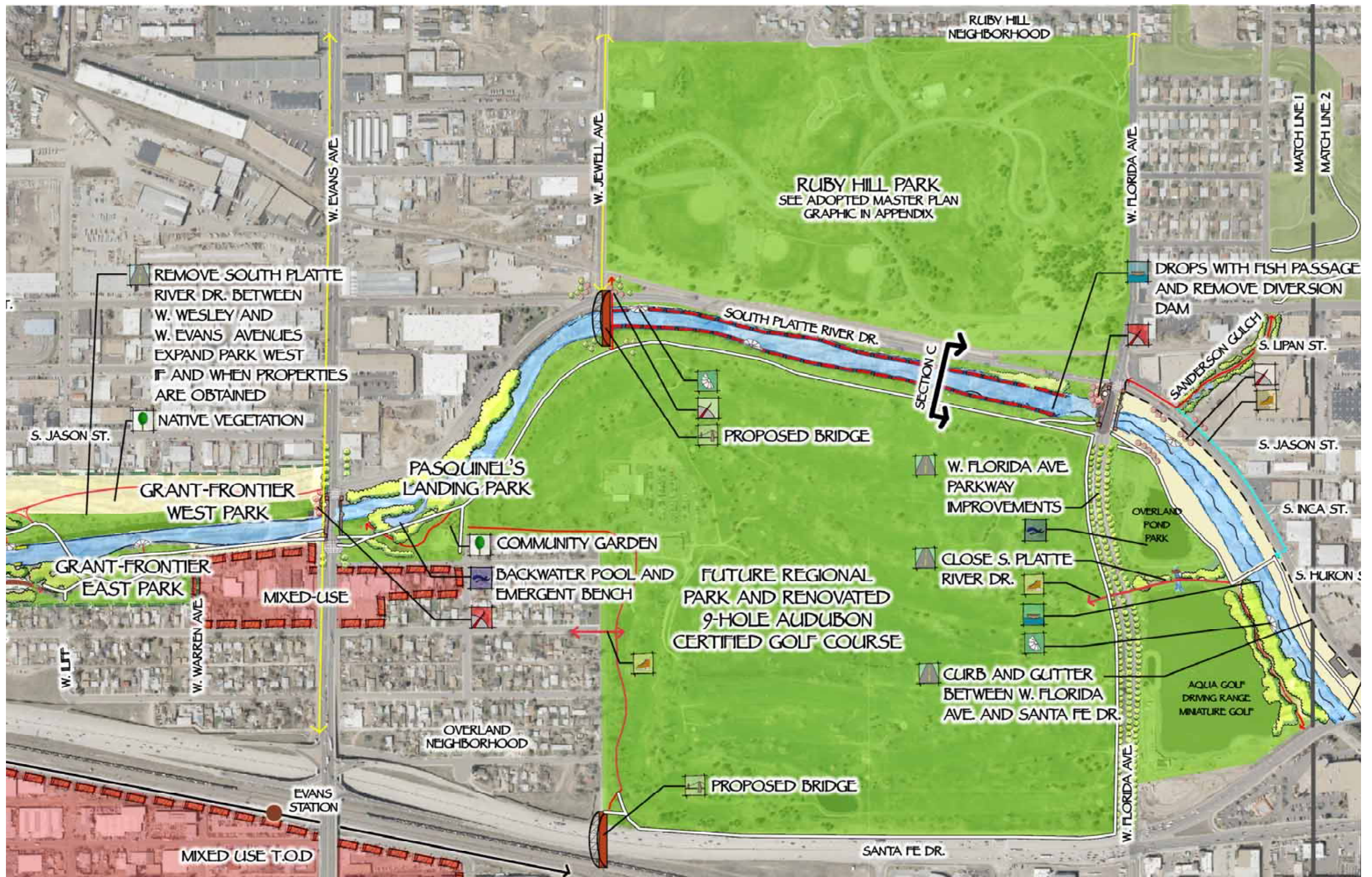
- Increase visibility into and out of the Greenway Corridor by laying back the riverbank slopes and providing night lighting under roadway bridges and railroad underpasses (contingent on consultation with Colorado Division of Wildlife). Consider use of monitored security cameras for areas that are especially isolated.
- Provide multiple opportunities for Greenway users to move in and out of the Greenway corridor, such as the reach between the Santa Fe Drive bridge and Johnson Habitat Park and between Valverde Park and W. 6th Avenue. Ingress and egress points should be clearly marked.
- Work with law enforcement and emergency agencies to develop a safety and security action plan for the South Platte River Greenway.

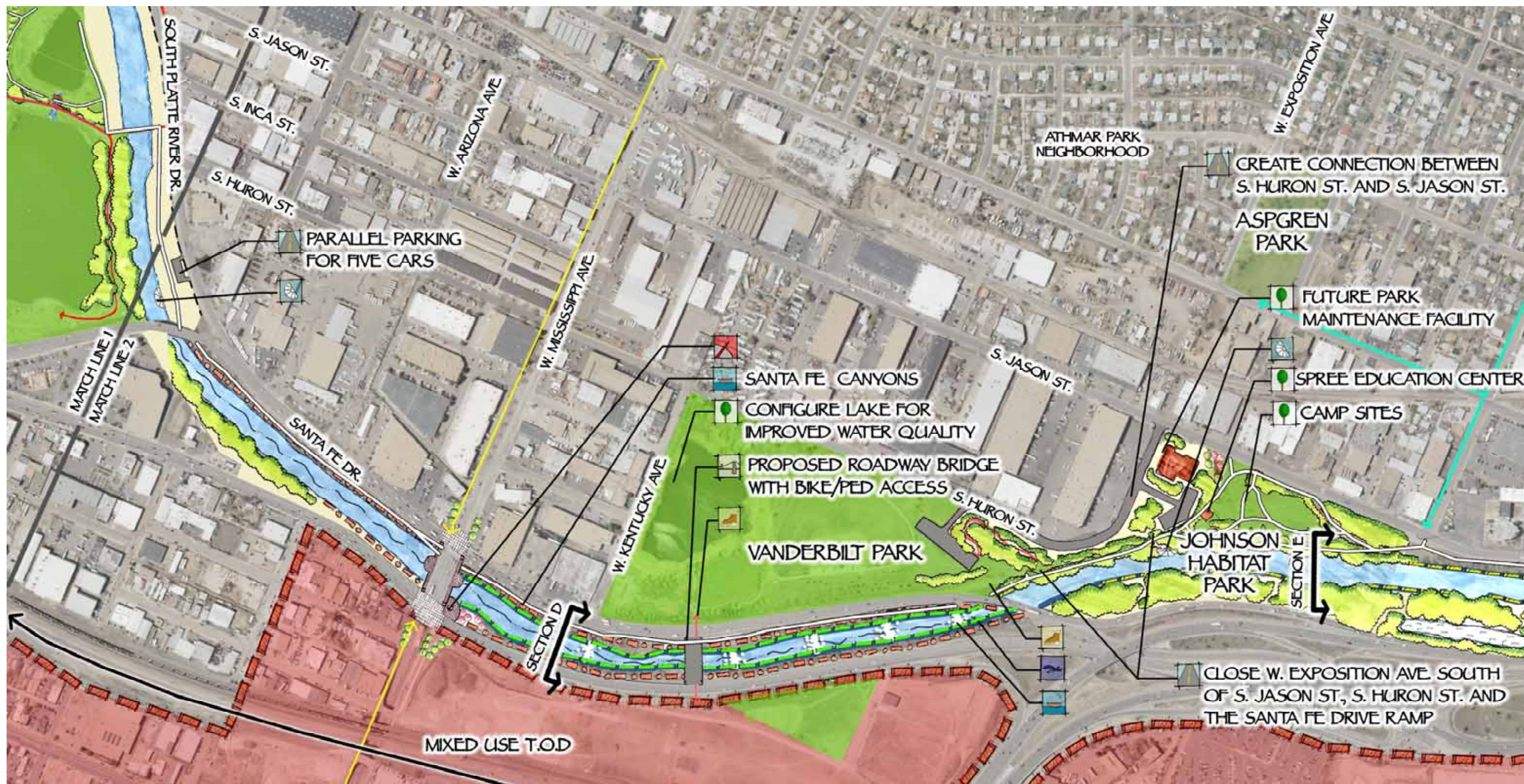
♦ **Implementation Tools** - To improve and preserve the River's health, the City and County of Denver should implement a variety of regulatory measures.

- Establish a South Platte River Greenway Advisory Committee. The Committee would review and advise implementation plan proposals.
- Develop a River Maintenance Memorandum of Agreement between public entities and non-profit organizations addressing the maintenance of the South Platte River within the City and County of Denver.
- Coordinate with non-governmental partners, such as the Greenway Foundation, South Platte River Environmental Education (SPREE), the Trust for Public Land and Protect Urban River Environment (PURE), to adopt and implement recommendations to improve water quality.
- Establish a voluntary conservation easement program for setbacks that preserve lands adjacent to the River and increase vegetation, wildlife habitat and pervious landscapes.

- Explore creating a River setback standard in order to establish a publicly owned River edge along Denver's major urban drainage way; a minimum setback requirement from the top of the bank of at least 100 feet, is recommended. This will ensure adequate space for trail connections and Greenway amenities. All surfaces within this setback should be pervious.
- Establish a parks, recreation and Greenway development fee for land acquisition and construction of new parks and open space projects.
- Support actions to have the City and County of Denver work with conservation organizations such as Trust for Public Land and the Greenway Foundation to explore the possibility of creating an urban land trust.







COMMERCIAL GREENWAY CORRIDOR

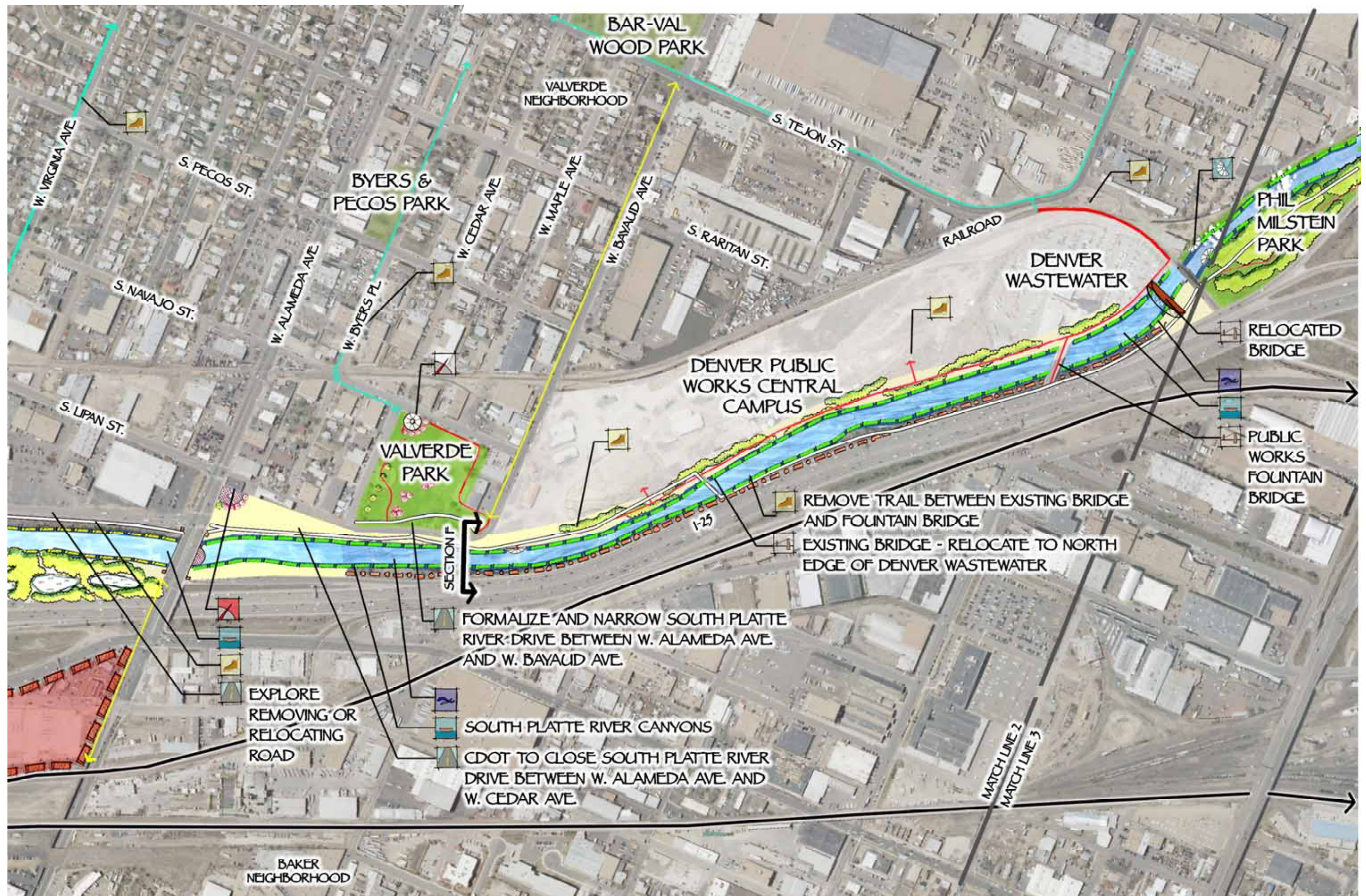
- Architectural Improvement at Major River Gateway Including Vertical Sculpture Element.
- Architectural Improvement to Neighborhood Gateway.
- Improve Water Quality and Aquatic Habitat at location and with Method Depicted.
 - Bendway Weirs
 - Whitewater Drops
 - Sills

- River Edge Access and Boat Put-In.
- Access and Trail Improvements Including Trail Construction, Widening, On-Street Bicycle and Pedestrian Improvements, and Additional Access Points and Trail Connections.
 - 12' Trail Section
 - Greenway Street Connection
 - On-Street Bike and Pedestrian Improvements
 - Existing Trail

- Road Closures or Improvements.
- Channel Improvements to Enhance Boat Passage and Provide Whitewater Recreational Opportunities.
- Proposed or Relocated Bridge Structures that may Accommodate Pedestrian or Vehicular Use
- Specific Park Improvements
- Canyons
DETAILED DESCRIPTION RECOMMENDATIONS IN CHAPTER 4

- Proposed Park
- Enhanced Park may Include New Trails, Features and/or Amenities and Use of Xeric Practices such as Replacement of Irrigated Turf
- Existing Park
- RTD Light Rail and Stations

NORTH

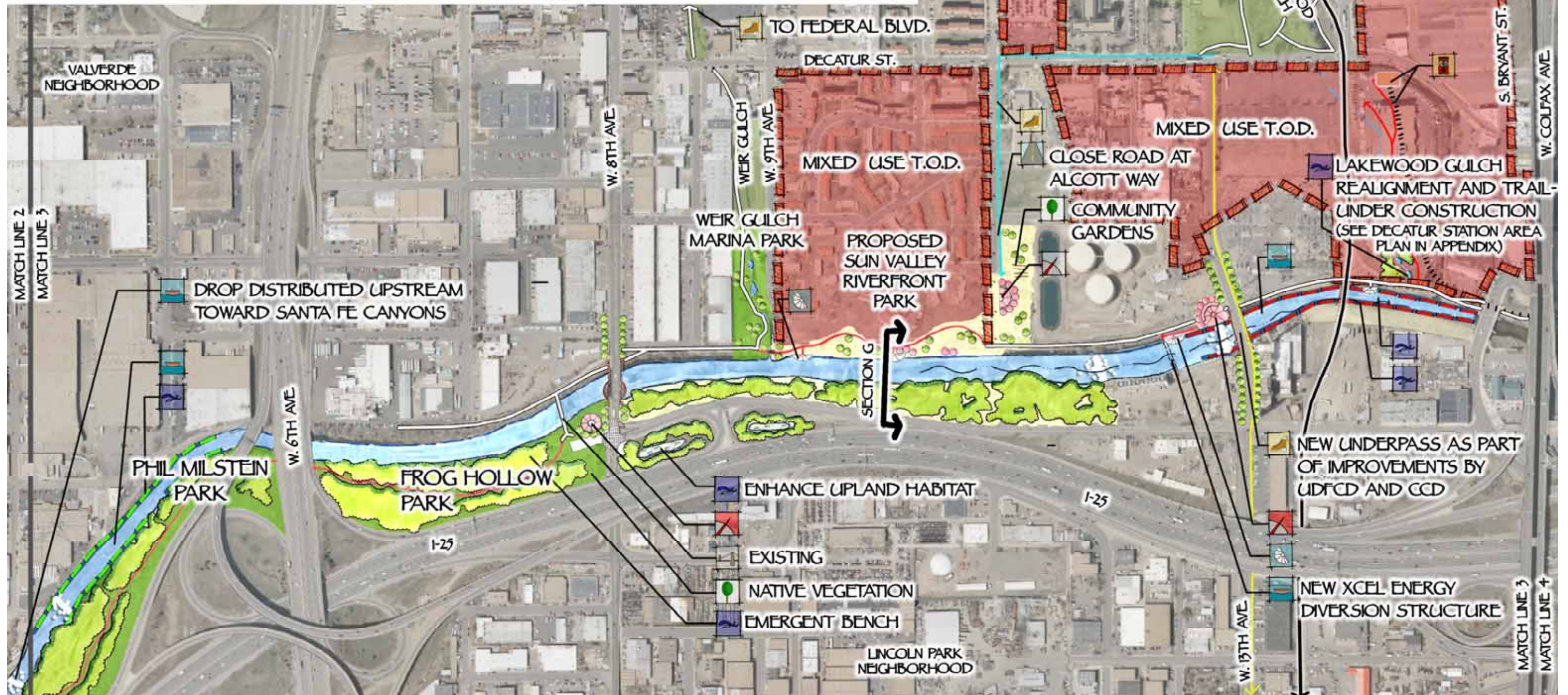


URBAN GREENWAY CORRIDOR

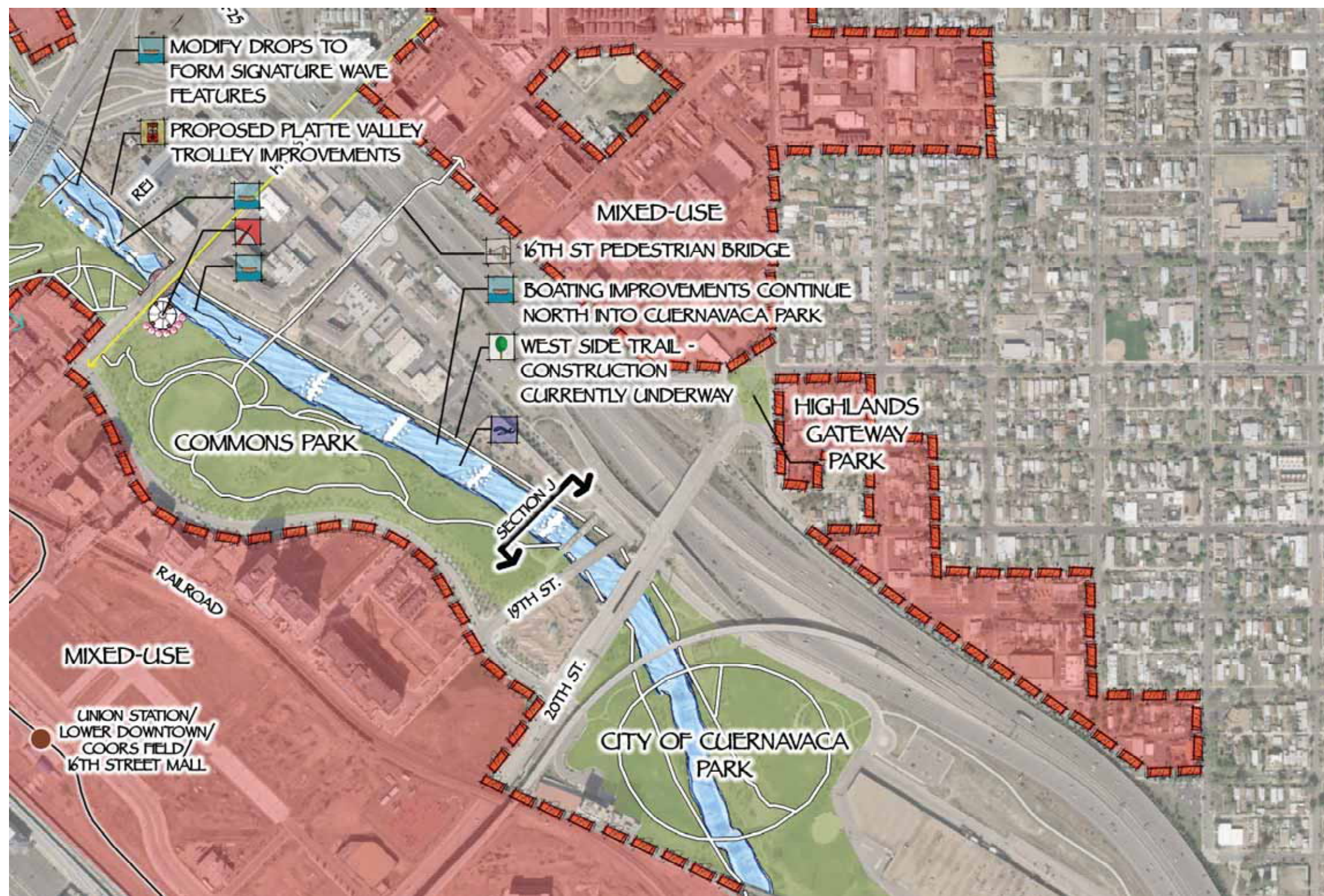
- Architectural Improvement at Major River Gateway Including Vertical Sculpture Element.
 - Architectural Improvement to Neighborhood Gateway.
 - Improve Water Quality and Aquatic Habitat at location and with Method Depicted.
 - Whitewater Drops
 - Sills
 - River Edge Access and Boat Put-In.
 - Rail Access Improvements to Platte Valley Trolley Including New Trolley Line, Station and Car House.
 - Road Closures or Improvements
- DETAILED DESCRIPTION OF RECOMMENDATIONS IN CHAPTER 4

- Access and Trail Improvements Including Trail Construction, Widening, On-Street Bicycle and Pedestrian Improvements, and Additional Access Points and Trail Connections.
 - 12' Trail Section
 - Greenway Street Connection
 - On-Street Bike and Pedestrian Improvements
 - Existing Trail
- Channel Improvements to Enhance Boat Passage and Provide Whitewater Recreational Opportunities.
- Proposed or Relocated Bridge Structures that may Accommodate Pedestrian or Vehicular Use.
- Specific Park Improvements.
- RTD Light Rail and Stations

- Proposed Park
- Enhanced Park may Include New Trails, Features and/or Amenities and use of Xeric Practices such as Replacement of Irrigated Turf.
- Existing Park

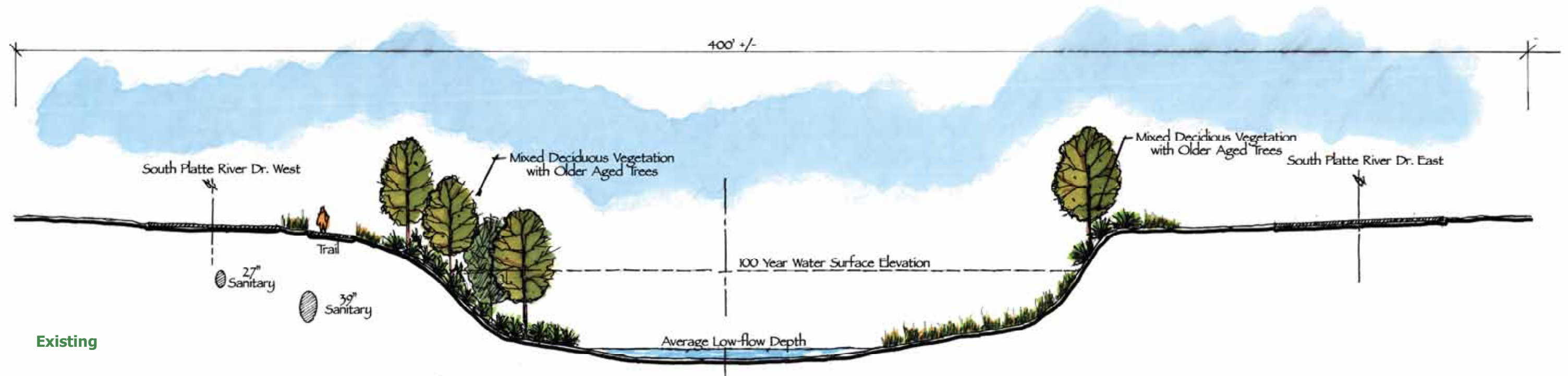




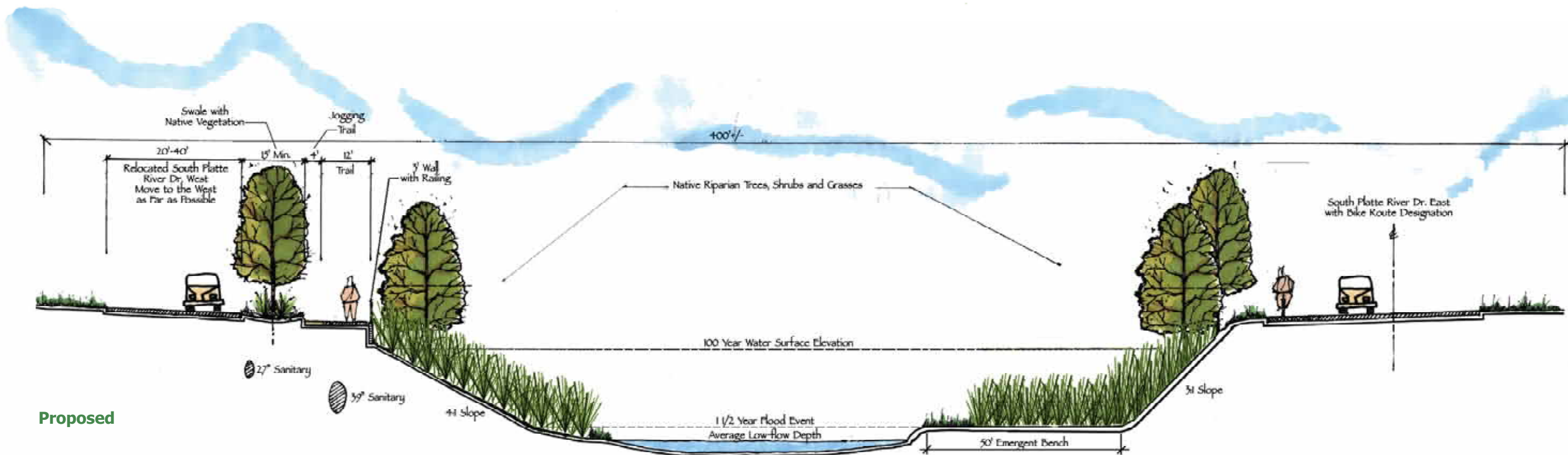


G. Typical Sections

Section A - North of W. Harvard Gulch



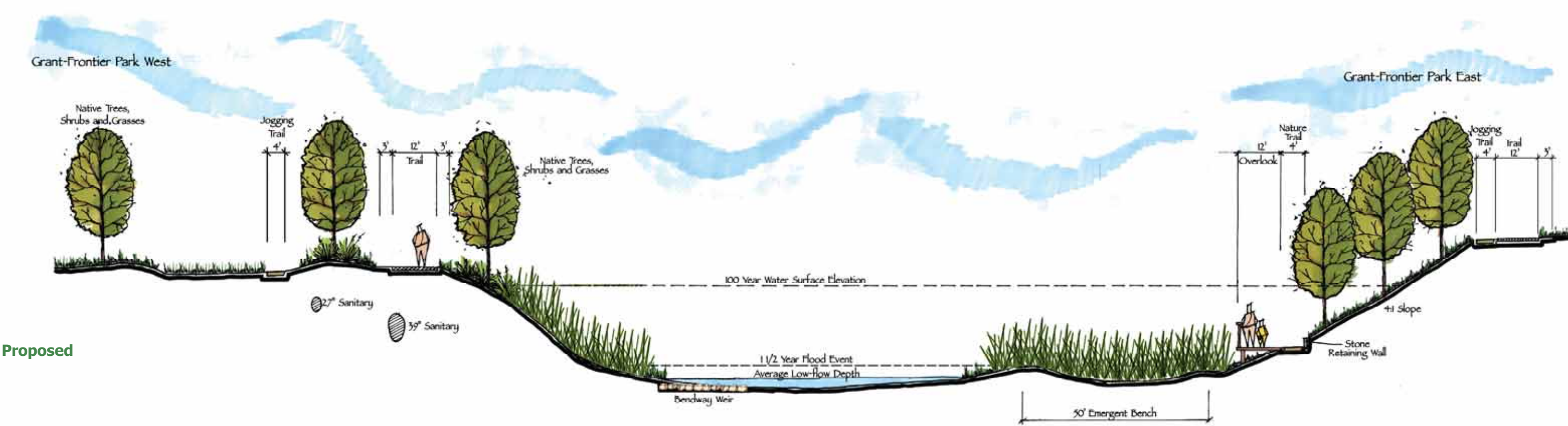
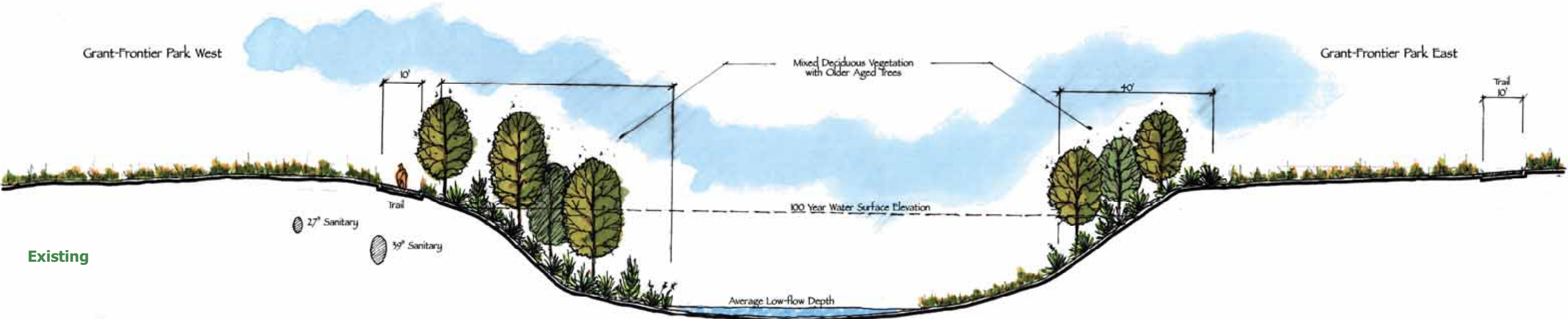
Existing



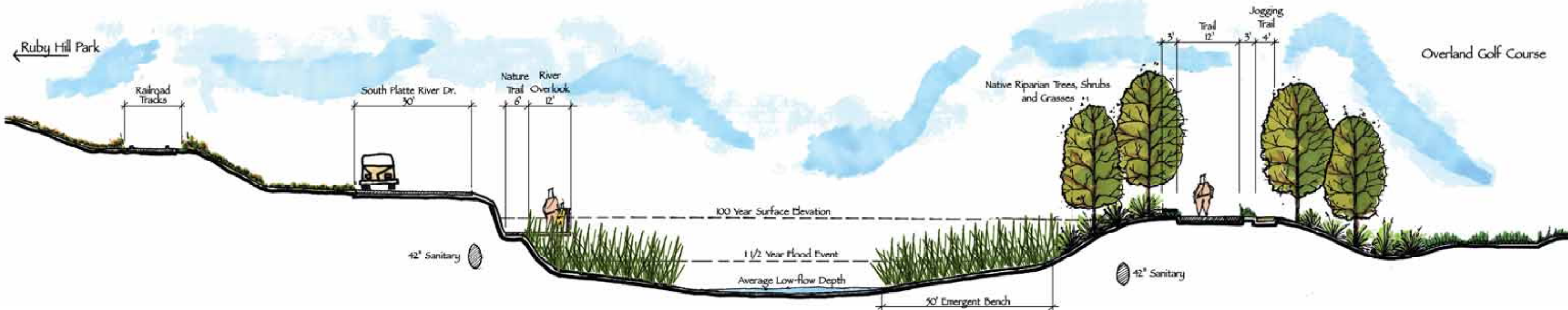
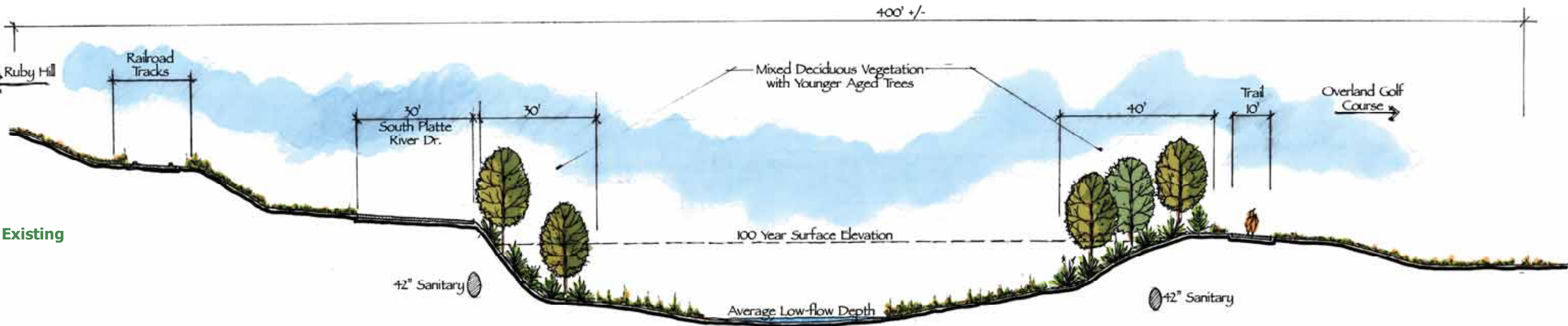
Proposed

G. Typical Sections - Continued

Section B - Grant-Frontier Park

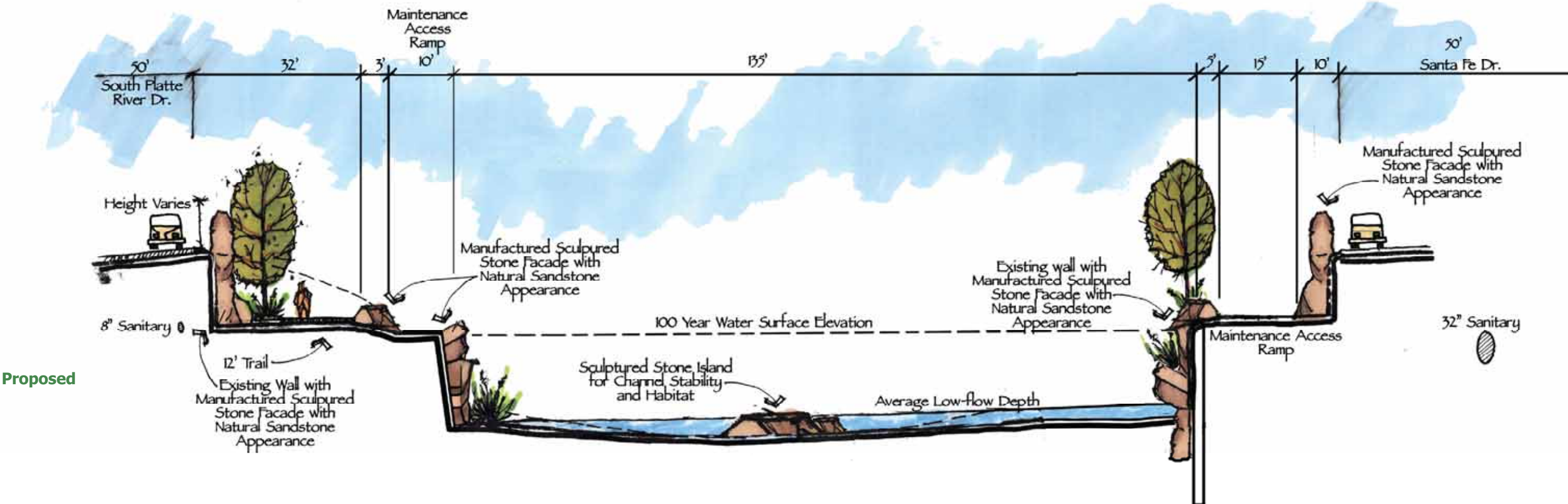
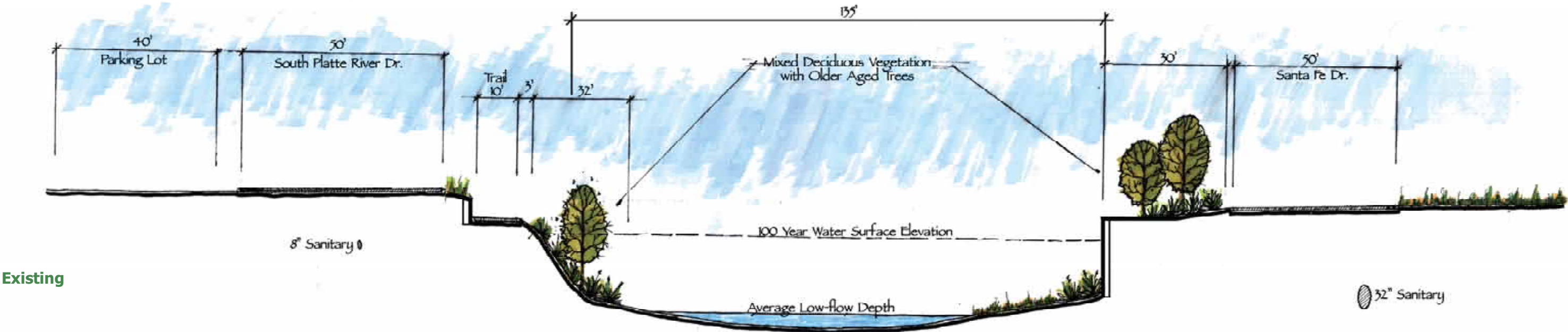


Section C - Ruby Hill Park and Overland Golf Course

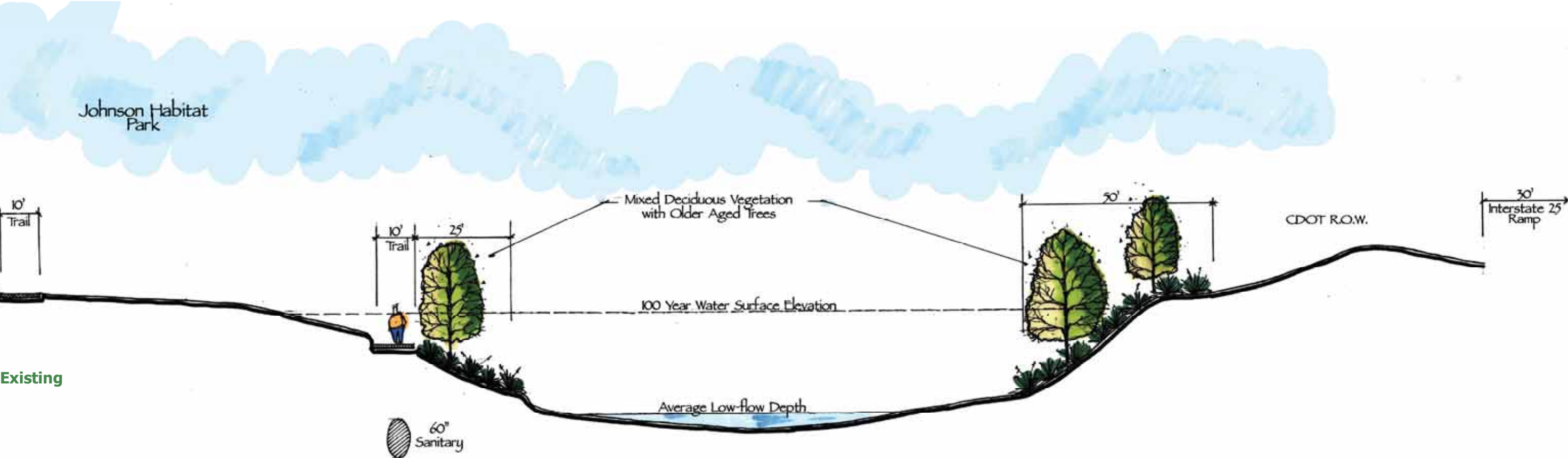


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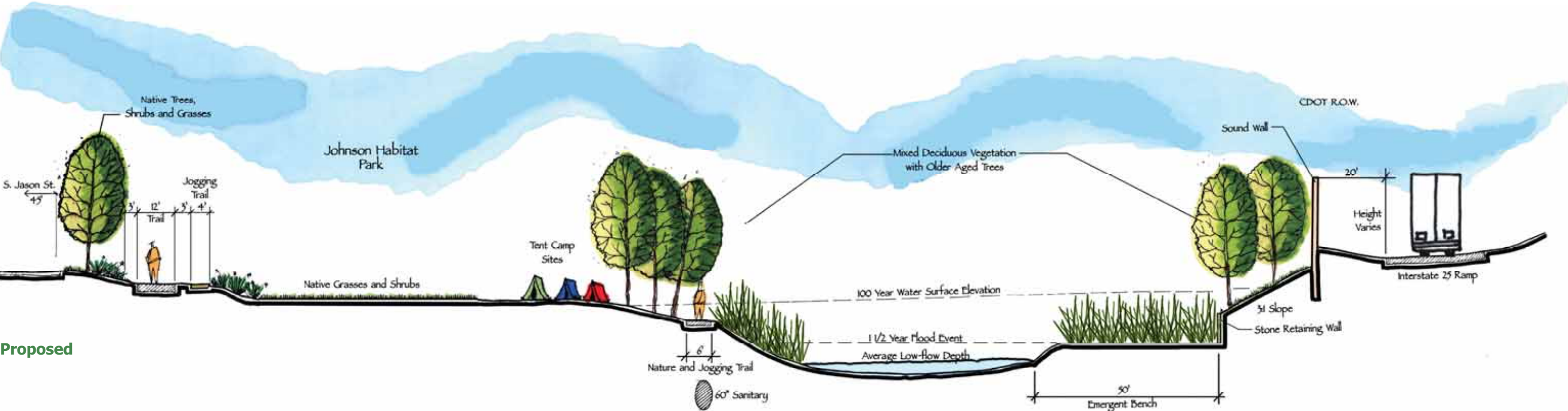
Section D - W. Kentucky Ave: South Platte River Canyons



Section E - Johnson Habitat Park



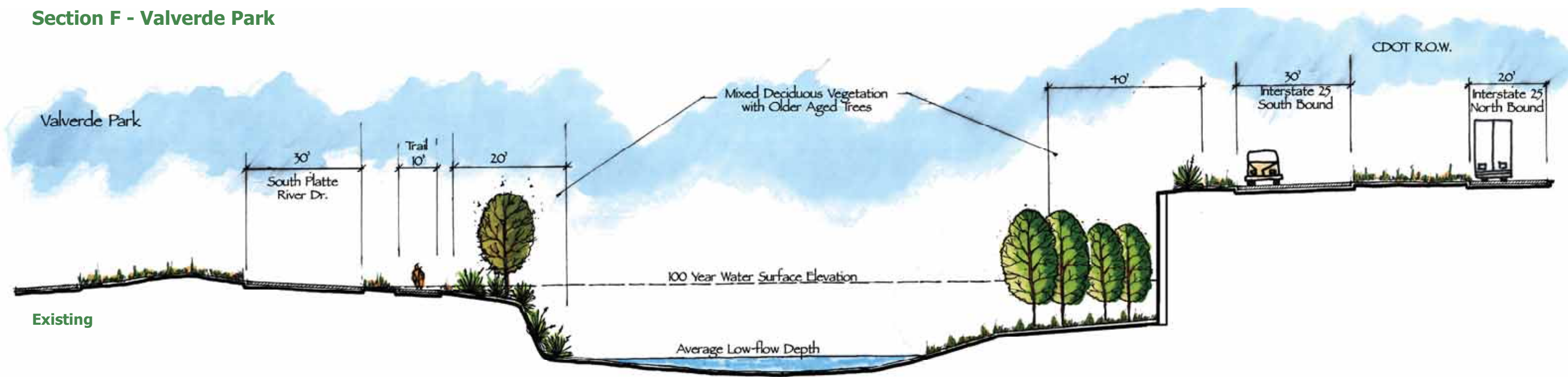
Existing



Proposed

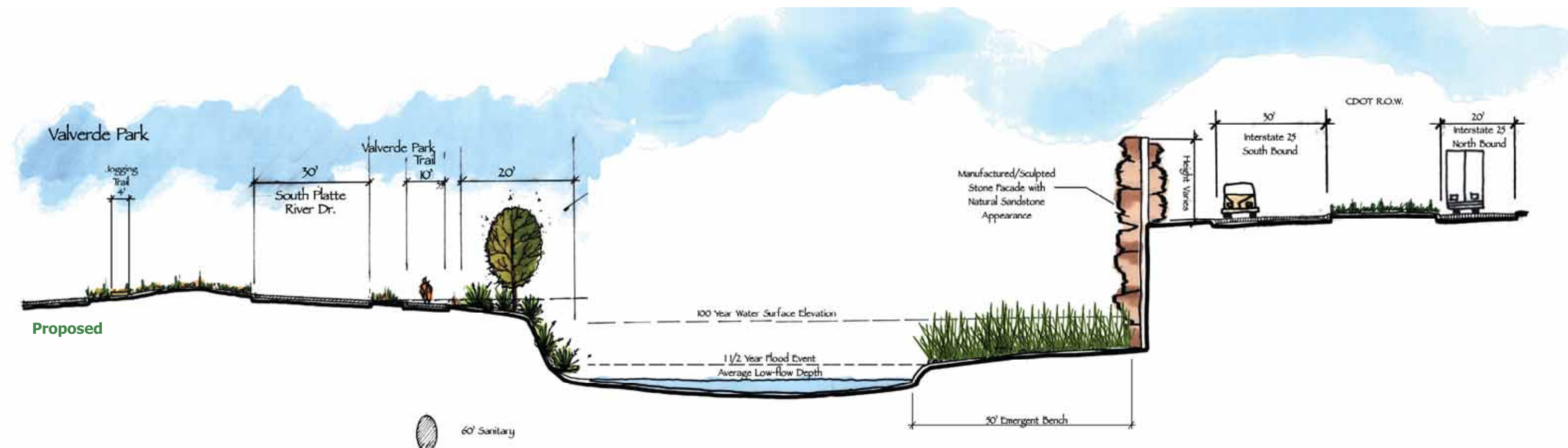
G. Typical Sections - Continued

Section F - Valverde Park



Existing

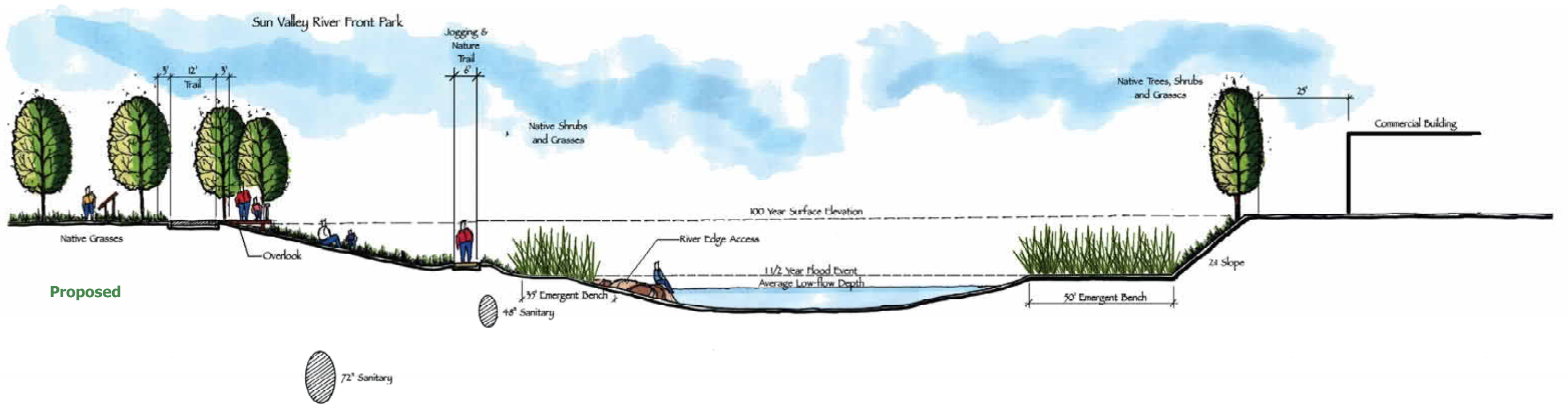
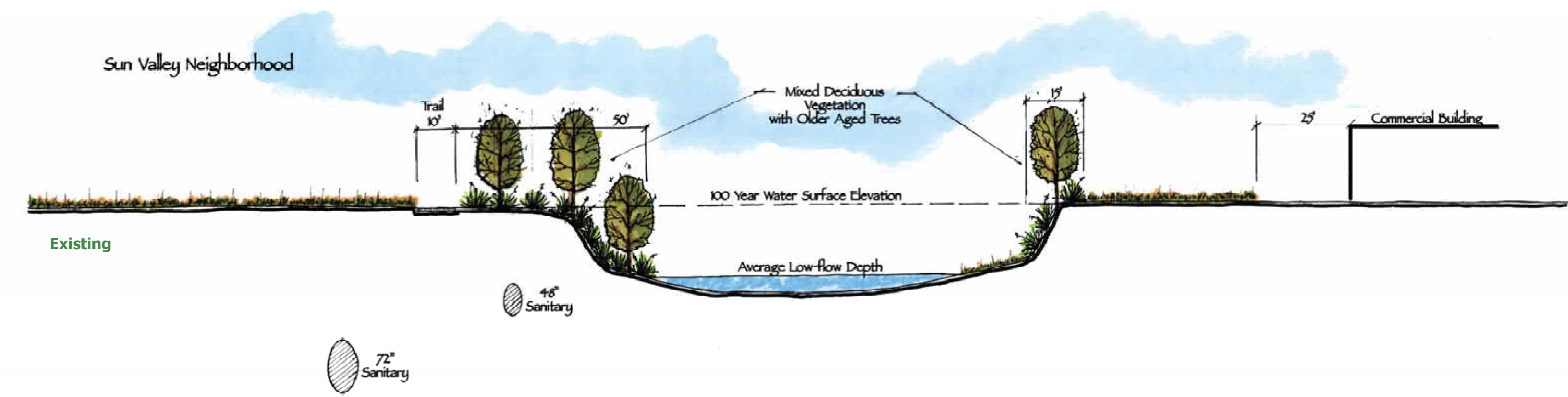
60' Sanitary



Proposed

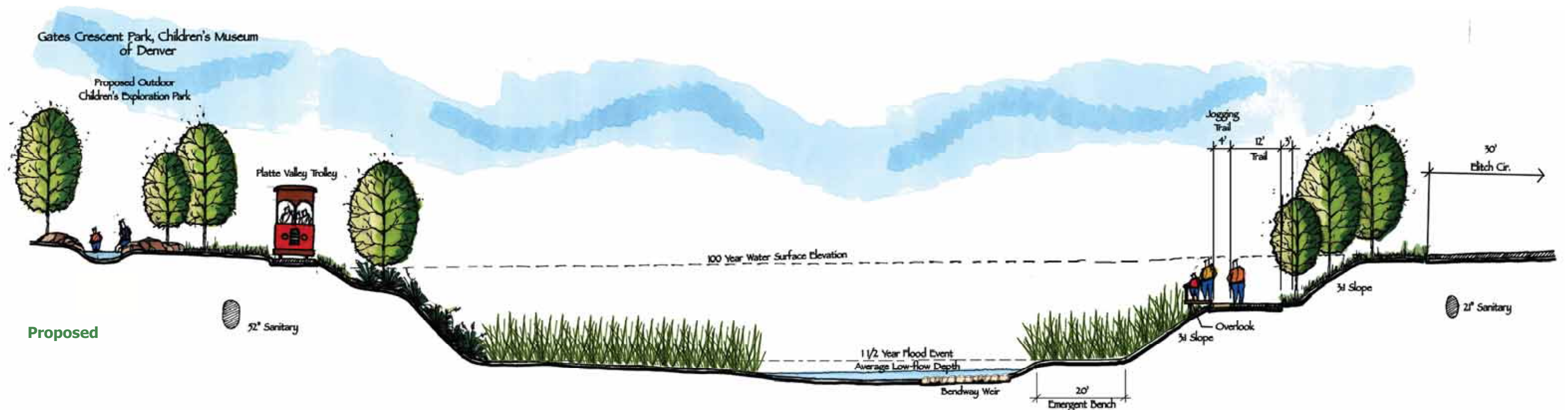
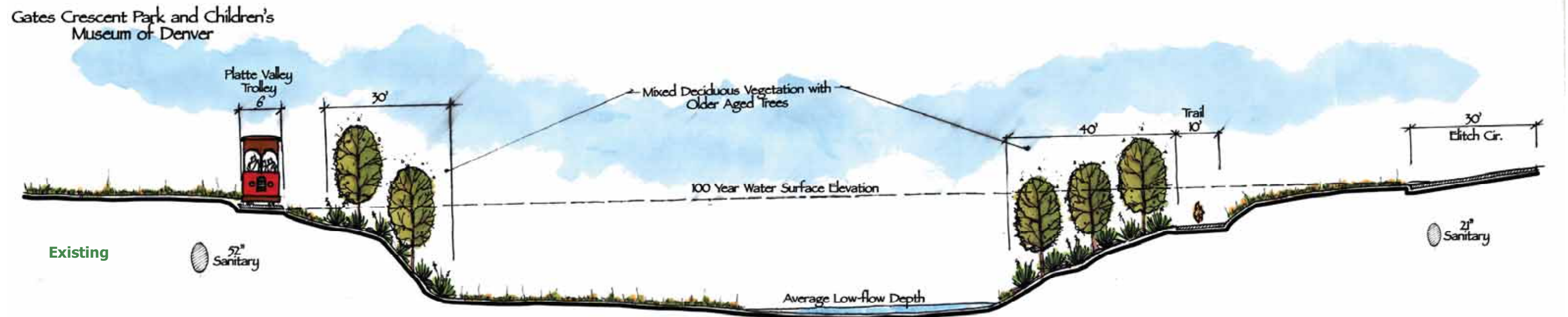
60' Sanitary

Section G - Sun Valley Neighborhood

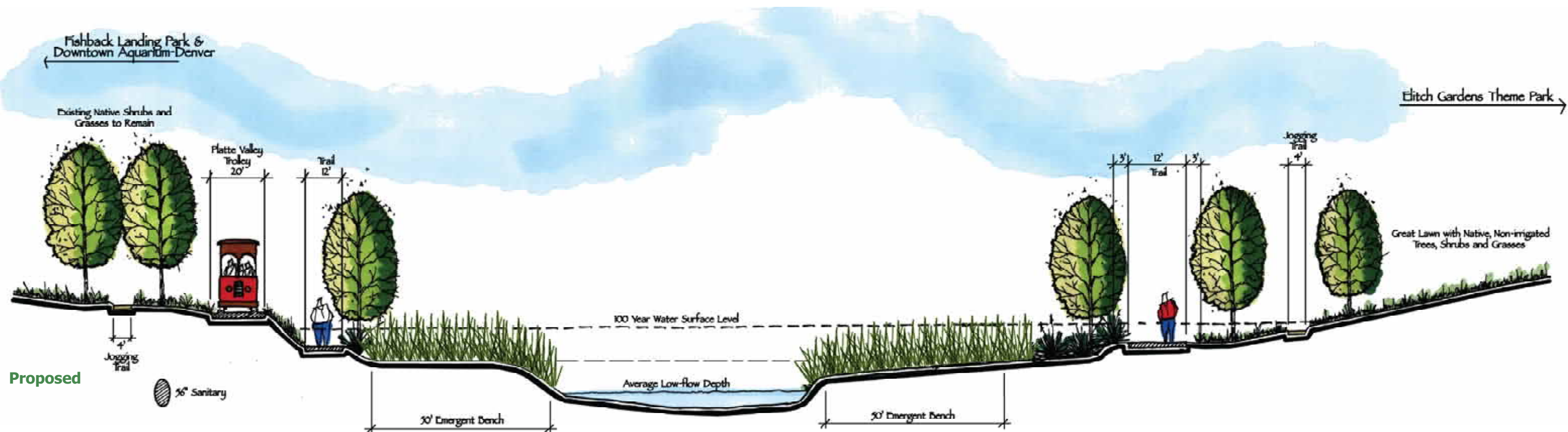
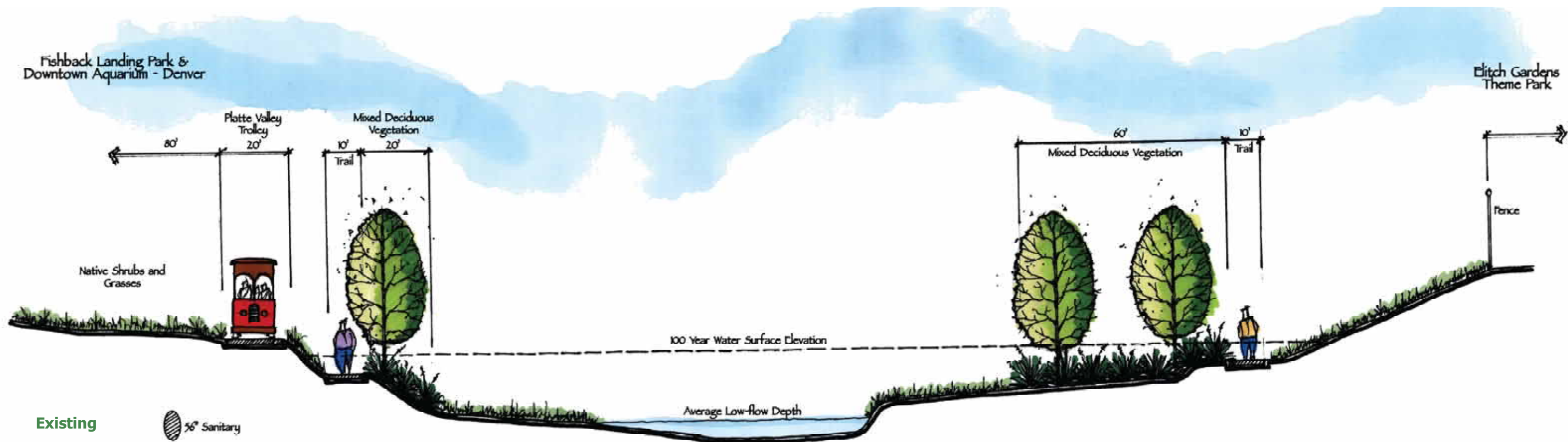


G. Typical Sections - Continued

Section H - Gates Crescent Park

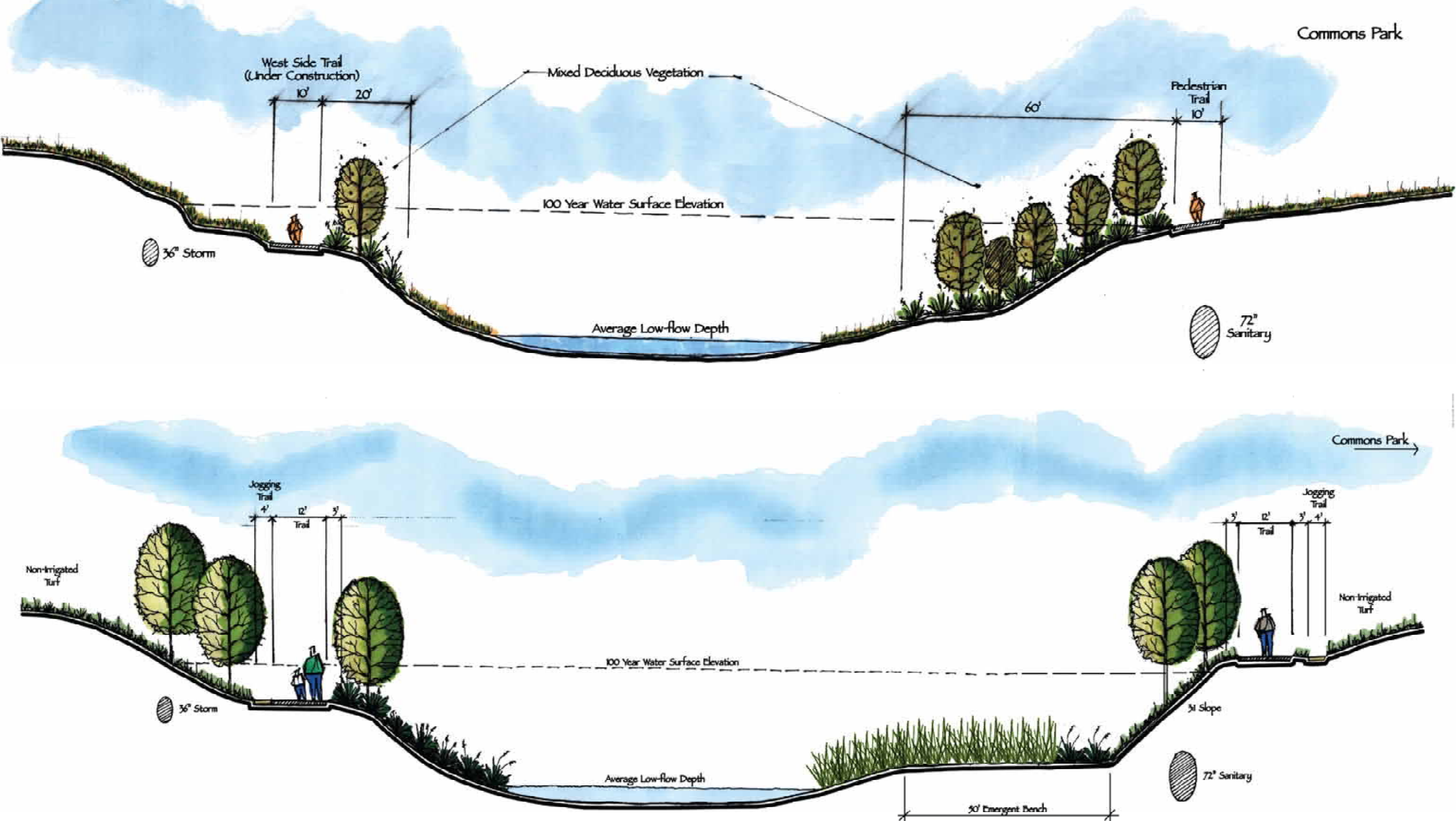


Section I - Fishback Landing Park and Elitch Gardens Theme Park



G. Typical Sections - Continued

Section J - Commons Park



Chapter 2: The Process

A. Acknowledgements

City and County of Denver

John Hickenlooper – Mayor of Denver

Denver City Council

Jeanne Robb - Council President – District 10

Rick Garcia – District 1

Jeanne Faatz – District 2

Paul Lopez – District 3

Peggy Lehmann – District 4

Marcia Johnson – District 5

Charlie Brown – District 6

Chris Nevitt – District 7

Carla Madison – District 8

Judy Montero – District 9

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River South Greenway Master Plan Funding Partners

The Greenway Foundation

Colorado Water Conservation Board

Urban Drainage and Flood Control District

Denver Public Works

Denver Water

Denver Parks and Recreation

River South Greenway Master Plan Steering Committee

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The Trust for Public Land

Land Acquisition Issues

Wade Shelton

Stakeholders

This Plan would not have been possible without the involvement, engagement and vision of numerous stakeholders within and outside of the RISO area. A list of stakeholders who attended and participated in the public meetings is contained in the Appendix of this master plan, along with a record of numerous interactions with staff and consultants.

A Special Thank You

We extend our gratitude to the staffs of Mile High Station and Overland Golf Course for hosting public outreach meetings on July 27 and September 9, 2009, respectively.

B. The Planning Process

The River South (RISO) Greenway Master Plan was launched as a follow up to the 2008-2009 River North (RINO) Greenway Master Plan. The RISO Plan involved a coordinated effort between the Greenway Foundation, Colorado Water Conservation Board, Urban Drainage and Flood Control District, Denver Public Works, Denver Parks and Recreation and Denver Water.

At the project's inception, the Greenway Foundation assembled a team of professionals to manage the planning process for the RISO Plan. To ensure citizen and expert participation in the planning process, the planning team headed efforts to assemble and manage a multi-discipline Steering Committee and to solicit and document participation and input from landowners, residents, community organizations, businesses, schools and area service providers throughout the planning process.

Synergy with the River North Master Plan

The overarching goal of the RINO and RISO Plans is to produce separate master plans, complementary to one another, that will aid in the development of a single implementation and priority-setting document to be prepared with help of a planning grant awarded by Great Outdoors Colorado (GOCO) in June 2009. In addition, the RISO Plan has a synergistic relationship with the Colorado Water Conservation Board (CWCB) Metro Basin Roundtable in that this reach of the South Platte River was identified as having high recreational values associated with it.

With this synergy in mind, the RISO planning team closely mirrored the RINO planning process. The planning team began its efforts with the thorough review and adoption of the RINO Plan's mission, vision, project goals, objectives and planning principles. These plan elements were further refined and expanded to reflect the intentions of the RISO Master Plan with the input of the RISO Steering Committee members, stakeholders and citizens.



Review of Existing Plans and Conditions

The RISO Greenway Master Plan is the first comprehensive examination of this section of the South Platte River to be undertaken since the 1980s. Given the length of time since the last comprehensive look into the corridor and in order to evaluate and document existing conditions, planners hosted a bus tour of the entire RISO section in May 2009. Following the bus tour and the collection of expert input from Steering Committee members, the team created maps showing existing conditions of the RISO Corridor as of summer 2009.

A thorough review of completed and current planning efforts, along with numerous site visits and discussions with various City agencies, stakeholders and citizens also contributed to the team's understanding of existing conditions. Completed master plans for Ruby Hill Park, Overland Golf Course, Vanderbilt Park, Valverde Park, the Denver Public Works Central Campus and Decatur Station Area Plan were studied. Future Decatur RTD West Corridor Light Rail station and drainage-way improvement plans for Lakewood Gulch and the South Platte River were closely examined as part of this effort.

Further analysis of existing conditions uncovered specific issues and challenges that need to be addressed to solidify project goals. A more detailed discussion of existing conditions, analysis, recommendations and implementation follows in Chapters 3 and 4.

Team Activities

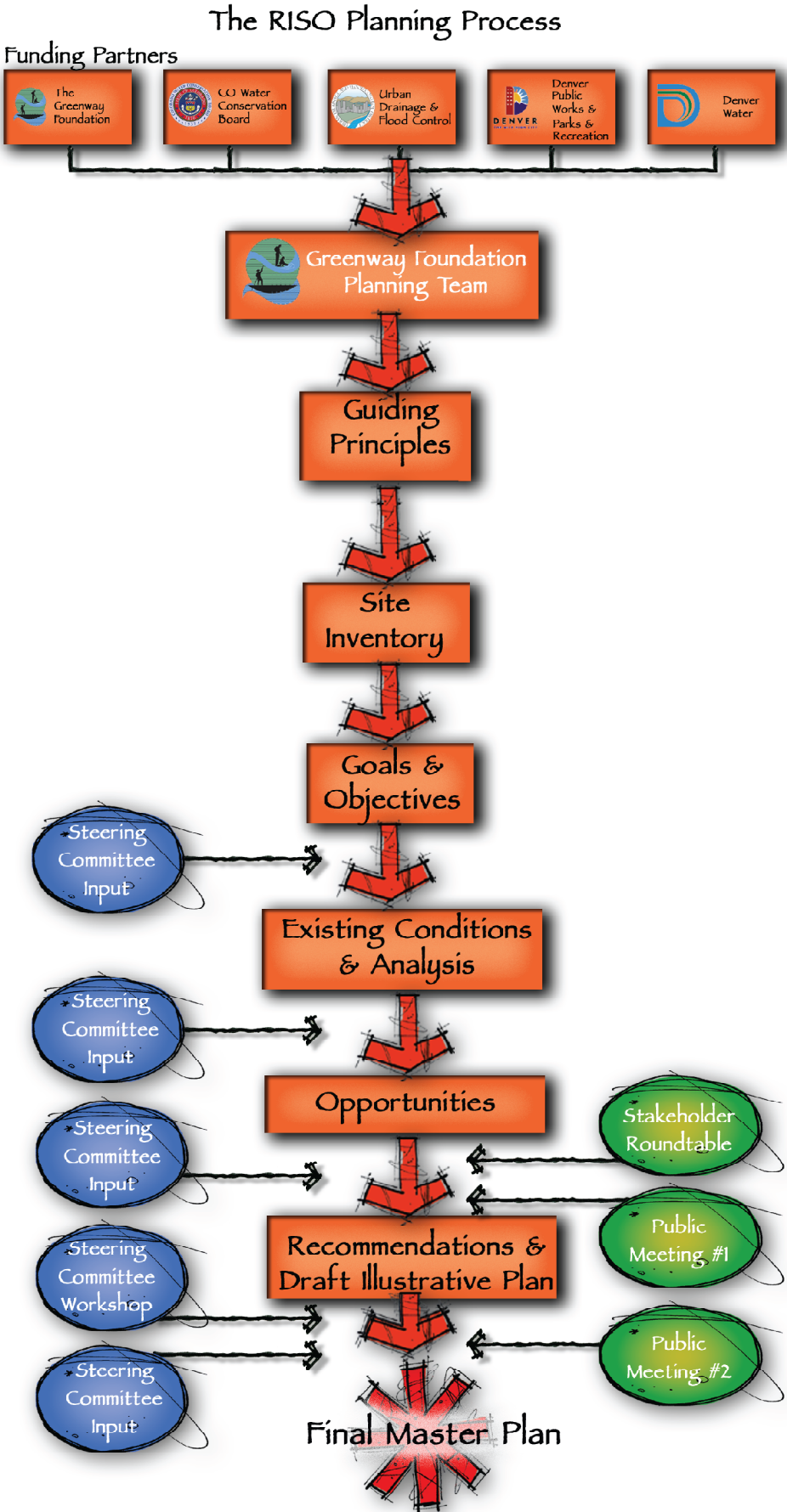
The Planning Team met semi-monthly and held monthly Steering Committee meetings to explore issues and options for the RISO Plan. These meetings helped to guide the planning process and to aid planners in further comprehending and defining existing conditions within the RISO Corridor. At the outset, Steering Committee members were invited to join the planning team in touring the RISO area and in rafting and kayaking the River to experience the RISO project area first-hand.

Steering Committee members reviewed completed and ongoing plans for adjacent areas and related issues throughout the process and participated in issue-specific workshops as necessary. Plans examined by the Steering Committee include park plans, an inventory of natural areas and Denver's waterway acreage, Blueprint Denver, neighborhood plans for areas adjacent to the River, light rail and bicycle plans and existing ordinances and engineering studies.

Public and Stakeholder Outreach

Public and stakeholder outreach was an integral part of the planning process from inception to completion.

More than 300 parcels of land exist within 200 feet of the River in the 7-mile-long RISO reach, and land uses along the RISO corridor include a mix of industrial, rail yards, schools, highways, parks and residential areas. There is also a mix of private and public property ownership within the corridor. More than 160 private property owners were contacted and invited to participate in the planning process.



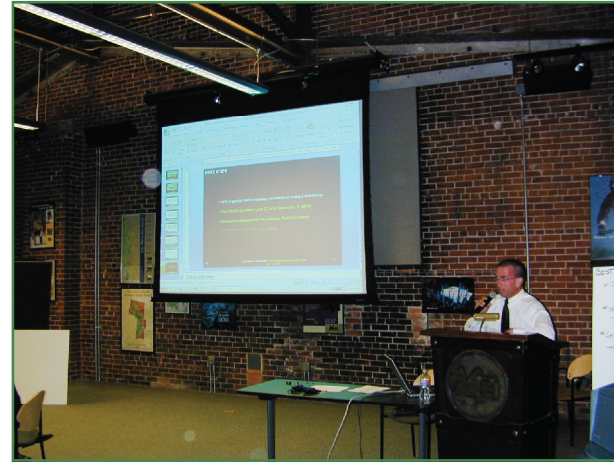


Two public meetings were held to solicit general public input as well as specific input on the base maps for the four sections of the RISO Corridor. The first public meeting was held on July 27, 2009, and the second on September 9, 2009. Participants in these meetings expressed a desire for water recreation opportunities, including kayaking and whitewater rafting, along with natural parkland areas as opposed to irrigated, trimmed parks. Water quality and conservation were also raised as public concerns. A record of all comments was assembled for each of these meetings; it appears in the "Summary of Public Input" in the Appendix to this plan.

Agency Coordination

Agency coordination was key to the development of many elements and partnerships within the RISO Greenway Master Plan. Members of the planning team along with representatives of state and local government agencies gathered for a workshop held at the Colorado Department of Transportation, Region 6, to explore possible cooperation with regard to open space and highway right-of-way in planned highway improvements considered for the section of I-25 running parallel to the South Platte River.

Also, close coordination with Urban Drainage and Flood Control District, U. S. Army Corps of Engineers, Denver Parks and Recreation and others helped to frame current studies as well as recent and current River projects. Beginning in the fall of 2009, the UDFCD and City and County of Denver Fastracks Drainage project will remove a significant portion of land from the floodplain and make dramatic improvements in River flow in the reach that includes Lakewood Gulch. It will also make way for the RTD West Corridor Light Rail line (under construction).



C. Objectives

Objectives were developed early in the process with extensive input from the Steering Committee, stakeholders and the public. The objectives are based on the mission and goals set forth in Chapter 1.

The objectives are grouped into three main areas of emphasis: healthy, habitable and connected.

Healthy

Use man-made and natural systems to:

- Improve aquatic habitat and riparian vegetation
- Develop an adaptive management trash strategy for the River
- Improve water quality for a swimmable River
- Reduce water consumption and water pollution through the reduction of irrigated turf grasses
- Capture stormwater and improve the quality of stormwater drainage
- Create and enhance natural beauty
- Identify appropriate passive and active recreation opportunities
- Identify appropriate open space opportunities
- Work with the CWCB Metro Basin Roundtable and other stakeholder groups to achieve these stated objectives

Habitable

Use the revitalized River ecosystem and adjacent open space to:

- Encourage active and passive recreation with the River

- Improve water quality for safe, swimmable, human contact
- Enhance sense of community and heritage
- Encourage learning and respect for the environment
- Stabilize the channel and reduce flood risks
- Create ecological buffers between development and the River
- Improve the quality of human life and wildlife
- Support appropriate riverside and neighborhood development

Connected

Create integral links between:

- People and the River
- Natural and developed open space along the River corridor
- Riverside developments, open space and the River
- People and Denver's outdoor heritage
- Denver residents and visitors
- Denver's past, present and future

D. Planning Principles

The following planning principles were developed to guide future planning and design decisions to realize the objective of a healthy, habitable and connected River:

- New open space, whether natural or developed, shall enhance the quality of both the natural systems of the River and the human activities of its users.
- Interventions taken upon the River and its bed and banks shall emphasize the connection of surrounding ecosystems, development and neighborhoods.
- Development along the River shall respect and enhance the River ecosystem and encourage appropriate human activities that sustain the overall health of the River.
- Development in the River Corridor shall incorporate and enhance Denver's cultural heritage and sense of community for neighborhoods adjacent to the River.

E. Next Steps

- Work to combine the River North and River South Greenway Master Plans using the Great Outdoors Colorado (GOCO) planning grant, with additional funding from the City and County of Denver and the Greenway Foundation. The GOCO grant was awarded in June, 2009.
- Build an implementation matrix showing all of the recommendations of this plan. Additions to this matrix will come as a result of the GOCO planning grant process.
- Identify five high-priority projects (through the GOCO planning grant process) and begin to implement those projects.

Chapter 3: Existing Conditions and Opportunities

According to Blueprint Denver, the River corridor to the south of Colfax Avenue has yet to receive the same level of planning and investment as Commons Park in the Central Platte Valley and Northside Park in Globeville. "While maintaining viable industrial and employment areas along the River, there are opportunities to improve certain segments as amenities for Southwest Denver, improve flood control, connect parks and trails across the River, and build new neighborhoods."

A. River South Greenway Identity

The area of the South Platte River within the RISO Greenway Master Plan is dominated by commercial and light industrial enterprises, a major sewage treatment plant, two electric power generation plants, roadways and the railroad. Each of these uses has encroached on the South Platte River, resulting in

the channelization and narrowing of the riverbanks, removal of the natural sinuosity and native vegetation of the River and increased sedimentation and decreased water quality due to urban runoff. Currently, the South Platte River would best be described as unnatural and industrial in character.

Several residential subdivisions exist immediately adjacent to the River. Physical barriers, such as commercial and industrial areas, roadways and the railroads, disconnect the River from these neighborhoods, both physically and culturally. Persons entering Denver from the south along the River will observe an area that is commercial and industrial in nature. The major open space and recreation area within the RISO reach is located between W. Evans Avenue and W. Florida Avenue and includes Grant-Frontier Park, Overland Golf Course, Pasquinel's Landing Park, Ruby Hill Park, Overland Pond Park and



Park and open space lands located adjacent to the River dramatically improve the quality of the Greenway user experience.

the Aqua Golf pond and miniature golf area. Because open space is concentrated within this area, the River's natural appearance and identity is in contrast with the surrounding commercial and industrial areas. A summary of existing conditions that impact the River's identity include:

- Physical barriers such as roadways and railroads inhibit the physical connectivity of neighborhoods and their cultural identities with the River.
- Commercial and light industrial use, as well as highways and railroads, dominate the visual character of the corridor.
- The River is unnatural in character and function, exemplified by a narrow corridor with steep slopes and straightened alignment (channelized River corridor), poor water quality and diminished wildlife habitat.

- The natural state of the South Platte River has been eroded in places. Some current uses do not take advantage of the proximity to the River and diminish the enjoyment of this open space.
- Current zoning does not allow some appropriate uses such as increased open space and mixed-use residential, but allows other inappropriate uses such as industrial, and does not provide appropriate design standards for new development.

Historically, this reach of the South Platte River was the site of a tent city and placer gold was mined up and down the South Platte River and its tributaries. Montana City, established in 1858, was the first American town built in this part of the Pikes Peak mining region. It was located where Grant-Frontier Park sits today. A successful potato farmer originally homesteaded the Overland Golf Course site. Overland Golf Course originally opened as a nine-hole golf



Most of the RISO Greenway Corridor is bordered by commercial and light industrial development as depicted in this birds-eye photo of the River.

course in the early 1890s. A horse race track also opened during this period. Later an automobile race track and a motorcycle race track were built on the site. During World War I, Camp Baldwin (a Colorado National Guard Camp) replaced the racetracks and golf course. After closure of Camp Baldwin, Overland Golf Course was reestablished. By 1957, Overland Golf Course became an 18-hole golf course. It has the distinction of being Colorado's oldest golf course.

B. Existing Land Use and Ownership

Land ownership patterns along the RISO Greenway Corridor reveal a mixture of public and private ownership. Approximately 312 parcels of land touch the banks of the River (see General Types of Property Ownership, page 41). Of that number, approximately one-third are publicly owned. Railroads occupy almost seven percent of the total land ownership and utilities just under four percent. Corporations and individuals represent more than half of the ownership.

Industry is the predominant land use within a quarter-mile on either side of the South Platte River. Other major land uses found in the River Corridor include residential use at 24 percent, commercial and office activities at 12 percent and land vacancy at 10 percent. The remainder of use is devoted to parks, open space, parking, other public uses and utilities.

Because of existing land uses, the meandering pattern common to river systems has been replaced by urban encroachment, resulting in a narrow corridor that does not exhibit the amount or quality of wildlife habitat that is typical of a natural river ecosystem.

The South Platte River acts as a barrier between the neighborhoods within the RISO Greenway. The long standing industrial development and transportation infrastructure along the River further separates adjacent residential areas. New and vital neighborhoods are envisioned for areas surrounding RTD transit stations in the area, many of which have an opportunity to connect to the River and to the envisioned recreational amenities. As redevelopment continues as an outgrowth of the Central Platte Valley, the River can serve as a focus for new and vital neighborhoods.



South Platte River through metro Denver has been realigned into a more straightened channel.

Current and future development is increasing the demand for parks, open space, trails and recreation amenities along the RISO Greenway. Significant potential impacts to the River's water quality from future, high-density development are anticipated. The type and character of new developments allowed in the RISO reach of the South Platte River will have a profound impact on the identity of the RISO Greenway and its image as a southern gateway into Denver.

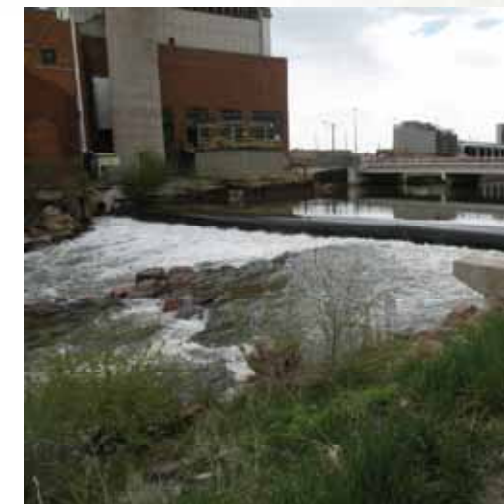
C. Existing River Health

The South Platte River as it flows through metropolitan Denver is categorized as an urban River. The channel has been straightened and realigned. The River is narrow and relatively deep, and there are a few exposed gravel and sand bars during average flow conditions. The banks are stabilized to prevent lateral channel migration and the floodplain is developed.

The River has been channelized and deepened through most of the Denver reach to minimize the floodplain. This allows more land to be developed and reduces the amount of riparian vegetation and habitat. Existing urban channelization has negatively impacted ecosystems by compromising the structural diversity of the stream bed, which leaves steep, narrow banks that provide limited support for terrestrial or aquatic vegetation and wildlife. Currently, the River's flow regime is highly regulated due to operations in three upstream flood control and water supply reservoirs - Chatfield, Cherry Creek and Bear Creek. Low-flow rates have a critical impact on habitat because they may not sufficiently inundate habitat areas and can result in higher water temperatures and lower water quality. Existing River recreational features, such as boat chutes, were designed primarily to accommodate safe boat passage. Further, most features are located to accommodate underground utilities. As a result, the existing features under perform both as recreational amenities and as contributors to health of the River and its habitat species.

In contrast to a natural river of similar morphology and broad-plain physical setting, the South Platte River flowing through Denver is narrow and incised. Channel incision is a direct consequence of channelization, encroachment, confinement and urbanization. With man-made morphology in place, the River's banks have been armored to prohibit lateral migration and to stabilize the channel location. Without adequate bank armoring, the consequences of channel incising include accelerated stream bank erosion, land loss, aquatic habitat loss, lowering of water tables and downstream sedimentation.

The study reach is extensively constrained by urban development. Much of the channel is surrounded by a very narrow riparian corridor, which is typically less than 50 feet wide along each bank. A number of parks located within the River's reach could provide space for bank re-grading, River re-routing (i.e., re-meandering) and/or the reestablishment of floodplain. Vertical concrete walls contain some portions of the channel, primarily where Interstate 25 and Santa Fe Drive parallel the riverbanks. The study reach is also confined by existing infrastructure, notably a large number of storm outfalls and major sanitary sewer interceptors running parallel to one or both banks of the River.



Xcel Energy Zuni Station's inflatable dam located at W. 13th Avenue

UDFCD and City and County of Denver has constructed a number of stabilization and flood management projects within RISO that have positively influenced channel stability and reduced flood risks. Phase I of the Central Platte Valley project, completed 1996,

extends one mile from approximately 15th Street to the I-25 crossing of the South Platte River. This project lowered the channel bed and stabilized the banks, resulting in a riverbed that is two to two-and-a-half feet lower within the project area. Phase II of the Central Platte Valley project, completed in 2001, extends from the I-25 crossing to just downstream of Lakewood Gulch. This project stabilized the banks, increased high-flow conveyance and constructed river training structures (jetties) to concentrate flow toward the center of the channel in a meandering pattern. Phase III will extend similar types of modifications from Lakewood Gulch upstream to W. 8th Avenue and is expected to be completed in 2012. This phase will also increase flood protection by removing the inflatable dam at the Xcel Energy Zuni Station, lowering and widening the channel and providing a below-grade, multi-use bicycle and pedestrian trail crossing under W. 13th Avenue.

D. Existing Water Quality

Urban activities in the Denver metropolitan area have adversely impacted the South Platte River's aquatic habitat and recreational uses. The public perceives the water quality in the River to be poor, thereby negatively impacting the reputation of the South Platte River for boating, fishing and other recreational activities. The public is particularly concerned with the levels of E. coli within the River. Water quality warnings are posted near the River. However, they often misrepresent current conditions and fail to offer a plan to improve the status quo.



Existing conditions of the South Platte River at the Lakewood Gulch confluence

According to the Colorado Water Quality Control Commission, both point and non-point source loading from the surrounding watersheds affect the water quality of the South Platte River in the study area. The following major drainage basins contribute urban runoff to the study area: South Platte River, Bear Creek, Harvard Gulch, Lakewood Gulch, Weir Gulch, Sloan's Lake and Cherry Creek. Elevated E. coli levels have been identified as cause of impairments in the South Platte River and Lakewood Gulch, and elevated E. coli, iron and selenium levels have been identified as cause of impairments in Cherry Creek. There are currently 130 storm sewer outfalls along the RISO reach that drain the majority of the City's urban runoff directly to the South Platte River. Additionally, the Littleton/Englewood Wastewater Treatment Facility contributes effluent (treated water discharge) flows to the study reach.

Overview of Colorado Water Quality Regulations

Water quality standards enhance water quality and protect public health and welfare.

Water quality standards provide the foundation for accomplishing two of the principal goals of the Clean Water Act (Section 101):

- Restore and maintain the chemical, physical and biological integrity of the nation's waters.
- Where attainable, achieve water quality that promotes protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water.

Water quality standards consist of three elements:

- The designated beneficial use or uses of a water body or segment of a water body;
- The water quality criteria necessary to protect the designated use or uses of that particular water body; and
- An anti Degradation policy.

Examples of designated uses are recreation and protection of aquatic life. Water quality criteria describe the quality of water that supports a designated use. Water quality criteria can be expressed in numeric limits or in a narrative statement. Anti-degradation policies provide the mechanism for implementing activities in and around water bodies in a manner that protects water quality.

Colorado's water quality is regulated by the Colorado Water Quality Control Commission with input from the Colorado Department of Public Health and Environment (CDPHE). Water quality standards can be found in Regulation 31: The Basic Standards and Methodologies for Surface Water. In addition to water quality standards, rules are developed in association with the National Pollution Discharge Elimination System (NPDES) to regulate the quality of point source discharges. Under the Colorado Discharge Permit System (CDPS), permits are issued by CDPHE to dischargers that limit the amount of pollutants in a facility's effluent. CDPHE also issues municipal stormwater permits (MS4s) that regulate discharges to surface waters through urban stormwater systems. As presented above, effluent from the Littleton/Englewood Wastewater Treatment Facility is discharged to Segment 14 of the South Platte River (Chatfield Reservoir to Burlington Ditch headgate) as well as stormwater runoff through 130 storm sewer outfalls.

Applicable Uses of Segment 14 of the South Platte River

The RISO Greenway study area falls within Segment 14. The Commission designates use classifications for this segment of the South Platte River. The designated uses for Segment 14 are agriculture, aquatic life, water supply and recreation. The following describes each of these use classifications as applied to the study area:

- Agriculture: These surface waters are suitable or intended to become suitable for irrigation of crops usually grown in Colorado and are not hazardous as drinking water for livestock.
- Recreation E (Existing Primary Contact Recreation): These surface waters are used for primary contact recreation or have been used for such activities since November 28, 1975.
- Domestic water supply: These surface waters are suitable or intended to become suitable for potable water supplies. After receiving standard treatment (defined as coagulation, flocculation, sedimentation, filtration and disinfection with chlorine or its equivalent), these waters will meet Colorado drinking water regulations and any revisions, amendments or supplements thereto.
- Aquatic life (Class 1 Warm Water Aquatic Life): These are waters that (1) currently are capable of sustaining a wide variety of warm water biota, including sensitive species; or (2) could

sustain such biota but for correctable water quality conditions. Waters shall be considered capable of sustaining such biota where physical habitat, water flows, or levels and water quality conditions result in no substantial impairment of the abundance and diversity of species.

Applicable Water Quality Criteria and Associated TMDLs

As previously described, water quality criteria are numeric values or parameters set at levels to protect the designated uses. Water quality criteria for Segment 14 of the South Platte River are listed in Regulation 38: Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin.

Section 303(d) of the Clean Water Act requires states to assess water quality every two years. Water bodies that do not meet the State's water quality standards are put on the "303(d) list" of water quality limited waters. Waters on the 303(d) list are then targeted for Total Maximum Daily Load (TMDL) development, which determines load reductions required to meet water quality standards. Segment 14 of the South Platte River was placed on the 1998 Colorado 303(d) list of water quality limited water bodies for E. coli and the 2002 303(d) list for nitrate.

E. coli is an indicator organism for pathogenic bacteria. Instream water quality data available through the Denver Department of Environmental Health (DEH). Environmental Quality Division (EQD) water quality reports indicate that one of the primary sources of E. coli is dry weather discharge from storm sewers. E. coli is also a concern during wet-weather storm events; wet weather water quality samples collected by USGS and UDFCD between 1998 and 2001 at two locations in Segment 14 exceeded the E. coli water quality standard for all samples taken. Nitrate is primarily a dry weather flow concern associated with point source discharges. Although there is no numeric criteria for trash, it has also been a concern for recreational users such as paddlers, swimmers, anglers, joggers and walkers, who have documented the presence of trash and the perceived impairment of the South Platte River.

As a result of the 303(d) listings for E. coli and nitrates, TMDLs were developed for both parameters.

The Segment 14 E. coli TMDL specifically addressed E. coli issues seen during dry weather periods. The TMDL implementation actions require installation of best management practices (BMP's) to treat dry weather discharges from storm sewers that focus on infrastructure repair and maintenance. The nitrate TMDL for Segment 14 identified wastewater treatment plant (WWTP) effluent as the main source of nitrate in the study reach. As a result, waste loads have been allocated to the Littleton/Englewood, Glendale, and Centennial WWTPs in accordance with the developed TMDL. The Glendale WWTP was decommissioned in June 2007 and no longer contributes waste loads to Segment 14.

A number of tools and ongoing studies are being developed to improve the water quality of the South Platte River. The City and County of Denver and UDFCD have developed tools to improve the quality of urban runoff based on Low-Impact Development (LID) strategies and BMP's. LID will decrease the amount of stormwater that ultimately drains to the reach while BMP's will improve the quality of the water that does enter the River.

Denver's Water Quality Management Plan is intended to better integrate stormwater management and water quality protection into Denver's planning, engineering and infrastructure management. The Plan was completed in 2004 and is available for download through the City's website. Similarly, UDFCD's Urban Storm Drainage and Criteria Manual, Volume 3, provides guidance for the selection and design of stormwater quality BMP's. UDFCD is currently updating Volume III of their Criteria Manual. Over time, reference to and use of these documents and tools will help improve the water quality throughout the urban corridor.

In addition to work completed by the City and County of Denver and UDFCD, DEH has begun to explore the development of a predictive water quality model and real-time water quality monitoring system for the study area. At this time, DEH is considering implementing modeling efforts to predict when E. coli levels at the confluence of the South Platte River and Cherry Creek are and are not safe for recreation.

E. Existing Riparian Habitat

The South Platte River flows through densely urbanized lands within the study reach, but also presents conditions for quality mixed deciduous riparian habitat. Occasionally, the riverbank flattens out into terraces or banks of existing willow scrub-shrub communities. Downstream reaches of the study area appear to be more heavily affected by development, whereas upstream reaches appear to be denser, older-age-class forests with a more native riparian species composition, including cottonwood and willow.

Non-native or nuisance flora listed on the Colorado noxious, invasive or exotic pest plant weed lists have been identified in the study area and were found scattered throughout the RISO reach. The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory identifies approximately 3.3 acres of wetlands along the study reach. The wetlands inventory classifies most of the River as lower perennial with unconsolidated bottom and shore, indicating low gradients and velocities, channel walls and bottoms consisting mainly of small sand and mud particles smaller than stones, developed floodplain and a potential for oxygen deficits. The identified wetlands are labeled as non-tidal freshwater wetlands dominated by trees or scrub-shrub woody vegetation. Wetlands are identified in four locations: two emergent benches along the east bank between Interstate 25 and W. 6th Avenue, an emergent bench along the east bank between W. Evans Avenue and W. Florida Avenue (at approximately W. Jewell Avenue) and an emergent bench along the west bank just upstream of Speer Boulevard.



Johnson Habitat Park

F. Existing Aquatic Habitat

Runs and glides dominate the habitat within RISO. A run is habitat in low-gradient river sections with little turbulence and a defined channel thalweg (flat-bottom channel sections); whereas glides occur in low-gradient reaches with little turbulence but do not have a definite thalweg. There are long reaches in RISO with little transverse or longitudinal channel variation (flat bottom and constant slope). Downstream of W. 6th Avenue, the cross-section is primarily trapezoidal. More variation exists in the channel bottom upstream of W. 6th Avenue. Most pools identified within RISO are plunge pools formed over time at outfall locations. Pools may also be found immediately upstream and downstream of riffles or grade control structures.

Various studies conducted over the past 30 years have identified and documented many native and non-native fish species in RISO. The Colorado Division of Wildlife (CDOW) has been compiling fish sampling data for native and non-native fish species throughout Colorado. The CDOW database contains fish sampling data at six locations along the South Platte River within the study area, from upstream to downstream the locations are as follows: W. Evans Avenue, W. Florida Avenue, W. Alameda Avenue, a location near Zuni Street, a location at the Old Colfax Bridge and a location near the confluence with Cherry Creek in the boat chute pools. The following native and non-native species are identified as present within the study reach:

- **Native Species:**

- Black Bullhead
- Channel Catfish
- Common Shiner
- Creek Chub
- Green Sunfish
- Longnose Dace
- Longnose Sucker
- White Sucker

- **Non-Native Species:**

- Bluegill
- Common Carp
- White Crappie
- Black Crappie
- Largemouth Bass
- Yellow Perch
- Mosquitofish



Fishing in the South Platte River

Trout species were not found in the South Platte River during the fish sampling events that form the basis of the CDOW data; however, they are considered to be an important game fish by many people who fish in the study reach. Trout have been caught regularly over the last several years by avid urban anglers.

G. Existing Transportation and Roadways

South Platte River Drive and Santa Fe Drive are located along the east and west banks of the South Platte River. Interstate 25 is located on the east bank of the South Platte River between W. Dartmouth Avenue and W. 6th Avenue. These roadways create both visual and physical barriers to the River (see Barriers Map page 48). Santa Fe Drive and Interstate 25 are significant sources of noise pollution, which reduce the quality of the Greenway user's experience. The existing alignment of each of these roadways prohibits Greenway and River habitat expansion, as well as the ability to lay back the riverbanks in order to improve the River's stability and health. These roadways, in conjunction with nearby railroads, have a major impact on access safety and the visual character of RISO Greenway.

H. Existing Parks and Public Open Spaces

Sixteen parks, one golf course, an open space and a skate park currently exist on the RISO reach of the South Platte River, from south to north, including:

- 1. Grant-Frontier Park
- 2. Pasquinel's Landing Park
- 3. Ruby Hill Park
- 4. Overland Golf Course
- 5. Overland Pond Park
- 6. Aqua Golf pond
- 7. Vanderbilt Park
- 8. Valverde Park
- 9. Johnson Habitat Park
- 10. Phil Milstein Park
- 11. Frog Hollow Park
- 12. Weir Gulch Park
- 13. Sun Valley open space
- 14. Gates Crescent Park, including the Children's Museum of Denver
- 15. Fishback Landing Park, including the Downtown Aquarium-Denver
- 16. Centennial Gardens
- 17. Confluence Park
- 18. Commons Park
- 19. Denver Skate park



Grant-Frontier Park

The Existing Park and Recreation Amenities chart on this page summarizes existing amenities and recreational features in parks adjacent to the South Platte River.

The City and County of Denver Parks and Recreation Planning Division has developed new master plans for Vanderbilt and Ruby Hill Parks. The division has also recently completed park improvements at Valverde Park.

Existing Park and Recreation Amenities - Corresponds to Existing Conditions Map, Recreation Features (see page 44).

	Facility	Location	Amenities
A	Grant-Frontier Park	W. Evans Avenue at the South Platte River Drive	Children's Playground, Restrooms (Seasonal), Water Fountain (Seasonal), Pioneer Cabin
B	Pasquinel's Landing Park	W. Evans Avenue and S. Huron Street	Water Fountain, Restrooms (Seasonal), Childrens Playground, Picnic Tables, Exercise Stations
C	Ruby Hill Park	Between W. Florida Avenue and W. Jewell Street along the South Platte River	Water Fountain, Restrooms (Seasonal), Childrens Playground, Picnic Tables, Swimming Pool, Play Fields, Basketball Court, Tennis Court, Sledding Hill
D	Overland Golf Course	Between W. Florida Avenue and W. Jewell Street	Restromms, Water Fountain, Food
E	Overland Pond Park	W. Florida Avenue at South Platte River Drive	Restrooms (Seasonal), Nature Walk/Pond, Picnic Tables, Fishing Piers, Docks, Boat Landing
F	Aqua Golf	W. Florida Avenue and Santa Fe Drive	Restroom, Water Fountain, Food Concession
G	Vanderbilt Park	W. Tennessee Avenue and S. Huron Street	Ballfields
H	Johnson Habitat Park	S. Jason Street and South Platte River Drive	Water Fountain (Seasonal), Picnic Area
I	Valverde Park	South Platte River Drive and W. Cedar Ave.	Ballfields, Basketball Court, Football Field, Softball Field
J	Phil Milstein Park	No Vehicle Access North of W. 6 th Avenue	Picnic Tables
K	Frog Hollow Park	W. 8 th Avenue at I-25	Water Fountain (Seasonal), Restrooms (Seasonal)
L	Weir Gulch Marina Park	W. 9 th Avenue and S. Decatur Street	Picnic Tables
M	Sun Valley open space	Weir Gulch Marina Park and W. 13 th Avenue	Picnic Tables
N	Gates Crescent Park	Children's Museum Drive at I-25	Children's Museum of Denver, Picnic Areas, Water Fountain (Seasonal), Restrooms (Seasonal), Volleyball Court, Playground
O	Fishback Landing Park	Water Street	Downtown Aquarium - Denver, Restrooms (Seasonal), Water Fountain (Seasonal)
P	Centennial Gardens	1100 Little Raven Street	Restrooms (Year-round), Water Fountain
Q	Confluence Park	15 th and Platte Streets	Water Fountain, Bike Racks, Kayaking
R	Commons Park	15 th to 19 th Streets on Little Raven Street	Restrooms (Seasonal), Water Fountain (Year-round), Public Art, Pay Phone
S	Denver Skatepark	19 th and Little Raven Streets	Restrooms (Year-round), Picnic Pavilion, Pay Phone, Water Fountain (Year-round)

Overland Pond Park, Johnson Habitat Park, Phil Milstein Park, the eastern edge of Ruby Hill Park, parts of Fishback Landing Park and Gates Crescent Park contain native vegetation, including grasses and shrubs requiring low water levels. The dominant ground cover in the remaining parks and open space areas is irrigated turf grass. Irrigated turf grasses are expensive to maintain. They contribute to decreased River water quality because chemical fertilizers and herbicides are required to maintain them.



Overland Pond Park

Sun Valley open space is located within Denver Housing Authority property and is undeveloped. A loop trail, including two pedestrian bridges that cross over the River, is located within the open space but does not currently connect to the South Platte River multi-use trail. To access the open space from the regional trail on the east side of the River, users must cross over the River at Commons Park. A connection underneath Interstate 25 extends west from the park. This is the only connection to the RISO Greenway from the neighborhoods west of I-25.



Sanderson Gulch Trail

An 8- to 10-foot-wide concrete, multi-use trail runs parallel to the River over the entire distance of the RISO Greenway Corridor. The trail connects the parks and golf course and continues south to the Mary Carter Greenway in Arapahoe County. Urban encroachment impedes the expansion of the Greenway, existing parks, public open space and ecological buffer zones on either the west or east edges of the river.



Pasquinel's Landing Park

Because of urban encroachment, acquiring additional open space is necessary immediately adjacent to the River for the purpose of improving water quality, laying back bank slopes to improve visibility, increasing accessibility, maintaining river stability, providing areas to detain and filter stormwater run-off before it enters the River, removing impervious soils that increase stormwater run-off and creating riparian buffer zones to increase and protect valuable habitat.



Frog Hollow Park

Community members revealed in the River South Greenway Master Plan public meetings that they do not regularly use the Greenway and adjacent parks as much as they would prefer because they are not accessible from their neighborhoods and/or do not contain amenities they would use. Additionally, citizens perceive some areas of the RISO Greenway corridor to be unsafe due to a lack of visibility and because isolated reaches of the Greenway do not provide exit trails for long distances in some areas. Citizens and community leaders said that the use of night lighting and better access to and from the Greenway would increase visibility and safety. However, the Colorado Division of Wildlife should be consulted to determine any potential adverse impacts to wildlife.



Gates Crescent Park



Vanderbilt Park

I. Multi-Use Trails and River South Greenway Connections

The lack of safe, lateral connections between neighborhoods, business districts and the RISO Greenway corridor was a major issue expressed during the public input process. The most commonly raised concerns with regard to unsafe access to the Greenway from neighborhoods include passage over Interstate 25 and the railroad located along the east side of the River. Residents further expressed concern that streets that extend perpendicular to the South Platte River do not have adequate sidewalks, facilities for cyclists, crosswalks or directional signage.



The South Platte River Greenway is a very popular recreational amenity for citizens throughout the Denver metropolitan area.

The majority of multi-use trail segments along the South Platte River in RISO are 8 feet wide, which reflects a progressive standard from the 1970s through the 1980s when these trails were originally constructed. A few 10-foot segments of trail have replaced the original trails. Trail design standards have evolved over the last decade to keep pace with an increasing number of trail users. According to the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, the recommended minimum width for a shared-use trail (multi-use trail) is 10-feet. However, in high-volume areas or where multiple uses are common, trail widths of 12- or even 14-feet are common.

Within the RISO Greenway Corridor, non-motorized, lateral connections to the River are almost exclusively through trails that have been developed along tributaries such as West Harvard Gulch, Sanderson Gulch, Weir Gulch, Lakewood Gulch and Cherry Creek. Directional signage to facilitate connection and way-finding is lacking and no organized system for posted bike routes, bike lanes or sidewalks are currently identified within the Corridor.

• Barriers to River South Greenway Access

Access to the South Platte River is made difficult and unsafe by physical barriers such as major highways, roadways and railroads. Access is further impaired by a lack of bicycle and pedestrian facilities such as lateral connector trails, sidewalks and signalized crosswalks (see Barriers Map page 48 and Access Opportunities Map page 50).



W. Alameda Avenue demonstrates the lack of a sense of arrival or entry to the River within the RISO Greenway Corridor.

In addition, the River bisects neighborhoods and businesses located on either side of the River. Specific barriers preventing safe access to the River South Greenway include:

- Railroads and railroad yards
- Santa Fe Drive
- Interstate 25
- South Platte River



Trial underpass at W. Evans Avenue

• Gateways and Entry

The South Platte River Greenway is an entrance gateway into the City and County of Denver from Arapahoe county. However, a lack of entry and gateway features along the River makes it difficult to obtain a sense of arrival between Denver and Arapahoe Counties. Santa Fe Drive and Federal Boulevard and Broadway are three major potential access points that run parallel to the South Platte River. W. Mississippi Avenue, W. Alameda Avenue, W. 8th Avenue, W. 13th Avenue, 15th Street, Speer Boulevard and 19th and 20th Streets are major roadways that transverse and dissect the River within the RISO corridor.

Thousands of automobile commuters utilize the roadways each day without recognizing that the South Platte River is only a few blocks, or even a few feet, away. Planning efforts and roadway corridor design guidelines should be developed that will:

- Increase public awareness of the River and Greenway amenities.
- Create a sense of entry, gateway and identity for the City and County of Denver and the RISO Greenway.
- Provide logical way-finding through signage.
- Provide safe bicycle and pedestrian access within the RISO Greenway study area.

J. In-River Recreation

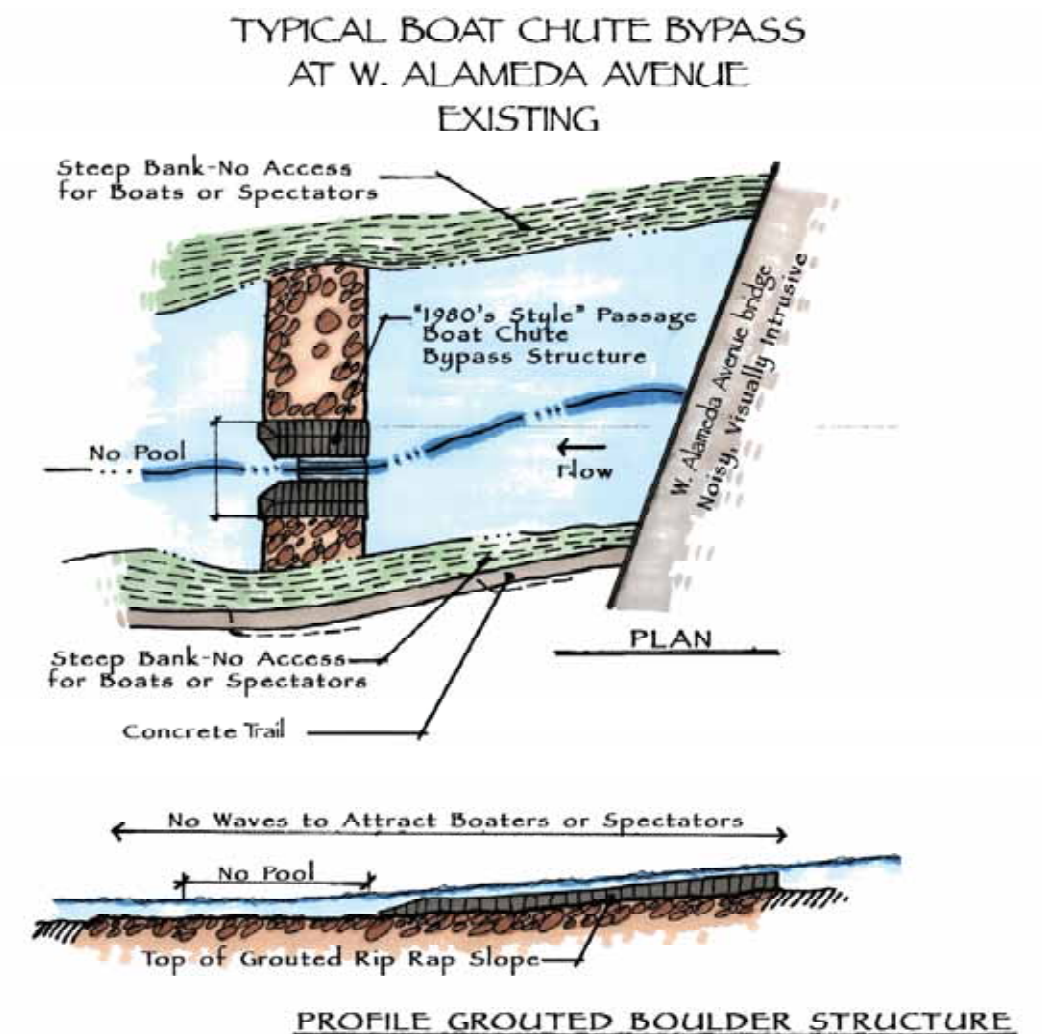
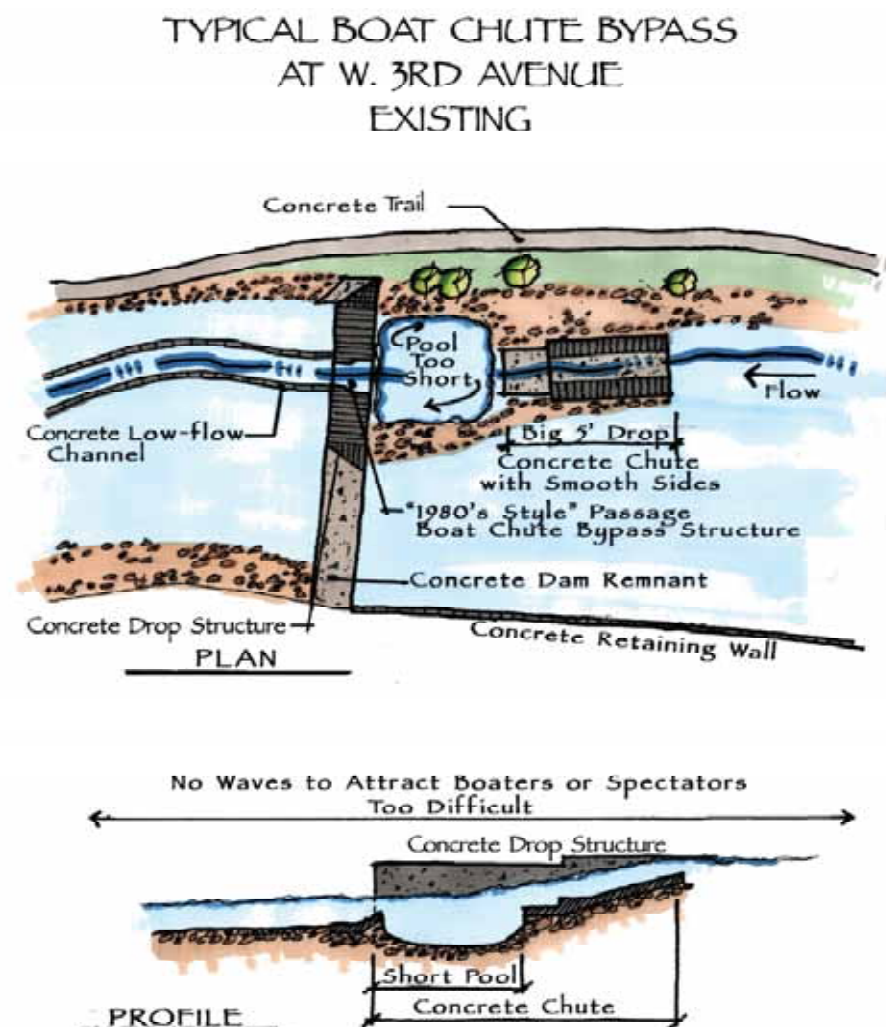
The South Platte River has not realized its full potential as a recreational amenity. Recreational whitewater feature designs and approaches to river stabilization have advanced considerably since the 1970s and 1980s, when the majority of the River's existing structures were constructed. To that end, possible reasons for the lack of in-river recreational use on the South Platte River include poor access to the River's edge, potentially hazardous drop structures, poor water quality and competition from the proliferation of new whitewater river parks in the metropolitan

area. The establishment of fish habitat, fish passage and quality recreational fishing improvement objectives has created an exciting and long overdue field of study for the South Platte River. Examples of the earlier types of drop improvements are illustrated in the plan graphic below.

The W. 3rd Avenue bypass boat chute features a large, steep concrete chute and a short, heavily armored pool below. While this structure provides basic passage for recreational whitewater craft, it offers no waves on which users may develop river-running skills or learn how to negotiate natural rivers.

The short pool at the end of the drop presents a hazard and offers virtually no recovery room for novice rafters or kayakers. The boat chute at W. Alameda Avenue is typical of many structures installed in the South Platte River today (these structures were primarily for utility crossing protection and were not originally designed as recreational drops). Unlike the W. 3rd Avenue structure, this chute extends across the River, drops approximately two feet and is easy to navigate. However, this chute does not offer hydraulic features that could easily enhance a River trip or draw users to the site. Neither the W. 3rd Avenue nor the W. Alameda Avenue structure promotes healthy aquatic habitat or fish passage for many native fish species.

Examples of Earlier Types of Drop Improvements



A contemporary design approach to River stabilization distributes gradient throughout the River reach to avoid long, flat, shallow reaches that invite organic sediment deposition and low dissolved oxygen levels.

K. River Safety and Security

Two public outreach meetings and discussions with community leaders and Denver Police officials revealed that many residents believe that safety on the South Platte River Greenway is an issue. Concerns include isolated reaches of the Greenway that make people feel vulnerable to drug users and transients loitering along the River Corridor.

L. Opportunities

Analysis of existing conditions leads to the identification of opportunities along RISO. Opportunities maps for access, land, land use and water recreation and habitat (see Opportunities Maps pages 50 to 53) were completed and provided a valuable tool when developing the Vision Plan Map (see pages 6 to 7) and determining planning proposals that are identified in Chapters 1 and 4.

Access Opportunities

Connecting the South Platte River Greenway to neighborhoods, parks, key destinations and places of employment were identified as an objective for the RISO Greenway Master Plan. Opportunities to provide east/west bicycle and pedestrian connections to the River along major transportation corridors were identified. They include (from south to north) W. Evans Avenue, W. Jewell Avenue, W. Florida Avenue, W. Mississippi Avenue, W. Alameda Avenue, W. 8th Avenue, W. 13th Avenue, W. 15th Avenue and W. 29th Avenue. Major transportation corridors were selected as an opportunity because of their regional connectivity potential and high visibility to the River.

Local bicycle and pedestrian access between the River, nearby parks and neighborhoods were identified along residential roadways. Each roadway identified on the map was evaluated based on the presence of sidewalks, number of driveways and the efficiency of connection. The Denver Bicycle Master Plan (Update 2001) was reviewed to understand proposed "Neighborhood Bike Routes" and "Roads with Bike Lanes". These were subject to field verification to determine

their current validity as a part of the RISO access plan.

Additional access opportunities include potential greenways along tributaries to the South Platte River. Five tributaries exist within the RISO corridor including (from south to north) Harvard Gulch, Sanderson Gulch, Weir Gulch, Lakewood Gulch and Cherry Creek. All of these tributaries have multi-use trails. However, opportunities to complete missing sections were identified and are discussed below.

- Harvard Gulch - Complete a regional trail underpass at the railroad trestle.
- Sanderson Gulch - Complete the missing regional trail between the River and S. Lipan Street. When the W. Florida Avenue bridge over the River is redesigned, include expanded bicycle and pedestrian facilities on the bridge including a River viewing area. Also include architectural features on the bridge that support the concept of making W. Florida Avenue a major transportation corridor/connection to the South Platte River.
- Weir Gulch - Expand the multi-use regional trail and park into a larger complex of parks that wrap around the south, east and north edges of the Sun Valley residential area. Complete the approximately 150' section of trail that is missing south of S. Federal Boulevard.
- Lakewood Gulch - The City and County of Denver in partnership with the Urban Drainage and Flood Control District are implementing major improvements to Lakewood Gulch and the Lakewood Gulch Greenway. These improvements include realignment of the gulch, a new multi-use trail and vegetation.
- Cherry Creek - Utilize Cherry Creek as a major bicycle and pedestrian corridor between the River and downtown Denver

Opportunities for regional and neighborhood access points to the South Platte River were identified. Regional access points are located at the intersection of major transportation corridors and the South Platte River. They function as gateways to the Greenway and will reinforce way finding and the sense of arrival to the River. These regional access points exist at

W. Evans Avenue, W. Florida Avenue, W. Mississippi Avenue, W. Alameda Avenue, W. 8th Avenue, W. 13th Avenue and 15th Street.

The local bicycle and pedestrian access points or tributary regional trails that intersect with the River and could also function as local neighborhood access points. Neighborhood access occur at W. Harvard Gulch, Grant-Frontier Park, S. Huron Street, Johnson Habitat Park, Valverde Park, W. 5th Avenue, Weir Gulch Marina Park, Lakewood Gulch, Invesco Field/Bronco bridge and Fishback Landing Park.

Land Opportunities

The Land Opportunities map identifies those public and privately owned lands that could make a significant contribution to the vitality of the South Platte River Greenway. The opportunity being presented is the creation of a system of parks and amenities that would become the framework for a healthy community in the future. The enhancement of publicly owned parks such as Ruby Hill, Overland Golf Course, Vanderbilt, Johnson Habitat, Valverde and others represents an opportunity to create better connections to the South Platte River. Additionally there are numerous opportunities on adjacent public and private lands for river bank restoration. Redevelopment opportunities on private lands at Elitch Gardens Theme Park, Sun Valley Public Housing and the deteriorating industrial area south of Ruby Hill Park should be designed to incorporate the South Platte River as an amenity for any future development efforts.

Land Use Opportunities

Land Uses are identified on the Land Use Opportunities Map on page 52 as envisioned for the City in Blueprint Denver. As these areas evolve they represent an opportunity to connect to current and future amenities offered by the South Platte River. The development of a true regional recreational amenity including a system of interconnected parks and recreational features will foster redevelopment and private investment along the South Platte River Corridor. This map presents the opportunities for future public/private partnerships that will help fund both Greenway and private development. For example, the Transit Oriented Development associated with the existing Southwest and West RTD Light Rail line stations will increase population and the accompanying demands for recreational amenities provided, in part by the South Platte River. The mixed use envisioned

for Jefferson Park, Highland and Confluence Park areas offer similar opportunities for utilizing South Park River recreational amenities and for the South Platte River to connect to future amenities in these project areas. Finally, the expansion of the entertainment and cultural district in the Auraria and Gates Crescent areas represent a direct opportunity to incorporate water-based amenities offered by the South Platte River.

Water Recreation and Habitat Opportunities

Water recreation on the South Platte River has not been promoted aggressively for decades, aside from attention that was paid to the Confluence Park white-water improvements completed in 1995. Opportunities abound to improve both access to the River and instream features that will encourage fishing, swimming and boating using canoes, inflatables, kayaks and stand-up paddle boards.

Each riverside community can acknowledge the River as an amenity by making connections to adjacent parks and the River edge. Ten potential areas for future River edge access were identified including, W. Harvard Gulch, Grant-Frontier Park, Pasquinel's Landing Park, Overland Golf Course south of W. Florida Avenue, Valverde Park, Sun Valley open space, Gates Crescent Park (two locations), Fishback Landing Park and Commons Park. Creating new access or replacing narrow, non-paved paths with ADA-accessible trails that provide access to the River's edge will improve the users ability to use the River for recreation and provide a connection between people and the River.

In addition, existing drops can be improved from their currently functional but nondescript and sometimes hazardous nature to those that boast low hazard, high value features. These include eddies for pausing mid-stream, clear chutes with nicely shaped hydraulics and staging locations for portaging and regrouping - all of which appeal to both human users and our aquatic friends. Signature features that invite destination 'park and play' paddling or surfing can be located where vehicular access or shuttles will accommodate the River traffic. The entire RISO reach has potential opportunities for whitewater boating and fishing improvements.

Aquatic and riparian habitat restoration opportunities were determined through field reconnaissance, previous studies, geographical information system (GIS) mapping data and community outreach. The aquatic habitat within RISO is dominated by runs and glides and the River cross-section is relatively flat and wide, resulting in opportunity for improvements throughout the entire RISO reach. Habitat opportunities were subdivided into three categories including:

- Native Habitat Restoration (located between W. Dartmouth Avenue and W. 14th Avenue) - This habitat classification indicates that little native vegetation exists, resulting in low wildlife benefit and the need for a total habitat restoration effort.
- Protect and Enhance Existing Habitat (between 14th Avenue and Interstate 25) - This classification occurs when native vegetation species are dominate along the River. Native populations should be protected and enhanced in these areas.
- Native Habitat Protection, Enhancement and Restoration (located between Interstate 25 and 20th Street) - Native species mixed with non-native species describes this habitat classification. Native population should be protected while non-native and invasive species should be removed and replaced with native plants.

M. Existing Conditions Maps

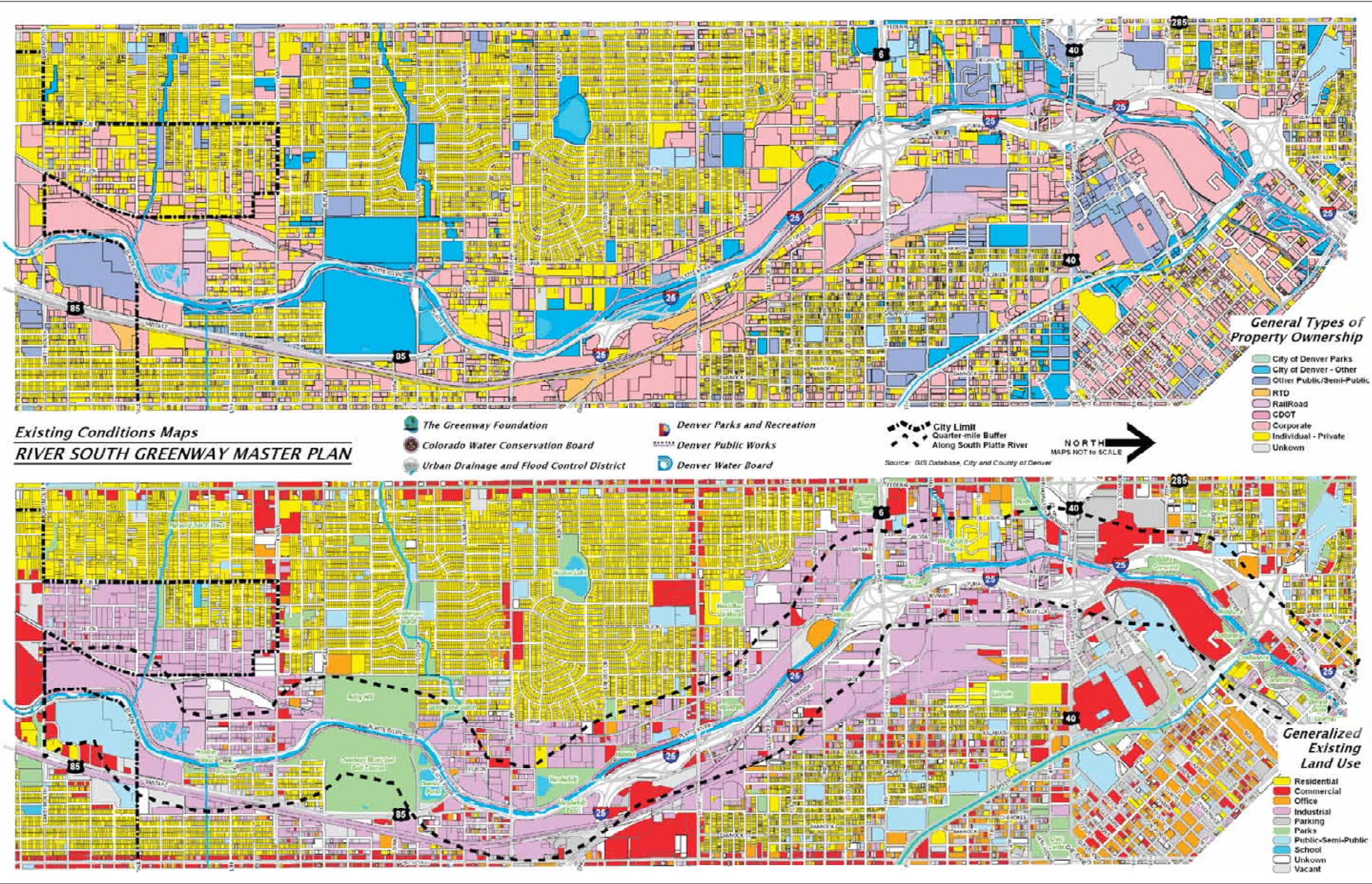
Identification and analysis of existing conditions resulted in an understanding of issues, challenges and specific planning recommendations within the River South Greenway Master Plan study area. For analysis purposes, existing conditions were organized into sixteen maps including:

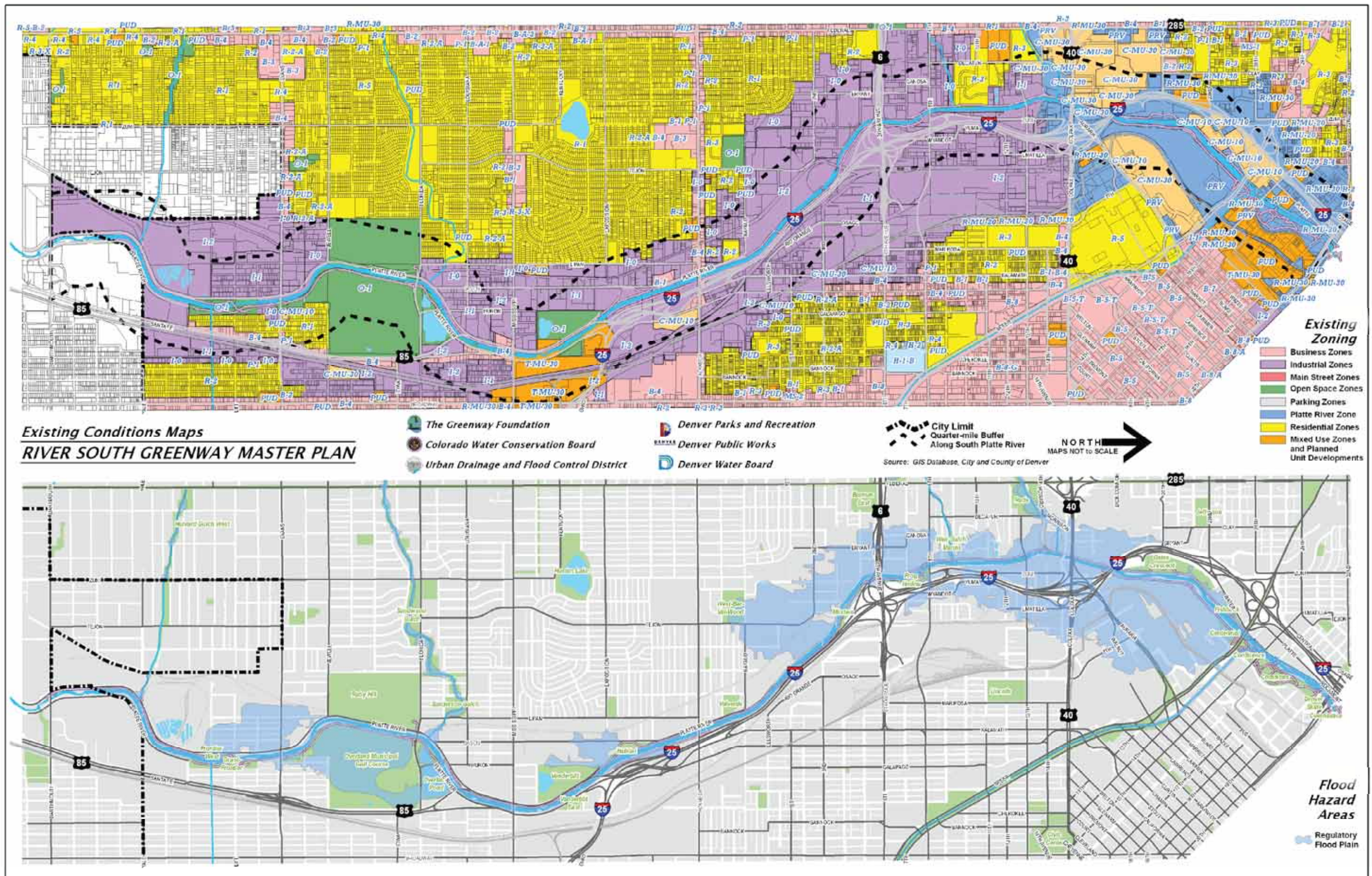
1. General Types of Property Ownership
2. Generalized Existing Land Use
3. Existing Zoning
4. Flood Hazard Areas
5. Blueprint Denver
6. Neighborhood Features
7. Mobility
8. Recreation Features
9. Existing In-River Recreation Features
10. Aquatic Habitats
11. Vegetation Habitat
12. Sanitary Sewer Infrastructure
13. Storm Sewer Infrastructure
14. Notable Channel Features
15. Barriers
16. Landfills

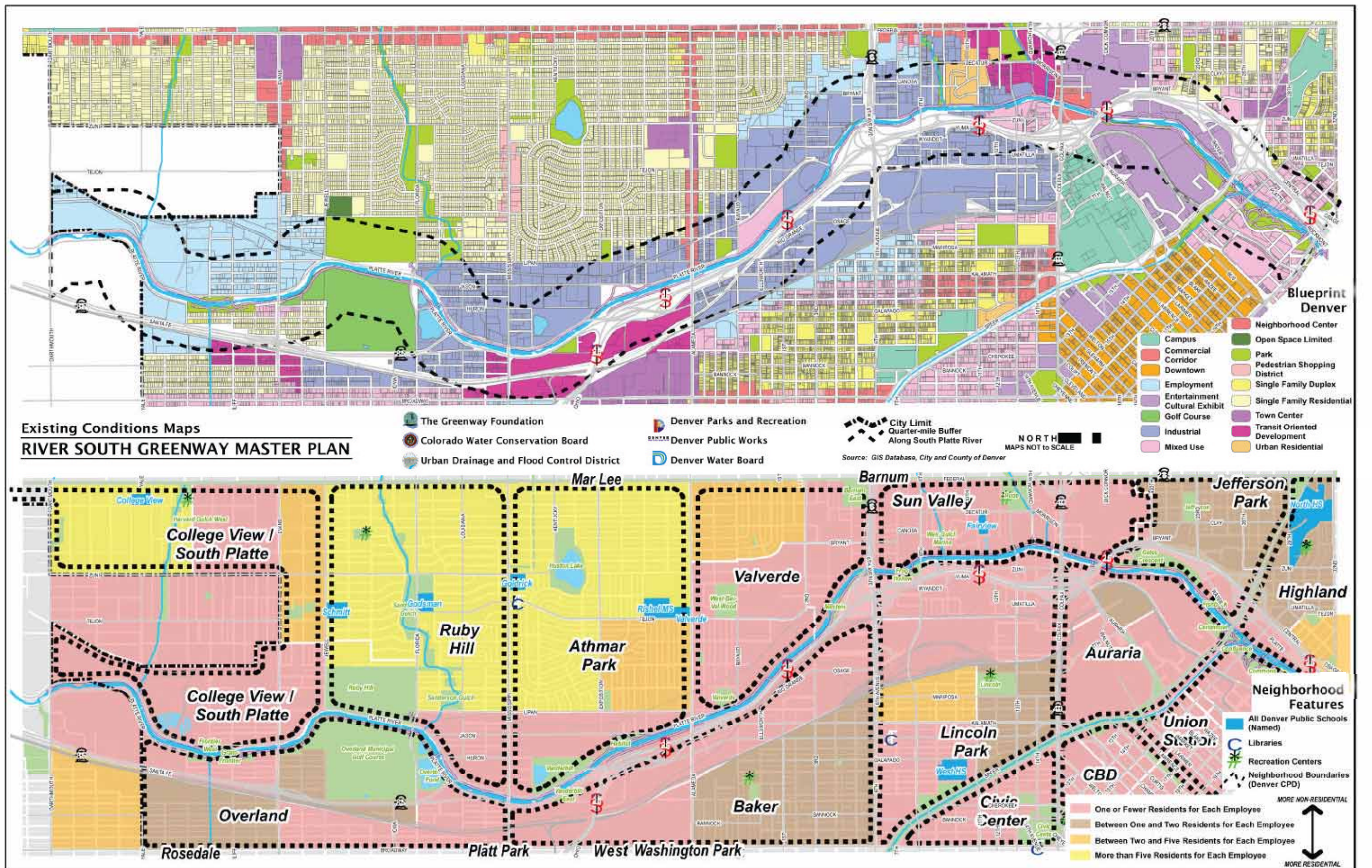
N. Opportunities Maps

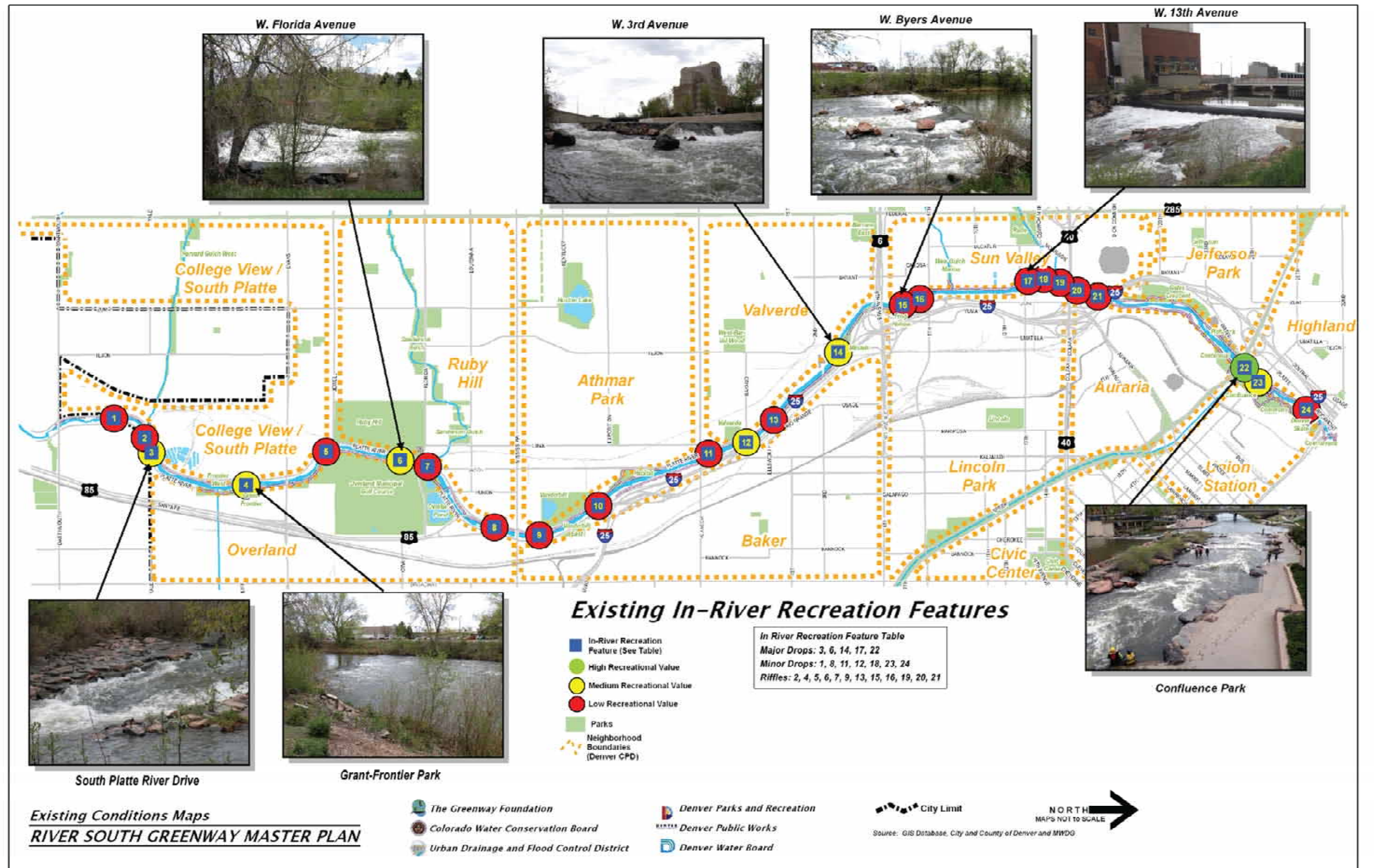
For analysis purposes, existing conditions were organized into four opportunities maps including:

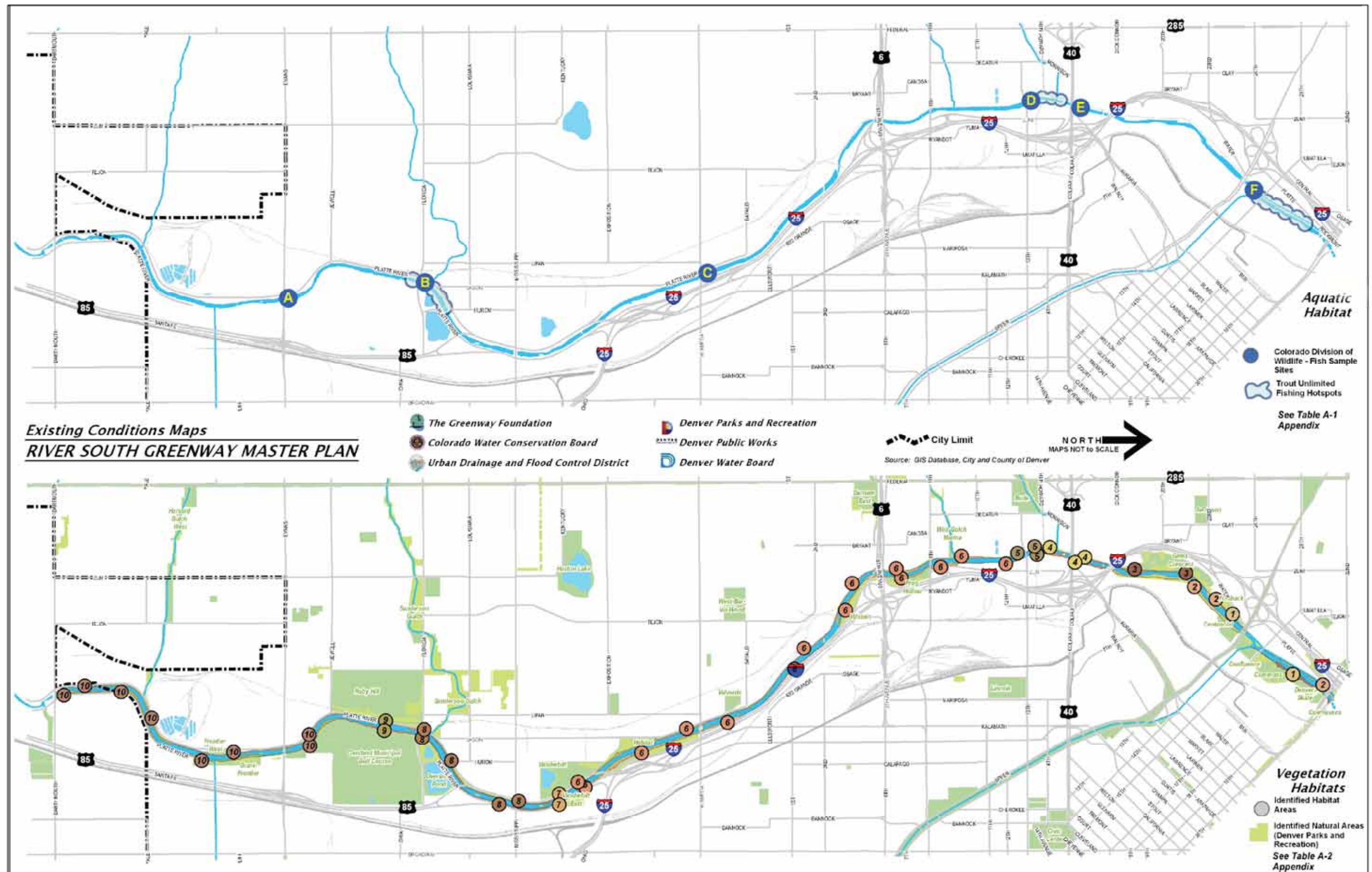
1. Access Opportunities
2. Land Opportunities
3. Land Use Opportunities
4. Water Recreation and Habitat Opportunities

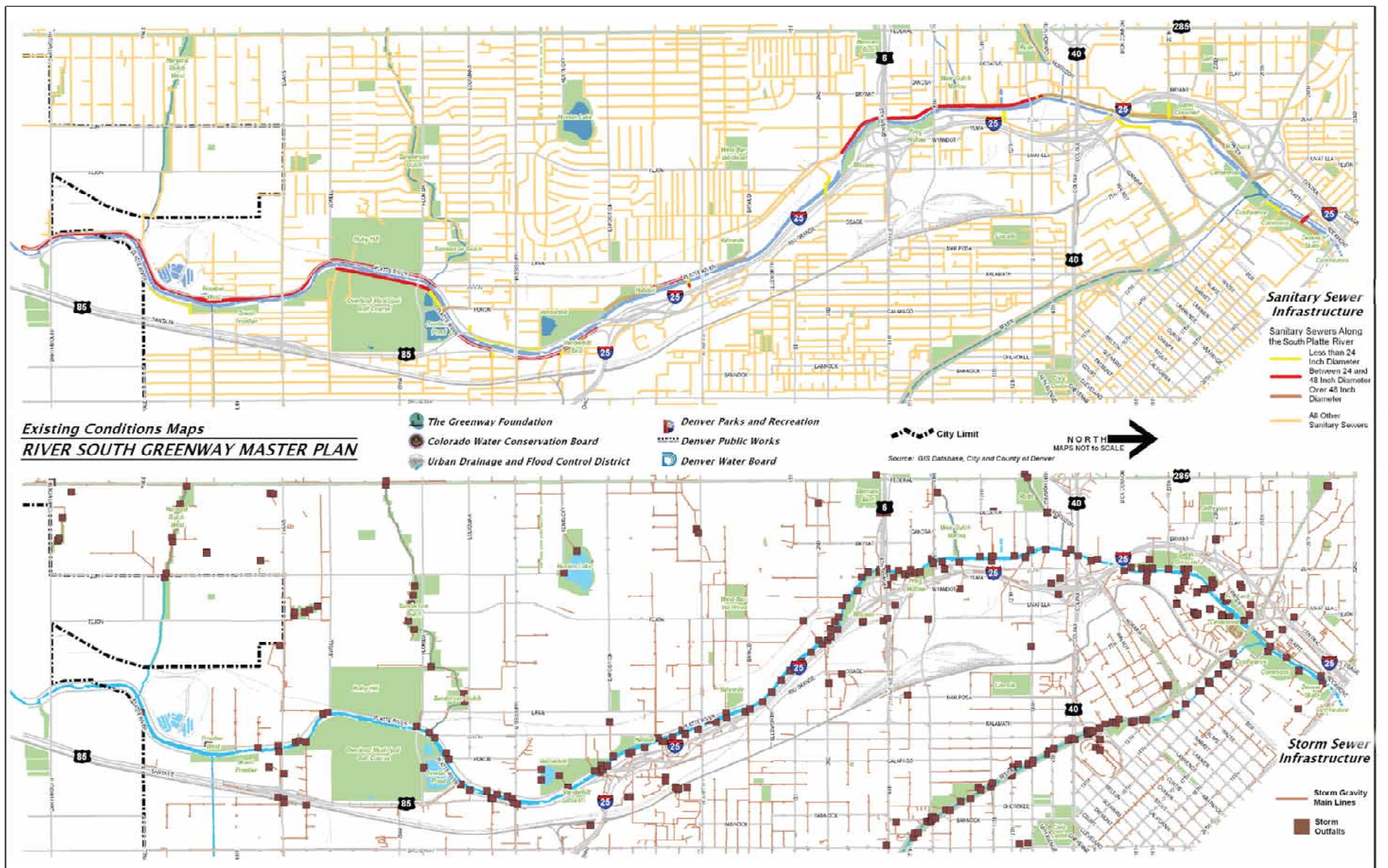


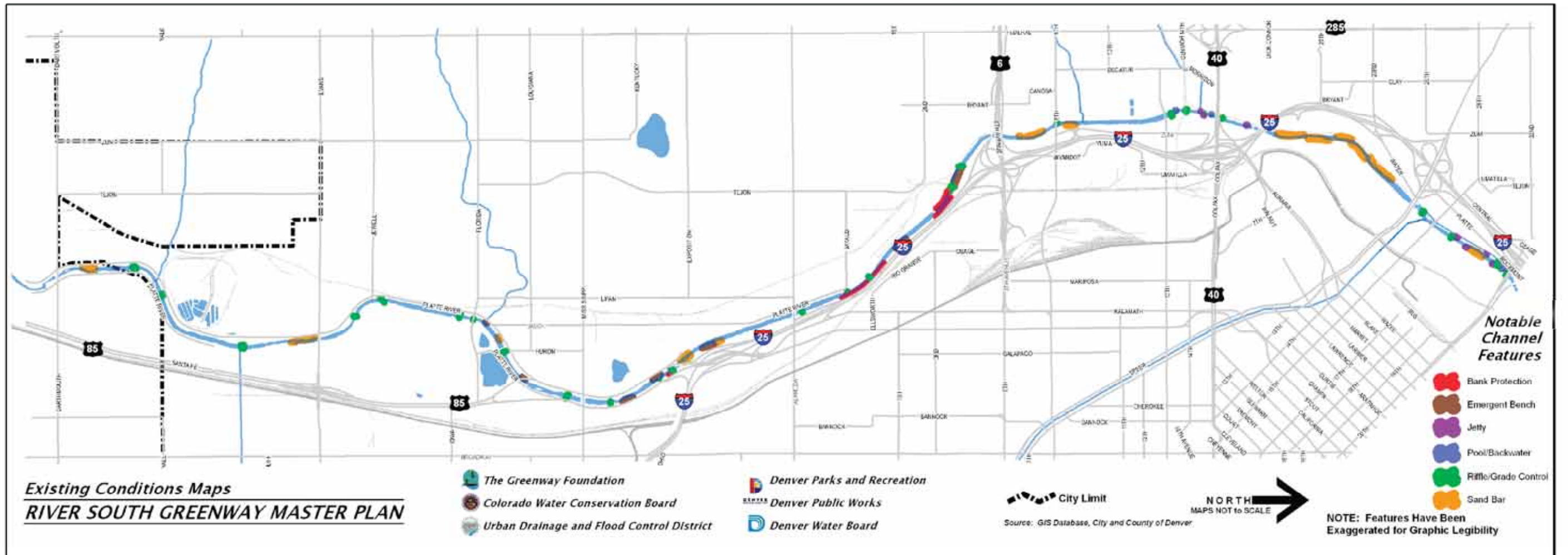






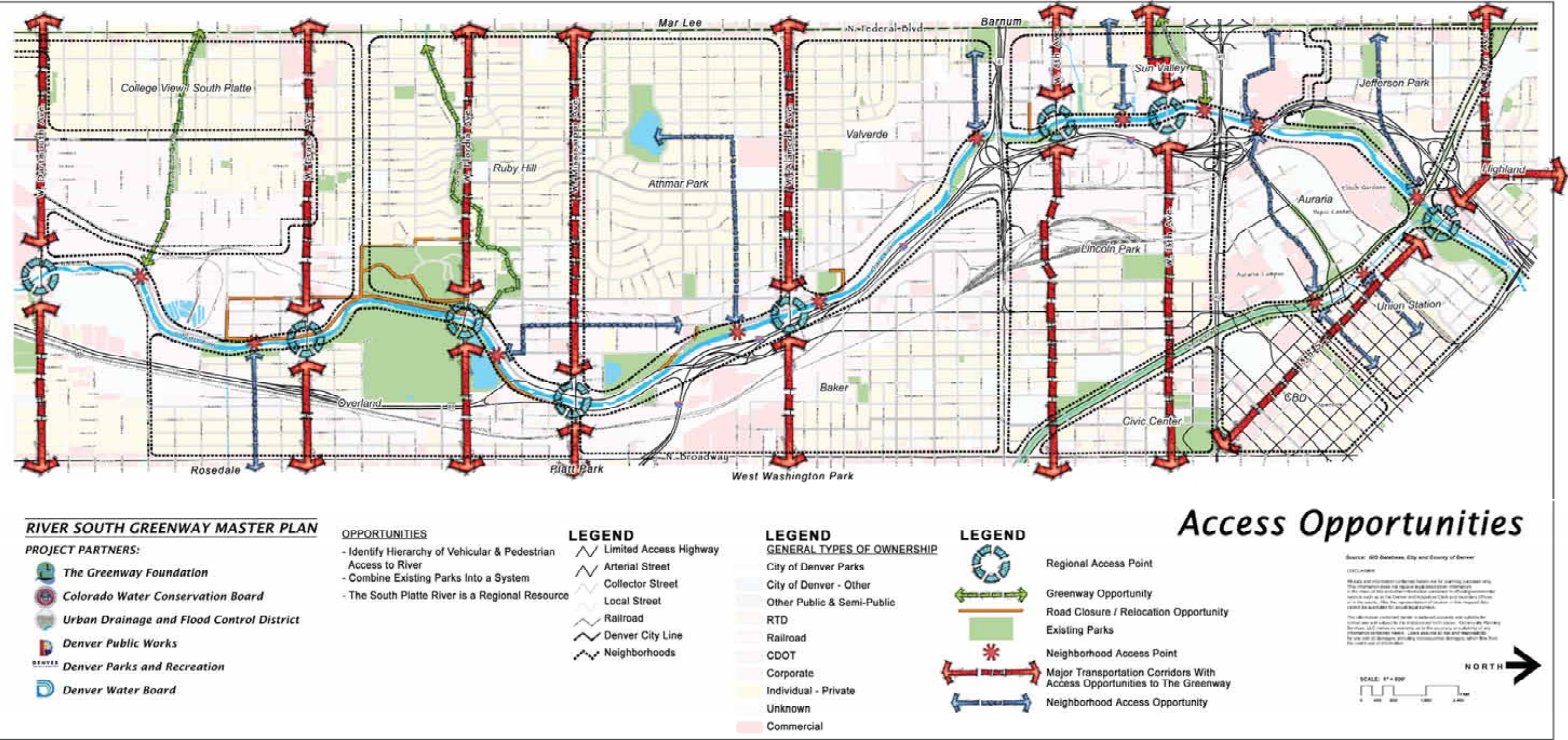


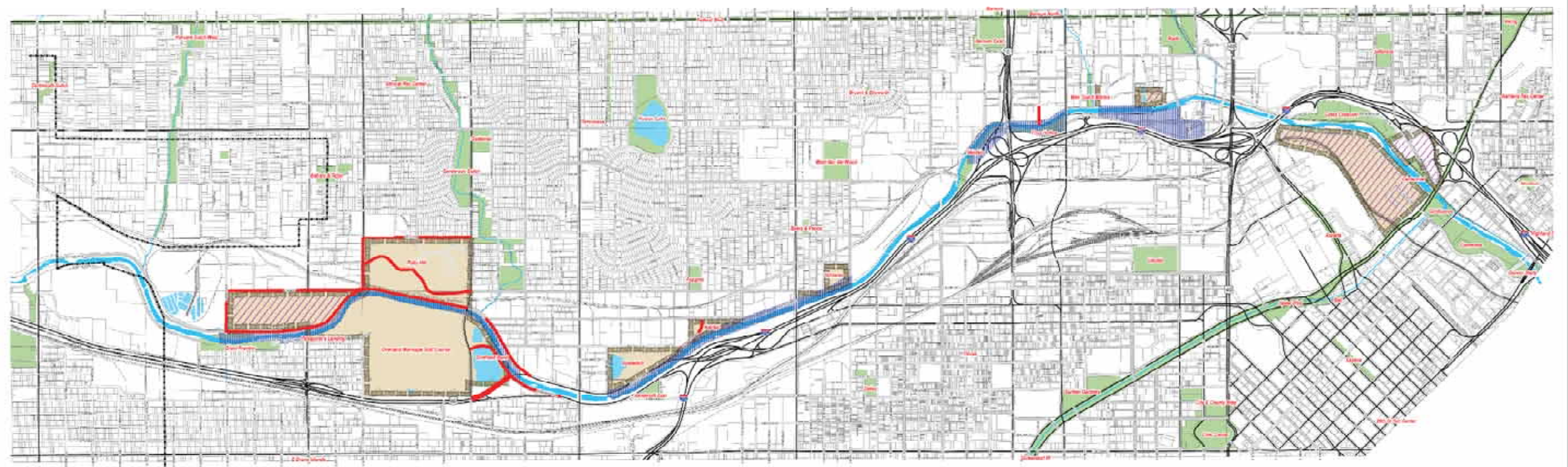






Opportunities Maps





RIVER SOUTH GREENWAY MASTER PLAN

PROJECT PARTNERS:

-  The Greenway Foundation
-  Colorado Water Conservation Board
-  Urban Drainage and Flood Control District
-  Denver Public Works
-  Denver Parks and Recreation
-  Denver Water Board

OPPORTUNITIES

- Identify Lands That Can be Used to Make Significant Greenway Improvements
- Identify Opportunities For Roadway Improvements
- Combine Existing Parks Into a System
- Maximize The Use of The Existing Parks

LEGEND

-  Limited Access Highway
-  Arterial Street
-  Collector Street
-  Local Street
-  Railroad
-  Denver City Line

LEGEND

-  South Platte River
-  Existing Parks
-  Greenway Amenity Opportunities (Public Lands)
-  Greenway Amenity Opportunities (Private Lands)
-  River Bank Restoration Opportunities
-  Road Closure / Relocation Opportunities

Land Opportunities

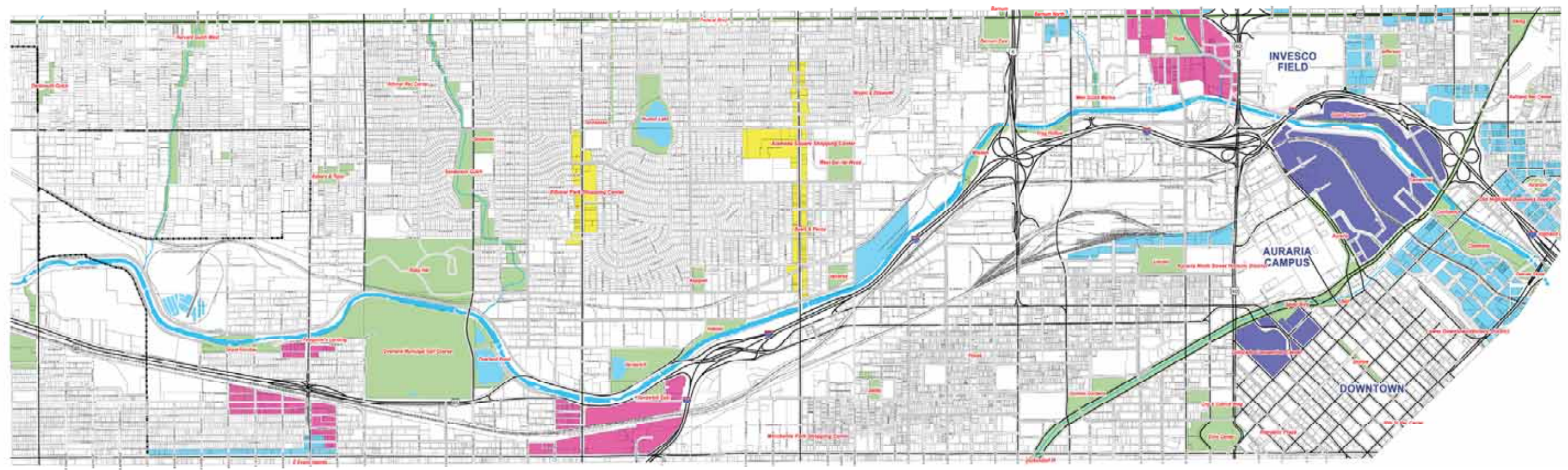
Source: GIS Database, City and County of Denver

DISCLAIMER:

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SCALE: 1" = 600'





RIVER SOUTH GREENWAY MASTER PLAN

PROJECT PARTNERS:

-  The Greenway Foundation
-  Colorado Water Conservation Board
-  Urban Drainage and Flood Control District
-  Denver Public Works
-  Denver Parks and Recreation
-  Denver Water Board

OPPORTUNITIES

- Identify Potential Future Access Opportunities
- Influence Greenway Amenity Design
- Influence Redevelopment
- The South Platte River is a Regional Resource
- Funding Opportunities

LEGEND

-  Limited Access Highway
-  Arterial Street
-  Collector Street
-  Local Street
-  Railroad
-  Denver City Line

LEGEND

AREAS OF CHANGE/ INCREASING POPULATION

-  TOD
-  Mixed Use

AREAS OF CHANGE/ DESTINATIONS

-  Entertainment, Cultural, Exhibition
-  Commercial Corridor / Neighborhood & Town Center / Shopping

Note: This Information is Based on "Blueprint Denver"

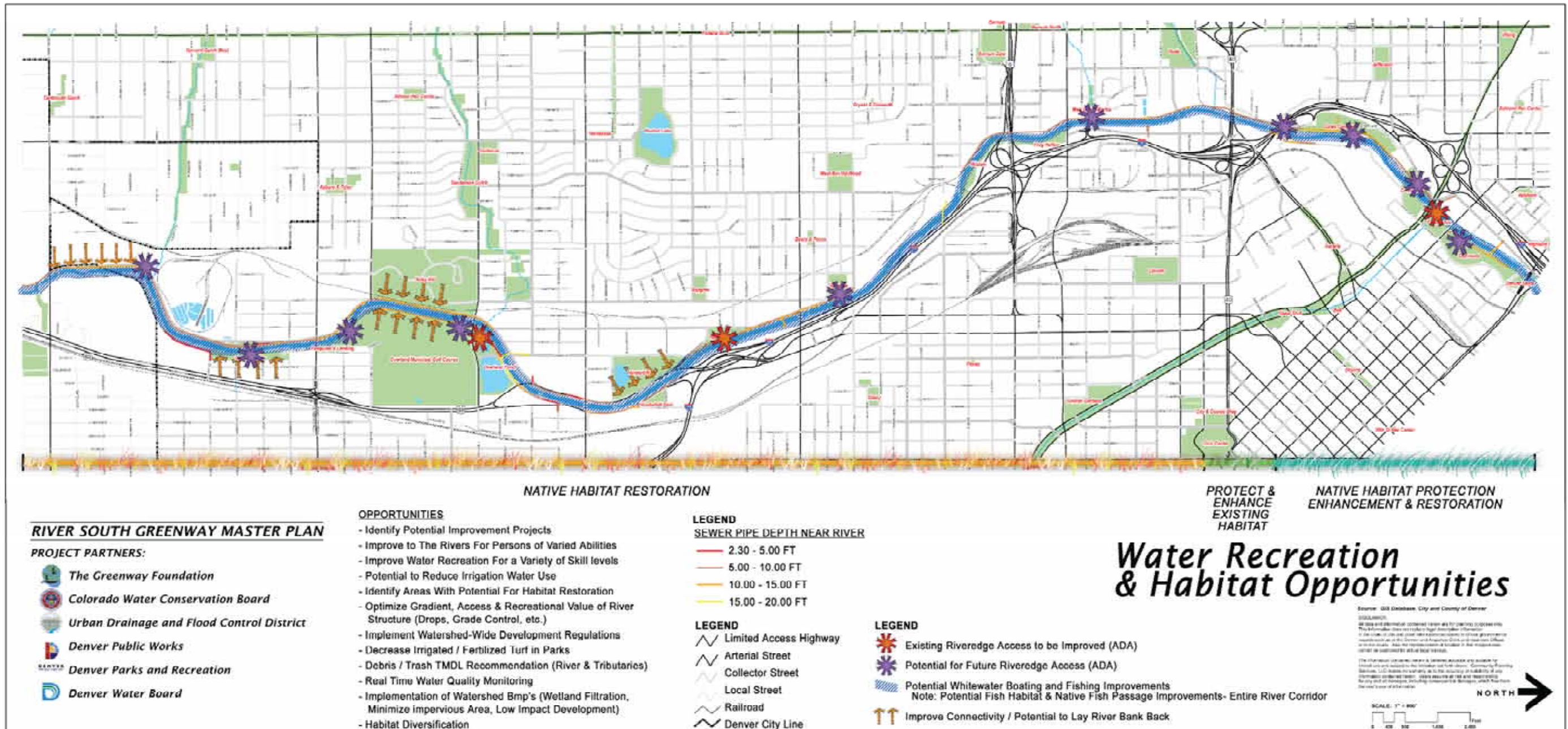
Land Use Opportunities

Source: GIS Database, City and County of Denver

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SCALE: 1" = 800'

NORTH 



Chapter 4: Detailed Recommendations

River South Greenway Master Plan recommendations are based on master plan goals and objectives, analysis of existing conditions, sound planning principles and input from the funding partners, stakeholders and citizens.

The RISO Greenway Master Plan recommends a number of improvements and modifications to address the multiple aspects of the River identified in Chapters 1 through 3. In many cases, a proposed improvement will cover several aspects, such as providing greater River stability, additional recreational uses and enhanced habitat.

A. River Health

The areas of the River that exhibit a natural morphology and riverine habitat should be preserved. Parts of the River that have been adversely affected by urbanization and encroachment should be rehabilitated in a manner that simulates the natural condition to the extent possible. In most reaches of the RISO Greenway Corridor, restoring natural conditions is not possible. However, channel and overbank structures can be developed that will improve water quality, channel stability, habitat and recreational functionality. Where possible, an effort should be made to reconnect the River channel to the floodplain either by creating flood storage areas at a lower elevation or by using open space adjacent to the channel for flood storage.

◆ **River Bank Stability** - Sections A through G in Chapter 1 display components of recommended riverbank improvements in the RISO Greenway Corridor. The Urban Drainage and Flood Control District recommends construction of naturally vegetated riverbanks at a 3:1 slope or flatter. An irrigated turf grass riverbank should be constructed at a 4:1 slope or flatter. Where obstacles such as utilities or lack of available land are constraints, a system of terraced walls can be incorporated into the riverbank resulting in 1.5:1 side slopes. However, the walls must allow for maintenance access and should promote public access to the River and Greenway.

◆ **Emergent Benches** - The “continuous emergent bank” or low-lying river buffer evident throughout this plan represents a fundamental River improvement and offers a win-win for the River, its users and its managers. It will provide enhanced riverine habitat, improve access for maintenance and invite access to the water’s edge. While restoration of the River’s historically wide floodplain in this ecologically valuable zone is simply not practical, replacement of a minimal, continuous and ecologically effective corridor may be achievable. The recommended emergent bench is a minimum of 50 feet wide on at least one side, or preferably on both sides wherever practical. To maximize the ecological benefit, the elevation of the emergent bench should typically correspond to the water surface elevation of the 1.5 year discharge. Emergent benches may reduce the flood carrying capacity of the channel section, so base flood elevations (BFE’s) must be considered during preliminary design.

◆ **Riparian Buffer** - A riparian buffer should be restored where feasible to provide wildlife habitat and improve water quality. The riparian buffer should be comprised of native trees, shrubs and grasses and should extend laterally from the top of the bank for a minimum width of 50 feet, or a more desirable width of 100 feet or greater. Additional pervious surfaces draining to the riparian buffer will help improve the quality of urban runoff entering the South Platte River.

◆ **Create Non-Irrigated Natural Areas** - Many of the parks located along the RISO Greenway Corridor use irrigated Kentucky bluegrass turf. Kentucky bluegrass requires supplemental irrigation, fertilization and chemical weed control to maintain its health and beauty, measures that are costly and which contribute to poor water quality in the South Platte River. Non-irrigated natural areas vegetated with native grasses, shrubs and trees would decrease the need for chemical fertilizers and herbicides, improve water quality, lower maintenance costs and enhance wildlife habitat. A goal of reducing irrigated turf grasses and landscape areas by 50% within the RISO Greenway Corridor is recommended.

◆ **Stormwater Detention** - The City and County of Denver and Urban Drainage and Flood Control District encourage consolidation of future stormwater detention facilities into several large detention ponds as opposed to many smaller ponds. Combining smaller stormwater facilities into larger ones provides the opportunity to create an attractive amenity for recreational and passive open space uses as well as natural lands that enhance the ecology of the River. In order to achieve this goal, additional open space lands will be needed to accommodate detention pond storage areas. Several sites have been identified as potential stormwater detention sites including an area east of the River and adjacent to Interstate 25 (between S. Huron Street and W. Alameda Avenue) and between W. 8th Avenue and W. 13th Avenue. Much of this stormwater detention will be for Interstate 25 stormwater mitigation. In addition to stormwater detention, the facilities should include wetland filtration for water quality improvements, wildlife habitat and recreational amenities. Given the limited available land within this urban reach, smaller stormwater detention facilities may increase the opportunities for water quality improvements and should also be considered as development occurs.

◆ **Water Quality** - Primary water quality concerns include bacteria and nitrates as well as general urban runoff that enter the River during and immediately after rainstorm and snow melt events. Bacteria and nitrates are being addressed, in part, by the upstream treatment plants that contribute treated water to the River flow. Urban runoff should be addressed through the implementation of watershed-wide and end-of-pipe BMP’s to improve water quality in the River; watershed-wide BMP’s are preferred over end-of-pipe BMP’s by both the City and County of Denver and the Urban Drainage and Flood Control District. Although sediment is not necessarily a contaminant, sediment derived from urban streets and properties can result in what is known as the “urban sheen” that can be found on natural bed and bank material. It is associated with a variety of contaminants that are harmful to humans and the ecosystem. Urban sediment can be controlled both at its source through LID and BMP techniques and at storm drain outfalls utilizing appropriate outfall configurations that trap the sediment before

its introduction into the River flow. Controls can include mechanical methods such as gross solids removal devices/media filters or natural components, such as River edge wetlands that act to filter the stormwater.

Water quality improvements to the South Platte River can be accomplished using a variety of methods, specifically the watershed wide LID and BMP’s discussed in Denver’s Water Quality Management Plan and UDFCD’s Urban Storm Drain Criteria Manual Volume III. In addition, daylighting of existing tributaries, such as Sanderson Gulch, and improving aquatic and terrestrial habitat in all of the tributaries at their confluence with the River would improve the RISO riverine ecosystem. Off-channel stormwater detention ponds should incorporate wetlands to filter out pollutants, as well as to provide aesthetic recreation and wildlife benefits. The emergent bench should be widened on both sides of the River whenever possible to provide increased vegetation to shade and cool the River’s water temperature; to reduce flow velocities and promote settling and nutrient uptake; to allow space for stormwater wetland filtration; and to facilitate channel maintenance. To complement and increase the effectiveness of the wetland filtration areas, stormwater outfalls should discharge upstream of these features. The incorporation of adjacent lands buffering the River will increase pervious land and help reduce stormwater run-off and promote groundwater recharge.

Stormwater BMP’s (detention basins, bio-filters, hydrodynamic devices, media filters, retention ponds, wetland basins, wetland channels, grass swales, grass buffers, rain gardens and pervious materials) should be implemented to protect and improve water quality.

In September 2009, a multi-jurisdictional organization called Protect Urban River Environment (PURE) was formed to study and make recommendations for adopting an adaptive management approach to reducing trash in the South Platte River through metropolitan Denver. Recommendations resulting from the efforts of PURE should be considered and adopted as appropriate.

◆ **Water Quality Monitoring and Warning System** - A real time water quality monitor and warning system located at Confluence Park will provide a much-needed public health tool to predict and inform the public about River water quality on a daily basis. As evidenced by current reporting, the water quality of the South Platte River varies on a daily basis and is often within established limits as set by the Colorado Department of Public Health and Environment for fecal coliform and E. coli. The proposed water quality monitoring and warning system will provide a tool for the public to be more knowledgeable and able to judge health-related risks before coming into contact with the water. It will also assist the City and County of Denver to measure improvement toward achieving the Greenprint Denver goal of a "swimmable/fishable" South Platte River.

◆ **In-Channel Recreation and Water Quality** - In-channel recreation improvements can enhance aquatic habitat by increasing channel velocities during typical flows and reducing deposition and accumulation of fine and organic sediments. This is accomplished by distributing hydraulic drop, increasing riverbed gradient and concentrating low-flows with jetties, similar to what has been implemented in the City of Cuernavaca Park section of the River. Replacement and relocation of drop structures will also improve aeration, increase oxygen levels and reduce obstacles to fish movement in the River.

◆ **Aquatic Habitat** - Aquatic wildlife can benefit from a diversified channel structure that includes riffles, pools, runs/glides and an abundance of protective cover. These structural elements should be combined with other features that are present on the River including grade control structures, diversion dams, jetties and river crossings. In some RISO Greenway locations, the river runs very shallow and slow during low-flow periods. Aquatic species in these locations would benefit from a defined thalweg that runs deeper and faster. Creating a meandering low-flow channel was tried in the past but was not successful due to a lack of flow control.

A challenge in creating additional channel structure for habitat diversity is maintaining regulatory water surface elevations. Therefore, the addition

of structures to increase habitat diversity must be accomplished in a way that flood conveyance capacity is not reduced. Increasing flood storage and floodplain areas along the River can do this. Aquatic habitat improvements that benefit native species should be a priority, although increased fishing also argues for an increase in sport fish habitat for both warm and cold water species as both have been found in the reach. Structure, in the form of organic (i.e., woody) debris and aquatic vegetation, should be included to benefit insect populations that act as food for fish. However, woody debris should be included in the channel in such a way that it will not become dislodged and form an impediment to flow downstream.

Low-flow hydraulic models and seasonal hydrologic analysis have been combined with specific target fish species optimal habitat conditions to identify reaches that would benefit substantially from improved habitat. The following three types of aquatic habitat improvements are shown on the recommended plans and correspond with the multi-objective nature of the recommendations:

- Bendway weirs are recommended in glide reaches with poor existing habitat. The bendway weir concept was developed by the United States Army Corps of Engineers 20 years ago to address erosion control, stream restoration, and habitat improvement challenges. Bendway weirs are typically submerged and redirect currents and velocities perpendicular to the direction of the weir. Traditionally, bendway weirs are located along outer banks to direct flows away from the outer bank and protect the bank from scouring; however, the same theory or function may be applied to a straight channel. Bendway weirs angled upstream and located alternately (opposite sides) will direct flow away from the bank and help define a meandering flow path pattern. Additional computational and physical modeling are recommended to determine design criteria (spacing and length of weirs) to achieve the desired meandering flow path, and to determine how the meander wavelength changes under different flow rates.

- Whitewater drops are recommended to enhance the recreational experience and to allow native and game fish migration up and down

the river. Fish passage is critical to allow movement to spawning and forage areas during seasonal fluctuations in water levels. The typical whitewater drop profile varies across the crest; the boatable section is narrow, ending with a deep pool and a large wave. The portion of the drops adjacent to the boatable section has a mild slope (less than 10H:1V) and is comprised of large boulders offering various flow paths (high interstitial flow) around the boulders. In addition to enhancing the recreational experience, the whitewater drops will provide habitat for insects and increase the amount of dissolved oxygen in the water. Jetties are also located along the banks within the drop reaches to help develop scour pools and eddies where fish can seek refuge during high flow events.

- Sills and jetties are recommended through the poor habitat portions of the canyons reaches to distribute gradient and to avoid long, flat, shallow reaches that invite organic sediment deposition and low dissolved oxygen levels. The sill crest is oriented upstream to concentrate low-flows and help develop a more pronounced thalweg. The sills will promote a riffle/run habitat sequence and the jetties will help develop scour pools and eddies where fish can seek refuge during high flow events.

◆ **Terrestrial Habitat** - Invasive, non-native vegetation, should be eliminated from the RISO Greenway riparian zone to the maximum extent possible and replaced with native species that are indigenous to the South Platte River. Replacement vegetation should include a broad range of species that provide protective cover for both aquatic and terrestrial wildlife and provide stabilization



W. Florida Avenue bridge looking east at proposed gateway improvements over the River.

of the riverbanks through their root mass. In areas where additional flood storage/floodplain re-connection is deemed possible, wetland habitat should be considered including backwater pools and secondary channels. Riparian vegetation should transition from river edge wetland species through bottomland and upland species. Attempts should be made to provide protective cover for riparian wildlife through non-vegetative structures, such as rock clusters associated with grade control structures, as well as provide protective opportunities for nesting and denning. The RISO Greenway Master Plan recommends that riparian tree nurseries/working urban forests be established along the RISO Greenway Corridor in order to provide an inexpensive source of plant materials for restoration efforts.

B. Transportation and Roadways

The purpose of the River South (RISO) Greenway Master Plan is to identify proposed conceptual improvements to the South Platte River Greenway corridor. The scope of the RISO Plan does not include nor consider transportation planning protocols beyond existing bicycle and pedestrian master plans previously completed by the City and County of Denver. In order to identify potential locations for bicycle and pedestrian connections from neighborhoods, parks and businesses, the Plan made visionary recommendations for desirable lateral, on-street bicycle and pedestrian improvements such as identifying potential bicycle and pedestrian routes that connect into the South Platte River regional trail. In addition, specific recommendations for roadways (narrowing, moving, abandoning, etc.) have been made. The intent is to provide the appropriate agencies with possible on-street bicycle and pedestrian roadway improvements

to consider for future transportation planning in order to improve connectivity to the South Platte River Greenway. Cross reference to city wide multi-modal plan (Denver Parks and Recreation and Public Works joint effort) beginning in 2010.

This RISO Greenway Master Plan will provide guidance and rationale for future transportation planning decisions as they affect the River. Future transportation planning should coordinate transportation improvements between Federal Boulevard and Broadway, and others as appropriate to ensure adequate access and linkages with the RISO Greenway Corridor. Transportation planning should coordinate location of future transit stations to ensure multi-modal connections with the RISO Greenway Corridor and the parks therein. Finally, transportation planning should convert, where feasible, and/or remove City roads/rights-of-way located adjacent to the River. These spaces should be converted to pervious open space or parks. Laying back the riverbank would make it more stable and easier to maintain. All proposed roadway closures or relocations recommended in the River South Greenway Master Plan will require further study.

◆ **General** - Improvements to east/west roadways that extend between Federal Boulevard, Broadway and the River should include continuous sidewalks, crosswalks to maximize safety, neighborhood gateway features, directional signage for way finding and bicycle routes and/or lanes as appropriate. Crosswalks should include distinctive and accessible crosswalk pavement such as stamped concrete or pavers.

◆ **South Platte River Drive**

- **Between W. Dartmouth Avenue and W. Wesley Avenue** - Realign South Platte River Drive away from the River as far as possible from its current location. Moving the roadway west will allow for laying back the riverbank slope, increasing the width of the emergent flood bench, increasing or creating riparian buffers, improving wildlife habitat, increasing visibility and public access to the River and providing recreational opportunities. Provide a grade-separated bicycle and pedestrian crossing over Santa Fe Drive and the railroad on W. Evans Avenue and complete a connection to the RTD Light Rail station.

- **Between Grant-Frontier Park east and W. Dartmouth Avenue** - Designate South Platte River Drive east as a bike route between the park and the existing bicycle/pedestrian bridge over the River just south of W. Dartmouth Avenue.
- **Between W. Wesley Avenue and W. Evans Avenue** - Explore reducing the two-way traffic on South Platte River Drive to one-way traffic and move the roadway as far west as possible. This improvement would require coordination with CDOT work planned for W. Evans Avenue. Expand Grant-Frontier Park west into the abandoned road area. If and when private properties that front South Platte River Drive are acquired, remove all (or the remaining portion) of South Platte River Drive west between W. Wesley Avenue and W. Evans Avenue. Phased removal or reduction to a one-way road in this area will allow for the expansion of Grant-Frontier Park to the west, laying back the riverbank slope, increasing the width of the emergent flood bench, increasing or creating riparian buffers, improving wildlife habitat, increasing visibility and public access to the River and providing recreational opportunities.

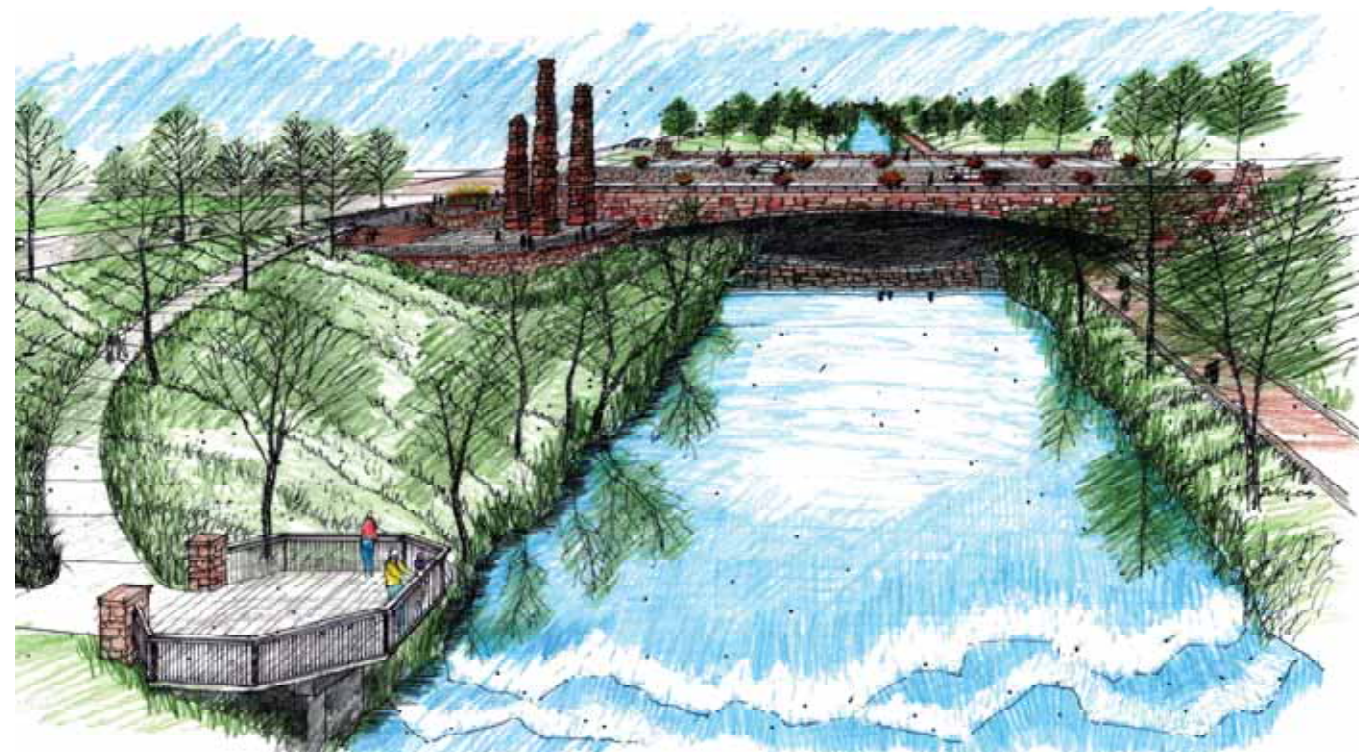
- **Between W. Florida Avenue and Santa Fe Drive** - Provide new curb and gutter on South Platte River Drive to formalize the roadway edge in such a manner that additional land adjacent to the River is available to laying back of the riverbank as much as possible. Provide access to a proposed Greenway parking lot and trailhead between S. Huron Street and Santa Fe Drive.
- **Between W. Florida Avenue and northbound Santa Fe Drive** - Close South Platte River Drive between Overland Pond Park and the Aqua Golf pond from W. Florida Avenue and northbound Santa Fe Drive. Reclaim the roadway as a natural open space area with native trees, shrubs and grasses and lay back the riverbank to create a wider emergent bench and vegetative buffering. Provide a bicycle pedestrian Greenway street connection between Overland Golf Course, Overland and Platt Park Neighborhoods via a bicycle pedestrian connection spanning Santa Fe Drive and the railroad.

◆ **W. Florida Avenue** - Redesign W. Florida Avenue as a Greenway street connection and parkway with native trees, shrubs and grasses from the

South Platte River to Santa Fe Drive. Provide for safe bicycle and pedestrian access between Overland Pond and Aqua Golf pond over W. Florida Avenue to the Overland Golf Course by adding an at-grade pedestrian refuge island, a crosswalk utilizing specialty pavement such as stamped concrete or pavers, and signage. When the W. Florida Avenue bridge is scheduled for replacement, the new bridge design should incorporate 10-foot width bicycle and pedestrian trails on both sides of the bridge, a river viewing area, multi-use trail access to the South Platte River regional trail, multi-use regional trail connection to the Sanderson Gulch regional trail on the west side of the River, an architectural/gateway feature and aesthetic character that is compatible with the natural environs of the South Platte River such as a stone façade (see below).

◆ **Vanderbilt/Johnson Habitat Park and Valverde Park Areas**

- **Vanderbilt Park/Johnson Habitat Park** - Close W. Exposition Avenue south of S. Jason Street (located between Vanderbilt Park and Johnson Habitat Park), S. Huron Street and the ramp to southbound Santa Fe Drive. Create a new roadway alignment and connection between S. Huron Street and S. Jason Street along the southern edge of the future Denver Parks and Recreation maintenance facility. The new connection would be located on the old Denver Animal Shelter property. Removal of the roadways will provide a continuous open space and Greenway corridor, safe multi-use trail connection between the parks and additional land to expand the River bank and habitat.
- **Valverde Park** - Coordinate with CDOT and Denver Public Works on the timing and logistics of closing South Platte River Drive between W. Alameda Avenue and W. Cedar Avenue to allow for additional open space needed to widen and lay back the River bank. The closure of South Platte River Drive is contingent on completion of Phase 1 and Phase 2 construction of I-25 Corridor improvements as proposed in the Valley Highway - Logan to 6th Avenue Record of Decision (ROD).



Conceptual perspective of the W. Florida Avenue bridge improvements

- ◆ **Sun Valley Neighborhood** - Close W. 11th Avenue at Alcott Way to provide additional park land in the proposed Sun Valley Riverfront Park.
- ◆ Whenever possible, provide **lateral neighborhood bicycle and pedestrian street connections** by improving and providing continuous sidewalks, on-street bicycle facilities (designated bike route) and directional signs. Neighborhood street connections are proposed for W. Jewell Avenue, S. Huron Street/ S. Jason Street (connecting Overland Golf Course and Johnson Habitat Park), W. Iowa Ave (connecting Overland Golf Course and Platt Park neighborhood via at-grade crossing over Santa Fe Drive and existing railroad underpass), W. Virginia Avenue/ S. Zuni Street/ S. Lipan Street (connecting to Huston Park, Aspgren Park and Johnson Habitat Park), W. Byers Place/ S. Tejon Street (connecting Valverde Park, Bar-Val Wood Park and Denver Public Works Central Campus), W. 2nd Avenue/ S. Decatur Street/ W. 5th Avenue (connecting to Barnum East Park), S. Decatur Street/W. 11th Avenue (connecting to Rude Park), Auraria Parkway/ Water Street/ 11th Street (connecting to Invesco Field, Pepsi Center and Auraria Higher Education Center), Wewatta Street (connecting to the 16th Street pedestrian bridge via underpass at 15th Street), Water Street/ W. 23rd Avenue (connecting to Jefferson Park and Fishback Landing Park) and Tejon Street (connecting to Highlands Neighborhood).
- ◆ **Major transportation corridor connections** are similar to neighborhood street connections because they involve continuous sidewalks, on-street bicycle facilities, such as designated bike routes or bike lanes and directional signage. They typically do not occur in neighborhoods and accommodate users from areas beyond neighborhoods such as Washington Park that are not adjacent to or near the South Platte River. Transportation corridor connections are proposed for W. Evans Avenue (east of the River), W. Alameda Avenue, W. 8th Avenue (east of the River), W. 29th Avenue (connecting Confluence Park to Viking Park and Highlands neighborhood).
- ◆ Provide **lateral Greenway street connections** by improving sidewalks up to 8'-feet in width to potentially accommodate separated multi-use trails adjacent to the street and designed with

pervious landscape areas for stormwater runoff accumulation. Greenway street connections are proposed for W. Evans Avenue (west of the River), W. Jewell Avenue (east of the River), W. Florida Avenue, W. Mississippi Avenue, W. Bayaud Ave, W. 13th Avenue and 15th Street. All lateral bicycle and pedestrian connections should include directional signage that assists the user in understanding where they are within the Denver bicycle and pedestrian system and where the various connection routes are located.

- ◆ Develop **neighborhood gateway features** at key roadway intersections that function to improve entrance visibility, way finding and safe access to the River (See Vision Plan Map on pages 6 to 7). Neighborhood gateway features may include design elements such as signage, crosswalks with specialty pavement such as stamped concrete or pavers, landscaping and architectural art features that are visible by the motorist, cyclist or pedestrian. The gateway features located at key roadway intersections function to provide safe passage and way finding for motorists, bicyclists and pedestrians seeking to access the RISO Greenway.
- ◆ **Coordinate efforts with the Platte Valley Trolley** to increase opportunities for public use and to further develop trolley stops, maintenance facilities, and educational opportunities including a re-designed trolley stop at Confluence Park (See conceptual site plan on page 11), a trolley connection to the RTD Light Rail Corridor (Please refer to plan map on page 16), a proposed multi-use trolley facility near Invesco Field and a transit museum as part of the proposed multi-use Community Entertainment Center located between the Children's Museum of Denver and the Downtown Aquarium-Denver (See plan maps on pages 17 and 18).

C. Public River Edge

Maintain a publicly owned River edge throughout the RISO Greenway Corridor. Roads, trails and promenades should provide separation between public and private areas.

D. Parks and Public Open Space

Recreational use of the South Platte River has increased dramatically with the construction of Greenway amenities such as multi-use trails, parks and boating features. In addition to trail users and boaters, the River is currently used for swimming, fishing and wildlife viewing. These uses should be further encouraged and taken into account whenever modifications are proposed for the riverine corridor.

As the southwest Denver population and recreation demand increases, existing and proposed parks and open space should increase recreation opportunities within the RISO Greenway Corridor. The City and County of Denver, the Greenway Foundation, developers and other partners should work cooperatively to expand existing parks and acquire new land for park and open space purposes. This Plan encompasses a wide range of potential park and open space opportunities from small pocket parks to large regional destination parks.

- ◆ **Existing Parks** - Re-energize the existing parks along the RISO Greenway Corridor by improving and adding amenities that meet user needs and reflect cultural identity. Citizens should be fully engaged in the planning process to ensure that community expression, identity and "fingerprints" are included in each park design. This coordinated effort will foster increased park use and stewardship.
- ◆ **Grant-Frontier Park east and west**
 - Reduce the amount of irrigated turf grass by 50 percent.
 - Layback the riverbank to a maximum slope of 4:1 to improve River edge access and maintenance.
 - Increase width of the emergent bench on the east and west sides of the River.
 - Provide accessible River access and boat put-in and take-out to the east and west park sites.
 - Restore banks with riparian plant species.
 - Provide a backwater wetland on the east and west park sites.
 - Expand the park to the west, contingent on successful reduction of the roadway width or acquisition of properties adjacent to and closing of South Platte River Drive between

W. Evans Avenue and W. Wesley Avenue in order to provide sufficient land for bank, water quality and habitat improvements and to expand the park west.

- **Pasquinel's Landing Park**
 - Reduce the amount of irrigated turf grass by 50 percent.
 - Layback the riverbank to a maximum slope of 4:1 to improve River edge access and maintenance.
 - Increase the width of the emergent bench.
 - Provide accessible River access and boat put-in and take-out.
 - Restore banks with riparian plant species.
 - Provide a backwater wetland pool.
 - Create a community garden.
- **Overland Golf Course**
 - Create a Southern Platte Valley Regional Park (SPVRP) by developing a new park and recreation re-use plan for the Overland Golf Course site. The SPVRP will function as a regional park anchor and gateway for the south end of the South Platte River Greenway.
 - Improve safe connectivity between Overland Golf Course, Grant-Frontier Park, Pasquinel's Landing Park, Ruby Hill Park, Overland Pond and the Aqua Golf pond driving range/miniature golf area.
 - Reduce the amount of irrigated turf grass by 50 percent.
 - Layback the riverbank to a maximum slope of 4:1 to improve River edge access and maintenance.
 - Increase the width of the emergent bench.
 - Provide accessible River edge access and boat put-in and take-out.
 - Restore banks with riparian plant species.
 - Create a side channel with wetland habitat.
 - Provide a natural area and environmental learning center.
 - Reconfigure the existing golf course into a nine-hole executive Audubon-certified golf course.
 - Provide an area for active recreation amenities based on community recreation needs to be determined.
 - Install a new bicycle and pedestrian bridge over the River to provide connectivity and

safe access between Ruby Hill Park and the Overland Golf Course site.

- **Overland Pond Park**

- Improve fish habitat in and around pond.
- Improve accessible fishing access on east edge of pond.
- Remove the one-way section of South Platte River Drive between Overland Pond and the Aqua Golf pond. Restore abandoned roadway with native plant species.
- Reduce the width of the single northbound lane of Santa Fe Drive between W. Florida Avenue and S. Jason Street. End the northbound lane at S. Jason Street to provide a left turn onto S. Jason Street. Restore areas gained by width reduction with native riparian vegetation.
- Provide a multi-use trail along the east and south edges of the park.
- Provide a safe, at-grade bicycle and pedestrian crosswalk with refuge median between Overland Golf Course and the park.

- **Aqua Golf pond/Miniature Golf**

- Improve fish habitat in and around pond.
- Improve accessible fishing access on west edge of pond.
- Remove the one-way, northbound South Platte River Drive along the north edge of the Aqua Golf pond all of the way to Santa Fe Drive. Rehabilitate the abandoned roadway area and north side of pond with riparian plant species.
- Extend trail from Overland Pond Park along the north side of the Aqua Golf pond to the driving range/miniature golf area and then along the south edge of the pond parallel with W. Florida Avenue.

- **Ruby Hill Park**

- Improve connectivity and access between Ruby Hill Park, the River and Overland Golf Course site by providing an improved trail when the W. Florida Avenue bridge is redesigned and constructed.
- Provide a new bicycle and pedestrian bridge between Ruby Hill Park and the Overland Golf Course near W. Jewell Avenue.

- **Vanderbilt Park**

- Improve connectivity between Vanderbilt Park and Johnson Habitat Park by removing the southbound on ramp to Santa Fe Drive.
- Layback the riverbank to a maximum slope of 4:1 to improve River edge access and maintenance in the area of the abandoned roadway.
- Restore abandoned roadway area and north side of pond with riparian plant species.
- Provide a trail connection between the parking lot in Vanderbilt Park and the RISO regional trail.

- **Johnson Habitat Park**

- Convert existing building to a new headquarters for the South Platte River Environmental Education (SPREE) program.
- Develop a parking lot for Denver Parks and Recreation Department and Greenway users at the future park maintenance facility site. Provide a trail connection between the parking lot in Vanderbilt Park and the regional trail.
- Include supervised camping sites.
- Provide River edge access and boat put-in and take-out.
- Develop a neighborhood gateway to the park and Greenway.
- Use CDOT right-of-way from east bank of River including layback of riverbank to a maximum 4:1 slope and restore the slope with riparian plant species.
- Increase the width of the emergent bench.

- **Valverde Park**

- Extend Valverde Park south to W. Alameda Avenue by utilizing the former Yacht Club site.
- Formalize South Platte River Drive between W. Alameda Avenue and W. Bayaud Avenue by narrowing the road width as much as possible in addition to new curb and gutter.
- Layback the riverbank to a desired slope of 4:1 to improve River edge access and maintenance in the area of the narrowed roadway.
- Restore lands obtained by narrowing of roadway with riparian plant species.
- Develop a neighborhood gateway on the southwest corner of the park.

- Provide a trail connection between the parking lot in Valverde Park and the RISO regional trail.

- **Phil Milstein Park**

- Develop a larger grove of cottonwood trees within the park and along the CDOT right-of-way.
- Layback the riverbank to a maximum slope of 4:1 to improve River edge access and maintenance.
- Increase the width of the emergent bench.
- Improve visibility and safety in the park by adding night lighting underneath the railroad trestle and W. 6th Avenue overpass (contingent on consultation with the Colorado Division of Wildlife). Consider security camera surveillance along the trail between Valverde Park and W. 8th Avenue.
- Restore banks with riparian plant species.
- Provide accessible River edge access and boat put-in and take-out on the west and east sides of the River.
- Acquire appropriate property for River edge access.

- **Frog Hollow Park**

- Reduce the amount of irrigated turf grass in the park by 50 percent.
- Layback the riverbank to a maximum slope of 4:1 to improve River edge access and maintenance.
- Increase the width of the emergent bench.
- Improve visibility and safety in the park by adding night lighting underneath W. 8th Avenue (contingent on consultation with the Colorado Division of Wildlife). Consider security camera surveillance along the trail between W. 6th Avenue and W. 8th Avenue.
- Restore banks with riparian plant species.
- Provide accessible River edge access and boat put-in and take-out on the west and east sides of the River.
- Acquire appropriate property for River edge access.

- **Gates Crescent Park**

- Reduce the amount of irrigated turf grass in the park by 50 percent.
- Develop an outdoor children's exploration park area in conjunction with the Children's

Museum of Denver.

- Replace or expand the existing play area with a new playground that has health, ecological and historical themes, including an education exhibit on river ecology and history.
- Develop a play structure/pedestrian bridge that extends over the existing regional trail and overlooks the River.
- Develop a multi-use facility containing a transit museum, community entertainment venue in the area between the Children's Museum of Denver and Downtown Aquarium-Denver.

E. Proposed Parks and Public Open Space

The acquisition of additional public open space adjacent to the River is required in order to expand or improve River stability, water quality, habitat buffers and recreational opportunities. The existing Elitch Gardens Theme Park was identified as a possible area for new park and open space expansion within the RISO Greenway corridor. However, the RISO Greenway Master Plan does not advocate the removal of Elitch Gardens Theme Park, but contemplates what might occur on the site if or when Elitch Gardens relocates to another site.

This site could consist of a large events park, an expanded River edge, large natural areas and a mixed-use development along the eastern edge of the site, plus a recirculating whitewater boating course. Two bicycle/pedestrian bridges over the River are also planned at Gates Crescent Park and Fishback Landing Park. The proposed bridge closest to the Downtown Aquarium-Denver will be a custom designed plaza bridge (see illustration on page 61) and will provide a platform for viewing the River and river activities. The new large events park site would be similar to that of the Commons Park area. The new park and mixed-use development would complement the Central Platte Valley Event District that is proposed for this reach of the RISO Greenway.

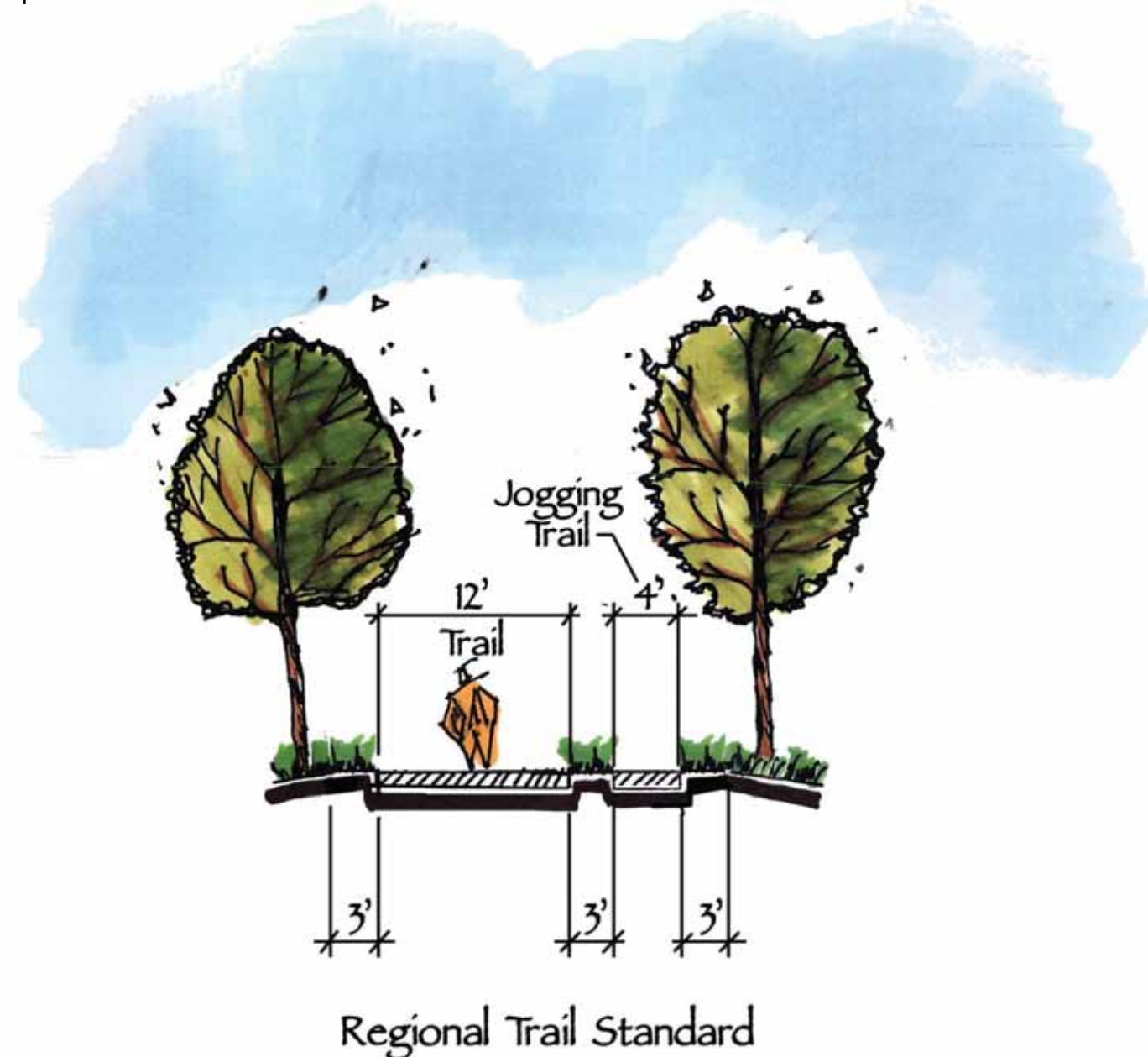
Another potential site is at Sun Valley neighborhood. A riverfront park is proposed to wrap around the south (utilizing Weir Gulch Marina Park), east and north edges of the Denver Housing Authority site.

In addition to the expanded park and open space, regional trail connections should be improved or completed on Weir Gulch to Federal Boulevard and to Rude Park.

F. Multi-Use Trails and River Connections

Currently, the regional trail system through Denver consists of either 8-foot- or 10-foot wide concrete paths. Some sections are 35-years old. These existing trails should be replaced with new, 12-foot-wide, multi-use trail constructed of tinted concrete whenever possible. A 3-foot clear zone is recommended

on both sides of the trail (see Regional Trail Standard Cross Section below). In addition, a 4-foot minimum width, soft-surface jogging path should be installed parallel to the trail. The jogging path can function as a 3-foot clear zone on either side of the trail if there is not sufficient width to accommodate the desired design. All new trails should comply with design standards including the Guide for the Development of Bicycle Facilities (1999 edition), prepared by AASHTO, the Americans with Disabilities Act (ADA) - Outdoor Recreation Guidelines and applicable City and state guidelines. It is possible the Regional Trail Standard Cross Section is not achievable along certain segments of the regional trail.

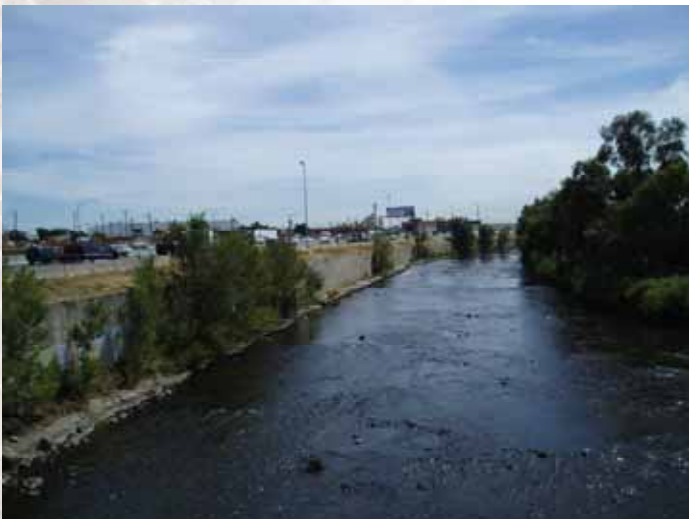


A network of multi-use trails will make the RISO Greenway Corridor more accessible to key destinations such as neighborhoods, parks, other trail systems and business districts. New, multi-use trail segments along the RISO Greenway Corridor are recommended at the following locations:

- Complete the missing trail segment along W. Harvard Gulch underneath the railroad trestle.
- Increase the minimum width of the South Platte River regional trail from 8 feet to 12 feet, with 3-foot clearance zones on each side of the trail.
- Provide a 4- to 6-foot-wide, soft-surface path for jogging and hiking that runs parallel to the multi-use regional trail.
- Designate South Platte River Drive east of the River between Grant-Frontier Park and the existing bicycle and pedestrian bridge located south of W. Dartmouth Avenue as a bike route.
- Complete a bicycle and pedestrian bridge over the South Platte River to make a safe connection between Ruby Hill Park and Overland Golf Course.
- Provide 10-foot-wide, multi-use trail on the proposed future W. Florida Avenue bridge. Complete a trail connection on the east side of the bridge with the existing South Platte River regional trail and on the west side of the bridge with the proposed Sanderson Gulch trail.
- Provide a bicycle pedestrian Greenway street connection between Overland Golf Course, Overland and Platt Park neighborhoods via a bicycle pedestrian connection spanning Santa Fe Drive and the railroad.
- Develop a multi-use trail on the west side of the River between Sanderson Gulch and the existing bicycle/pedestrian bridge at Overland Pond Park. If sufficient width is available, construct a small parking lot along South Platte River Drive between S. Huron Street and Santa Fe Drive.
- Complete the missing segment of the Sanderson Gulch Greenway between the River and S. Lipan Street.
- Create a multi-use trail between Overland Pond Park and Aqua Golf pond approximating the alignment of South Platte River Drive that is proposed for removal (see the Transportation and Roadways section in this chapter).
- Build a multi-use trail along the south edge of Overland Pond Park from the existing South Platte River regional trail to the Aqua Golf/minature golf concessions. Include an at-grade crosswalk with refuge median to connect Overland Pond Park and Overland Golf Course.
- Complete a multi-use trail around the north, east and south edges of the Aqua Golf pond and complete connections to the Overland Pond Park multi-use trail and W. Florida Avenue
- Construct a trail between Vanderbilt Park and Johnson Habitat Park.
- Build a trail from the southwest corner of Valverde Park to the existing regional trail.
- On the west side of the River, study the develop a multi-use trail from the existing bicycle/pedestrian bridge located adjacent to the new Denver Public Works Central Campus up to the Denver Public Works Wastewater Management Administration Building site to a proposed bicycle/pedestrian bridge located upstream of the existing railroad trestle. Extend a multi-use trail along the north edge of the Denver Waste Management Administration site to S. Tejon Street and W. 2nd Avenue. Provide an at-grade crossing over the railroad tracks to complete the connection.
- Replace the existing trail within the proposed Santa Fe Canyons (refer to discussion of Commercial Greenway Corridor on pages 14 and 15 typical section on page 22) located between the Santa Fe Drive bridge and Johnson Habitat Park with a new trail that is integrated with and into the canyon walls. In addition to the new trail, maintenance and emergency



Conceptual perspective of the Santa Fe Canyons

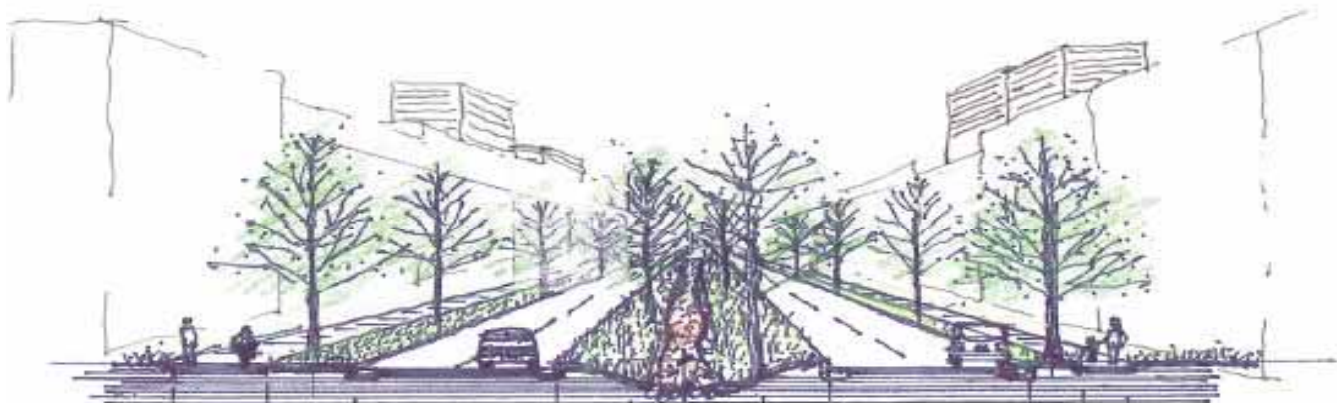


Top: Existing condition of proposed Santa Fe Canyons
Bottom: Looking south to W. Alameda Avenue

access and boat put-ins and take-outs are recommended for this reach of the River.

- Remove the existing trail segment between the existing bicycle/pedestrian bridge north of Valverde Park and the fountain bridge located across from the Denver Public Works Wastewater building. If possible, move/reuse the bicycle/pedestrian bridge to the proposed location near the northern edge of the Denver Public Works Wastewater building. In addition, construct canyon walls along the east side of the River within this segment.
- A future roadway bridge is planned to cross over the River in the vicinity of Vanderbilt Park. The new bridge should include bicycle and pedestrian facilities to connect with the existing regional trail along the River and future mixed-use development on the east side of the River. The timing for the implementation of bridge is not known as is tied to future development agreements.
- Utilize the Denver Wastewater fountain bridge to create a loop trail on the east side of the River between the Denver Wastewater fountain bridge and new bicycle/pedestrian bridge located upstream of the railroad trestle.
- Provide a grade-separated bicycle and pedestrian crossing over Santa Fe Drive and the railroad on W. Evans Avenue and complete a connection to the RTD Light Rail station.

- Enhance the open space area between the Bronco bridge and Invesco Field, the new open space will function as a new gateway between both Invesco Field and the Greenway.
- Whenever possible, provide lateral neighborhood bicycle and pedestrian street connections by improving and providing continuous sidewalks, on-street bicycle facilities (designated bike route) and directional signs. Neighborhood street connections are proposed for W. Jewell Avenue, S. Huron Street/ S. Jason Street (connecting Overland Golf Course and Johnson Habitat Park), W. Iowa Ave (connecting Overland Golf Course and Platt Park neighborhood via at-grade crossing over Santa Fe Drive and existing railroad underpass), W. Virginia Avenue/ S. Zuni Street/ S. Lipan Street (connecting to Huston Park, Aspgren Park and Johnson Habitat Park), W. Byers Place/ S. Tejon Street (connecting Valverde Park, Bar-Val Wood Park and Denver Public Works Central Campus), W. 2nd Avenue/ S. Decatur Street/ W. 5th Avenue (connecting to Barnum East Park), S. Decatur Street/W. 11th Avenue (connecting to Rude Park), Auraria Parkway/ Water Street/ 11th Street (connecting to Invesco Field, Pepsi Center and Auraria Higher Education Center), Wewatta Street (connecting to the 16th Street pedestrian bridge via underpass at 15th Street), Water Street/ W. 23rd Avenue (connecting to Jefferson Park and Fishback Landing Park) and Tejon Street (connecting to Highlands Neighborhood).
- Major transportation corridor connections are similar to neighborhood street connections because they involve continuous sidewalks, on-street bicycle facilities, such as designated bike routes or bike lanes and directional signage. They typically do not occur in neighborhoods and accommodate users from areas beyond neighborhoods such as Washington Park that are not adjacent to or near the South Platte River. Transportation corridor connections are proposed for W. Evans Avenue (east of the River), W. Alameda Avenue, W. 8th Avenue (east of the River), W. 29th Avenue (connecting Confluence Park to Viking Park and Highlands Neighborhood).
- Provide lateral Greenway street connections by improving sidewalks up to 8'-feet in width to potentially accommodate separated multi-use trails adjacent to the street and designed with pervious landscape areas for stormwater runoff accumulation. Greenway street connections are proposed for W. Evans Avenue (west of the River), W. Jewell Avenue (east of the River), W. Florida Avenue, W. Mississippi Avenue, W. Bayaud Ave, W. 13th Avenue and 15th Street. All lateral bicycle and pedestrian connections should include directional signage that assists the user in understanding where they are within the Denver bicycle and pedestrian system and where the various connection routes are located.
- Major River Gateways are located at strategic locations along the RISO Greenway Corridor to provide the user with easily recognizable loca-

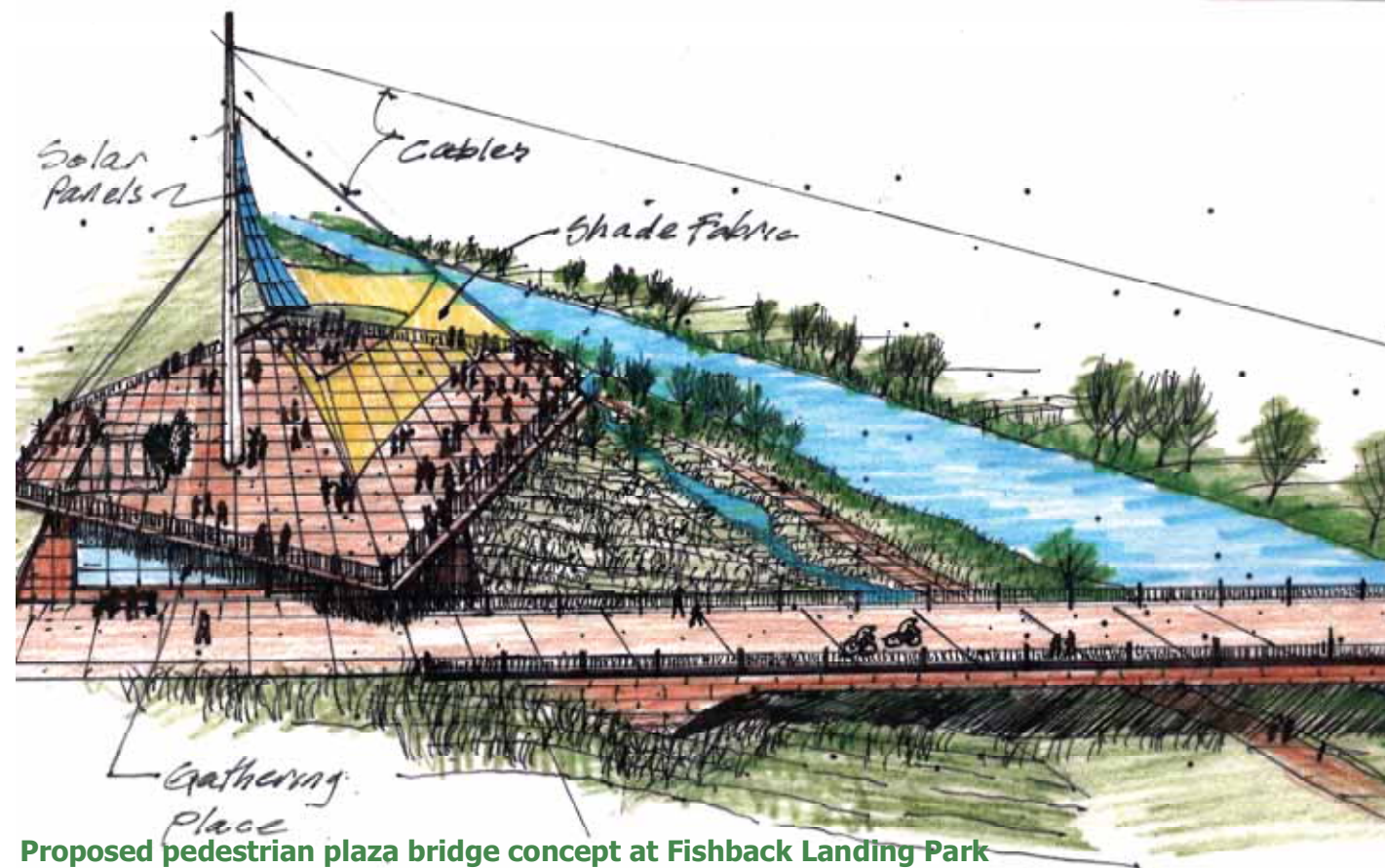


Typical Greenway street connection

tions to access the River, provide an exciting sense of arrival and reinforce the River's sense of place. Major River Gateway features within RISO Greenway Corridor are recommended for W. Evans Avenue, W. Florida Avenue, W. Mississippi Avenue, W. Alameda Avenue, W. 8th Avenue, W. 13th Avenue and W. 15th Avenue (See Vision Plan Map on pages 6 to 7).

In addition, the W. Florida Avenue bridge, when scheduled for replacement, should be designed as a gateway feature into the RISO Greenway. Major River Gateways may include a tall sculpture or architectural element that is easily recognized from the roadway and from at least two blocks away. Specialty lighting, specialized pavement, landscaping and bicycle and pedestrian access to the regional trail would enhance the gateways.

- Neighborhood Gateways are associated with many of the lateral on-street bicycle facility and sidewalk connections previously described in this section and are located where the neighborhood street connections enter into the South Platte River Greenway. They provide a visual sense of arrival and departure for Greenway users. They may include a small sculptural or architectural element, signage and landscaping elements. Neighborhood Gateways are proposed at the confluence of W. Harvard Gulch, Ruby Hill Park on W. Jewell Avenue, Johnson Habitat Park, Valverde Park, the proposed Sun Valley riverfront park, the Bronco Bridge and Fishback Landing Park.



Proposed pedestrian plaza bridge concept at Fishback Landing Park



Proposed neighborhood gateway concept

G. In-River Recreation

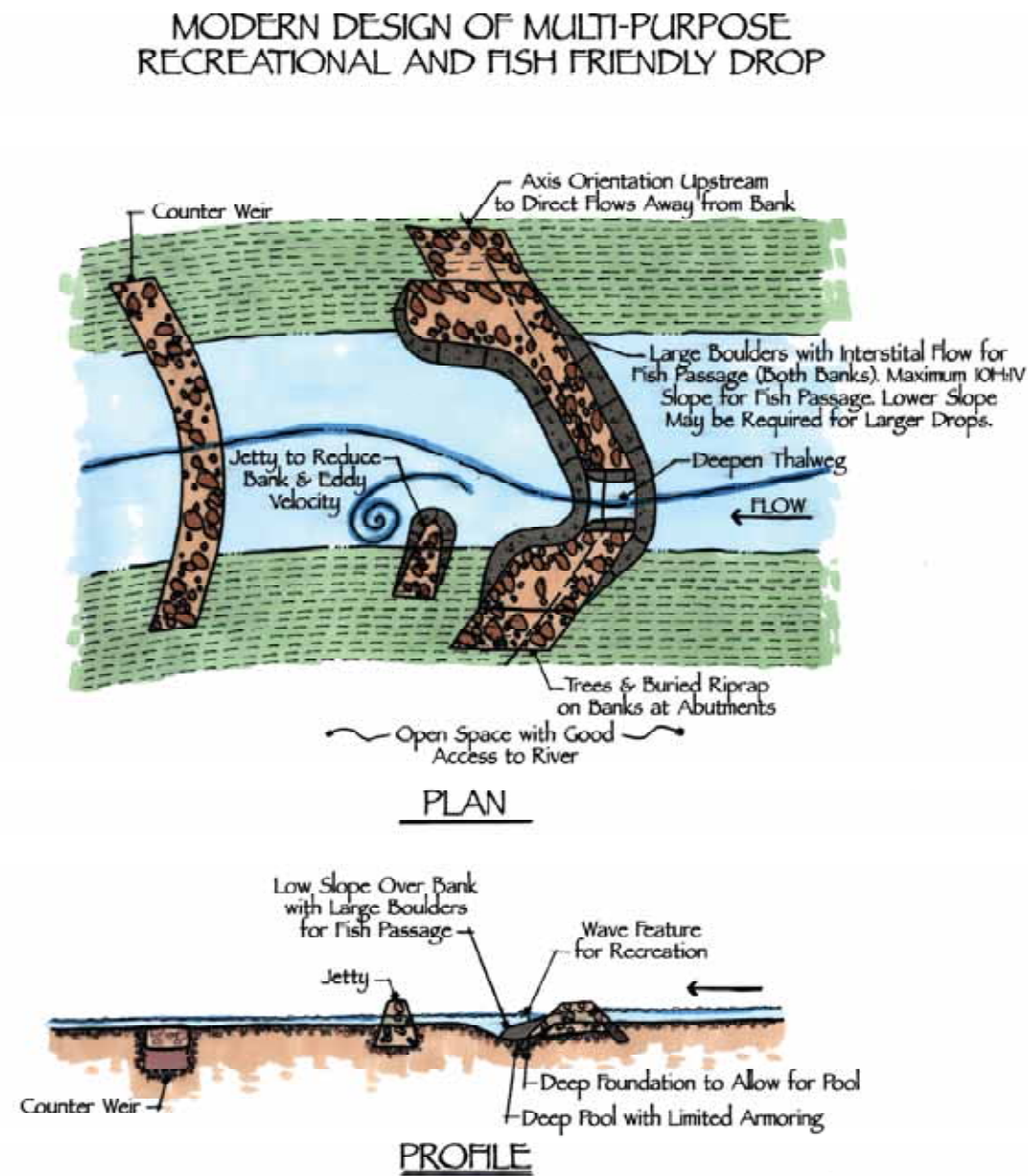
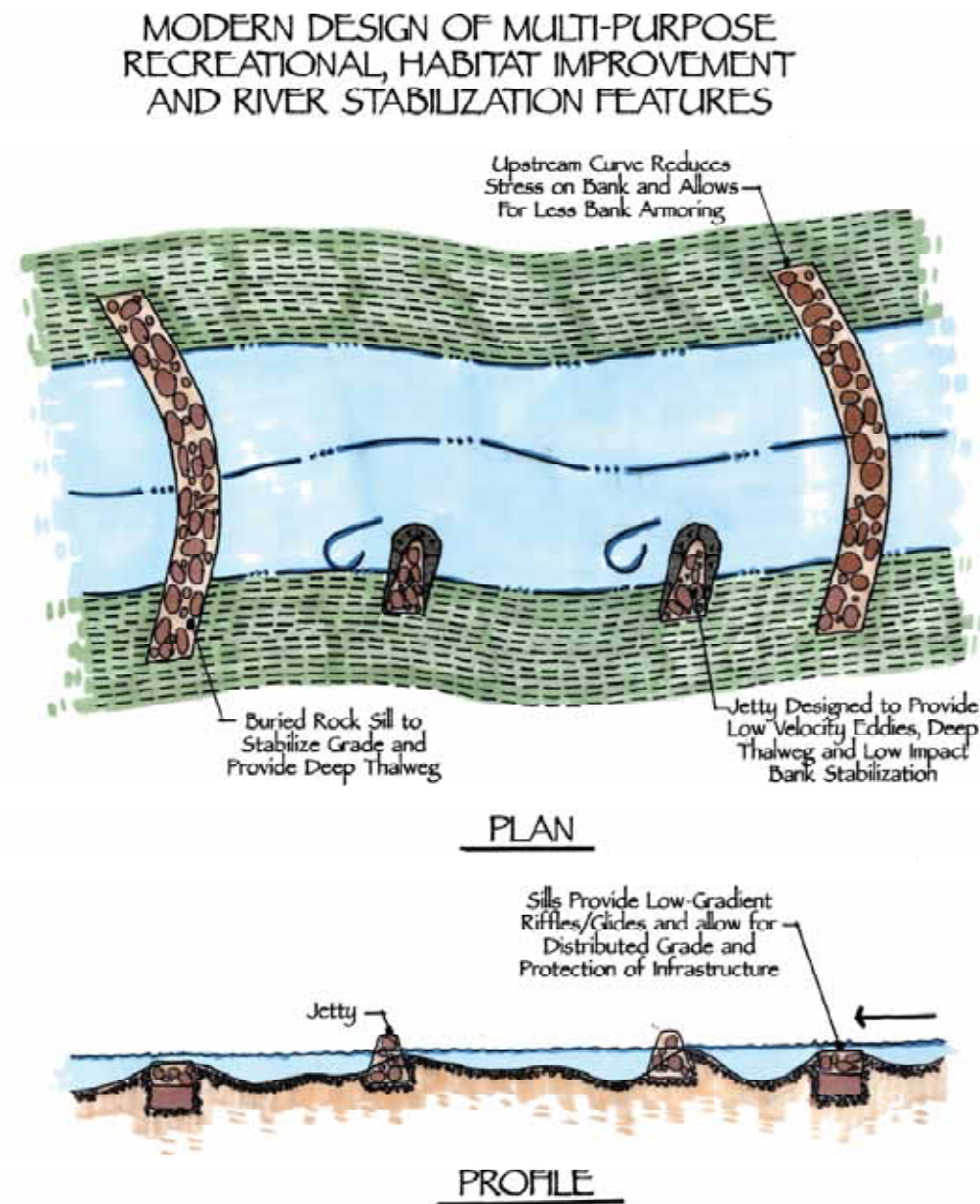
Examples of the earlier types of improvements are shown on page 38. The W. 3rd Avenue bypass boat chute features a wide, steep, concrete passageway with a short, heavily armored pool below. While this structure provides basic passage for recreational whitewater craft, it offers no waves for users to develop river-running skills or to learn how to negotiate features in natural rivers. The short pool at the end of the drop offers virtually no recovery room for novice rafters or kayakers.

The boat chute at W. Alameda Avenue is typical of many structures installed in the River today. Unlike the W. 3rd Avenue structure which drives all passage to a well-defined chute on the right, this chute extends across the River. It is not nearly as tall, dropping only about two feet and is easy to navigate unlike the 3rd Avenue drop which can be dangerous at higher flow levels. Sadly, the undistinguished hydraulic features neither enhance a river boating trip nor draw users to the site.

Contemporary river stabilization design distributes gradient throughout the River reach to avoid long, flat, shallow reaches. This approach allows organic sediment deposition and lowers dissolved oxygen levels. Transverse river stabilization elements, as shown on page 63, include bendway weirs. Sills and jetties are proposed structures that will distribute gradient successfully. These elements will create pools, riffles, glides, and a deep *thalweg to improve fish habitat, water quality, and recreational users' experiences. Localizing steeper drops in several locations will protect existing infrastructure and provide for water diversions. (*In hydrology and fluvial geomorphology, the thalweg (sometimes called the "valley line") is a line drawn to join the lowest points along the entire length of a streambed or valley in its downward slope, defining its deepest channel. It thus marks the natural direction (the profile) of a watercourse. The thalweg is almost always the line of fastest flow in any river. The term is also sometimes used to refer to a subterranean stream that percolates under the surface and in the same general direction as the surface stream.)

A typical drop that addresses the objectives described above is shown on page 62. This prototypical structure has less than three feet of drop, and its align-

Examples of Proposed Drop Improvements



ment is oriented to reduce bank shear stress and to reduce the need for excessive armoring. Unlike the existing drop at W. Alameda Avenue, its profile varies across the crest, and the boatable section is narrow, ending with a deep pool and a large wave. The adjacent sides of the drop have a lower gradient and are comprised of large boulders offering various flow paths (high interstitial flow) around the boulders. This creates an environment along the banks that fish tend to prefer when they travel upstream.

Graphics on pages 64 and 65 are plans and profiles of the entire RISO Greenway Corridor. The plan views indicate the location of existing in-water rapids created by drop structures and smaller riffles. The profiles show the existing invert from the 1986 Flood Hazard Area Delineation Map. They also show (1) water surfaces representative of a typical springtime flow from an approximate effort completed as a part of this study, and (2) locations of some representative utility crossings. The approach for meeting

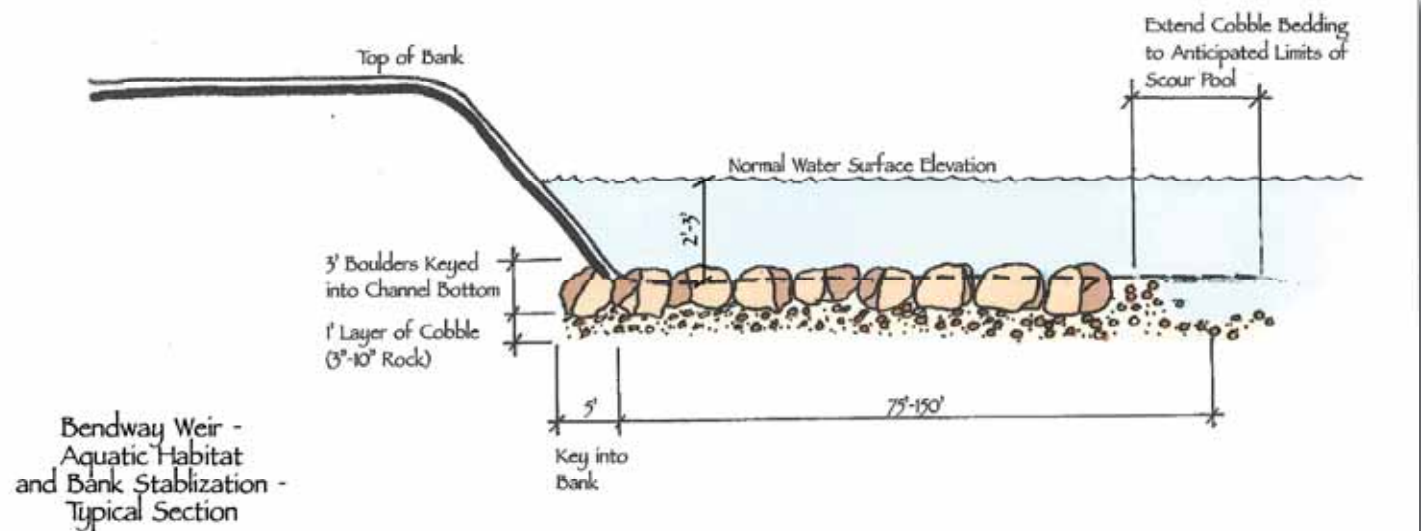
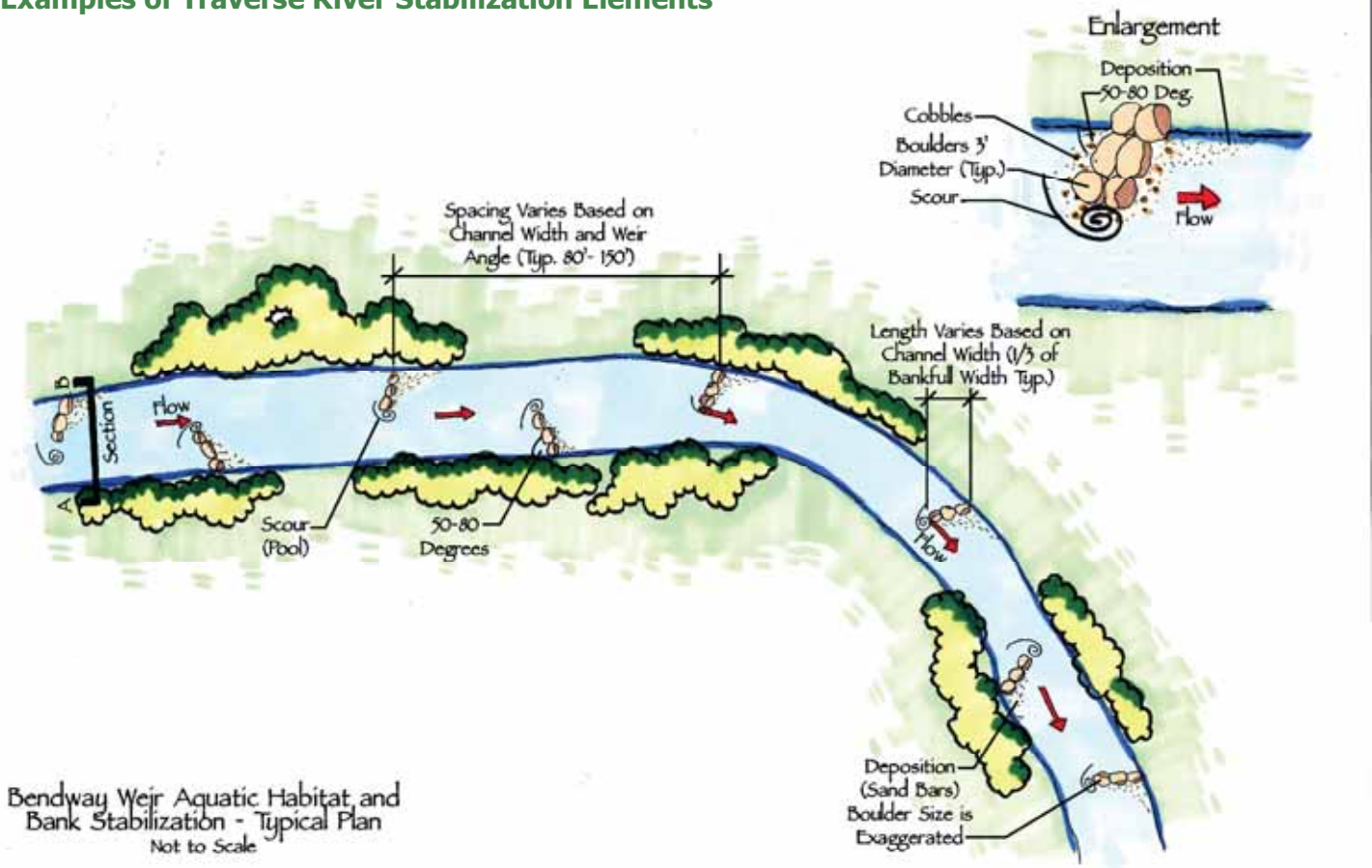
recreational, habitat enhancement and stabilization objectives centers on re-distributing the hydraulic drop throughout the reach. Redistribution efforts require lowering of the river invert, some utilities and possibly foundations of various existing infrastructure. In reaches where new construction is planned, this profile is intended to alert utility or infrastructure owners to the need to lower the future invert.

Consolidation of drops is planned in only one area, downstream of Confluence Park, to create a greatly expanded Confluence "whitewater river" Park.

Confluence Park is the focal point for boating along RISO Greenway Corridor and is well known as the primary whitewater recreation destination on the South Platte River in the Denver metro area. A number of conditions have changed since its most recent updates in the mid-1990s. Most relevant is that the structure's primary purpose, a water diversion, is no longer needed. The pipeline and intake are now planned for decommissioning. Since its construction, the recreational usage of Confluence Park has dramatically increased, reflective of the extensive adjacent development. The short length and narrow width of the whitewater course offers a limited capacity, and the course is too small to host regional whitewater events. A significant update of existing amenities is needed to return Confluence Park to its former status as a premier urban whitewater recreational attraction. Improvements planned to revitalize the park are shown on page 63. The concept plan includes extending the course by lowering the river invert at Commons Park and City of Cuernavaca Park, and moving the drop upstream to create a continuous course. This will allow Denver to host national events and provide for a wider variety of recreational uses as well as land-based observers. Improvements include increased gradient upstream of the course, installation of night lighting, additional flows through the whitewater course, adjustable features that accommodate different uses and lowered elevation at the entrance of the existing course.

To further enhance Confluence Park as a whitewater river park, a recirculation water system is proposed. Utilization of the existing intake and upper portion of the diversion conduit greatly reduces the capital cost of the system. A pump station would be constructed downstream of the park and recirculate water throughout the course and downstream reach. The reliable flow would increase usage by extending its season through the summer and fall months, making it much more reliable for hosting events. The recirculation system could also lead to improvements in the water quality by increasing natural water quality improvement processes that occur in highly aerated flows and in alluvial rivers. Furthermore, various passive or active treatment features could be added to the system to further improve the water quality and

Examples of Traverse River Stabilization Elements



fish habitat. The system's effectiveness would be realized during the warmer and lower-flow periods when water quality is at its worst and in-river usage is high.

Other recommended in-river improvements for the RISO Greenway Corridor include:

- Move or consolidate gradient to improve

boating and/or fishing at Grant-Frontier Park, Vanderbilt Park and Phil Milstein Park.

- Distribute gradient at Overland Golf Course to integrate with proposed re-use improvements of the golf course and reconfigure the existing diversion dam and intake structure located south of W. Florida Avenue. If implemented,



these attributes will provide a destination for high quality, water recreation experiences for boating and fishing.

- Create low-water wading at Pasquinel's Landing Park, Frog Hollow Park and other River edge access points.
- Redesign the large drop located adjacent to the Denver Public Works Wastewater Management Administration Building to distribute the gradient and reduce the level of difficulty for boaters.
- Improve access and boat put-ins and take-outs by extending the regional trail to the River's edge. (Please refer to section on Multi-Use Trails and River Connections.)
- Relocate and redesign proposed drops at Lakewood Gulch to integrate with new Greenway and River improvements. Implementation

of these improvements will eliminate the last impediment to boating on the Denver reach of the South Platte River, provide accessible River-edge access, improve fish habitat and provide a continuous boating experience to Confluence Park.

H. Safety and Security

In order for the South Platte River Greenway to be successful, it must be a safe and inviting place for citizens to recreate, exercise and use as an alternative transportation route. Many of the improvements recommended in other sections of this master plan greatly contribute to overall safety for users. For example, laying back the riverbank slopes will enhance visibility into and out of the RISO Greenway Corridor. Proposed trail improvements will help provide multiple opportunities for users to move in and out of the Greenway Corridor, and gateways will provide clearly identifiable visual clues to specific points where users can enter or depart the Greenway. Where ingress

and egress are not available, such as between Phil Milstein Park and W. 8th Avenue, remote controlled security cameras should be considered.

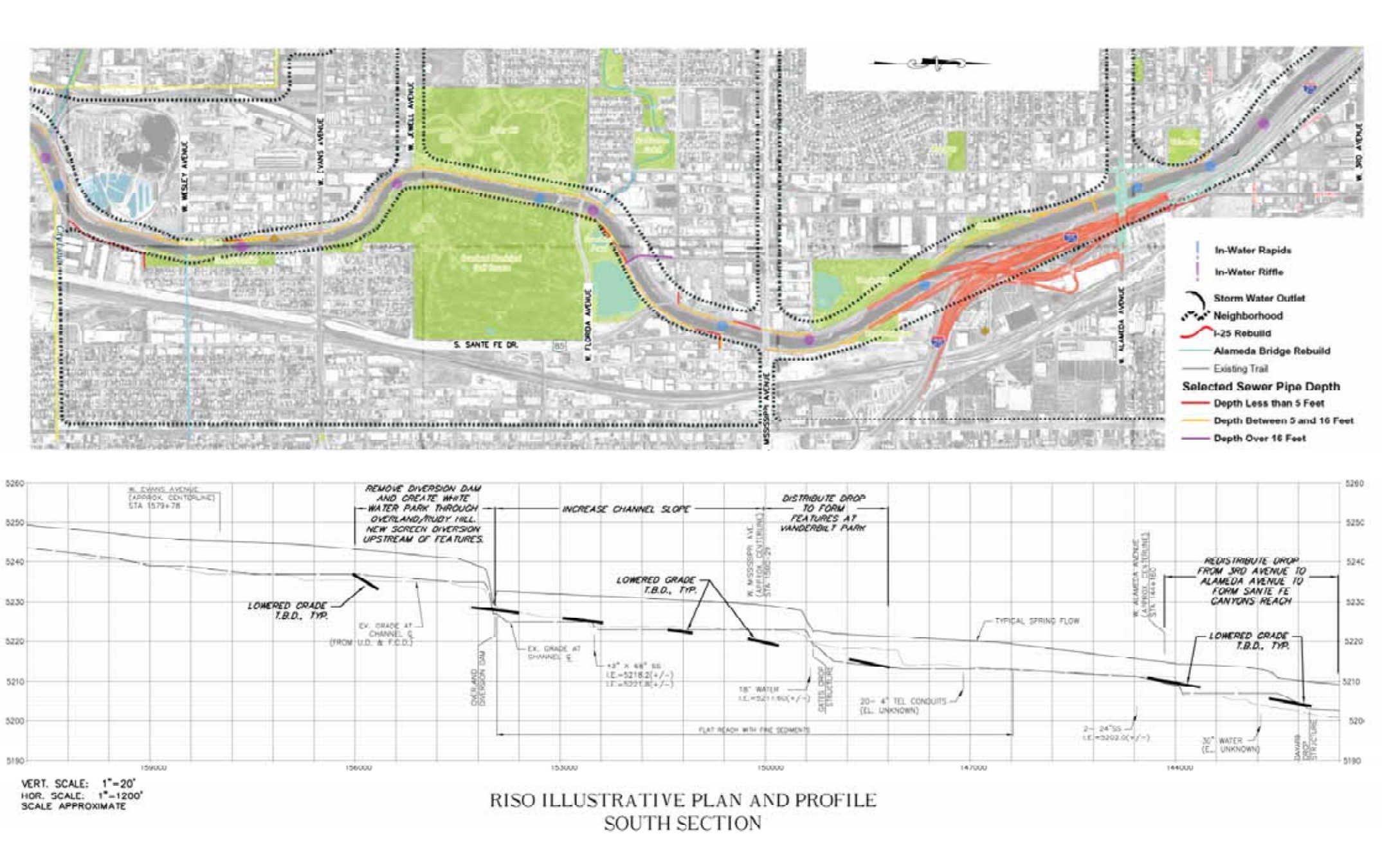
As automobile fuel prices rise, increased numbers of citizens will use the Greenway as an alternative form of transportation. Commuters will use the Greenway during periods of darkness, especially in winter months. Providing night lighting along dark sections of the regional trail and under roadway bridges and railroad overpasses will help to make the commute safer (contingent on consultation with the Colorado Division of Wildlife).

Frequent police monitoring of the entire South Platte River Greenway in Denver is reassuring to users and a deterrent to crime. A task force comprised of law enforcement and emergency agencies, City and County of Denver Parks and Recreation, the Urban Drainage and Flood Control District, and the Greenway Foundation should be formed to develop a safety and security action plan for the South Platte River Greenway.

1. Implementation Tools

To accomplish the goals of the RISO Greenway Master Plan, the City and County of Denver should implement regulatory measures to improve the health and vitality of the South Platte River. Best management practices were identified that would benefit the South Platte River. These practices include:

- ♦ **South Platte River Greenway Advisory Committee** - Create a South Platte River Greenway Advisory Committee, comprised of the Manager or his/her designee of Denver Parks and Recreation, Denver Public Works, Denver Community Planning and Development, Denver Environmental Health, and representatives from various stakeholder groups, including Urban Drainage and Flood Control District, the Greenway Foundation and other interested parties. Subcommittees would be established to deal with issues such as management and maintenance, River health, parks, recreation and open space, safety and security. Creation of the advisory committee would serve as a guide for identifying a multi-jurisdictional cooperative approach to establishing and implementing South Platte River objectives. The committee would meet on a regular basis to review and advise the



implementation plans' progress as well as develop new implementation steps as needed.

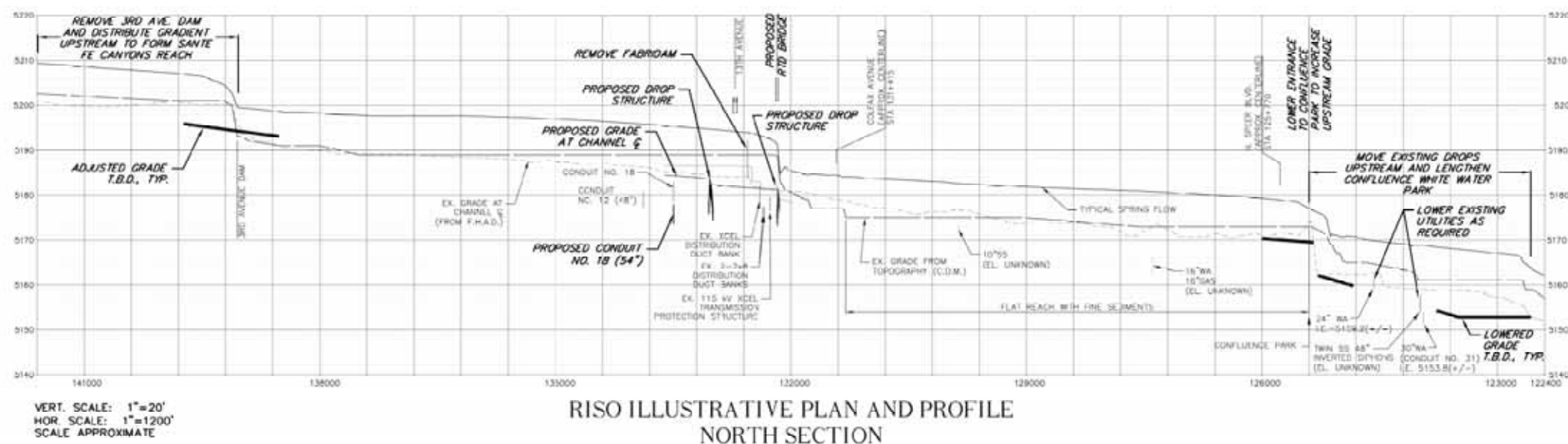
- ♦ **River Maintenance** - Develop and execute a Memorandum of Agreement between the City and County of Denver, regulatory agencies and community organizations that establishes maintenance needs, responsibilities and implementation for the South Platte River within the City and County of Denver.

- ♦ **Water Quality, including Zero Trash Tolerance Policy** - Consider adoption and implementation of proposals put forward by the Protect Urban River Environment (PURE) to improve water quality, including a zero trash tolerance policy for the South Platte River through metropolitan Denver.

- ♦ **Riparian Buffer Conservation Easements** - This is a voluntary approach to riparian setbacks where the City and County of Denver can work with willing landowners and nonprofit conservation organizations to acquire the development rights

to key riparian buffer areas and restore them as needed to improve water quality within the South Platte River Corridor. Denver should seek a minimum of 50 feet for each easement and encourage the reestablishment of riparian habitat where appropriate.

- ♦ **River Setback Standard** – Explore creating a River setback standard in order to establish a publicly owned River edge along Denver's major urban drainage way; a minimum setback requirement from the top of the bank of at least 100 feet, is



recommended. This will ensure adequate space for trail connections and Greenway amenities. All surfaces within this setback should be pervious.

- ◆ **Development Fee** - The City and County of Denver should explore creating a parks, recreation and greenway development fee, similar to the fee assessed in the City's Gateway District, to assist with the acquisition and construction of new parks and open space projects.

- ◆ **Acquire Land Adjacent to the River** - The City and County of Denver should acquire land or property interests as needed to implement the goals and recommendations of the RISO Greenway Master Plan. Such acquisitions will be critical to many aspects of the plan, including, but not limited to, enhancing existing parks and open space, creating new parks and open space, improving water quality and maintaining existing and new stormwater control and mitigation structures. Such acquisitions may range from acquiring title in fee simple, acquiring conservation easements to permanently protect riparian buffers or privately held open

space, or exchanging City-owned property for private property.

There are different benefits to each land acquisition strategy. For example, by acquiring title to property in fee simple, either through purchase, bargain sale or donation, Denver will have complete control over the property in question, which will be necessary for the creation of new parks or other improvements. Land exchanges allow the City to acquire key pieces of property without having to purchase the property, so that City funds can be used for other projects. Finally, conserva-

tion easements enable the City to permanently protect key environmental resources or open space without having to purchase the property or exchange it for another property. Easements can be a more cost-effective way to implement the RISO Greenway Master Plan in areas where the City does not need to have complete control over the property. Denver should partner with non-profit land conservation organizations, such as the Trust for Public Land and the Greenway Foundation, to implement these strategies.

One of the challenges with using conservation easements as an implementation tool will be finding the most appropriate organization to hold, monitor and enforce those easements. Using conservation easements in an urban area is a relatively new practice, and while Denver could potentially hold the easements, they would be more effectively managed by an urban land trust that could handle the day-to-day management of the easement with Denver co-holding the easement. This would give the City a real property interest in each property, allowing it to act as a backstop should enforcement action be needed. Denver should work with conservation organizations such as, Trust for Public Land and the Greenway Foundation to explore the possibility of creating an urban land trust.

J. Summary of Recommended Projects

CATEGORY OF OPPORTUNITIES AND CHALLENGES	RECOMMENDATIONS	SUBRECOMMENDATIONS	RESPONSIBLE AGENCIES/PARTIES
RIVER HEALTH	River Bank Stability		UDFCD
	Emergent Benches		TGF, CCD agencies
	Riparian Buffer		TGF, CCD agencies
	Non-Irrigated Natural Areas		DPR
	Stormwater Detention		DPW
	Water Quality		EPA, CDPHE, DEH
	Water Quality Monitoring and Warning System		EPA, CDPHE, DEH
	In-Channel Recreation and Water Quality		EPA, CDPHE, DEH, DPR, TGF
	Aquatic Habitat	Bendway weirs	TGF, CCD agencies
		Whitewater drops	TGF, CCD agencies
TRANSPORTATION AND ROADWAYS		Sills and jetties	TGF, CCD agencies
		Terrestrial Habitat	CDOW, DPR
	South Platte River Drive	Realign roadway away from the River between W. Dartmouth and W. Wesley avenues.	DPW
		Designate as bike route between Grant-Frontier Park east and W. Dartmouth Avenue.	DPW
		Remove South Platte River Drive west between W. Wesley and W. Evans avenues.	DPR, DPW
		Add curb and gutter, maximize space to lay back the riverbank between W. Florida Avenue and Santa Fe Drive.	DPW, DPR
		Provide connection between S. Jason Street and S. Huron Street with realigned W. Exposition Avenue that provides access to Greenway parking lot.	DPW, DPR
		Close South Platte River Drive between Overland Pond Park and the Aqua Golf Pond and reclaim the roadway as a natural area.	DPR, DPW
		Formalize and narrow South Platte River Drive between W. Alameda Avenue and W. Bayaud Avenue.	DPW, DPR
	W. Florida Avenue	Redesign W. Florida Avenue as a Greenway street connection from the South Platte River to Santa Fe Drive.	DPW, DPR

CATEGORY OF OPPORTUNITIES AND CHALLENGES	RECOMMENDATIONS	SUBRECOMMENDATIONS	RESPONSIBLE AGENCIES/PARTIES
	Vanderbilt Park/Johnson Habitat Park	Close W. Exposition Avenue south of S. Jason Street (located between Vanderbilt Park and Johnson Habitat Park), S. Huron Street and the ramp to southbound Santa Fe Drive. Create a new roadway alignment and connection between S. Huron Street and S. Jason Street along the southern edge of the future DPR maintenance facility.	DPW, DPR
	Valverde Park	Coordinate with CDOT and Denver Public Works on the timing and logistics of closing South Platte River Drive between W. Alameda Avenue and W. Cedar Avenue to allow for additional open space needed to widen and lay back the river bank. The closure of South Platte River Drive is contingent on completion of Phase 1 and Phase 2 construction of I-25 Corridor improvements as documented in the Valley Highway – Logan to 6 th Avenue Record of Decision (ROD).	CDOT, DPW, DPR
	Sun Valley Neighborhood	Close W. 11 th Avenue at Alcott Way to provide additional park land in the proposed Sun Valley riverfront park.	DPW, DPR
PUBLIC RIVER EDGE	Maintain a publicly owned River edge throughout the RISO Greenway Corridor.	Roads, trails and promenades should provide separation between public and private areas.	DPR, DCPD
PARKS AND PUBLIC OPEN SPACE	Re-energize the existing parks along the RISO Greenway Corridor by improving and adding amenities that meet user needs and reflect cultural identity.	Grant-Frontier Park east and west	DPR
		Pasquinel's Landing Park	DPR
		Overland Golf Course	DPR
		Overland Pond Park	DPR
		Aqua Golf/Miniature Golf	DPR
		Ruby Hill Park	DPR
		Vanderbilt Park	DPR
		Johnson Habitat Park	DPR
		Valverde Park	DPR
		Phil Milstein Park	DPR
		Frog Hollow Park	DPR
		Gates Crescent Park	DPR
PROPOSED PARKS AND PUBLIC OPEN SPACE	Acquire additional public open space adjacent to the River in order to expand or improve River stability, water quality, habitat buffers and recreational opportunities.	Acquire additional land for public open space.	DPR

CATEGORY OF OPPORTUNITIES AND CHALLENGES	RECOMMENDATIONS	SUBRECOMMENDATIONS	RESPONSIBLE AGENCIES/PARTIES
		If Elitch Gardens moves, expand open space in redevelopment.	DCPD, DPR
		Create a riverfront park at Sun Valley Homes.	DHA, DPR, DCPD
MULTI-USE TRAILS AND RIVER CONNECTIONS	Create a network of multi-use trails throughout the RISO Greenway Corridor.	Complete missing trail segment along W. Harvard Gulch.	DPR
		Increase minimum width of regional trail from 8 feet to 12 feet, with 3-foot clearance zones on each side of trail.	DPR
		Provide 4-foot to 6-foot-wide, soft surface path for jogging and hiking.	DPR
		Complete bicycle and pedestrian bridge over River to make connection between Ruby Hill Park and Overland Golf Course.	DPR, DPW
		Provide 10-foot-wide, multi-use trail on proposed W. Florida Avenue bridge. Complete east side trail connection and west side connection with Sanderson Gulch trail.	DPW, DPR
		Develop trail on west side of River between Sanderson Gulch and Overland Pond Park bicycle/pedestrian bridge	DPR
		Complete missing segment of Sanderson Gulch Greenway.	DPR
		Create a trail between Overland Pond Park and Aqua Golf	DPR
		Build a trail between Overland Pond Park bicycle/pedestrian bridge and Aqua Golf	DPR
		Complete multi-use trail around Aqua Golf with connections to Overland Pond multi-use trail.	DPR
		Construct a trail between Vanderbilt Park and Johnson Habitat Park	DPR
		Build a trail from the southwest corner of Valverde Park to the existing Greenway trail	DPR
		On west side of River develop multi-use trail from existing bicycle/pedestrian bridge at new Denver Public Works Central Campus to Denver Public Works Wastewater building.	DPR
		Utilize Denver Wastewater fountain bridge to create loop trail on east side of River.	DPR
		Replace existing trail within proposed Santa Fe Canyons.	DPR
		Remove existing trail	DPR

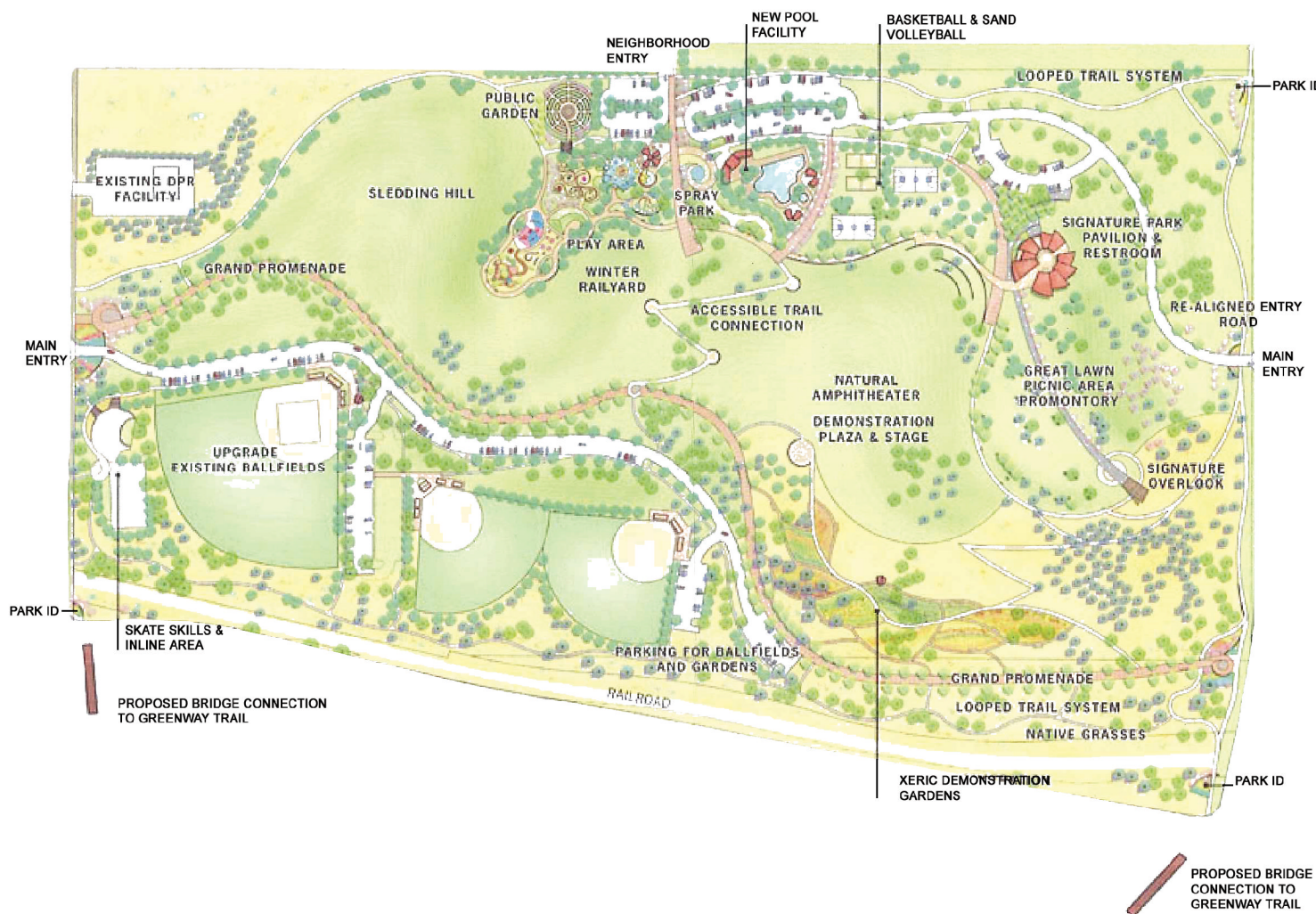
CATEGORY OF OPPORTUNITIES AND CHALLENGES	RECOMMENDATIONS	SUBRECOMMENDATIONS	RESPONSIBLE AGENCIES/PARTIES
		segment between existing bicycle/pedestrian bridge north of Valverde Park and fountain bridge.	
		Provide a grade-separated bicycle and pedestrian crossing over Santa Fe Drive and the railroad on W. Evans Avenue.	DPR, DPW
		Provide lateral neighborhood bicycle and pedestrian street connections by improving and providing continuous sidewalks, on-street bicycle facilities and directional signs to the River.	DPW
		Provide lateral Greenway street connections by improving sidewalks up to eight feet in width to accommodate separated multi-use trails adjacent to the street and pervious landscape areas for stormwater runoff accumulation.	DPW, DPR
		Develop neighborhood gateways.	DCPD
IN-RIVER RECREATION	Utilize contemporary river stabilization design in order to distribute gradient throughout the River reach.	Use bendway weirs, sills and jetties.	UDFCD, DPR
	Redistribute the hydraulic drop throughout the River reach.	Lower the River invert, some utilities and possibly foundations of various existing infrastructure.	UDFCD, DPW
		Consolidate drops downstream of Confluence Park to create a greatly expanded Confluence "whitewater river" Park.	UDFCD, DPR, DPW
	Return Confluence Park to its former status as a premier urban whitewater recreational attraction.	Extend the course by lowering River invert at Commons Park and City of Cuernavaca Park.	UDFCD, DPR, DPW
		Move the drop upstream to create a continuous course.	UDFCD, DPR, DPW
		Increase the gradient upstream of the course.	UDFCD, DPR, DPW
		Add flow through the whitewater course.	UDFCD, DPR, DPW
		Adjust features that accommodate different uses.	UDFCD, DPR, DPW
		Lower the elevation at the entrance of the existing course.	UDFCD, DPR, DPW
	Move or consolidate gradient to improve boating and/or fishing at Grant-Frontier Park, Vanderbilt Park and Phil Milstein Park.		DPR, DPW
	Distribute gradient at Overland Golf Course		DPR, DPW

CATEGORY OF OPPORTUNITIES AND CHALLENGES	RECOMMENDATIONS	SUBRECOMMENDATIONS	RESPONSIBLE AGENCIES/PARTIES
	Create low water wading at Pasquinel's Landing Park, Frog Hollow Park and other River edge access points.		DPR, DPW, UDFCD
	Redesign the large drop located adjacent to Denver Public Works Wastewater building.		DPW, DPR
	Improve access and boat put-ins and take-outs by extending the Greenway trail to the River's edge.		DPR, DPW
	Relocate and redesign proposed drops at Lakewood Gulch to integrate with new Greenway and River improvements.		UDFCD, DPR, DPW
SAFETY AND SECURITY	Lay back riverbank slopes.		UDFCD, DPW
	Add gateways and access points to Greenway Corridor.		UDFCD, DPW
	Consider remote controlled security cameras.		Denver Police, DPR, DPW
	Install underpass night lighting.		DPR, DPW, UDFCD
	Arrange for frequent police monitoring of entire South Platte River Greenway in Denver.		Denver Police
	Assemble task force to develop a safety and security action plan.		Denver Police, DPR, UDFCD, TGF
IMPLEMENTATION TOOLS	Create the South Platte River Greenway Advisory Committee		DPR, DPW, DCPD, DEH, UDFCD, TGF
	Develop and execute a Memorandum of Agreement that establishes maintenance needs, responsibilities and implementation.		DPR, DPW, DCPD, UDFCD, TGF
	Consider adopting and implementing proposals put forward by the Protect Urban River Environment (PURE) to improve water quality.		EPA, CDPHE, CDOW, DEH, TGF, CWCB
	Acquire development rights to key riparian buffer areas and restore them as needed to improve water quality within the South Platte River Corridor. Seek a minimum 50 feet setback for each easement and encourage the reestablishment of riparian habitat where appropriate.		EPA, CWCB, CDOW, CDPHE, CCD agencies, UDFCD, TGF
	Explore creating a River setback standard in order to establish a publicly-owned River edge. A minimum setback requirement from the top of the bank of at least 100 feet is recommended.		DPR, DPW, DCPD, UDFCD, TGF, TPL

CATEGORY OF OPPORTUNITIES AND CHALLENGES	RECOMMENDATIONS	SUBRECOMMENDATIONS	RESPONSIBLE AGENCIES/PARTIES
	Explore creating a parks, recreation and greenway development fee to assist with acquisition and construction of new parks and open space projects.		UDFCD, DPR, DPW, DCPD, OTHER CCD agencies, TGF
	Acquire land or property interests as needed to implement the goals and recommendations of the RISO Greenway Master Plan.	Acquire title to property in fee simple.	UDFCD, CCD agencies, TGF, TPL
		Acquire property through bargain sale or donation.	UDFCD, CCD agencies, TGF, TPL
		Acquire property through land exchanges.	UDFCD, CCD agencies, TGF, TPL
		Protect key environmental resources or open space through conservation easements.	UDFCD, CCD agencies, TGF, TPL

Appendix

Ruby Hill Park Master Plan Graphic



Decatur Station Graphic



Summary of Public Input

These are the comments collected at the public meetings held in Summer 2009 to acquaint interested residents and river recreation users and others with the planning process underway. The River South Greenway Master Plan team benefitted greatly from the participation of all who attended these meetings and shared their ideas.

Southern Platte Valley Regional Park

- Look at purchasing J. C. Helenstader-owned land at southeast corner of West Evans Avenue and South Platte River Drive.
- Acquisition opportunity noted at Platte River Drive south of West Evans Avenue; proposed location for 5-story residential buildings.
- TAA noted on ramp north of West Evans Avenue between South Cherokee Street and South Banck Street.

General

- In the proposed urban farm area, put in a small greenhouse.
- Great to see urban farm areas on the proposed map. How large? More = better. Can this land be leased for farming by non-profits? By for-profit small farmers? Farmers' market area? Good!
- Consider a river interpretive center at South Platte River and West Florida Avenue (with use of a glass tunnel).
- Access

River Health

- Love the efforts to improve water quality and restore more natural environment with native plants, etc.
- Wetland area on one-third of the golf course is a great idea.
- I really like the idea of a natural area where children can learn about the world.
- River opposite Overland Pond is a primary in-stream restoration area.
- Provide an area for a think tank to teach/research water issues in the West/Platte River Basin. (Less entertainment places. More thoughtful programs).
- Promote native vegetation usage and education natural area. It's a great plan.
- Need to clean up the river.

- South Platte River at Dartmouth is a primary in-stream river restoration area.
- Don't lose the wild with too much carnival.
- Change water used for golf course irrigation; it has an odor.

Transportation and Roadways

- Construct sound mitigation from the industrial area across Platte River Drive.
- Make sure transportation plan includes access to all of the businesses near the river.
- Reduce industrial noise (at river and West Harvard Avenue).
- Develop pedestrian bridge across South Platte River at West Florida Avenue.
- Consider building a new road around west side of Ruby Hill Park south to West Jewell Avenue then east to South Platte River, then south again to West Wesley Avenue, then east to Grant-Frontier Park.
- Improve road access and entry at south end of Overland Golf Course.

Public River Edge

- Vary the riverfront to draw people to the banks.
- Create bird watching area at Aqua Golf pond.

Parks and Public Open Space

- Need places to get food and drink at regular intervals along the river – not chains.
- Ruby Hill Park.
- Create a Festival Park in Ruby Hill.
- Put a Gene Amole Memorial Park at the top of Ruby Hill and hold Friday waltzes.
- Bury those power lines on Ruby Hill.
- Build an iconic statue at the top of Ruby Hill Park.
- Look at removing road on west side of South Platte River between Ruby Hill Park and Overland Golf Course.

Proposed Parks and Public Open Space

- An environmental learning center on the South Platte River is desperately needed.
- Overland Golf Course – new plan.
- Integrate a second channel of the South Platte River with golf course and make it a feature of golf course from Overland Pond along west side of golf course along river and south and east to South Huron Street.
- Dump the golf course idea. 98 percent of the City of Denver does not play golf and that does

make it economically reasonable.

- Get rid of golf course idea.
- Like the new plan for Overland Golf Course.
- Don't change or eliminate Overland Golf Course.
- You can't sell an executive golf course to a true golfer.
- Do not close the golf course. Plus you would replace it with a swamp and a park that will become a hangout for gang activity.
- Great idea for the park, but put it next to the river.
- Why not another Washington Park instead of chopping Overland Golf Course into pieces?
- We already have a nine-hole golf course at Harvard Park, so why have two so close together that are so similar?
- Possible historical educational opportunities with Wright Brothers airplane landing at Overland Park. (Is there other similar opportunities?)
- Leave Overland Golf Course alone. It's a historical landmark – 1895.
- I love the idea of multi use for Overland Golf Course.
- "Executive" golf course is a ridiculous euphemism. It is a Par 3 course. You may as well get rid of the course, which is a historic course.
- Overland Golf Course was the first golf course built west of the Mississippi. Do you really want to lose that historic value for something that is still useful and enjoyed?
- Real golfers don't play executive golf courses.
- In the long, long term, industry should be moved away from the river (which is a real and irreproducible asset) and the whole area ¼ mile back on each side should be park. (Modest proposal, but why not dream?)
- Skate park in this area at South Platte River and West Evans Avenue under West Evans Avenue viaduct
- Multi-Use Trails and River Connections
- Create access from east to west that does not require automobiles; make it safe.
- Need to see the South Platte River Corridor transformed into native vegetation greenbelt with safety.
- Need signs along the river that tell the history of the area that you are in.
- Build a bicycle path through the power plant site to increase access. Why not talk to Xcel Energy about moving and use the land for a park.
- If the golf course goes, think about strong link

between Ruby Hill and Overland parks for major Washington Park-type experience.

- Create connection for West Harvard Gulch along the gulch.
- Walking separation from riding path near Arapahoe Station Power Plant.
- Need connection to mass transit LRT from Overland Park area.
- Develop soft surface running path along South Platte River.
- Need a pedestrian/bike bridge across railyards and Santa Fe Drive at West Iliff Avenue.
- Create connection for Sanderson Gulch along gulch to South Platte River.
- Move trail away from traffic along Santa Fe Drive on east side of Overland Golf Course.

In-River Recreation

- In proposed white water area, need to take into consideration in-stream flow for fish habitat.
- Need drops, rifles for D.O. (at river and Arapahoe Station Power Plant).
- Possible site for boat landing at South Platte River north of West Evans Avenue
- Develop boat landing on east and west sides of South Platte River at Overland Golf Course.
- Integrate second channel with golf course and make it a feature of golf course from Overland pond along west side of golf course along river and south and east to South Huron Street.

Safety and Security

- Need emergency phones and anti-graffiti measures.
- Unsafe area noted at West Evans Avenue east of South Platte River across railyards.

Commercial Greenway Corridor

General

- Commercial is a misnomer; it is an industrial/transportation area.

River Health

- Need more wetland/marsh near the river to clean the river and create habitat. Look to City of Minneapolis as they have restored spaces around lakes.
- Add River bends or eddies? Improve streamside habitat and banks.
- Develop more riparian, natural habitat at South

Platte River north of West Bayaud Avenue.

Transportation and Roadways

- Need safe pedestrian and bicycle access from east side of river. Especially between Alameda and Evans avenues.
- Build a “major” bridge across the river at Alameda Avenue – like those across major rivers in the Midwest
- At Alameda, create better access to the river and improve walking and bicycle route on Alameda.
- At Valverde Park, build a bridge that is called for in the Baker Neighborhood Plan, the Valley Highway Plan and the Bicycle Master Plan. It would cross the river and I-25.
- Improve green space within cloverleaf on I-25; it is the largest green space within the Baker Neighborhood.
- Alameda Station Transit Oriented Development (TOD) plan is suggested for area at Santa Fe Drive and South Cherokee Street between West Alaska Place and Alameda Avenue. This area is slated to have more residential in future.
- Close ramp at Animal Shelter at Valverde Park.
- Create connection to mass transit, light rail, etc. at West Exposition Avenue and South Platte River.
- Build tunnel or alley under I-25 to connect as part of I-25 improvements.

Public River Edge

- Don’t install faux stone walls. Build terraced landscape instead.
- Create access on both sides of South Platte River recreation through Habitat Park.

Parks and Public Open Space

- Habitat Park offers the only place for urban camping in Denver. Any plan to further develop and utilize this is great. A good opportunity to provide educational activities.
- In Vanderbilt Park, create a group of tent spaces, build a wash house/latrine. Add an amphitheatre and “fire” central space.

Proposed Parks and Public Open Space

- Put urban farm space near industrial; community gardens near residential.
- Add possible park and open space south of West Alameda Avenue at South Platte River.

Multi-Use Trails and River Connections

- Create access to the river that does not require a car.
- Baker Neighborhood lacks connections to the river; need to improve and increase connections.
- Need several much better people/bicycle connections between Alameda light rail station and the South Platte River Regional Trail.
- Connect banks with a footbridge at Virginia Avenue.
- Need a better connection with Washington Park neighborhood and the Alameda light rail station – some sort of better bicycle/pedestrian-friendly corridor.
- Between Alameda to Evans, move the trail away from South Santa Fe Drive
- Need connection to the river at Sanderson Gulch. Lots of people use this trail and would follow it down river.
- Widening the bicycle path is a wonderful idea.
- Need pedestrian and bicycle access across Santa Fe Drive.
- Improve bicycle and pedestrian trail from Alameda to Mississippi.
- Possible reroute of bike path along West Exposition Avenue from South Vallejo Street to the South Platte River.
- Improve South Platte River and park access at Alameda Bridge.
- Add bridge with access from both sides at Habitat Park for pedestrians and bikes.
- Develop trail on west side of river between Phil Milstein Park and Valverde Park.

In-River Recreation

- Cantilever fishing piers. Double as boat launches.

Safety and Security

- Add a road with lighted intersection/gate Vanderbilt Park where pedestrian bridge across river is proposed.

Urban Greenway Corridor

General

- More space for urban farms and community gardens.

River Health

- Weir Gulch needs to be redesigned to remove concrete box and open the “delta.”

Transportation and Roadways

- Need pedestrian/bicycle bridges to go from east to west across I-25.
- Maintain enough space for the possibility of the Platte Valley Trolley reaching as far south as possible – at least to Alameda – to provide rafting access.
- West line of light rail is shown at West Howard Avenue across river.

Public River Edge

- Use real rocks in the canyon area of the river instead of “Disney rocks.”

Proposed Parks and Public Open Space

- Why not ask Denver Housing Authority to sell the Sun Valley property and build good housing elsewhere? Redevelop the land into multi-use major redevelopment (with park space along the river).

Multi-Use Trails and River Connections

- Need visual entry to river corridor at 6th Avenue.
- Look up Frederick, Maryland Boy Scout sculpture.
- Need bicycle access to the river corridor and have it clearly shown on maps.
- Emphasize confluence of South Platte River with Lakewood Gulch and Weir Gulch to much greater degree. The tributaries are gateways to the neighborhoods.
- Note trail and places where crossings are at grade at West 8th Avenue and West 13th Avenue.
- Develop connection and open space to school at West 13th Avenue and South Platte River.

In-River Recreation

- Develop braids and fish structure at Frog Hollow Park and South Platte River.
- Create wheelchair fishing access, more river braids and more holding water for fish.
- Braid the channels at specific areas to increase overall habitat.

Central Platte Valley Event District

General

- Educate river users on water conservation.
- Develop Riverwalk especially retail and restaurants that front on South Platte River near 20th Street.

River Health

- Area of river just downstream of Speer Boulevard could become a primary in-stream restoration area.
- Expand wetlands outfall areas for filtration/aesthetics. Near Blake Street?
- Include stormwater filtration systems (with natural media) in the designs

Transportation and Roadways

- Maintain the space for a trolley line along the river for tourist and rafting access.
- Platte Valley Trolley needs include storage facility, connection to RTD Decatur light rail stop or on 13th Avenue corridor and two-track station at Decatur or passing track.
- Identify and locate transit museum (and barn) for Platte Valley Trolley near Children’s Museum and Aquarium.
- Another possible location for Platte Valley Trolley barn is on Stadium District land north of West Colfax Avenue at South Platte River.
- Create Platte Valley trolley access between West Colfax Avenue to Decatur RTD light rail station; enhance stops, create storage and parking.

Public River Edge

- Activate retail as close as possible (opposite Commons Park) between 15th and 20th streets.
- Integrate Auraria Master Plan with any proposed riverfront development.

Parks and Public Open Space

- Promote native vegetation wherever possible and limit Kentucky bluegrass.

Proposed Parks and Public Open Space

- If and when Elitch Gardens Theme Park moves away, look at changing that area to a mixed use destination and whitewater park.

Multi-Use Trails and River Connections

- Create soft surface path between 15th Street and 19th Street on top of bank on west side.
- Create more pedestrian-only paths including loops with information/interpretive signs near Confluence Park.

In-River Recreation

- Signature wave feature is a good idea. Large wave features are attractive to kayakers. Glen-

- wood Springs whitewater park is a good example.
- Include several distinct wave features for kayaking with large eddies. Look at other designs for whitewater parks, such as Golden, Salida, Durango, which have successful parks. Adapt to flow conditions on South Platte River.
 - Estimate the operational cost for a recirculation system.
 - Check proposals for cutbacks and waves and how they affect the overall water level height as well as other river activities.
 - Provide a sport fishery in this section of the South Platte River. Small mouth bass would be the quarry. No native fish mentioned are sport fish. Need fish habitat.
 - Could rafts be pulled behind the trolley to minimize congestion and traffic to boat access points?
 - Develop more stream habitat. Add more in-stream structures.

Whitewater Blow Up

Transportation and Roadways

- Need a river feature at Speer Boulevard. and I-25 -- and at all bridges to "tune out" road noise at river level.

Proposed Parks and Public Open Space

- Prefer ideas that recreate a natural Colorado setting and habitat, i.e. marshlands, cottonwood groves, etc.

Multi-Use Trails and River Connections

- Opportunity for a progressive idea to engage our aging population with the river corridor and the Auraria Higher Education Center campus.

In-River Recreation

- A proposed new whitewater course near Confluence Park is a great idea; look at Olympic white-water park in Charlotte, North Carolina.

Safety and Security

- Need to provide parking; this area is already congested.

RISO Stakeholder Meeting

TABLE 1

Facilitator: Gordon Robertson, Denver Parks and Recreation
Reporter: Rebecca Hunt, Highland United Neighbors, Inc.
Recorder: Jon Novick, Denver Environmental Health

Group Focus:

- Dog open space (where the pound is now)
- In stream recreation (kayaks, beach, cleaner water)
- Access
- Additional priorities
- Highlight water quality /tributaries
- Public education (water safety)
- Address homelessness
- Integrate information about river into other events/brochures (e.g. Children's Museum of Denver)
- More integrated uses
- Accommodation of multiple uses on trails
- More access points for boating on water
- More signage
- Multi-use ADA access points
- Boating safety
- Define safety
- Sort out turf issue/roadblocks (flood control)
- Rethink public policy related to land use along the river
- Encourage alternative zoning along river/zoning overlays
- Work with neighborhood groups on access points to river
- Dog park at current site of animal shelter
- Access points with opportunity to interact with the river
- Create a world-class whitewater play park and tubing run

TABLE 2

Reporter: Greg Kyle, Colorado Whitewater Association
Recorder: Donna Pacetti, Denver Water/Greenprint Denver
Facilitator: Bob Armstrong, CDM

Group Focus:

- Expand access opportunities for public
Access points defined/expanded
- Opportunities at Elitch's location
- Riverwalk?
- Lay back riverbanks to increase access
- Features in the river
- Natural river benches/outcrops
- Side channels/oxbows
- Take advantage of river's curves
- Reroute into Overland Golf Course site
- Create wetlands
- Opportunities/additional ideas
- Non-point source pollution
Use BMPs
- North of Alameda bikepath redirection/improvements
- Additional boating/recreational opportunities, plus more public access to the river
- Improve water quality
- Create whitewater venue
- Encourage public use of the river
- Connect recreation with other opportunities
Shops
Community gardens
Farmers' markets
Beerfests
Beer Gardens
Human element (expand access for people with parking and signs)
Artfests
Model boat races

MARKINGS ON MAP

- At Frog Hollow (W. 8th Avenue): expand kayak access
- At Valverde (approximately W. 1st Avenue): cantilever bike path over river
- At Overland Golf Course: Expand bank/side channel, create wetland, side/off channel
- At Zuni Power Plant: Create standing wave, hold beer festivals, create improved area for recreation
- At Elitch's site: Integrate the park to the river, alternative uses

- At Cuernavaca Park: Create standing wave
- Build features in the river with rocks, natural benches, habitat improvements
- Can we add fishing?

TABLE 3

Facilitator: Roy Fronczyk, Community Planning Services, Inc.
Reporter: Sandyn Sudneski, Office of State Sen. Linda Newell
Recorder: Susan Baird, Denver Parks and Recreation

Group Focus:

- Is congestion a problem (on trails)? If so,widen them (to accommodate all users)
- Opportunity for recreation
- Entrepreneurial? Rent boats
- Boat access whole reach
- String of crown jewels – 2-mile nodes
- Recreation, entertainment, more
- New drops; drop = opportunity
- Do something with Santa Fe by Vanderbilt
- One side of the river (deck, tunnel, move lanes) Get neighborhoods closer (connections, trail-heads, more buy-in)
- Thematically placed activities
- Anchors!
- Enough park and open space for future density
- BID/HOA for corridor

MARKINGS ON MAP/STICKIES

- Dog park at current pound
- Close road along river behind Overland Golf Course? Road too busy to close?
- North of Jewell and west of the river -- railroad problem??
- Area along river south of Evans Avenue outlined as a future opportunity.
- Outline on map and sticky note saying 80 acres = Destination Sun Valley and
- Campus -- positive partners.

TABLE 4

Facilitator: Merle Grimes, MDG, LLC
Reporter: Dina Costillo, Athmar Park Neighborhood Association (There was another person who reported with Dina.)
Recorder: Terry Baus, Denver Public Works

Group Focus:

- Access, Safety, Way Finding (if on river)

- Signage
- Branding
- Access corridors
- Sense of arrival
 - How to get to it?
- Greenway
- River
- Disconnected – Athmar Park area
 - Lack of vendors
 - Public safety considerations
 - Replicate steamboat landing
 - Commercialized tubing stations
 - Improvethetheexperienceofbeingimmediately next to Santa Fe/I-25
 - TODlinkagetotrailswithbikeracks/storage at TODs
 - Lighting (on trails)
 - 2nd skateboard park
 - More people living on the river in RISO
 - Dog park at animal shelter
 - Small and large
 - Dog pond
- Health

MARKINGS ON MAP/STICKIES

- Noise barriers between river and I-25
- Improve access across I-25 between Children’s Museum of Denver and Fishback Landing Park
- Pedestrian bridge near Vanderbilt Park
- Improve access from neighborhoods to Habitat Park
- Denver Bicycle, Mike Blake, 303-725-8911
- Steve Sander, Denver Economic Development

TABLE 5

Facilitator: Travis Bogan, CDM
 Reporter: Kaz Berzins
 Recorder: Karen Good, Denver Public Works

Group Focus:

- Overland Golf Course
- Road between Pond and Aqua Golf isn’t used or needed by Denver Parks
- Land by Santa Fe used as gateway/parking/amenity area
- Water Quality – Use plan to help identify ways to improve water filtration, reduce waste into river
- Includes possible land acquisition
- Incorporate recommendations from City’s storm-water master plan/game plan, etc.
- Neighbors and citizens plus commercial/business

- Keep all commercial businesses involved in new amenities/parking
- Industrial users
- Getting/giving opportunities to make these uses better in the short term
- Think about what is visible from/to the river
- Parking issues – Where are you providing connections? Will there be intrusion into neighborhoods?
- Attractive nuisances
- How to deal with neighborhood issues
- Golf balls usually go right – point to consider when locating paths/trails
- Natural resources/wildlife corridor - animals, not just fish - mammals/reptiles, possums - human conflict
- Public safety/natural resource protection – balance these sometimes competing/conflicting goals
- Parks use of reclaimed water for parks – long range plan of reclaimed water links along river
- Do we really want more parks that require irrigation? More grass?
- Have decision makers at the table from the start – more buy-in
- Include EPA and others in water conversation
- Bikes go fast, pedestrians slow -- points of conflict especially for pedestrians with dogs and those with mobility challenges – gravel path next to paved path could be a solution – or fully separated trails/paths
- Build on areas where there are other amenities – Pepsi Center, Elitch’s, golf course, etc. String of pearls

MARKINGS ON MAP/STICKIES

- Consider wildlife corridor – other species, small mammals, birds, etc.
- Area south of Aqua Golf – parking/access
- Overland Pond/Aqua Golf – great potential

TABLES 6 AND 8 COMBINED

Facilitator: Devon Buckels, Denver Parks and Recreation; Wade Shelton, Trust for Public Land
 Reporter: Jack Unruh, Overland Park Neighborhood Association
 Recorder: Tim Martinez, Denver Economic Development

Group Focus:

- Abandoned car wash (Aqua Golf)

- Opportunity: amenity
- Skate park?
- Aqua Golf area connections and system improvement
- Platt Park/Washington Park connection – Cherokee?
- Pedestrian/bike challenge – separation, both banks
- Buffer from cars, noise, dust
- Overland Park/Aqua Golf quick win – remove road
- General Chemical – trail
- Stop dumping
- Detention needed
- Stop dumping
- EducationTransition – land between zones
- Overland: Commercial zoning? (not industrial)
- Urban farms/community garden
- Use of green space
 - Includes farmers market and access between community and fresh food sources

MARKINGS ON MAP/STICKIES

- More trail away from I-25 and Santa Fe
- Near Evans Avenue and river: property for sale - repair shop
- Create connection to Evans RTD station
- Between river and I-25 near W. Iliff Avenue – CDOT (more space) – Farmers Urban Market
- Charm bracelet – Opportunity to develop (new urban design?)
- Cultural
- Artistic representations of history and neighborhoods -- through bridges and access points
- Bridge connection – Santa Fe/South Platte River – from Gates redevelopment
- Physical separation of vehicles/trail/dust/dirt
- Eliminate road between Aqua Golf and Overland Park
- At Aqua Golf – Abandoned car wash
- Wider trails or alternate trails – mixed use - pedestrian/bike
- Eliminate detrimental discharges into river

TABLE 7

Facilitator: Kevin Shanks, THK
 Reporter: Jon Kahn, Confluence Kayaks
 Recorder: Kim Watanabe, Denver Public Works

Group Focus:

- Increase water elevation for recreation and habitat

- Improve water quality
- More testing
- Better regulation
- Education of recreational users instead of regulation
- Manage the different users (pedestrians, bikes, dogs...) not to diminish anyone’s use
- Access to the river for community along entire reach
- Connections to neighboring parks and crossing major streets
- Recreation anchor around Overland/Ruby Hill area.
- Boat landings
- Art walks and parks around commercial properties
- Metro Wastewater concerns about water levels
- Tax increase around Englewood Treatment Plant – will this go towards project?
- Detention needed
- Stop dumping
- More commercial, not more industrial

MARKINGS ON MAP/STICKIES

- South of W. Mississippi to River – access through industrial area
- East and west of river at Howard Place – visual access
- Near Florida Avenue and river – boating feature
- Connect to Overland Pond
- Create landings and parking
- Practice area for kayakers – flat water

TABLE 9

Facilitator: Risa Shimoda, McLaughlin Whitewater Design Group
 Recorder: Dave Erickson, Denver Environmental Health
 Reporter: Pat Ayers, Athmar Park Neighborhood Association

Group Focus:

- Enhanced connectivity
- Bikes
- Transit
- Improved bridge structure
- Destination corridor
- West side/east side – among major attraction
- Ownership?
- Impact on river use
- Strategic acquisition

- Safety e.g. 8th Avenue west of Bayaud
- No “bailout”
- Reconnect into grid
- String of pearls/charm bracelet – connectivity/nodes
- Reconnecting to grid
- Bridges/neighborhood connections
- Land on both sides of river/uses/acquisitions
- Safety/bailout/water quality (real time)
- Connect vital pockets of recreation/habitat
- Small parks
- Habitat
- Activity nodes
- Amenities
- Real time water quality

MARKINGS ON MAP/STICKIES

- Danger zone: 8th to W. Bayaud – no bail out if something (e.g. flat tire, bad guys) happened
- 6th Avenue underpass is dark
- River notice signage (needed) all along
- Use existing gradient at Xcel Zuni power plant drop to create a whitewater park or similar feature
- Share parking between attractions. Direct pedestrians to use riverwalk.
- More visible promotion for the river as an educational tool
- Real-time water quality notification
- River access points at some of the charms on the bracelet
- ADA
- Fishermen
- Boaters
- Public
- “Adopt a River” – bring community involvement into river/water quality
- Use “bike share” stations along river paths
- Complete the connection between the river and Sanderson Gulch
- Property acquisition – create green space on both sides of the river at bridges
- Mural project on I-25 retaining wall
- In area between (Vanderbilt, Habitat parks) better bridge/trail connections
- E/W connections to neighborhoods
- Change land use for east bank of the River in area opposite Vanderbilt Park

Table A-1 - Fish Sample Database 1981 through 2005 Compiled by Colorado Division of Wildlife.

Fish Species	Sample Sites					
	A - Evans Avenue	B - Florida Avenue	C - Alameda Avenue (right bank)	D - Excel Energy (Zuni Street)	E - Old Colfax Bridge	F - Confluence with Cherry Creek
Black bullhead*	-	-	-	-	-	14
Black crappie	-	-	-	-	-	1
Bluegill	-	-	-	6	-	2
Channel catfish*	-	-	-	-	-	2
Common carp	1	4	1	18	-	287
Creek chub*	6	-	1	-	-	297
Fathead minnow*	12	-	14	4	1	1,082
Green sunfish*	20	-	5	8	-	45
Largemouth bass	1	-	1	7	-	28
Longnose dace*	1	-	-	-	-	58
Longnose sucker*	-	-	1	4	4	423
Mosquitofish	72	-	271	-	-	-
Plains killfish*	-	-	-	12	-	-
Sand shiner*	-	-	-	-	-	2
White crappie	-	-	-	24	-	-
White sucker*	205	6	91	18	-	120
Yellow perch	-	-	1	-	1	2

* Species native to the South Platte River

Table A-2: Description and Quality Ranking for Habitats Along the South Platte River between 20 th Street Bridge and Dartmouth Avenue.			
Habitat Reach	Description of Riparian Habitat	Habitat Quality Ranking	Reason
Habitat-1	<u>Left Bank</u> - The overstory is mixed deciduous including elm (Ulmus pumila), alder (Alnus incana ssp. tenuifolia), ash (Fraxinus pennsylvanica), cottonwood (Populus deltoides), willow (Salix spp.), and sumac (Rhus spp.). Overstory cover ranges from 35% to 100% and is typically 20-25 feet wide along the bank. The understory is a mixture of grasses and forbs such as barley (Hordeum spp.), bindweed (Convolvulus arvensis), common mallow (Malva neglecta), squirreltail (Elymus elymoides), and dock (Rumex spp.). Understory cover ranges from 65% to 100%. Sand bars along the left bank are approximately 85% covered by willows, alders, and ash. <u>Right Bank</u> - Habitat along the right bank is essentially the same as the left bank from 20th Street bridge to Confluence Park. At Confluence Park habitat thins out and becomes interspersed with vegetation affected by park activities. <u>Other</u> - Vegetation underneath each bridge is sparse to non-existent.	Low	Extent of urban upland species intermingling, low percentage of canopy cover, and amount of disturbance.
Habitat-2	<u>Left Bank</u> - The overstory is predominantly willow with occasional cottonwood intermingled. Overstory cover is 100% and is typically 20-50 feet wide along the bank. The understory is a mixture of grasses and forbs such as barley, bindweed, common mallow, milkweed (Asclepias spp.), and squirreltail. Understory cover is essentially 100%. <u>Right Bank</u> - Habitat along the right bank is essentially the same as the left bank. <u>Other</u> - Bank slopes are flatter within Habitat-2 allowing for more of a willow-dominated scrub-shrub habitat. Additionally, the availability of bank habitat is greater allowing for a wider riparian strip.	High	Extent of willow scrub-shrub and high percentage of canopy cover.
Habitat-3	The over and understory along the left bank are the same as described in Habitat-1.	Low	Extent of urban upland species intermingling, low percentage of canopy cover, and amount of disturbance.
Habitat-4	<u>Left and Right Banks</u> - The overstory is predominantly cottonwood with a 35-70% cover. The understory is a mixture of grasses and forbs such as barley, bindweed, common mallow, and squirreltail. Understory cover is ranges from 75-100%. <u>Other</u> - It appears that this stretch of the riverbank has been revegetated at some point given the uniformity of the cottonwood spacing and location on the bank.	Medium	Assumption that the site is in the process of improving from restoration.
Habitat-5	<u>Left Bank</u> - The overstory has the occasional larger tree and the understory is typically very ruderal and often barren. This bank has a 25-foot strip of land available for vegetation. <u>Right Bank</u> - The over and understory is similar to that on the Left Bank. However, development has occurred right up to the waterline; therefore, there isn't much if any room for vegetative growth on this bank.	Low	Lack of canopy cover and highly disturbed nature of the habitat
Habitat-6	<u>Left Bank</u> - The overstory is mixed deciduous with cottonwood, alder, elm, and willow. The trees in this reach appear to be an older age class than those in previous habitat segments. Overstory cover ranges from 35-100% and is typically 20-50 feet wide along the bank. The understory is a similar mixture of grasses and forbs found in earlier habitat segments. Understory cover is essentially 100%. <u>Right Bank</u> - Habitat along the right bank is essentially the same as the left bank. <u>Other</u> - There are several areas where development has created concrete lined banks, usually where I-25 is immediately adjacent to the South Platte River. Additionally, there are several areas where terraces exist allowing the occasional willow scrub-shrub habitat to develop.	High	Higher percentage of canopy cover and older age class canopy.
Habitat-7	<u>Left and Right Banks</u> - The overstory is a younger age class of trees in an area that appears to have been altered in the recent past. Overstory cover is 25-65% and is typically 20-50 feet wide along the bank. The understory is the mixture of grasses and forbs typical in developed areas along the South Platte River. Understory cover is essentially 100%. <u>Other</u> - Again this area appears to have been modified in the recent past creating a younger age class of trees.	Medium	Lower percentage of canopy cover and younger age class canopy.
Habitat-8	<u>Left and Right Banks</u> - Habitat on both banks is similar to that described in Habitat-6. <u>Other</u> - There is an area just south of Mississippi Avenue on the Right Bank where a concrete retaining wall has been placed along South Santa Fe Avenue. Additionally, there are several areas where terraces exist allowing the occasional willow scrub-shrub habitat to develop.	High	Higher percentage of canopy cover and older age class canopy.
Habitat-9	<u>Left and Right Banks</u> - The over and understory species composition remains essentially unchanged from Habitat -8 except the age of vegetation appears to be younger. Additionally, the overall cover is thinner.	Medium	Lower percentage of canopy cover and younger age class canopy.
Habitat-10	<u>Left and Right Banks</u> - The over and understory is similar to that described in Habitat-6.	High	Higher percentage of canopy cover and older age class canopy.

Table A-3: CHARACTERISTICS OF LANDFILLS IN THE RIVER SOUTH GREENWAY STUDY AREA			
MAP NO.	TYPE OF LANDFILL	CHARACTERISTICS OF LANDFILL	DETAIL_REM
0	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
1	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
2	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
3	KNOWN LANDFILL		
4	KNOWN LANDFILL		
5	KNOWN LANDFILL	CONTENTS OF FILL AREA IS UNKNOWN, AND MAY OR MAY NOT CONTAIN SOLID WASTE ALONG WITH EARTHEN MATERIAL.	NO VISIBLE TRASH, NO VISIBLE SETTLEMENT, NO METHANE.
6	KNOWN LANDFILL	TRASH ABOUND; MAY CONTAIN SOLID WASTE AND EARTHEN MATERIALS.	SOIL COMPACTED/ IMPOSSIBLE TO BAR PUNCH, SMALL TRACE OF METHANE, NEEDS FURTHER STUDY. OPERATING IN 1946 & 1947.
7	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
8	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHERE VISIBLE ON 1949, 1963 OR 1971 AERIALS
9	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
10	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
11	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHRE VISIBLE ON 1949, 1967 OR 1971 AERIALS
12	KNOWN LANDFILL		
13	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHERE VISIBLE ON 1949, 1963 OR 1971 AERIALS.
14	KNOWN LANDFILL		OPERATING IN 1948
15	KNOWN LANDFILL	CONTENTS OF FILL AREA IS UNKNOWN AND MAY OR MAY NOT CONTAIN SOLID WASTE ALONG WITH EARTHEN MATERIAL.	
16	REPORTED DUMP		
17	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
18	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
19	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHERE VISIBLE ON 1949, 1963 OR 1971 AERIALS.
20	REPORTED DUMP	CONCRETE, ASPHALT, LUMBER, CARDBOARD & TRASH. ONLY PERMITTED FOR DIRT AND OTHER DEMO FILL.	OPERATING IN 1966. RECENT DUMPING IN 1972; HOWEVER IT WAS TO HAVE BEEN CLOSED.
21	KNOWN LANDFILL	NO COMPACTION, NO DAILY OR INTERMEDIATE COVER MATERIAL; 1 TO 4 FOOT OF CLEAN FILL OVER ENTIRE LANDFILL; FILL RANGES 20-40 ' IN THICKNESS. GW AT APPROX. 10 FEET.	62% OF METHANE GAS FROM BASEMENT OF OFFICE OF CHURCH.
22	OTHER	CLAY, SILT, SAND, GRAVEL AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
23	KNOWN LANDFILL		NO VISIBLE TRASH.

24	KNOWN LANDFILL	PRATT, 1981. AREA ORIGINALLY A CLAY PIT. DURING 1930s, CLAY PIT USED FOR REFUSE FILL. REFUSE BURNED UNTIL EARLY 1950. FILL CONTINUED TO THE SOUTH UNBURN, FILLING NORTH TO SOUTH. CLOSED IN EARLY TO MID-1950s. MAX. DEPTH OF CLAY PIT = 10 TO 15 FEET.	REFUSE IN 7 OF 25 BORINGS BETWEEN 2 & 13 FEET. MOST IN STADIUM PARKING LOT. METHANE IN 3 BORINGS; 2 IN PARKING LOT (W ENTRANCE) AND 1 IN ALLEY OF RES AREA BETWEEN W 23RD & RIVER DR.
25	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHERE VISIBLE ON 1949, 1963 OR 1971 AERIALS
26	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
27	KNOWN LANDFILL		
28	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHRE VISIBLE ON 1949, 1967 OR 1971 AERIALS
29			
30	KNOWN LANDFILL	NO VISIBLE TRASH.	NO METHANE FOUND
31	KNOWN LANDFILL		
32	KNOWN LANDFILL	AREA SUBJECTED TO FLOODS; REFUSE WASIED INTO RIVER. PRIMARILY HOUSEHOLD WASTE WITH HIGH ORGANIC CONTENT. 2 OF 10 BORINGS ENCOUNTERED REFUSE. GW AT 10-20 FEET. METHANE IN 6 OF 10 BORINGS.	COVERED WITH A LIGHT GRANULAR MATERIAL WHEN CLOSED. AREA DEVELOPED IN MID-1950s. NO OPEN BURNING.
33	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
34	REPORTED DUMP		
35	KNOWN LANDFILL		INDUSTRIAL AREA.
36	OTHER	CLAY, SILT, SAND, GRAVEL AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
37	KNOWN LANDFILL	NO VISIBLE TRAH. CONTENTS OF FILL AREA IS UNKNOWN, AND MAY OR MAY NOT CONTAIN SOLID WASTE ALONG WITH EARTHEN MATERIALS	ACCORDING TO DHH DATABASE, NO VISIBLE TRASH, NO SETTLEMENT, NO METHANE FOUND.
38	KNOWN LANDFILL	NO VISIBLE TRASH.	NO METHANE FOUND.
39	KNOWN LANDFILL		TEMPORARILY CLOSED IN 1960
40	KNOWN LANDFILL		
41			
42	KNOWN LANDFILL		
43	KNOWN LANDFILL	RESIDENTIAL & COMMERCIAL SOLID WASTE. PIT PARTIALLY FILLED WITH WATER.	NO DAILY COVER OR INTERMEDIARY COVER. NO COMPACTION. FINAL TOP COVER OF 1-4 FEET OF CLEAN FILL. MAX. DEPTH 40'.
44	KNOWN LANDFILL	WASTE RUBBER AND TIRES. SMALL AMOUNT OF SOLID WASTE (CANS, PAPER) AND DEMOLITION DEBRIS.	A 1-5 FOOT GRANULAR MATERIALS TOP COVER PLACED AND COMPACTED WHEN CLOSED. DEVELOPED FOR INDUSTRIAL AND COMMERCIAL USE IN LATE 1950s, EARLY 1960s.
45	KNOWN LANDFILL	COMMERCIAL & RESIDENTIAL SOLID WASTE. 6 OF 9 BORINGS ENCOUNTERED REFUSE. 4 OF 6 ENCOUNTERED EXPLOSIVE LEVELS OF METHANE.	A 1 TO 5 FOOT TOP COVER CONSISTING OF GRANULAR MATERIALS WAS PLACED AND COMPACTED OVER FILL WHEN CLOSED. DEVELOPED FOR INDUSTRIAL AND COMMERCIAL USE IN LATE 1950s.
46	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHERE VISIBLE ON 1949, 1963 OR 1971 AERIALS.
47	OTHER	CLAY, SILT, SAND, GRAVEL AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
48	OTHER	CLAY, SILT, SAND, GRAVEL AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
49	KNOWN LANDFILL	NO VISIBLE TRASH. AREA STILL BEING USED AS A LANDFILL IN 1974.	SAME NON-UNIFORM SETTLEMENT; TRACE OF METHANE.
50	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHERE VISIBLE ON 1949, 1963 OR 1971 AERIALS.

51	KNOWN LANDFILL	SOIL AND DEMOLITION FILL TO A DEPTH OF 36-37 FEET, INCLUDING CONCRETE RUBBLE; WOOD; SOIL; AND ORGANIC MATERIAL.	METHANE CONCENTRATIONS RANGED FROM 6-92% OF THE LEL, AND 8-60% GAS BY VOLUME.
52	KNOWN LANDFILL	VISIBLE TRASH. AREA STILL BEING USED AS A LANDFILL IN 1974.	
53	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHERE VISIBLE ON 1949, 1963 OR 1971 AERIALS.
54	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
55	OTHER	CLAY, SILT, SAND, GRAVEL AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
56	KNOWN LANDFILL	SOME VISIBLE TRASH.	NON-UNIFORM SETTLING.
57	REPORTED DUMP		
58	KNOWN LANDFILL	RESIDENTIAL AND COMMERCIAL SOLID WASTE, DEMOLITION DEBRIS. NO COMPACTION. NO DAILY OR INTERMEDIARY COVER. 1 -4 FEET OF CLEAN FILL OVER TOP.	MAXIMUM DEPTH 40 FEET; PORTION OF PIT CONTINUALLY FILLED WITH WATER.
59			
60	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHERE VISIBLE ON 1949, 1963 OR 1971 AERIALS.
61	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
62	KNOWN LANDFILL	NO VISIBLE TRASH.	NO METHANE FOUND.
63	KNOWN LANDFILL	NO VISIBLE TRASH.	NO METHANE FOUND. NO SETTLEMENT.
64	KNOWN LANDFILL	NO VISIBLE TRASH.	NO METHANE FOUND. NO SETTLEMENT.
65	OTHER	MAN MADE DEPOSITS COMPOSED OF VARYING AMOUNTS OF EARTH, ROCK FRAGMENTS, AND REFUSE.	MAPPED WHERE VISIBLE ON 1949, 1963 OR 1971 AERIALS.
66	OTHER	CLAY, SILT, SAND, GRAVEL, AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	
67	OTHER	CLAY, SILT, SAND, GRAVEL AND A VARIETY OF DEBRIS CONSISTING OF WOOD, BRICK, CONCRETE, METAL, PLASTIC, GLASS, VEGETATION, AND OTHER TRASH.	

SOURCE: City and County of Denver, Geographic Information System Database; "Landfills" Shape File, last updated 12/05/05.