BIG THOMPSON

RIVER CORRIDOR MASTER PLAN

City of Loveland

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December 2017

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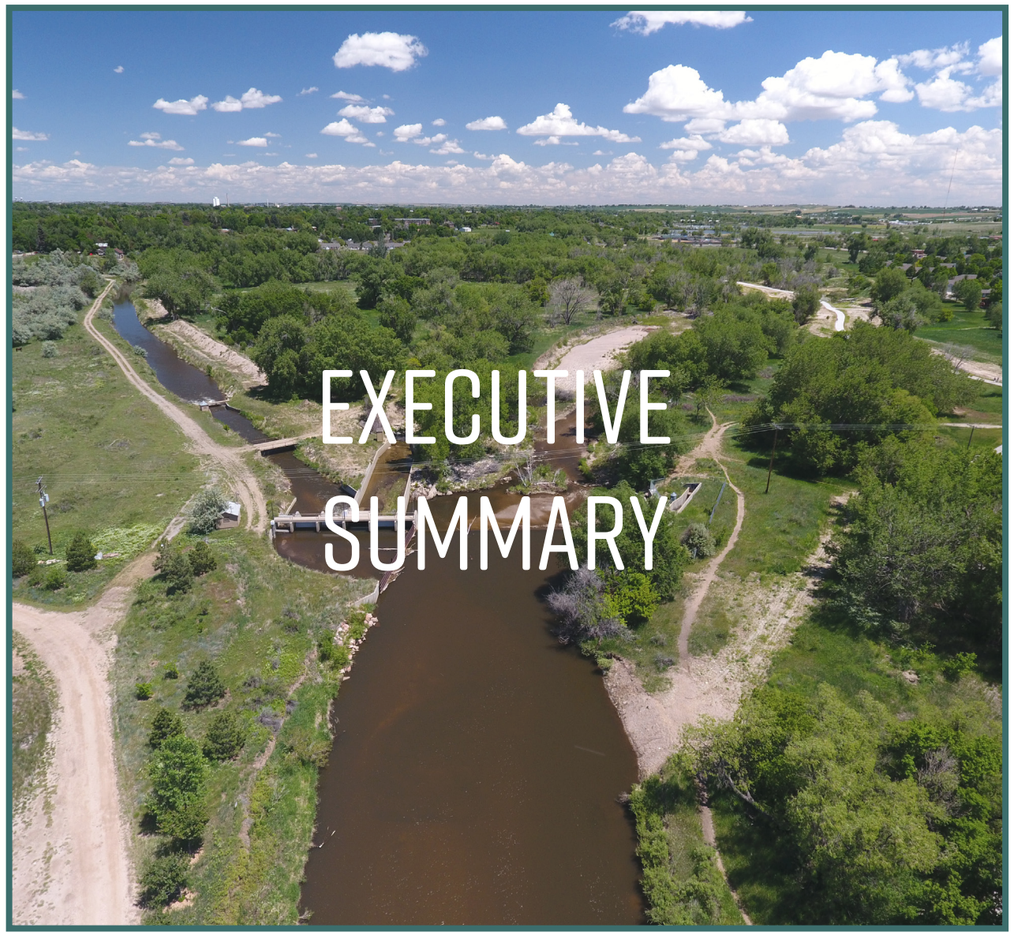

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

This document is a Master Plan for the Big Thompson River Corridor from the Morey Wildlife Reserve on the west to the gravel pit ponds east of County Road 9E, where Boyd Lake Avenue will be extended to cross the river in the future. Figure ES-1 illustrates the extents of the Master Plan.

The vision for this Master Plan has been shaped by significant public input received throughout the project along with the shared vision of previous planning efforts to preserve natural areas along the Big Thompson River Corridor for floodplain, ecological, and other community benefits. Representatives from multiple City departments including Public Works, Parks & Recreation, and Water & Power have provided input through a Technical Advisory Committee, as have the Big Thompson Watershed Coalition (BTWC) and the Big Thompson Water Quality Forum.

The overall vision for Big Thompson River Corridor through the City of Loveland is based on preserving and enhancing natural functions of the corridor while providing more opportunities for the community to interact with the river along the corridor. This vision of the corridor includes:

1. Creating a resilient river corridor that is a treasured asset of the City of Loveland.
2. Flood conveyance improvements to provide north-south passage under major flood conditions.
3. Preserving and maintaining remaining natural areas along the river.
4. A river that supports an urban fishery.
5. Continued acquisition of land along the river corridor including floodway and floodplain areas.
6. New opportunities for river access in existing City parks and natural areas, with improved access for active water-based recreational uses along reaches with publicly owned river frontage.
7. A continuous regional bike/pedestrian trail from Rossum Drive on the west to County Road 9E on the east (and eventually to I-25).
8. Open land for wildlife where elk, deer, small mammals and many species of birds find habitat.
9. Access to City-owned natural areas and trails for newly developing areas.
10. A comprehensive maintenance and management plan and program.
11. Increased community involvement with the river corridor through additional programs and events.

The study area was evaluated on a reach-by-reach basis, following the same reach boundaries and numbering conventions as the 2015 Big Thompson River Restoration Maser Plan that Ayres Associates prepared for the BTWC. Tables ES-1 summarizes reach names and upstream and downstream limits.

This Master Plan was funded by both the City of Loveland and a Community Development Block Grant – Disaster Recovery (CDBG-DR) planning grant as administered by the State of Colorado Department of Local Affairs (DOLA).

Given the nine-mile extent of the corridor evaluated and the complexity of issues along each reach, this Master Plan provides conceptual-level guidance for future improvements. Implementation of conceptual plans will require detailed design involving coordinated efforts between multiple City departments and collaboration between the City and Larimer County in some areas. Implementation of improvements along the corridor is already occurring on the western end of the project area with the BTWC's Rossum to Wilson River Improvement Project and Larimer County's Namaqua Road Bridge Replacement Project.

Flood hazard reduction projects are designed and funded to raise approaches for Wilson Avenue to provide north-south passage in greater than a 100-year event, and plans have also been developed to upgrade the Railroad Avenue crossing to pass a 50-year event without road overtopping. In addition to these two imminent flood hazard reduction projects, the Master Plan places a high priority on the improvements to upgrade the Lincoln Avenue – U.S. Hwy 287 crossing to pass the 100-year peak discharge without road overtopping.

Reach Number	Name	Upstream Boundary	Downstream Boundary
29	Morey Wildlife Reserve	MM 87.7	Rossum Drive
30	Rossum-Namaqua	Rossum Drive	Namaqua Avenue
31	Namaqua-Wilson	Namaqua Avenue	Wilson Avenue
32	Wilson-Taft	Wilson Avenue	Taft Avenue
33	Taft-Railroad	Taft Avenue	Railroad Avenue
34	Fairgrounds Park	Railroad Avenue	Lincoln Avenue - U.S. Hwy 287
35	Lincoln-St. Louis	Lincoln Avenue - U.S. Hwy 287	St. Louis Avenue
36	St. Louis-Boise	St. Louis Avenue	Boise Avenue
37	Boise-CR 9E	Boise Avenue	CR 9E
38	CR9E-d/s Study Limit	CR 9E	Ponds d/s of CR 9E

Table ES-1. Reach Designations

There are several overarching concepts to provide better geomorphic stability and a more resilient river corridor that should be implemented throughout the study area where feasible. These include development of stabilized overflow spillways between the river and gravel pits and high flow channels to convey flood flows while minimizing erosion and avulsions, increasing the capacity of bridges and/or the use of relief culverts, use of multi-stage channels with a low flow channel or inner berm where practical, re-connection of the floodplain through use of floodplain benches, and improving overall conveyance capacity and connectivity of the river corridor. Some of these tactics can be easily applied to the study corridor, while others are more difficult due to property ownership, existing land uses, and associated space constraints.

Parks and natural areas are central components of the Master Plan. Namaqua, Centennial, Fairgrounds, and Barnes Parks provide many amenities including picnic areas, ball fields, racquet courts, and playgrounds. In addition to these more traditional park areas, the City Parks & Recreation Department's Open Lands/ Natural Areas Program has acquired significant land along the river corridor. The parks and natural areas have not only kept development out of hazardous locations but also have created a greenway through a significant part of the City that provides trails, recreational opportunities, and natural areas for wildlife.

The Master Plan for infrastructure and land use decisions in the corridor is based on long-term resilience. This strategy includes maximizing flood hazard reduction benefits while minimizing long-term costs, improving life safety and emergency access, and reducing impacts and economic hardships to local businesses during a flood to the extent feasible. The approach that the City envisions includes restoring natural river and floodplain functions where they are currently lacking, returning to a more natural and beautiful riparian corridor, improving recreation opportunities for citizens to enjoy the corridor, improving water quality, and creating a sustainable and

Flood History

The flood history of the Big Thompson River is infamous in Colorado with two major flood events occurring within less than a 40-year period, from the 1976 flood that ravaged the canyon and was the deadliest flood in Colorado history to the 2013 flood that was remarkable in magnitude and duration. The September 2013 event was a 100-year event for Loveland and clearly demonstrated the vulnerabilities of road crossings to overtopping and gravel pit embankments to massive erosion and avulsion. This Master Plan includes recommendations to improve resilience and public safety in future flood events including improvements for 100-year capacity at Lincoln Avenue – US Hwy 287 and the 2018 Wilson Avenue Bridge project to raise approaches to provide in excess of 100-year capacity before road overtopping.

economically stable environment for future community and business development.

By developing a comprehensive river corridor plan for the nine-mile stretch of the Big Thompson River from the Morey Wildlife Reserve to the future extension of Boyd Lake Avenue downstream of County Road 9E, the City of Loveland seeks to transform the Big Thompson River Corridor into a community greenway, connecting people with nature and the river and providing a balance of passive and active uses that complement surrounding land uses, accommodate wildlife, and preserve the natural beauty of the riparian corridor.

It will take years and significant funding to implement the full plan. Realizing the vision of this Master Plan will require long-term investment in the corridor and diligent management by the City to coordinate efforts to improve and maintain the river corridor between multiple City departments, the County, private property owners, and other stakeholders. This investment and diligence will transform what is currently an underutilized resource into a resilient community greenway that will be enjoyed by residents of Loveland for years into the future.

Community Input

Community input was fundamental in shaping the vision of this Master Plan. Citizen and stakeholder input was solicited throughout the project. Community outreach activities included:

- Participation in major City summer events including the 4th of July Celebration, The Cherry Pie Festival, and the Corn Roast Festival, as well as select Farmers' Markets and Foote Lagoon concerts.
- Organizing and conducting a two-day Strategic Planning Workshop to obtain public input as plans were being formulated.
- Creation and operation of a project website (www.ABetterBigT.com) with information on public outreach events, project updates, and a news blog.
- Creation and distribution of an online public survey through Open City Hall, social media, and the website.

Together, these elements gave members of the public the platform to voice their opinions and ideas about decisions along the corridor and provided the project team with valuable local knowledge upon which design decisions could be based.

Community input emphasized that the citizens of Loveland value to Big Thompson River Corridor as a recreational and natural resource. People surveyed felt satisfied with the extent of formal parks such as Centennial and Fairgrounds/Barnes Park and preferred that the remainder of the river corridor retain a natural character. This desire is well aligned with the City's strategy of acquiring natural areas within the corridor and the flood resilience strategy of preserving land within the floodplain and floodway as open space.

People also expressed a desire for more river access and opportunities for water-based recreational activities including fishing, wading, swimming and tubing. These activities are already occurring along the corridor; however, there are few designated river access areas. Providing designated river access areas will improve public safety for those who currently access the river and will help direct river users away from reaches of the river that run through private property.

The top five priorities identified in this Master Plan are as follows:

Priority #1 – Maintenance of River Corridor

Because there is no formal management and maintenance program for the Big Thompson River, portions of the river have been neglected, which creates potential hazards and reduces the conveyance capacity of the Big Thompson River through the City. The highest priority identified in this Master Plan is to conduct maintenance along the river corridor in areas with publicly owned river frontage. Maintaining the existing infrastructure along the river corridor will increase the capacity at some road crossings without the large expense of capital improvement projects. The estimated annual cost to perform routine maintenance for City-accessible portions of the river is on the order of $120,000 per year. Initial costs may be higher due to the lack of maintenance for many years; however, establishing a maintenance program would have a significant positive impact on the Big Thompson River Corridor and its conveyance of flows through the City.

While the City currently does not have a budget line item for river maintenance activities, this is a modest cost in the context of departmental budgets. It is also an extremely important item in terms of municipal liability. There are legal precedents for municipalities being sued for failing to maintain the flood carrying capacity of a waterway in an urban area. While natural rivers require little to no maintenance, and trees and large woody debris in natural streams provide habitat and other benefits, in urban areas where a river has been channelized and constricted by bridges and other encroachments, maintenance cannot be ignored. Large woody debris in the channel has the potential to become lodged in bridge openings, causing elevated floodwaters upstream. It also can form debris dams in the river during a flood that can cause localized increases in peak flow rates when they breach.

To efficiently plan and execute maintenance activities, developing a maintenance and management plan for the river is recommended. This plan would begin by itemizing reach-by-reach maintenance needs and cost projections and would include a map showing specific areas for maintenance activities (e.g. snags to remove, minor bank repair areas, bridge maintenance, etc.). A maintenance and debris removal plan could be developed for $10,000 to $20,000 that would outline areas for removal, estimated quantities, and cost estimates.

Priority #2 – River Corridor Coordinator

Because neither the City of Loveland nor Larimer County has a formal management and maintenance program for the Big Thompson River, responsibilities for the river corridor are shared between multiple City departments such as Parks and Recreation, Open Lands, and Public Works. However, none of these departments have funding dedicated to the maintenance of the actual river itself. Therefore, the Master Plan recommends that the City establish a new full-time position for a River Corridor Coordinator. This position would have many responsibilities but ultimately would coordinate between departments and programs in the City that have overlapping responsibilities for the river corridor to maximize the effectiveness of their combined efforts. This person also would seek funding through grants and other sources to implement projects along the river corridor.

A River Corridor Coordinator would be an investment by the City that will pay dividends in terms of obtaining state and federal money to invest in the river corridor and in terms of reduced municipal liability due to improved management and maintenance of the river corridor. The estimated annual cost of a full time employee to fulfill this position is on the order of $100,000 or less. The City should also continue its River Team, which was created in response to the 2013 Flood. The River Team, currently led by Stormwater Engineering but including representatives from other affected departments, can continue to coordinate projects related to the river corridor and implementation of this Master Plan. The proposed River Corridor Coordinator would ultimately lead this team.

BTWC could potentially perform many of the duties of a River Corridor Coordinator in the near-term and already has well-established relationships with public and private entities along the river corridor. Until the City is able to establish a staff position for the River Corridor Coordinator, the City could consider contracting with BTWC to perform some or all of the position's functions.

Priority #3 – Lincoln Avenue – US Hwy 287 Improvements

Improving north-south travel capabilities during a major flood event is a high priority for public safety. Because Lincoln Avenue is a federal highway and major north-south route in Larimer County, implementing improvements to allow for safe crossing in a 100-year event is critical. Ayres has already developed plans for these improvements

that include: (1) replacement of the existing bridge with a new 240-foot span bridge and raising the roadway south of the bridge by as much as four feet; (2) creating lowered and widened floodplain benches through Fairgrounds Park, with some minor top-of-bank berming; (3) reducing the size of the pond south of the channel and west of Hwy 287 so that a low floodplain bench can be constructed on the south side of the channel; and (4) construction of a lowered and widened floodplain bench downstream of Hwy 287. The cost of this project is estimated at approximately $17M, which makes it one of the most expensive projects included in the Master Plan. The importance of Hwy 287 as a north-south major arterial route, the potential to reduce land included in the floodplain and floodway, and the overall improvements in resilience of the area helps justify these costs.

The City should continue to pursue potential funding sources including FHWA, CDOT, and/or FEMA. This is an expensive project, but it is a very important project for public safety and flood hazard reduction. This project is also a critical component to implementation of the Hwy 287 Strategic Plan and its vision of both a River District and southern gateway into Loveland.

Priority #4 – Wilson Avenue – Elevation of Roadway Approaches to Bridge

Raising the approaches to the Wilson Avenue Bridge to prevent overtopping in the 100-year event is a high priority because it is the most economical way to establish a north-south arterial with better than 100-year crossing capacity. During the 2013 flood, Wilson Avenue was the last street to overtop and the first to reopen. This project is currently under design and anticipated to be constructed in 2018. This project will increase the resilience of the reach from Namaqua Avenue to Wilson Avenue, the lowest ranked reach in the baseline resilience assessment. This project is already funded, so costs are not included in the Master Plan.

Priority #5 – Mariano Exchange Ditch Water Quality Evaluation

Based on water quality data, observations, and comments from the public, the single greatest water quality issue for the Big Thompson River through Loveland is the poor quality of water from Mariano Exchange Ditch. Where the Mariano Exchange Ditch enters the Big Thompson River upstream of Wilson Avenue, there is a visual spike in turbidity that can be seen at the confluence with the ditch and in the river downstream. Given public desires for greater river access and a healthy urban fishery, addressing the water quality of the Mariano Exchange Ditch return flows is a high priority. Finding a solution will require cooperation between the City, the Ditch and Reservoir Company and the State. Improving the water quality of the Big Thompson River through the City of Loveland would be a major step toward gaining public support for future Master Plan improvements. It will also benefit recreation and public safety for water users. The estimated cost of further study and conceptual design of improvements for reducing sediment discharges from Boedecker Reservoir is approximately $300,000.

BIG THOMPSON RIVER CORRIDOR MASTER PLAN

Study Limits Map

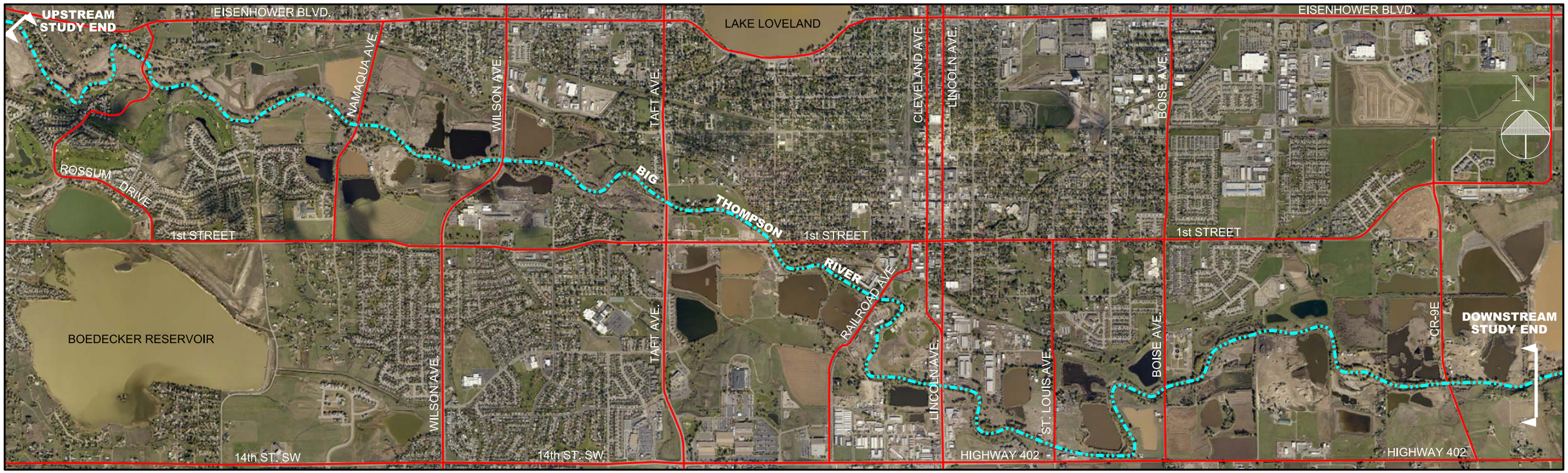
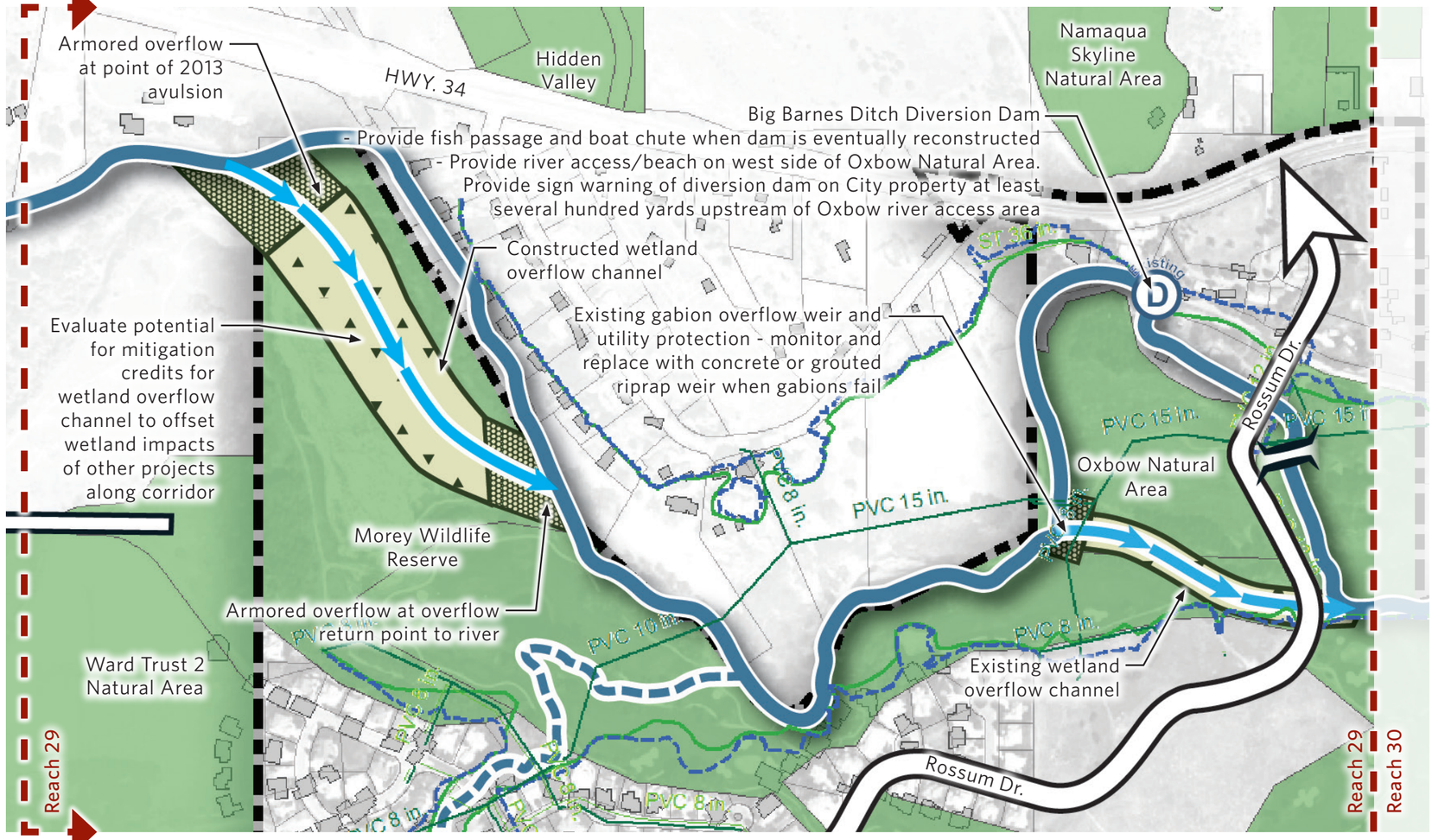


Figure ES-1. Big Thompson River Corridor Master Plan Study Limits Map

Category & Cost												
Reach	Flood Hazard Reduction	Gravel Pits[2]	Aquatic Habitat	Geomorphology[2]	Natural Area/ Open Space	Parks & Recreation	Trails	Land Use	Utilities	Water Quality	Maintenance[4]	Total
29	$1,660,000		$1,81M - est. cost of Big Barnes diversion dam retrofit - not included in overall cost estimate since private dam		$100,000	$745,000	$1,083,000				$23,000	$3,590,000
30	$350,000[1]	----[3]	----[3]	----[3]	$100,000	$489,000	$368,000	$174,000			$26,000	$1,483,000
31	----[1]	----[3]	----[3]	----[3]		$43,000	$368,000	$14,000		$300,000	$16,000	$725,000
32				$1,430,000	$161,000	$162,000	$84,000		$111,000		$19,000	$2,473,000
33	----[1]	$2,450,000				$133,000	$123,000		$37,000		$24,000	$2,743,000
34	$16,900,000			$945,000		$4,792,000	$267,000		$74,000		$17,000	$22,970,000
35	$3,230,000	$675,000		$945,000	$24,000	$933,000	$811,000				$14,000	$6,620,000
36		$1,575,000		$790,000	$100,000	$578,000	$734,000				$20,000	$3,800,000
37		$2,625,000		$2,363,000	$136,000	$35,000	$1,493,000			$368,000	$34,000	$6,660,000
38	----[1]	$1,050,000		$473,000			$210,000				$10,000	$2,790,000
Totals	$21,790,000	$8,375,000	----[3]	$6,946,000	$621,000	$7,910,000	$5,541,000	$190,000	$220,000	$670,000	$203,000	$52,824,000

Table ES-1. Conceptual Costs by Reach and Category

[1] Costs for road crossing improvements for Namaqua, Wilson and Railroad are not included because these projects are already funded; costs for future Boyd Lake Avenue bridge and conveyance improvements not included since funding for this will be from Transportation.
[2] Gravel pit and geomorphology improvements for reaches 35 - 38 involve public and private lands. More detailed planning should identify stakeholders and potential cost sharing opportunities.
[3] BTWC working on improvements for Rossum to Wilson reach.
[4] Maintenance cost estimates are for entire length of river through each reach, including public and private land. Maintenance costs are not included in total since they are estimated average annual costs.



Legend:

- Major Roadway Connections
- Big Thompson River
- Tributary of the Big Thompson River
- High Flow Path
- Existing Diversion Dam
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Ownership - City of Loveland
- Armored Overflow Protection
  See UDFCD Urban Storm Drainage Criteria Manual or USACE guidance for riprap sizing, use soil riprap in higher visibility area to soften appearance and provide vegetation
- Constructed Wetland Overflow Channel
- Sanitary Gravity Main
- Sanitary Pressurized Main
- Water Pressurized Main
- Stormwater Outfall

0′ 400′ 800′ Feet

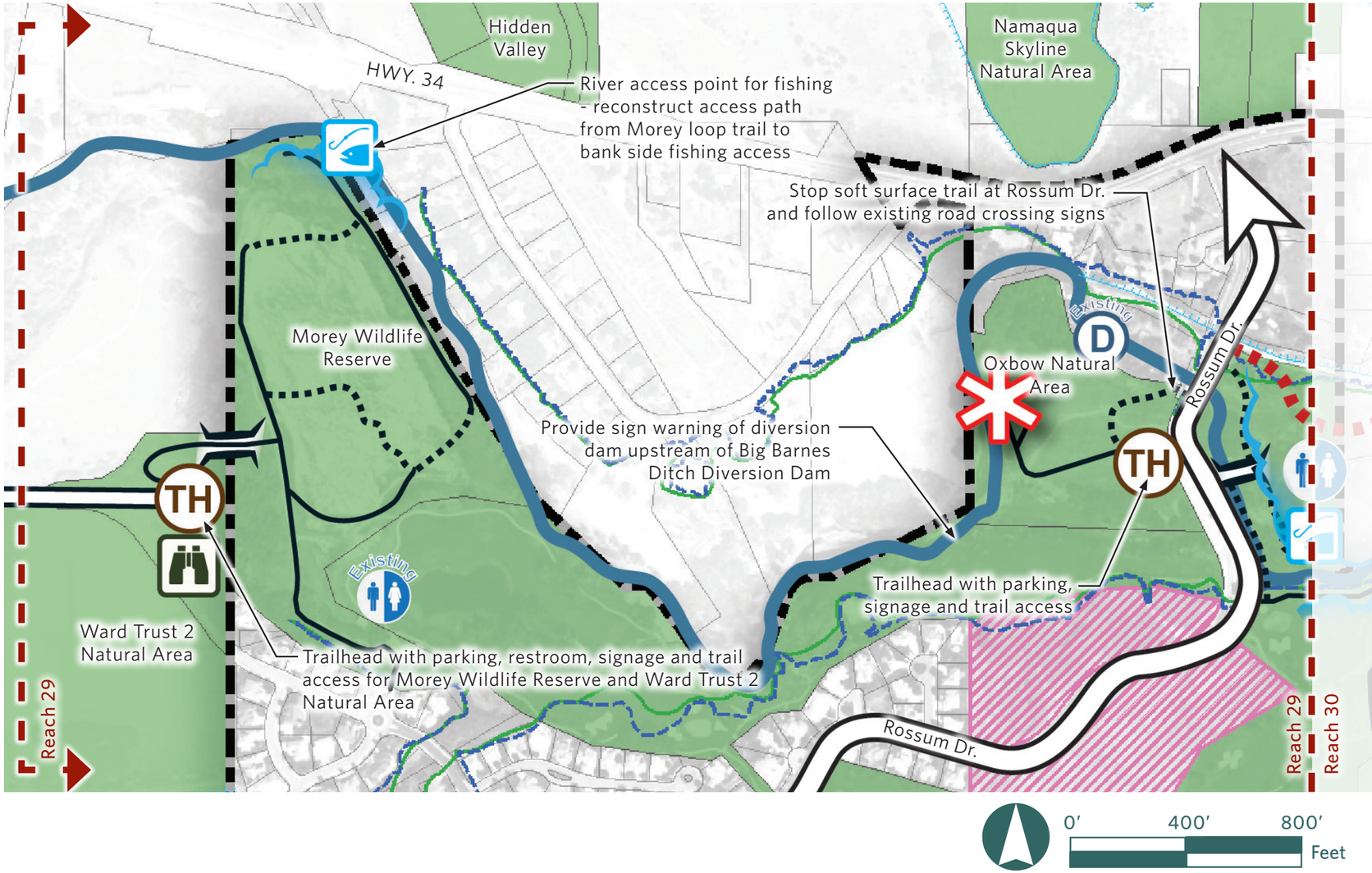
Flood Hazards		
Morey Wildlife Reserve Constructed Wetland Overflow Channel	$1,350,00	Mid
Overflow Weir upstream of Oxbow Natural Area	$310,000	Mid

Aquatic Habitat		
Big Barnes Ditch Diversion Dam Fish and Boat Passage	$1,810,000	Mid

Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$23,000	Near

Figure ES-2-Reach 29 H & H Map

REACH 29: Morey Wildlife Reserve to Rossum Drive Near-, Mid- and Long-term Prioritization



Legend:

- River Access Point
- Proposed Trail Head
- Proposed Wildlife Overlook
- Proposed Fishing Access
- Existing Restroom
- Existing Diversion
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Potential Future Development Area
- Bike Lanes
- Bike Routes
- Big Thompson River
- Major Roadway Connections
- Existing Loveland Recreational Trail
- Proposed Recreational Trail
- Existing Soft Surface Trail
- Proposed Soft Surface/Boardwalk Trails
- Ownership - City of Loveland

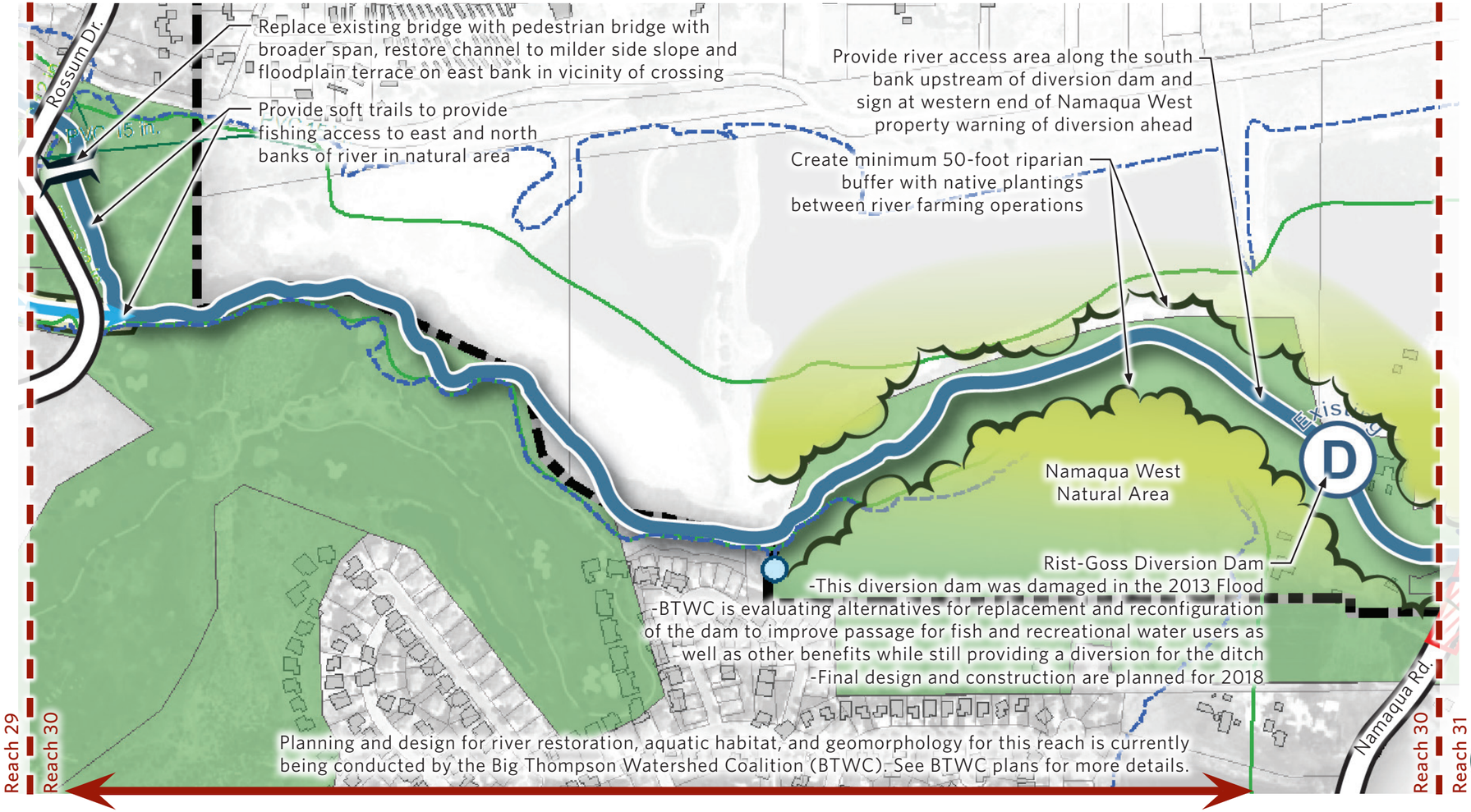
Natural Area/Open Space		
Morey Wildlife Reserve Revegetation and Weed Control	$70,000	Near
Oxbow Natural Area Revegetation and Weed Control	$30,000	Near

Parks & Recreation		
Oxbow Natural Area River Access	$39,000	Mid
Morey Wildlife Reserve Fishing Access	$6,000	Near
Morey Wildlife Reserve Trailhead	$525,000	Mid
Oxbow Natural Area Trailhead	$175,000	Mid

Trails		
Morey Wildlife Reserve Soft Surface Trails	$320,00	Long
Trail Access to Morey Wildlife Reserve from New Trailhead	$430,000	Long
Morey Wildlife Reserve Boardwalk Trails	$360,000	Long

Figure ES-3-Reach 29 Rec Map

REACH 30: Rossum Drive to Namaqua Avenue
Near-, Mid- and Long-term Prioritization



Flood Hazards		
Oxbow East Pedestrian Bridge Replacement	$350,000	Mid

Gravel Pits	
Big Thompson Watershed Coalition - Rossum to Wilson Project	Ongoing

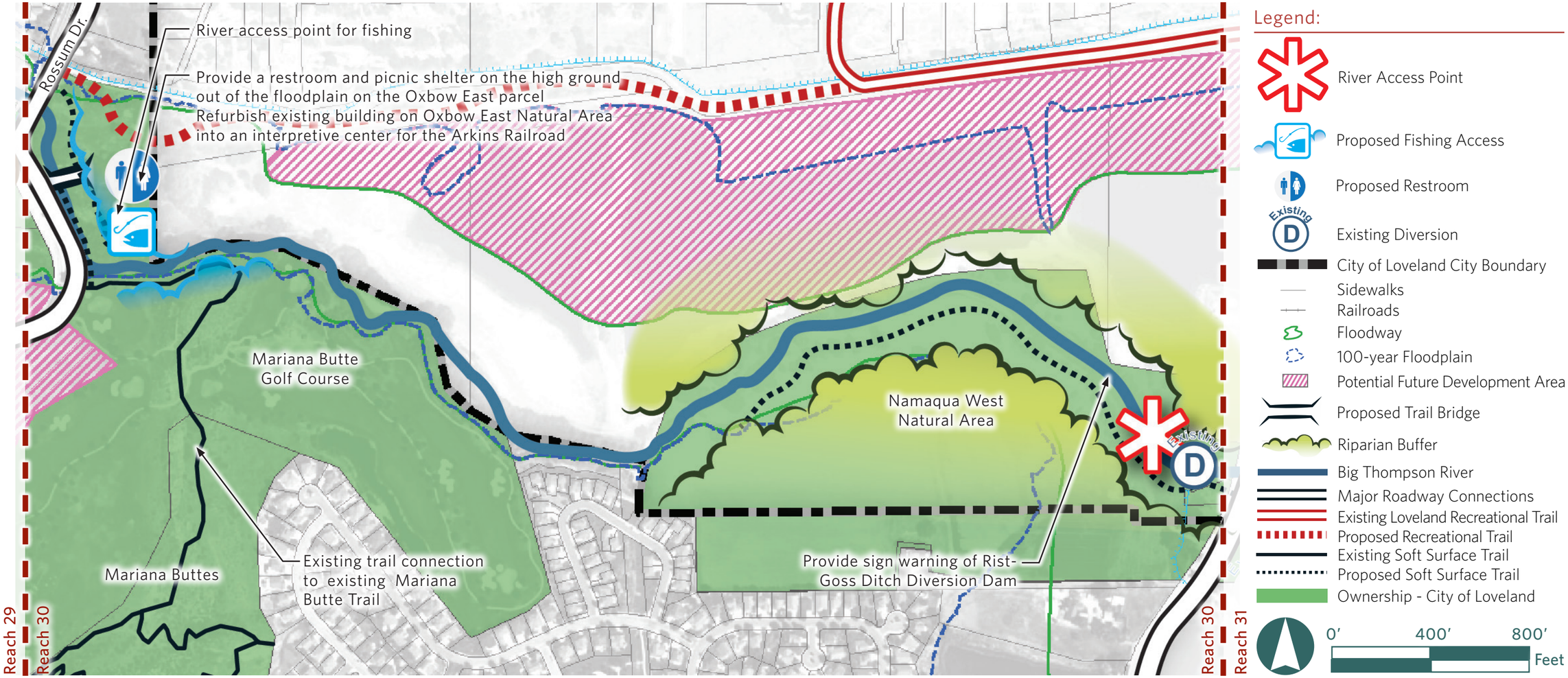
Aquatic Habitat	
Rist-Goss Diversion Dam Replacement	Ongoing
Big Thompson Watershed Coalition - Rossum to Wilson Planning Project	Ongoing

Geomorphology	
Big Thompson Watershed Coalition - Rossum to Wilson Planning Project	Ongoing

Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$26,000	Near

Figure ES-3-Reach 30 H & H Map

REACH 30: Rossum Drive to Namaqua Avenue
Near-, Mid- and Long-term Prioritization



Natural Area/Open Space		
Oxbow East Natural Area Weed Control & Vegetation	$20,000	Mid
Namaqua West Natural Area Weed Control & Vegetation	$80,000	Mid

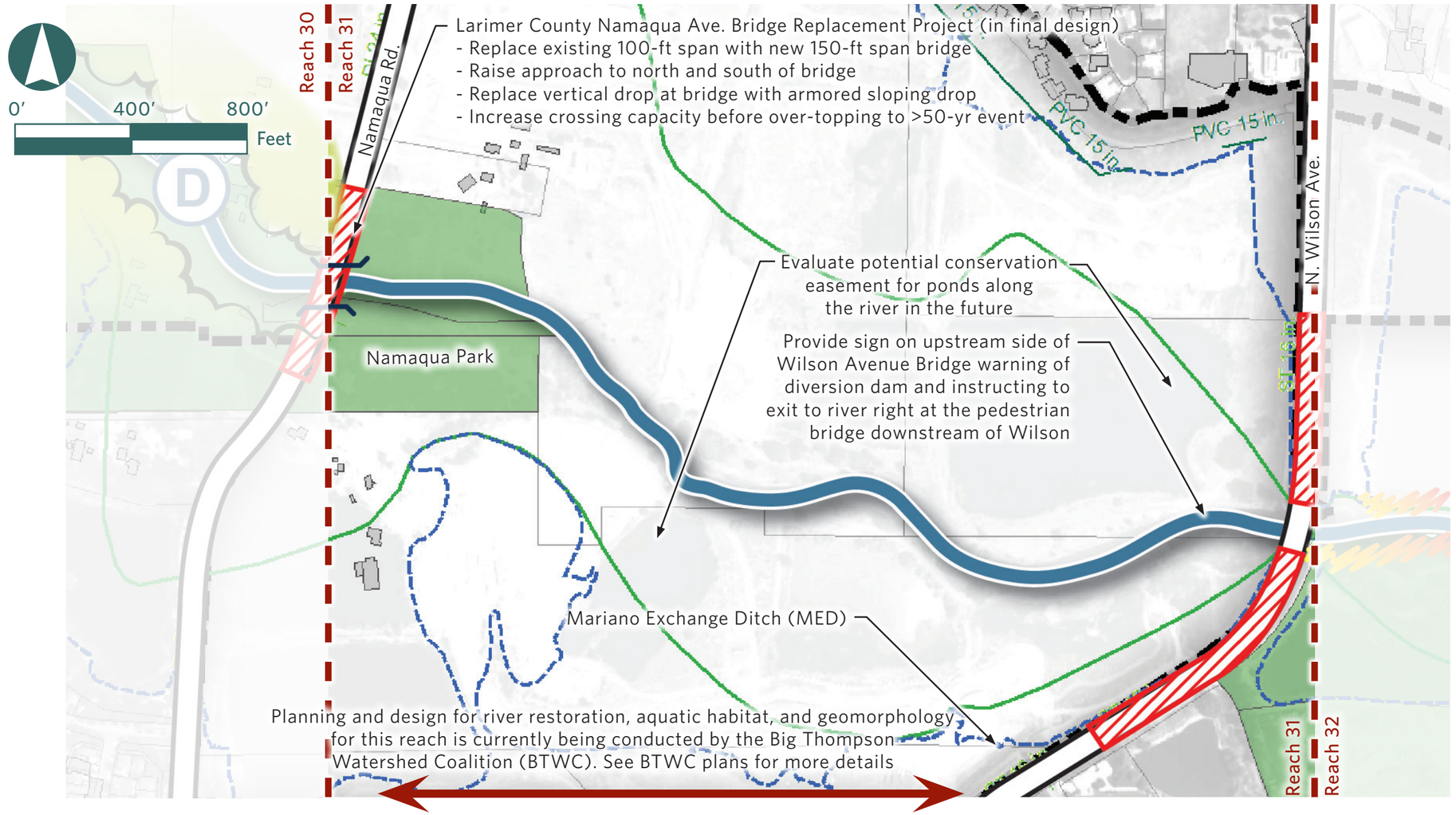
Parks & Recreation		
Oxbow East Parcel Picnic Shelter and Refurbished Building	$440,000	Mid
Oxbow Natural Area Fishing Access	$9,000	Mid
Rist-Goss Diversion Dam Warning	$40,000	Near

Trails		
Rossum - Namaqua Recreational Trail Extension	$368,000	Mid

Land Use		
Riparian Buffer	$113,000	Mid
Buffer Area Livestock Exclusion	$48,000	Mid
Loveland Ready Mix Coordination	$13,000	Ongoing

Figure ES-4-Reach 30 Rec Map

REACH 31: Namaqua Avenue to Wilson Avenue
Near-, Mid- and Long-term Prioritization



Legend:

- Major Roadway Connections
- Big Thompson River
- High Flow Path
- Existing Diversion Dam
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Ownership - City of Loveland
- Riparian Buffer
- Proposed Elevation of Roadway
- Sanitary Gravity Main
- Sanitary Pressurized Main
- Water Pressurized Main
- Stormwater Outfall

Flood Hazards		
City of Loveland Wilson Avenue Flood Mitigation	Funded	Near

Gravel Pits	
Big Thompson Watershed Coalition - Rossum to Wilson Project	Ongoing

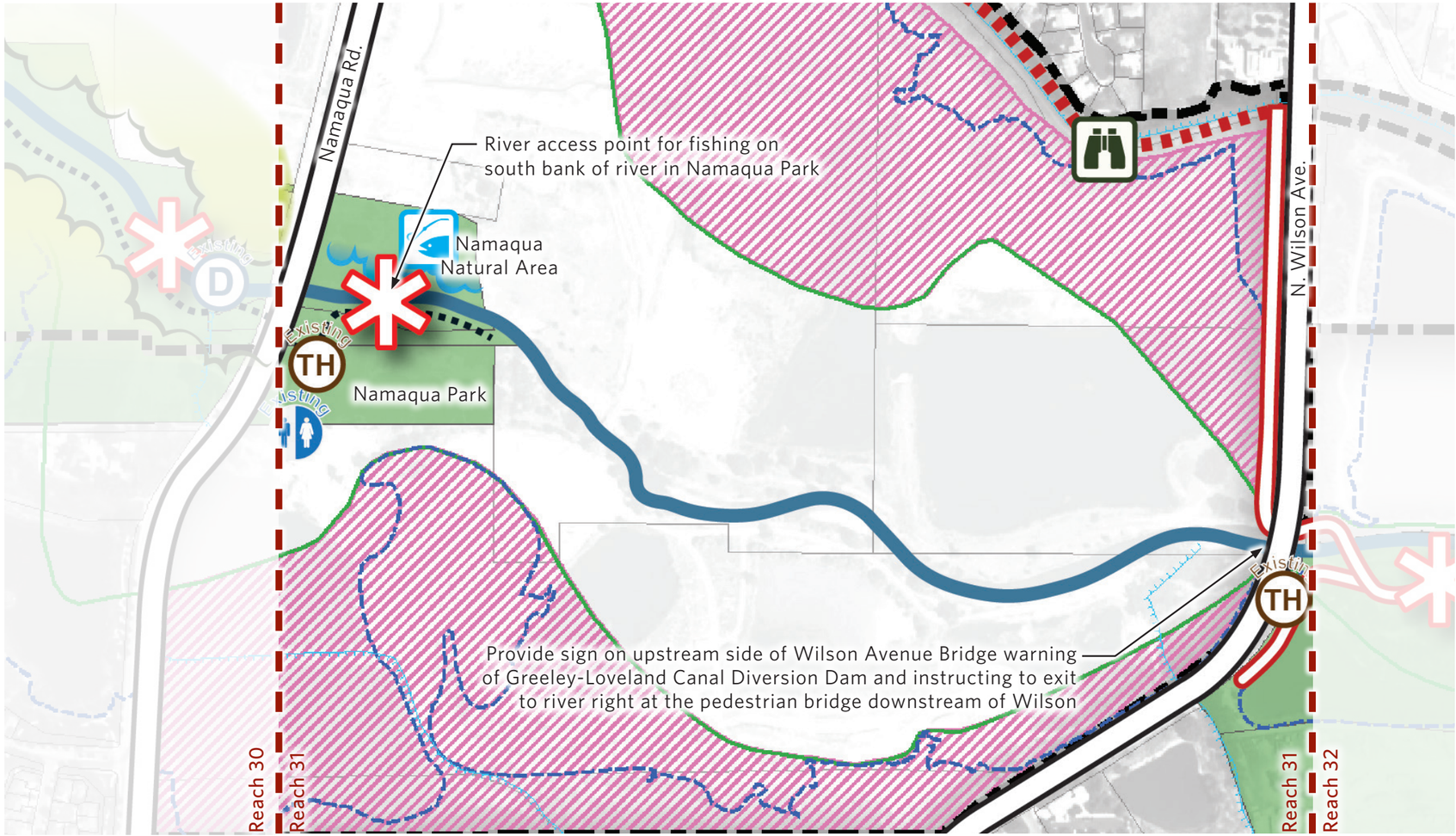
Aquatic Habitat	
Big Thompson Watershed Coalition - Rossum to Wilson Planning Project	Ongoing

Geomorphology	
Big Thompson Watershed Coalition - Rossum to Wilson Planning Project	Ongoing

Water Quality		
Mariano Exchange Ditch Water Quality - Study & Detailed Plans	$300,000	Near

Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$16,000	Near

Figure ES-5-Reach 31 H & H Map



Legend:

- River Access Point
- Existing Trail Head
- Proposed Wildlife Overlook
- Proposed Fishing Access
- Existing Restrooms
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Potential Future Development Area
- Big Thompson River
- Major Roadway Connections
- Existing Loveland Recreational Trail
- Proposed Recreational Trail
- Existing Soft Surface Trail
- Proposed Soft Surface Trail
- Ownership - City of Loveland

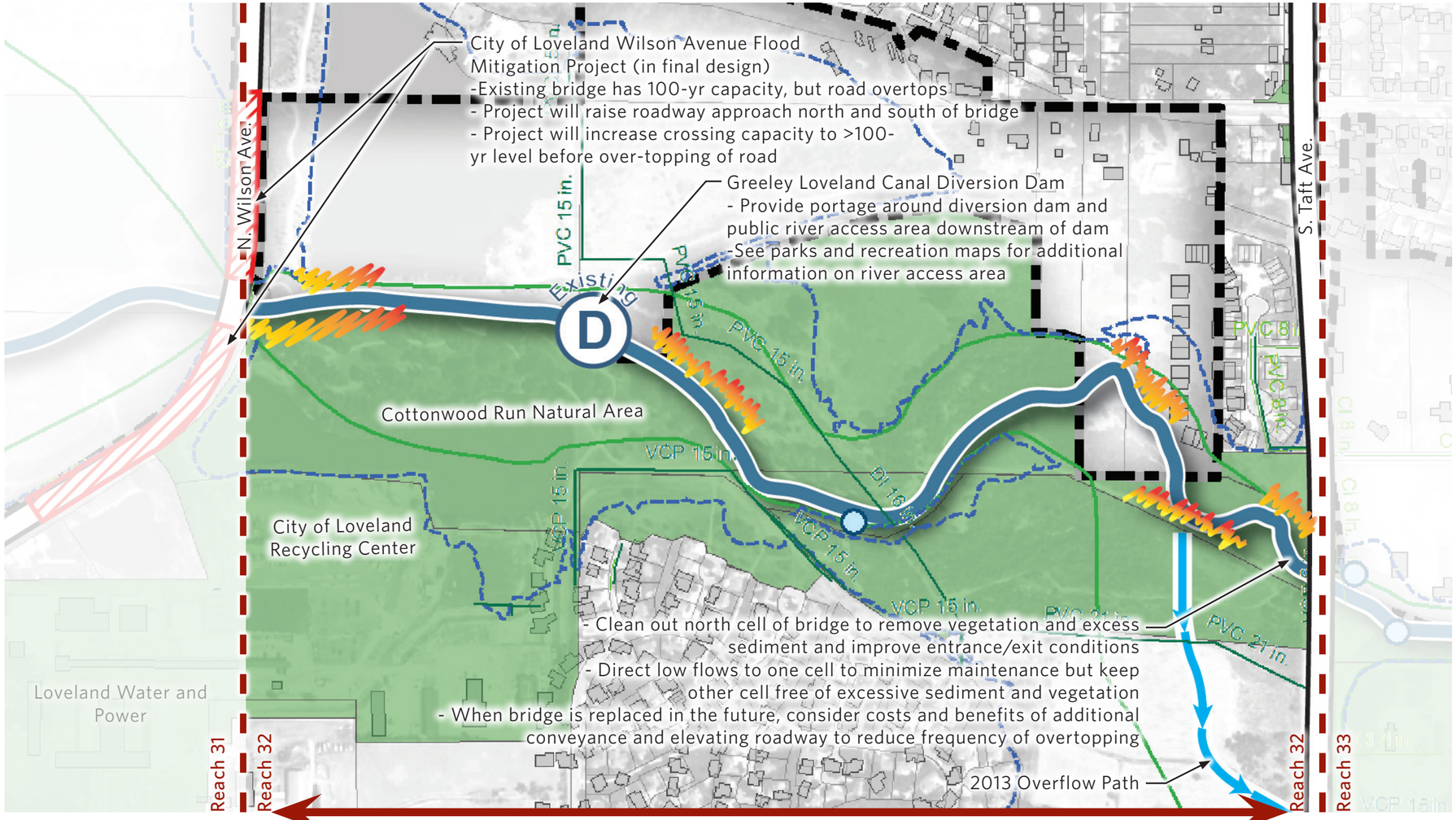
0′ 400′ 800′ Feet

Parks & Recreation		
Namaqua Park River Access	$40,000	Near
Greeley-Loveland Canal Diversion Dam Warning	$3,000	Near

Trails		
Namaqua - Wilson Recreational Trail Connection	$368,000	Mid

Landuse		
Coordinate with Property Owners	$14,000	Ongoing

Figure ES-6-Reach 31 Rec Map



Legend:

- Major Roadway Connections
- Big Thompson River
- High Flow Path
- Existing Diversion Dam
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Ownership - City of Loveland
- Proposed Elevation of Roadway
- Bank Stabilization
- Sanitary Gravity Main
- Sanitary Pressurized Main
- Water Pressurized Main
- Stormwater Outfall

0′ 400′ 800′ Feet

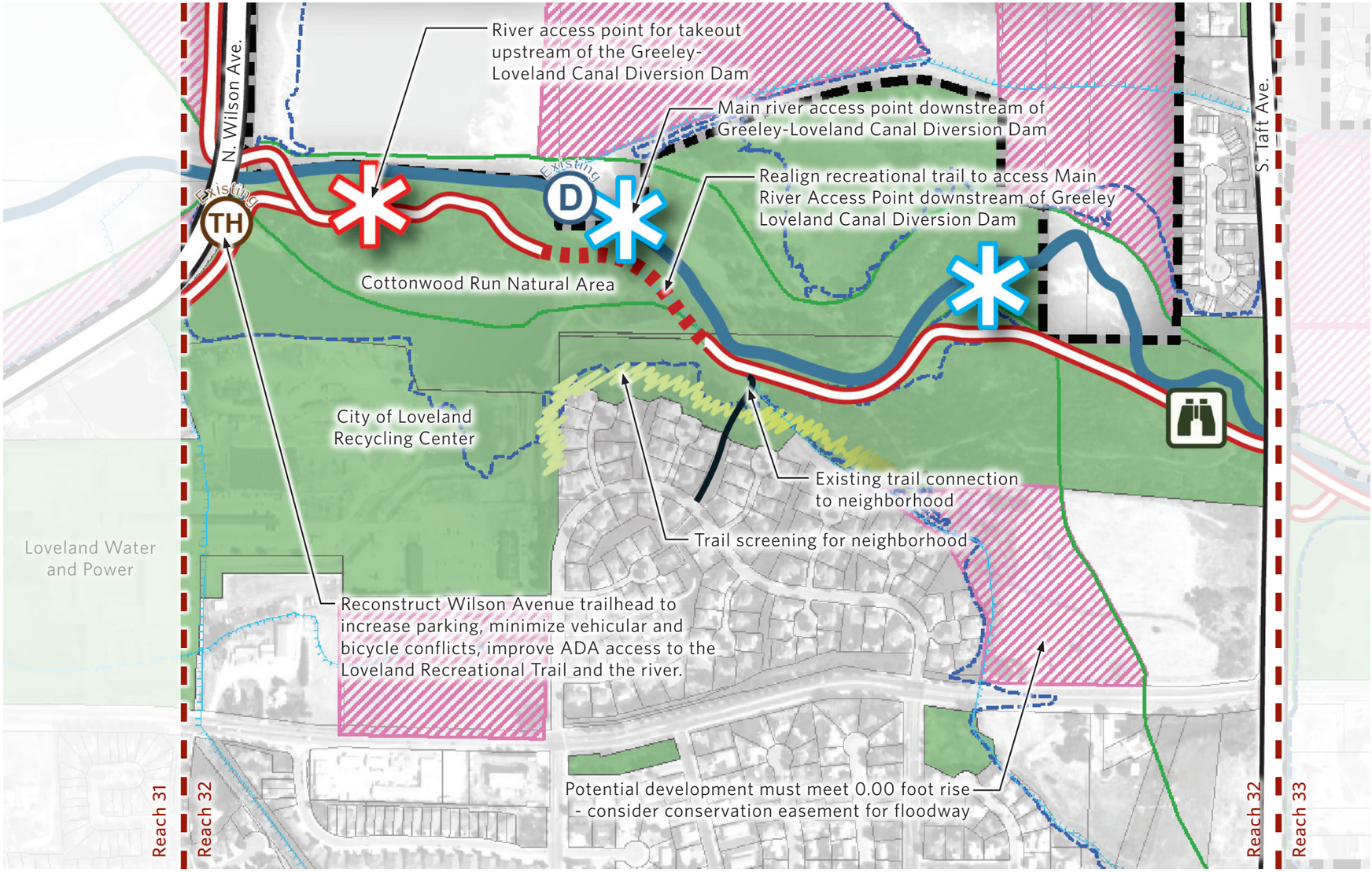
Geomorphology		
Bank Stabilization (~ 1800 feet)	$1,430,000	Mid

Utilities		
Three 8-inch Sanitary Sewer Protection	$111,000	Near

Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$19,000	Near

Figure ES-7-Reach 32 H & H Map

REACH 32: Wilson Avenue to Taft Avenue
Near-, Mid- and Long-term Prioritization



Legend:

- River Access Point
- Main River Access Point
- Existing Trail Head
- Proposed Wildlife Overlook
- Existing Diversion
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Potential Future Development Area
- Proposed Trail Bridge
- Vegetative Screening
- Big Thompson River
- Major Roadway Connections
- Existing Loveland Recreational Trail
- Proposed Recreational Trail
- Ownership - City of Loveland

0′ 400′ 800′ Feet

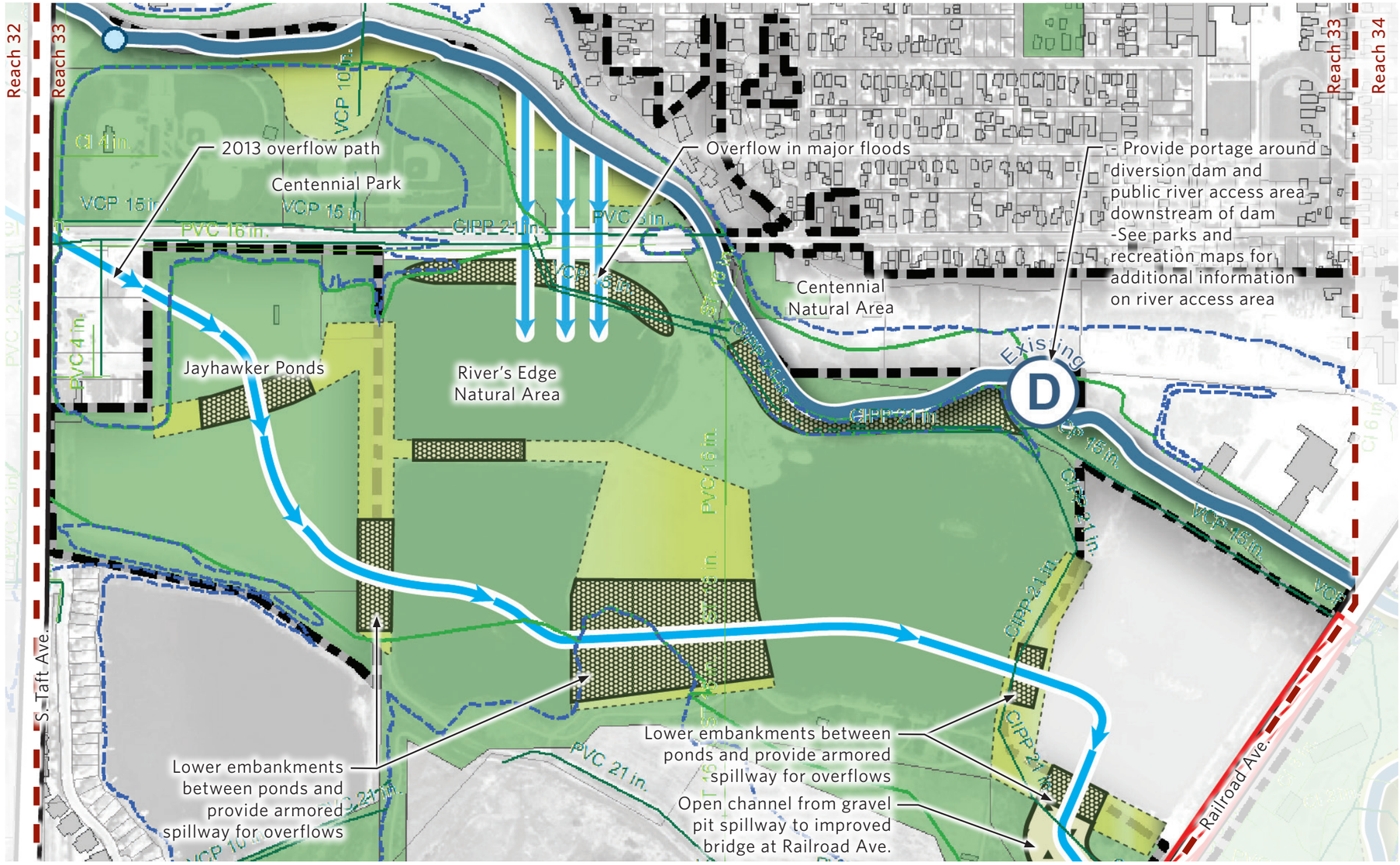
Natural Area/Open Space		
Cottonwood Natural Area - East Revegetation, Weed Control, and Russian Olive Removal	$130,000	Near
Cottonwood Natural Area - West Revegetation and Weed Control	$31,000	Near

Parks & Recreation		
Greeley/Loveland Canal Diversion Dam Take-Out	$39,000	Near
Cottonwood Run Natural Area River Access	$114,000	Near
Wildlife Viewing Upstream of Taft Avenue	$9,000	Mid
Wilson Avenue Trailhead Improvements	$525,000	Near

Trails		
Realigned Recreational Trail	$84,000	Mid

Figure ES-8-Reach 32 Rec Map

REACH 33:



Legend:

- Proposed Underpass
- Major Roadway Connections
- Big Thompson River
- High Flow Path
- Existing Diversion Dam
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Ownership - City of Loveland
- Armored Overflow Protection
  See UDFCD Urban Storm Drainage Criteria Manual or USACE guidance for riprap sizing, use soil riprap in higher visibility area to soften appearance and provide vegetation
- Constructed Wetland Overflow Channel
- Proposed Elevation of Roadway
- Bank Stabilization
- Sanitary Gravity Main
- Sanitary Pressurized Main
- Water Pressurized Main
- Stormwater Outfall

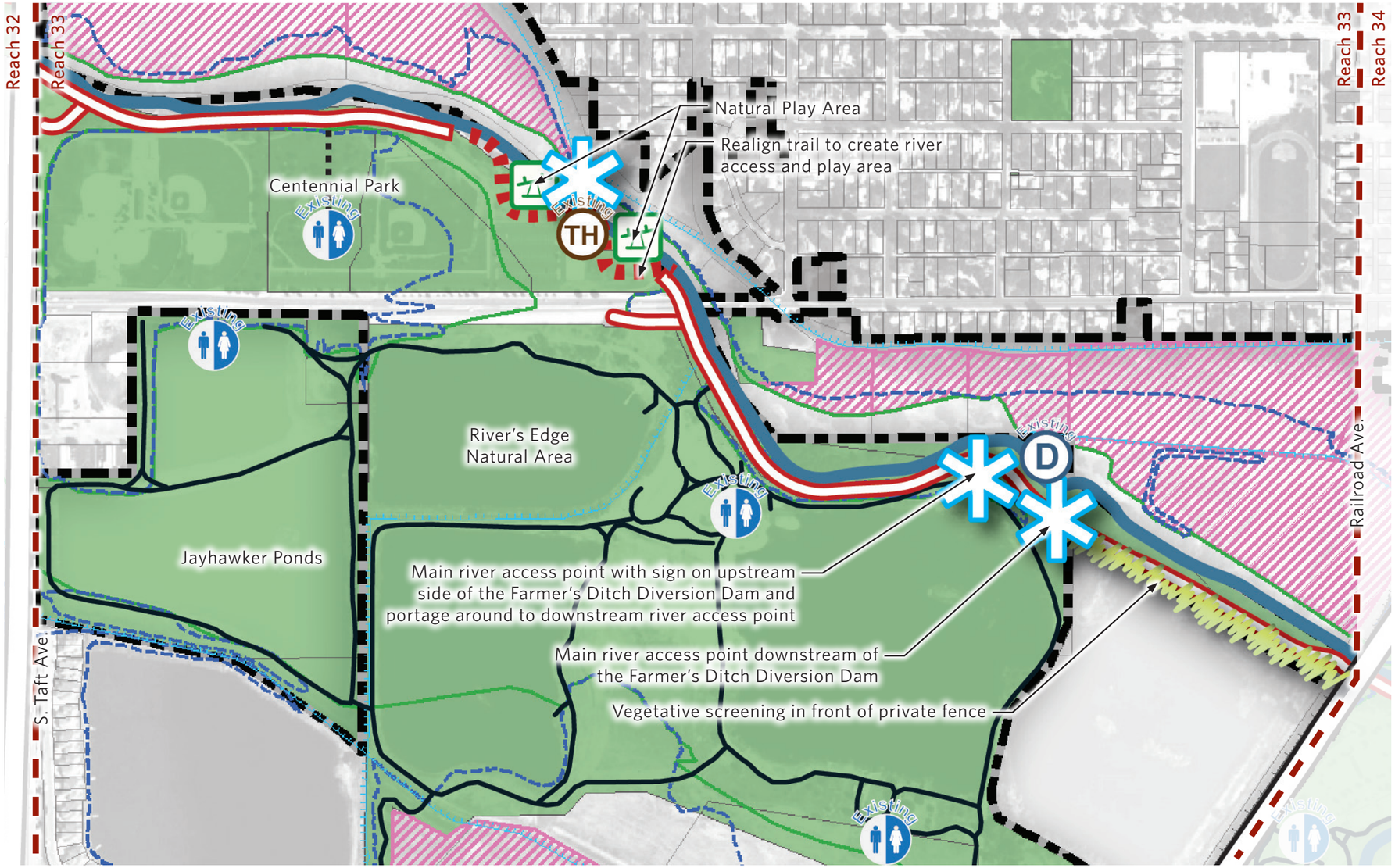
0′ 400′ 800′
Feet

Gravel Pits		
Jayhawker and River's Edge Pond Armoring (gravel pit embankment lowering and armoring in this reach)	$2,450,000	Mid

Utilities		
16-Inch Waterline Protection	$37,000	Near

Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$24,000	Near

Figure ES-9-Reach 33 H & H Map



Legend:

- Main River Access Point
- Existing Trail Head
- Existing Restroom
- Existing Diversion
- Natural Play Area
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Potential Future Development Area
- Vegetative Screening
- Big Thompson River
- Major Roadway Connections
- Existing Loveland Recreational Trail
- Proposed Recreational Trail
- Existing Soft Surface Trail
- Proposed Soft Surface Trail
- Ownership - City of Loveland

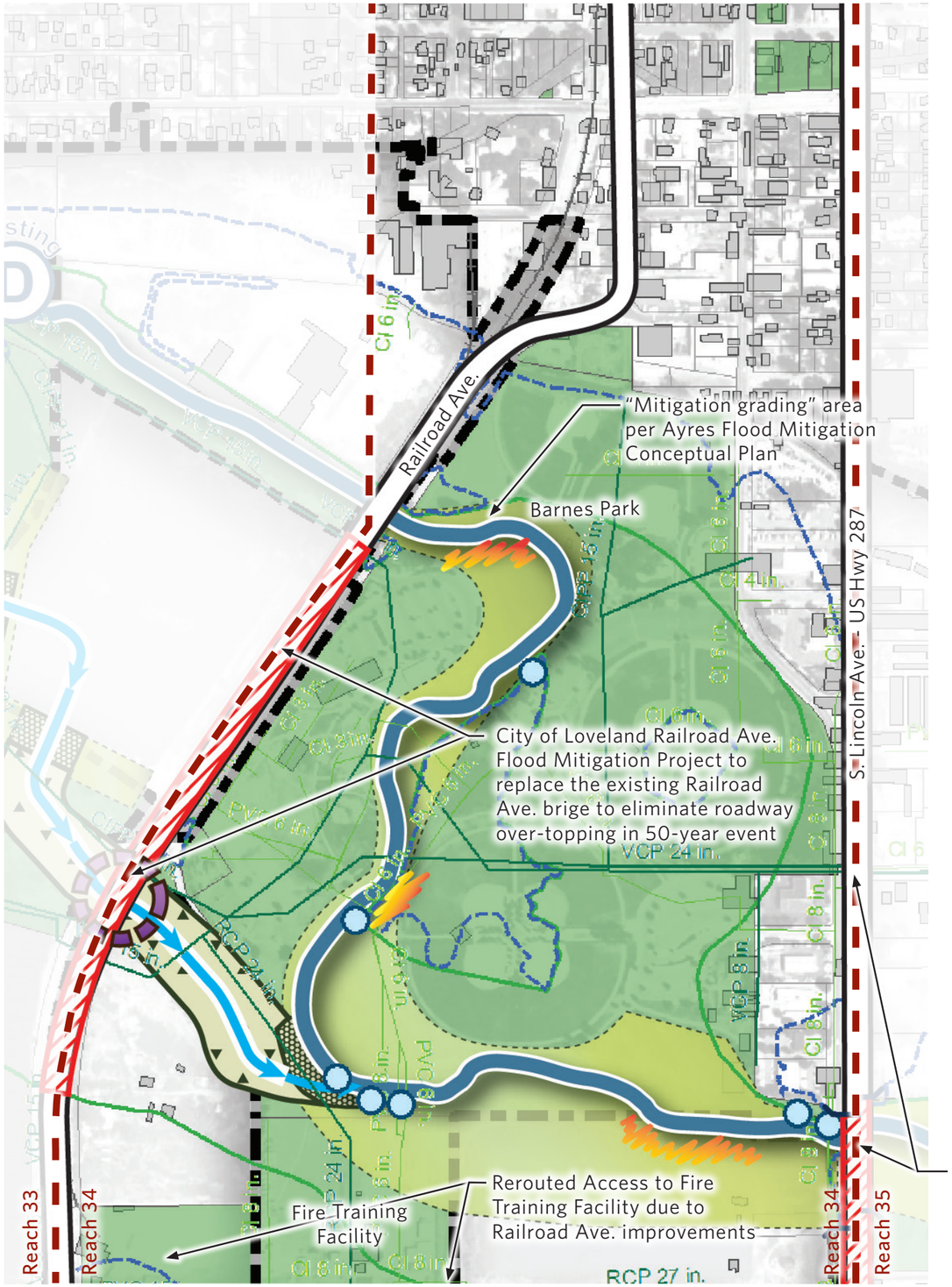
0′ 400′ 800′ Feet

Parks & Recreation		
Centennial Park River Access	$53,000	Mid
Farmers Ditch Diversion Take-Out and Put-In	$80,000	Near

Trails		
Vegetative Screening	$18,000	Near
Realigned Recreational Trail	$105,000	Near

Figure ES-10-Reach 33 Rec Map

REACH 34: Railroad Avenue to Lincoln Avenue (Highway 287)
Near- Mid- and Long-term Prioritization



Legend:

- Major Roadway Connections
- Big Thompson River
- High Flow Path
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Ownership - City of Loveland
- Proposed Elevation of Roadway
- Bank Stabilization
- Sanitary Gravity Main
- Sanitary Pressurized Main
- Water Pressurized Main
- Stormwater Outfall

0′ 400′ 800′ Feet

Flood Hazards		
City of Loveland Lincoln Avenue - US Highway 287 Flood Mitigation	$16,900,000	Near

Geomorphology		
Bank Stabilization (~ 1200 feet)	$945,000	Mid

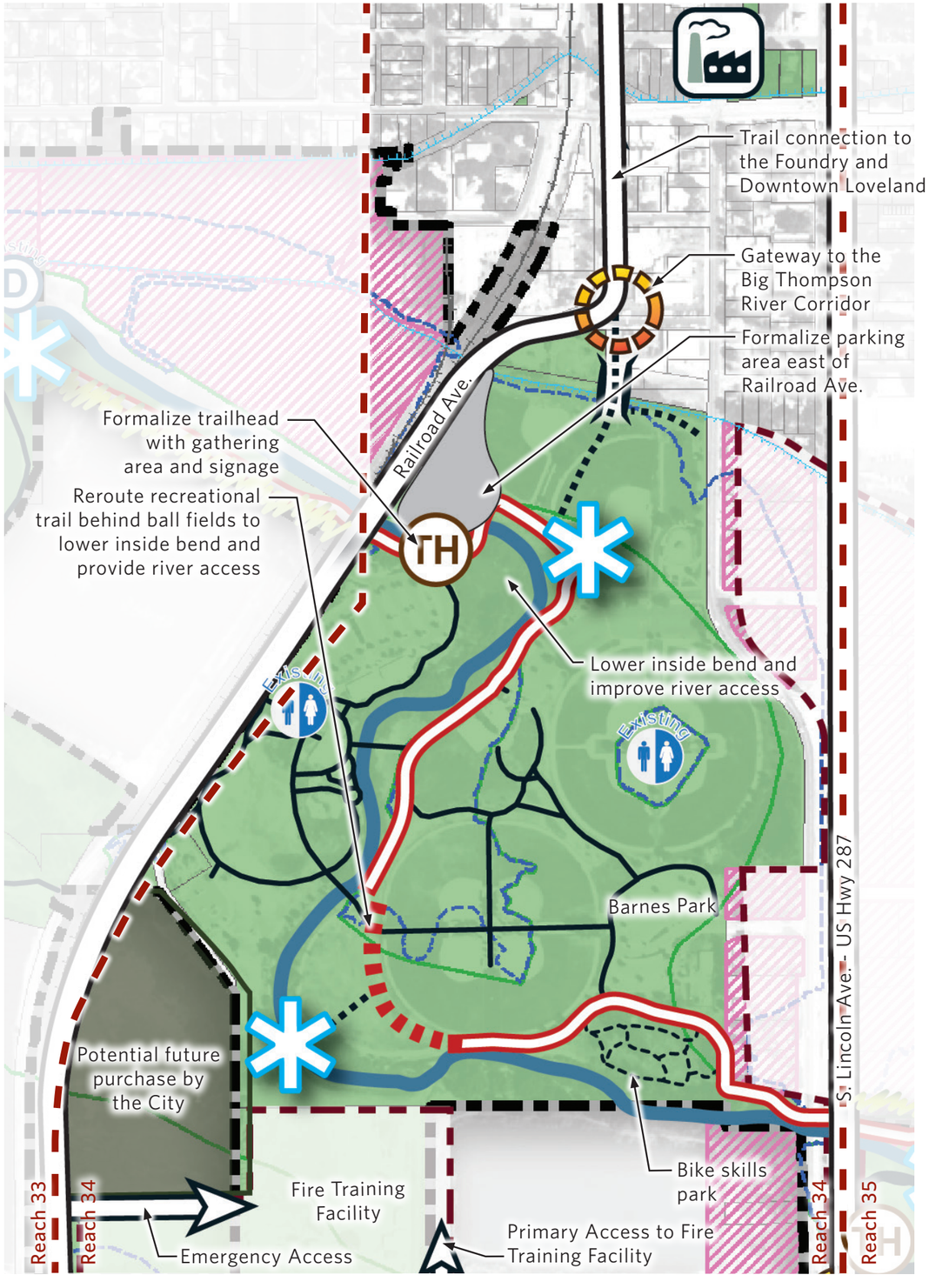
Utilities		
24-Inch Sanitary Sewer Protection	$37,000	Near
6-Inch Waterline Protection	$37,000	Near

Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$17,000	Near

City of Loveland Lincoln Ave. - US Hwy 287 Flood Mitigation Project
- Replace existing bridge with 240-ft span bridge
- Elevate roadway to eliminate 100-yr over-topping
- "Mitigation grading" upstream and downstream of crossing for additional floodplain storage
- See Ayres US Hwy 287 Bridge & Flood Mitigation Conceptual Plan

Figure ES-11-Reach 34 H & H Map

REACH 34:



Legend:

- Main River Access Point
- Proposed Trail Head
- Existing Restroom
- City of Loveland City Boundary
- Proposed Trail Bridge
- Vegetative Screening
- Big Thompson River
- Major Roadway Connections
- Existing Loveland Recreational Trail
- Proposed Recreational Trail
- Existing Soft Surface Trail
- Proposed Soft Surface Trail
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Potential Future Development Area
- Ownership - City of Loveland
- The Foundry
- Proposed Gateway

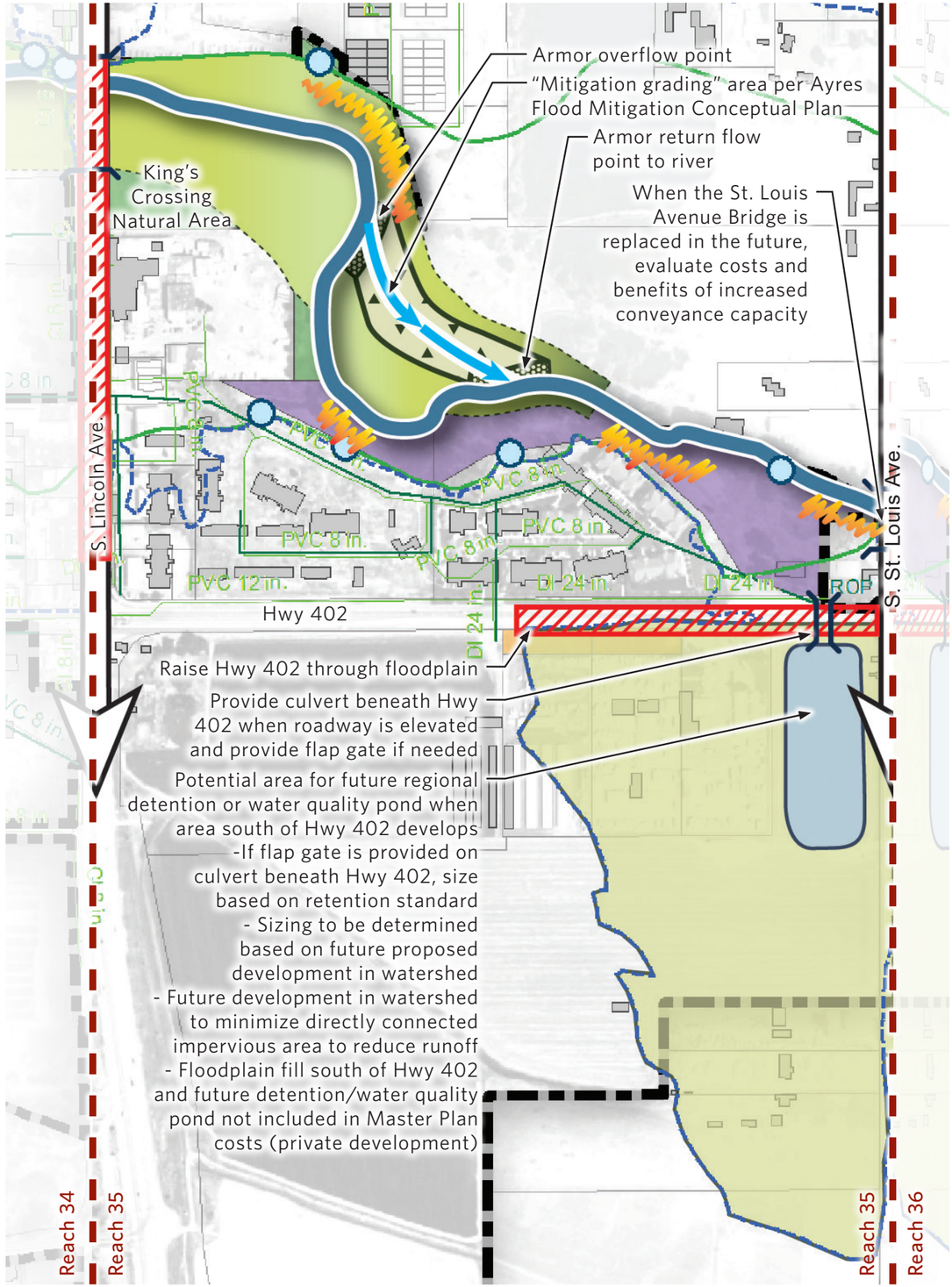
0′ 400′ 800′ Feet

Parks & Recreation		
Fairgrounds Park River Access	$110,000	Mid
Fairgrounds Park Bike Skills Park	$132,000	Mid
Gateway to the Big Thompson River Corridor Railroad Avenue Improvements	$3,500,000	Long
Redevelopment of Old Loveland Wastewater Treatment Plant Site	$875,000	Mid
Fairgrounds Park Trailhead	$175,000	Mid

Trails		
Bike Trail Connection from North End of Fairgrounds Park to 1st Street	$158,000	Mid
Realignment of Trail Near Fairgrounds Park River Access	$109,000	Mid

Figure ES-12-Reach 34 Rec Map

REACH 35: Lincoln Avenue (Highway 287) to St. Louis Avenue
Near-, Mid- and Long-term Prioritization



Legend:

- Major Roadway Connections
- Big Thompson River
- High Flow Path
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Ownership - City of Loveland
- Ownership - Conservation Easement
- Ownership - Larimer County
- Water Quality Pond
- Potential Floodplain Fill Area
- Constructed Wetland Overflow Channel
- Proposed Elevation of Roadway
- Bank Stabilization
- Sanitary Gravity Main
- Sanitary Pressurized Main
- Water Pressurized Main
- Stormwater Outfall

0′ 400′ 800′
Feet

Flood Hazards		
Raise Highway 402, including culvert	$3,230,000	Long

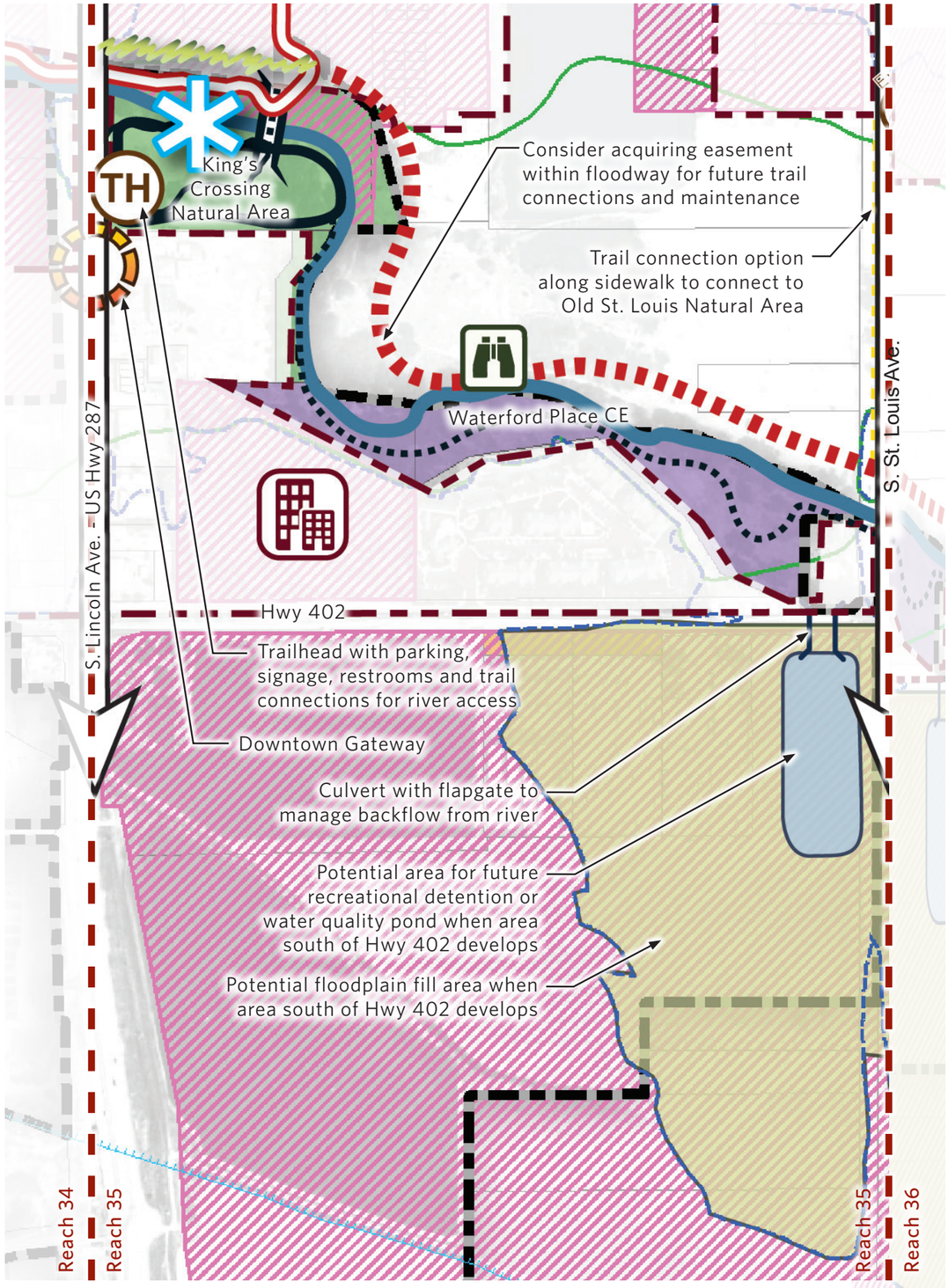
Gravel Pits		
Overflow Channel Armoring	$675,000	Mid

Geomorphology		
Bank Stabilization (~ 1200 feet)	$945,000	Mid

Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$14,000	Near

Figure ES-13-Reach 35 H & H Map

REACH 35: Lincoln Avenue (Highway 287) to St. Louis Avenue
Near-, Mid- and Long-term Prioritization



Legend:

- Main River Access Point
- Proposed Trail Head
- Proposed Wildlife Overlook
- City of Loveland City Boundary
- Proposed Trail Bridge
- Vegetative Screening
- Big Thompson River
- Major Roadway Connections
- Multi-family Development
- Existing Loveland Recreational Trail
- Proposed Recreational Trail
- Existing Soft Surface Trail
- Proposed Soft Surface Trail
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Potential Future Development Area
- 287 Strategic Planning Area
- Ownership - City of Loveland
- Proposed Ponds/Wetland Areas
- Potential Floodplain Fill Area
- Ownership - Conservation Easement
- Proposed Gateway

0′ 400′ 800′ Feet

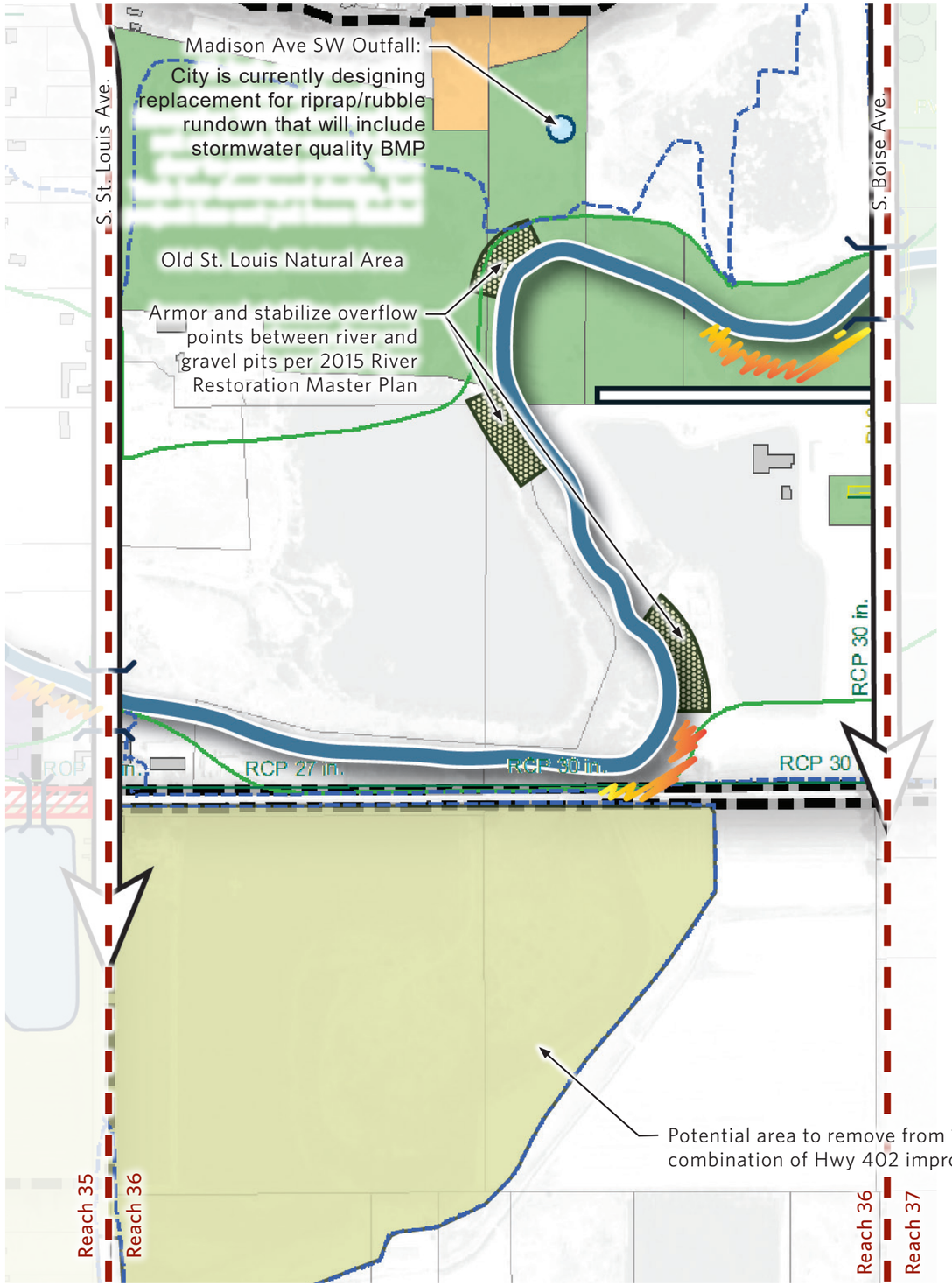
Natural Area/Open Space		
King's Crossing Natural Area Weed Control and Revegetation	$24,000	Near

Parks & Recreation		
Gateway to Downtown Architectural Element Along Lincoln Avenue	$132,000	Mid
King's Crossing Natural Area Trailhead	$525,000	Mid
King's Crossing Natural Area River Access	$276,000	Mid

Trails		
Vegetative Screening	$5,000	Near
Lincoln Ave. - St. Louis Ave. Recreational Trail and Pedestrian Bridge	$635,000	Mid
Lincoln Ave. - St. Louis Ave. Soft Trail	$171,000	Mid

Figure ES-14-Reach 35 Rec Map

REACH 36: St. Louis Avenue to Boise Avenue
Near- Mid- and Long-term Prioritization



Legend:

- Major Roadway Connections
- Big Thompson River
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Ownership - City of Loveland
- Ownership - Larimer County
- Potential Floodplain Reduction Area
- Armored Overflow Protection
  See UDFCD Urban Storm Drainage Criteria Manual or USACE guidance for riprap sizing, use soil riprap in higher visibility to soften appearance and provide vegetation.
- Constructed Wetland Overflow Channel
- Proposed Elevation of Roadway
- Bank Stabilization
- Sanitary Gravity Main
- Sanitary Pressurized Main
- Water Pressurized Main
- Stormwater Outfall

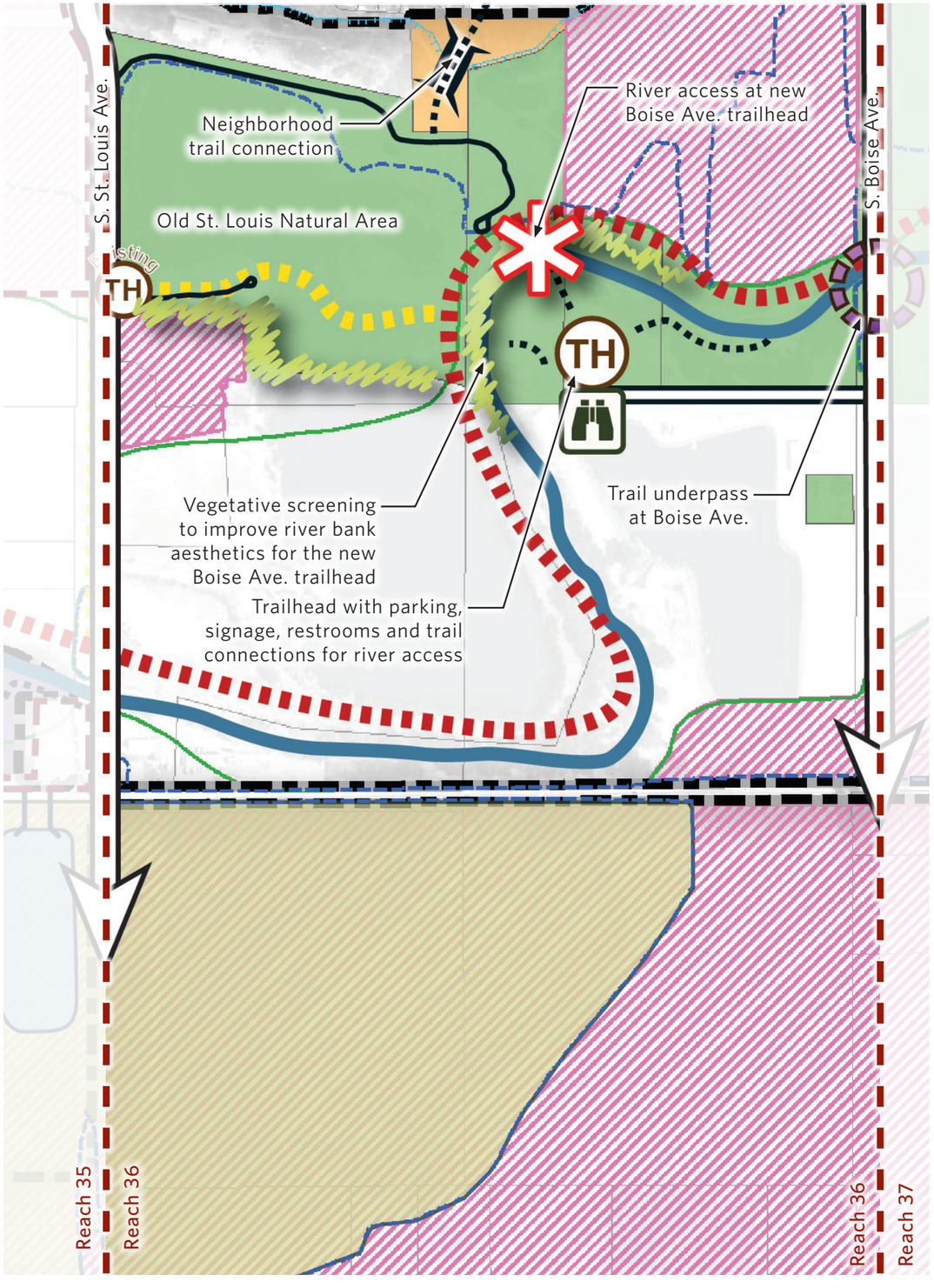
0′ 400′ 800′ Feet

Gravel Pits		
Overflow Armoring (~ 1,500 feet)	$1,575,000	Long

Geomorphology		
Bank Stabilization (~ 1,000 feet)	$790,000	Mid

Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$20,000	Near

Figure ES-15-Reach 36 H & H Map



Legend:

- River Access Point
- Proposed Trail Head
- Existing Trail Head
- Proposed Wildlife Overlook
- City of Loveland City Boundary
- Vegetative Screening
- Proposed Trail Bridge
- Big Thompson River
- Major Roadway Connections
- Proposed Recreational Trail
- Alternative Recreational Trail Alignment
- Existing Soft Surface Trail
- Proposed Soft Surface Trail
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Potential Future Development Area
- Ownership - City of Loveland
- Potential Floodplain Fill Area
- Ownership - Larimer County
- Proposed Underpass

Natural Area/Open Space		
Old St. Louis Natural Area Weed Control, Revegetation and Wetland Creation	$100,000	Mid

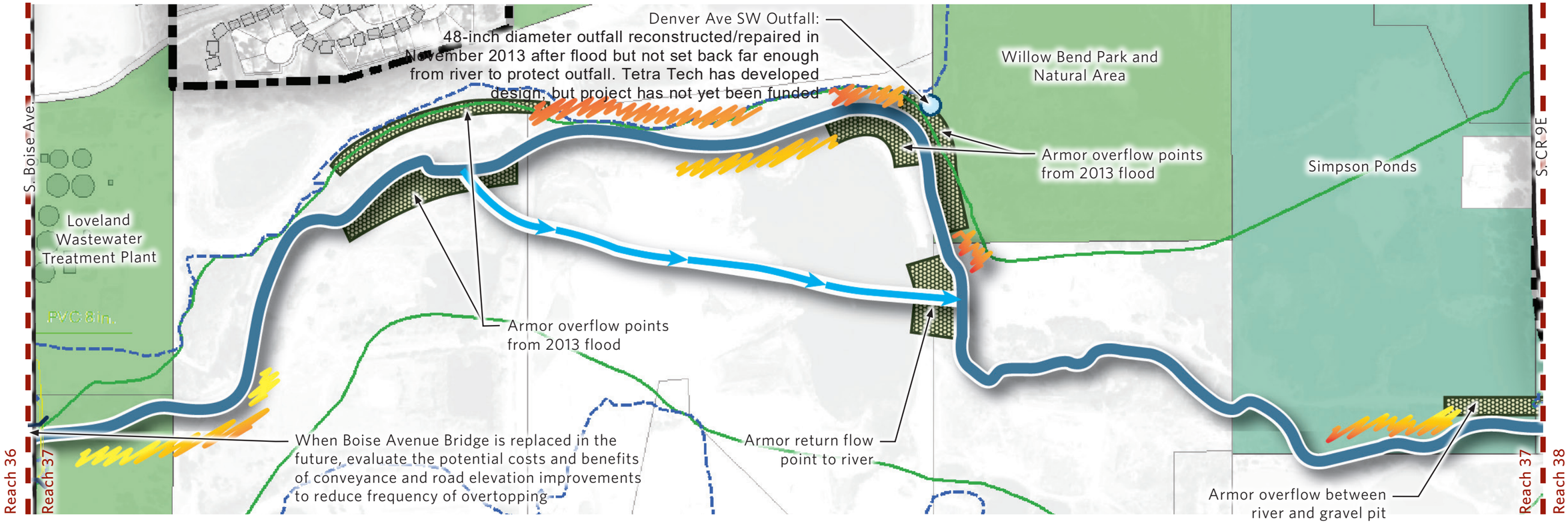
Parks & Recreation		
Old St. Louis Natural Area Shelter	$53,000	Near
Boise Ave. Site Trailhead	$525,000	Mid

Parks & Recreation		
Vegetative Screening	$12,000	Near
St. Louis Ave - Boise Ave Recreational Trail	$530,000	Mid
Madison Avenue Neighborhood Trail Connection	$130,000	Mid
Old. St. Louis Natural Area Soft Trail	$62,000	Mid

Note: Proposed underpass costs not included in Master Plan because underpass will be constructed as part of road project.

0′ 400′ 800′ Feet

Figure ES-16-Reach 36 Rec Map



REACH 37: Boise Avenue to CR 9E Near-, Mid and Long-term Prioritization

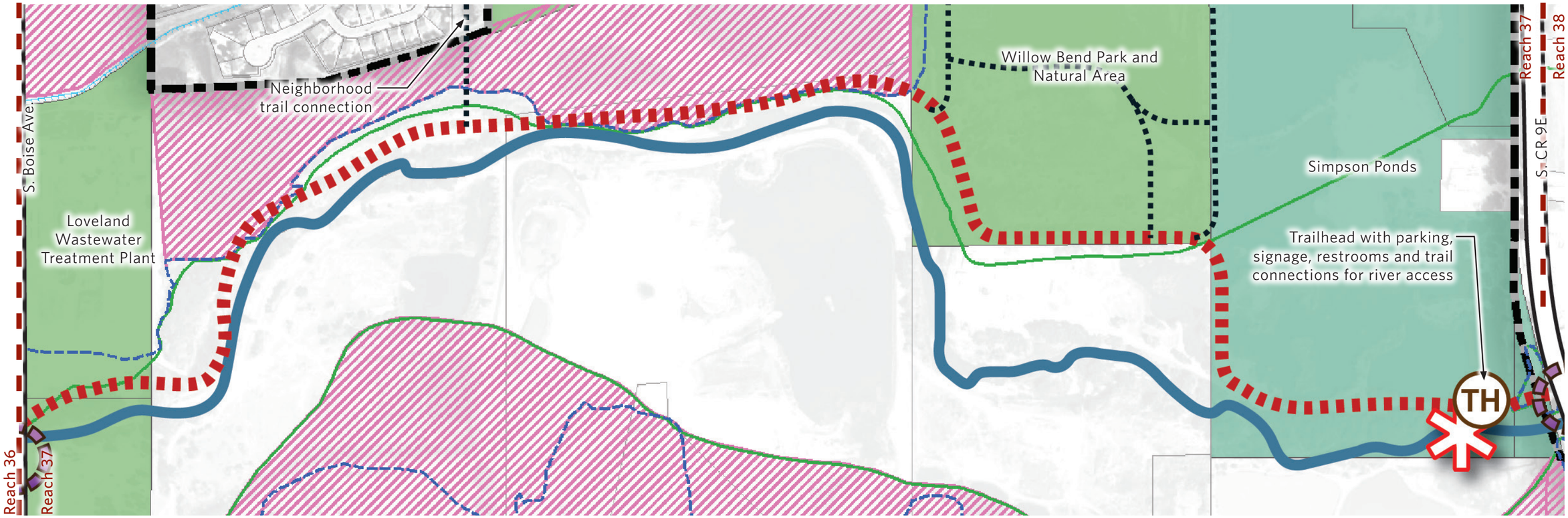
Gravel Pits		
Overflow Armoring (~ 2,500 feet)	$2,625,000	Mid
Geomorphology		
Bank Stabilization (~ 3,000 feet)	$2,363,000	Mid
Water Quality		
Denver Avenue Outfall Repairs and BMP	$368,000	Near
Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$34,000	Near

0′ 400′ 800′
Feet

Legend:

- Major Roadway Connections
- Big Thompson River
- High Flow Path
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Ownership - City of Loveland
- Ownership - State of Colorado
- Armored Overflow Protection
  See UDFCD Urban Storm Drainage Criteria Manual or USACE guidance for riprap sizing, use soil riprap in higher visibility areas to soften appearance and provide vegetation
- Bank Stabilization
- Water Pressurized Main
- Stormwater Outfall

Figure ES-17-Reach 37 H & H Map



REACH 37:

Boise Avenue to CR 9E Near-, Mid and Long-term Prioritization

Natural Area/Open Space		
Willow Bend Park and Natural Area Weed Control and Revegetation	$136,000	Near

Parks & Recreation		
Simpson Ponds River Access	$35,000	Mid

Trails		
Boise Ave - CR 9E Recreational Trail	$893,000	Long
Torrent Duck Ave Neighborhood Trail Connection	$75,000	Mid
Simpson Ponds Trailhead	$525,000	Long

Note: Proposed underpass costs not included in Master Plan because underpass will be constructed as part of road project.

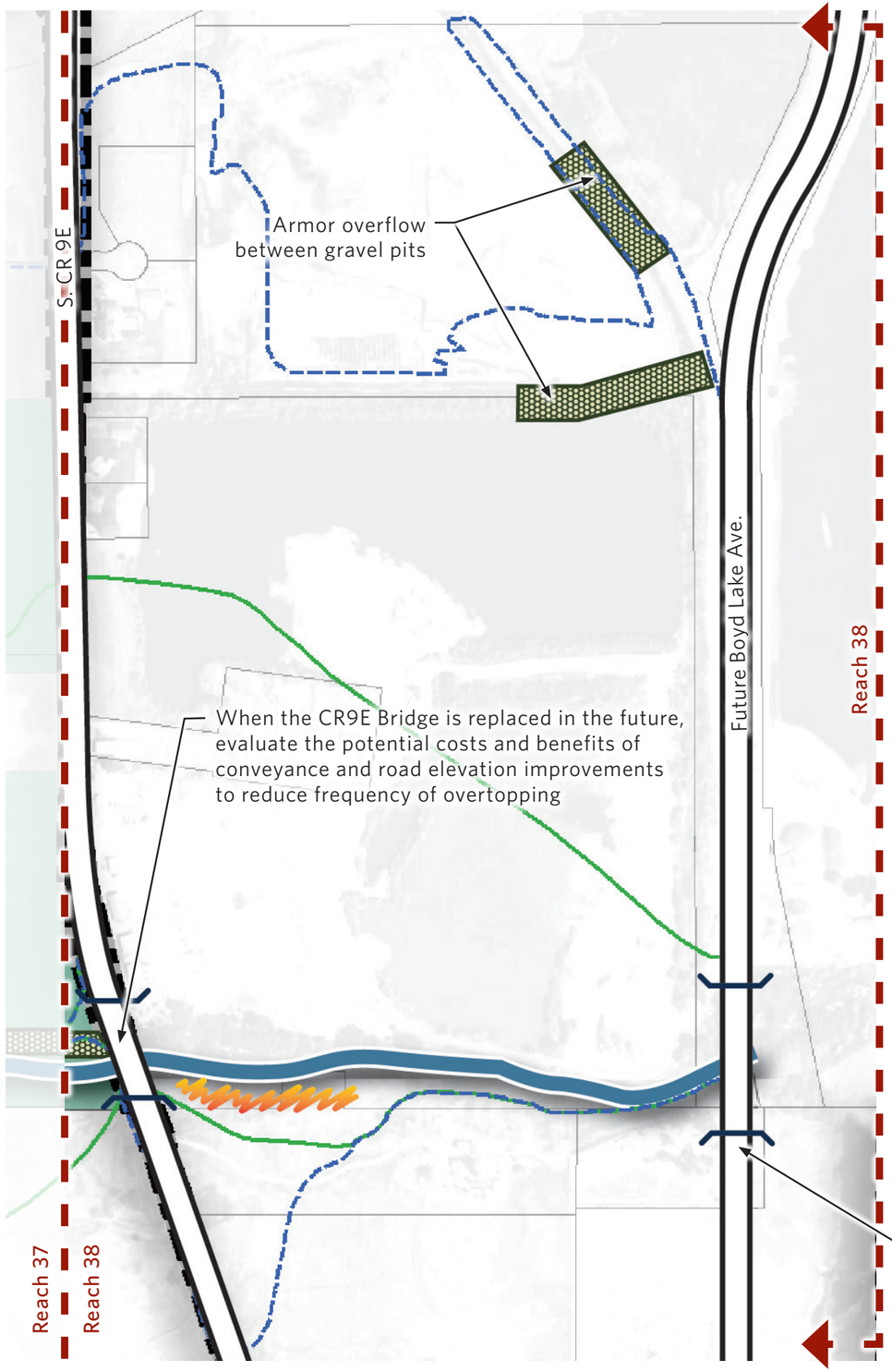
0′ 400′ 800′
Feet

Legend:

- River Access Point
- City of Loveland City Boundary
- Big Thompson River
- Major Roadway Connections
- Proposed Recreational Trail
- Proposed Soft Surface Trail
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Potential Future Development Area
- Ownership - City of Loveland
- Ownership - State of Colorado
- Proposed Underpass

Figure ES-18-Reach 37 Rec Map

REACH 38: CR 9E to D/S Study Limit
Near- Mid- and Long-term Prioritization



Legend:

- Major Roadway Connections
- Big Thompson River
- City of Loveland City Boundary
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Ownership - City of Loveland
- Ownership - State of Colorado
- Armored Overflow Protection
  See UDFCD Urban Storm Drainage Criteria Manual or USACE guidance for riprap sizing, use soil riprap in higher visibility areas to soften appearance and provide vegetation
- Bank Stabilization

0′ 400′ 800′ Feet

Gravel Pits		
Gravel Pit Overflow Armoring	$1,050,000	Mid

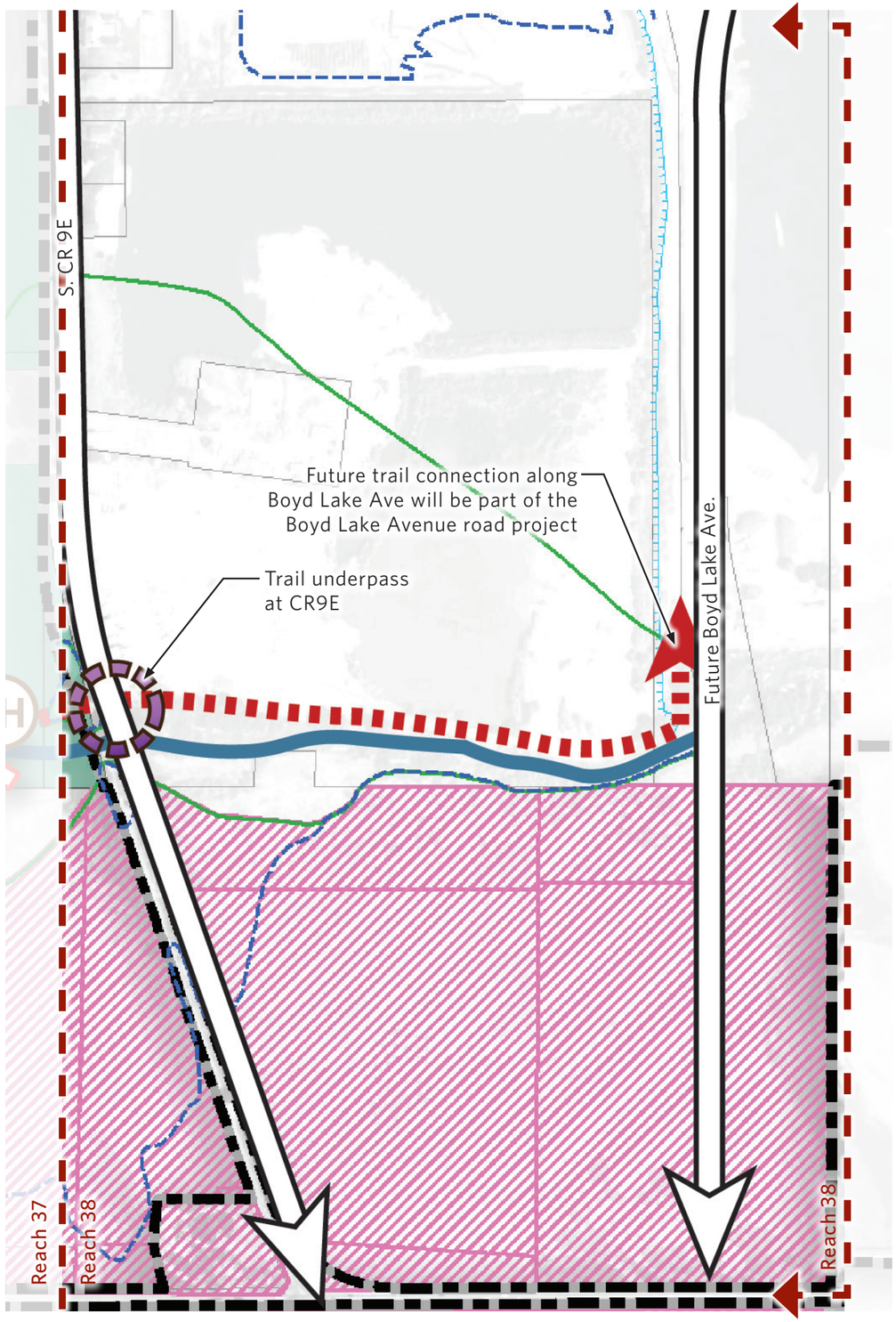
Geomorphology		
Bank Stabilization (~ 600 feet)	$470,000	Long

Maintenance		
Routine Annual Maintenance and Debris Removal (Public and Private)	$10,000	Near

When Boyd Lake Avenue is constructed along this approximate alignment in the future, provide combinations of a primary bridge and secondary bridges or culverts needed to convey the 100-yr peak discharge with adequate freeboard Future road should not overtop in a 100-yr event

Figure ES-19-Reach 38 H & H Map

REACH 38: CR 9E to D/S Study Limit
Near- Mid- and Long-term Prioritization



Legend:

- Proposed Trail Head
- City of Loveland City Boundary
- Big Thompson River
- Major Roadway Connections
- Proposed Recreational Trail
- Proposed Soft Surface Trail
- Sidewalks
- Railroads
- Floodway
- 100-year Floodplain
- Potential Future Development Area
- Ownership - City of Loveland
- Proposed Underpass

0′ 400′ 800′ Feet

Trails		
CR 9E - Boyd Lake Ave Recreational Trail	$210,000	Long

Note: Proposed underpass costs not included in Master Plan because underpass will be constructed as part of road project.

Figure ES-20-Reach 38 Rec Map