

Difficult Trails in Difficult Places

*Landscape Architects and Engineers
working together to resolve conflict in
the planning, design & construction of trails*

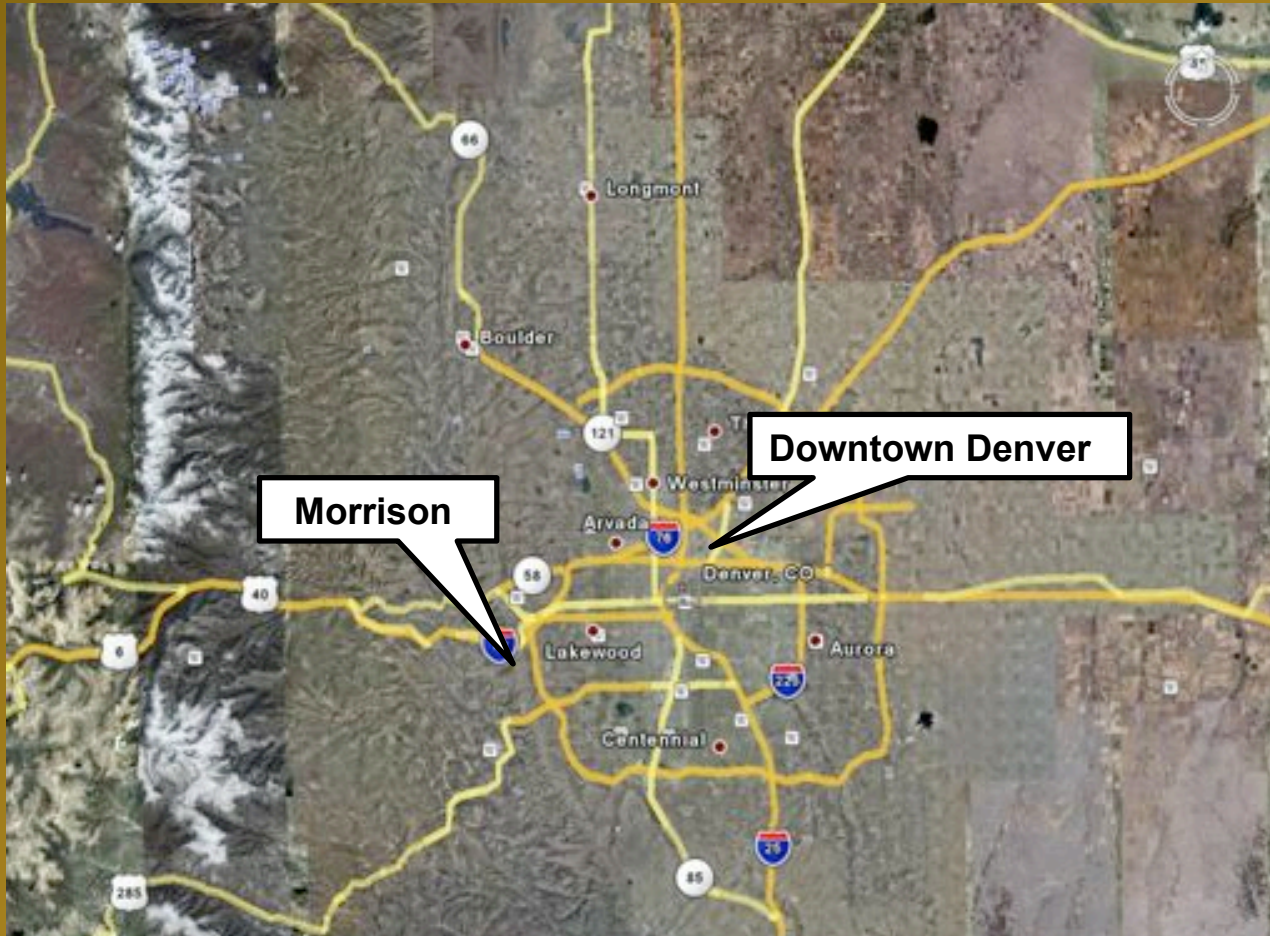


DHM DESIGN and WHPacific, Inc.
With The Greenway Team and Brown & Caldwell

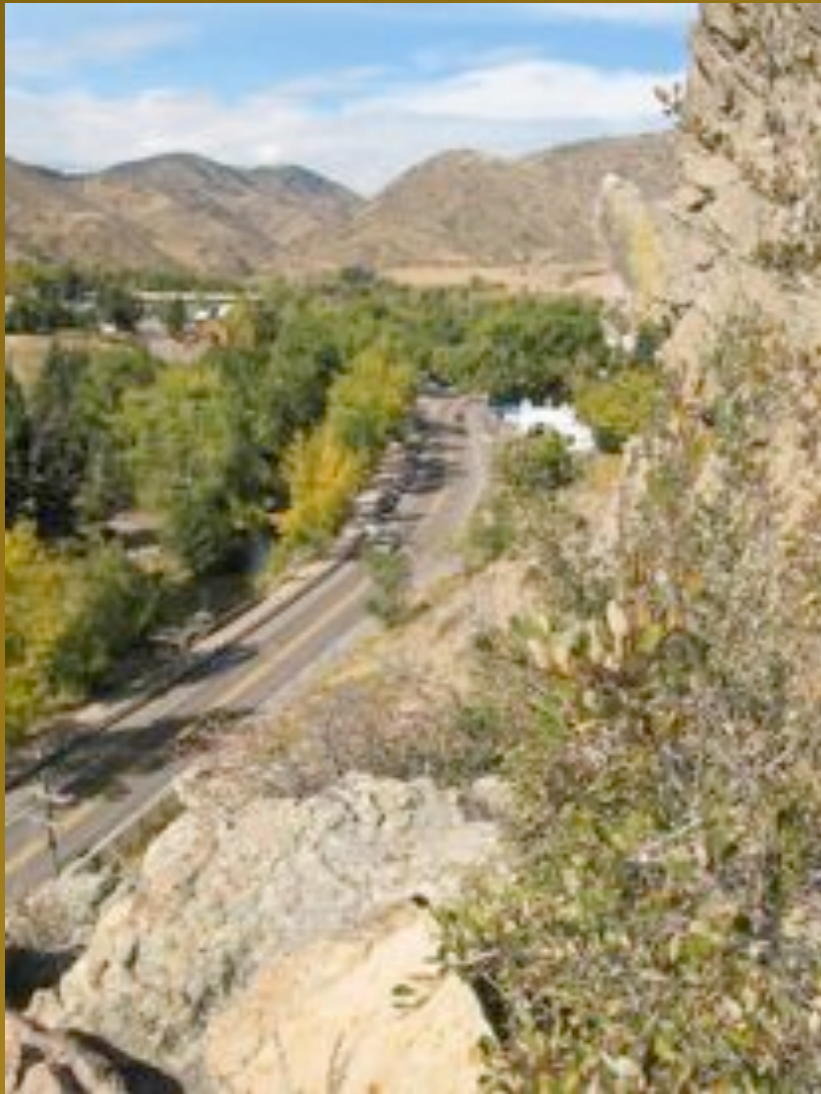


Bear Creek Greenway & Trail Morrison, Colorado

Working with small communities



Located 30 minutes from downtown Denver
behind the hogback



Highway parallels Bear Creek which was hardly visible from its banks.

Founded in 1874 as a passageway gold mines to the west. Morrison is the gateway to the Bear Creek Canyon. Surrounded with parks and open space including Red Rocks natural amphitheater.



Rock climbing at canyon opening



**Morrison had limited off-street bicycle facilities
With disjointed downtown walkways, hardly accessible.
Heavy concert and weekend traffic.**

Population of 450 people
Downtown comprised of antique shops,
restaurants, boutiques and other stores.
Area draws thousands of bicyclists, hikers, and those
interested in the rich geologic and cultural landscape.



TNT, El Mercado, Blue Cow





Project: 1999 to 2004

Budget: \$ 2.7 million

Funded by: Jefferson County Open Space, Great Outdoors
Colorado State Trails Program, and the Town of Morrison, Urban
Drainage,



¾ miles of 10' wide multi-use trail, pedestrian walks, signature bridge, decking,
trail amenities, and revegetation of creek banks.

Trail provides connectivity to the regional trail system of Denver.



CHALLENGES

Tight Corridor

Highway Traffic

Pedestrian/ Bike Safety

Eroding Creek Banks

Downtown Parking

Perception of “Change”

Town Council

Design Team Included:

Greenway Planners

Landscape Architects

Civil Engineers

Structural Engineers

Traffic Engineers

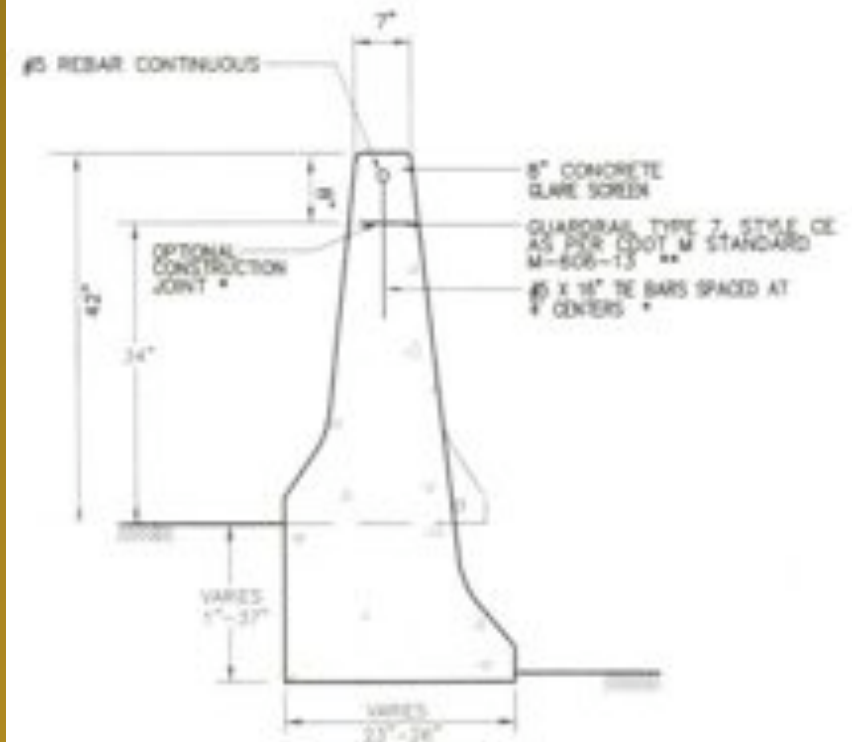
Ecologists

STREET INTERFACE



Customized Concrete Barrier to accommodate grade change and limited width.

Adjusted Lane Striping measured to the "inch" Reset Guardrail-Pedestrian Rail



GUARDRAIL SECTION (STYLE CE)

SCALE: 1"=4'-0"

* VERTICAL TIE BARS ARE NOT REQUIRED WHEN THE GLARE SCREEN IS POURED MONOLITHICALLY.

** THE BASE 34"-71" SHALL CONFORM TO CDOT'S STANDARD GUARDRAIL TYPE 7 (STYLE CE)

STREET INTERFACE



Custom Pedestrian Railing
protecting trail users from back of
guardrail



PARKING INTERFACE



Parking Layout to maintain existing count
Paving Treatment to demark pedestrians, car doors and bicycles
Signage to direct and separate user types



PARKING INTERFACE

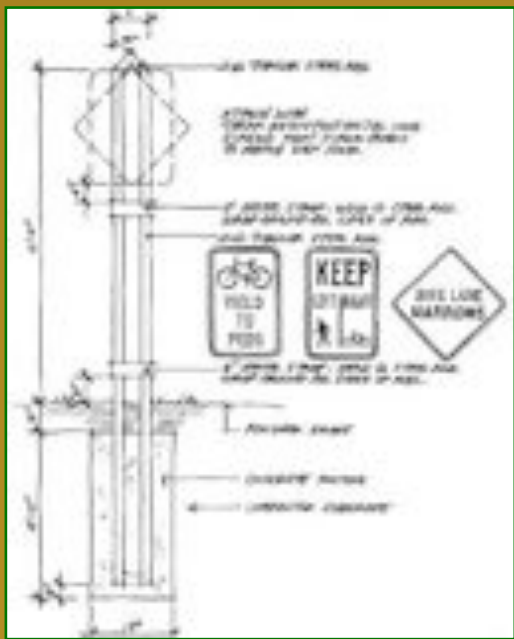
Working with property owners to gain support and accomplish trail corridor



SIGNAGE



Signage-Simple, attractive mounting, meeting MUTSCO



CREEK EXPERIENCE

Volunteer plantings to restore creek banks, reducing erosion and making attractive.



CREEK EXPERIENCE



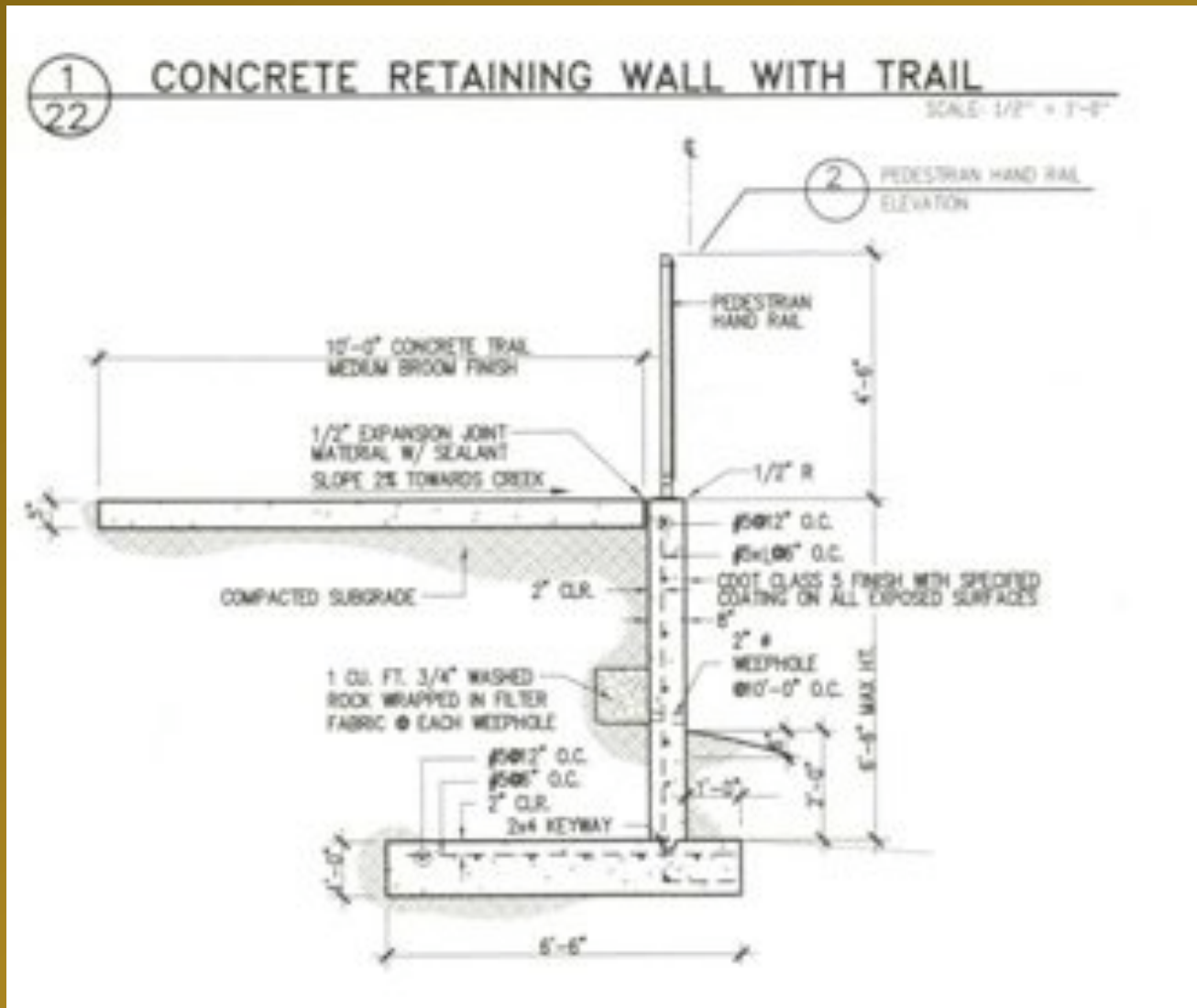
Deck structures constructed and poured in place. Preserved trees, but did disturb creek banks. Still less excavation and disturbance than a structural wall with footings or piles.



CREEK EXPERIENCE



CREEK EXPERIENCE



CREEK EXPERIENCE



CREEK EXPERIENCE



Transparent Pedestrian Rail
Place Trail along Creek Edge
Provide Overlooks



CREEK EXPERIENCE

Rest Area with seating and trash receptacles
Gardens and Dining Along Trail



BRIDGE INSTALLATION



Narrow Corridor- “Just Feet From Restaurant”
Careful Installation- Seismic Monitoring
Power shut-off, generators for freezers, lost revenue
Bridge From California (Eisenhower Tunnel)



BRIDGE INSTALLATION

Trail Accessible To All



DECK INSTALLATION



DECK INSTALLATION

Difficult Construction

Engineering Field Changes

Piles moved horizontally when driven into bedrock

2 Precast Twin 'T's fit together to form deck



DECK INSTALLATION



DECK INSTALLATION



Realign Highway at intersection
Working with traffic engineer and CDOT



VETERAN'S MEMORIAL

Preserving The Past

Working with veterans group to design plan that accepts trail while reestablishing an important memorial.



VETERAN'S MEMORIAL



Working With Veterans Group
Integrating the Trail



VETERAN'S MEMORIAL



TWO CREEKS PARK

Urban Park-Rest Area
Benches/ Bike Racks
Trail Connection
Interpretive Kiosk and Mural



TWO CREEKS PARK



RIBBON CUTTING



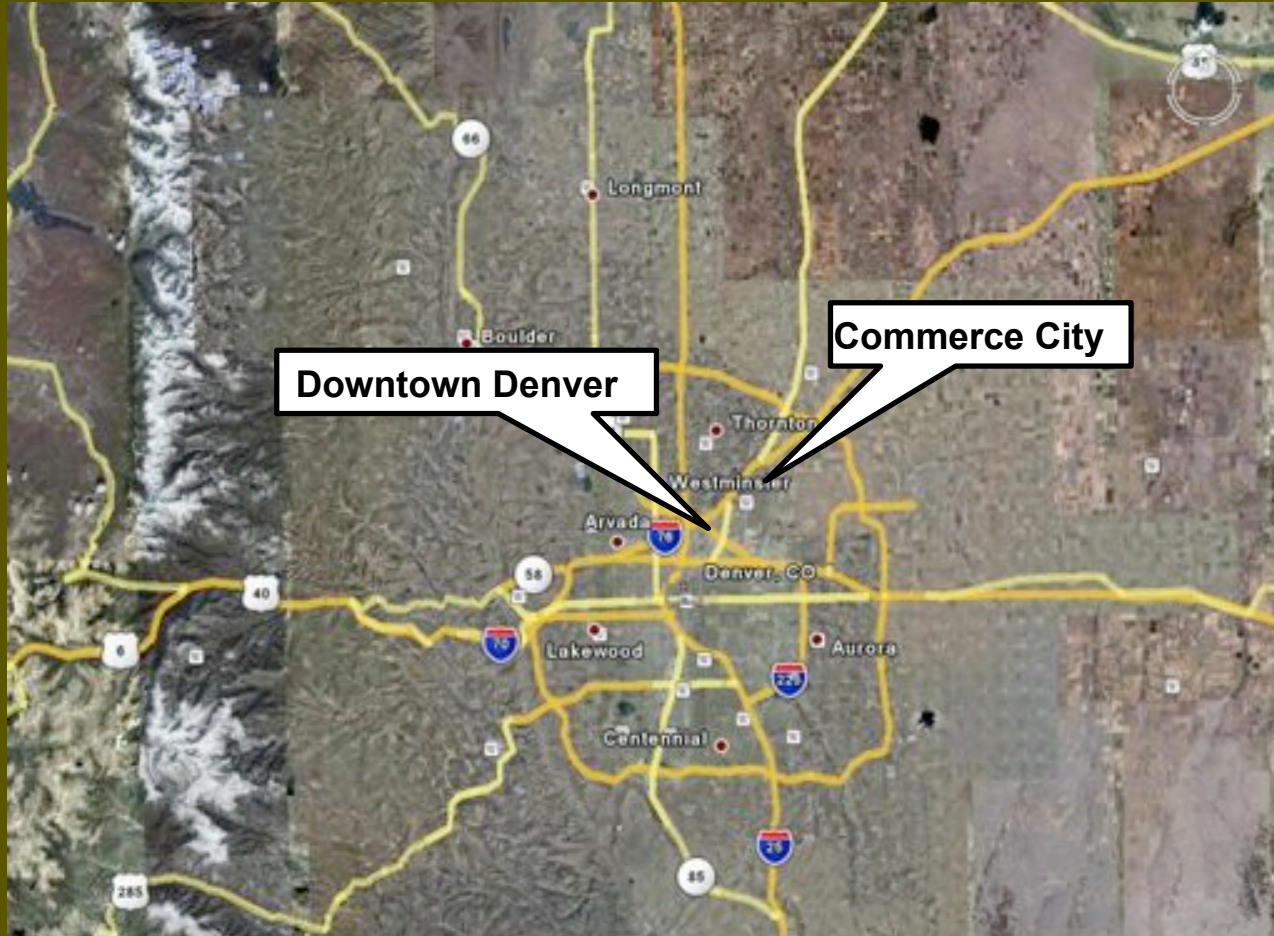
NEW STANDARD TRAIL SECTION
(PENDING 3 YEAR CDOT REVIEW)





Sand Creek Greenway
Commerce City, Colorado

Restoring an Industrial Corridor



Located north of downtown Denver adjacent to The Rocky Mountain Wildlife Refuge



Population of 45,000 people
City businesses include refineries, trucking
companies, manufacturing plants and the new
Colorado Rapid's Soccer Stadium



INDUSTRIAL CHARACTER

- Active Petroleum and Chemical Plants
- Multiple Railroad Crossings
- Utilities and Security



INDUSTRIAL CHARACTER

- Gravel Mining
- Devastated Landscapes
- Dumping



EXISTING BARRIERS

- Highways/ Roadway Structures/ Railroads/ Canals
- Gabion Blankets
- Steep Slopes with debris/trash



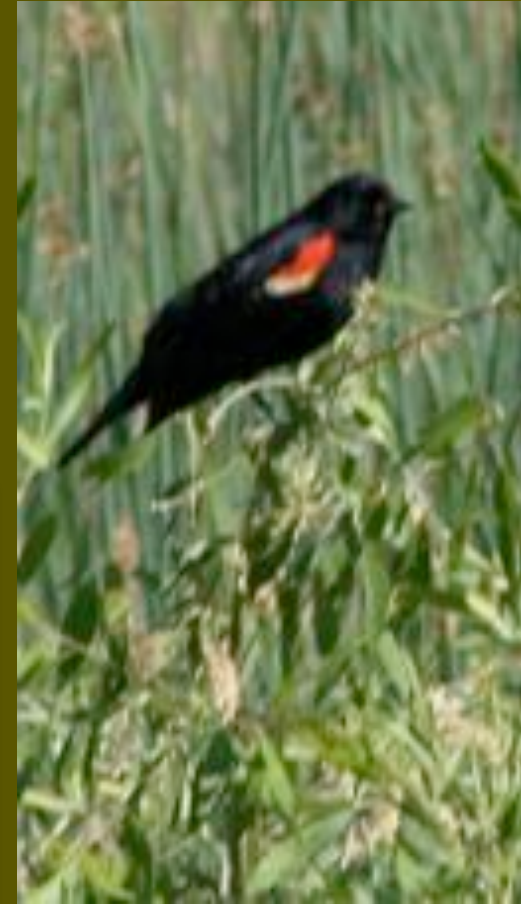
DIVERSE LANDSCAPE

- Wetlands
- Riparian Areas
- Cottonwood Galleries



WILDLIFE

- Large number of Bird Species
- Reptiles and Fish
- Fox, Deer and Small Mammals



Master Plan

Greenway extends 3 miles connecting Commerce City and eastern Cities into the Platte River Greenway system, which extends for over 50 miles

Construction Cost of approx. \$6 million

Funded by GOCO/State Trails grants, Adams Co. Open Space funds, Regional Greenway, City, In kind donations



Design Team Included:

Greenway Planners

Landscape Architects

Civil Engineers

Structural Engineers

Geotechnical Engineers

Ecologists

SEGMENT ONE: THE CONFLUENCE

Challenges:

- River and irrigation ditch crossing.
- Property acquisition / Landfill & concrete rubble.
- Gateway to the city / Image of overall corridor.



SEGMENT ONE: THE CONFLUENCE

• Signature Bridge

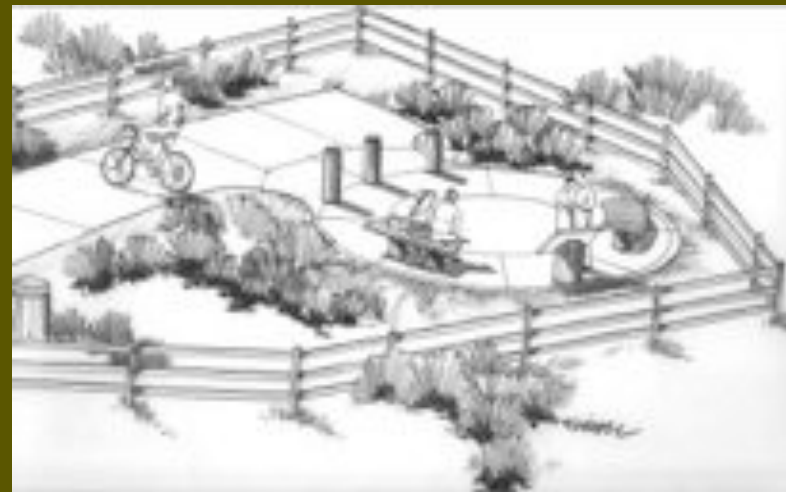


SEGMENT ONE: THE CONFLUENCE



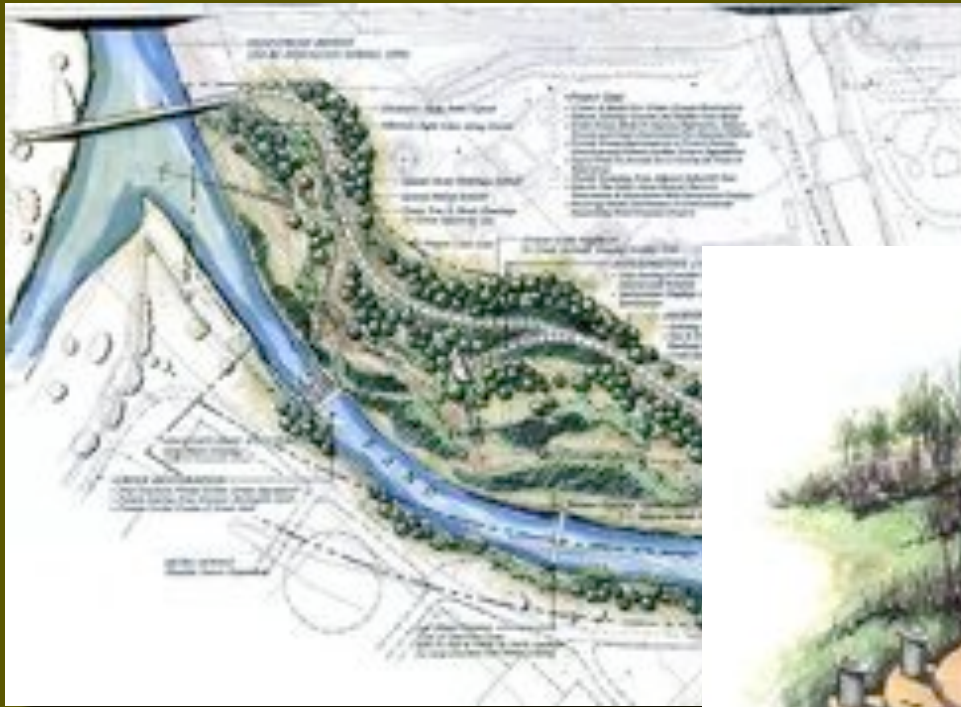
SEGMENT ONE: THE CONFLUENCE

• Canal Crossings



SEGMENT ONE: THE CONFLUENCE

- Confluence Design
- Overlook Concept



SEGMENT TWO: RESTORATION ZONE

Challenges:

- Steep slopes with landfill
- Adjacent property storage
- Sheet piles controlling drainage
- Railroad Crossings and Accessibility



SEGMENT TWO: RESTORATION ZONE



SEGMENT TWO: RESTORATION ZONE



SEGMENT TWO: RESTORATION ZONE

- Lessons Learned



SEGMENT TWO: RESTORATION ZONE

- Lessons Learned



SEGMENT TWO: RESTORATION ZONE

- Fill used to create berming
- Images added to walls for interest



SEGMENT THREE: INDUSTRIAL ZONE



Challenges:

- Security for adjacent property owners
- Concerns about fire hazards
- Trail User safety and frequent flooding



SEGMENT THREE: INDUSTRIAL ZONE



SEGMENT THREE: INDUSTRIAL ZONE



SEGMENT FOUR: FOX FOREST



Challenges:

- Security for adjacent property owners
- Concerns about fire hazards
- Trail User safety and frequent flooding



SEGMENT THREE: INDUSTRIAL ZONE



SEGMENT FOUR: FOX FOREST



Challenges:

- Heavy landfill.
- Creek not visible.
- Screen industrial storage.
- Railroad crossing.
- Security for adjacent properties.

SEGMENT FOUR: FOX FOREST

Site cleanup and grading.
Volunteer opportunities.



SEGMENT FOUR: FOX FOREST



SEGMENT FOUR: FOX FOREST



SEGMENT FOUR: FOX FOREST



SEGMENT FOUR: FOX FOREST

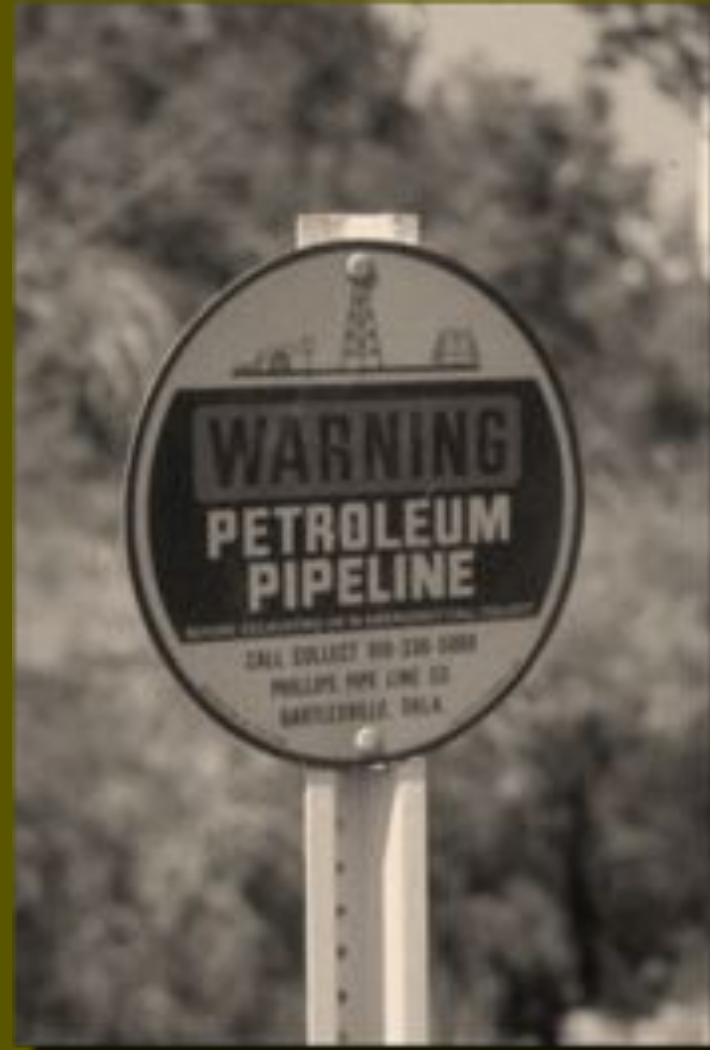


SEGMENT FIVE: WETLAND PARK



Challenges:

- Steep slopes with landfill
- Utilities
- Protection of wetlands
- Accessible Trailhead



SEGMENT FIVE: WETLAND PARK



**SEGMENT FIVE:
WETLAND PARK**



**SEGMENT FIVE:
WETLAND PARK**



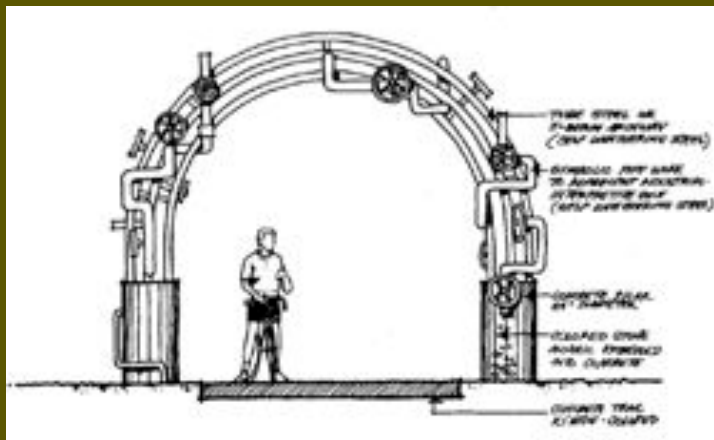
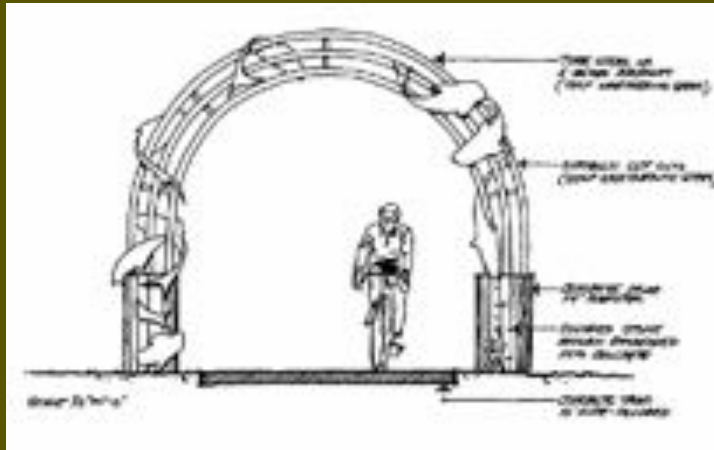
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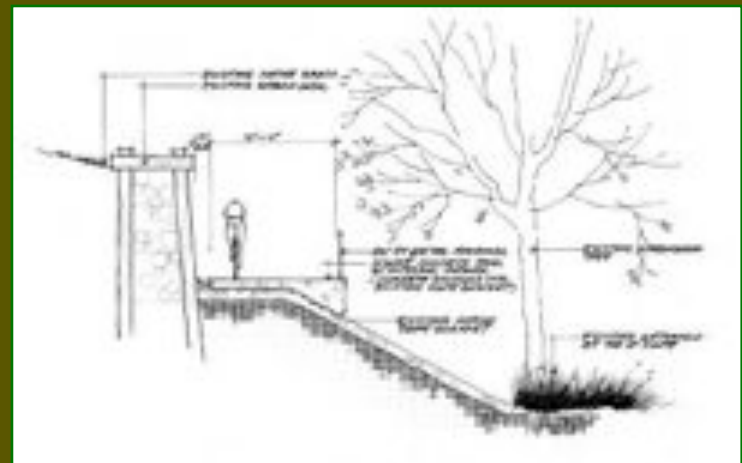


SEGMENT FIVE: WETLAND PARK



Before

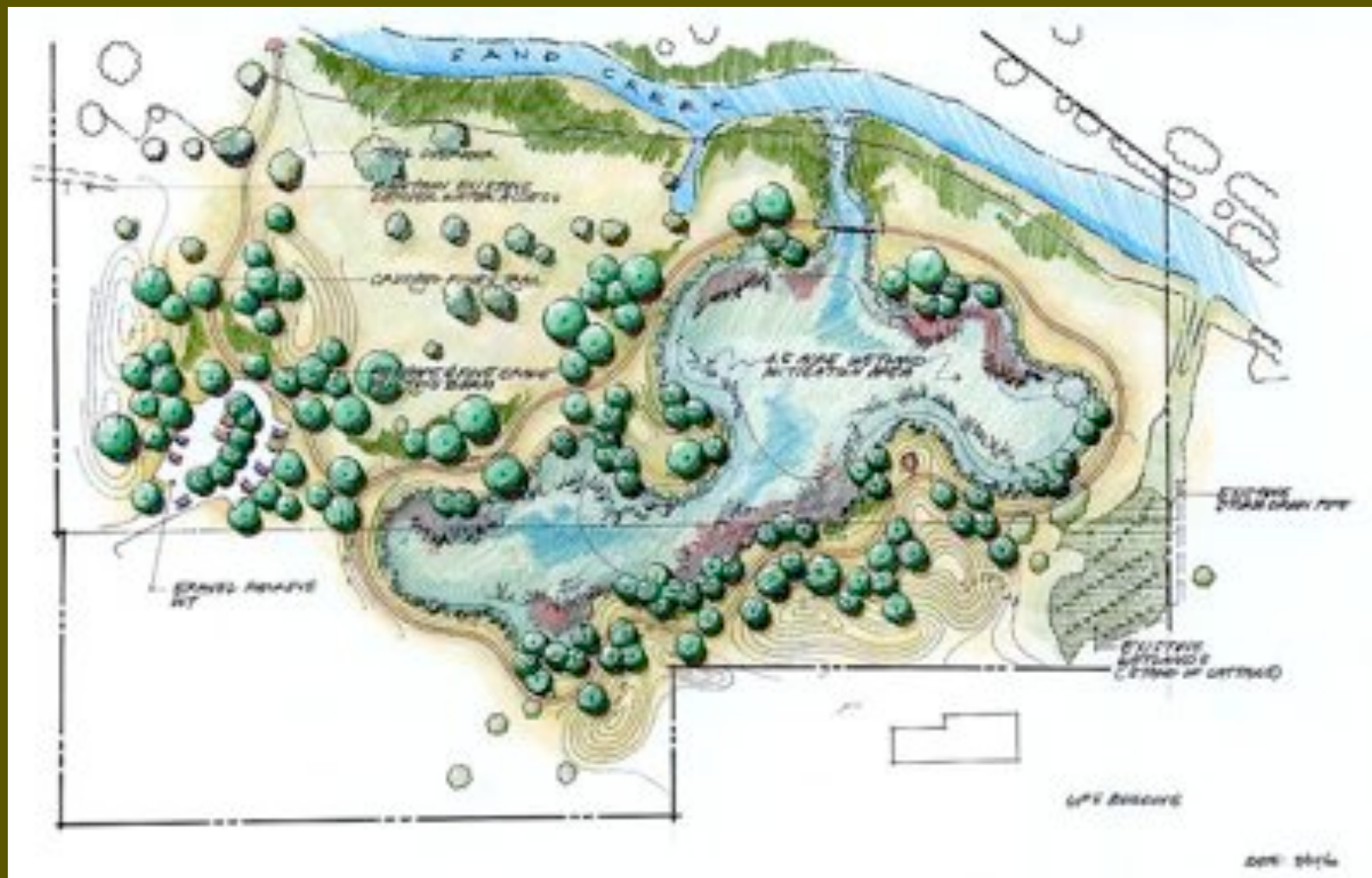
SEGMENT FIVE: WETLAND PARK



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SEGMENT FIVE: WETLAND PARK



**SEGMENT FIVE:
WETLAND PARK**



SEGMENT FIVE: WETLAND PARK



SEGMENT FIVE: WETLAND PARK



SEGMENT SIX: COTTONWOOD GALLERY

Challenges:

- Steep slopes
- Adjacent land uses
- Protection of existing vegetation



SEGMENT SIX: COTTONWOOD GALLERY



**SEGMENT SIX:
COTTONWOOD GALLERY**



**SEGMENT SIX:
COTTONWOOD GALLERY**





Blue River Trail
Silverthorne, Colorado

Embracing a Gold Medal Stream



Population of 3,200 people
Located approx. 75 miles west of Denver
City businesses include refineries, trucking companies, manufacturing plants and
the new Colorado Rapid's Soccer Stadium

**Lake Dillon- Major Water Supply for Denver
Factory Outlet Stores
Yearround and Seasonal Residents**





DILLON LAKE CONNECTION



Connects Dillon with Silverthorne
200 ' Vertical Grade Change
Series of Ramps with Landings
Concerns with Security

Design Team Included:

Greenway Planners
Landscape Architects
Civil Engineers
Structural Engineers
Ecologists
Wildlife Biologist



DILLON LAKE CONNECTION



Protective Railing
Signage
Rest Areas with Seating



DILLON LAKE CONNECTION



DILLON LAKE CONNECTION

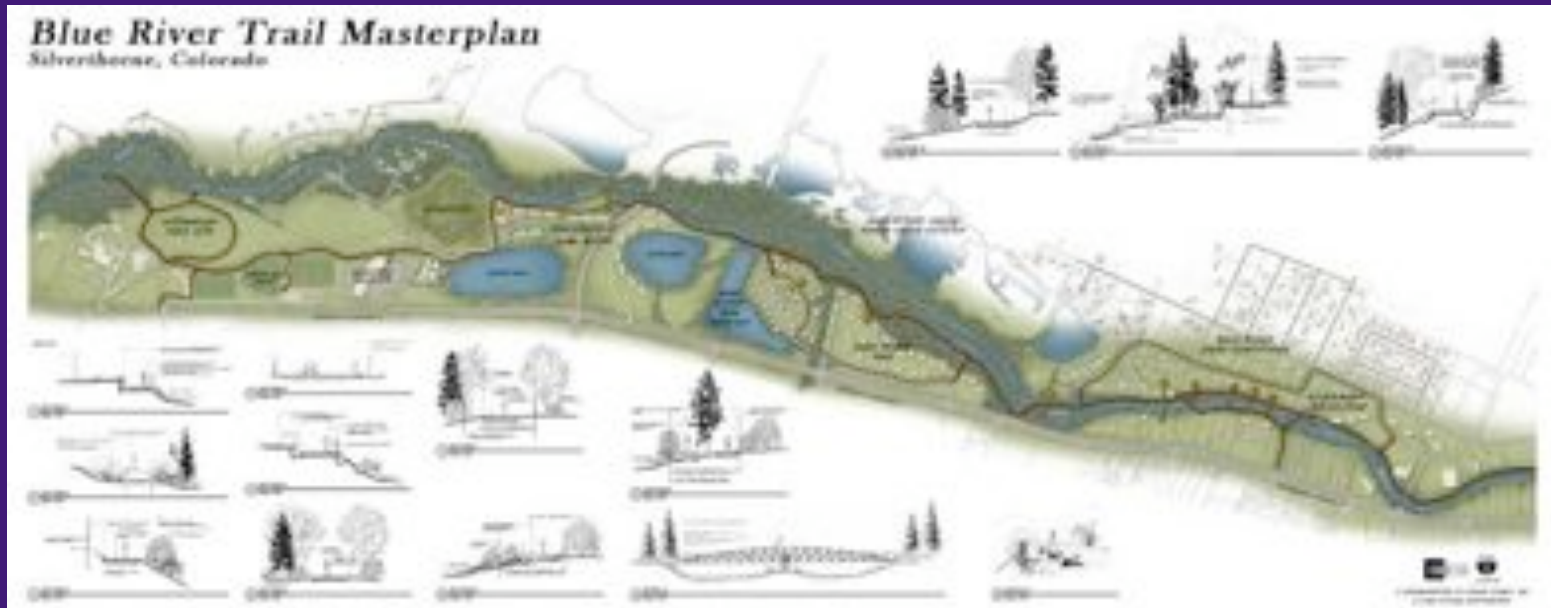


DILLON LAKE CONNECTION



BLUE RIVER

Total Cost to date \$1.5 Million



BLUE RIVER



BLUE RIVER



BLUE RIVER

Majority of Trail is 10' Wide Asphalt on Grade
Decking Through Riparian Areas



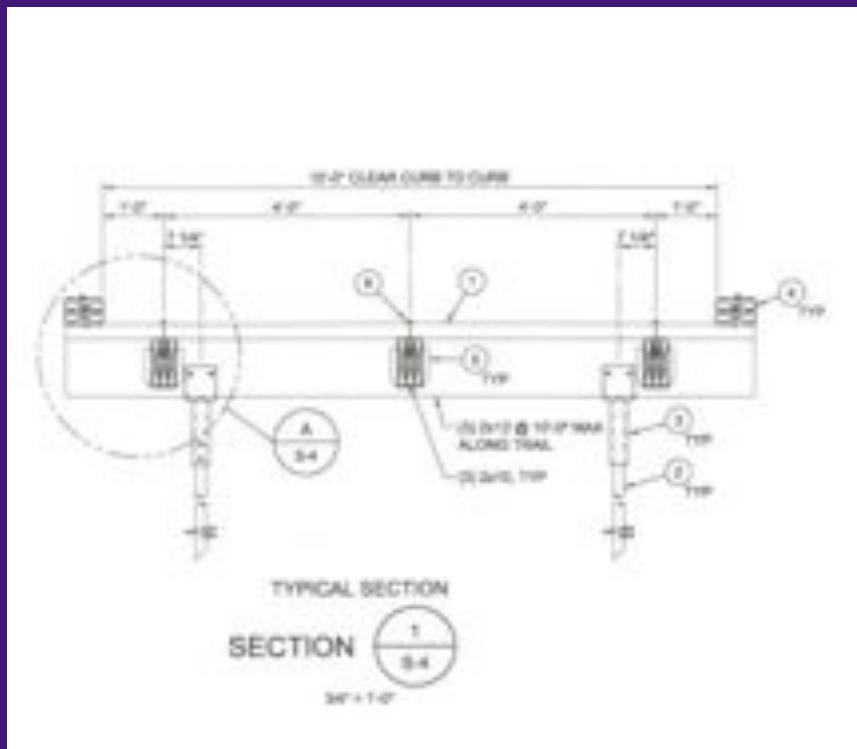
BLUE RIVER



BLUE RIVER



BLUE RIVER



BLUE RIVER



Decking Through Riparian Areas
Minimal Railings to Allow for Wildlife Movement



BLUE RIVER



BLUE RIVER



BLUE RIVER

MSE Retaining Walls to Accommodate Grade Change
“Transparent” Railing to Maintain Views of River



BLUE RIVER

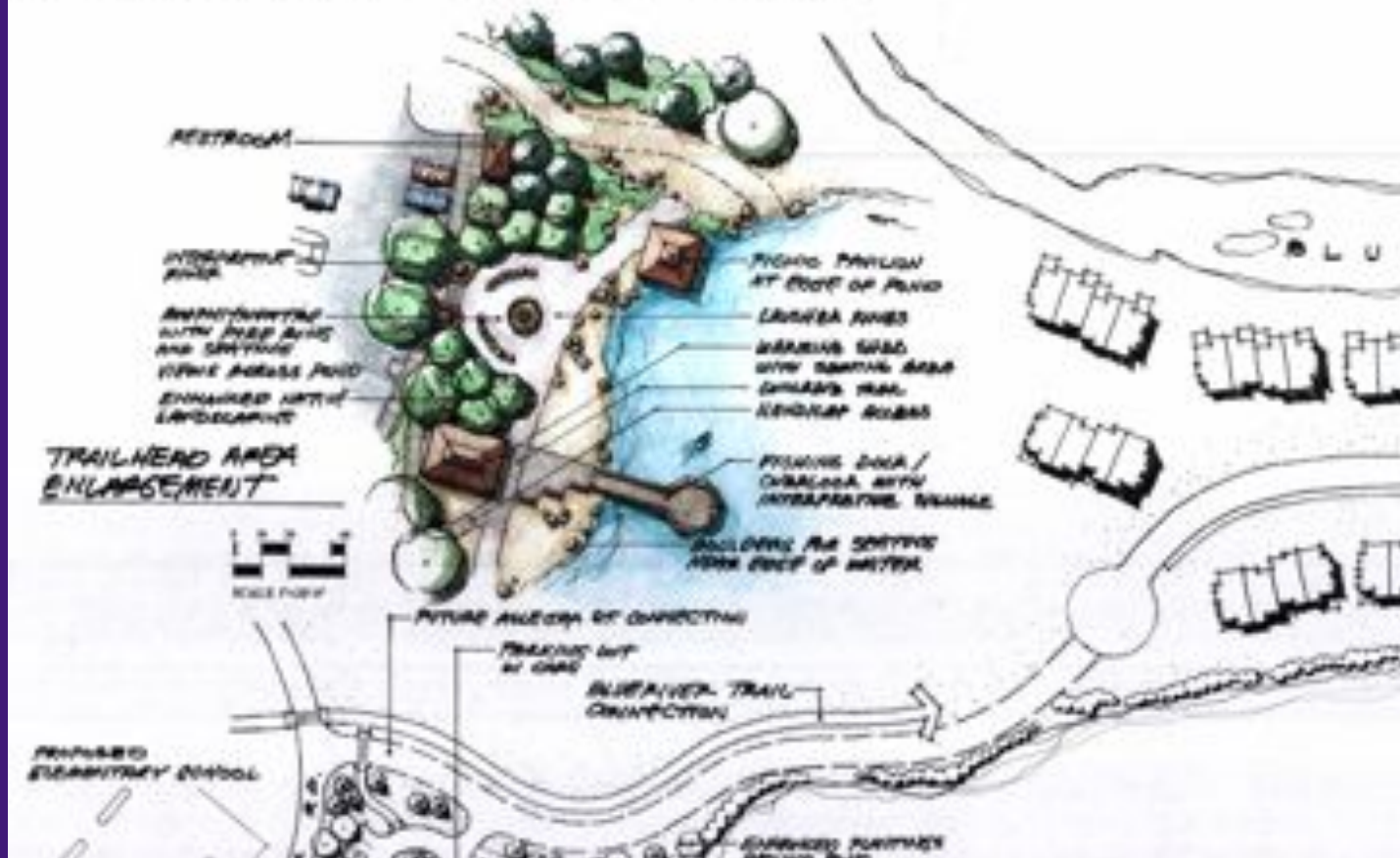


Elementary School



NORTH POND

North Pond Conceptual Master Plan



NORTH POND

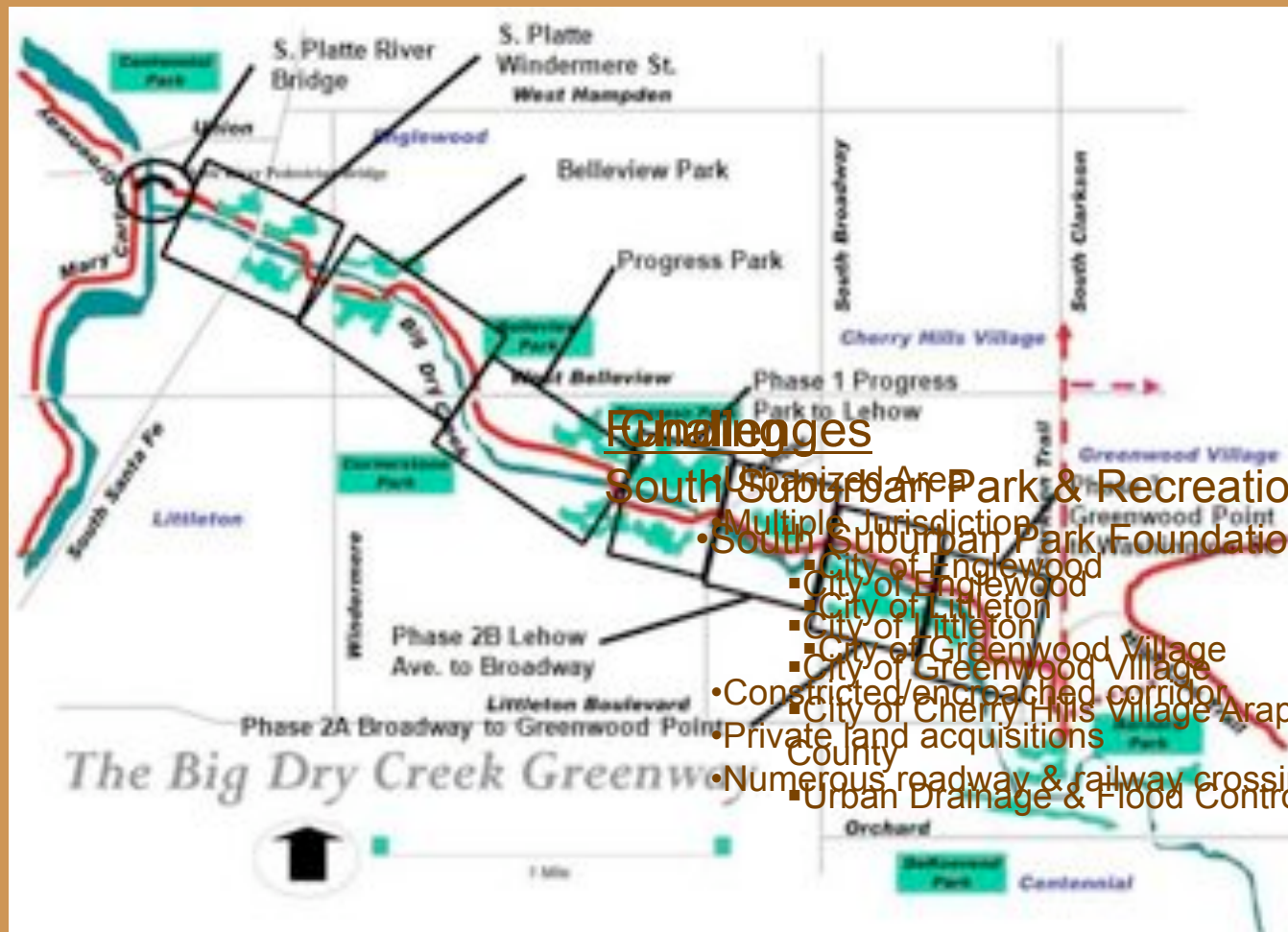


Destination-Public Park & School
Fishing, Docks, Ice Skating, Fire Pit
Trailhead



Big Dry Creek Trail

An Urban Greenway Corridor



Challenges

South Suburban Park & Recreation District

- Multiple Jurisdiction
 - City of Englewood
 - City of Englewood
 - City of Littleton
 - City of Littleton
 - City of Greenwood Village
 - City of Greenwood Village
- Constricted/encroached corridor
- City of Cherry Hills Village
- Arapahoe County
- Private land acquisitions
- Numerous roadway & railway crossings
- Urban Drainage & Flood Control

Bridge Span Across South Platte River Connection to Mary Carter Greenway

Challenges

Cross Channelized River with little freeboard available.

Solutions

Design free span bridge (200ft) with minimal deck thickness.

Total Cost

\$385,000

Completed 2002

Completed

2002



Bridge Span Across South Platte River Connection to Mary Carter Greenway - Construction



Bridge Span Across South Platte River Connection to Mary Carter Greenway - Completion



S. Platte River to S. Windermere Street

Challenges

Underpass designs for 5 crossings
BNRR
RTD
BNRR SPUR
Santa Fe Drive
S. Windermere

Total Cost

\$592,530

Trail Length

2,500 LF

Completed

2001



S. Platte River to S. Windermere Street – Pre Construction & Construction



S. Platte River to S. Windermere Street – Post Construction



Bellevue Park City of Englewood



Progress Park City of Littleton



Phase 1

Progress Park to Lehow Avenue City of Englewood

Challenges

Eroding channel
Creek crossing solution
100-yr floodplain

Total Cost

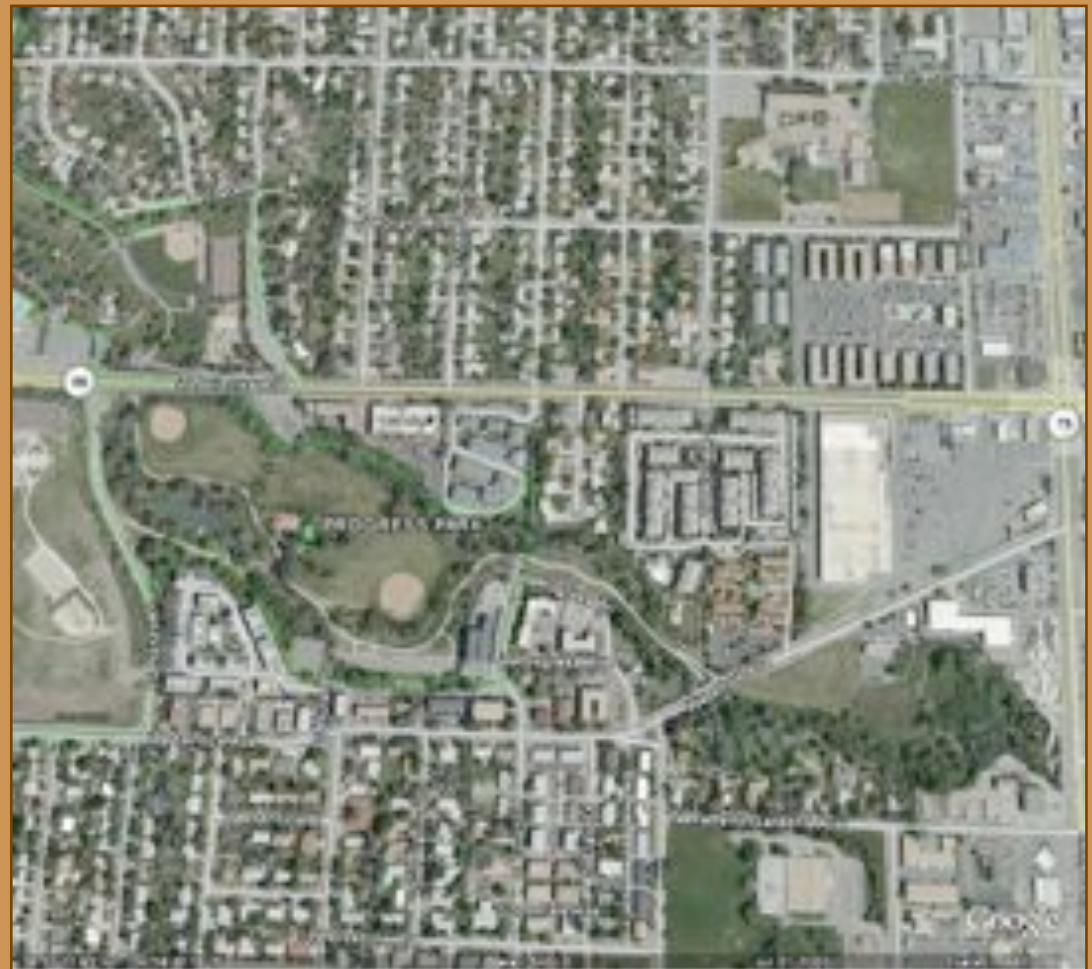
\$417,600

Total Length

1,100 LF

Completed

2004



Phase 1

Progress Park to Lehow Avenue City of Englewood
– Pre Construction and Construction



Phase 1

Progress Park to Lehow Avenue City of Englewood
– Completed



Phase 2A

Broadway to Greenwood Point

Challenges

- Narrow/encroached channel
- Steep channel banks
- Limited access
- Broadway underpass

Total Cost

\$518,388

Total Length

1,000 LF

Completed

2007



Phase 2A

Broadway to Greenwood Point– Pre Construction



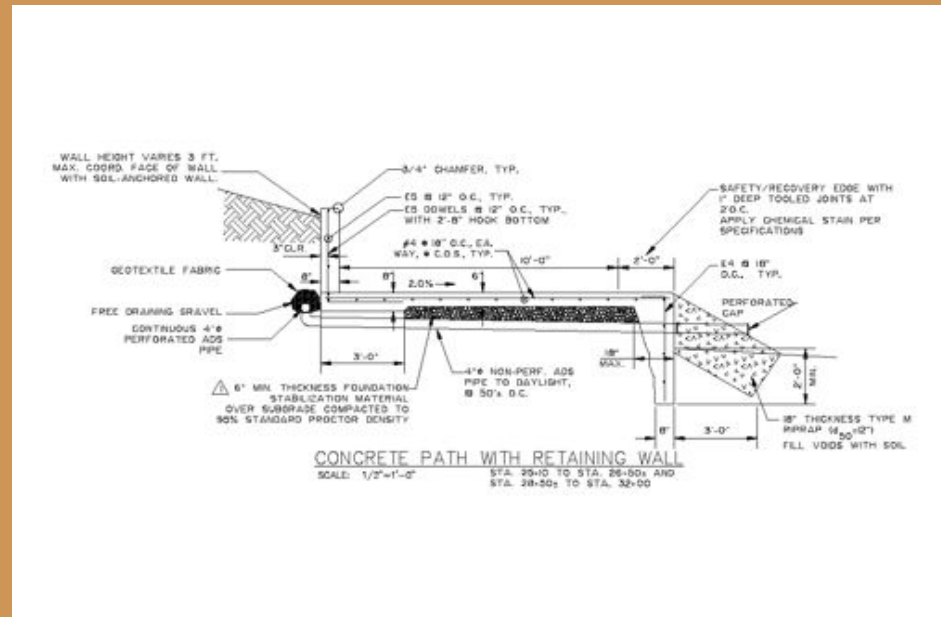
Phase 2A

Broadway to Greenwood Point– Construction



Phase 2A

Broadway to Greenwood Point– Path with Wall Construction



Phase 2A

Broadway to Greenwood Point– Completed



Phase 3

Greenwood Point to Washington Street

City of Littleton

Challenges

- Narrow encroached channel
- Steep channel banks
- Limited access
- Eroding channel

Total Cost

\$680,000

Total Length

2,500 LF

Completed

2006



Phase 3

Greenwood Point to Washington Street
City of Littleton – Pre Construction



Phase 3

Greenwood Point to Washington Street
City of Littleton – Construction



Phase 3

Greenwood Point to Washington Street
City of Littleton – Completed



Phase 2B

Lehow Ave. to Broadway

Challenges

- Eroding channel
- Two Crossings
- Ramp to Broadway
- Unsuitable soils

Total Cost

\$631,577 (bid)

Total Length

1,200 LF

Est. Completion

2009



Phase 2B

Lehow Ave. to Broadway– Pre Construction and Construction



Big Dry Creek Trail

An Urban Greenway Corridor



Total Cost: \$3.2 million

Federal Enhancement Funds : \$600,000

Thank You

DHM DESIGN and WHPacific, Inc.
With The Greenway Team and Brown & Caldwell

