

RESILIENT ST. VRAIN PROJECT

Planning, Design and Construction
to Reduce Future Flood Risk

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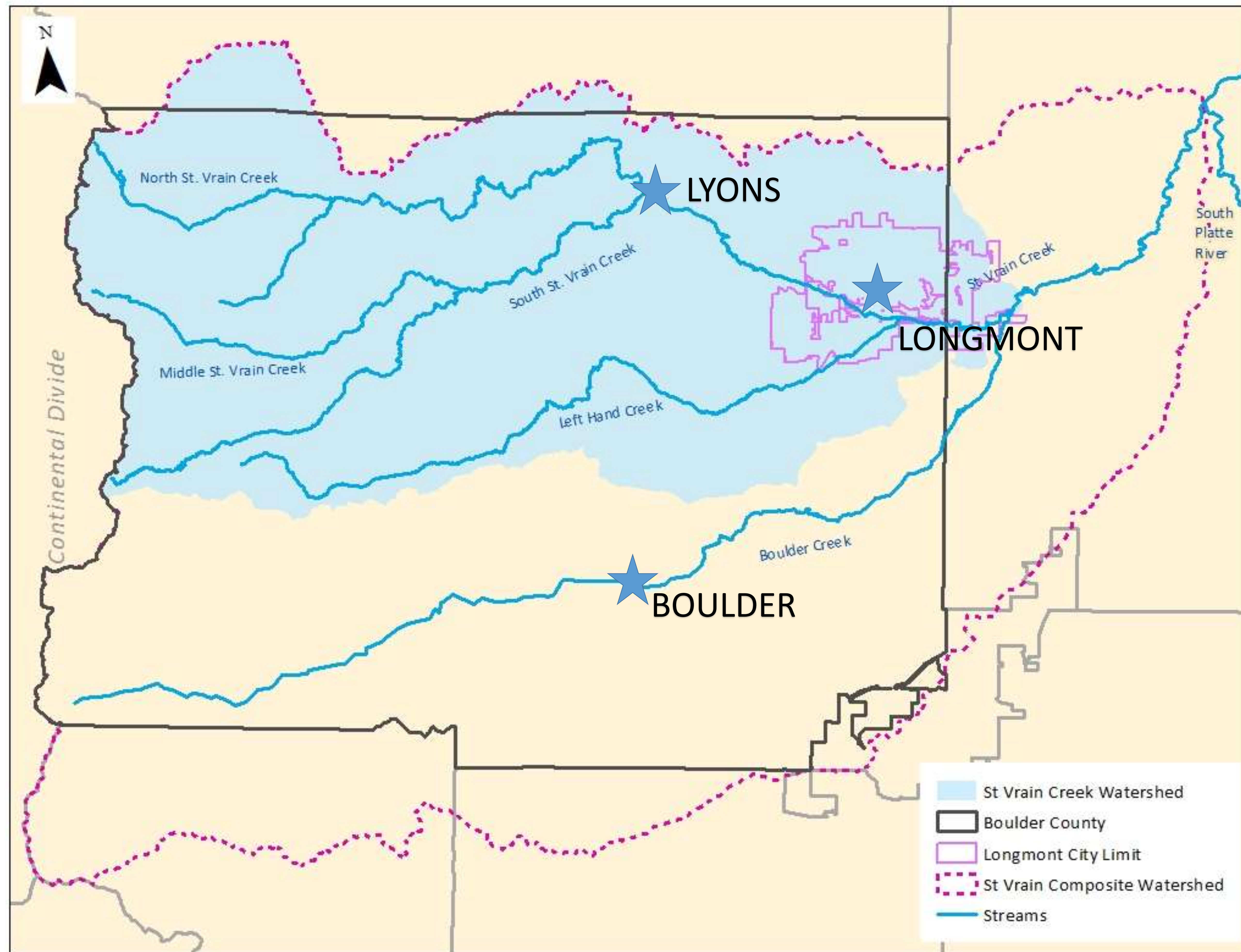


September 2013 Flood

- Impacted all of northeastern Colorado along the South Platte River Basin
- +9 inches of rain in 24 hours
- +17 inches of rain in 10 days
- Annual Exceedance Probability = 1/1000 (0.1%)
- ~14 inches = Average Annual Rainfall



St. Vrain Creek Watershed





SEPTEMBER FLOOD

9/12/2013

By the Numbers

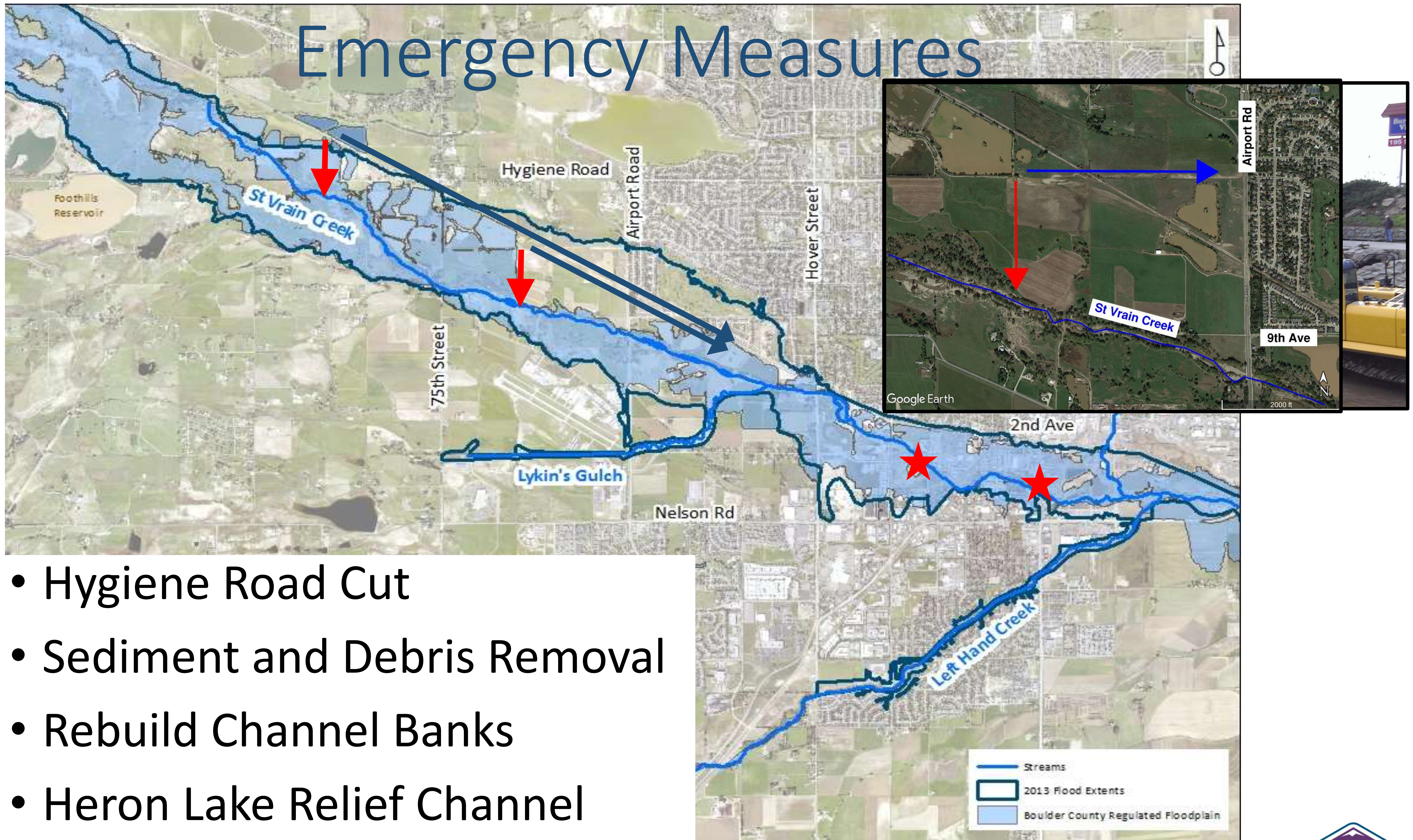
Federal Disaster 4145

- 18 counties
- 120 miles of State Highways damaged
- 76,000 homes and 750 businesses damaged
- \$4 Billion in total damages
- 10 confirmed fatalities

Longmont

- \$100 Million in flood related damages
- \$55 Million in FEMA Public Assistance
- City WWTP shut down for 3 days
- City water system never shut down
- 0 reported casualties

Emergency Measures



- Hygiene Road Cut
- Sediment and Debris Removal
- Rebuild Channel Banks
- Heron Lake Relief Channel



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RESILIENT ST. VRAIN PROJECT



Resilient St. Vrain Project

Master Plan

- 8 river miles of St Vrain Creek
- 10 years to complete

Project Goals

- Protect people, property and infrastructure
- Reduce future flood risk and safely convey 100-year flood flows
 - Remove 818 acres and 526 structures from the floodplain
- Restore St. Vrain Greenway trail
- Maintain or improve natural environment
 - Incorporate natural channel design
- Recognize previous planning efforts



RSVP Master Plan



RSVP Master Plan

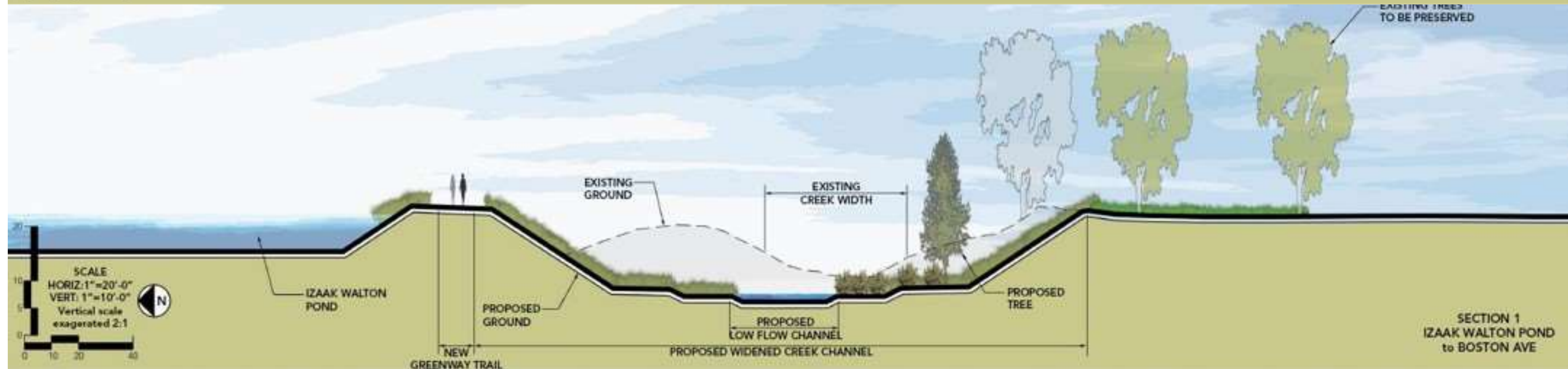
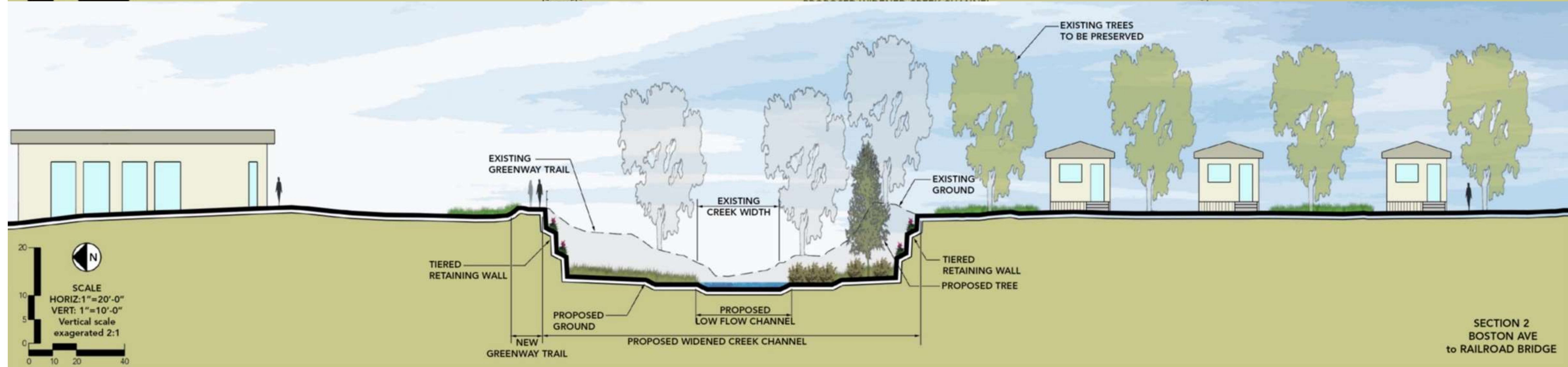
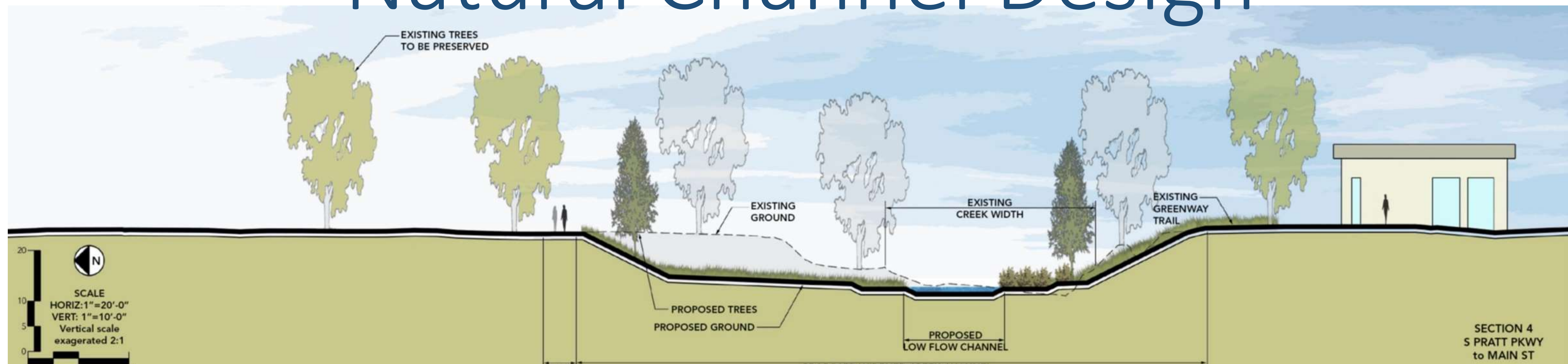


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Natural Channel Design



Hydrologic Evaluation

100-year Peak Discharge (cfs)

St. Vrain Creek	Existing Regulatory Discharge	Current Revised Discharge	Estimated Peak Discharge
Hwy 36 (Lyons, CO)	8,880	12,100	23,000
Airport Road	9,580	13,200	14,000
Hwy 287 (Main St.)	10,580	15,200	14,500
below Left Hand Creek	14,850	17,400	18,500
above Boulder Creek	16,440	17,500	
South Platte River	16,520	23,400	23,500

±30% - 40% increase in 100-year storm

2013 Flood 100-year to 500-year event

Permitting

- NEPA EA– FONSI
 - Section 7 Biological Assessment
 - Section 106 Cultural Resources
 - Section 401 Certification
- Avian Protection Plan (CPW)
- Colorado SB 40 Certification (CPW)
- USACE 404 Permits
- Floodplain Permitting



Project Costs

Design & Permitting	\$ 15.0M
Sandstone Ranch Reach	\$ 8.5M
City Reach 1	\$ 12.5M
City Reach 2A	\$ 7.5M
City Reach 2B	\$ 8.0M
BNSF RR Bridge	\$ 4.5M
Izaak Walton Reach	\$ 20.0M
<u>City Reach 3</u>	<u>\$ 60.0M</u>
RSVP TOTAL	\$136.0M
Sunset Street Bridge	\$ 3.4M
Main Street Bridge	\$ 6.0M
South Pratt Parkway Bridge	\$ 6.5M



Funding Partners



FEMA



COLORADO

Division of Homeland Security
& Emergency Management

Department of Public Safety

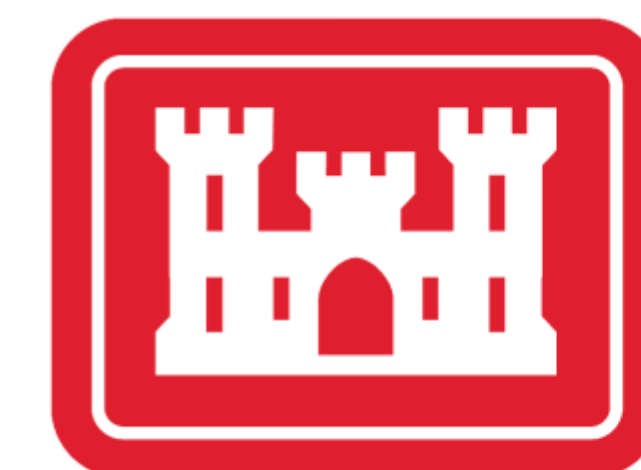


COLORADO

Department of Local Affairs



U.S. Department of Transportation
**Federal Highway
Administration**



**US Army Corps
of Engineers®**

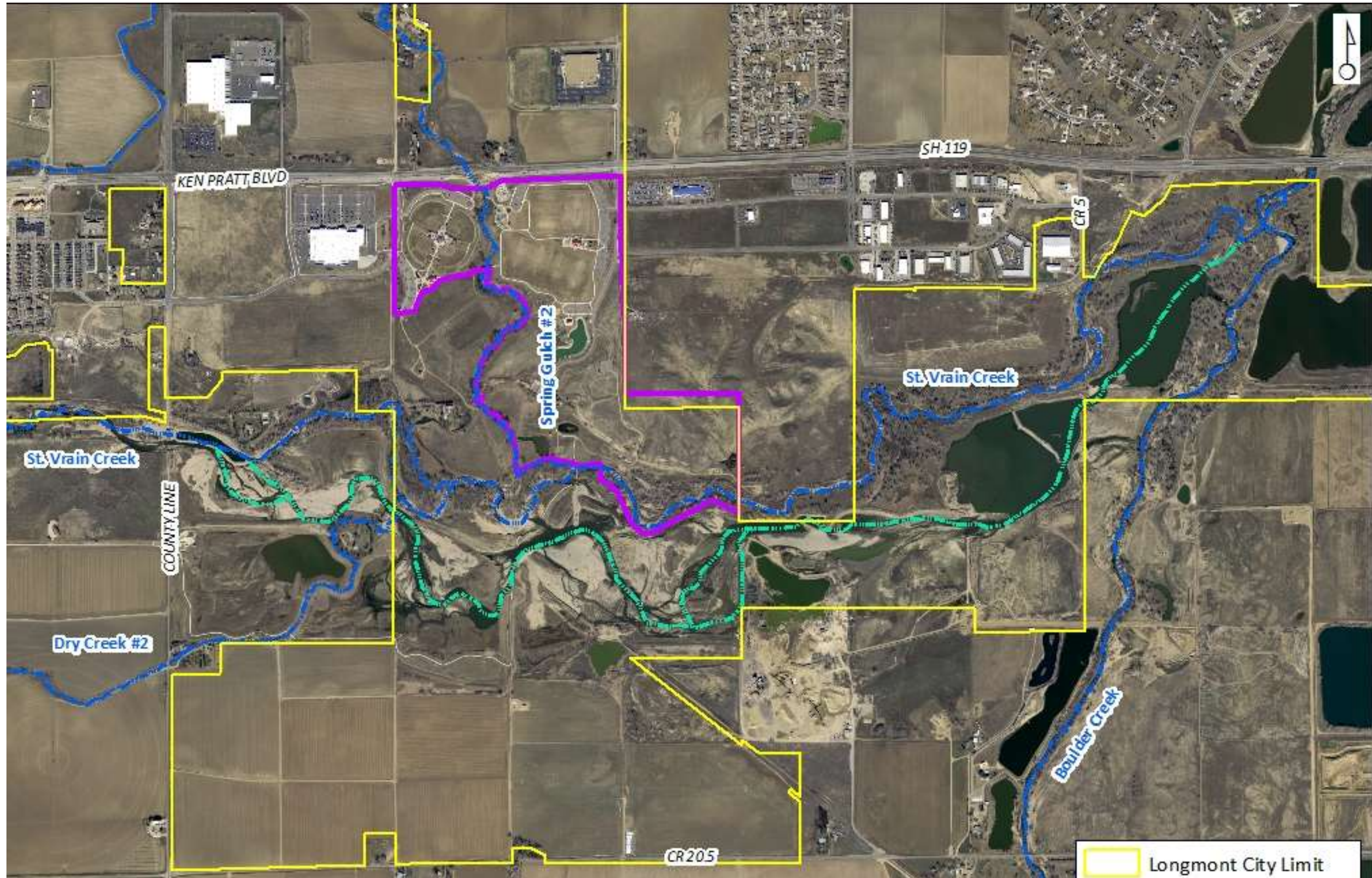


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Sandstone Ranch Reach

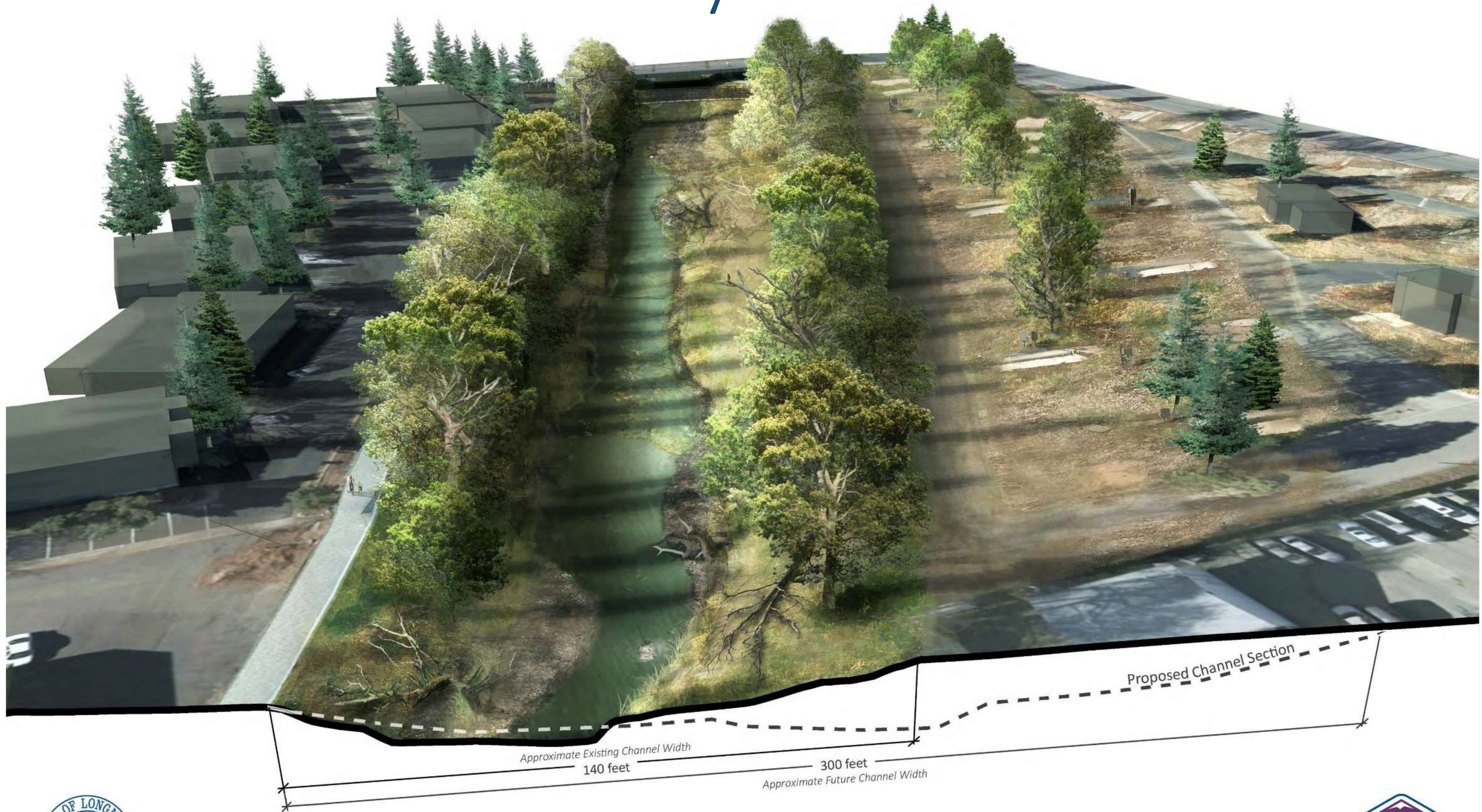


RSVP City Reach 1



Dickens Farm Nature Area

RSVP City Reach 2A

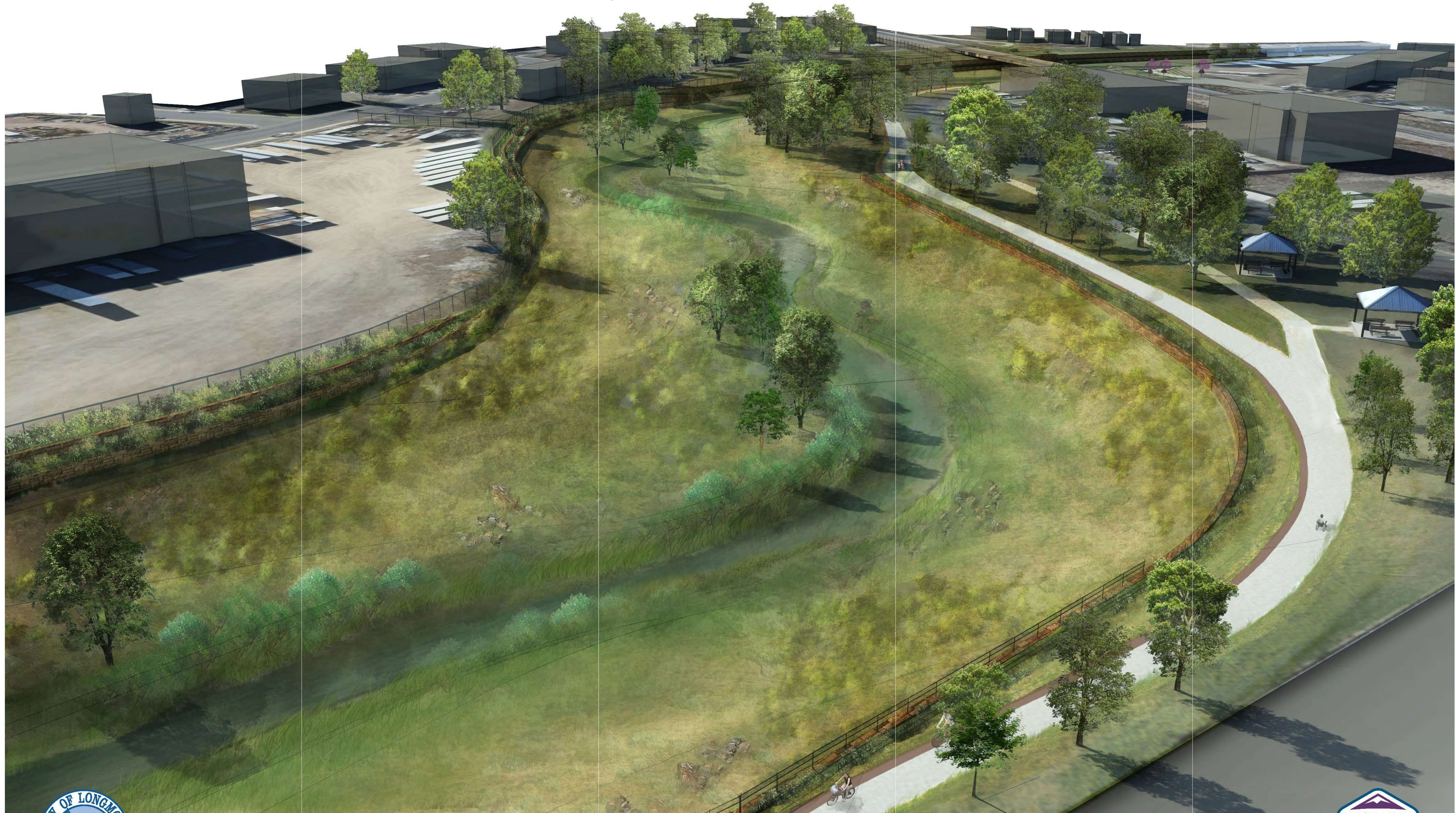


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MARCH 2017

RESILIENT ST. VRAIN PROJECT
CITY REACH 2A - EXISTING CONDITIONS
MAIN STREET to SOUTH PRATT PARKWAY



RSVP City Reach 2A & 2B



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MARCH 2017

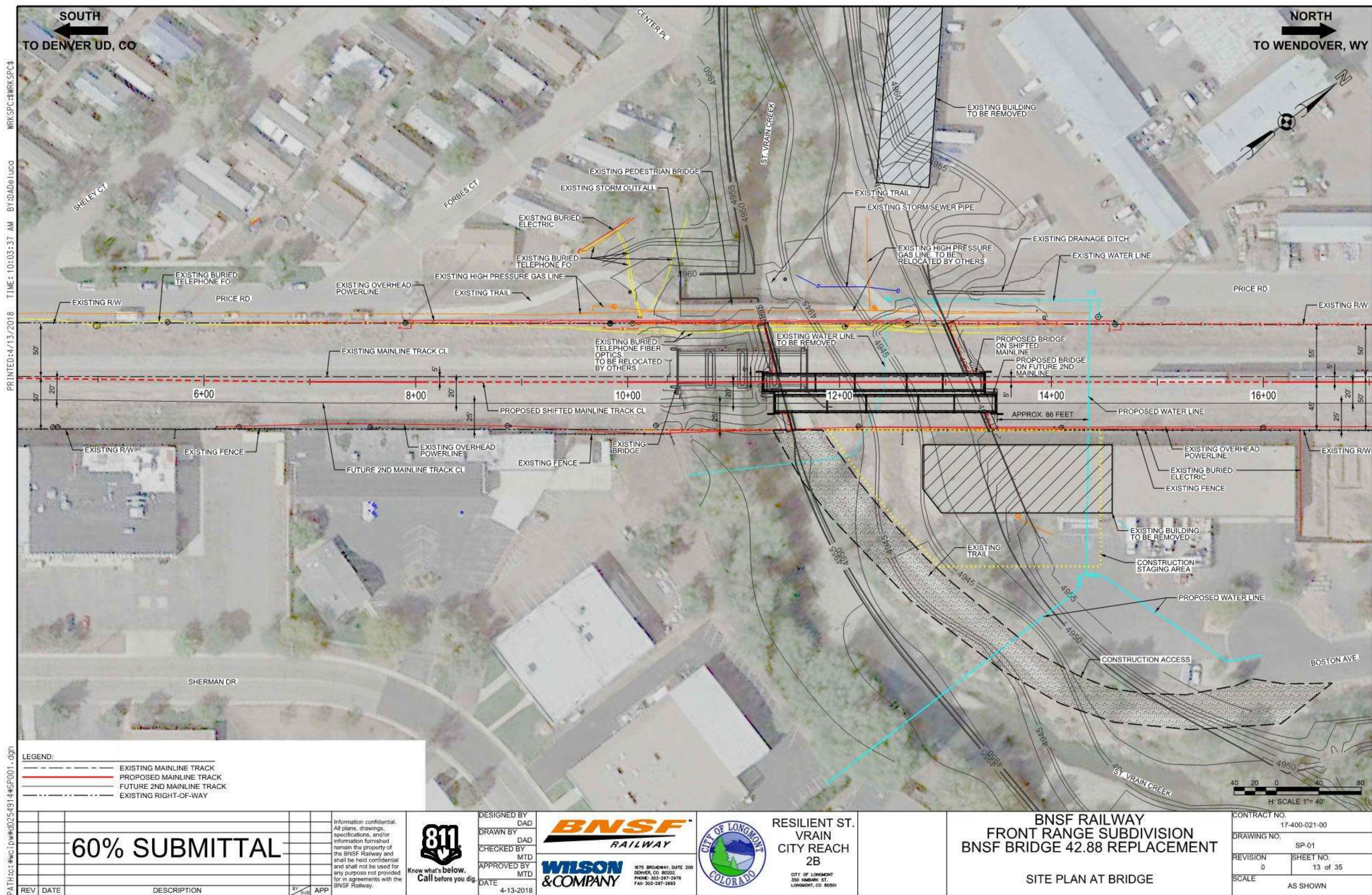
CITY REACH 2B - POST CONSTRUCTION MATURE VEGETATION CONDITIONS

SOUTH PRATT PARKWAY to THE BNSF RAILROAD BRIDGE

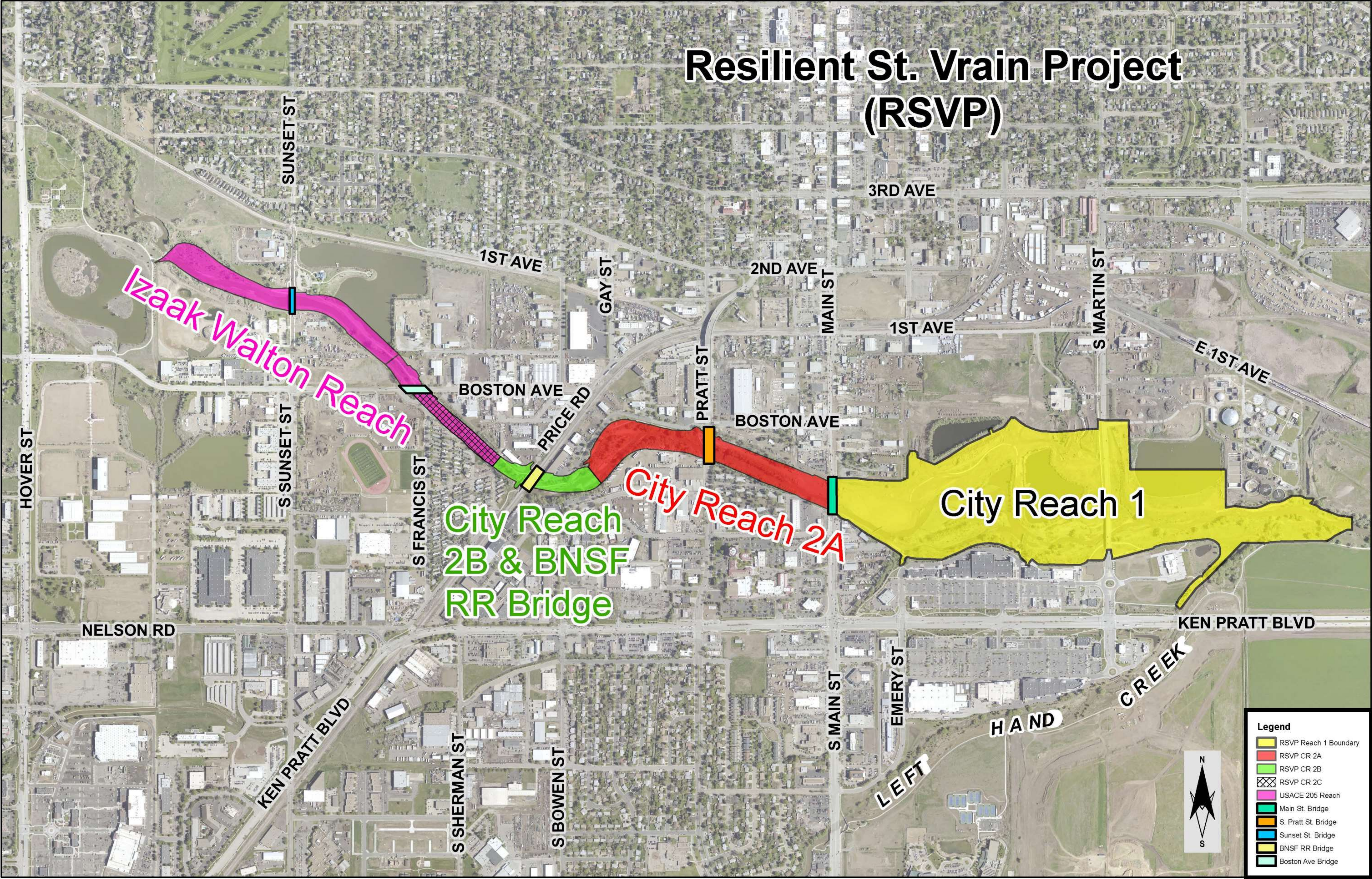
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BNSF Railroad Bridge



Resilient St. Vrain Project (RSVP)



Lessons Learned

- Collaboration
 - Public Meetings
 - Funding Partners
 - Creek Coalitions and Ditch Companies
- Permitting
 - Federal Nexus between funding partners (e.g. FEMA/USACE/HUD/FHWA)
- Look Beyond
 - Know your watershed and upstream risks
 - Neighboring Jurisdictions



Design Team



ERO Resources Corp.



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QUESTIONS?



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