



CO 52 PLANNING AND ENVIRONMENTAL LINKAGES STUDY EXISTING CONDITIONS REPORT

AUGUST 2020

CDOT Project Code 21656

CO 52
CO 119 - CO 79

State of the State

One month before initiating the Existing Conditions phase of the State Highway (CO) 52 Planning and Environmental Linkages (PEL) / Access Control Plan (ACP), the COVID-19 pandemic caused a near country-wide shut down. The shutdown resulted in global social- and economic- disruption, mass cancellations and postponements of events, and the largest economic recession since the Great Depression. Without a vaccination in place to prevent transmission of the virus, several urban centers around the country mandated “Stay at Home” orders in an effort to prevent additional spread of the virus. Colorado followed this trend and issued a similar order which allowed only essential workers to travel outside of their local communities. The order significantly decreased the amount of people traveling outside of their communities. By August 2020, Colorado was under a “Safer at Home” prevention and management strategy which asked citizens to work remotely as much as possible and required stores, entertainment venues, and restaurants to operate at a limited capacity. The Colorado COVID-19 guidelines resulted in a significant change to traffic patterns on CO 52. Commuter traffic to employment and education centers decreased while freight traffic increased due to a larger number of people ordering goods online.

The project team initially planned to collect traffic data prior to development of the Existing Conditions Report. In light of the impact COVID-19 has had on the corridor, the team opted to delay traffic data collection with the expectation that normal traffic patterns would resume in the fall. In order to develop a preliminary understanding of existing transportation conditions on the corridor, historic regional data was utilized to characterize traffic patterns; current traffic data would be collected in the fall. The result of this pandemic allowed the project team to pause and consider the potential long-term impacts of this pandemic on our communities and discuss if project alternatives could look different moving forward.

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List of Acronyms

ACHP	Advisory Council on Historic Preservation	NLCD	National Land Cover
ACP	Access Control Plan	NPS	National Park Service
ADT	Average Daily Traffic	NR-A	Non-Rural Principal Highway
BNSF	Burlington Northern Santa Fe Railway	NR-B	Non-Rural Arterial
BRT	Bus Rapid Transit	NWI	National Wetland Inventory
CDOT	Colorado Department of Transportation	OAHP	Office of Archaeology and Historic Preservation
CDPHE	Colorado Department of Health and Environment	OS/OW	Oversize/Overweight
CHAMP	Colorado Hazard Mapping Program	OTIS	Online Transportation Information System
CMP	Corrugated metal pipes	PDO	Property damage only
CO	Colorado	PEL	Planning and Environmental Linkages
CPW	Colorado Parks and Wildlife	R-A	Regional Highway
CSA	Community Service Areas	R-B	Rural Highway
CWA	Clean Water Act	ROW	Right-of-way
CWCB	Colorado Water Conservation Board	RTD	Regional Transportation District
DRCOG	Denver Regional Council of Governments	RUA	Regional Urbanization Areas
EPA	Environmental Protection Agency	SHPO	State Historic Preservation Office
FEMA	Federal Emergency Management Agency	SPF	Safety Performance Functions
FHWA	Federal Highway Administration	SWA	State Wildlife Area
FRA	Federal Railroad Administration	T&E	Threatened and Endangered
LOBO	Longmont-to-Boulder Trail	TAZ	Transportation Analysis Zones
LOSS	Level of Service of Safety	TPR	Transportation Planning Region
LTS	Level of Traffic Stress	TTI	Travel Time Index
LWCF	Land and Water Conservation Fund	UP	Union Pacific Railroad
MP	Milepost	US DOI	U.S. Department of the Interior
mph	Miles per hour	US EPA	U.S. Environmental Protection Agency
MPO	Metropolitan Planning Organization	USACE	U.S. Army Corps of Engineers
NAAQS	National Ambient Air Quality Standards	USFWS	U.S. Fish and Wildlife Service
NEMT	Non-Emergent Medical Transportation	USGS	U.S. Geological Survey
NEPA	National Environmental Policy Act	VMT	Vehicle Miles Traveled
NFIP	National Flood Insurance Program	WCR	Weld County Road
NFRMPO	North Front Range Metropolitan Planning Organization	WOTUS	Waters of the U.S.
NHD	National Hydrography Dataset		

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01

INTRODUCTION

The vision for CO 52 is to improve safety and travel time reliability along the corridor for all modes and accommodate future growth plans of the local communities.

1.0 Introduction

Colorado Department of Transportation (CDOT) is preparing a Planning and Environmental Linkages (PEL) Study and Access Control Plan (ACP) for the Colorado State Highway (CO) 52. CO 52 is a major east-west connection corridor for the region which is experiencing an increase in residential and commercial development. The corridor provides critical east-west access from residential and rural areas to business centers, as well as commercial freight from industrial centers along the corridor. Due to increased travel demand, the corridor is experiencing high congestion during peak periods exacerbating current safety concerns.

The PEL study provides an understanding of the transportation problems in the corridor, a collaboratively developed vision for the future, and potential projects to implement that vision. CDOT and PEL partners initiated this study to explore a range of short-and-long-term improvements for the corridor. The study will support CDOT, the local agencies, stakeholders, and the public to determine improvements that

should be made and estimate right-of-way preservation for future projects. The project limits extend 41.6 miles (mile post [MP] 0 to MP 42) along CO 52, from CO 119 in Boulder County to CO 79 east of Hudson in Weld County (*Figure 1-1*).

The Existing Conditions Report has been prepared to document current and anticipated future conditions. Land use studies developed by local agencies and CDOT discuss future transportation and development plans relevant to CO 52. Data collected regarding traffic operations, safety statistics, and roadway geometrics provides the baseline for identifying needs and potential transportation improvements in the corridor. The report also documents existing environmental resources to identify critical environmental issues, constraints, and opportunities.

The report will provide the following content:

- **Planning Context:** Summary of existing planning efforts as well as the Denver Regional Council of Governments (DRCOG) Land Use and Travel Demand Model
- **Traffic Context:** Summary of traffic operations, roadway geometry, transit, bicycle facilities, pedestrian facilities, and railroads
- **Environmental Context:** Summary of all relevant environmental resources within the Environmental Study Area

Figure 1-1 Location Map



1.2 Stakeholders

Agency stakeholders for the CO 52 PEL include the following:



Built On What Matters

Upper Front Range
Transportation
Planning Region



The following have also been identified as key Corridor organizations.

The list of organizations is considered dynamic; additional organizations will be added throughout the study.

- City of Boulder
- City of Broomfield
- City of Longmont
- Niwot
- Aims Community College
- Bustang Express Bus Service
- Regional Transportation District - Denver
- State Historic Preservation Office (SHPO)
- Colorado Parks and Wildlife (CPW)
- Colorado Department of Public Health and Environment (CDPHE)
- Colorado Motor Carriers Association
- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Services (USFWS)
- Environmental Protection Agency (EPA)
- National Resources Conservation Service
- BNSF Railway Company
- Union Pacific Railroad
- Left Hand Ditch Company
- Boulder & White Rock Ditch & Reservoir Company
- Liggett Ditch & Reservoir Company
- Boulder & Weld County Ditch
- Lower Boulder Ditch Company
- Leyner-Cottonwood Consolidated Ditch Company
- Community Ditch Company
- Stanley Ditch Company
- Lower Boulder Ditch Company
- Brantner Ditch Company
- Lupton Bottom Ditch Company
- Fulton Ditch Company

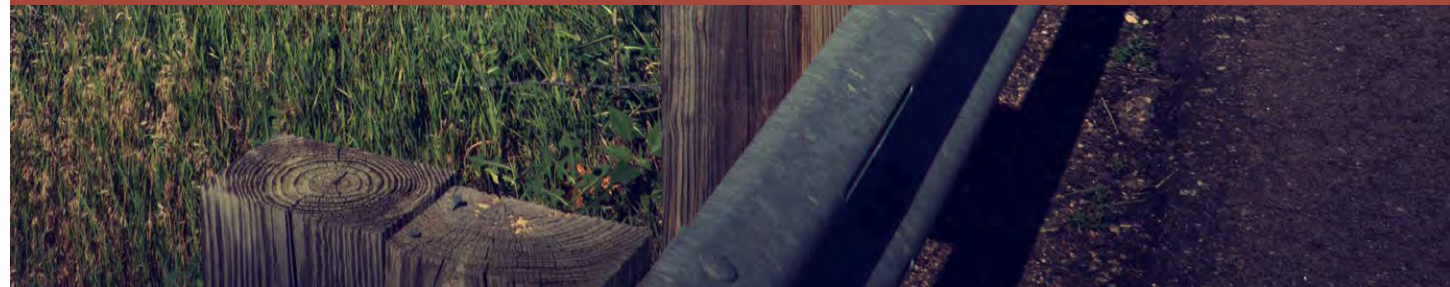


02

PLANNING CONTEXT

2.0 Introduction

This section includes information from communities on the corridor about their individual plans and goals for the CO 52 corridor. This information provides useful context for developing a CO 52 vision and assessing potential future improvements in the region.



2.1 Review of Existing Planning Efforts

Consideration of existing plans and the envisioned future as defined by county and municipal jurisdictions across the length of the corridor is critical to the study of potential CO 52 improvements and how they fit with or are impacted by this desired future state.

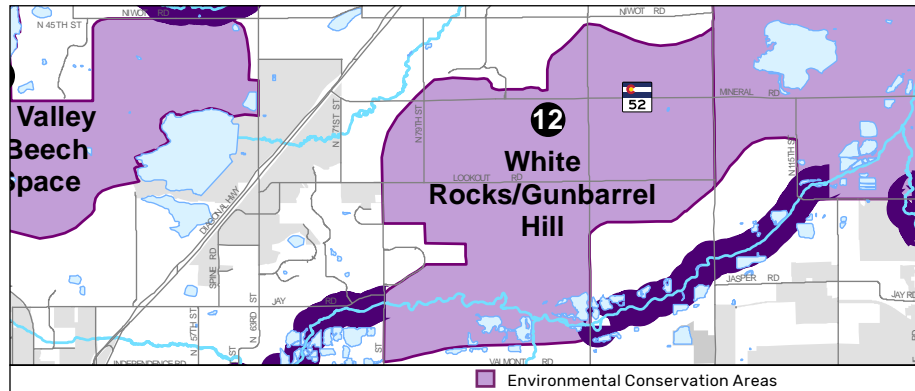
BOULDER COUNTY COMPREHENSIVE PLAN, AMENDED 2018

[View the full plan online](#)

To ensure that future land use decisions affecting the County's lands are made in a coordinated and responsible manner.



- Dominant theme of plan is environmental preservation
- Goal to concentrate urban development within or adjacent to existing urban areas
- The plan's transportation goals focus on:
 - Supporting a robust and resilient economy,
 - Ensuring equitable access to a safe transportation system,
 - Supporting fast, frequent, affordable, and reliable transit between County communities with high-quality transit stop facilities.



Much of the land along CO 52 within Boulder County is Boulder County Open Space or in a County Conservation Easement. New development should be channeled into Community Service Areas (CSA) outside of open space or conservation easements; CSAs are designated areas which a city expects to accommodate future urban growth.

BOULDER VALLEY COMPREHENSIVE PLAN, 2015 MAJOR UPDATE

[View the full plan online](#)

The Boulder Valley Comprehensive Plan is a general statement of the community's desires for future development and preservation of the Boulder Valley. It includes the community's vision for the future, core values, and policies.



GOALS/VISIONS

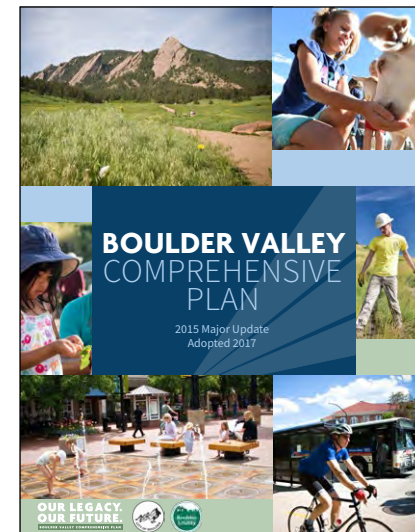
The desired land use pattern outlined in the Boulder Valley Comprehensive Plan includes:

- Major land use changes not recommended



APPLICATION TO CO 52

A small portion of the western edge of the CO 52 corridor is situated within City of Boulder, and a few parcels south of the corridor and a buffer along the corridor are owned by the City. A transitional business area is envisioned for the area bounded by CO 119, CO 52, and North 71st Street. All other areas south of CO 52 are open space or existing residential and industrial uses.



EXISTING PLANNING

BOULDER COUNTY TRANSPORTATION MASTER PLAN, 2020

View the full plan online

The purpose of the Boulder County Transportation Master Plan is to reflect the work that has been completed since 2012 and to include new or trending transportation-related technology. Additionally, Vision Zero, the Boulder community's initiative to reduce the number of traffic-related fatalities and serious injuries to zero, has been incorporated into the Transportation Master Plan.



GOALS/VISIONS

The goals outlined in the Transportation master plan are:

- Ensure effective and efficient management of the existing transportation system
- Minimize environmental impacts
- Ensure safety for all transportation modes
- Support a healthy and sustainable economy
- Ensure equitable access to the transportation system
- Enhance county identity and community character



WELD COUNTY CODE, CHAPTER 22, COMPREHENSIVE PLAN, 2020

View the full plan online

The Weld County Code in Chapter 22 of the Comprehensive Plan serves as the foundation of all land use and development regulations in the County and is intended to guide and accomplish the coordinated, adjusted, and harmonious development of the County.



GOALS/VISIONS

The County Code establishes guiding principles for the County's land use policy:

- Preserve private property rights
- Respect for the county's agricultural tradition
- Recognize the County's diversity
- Encourage economic prosperity and economic growth
- Maintain the rural character of unincorporated communities



APPLICATION TO CO 52

Future CO 52 transportation projects should consider the following guidance to incorporate Weld County's Comprehensive Plan goals:

- Maintain a Transportation Master Plan that is comprehensive, addressing the future multi-modal transportation needs of all areas of the County.
- Ensure that funding mechanisms for transportation are adequate to provide a sufficient level of service.
- Promote a unified, functionally integrated and coordinated County-wide street and highway system that moves people and goods in a safe, economical and efficient manner.
- Promote safe corridors for walking, cycling and other similar modes of transportation in both rural and urban areas.
- Encourage the continued use of rail corridors for future rail-related transportation uses.
- Encourage a variety of transit options.
- Provide a coordinated approach to the transportation system between all applicable jurisdictions



APPLICATION TO CO 52

CO 52 is projected to exceed capacity over time and will likely require operational and safety improvements at signalized intersections and major trail crossings. Boulder County supports multimodal and intersection improvements along CO 52, including queue jump lanes. In general, Boulder County does not support the addition of general purpose lanes.



EXISTING PLANNING

WELD COUNTY 2035 TRANSPORTATION PLAN, 2011

[View the full plan online](#)

The purpose of the Weld County Transportation Plan is to provide a coordinated county-wide road system that moves people and goods in a safe, economical, and efficient manner.

The goals outlined in the Weld County Transportation Plan include:

- Establish a classification system that preserves the functional integrity (safety, capacity, and mobility) of the County roadway network through coordinated right-of-way, access, and cross-section guidelines
- Develop and maintain a safe and efficient roadway network
- Encourage partnerships with the Colorado Department of Transportation (CDOT), North Front Range Metropolitan Planning Organization (NFRMPO), Denver Regional Council of Governments (DRCOG) MPO, Upper Front Range Transportation Planning Region (TPR), municipalities, special districts, and private entities to coordinate transportation improvements, land use strategies, and enhance interagency communication.
- Enhance regional arterial roadways
- Coordinate long-range and transportation planning decisions to ensure new development maintains a sufficient level of service
- Create a transportation planning document that functions for staff and elected officials when making future development decisions
- Develop a plan and implement strategies that recognize funding limitations and seek alternative funding sources
- Ensure the transportation plan remains current with the evolving conditions and needs of the County, as well as continues long-range planning projections to prepare for future system expansions



GOALS/VISIONS



APPLICATION TO CO 52

The Weld County Transportation Plan outlines specific transportation and roadway improvement projects for CO 52 that will help to fulfill the goals stated in the plan.

- Intersection improvements at CO 52 and WCR 19
- Intersection improvements at CO 52 and WCR 37

TOWN OF ERIE COMPREHENSIVE PLAN, 2016

[View the full plan online](#)

The Town of Erie Comprehensive Plan outlines the community's vision and goals for the future, along with principles, policies, and recommendations to achieve those goals.



GOALS/VISIONS

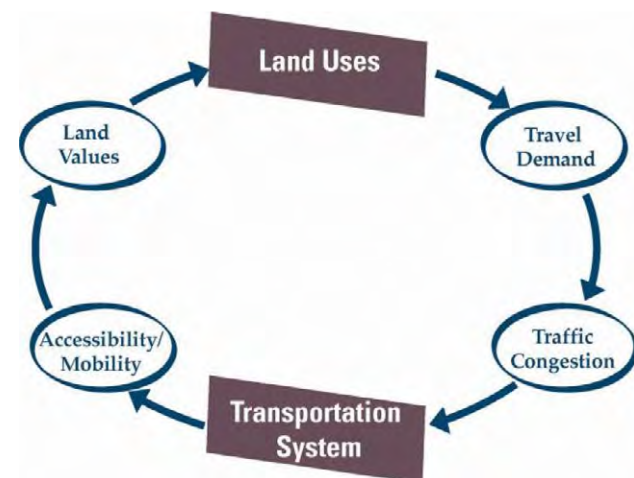
The Comprehensive Plan focuses on:

- Conserving and enhancing Erie's small-town character
- Preserving the natural environment
- Creating a balanced community with a high quality of life



APPLICATION TO CO 52

CO 52 is identified as an area of special consideration in the plan because of its gateway status into Erie. Applicable future development along the corridor is to occur east of County Line Road. Commercial development is to occur in a series of compact activity centers at intersections with CO 52 at WCR 3, WCR 5 (Community Commercial), and WCR 7 (Regional and Community Commercial). Medium to higher density residential uses are also slated to occur next to the activity centers between WCR 5 and WCR7.



EXISTING PLANNING

TOWN OF ERIE TRANSPORTATION PLAN, 2018

[View the full plan online](#)

The Town of Erie Transportation Plan is a critical component of Erie's community planning and is the Town's recognition of the need to be proactive about transportation as the pace of growth and development increases.



The Transportation Plan used the goals from the Comprehensive Plan as a starting point to develop the policy framework that includes a transportation system that is:

- Well maintained and safe for motorized and non-motorized users
- Efficient and reliable
- Accessible, connected, and integrated multimodal
- Supportive of a healthy, thriving economy, and provides transportation access for employment, recreation, shopping, open spaces, and social activities
- Respectful of and provides access to the natural and built environment
- Well planned, funded, and implemented



CO 52 is included in the Transportation Plan's planning area. Projects included in the 2040 Roadway Plan include widening the corridor from two to four lanes within the planning area boundary and signaling the intersection at CO 52 and WCR 7.

TOWN OF ERIE WASTEWATER COLLECTION SYSTEM MASTER PLAN, 2020 AND TOWN OF ERIE OUTFALL SYSTEMS PLAN (EAST OF COAL CREEK)

Note: Plan not yet posted to the Town of Erie

The purpose of the Town of Erie Wastewater Collection System Master Plan is to provide a long-range planning tool, guidance for implementing capital improvements, and a method to respond to significant growth.



The plan:

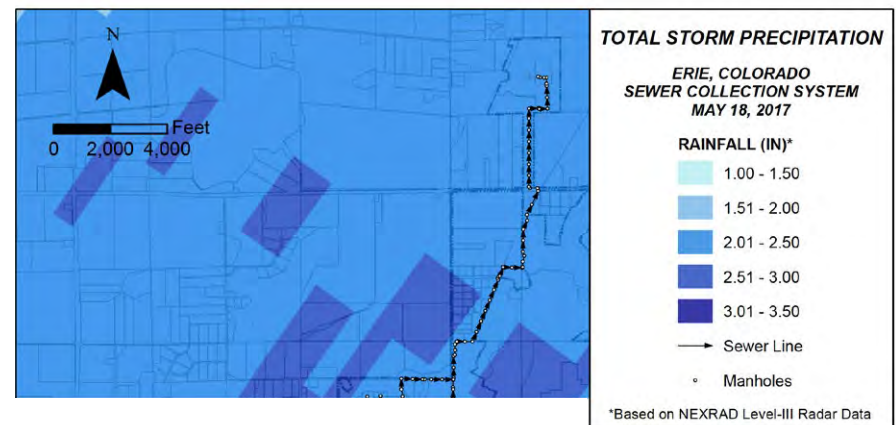
- Reviewed previous reports, models, and data
- Assessed conditions of major sewer mains
- Prepared cost estimates and phasing for recommended improvements within the next 15 years



APPLICATION TO CO 52

Interceptors are planned along CO 52 that would serve the future planned developments. Planned improvements are estimated at \$7,000,000 and would be located between the North Wastewater Reclamation Facility located east of County Line Road and WCR 7.

Town of Erie also issued an Outfall Systems Plan (East of Coal Creek) that identifies several proposed improvements to outfall systems that cross or intersect with CO 52. Outfall systems would be field identified and considered in future design projects. This plan is not yet available online.



EXISTING PLANNING

TOWN OF FREDERICK COMPREHENSIVE PLAN, 2015

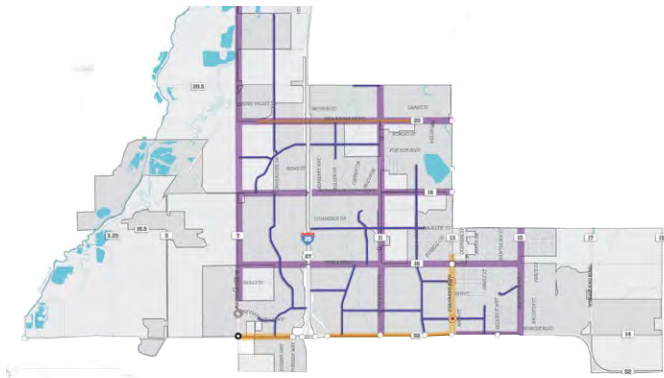
[View the full plan online](#)

The Town of Frederick Comprehensive Plan is intended to serve as a guide in making decisions that best facilitate new growth in town while preserving its historic, small-town feel.



The Comprehensive Plan envisions that:

- Frederick be defined by its historic downtown, well-maintained neighborhoods, and large open spaces
- Frederick accommodates new households while maintaining its rural, agrarian character



TOWN OF FREDERICK DOWNTOWN DEVELOPMENT PLAN, 2010

[View the full plan online](#)

The Town of Frederick Downtown Development Plan is to be used with the Town's Comprehensive Plan to guide the development in the downtown area focusing on its unique characteristics.



The Downtown Development Plan's goals include:

- Providing a direct connection between the Town of Frederick's Comprehensive Plan and revitalization opportunities within downtown Frederick
- Providing for orderly development of downtown Frederick in a method consistent with the Comprehensive Plan and the vision created through the public outreach process



APPLICATION TO CO 52

There are plans to reconnect Main Street to CO 52 using a realignment south of 8th Street. Doing so may provide opportunity for projects along CO 52 through Frederick.



APPLICATION TO CO 52

The Frederick Growth Strategy prioritizes growth adjacent to existing development and via infill. Much of the CO 52 corridor, from just west of Aggregate Boulevard to just east of Ridgeway Boulevard, falls within the priority growth area.

The intersection of CO 52 with both I-25 and Colorado Boulevard is home to three urban renewal areas established by the Frederick Urban Renewal Authority. The I-25 and CO 52 interchange is the gateway into Downtown and provides an opportunity for regional commercial uses. The northeast corner of the CO 52 and Colorado Boulevard/WCR 13 intersection will include a mix of uses, and will maintain a traditional street grid that promotes non-motorized mobility and connectivity.



EXISTING PLANNING

TOWN OF FREDERICK PARKS, OPEN SPACE, & TRAILS MASTER PLAN - RECOMMENDATIONS, 2010

[View the full plan online](#)

The Town of Frederick Parks, Open Space, & Trails Master Plan - Recommendations is guided by the Community Design Principles and Development Standards (the Land Use Code). The central premise of the Land Use Code is that new development should pay its own way when it comes to constructing the parks that new residents will require.



The Plan Recommendation include:

- Improving existing parks
- Constructing new parks in conjunction with the homes they're intended to serve
- Improve/develop multi-use pathways and trail crossings across roadways



Built On What Matters



Recommendations include widening/implementing concrete pathways along the Colorado Front Range Trail. It also proposes a new trailhead at Colorado Blvd and CO 52 to access Colorado Blvd Trail and Colorado Front Range Trail.

DACONO FORWARD. COMPREHENSIVE PLAN UPDATE, 2017

[View the full plan online](#)

The purpose of the Dacono Forward Comprehensive Plan Update is to set the policy framework that will guide future decisions related to growth and development, redevelopment, land use, zoning, and capital investment.



The Comprehensive Plan Update identifies a vision for Dacono in 2035 that includes:

- Diverse living choices
- Home-grown business across sectors
- Shops within and adjacent to town
- Redeveloped Old Town Village Center
- Connected neighborhoods and activity nodes: recreational trails and parks playgrounds and sidewalks
- Educational facilities at all stages of life
- Neighborhood amenities that are "Green" and sustainable
- Advanced leadership by appointed and elected officials, residents, businesses, and property owners



APPLICATION TO CO 52

The plan identifies the area adjacent to CO 52 and I-25 as the commerce district. Land use intensities gradually decrease along CO 52 from west to east, shifting to residential and small town characteristics in the eastern part of Dacono.



EXISTING PLANNING

DACONO FIELD INVENTORY, REGIONAL TRANSPORTATION AND DRAINAGE IMPACT FEES ANALYSIS

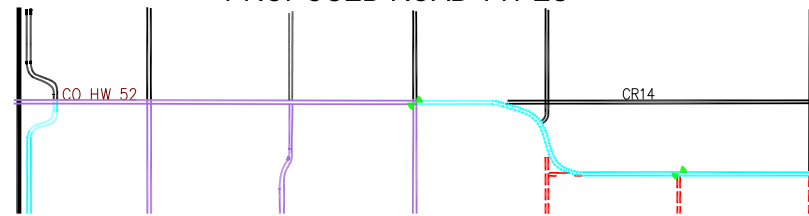
[View the full plan online](#)

The purpose of the Dacono Field Inventory and Fees Analysis is to determine the impact fees for roadway and drainage improvements throughout the city. In order to accommodate the City of Dacono's predicted growth, the city will need to expand and improve its roadway, drainage, and irrigation systems.



The Field Inventory and Fees Analysis' primary objective is to provide a financial guideline based off the Drainage Master Plan.

CITY OF DACONO PROPOSED ROAD TYPES



LEGEND	
COLLECTOR (RURAL)	===== MAJOR ARTERIAL WITH RAISED MEDIAN, (purple line)
LOCAL (RURAL)	----- 4 LANES (URBAN) (cyan line)
TRAFFIC SIGNAL	🚦 MINOR ARTERIAL, 4 LANES (URBAN) (magenta line)
	MAJOR COLLECTOR (URBAN) (blue line)
	MINOR COLLECTOR (URBAN) (dark blue line)
	OUTSIDE OF STUDY AREA (black line)



- The analysis recommends the following improvements:
- Proposed road types show CO 52 as a 4-lane major arterial with raised median transitioning to a 4-lane minor arterial.
 - The Drainage Master Plan outlines an irrigation improvement on Sullivan Ditch along CO 52. This plan reroutes the ditch to run along CO 52 on the North side, as opposed to crossing it at CO 52-FR.7 and CO 52-FR.3.
 - Part of the South Weld I-25 Corridor Drainage Master Plan includes the reroute of Sullivan Ditch along CO 52.

DACONO PARKS, TRAILS, AND OUTDOOR RECREATION MASTER PLAN, 2008

[View the full plan online](#)

The Dacono Parks, Trails and Outdoor Recreation Master Plan sets forth Dacono's vision for its parks and trails system, guided by key community goals. It may function as a road map for City Staff, City Council, advisory committees, and the community to create an exceptional parks and trails network.



Key community goals included in the Parks, Trails and Outdoor Recreation Master Plan:

- Providing equitable access to safe, quality parks, trails and outdoor recreation facilities
- Using parks and trails to help enhance Dacono's character
- Including public art and environmental education into every facility
- Connecting the City's parks, neighborhoods and businesses to each other and to regional trails
- Actively preserving significant open lands



APPLICATION TO CO 52

- The plan recommends numerous improvements such as:
- A major grade separation at the Legacy Trail intersection with CO 52.
 - 10' wide concrete surface for the Legacy Trail with matching funds for a grade separation at CO 52.



EXISTING PLANNING

PICTURE FORT LUPTON. A PLAN FOR OUR COMMUNITY’S FUTURE, 2018

[View the full plan online](#)

The Fort Lupton Comprehensive Plan acts as the City’s official policy guide for land use and development over the next 10-20 years.



- The Comprehensive Plan envisions Fort Lupton:
- As a premier destination in the Front Range
 - To be well positioned to capture growth and investment on the periphery of Denver
 - Recommends that the City adopt a complete streets policy



The plan divides the City into subareas including the 1st Street (CO 52) Corridor Subarea. The intersection of Denver Avenue and 1st Street is the gateway to Downtown and supports high frequency traffic. The City will encourage commercial investment in this area to foster a cohesive district and an inviting entrance to Downtown. Eastern 1st Street Commercial (Pacific Avenue to the western edge of Coyote Creek Golf Course) is to support high quality commercial investment.

FORT LUPTON CORE URBAN RENEWAL PLAN, 2015

[View the full plan online](#)

The Fort Lupton Core Urban Renewal Plan will provide a comprehensive and unified plan to promote and encourage quality development of the Area by private enterprise pursuant to the Comprehensive Plan.



- Encourage and facilitate the development of the urban area by private enterprise
- Implement the goals of the Comprehensive Plan



APPLICATION TO CO 52

Areas identified for renewal include the intersections of CO 52 and US 85, Grand Avenue, Denver Avenue, and Pacific Avenue where accidents occur. Specifically, at the US 85 intersection, a lack of sidewalk prevents pedestrians from being able to safely cross under US 85.



EXISTING PLANNING

ROOTED IN FORT LUPTON: COMMERCIAL CORRIDOR STREETScape PLAN

[View the full plan online](#)

The Rooted in Fort Lupton: Commercial Corridor Streetscape Plan bases its design solutions for the city from the 2018 Fort Lupton Comprehensive Plan.



- The vision of the Commercial Corridor Streetscape Plan:
- Is in response to recommendations adopted by the City in the Master Plan for Denver Avenue and CO 52
 - Envisions places to gather together and shop and dine with friends.



The Streetscape design creates subareas along CO 52 to guide design along the jurisdiction's primary east-west connection. There is a vision for increased bike connectivity with the potential for a dedicated bike lane along CO 52 provided there is adequate ROW on the north side of CO 52. Doing so would provide an important connection from the Platte River along US 85 to downtown Fort Lupton. In addition, the plan suggests an alternate truck route to CO 52, as well as bulb-outs, landscaping, and ADA ramps at Denver Avenue and CO 52. The plan notes that a CO 52 Stakeholder meeting held in December of 2018 indicated that stakeholders wanted to improve the "gray and ugly" visual appearance of CO 52 and increase automobile and pedestrian safety. Artistic gateway treatments are also recommended.

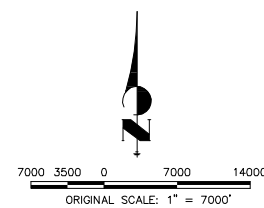
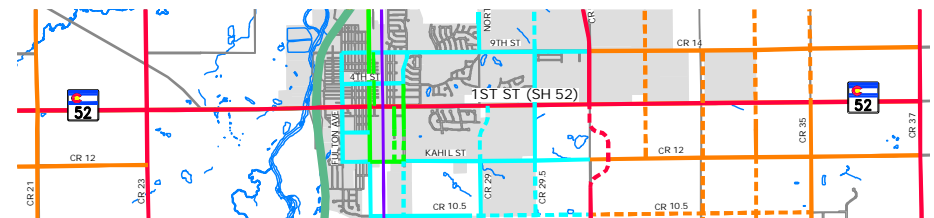
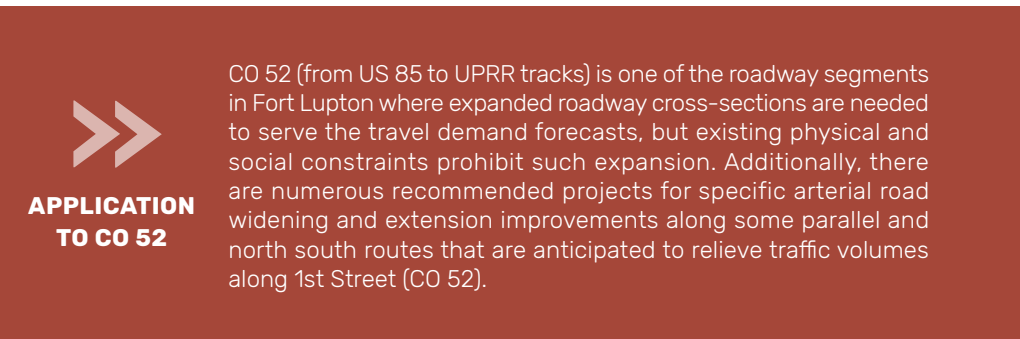
FORT LUPTON TRANSPORTATION PLAN, 2018

[View the full plan online](#)

This 2018 Fort Lupton Transportation Plan was prepared in response to the recent development of the City's 2018 Comprehensive Plan and includes references to other plans and planning efforts. The Transportation Plan provides additional details specific to the transportation system.



- The goals of the Transportation Plan include:
- Implementing a comprehensive transportation system plan in conjunction with continued development through incremental steps
 - Address these specific transportation elements: roadway network, regional transit, pedestrian facilities, bicycle facilities, recreation trails



EXISTING NETWORK LEGEND - ROAD IMPROVEMENTS		FUTURE NETWORK LEGEND - ROAD IMPROVEMENTS	
	4-LANE ARTERIAL		4-LANE ARTERIAL
	RURAL COLLECTOR		RURAL COLLECTOR
	URBAN COLLECTOR		URBAN COLLECTOR
	RETAIL STREET		RETAIL STREET
	UNION PACIFIC RR		
	4-LANE HIGHWAY		
	FORT LUPTON CITY LIMITS		

NOTE: FUTURE ROADWAYS ARE SHOWN ON A CONCEPTUAL BASIS.

EXISTING PLANNING

TOWN OF HUDSON 2035 COMPREHENSIVE PLAN, 2018

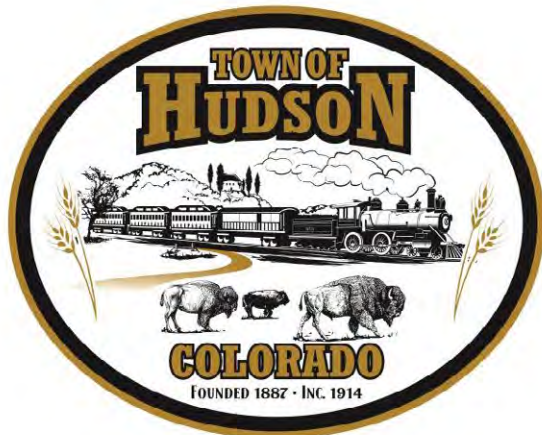
[View the full plan online](#)

The Hudson Comprehensive Plan is intended to guide growth, redevelopment, and capital investment. The plan outlines a mission of enhancing the quality of life for those who live in, work in, or visit Hudson.



The Comprehensive Plan envisions:

- Town's gateway at I-7 and CO 52 providing a positive first impression to visitors of Hudson
- Signage, landscaping, and increased setbacks for incoming travelers



The I-76 and CO 52 interchange is noted as an ideal site for regional commercial uses serving the traveling public and Northeastern Colorado residents. The plan anticipates improvement and/or widening of CO 52 from WCR 43.5 to WCR 49, as well as buildout and extension of WCR 49/I-76 intersection and the WCR 49 roadway configuration south to CO 52. A mix of uses are envisioned along the CO 52 corridor with higher residential density near the historic Hudson Town Center and the I-76 interchange.

TOWN OF HUDSON TRANSPORTATION MASTER PLAN

[View the full plan online](#)

The primary purpose of the Transportation Plan is to provide a document to guide transportation decision making for the Town of Hudson.



The plan aims to:

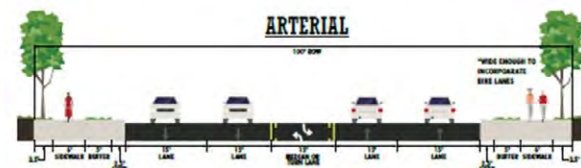
- Continue to provide a safe and efficient transportation network
- Provide a well-balanced hierarchy of streets
- Seek opportunities to enhance regional mobility connections
- Accommodate appropriate access to and within development areas
- Encourage use of alternate modes
- Preserve the character of the Town while pursuing opportunities to modernize transportation facilities



APPLICATION TO CO 52

This plan includes a list of transportation projects, programs, and funding that will be necessary to realize this plan, while minimizing and mitigating impacts for residents. The Town is served by a traditional, rural county grid pattern of streets that has incrementally urbanized over time; including the addition of direct access to the U.S. interstate system. Truck hauling and freight rail traffic are increasingly important parts of the transportation and economic environment in Hudson and add complexity to the overall multi-modal network.

TOWN OF HUDSON TRANSPORTATION PLAN



EXISTING PLANNING

TOWN OF KEENESBURG COMPREHENSIVE PLAN, 2005

[View the full plan online](#)

The purpose of the Keenesburg Comprehensive Plan is to provide predictability, balance, and flexibility regarding future growth, land uses, and development. A revised Land Use Plan map was adopted on July 16, 2018.



The plan sets out to:

- Balance land uses between residential, commercial, retail, office, industrial, and public uses
- Promote economically self-supporting and self-sustaining town



A revised Land Use Plan map was adopted on July 16, 2018. A section of land within Keenesburg is located along CO 52 from just east of WCR 55 to east of WCR 59. Highway commercial uses are envisioned along the length of the CO 52 corridor with a commercial business district between the highway and downtown Keenesburg to the north.

DRCOG METRO VISION PLAN, UPDATED 2019

[View the full plan online](#)



The plan:

- Serves as a tool to promote regional cooperation on issues that overlap
- Aims to provide a safe and resilient natural and built environment
- Aims to identify an efficient and predictable development pattern
- Calls for connected multimodal region



The vision supports diverse and context sensitive solutions across the entire vision area.

CDOT NORTH I-25 ENVIRONMENTAL IMPACT STATEMENT, 2011

[View the full plan online](#)



The plan aims for:

- Improved safety between CO 7 and CO 52, where I-25 was recently widened to six lanes and updated to current design standards
- Reduction in accidents resulting from the recent improvement



The plan noted that as I-25 becomes more congested, development and traffic could be pushed to east-to-west alternate corridors including CO 52. Recommendations include upgrading substandard interchanges on I-25 including the CO 52 and I-25 interchange.

EXISTING PLANNING

2.2 Current and Future Land Use

Current and future land uses are assessed to identify community growth so transportation improvements can be designed to accommodate future development pressure. There is no specific regulatory framework to guide federally funded transportation improvement projects, but improvements should be generally consistent with comprehensive plans developed by the associated local agencies.



AGENCIES

- Denver Regional Council of Governments (DRCOG)
- Boulder County
- Weld County
- Town of Erie
- Town of Frederick
- City of Dacono
- City of Fort Lupton
- Town of Hudson
- Town of Keenesburg

In order to provide a broad perspective of land use changes affecting the corridor, the land use study area was developed to encompass and reflect the land uses within the jurisdictional boundaries of the communities along CO 52. The land use study area includes all lands within the jurisdictions that are part of the stakeholder group and reflect an approximate 3-mile buffer of the CO 52 corridor.



METHODOLOGY

The Current Land Use Patterns Map (*Figure 2-1*) was developed using County Assessor records and aerial maps. The Future Land Use Map (*Figure 2-2*) was developed by aggregating future land use data from their comprehensive plans. All land use categories were aggregated to provide land use designations along the entire project corridor. This analysis assumes that cities and towns will annex adjacent County lands as reflected by their plans. In addition to the plan review above, local agency stakeholders were interviewed about current and future planned developments in order to identify any concerns related to near term growth. Current and future land uses along the corridor were aggregated into the following categories:

- Agriculture / Rural Residential
- Commercial
- Industrial / Mineral
- Mixed Use
- Public / Semi-Public
- Public Lands / Open Space
- Residential
- Vacant

CURRENT A review of current land uses along the corridor indicate that Agricultural lands predominate. In Boulder County there is a significant amount of Public Lands/ Open Space outside of incorporated cities. Data in *Figure 2-2* indicates that commercial and residential development near and along CO 52 will primarily be concentrated within and near incorporated towns/cities and at major interchanges such as I-25, US 85 and other north-south arterials. Some very low density residential is typically allowable in agricultural areas.

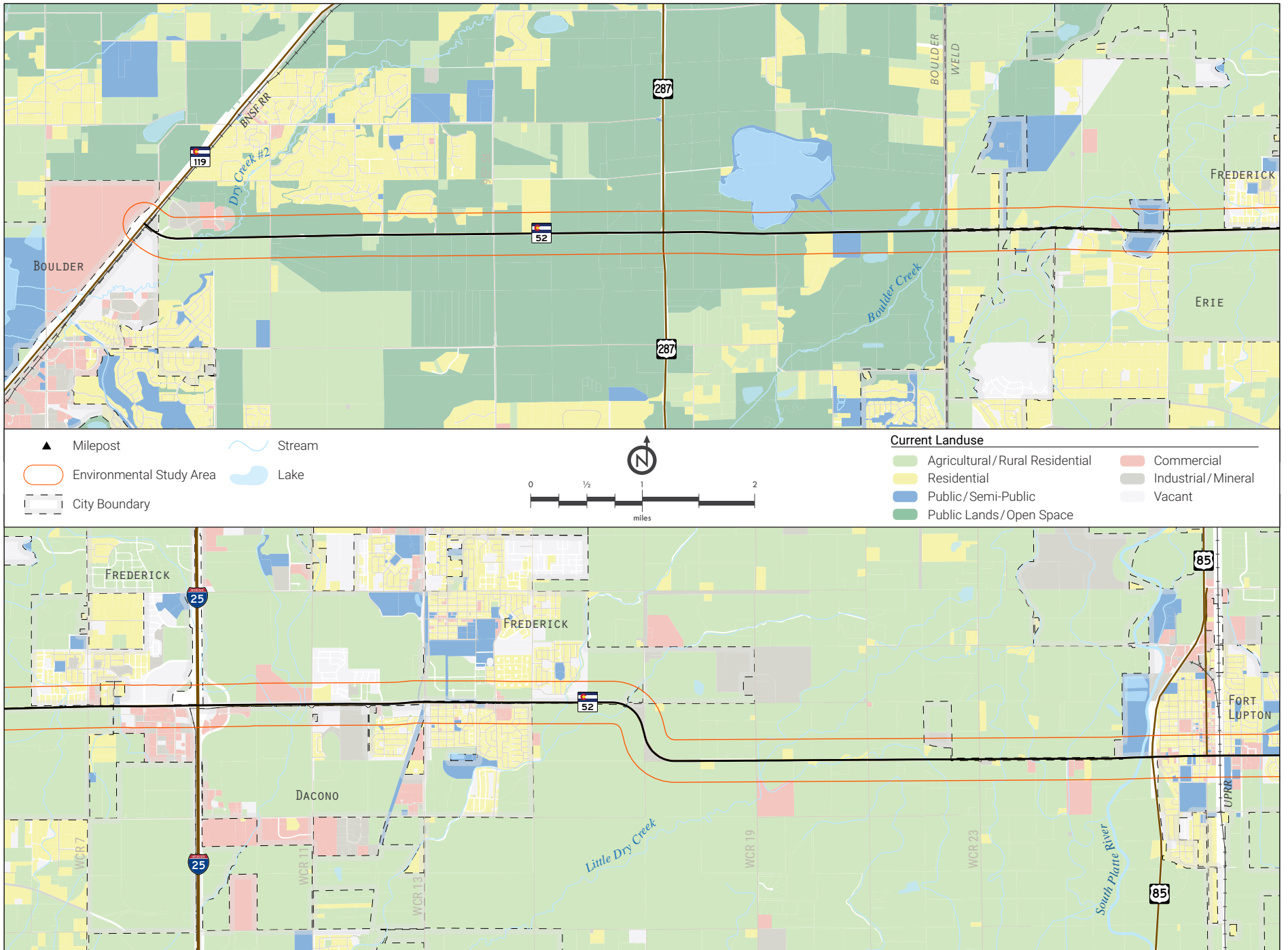
FUTURE The Travel Demand Modeling maps in Section 3.3 forecast household and employment growth and densities in 2045. While the land use maps shown in this section depict future growth, some of the growth shown here may occur beyond the 25-year time horizon incorporated into the Travel Demand Modeling maps. However, in general, the travel demand model reflects local cities and towns growth plans as represented by their land use plans shown here. Further information is provided in Section 3.4.



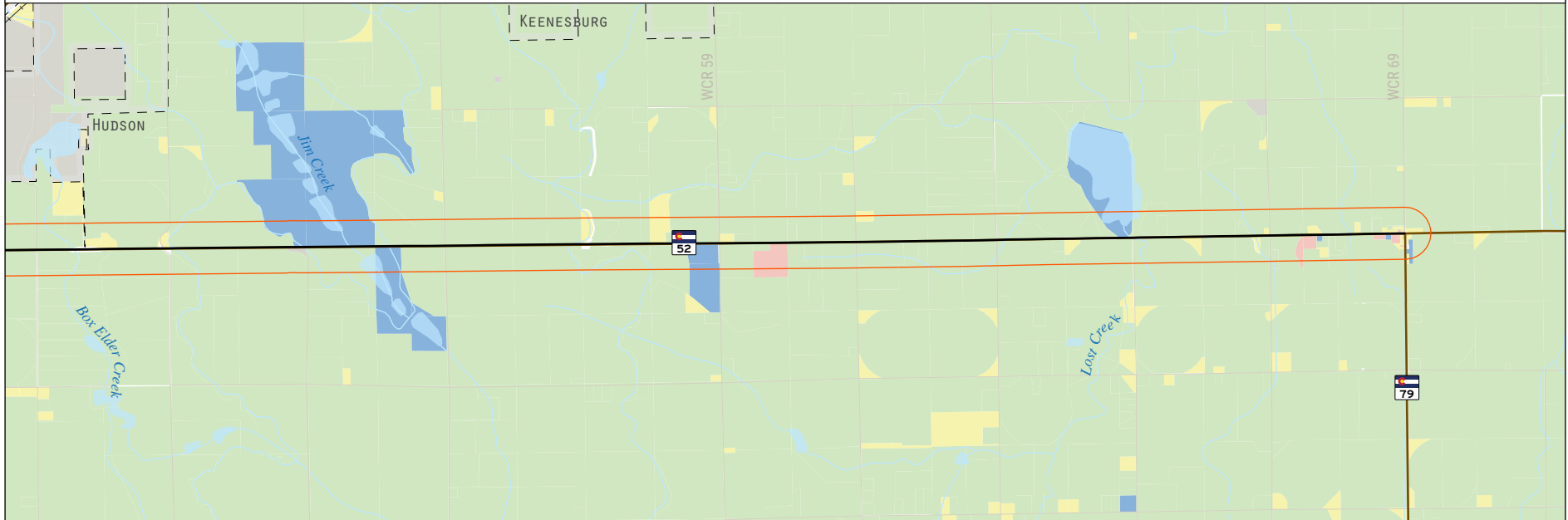
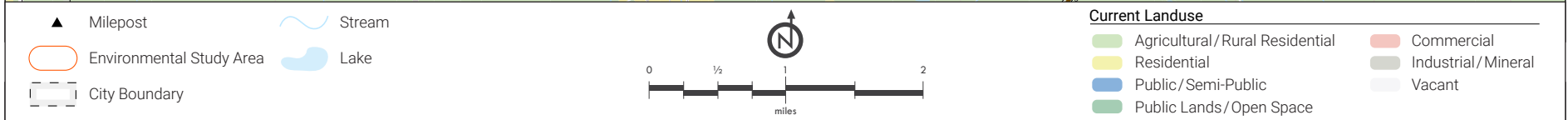
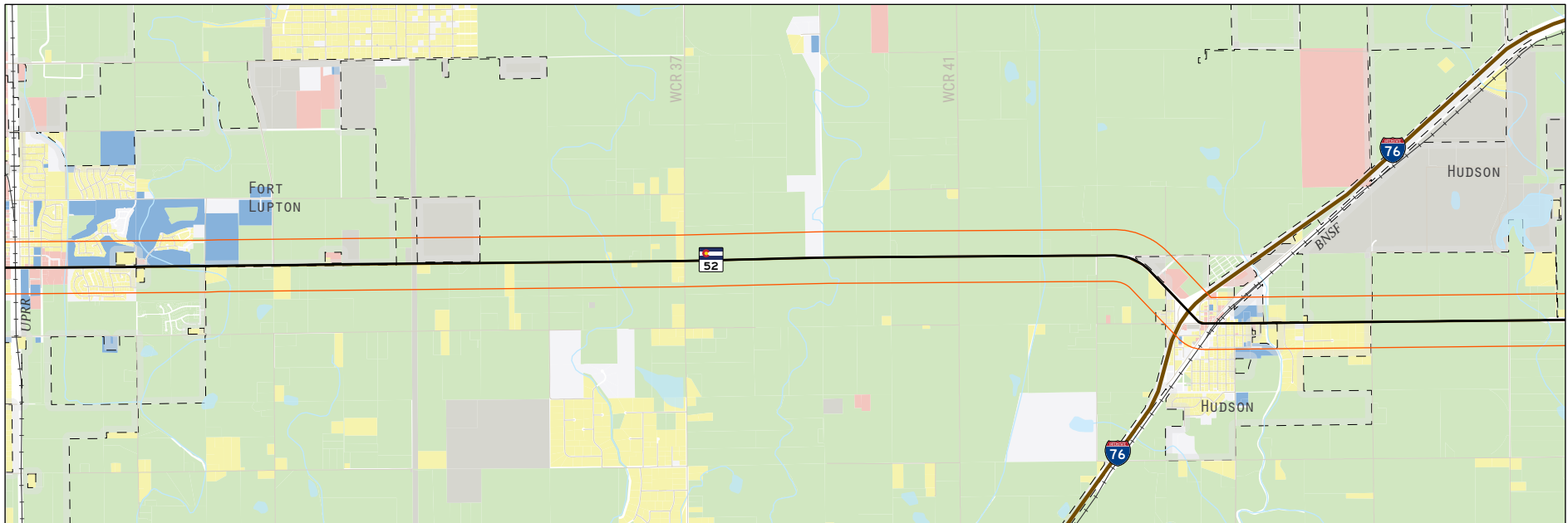
NEEDS

All land use plans and data indicate major future land use changes to occur close to existing developed areas along the corridor. CDOT will continue to work closely with the local jurisdictions throughout the process in order to ensure that planned improvements reflect community land use values and goals. CDOT requires that federally funded projects consider the impacts of transportation projects on the land use patterns of local agencies which are relevant to the project area.

Figure 2-1 Current Land Use

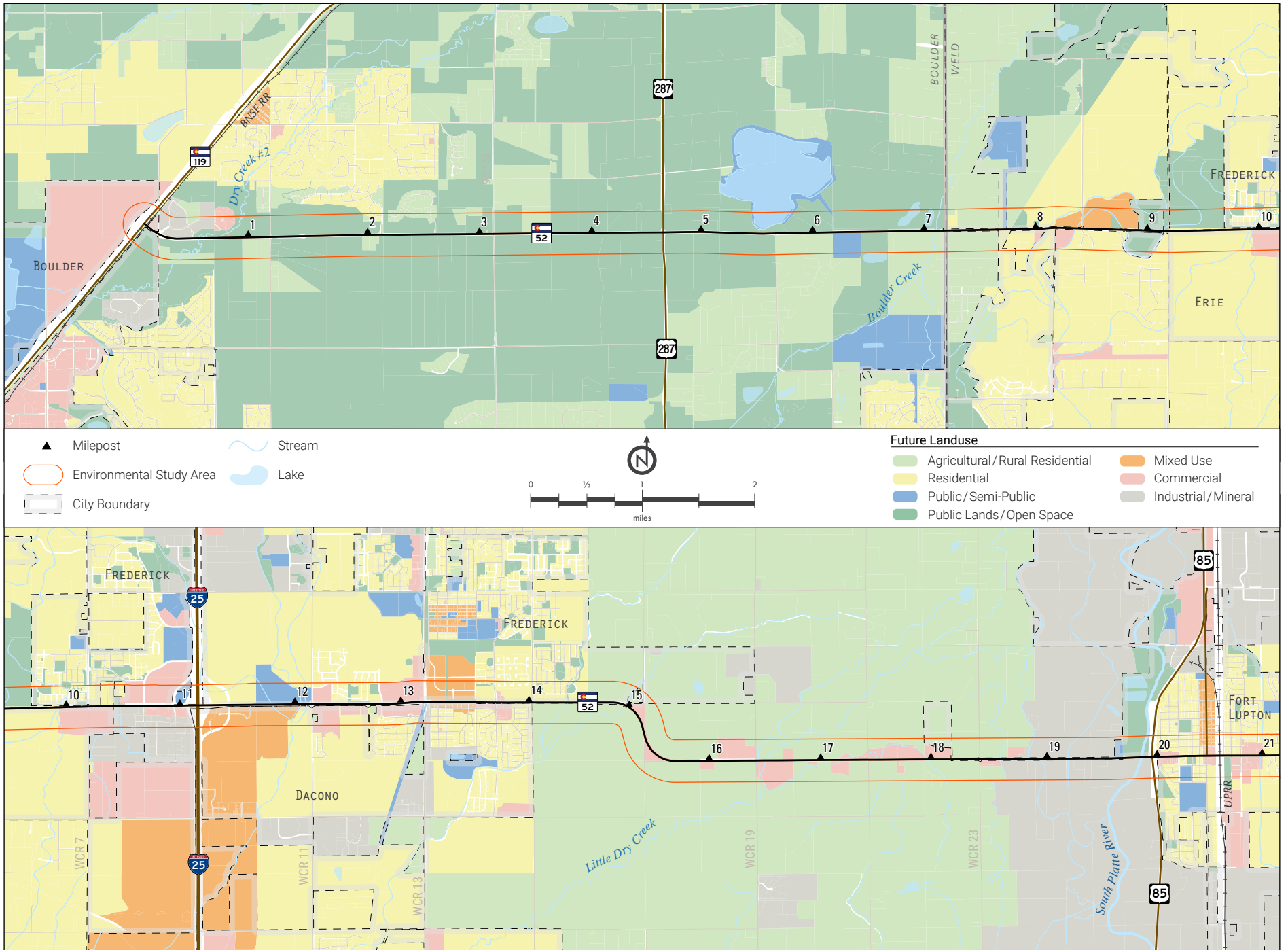


EXISTING PLANNING

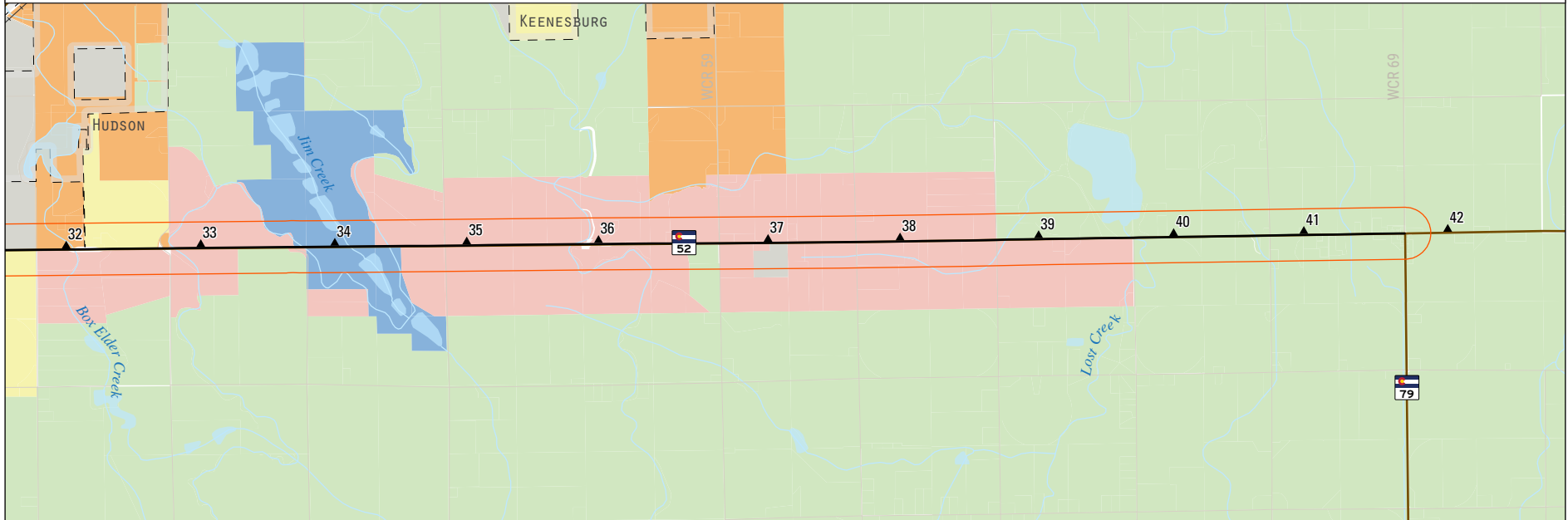
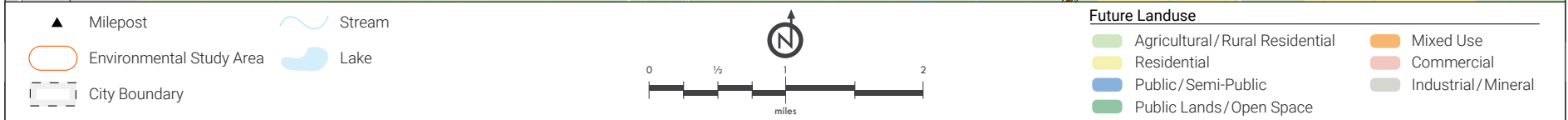
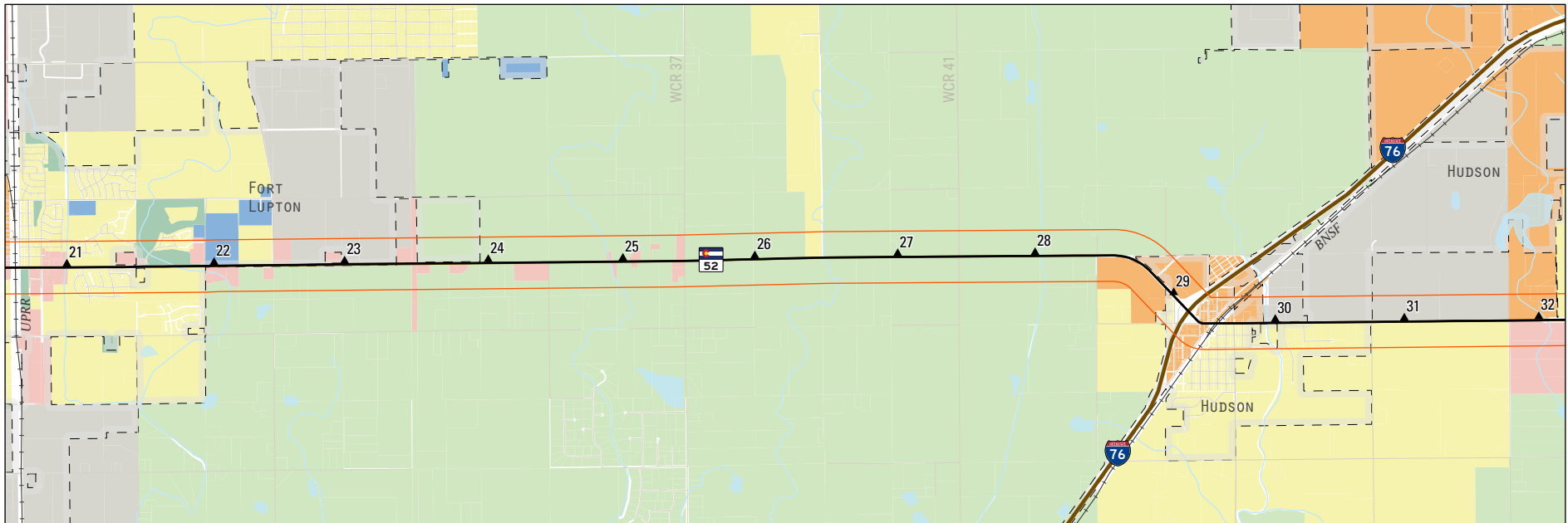


EXISTING PLANNING

Figure 2-2 Future Land Use



EXISTING PLANNING



EXISTING PLANNING

2.3 Planning Context References

Additional Planning Documents

Northwest Area Mobility Study

The study was completed in 2013 and resulted in a prioritized list of mobility improvements for the Northwest area of the Regional Transportation District's (RTD) service area. Although not specifically identified along CO 52, the study does include the feasibility of new east/west connections and could potentially consider transit opportunities along CO 52 in the future.

SH 119 Multi-modal Planning and Environmental Linkages Study

The study was completed in 2019 in an effort to implement the Northwest Area Mobility Study's recommendation to optimize regional connectivity and mobility between and within Boulder and Longmont with a goal of providing multi-modal improvements that would result in faster and more reliable travel throughout the SH 119 corridor. One of the recommended BRT alternative configurations considered BRT/queue jump lanes at the CO 52/CO 119 intersection.

North I-25 Final Environmental Impact Study

The study was completed in 2011 and resulted in several multimodal transportation alternatives along approximately 61-miles of the I-25 corridor from Fort Collins to Denver. Recommended alternatives included adding capacity along I-25 at the CO 52 interchange.

US 85 PEL

The study was completed in 2017 and resulted in multiple transportation improvement alternatives along 62-miles of the US 85 corridor between I-76 in Commerce City and Weld County Road (WCR) 100 in Nunn, Colorado. The study identified recommended multimodal transportation alternatives at and in the vicinity of the interchange at CO 52.

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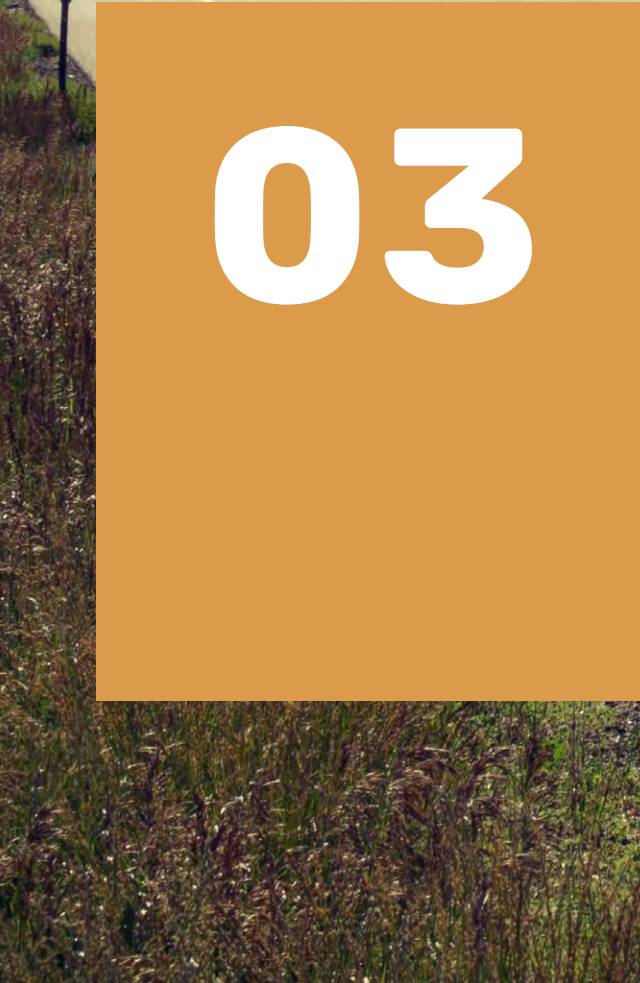


03

TRANSPORTATION CONTEXT

3.0 Introduction

This section discusses the existing conditions of the transportation system including roadway characteristics, traffic operations, travel demand modeling, socioeconomic projections, safety, bicycle, pedestrian, transit, railroad crossings, freight, and structures. Future (2045) No Action traffic projections are also presented along with recommendations of needed improvements in the corridor.



3.1 Roadway Characteristics

To identify and locate roadway deficiencies in the study area for potential improvements, it is important to know the current roadway characteristics of CO 52. Access classification, lane geometry and quantity, speed, access point density, and shoulders are important features of the roadway.



METHODOLOGY

Aerial imagery and the CDOT *Online Transportation Information System* (OTIS) were utilized to collect roadway geometric data (CDOT, 2020a). Field data collection focused on identifying areas with poor pavement condition, deficient clear zone, and vertical sight distance problems. OTIS was used to determine lane and shoulder widths, functional classification, access control classification, and speed limits along the corridor. Acceleration and deceleration lane locations and lengths were determined using aerial imagery.

CLASSIFICATIONS Figure 3-1 displays the access control classifications along the corridor. Access control classifications are used by CDOT and local agencies to provide access rights to the highway while ensuring safety and mobility standards are maintained. Most of the corridor is designated as *Regional Highway* (R-A) or *Rural Highway* (R-B). Segments through the developed segments of Niwot, Erie, Dacono, Frederick, Fort Lupton and Hudson are designated as *Non-Rural Principal Highway*

(NR-A) or *Non-Rural Arterial* (NR-B). The letter designation, A or B, indicates the level of access control required of the highway. Corridors designated with a "A" typically have more restrictive access requirements than those designated as "B".

In addition to access control classifications, CDOT also designates their highways with a functional classification. CO 52 between CO 119 and I-76 is functionally designated as a *Principal Arterial*. From I-76 to CO 79, CO 52 is designated as a *Minor Arterial*. *Principal Arterial* is the highest functional classification below *Interstate Highways and Expressways*. Their primary function is mobility and they typically serve mid-to-large size towns and cities. *Minor Arterial* is one functional level lower than *Principal Arterial*. They often serve smaller communities, carry lower volumes of traffic, and connect to *Principal Arterials*.

LANE GEOMETRY Generally, travel lanes throughout the study area are 12-ft wide. CO 52 is primarily two through lanes with a double yellow centerline or a yellow dash line for passing areas. The corridor widens to 4 lanes for roughly 3/4-mile through the I-25 interchange as well as at major intersections west of I-25 and through the WCR 13 intersection east of I-25.

At many intersections, CO 52 includes auxiliary lanes for right- and left-turn movements. Acceleration lanes are used in the corridor for traffic entering the roadway. The length of these lanes is determined by the travel speed of the roadway being entered and how long it takes a vehicle to accelerate to that speed to merge into the through lane.

Figure 3-1 Access Control Classification

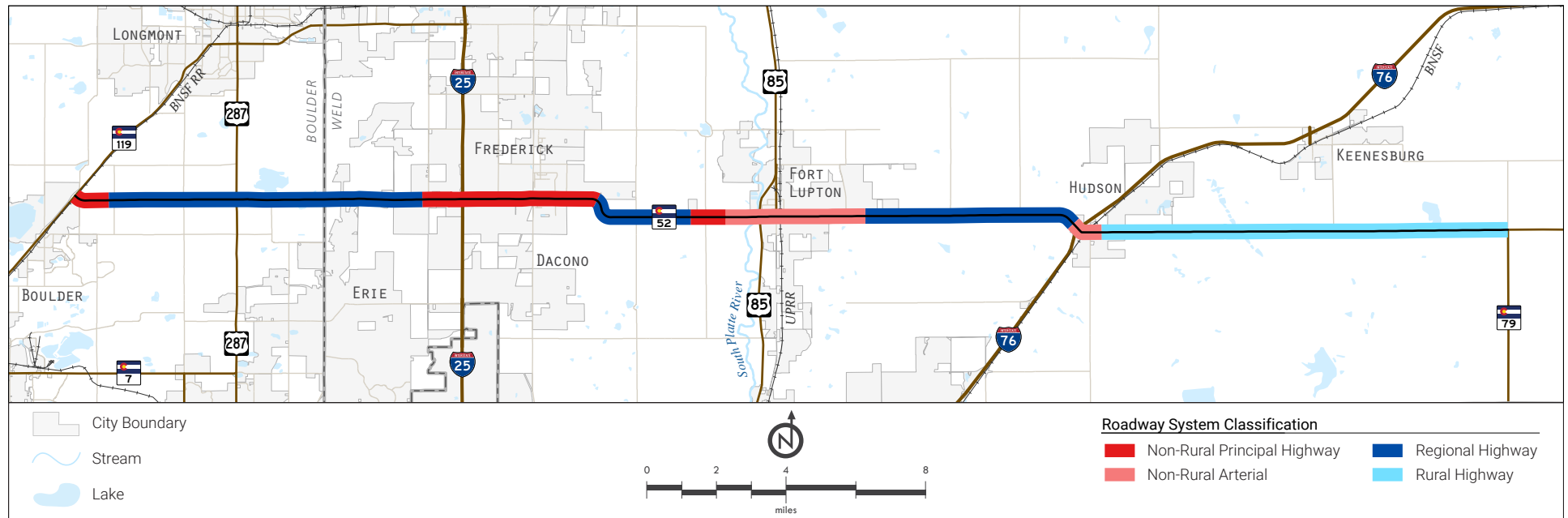
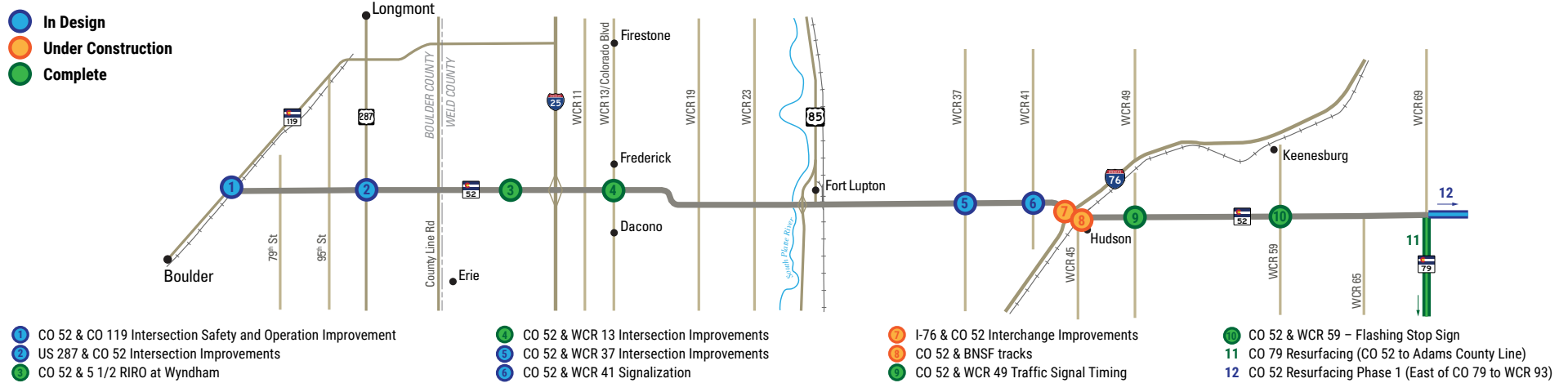


Figure 3-2 Completed and Under Construction Projects Along the CO 52 Corridor



Deceleration lanes are used in the corridor for right turns and left turns. These lanes allow vehicles to start slowing down, move out of the traveled lanes, and not impede the traffic that is traveling at the posted speed limit, while also providing storage of vehicles that are turning left.

SPEED Posted speeds vary widely throughout the corridor. The posted speed limit is generally 55 miles per hour (mph) west of WCR 19 and 65 mph east of WCR 19. As CO 52 traverses urban areas such as Dacono, Frederick, Fort Lupton and Hudson, the posted speed limit ranges from 25 mph to 40 mph.

SHOULDERS CO 52 includes paved shoulders throughout the study area. Shoulder widths are inconsistent, varying between 2- and 10-feet. Required shoulder widths are dependent on roadway classification and are important to allow for additional space should a motorist need to take evasive action, recover control of their vehicle, or pull a disabled vehicle out of the path of traffic. Roadway characteristics including travel lanes, turn lanes, acceleration lanes, and shoulder width are shown in *Appendix A: Roadway Characteristics Map*.

CORRIDOR PROJECTS Existing projects recently completed, in design, or under construction as of July 2020 within the project corridor are identified in *Figure 3-2*.

Poor pavement conditions were observed starting east of I-25 through Dacono to WCR 19 and from east of US 85 through Fort Lupton to WCR 29 1/2. These areas, as well as from US 287 to County Line Road and from West of I-76 to Banner Lakes, are identified in CDOT’s pavement condition database as having Low Drivability Life (CDOT 2019).

Deficient clear zone conditions were identified at multiple locations along the corridor. Several spot locations were identified where headwalls, narrow bridges, or irrigation features are located directly adjacent to the roadway. In addition to these spot locations, two stretches located east of Fort Lupton and east of Hudson were observed to have ditches and trees running parallel to CO 52 that encroach on the clear zone.



NEEDS

Field observations identified several non-standard intersections located on the reverse curves east of Dacono near MP 15 and 15.65. These curves have been identified for further study during the Alternatives Analysis phase of the project. Several vertical curves that may not meet design criteria were also identified during the site visit (MP 21.5, WCR 43, MP 32.15, WCR 53, WCR 55). These locations should be evaluated further during Alternatives Analysis.

Corridor improvement alternatives should focus on addressing geometric deficiencies within the corridor. Alternatives should include standardization of shoulder widths based on current design standards, roadway classification and travel speed. The reverse curves between MP 14 and MP 16 have been identified as an area of concern and will be an area of focus during Alternatives Analysis, including the non-standard intersections within the curves. Additionally, the *Access Control Plan* (ACP) should evaluate the need for, and improvements to, turn lanes at all access points within the corridor.

3.2 Traffic Operations

Traffic operations tell the story of how the existing facility is functioning based on current traffic levels and design characteristics. The INRIX Probe Data Analytics Suite was used from CDOT to evaluate historic operational characteristics. INRIX uses anonymized data collected from mobile networks and other sources to provide location-based traffic data and analytics. Information on congestion, travel time, vehicle speed, and other information is aggregated over a set of roadway stretches; and compiled by roadway stretch and time period.

The historic corridor operations were reviewed over a seven-year time period, 2013 through 2019, to identify general trends. The CO 52 corridor was divided into two broad sections based on the maximum speed limit over each section: CO 119 to WCR 19 (55 mph), and WCR 19 to CO 79 (65 mph). The corridor split, approximately halfway between I-25 and US 85, also helps highlight the commuter-driven congestion in the western portion of CO 52. The annual data was aggregated for midweek days (Tuesday, Wednesday, and Thursday) during the AM peak period (6 a.m. to 8 a.m.) and PM peak period (4 p.m. to 6 p.m.), by direction.



METHODOLOGY

The analysis focuses on two metrics: Speed and Travel Time Index (TTI). The speed charts show the average travel speed by direction and peak period. The TTI is the ratio of the average peak period travel speed to the free-flow travel time for each stretch of the corridor. The TTI indicates the relative severity of congestion as it compares the average travel time experienced during the peak periods on a day to day basis to the travel time under light traffic conditions. A higher TTI number signifies a higher level of peak period congestion.

CDOT's statewide travel demand model was used to estimate future year (2045) The No Action Alternative assumes no improvements would be made to the corridor, including the surrounding transportation net Patti Miers, except those projects which funds are already committed by a government or an agency. "No Action" traffic volumes, vehicle miles of travel (VMT), and travel time. The model was also used to estimate existing (2020) VMT and travel time in the corridor.

OPERATIONS *Figure 3-3* shows the change in speed and TTI from 2013 through 2019. Along the western section of CO 52, there is a directional pattern of increased congestion (lower average speed, higher TTI) in the westbound direction during the AM peak period, and in the eastbound direction during the PM peak period. This generally correlates to the observed pattern of commuter traffic, towards Boulder County via CO 119 in the morning and away in the evening. Although there are fluctuations, the general pattern of worsening conditions is apparent from year to year.

The patterns along the eastern section of CO 52 also show a general worsening trend, but to a lesser degree without as much distinction between the AM and PM peak periods. In general, eastbound CO 52 is more congested during the AM peak period, and westbound CO 52 is more congested during the PM peak period, in direct contrast to the western section.

In anticipation of the postponed data collection that should occur in fall, a more in-depth review was performed using data focusing on September 2019, which is reasonably close to average according to the 2019 data. The charts again show the average speed and TTI along CO 52 during the AM and PM peak periods, though for this analysis the information is shown in a linear fashion based on the corridor stretches available from INRIX rather than aggregated over distance. In addition, the posted speed limit, from CDOT OTIS is, are shown along the corridor by direction. The top five most significant bottleneck locations are also indicated in the central map.

The bottleneck locations in *Figure 3-4* generally correlate to significant changes in speed and TTI; in most cases conditions improve downstream of the bottleneck location as severe congestion will have a metering effect, limiting the amount of traffic from that point forward.



Intersection of N 95th St and CO 52

There are several locations along the corridor characterized by severe congestion during the peak periods. The historic analysis for September 2019 shows that CO 119W, US 287, County Line Road, I-25, and US 85 are locations where bottlenecks exist that should be evaluated in greater detail as part of the CO 52 PEL project.



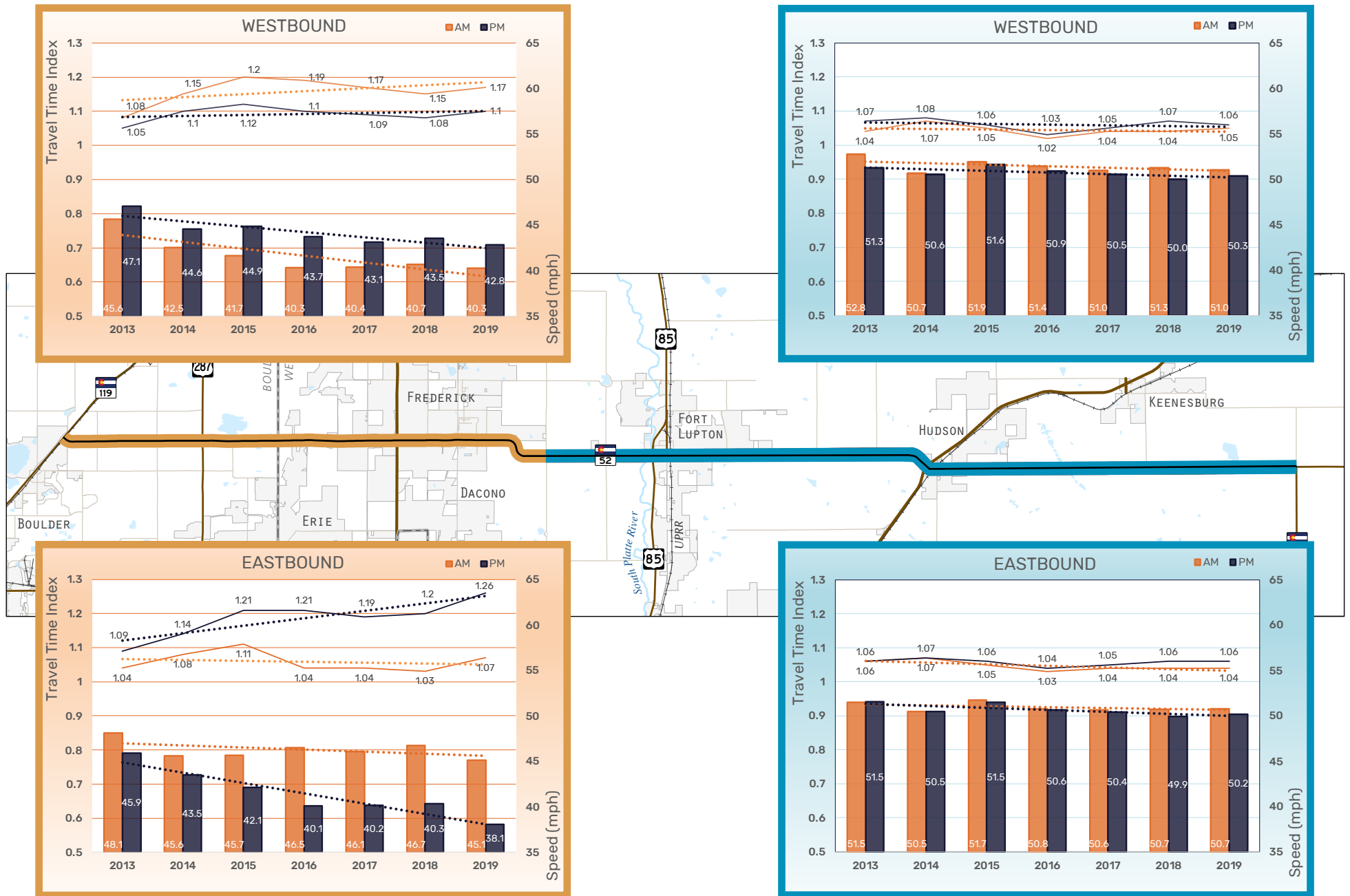
NEEDS

The anticipated growth along the corridor due to increases in employment and housing will further exacerbate traffic congestion in future years. In addition to addressing the bottleneck locations, a detailed evaluation is needed to determine long term strategies to mitigate the impact of traffic growth. Potential system-wide improvements could include additional through lane capacity, multimodal options (transit, pedestrian and bicycle; particularly along the western half of the corridor), transportation technology applications, and travel demand management measures.

The anticipated data collection and detailed traffic operations analysis will help provide more information regarding the current conditions and potential remediation measures throughout the corridor.

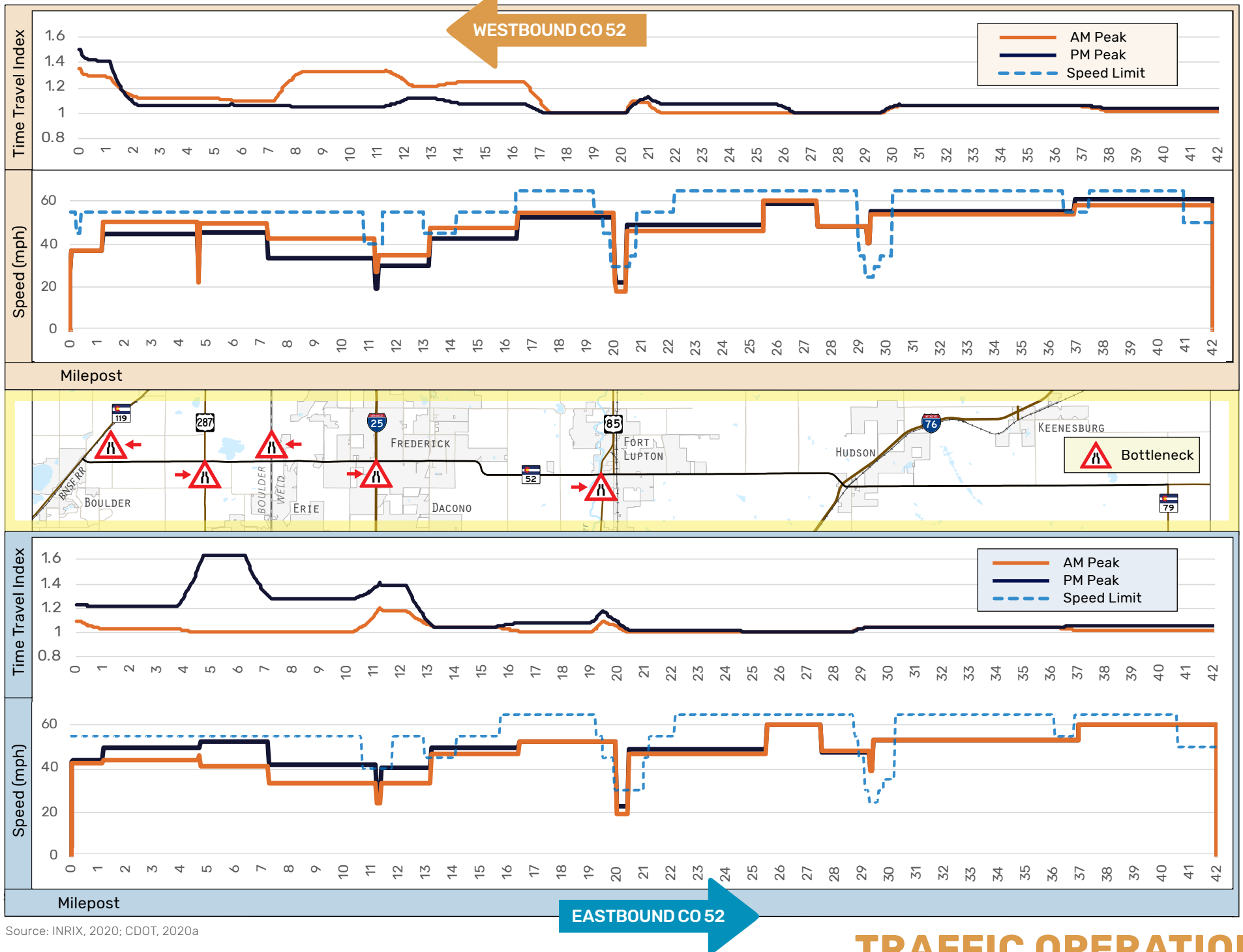
TRAFFIC OPERATIONS

Figure 3-3 CO 52 Traffic Operations – Annual Historical Trends



Source: INRIX, 2020

Figure 3-4 CO 52 Segment operations by Milepost - September 2019 Snapshot



Source: INRIX, 2020; CDOT, 2020a

3.3 Travel Demand Modeling

Under the No Action scenario, future operations give a glimpse to how the facility is projected to function in 2045 if no additional improvements are completed beyond the fiscally constrained planned projects, which are those future projects along the corridor which funds are already committed by a government or an agency. In addition, projects that are in design, under construction, or recently completed are considered in the No Action Alternative (Figure 3-2).



METHODOLOGY

CDOT’s travel demand model was used to forecast future traffic volumes along CO 52. The travel demand model, StateFocus (Version 1.4), uses socioeconomic projections for the State of Colorado to generate travel demand. The socioeconomic information encompasses households, population, and employment for the 2015 base year and 2045 future horizon year projections. Based on this information, the travel model produces 2045 forecasts of roadway volumes on a coded network of the roadway system. The travel model was calibrated and validated by CDOT to year 2015 observed traffic volumes.

TRAFFIC VOLUMES Existing and 2045 No Action daily traffic volumes at select locations are shown in Table 3.1. Traffic volumes in 2019 typically range from 12,000 to 20,000 at most locations along the western portion of the corridor. On the east side of I-25, traffic approaches 25,000 vehicles per day. Near Fort Lupton, there are approximately 11,000 vehicles per day. East of I-76, daily traffic ranges from nearly 4,000 vehicles to about 2,000 vehicles per day near CO 79.

Overall daily vehicle miles traveled (VMT) on CO 52 between SH 119 and CO 79 was about 308,000 VMT in 2015. In 2045, the daily VMT on CO 52 is projected to increase to about 534,000 VMT, a growth of 74 percent over 2015.

In terms of growth in traffic volumes by general location, CO 52 in Boulder County is expected to carry about 18,000 to 30,000 daily vehicles—a growth is projected of about 40 to 55 percent over 2015 conditions. The most dramatic growth is projected in Weld County between Colorado Boulevard and US 85, where traffic is projected to increase by over 90 percent in some sections. In the eastern most section, the traffic west of I-76 is projected to grow substantially over current levels, generally by 6,000 or 7,000 vehicles per day. East of I-76, volumes are projected to increase by 1,500 vehicles per day or less.

TRAVEL TIMES Existing traffic volumes are creating areas of congestion along the CO 52 corridor. Lack of adequate capacity at major intersections controlled by traffic signals is a major contributor to the congestion issues. The result is delay to the traveling public with lengthy queues at multiple locations along the corridor. With growth in future traffic volumes by year 2045 ranging from 30 percent to nearly 90 percent along the highway, travel times are projected to increase throughout the corridor under No Action conditions, especially along its western half. Existing and future travel times and travel time indices along the corridor are illustrated in Table 3.2. A travel time index measures the actual travel time compared to free-flow travel time with a value at or just above 1.0 indicating free-flow or near free-flow conditions while higher values indicate greater congestion.

Overall free-flow travel time along the 41.6-mile project corridor is just over 53 minutes in both the eastbound and westbound directions. Existing (year 2019) travel times during the AM and PM peak hours are 57.8 and 59.5 minutes in the eastbound direction and 61.7 and 57.1 minutes in the westbound direction, respectively. Current travel time indices range from 1.1 to 1.3 in the western portion of the corridor, and 1.0 east of WCR 31.

In the year 2045 No Action scenario, travel times for the entire corridor are expected to increase by 22 percent to 31 percent during peak hours. The western half of CO 52 is expected to experience increases in travel times of up to 71 percent during the peak hours. Travel times between WCR 19 and WCR 31 are expected to increase 10 percent to 21 percent in both directions during the peak hours. Travel times east of WCR 31 are expected to experience minimal increases in travel times at 2 percent or less in both directions during the peak hours.

Table 3.1 Existing and 2045 No Action Daily Traffic Volumes at Select Locations

LOCATION	ADT		CHANGE	
	2020 EST. COUNT	2045 NO ACTION		
CO 119 to 95th Street	12,400	18,200	5,800	47%
95th Street to US 287	13,000	18,000	5,000	38%
US 287 to County Line Road	19,000	26,700	7,700	41%
County Line Road to I-25	19,600	29,900	10,300	53%
I-25 to Colorado Boulevard	25,200	36,900	11,700	46%
Colorado Boulevard to Ridgeway Boulevard	15,800	29,600	13,800	87%
Ridgeway Boulevard to WCR 19*	11,800	18,900	7,100	60%
WCR 19 to US 85	11,600	21,600	10,000	86%
US 85 to Rollie Ave	11,500	18,400	6,900	60%
Rollie Ave to WCR 31*	11,500	18,700	7,200	63%
WCR 31 to WCR 37*	10,300	16,600	6,300	61%
WCR 37 to I-76	9,200	15,900	6,700	73%
I-76 to WCR 49	4,000	5,400	1,400	35%
WCR 49 to WCR 59	3,100	4,100	1,000	32%
WCR 59 to CO 79	2,000	2,800	800	40%

*No count in this section, estimated based on upstream and downstream counts. Sources: CDOT, 2020a; CDOT, 2020b (2020 observed traffic count),(future volume)

Table 3.2 Existing (Year 2019) and 2045 No Action Travel Times

LOCATION	LENGTH/FREE FLOW TRAVEL TIME	TRAVEL TIME IN MINUTES (TRAVEL TIME INDEX)					
		AM PEAK			PM PEAK		
		EXISTING (YEAR 2019)	2045 NO ACTION	% CHANGE	EXISTING (YEAR 2019)	2045 NO ACTION	% CHANGE
EASTBOUND							
CO 119 to County Line Road	7.2 mi/8.6 min	9.2 (1.1)	9.8 (1.1)	7%	10.7 (1.2)	16.6 (1.9)	56%
County Line Road to WCR 19	9.2 mi/12.4 min	14.0 (1.1)	23.0 (1.9)	65%	15.1 (1.2)	25.7 (2.1)	71%
WCR 19 to WCR 31	6.0 mi/12.1 min	13.7 (1.1)	16.5 (1.4)	21%	13.3 (1.1)	14.8 (1.2)	12%
WCR 31 to WCR 49	9.2 mi/13.0 min	13.5 (1.0)	13.5 (1.0)	0%	13.2 (1.0)	13.2 (1.0)	0%
WCR 49 to CO 79	10.0 mi/7.2 min	7.5 (1.0)	7.5 (1.0)	0%	7.4 (1.0)	7.4 (1.0)	0%
Overall	41.6 mi/53.3 min	57.8 (1.1)	70.3 (1.3)	22%	59.5 (1.1)	77.8 (1.5)	31%
WESTBOUND							
CO 119 to County Line Road	7.2 mi/8.9 min	11.2 (1.3)	18.3 (2.1)	64%	9.7 (1.1)	11.3 (1.3)	16%
County Line Road to WCR 19	9.2 mi/12.4 min	16.3 (1.3)	26.6 (2.1)	63%	13.5 (1.1)	22.3 (1.8)	66%
WCR 19 to WCR 31	6.0 mi/12.1 min	13.4 (1.1)	14.8 (1.2)	10%	13.2 (1.1)	15.8 (1.3)	20%
WCR 31 to CO 49	9.2 mi/12.7 min	13.3 (1.0)	13.3 (1.0)	0%	13.3 (1.0)	13.3 (1.0)	0%
WCR 49 to CO 79	10.0 mi/7.3 min	7.5 (1.0)	7.5 (1.0)	0%	7.5 (1.0)	7.7 (1.1)	2%
Overall	41.6 mi/53.4 min	61.7 (1.2)	80.5 (1.5)	31%	57.1 (1.1)	70.3 (1.3)	23%

Sources: INRIX, 2020; CDOT, 2020b (future travel times)

Portions of the CO 52 corridor will need to accommodate substantial traffic growth in the future. Traffic on CO 52 already exceeds 25,000 vehicles per day east of I-25. Between I-25 and US 85, traffic will almost double over current volume levels. Traffic on CO 52 in Boulder County will grow by 40 to 50 percent between 2015 and 2045.

**NEEDS**

Travel time indices similarly reflect increased travel demands. Currently, between CO 119 and WCR 19, there are travel time delays with travel time indices at 1.3 during the AM peak in the westbound direction and 1.2 during the PM peak in the eastbound direction. In the 2045 No Action scenario, travel time indices are projected to range from 1.8 to 2.1 in this section. Between WCR 19 and WCR 31, the travel time indices will increase to 1.2 to 1.4. East of this location, the travel time index will remain at or near 1.0.

Future improvements will be needed on CO 52 to serve the growth in traffic.

TRAVEL DEMAND

3.4 Socioeconomic Projections

CDOT’s travel demand model was used to forecast future traffic volumes along CO 52 as described in Section 3.3. The travel demand model, StateFocus (Version 1.4), uses socioeconomic projections for the State of Colorado to generate travel demand. The socioeconomic information encompasses households, population, and employment for a base year (2015) and forecasts for a future horizon year (2045). This section summarizes socioeconomic projections and why they are important to the PEL.

The socioeconomic data sets are based on local comprehensive land use plans. These plans are prepared by local governments to guide development of their respective jurisdictions into the future, as discussed in Section 2.1. The regional planning agencies reference this information to develop geographically allocated socioeconomic forecasts of future population and employment that conform to regional control totals developed by the State Demography Office. The geographic areas, termed transportation analysis zones (TAZs), are much larger than the parcel-based land use plans. Base year (2015) calculations use the Census, local survey results, and other available data to reflect observed household and employment numbers. The forecasts incorporate development plans, zoning policies, and other factors to geographically project future (2045) numbers of households, population, and employment. This information is the primary input to travel demand models.



METHODOLOGY

A 3-mile buffer on either side of CO 52, from CO 119 to CO 79, was used to examine the current conditions and projected growth in households and employment along the corridor.

SOCIOECONOMIC DATA Table 3.3 depicts the growth in both households and employment for the study area. Subsequently, Figure 3-5 and Figure 3-6 illustrate the density of existing households in 2015 and growth in household density through 2045, while Figure 3-7 and Figure 3-8 depict the density of existing employment in 2015 and growth in employment density through 2045.

Table 3.3 CDOT 2015 and 2045 Socioeconomic Data

	2015	2045	GROWTH	% GROWTH	AVG. ANNUAL GROWTH RATE
Household	23,454	53,715	30,261	129%	2.8%
Employment	34,837	42,855	8,018	23%	0.7%

Source: CDOT, 2020b

To understand the growth trends better, the socioeconomic data within the zones along the CO 52 3-mile buffer was compiled along stretches of the corridor. Table 3.4 depicts the growth in households along the corridor stretches. The data indicates that the vast majority of household growth is expected west of WCR 19 and the Frederick and Dacono area. The corridor from County Line Road to WCR 19 is projected to grow the most with over 18,000 new households, an increase of 182 percent over existing household totals.

Table 3.4 CDOT 2015 and 2045 Household Data

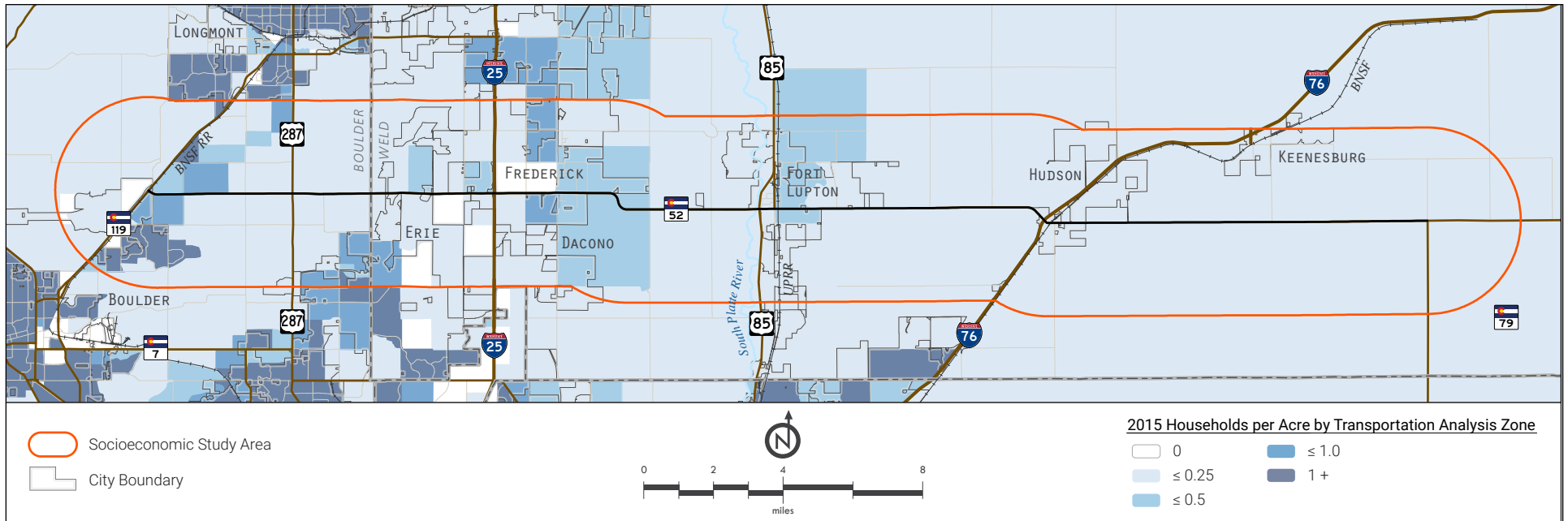
DESCRIPTION	2015	2045	GROWTH	% GROWTH	AVG. ANNUAL GROWTH RATE
CO 119 to County Line Rd	8,239	17,319	9,080	110%	2.5%
County Line Rd to WCR 19	10,103	28,527	18,424	182%	3.5%
WCR 19 to WCR 31	2,150	3,644	1,494	69%	1.8%
WCR 31 to WCR 49	2,089	2,867	778	37%	1.1%
WCR 49 to CO 79	873	1,358	485	56%	1.5%

Source: CDOT, 2020b



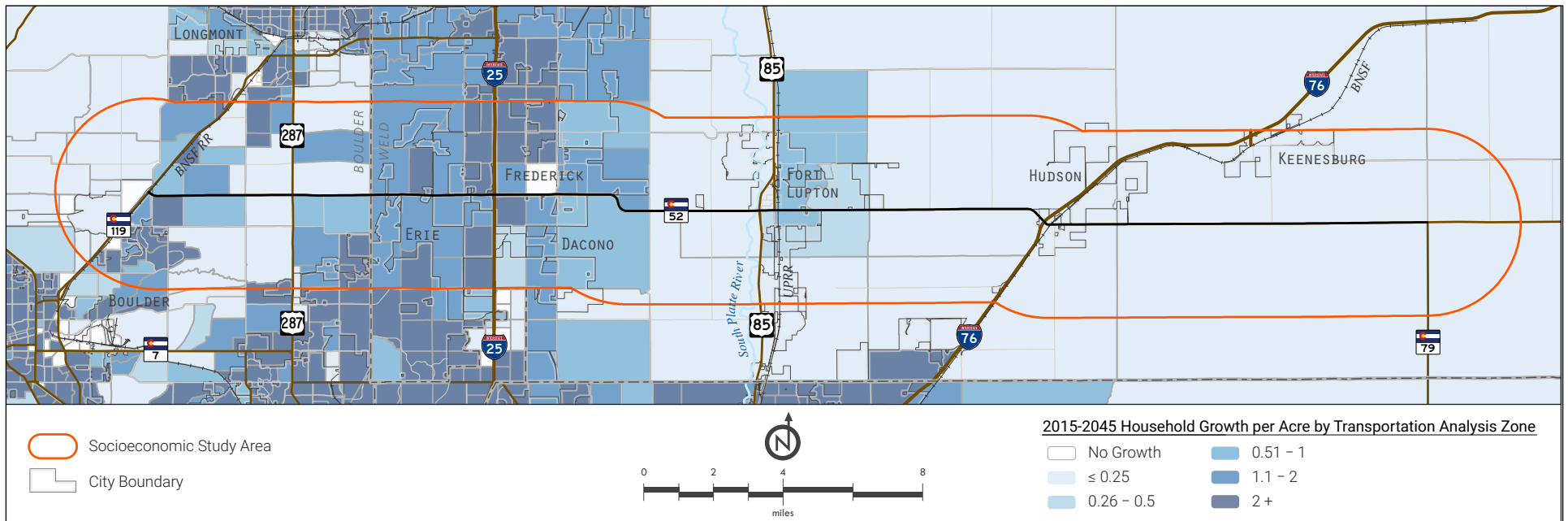
IBM Boulder Complex at Intersection of CO 52 and CO 119

Figure 3-5 Growth in Household Density - 2015



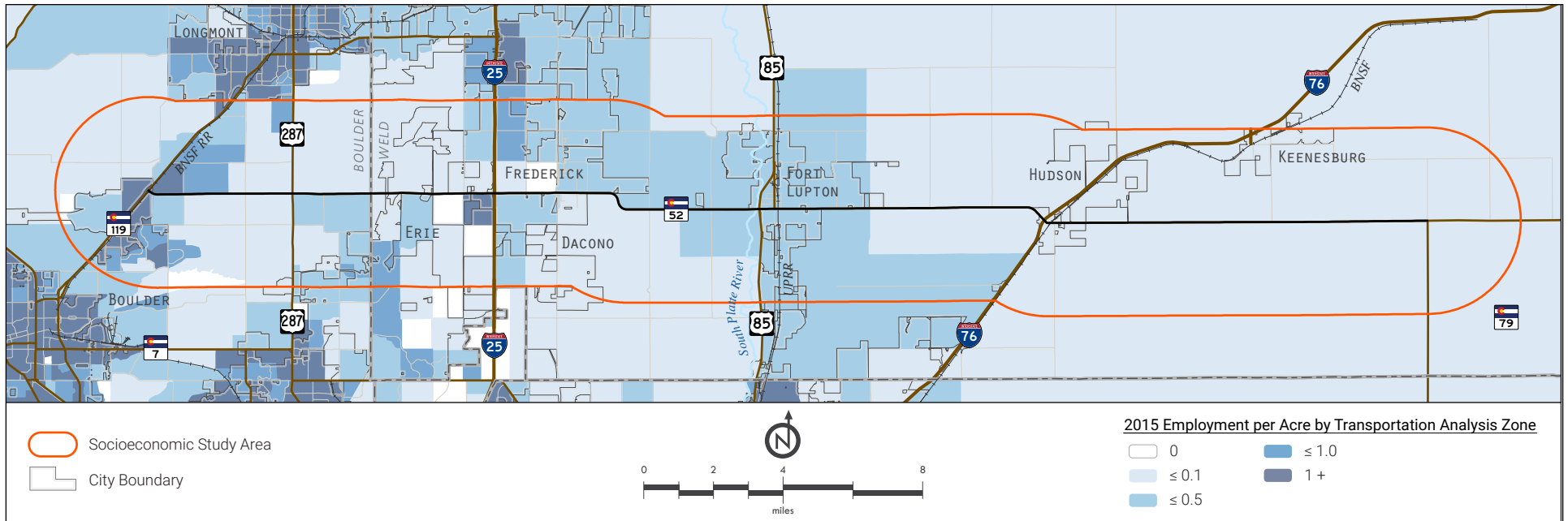
Source: CDOT, 2020b

Figure 3-6 Growth in Employment Density - 2015-2045



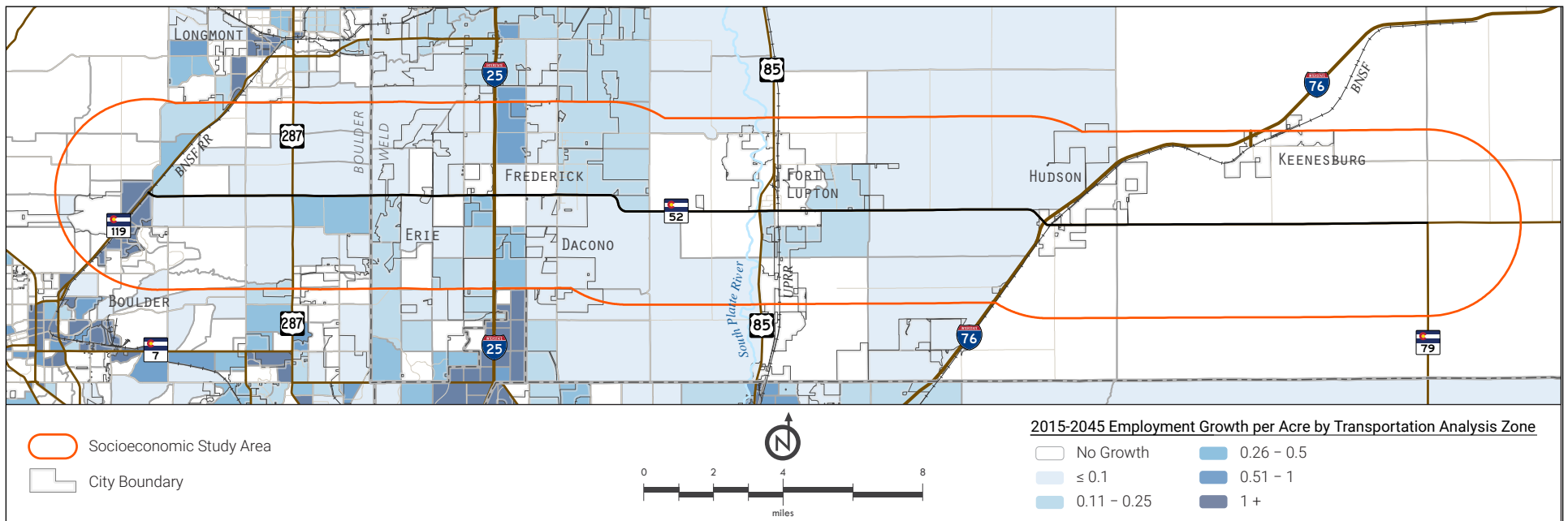
Source: CDOT, 2020b

Figure 3-7 Employment Density - 2015



Source: CDOT, 2020b

Figure 3-8 Employment Density Growth - 2015-2045



Source: CDOT, 2020b

CORRIDOR EMPLOYMENT Table 3.5 depicts the growth in employment along the corridor stretches. The data shows that employment is expected to grow west of WCR 19 while to the east, employment numbers decline into the future. The corridor stretch west of County Line Road is expected to experience the greatest absolute job growth at over 5,000 jobs. The corridor stretch between County Line Road and WCR 19 is expected to experience the greatest percentage growth at over 50 percent. East of WCR 19, job totals are expected to decline.

Table 3.5 CDOT 2015 and 2045 Employment Data

DESCRIPTION	2015	2045	GROWTH	% GROWTH	AVG. ANNUAL GROWTH RATE
CO 119 to County Line Rd	18,816	24,017	5,201	28%	0.8%
County Line Rd to WCR 19	7,611	11,455	3,844	51%	1.4%
WCR 19 to WCR 31	4,027	3,712	-315	-8%	-0.3%
WCR 31 to WCR 49	3,658	3,397	-261	-7%	-0.2%
WCR 49 to CO 79	725	274	-451	62%	-3.2%

Source: CDOT, 2020b

Currently, much of the study area is used for agriculture or is undeveloped. The StateFocus model projections indicate that the number of households within the study area will more than double by 2045, adding over 30,000 households for a total of nearly 54,000. Main concentrations of residential growth are within or near the areas just east of CO 119 (Niwot), Erie, Frederick, Fort Lupton, and Dacono. The cities are located along the major north-south corridors of CO 119, I-25 and US 85, respectively. And though the figures do not illustrate it due to the size of the zones in the east, moderate growth in density is expected along the I-76 corridor and further east along CO 52.

Employment density is greatest toward the western portion of the study area, near Boulder and Longmont. Growth in employment is expected to be much less than residential growth. Overall employment growth is forecasted at about 23 percent, or just over 8,000 additional jobs, resulting in nearly 43,000 jobs along the corridor by 2045. Growth in employment density is generally expected along most of the study area west of I-76, especially near CO 119, Erie, Frederick, Fort Lupton, and Dacono.



NEEDS

As current agricultural or undeveloped land along the corridor becomes developed into mostly residential areas, CO 52 will be more utilized to connect to employment centers within the region. This is accentuated due to CO 52 serving as one of the main east-west corridors in the area. This may particularly affect connections to major north-south roadways such as CO 119, I-25, US-85, and I-76.



Wyndham Hill subdivision in Frederick

3.5 Traffic Safety

Crashes occur on the roadway, ranging from vehicles hitting other vehicles (rear-end, side-swipe, etc.) to vehicles hitting pedestrians/bicyclists, and even vehicles hitting objects or animals. Crashes can also occur at any number of locations along a highway such as at an intersection, a driveway, or non-intersection locations such as midblock. They range in severity from property damage only (PDO) to injuries (INJ), and in the worst-case, fatalities (FAT).

Crash data was obtained from CDOT’s statewide crash database. Data from July 1, 2014 to June 30, 2019 was utilized for the analysis. Data includes all crashes within the CO 52 corridor study limits from CO 119 to CO 79. Crashes on cross streets for *intersection* and *intersection-related* crashes were also included in the analysis, out to approximately 50-foot north and south of the CO 52 right-of-way.



METHODOLOGY

The assessment of the magnitude of safety problems was refined using Safety Performance Functions (SPF). The SPF reflects the relationship between traffic exposure measured in Average Daily Traffic (ADT), and crash count measured in crashes per year. The SPF model provides an estimate of the normal or expected crash frequency and severity for a range of ADT among similar facilities.

CRASHES There were 1,603 reported crashes on CO 52 during the five years of analyzed data as shown in *Table 3.6*. There has been a slight increase in crashes of approximately 10 percent between 2014 and 2019. There were 13 fatal crashes, resulting in 15 persons killed. Injury and fatal crashes combined account for 32 percent of the crashes in the corridor.

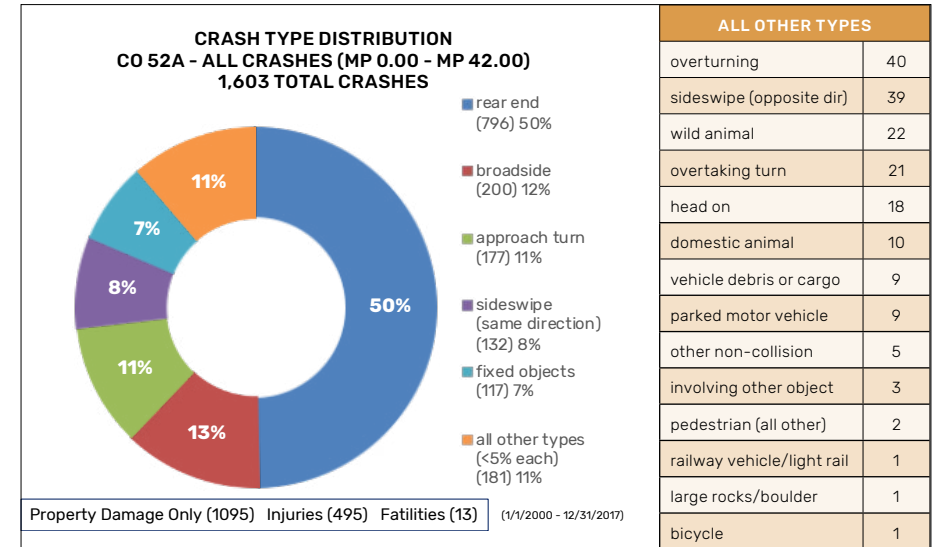
Table 3.6 CO 52 Crashes by Year

YEAR	NUMBER OF CRASHES				PERSONS	
	PDO	INJ	FAT	TOTAL	INJURED	KILLED
7/1/2014 to 6/31/2015	202	94	5	301	153	5
7/1/2015 to 6/31/2016	194	93	1	288	139	1
7/1/2016 to 6/31/2017	230	93	5	328	143	5
7/1/2017 to 6/31/2018	249	105	1	355	167	3
7/1/2018 to 6/31/2019	220	110	1	331	171	1
Total	1,095	495	13	1,603	773	15
Average/Yr	219.0	99.0	2.6	320.6	154.6	3.0

Source: CDOT, 2020c

Figure 3-9 summarizes the crashes by type for the corridor. *Rear end* crashes account for the most crashes (50 percent); many of these crashes occur at intersections and urbanized areas within the corridor where there are concentrated access points. *Broadside* and *approach turn* crashes are the next most prevalent crash types, accounting for 13 percent and 11 percent of crashes, respectively. These crashes were focused at signalized intersections and at stop-controlled side street approaches where gaps in traffic are less frequent for motorists turning onto or crossing CO 52.

Figure 3-9 CO 52 Crash Distribution Breakdown

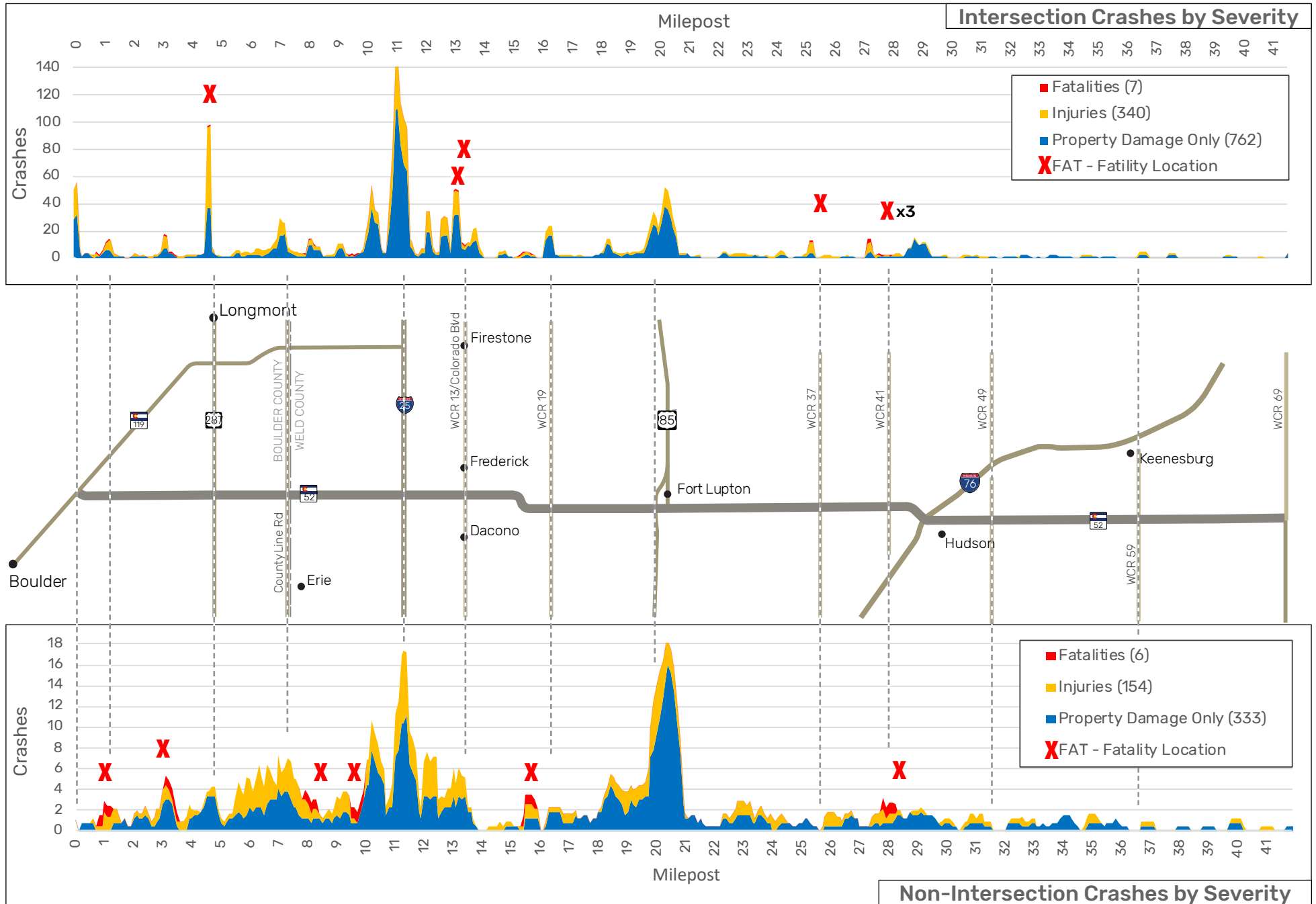


Source: CDOT, 2020c

It should also be noted that there were two *pedestrian* type crashes and one *bicycle* type crash reported along the study corridor during the five-year study period. The crashes were non-fatal.

Figure 3-10 illustrates the magnitude of intersection and non-intersection crashes by location along the corridor. Sixty-nine percent of all crashes were classified as *intersection* or *intersection-related* crashes. Most crashes occur in the western half of the corridor and tend to be clustered near major intersections and adjacent development.

Figure 3-10 CO 52 Crash Distribution Map



Source: CDOT, 2020c

LEVEL OF SERVICE OF SAFETY Using CDOT's SPF analysis procedures, intersections with a high potential for crash reduction were identified based on the Level of Service of Safety (LOSS) designation. LOSS is a commonly used safety rating that rates safety performance from I to IV, with IV indicating the highest potential for crash reduction. *Table 3.7* lists all intersections with a LOSS IV rating for either total crashes or severe crashes (injury and fatal), and/or those intersections with a fatal crash.

Table 3.7 Intersections with High Potential for Crash Reduction

MP	DESCRIPTION	LEGS	SIGNAL	NUMBER OF CRASHES				LOSS TOTAL	LOSS SEVERE
				PDO ¹	INJURY	FATAL	TOTAL		
4.67	US 287	4	Yes	47	59	1	107	III	IV
8.17	WCR 3	3	No	12	3	0	15	IV	III
10.39	Puritan Way	3	No	28	7	0	35	IV	IV
10.95	West Frontage Road (I-25)	4	Yes	26	17	0	43	IV	IV
11.08	SB I-25 Ramps	4	Yes	28	6	0	34	IV	II
11.21	NB I-25 Ramps	4	Yes	99	23	0	122	IV	IV
11.45	East Frontage Road (I-25)	4	Yes	79	29	0	108	IV	IV
12.81	Flying Circle Boulevard	3	Yes	20	11	0	31	IV	IV
13.19	Colorado Ave (WCR 13)	4	Yes	40	15	1	56	III	III
13.45	Cherry Street	3	No	5	2	1	8	III	III
13.64	Forest Street	3	No	10	2	0	12	IV	III
13.9	Mac Davidson Drive	3	No	3	3	0	6	IV	IV
16.42	WCR 19	4	No	20	5	0	25	IV	IV
25.46	WCR 37	4	No	4	7	1	12	IV	IV
27.46	WCR 41	4	No	5	6	3	14	IV	IV
29.07	West Frontage Road (I-76)	4	No	11	1	0	12	IV	II
36.92	WCR 59	4	No	3	2	0	5	IV	III
37.92	WCR 61	4	No	3	1	0	4	IV	IV
41.94	CO 79 (WCR 69)	4	No	4	0	0	4	IV	II

Source: CDOT, 2020c

¹Property Damage Only



West of CR 51 looking towards downtown Hudson

The crash data and safety analysis indicate there are 17 intersections that exhibit high crash frequency and have a high potential for crash reduction, plus two intersections rated at LOSS III but with a fatal crash occurrence. Detailed analysis and recommendations for these locations is presented in *Appendix B: Supporting Documentation*. Intersection pattern recognition analysis will be completed during the Alternatives Development phase of the project to identify correctable crash patterns and to develop specific safety treatment recommendations.



NEEDS

Crashes at non-intersection locations are less prevalent than intersection crashes, accounting for 31 percent of all crashes. Identifiable non-intersection crash patterns include *rear end*, *fixed object*, and *sideswipe (same direction)* crashes. Between MP 15.50 and MP 15.70, there were three head-on crashes and one fatality. This segment is in the vicinity of the reverse curve near WCR 17. More detailed analysis should be conducted during the Alternative Development phase of the project to identify potential mitigation measures for the reverse curve in this area, as well as at other non-intersection crash locations in the corridor. Potential treatment measures may include clear zone protection, access management, capacity enhancements, rumble strips, and signing and striping upgrades.

3.6 Bicycle Facilities and Operations

This analysis evaluated existing and proposed bicycle facilities and operations along the CO 52 corridor. Based on the length of the corridor and given the many municipalities CO 52 serves and connects, existing bicycle facilities and available roadway width to provide proposed bicycle facilities vary throughout the corridor. To accurately assess the bicycle conditions, the analysis divided the corridor into three areas.

- **West Area:** CO 119 to County Line Road within Boulder County
- **Central Area:** County Line Road to WCR 37 within Weld County
- **East Area:** WCR 37 to CO 79 within Weld County



Insufficient shoulder width for multimodal use

The analysis included a desktop review of plans, online resources, and available GIS data from local and regional agencies. The GIS data from agencies along the corridor was standardized for consistent representation. Bicycle facility classifications included: existing and proposed on-street facilities (includes shoulders, bike lanes and on-street shared bike routes), off-street paved, off-street unpaved, and conceptual and unknown trail type. For more details see *Appendix B: Supporting Documentation*. In addition to the review of data, information provided during stakeholder interviews was synthesized as applicable.



METHODOLOGY

A Bicycle Level of Traffic Stress (LTS) analysis following the methodology developed by the Mineta Transportation Institute (Maaza C. Mekuria, 2012) was performed to assess the comfort and connectivity of the bicycle net Patti Miers along corridor. It is noted that the corridor was broken up into segments and crossings for the LTS analysis. The analysis provides a score of comfort ranging from LTS 1 to LTS 4 based on the level of stress brought on by vehicular traffic. LTS 1 is suitable for children; LTS 2 represents the traffic stress that most adults will tolerate; LTS 3 and 4 represent greater levels of stress. The data used for this analysis includes the following:

- CDOT’s OTIS “HIGHWAY” database which includes speed limit data and the number of lanes for roadway segments; and
- Digitized crossings along the CO 52 corridor from a desktop field review and notes on the presence of a signal.

For the purposes of this analysis, shoulders along CO 52 that are 4-feet in width or wider were considered equivalent to bike lanes and analyzed as such. *Table 3.8* summarizes the criteria to determine LTS for bike lanes not adjacent to a parking lane.

Table 3.8 LTS Criteria for Bike Lanes Not Alongside a Parking Lane

	LTS > 1	LTS > 2	LTS > 3	LTS > 4
Street Width (through lanes per direction)	1	2 lanes per direction, if directions are separated by a raised median	more than 2-ft., or 2-ft. without a separating median	(no effect)
Bike Lane Width (includes marked buffer and paved gutter)	6-ft. or more	5.5-ft. or less	(no effect)	(no effect)
Speed Limit or Prevailing Speed	30 mph or less	(no effect)	35 mph	40 mph or more
Bike Lane Blockage (may apply in commercial areas)	rare	(no effect)	frequent	(no effect)

Note: (no effect) = factor does not trigger an increase to this level of traffic stress.

Source: Maaza C. Mekuria, 2012

Each corridor stretch was analyzed based on these criteria and used the principle of the “weakest link”, the worst level of stress governs for that stretch. For stretches of CO 52 without shoulders the LTS criteria for bicyclists in mixed traffic were followed (*Table 3.9*). Because any corridor stretch with a speed limit of 40 mph or higher will have an LTS of 4 regardless of the other criteria, speed limit was used as the primary LTS screening criteria for the CO 52 corridor.

Table 3.9 LTS Criteria in Mixed Traffic

SPEED LIMIT	STREET WIDTH		
	2-3 LANES	4-5 LANES	6+ LANES
Up to 25 mph	LTS 1 ^a or 2 ^a	LTS 3	LTS 4
30 mph	LTS 2 ^a or 3 ^a	LTS 4	LTS 4
35+ mph	LTS 4	LTS 4	LTS 4

Note: ^a Use lower value for streets without marked centerlines or classified as residential and with fewer than 3 lanes; use higher value otherwise. Source: Maaza C. Mekuria, 2012

CO 52 is one of the few continuous and straight east-west connections between CO 119 in Boulder County and the eastern towns of Wiggins and Fort Morgan. As a result, this corridor is a critical link in the transportation network not only for vehicles, but also for bicycles. No other continuous bicycle route or trail exists in close proximity that provides similar east-west connectivity for this area. The corridor is located in between many growing communities north and south of the corridor and intersects several other communities. Therefore, providing north-south connectivity across CO 52 is important to ensure connectivity and provide safe crossings within these growing communities.

BICYCLE FACILITIES

Crashes between bicyclists and motor vehicles were reviewed and analyzed in Section 3.5 Traffic Safety. Between July 2014 and June 2019, one bicycle crash (non-fatal) was reported within the study corridor.

BIKE FACILITIES Figure 3-11 shows the existing bicycle facilities proximate to CO 52. Currently there are no designated bicycle routes along CO 52, yet most of the western part of the corridor from CO 119 to US 85 has shoulders that are 4-feet or greater. In addition, off-street paved bicycle paths are planned along CO 52 in the communities of Dacono, Frederick and Fort Lupton. A parallel facility is also planned between Fort Lupton and Dacono along WCR 12, south of CO 52. DRCOG notes this proposed facility between Fort Lupton (CR 23) and Dacono as part of their Regional Active Transportation Corridors. This trail segment is also part of the proposed Front Range Trail.

Few designated existing bicycle facilities cross the corridor. Existing trails that cross the corridor include the Longmont-to-Boulder (LOBO) Trail, which crosses CO 52 at an underpass just west of 79th Street, and the Firestone/Legacy/Old Railroad Trail, which crosses CO 52 at-grade at Colorado Boulevard. Many proposed trails are planned by the corridor local agencies, many of them following streams and ditches. DRCOG notes 95th Street, the LOBO trail and CO 119 as part of their Regional Active Transportation Plan (DRCOG, 2019) *corridors*.

LEVEL OF TRAFFIC STRESS (LTS) RATINGS Figure 3-12 illustrates the LTS ratings along CO 52. As previously stated, the LTS for most of the corridor is very high (LTS 4) due to the high vehicle speeds. Travel speeds predominantly range from 55 to 65 mph with a couple exceptions in Fort Lupton and Hudson, where vehicle travel speeds drop below 40 mph. The LTS crossing rating indicates that bicycle travel across CO 52 is difficult at many of the unsignalized intersections due to the high volume and/or high speed of vehicular traffic along CO 52.

PHYSICAL CONDITIONS Available space along the corridor provides some physical infrastructure to support bicycle east-west connectivity where roadway shoulders are present. Review of the existing shoulder data from CDOT's Colorado Bicycle & Byways Map shows that generally the corridor has shoulders greater than 4-feet from CO 119 to Fort Lupton. However, gaps at major intersections (95th St, US 287, I-25, and US 85) plus additional gaps at sporadic stretches along the corridor make it challenging for cyclists to travel along the corridor. Very few stretches of the corridor have shoulders from Fort Lupton to CO 79 making it challenging for cyclists to travel east of Fort Lupton. As a result, cyclists are forced to mix with vehicular traffic.

OPERATIONAL AND USE CONDITIONS The bicycle environment along CO 52 is not appealing to most users. High traffic volumes and speeds from 40 to 65 mph in most of the corridor results in a LTS score of 4. A general analysis of the corridor and stakeholder interviews indicate some bicycle usage at both ends of the corridor with lower usage in the center. Stakeholders from the western side of the corridor mentioned high bicycle usage of the corridor from the Boulder County bicycle community and bicycle clubs. On the eastern side of the corridor, stakeholders mentioned that a couple of bicycle clubs use the corridor regularly, especially the stretch traveling east of Keenesburg since bicycle traffic from I-76 and the I-76 Frontage Road traveling east is rerouted along WCR 59 and CO 52. In addition, high bicycle usage along this stretch of the corridor has occurred in the past during bicycle races and organized events that include Pedal the Plains. This indicates that existing conditions at both ends of the corridor make it possible for cyclists to use the road. Existing conditions in the center of the corridor, such as high traffic speed and crossings of major highways (I-25 and US 85), deter users.

Crossing CO 52 as a cyclist can be challenging. Even though CO 52 mostly consists of one lane in each direction, high traffic volumes and high speeds make it difficult for cyclists to cross. Of the 85 roadways that intersect CO 52, 20 are signalized. Existing trails that cross CO 52 include the LOBO trail, which crosses under CO 52 through an existing underpass, and the Firestone Trail that crosses CO 52 at the signalized intersection of Colorado Boulevard. The LTS analysis for unsignalized crossings indicates better LTS for the crossings within the municipalities based on lower travel speeds. Stakeholders throughout the corridor noted challenges with crossing CO 52 within the municipalities and the need to connect trails north and south of the corridor. Outside of the municipalities, higher bicycle usage is expected to occur along roadways with 4-foot shoulders or roadways with low traffic volumes. Some of them include CO 119, 79th Street, 95th Street, E County Line Road, WCR 27, Colorado Boulevard, WCR 23, WCR 59, and WCR 77.

PROPOSED CONDITIONS Currently, the corridor from east to west does not provide continuous connectivity for bicyclists due to gaps in adequate shoulder widths. The central stretch of the corridor includes proposed trails projects along CO 52 that would improve east-west connectivity along the corridor. Several plans proposed a trail along CO 52. The proposed segment of the Colorado Front Range Trail/52-85 Trail that falls within this area is also part of DRCOG's Regional Active Transportation Plan (DRCOG, 2019). The proposed alignment goes from Colorado Boulevard, travels along CO 52 and then south on WCR 23. In addition, Fort Lupton's 2018 Parks & Trails Master Plan (Fort Lupton, 2018) also proposes a connector trail along CO 52 that connects the Front Range Trail to other trails within Fort Lupton. Additional regional and local trails are proposed to travel north-south in the study area and cross CO 52. Many of them are proposed in the central area to provide connectivity between Erie, Dacono, Frederick and Fort Lupton. In the western area of the corridor near CO 119, the LOBO trail and 95th Street are noted by DRCOG as a Regional Active Transportation Corridor (Figure 3-11).

STAKEHOLDER INPUT In addition to the many proposed bicycle facilities depicted from the different local and regional agencies, stakeholders shared with the project team their priorities in terms of bicycle mobility needs, challenges, and desires around CO 52. In the western portion of the corridor, Boulder County expressed interest in having a trail along CO 52 or bikeable shoulders that could connect to the LOBO underpass. Multimodal access for different types of cyclists (not only the risk tolerant) and safety are of high importance for Boulder County. Where there is no available space for the trail within the current configuration, Boulder County suggested shifting the roadway to create space for a trail. If there is no available space for the trail within the current configuration, shifting the roadway within the right-of-way to create space for the trail should be explored. Important bicycle access points to be considered include the IBM campus west of CO 119. IBM is a large employer, the location of the future BRT stop at CO 119 and the planned CO 119 shared use path.

Stakeholders from Erie, Dacono, and Frederick expressed their desire for improved bicycle mobility along and across CO 52 as the corridor develops. Frederick indicated that multi-use paths are proposed outside of CDOT's right-of-way, which encroaches on small lots and results in fewer driveway access points. Erie noted that the segment of the corridor west of I-25 is highly used by bicyclists and traffic congestion creates a safety concern. Dacono highlighted the crossings at Colorado Boulevard and Glenn Creighton Drive/Frederick Way as important multimodal crossings that can be improved to provide a safer crossing for residents and kids wanting to access community amenities and services such as schools, the recreation center and retail establishments.

In the eastern segment of the corridor, CO 52 intersects Fort Lupton and Hudson, and is proximate to Keenesburg resulting in a desire for improved crossings that connect existing trails and community amenities. In Fort Lupton there is a desire for several crossings of CO 52 including a crossing near the recreation center at Harrison Avenue to connect the trails and parks on both sides of CO 52, and a crossing near the river that would serve a proposed trail in the City's long-term plan. Hudson would like improved crossings along the corridor as housing is on the south side of the corridor while shops and recreation are on the north. Beach Street is a high priority intersection for Hudson. Keenesburg noted that no available shoulders or bicycle facilities exist within this stretch of corridor, which coupled with high speed traffic create a safety concern for bicyclists. Even though no specific plans currently exist, Keenesburg would like to eventually connect with trails all the way south to Denver.



NEEDS

CO 52 is a critical link for regional east-west bicycle connectivity because of its continuity. The corridor serves as an essential connection between many communities located north and south of the corridor. Because the context throughout the corridor varies significantly, the needs for the corridor can be categorized both as overall corridor needs, and as specific needs for the western, central and eastern areas of the corridor.



Overall Corridor Needs

- Improve bicycle mobility because there are no other existing or proposed parallel bicycle routes that connect the CO 52 communities
- Improve the existing gaps in the shoulders near major intersections
- Upgrade the existing infrastructure and operations to improve level of comfort for cyclists
- Supplement the bicycle network by implementing proposed regional trails along CO 52
- Improve crossings of CO 52 as development starts to occur along the corridor

West Area Needs

- Explore shifting CO 52 to the north or south to provide a shared use trail parallel to the corridor
- Consider bicycle crossing enhancements at CO 119 and 95th Street (and other important multimodal nodes) since both roadways are designated proposed Regional Active Transportation Corridors by DRCOG
- Provide a continuous and safe bicycle facility on CO 52 through the I-25 interchange area

Central Area Needs

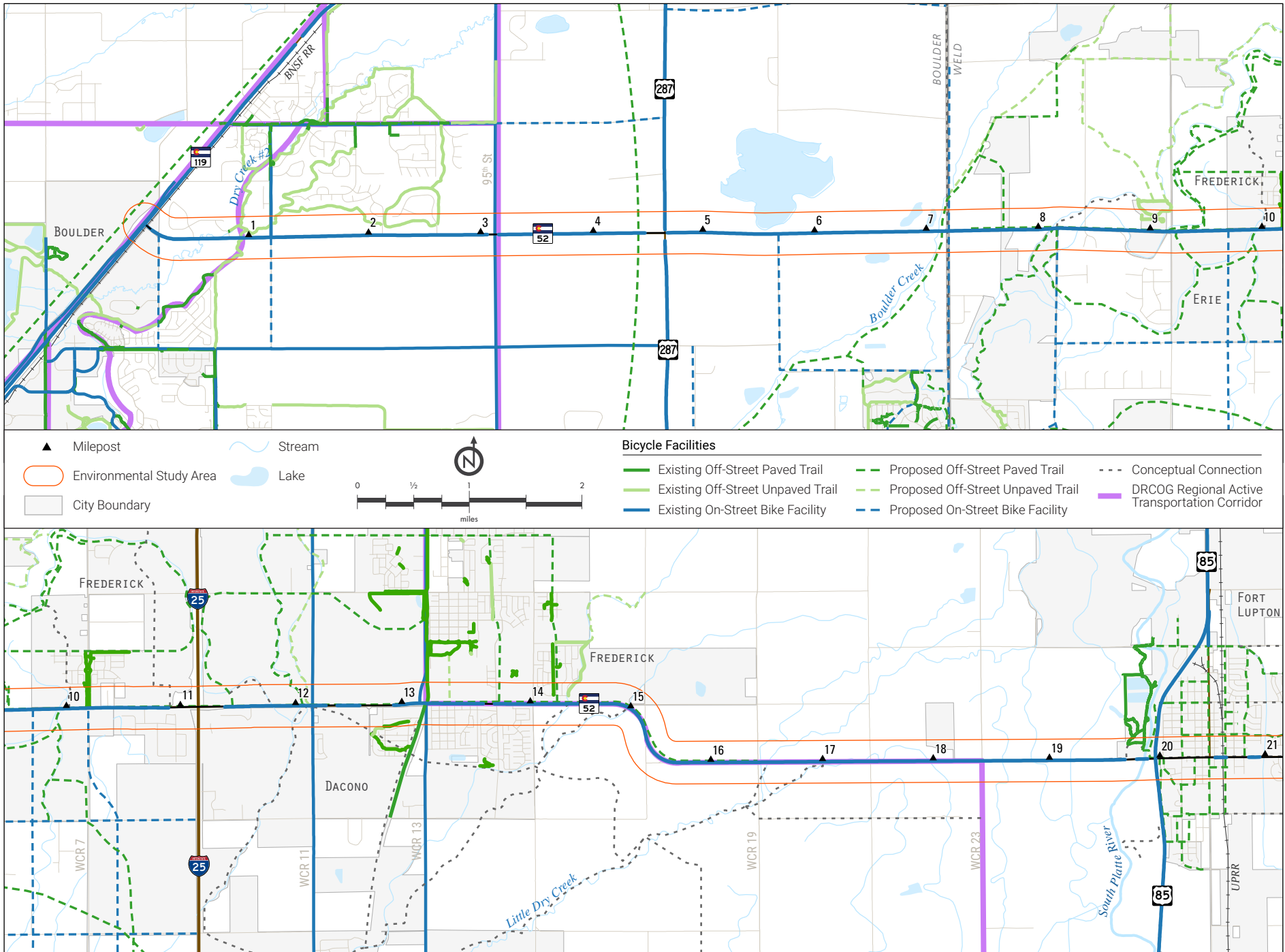
- Consider the proposed regional trails and bicycle routes near the municipalities of Erie, Frederick, and Dacono, with special consideration for the crossings of CO 52
- Consider the proposed Regional Active Transportation Corridor (85-25 Trail/Front Range Trail) that travels from the south along WCR 23, to the west along CO 52, and connects with the existing Firestone Trail
- Consider a connection along the corridor from Fort Lupton to the 85-25 Trail/Front Range Trail
- Improve connections across CO 52 between Dacono and Frederick and within Fort Lupton that serve community amenities such as schools, recreation centers, trails, and retail establishment

East Area Needs

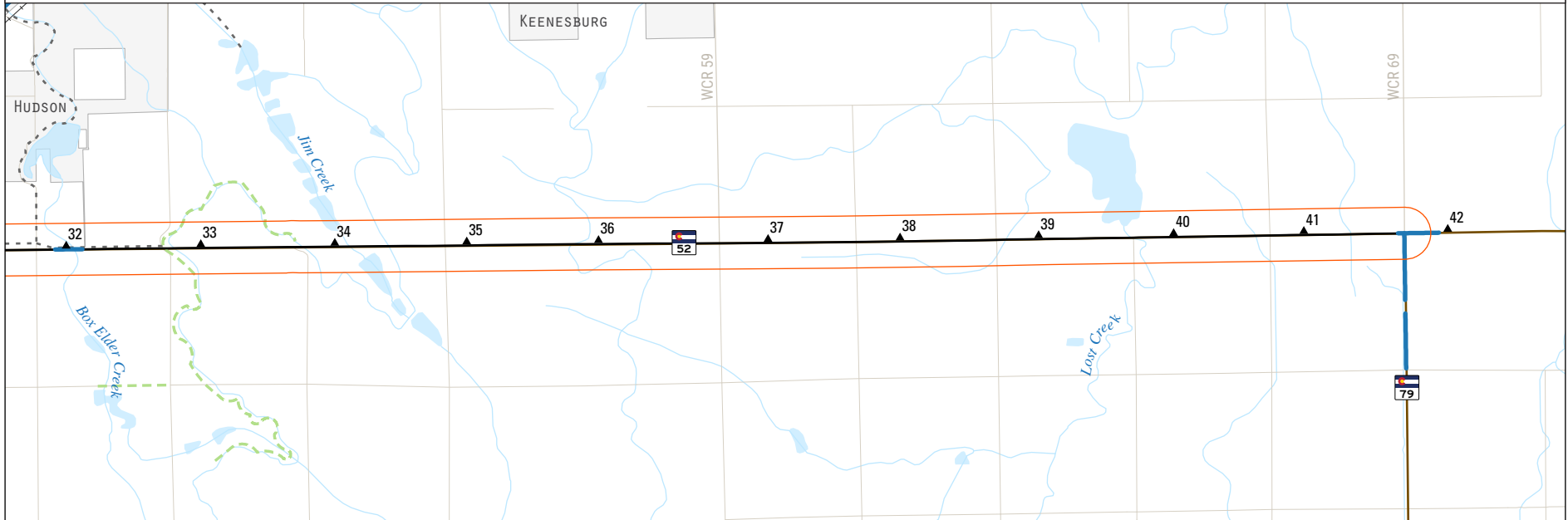
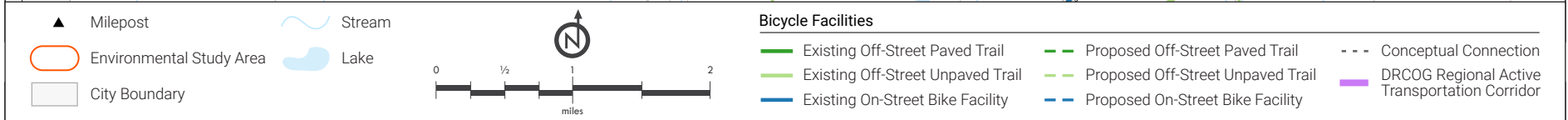
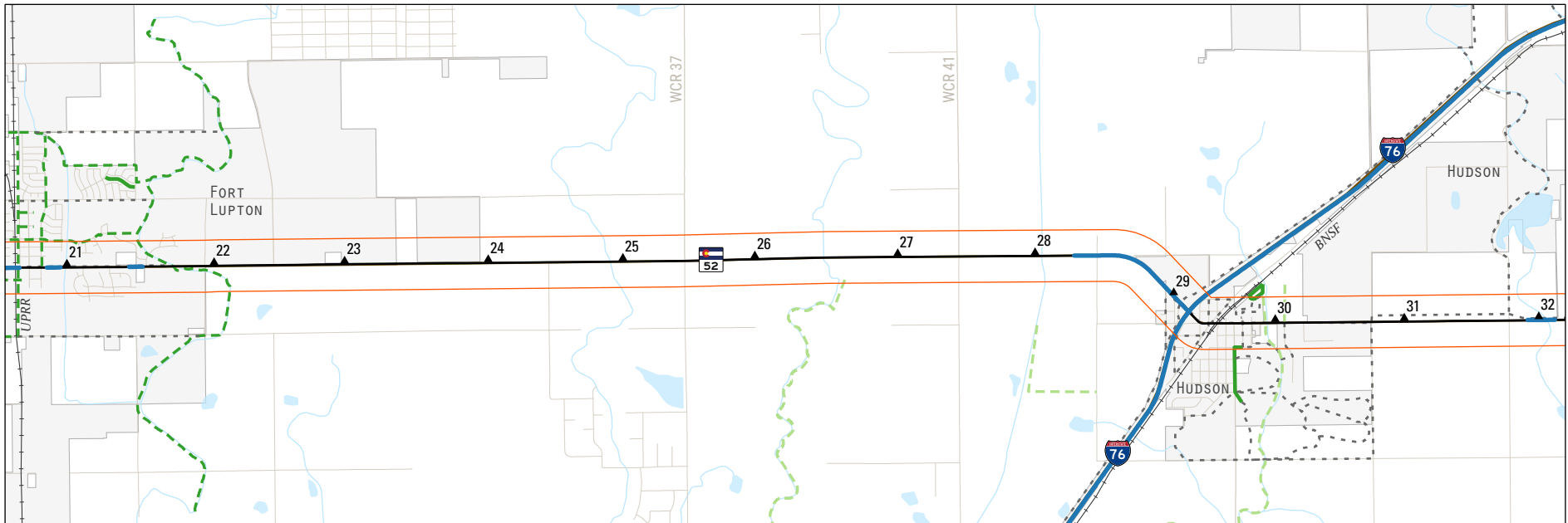
- Improve crossings within Hudson where CO 52 intersects the street grid and is a barrier for north-south mobility
- Provide bicycle safety enhancements east of Hudson

BICYCLE FACILITIES

Figure 3-11 Bicycle Facilities

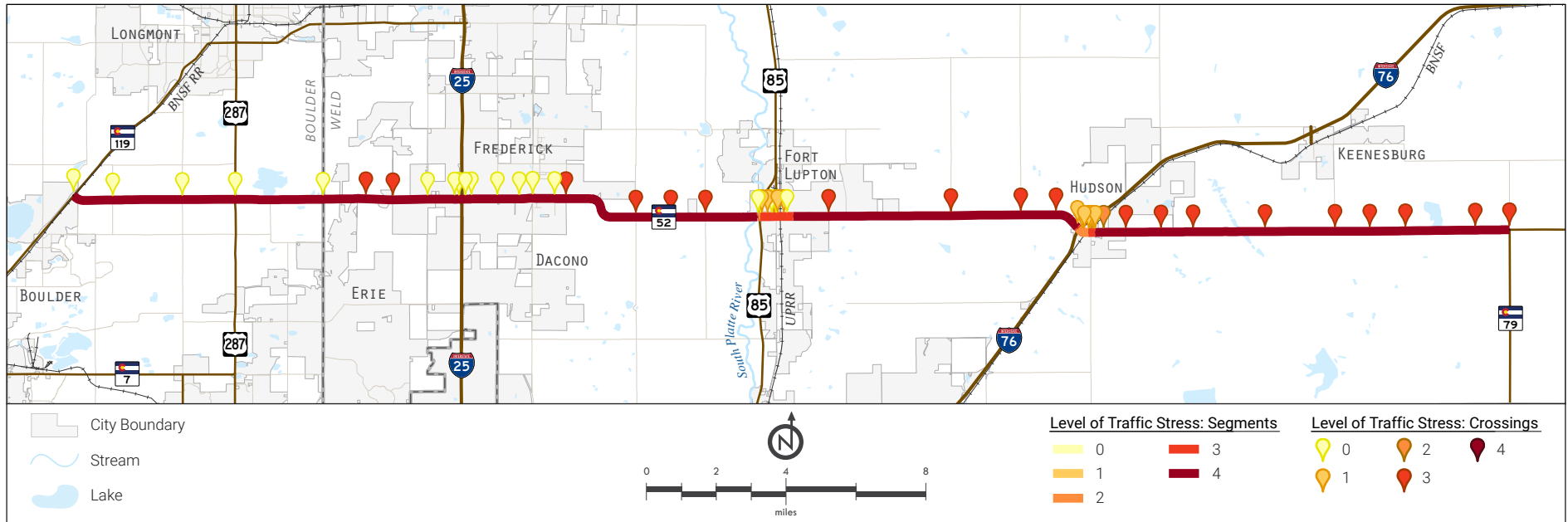


BICYCLE FACILITIES



BICYCLE FACILITIES

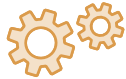
Figure 3-12 Level of Traffic Stress (LTS) Analysis



3.7 Pedestrian Facilities and Operations

This assessment analyzed existing and proposed pedestrian facilities and operations along the corridor. Since pedestrian conditions vary widely and are concentrated in few locations, the analysis divided the corridor into three areas.

- **West Area:** CO 119 to County Line Road within Boulder County
- **Central Area:** County Line Road to WCR 37 within Weld County
- **East Area:** WCR 37 to CO 79 within Weld County



METHODOLOGY

The analysis included a desktop review of plans, online resources, and available GIS data from local and regional agencies. The GIS data from agencies along the corridor was standardized for consistent representation. In addition to the review of data, information provided during stakeholder interviews were synthesized as applicable. See *Appendix B: Supporting Documentation* for a detailed methodology and process for the GIS data.

PEDESTRIAN TRAILS *Figure 3-13* shows the existing and proposed pedestrian facilities proximate to CO 52. Pedestrian facilities are categorized as paved and unpaved trails and sidewalks. Currently, few pedestrian facilities exist along or across the corridor since most of the corridor is adjacent to undeveloped land. The pedestrian facilities that do exist are mostly located within the municipalities adjacent to the corridor. There are several planned regional trails that are expected to support pedestrian travel across and along the corridor. DRCOG's Regional Active Transportation Plan (DRCOG, 2019) highlights CO 119, LOBO Trail, 95th Street and a proposed trail from WCR 23 to Firestone Trail.

PHYSICAL CONDITIONS The few pedestrian facilities that cross or run parallel to CO 52 are located within Dacono, Frederick, Fort Lupton, and Hudson. Since most of the corridor is adjacent to undeveloped land, current pedestrian needs are located within those municipalities. Even though some pedestrian facilities exist, the quality of those facilities impacts the overall pedestrian experience. Narrow sidewalk widths adjacent to travel lanes and few controlled pedestrian crossings make it difficult for safe and comfortable pedestrian travel along and across the corridor.

OPERATIONAL AND USE CONDITIONS Pedestrian travel is limited to the municipalities of Dacono, Frederick, Fort Lupton, and Hudson. Pedestrian travel in these towns is generated by schools, parks, and commercial use. Some schools and community resources near CO 52 include Thunder Valley K-8 and Carbon Valley Parks and Recreation District within Frederick. Within Fort Lupton, Fort Lupton Middle School, Butler Elementary, and Community Center Park and Recreation Center are close to the corridor. Many students must cross CO 52 from the residential area on the north to the schools on the south side of CO 52. In Hudson, Hudson Elementary is located south of the corridor and Hudson Memorial Park is located to the north. In addition, most of the residential area is south of CO 52 while commercial uses

are located north of the corridor, generating many pedestrian crossings in this segment. Outside of these municipalities, additional pedestrian use mostly occurs along recreational trails such as the LOBO Trail and Firestone Trail.

PROPOSED CONDITIONS Within Fort Lupton and Hudson, proposed improvements include trails and crossings that connect both sides of CO 52 as well as improve pedestrian travel along the corridor. There are several other proposed recreation trails within Dacono, Erie and Frederick that will need to cross CO 52 when constructed.



Looking northwest at pedestrian bridge over South Platte River in Fort Lupton

STAKEHOLDER INPUT Specific to the west end of the corridor, Boulder County expressed interest in a multiuse trail along CO 52 that connects to the LOBO underpass of CO 52. If there is no available space for the trail within the current configuration, shifting the roadway north or south within the available right-of-way to create space for the trail should be explored. Important pedestrian access points to be considered include the IBM campus. IBM is a large employer, the location of future BRT stop at CO 119, and the location of the planned CO 119 shared use path.

In the central area of the corridor stakeholders from Dacono mentioned the need to improve crossings of CO 52 for kids to safely access amenities including community recreation centers and schools. Stakeholders specifically mentioned the intersection of Glenn Creighton Drive/Frederick Way as a good location for a pedestrian crossing because of the nearby K-8 and middle school. In addition, stakeholders mention access to retail is very important for residents without vehicles.

Regarding the eastern portion of the corridor, stakeholders from Fort Lupton mentioned their desire for safer school crossings at the Fulton Avenue intersection. In addition, stakeholders identified a need for a controlled crossing at Harrison Avenue to improve safety and access to the Fort Lupton Recreation Center, thereby connecting trails and parks on both sides of CO 52. Proximity of Harrison Avenue to the nearby signal at Rollie Avenue makes the addition of a controlled crossing difficult. In Hudson, stakeholders mentioned the need to improve the crossing of CO 52 because most of the housing is located on the south side and the shops and recreation are on the north side.



NEEDS

Overall Corridor Needs

- Improve safety and comfort level of existing pedestrian facilities by expanding the sidewalk network, increasing sidewalk width, and separating sidewalks from the roadway
- Install controlled pedestrian crossings where demand exists and physical conditions allow

West Area Needs

- Explore shifting CO 52 to the north or south to create a shared use path parallel to the corridor that is within the available right-of-way

Central Area Needs

- Provide connections to planned regional and local trails within Dacono, Frederick and Erie

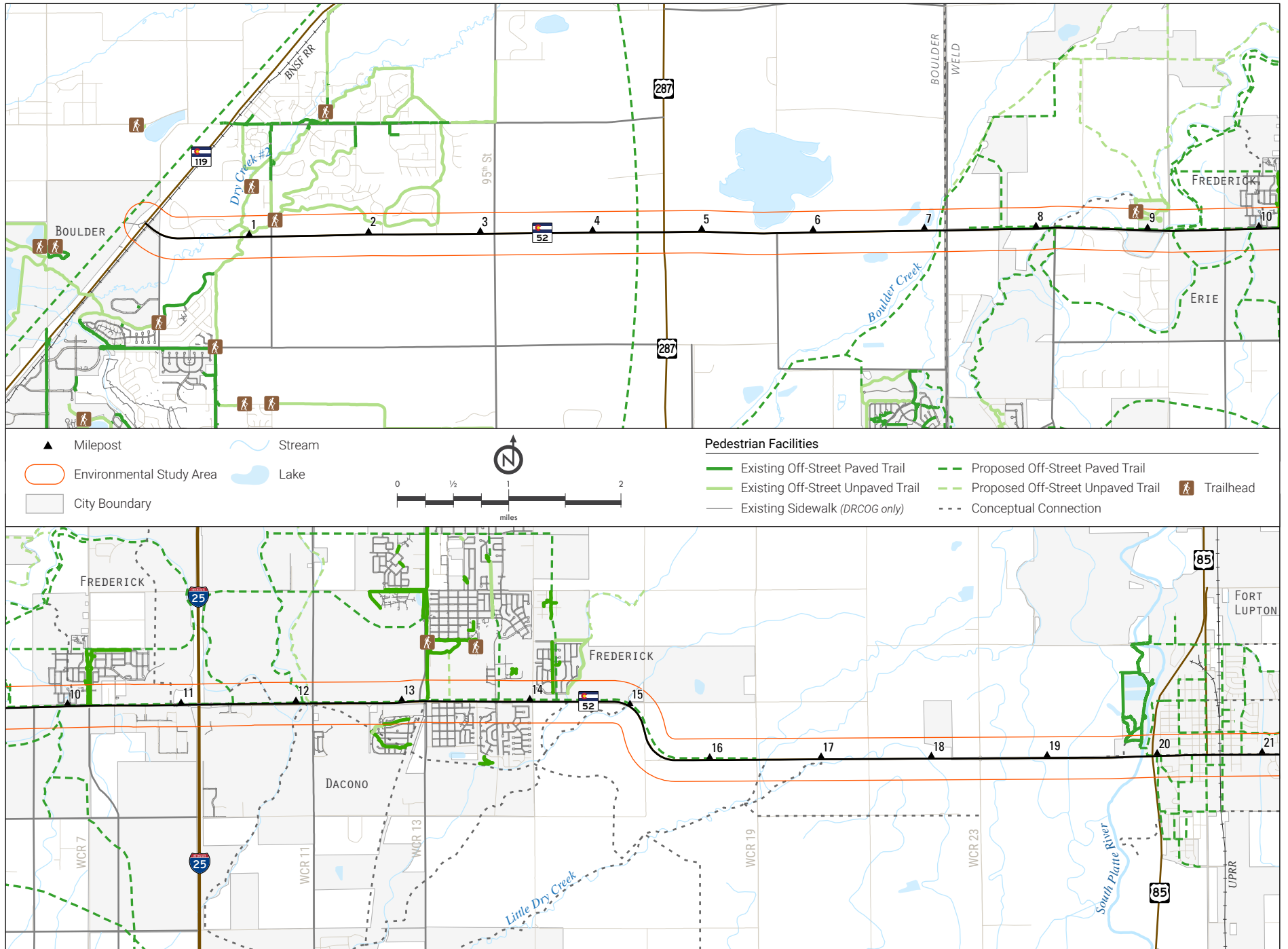
East Area Needs

- Improve crossings of CO 52 within Fort Lupton and Hudson, especially near the schools and parks
- Implement proposed trail network within Fort Lupton and Hudson, including the crossings of CO 52

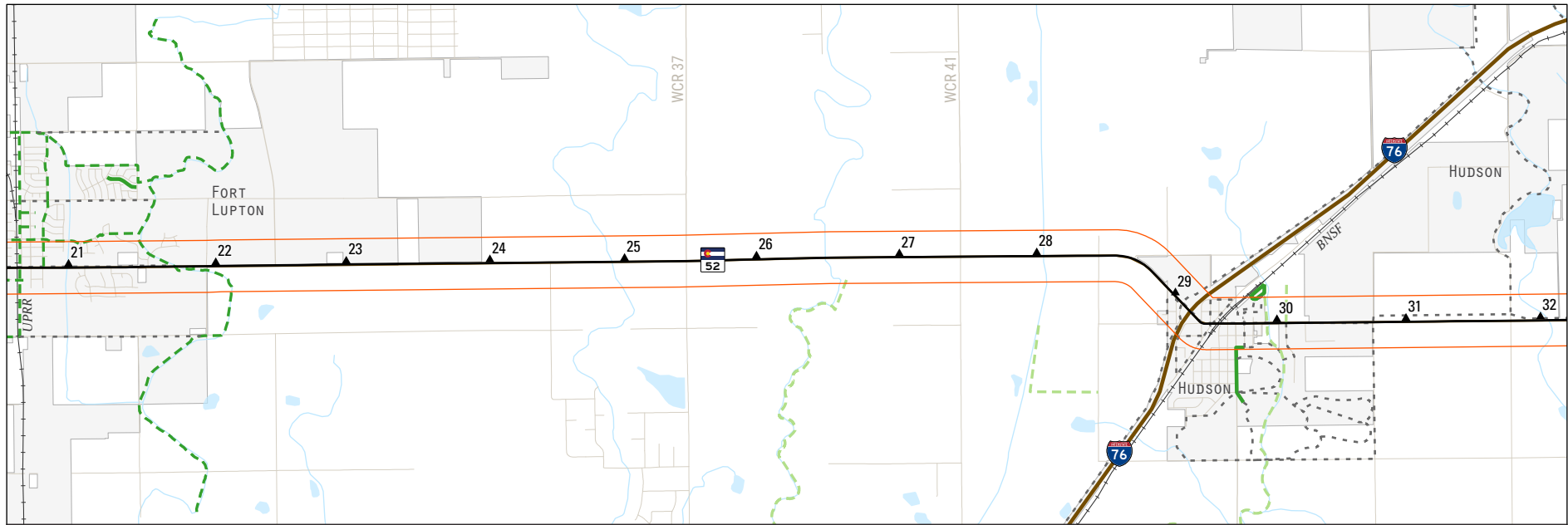


Looking east at the corner of Grand and CO 52 in Fort Lupton

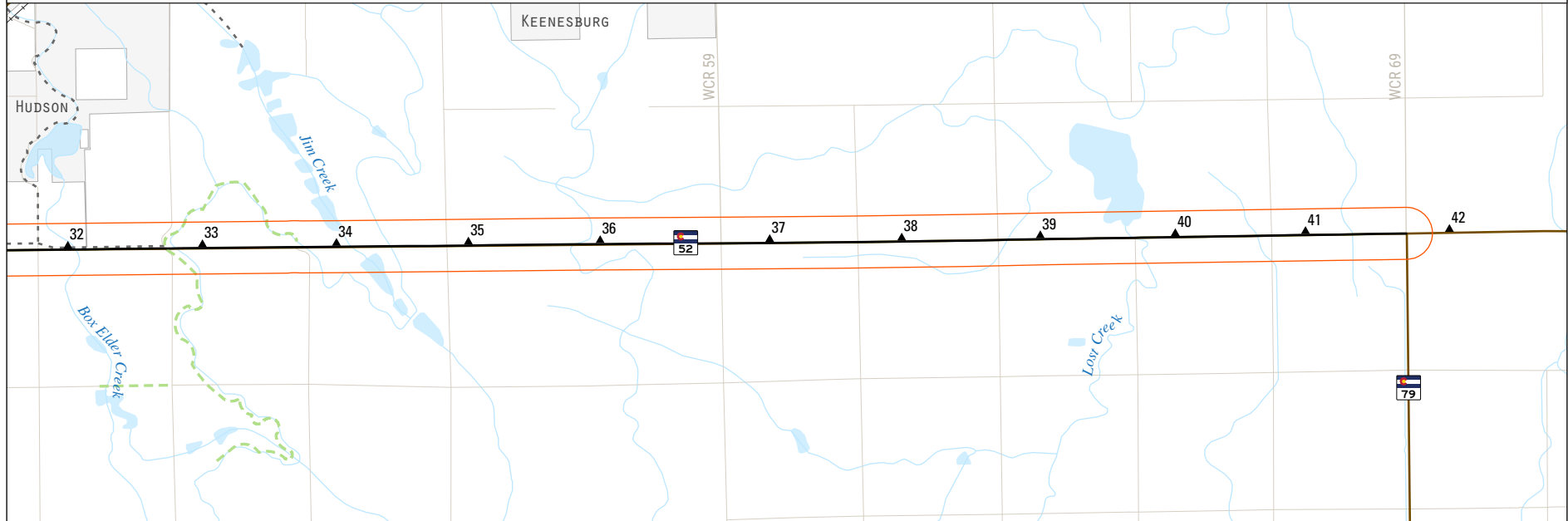
Figure 3-13 Pedestrian Facilities



PEDESTRIAN FACILITIES



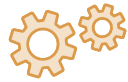
▲ Milepost	Stream	 0 1/2 1 2 miles	Pedestrian Facilities	
○ Environmental Study Area	Lake		— Existing Off-Street Paved Trail	— Proposed Off-Street Paved Trail
□ City Boundary			— Existing Off-Street Unpaved Trail	— Proposed Off-Street Unpaved Trail
			— Existing Sidewalk (DRCOG only)	Trailhead
			- - - Conceptual Connection	



PEDESTRIAN FACILITIES

3.8 Transit

This section summarizes the existing and planned transit network in the study area.



METHODOLOGY

Transit resources from CDOT and the Regional Transportation District (RTD) were reviewed to obtain information about fixed-route transit services serving the corridor. These included bus schedules, route information and planning documents. In addition, RTD and CDOT ridership data and transit service information was requested directly from the agencies.

RTD FIXED ROUTE SERVICE OVERVIEW operates four regional bus routes that intersect CO 52 and demand-response transit within the study area. RTD defines regional routes as fixed routes that are primarily along a state highway or freeway.

The RTD BOLT and Route J are regional bus routes from Boulder to Longmont providing service along CO 119. BOLT operates seven days per week, while Route J operates only on weekdays. There is a northbound and southbound stop for these routes at CO 52 and CO 119 (RTD, 2020a).

The RTD regional routes LD1/LD2/LD3 operate along US 287, providing regular service between Longmont and Denver and Longmont and Broomfield, respectively. These routes have a stop at the intersection of US 287 and CO 52. LD1/LD2/LD3 routes provide service along US 287 Monday through Saturday (RTD, 2020b).

The Longmont Regional Express includes RTD regional routes LX1/LX2, a weekday express service from Longmont to Denver (RTD, 2020b).

More information about RTD transit service frequency and service hours is displayed in *Table 3.10* Transit Service Summary.

CDOT SERVICE OVERVIEW CDOT provides regional Bustang bus service between Fort Collins and Denver along I- 25 on the North Line. The bus provides eight daily trips northbound and southbound focused on regular commuting hours. Bustang currently does not stop within the study area; the closest stop to CO 52 is the Loveland/Greeley Park and Ride at US 34. More information about CDOT Bustang transit service frequency and service hours is displayed in *Table 3.10*.

DEMAND-RESPONSE TRANSIT OVERVIEW RTD demand-response service, Access-a-Ride is provided along Routes BOLT and LD. Access-a-Ride is a shared-ride service intended for those who cannot use regular fixed-route bus/light rail service due to a disability. Service is available within 3/4-mile of either route at both CO 52/CO 119 and at CO 52/US 287 during the hours those routes operate (pers. comm. Doug Monroe, RTD).

Other non-RTD demand-response services are available in the study area. Non-Emergent Medical Transportation (NEMT) provides transportation to and from covered non-emergency medical appointments or services. NEMT available to Medicaid members

in Weld and Boulder counties who do not have other transportation options (Thrive Center, 2020). Via Mobility Services is a paratransit service primarily serving people in Boulder County over age 60 and those with disabilities (Boulder County, 2016). Numerous nonprofits operate in Weld and Boulder counties providing various types of demand-response services (Weld County, 2020).

Table 3.10 Transit Service – Existing Conditions Summary

ROUTE	WEEKDAY		WEEKEND	
	FREQ.	SERVICE HOURS	FREQ.	SERVICE HOURS
Bustang N Line	16 daily trips	5 am – 9 pm	1-2 daily trips	7 am – 8 pm
RTD BOLT	60 min	4:30 am – 1:30 am	60 min	6 am – 1:30 am on Saturday, 6 am – 12:30 am on Sundays and holidays
RTD LD/LD1/LD3	120 min	5 am - midnight	120 min	9:30 am – midnight on Saturday No service on Sundays

Sources: CDOT, 2020d; RTD 2020a; RTD, 2020b

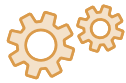


NEEDS

The results indicate that one regional bus route is partially located along the CO 52 corridor between I-25 and US 287, and several other bus routes intersect the corridor. The Alternatives Analysis should consider automobile, pedestrian, and bicycle connections and access to bus stops on and adjacent to the corridor. The Alternatives Analysis should also assess if there is ridership demand for a future east-west bus route in the western third of the corridor.

3.9 Freight Rail

The project corridor includes three active railroad track segments that cross CO 52 (shown on *Figure 3-14*). Two of the railroads are owned by Burlington Northern Santa Fe Railway (BNSF) and one is owned by Union Pacific Railroad (UP). Three abandoned rail lines traverse the project, including one that is a paved trail and runs parallel to Colorado Boulevard, one near County Line Road, and one parallel to WCR 67 and WCR 10.



METHODOLOGY

Information regarding existing railroad crossings was obtained from the Federal Railroad Administration (FRA) website via U.S. DOT Crossing Inventory and Accident Report forms. Field observation of existing crossing features (crossing material, roadway width, and existing advance warning signing/stripping) serve to inform existing conditions from which potential improvements are determined.

RAIL CROSSINGS *Table 3.11* shows the detailed location and approximate number of trains per day for each active crossing. The west crossing, operated by BNSF, is in Boulder County, passing through Niwot. This track runs approximately six trains per day (2019 data) and crosses three lanes of traffic on CO 52. This crossing is at-grade, equipped with active signalization in addition to flashers and gates, and has pavement marking stop lines and railroad crossing symbols. The most recent crash for this track was in 1995. There were a total of five crashes between 1989 and 1995 on this track, no injuries were reported.

The central crossing, operated by UP, is in Weld County, passing through the City of Fort Lupton. This track runs approximately ten trains per day (2017 data) and crosses two lanes of traffic on CO 52. This crossing is at-grade, equipped with active signalization in addition to flashers and gates, and has pavement marking stop lines and railroad crossing symbols. The most recent crash for this track was in 1995. There were a total of three crashes between 1976 and 1995 on this track, no injuries were reported.

The east crossing, operated by BNSF, is in Weld County, passing through the Town of Hudson. There are three tracks at this location, which run approximately 18 trains per day (2019 data), and cross two lanes of traffic on CO 52. These crossings are at-grade, equipped with active signalization in addition to flashers and gates, and have pavement marking stop lines and railroad crossing symbols. The most recent crash at this location occurred in January of 2019, involving a passenger vehicle and a train no injuries were reported. There were a total of nine crashes between 1977 and 2008, no injuries were reported; however, there have been three pedestrian fatalities at this location, which occurred in 2005 and 2006. Since then, the pedestrian crossing was improved by adding a new sidewalk crossing along the south side of CO 52, active signalization (flashers and bells) adjacent to the sidewalk, and advance warning signs.

BNSF Railroad Projects

As part of the CO 52 and I-76 interchange improvements, BNSF and CDOT are teaming up to improve the current BNSF crossing just east of the interchange. Tracks at this location were uneven due to soft substrate issues. Construction for the interchange improvements are underway and anticipated to be completed by fall of 2021.



In addition to the track updates at CO 52, BNSF is building a Logistics Center Hudson at I-76 and CR 49, just north of the CO 52 corridor. The Logistics Center Hudson is a 430-acre facility featuring 15 sites for customers who wish to ship via individual railcars and a unit train site for customers who ship entire trainloads. The development is designed to help customers more easily reach Denver and surrounding markets via new rail-served sites.

Image: Looking north at the future BNSF Logistics Center in Northeast of Hudson, CO



NEEDS

Coordination efforts with the railroads, Public Utilities Commission (PUC) and other potential stakeholders with regulatory authority should be considered in a project timeline to implement improvements at these locations. An approved PUC Application and executed C&M Agreement is required for construction at each of the affected at-grade crossings. Both railroads require a Preliminary Engineering agreement, with an associated fee to support their engagement with the project.

PUC application and approval can be a long-lead process: railroads should be engaged early to work in partnership towards an uncontested PUC application. After final design and agreements are executed an uncontested PUC application can take 3-4 months for approval. Should conditions of support be considered not feasible, a contested PUC application can take up to a year for approval but remaining design and agreements would still need to be executed after the PUC application is approved.

CO 52 right-of-way in the area adjacent to BNSF and UP right-of-way should be determined at the concept level to determine if encroachment for roadway corridor improvements is needed. Abandoned lines, even if converted to trails for alternative uses, may require coordination with the PUC.

FREIGHT RAIL

Figure 3-14 Railroad Crossings

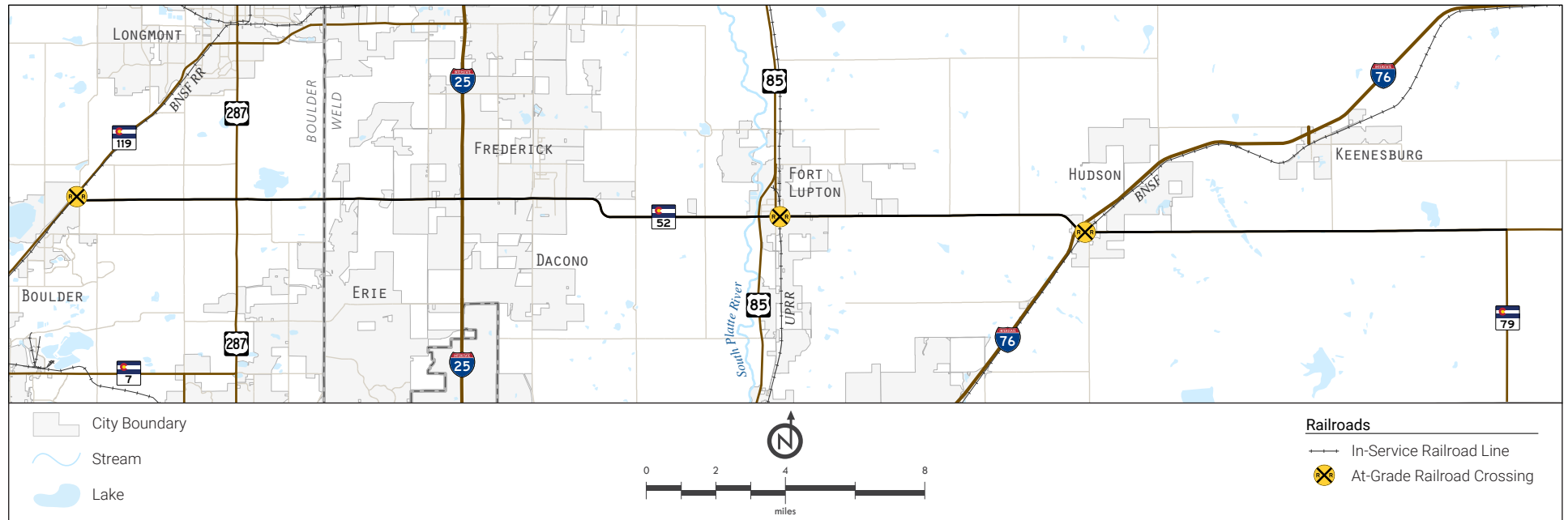


Table 3.11 Railroad Crossing Data

CROSSING NAME	CITY/TOWN	DOT #	PUBLIC/PRIVATE	RAILROAD	MILEPOST	MAX. TRAIN SPEED (MPH)	# OF TRACKS	APPROX. TRAINS/DAY	ROAD LINES	SIDEWALK	CROSSING DESCRIPTION	NOTES
West Crossing	Niwot	244831K	Public	BNSF	36.679	49	1	6 (2019)	4	No	Active Signalization (Gates/Flashers)	56' Wide Crossing
Central Crossing	Fort Lupton	804463V	Public	UP	25.51	50	1	10 (2017)	2	2	Active Signalization (Gates/Flashers)	56' Wide Crossing
East Crossing	Hudson	057209F	Public	BNSP	512.981	79	3	18 (2019)	2	1	Active Signalization (Gates/Flashers)	40' Wide Crossing (Main/Siding/Yard)

Trains per day come from latest FRA Train counts. This is the best available information but not completely accurate as conditions for train traffic can change depending on time of year and day of the week. Source: Federal Railroad Administration, 2020

3.10 Motor Vehicle Freight

The Upper Front Range 2045 Regional Transportation Plan (CDOT, 2020e) labeled CO 52 as a freight corridor in Colorado. CO 52 has been identified as a route that facilitates the movement of critical goods, such as farm-to-market products and oil and gas. Approximately 35-miles of CO 52 within the project corridor is located in Weld County. According to the Weld County website, it is nationally ranked for its animal products, and is Colorado's leading producer of beef cattle, grain, sugar beets, and dairy products. In addition, 88 percent of crude oil production and 40 percent of natural gas production in Colorado comes from Weld County. As such, transportation of goods requires a substantial amount of heavy and oversized vehicles.



METHODOLOGY

Motor vehicle freight data was gathered from CDOT's OTIS website and through conversation with CDOT's Commercial Vehicles Operations Manager for Oversize/Overweight Permits.

FREIGHT EXISTING CONDITIONS Truck percentages fluctuate along the CO 52 corridor as shown in *Table 3.12*. On average, trucks as a percentage of total traffic in the corridor range from about 3 to 20 percent. The west end of the corridor has lower truck percentages of between 3 and 5 percent, primarily due to a much higher percentage of commuter traffic and fewer freight destinations towards the west. The percent of trucks in the central part of the corridor ranges from 6 and 10 percent, with many of those trucks utilizing I-25 and US 85 to access CO 52. The east end of the corridor, from the Town of Hudson to CO 79, carries roughly 14 to 20 percent of trucks relative to the overall corridor traffic.

Designated Hazmat and Oversized Truck Route

CO 52 within the study area is designated as a hazardous materials and oversize vehicle route from CO 119 to CO 79 (CDOT 2017; CDOT, 2018a). Roughly 80 percent of hazardous material cargo are petroleum trucks serving the oil and gas industry and its commercial delivery. Shipment of wind turbine blades from the Windsor and Greeley area are among the cargo types of oversize freight trucks. The corridor provides an east-west freight route for the northern Denver metropolitan area that has relatively few horizontal or vertical clearance restrictions. The only overpass above CO 52 within the study area is located at US 85 with a vertical clearance of 16'-10", which is tall enough for many oversized vehicles. In contrast, Interstates 67, 70, and 25 and US 36 all have restricted bridge heights ranging from 14'-7" to 16'-0". In June 2020, the Project Team met with CDOT's Oversize/Overweight (OS/OW) permits section and learned there is limited data on the amount of hazardous and oversize trucks (CDOT Permit Office, Pers. Comm. 2020). Single-use and annual use permits are issued to motor carriers. The number of single use permits is approximately 4,000 per year; the number of trips exercised under annual use permits is not recorded.

Table 3.12 Percent Truck Trips of Total Vehicle Volume

LOCATION	TRUCK %* 2018
CO 119 to 95th Street	2.8
95th Street to US 287	3.9
US 287 to County Line Road	5.0
County Line Road to I-25	5.9
I-25 to Colorado Boulevard	6.5
Colorado Boulevard to Ridgeway Boulevard	7.8
Ridgeway Boulevard to WCR 19	10.0
WCR 19 to US 85	10.0
US 85 to Rollie Ave	7.4
Rollie Ave to WCR 31	6.4
WCR 31 to WCR 37	6.4
WCR 37 to I-76	13.6
I-76 to WCR 49	13.6
WCR 49 to WCR 59	13.6
WCR 59 to CO 79	19.0

*The most recent year of truck percentage data in the CDOT OTIS database is 2018. Source: CDOT, 2020a



NEEDS

CO 52 plays a crucial role in moving motor vehicle freight across north central Colorado. Improvements to the corridor should ensure that freight mobility is maintained in a safe and efficient manner. Intersections, turning paths, lane widths and shoulders should be designed to accommodate the frequent movement of semi-tractor trailer trucks. Furthermore, CO 52 plays a unique role in the movement of oversized vehicles due to restricted bridge heights on alternative freight routes such as I-76, I-70, I-25 and US 36. Any future overpass improvements such as bridges or overhead sign structures should be designed to a minimum vertical clearance of 17'-0". Specialty trucks used for hauling wind turbine blades are also common in the corridor and should be accommodated by future corridor improvements.

VEHICLE FREIGHT

3.11 Structures

Existing Structure Inspection and Inventory Reports were reviewed for all major structures.



METHODOLOGY

Structure reports provide sufficiency ratings, condition/function status, and documented roadway widths. While this information was available for the major structures, no such reports are available for the minor structures. A site assessment of all structures was conducted, but no formal inspection was completed. Formal inspections are recommended for any minor structures that are anticipated to be repaired, rehabilitated, or widened as part of a future project – these inspections should occur during the preliminary design phase of project development.

CORRIDOR STRUCTURES Along the 41.6-miles of CO 52, there are 51 bridge structures. 22 of these structures are classified as major structures, or structures which have a span length greater than 20'. Major and minor structures are shown in *Appendix A: Roadway Characteristics Map*. Of these 22 major structures, 21 carry CO 52 over a crossing feature, while 1 major bridge carries US Highway 85 over CO 52 near Fort Lupton. The remaining 29 bridges are classified as minor structures, or structures which have a maximum span length of less than 20', but greater than 4'. These minor structures all carry CO 52 over crossing features such as small streams, irrigation ditches or drainage crossings. Throughout the corridor, the structures varied in both classification of major and minor and types of structures utilized. Structure types included reinforced concrete box and pipe culverts, corrugated metal pipes (CMP), timber bridges, and both concrete and steel girder bridges (*Table 3.13*).



Structure D-16-DS over Boulder Creek

Planning for Resiliency

A PEL can facilitate transportation decision-making that considers environmental, community, and economic goals early in the planning stage and carry them through project development, design, and construction. During this early planning process, natural threats to the corridor can also be identified.

Of the 22 major structures, 3 of them cross significant water features. At milepost 7.19, major structure D-16-DS carries CO 52 over Boulder Creek. During the floods in 2013, this bridge was affected by scour, which was compounded during another major flood in 2015. Repairs including the addition of riprap along the channel have been completed and documented in the most recent Bridge Inspection Report from 2019. Any future work planned on this bridge shall consider resiliency and scour mitigation.

Projects that are identified early in the planning process have the opportunity to include resiliency measures as they move into NEPA and design. Resiliency measures will provide the surrounding community the ability to rebound and adapt to changing conditions. The additional investment to ensure resiliency will support system longevity.



Looking west at box culvert conveyance in Boulder County



NEEDS

A common trend throughout the corridor was the absence of guardrails at many of the structures. This concern is identified for numerous major bridges in the *Structure Summary Table 3.13*. A complete list of all major and minor structures is included in *Appendix B: Supporting Documentation*. Minor structure number 052A016420BR, at milepost 16.4, is of particular concern. This minor structure is located very close to the intersection of CO 52 and WCR 19. During the field visit, trucks and cars were turning from westbound CO 52 to northbound WCR 19 and driving onto one of the culvert's headwalls creating a very dangerous situation for the drivers, and potential harm to the structure itself.

STRUCTURES

Table 3.13 Major Structure Summary

MILEPOST REFERENCE	STRUCTURE ID	FEATURE CROSSED	SUFFICIENCY RATING	ROADWAY SECTION/ AVAILABLE WIDTH (FT)*	SUPPLEMENTARY FIELD OBSERVATIONS
1.20	D-16-Y	Boulder & White Rock Ditch	82.3	104.00	Headwalls are very close to barrier/road edge
7.19	D-16-DS	Boulder Creek	92.8	96.17	No significant defects
8.39	D-16-Q	Lower Boulder Canal	94.8	88.00	No significant defects, no existing barrier
8.79	8.79	Lower Boulder Canal	94.8	50.40	No barrier, and headwall close to roadway
9.58	D-16-X	Lower Boulder Canal	82.3	103.00	No significant defects, no existing guardrail
11.17	D-17-AP	I-25	95.4	94.50	No significant defects
11.79	D-17-CU	Lower Boulder Canal	91.3	46.10	No significant defects, no existing guardrail
12.19	D-17-AV	Sullivan Canal	75.1	102.60	No significant defects, no existing guardrail
16.50	D-17-BU	Little Dry Creek	69.2	34.00	No significant deterioration
18.85	D-17-H	Canal	95.7	46.00	No significant defects, no existing guardrail
19.58	D-17-BH	S. Platte River Overflow	95.7	50.00	No significant defects, no existing guardrail
19.87	D-17-I	Sout Platte River	76.1	34.00	No significant deterioration
19.96	D-17-DE	CO 52 (US 85 goes over)	100	88.50	No significant deterioration
21.75	D-17-F	Fulton Ditch	96.6	46.00	No significant defects, no existing guardrail
24.90	D-18-BM	Speer Canal	90.1	46.40	No significant deterioration
28.05	D-18-B_Minor	Beebe Canal	93.9	46.50	No significant deterioration
29.27	D-18-BR	I-76	97.6	63.00	No significant deterioration
32.15	D-18-BD	Box Elder Creek	99.6	52.00	No significant deterioration
32.83	D-18-B	Denver Hudson Canal	51.7	31.00	No significant deterioration
33.80	D-18-C	Denver Hudson Canal	73.8	32.00	No significant deterioration
33.80	D-18-A	Denver Hudson Canal	90.0	31.00	No significant deterioration
35.95	D-18-AX	Minor Waterway	78.6	32.00	No significant deterioration

*Width measurement taken from the existing Structure Inspection and Inventory Report

Note: A complete list of major and minor structure can be found in *Appendix B: Supporting Documentation*

Source: CDOT, 2020a

3.12 Transportation Context References

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04

ENVIRONMENTAL OVERVIEW

4.0 Introduction

This chapter summarizes existing environmental conditions of the CO 52 corridor. The environmental resources studied were selected based on the characteristics of the Environmental Study Area and input from stakeholders, Colorado Department of Transportation (CDOT), and Federal Highway Administration (FHWA). The resources considered generally are consistent with the National Environmental Protection Act (NEPA), its implementing regulations, and CDOT and FHWA guidelines.

4.1 Floodplains and Floodways

The Federal Emergency Management Agency (FEMA) identifies flood hazard areas as geographic zones with a defined level of risk of flooding along a waterway. The assigned zone type reflects the potential for flooding based on the characteristics of topography in relation to the associated drainage. Floodzones along the project corridor were assessed to identify flooding risks to the corridor.



AGENCIES

- Boulder & Weld Counties Floodplain Administrators
- Federal Highway Administration (FHWA)
- Colorado Department of Transportation (CDOT)
- The U.S. Army Corps of Engineers (USACE)
- Colorado Water Conservation Board (CWCB)
- Federal Emergency Management Agency (FEMA)

REGULATORY FRAMEWORK

- FHWA Floodplain Regulations, 1979
- Executive Order 11988, 1877
- Executive Order 13690, 2015
- National Flood Insurance Program (NFIP), 1968
- CWCB Rules & Regulations for Floodplains in Colorado, 2020
- Colorado Hazard Mapping Program (CHAMP), 2020



METHODOLOGY

The FEMA Flood Map Service Center and CHAMP were reviewed to identify floodzones along the corridor. Floodzones were mapped along the length of the project corridor to assess the potential for impact on floodplains resulting from future project design. Floodplains within the Environmental Study Area are listed in *Table 4.1* and depicted in *Figure 4-1*.



MOVING FORWARD

PRE-NEPA RECOMMENDATIONS Colorado Department of Transportation (CDOT) evaluates potential alternative footprints for transportation projects to ensure they do not encroach or alter floodplains and cause future flooding or other adverse impacts. The floodplain evaluation should be completed during conceptual design of any proposed project.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: Design solutions should minimize impacts to the floodplain and be developed cooperatively with U.S. Army Corps of Engineers (USACE), FEMA, and the affected communities.

SCHEDULE AND BUDGET: Project scheduling and budget should consider including time for floodplain development permitting and Conditional Letter of Map Revisions (CLOMR; 9-12 months).

Table 4.1 Floodplains and Floodways

LOCATION	DRAINAGE	FLOODPLAIN ZONES
MP 0.5	Dry Creek	AE, X:500-year
MP 6.5 to MP 7.8	Boulder Creek	AE, X: 500-year
MP 13.2 to MP 13.6	Tri-Area Drainageway	AE, AE Floodway, AO, X:500-year
MP 16.5 to MP 16.6	Little Dry Creek	A
MP 18.9 to MP 19.9	Lupton Bottom Ditch, South Platte River	AE, AE Floodway
MP 31.6 to MP 32.1	Box Elder Creek	A
MP 34.0	Jim Creek	A

Source: FEMA 2020

Zone X: Area determined to have 0.2 percent (500-year) annual chance flooding.
Zone A: Area inundated by 1 percent (100-year) annual chance flooding, for which no base flood elevation (BFE)s have been determined.

Zone AE: Area inundated by 1 percent (100-year) annual chance flooding, for which BFEs have been determined.

Zone AO: Area inundated by 1 percent (100-year) annual chance flooding (usually sheet flow on sloping terrain), for which average depths have been determined; flood depths range from 1 to 3 feet.

Floodway: Area identified as the stream channel and overbank areas necessary to effectively convey floodwaters.

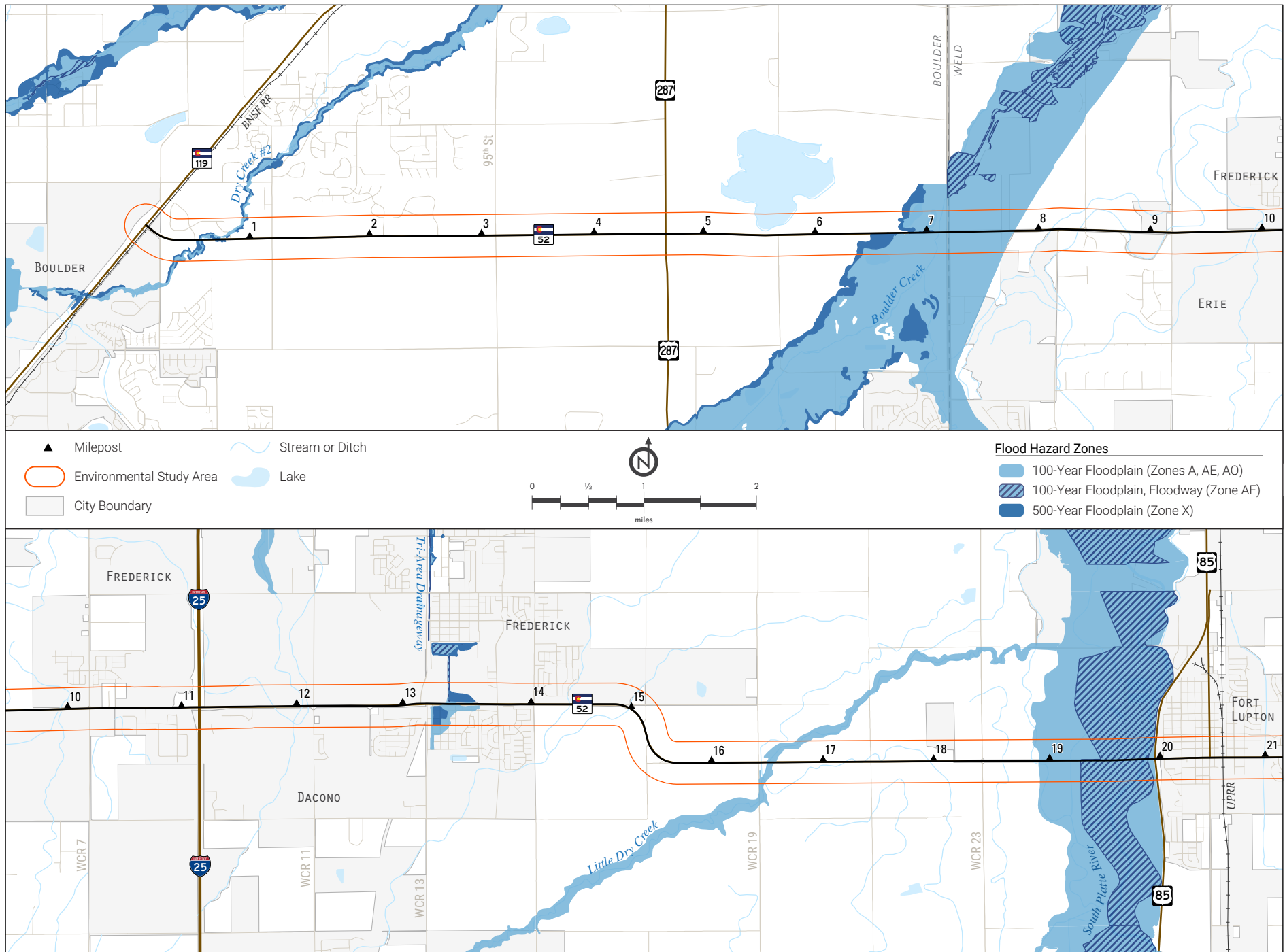
2013 and 2015 Flood Considerations

In 2013, flood waters exceeded the banks of Boulder Creek (MP 6.5 to MP 7.8) and spread north-northwest across adjacent fields. The overbank flows were impounded along the upstream roadway embankment of CO 52 but did not overtop the highway. As the overbank flows returned to the creek from the fields to pass under the bridge, the west bank of the creek began to erode resulting in head cutting into the field and a large scour hole. Damage increased during the 2015 flood event. Recommended repairs included riprap replacement at the abutments and structural backfill around the headwall and wingwall. Scour potential should be considered with future improvements at this location.

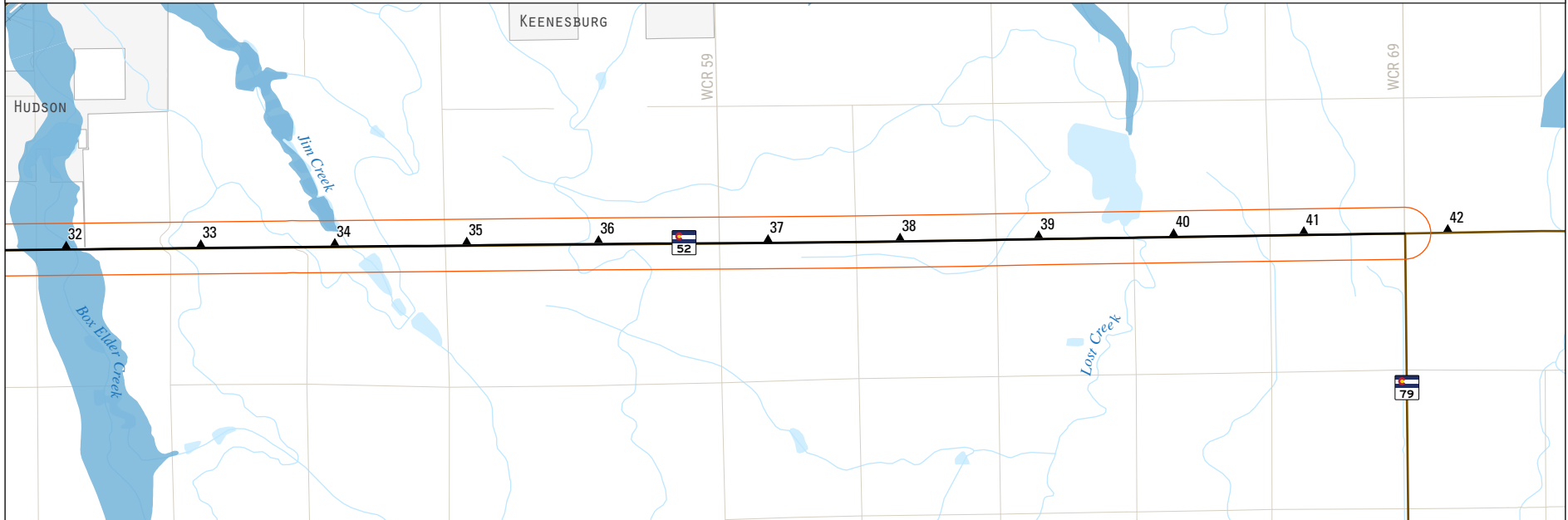
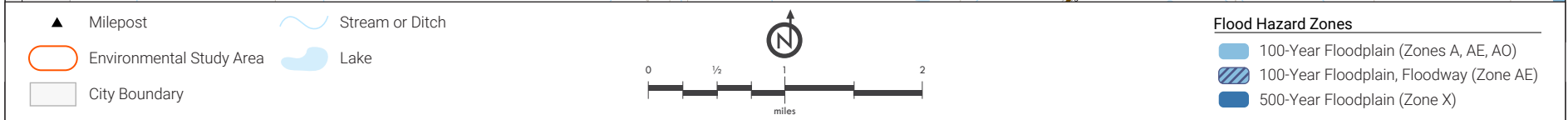
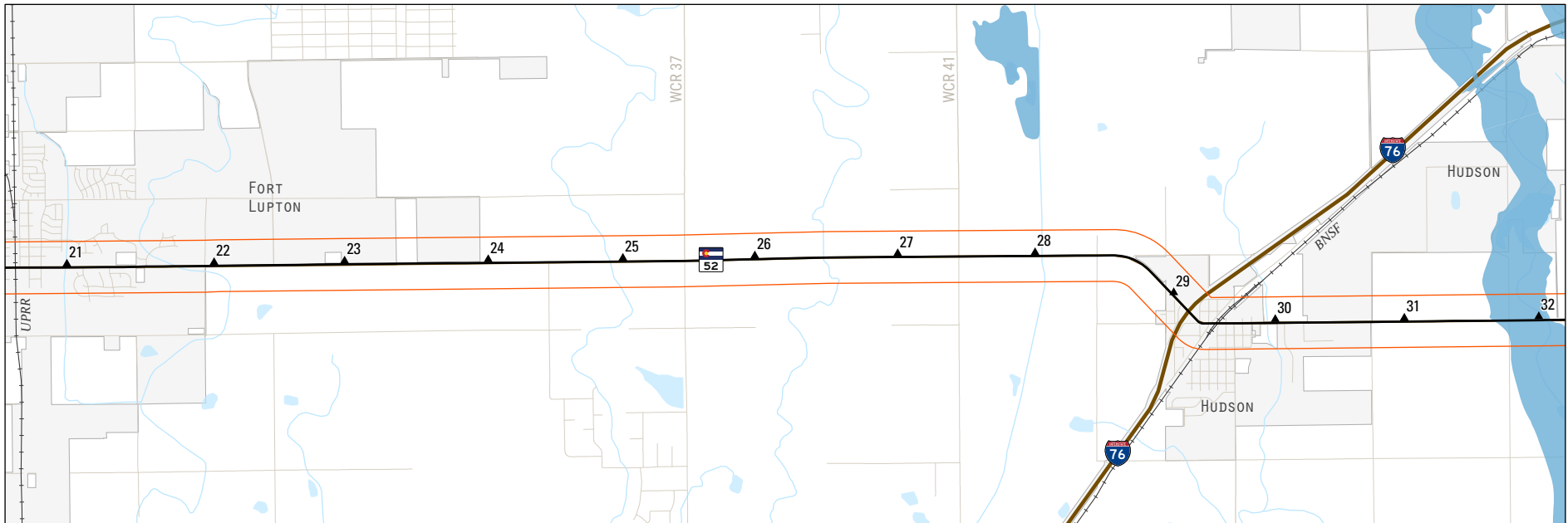


FLOODPLAINS

Figure 4-1 Floodplains and Floodways



FLOODPLAINS



FLOODPLAINS

4.2 Wetlands and Other Waters of the U.S.

Impacts to potentially jurisdictional wetlands and waters (Waters of the U.S. [WOTUS]) may require permitting under Section 404 of the Clean Water Act (CWA). Colorado Department of Transportation (CDOT) projects receiving federal funding from the Federal Highway Administration (FHWA) must identify and assess all wetlands within the project boundary for functionality by utilizing the FACWet method if permanent impacts to wetlands exceed 0.1 acre.



AGENCIES

- U.S. Environmental Protection Agency (US EPA)
- Federal Highway Administration (FHWA)
- U.S. Army Corps of Engineers (USACE)
- Colorado Department of Transportation (CDOT)
- Colorado Parks and Wildlife (CPW)
- State Historic Preservation Office (SHPO)
- U.S. Fish and Wildlife Service (USFWS)

REGULATORY FRAMEWORK

- Section 404 of the Clean Water Act, 1972
- Department of Transportation Order 5660.1A, 2000
- Colorado Senate Bill 40, 1969
- Executive Order 11990 Protection of Wetlands, 1977
- City of Boulder Revised Code, Chapter 9-3-9: Stream, Wetlands & Water Body Protection, 1981
- 23 CFR 777 Mitigation of Impacts to Wetlands and Natural Habitat
- Technical Advisory T6640.8A, 1985



METHODOLOGY

Wetlands and WOTUS were identified within the Environmental Study Area. The following resources were reviewed:

- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (USFWS, 2020a)
- U.S. Geological Survey (USGS) National Hydrographic Dataset (USGS, 2020)

WATERS Wetlands and other WOTUS within the Environmental Study Area are a mix of stream channels, ponds, reservoirs, and wetlands. Results from a desktop review of the USFWS NWI and USGS NHD are depicted in *Figure 4-2*. In addition, Bulrush Wetland Park in the Town of Frederick is identified as a wetland mitigation bank used to promote educational opportunities (Town of Frederick, 2020). The park is funded by the USACE and maintained by the Town of Frederick since 2007. Additional areas of concentrated wetlands are potentially located at the following waterbody crossings: Dry Creek, Boulder Creek, Lower Boulder Ditch, Little Dry Creek, South Platte River, Box Elder Creek, Jim Creek, and Lost Creek. Wetlands and WOTUS within the Environmental Study Area can be seen in *Appendix A: Roadway Characteristics*.



Pond at Banner Lakes State Wildlife Area



MOVING FORWARD

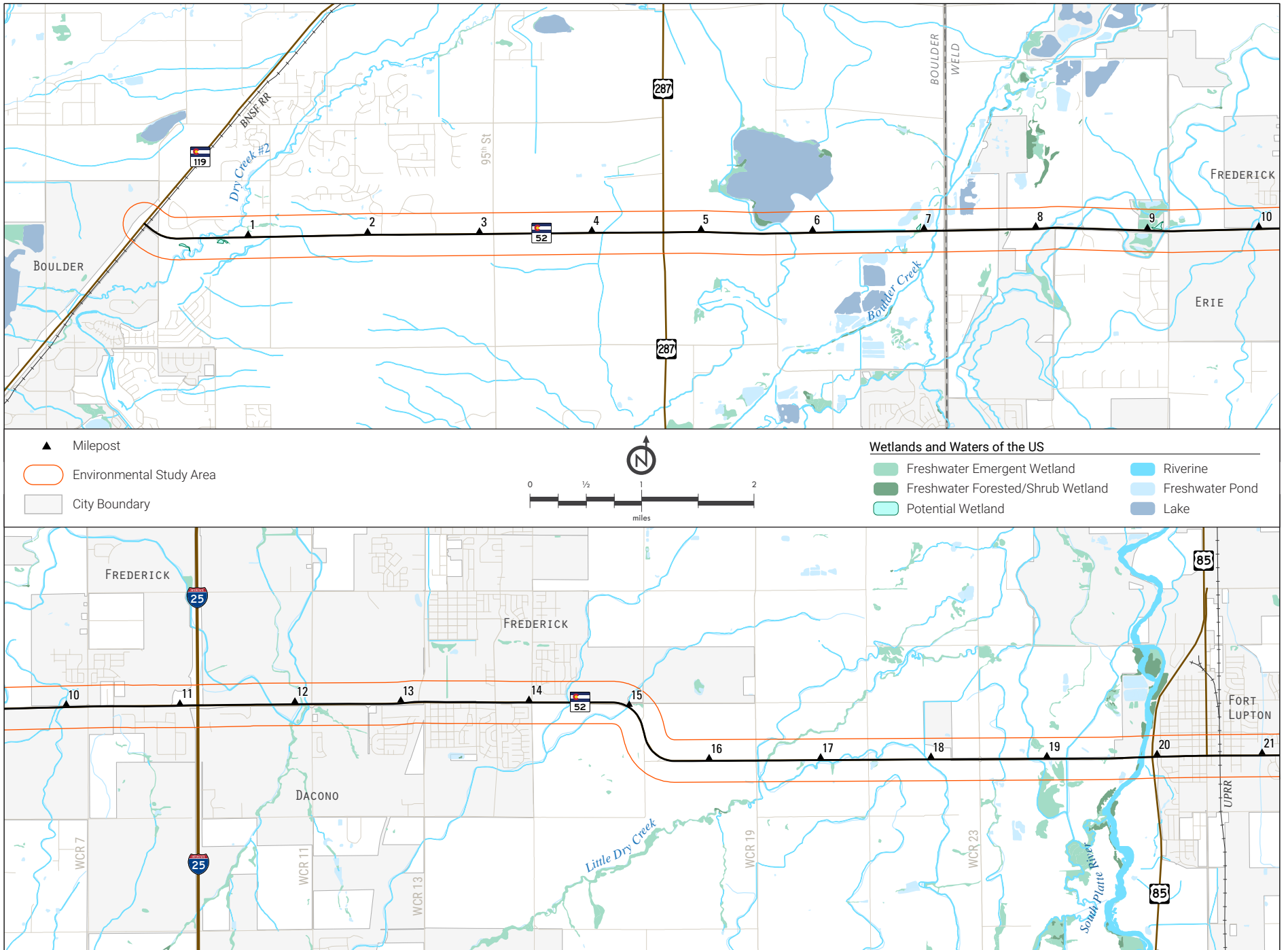
PRE-NEPA RECOMMENDATIONS If proposed project improvements impact an area that may contain wetlands or other WOTUS, a wetland delineation will be required. Various permits and additional documentation are required under Section 404 of the CWA and CDOT policy if wetlands are impacted.

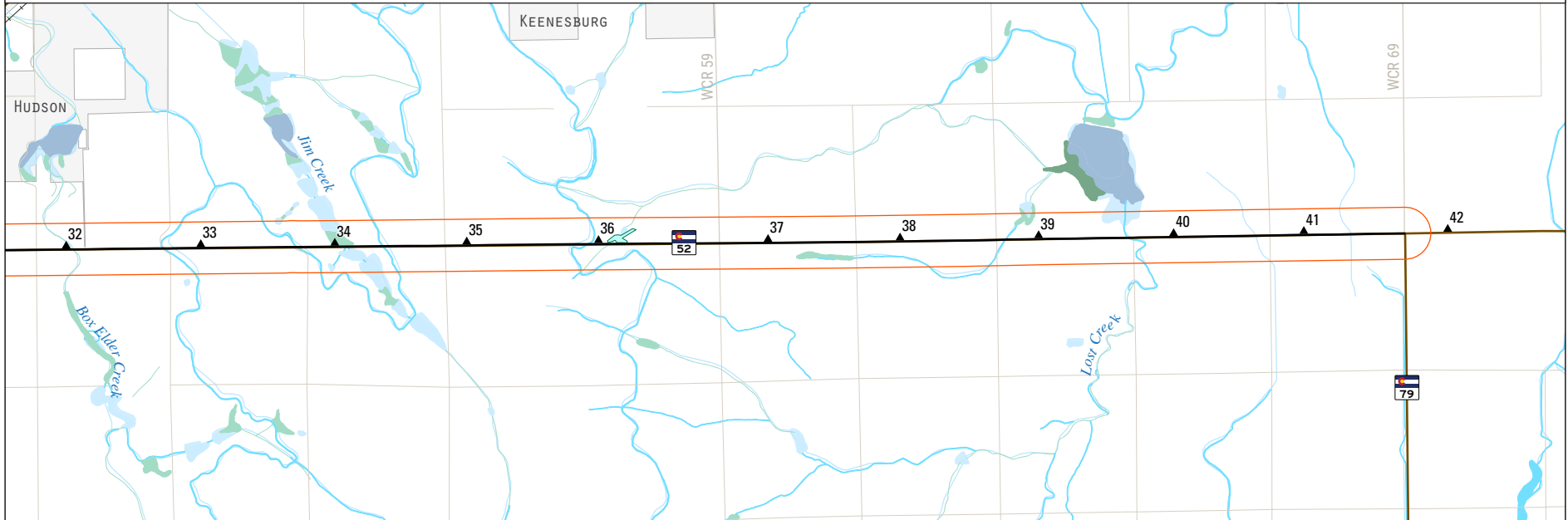
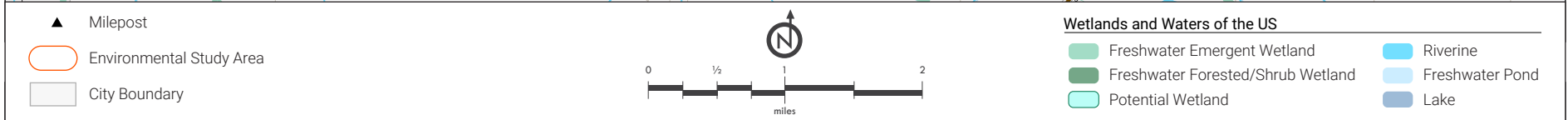
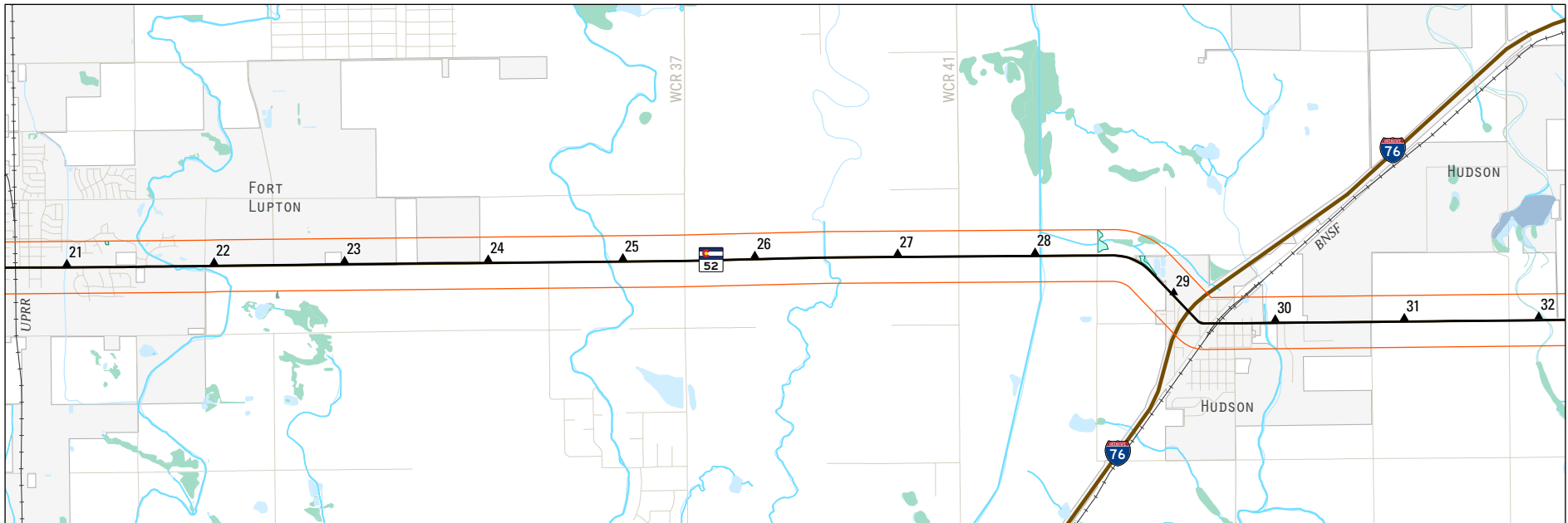
DESIGN AND PROJECT IMPLICATIONS

SCOPE: A Wetland Delineation Report and FACWet Analysis must be completed prior to construction. A Section 404 permit can take between 45 days (Nationwide Permit) and up to a year (Individual Permit) to process.

SCHEDULE AND BUDGET: Wetland impacts can be compensated by purchasing wetland credits or creating a wetland within the project area, or agreed upon location with the USACE.

Figure 4-2 Wetlands and other WOTUS





4.3 Water Quality

Transportation projects can impact drainage and water quality during construction and maintenance/operation phases. Depending on the extents of land disturbance, and location of the proposed project, specific stormwater permits would be required.



AGENCIES

- Federal Highway Administration (FHWA)
- Colorado Department of Public Health and Environment (CDPHE)
- Colorado Department of Transportation (CDOT)
- U.S. Environmental Protection Agency (EPA)
- Local agencies

REGULATORY FRAMEWORK

- Clean Water Act Clean Water Act Section 303(d): Impaired Waters and Total Maximum Daily Loads, 1972
- CDOT Permanent Water Quality Program
- CDOT Water Quality Construction Site Program
- Local Agency Guidance - Municipal Separate Storm Sewer System (MS4) program documents

Water resources were assessed within the Environmental Study Area, which is defined as a 1,000-foot buffer from the CO 52 centerline within the project limits. The following resources were reviewed:

- CDOT Online Transportation Information System (OTIS) (CDOT, 2020a)
- U.S. Geological Survey (USGS) National Hydrographic Dataset (USGS, 2020)
- Colorado Department of Health and Environment (CDPHE) Clean Water GIS Maps (CDPHE, 2020a)

Surface waters and MS4 boundaries within the Environmental Study Area are shown in *Figure 4-3*.



METHODOLOGY

MS4 PERMITS MS4 Permits govern stormwater discharges from CDOT facilities and discharges in municipalities and county urbanized areas with a population of at least 50,000 (CDOT, 2020b). If certain thresholds are exceeded, the terms and conditions of MS4 permits must be met (CDOT, 2015b). The following state and local agencies are MS4 permit holders:

- CDOT, in locations where CDOT-owned roadways cross through Phase II permit areas (small urbanized areas)
- City of Boulder
- Town of Erie
- Boulder County, in urbanized areas only
- Weld County, although its coverage area does not extend into the Environmental Study Area

303(D) LISTED Surface waters in the Environmental Study Area, and those listed as 303(d) Listed Impaired Waters include the following:

- Dry Creek
- Little Dry Creek
- Box Elder Creek
- Jim Creek
- Lost Creek
- Boulder Creek, 303(d) listed for arsenic
- South Platte River, 303(d) listed for arsenic

PRE-NEPA RECOMMENDATIONS MS4 boundaries and 303(d) listings should be confirmed, and the needs for permanent water quality should be considered based on conceptual designs.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: Construction and long-term maintenance of permanent water quality control measures will need to be determined before final design is completed. Potential permit requirements include:

- CDOT MS4 Permit and General Phase II MS4 permit CDPHE Stormwater Discharges Associated with Construction
- Activity Permit (CDPHE, 2020b)
- CDPHE Dewatering Discharge Permit (CDPHE, 2020c)
- Local Agency Stormwater Grading Permits, as required

SCHEDULE AND BUDGET: Early coordination between CDOT and the local agencies should occur to identify stormwater permitting requirements for the project. Required permanent water quality control measures can result in increased right-of-way impacts, affecting cost and schedule.

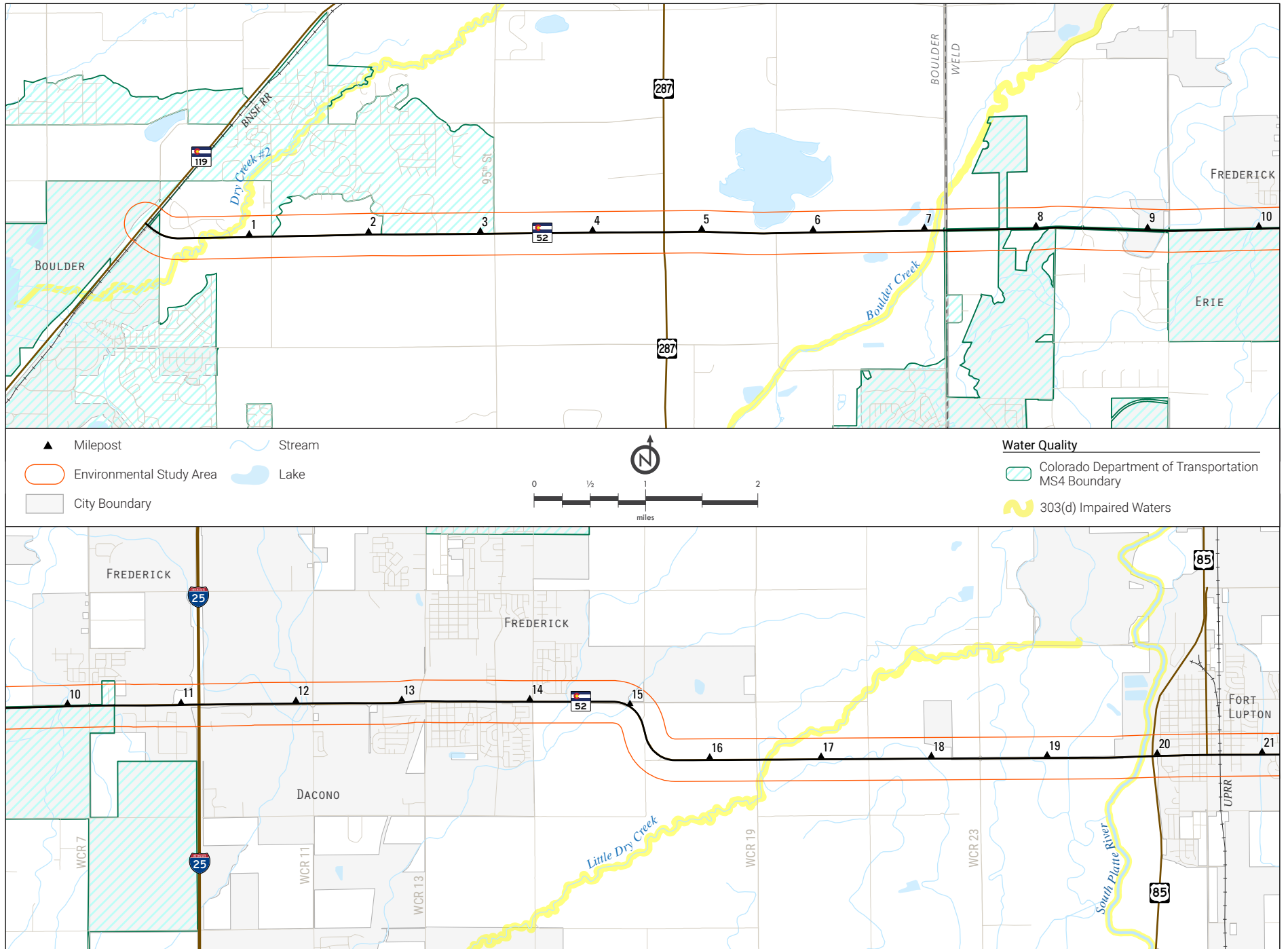


MOVING FORWARD

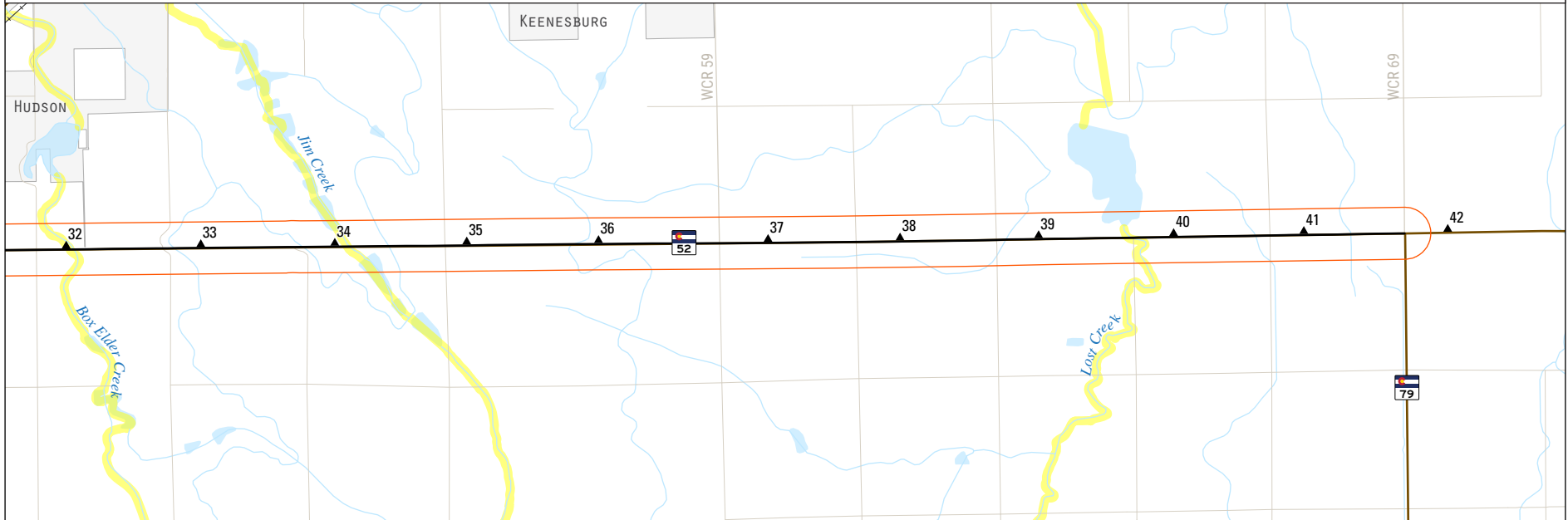
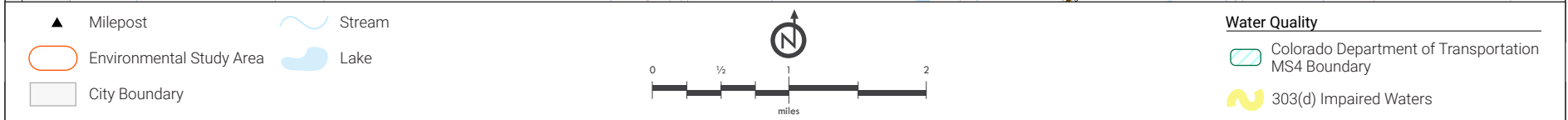
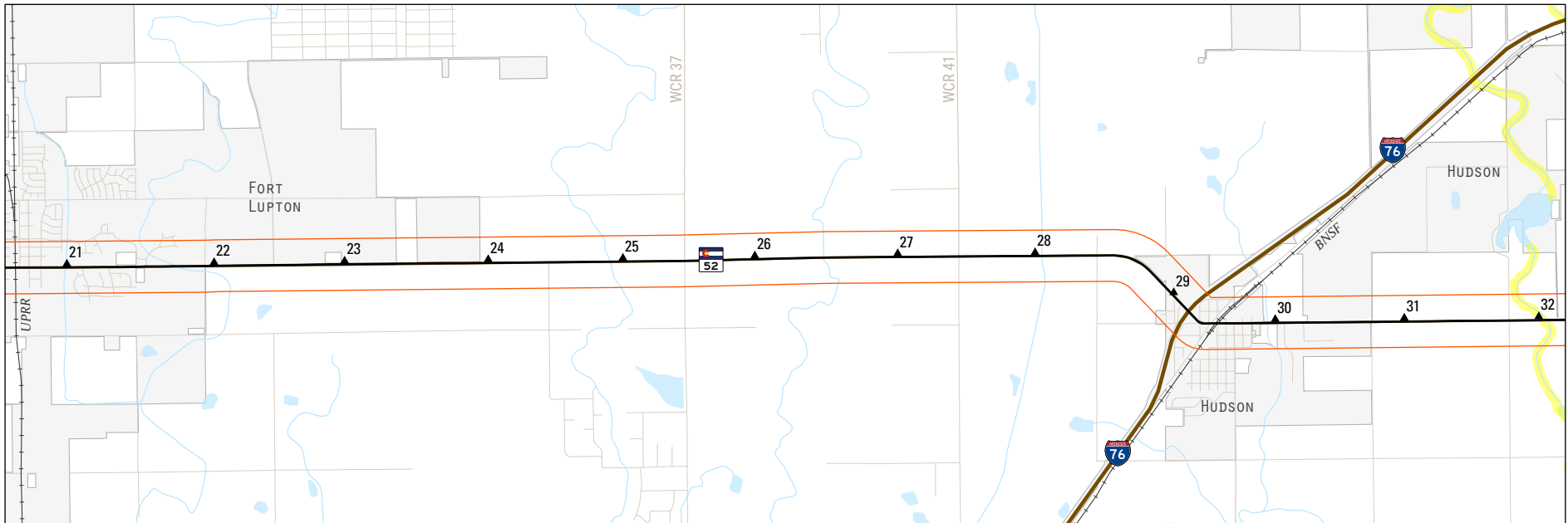


Culvert and drainage pipe at the west end of CO 52

Figure 4-3 Water Quality Resources



WATER QUALITY



WATER QUALITY

4.4 Threatened & Endangered Species, Species of Special Concern, Migratory Birds, and Eagles

The potential for the occurrence of state- and federally-threatened and endangered (T&E) species, state species of special concern, migratory birds, and eagles must be considered for transportation projects initiated by CDOT, or with a federal nexus. Habitat that can support these species includes wetlands, riparian areas, native shortgrass prairie, prairie dog colonies, or other native, high-quality habitats. In addition, big game should be considered along highway corridors to identify locations where wildlife vehicle collision hotspots could occur.



AGENCIES

- Federal Highway Administration (FHWA)
- U.S. Fish and Wildlife Service (USFWS)
- Colorado Department of Transportation (CDOT)
- Colorado Parks and Wildlife (CPW)
- Boulder County

REGULATORY FRAMEWORK

- Section 7 of the Endangered Species Act (ESA), 1973
- Migratory Bird Treaty Act (MBTA) of 1918, 1916
- Bald and Golden Eagle Protection Act, 1940 amended 1962
- Colorado Senate Bill 40 (SB 40) Wildlife Certification, 2013
- Colorado Nongame, Endangered, or Threatened Species Conservation Act, 1984
- CDOT Impacted Black-Tailed Prairie Dog Policy, 2009
- CDOT Shortgrass Prairie Initiative, 2003
- City of Boulder Urban Wildlife Management Plan, 2006



METHODOLOGY

The potential for the presence of state- or federally- listed species, and species of special concern and/or their habitat was assessed within the Environmental Study Area and is shown in *Tables 4.2 and 4.3*. The potential for the presence of federally protected raptors extended 0.5-mile from the CO 52 centerline based on the CPW recommended buffer zone for the active nests of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*; CPW, 2008).

T&E SPECIES Preble's Meadow Jumping Mouse (*Zapus hudsonius*; PMJM) and Ute Ladies'-Tresses Orchid (*Spiranthes diluvialis*; ULTO) have the potential to occur within the Environmental Study Area, though there is no critical habitat for either species present within the corridor. Potentially suitable PMJM habitat is present along Boulder Creek and the South Platte River. Boulder County has designated the section of Boulder Creek that intersects with the Environmental Study Area as a suitable restoration area for PMJM habitat, as it is contiguous with the critical habitat upstream. ULTO has the potential to occur in Boulder County, the most western portion of the Environmental Study Area.

EAGLES There are several active bald eagle nests (*Figure 4-4*) located both within the 0.5-mile human encroachment buffer zone for active bald eagle nests and within the Environmental Study Area. Bald eagle winter concentration range, winter forage,

and winter range are found throughout the Environmental Study Area (2020b; 2020a). Several raptors have active nests within the extended 0.5-mile study area, including red-tailed hawks (*Buteo jamaicensis*), Swainson's hawks (*Buteo swainsoni*), and great horned owls (*Bubo virginianus*) (CPW, 2020a).

OTHER RAPTORS Other raptor nests are included on *Figure 4-4*. CPW nest data does include raptor species; however, raptor species (with the exception of bald eagle) is not included on this figure. Raptor species and specific buffers should be considered prior to future project implementation; nest locations should be surveyed pre-construction, prior to leaf out.

BIG GAME CPW Species Activity Mapping (SAM) data indicates the presence of mule deer (*Odocoileus hemionus*) highway crossings between MP 31.3 and 34.6 which coincide with the stretch of the corridor that bisects the Banner Lakes State Wildlife Area. These locations are depicted on *Figure 4-4*. Mule deer general habitat, winter and summer concentration, and migration corridors occur throughout the Environmental Study Area. No other big game habitat, as identified by CPW, intersects the Environmental Study Area (CPW, 2020a).

PRE-NEPA RECOMMENDATIONS CDOT's publicly available wildlife information should be used to determine the potential for habitat early in the planning process.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: A Biological Resources Report should be prepared to document biological resources present in the proposed project area, such as vegetation, wetlands, waterways, wildlife, riparian, noxious weeds, and special status species. Documentation of the existing biological resources would aid in decision-making and identify required permitting.

SCHEDULE AND BUDGET: When wildlife impacts are expected, adequate time must be built into the design schedule to consider temporary and permanent impacts, for example time for a Biological Resources Report, Section 7 Consultation with USFWS, SB 40 reporting, and permitting and potential mitigation measures.

Costs related to mitigation, like wildlife fencing or PMJM mitigation should be considered during project development. Additionally, seasonal restrictions can affect construction and surveys.

- **Migratory Birds** – April 1 to August 31 or in presence of active nests
- **Bald Eagles** – Avoid construction during active nesting season in eagle nest buffer zones between January 1 to August 31
- **Raptors** – October 15 to July 31 or within various radii of active nests
- **PMJM Habitat** – September/October to May
- **ULTO** – Survey for presence between late July/early August
- **Common Garter Snake** – Spring
- **Fish** – Coordinate with CPW to identify latest sampling records for species of concern



MOVING FORWARD

Table 4.2 Federally Listed T&E Species Potential for Occurrence

COMMON NAME	SPECIES	STATUS	HABITAT REQUIREMENTS	SUITABLE HABITAT IN ENVIRONMENTAL STUDY AREA
*Least Tern	<i>Sternula antillarum</i>	Endangered	Migrants occur at reservoirs, lakes, and rivers with bare sandy shorelines. Local uncommon summer resident on northeastern plains of Colorado.	Stop-over habitat not present. Conditional Effects Analysis when potential for water depletion in South Platte Rivershed occurs.
*Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered	Known population in Mississippi River from Missouri to the Gulf of Mexico.	No suitable habitat occurs. Conditional Effects Analysis when potential for water depletion in South Platte Rivershed.
*Piping Plover	<i>Charadrius melodus</i>	Threatened	Rare migrant on eastern plains to foothills of Colorado between April and May. Nest on sandy lakeshores, sandbars within riverbeds or sandy wetland pastures.	No suitable habitat occurs. Conditional Effects Analysis when potential for water depletion in South Platte Rivershed.
Preble's Meadow Jumping Mouse	<i>Zapus hudsonius</i>	Threatened	Inhabits well developed riparian habitat with adjacent, relatively undisturbed grassland communities and a nearby water source.	Yes – documented habitat along Boulder Creek and potential habitat along South Platte River.
Ute Ladies'-Tresses Orchid	<i>Spiranthes diluvialis</i>	Threatened	Occurs within sub-irrigated alluvial soils along streams margins; open meadows on floodplains, including riparian areas.	Potential habitat within Boulder County on the west end of corridor.
*Western Prairie Fringed Orchid	<i>Platanthera praeclara</i>	Threatened	Occurs in mesic to wet, unplowed tallgrass prairie and meadows, but also found in old fields and roadside ditches. Not currently known to Colorado's Front Range.	Not known to Colorado's Front Range. Conditional Effects Analysis when potential for water depletion in South Platte Rivershed.
*Whooping Crane	<i>Grus americana</i>	Endangered	Rare migrant in Colorado between April and October. Stopover habitat includes sites with good horizontal visibility, water depth of 1 foot or less, and minimum wetland size of 1 acre for roosting.	Stop-over habitat is not present in the study area. Conditional Effects Analysis when potential for water depletion in South Platte Rivershed.

Source: USFWS 2020b. *Impacts to species only considered when projects have the potential to deplete water downstream.

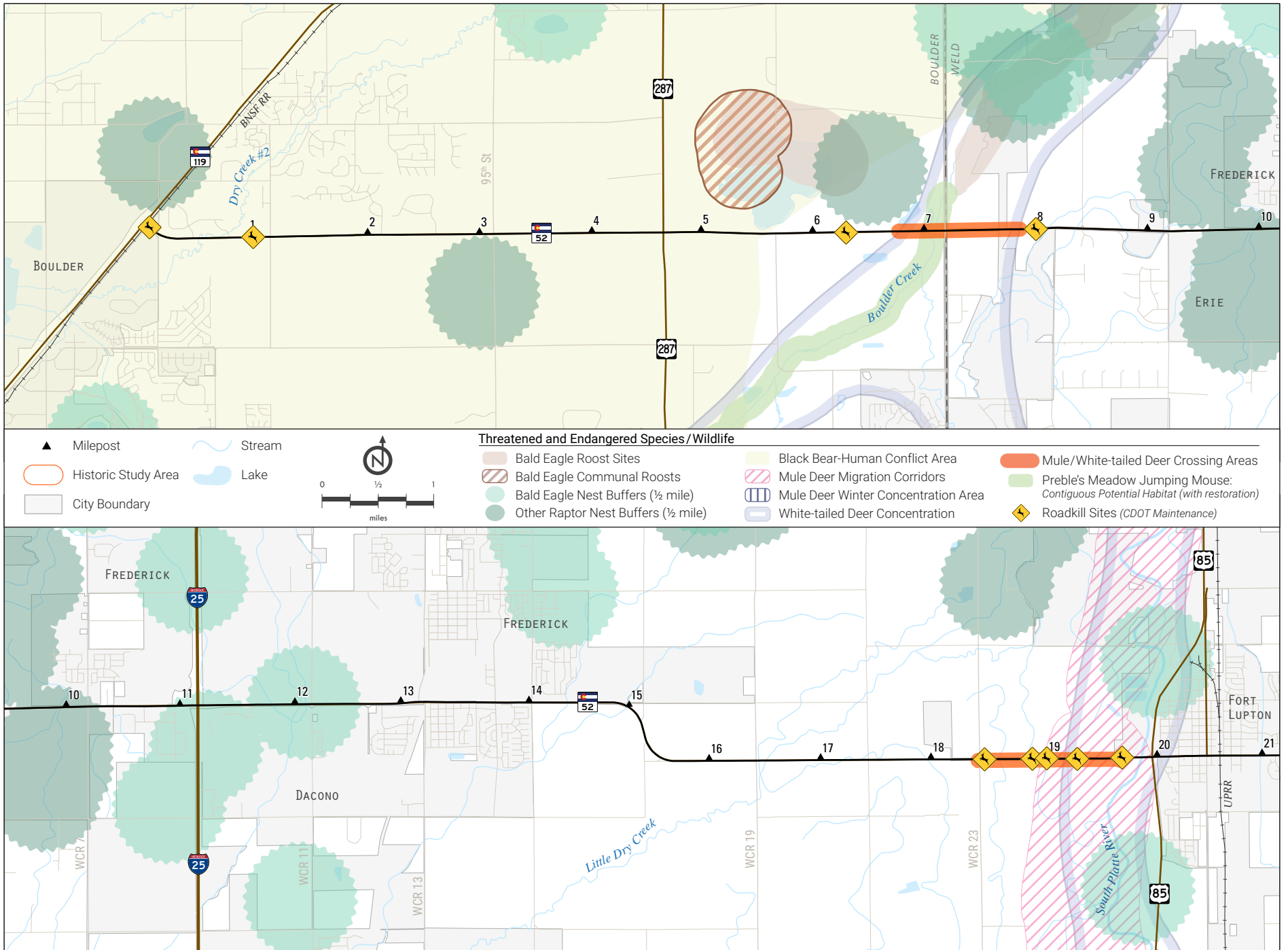
Table 4.3 State-Listed Species Potential Impacts

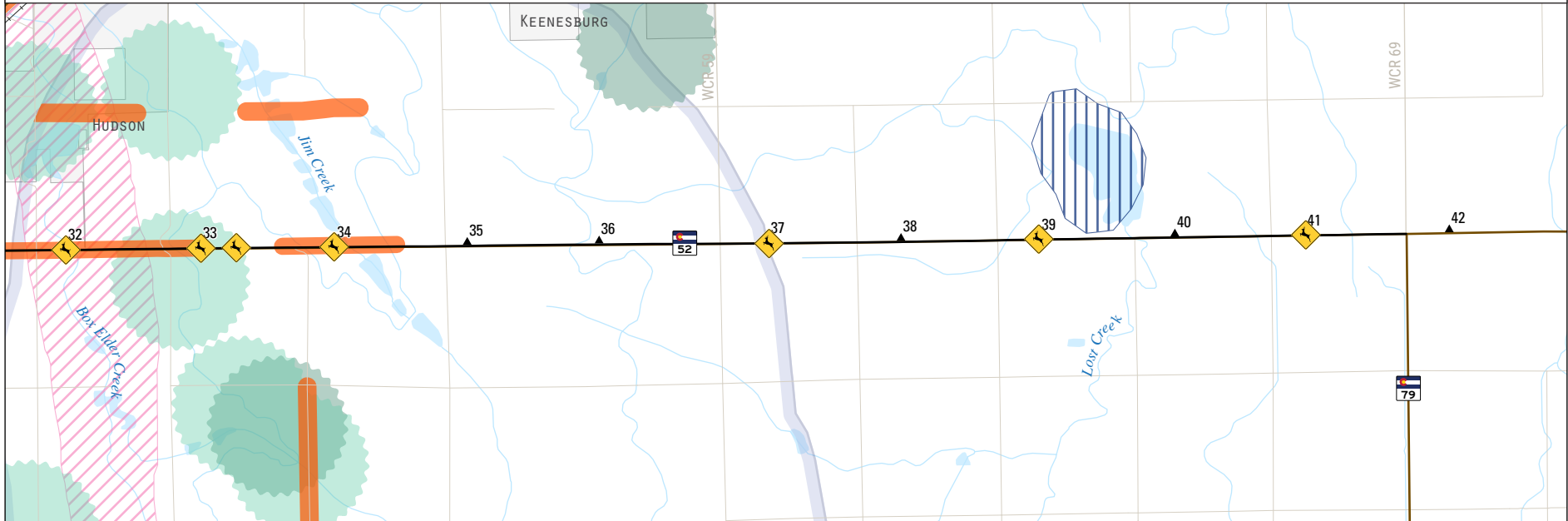
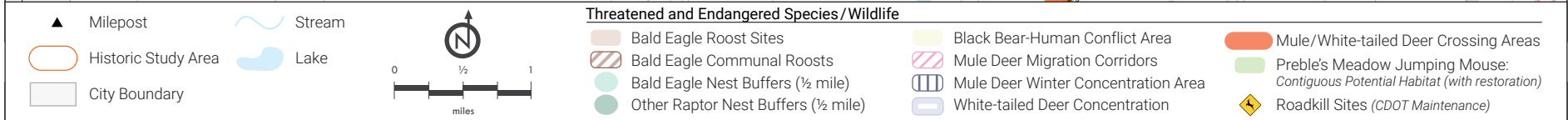
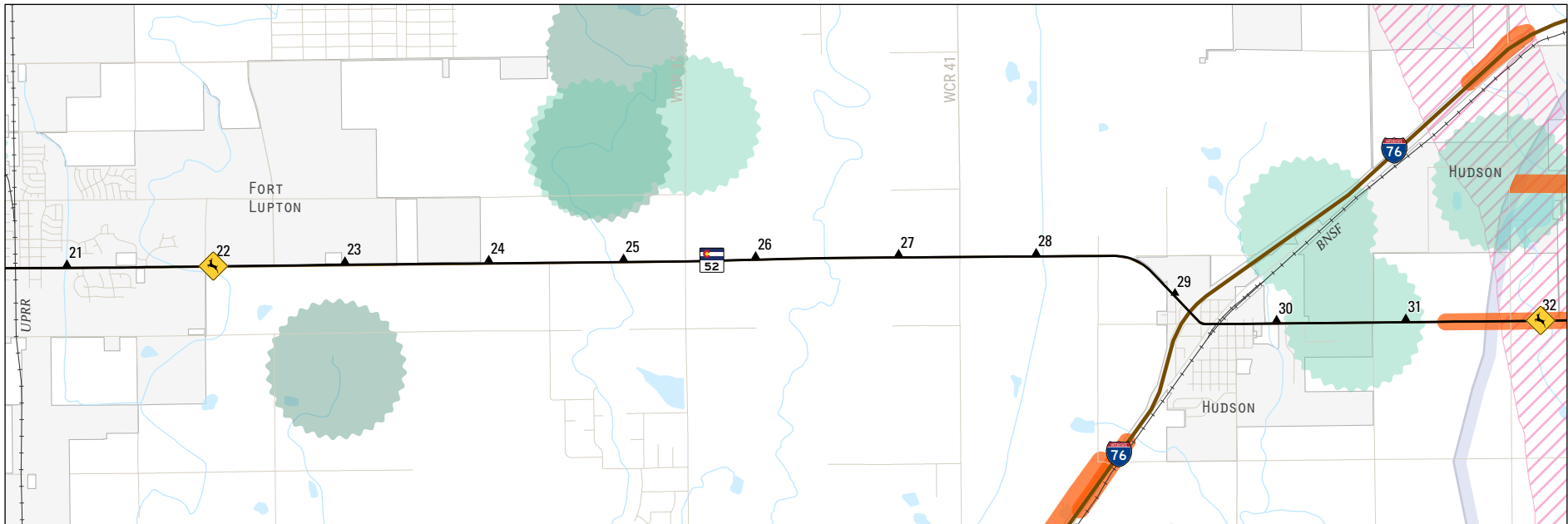
COMMON NAME	SPECIES	STATUS	HABITAT REQUIREMENTS	SUITABLE HABITAT IN ENVIRONMENTAL STUDY AREA
Black Tailed Prairie Dog	<i>Cynomys ludovicianus</i>	Special Concern	Open grasslands with low to relatively sparse vegetation. Area is dry and relatively flat or gently sloping	Yes – habitat likely present
Brassy Minnow	<i>Hybognathus hankinsoni</i>	Threatened	Small, clear, sluggish and weedy creeks or small rivers with sand, gravel, or mud bottom overlain with organic sediment. Also common in pools in stream channels, back waters, and beaver ponds.	Conditional Effects Analysis when potential for water depletion in South Platte Rivershed. Found along the South Platte River and all tributaries just east of Fort Morgan to Nebraska border.
Burrowing Owl	<i>Athene cunicularia</i>	Threatened	Dry, open areas with short grasses and no trees. Nest and live in burrows created by prairie dogs, ground squirrels, and badgers.	Yes-habitat likely present
Common Garter Snake	<i>Thamnophis sirtalis</i>	Special Concern	Occur in a wide range of aquatic, wetland, riparian, and upland habitats.	Yes-habitat likely present
Common Shiner	<i>Luxilus cornutus</i>	Threatened	Occur in clear, cold, weedless waters of streams with moderate to swift current, gravel to rubble bottoms, and alternating pools and riffles. They typically avoid riffles.	Yes – habitat follows Left Hand Creek east of CO 119 and St. Vrain Creek and all tributaries. The eastern limit is west of St Vrain State Park and the northern limit is approx. WCR 34.
Stonecat	<i>Noturus flavus</i>	Special Concern	Found in small creeks and small to large rivers under rocks in runs, riffles and rapids. Adjusted to the transitional area between cold water and warm water along the St. Vrain Creek.	Yes – habitat mirrors common shiner, with an additional section following I-25 on CO 52 between Aggregate Blvd and WCR 17, heading north to Boulder Creek. Northeastern limit along Boulder Creek is shown as CO 66 near WCR 17.
Swift Fox	<i>Vulpes velox</i>	Special Concern	Occur in open prairies and plains, including areas of short to mid-height perennial grasslands, sparse shrubs, and croplands.	Yes – habitat present along eastern end corridor

Source: CPW 2020c

A Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus*) along the CO 52 corridor

Figure 4-4 Wildlife Resources





4.5 Vegetation and Noxious Weeds

Early identification of the vegetation communities present within the study area provides determination of the likelihood that sensitive plant or animal species might be present. It enables determination of the need for supplemental field studies so that these can be initiated at the proper time.

Noxious weeds are defined as those non-native plants that aggressively invade and are detrimental to native vegetation communities and ecosystems. The Colorado State Noxious Weed Act (Colorado Revised Statute 35-5.5-103) developed a list of plants considered noxious in the state of Colorado that should be targeted for control by various methods dependent on list category (A, B, or C). Local jurisdictions can provide additional guidance and regulation based on their landscapes and need for enforcement.



AGENCIES

- U.S. Department of Agriculture (USDA)
- Colorado Department of Transportation (CDOT)
- Colorado Parks and Wildlife (CPW)
- Colorado Department of Agriculture (CDA)
- Boulder County Weed Management Program
- Weld County Weed Division
- Local agencies

REGULATORY FRAMEWORK

- Federal Noxious Weed Act, 1974
- Executive Order 13751 Safeguarding the Nation from the Impacts of Invasive Species
- Landscaping and Scenic Enhancement Regulation, 2016
- Landscape and Roadside Development Regulation, 1978
- Colorado Noxious Weed Act, 2016
- Boulder County Noxious Weed Management Plan, 2004
- Weld County Code, Chapter 15 – Vegetation, 2020
- Boulder County Invasive Plants and Weeds Annual Report, 2019
- Weld County Weed Division Website, 2020



METHODOLOGY

Vegetation data, including available noxious weed data, was reviewed within the Environmental Study Area. Publicly available spatial vegetation data included:

- CDOT Online Transportation Information System (OTIS) Website Map View Page - Noxious Weeds (CDOT, 2017)
- Multi-Resolution Land Characteristics Consortium (MLRC) National Land Cover Database (NLCD [2016])

In addition, Boulder County Invasive Plants and Weeds Annual Report (2019) and Weld County Weed Division Website (2020) were reviewed to identify known noxious weeds present in each county.

NLCD data indicates that cultivated cropland comprises the majority of the Environmental Study Area (Table 4.5; Figure 4-5). Noxious weed locations identified through publicly available CDOT data are depicted in Figure 4-5 (CDOT, 2017).

Table 4.4 NLCD Land Cover Percentage

LAND COVER TYPE	PERCENT COVER
Barren Land	0.06%
Cultivated Crops	55.79%
Deciduous Forest	0.09%
Developed, High Intensity	0.85%
Developed, Low Intensity	7.98%
Developed, Medium Intensity	3.59%
Developed, Open Space	6.58%
Emergent Herbaceous Wetlands	2.48%
Hay/Pasture	4.09%
Herbaceous	16.42%
Open Water	0.90%
Shrub/Scrub	0.38%
Woody Wetlands	0.79%

Source: NLCD, 2016

PRE-NEPA RECOMMENDATIONS Future projects will require field work during the growing season to characterize major vegetation communities and to verify the presence or absence of noxious weeds.

DESIGN AND PROJECT IMPLICATIONS

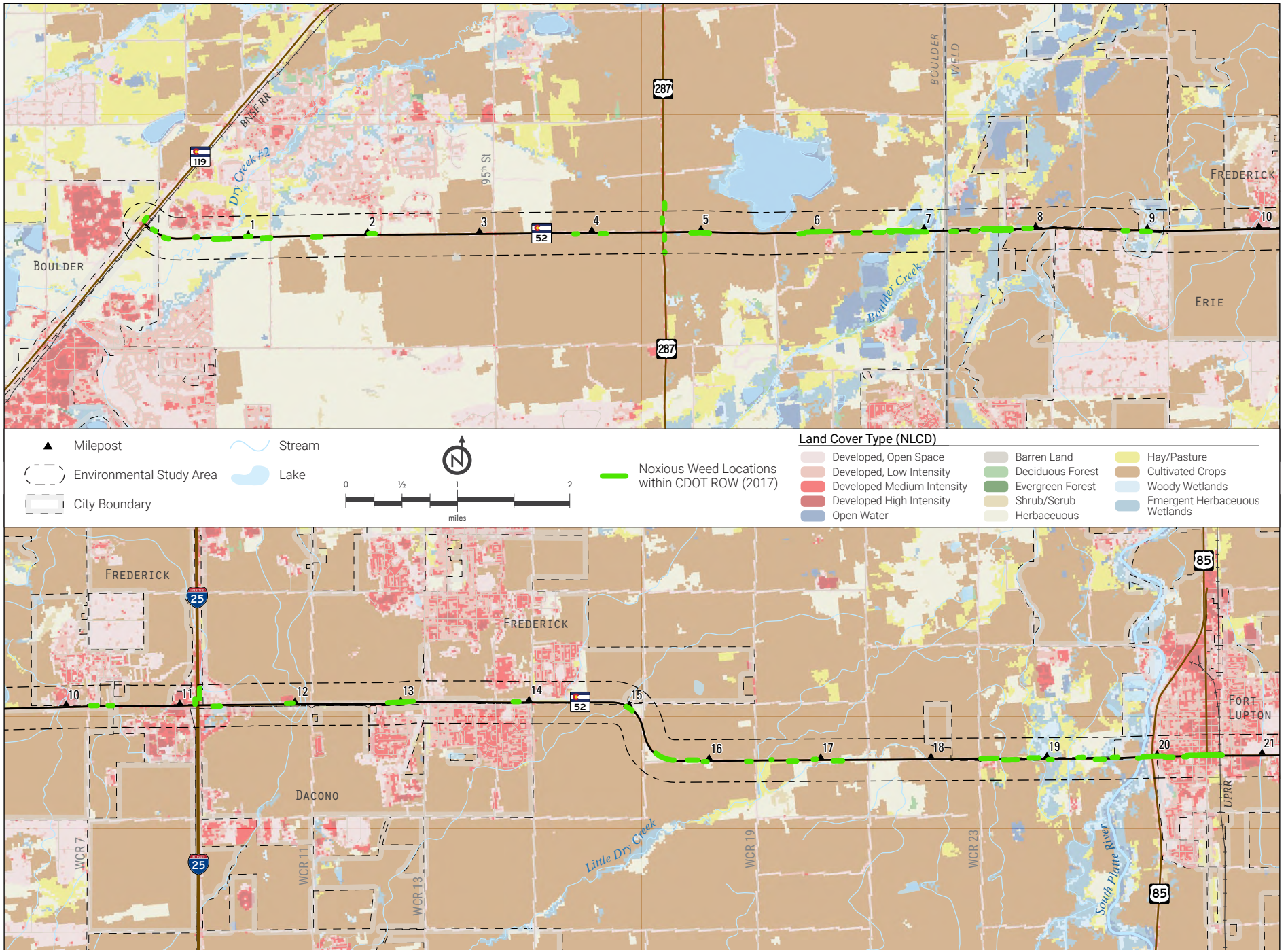
SCOPE: Commitments will be required for revegetation and noxious weed management. CDOT Standard Specifications address revegetation and noxious weeds and, if necessary, project-specific specifications can be created, as well as an integrated weed management plan.

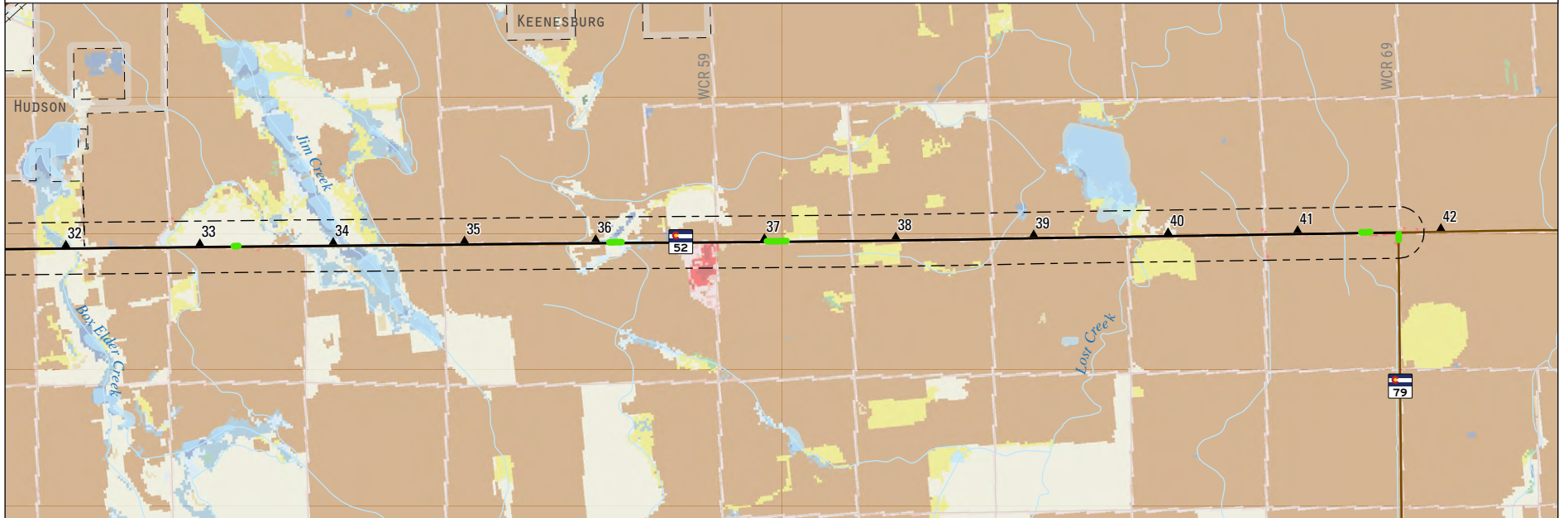
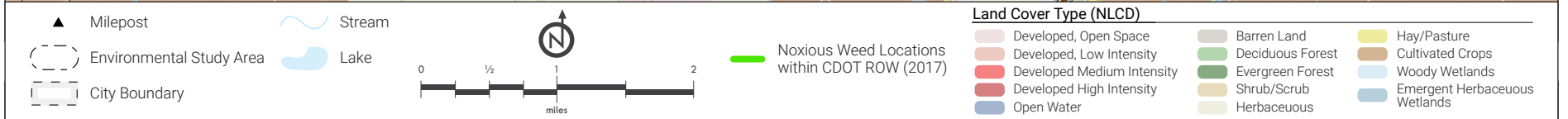
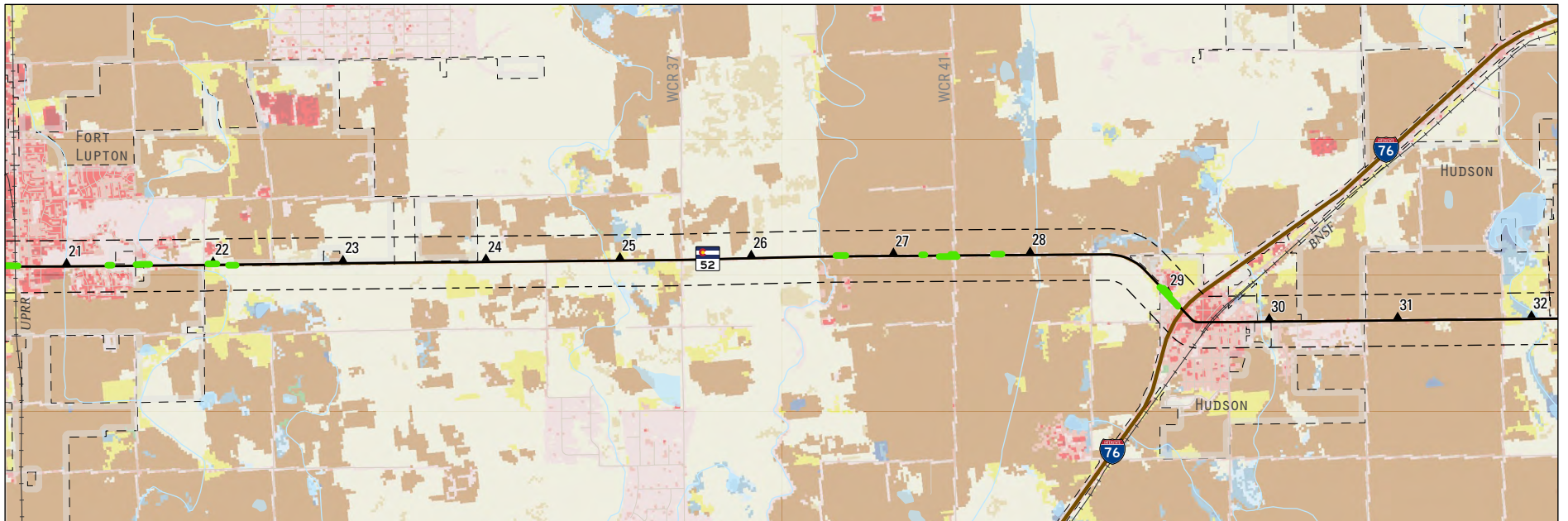
SCHEDULE AND BUDGET: Construction requiring land disturbance has the potential to spread existing noxious weed populations or introduce new noxious weed populations into high quality native habitat. Coordination with local agencies is anticipated, especially in areas adjacent to conserved open spaces, agricultural lands, and Banner Lakes State Wildlife Area.



MOVING FORWARD

Figure 4-5 Vegetation and Noxious Weeds





VEGETATION

4.6 Hazardous Materials

Evaluation of hazardous material concerns is required for the acquisition of property for right-of-way and construction disturbance. Doing so protects worker health and safety, provides liability due diligence for the purchasing entity, and informs the project Alternatives Analysis of potential hazardous material impacts.



AGENCIES

- Federal Highway Administration (FHWA)
- U.S. Environmental Protection Act (EPA)
- Colorado Department of Transportation (CDOT)
- Colorado Department of Public Health and Environment (CDPHE) Hazardous Materials and Waste Management Division
- Colorado Department of Labor and Employment Division of Oil and Public Safety

REGULATORY FRAMEWORK

- Comprehensive Environmental Response, Compensation, and Liability Act, 1980
- Resource Conservation and Recovery Act, 1976
- Title XIV of the Public Health Service Act (“Safe Drinking Water Act”), 1974
- American Society for Testing and Materials (ASTM) Standard E1527-13, 2013 and E1528-14, 2014
- CDOT Hazardous Materials Guidance, 2018

Known hazardous materials were identified within the Environmental Study Area. Resources reviewed include:

- Regulatory database search for sites with potential or recognized environmental conditions (GeoSearch, 2020)
- Colorado Oil and Gas Conservation Commission (COGCC) GIS data and individual utility company records
- Google map aerial overview



METHODOLOGY

Sites were screened for risk based on distance from CO 52 and known or suspected environmental conditions. No field review or additional file review was completed. It was assumed that a recorded or presumed spill, leaking underground storage tank, landfill, oil and gas well, industrial site with unconfirmed hazardous materials handling procedures, or other non-regulated land use was a higher environmental risk.

SITES There are 33 Potential Environmental Concerns (PECs) and 16 Recognized Environmental Concerns (RECs) in the Environmental Study Area; there may be more than one environmental concern on a site. The sites are characterized as follows:

- 18 leaking storage tank sites
- 29 underground storage tank sites
- 9 above ground storage tank sites
- 3 liquefied petroleum gas tank sites
- 1 superfund (SEMSARCH) archived site (Site 1, Tony Cito Dump)
- 1 clandestine drug laboratory (CDL) (Site 43)

- 7 sites with reported spills
- 2 industrial sites with unknown material handling, storage, and disposal practices
- Railroads in Longmont, Fort Lupton, and Hudson
- 225 oil and gas wells facilities, with approximately half concentrated in western Weld County near the I-25 corridor. Petroleum pipelines and flow lines are located within the Environmental Study Area and are summarized in Section 4.12 Utilities.

Based on the CDPHE Historical Solid Waste Landfills database, Site 1 Tony Cito Dump (Boulder County) is assumed to be a historical dump/landfill and is currently in residential use (*Figure 4-6; Appendix B*). It is listed in the SEMSARCH, which houses an archive of sites. Archived status assumes that assessment of the site has been completed, and the EPA has determined that no further steps will be taken to list the site on the National Priorities List. Site 43 is the reported location of a clandestine drug laboratory (CDL; *Figure 4-6; Appendix B*).

Appendix B: Supporting Documentation contains a list of RECs and PECs in the Study Area with brief site descriptions.

REC AND PEC Potential for contamination that may affect the environment or health and human safety may be categorized as a REC or PEC. ASTM defines a REC as a confirmed or suspected release of hazardous substances or petroleum products. A PEC includes the possibility of a current, past, or future release. A PEC is assumed to comply with relevant regulations. The locations of the RECs and PECs are depicted in *Figure 4-6*.

PRE-NEPA RECOMMENDATIONS Impacts to or acquisitions of Sites 1 and 43 should be evaluated during scoping and should be avoided in future projects if a viable alternative exists.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: Every CDOT project requires a CDOT Initial Site Assessment Checklist/Form 881, a Modified Environmental Site Assessment, or a Phase I Environmental Site Assessment. If an alternative requires the acquisition of property with a REC a Phase II Environmental Site Assessment is recommended. A Phase II assessment would be required if the properties or a portion of the properties were to be acquired for right-of-way.

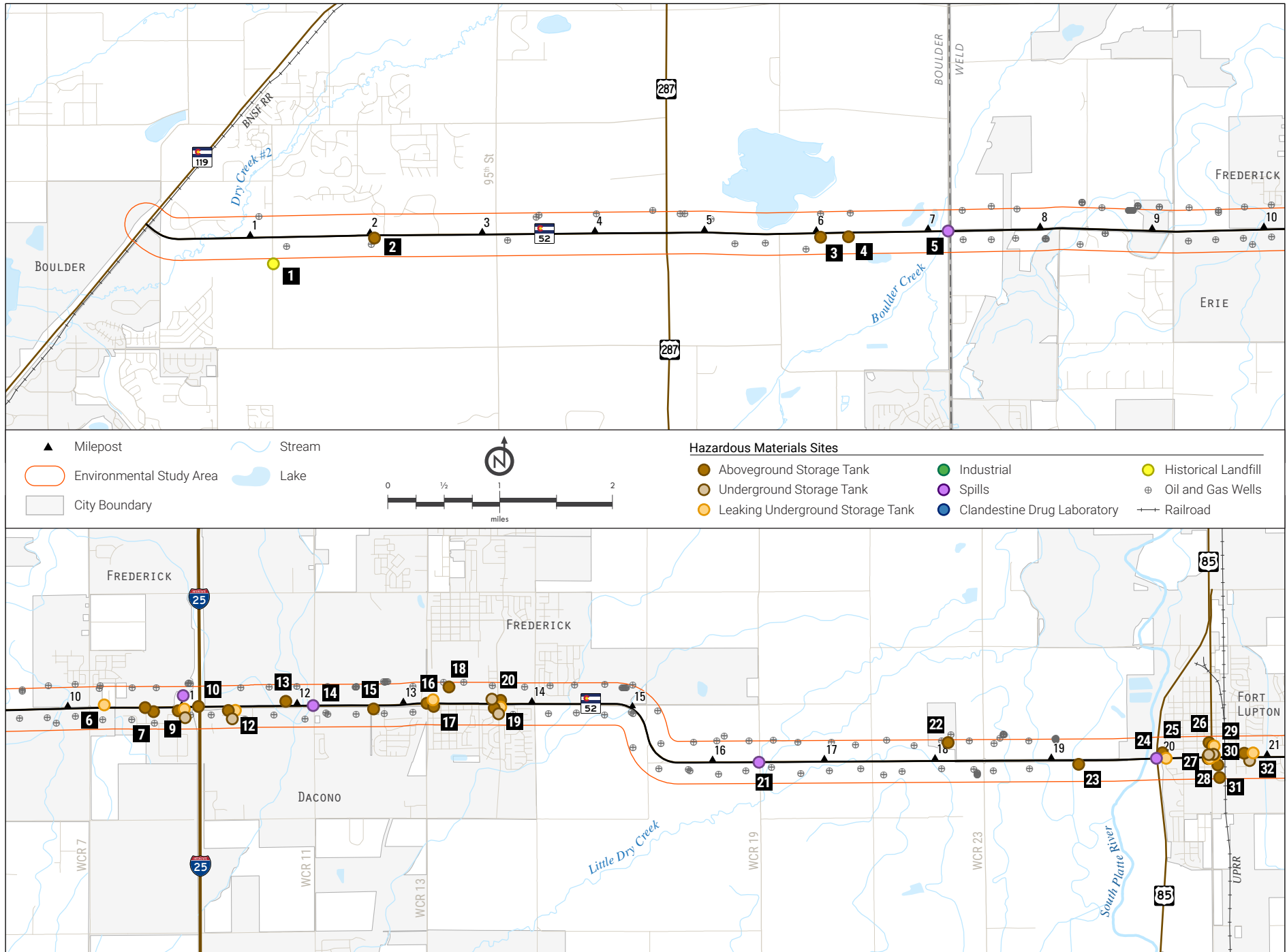
SCHEDULE AND BUDGET: The use of CDOT Specification 250 Environmental Health and Safety Management must be followed prior to construction, environmental notes must be added to the construction documents, and a Materials Management Plan must be developed and used during construction activities if encountering hazardous materials is anticipated. CDOT’s specifications are developed concurrently with the FOR. Depending on the specific project site, development of a project-specific Materials Management Plan can take anywhere between 4-6 weeks.



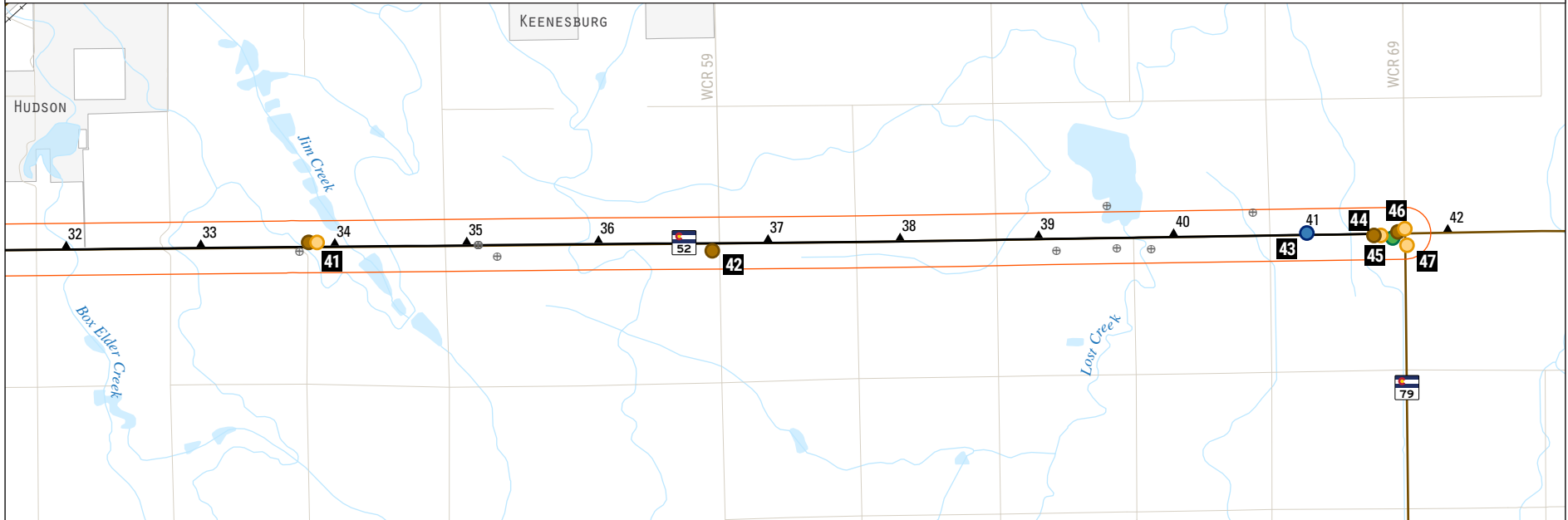
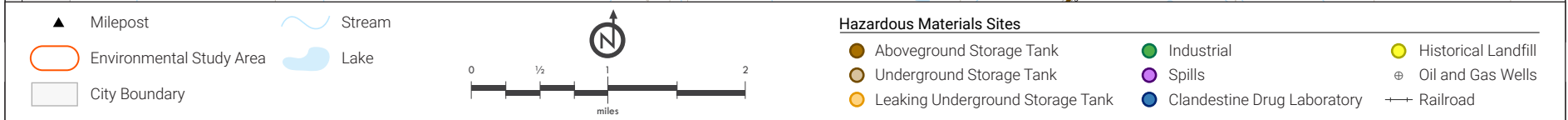
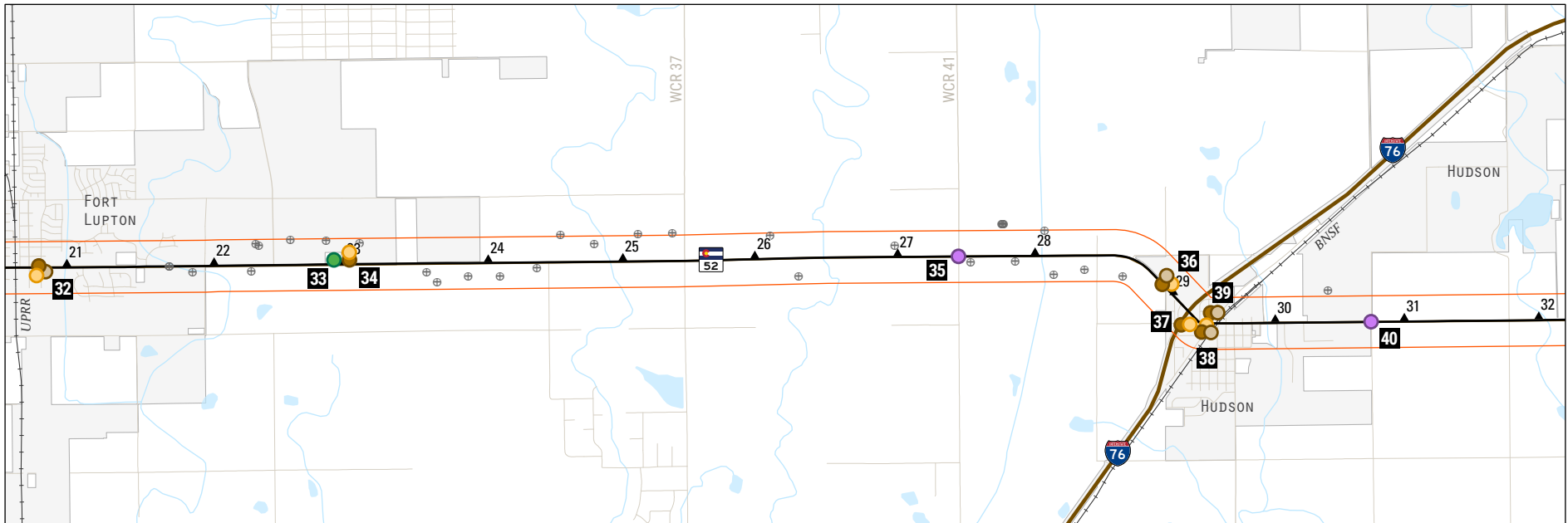
MOVING FORWARD

HAZARDOUS MATERIALS

Figure 4-6 Hazardous Materials Concerns



HAZARDOUS MATERIALS



HAZARDOUS MATERIALS

4.7 Historic Resources

Historic resources are regarded as those man-made or designed buildings, structures, objects, districts, or sites that are 50 years old or older and eligible to or listed in the National Register of Historic Places (NRHP). Under Section 106 of the National Historic Preservation Act of 1966 (NHPA), federal agencies are required to consider the effects of their undertakings on historic resources. Potential historic resources along the Study corridor were identified to assist in project planning efforts.



AGENCIES

- Federal Highway Administration (FHWA)
- Office of Archaeology & Historic Preservation (OAHP) and State Historic Preservation Office (SHPO)
- Tribal Historic Preservation Office (THPO)
- U.S. Army Corps of Engineers (USACE)
- Local municipalities/ Preservation Commissions
- Local historical societies
- Irrigation companies
- Railroad companies

REGULATORY FRAMEWORK

Section 106 of the NHPA, 1966

Section 4(f) of Department of Transportation Act, 1967

Colorado State Register of Historic Places Act, 1975

The historic resources study area covers a smaller area than the Environmental Study Area, since a historic study area equal to the Environmental Study Area would yield an excessive number of resources that would not be impacted by projects along the corridor. The study area was developed in coordination with CDOT and FHWA as a 350-foot buffer from the roadway centerline. The area was expanded for a short segment approximately 3.6 miles west of Fort Lupton to accommodate a potential realignment location. Data within the study area captured only those historic resources from the OAHP COMPASS database and Assessor's search results that have the potential to be impacted by potential improvements.



METHODOLOGY

A search of the OAHP COMPASS database was completed in June of 2020 to identify previously surveyed historic resources (*Appendix B: Supporting Documentation*). Boulder and Weld County Assessor's data was also analyzed in June of 2020 for parcels located within the historic resources study area containing buildings or structures built in 1975 or before (45 years old or older). CDOT's OTIS application was used to identify bridges and culverts in the historic resources study area built in 1975 or earlier (*Appendix B: Supporting Documentation*). In addition, active and abandoned railroad lines were identified.

RESOURCES Historic resources in the historic resources study area include, but are not limited to: urban and agrarian buildings, and structures such as railroads, roads, culverts, bridges, and irrigation systems. These resources are shown in *Figure 4-7*. According to COMPASS search results, 18 resources within historic resources study area were previously determined eligible to the NRHP, are listed on the NRHP or State Register of Historic Places, or are considered supporting segments of eligible resources, while 22 were determined officially not eligible or not supporting segments, which are portions of the linear resource that lack integrity, and 45 were given field determinations or no assessment. CO 52 itself was determined officially eligible for listing in the NRHP. While proposed projects likely cannot avoid impacts to the highway itself, efforts to minimize alterations to the features that support its eligibility to the NRHP and early coordination with the SHPO may help avoid adverse effects to the resource.

CO 52 intersects numerous irrigation segments, and almost three-quarters of the irrigation segments within the historic resources study area have not been previously evaluated for NRHP eligibility. There are numerous bridges and culverts, and a majority of the culverts were not previously surveyed. The search of the Weld and Boulder Counties' Assessor's Offices indicates that 29 percent of the parcels in the historic resources study area contain buildings constructed in 1975 or earlier, with the earliest construction date of 1875.

There are concentrations of potentially historic resources and properties along the CO 52 corridor which are shown in *Table 4.5*. It is possible that some of these clusters of historic resources may constitute historic districts, which are concentrations or linkages of historic resources that are united aesthetically or historically.

Table 4.5 Concentrations of Potentially Historic Resources and Properties

LOCATION	MILEPOST (MP)
Dacono on the south side of the highway	Mileposts 13.2 and 13.8
Fort Lupton on both sides of CO 52	Mileposts 20 and 20.7
Hudson	Mileposts 29.3 and 30.2
Hudson (eastern terminus)	Mileposts 40.9 to 41.9



Historic farmstead in Boulder County

PRE-NEPA RECOMMENDATIONS The existing conditions information should be used to help inform the project planning process to minimize or avoid impacts to previously identified eligible or listed historic resources and identify sensitive areas or resources.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: Design solutions should minimize impacts to identified historic resources and recognize those areas that may require additional historic survey. Future projects would require Section 106 and potentially Section 4(f), which is addressed in section 4.10 of this document, and Colorado State Register of Historic Places Act compliance. As a part of that process, the lead federal agency will develop an Area of Potential Effects once conceptual level design plans are developed that include all areas that will be potentially impacted, directly or indirectly, by the undertaking. The lead federal agency is then responsible for developing eligibility and effects determinations for impacted resources and initiating consultation with consulting parties, including the SHPO and/or THPO and local historical societies.

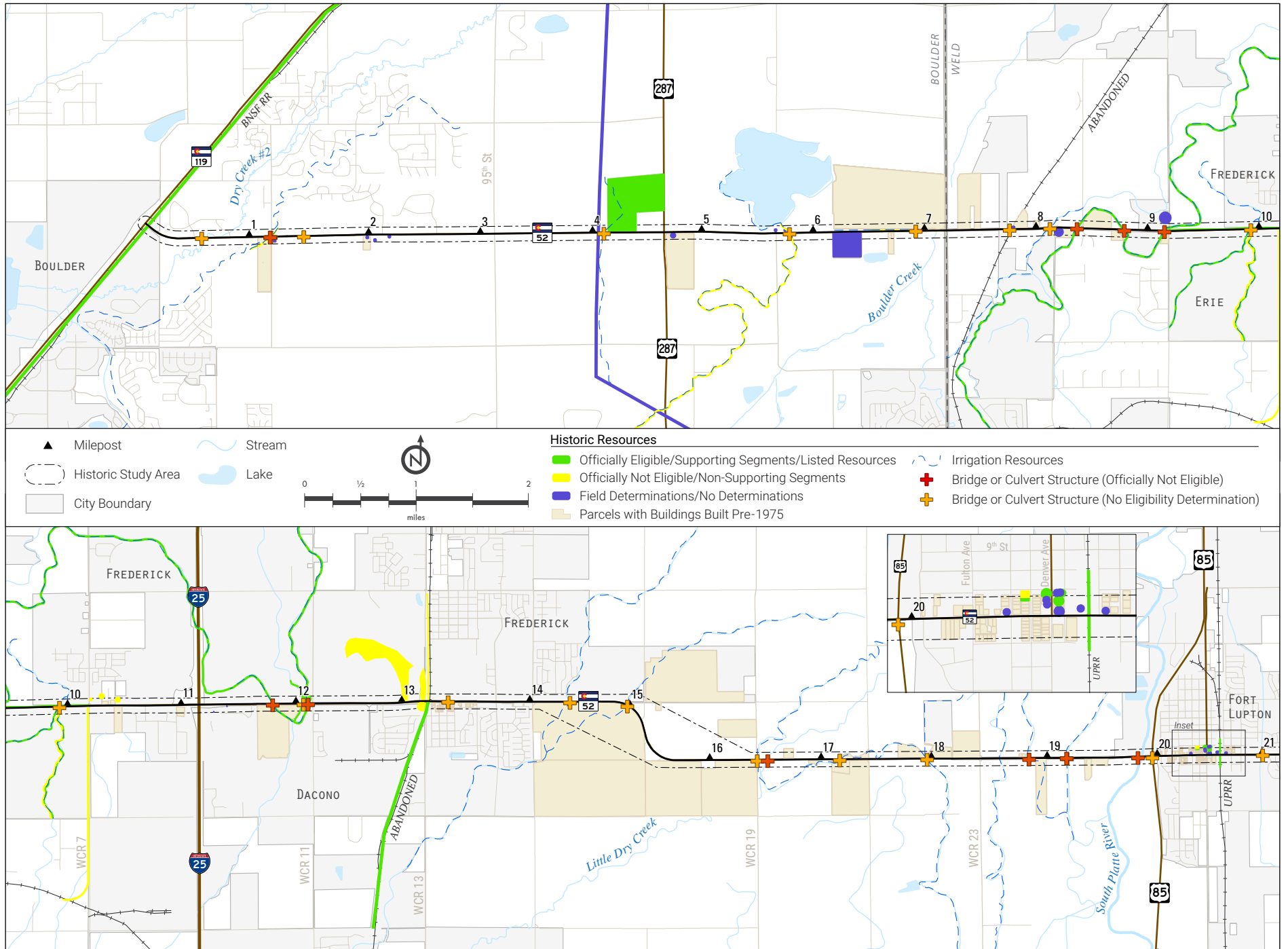
SCHEDULE AND BUDGET: The SHPO and/or THPO is provided an initial 30-day review period. If adverse effects are discovered, consultation, review, and resolution of adverse effects under both Section 106 and Section 4(f) can be a lengthy process, and additional time should be allotted in the schedule for Section 106 and Section 4(f) clearances.



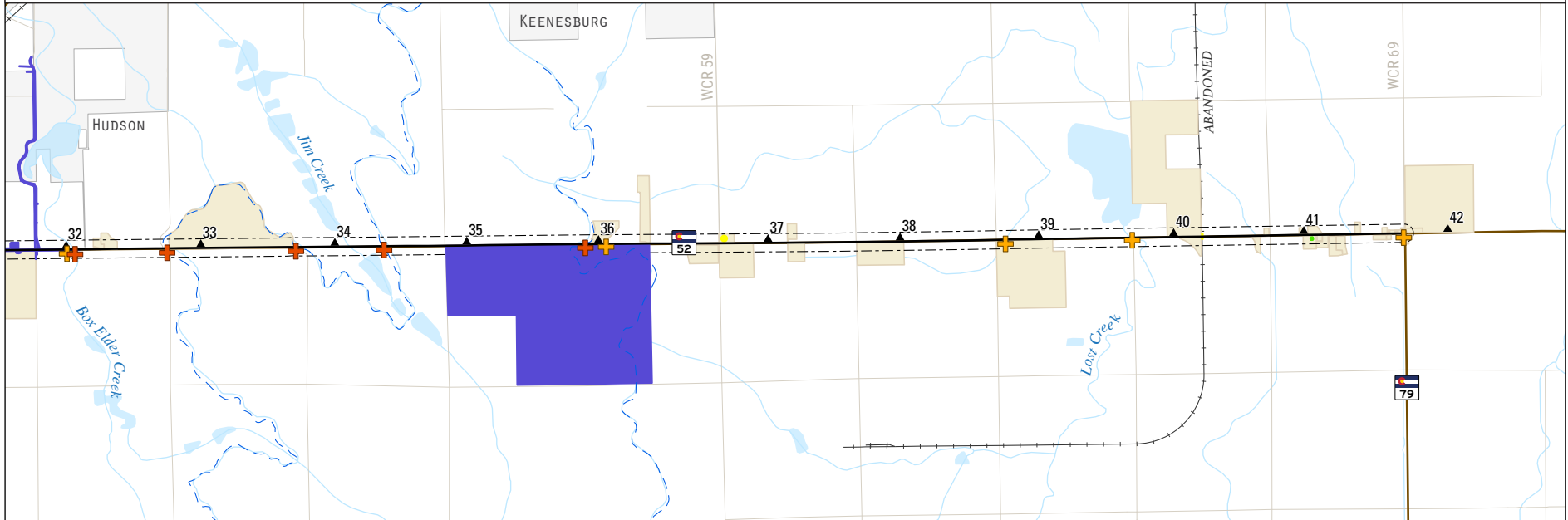
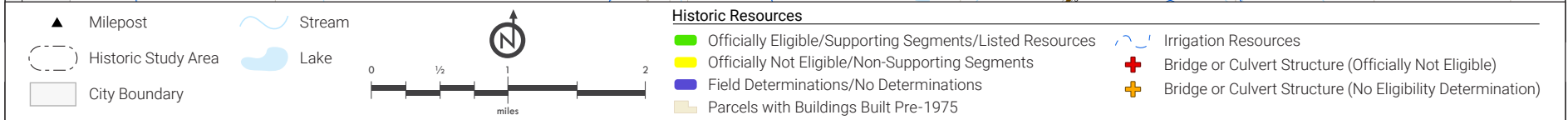
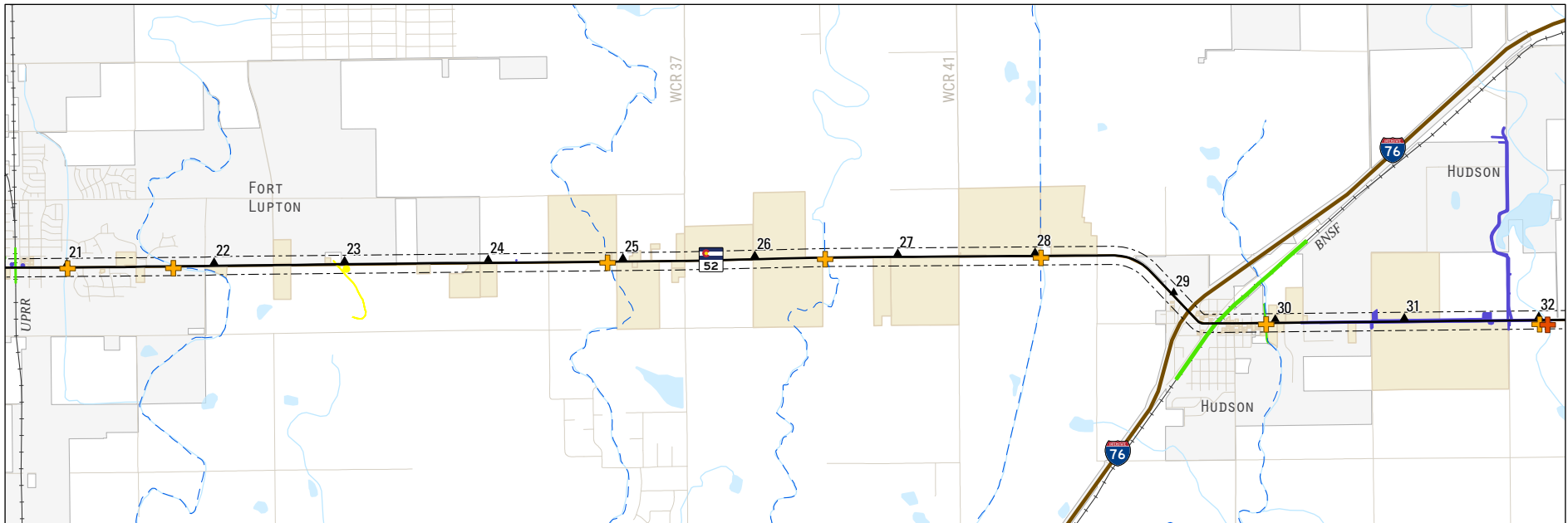
**MOVING
FORWARD**

HISTORIC RESOURCES

Figure 4-7 Historic Resources



HISTORIC RESOURCES



HISTORIC RESOURCES

4.8 Paleontological Resources

Paleontological resources include fossils (the remains and traces of once-living organisms, preserved in the rock record) and the rocks surrounding those fossils that provide context. Because fossil organisms are, for the most part, extinct, no further fossils of those organisms will ever be formed; therefore, fossils are considered to be a non-renewable resource, protected under various state and federal laws and regulations.



AGENCIES

- Federal Highway Administration (FHWA)
- Colorado Department of Transportation (CDOT)

REGULATORY FRAMEWORK

- Historical, Prehistorical, and Archaeological Resources Act: C.R.S. 24-80-401 et al., 1973
- Antiquities Act of 1906: Title 16, Sections 431-433, 1906
- Federal Aid Highway Act of 1956: Title 23, Section 305, 1956
- NEPA: Title 42, Section 4321 et al., 1969
- FLPMA: Title 43, Section 1732 (Pertinent regulations: 43 CFR 2920, 43 CFR 7; informal guidelines for identifying significant fossil localities printed in Appendix B of Kuntz, D. W., H. J. Armstrong, and F. J. Athearn, 1989, "Faults, Fossils, and Canyons: Significant Geologic Features on Public Lands in Colorado", Colorado State Office, Bureau of Land Management Cultural Resources Series 25, 63 p.), 1976
- Paleontological Resources Preservation Act (PRPA), 2009



METHODOLOGY

Geology of the project area was reviewed within the Environmental Study Area. Publicly available mapping data included Geologic Quadrangle Maps.

SOURCES PFYC (Potential Fossil Yield Classification) is a system that classifies geological units from 1 (non-sensitive for paleontological resources) to 5 (highly sensitive for paleontological resources), based on the likelihood of finding scientifically important fossils in each unit. Excavation within each unit classification will require different degrees of mitigation, usually in the form of monitoring by a qualified and permitted paleontologist. Typically units that are classified as PFYC 3 (moderate or unknown sensitivity) will require spot-monitoring, units classified as PFYC 5 will require continuous monitoring, and units classified as PFYC 4 may require some combination of the two depending on the proximity of fossil localities within those units. Units classified as PFYC 1 or 2 do not typically require monitoring for paleontological resources.

Based on the map review, the following table identifies units that may require spot-monitoring or continuous monitoring are known to underlie the project area (*Table 4.6*).

Archaeological Resources

Archeological resources have not been detailed in the Existing Conditions Report since findings are not expected to influence the alternatives. Local archeological sites may require NEPA evaluation for future proposed improvements along the project corridor. NEPA scoping process requires identifying previously recorded sites and surveys within 0.5 miles of the corridor through the Office of Archaeological and Historic Preservation (OAHP). If sensitive areas are revealed in this process, then surveying and construction monitoring may be required.



Roadway improvement projects must consider sensitive archaeological and paleontological resources prior to development

PRE-NEPA RECOMMENDATIONS Two areas along the corridor were identified as PFYC 5 (highly sensitive for paleontological resources). Projects in this area require additional investigations for paleontological resources.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: Spot-monitoring consists of occasional check-ins by a qualified and permitted paleontologist to examine areas of current excavation as well as any debris removed from previously excavated areas. Continuous monitoring requires a qualified and permitted paleontologist to be on site during all excavation into the rock unit being monitored.

SCHEDULE AND BUDGET: In the event that scientifically important fossils are discovered, they will be removed from the work site to a repository museum for further study. This may impact the project schedule but does not typically cause major setbacks. In addition to fossil excavation, other kinds of mitigation may be considered, including educational materials produced about particularly important fossil sites that may be discovered.



MOVING FORWARD

PALEONTOLOGICAL

Table 4.6 FYC Units within the Environmental Study Area

UNIT	FULL UNIT NAME	AGE	PFYC	MAP
Qs2	Slocum Alluvium	Pleistocene	3	Niwot Quad
Kp	Pierre Shale	Cretaceous	3	Niwot Quad
Qes	Eolian Sand and Silt	Holocene and Pleistocene	3	Niwot Quad
Kfh	Fox Hills Sandstone	Cretaceous	3	Niwot Quad
Qe	Eolium	Holocene and Pleistocene	3	Erie Quad
Qs	Slocum Alluvium	Pleistocene	3	Erie Quad
Qc	Colluvium	Holocene and Pleistocene	3	Erie Quad
Kl	Laramie Formation	Cretaceous	3	Erie Quad
Ql	Loess	Pleistocene	3	Fort Lupton Quad
Kdw	Dawson Formation	Cretaceous	5	Fort Lupton Quad
Qss	Alluvial Sand and Silt	Pleistocene	3	Fort Lupton Quad
Qrg	River Gravel	Pleistocene	3	Fort Lupton Quad
Kdw	Dawson Formation	Cretaceous	5	Hudson Quad
Ql	Loess	Pleistocene	3	Hudson Quad
Qe	Loess	Holocene and Pleistocene	3	Frederick Quad
Qg2	Gravel Deposit 2	Pleistocene	3	Frederick Quad
Qa2	Alluvium 2	Holocene and Pleistocene	3	Frederick Quad
Qgo	Older Gravel and Alluvium	Pleistocene	3	Greeley 1x2
TKd	Denver Formation	Paleocene and Cretaceous	5	Greeley 1x2
Qg	Gravel and Alluvium	Pleistocene	3	Greeley 1x2

Sources: Braddock, 1978; Colton, 1977; Keller and Morgan, 2018; Soister, 1965a; Soister, 1965b; Trimble, 1975

Keller, S.M., and Morgan, M.L., 2018, Geologic Map of the Frederick Quadrangle, Weld and Broomfield Counties, Colorado: Colorado Geological Survey, Open-File Report 18-01, scale 1:24,000”
 Braddock, W.A., and Cole, J.C., 1978, Preliminary geologic map of the Greeley 1 degree x 2 degree quadrangle, Colorado and Wyoming: U.S. Geological Survey, Open-File Report OF-78-532, scale 1:250,000

Soister, P.E., 1965, Geologic map of the Fort Lupton quadrangle, Weld and Adams Counties, Colorado: U.S. Geological Survey, Geologic Quadrangle Map GQ-397, scale 1:24,000

Soister, P.E., 1965, Geologic map of the Hudson quadrangle, Weld and Adams Counties, Colorado: U.S. Geological Survey, Geologic Quadrangle Map GQ-398, scale 1:24,000

Trimble, D.E., 1975, Geologic map of the Niwot quadrangle, Boulder County, Colorado: U.S. Geological Survey, Geologic Quadrangle Map GQ-1229, scale 1:24,000

4.9 Traffic Noise

Noise is defined as unwanted sound and includes any sound that is generally considered annoying or offensive. Physical and operational changes to the highway may cause noise levels to increase and be noticeable to receptors, if not mitigated. Noise receptors are locations where highway traffic noise may be detrimental to enjoyment and functional use of a property.



AGENCIES

- Federal Highway Administration (FHWA)
- Colorado Department of Transportation (CDOT)
- Local agencies

REGULATORY FRAMEWORK

• Title 23 Code of Federal Regulations §772 – Procedures for Highway Abatement of Traffic Noise and Construction Noise

• Federal Highway Administration’s Highway Traffic Noise: Analysis and Abatement Policy and Guidance, 2011

• Colorado Department of Transportation Noise Analysis and Abatement Guidelines, 2015

The traffic noise study area is defined as the study corridor within a 500-foot buffer from the CO 52 travel lanes and is used to consider noise-sensitive resources adjacent to the study corridor. This follows CDOT guidance for a NEPA noise analysis area, which is 500 feet from the edge of any proposed transportation improvements. A desktop review of aerial imagery was completed to collect data on adjacent land uses. Boulder County (Boulder County Assessor’s Office, 2018) and Weld County (Weld County Assessor’s Office, 2020) GIS data sets were also consulted to determine land use within the study corridor.



METHODOLOGY

Activity Categories are categories of land use adjacent to a roadway project. The categories are designated A through G in the CDOT Noise Analysis and Abatement Guidelines (CDOT, 2015a). The definitions of the Activity Categories are included in Table 4.1. For this analysis, existing land uses within the traffic noise study area that fell within Activity Category B (residential), C (exterior parks and public areas), and E (exterior developed land uses) were identified. Activity Categories A and D do not occur in the traffic noise study area. Activity Categories F and G receptors are non-sensitive to traffic noise or undeveloped land uses, and are not considered sensitive noise receptors.

Results of the data review indicated that 888 of 1,480 parcels in the traffic noise study area contain noise-sensitive land uses. These Activity Categories and the noise-sensitive areas are summarized in *Table 4.7* and displayed in *Figure 4-8*.



Increasing truck traffic near residential areas

PRE-NEPA RECOMMENDATIONS Projects should consider potential noise receptors along the corridor such as parks, trails, and rural homes in Boulder and Weld Counties. NEPA requires a comparison of a proposed alternative (in the design year) with a baseline (the no-build alternative or no action alternative, in the existing year) to evaluate potential changes in the traffic noise environment.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: A traffic noise assessment is required for Type 1 projects (as defined in CDOT Noise Analysis and Abatement Guidelines [CDOT, 2015a]) to determine if the proposed project would have impacts on sensitive receptors. A traffic noise impact is considered to occur when any noise-sensitive receptor is subjected to either 1) future noise levels that approach or exceed the Noise Abatement Criteria, or 2) future noise levels that substantially exceed the existing noise levels. Both of the above must be analyzed to adequately assess the noise impact of a proposed project. Qualified practitioners, as defined by the CDOT Noise Analysis and Abatement Guidelines (CDOT, 2015a), must conduct noise evaluations.

SCHEDULE AND BUDGET: Project scheduling and budget should consider including time for the above NEPA approvals and any coordination for compliance with local noise ordinances during construction.



MOVING FORWARD

Table 4.7 CDOT Noise Abatement Criteria and Noise-Sensitive Areas

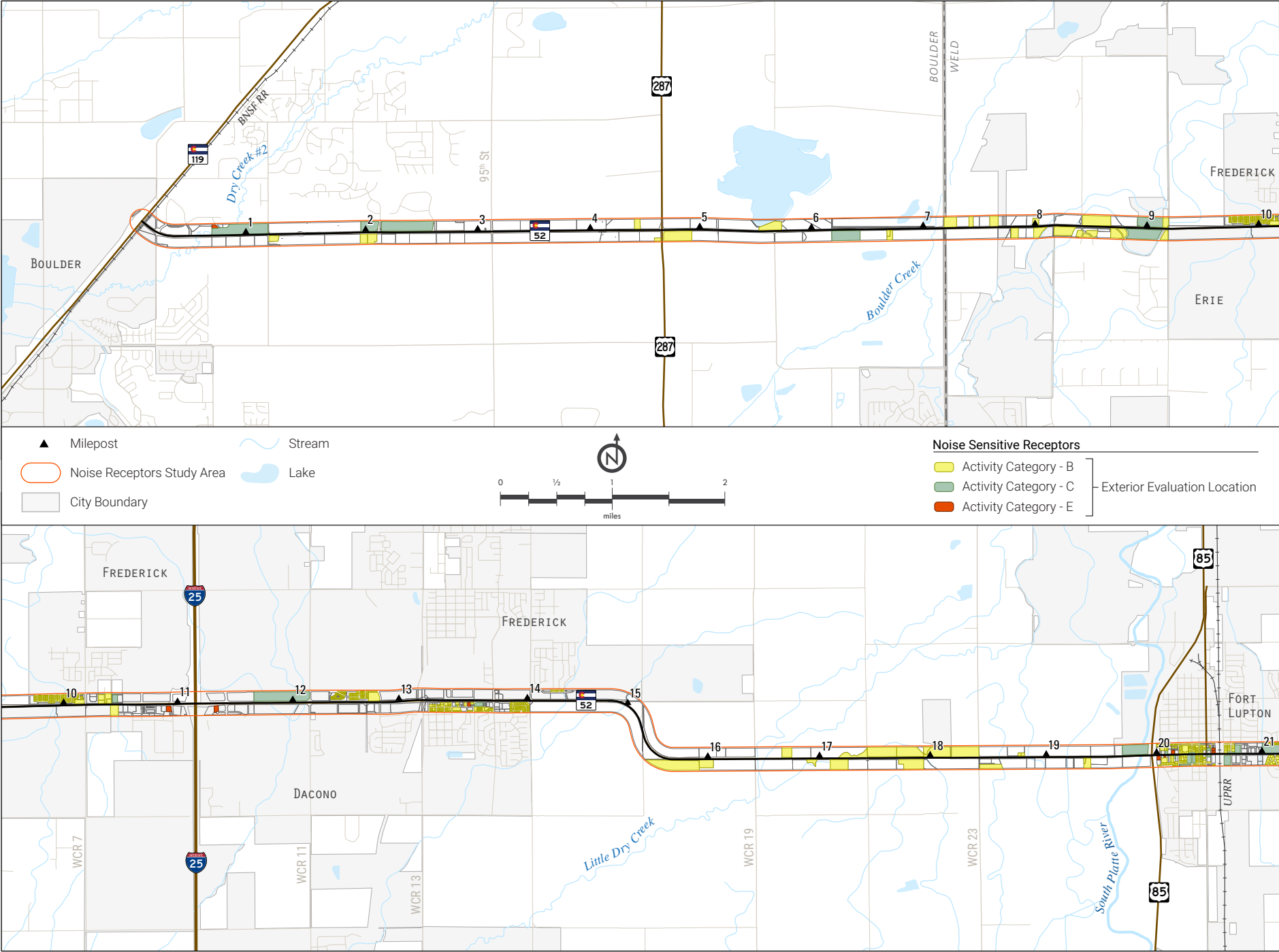
LOCATION	NOISE-SENSITIVE AREA SUMMARIES	POTENTIAL NOISE IMPACT AND ABATEMENT AREAS
Activity Category B** – 66 dBA* Exterior		
Boulder County	Rural homes on large parcels (some with agriculture) dispersed along the corridor.	Rural homes concentrated between N 79th Street and N 95th Street
Weld County	Rural homes on large parcels (some with agriculture) dispersed along the corridor, along with medium density homes, under construction homes, and mobile homes.	Rural homes concentrated between CR 1 and CR 5, between CR 17 and CR 23, between CR 29 1/2 and CR and CR 41, between CR 49 and CR 51, and between CR 55 and CR 63. Medium density homes concentrated between CR 5 and I-25, between CR 67 and CR 69, and in Dacano, Fort Lupton, and Hudson. Under construction medium-density homes between Silver Birch Road and Colorado Boulevard. Mobile home park located near NE County Line Road
Activity Category C** – 66 dBA Exterior		
Boulder County	Parks, trails, and an equestrian area throughout the corridor.	Parks and trails concentrated between N 71st Street and N 95th Street, Equestrian area between N 107th Street and CR 1.
Weld County	Parks/recreation areas, places of worship, medical facilities, veterinarian clinics, schools, non profit structures, and golf courses throughout the corridor.	Park/recreation areas concentrated between CR 3 1/2 and CR 5, near Fort Lupton, and between CR 53 and CR 55. Places of worship concentrated in Fort Lupton, Hudson, and between CR 67 and CR 69.
Activity Category E** – 71 dBA Exterior		
Boulder County	Office with outdoor seating.	Office with outdoor seating located near CO 119.
Weld County	Restaurants and offices with outdoor seating.	Restaurants and offices with outdoor seating concentrated in Fort Lupton, Hudson, Dacono, and near I-25.

* A-weighted decibels, abbreviated dBA, are an expression of the relative loudness of sounds in air as perceived by the human ear.

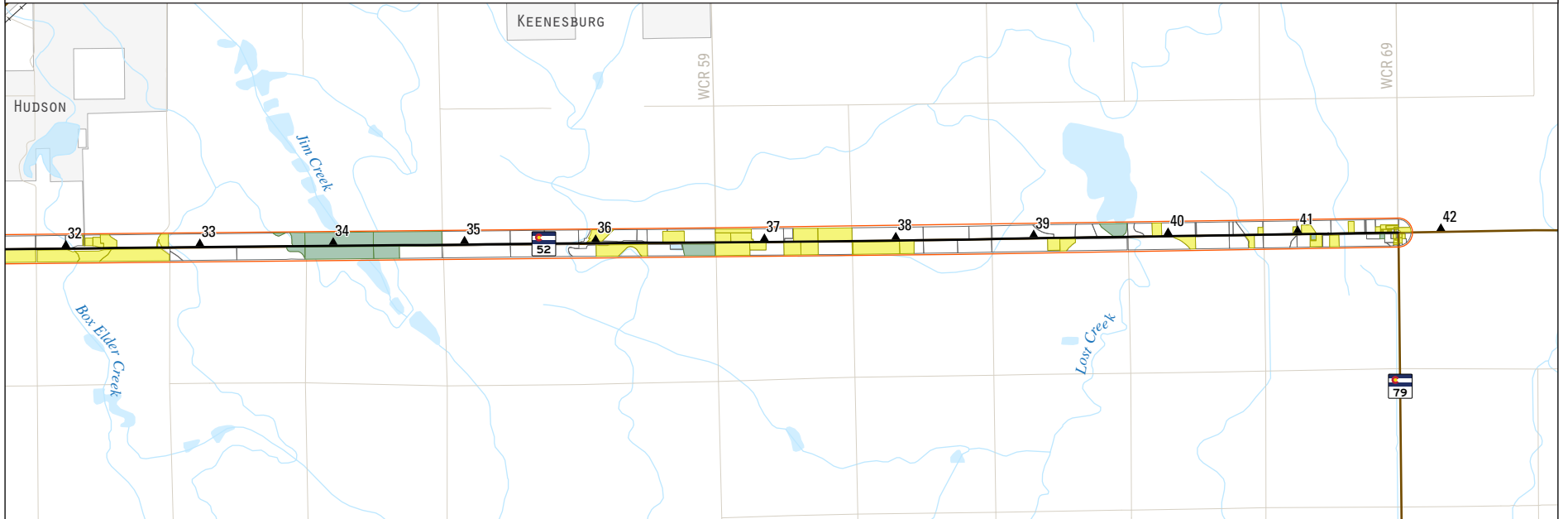
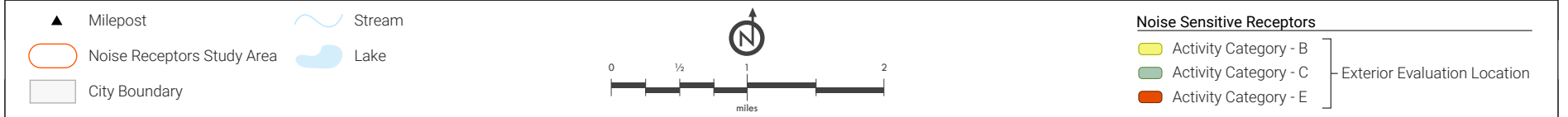
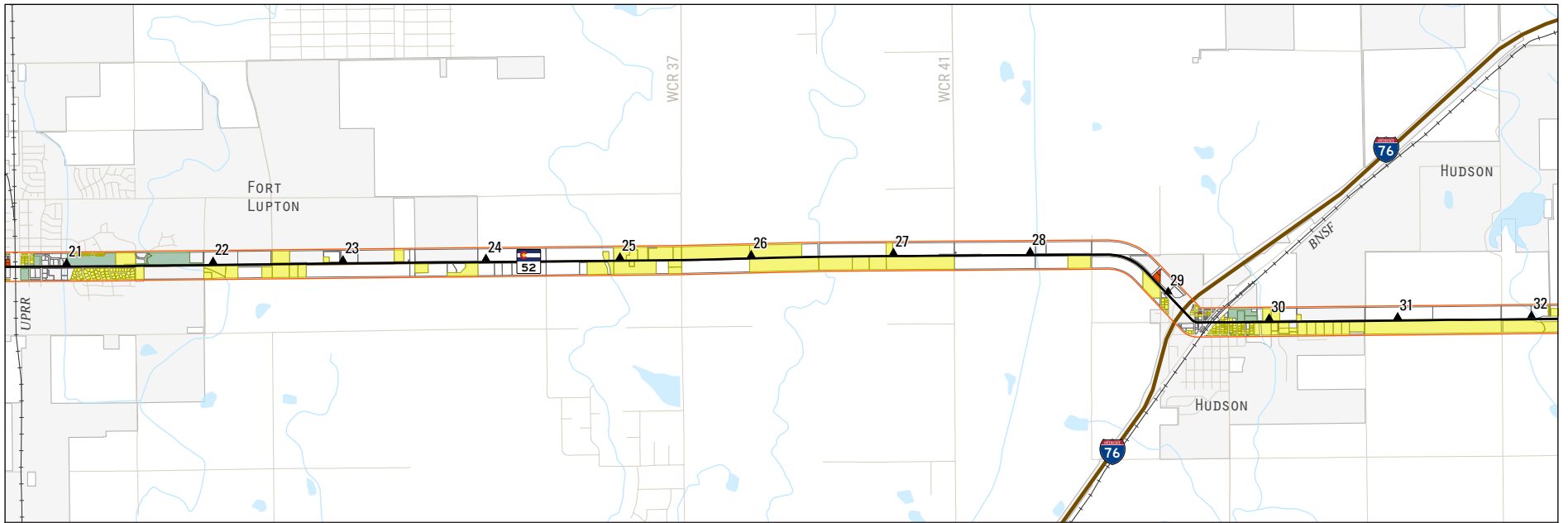
**Activity Category A receptors are extremely rare and apply only to extraordinary special public needs where the existing environment is of a serene nature that needs to be preserved to allow the area to continue to serve its purpose. Activity Category B receptors are residential land uses. Activity Category C are active sport areas, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings. Activity Category D describes criteria for interior evaluations when all exterior analytical methods have been exhausted. Activity Category E are exterior land uses, such as hotels, motels, time-share resorts, vacation rental properties, offices, restaurants/bars, and other developed lands, properties or activities not included in Categories A-D or F. Activity Categories F and G receptors are non-sensitive to traffic noise or undeveloped land uses, and are not considered noise sensitive.

Source: CDOT, 2015a

Figure 4-8 Activity Categories and Noise-Sensitive Areas



TRAFFIC NOISE



TRAFFIC NOISE

4.10 Parks, Trails, Open Spaces, Wildlife and Waterfowl Refuges

FHWA funded projects must consider historic and non-historic 4(f) resources when developing transportation projects. Non-historic Section 4(f) resources are defined as existing and planned public parks; recreation areas; and wildlife or waterfowl refuges of national, state, or local significance. Public open spaces and recreational trails are also eligible for 4(f) status. Historic 4(f) resources are described in Section 4.7.

All transportation projects must consider 6(f) resources—public lands and facilities purchased or enhanced using Land and Water Conservation Fund (LWCF) Act grants through the U.S. Department of the Interior (USDOI) National Park Service (NPS) and CPW.



AGENCIES

- U.S. Department of Interior (US DOI)
- Federal Highway Administration (FHWA)
- National Park Service (NPS)
- U.S. Army Corps of Engineers (USACE)
- Colorado Department of Transportation (CDOT)
- Colorado Parks and Wildlife (CPW)
- Great Outdoors Colorado
- Local agencies

REGULATORY FRAMEWORK

Section 4(f) of the Department of Transportation Act, 1966 Land and Water Conservation Fund (LWCF) Act, 1965



METHODOLOGY

Section 4(f) and 6(f) resources were assessed within the Environmental Study Area, which is defined as a 1,000-foot buffer from the CO 52 centerline within the project limits. In Boulder County the Section 4(f) and 6(f) study area was extended for trails—north to Monarch Road and south to Lookout Road—to illustrate that changes within the project limits could affect connectivity in the existing trail and bicycle-pedestrian system. In Frederick and Dacono in Weld County, the Environmental Study Area was extended north to 8th Street and south to 2nd Street, also to illustrate that CO 52 changes could affect connectivity related to the existing trails system. Section 4(f) and 6(f) resources were compiled by reviewing the information collected from review of the relevant plans.

Findings from the May 2020 desktop review are illustrated in *Table 4.8* and *Figure 4-9*.

PARKS AND TRAILS The corridor contains several existing and future recreational trailheads and trail crossings (See Sections 3.6 and 3.7). Sections of four different major regional trails intersect the corridor, including the Longmont-to-Boulder, Colorado Front Range, St. Vrain Legacy, and Little Dry Creek Trails (City of Dacono, 2008; City

of Dacono, 2017; Town of Frederick, 2010; Town of Frederick, 2015; Town of Frederick, 2020b; City of Fort Lupton, 2018). There are two parks classified as 6(f), the City of Fort Lupton's Pearson Park and Fort Lupton School Community Park. Additionally, the Dacono and Frederick Portion of the St. Vrain Legacy Trail is a 6(f) resource.

OPEN SPACE The corridor hosts multiple open space properties, including the bisected Bulrush Wetland Park, a regional open space (Town of Frederick, 2020a). Although there are 44 open space parcels in the Environmental Study Area between CO 119 and East County Line Road, with most directly adjacent to CO 52, only 7 parcels host public access (Boulder County, 2020a-2020d). These seven parcels form parts of four 4(f) resources: Gunbarrel-Heatherwood Natural Area, Monarch Park, Hillside Estates, and Somerset Estates (Boulder County, 2020b).

WILDLIFE AND WATERFOWL REFUGES The largest Section 4(f) resource identified is the 934-acre Banner Lakes State Wildlife Area (Banner Lakes SWA) bisected by CO 52 and located between Weld County Road (WCR) 51 and WCR 55. At least five Banner Lakes SWA public facilities are within the Environmental Study Area (CPW, 2020b).

SECTION 6(f) PROPERTIES Two 6(f) resources are in the Environmental Study Area: Pearson Park in Fort Lupton and the Frederick portion of the St. Vrain Legacy Trail. There is one 6(f) resource just outside the Environmental Study Area—the Fort Lupton Schools property (CDOT, 2020a ; CPW 2020d).

PRE-NEPA RECOMMENDATIONS To avoid delays Section 4(f) and 6(f) evaluations should occur at the start of the NEPA process and be considered during alternatives analysis.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: Affected properties require coordination with FHWA, CDOT, and officials with jurisdiction. If there is an identified "use" for transportation purposes, recreation properties must be evaluated separately. Planning for these evaluations assists in the ability to meet both project approval and construction timelines. Ultimately, the FHWA is responsible for making decisions related to Section 4(f) compliance.

CONSTRUCTION/DESIGN: If avoiding impacts to 4(f) and 6(f) properties is not feasible or prudent, planning and documentation of measures to minimize harm or mitigate impacts, is required. An individual Section 4(f) approval process can take one year or more, whereas exceptions or de minimis determinations (for minor use) can take four to six months. It is recommended to avoid 6(f) impacts when possible as one-to-one acreage replacement of equal or greater resource value is required. Negotiations and mitigation plan approval for Section 6(f) resources can take 16 months or more and require National Parks Service approval.



MOVING FORWARD

RECREATIONAL RESOURCES

Table 4.8 CO 52 Section 4(f) and 6(f) Resources Listed West to East from CO 119 to CO 79

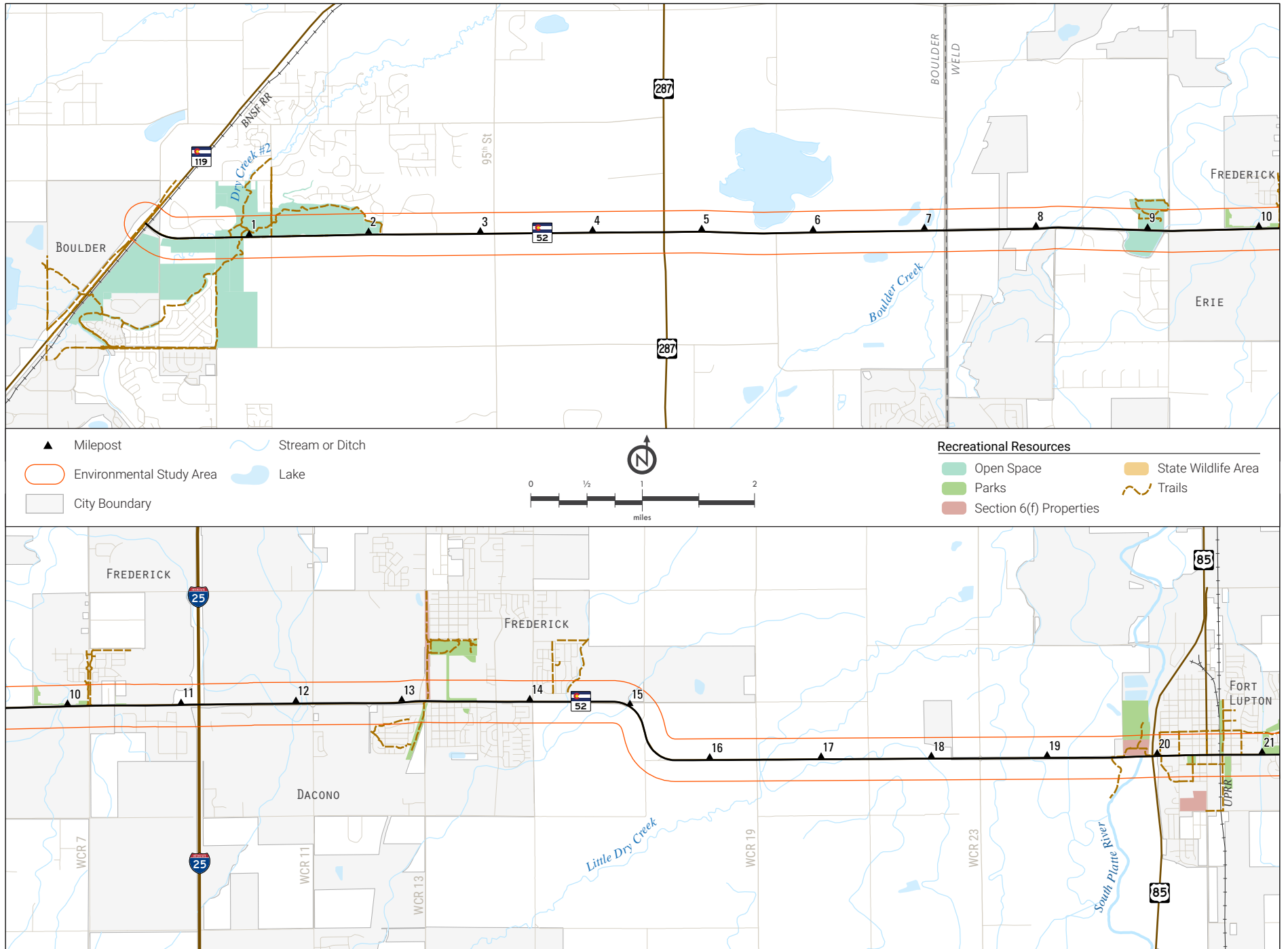
4(F)	6(F)	RESOURCE NAME	COMMENTS
PARKS			
X		Frederick Wyndham Hill Park	Adjacent to CO 52
X		Frederick Centennial Park	Within Environmental Study Area
X		Frederick Entryway Plaza	Adjacent to CO 52
X		Dacono Memorial Park	Within Environmental Study Area
X		Dacono 7th Street Park	Within Environmental Study Area
X	X	Fort Lupton Pearson Park	Adjacent to CO 52
X		Fort Lupton Koshio Park	Adjacent to CO 52
X		Fort Lupton Railroad Park	Adjacent to CO 52
X		Fort Lupton Community Center Park	Adjacent to CO 52
X		Fort Lupton Coyote Creek Golf Course	Adjacent to CO 52
X		Hudson I-76 Traveler Park (Future)	Future Park Adjacent to CO 52 - publicly owned assets that are set aside for future recreation are considered 4(f)
X		Hudson Ash Street Property	Adjacent to CO 52
X		Hudson 4th Ave Mini Park (Future)	Future Park within Environmental Study Area - publicly owned assets that are set aside for future recreation are considered 4(f)
X		Hudson Memorial Park	Adjacent to CO 52
TBD	X	Fort Lupton Schools	Within Environmental Study Area and portions of public school properties used mainly for recreation can be considered 4(f) resources and Fort Lupton School Community Park is 6(f)
TBD		Weld Central Middle School	Adjacent to CO 52 and portions of public school properties used mainly for recreation can be considered 4(f) resources, several CO public school playgrounds are 6(f)

(table continued on next page)

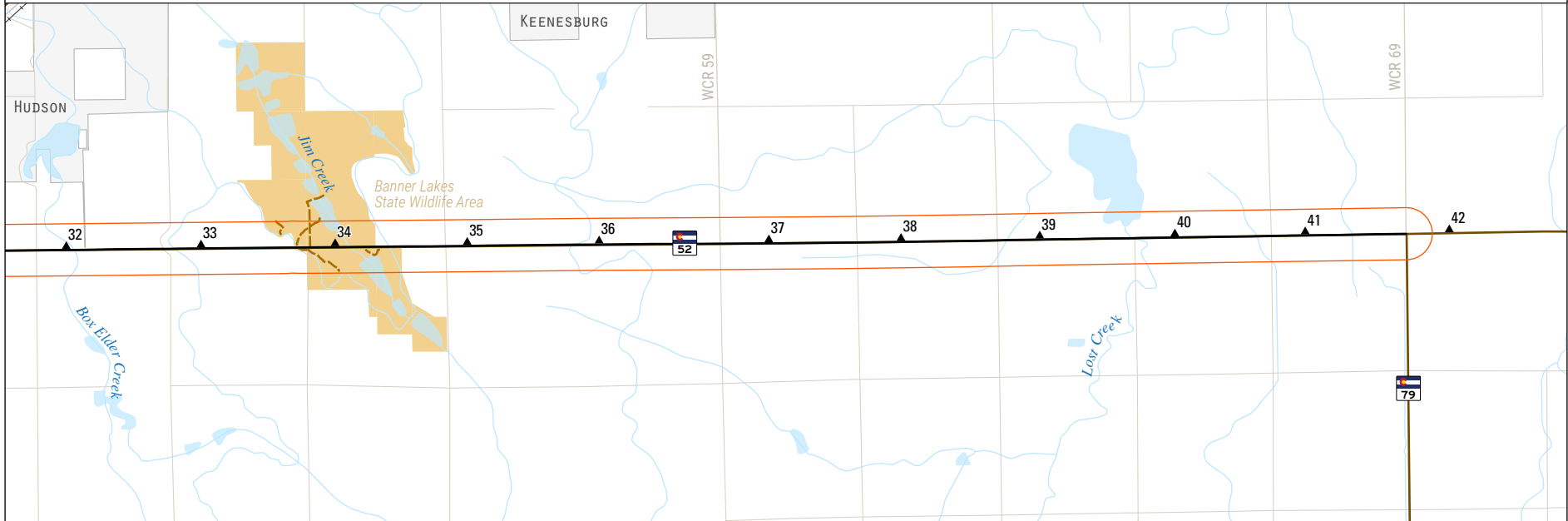
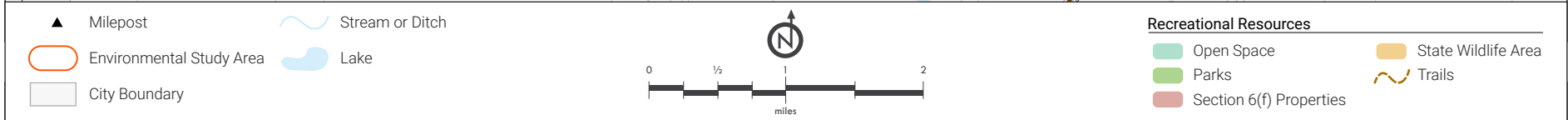
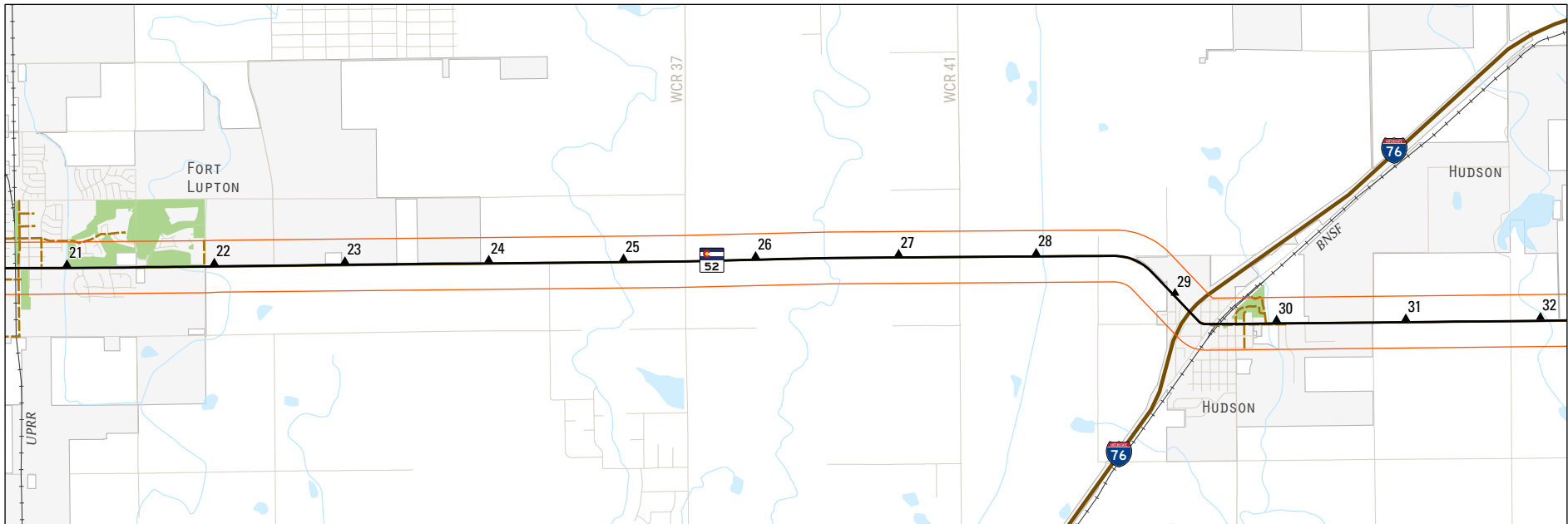
4(F)	6(F)	RESOURCE NAME	COMMENTS
TRAILS			
X		Niwot and Boulder County Longmont-to-Boulder (LoBo) Regional Trail / Cottontail Trail	LoBo portion (Cottontail Trail) crosses CO 52 about 0.10-mile before highway milemarker "1" and 0.25-mile before N 79th St
X		Niwot and Boulder County Niwot Trail System	Niwot Loop Trailhead and multiple local trails within Environmental Study Area from CO 119 to N 95th St and crossing CO 52
X		Town of Frederick and City of Dacono Colorado Front Range Trail (CFRT) Frederick and Dacono Portion	Part of multi-state Wyoming to New Mexico trail system and crossing Environmental Study Area at Colorado Blvd and CO 52
X	X	Town of Frederick and City of Dacono St. Vrain Legacy Trail Frederick and Dacono Portion	Trails connecting Firestone, Frederick, Dacono, Erie and Longmont with St. Vrain State Park and intersecting with CFRT at CO 52 with the Frederick portion also a 6f resource
X		Frederick Bulrush Wetland Park Trails	Soft trails with public access upon reservation
X		Dacono Loop Trail	Existing and future trailheads and neighborhood trails from I-25 to Weld County Road (WCR) 21 and crossing CO 52
X		Little Dry Creek Regional Trail Dacono Portion (Future)	Existing and future trailheads and trails connecting Arvada, Westminster, Broomfield, Thornton and Dacono up to CO 52
X		Fort Lupton Multi-use Trails	Existing and future trailheads and multiple local trails from WCR 23 to WCR 35 and crossing CO 52
X		Hudson Multi-use Trails	Existing trails in parks and conceptual trails adjacent to and crossing CO 52 connecting Hudson with Box Elder Creek, Banner Lakes State Wildlife Area, and the Wild Animal Sanctuary
X		Banner Lakes State Wildlife Area Trails	Facilities and informal trails along north and south sides of CO 52
OPEN SPACE			
X		City of Boulder Open Space and Mountain Parks Gunbarrel-Heatherwood Natural Area	Adjacent to CO 52 and contains portions of Dry Creek, LoBo trail and City of Boulder trails
X		Boulder County Parks and Open Space Monarch Park	Adjacent to CO 52 and contains portions of Dry Creek, LoBo trail and Niwot trails
X		Boulder County Parks and Open Space Hillside Estates	Adjacent to CO 52 and contains Niwot trails
X		Boulder County Parks and Open Space Somerset Estates	Adjacent to CO 52 and contains Legend Ridge Trail, a soft surface trail that is part of Niwot trails system
X		Frederick Bulrush Wetland Park	Bisected by CO 52 and provides public access upon reservation while also serving as a USACE chartered wetland mitigation bank
WILDLIFE AND WATERFOWL REFUGES			
X		Banner Lakes State Wildlife Area	This site is bisected by CO 52 and hosts seasonal public access primarily for hunting and fishing with hiking and wildlife viewing allowed outside of hunting and waterfowl nesting season

Source: Relevant land use plans identified in references

Figure 4-9 CO 52 Section 4(f) and 6(f) Resources Shown West to East from CO 119 to CO 79



RECREATIONAL RESOURCES



RECREATIONAL RESOURCES

4.11 Environmental Justice

Environmental justice analysis evaluates the impacts of programs, policies, and activities on low-income and minority populations to achieve an equitable distribution of benefits and burdens. The Federal Highway Administration (FHWA) and Colorado Department of Transportation (CDOT) are required to identify and address disproportionately high and adverse human health and environmental effects on low-income and minority populations to ensure compliance with Executive Order 12898. The following section will provide an overview of environmental justice considerations for future CO 52 projects and minority and low-income populations in the communities surrounding the Project.



AGENCIES

- Federal Highway Administration (FHWA)
- Colorado Department of Transportation (CDOT)
- U.S. Department of Housing and Urban Development (HUD)
- U.S. Census Bureau

REGULATORY FRAMEWORK

- Executive Order 12898, Environmental Justice for Low Income & Minority Populations, 1994
- Title VI of the Civil Rights Act of 1964, as amended
- FHWA Order 6640.23A on Environmental Justice, 1994
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, 2000
- FHWA Guidance on Environmental Justice and NEPA, 2011
- U.S. Department of Transportation (USDOT) Order 5610.2(a) on Environmental Justice, 2012
- FHWA Environmental Justice Reference Guide, 2015
- CDOT National Environmental Policy Act Manual, Version 5, 2017

FHWA and CDOT have established guidelines for identifying minority and low-income populations, potential impacts, and potential mitigation measures. Data was collected and analyzed in accordance with FHWA and CDOT guidelines (*Tables 4.9 and 4.10*).

- **Minority Population:** A minority is a person who is Black, Hispanic or Latino, Asian American, American Indian or Alaska Native, or Native Hawaiian or Pacific Islander. A minority also includes other races (non-white and not previously listed) and those of two or more races. Hispanic or Latino heritage is accounted for as an ethnicity in census data and is not listed as a racial category. U.S. Census takers may select both ethnicity as well as a racial category (e.g. Hispanic/Latino Origin and White). To avoid double counting ethnicity and race, the minority population is derived by subtracting the portion of the population categorized as not Hispanic, white alone from the total population. This represents the minority population which is then divided by the total population to obtain the percent minority (2018, ACS DP 05).



METHODOLOGY

- **Low Income Population:** Low income populations are defined by using U.S. Census household size data and income limits set by the HUD. That percentage is determined by calculating the number of households with an annual income 30 percent below the area median income (AMI) for an average household size of 2.46, which in the Boulder County area is \$26,100. In Weld County, an average household size is 2.83 with a low income estimate of \$22,100. Because income data is released from the US Census in increments of \$5,000, the low-income threshold used in the analysis is \$25,000 per year (2018, ACS DP 03)(2018, HUD).

Table 4.9 Minority Populations within EJ Study Area

LOCATION	HOUSING DESCRIPTION	AREA BOUNDARIES
West of I-25	Single Family Residential and a Mobile Home Park Rural Residential	3 Census blocks with 30% or more minority population SE of 119 and Jay Road: 43% minority 2 contiguous Census Blocks bounded by 95th to the west and Aggregate Boulevard to the east and south to Lookout Road (crosses over CO 52). 45% minority
East of I-25: Census Blocks around Fort Lupton	Rural Residential Primarily Single Family Residential	6 Census Blocks with 30% or more minority population West of US85 bounded by WCR 18 on the north and WCR 19 to the west: 41% minority 5 Census Blocks bounded by US 85 to the west and WCR 23 to the north. Both sides of CO 52. 38% to 70% minority
East of I-25: Census Block northeast of intersection of CO 52 and I-76	Rural and Single Family Residential	1 Census block with more than 30% minority population I-76 to the north, CO 52 on the south encompassing Hudson and Keenesburg; 36% minority

Source: U.S. Census Bureau, 2010

Table 4.10 Low Income Populations within EJ Study Area

LOCATION	HOUSING DESCRIPTION	AREA BOUNDARIES
West of I-25	Single Family Residential and a Mobile Home Park	2 Census blocks with 20% or more low income population Southeast of 119 and Jay Road: 34% low income
	Rural Residential	South of CO 52, east of County Line surrounded by Sullivan Ditch: 31% low income
East of I-25	Single Family Residential	1 Census Block with 20% or more low income population Forest Avenue to the west, Stanley Ditch to the south, CO 52 to the north, and Ridgeway Boulevard to the east: 27% low income
	Primarily Single Family Residential	Small census blocks just east of US85, immediate north of and south of the CO 52 corridor. 22% to 24% low income
East of I-25: Census Block northeast of intersection of CO 52 and I-76	Rural and Single Family Residential	1 Census block with more than 20% low income population I-76 to the north, CO 52 to the south encompassing Hudson and Keenesburg. 28% minority

Source: Census Data, 2010

Findings are depicted at the Census Block Group level which is the lowest level geography available for this data. Percentages are calculated based on total populations and households in the outlined census block groups (Figure 4-10 and 4-11).



CO 52 (MP 3) looking west along corridor



MOVING FORWARD

PRE-NEPA RECOMMENDATIONS Future projects will need to consider environmental justice analyses for individual projects during subsequent preliminary engineering and environmental processes. Environmental justice analysis is typically a subset of the social and economic resources analyses completed during NEPA. Social and economic resources analyses will consider a broader scope of social and economic impact concerns, such as community resources and businesses affected by the project or construction.

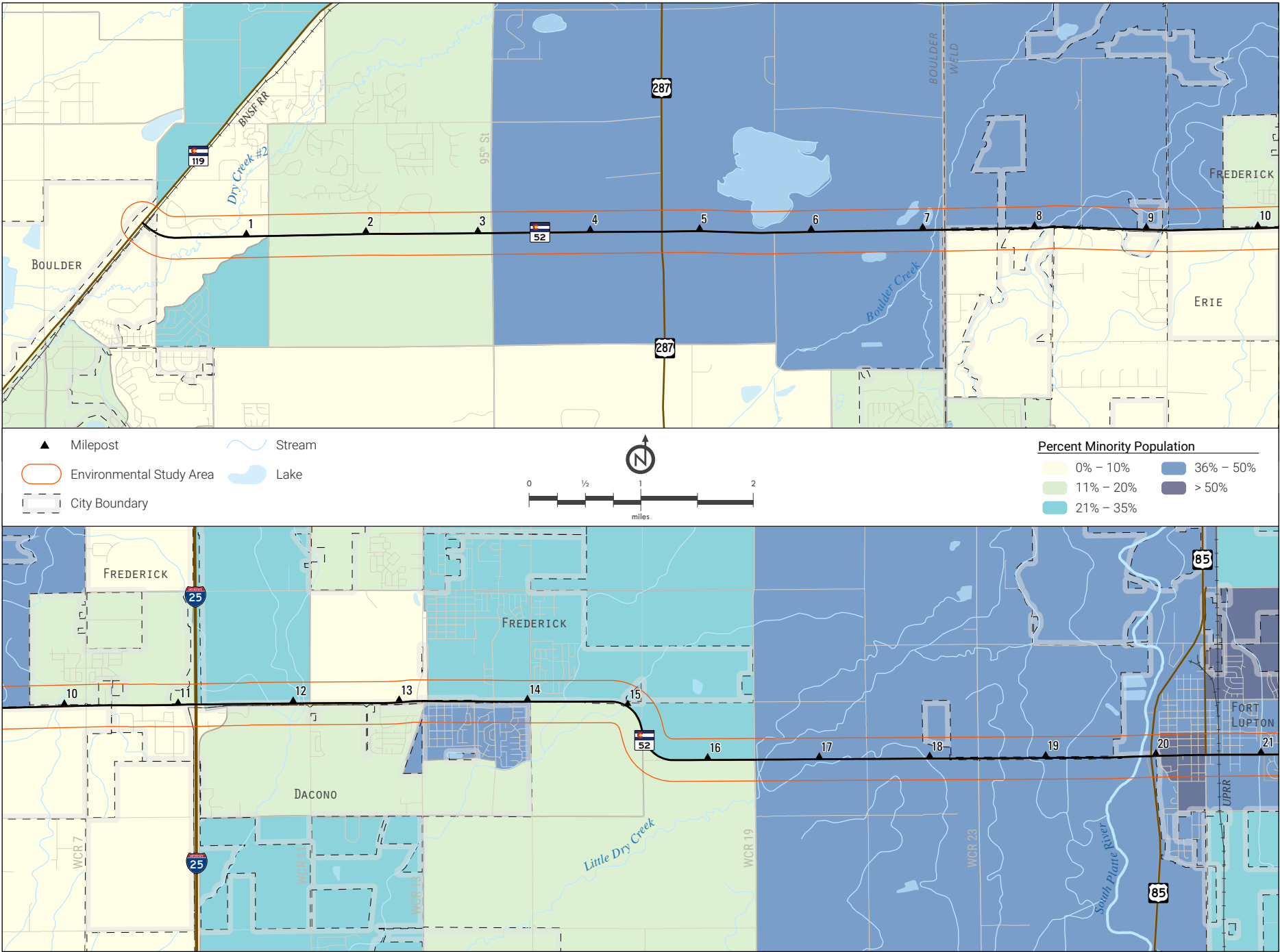
DESIGN AND PROJECT IMPLICATIONS

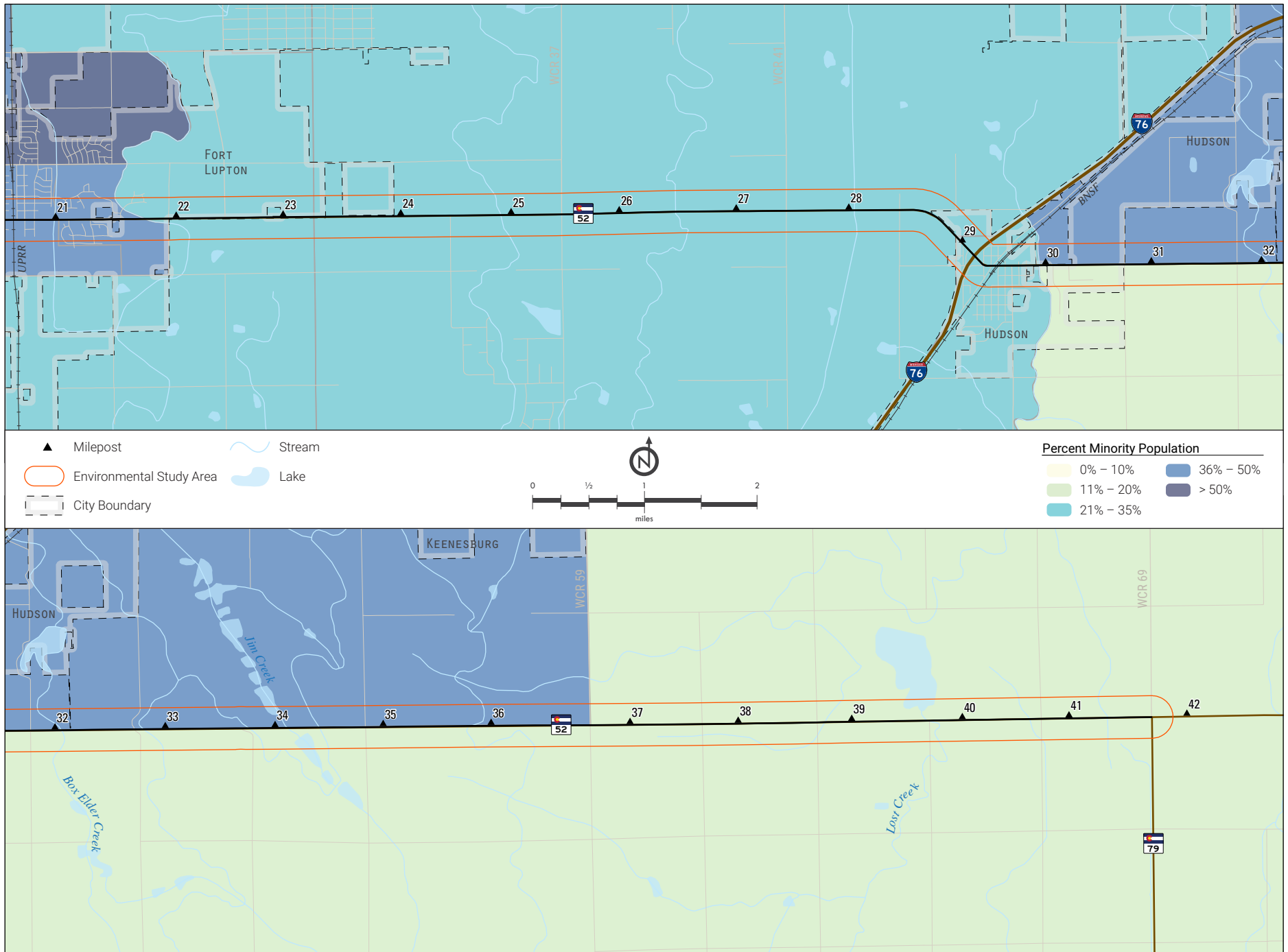
SCOPE: The NEPA process for individual projects will require the following information be determined and documented:

- Area of potential impact for the project and identification of minority and low-income populations and resources serving these populations
- Opportunities for public participation provided throughout the project development process, which may require specialized outreach
- Environmental effects and benefits of the project on all communities and if those effects are disproportionately high or adverse for the identified Environmental Justice populations
- Feasible mitigation measures, if applicable
- Whether the effects remain disproportionately high and adverse after mitigation, if applicable

In the Alternatives Analysis, each alternative will be assessed for positive or negative impacts to low-income and minority populations. Efforts will be made to mitigate any adverse impacts to these environmental justice populations identified during the NEPA analysis. This can be done by minimizing impacts, reducing or eliminating the impact over time, or compensating for the impact.

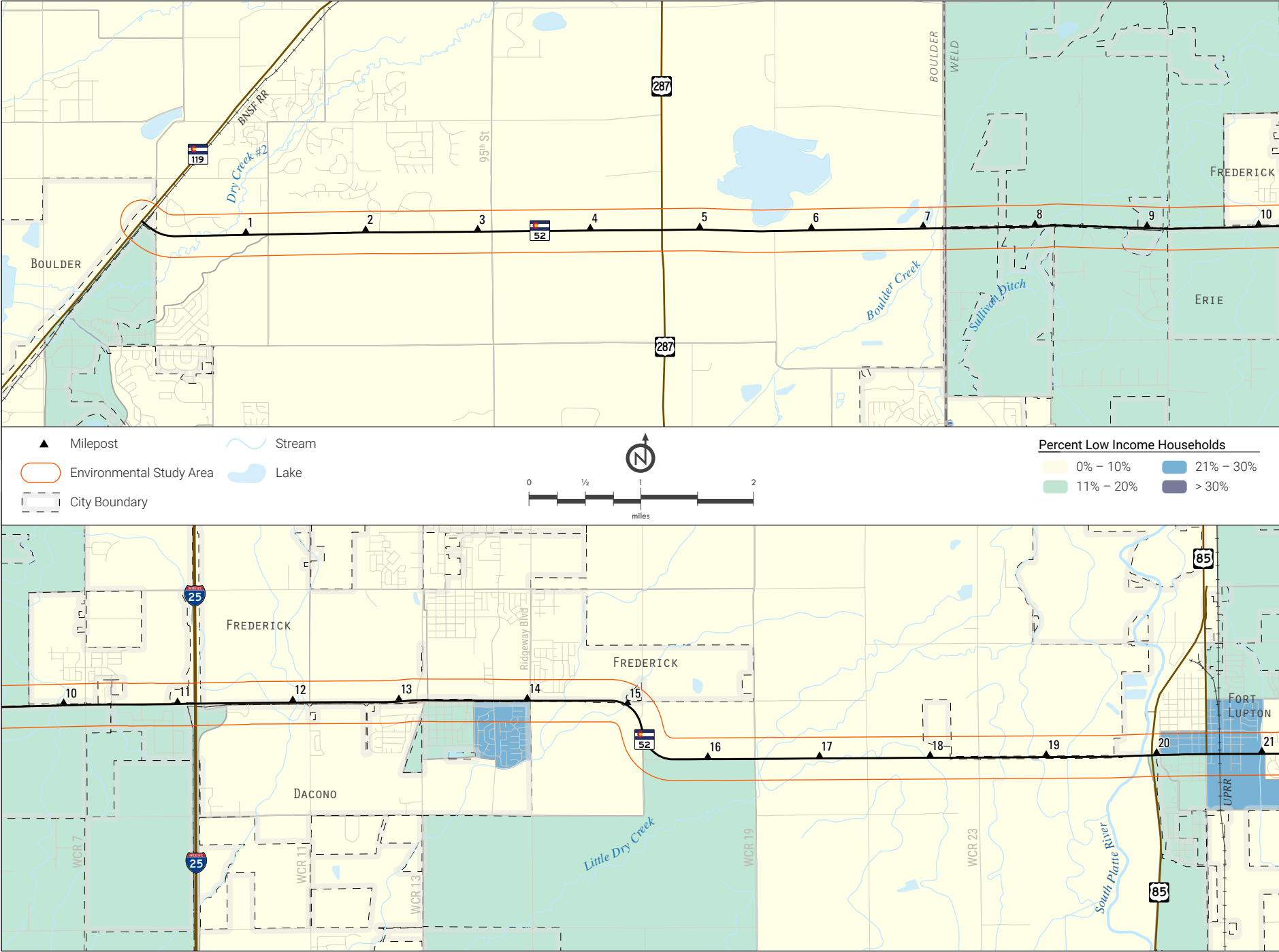
Figure 4-10 Percent Minority Population Map

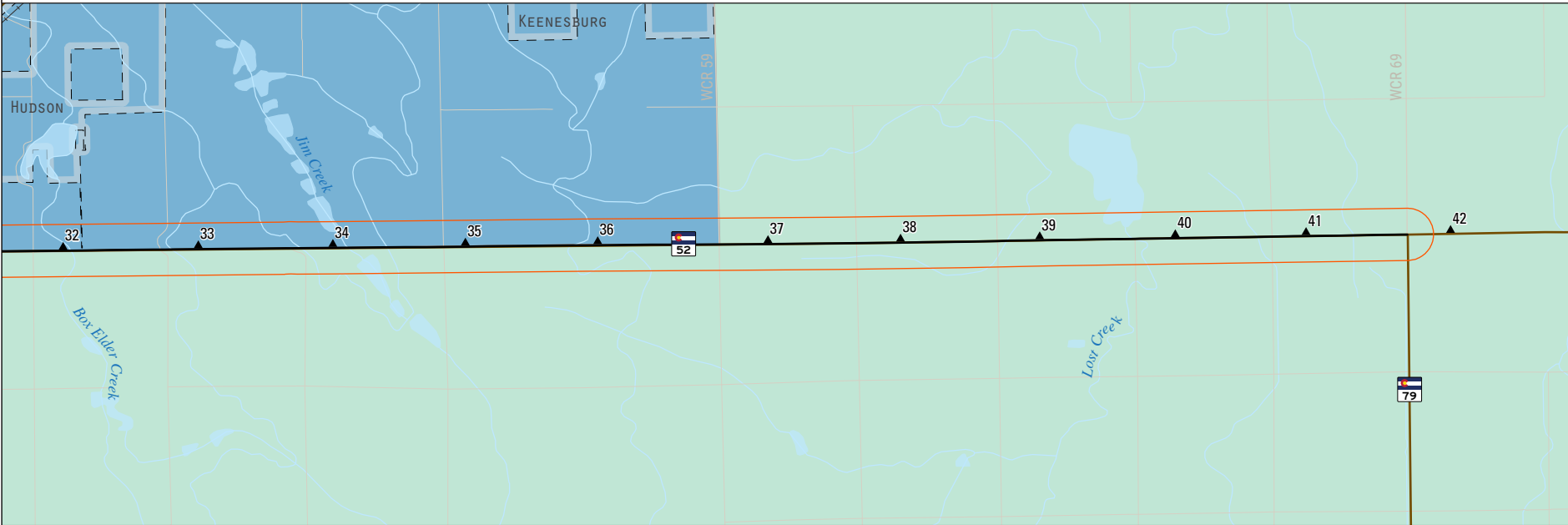
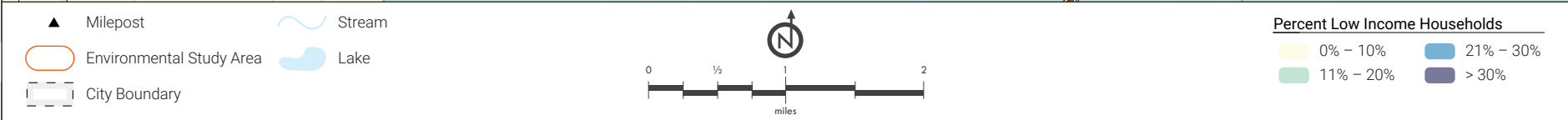
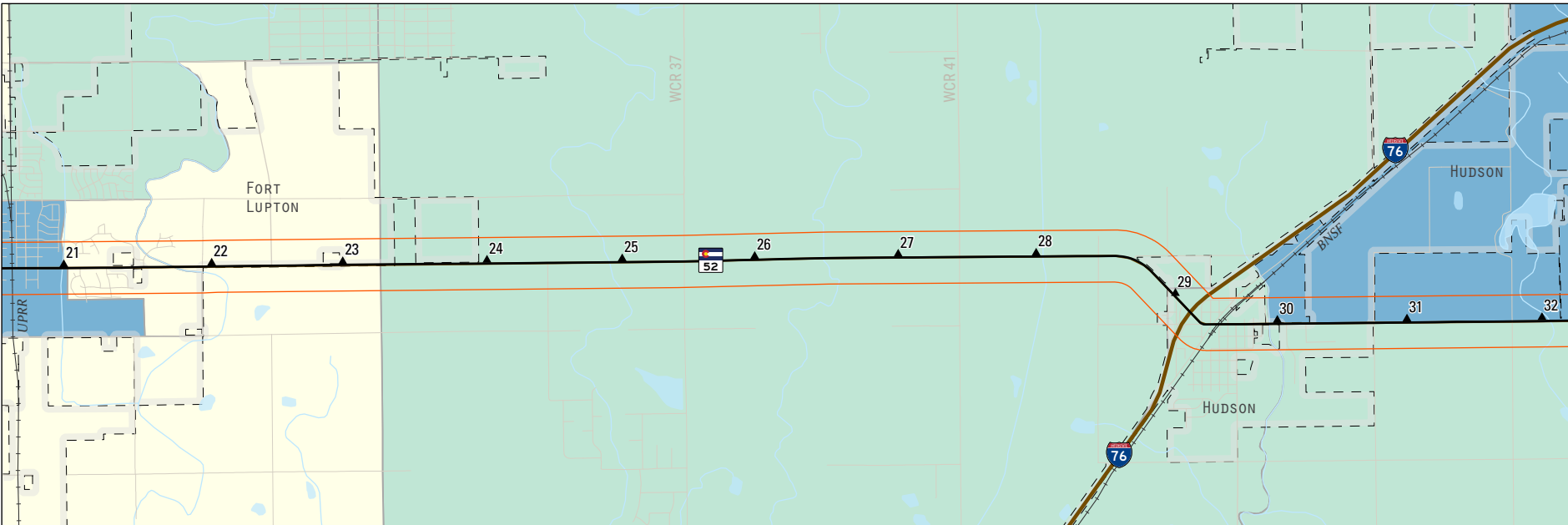




ENVIRONMENTAL JUSTICE

Figure 4-11 Percent Low Income Households Map





ENVIRONMENTAL JUSTICE

4.12 Utilities

Utility facilities for communications (fiber optic and telephone), electric and gas, oil and production, water, sanitary sewer, and storm sewer are located within CO 52 right-of-way or easements on adjacent private property. This study identifies major utility infrastructure that should be avoided or would require more costly or complicated utility relocation processes if affected by future projects.



AGENCIES

- Federal Highway Administration (FHWA)
- Colorado Department of Transportation (CDOT)
- 5 communications utility companies
- 5 electric and gas utility companies
- 19 oil and gas production companies
- 6 water, sanitary, or storm utility providers

A complete listing with descriptions of the utilities in the Environmental Study Area is included in *Appendix B: Supporting Documentation*.

REGULATORY FRAMEWORK

- American Society of Civil Engineers (ASCE) Standard C-I 38-02, 2002
- 23 CFR Part 645.105 Utility Relocations, Adjustments, and Reimbursement, Definitions, 2000
- 2 CCR 601-18 State Highway Utility Accommodation Code, 2009
- CRS 9-1.5 Excavation Requirements, 2018
- CDOT Project Development Manual, 2006



METHODOLOGY

Utility infrastructure was assessed within the Environmental Study Area, which is defined as a 1,000-foot buffer from the CO 52 centerline within the project limits. Utility records were requested through the Colorado 811 notification process, and GIS records of wells and flow lines were requested from the Colorado Oil and Gas Conservation Commission (COGCC). Follow-up conversations were held with utility providers in May 2020. Using the collected information and a Google map aerial, the review identified utility infrastructure that is critical for service distribution within the Environmental Study Area or that could be costly and/or complicated to relocate. This included:

- Electric transmission lines and substations
- Water lines at least 24 inches in diameter
- Sanitary sewers at least 18 inches in diameter
- Storm sewers at least 36 inches in diameter
- Gas transmission lines
- Petroleum (oil and gas) facilities
- Critical telecommunications lines

MAJOR UTILITIES Based on information from utility owners and existing data sources, approximately 107 major utilities were identified within the Environmental Study Area. Proposed improvements need to prioritize avoiding major water, sanitary sewer, and storm sewer lines near 95th Street, Colorado Boulevard, Pacific Avenue, and CR 29 1/2. It will be difficult to avoid impact to oil and gas flow lines; however, the 24-inch high-pressure crossings between CR 31 and CR 33 should be avoided. Approximately half of the oil and gas wells in the 1,000-foot buffer are concentrated in western Weld County near I-25; however, these are located beyond CO 52 and may not be in direct conflict with proposed improvements. *Figure 4-12* illustrates the locations and identification number of existing major utilities within the study area. *Table 4.11* summarizes the utility types locations.

PRE-NEPA RECOMMENDATIONS Utility coordination should occur during design of any proposed improvements to identify specific mitigation measures such as avoidance and relocations to reduce potential for impacts to existing utilities. During the design phase, all utilities must be identified consistent with CRS 9-1.5. Note that additional utilities may have been installed in the corridor after completion of this study.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: CDOT has established procedures for coordinating with utility companies when utilities may be impacted by a project that must be followed to obtain CDOT Utility Engineer approval. As the design progresses to Final Office Review, the design team must coordinate with the affected utility companies. Discussions need to include utility conflicts; opportunities to minimize conflicts; timing, location, and cost responsibility for necessary utility adjustments or relocations; and existing and future utility agreements. This coordination will be documented in project utility plans, specifications, and utility agreement letters and provided to the Region Utility Engineer to review and issue a Utility Clearance.

SCHEDULE AND BUDGET: Costs related to the relocation of water lines, sanitary sewer, and storm sewer should be considered when developing project cost. Additional funding for utility relocations may be required for private utilities located within utility easements, such as oil and gas production facilities. Generally, utility relocation costs related to private utilities within the public right-of-way will be at utility owner cost, per 2 CCR 601-18. Adequate time and construction phasing must be built into the schedule to allow for utility relocations to avoid construction delays.



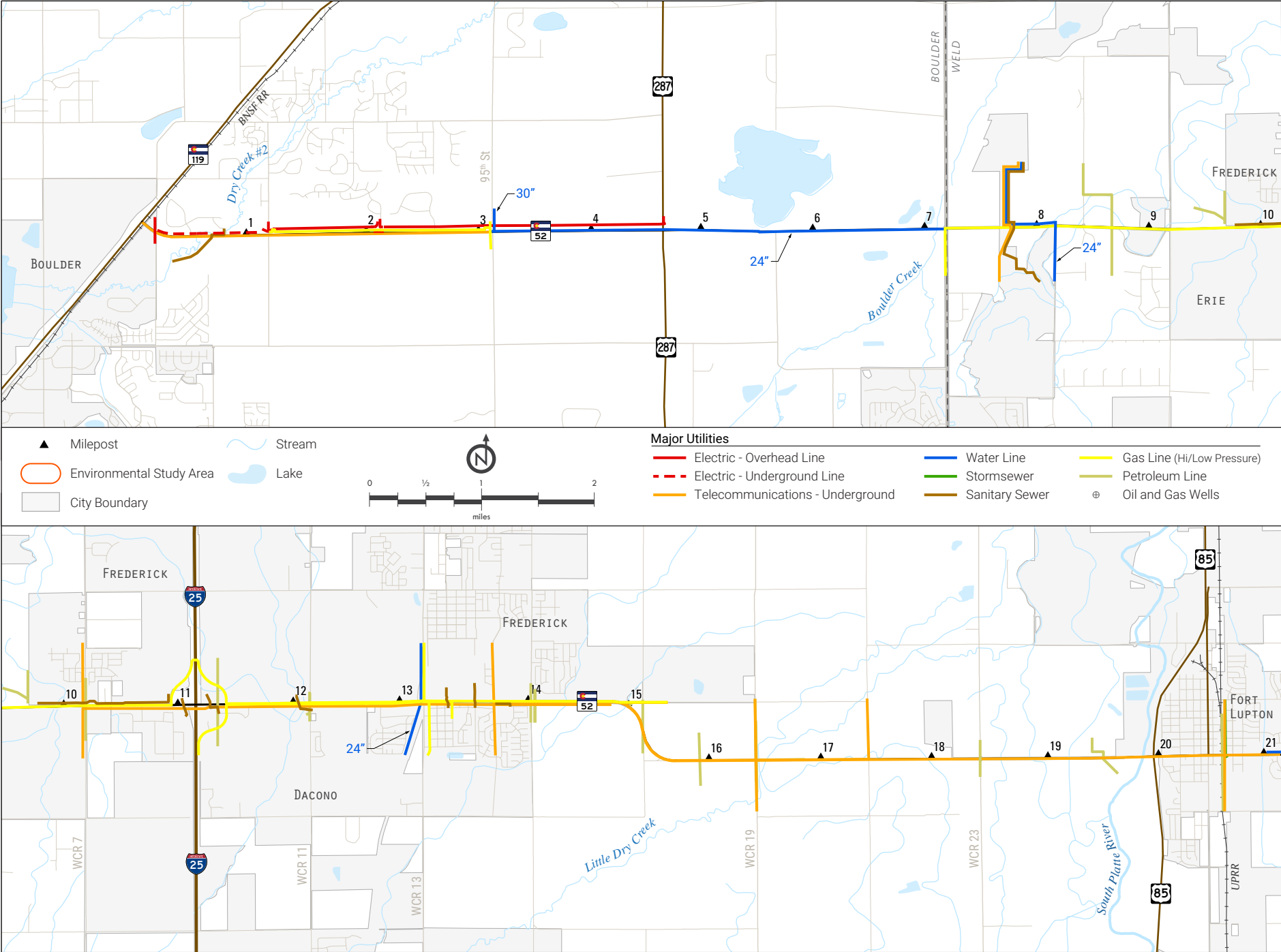
MOVING FORWARD

Table 4.11 Major Utilities in the Study Corridor

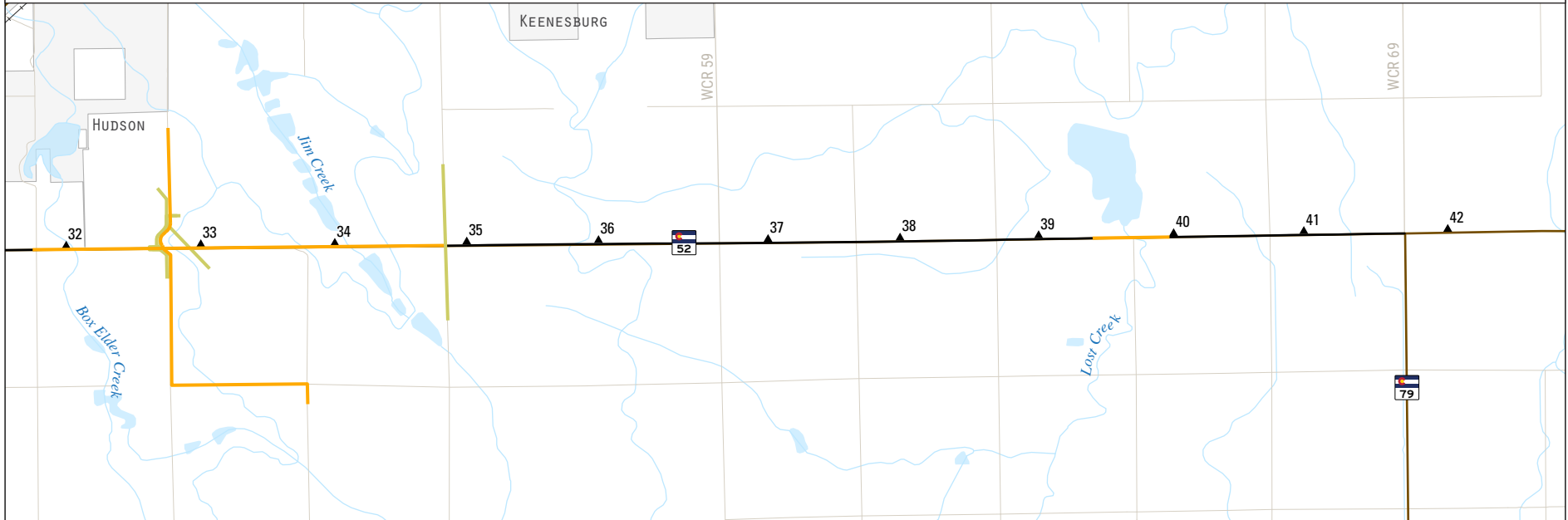
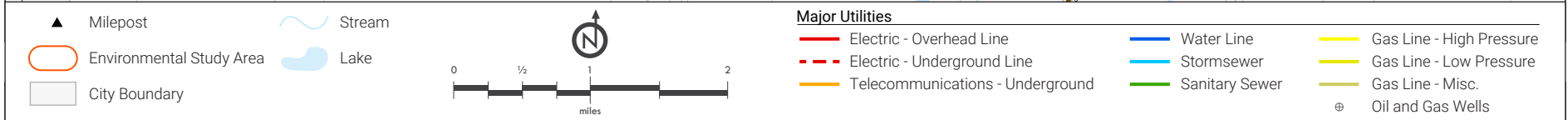
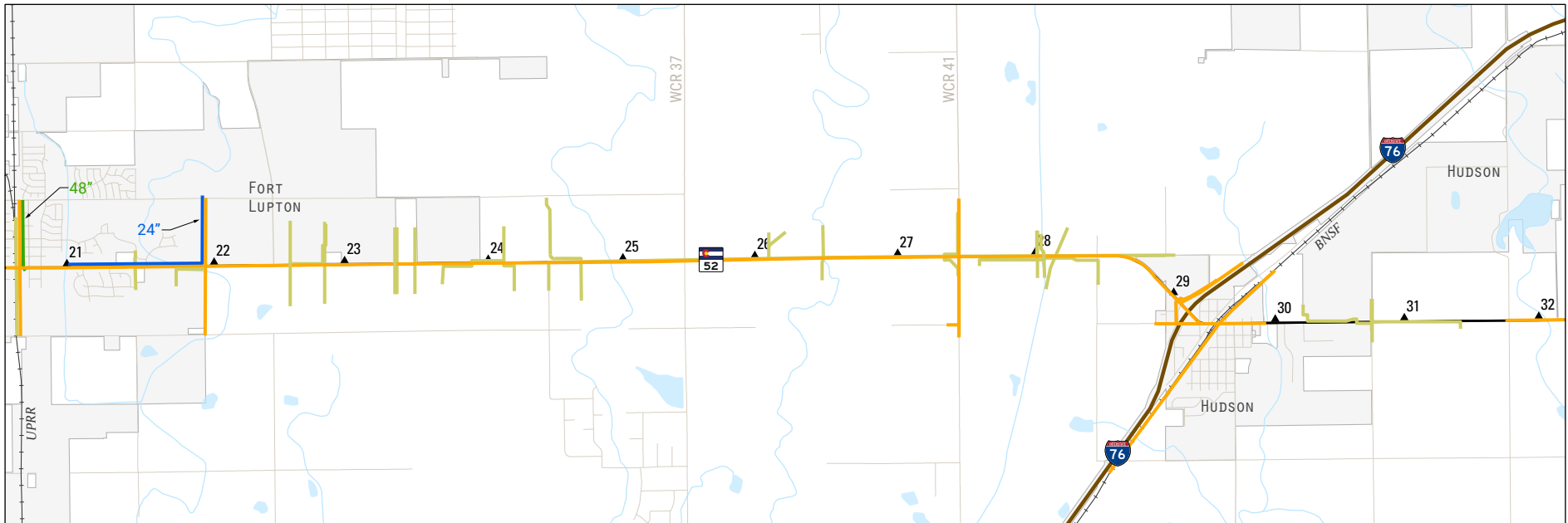
UTILITY TYPE	MAJOR UTILITY OWNERS	MAJOR UTILITIES IN STUDY CORRIDOR
Communication	AT&T, CenturyLink, Comcast, Level 3, Sprint	At least 10 fiber crossings at or near WCR 14, WCR 19, WCR 41, Aggregate Boulevard, College Avenue, Glenn Creighton Drive, and Pacific Avenue
		While not major facilities, buried fiber optic and/or telephone lines in right-of-way both north and south of CO 52 along the entire corridor
Electric Transmission	Xcel Energy	Buried and overhead primary electric lines in public right-of-way on the north side of CO 52 between CO 119 and US 287
		CDOT and Morgan County have minor electric distribution
Gas Transmission	Black Hills Energy, Xcel Energy	Gas transmission lines in CO 52 right-of-way from 79th Street to 95th Street; County Line Road to CR 14; and I-25 Frontage Road to Cherry Street
		At least 4 gas line crossings of CO 52
Petroleum (oil and gas wells and gatherers)	Black Diamond Pipeline, Crestone Peak, DCP Midstream, DJ South Gathering, Enterprise Products, Kinder Morgan, KP Kauffman, Magellan, Painted Pegasus Petroleum, Phillips 66, Sinclair, Suncor, Western Midstream	At least 225 oil and gas wells in 1,000-foot buffer
		Kinder Morgan has 3 high pressure pipeline crossings between CR 31 and CR 33; CR 37 and Bowles Canal Road
		At least 55 pipelines/flow lines within 1,000-foot buffer of the CO 52
		Flow lines parallel CO 52 between CR 35 and CR 12 ½ and CR 47 and CR 49
Sanitary Sewer	Niwot Sanitation District, Saint Vrain Sanitation District	8 sanitary sewer crossings between CO 119 and CR 14
		City of Dacono and City of Fort Lupton have minor sanitary sewer lines
Storm Sewer	City of Fort Lupton	48-inch storm sewer crossing at Pacific Avenue
Water	Left Hand Water District, Central Weld County Water District, City of Fort Lupton	Potable water lines in the CO 52 right-of-way from 95th Street to County Line Road, and east of Rollie Avenue to CR 29 ½
		24-inch and 30-inch water line crossing of CO 52 at Colorado Boulevard and CR 29 ½
		City of Dacono and Northern Water District do not have major water lines

Sources: COGCC, 2020; Colorado 811, pers. comm; Utility Provider Record Requests, 2020

Figure 4-12 Existing Major Utilities



Source: Colorado Oil and Gas Conservation Commission (COGCC), 2020. Oil and gas well shape file.



Source: Colorado Oil and Gas Conservation Commission (COGCC), 2020. Oil and gas well shape file.

4.13 Visual Resources

Visual resources were evaluated to better describe the landscape character, community and user views, and visual quality of the CO 52 corridor. An inventory of the foreground and the influence of the background vistas included the Rocky Mountain Front Range, Longs Peak, and Indian Peaks. Local jurisdictions have policies and regulations which indicate the desire for roadways to be context-sensitive, protect important viewsheds, and improve visual quality.



AGENCIES

- Federal Highway Administration (FHWA)
- Colorado Department of Transportation (CDOT)
- Local agencies
- Residents, business owner and patrons, and recreational users

REGULATORY FRAMEWORK

- FHWA Guidelines for the Visual Impact Assessment of Highway Projects, 2015
- CDOT Visual Assessment Guidelines, 2019
- CDOT Planning and Environmental Linkages (PEL) Handbook – Version 2, 2016
- Local plans that include policies to protect viewsheds and visual quality



METHODOLOGY

The visual resource study area is tailored to include foreground or background views from CO 52 that influence visual quality. A viewshed study area was established which varied between a 0.25 to 0.50-mile from the roadway centerline (*Figure 4-13*). A Google Earth scan of landscape composition and a spring 2020 field review identified visual elements that are representative of landscape character types, viewers, and visual quality along CO 52. The methodology for the visual resources assessment followed the CDOT Visual Assessment Guidelines approach (CDOT, 2019).

LANDSCAPE UNITS Five landscape units were established along the corridor based on their specific visual identities. Similar characteristics, such as viewsheds, vegetation, landforms, and development, were grouped to define the boundaries of each unit. The landscape character, viewers, and visual quality of each unit are typically similar on both sides of the corridor. Visual quality describes the relationship between the viewers and their environment, and considers vividness, intactness, and unity of the landscape within foreground viewsheds. Landscape units along CO 52 are summarized in *Table 4.12*.

The corridor blends in well with adjacent landforms, vegetation, and cultural aspects in Landscape Units 1, 2, and 4 (*Figure 4-13*). Visual quality is balanced within these units and panoramic views of the Front Range are present throughout. CO 52 passes through several rural towns in Landscape Unit 3 and serves as their main street where small commercial businesses and single-family residences border the corridor. Groups of structures and vegetation frequently block views of the Front Range from the highway within these towns. Landscape Unit 4 is dominated by visually prominent

expansive fields representative of High Plains agriculture. Few buildings interrupt the horizon view. Units west of Landscape Unit 5 typically have a higher concentration of tree canopy and tree-lined drainages than those located to the east.

Panoramic viewsheds of the Rocky Mountain Front Range, Longs Peak, and Indian Peaks are noteworthy in all five landscape units. The Longs Peak focal point is most visible westward from the Town of Hudson. As viewers from the highway approach CO 119, the foothills become more prominent. Based on FHWA visual quality criteria (FHWA, 2015), natural visual harmony, cultural order, and visual unity vary throughout the corridor.

PRE-NEPA RECOMMENDATIONS Project improvements including bridges, overpasses, or bypasses should consider the panoramic viewsheds of the Rocky Mountain Front Range for adjacent properties and travelers to the west. The FHWA Visual Impact Assessment scoping process provides a framework for establishing the appropriate level of study and documentation for NEPA projects with four steps: Establishment, Inventory, Analysis and Mitigation.



MOVING FORWARD

DESIGN AND PROJECT IMPLICATIONS

SCOPE: Measures should be developed to avoid or minimize visual contrast of transportation improvements. Design solutions should consider local agency aesthetic directives and planning goals for aesthetic improvements as well as Section 4(f), 6(f), and Section 106 resource compliance. Project design guidelines should be developed to achieve visual compatibility and continuity with landscape settings and viewsheds.

SCHEDULE AND BUDGET: Time should be included in the schedule to allow alternatives to evaluate compliance with local agency aesthetic directives, identity, and context sensitivity while meeting CDOT's safety and mobility needs. Visual resources are addressed concurrent with other environmental resources.

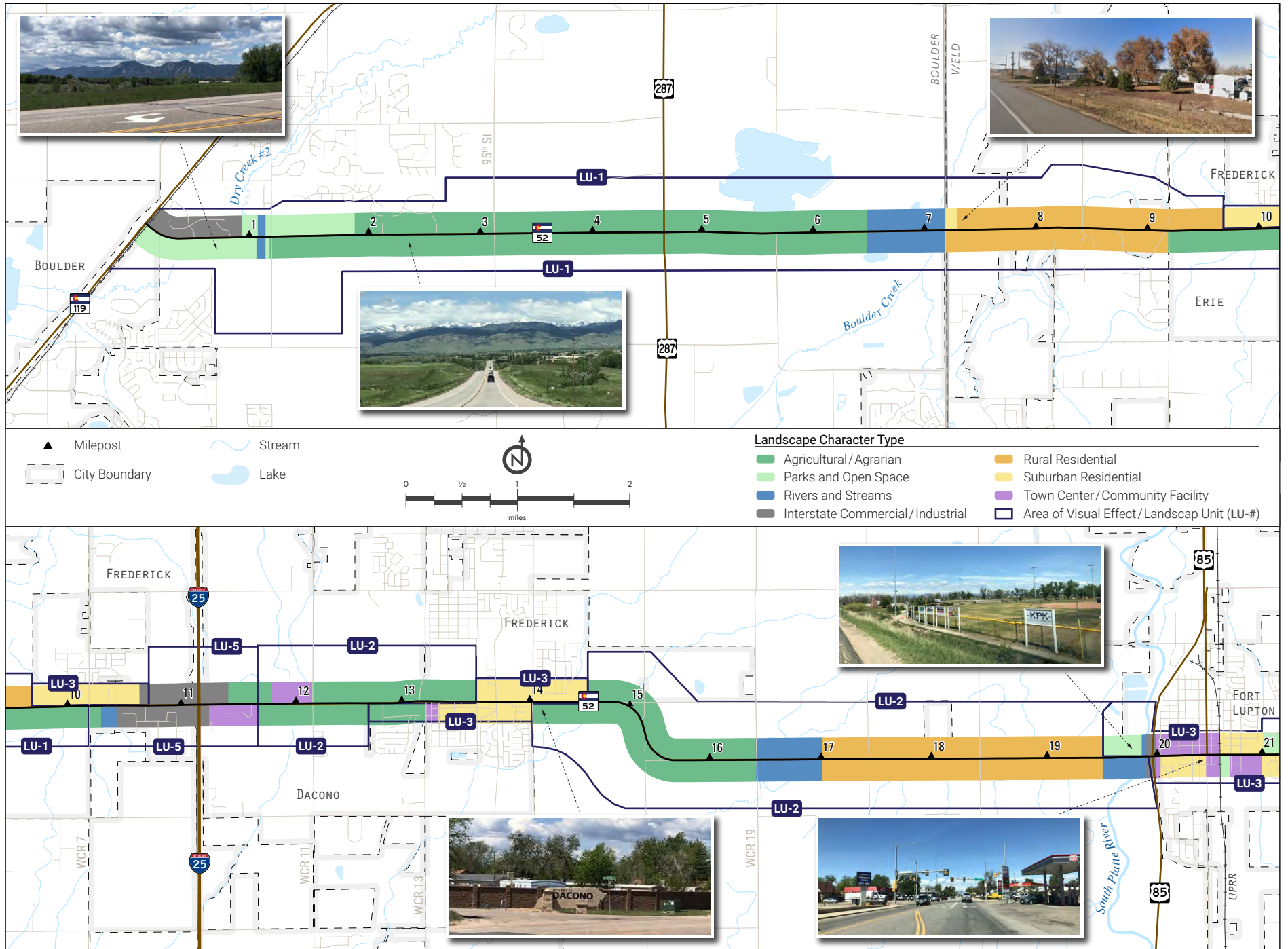
Table 4.12 Inventory of Landscape Units

VISUAL INVENTORY	LANDSCAPE UNITS									
	1		2		3		4		5	
	N	S	N	S	N	S	N	S	N	S
Landscape Character Types										
Rolling Terrain										
Expansive Flat Terrain										
Tree Lined fields or drainage										
Rural Residential										
Suburban Residential										
Parks, Open Space and Trails										
South Platte River Corridor										
Large Agricultural Fields										
Oil and Gas Wells										
Town Centers / Community Facilities										
Interstate Commercial / Industrial										
VIEWERS										
Business										
Residential										
Recreational Users										
VISUAL QUALITY										
Vividness										
Intactness										
Unity, Scale and Composition										
CO 52 MOUNTAIN VIEWS										
Front Range Panorama										
Longs Peak Focal Point										
Foothills Terrain										

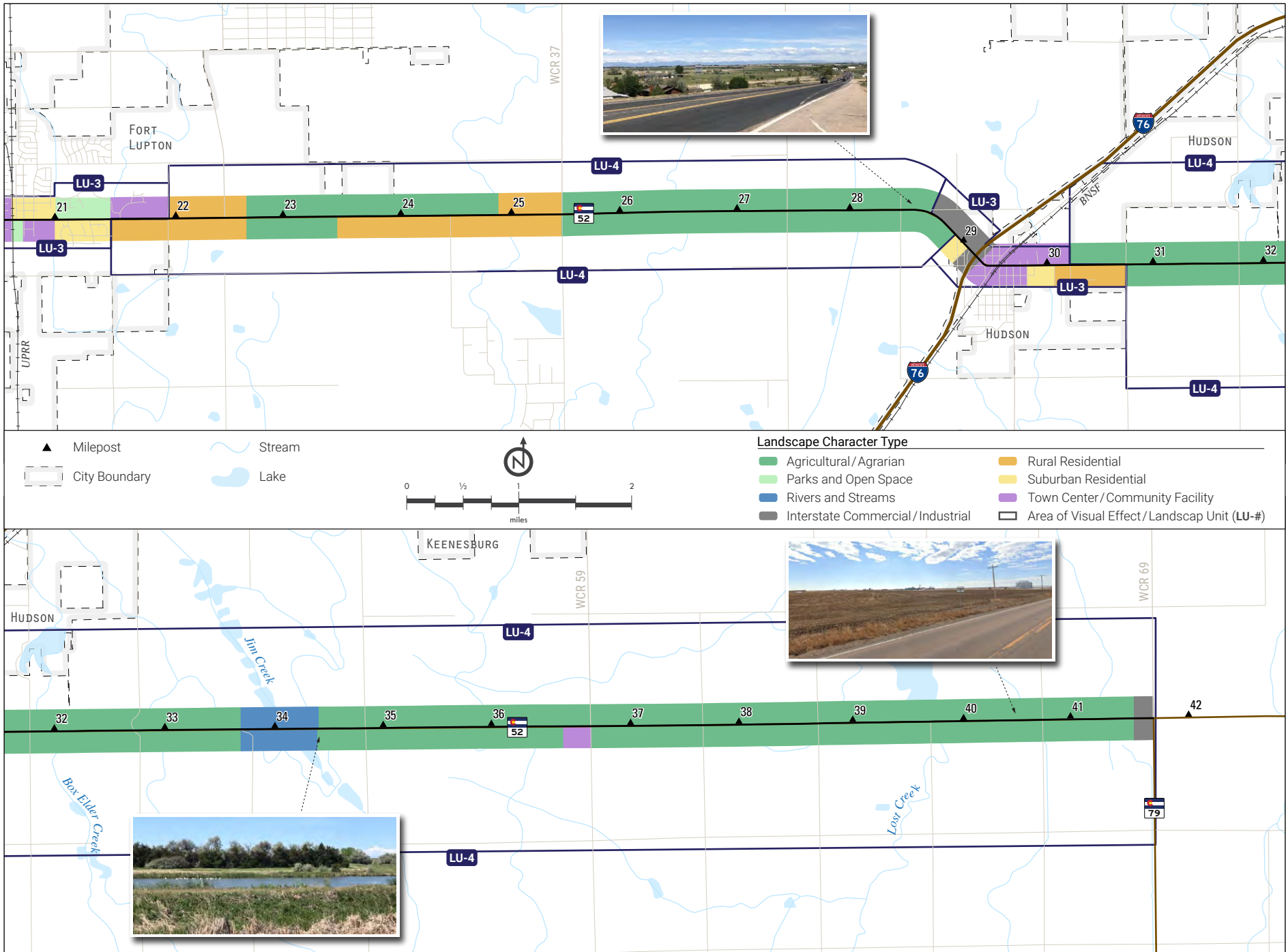
VISUAL INVENTORY LEGEND			
Landscape Character	Prominent	Present	Absent
Viewers/Distance Zones	Foreground	Middle ground	Background or Absent
Visual Quality	Prominent (P) ★	present (p) ◆	Absent
Mountain Viewsheds	Longs Peak Focal Point (LP) ▲	Foothills terrain (F) ●	Front Range Panorama (FRP) ■

Source: Google Earth, 2020

Figure 4-13 Visual Resources



VISUAL RESOURCES



VISUAL RESOURCES

4.14 Prime and Unique Farmland

The Natural Resource Conservation Service (NRCS) defines prime and unique farmland as land designated for agricultural uses.

Prime farmland must have at least one of the following:

- Dependable water supply, natural or irrigated
- Favorable temperature and growing season
- Acceptable acidity or alkalinity, salt content, and few or no rocks
- Permeable to air and water
- Do not flood frequently continuously saturated, or excessively eroded

NRCS farmland classifications include:

- **Prime Farmland:** has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor
- **Farmland of Statewide or local importance:** used to produce food, feed, fiber, forage, or other crops
- **Farmland of Unique Importance:** currently used to produce high-valued food and fiber such as citrus or tree nuts
- **Not Prime Farmland:** farmland that is none of the above



AGENCIES

- U.S. Department of Agriculture (USDA)
- Natural Resource Conservation Services (NRCS)

REGULATORY FRAMEWORK

Farmland Protection Policy Act (FPPA), 1994



METHODOLOGY

Data was obtained from the NRCS USDA Soils Farmland Class dataset and clipped to the project Environmental Study Area (Figure 4-14).

PRIME FARMLAND A review of data indicated that there are areas within the Environmental Study Area identified as prime farmland, farmland of statewide importance, and farmland of local importance. Prime farmlands are located along the majority of the western and eastern portions of the corridor from Fort Lupton west to CO 119, and from Hudson east to CO 79. Lands east of Fort Lupton are identified as farmlands of local importance, with a lesser portion identified as farmlands of statewide importance. Areas adjacent to I-25, US-85, and intermittent areas west of Fort Lupton to WCR 41 are not identified as prime farmland (Table 4.13).

A review of data indicated that there are areas within the Environmental Study Area identified as prime farmland, farmland of statewide importance, and farmland of local importance. Prime farmlands are located along the majority of the western and eastern portions of the corridor from Fort Lupton west to CO 119, and from Hudson east to CO 79. Lands east of Fort Lupton are identified as farmlands of local importance, with a lesser portion identified as farmlands of statewide importance.

Table 4.13 Percentage Prime Farmland in the Environmental Study Area

FARMLAND DESIGNATION	PERCENT COVER IN ENVIRONMENTAL STUDY AREA (%)
Prime Farmland	67.41%
Farmland of Statewide Importance	12.57%
Farmland of Local Importance	4.91%
Not Prime Farmland	15.11%

Source: USDA NRCS, 2020



MOVING FORWARD

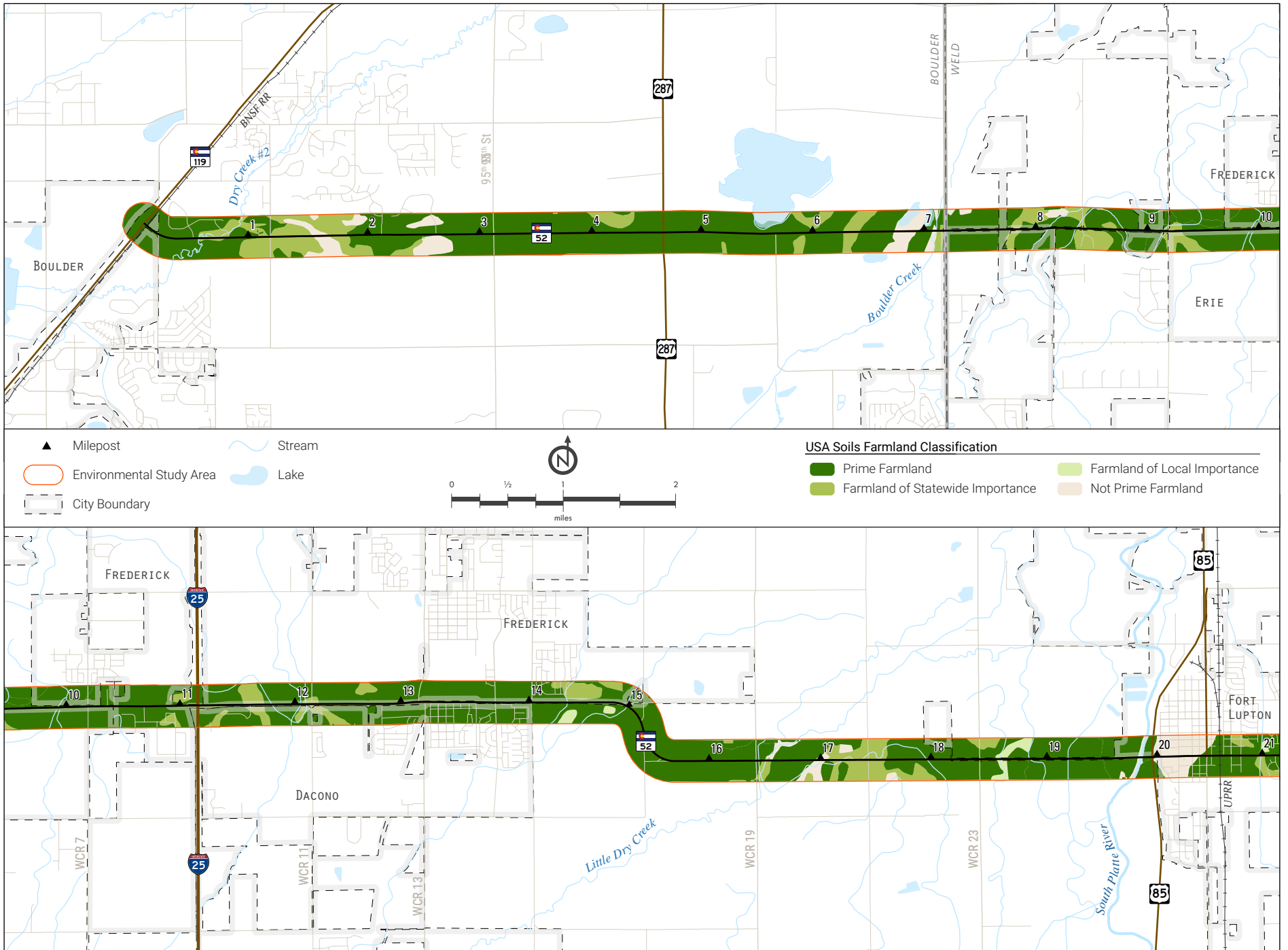
PRE-NEPA RECOMMENDATIONS The goal of the FPPA is to minimize the conversion of farmland to non-agricultural use. NRCS maps should be reviewed to determine if farmland is present. A visual inspection of the area is needed and if it is clearly not being used as farmland, the Farmland Protection Policy Act does not apply.

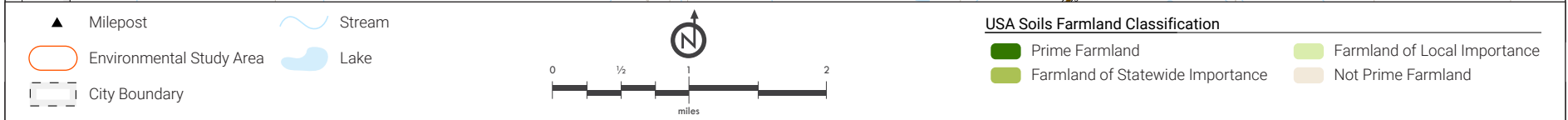
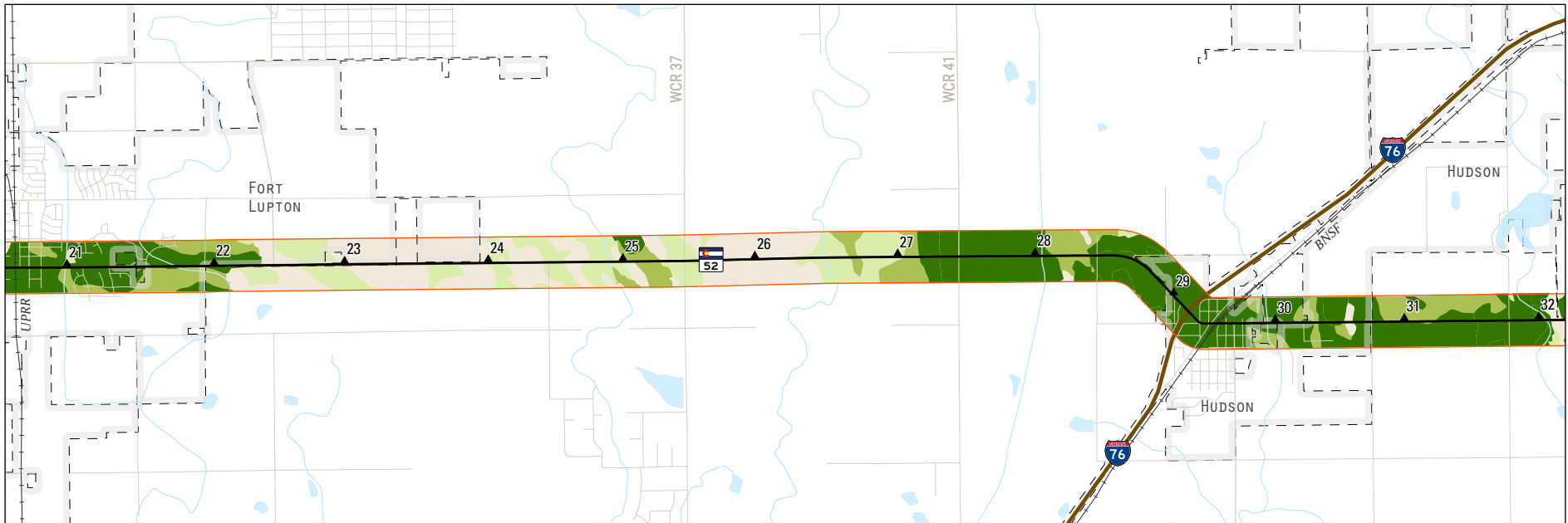
DESIGN AND PROJECT IMPLICATIONS

SCOPE: Alternatives are unlikely to significantly impact prime farmlands. Nonetheless, right-of-way acquisition should minimize impacts to prime farmlands and complete the application for conversion from prime farmland to developable land as necessary.

SCHEDULE AND BUDGET: Projects will need to determine potential impacts to farmland and document appropriate mitigation in the NEPA document.

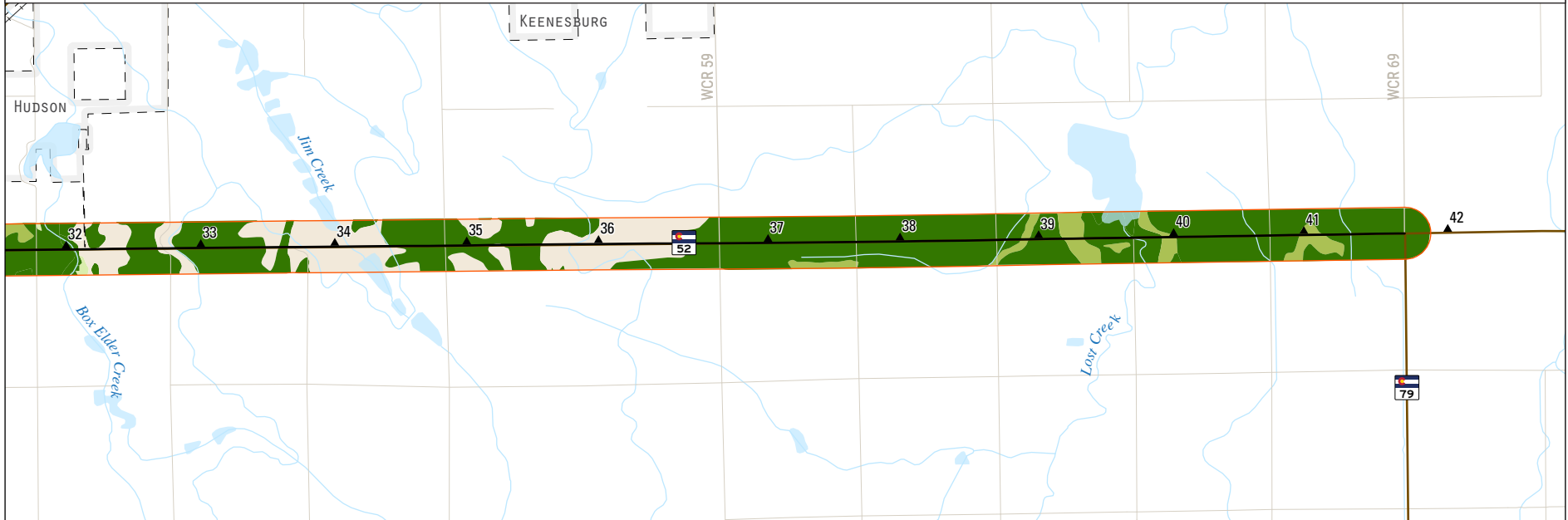
Figure 4-14 Prime and Unique Farmland





USA Soils Farmland Classification

- Prime Farmland
- Farmland of Local Importance
- Farmland of Statewide Importance
- Not Prime Farmland



4.15 Air Quality

Air quality must be considered in project development activities in accordance with the Transportation Conformity rules in 40 Code of Federal Regulations (CFR) 51 and 93, Subpart A. Those requirements apply to any highway or transit project funded or approved by the U.S. Department of Transportation and by metropolitan planning organizations or other recipients of funds under Title 23 U.S.C. or the Federal Transit Laws (49 U.S.C. Chapter 53), including regionally significant projects.



AGENCIES

- Colorado Department of Public Health and Environment (CDPHE) Air Pollution Control Division
- Denver Regional Council of Governments (DRCOG)
- Upper Front Range Transportation Planning Region (UFRTPR)
- North Front Range Metropolitan Planning Organization (NFRMPO)
- Colorado Department of Transportation (CDOT)
- U.S. Environmental Protection Agency (EPA)
- Federal Highway Administration (FHWA)

REGULATORY FRAMEWORK

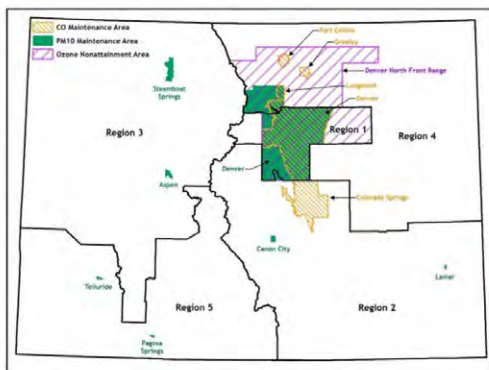
- 42 U.S.C. §7401 et seq. Clean Air Act (CAA), as amended
- National Ambient Air Quality Standards (NAAQS) under 40 CFR 50
- Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas, EPA Publication EPA-420-B-15-084, 2015
- FHWA Memorandum: Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, 2016
- Air Quality Project-Level Analysis Guidance, 2019
- Colorado Air Quality Control Commission Regulation No. 10, Criteria for Analysis of Transportation Conformity, 2016



METHODOLOGY

Air quality was assessed within the Environmental Study Area, which is defined as an approximate 1,000-foot buffer from the CO 52 centerline within the project limits. A portion of the Environmental Study Area is situated within partially within the Denver Regional Council of Governments (DRCOG) and partially within the Upper Front Range Transportation Planning Area.

Figure 4-15 Colorado NAAQs Nonattainment and Maintenance Areas



The status of the CO 52 corridor with respect to attainment of current NAAQS for transportation-related pollutants is summarized in *Table 4.14*. Colorado NAAQS non-attainment and maintenance areas are depicted in *Figure 4-15*.

Table 4.14 NAAQS Attainment Status

CORRIDOR SECTION	POLLUTANT/STANDARD	STATUS DESIGNATION
Boulder County	Carbon Monoxide (CO) 1971 NAAQS	Maintenance (from CO 52 south)
	Ozone 2008 NAAQS	Nonattainment (serious)
	Ozone 2015 NAAQS	Nonattainment (marginal)
	PM2.5 2006 & 2012 NAAQS	Attainment
	PM10 1987 NAAQS	Maintenance
Weld County	Carbon Monoxide (CO) 1971 NAAQS	Attainment
	Ozone 2008 NAAQS	Nonattainment (serious)
	Ozone 2015 NAAQS	Nonattainment (marginal)
	PM2.5 2006 & 2012 NAAQS	Attainment
	PM10 1987 NAAQS	Maintenance



MOVING FORWARD

PRE-NEPA RECOMMENDATIONS Transportation projects considered for federal funding must conform to both regional and local air quality standards. Projects must be assessed by DRCOG and/or the Upper Front Range Transportation Planning Region (UFRTPR) and the North Front Range Metropolitan Planning Organization (NFRMPO) in coordination with the EPA for conformance to regional air quality standards. Once deemed in compliance for NAAQS at a regional level, the project can be slated for federal funding and included in the Statewide Transportation Improvement Program (STIP) and regional Transportation Improvement Program (TIP) and can be deemed compliant for ozone purposes under the Transportation Conformity Rules. Once included in the STIP/TIP projects can be considered for local conformance.

DESIGN AND PROJECT IMPLICATIONS

SCOPE: Project alternatives need to be assessed for local conformity to air quality standards to determine the need for a PM10 hot-spot analysis based on whether there is a significant increase in diesel vehicle traffic associated with the improvements.

SCHEDULE: Project scheduling should consider time for conformance to Transportation Conformity Rules at a regional level, and for air quality modeling at a local level. The procedure to determine conformance requires approximately 6-12 months, from regional modeling to local conformance approval.

4.16 Environmental Context References

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