BIOLOGICAL RESOURCES TECHNICAL REPORT

FOR THE

6TH AVENUE PARKWAY EXTENSION ENVIRONMENTAL ASSESSMENT

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TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

AFB..... Air Force Base
BGEPA ..... Bald and Golden Eagle Protection Act
BMP..... best management practice
BRR ..... Biological Resources Technical Report
CDA ..... Colorado Department of Agriculture
CDOT ..... Colorado Department of Transportation
CDPHE ..... Colorado Department of Public Health and Environment
CNHP ..... Colorado Natural Heritage Program
CPW ..... Colorado Parks and Wildlife
CRS ..... Colorado Revised Statutes
CVCP..... Colorado Vegetation Classification Project
CWA ..... Clean Water Act
CWMA ..... Colorado Weed Management Association
E. coli..... *Escherichia coli*
E-470 ..... E-470 Tollway
EA..... Environmental Assessment
ERO..... ERO Resources Corporation
ESA ..... Endangered Species Act
FACWet ..... Functional Assessment for Colorado Wetlands
FHU ..... Felsburg Holt & Ullevig
FHWA..... Federal Highway Administration
GIS ..... Geographic information system
IPaC..... Information, Planning, and Conservation System
LiDAR ..... Light Detecting and Ranging Technology
MBTA..... Migratory Bird Treaty Act
NDIS ..... Natural Diversity Information Source
NEPA..... National Environmental Policy Act
NWI..... National Wetland Inventory
OHWM..... Ordinary High Water Mark
OTIS ..... Online Transportation Information System
PBA ..... Programmatic Biological Assessment
ROW..... Right-of-way
RPW ..... Relatively Permanent Water
SB 40..... Senate Bill 40
SE..... Selenium

SGPI PBO..... Central Shortgrass Prairie Programmatic Biological Opinion
SH 30 ..... State Highway 30
SPWRAP ..... South Platte Water Related Activities Program
SWMP ..... Stormwater Management Plan
TCGC ..... Triple Creek Greenway Corridor
TMDL..... Total Maximum Daily Load
TNW ..... Traditional Navigable Water
USACE ..... U.S. Army Corps of Engineers
USEPA ..... Environmental Protection Agency
USFWS..... U.S. Fish and Wildlife Service
WUS ..... Waters of the U.S.

1. INTRODUCTION

This technical report has been prepared in support of the 6th Avenue Parkway Extension Environmental Assessment (EA) extending 6th Avenue from State Highway 30 (SH 30) to the E-470 Tollway (E-470). This technical report evaluates the effects of the Proposed Action and the No Action Alternative with respect to biological resources.

1.1 Proposed Action

The Proposed Action would extend the 6th Avenue Parkway for approximately 2 miles along a new alignment, connecting existing 6th Avenue/SH 30 to the west with the existing 6th Avenue Parkway at E-470 to the east. This would close a gap in the existing major arterial street system, reducing out of direction travel and improving the efficiency and reliability of the transportation system. The Proposed Action would be a six-lane arterial roadway with a raised median and sidewalks.

Six initial alternatives were developed and screened through three screening levels to identify the Proposed Action. The alternatives screening is summarized in **Appendix A1** *Alternatives Technical Report* of the EA. Details of the Proposed Action are presented in **Appendix A2** *Conceptual Design Plans* of the EA.

The Proposed Action is shown on **Figure 1**. Major elements of the Proposed Action are identified by number from west to east on **Figure 1**, and include the following:

Element 1. Tie into existing 6th Avenue/SH 30: 6th Avenue/SH 30 is an existing two-lane arterial. At the western end of the Proposed Action, a signalized "thru-tee" type intersection would be constructed connecting the Proposed Action roadway to existing 6th Avenue/ SH 30. This new signalized intersection would include bypass lanes for the eastbound SH 30 through movement or a thru-tee signalized intersection with bypass lanes for both the eastbound SH 30 through movement. The tie-in would be an urban curb and gutter section with three 12-foot travel lanes in each direction to connect to future 6-lane section to the west. A 10-foot sidewalk would be located on both the north and south sides of the roadway.

Element 2. Triple Creek Trail realignment and connections: A portion of the existing Triple Creek Trail would be realigned and would pass beneath the Proposed Action roadway which would be on a bridge at this location (see Element 3 in **Figure 1**). The Triple Creek Trail would be connected to 6th Avenue via a spur trail to the sidewalk constructed along the south side of the new roadway. The Triple Creek Trail is a 10–foot wide soft surface trail that serves equestrians, bicyclists and pedestrians. The realigned portion would match the existing width and surface. A 10-foot sidewalk on both sides of the bridge (Element 3) would provide connections to the trail. The southern terminus of the trail is currently at the Coal Creek Arena, and further extension to the south is planned by the City of Aurora.

Element 3. Roadway bridge over Sand Creek: Immediately east of the new intersection with existing 6th Avenue/SH 30 (Element 1 in **Figure 1**), the roadway would be elevated onto a six-lane bridge crossing over Sand Creek and its associated floodplain/floodway, and over the Triple Creek Trail. The bridge length and profile would be set to minimize impacts to Sand Creek, while still providing a minimum 10-foot vertical clearance over the Triple Creek Trail. The bridge would have a median and sidewalks. The bridge would be approximately 680 feet in length with 5 variable length spans supported on four piers. The bridge would be

designed to be compatible with the surrounding environment and to allow wildlife connectivity along Sand Creek and the Triple Creek Trail.

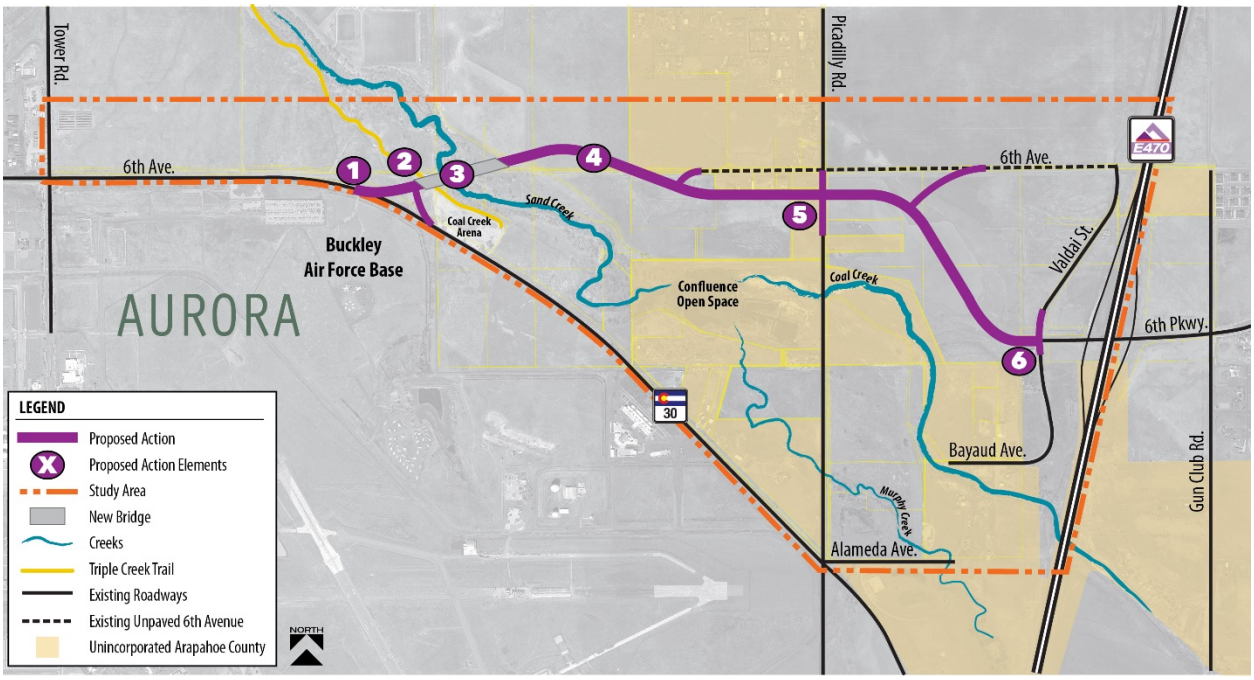
Element 4. 6th Avenue Parkway arterial roadway: The 6th Avenue Parkway extension would consist of a 144-foot wide, six-lane arterial roadway (three lanes in each direction) with a raised vegetated median. There would be curb and gutter and 10-foot wide sidewalks on the north and south sides of the roadway. The Proposed Action would provide two new access connections from the Proposed Action to two existing portions of 6th Avenue. One of these connections would provide access to the existing residences along unpaved 6th Avenue, west of Picadilly Road. The second connection would extend northeast from the Proposed Action to unpaved 6th Avenue to areas planned for development east of Picadilly Road.

Element 5. Intersection with Picadilly Road: The Proposed Action roadway would cross Picadilly Road, which is an existing north-south road. A signalized intersection would be constructed at this location. Picadilly Road is currently two lanes, but the City of Aurora anticipates that expansion to six lanes would occur in the future as a different project. Therefore, the intersection would be configured such that future expansion of Picadilly Road to six lanes can be accommodated and is not precluded.

Element 6. Tie into existing 6th Avenue Parkway at E-470: On its eastern end, the Proposed Action roadway would tie into the existing E-470 interchange, which currently truncates at this location, forming a connection with the existing 6th Parkway to the east of the interchange. The intersection tie-in at Valdai Street and 6th Avenue Parkway would be signalized. This connection would allow access from the west via the Proposed Action to the E-470 interchange and to the existing 6th Avenue Parkway extending to the east of E-470.

In addition to these transportation elements, the Proposed Action would include permanent roadway stormwater drainage with water quality features for roadway runoff and accommodate offsite stormwater flows. Details of drainage and water quality features are presented in **Appendix A6** *Floodplains and Drainage Assessment Technical Report* of the EA.

Figure 1 Proposed Action and Study Area



Note: Numbers in graphic correspond with text above.

1.2 No Action Alternative

If the Proposed Action is not selected for implementation, there would be no improvements made to 6th Avenue beyond the existing and committed transportation system. The No Action Alternative was carried forward as a baseline comparison for environmental analysis purposes.

1.2.1 Study Area vs. Proposed Action Footprint

For this EA, a number of different study areas were needed to assess impacts, both direct and indirect to various resources. The use of resource-specific study areas allows the assessment to be focused on the particular resource and the impacts that might be expected. Without such resource-specific study areas, the analysis for some resources would either be needlessly broad or not broad enough. The following study area terminology will apply for this Biological Resources Technical Report (BRR).

Study Area – The study area encompasses that area in which major travel pattern changes could occur as a result of the implementation of the 6th Avenue Parkway Extension project. The limits of the study area on the west side begin at Tower Road and extend south to Alameda Avenue. E-470 borders the project on the east edge. On the north side the study area extends about 1,000 feet north of existing 6th Avenue (**Figure 1**).

Proposed Action Footprint – The resource-specific study areas vary by resource and are tailored such that it is appropriate for each resource of concern. This is the area in which physical impacts may occur during project implementation and construction. The proposed action footprint consists of the permanent constructed features and areas of temporary construction access and staging where disturbance may occur during the construction process.

1.3 Previously Reported Environmental Resources

Previously, biological resources along the Triple Creek Greenway Corridor (TCGC) and in adjacent areas were evaluated in the *Survey of Biological Resources in the Triple Creek Greenway* report (Colorado Natural Heritage Program [CNHP], 2014), the *Baseline Inventory Report – 6th and Coal Creek Expansion Property Southwest of E. 11th Ave. and Liverpool St.* (ERO Resources Corporation [ERO], 2013), and several Conservation and Deed Easements by the City of Aurora (Aurora, 2013a & 2013b). The information from these previous baseline studies were reviewed and pertinent information to the project area is included as a part of this BRR and in subsequent alternatives evaluation. The environmental resources discussed in this BRR includes: land cover types, noxious weeds, wetlands, migratory birds (including raptors and waterfowl), special status species (including threatened, endangered, proposed, candidate and state concern), Senate Bill 40 (SB 40) (riparian) resources, and wildlife movement corridors.

2. AFFECTED ENVIRONMENT

This section describes the biological resources (special status species habitat, wetlands, noxious weeds, nesting migratory birds, SB 40 resources) and land cover types of the study area, including resources identified through previous surveys (CNHP, 2014; ERO, 2013). This section also includes resources identified from federal, state, and local agencies. Lastly, information is included based on site conditions during several field surveys conducted from October 2014 through May 2015. A wetland delineation was also conducted as a part of this analysis **Appendix A7** *Wetlands Delineation*.

2.1 Federal Regulations and State Statutes

As identified in **Section 1.0**, the National Environmental Policy Act (NEPA) requires projects with federal oversight or projects pursuing federal funding assistance to evaluate the environmental consequences of proposed actions. Other federal regulations also require coordination with federal agencies to identify impacts to other sensitive biological resources.

2.1.1 Other Federal Regulations

This section identifies other important federal regulations and the biological resources they protect which require surveying for, and analysis of, during the NEPA process. These other federal regulations include:

- The Clean Water Act (CWA) of 1972, which protects wetlands, open water, and other Waters of the US (WUS);
- The CWA of 1972, Section 303(d), which requires states to develop lists of impaired waters;
- Federal Executive Order 11990 Protection of Wetlands, which directs lead federal agencies, in this instance the Federal Highway Administration (FHWA), to protect isolated wetlands by avoiding direct or indirect support of construction in wetlands when a practicable alternative is available;
- The Endangered Species Act (ESA) of 1973, which protects threatened and endangered species and their habitat;
- The Bald and Golden Eagle Protection Act (BGEPA) of 1940, which protects Bald and Golden Eagles and prohibits anyone (except through an issuance of a permit) from "taking" either of these species of eagles, including their parts, nests (even inactive nests), and eggs;
- The Migratory Bird Treaty Act (MBTA) of 1918, which protects a vast majority of birds found in Colorado and their active nests;
- The Federal Noxious Weed Act of 1974, which established a program to control the spread of noxious weeds;
- Federal Executive Order 13112 Invasive Species, which prevents the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause; and
- FHWA Guidance on Invasive Species (FHWA, 1999).

2.1.2 Other State Statutes and Local Regulations

This section identifies other state statutes that the Colorado Department of Transportation (CDOT) is managed by and which are specific to biological resources that may be impacted through proposed actions as these actions relate to transportation facilities. Also, this section identifies any Arapahoe County or City of Aurora regulations that are specific to biological resources which may be found on Arapahoe County owned properties or City of Aurora owned properties. These state statutes and local regulations include:

- Colorado Department of Agriculture (CDA), Plant Industry Division, Colorado Noxious Weed Act, 35-5.5-101 to 119, Colorado Revised Statutes (CRS), including species on the December 2014 Noxious Weed List;
- CDOT's NEPA Manual – Management Guidelines for Noxious Weeds, Chapter 9, Section 9.7.3 (CDOT, 2015)
- SB 40 Wildlife Certification for impacts to streams, streambanks, or stream tributaries (CDOT & CPW, 2013);
- The Colorado Nongame, Endangered, or Threatened Species Conservation Act, CRS 33-2-101 to 108, (Repealed and reenacted by Laws 1984, S.B. 78, § 1, eff. Jan. 1, 1985);
- Arapahoe County Noxious Weed Management Plan (Arapahoe County, 2012); and
- City of Aurora Parks, Recreation, and Open Space Rules and Regulations Sections 6208 and 6211.

2.2 Description of Existing Conditions

The information presented in this report is based on field surveys conducted on October 23, 2014, March 16, 2015, March 17, 2015, and continuous field visits from January to May in 2015 as part of efforts to identify any nesting Bald Eagles (*Haliaeetus leucocephalus*) in the project area. Environmental Scientists from Felsburg Holt and Ullevig (FHU), including, Keith Hidalgo, Jessica Myklebust, Anthony Marshall, and Jake Lloyd conducted the field visits.

The species of vegetation observed during the field visits represent the identification of plant species easily visible during the time of the surveys and should not be considered comprehensive. Further field studies conducted earlier in the growing season could reveal other species within the project area.

The study area is located in the City of Aurora, in Arapahoe County, Colorado, at approximately 5,500 feet above sea level. The study area is in the western-most edge of the Flat to Rolling Plains of the High Plains ecoregion. This ecoregion (US Environmental Protection Agency [USEPA], 2003) is described as:

> "More level and less dissected than the adjacent Moderate Relief Plains (25c). Soils are generally silty with a veneer of loess. Dryland farming is extensive, with areas of irrigated cropland scattered throughout the ecoregion. Winter wheat is the main cash crop, with a smaller acreage in forage crops."

Generally, the study area is located to the east of the Buckley Air Force Base (AFB), west of high-and low-density single-family residences and commercial businesses, west of E-470 and surrounding agricultural lands, north of agricultural lands, and south of recreational ball fields, agricultural lands, and single-family residences. The natural characteristics of this ecoregion have been replaced by development; however, the blue grama-buffalo grass association was observed in many upland areas around the study area. The natural vegetation in the study area consists primarily of native and non-native grasses, weedy forbs, shrubs, and trees throughout the stream and riparian areas and in the open areas in and adjacent to the study area.

2.2.1 Clean Water Act Section 303(d) Information

Coal Creek, two un-named tributaries to Coal Creek, Murphy Creek, and an un-named tributary to Murphy Creek (as identified by Colorado Department of Public Health and Environment [CDPHE] stream segmentation source information) are all found in the study area and pass through the study area flowing from southeast to northwest into Sand Creek. Sand Creek subsequently flows northwest toward a confluence with the South Platte River approximately 12.3 miles to the northwest. This riparian and stream corridor is locally referred to as the Triple Creek Greenway (CNHP, 2014) or TCGC.

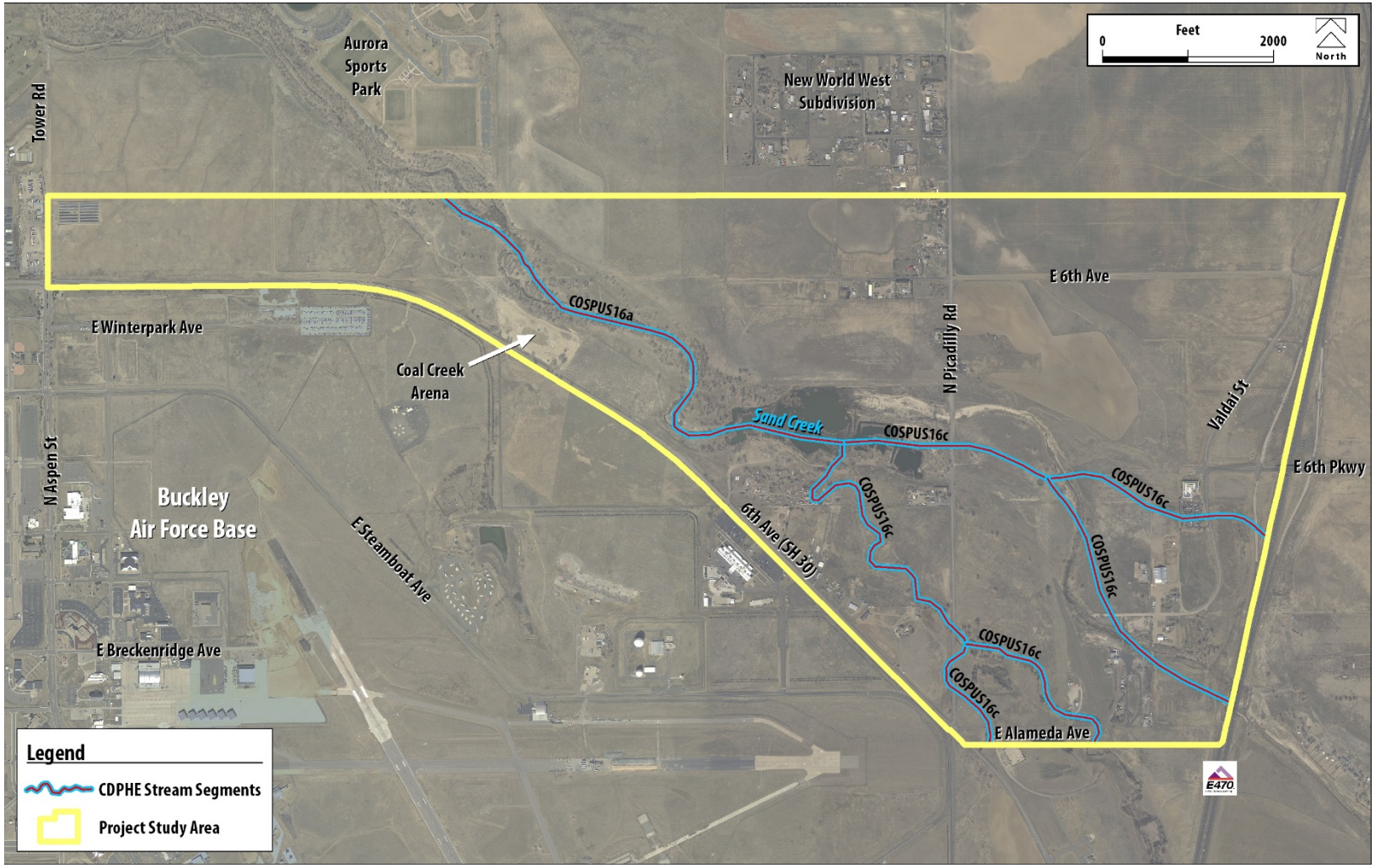
The study area lies within an un-named sub-watershed of the Sand Creek watershed, part of the South Platte River Basin. This watershed is the 6th level Hydrologic Unit Code 101900030402. As identified above, Coal Creek, Murphy Creek, and their respective tributaries travel directly through the study area. Aurora Reservoir is found to the southeast of the study area by approximately 8.65 miles.

Two segments of Coal Creek are present in the study area (one segment east of Picadilly Road and one segment west of Picadilly Road) and are identified with unique stream segment codes of COSPUS16a (Sand Creek) and COSPUS16c (Coal Creek), downstream from Aurora Reservoir. These stream segment identification codes are defined and used by CDPHE (CDPHE 2012). This segment of Coal Creek is on the CDPHE 303(d) list of Impaired Waters for *Escherichia coli* (E. coli) and selenium (Se). Segment COSPUS16a has a 303(d) high priority for E. coli and a low priority for Se. Currently, there is no known active monitoring and evaluation parameters associated with Segment COSPUS16a. Refer to **Figure 2** for a map of the above listed CDPHE stream segments.

All other stream segments found within the study area, including Murphy Creek, a segment of Coal Creek, and un-named tributaries of both, are identified as COSPUS16c, downstream from Aurora Reservoir (CDPHE, 2012). These stream segments are on the CDPHE 303(d) list of Impaired Waters for Se and have a low priority. Currently, there is no known active monitoring and evaluation parameters associated with these stream segments listed as COSPUS16c.

If a stream segment is on the 303(d) list, it requires the development of a Total Maximum Daily Load (TMDL). A TMDL is developed to identify the total pollutant a waterbody can assimilate and still meet water quality standards. No TMDLs are in place for these stream segments. TMDLs will be required for monitoring water quality of these stream segments, but may not be required as part of this project.

Figure 2 CDPHE Stream Segmentation



2.2.2 Cover Types & Vegetation

Existing Cover Types in the Study Area

Based on a review of the Colorado Parks and Wildlife's (CPW) Colorado Vegetation Classification Project (CVCP) and site visits of the study area, eleven (11) land cover types are identified in the general study area and are listed in **Table 1** and visible in **Figure 3**. **Appendix A** contains photographs of the cover types.

Table 1 Land Cover Types in the Study Area

Land Cover Type[1]	Area[2] (acres)	Percent of Visible Area
Grass/Forb Mix	353.7	30.2%
Grass Dominated	178.6	15.3%
Dryland Agriculture	274.1	23.4%
Commercial	39.3	3.4%
Roadway/Pavement Areas	45.8	3.9%
Residential	100.4	8.6%
Cottonwood	95.6	8.2%
Shrub/Grass/Forb Mix	38.6	3.3%
Water	17.7	1.5%
Herbaceous Riparian	18.3	1.6%
Willow	7.4	0.6%
Total[2]	**1,169.5**	**100%**

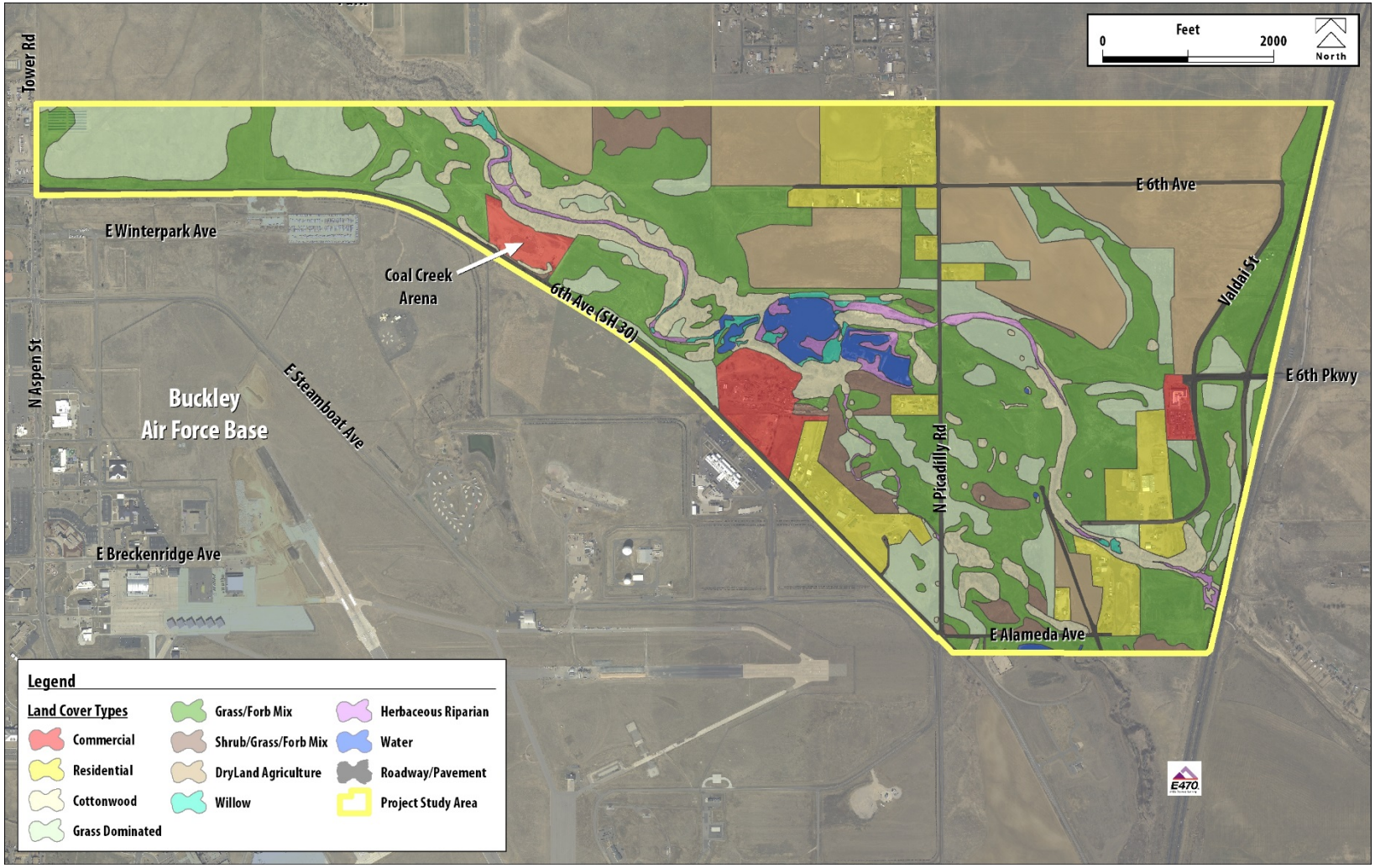
1 – Cover types correspond to those in the CVCP (CPW, 2014).

2 – Land cover was drawn at a 1 inch = 250 feet scale and is used to identify the amount of land that is undeveloped in/near the study area.

The field visits identified the extents of the CVCP vegetation categories present, identified separate land cover types, and identified the distribution of land cover within the immediate vicinity to the study area. As shown in **Table 1**, the Grass/Forb Mix and Grass Dominated are the most dominant cover types within the study area and adjacent areas.

Vegetation in the study area includes native trees, shrubs, and grasses, along with non-native weeds. Wetland plant species exist along the TCGC, and upland plant species exist in the surrounding open lands. Generally, the Grass/Forb Mix, Grass Dominated, Cottonwood, Herbaceous Riparian, and Willow cover types primarily consist of various native and non-native woody and herbaceous species including: plains cottonwood (*Populus deltoides*), lanceleaf cottonwood (*Populus acuminate*), narrowleaf cottonwood (*Populus angustifolia*), black locust (*Robinia pseudoacacia*), sandbar willow (*Salix interior*), rubber rabbitbrush (*Ericameria nauseosa*), chokecherry (*Prunus virginiana*), American plum (*Prunus americana*), common snowberry (*Symphoricarpos albus*), smooth brome (*Bromus inermis*), Scotch thistle (*Onopordum acanthium*), and poison hemlock (*Conium maculatum*). Upland tree species included non-native ornamental and noxious trees.

Figure 3 Land Cover Types in the Project Study Area



The non-native trees present include Russian olive (*Elaeagnus angustifolia*) and Siberian elm (*Ulmus pumila*). The vegetation present within the riparian corridor and adjacent uplands is native and has relatively high quality because of the presence of Sand Creek, Coal Creek, Murphy Creek, and their un-named tributaries. The quality of vegetation and habitat is able to retain a high quality due to the lack of overall development within the TCGC, presence of native wildlife, and low abundance of noxious weeds.

The Grass/Forb Mix cover includes rangeland that is co-dominated by grasses and forbs. Example species include arrowleaf balsamroot (*Balsamorhiza sagittata*), gumweed (*Grindelia spp.*), western wheatgrass (*Pascopyrum smithii*), or Kentucky bluegrass (*Poa pratensis*). Both gumweed and western wheatgrass were visible during the field visits, along with yellow sweetclover (*Melilotus officinalis*).

The Grass Dominated Rangeland cover type characterization is identified as areas dominated by annual and perennial grasses. Examples include Kentucky bluegrass, western wheatgrass, and needle and thread grass (*Hesperostipa comate*).

The CVCP identifies Dryland Agriculture as areas dominated by dryland crops and fields. Numerous dryland agricultural fields are found north and east of the study area and contained wheat and hay fields.

Commercial, Residential, and Roadway/Pavement Areas include cover dominated by urbanization. This includes areas with little vegetation, buildings, parking lots, roads, and airport landing strips.

The Cottonwood cover type characterizes areas as wooded riparian areas dominated by common cottonwood, narrowleaf cottonwood, plains cottonwood, or eastern cottonwood (*Populus deltoides deltoides*). Of these species, plains cottonwood and narrowleaf cottonwood were identified during the field visits.

Shrub/Grass/Forb Mix is also referred to as Mixed Rangeland and is generally considered a combination of Grass/Forb and Shrub/Grass Rangeland. Typically, these areas contain species such as western wheatgrass, needle and thread grass, rubber rabbitbrush, and yucca (*Yucca glauca*).

Water includes open water areas such as lakes, streams, and rivers. Open water is found throughout the TCGC and in small depression ponds and lakes within the study area. Several large ponds located in the middle of the study area are the result of aggregate mining operations in the past. These ponds were then filled in and are now a source of wildlife habitat, as evidenced by an existing beaver lodge and abundant presence of bird species.

The Herbaceous Riparian classification identifies cover where graminoid and forb dominated wetlands and riparian areas exist. This includes non-woody riparian areas consisting of sedges and cattails. Numerous pockets of broadleaf cattail (*Typha latifolia*) and narrowleaf cattail (*Typha angustifolia*) are found throughout the TCGC.

The Willow cover type is identified as a shrub riparian or wetland area dominated by shrub willow species. Numerous pockets of sandbar willow were identified along the TCGC, either adjacent to the channels, or in a few instances, traversing the entire channel width.

The above landcover types also correlate with the general vegetation descriptions identified in the *Baseline Inventory Report – 6th and Coal Creek Expansion Property Southwest of E. 11th Ave. and Liverpool St.* (ERO, 2013) and the ecological systems identified in the *Survey of Biological Resources in the Triple Creek Greenway, City of Aurora* (CNHP, 2014) report.

The TCGC also consists of SB 40 and Non-SB 40 (upland) shrubs and trees. SB 40 resources are considered important for wildlife within the riparian zone. These resources provide breeding, nesting, foraging, fringe, and shelter habitat for numerous amphibians, birds, fish, mammals, and reptiles. SB 40 resources were identified as part of a desktop review and verified during field surveys. These resources are described in more detail in **Section 2.2.9**.

2.2.3 Existing Conservation Easements, Parks, and Open Space Properties

Numerous parcels of land have been acquired by the City of Aurora and Arapahoe County within the study area for the purposes of setting aside land for open space and active/passive recreation use. These lands are shown in **Figure 4** and includes properties within the TCGC, the Coal Creek Arena, the ponds associated with the old aggregate pits (Confluence of Coal Creek and Murphy Creek), and parcels of land on either side of the TCGC where a future regional trail will provide connection to areas to the northwest and southeast for bicyclists, horseback riders, and pedestrians in the future. These existing parks and open space properties are described in further detail in **Appendix A16** *Parks, Recreation, Open Space and Section 4(f) and 6(f) Analysis Technical Report*.

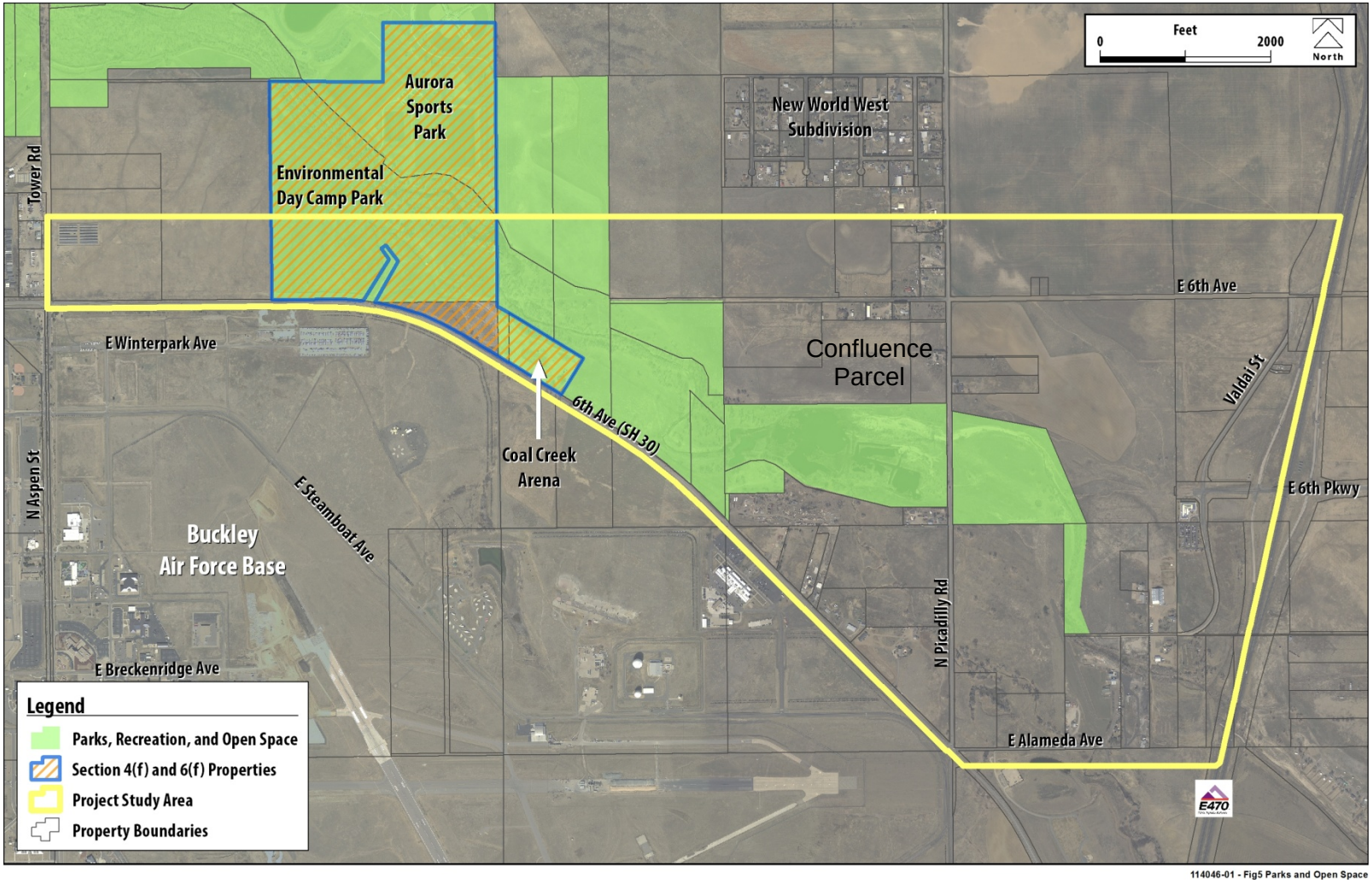
Several of these easements have restrictions associated with them and limit the ability for alternative design to be located within their parcel limits. This is especially true for the parcels containing the aggregate ponds (Confluence). Due to this limitation, the Proposed Action was specifically designed to avoid this area. For more information on easement restrictions related to parks, recreation, and open spaces refer to **Appendix A16** *Parks, Recreation, Open Space and Section 4(f) and 6(f) Analysis Technical Report*.

2.2.4 Noxious Weeds

The Colorado Noxious Weed Act requires the control of the 69 plant species designated as "noxious weeds." According to the CDA, noxious weeds are plants that reduce agricultural productivity, lower real estate values, endanger human health and well-being, and damage scenic values (CDA, 2010; CWMA, 2013). The state has divided the 69 noxious weeds into three groups: Lists A, B, and C. In addition, the state also has a Watch List for newly introduced noxious weeds that may become listed in the future because they exhibit the same characteristics as listed noxious weeds.

List A includes 20 plant species that have very limited to no distribution in Colorado and are designated for immediate eradication. List B includes 34 species that are locally common but are managed to stop continued spreading. List C includes 15 species that are generally widespread and are not managed to stop spreading but identified for additional education, research, and biological control. The Watch List contains 20 plant species; this Watch List is intended to serve advisory and educational purposes only and is used to locate and report distributions of these species for future designation as noxious weeds.

Figure 4 Parks, Recreation, and Open Space Properties



The project team reviewed preliminary data from CDOT's Online Transportation Information System (OTIS) for available information on mapped roadside noxious weeds. CDOT regularly maps noxious weeds as a part of maintenance activities. Based on available information from 2010 through 2013, numerous List B and List C species are found along 6th Avenue Parkway west of the study area. Since only List A and List B species require active management by the CDA, they are the only ones listed below in **Table 2** and are the only species shown in **Figure 5**.

Table 2 Noxious Weeds Present near the Study Area (CDOT 2015)

Common Name	Species Name	CDA: List A or B	Arapahoe County	Density
List B Species				
Canada Thistle	*Cirsium arvense*	List B	X	Common
Leafy Spurge	*Euphorbia esula*	List B	X	Scattered
Musk Thistle	*Carduus nutans*	List B	X	Scattered
Scotch Thistle	*Onopordum acanthium*	List B	X	Scattered

Source: CDA, 2014; Colorado Weed Management Association (CWMA), 2013; CDOT, 2015

Due to field surveys for the project occurring outside of the active growing season for plants, not all noxious weeds were identified. Based on field surveys conducted late in the season, noxious weeds were primarily found within road right-of-ways (ROWs) and are consistent with the areas identified by CDOT (CDOT, 2015). Due to the ability for noxious weed populations to fluctuate greatly from year to year, the project team identified only a few areas where noxious weeds were the dominant vegetation and where they would readily become re-established.

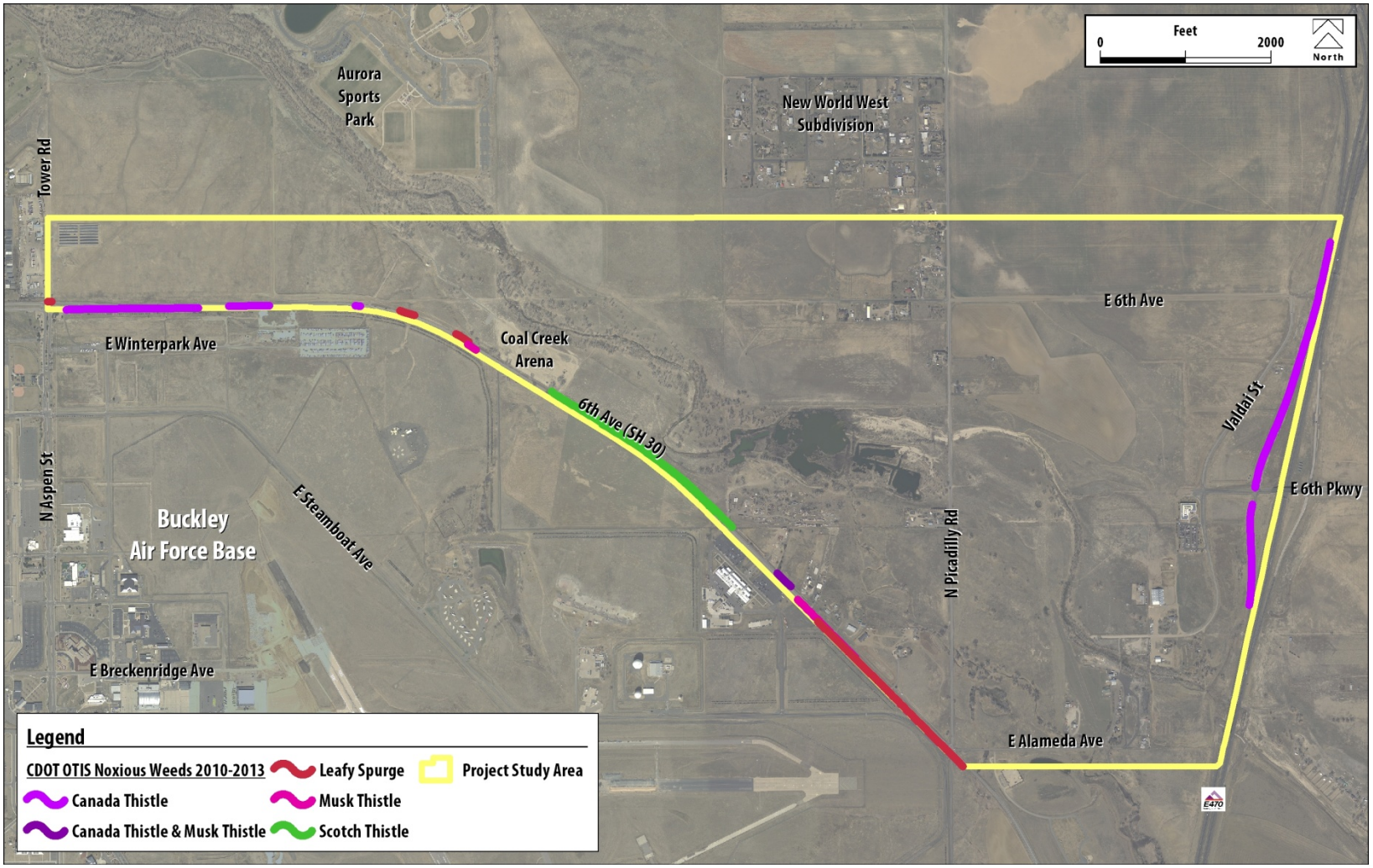
A separate noxious weed survey must be conducted and mitigation activities must be identified (as either a CDOT specification 217 or as a Noxious Weed Management Plan) prior to any construction activities occurring.

A total of four "List B" plant species designated as noxious weeds were identified by CDOT's OTIS adjacent to the study area on 6th Avenue Parkway and E-470. No "List A" species were found. Also, most of these species are found throughout the open, native seeding areas throughout the roadway ROW.

Noxious weed management is intended to follow these regulations and guidelines:

- CDA, Plant Industry Division, Colorado Noxious Weed Act, 35-5.5-101 119, CRS (2003);
- Federal Executive Order 13112 Invasive Species;
- FHWA Guidance on Invasive Species (FHWA, 1999);
- Incorporating Integrated Noxious Weed Management into the NEPA Analysis and Project Development Process. Draft, CDOT (CDOT, 2006); and
- Arapahoe County Noxious Weed Control Program (Arapahoe County, 2015).

Figure 5 Noxious Weeds in the Study Area



Additional information is provided in **Section 4.1.4** for the management of noxious weeds as part of construction activities.

2.2.5 Wetland Resources

In 1972, the US Congress passed the CWA to protect the quality of waters of the US, including adjacent wetlands. Section 404 of the CWA defines WUS as all traditional navigable waters (TNWs) and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters. The US Army Corps of Engineers (USACE) Regulatory Program administers and the USEPA enforces Section 404 of the CWA.

The definition of WUS under USACE jurisdiction does not include wetlands that lack a surface connection to, and, therefore, are isolated from, regulated waters. However, in projects with federal funding or oversight, a second piece of legislation, Executive Order 11990 Protection of Wetlands, directs the lead federal agencies, in this instance FHWA, to protect isolated wetlands by avoiding direct or indirect support of construction in wetlands when a practicable alternative is available.

Preliminary Desktop Review – National Wetland Inventory & Light Detecting and Ranging Technology

Prior to engaging in on-site field surveying activities, a desktop review was conducted to determine potential presence of wetlands and WUS in the study area. Utilizing National Wetland Inventory (NWI) data from the U.S. Fish and Wildlife Service (USFWS), several hydrologic features were depicted throughout the project site. These features include freshwater emergent wetlands, freshwater forested/shrub wetlands, freshwater ponds, lakes and riverine (riparian) areas (**Figure 6**).

The majority of these features appear aggregated near the center of the study area, where the convergence of Murphy Creek and Coal Creek occur. This convergence zone is also the site of previous disturbance from mining activities, giving rise to bodies of surface water from exposed groundwater. This area appears to be most suitable for wetland and WUS presence. At this location, Murphy Creek and Coal Creek join to become Sand Creek, which meanders northwest out of the study area. According to current data, a few pockets of potential wetlands appear to exist along this stretch of Sand Creek, most notably just north of the Coal Creek Arena.

In addition to NWI data, a topographical inspection was performed through use of Light Detecting and Ranging technology (LiDAR). Given that multiple drainage ways occur on the project site, this analysis provides a better understanding of site drainage behavior by displaying the possible stream channel Ordinary High Water Mark (OHWM) associated with changes in slope (**Figure 7**).

Those drainage areas that express a clear “bed and bank” and have an observable drainage condition can, and typically are, noted as WUS and fall under regulatory protection (USACE, 2014).

This preliminary desktop review identified areas for FHU staff to focus wetland delineation efforts in the field.

Figure 6 USFWS National Wetland Inventory

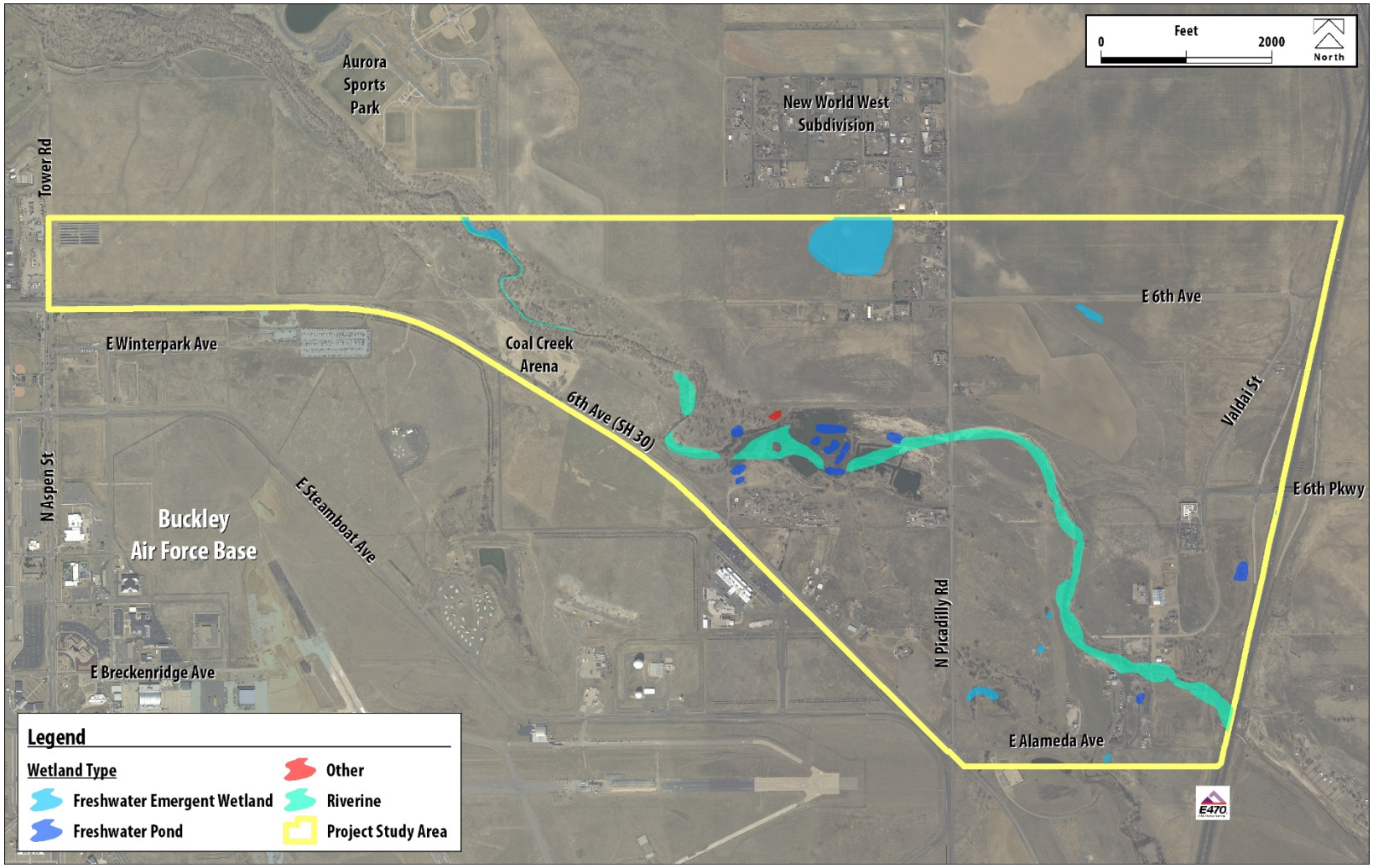
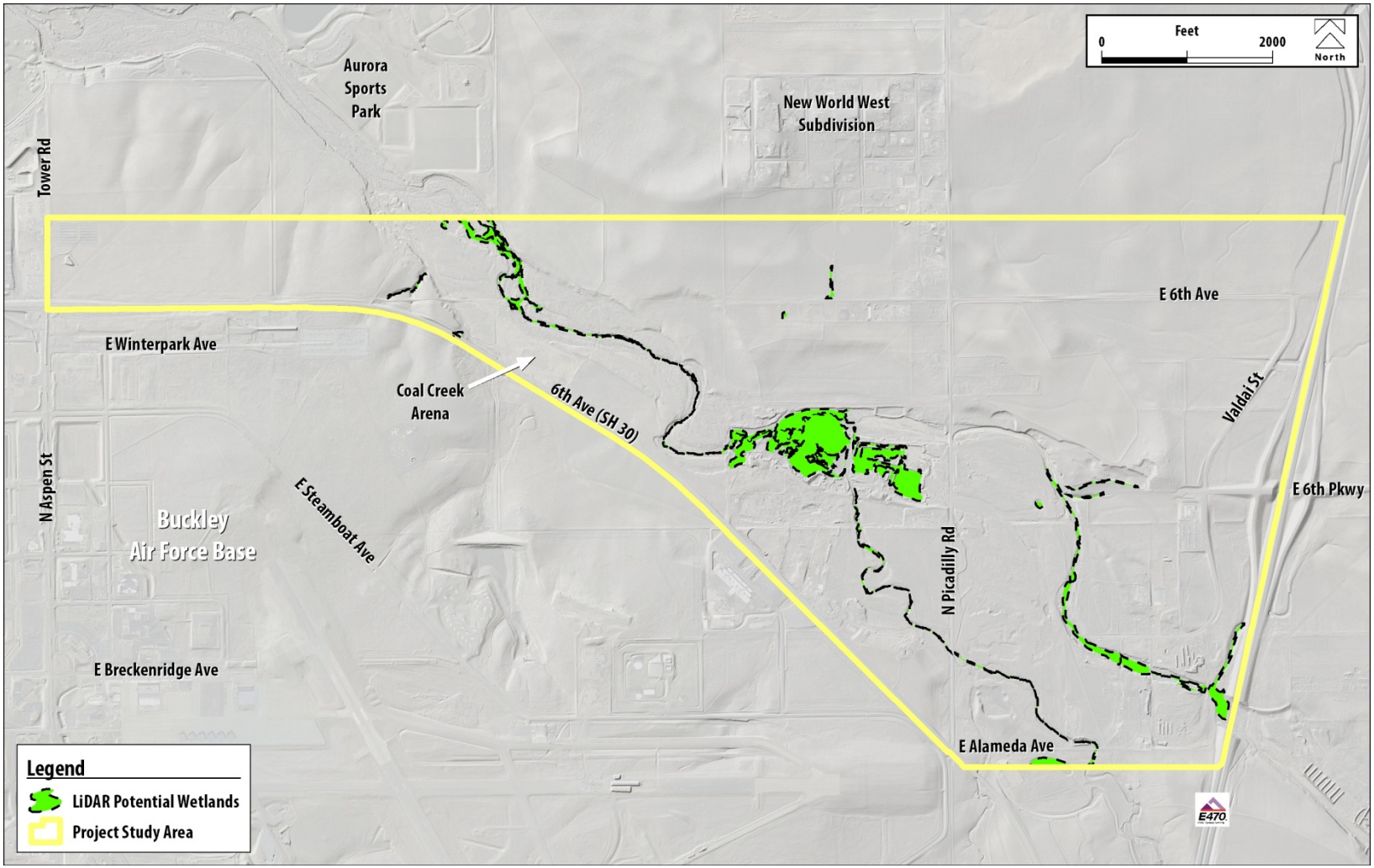


Figure 7 LiDAR Imagery and Potential Wetlands and Open Water Areas



On-Site Wetland Delineation

FHU staff focused not only focused wetland delineation efforts on areas identified as likely wetland areas from the NWI data and areas identified with a OHWM from the LiDAR information, but also limited wetland delineations within or adjacent to the Proposed Action Footprint. The wetlands delineated as part of the field surveys will be where likely construction impacts will occur, as compared to surveying the entire study area.

FHU performed a wetland delineation from March 16 to 17, 2015 with Keith Hidalgo (Certified Ecologist), Jake Lloyd, and Anthony Marshall, Environmental Scientists with FHU, in support of this EA. Wetlands identified in the field in March 2015 were documented using the latest Wetland Determination Forms from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (Version 2) (USACE, 2010). Site photographs included in **Appendix A** illustrate field conditions in from October 2014 through May 2015. A Trimble® GeoXH™ GNSS with ESRI's® ArcPad™ version 10.0 mobile geographic information system (GIS) was used to delineate wetland boundaries. The boundaries that have been delineated are shown on **Figure 8**, **Figure 9,** and **Figure 10.**

Wetlands delineated in March 2015 consisted of different species of vegetation, including plains cottonwood, sandbar willow, narrowleaf cattail, rushes and sedges. Vegetation was dense due to the amount of precipitation in the region during the 2014 season and snowmelt from the previous winter. Six (6) Wetland Determination Forms were completed for the project and all wetlands are labeled on **Figure 8**, **Figure 9,** and **Figure 10**. The total wetland area delineated as part of the field survey in March 2015 is 1.96 acres (**Table 3**). The wetland characteristics and boundaries (hydrology, soils, and vegetation) are described in detail in **Appendix A7** *Wetland Delineation Technical Report* and are consistent with the current conditions.

Table 3 Summary of the Wetlands in or near the Proposed Action Footprint

Wetland Identifier	Existing Area (Acres/ square feet)	Remarks
Wetland SCA	0.981	Large wetland associated with the Sand Creek floodplain/riparian corridor. Dominated by sandbar willow, common threesquare (*Schoenoplectus pungens*), scouring rush (*Equisetum laevigatum*) and jointleaf rush (*Juncus articulatus*).
Wetland CCA	0.689	Large wetland associated with the Coal Creek floodplain/riparian corridor (west side of Picadilly Rd). Dominated by sandbar willow.
Wetland CCB	0.285	Moderate wetland associated with the Coal Creek floodplain/riparian corridor (east side of Picadilly Rd). Dominated by sandbar willow, common three-square and jointleaf rush.
TOTAL	**1.96**	

Figure 8 Surveyed Wetlands in or near the Proposed Action Footprint

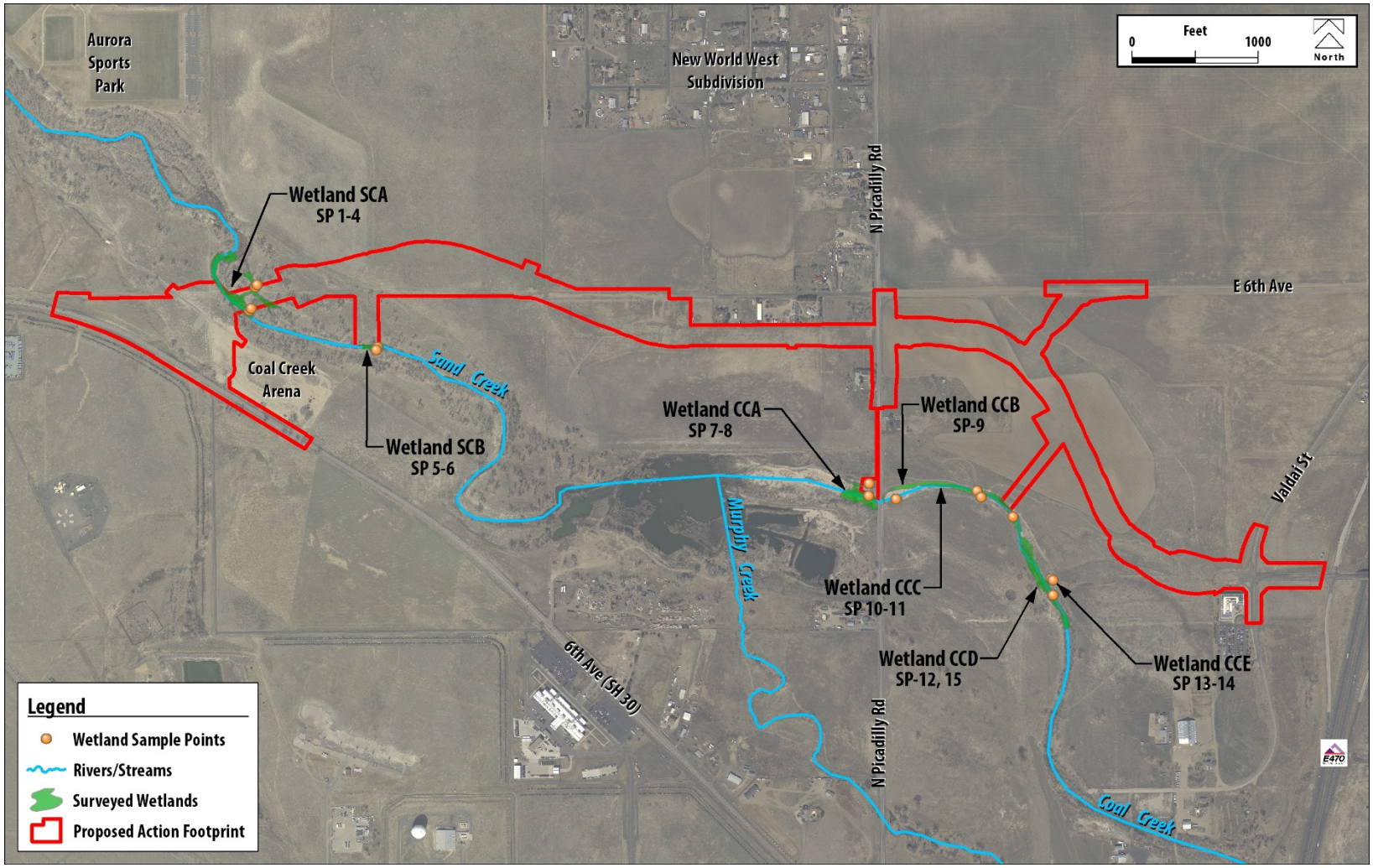


Figure 9 Sand Creek Wetlands

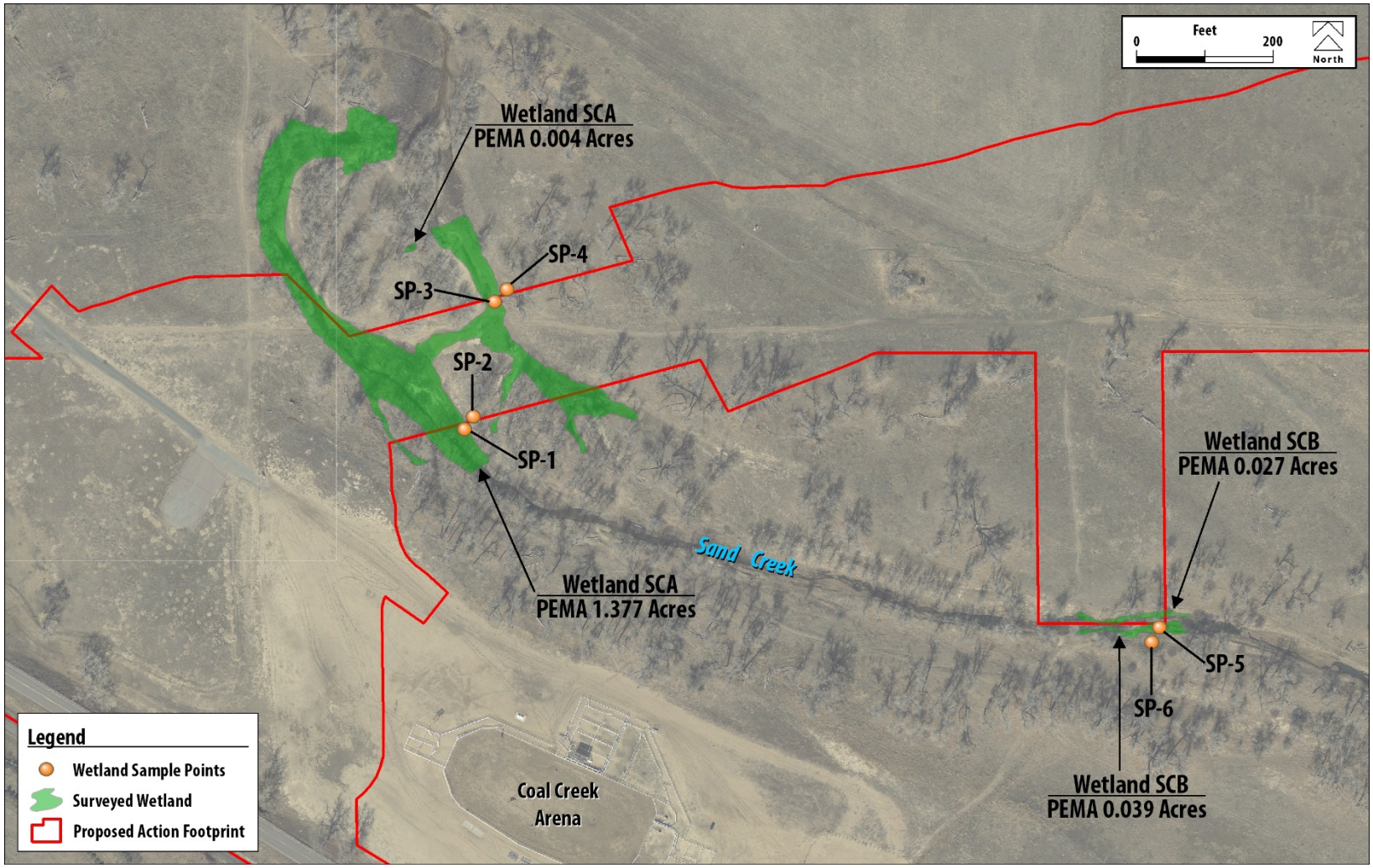
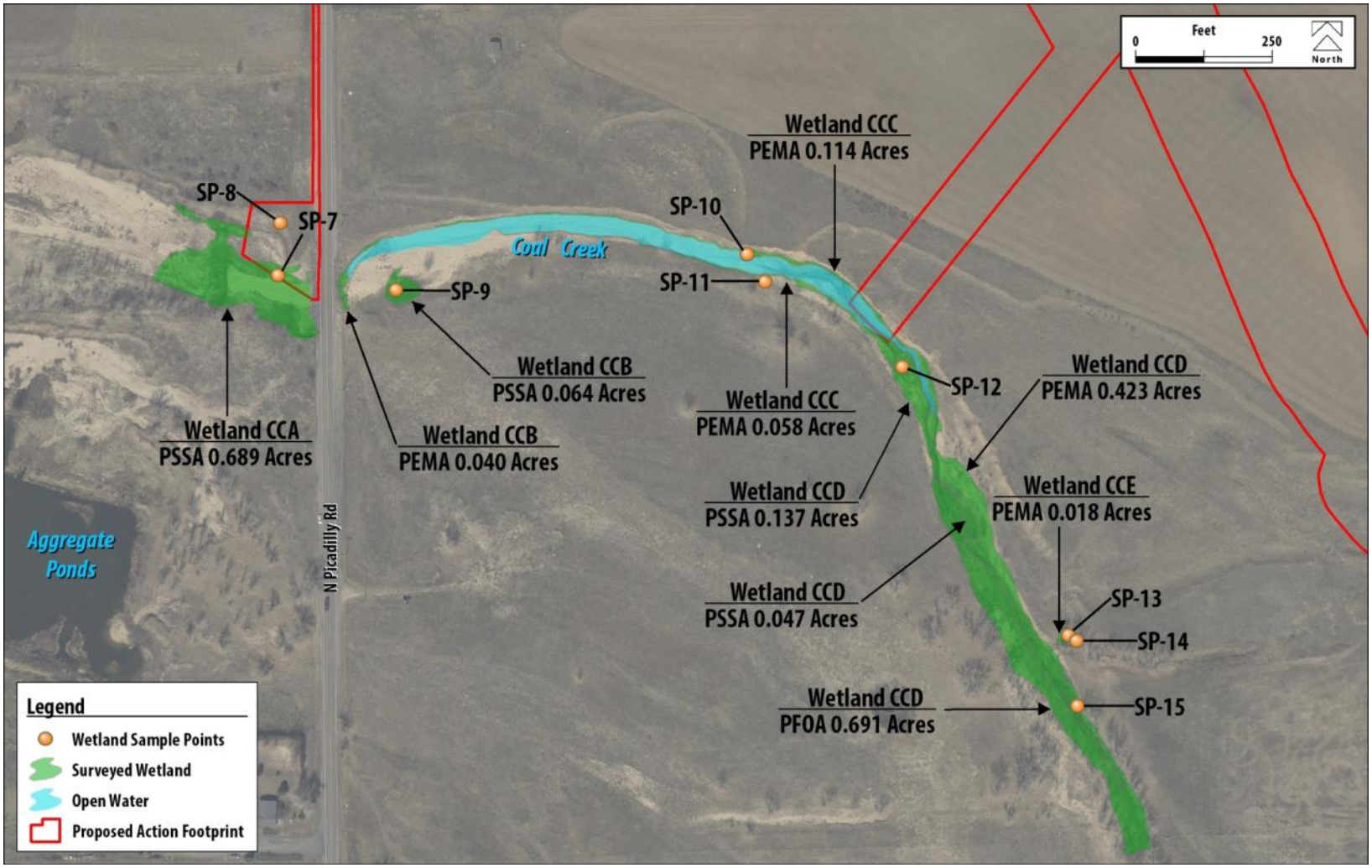


Figure 10 Coal Creek Wetlands



If the project permanently impacts more than 500 square feet of wetlands, a Wetland Finding Report will be required based on CDOT policy. Also, if permanent impacts to wetlands will be equal to or more than 0.10 acre, a Functional Assessment for Colorado Wetlands (FACWet) analysis will be required based on CDOT policy and will be incorporated into the Wetland Finding Report. These reports will be provided to CDOT prior to project construction activities. A CWA Section 404 Nationwide Permit will be required from the USACE for the project permanent wetland impacts. The Section 404 permit will be acquired prior to project construction activities occurring.

2.2.6 Waters of the U.S. and Jurisdictional Status

Murphy Creek, Coal Creek and Sand Creek would be considered WUS within the CWA jurisdiction (as defined by 33 Code of Federal Regulations Part 328). The specific WUS indicators include relatively permanent waters (RPWs) that flow directly or indirectly into a TNW and wetlands directly abutting RPWs that flow directly or indirectly into TNW (USACE, 2007). Wetlands identified during the March 2015 delineation were found directly abutting these RPWs and would likely be considered jurisdictional as well.

2.2.7 Wildlife

This section discusses the wildlife species that are known or are potentially present in or near the study area. Information on species distribution was obtained from existing literature (ERO, 2013; CNHP, 2014; CDPHE, 2012; CPW, 2015a; and CPW, 2015b), CPW data, USFWS data, CPW Natural Diversity Information Source (NDIS) data, and species information collected during field surveys conducted from October 2014 through May 2015. The site visits also included continuous surveys for Bald Eagle and other raptor nests.

Based on the habitats present in the study area (**Section 2.2.2**), numerous species of mammals, birds, reptiles, and amphibians could occur within the study area. The following section briefly describes species that were either observed during field visits, are likely to occur based on the presence of suitable habitat, or were identified in previous reports. Refer to **Appendix B** for a full list of wildlife observed at the time of the field visits.

Mammals

According to the NDIS database, over 50 mammal species are known or likely to occur in Arapahoe County (CPW, 2011). These include ungulates (hoofed mammals), carnivores (canines, cats, and weasels), bats, lagomorphs (rabbits and hares), and rodents (squirrels, chipmunks, mice, voles) (CPW, 2011; CPW, 2015). These groups of mammals are briefly discussed below.

Ungulate species known to occur in or near the study area include mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*). Pronghorn antelope (*Antelocapra americana*) are found further east of the study area as well.

Photo 1 - White-tailed deer along the TCGC

Ungulate species were observed in the TCGC during field surveys and use the riparian area as a major wildlife movement corridor to safely move through the study area. Also, visible signs of mule deer and white-tailed deer (tracks and scat) were observed using specific paths (game trails) through the study area; including heavily used game trails south of the aggregate pits.

Several white-tailed deer and mule deer were observed in the field on numerous occasions. It is anticipated that ungulate species use the study area as residents year-round. CPW maps areas throughout the TCGC for mule deer as: overall range, winter range, severe winter range, concentration areas, and a portion of 6th Avenue as a highway crossing (CPW, 2015a). CPW also maps TCGC as overall range for white-tailed deer. Most of the available habitats in the study area can sustain the two deer species due to: the width of the riparian corridor and the connection to the Aurora Reservoir to the south, large open shortgrass prairie to the east, the Sand Creek riparian corridor to the north and west, the Rocky Mountain Arsenal Wildlife Refuge to the north, and the limited development nearby allows for higher mobility of these species.

Numerous carnivore species occur in the study area, the most common being raccoon (*Procyon lotor*), coyote (*Canus latrans*), red fox (*Vulpes vulpes*), and striped skunk (*Mephitis mephitis*). All of these animals use a variety of habitats and generally occupy large areas (Fitzgerald et al., 1994). Individuals may use this area as a movement corridor, for hunting purposes or for denning purposes. All three of these species do live year-round within the TCGC in the study area. Raccoon, red fox, and coyote tracks and scat were observed in the TCGC.

Several bat and lagomorph species are likely to occur in the study area. This group includes big brown bat (*Eptesicus fuscus*), big free-tailed bat (*Nyctinomops macrotis*), little brown myotis (*Myotis lucifugus*), long-eared myotis (*Myotis evotis*), silver-haired bat (*Lasionycteris noctivagans*), eastern cottontail (*Sylvilagus floridanus*), and white-tailed jackrabbit (*Lepus townsendii*). All of these animals use a variety of habitats, mostly large open areas or edge habitat (Fitzgerald et al., 1994). These animals are likely to use the study area for extended

periods to fulfill their life-cycle needs. Several eastern cottontails and a single white-tailed jackrabbit were observed, along with rabbit scat during the field surveys.

Many rodent species may occur in the study area. This group is very large, and species common in the study area include the deer mouse (*Peromyscus maniculatus*) and fox squirrel (*Sciurus niger*). Various mice, voles, and woodrats (*Neotoma* spp.) would also use the study area. Numerous tracks and potential burrows to dens were observed during the field surveys. No trapping occurred to identify rodent species present at these locations.

Migratory Birds and Raptors

The vast majority of birds found in Colorado and their nests are protected under the MBTA of 1918. Disturbance of migratory bird nests, if active, is prohibited. Removal of active bird nests requires a MBTA permit from the USFWS. Typically, unless a nest is endangering human life or could cause injury, the permit to take an active nest is denied. CDOT also has a Standard Special Specification 240 (Migratory Birds) for Road and Bridge Construction controls during the construction of a project, which limits construction activity around nests from April 1 to August 31 (CDOT, 2011).

As a result of the habitats present in the study area, many bird species adapted to the shortgrass prairie and especially cottonwood riparian areas are likely to use the area. These bird species include the American Robin (*Turdus migratorius*), Red-tailed Hawk (*Buteo jamaicensis*), Ferruginous Hawk (*Buteo regalis*), Bald Eagle (*Haliaeetus leucocephalus*), Rock Dove (*Columba livia*), Downy Woodpecker (*Picoides pubescens*), White-breasted Nuthatch (*Sitta carolinensis*), and Black-billed Magpie (*Pica hudsonia*). Many other bird species may use or pass through the study area. In addition to the birds listed above, Mallard ducks (*Anas platyrhynchos*), Belted Kingfisher (*Ceryle alcyon*), and Canada Goose (*Branta canadensis*) were observed during the field surveys from October 2014 to May 2015. The NDIS identifies 278 species of birds that are present in Arapahoe County (NDIS, 2011). Bald Eagles, waterfowl, and other raptors are discussed in more detail below.

Photo 2 - Downy Woodpecker near Confluence Open Space

Bald Eagles

Bald and Golden Eagles are protected under the BGEPA of 1940. This law also protects their nests, even during the non-nesting season when no eagles are present. The BGEPA requires permits for the removal of any nest or eagles due to project activities. Previously, an active Bald Eagle nest was located within the study area near the aggregate pits. In an effort to protect this nest, the City placed seasonal restrictions, including fencing to limit human disturbance, in the area surrounding the nest for several years. However, the tree that this nest was located in collapsed in 2013 (as reported by City staff), destroying the nest. However, the seasonal restrictions and fencing to limit access is still in place.

As a component of this project, project staff continuously monitored the study area for any nesting Bald Eagles during the 2015 nesting season (FHU, 2015).

Photo 3 – Bald Eagle seen in the TCGC

Up to ten (10) Bald Eagles have been observed in the TCGC during these surveys roosting, foraging, and perching within the study area. This group of Bald Eagles is typically made up of five (5) sexually mature Bald Eagles and 4-to-5 juvenile Bald Eagles. One breeding pair, which show strong affinity to each other, roost separately outside of the study area to the north and have a nest located adjacent to the Springhill Golf Course, as identified by residents of the area. The other Bald Eagles have been viewed on a regular basis roosting, perching, and foraging near the aggregate pits to the south during the winter months, then dispersing during warmer periods. At the time of this report (May 2015) no active Bald Eagle nests have been found in the study area.

During the site visits in 2014 and 2015, a preliminary nest survey was conducted to identify potential Bald Eagle nests within the study area. Due to the potential for Bald Eagles to take over smaller raptor nests, project staff mapped out the locations of other raptor nests. Refer to **Figure 12** for locations of these smaller raptor nests.

Two active Bald Eagle nests within the region were identified from CPW data (2014). One of these nests, with an unknown activity status, is located approximately 4.5 miles southeast of the study area within the Coal Creek drainage. The second nest is located approximately 8 miles northwest of the study area within the First Creek drainage south of 72nd Avenue. Staff did not locate or map the location of the Bald Eagle nest located near the Springhill Golf Course.

CPW recommends that the buffer for a Bald Eagle nest is between 0.25 and 0.5-mile radius from an active nest, where seasonal restrictions on human encroachment are recommended from October 15 to July 31. Because this project is greater than 0.5 mile from the known active nests, there will be no impacts due to construction of this project to Bald Eagle nests at this time. However, the construction of a new roadway and bridge over the TCGC will have impacts on Bald Eagles due to the disruption to their foraging areas (prairie dog colonies) and perching and roosting areas. Also, Bald Eagles may re-nest in the study area between the time this EA is completed and the project goes to construction. FHU staff recommend eagle surveys be conducted prior to construction due to high Bald Eagle use in the study area. These direct and indirect impacts are discussed in further detail in **Section 3.0**.

Other Raptors

Numerous other raptors (birds of prey) can be found within the study area perching, roosting, foraging, and nesting. The species of raptors observed during the field surveys over the 2014/2015 survey period include: Red-tailed Hawk, Ferruginous Hawk, Great-horned Owl (*Bubo virginianus*), Swainson 's Hawk (*Buteo swainsoni*), and American Kestrel (*Falco sparverius*). Other, smaller sized owls can also be present, such as the Western Screech Owl (*Megascops kennicottii*), but were not observed during the field surveys during 2014/2015. In addition to these species, raptors which migrate during the winter are expected to return and use the study area for foraging, perching, and nesting in the spring of 2015. These migrant raptors can include: Swainson's Hawks (observed), Prairie Falcons (*Falco mexicanus*), and American Peregrine Falcons (*Falco peregrinus anatum*).

Photo 4 – Great-Horned Owl seen in the TCGC

Raptors have recommended buffer areas established by the CPW and the USFWS, including threatened and endangered species and Bald and Golden Eagles. If an active raptor nest is identified, CPW recommends species-specific buffers for human activity near the nest, beyond that which has historically occurred in the area (CPW, 2008a).

The construction of a new roadway and bridge over the TCGC will have impacts on these smaller raptors due to the disruption to their nesting locations, foraging areas (prairie dog colonies), perching and roosting areas. These direct and indirect impacts are discussed in further detail in **Section 3.0**.

Waterfowl & Herons

The presence of the ponded areas (previous aggregate pits) in the middle of the study area attracts numerous waterfowl species (ducks and geese) as well as herons. These ponds provide suitable nesting and foraging areas for these species in the spring and summer and provide a stopover for migrating species during the winter prior to the ponds freezing over. During the surveys in 2014/2015 observations were made of the following species: Mallard Duck, Canada Goose (including lesser), Northern Pintail (*Anas acuta*), Hooded Merganser (*Lophodytes cucullatus*), Northern Shoveler (*Anas clypeata*), Great Blue Heron (*Ardea herodias*), and Black-crowned Night-heron (*Nycticorax nycticorax*). The construction of a new roadway and bridge over the TCGC and near the aggregate ponds will have impacts on these waterfowl species due to the disruption to their normal activities (wading, dabbling, foraging, nesting). These direct and indirect impacts are discussed in further detail in **Section 3.0**.

Photo 5 – Mallard Ducks present at the ponds at Confluence Open Space

Due to the season (late 2014/early 2015) of the field surveys, it is likely that not all nests were identified. Surveys conducted throughout the breeding season will identify the presence of other migratory nesting birds.

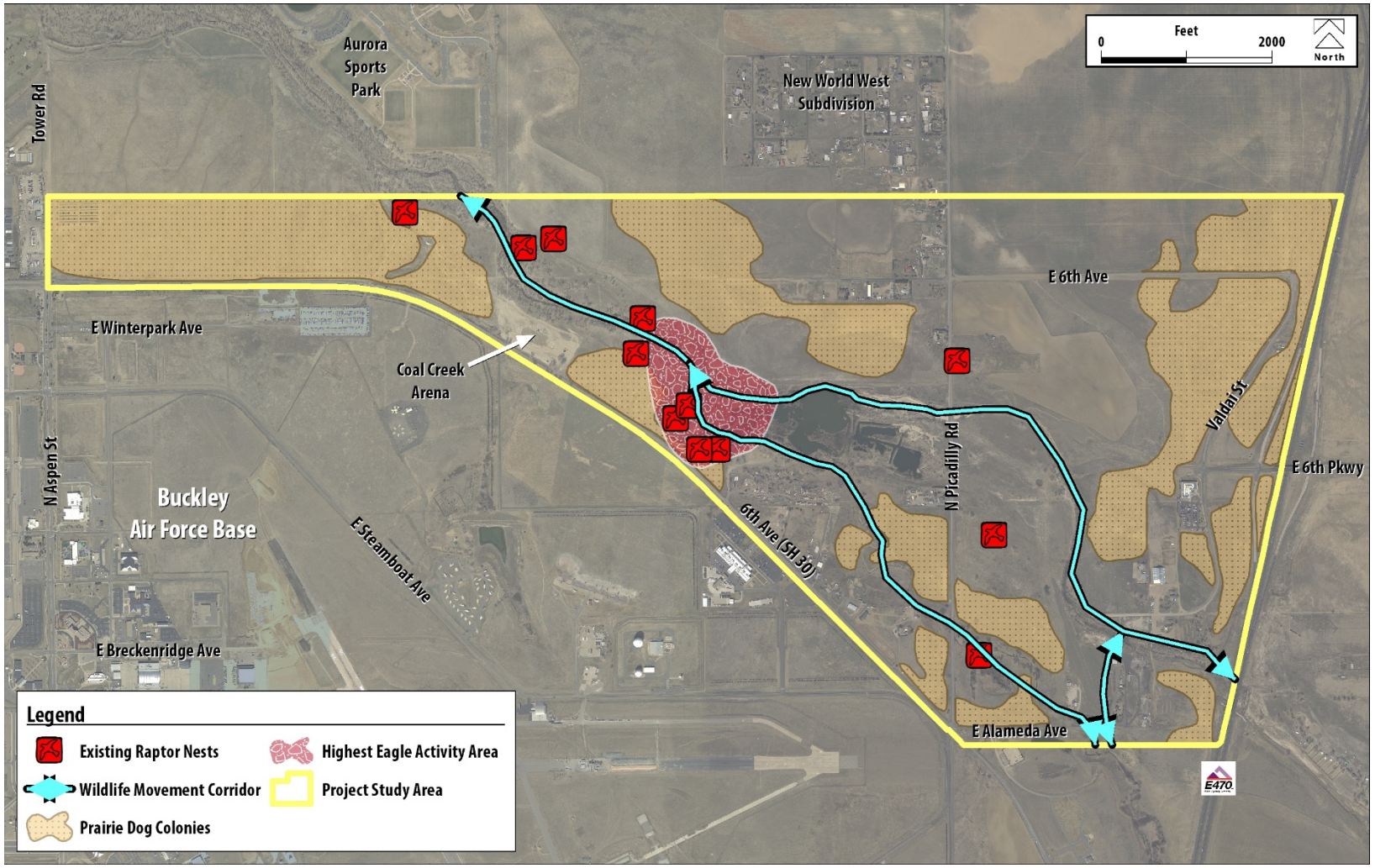
Impacts to migratory birds could occur if road and bridge construction occurs within the nesting season for birds (April 1 to August 31). An additional migratory bird and raptor nest survey is required if construction activities (clearing, grubbing, grading, etc.) occur within the nesting season for birds (April 1 to August 31).

Field surveys from October 2014 through May 2015 identified several raptor nests within the current study area (**Figure 11**). It is required that a qualified wildlife biologist survey the Proposed Action footprint to determine raptor activity, if construction is to occur between October 15 and August 31 due to the presence of known Bald Eagles and other, smaller raptors.

Photo 6 – Great-horned Owl cavity nest with owlets

Photo 7 – Active Swainson's Hawk nest

Figure 11 Wildlife Activity



Reptiles and Amphibians

According to the NDIS county list, there are 22 species of reptiles and 7 species of amphibians known to occur in Arapahoe County (NDIS, 2015). Many reptile and amphibian species are anticipated to be present in the study area because of the presence of suitable habitat within the TCGC. The CNHP previously identified the presence of a population of northern leopard frog (*Rana pipiens*) in ponding areas associated with Coal Creek (CNHP, 2014). Other species which could be present include: the common garter snake (*Thanmophis sirtalis*), bullsnake (*Pituophis catenifer*), common lesser earless lizard (*Holbrookia maculate*), painted turtle (*Chrysemys picta*), and the prairie rattlesnake (*Crotalus viridis*).

2.2.8 Special Status Species (Federal & State Listed)

FHU used the USFWS's Information, Planning, and Conservation System (IPaC) and the CPW Species Profile website to identify the latest information on special status species that may occur in the study area. **Table 4** includes a complete list of federal and state-listed species, including state species of special concern that can be found in Arapahoe County (USFWS, 2015; CPW, 2015b).

One (1) federally listed T&E species, one (1) species with other special federal protections, two (2) state T&E species, and seven (7) state species of special concern may occur in the study area due to the presence of suitable habitat. This includes the black-tailed prairie dog, American Peregrine Falcon, Bald Eagle, Ferruginous Hawk, Long-billed Curlew, Mountain Plover, Western Burrowing Owl, common garter snake, northern leopard frog, and Ute ladies'-tresses orchid.

Table 4 Threatened & Endangered Species and State Species of Concern Found within Arapahoe County

Common Name	Status	Habitat	Presence of Habitat
MAMMALS			
Black-tailed prairie dog (*Cynomys ludovicianus*)	SC	Black-tailed prairie dogs form large colonies or "towns" in shortgrass or mixed prairie **(Appendix A Photos 13, 15,** and **21**)	Present: numerous colonies are found throughout the study area.
Northern pocket gopher (*Thomomys talpoides*)	SC	They are found in many different habitat types including agricultural and pasture lands, semidesert shrublands, and grasslands at lower elevations upwards into alpine tundra.	Not Present: while potential suitable habitat is present, Arapahoe County is not listed as a county with occurrence or likely occurrence of the species (NDIS 2015)
Preble's meadow jumping mouse (*Zapus hudsonius preblei*)	FT / ST	Preble's meadow jumping mouse (PMJM) inhabits well developed riparian habitat with adjacent, relatively undisturbed grassland communities, and a nearby water source. Well-developed riparian habitat includes a dense combination of grasses, forbs and shrubs; a taller shrub and tree canopy may be present. PMJM has been found to regularly use uplands at least as far out as 100 meters beyond the 100-year flood plain. PMJM typically enter hibernation nests between September and October and emerge the following May.	Project is located within the Denver Metro Block Clearance Zone. Therefore, no effects are expected and no additional consultation is required with the USFWS (refer to **Figure 12**).
Swift fox (*Vulpes velox*)	SC	The swift fox is an animal of grasslands. It occupies shortgrass and midgrass prairies over most of the Great Plains, including eastern Colorado.	Present: Marginal habitat is present; however, no fox dens were observed and due to the amount of development surrounding the study area and the presence of higher quality habitat much further east, it is unlikely swift fox inhabit the area.

Common Name	Status	Habitat	Presence of Habitat
MAMMALS			
Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)	SC	Townsend's big-eared bat is a western species occupying semidesert shrublands, pinon-juniper woodlands, and open montane forests. Townsend's big-eared bat can be found throughout Colorado except on the eastern plains. Its distribution seems to be determined by availability of roosts, such as caves, mines, tunnels, crevices and masonry structures with suitable temperatures, making the conservation of suitable roosts essential to the management of this species.	Not Present: This project is found in the eastern plains and does not contain any of the identified vegetation and roosting components that are required.
BIRDS			
American Peregrine Falcon (*Falco peregrines anatum*)	SC	Typically, Peregrine Falcons nest on cliffs from about 25–1,300 feet high. Other sites include electricity transmission towers, quarries, silos, skyscrapers, churches, and bridges. In places without cliffs, Peregrines may use abandoned Common Raven, Bald Eagle, Osprey, Red-tailed Hawk, or Cormorant nests.	Present: foraging habitat exists throughout the study area.
Bald Eagle (*Haliaeetus leucocephalus*)	BGEPA, ST	Bald Eagles are seldom seen far from water - large rivers, lakes and seacoasts. In Colorado they are often found near reservoirs and along major rivers during both the summer and winter. During the breeding season Bald Eagles defend territories and most frequently can be found nesting in large cottonwood trees. In the winter Bald Eagles communally roost in large trees for warmth and protection and forage occasionally over prairie dog colonies (**Appendix A Photos 1- 4**).	Present: winter foraging and roosting; however, no new nest sites identified from January to May 2015.
Ferruginous Hawk (*Buteo regalis*)	SC	Inhabits grasslands and semidesert shrublands, and is rare in pinyon-juniper woodlands. Breeding birds nest in isolated trees, on rock outcrops, structures such as windmills and power poles, or on the ground. Winter residents concentrate around prairie dog towns.	Present: observed foraging over prairie dog colonies, but no active nests found in the study area.

Common Name	Status	Habitat	Presence of Habitat
BIRDS			
Least Tern† (*Sterna antillarum*) Interior population	FE / SE	Breeding birds nest on bare sandy shorelines of islands in reservoirs. Migrants occur at reservoirs, lakes, and rivers with bare sandy shorelines.	Not Present: Aurora Reservoir is the closest large body of water and is 8 miles away.
Long-billed Curlew (*Numenius americanus*)	SC	Shortgrass prairie and sometimes in wheatfields or fallow fields. Most nests are close to standing water. Migrants also are seen on shorelines and in meadows and fields.	Present: However, unlikely to occur due to amount of development in the area.
Mexican Spotted Owl (*Strix occidentalis lucida*)	FT, ST	Mexican Spotted Owls inhabit forested mountains and canyons with mature trees that create high, closed canopies, which are good for nesting.	Not Present
Mountain Plover (*Charadrius montanus*)	SC	Colorado is the primary breeding ground for the Mountain Plover, more than half of the world's population nests in the state. Despite their name, Mountain Plovers breed in shortgrass prairies. Mountain Plovers inhabit prairie grasslands, arid plains and fields. Nesting Plovers choose shortgrass prairies grazed by prairie dogs, bison and cattle, and overgrazed tallgrass and fallow fields.	Present: shortgrass prairies grazed by prairie dogs and fallow fields are found throughout the study area.
Piping Plover† (*Charadrius melodus*)	FT / ST	Piping Plovers occur as migrants, arriving around the first of April. Most have passed through by the end of May. They can be found in the eastern part of the state. Nesting habitat in Colorado is on sandy lakeshore beaches, sandbars within riverbeds or even sandy wetland pastures. An important aspect of this habitat is that of sparse vegetation.	Not Present
Western Burrowing Owl (*Athene cunicularia*)	SC	Primarily found in grasslands and mountain parks, usually in or near prairie dog towns. The Burrowing Owl also uses well-drained, steppes, deserts, prairies and agricultural lands. This species also favors well-grazed, early successional grasslands with soils having significant sand content. Openness, short vegetation, and burrow availability are also essential.	Present: Numerous prairie dog colonies, agricultural lands, and sandy soils are present within the study area.

Common Name	Status	Habitat	Presence of Habitat
BIRDS			
Western Snowy Plover (*Charadrius alexandrinus nivosus*)	SC	The Snowy Plover breeds on sandy coasts and brackish inland lakes, and is uncommon on fresh water. It nests in a ground scrape and lays three to five eggs. Previously observed at Antero Reservoir in Park County and Lake Cheraw in Otero County.	Not Present
Whooping Crane† (*Grus americana*)	FE	They live in mudflats around reservoirs and in agricultural areas. While wintering, they live on salt flats that are dominated by coastal salt grass. Their nesting grounds are wetland communities dominated by bulrush. Whooping cranes have not been seen in Colorado since 2002.	Not Present
REPTILES & AMPHIBIANS			
Common garter snake (*Thamnophis sirtalis*)	SC	In Colorado, the common garter snake inhabits marshes, ponds, and the edges of streams. For the most part, it is restricted to aquatic, wetland, and riparian habitats along the floodplains of streams. The common garter snake occurs in northeastern Colorado along the South Platte River and its tributaries at elevations below 6,000 feet.	Present: suitable habitat is found throughout the TCGC.
Northern leopard frog (*Rana/Lithobates pipiens*)	SC	Wet meadows and the banks and shallows of marshes, ponds, glacial kettle ponds, beaver ponds, lakes, reservoirs, streams, and irrigation ditches. May roam far from water during wet, mild weather.	Present: found in stretches of Coal Creek upstream from the study area (CNHP, 2014).
FISH			
Brassy minnow (*Hybognathus hankinsoni*)	ST	A variety of habitat types, can tolerate conditions "typical" of fluctuating plains streams, but is restricted in distribution and abundance by unknown factors.	Not Present: current distribution limits the Brassy Minnow to the South Platte River's eastern plains portion. The only tributary it has been found in is the lower St. Vrain River and Spottlewood Creek.

Common Name	Status	Habitat	Presence of Habitat
FISH			
Common shiner (*Luxilus cornutis*)	ST	This shiner requires streams of moderate gradient with cool, clear water, gravel bottoms and shaded by brush or trees.	Not Present: Common shiners are currently very rare and primarily limited to the main stem of the South Platte River.
Northern redbelly dace (*Phoxinus eos*)	SE	The northern redbelly dace requires vegetation and slow flowing streams. The pond in the Plum Creek drainage that contains this dace has a sand substrate along the shoreline with submerged vegetation covering a substrate of decomposing material in the middle.	Not Present: found primarily in the Plum Creek drainages.
Pallid sturgeon† (*Scaphirhynchos albus*)	FE	The species requires turbid water, diverse habitat types, and flow rates afforded by large, free flowing rivers.	Not Present
Plains minnow (*Hybognathus placitus*)	SE	Plains minnows prefer main channel areas with some current and sandy bottoms. The minnow eats aquatic plants, probably algae, and likely spawns in the spring.	Not Present: very rare, specimens collected in the South Platte River east of Fort Morgan, in the Republican Basin, and a few reservoirs from the eastern plains of the Arkansas River.
Stonecat (*Noturus flavus*)	SC	Found in fast water riffles and runs of streams, hiding under rocks, woody debris, or along sandbars during the day.	Not Present
Suckermouth minnow (*Phenacobius mirabilis*)	SE	The suckermouth minnow is usually found in riffle areas of warm prairie streams of all sizes with low to moderate currents and year-round flows.	Not Present: found in streams on eastern plains.

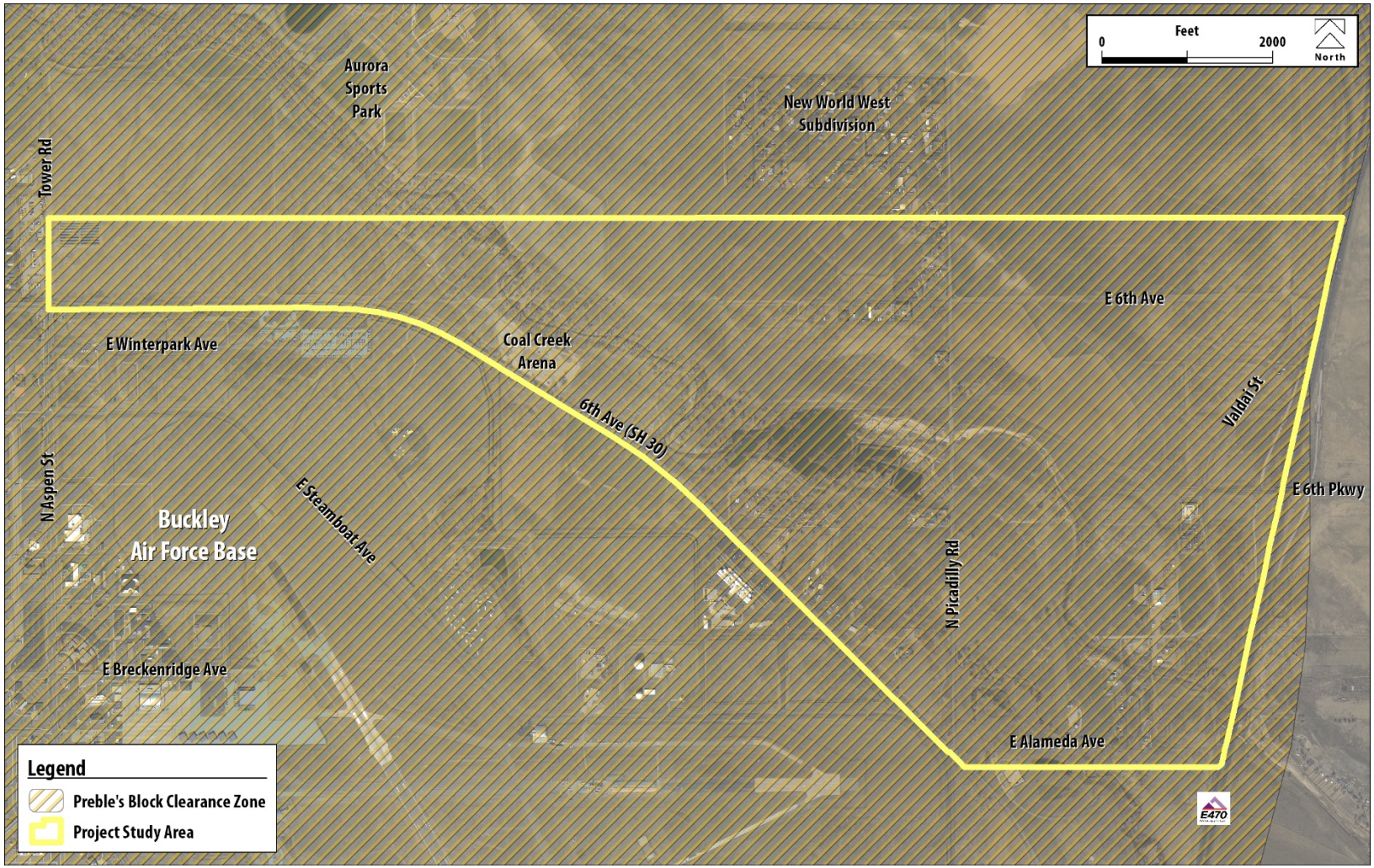
Common Name	Status	Habitat	Presence of Habitat
FLOWERING PLANTS			
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	FT	Known primarily from moist meadows associated with perennial stream terraces, floodplains, and oxbows at elevations between 4,300 - 6,850 feet. Additional vegetation and hydrology types occupied include seasonally flooded river terraces, subirrigated or spring-fed abandoned stream channels and valleys, and lakeshores. In addition, 26 populations have been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human-modified wetlands. New surveys have also expanded the elevational range of the species from 720-1,830 feet in Washington to 7,000 feet in northern Utah. Over one-third of all known Ute ladies'-tresses populations are found on alluvial banks, point bars, floodplains, or ox-bows associated with perennial streams.	Present: suitable habitat is found throughout the TCGC. Suitable habitat is specifically found along Sand Creek, Coal Creek, and Murphy Creek. Previous baseline studies did not identify the presence of the Ute ladies'-tresses Orchid.
Western prairie† fringed orchid (*Platanthera praeclara*)	FT	A perennial orchid of the tallgrass prairie and is found most often on unplowed, calcareous prairies and sedge meadows. Soil moisture is a critical determinant of growth, flowering, and distribution of western prairie fringed orchid.	Not Present: no tallgrass prairies or sedge meadows are present.

FE = Federally Endangered ST = State Threatened SC = State Species of Special Concern
FT = Federally Threatened SE = State Endangered

† This project has elements that will cause a depletion to the South Platte River basin. In order to address the effects this depletion will have on federally listed species downstream that depend on the river for their survival, CDOT, as a state agency, is participating in the South Platte Water Related Activities Program (SPWRAP). CDOT is cooperating with FHWA, which provides a federal nexus for the project. In response to the need for formal consultation for the water used from the South Platte basin, FHWA has prepared a Programmatic Biological Assessment (PBA) dated 02/22/2012 that estimates total water usage until 2019. The PBA addresses the following species: Least Tern (interior population) (*Sternula antillarum*), pallid sturgeon (*Scaphirhynchus albus*), Piping Plover (*Charadrius melodus*), western prairie fringed orchid (*Platanthera praeclara*), and the Whooping Crane (*Grus americana*). On 04/04/2012, the USFWS signed a Biological Opinion which concurs with this approach and requires a yearly reporting of water usage. The water used for this project will be reported to the USFWS at the year's end after the completion of the project as per the aforementioned consultation. Effects to species not addressed in the PBA or affected by causes other than water depletions to the South Platte, will be analyzed separately.

References:
CPW Species Profiles – Accessed February 2015
USFWS Species Profiles – ECOS, IPaC February 2015

Figure 12 Preble's Block Clearance Zone



Federal and State Special Status Species

Ute Ladies'-tresses Orchid
Over one-third of all known Ute ladies'-tresses orchid populations are found on alluvial banks, point bars, floodplains, or ox-bows associated with perennial streams. In addition, 26 populations have been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human-modified wetlands. Suitable habitat is present in riparian and wetland areas associated with Sand Creek, Coal Creek, and Murphy Creek (all are perennial streams) within the study area.

However, based on previous surveys of the TCGC by the CNHP (CNHP, 2014), and ERO Resources (ERO, 2013), it is likely that the Ute ladies'-tresses orchid does not inhabit the study area. Surveys conducted by FHU in 2014 and 2015 were outside of the typical blooming season (late July to August) for the Ute ladies'-tresses orchid.

Bald Eagle
The Bald Eagle was recently (2007) delisted from the ESA of 1973, but as identified in **Section 2.1.1**, is still afforded special protections under the BGEPA of 1940 and is also considered a state threatened species. Habitat for the Bald Eagle includes reservoirs and rivers. In winter, they may also occur locally in semi-deserts and grasslands, especially near prairie dog towns. Bald Eagles have been observed in the study area for several years by City of Aurora staff, CPW has mapped activity near the study area, and recreationists observe Bald Eagles in the study area on a regular basis. Suitable winter habitat is present within the study area, and although no existing nests were found within the study area, there are suitable nesting locations for breeding eagles to nest within the study area.

Western Burrowing Owl
The Western Burrowing Owl is listed as a state threatened species, primarily due to loss of habitat with the loss of prairie dogs and prairie dog towns due to development. This small owl is primarily found in grasslands and mountain parks, usually in or near prairie dog towns. The Western Burrowing Owl also uses well-drained, steppes, deserts, prairies and agricultural lands.

This species also favors well-grazed, early successional grasslands with soils having significant sand content. Openness, short vegetation, and burrow availability are also essential. While the study area has suitable habitat present, there are no previously recorded sitings or available data on Western Burrowing Owls inhabiting the study area neither from baseline studies nor from the City of Aurora staff.

State Species of Concern is not a statutory category and is primarily used as a list for species that have seen a decline in their populations and should be considered during project planning, but are not formally listed under the Colorado Nongame, Endangered, or Threatened Species Conservation Act, CRS 33-2-101 to 108. The seven (7) species identified below are identified as State Species of Concern.

Black-Tailed Prairie Dog
There are several areas of black-tailed prairie dog colonies in the study area (**Figure 11**). These areas include large colonies north and south of 6th Avenue, east and west of the TCGC, and east and west of E-470. Based on surveys from November 2014 to May 2015, all the prairie dog colonies in the study area were active and no activities (removal, bubonic plague, etc.) had affected these colonies.

American Peregrine Falcon
Typically, American Peregrine Falcons nest on cliffs from about 25–1,300 feet high. Other sites include electricity transmission towers, quarries, silos, skyscrapers, churches, and bridges. The potential for American Peregrine Falcons to nest in the study area is low, especially with the presence of other large raptors (Red-tailed Hawks, Great-horned Owls, etc.) inhabiting the study area and with preferred nesting sites found to the west. However, the American Peregrine Falcon could use the study area for foraging purposes.

Ferruginous Hawk
Ferruginous Hawks inhabit grasslands and semi-desert shrublands, and are rare in pinyon-juniper woodlands. Breeding birds nest in isolated trees, on rock outcrops, structures such as windmills and power poles, or on the ground. Winter residents concentrate around prairie dog towns. Winter numbers and distribution fluctuate greatly according to the availability of prairie dogs; when a local prairie dog population dies off due to plague; hawk numbers decrease drastically (CPW, 2014). Suitable Ferruginous Hawk habitat is present within the study area and a pair of Ferruginous Hawks was observed on multiple occasions hunting prairie dogs in the study area.

Long-billed Curlew
The Long-billed Curlew inhabits shortgrass prairie and sometimes in wheat fields or fallow fields. Most nests are close to standing water. Migrants also are seen on shorelines and in meadows and fields. While suitable habitat is present within the study area, the likelihood of this species to inhabit the study area is low due to the presence of development surrounding the study area and also due to the amount of noise from Buckley AFB.

Mountain Plover
Colorado is the primary breeding ground for the Mountain Plover, more than half of the world's population nests in the state. Despite their name, Mountain Plovers breed in shortgrass prairies. Mountain Plovers inhabit prairie grasslands, arid plains and fields. Nesting Plovers choose shortgrass prairies grazed by prairie dogs, bison and cattle, and overgrazed tallgrass and fallow fields. All of these habitats are present (except for the presence of bison and cattle) within the study area.

Common Garter Snake
Habitat for the common garter snake includes: wet meadows and the banks and shallows of marshes, ponds, glacial kettle ponds, beaver ponds, lakes, reservoirs, streams, and irrigation ditches. The common garter snake may roam far from water during wet, mild weather. Suitable habitat for the common garter snake is present in the study area within the TCGC and the areas associated with the Confluence.

Northern Leopard Frog
Northern leopard frogs inhabit wet meadows and the banks and shallows of marshes, ponds, glacial kettle ponds, beaver ponds, lakes, reservoirs, streams, and irrigation ditches. Northern leopard frogs inhabit elevations ranging from below 3,500 feet to above 11,000 feet (CPW, 2014). Suitable habitat for the northern leopard frog is present in the study area within the TCGC and the areas associated with the Confluence.

Impacts to these special status species and required mitigation are identified in **Section 3.0** and **Section 4.0** below.

2.2.9 Senate Bill 40 Resources

SB 40 is a regulatory requirement for agents of the state to obtain a certification from CPW when "…any stream or its bank or tributaries…" are impacted. This includes trees and shrubs that provide terrestrial wildlife habitat, as well as vegetative cover that aids in the quality of aquatic habitat. A desktop survey for existing riparian areas associated with the TCGC in the study area was conducted. There is a multitude of SB 40 tree and shrub resources found within the study area. These areas have been mapped and are shown on **Figure 13** and listed in **Appendix B**.

Numerous trees located within the study area will be affected by this project. SB 40 trees and shrubs must be inventoried prior to project construction as required by the SB 40 Wildlife Certification process. Any SB 40 trees or SB 40 shrubs impacted by the construction of this project must be mitigated for. Mitigation requirements will be based on requirements by CDOT, CPW, City of Aurora, and other local landowners.

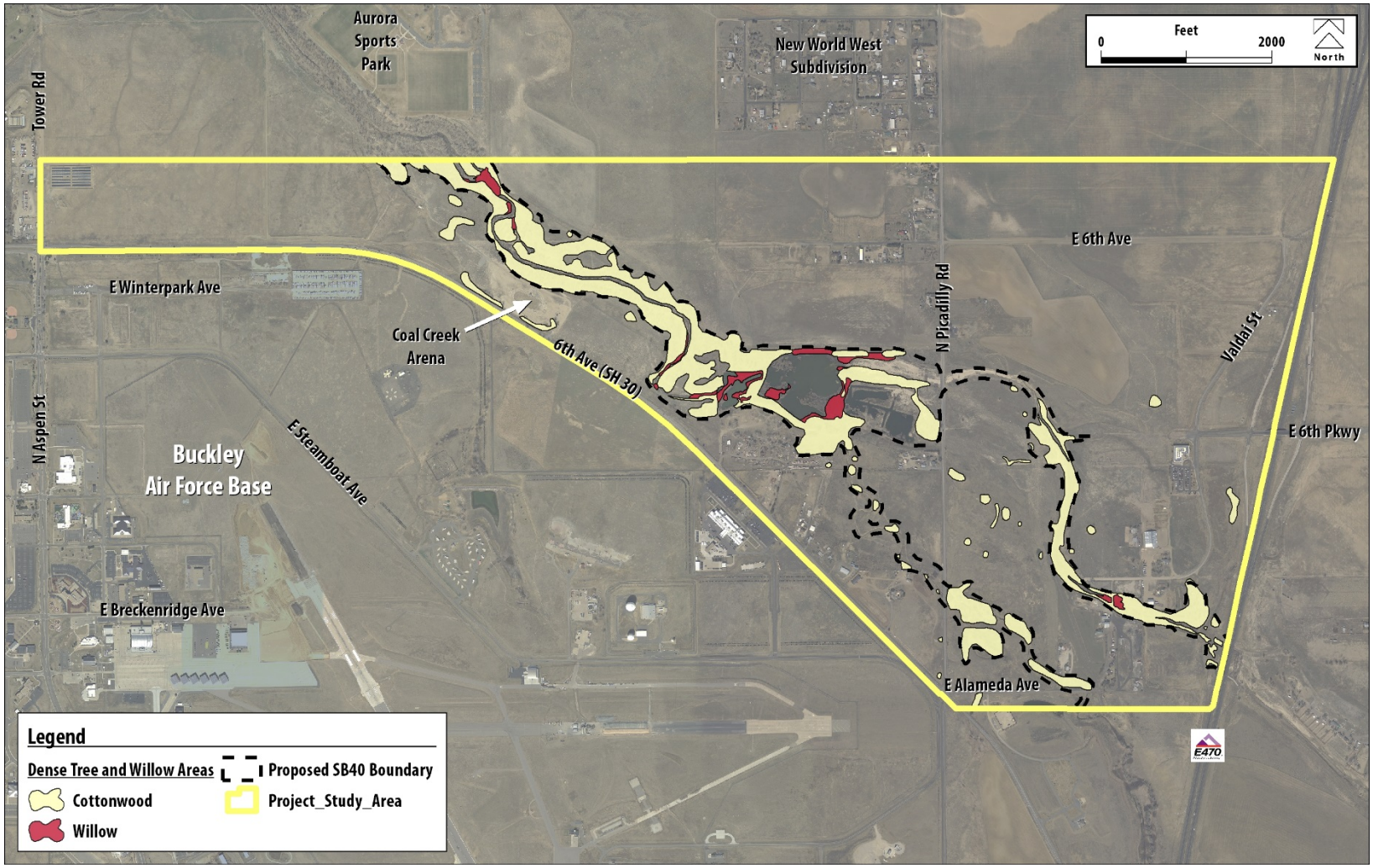
As seen in the site photographs in **Appendix A**, these trees include groups of plains cottonwood, narrowleaf cottonwood, lanceleaf cottonwood, and Siberian elm trees. A summary of the survey results is included below:

- Riparian shrubs observed in the area include sandbar willow, which is located along the banks and in the floodway of the TCGC in the middle of the study area.
- Plains cottonwood, narrowleaf cottonwood, lanceleaf cottonwood, and Siberian elm tree species were identified in and near riparian areas within the study area.

Any SB 40 trees that will be impacted by the project will be mitigated on either a 1:1 basis or a shrub to tree replacement ratio, depending on project-specific mitigation ratios identified by CDOT, CPW, City of Aurora, and other local landowners during the SB 40 Wildlife Certification process. Shrubs that will be impacted will be mitigated by aerial square-footage basis.

The exact location of SB 40 tree and SB 40 shrub removals will be determined as part of either final design plan set and/or construction documents. Replacement vegetation will be shown on either final design plan sets and/or construction documents or as part of Landscape Plans. It is likely that this project falls under a Formal SB 40 Wildlife Certification approval, which will be required prior to project construction activities.

Figure 13 Dense Tree Areas and the Proposed SB 40 Jurisdictional Boundary in the Study Area



3. IMPACT EVALUATION

This section describes the impacts of the Proposed Action and the No Action Alternative on the biological resources identified in the study area, including vegetation, noxious weeds, wildlife, special status species (including migratory birds), wetlands, and SB 40 resources. Permanent impacts from the Proposed Action were determined based on the project design footprint and included the areas of ground disturbance from the following project elements:

- New roadway and grading
- New bridge construction, including pier work, at Sand Creek
- Placement of riprap for erosion control
- Drainage outfall structures into Sand Creek and Coal Creek
- Trail connection with the Coal Creek Arena and the Triple Creek Trail
- Intersection improvements at Picadilly Road and at the E-470 interchange
- Intersection improvements at SH 30

Temporary impacts were determined based on the areas of ground disturbance that will be re-seeded and re-vegetated following construction.

As previously discussed, wetlands or other WUS, SB 40 resources, aquatic resources, and migratory bird nests were found within the study area and within or adjacent to the Proposed Action Footprint. A detailed description of mitigation measures is provided in **Section 4**. A summary of all No Action and Proposed Action impacts and required mitigation measures is provided in **Appendices C** and **D**.

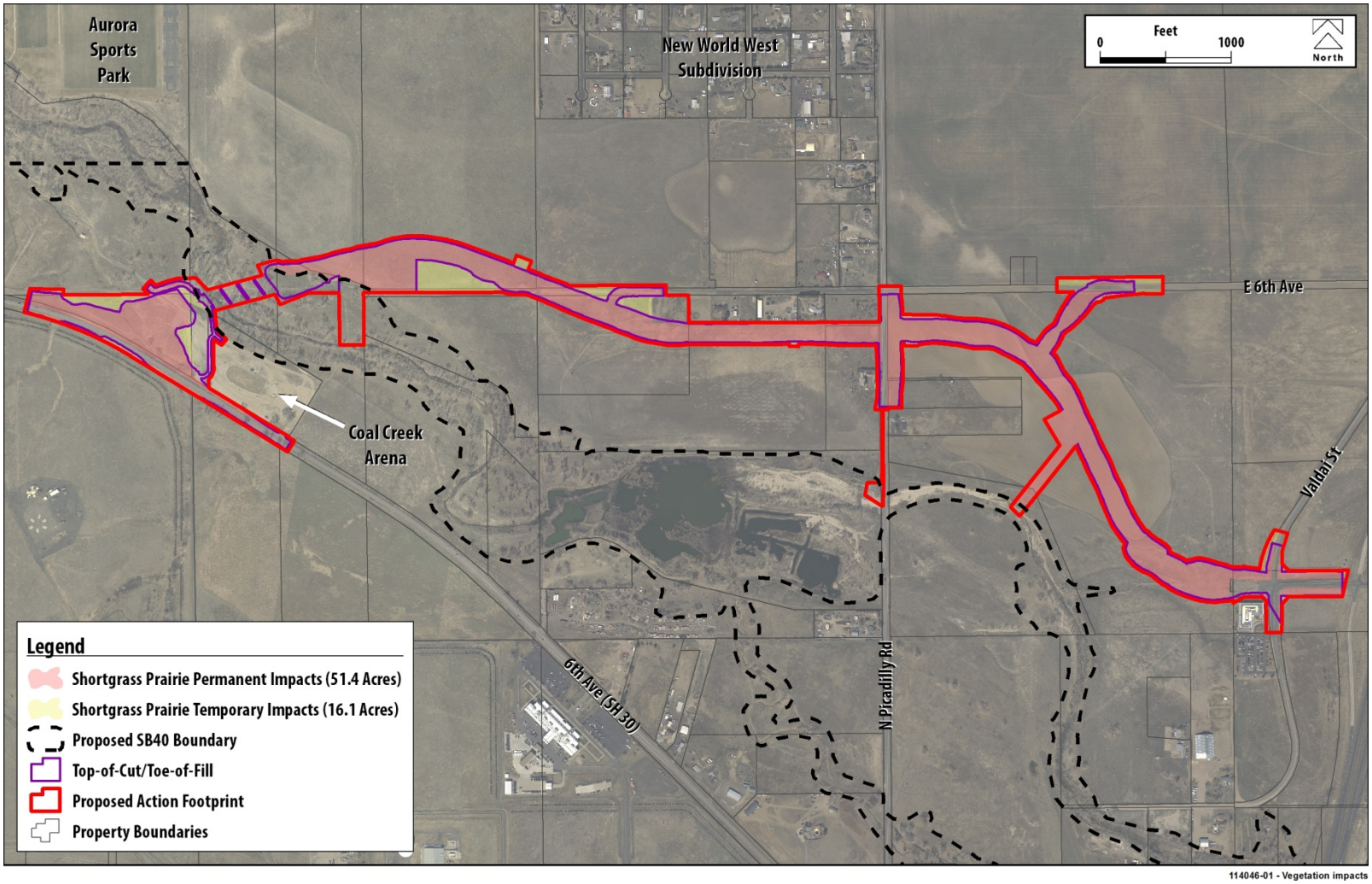
The Proposed Action was selected because it best balanced impacts to biological resources located with the park, recreation, and open space areas within the study area. Biological resources were a key screening criteria the alternatives screening process. The full alternatives screening process and selection of the Proposed Action is discussed further in **Appendix A1** *Alternatives Technical Report.*

3.1 Vegetation and Noxious Weeds

3.1.1 Proposed Action

Construction of the Proposed Action would result in a loss of vegetation in terms of cover and species composition. Specifically, the Proposed Action would result in the removal of approximately 67.5 acres of shortgrass prairie (including grasses and shrubs) due to construction activities that would require clearing and grubbing of existing shortgrass prairie areas (**Figure 14**). Impacts to shortgrass prairie areas are separated further by areas that are permanently impacted due to the addition of impervious surfaces to the landscape and areas that are temporarily impacted and can be re-vegetated. The increase in impervious surfaces would cause an increase in stormwater runoff and the exposure of the surrounding vegetation to higher levels of pollutants. Also, soil disturbance from construction equipment creates favorable conditions for the introduction and further spread of noxious weeds. Impacts to riparian vegetation are discussed further in **Section 3.6**.

Figure 14 Proposed Action Impacts to Shortgrass Prairie



Refer to **Table 5** for the estimated impacts to vegetation from the construction of the Proposed Action.

Table 5 Vegetation Impacts

Proposed Action Impacts	No Action Alternative Impacts
0.11 Acre Permanent Impact to Wetlands 0.60 Acre Temporary Impact to Wetlands 4.5 Acres Permanent Impacts to Riparian Vegetation (SB 40) 2.7 Acres of Temporary Impacts to Riparian Vegetation (SB 40) 51.4 Acres Permanent Impact to Shortgrass Prairie 16.1 Acres Temporary Impact to Shortgrass Prairie Removal of numerous upland trees.	0 Acres Permanent Impact 0 Acres Temporary Impact

* Temporary impacts generally occur from the short-term disturbance necessary for activities like construction access and grading. These areas will be re-vegetated once construction is completed.

3.1.2 No Action Alternative

While no direct permanent or temporary vegetation impacts would occur from the No Action Alternative, there is the potential for noxious weeds present in localized populations in the study area to further spread throughout the study area and to adjacent lands. Unless the City, Arapahoe County, and local landowners effectively treat existing populations of noxious weeds, this will likely occur.

3.2 Fish and Wildlife

Proposed Action

As identified is **Section 3.1.1**, construction of the Proposed Action would result in a permanent loss of 51.4 acres of shortgrass prairie, which would directly result in a permanent loss of habitat for terrestrial species, and potential cover for aquatic species. Potential cover for aquatic species includes riparian vegetation along the stream channel that provides shading, cover, nutrients, and potential forage habitat.

Effects to wildlife from implementation of the Proposed Action would include permanent habitat loss, degradation/disruption of habitat (for example, noise effects), loss of important foraging habitat for general wildlife species, and fragmentation of habitat due to the construction of the new roadway. Specifically, long-term impacts to wildlife due to the construction and operation of roadways can include altered movement patterns and direct mortality due to wildlife-vehicle collisions during crossings of the roadway when daily and/or seasonal movements across the landscape occur.

The study area is located in a known migration area for larger species such as deer and coyotes (based on field observations of heavily used wildlife trails); therefore, impacts would be to small, medium, and large-sized animals such as desert cottontail, black-tailed prairie dogs, coyotes,

low-flying birds, deer, amphibians, and reptiles. In the long term, increased obstacles, such as the new roadway, would make it more difficult for some wildlife to meet their biological needs, such as accessing food, breeding, etc. Wildlife mortality from construction-related ground clearing and earth-movement activities could also affect small terrestrial species and/or burrowing animals. While there are active informal trails in the riparian corridor, the construction of a regional trail as part of the Proposed Action would likely facilitate higher human use in the TCGC. This elevated human use may also adversely affect general wildlife species which inhabit the area.

However, the planned bridge at Sand Creek has been designed to span the majority of the floodplain. The approximate dimensions of the bridge are estimated to be approximately 700 feet long and between 12 feet and 14 feet above the ground surface. This bridge will allow sufficient space for wildlife species to move along the TCGC unhindered, it will maintain native soil material, and will provide cover material for wildlife to traverse the corridor safely

No permanent impacts to aquatic resources, such as impeding fish movement, are associated with the Proposed Action.

Construction of the Proposed Action would also cause the temporary loss of 16.1 acres of shortgrass prairie, which would cause temporary habitat loss, restrictions on wildlife movement, and the short-term temporary displacement of certain wildlife species due to the increased noise and human presence associated with construction activities (for example, construction noise and night lighting). Other temporary effects could be caused by the introduction and spread of noxious or invasive weed species, which further degrades wildlife habitat.

Impacts would occur primarily in the areas with minimal development where wildlife would be more likely to occur, such as in the areas near Sand Creek and the TCGC. Also, indirect noise and lighting impacts to wildlife will occur from the implementation of the Proposed Action due to construction activities and also due to increases in the number of vehicles using the new roadway and lights from vehicles at night.

One component that will minimize wildlife impacts is that wildlife will have the opportunity to cross under the roadway once the large span bridge is constructed over Sand Creek and its floodplain.

3.2.1 No Action Alternative

Under the No Action Alternative, impacts to wildlife would include additional loss, degradation, and fragmentation of habitat due to development in the surrounding landscape. Other impacts from the No Action Alternative would include continual degradation of the TCGC and surrounding riparian habitat due to the presence and expansion of noxious weeds and compaction from the use of social trails within the study area. No temporary impacts are associated with the No Action Alternative.

3.3 Special Status Species

3.3.1 Proposed Action

As identified in **Section 3.1.1**, construction of the Proposed Action would result in a loss of 51.4 acres of shortgrass prairie, 4.5 acres of jurisdictional SB 40 riparian areas, and 0.11 acre of wetlands, which would directly result in a permanent loss of habitat for terrestrial species, and potential cover for aquatic species. Three of the species identified in **Section 2.2.8** were observed within the study area, including the black-tailed prairie dog (state species of special concern), Bald Eagle (federally protected and state threatened), and the Ferruginous Hawk (species of special concern). In addition, the northern leopard frog (species of special concern) was observed in stretches of Coal Creek adjacent to the study area (CNHP, 2014).

Black-tailed Prairie Dog Impacts

Construction of the Proposed Action would permanently impact 22.8 acres of prairie dog colonies within the Proposed Action footprint. Specifically, impacts would occur to the prairie dog colonies on either side of the TCGC, the prairie dog colonies north of 6th Avenue Parkway east of Tower Road, and prairie dog colonies west of the E-470/6th Avenue Parkway interchange (**Figure 15**).

Black-tailed prairie dogs are considered a “keystone” species as they benefit up to 150 other species of wildlife, including plants and insects. The loss of black-tailed prairie dogs will also have long-term, indirect impacts on numerous other wildlife species from residing year-round in the study area to using the project area on a seasonal basis (migration). Species that use the study area and depend on black-tailed prairie dogs that may not return due to the loss of habitat include: Ferruginous Hawks, Bald Eagles, other raptor species, coyotes, red foxes, badgers, etc.

Western Burrowing Owl Impacts

While no Western Burrowing Owls were observed during surveys conducted in 2014 and 2015, there is potential habitat associated with the prairie dog colonies within the study area. The removal of the 22.8 acres of prairie dog colonies and the removal of 51.4 acres of shortgrass prairie will remove potential habitat for the Western Burrowing Owl.

Currently, there are no reports of Western Burrowing Owls previously nesting within the project area or within the study area. However, due to the loss of nesting habitat from the removal of prairie dog colonies, any Western Burrowing Owls that potentially nested within the study area will likely now select new nest sites further away.

Bald Eagle Impacts

While no Bald Eagle nests were observed in the study area, the TCGC is used annually as an area for winter-roosting Bald Eagles. The Proposed Action footprint will have direct impacts to Bald Eagles due to the loss of both roosting habitat (loss of 4.5 acres of jurisdictional SB 40 riparian habitat) and the loss of foraging habitat (22.8 acres of black-tailed prairie dog colonies).

Indirect impacts to Bald Eagles will also occur due to disturbances from construction activities, noise due to increased vehicular traffic, and disturbances due to vehicle lights at night.

These impacts may result in lower numbers of Bald Eagles using the TCGC during the winter when they rely on black-tailed prairie dogs to survive on when nearby open water is frozen over.

Ferruginous Hawk impacts

Direct impacts to Ferruginous Hawks will occur due to the loss of potential nesting habitat in shortgrass prairie areas (51.4 acres) and foraging habitat associated with the loss of black-tailed prairie dog colonies (22.8 acres, 40 percent of the shortgrass prairie impacts).

Indirect impacts to Ferruginous Hawks will also occur due to disturbances from construction activities, noise due to increased vehicular traffic, and disturbances due to vehicle lights at night.

Lower populations of black-tailed prairie dogs would result in lower numbers of Ferruginous Hawks in the area.

Other Special Status Species Impacts

Due to the presence of suitable riparian and upland habitat for various life stages of the: American Peregrine Falcon (foraging habitat), Long-billed Curlew (foraging and nesting habitat), Mountain Plover (foraging and nesting habitat), common garter snake (all life stage habitat), and swift fox (denning and foraging habitat) within the study area, there is a potential for permanent impacts to these species due to loss of habitat (51.4 acres of shortgrass prairie, 4.5 acres of jurisdictional SB 40 riparian habitat, and 0.11 acre of wetland areas) and direct mortality from construction activities associated with clearing and grubbing and construction vehicle use.

Ute Ladies'-tresses Orchid

Previous surveys (CNHP, 2014; ERO, 2013) did not locate any populations of Ute ladies'-tresses orchid plants within the study area. Surveys by FHU identified potential suitable habitat for this species and did not identify any populations of these plants. However, since these surveys were conducted after the typical blooming period (August) for these plants and potential suitable habitat is present, this project May Affect, Not Likely to Adversely Affect the Ute ladies'-tresses orchid.

Other permanent and temporary impacts to special status species would be similar to the impacts to fish and wildlife species discussed in **Section 3.2**.

3.3.2 No Action Alternative

Permanent and temporary impacts to special status species associated with the No Action Alternative would be similar to the impacts to fish and wildlife species discussed in **Section 3.2.1**.

3.4 Migratory Birds

3.4.1 Proposed Action

Multiple raptor nests, Bald Eagle use areas, passerine (songbird) nesting habitat, and waterfowl use areas were observed during the 2014 and 2015 field surveys within the study area and the TCGC. Construction activities associated with the construction of the new road alignment would have permanent impacts on potential nesting habitat and nests adjacent to or within the Proposed Action footprint. These permanent impacts can range from removal of nests in the inactive season (no Bald Eagle nests were present) to causing migratory birds to avoid the Proposed Action footprint due to continuous noise and visual disturbances. Habitat loss is associated with the permanent removal of 51.4 acres of shortgrass prairie, 4.5 acres of SB 40 riparian habitat, and 0.11 acre of wetlands.

Other indirect impacts will result in the reduction of populations of prey species and foraging areas, such as rodent and black-tailed prairie dogs, causing reductions in available food sources for migratory birds; plus, an increase in human presence, noise and lights and further destruction of habitat from added development.

Also, raptors will likely move nests farther away from the Proposed Action footprint to avoid disturbances to nesting. The Proposed Action is not expected to overly impact local populations of the raptors which were observed nesting nearby. Both Red-tailed Hawks and Great Horned Owls were the most abundant species present. Both of these species are considered generalists and adapted to human development. However, the Proposed Action footprint may cause a reduction of other local populations of raptors due to loss of habitat and habitat fragmentation.

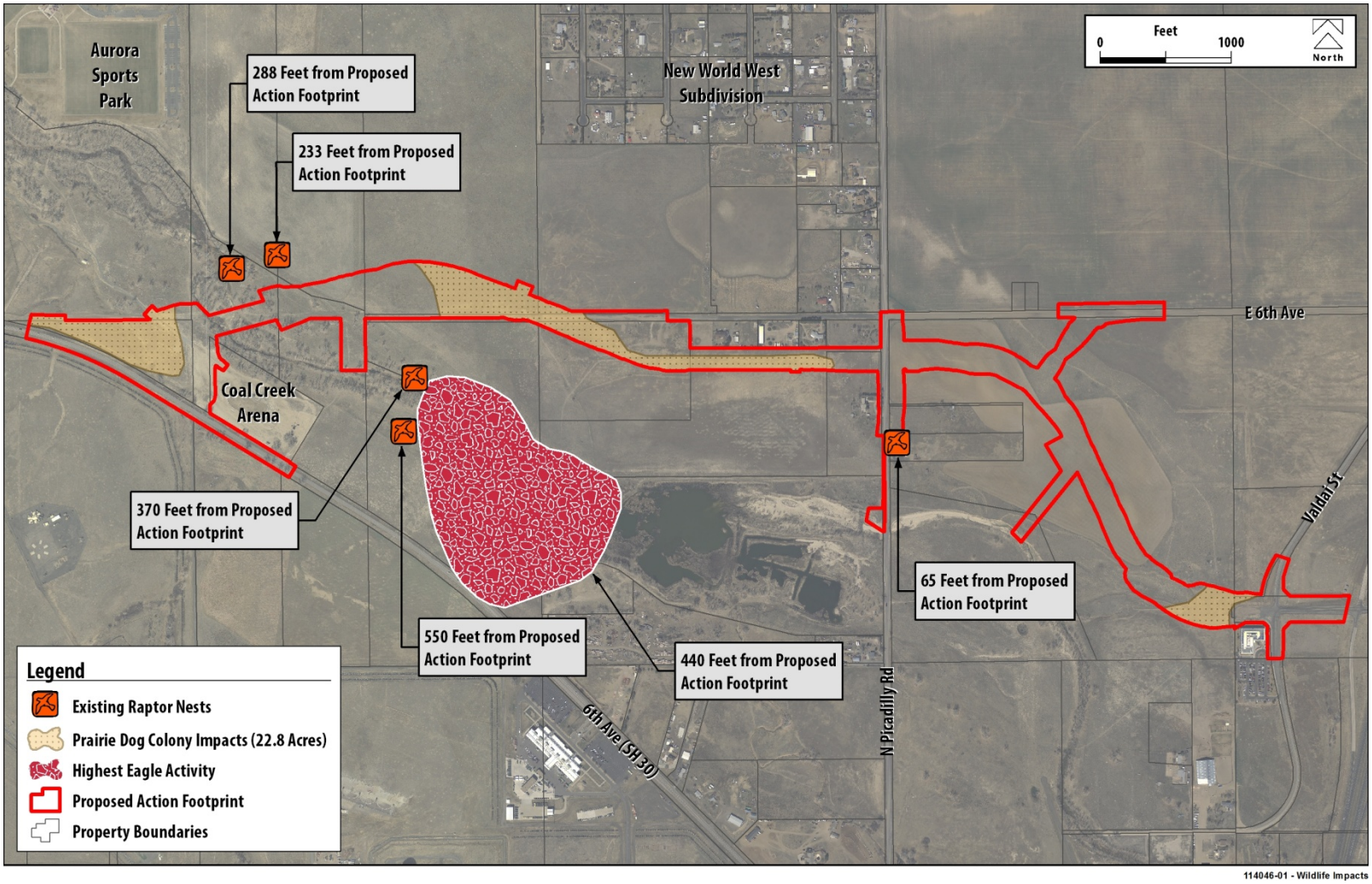
The Proposed Action footprint is located a short distance away from existing raptor nests (**Figure 15**). These distances are less than the buffer distances that CPW recommends for various nesting and winter roosting raptor species as identified in the *Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors* (CPW, 2008a).

Short-term temporary impacts due to the increased noise and human presence associated with construction activities of the Proposed Action (for example, construction noise and night lighting) would also affect migratory birds within the study area. Long-term impacts would occur to migratory birds due to increased levels of noise from vehicles, human recreationists, and future developments. After project construction is finished and future development occurs, numerous migratory bird species, especially those considered “habitat specialists,” would likely not inhabit the area and their local populations would be expected to diminish. However, species that have adapted to human development and are generalists are expected to persist and increase in population size.

3.4.2 No Action Alternative

Permanent and temporary impacts to migratory bird species associated with the No Action Alternative would be similar to the impacts to wildlife species discussed in **Section 3.2.1**.

Figure 15 Proposed Action Impacts to Wildlife



3.5 Wetlands

3.5.1 Proposed Action

The Proposed Action would permanently impact 0.11 acre and temporarily impact 0.60 acre of wetlands as a result of construction of the new road alignment. The Proposed Action would also potentially impact a total of approximately 577 linear feet of stream channel or stream bank associated with Sand Creek and Coal Creek.

However, as the Proposed Action is designed in further detail, these impact quantities will diminish by incorporating avoidance measures and minimization measures. Impacts to any stream channel or banks will be reduced significantly during the hydraulic engineering design process.

Impacts to wetlands associated with a newly constructed roadway will require a Section 404 permit under the CWA, which will need to be acquired from the USACE. In addition to the Section 404 permit, CDOT will require that a Wetland Finding Report and a FACWet Analysis be completed to address permanent impacts greater than 500 square feet and permanent impacts greater than 0.10 acre, respectively.

Mitigation of wetland impacts is discussed further in **Section 4.4**. Refer to **Figure 16** and **Figure 17** for the locations of permanent and temporary impacts to wetlands.

3.5.2 No Action Alternative

There would be no permanent or temporary wetland impacts due to the No Action Alternative.

3.6 Senate Bill 40 Resources

3.6.1 Proposed Action

Plains cottonwood, peachleaf willow, and sandbar willow, which are present in the TCGC drainage areas and within the Proposed Action footprint, are classified as SB 40 tree and shrub resources based on the SB 40 Guidelines established in a 2013 programmatic agreement between CPW and CDOT (CPW & CDOT, 2013). The Proposed Action would have numerous construction impacts in the TCGC drainage areas to SB 40 resources.

An estimated 7.2 acres of jurisdictional SB 40 areas would require clearing and grubbing activities to take place for construction to occur. Of this, 4.5 acres would permanently be impacted and converted to impervious areas. The SB 40 jurisdictional areas which can be reclaimed (2.7 acres), will be re-vegetated based on the SB 40 Guidelines (CPW & CDOT, 2013). Refer to **Figure 18** for the locations of impacts to SB 40 jurisdictional areas.

A full inventory of these resource (including individual trees and shrubs) impacts and identified mitigation requirements will be required as part of a Formal SB 40 Wildlife Certification process which will occur prior to construction of the Proposed Action. Refer to **Section 4.5** for further details on mitigation requirements.

3.6.2 No Action Alternative

There would be no impacts to SB 40 resources due to the No Action Alternative.

Figure 16 Proposed Action Impacts to Wetlands – West

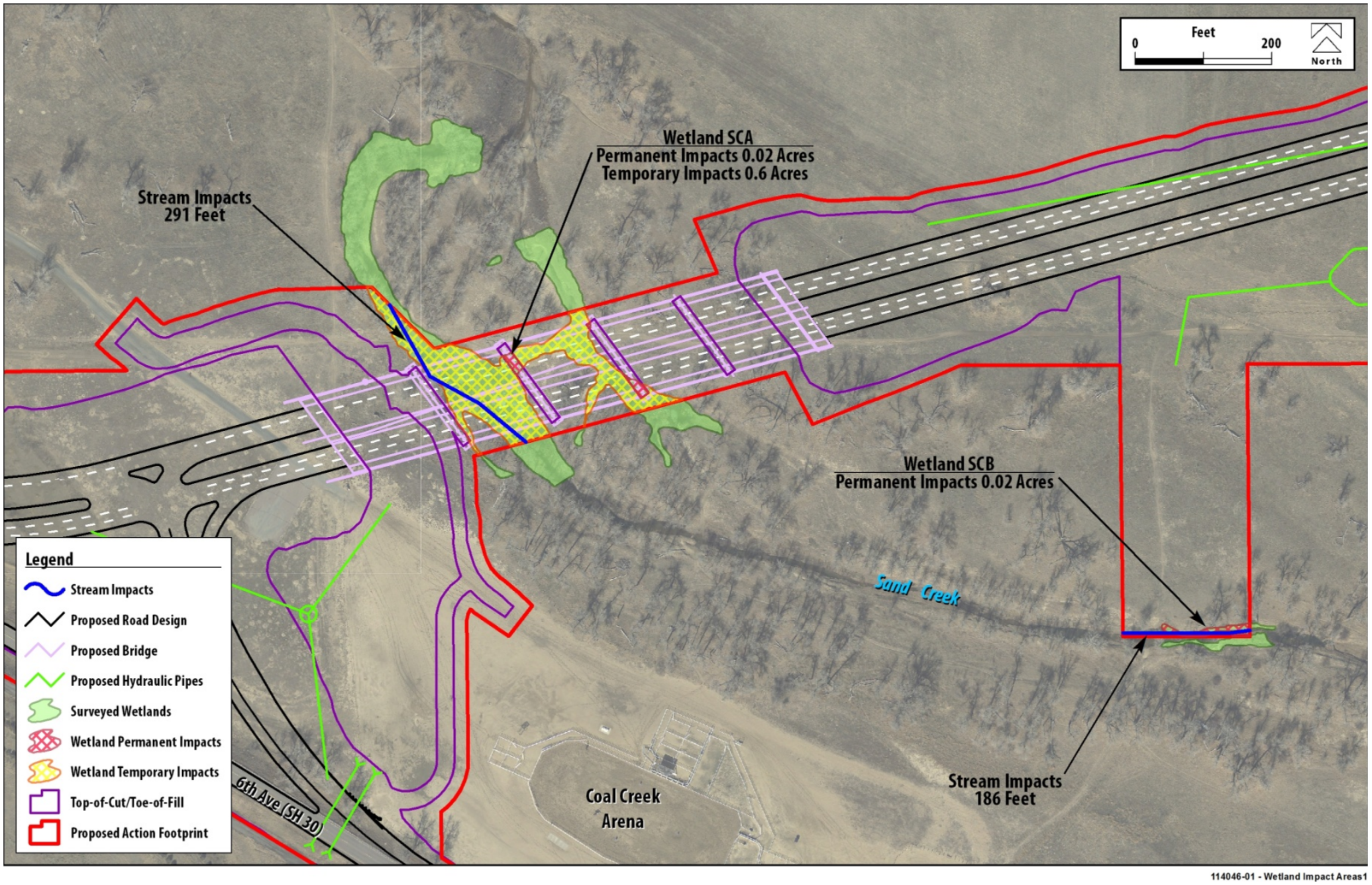


Figure 17 Proposed Action Impacts to Wetlands – East

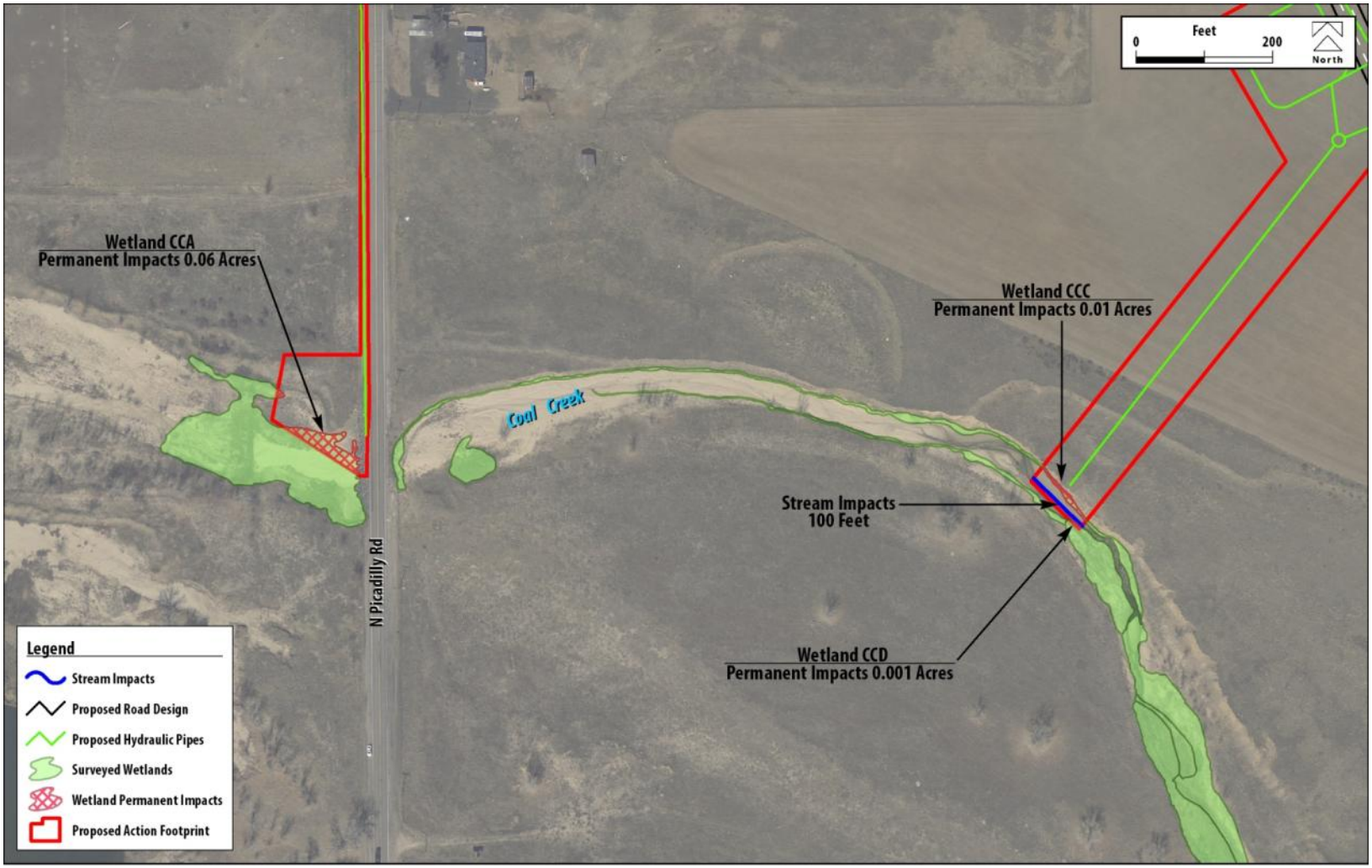
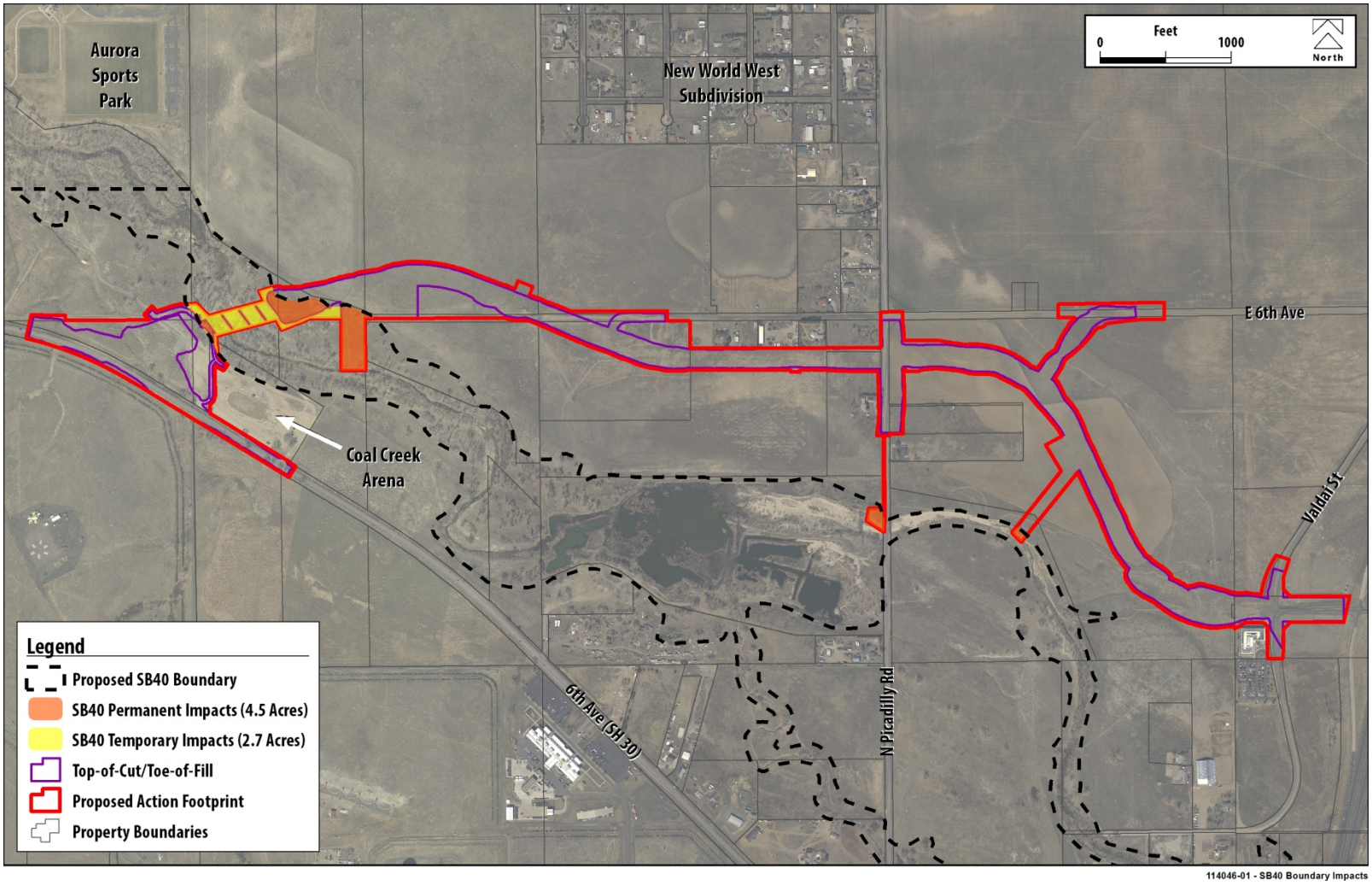


Figure 18 Proposed Action Impacts to Jurisdictional SB 40 Areas



4. MITIGATION

Mitigation strategies are required for the Proposed Action and are identified for each resource, as discussed below. Mitigation for this project will include the implementation of on-site best management practices (BMPs) for certain special status species, which are discussed in **Section 4.3**. A summary of all No Action and Proposed Action impacts and required mitigation measures is provided in **Appendices C** and **D**.

4.1 Vegetation and Noxious Weeds

4.1.1 On-Site Best Management Practices

Permanent impacts to approximately 51.4 acres and temporary impacts to approximately 16.1 acres of shortgrass prairie are expected as part of the construction of the Proposed Action. Mitigation for impacts to shortgrass prairie is included in **Section 4.3**.

Temporary vegetation impacts will be mitigated for by revegetation of temporarily impacted areas post-construction and will incorporate seed mixes and plantings of native species. Currently, there are no plans to mitigate permanent impacts to shortgrass prairie due to construction of the project.

4.1.2 Tree Replacement

Upland trees would be impacted due to construction of the Proposed Action. These trees will be replaced based on the City of Aurora's tree replacement policy and agreements with local landowners. If any additional tree species are impacted during construction, they will be replaced at a ratio designated by the City or based on agreements with local landowners.

Mitigation required for the removal of SB 40 trees and shrubs are identified in **Section 4.5** below.

4.1.3 Vegetation Enhancement/Restoration

Vegetation enhancement/restoration along the TCGC would also be implemented as part of this project. As identified in **Section 4.1.1** above and **Sections 4.4** and **4.5** below, temporarily disturbed areas will be revegetated post-construction with native species. Mitigation for permanent impacts will include additional on-site plantings and off-site mitigation for shortgrass prairie, SB 40 resources, and wetland resources.

4.1.4 Noxious Weed Management

Specific BMPs will be required during and after construction to reduce the potential for introduction and spread of noxious weed species. The City of Aurora will incorporate the management of the noxious weed populations into the project plan set in a CDOT project standard specification 217 (Herbicide Treatment) of the CDOT Standard Specifications for Road and Bridge Construction (CDOT, 2011) to be included with the construction plans.

Noxious weed management includes a noxious weed inventory and description of preventative and control measures that will be implemented during the construction of the project. The noxious weeds considered for management include those managed by Arapahoe County and the State of Colorado.

To effectively manage noxious weeds, management actions must be implemented in accordance with specific goals and priorities. The goal of weed management is to maintain and improve the health of the ecosystem in the study area by avoiding additional spreading of noxious weeds as a result of project construction.

Noxious weed management objectives are intended to support the overall management goal of maintaining the health of the ecosystem. There are two main management objectives:

- Preventing the establishment of new noxious weed populations in the study area as a result of project construction; and
- Preventing the continued spreading of noxious weeds in the study area as a result of project construction;

These objectives will generally be met by implementing the following actions at the project site:

- Follow CDOT Standards Specifications for Road and Bridge Construction controls during the construction of the project, including CDOT Specification 217 Herbicide Treatment (CDOT, 2011);
- Keep the area of ground disturbance to the minimum necessary;
- Thoroughly clean all equipment before entering and exiting the study area. Cleaning and disposal of weed infested soil shall be included in the cost of Item 626 Mobilization. The contractor shall submit a certification statement to the engineer that all equipment has been cleaned prior to initial site arrival;
- Avoid areas with dense noxious weed populations for topsoil salvage;
- Use only herbicides approved for use in water in or within 25 feet of wetlands or other water features;
- Approve broadcast herbicide spraying only through written consent of the engineer and apply when weather conditions (including wind) are suitable for such work;
- Notify engineer 24 hours prior to herbicide application;
- Survey the project for noxious weeds throughout construction to identify and treat weeds; and
- Coordination with the CDOT Region 1 Environmental staff is required if treatments for future weed infestations are required within CDOT ROW and coordination is required with the Arapahoe County Noxious Weeds Specialist if treatments for future weed infestations are required on county or city lands.

4.2 Fish and Wildlife

BMPs to prevent and minimize temporary impacts to vegetation will be developed and implemented prior to construction, which will be included in a Stormwater Management Plan (SWMP). The SWMP will also identify erosion control features to minimize erosion impacts as part of construction of the project.

4.3 Special Status Species

Mitigation for permanent impacts to federally threatened/endangered species habitat and species of concern potentially located within the study area is identified in the sections below. These mitigation measures include the implementation of on-site BMPs for black-tailed prairie dogs (state species of concern), American Peregrine Falcon (state species of concern), Bald Eagle (state threatened, other federal protection), Ferruginous Hawk (state species of concern), Long-billed Curlew (state species of concern), Mountain Plover (state species of concern), Swift Fox (state species of concern), Western Burrowing Owl (state threatened), common garter snake (state species of concern), northern leopard frog (state species of concern), and Ute Ladies'-tresses Orchid (federally threatened).

As part of this project, the City of Aurora will implement the BMPs identified in the Central Shortgrass Prairie Programmatic Biological Opinion (SGPI PBO) (**Appendix D**) in areas of presumed presence for these relevant species that would be disturbed during construction. While SGPI BMPs are being used for state species of special concern, these project construction activities are not covered under the PBO. BMPs associated with species listed in the SGPI PBO (USFWS, 2004) will also be incorporated.

4.3.1 Ute Ladies'-tresses Orchid

Additional field surveys during the blooming season, documentation, and coordination with the USFWS will place prior to construction of the Proposed Action per Section 7 of the ESA. Mitigation measures in the form of Conservation Conditions will include BMPs as outlined in the SWMP and include standard erosion control and water quality BMPs. A qualified biologist will conduct a survey a season prior to construction for Ute ladies'-tresses orchid habitat during the blooming season of the orchid (late July through August) to identify if the orchid is present. If no survey is conducted, then presence must be assumed and coordination with the USFWS will occur during final design for effects determination.

4.3.2 Bald Eagles

Monitoring for eagle winter-roosts and active eagle nests will continue up to and during construction. Close coordination will occur with USFWS and CPW. A meeting will be scheduled with these agencies no less than 6 months prior to construction activities to determine eagle activity and identify any existing nests. Surveys will be conducted within close proximity of the project from November 15 through August 15 each year to identify winter-roosting locations and active nest locations.

Should active winter-roosts or active eagle nests be identified, the appropriate mitigation, such as sequencing of construction activities and construction timing and duration restrictions, will be determined through coordination with USFWS and CPW. Ongoing coordination will occur with USFWS and CPW to discuss monitoring results during the November 15 through August 15 dates for the duration of the project.

4.3.3 Western Burrowing Owls

Due to the potential presence of Western Burrowing Owls associated with the black-tailed prairie dog colonies within the study area, there is also the potential for Western Burrowing Owls to be affected by project construction. Mitigation for the presumed presence of Western Burrowing Owls will include:

- Although Burrowing Owls may occur throughout a prairie dog colony, they are most often found near the colony's margins (Craig, 2001). Causing abandonment of a nest is a violation of the MBTA. As such, the City will limit work on projects that impact prairie dog colonies within the ROW to the non-nesting season, from August 15 to April 1 (Craig, 2001).
- Burrowing Owls may be present at a burrow up to one month prior to egg-laying and several months after young have fledged. Thus, in areas where Burrowing Owls are known by the qualified wildlife biologist or by the City to occur, earthwork should be avoided where possible from March 1 through March 31 and from August 15 through October 31 (Craig, 2001).
- If the City of Aurora engages in spraying for insects or elimination of prairie dogs on any of its ROWs, this should be reevaluated and eliminated in areas within 225 feet of known nesting locations (Dechant et al., 2001b).

If a project that would impact prairie dog colonies within the ROW cannot be scheduled for construction during any other time except the nesting season of Western Burrowing Owls (from March 1 to October 31), a qualified wildlife biologist will survey the study area for the presence of Burrowing Owls. If Burrowing Owls are found at the site, the City will coordinate with CPW per CPW's *Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls* (CPW, 2008b) and to ensure compliance under the MBTA.

4.3.4 Black-Tailed Prairie Dogs

Mitigation for potential impacts on black-tailed prairie dogs is covered per the City of Aurora's policies and includes off-site habitat conservation and implementation of the BMPs identified in the SWMP and by CPW. As identified in the City of Aurora's Policies, the City will avoid and minimize impacts on known black-tailed prairie dog colonies within the project footprint. CDOT's *Impacted Black-Tailed Prairie Dog Policy* (2009) will also be followed for all activities that affect black-tailed prairie dogs within the project footprint.

Because prairie dogs can expand their colonies into previously unoccupied areas over time, an additional site investigation should be conducted before beginning construction activities to verify the current status of prairie dog colonies in the project vicinity.

4.3.5 American Peregrine Falcon, Ferruginous Hawks, Long-billed Curlew, Mountain Plover, and Swift Fox

Mitigation for potential impacts to the American Peregrine Falcon, Ferruginous Hawk, Long-billed Curlew, Mountain Plover, and swift fox will be to limit construction activities to the non-nesting season (where possible), between September 1 and March 31. When construction must occur between April 1 and August 31, the project will follow CDOT's project special specification 240 (Migratory Birds). Specification 240 requires clearing and grubbing activities to occur prior to April 1 or after August 31 to remove potential nesting areas for migratory birds. Specification 240 also requires surveys be conducted every 3 days by a qualified wildlife biologist if construction activities occur during the active nesting season for migratory birds. Due to the potential for sensitive ground-nesting birds (Mountain Plover) to occur within areas of cropland, these surveys will be required throughout the Proposed Action footprint.

Coordination will occur with the USFWS whenever an active migratory bird nest is found to identify appropriate species-specific protection. If any surveys identify the presence of swift fox

or their dens, coordination with CPW will occur to identify more site-specific mitigation measures.

4.3.6 Common Garter Snake and Northern Leopard Frog

BMPs for the common garter snake and northern leopard frog will be implemented and include:

- If construction activities are to occur between May 1 and September 1 at sites that contain habitat (within the jurisdictional SB 40 areas, **Figure 14**) for the common garter snake and northern leopard frog, the qualified wildlife biologist and CPW will be consulted prior to construction to determine actions necessary to avoid and minimize impacts.
- Pesticide application near permanent bodies of water will be restricted during the period of frog metamorphosis (June to September).

BMPs developed and identified within the SWMP will sufficiently mitigate potential impacts to the common garter snake and northern leopard frog.

4.3.7 Migratory Birds

To avoid and minimize activities that will have an impact on migratory birds and their nests, the City will include in project construction plans a CDOT standard special specification 240 (Protection of Migratory Birds) for Road and Bridge Construction controls during project construction to limit activity around nests (CDOT, 2011d).

The standard special specification 240 will require modification to incorporate other early nesting raptors within the vicinity of the Proposed Action footprint. This specification will identify surveys for nesting Bald Eagles, Great Horned Owls, various hawks, and Western Burrowing Owls and surveys for other migratory birds during the typical nesting season. These survey periods are outlined below and are based on recommendations from CPW (CPW, 2008a).

Bald Eagles

A qualified wildlife biologist will conduct a survey for nesting Bald Eagles if construction occurs within the typical nesting season for Bald Eagles (October 15 to July 31).

Ferruginous Hawks

A qualified wildlife biologist will conduct a survey for nesting Ferruginous Hawks if construction occurs within the typical nesting season for Ferruginous Hawks (February 1 to July 15).

Red-tailed Hawks

A qualified wildlife biologist will conduct a survey for nesting Red-tailed Hawks if construction occurs within the typical nesting season for Red-tailed Hawks (February 15 to July 15).

Swainson's Hawks

A qualified wildlife biologist will conduct a survey for nesting Swainson's Hawks if construction occurs within the typical nesting season for Swainson's Hawks (April 1 to July 15).

Western Burrowing Owls

A qualified wildlife biologist will conduct a survey for nesting Western Burrowing Owls if construction occurs within the typical nesting season for Western Burrowing Owls (March 15 to October 31).

Great Horned Owls

A qualified wildlife biologist will conduct a survey for nesting Great Horned Owls if construction occurs within the typical nesting season for Great Horned Owls (January 1 to July 31).

Other Migratory Birds

A qualified wildlife biologist will conduct a migratory bird survey if construction occurs within the typical nesting season of other migratory birds (April 1 to August 31).

To further minimize impacts to migratory birds the City will incorporate a CDOT Special Specification 240 (Protection of Migratory Birds) as part of the final plan set. The Specification 240 will be modified, as needed, to provide protections for any migratory birds that may be present outside of the typical nesting season.

4.4 Wetlands

Wetland impacts due to construction of the Proposed Action are estimated at 0.11 acre of permanent impacts and 0.60 acre of temporary impacts. These impacts are based on preliminary design and are not considered final. Based on these preliminary design impacts, the following documentation or permits will be required prior to construction of the proposed action:

- A Wetland Finding Report will be required by CDOT prior to construction of the project.
- A FACWet Analysis will be required for permanent impacts over 0.10 acre. This analysis will occur prior to construction of the project.
- A Section 404 Nationwide Permit will be required.
- Based on permanent impacts being equal or greater than 0.10 acre, mitigation will be required. The purchase of wetland bank credits will facilitate permanent wetland impacts and on-site revegetation will be required in areas which are temporarily disturbed.

4.5 Senate Bill 40 Resources

All BMPs outlined under Section VI – General Conditions in the SB 40 Guidelines (CPW & CDOT, 2013) will be incorporated into this project and included in the SWMP. Example BMPs include reseeding all disturbed areas with a mix of native grasses and forbs and requirements that equipment be certified “clean” before arriving at and upon leaving the construction site to avoid the spread of invasive species.

All areas cleared of SB 40 tree and shrub resources will be replanted with a combination of native trees and shrubs. Exact mitigation ratios will be identified as a component of a Formal SB 40 Wildlife Certification process. Typical ratios include 1:1 for SB 40 trees removed, 4:1 for shrubs to trees (shrub plantings must be, at a minimum, 5-gallon size), 10:1 for willow stakes to trees, and aerial coverage (square feet) for any shrub replacements.

For more information on SB 40 jurisdictional determinations, guidelines and mitigation requirements, refer to the *Guidelines for Senate Bill 40 Wildlife Certification Developed and Agreed Upon by Colorado Parks and Wildlife and the Colorado Department of Transportation* (CPW & CDOT, 2013).

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Appendix A

Site Photographs

Photo 1 – Picture of the Seasonal Wildlife Closure enforced at a segment of the TCGC along Sand Creek.

Photo 2 – Picture of the juvenile BAEAs perched together within the TCGC.

Photo 3 – Picture of the female mature BAEA near the 2014 nest location.

Photo 4 – Picture of the mature male BAEA flying north through the TCGC.

Photo 5 – Picture of a Red-tailed Hawk nest found north of the 2014 nest site.

Photo 6 – Picture of a Red-tailed Hawk nest located directly east of SH 30 and the Buckley Air Force Base main building.

Photo 7 – Picture of a beaver lodge present in the aggregate ponds.

Photo 8 – Picture of a White-breasted Nuthatch observed near the aggregate ponds.

Photo 9 – Photograph showing heavy waterfowl use of the aggregate ponds during winter months.

Photo 10 – Photograph showing the presence of Red-tailed Hawks in the study area.

Photo 11 – Photograph showing presence of ground-nesting birds (Horned Lark) within prairie dog colonies in the study area.

Photo 12 – Photograph showing upland and wetland vegetation along Sand Creek.

Photo 13 – Photograph showing presence of black-tailed prairie dogs in the study area.

Photo 14 – Photograph showing presence of large mammals (white-tailed deer) using the study area.

Photo 15 – Photograph showing prairie dog spring pups investigating their surroundings.

Photo 16 – Photograph showing the Sand Creek channel during spring green-up.

Photo 17 – Photograph showing typical vegetation found within the riparian boundary of the TCGC, Spring 2015 green-up.

Photo 18 – Photograph showing dryland agricultural east of the TCGC in March. Agricultural lands are found between E-470 and the TCGC along with residential properties.

Photo 19 – Photograph showing uplands directly east of the TCGC.

Photo 20 – Photograph showing more large mammals (mule deer) using the TCGC.

Photo 21 – Photograph showing prairie dog colony north and west of the TCGC adjacent to 6th Avenue, north of Buckley AFB.

Appendix B

List of Observed Vegetation and Wildlife

Common Name	Scientific Name	Cottonwood	Grass Dominated	Grass/ Forb Mix	Shrub Riparian	Shrub/Grass Mix	Pavement, Gravel, Urban Built Up
Woody Plants							
Sandbar willow	*Salix interior*	X		X	X		
Rubber rabbitbrush	*Ericameria nauseosa*	X		X		X	
Plains cottonwood	*Populus deltoides*	X			X	X	
Lanceleaf cottonwood	*Populus acuminata*	X			X	X	
Narrowleaf cottonwood	*Populus angustifolia*	X			X	X	
Crack willow	*Salix fragilis*	X			X		
Honey locust	*Gleditsia triacanthos*	X					
Russian olive	*Elaeagnus angustifolia*	X				X	
Siberian elm	*Ulmus pumila*	X	X	X	X	X	
Herbaceous Plants							
Blue gramma	*Bouteloua gracilis*		X	X		X	
Canada thistle	*Cersium arvense*	X		X	X		X
Cattail	*Tyhpa sp.*				X		
Crested wheatgrass	*Agropyron cristatum*	X	X	X		X	
Showy milkweed	*Asclepias speciosa*		X	X	X		
Smooth brome	*Bromus inermis*	X	X	X		X	X
Flixweed	*Descurainia sophia*	X	X	X		X	
Reed canarygrass	*Phalaris arundinacea*				X		
Kochia	*Bassia scoparia*	X	X	X		X	X
Alfalfa	*Medicago sativa*		X	X			
Yellow sweetclover	*Melilotus officinalis*		X	X		X	
Scotch thistle	*Onopordum acanthium*	X	X	X		X	X
Western wheatgrass	*Pascopyrum smithii*	X	X	X			X
Kentucky bluegrass	*Poa pratensis*	X	X	X		X	X
Curly dock	*Rumex crispus*	X	X	X	X		
Clover	*Trifolium sp.*	X	X	X	X	X	
Common mullein	*Verbascum thapsus*	X	X	X		X	

Common Name	Scientific Name	Cottonwood	Grass Dominated	Grass/ Forb Mix	Shrub Riparian	Shrub/Grass Mix	Pavement, Gravel, Urban Built Up
Wildlife							
American Kestrel	*Falco sparverius*	X	X	X	X		
Belted Kingfisher	*Ceryle alcyon*				X		
Black-billed Magpie	*Pica hudsonia*	X		X	X		
Black-capped Chickadee	*Poecile atricapillus*	X			X		
European Starling	*Sturnus vulgaris*	X					
Downy Woodpecker	*Picoides pubescens*	X					
White-breasted Nuthatch	*Sitta carolinensis*	X					
American Tree Sparrow	*Spizella arborea*	X					
Swainson's Hawk	*Buteo swainsoni*	X	X	X	X		
Northern Pintail	*Anas acuta*				X		
Double-crested Cormorant	*Phalacrocorax auritus*						
Great-horned Owl	*Bubo virginianus*	X			X		
Great Blue Heron	*Ardea herodias*	X			X		
Yellow-rumped Warbler	*Setophaga coronata*						
White-tailed deer	*Odocoileus virginianus*	X			X		
Black-tailed prairie dog	*Cynomys ludovicianus*		X	X		X	
Northern Harrier	*Circus cyaneus*	X	X	X		X	
Green-winged teal	*Anas carolinensis*				X		
Wood Duck	*Aix sponsa*	X			X		
Northern Shoveler	*Anas clypeata*	X			X		
Bald Eagle	*Haliaeetus leucocephalis*	X	X	X			
Ferruginous Hawk	*Buteo regalis*	X	X	X	X		
Red-tailed Hawk	*Buteo jamaicensis*	X					
Eastern cottontail	*Sylvilagus floridanus*	X	X	X	X	X	
White-tailed jackrabbit	*Lepus townsendii*		X	X		X	
Rock Dove	*Columba livia*	X	X				X
Mallard Duck	*Anas platyrhynchos*		X		X		
Mule deer	*Odocoileus hemionus*	X	X	X	X	X	
Northern Flicker	*Colaptes auratus*	X	X		X		

*Note: This is a list of the most dominant vegetation observed during the field surveys and should not be considered comprehensive.
X = Observed

Appendix C

Summary of Biological Impacts

Resource	Context	No Action Alternative	Proposed Action
Wetlands/Waters of the US (FHU, 2016e – Appendix A7; FHU, 2016f – Appendix A8)	Wetlands within the study area are associated with Sand Creek and its tributaries, Coal Creek and Murphy Creek. Wetlands present are either abutting or adjacent to these creeks.	Would result in no impacts to wetlands or other Waters of the U.S.	Would result in a total of 0.11 acre of permanent impacts to wetlands abutting Sand Creek and Coal Creek. Would result in 0.60 acre of temporary impacts to wetlands abutting Sand Creek and Coal Creek. Would result in 577 linear feet of impact to the channel and/or stream banks of Sand Creek and Coal Creek. Would provide better opportunities for capturing sediment, which would be a benefit relative to the No Action Alternative.
Biological Resources - Vegetation (FHU, 2016f – Appendix A8)	The study area is located in a shortgrass prairie and riparian corridor where vegetation contributes to the scenic integrity of the area and supports vital resources and contains native vegetation that maintains ecological functions specific to the region.	Would result in no impacts to land cover and vegetation.	The Proposed Action footprint will have the following impacts to land cover: ▪ Permanent impacts to 51.4 acres of shortgrass prairie ▪ Temporary impacts to 16.1 acres of shortgrass prairie ▪ Permanent impacts to 4.5 acres of jurisdictional SB 40 riparian areas ▪ Temporary impacts to 2.7 acres of jurisdictional SB 40 riparian areas ▪ Permanent impacts to 0.11 acre of wetlands ▪ Temporary impacts to 0.60 acre of wetlands Construction of impervious surfaces would increase runoff exposing the surrounding vegetation to higher levels of pollutants. Increased runoff may lead to increased soil erosion.

Resource	Context	No Action Alternative	Proposed Action
Biological Resources - Noxious Weeds (FHU, 2016f – Appendix A8)	Noxious weeds are present in the study area and have the ability to spread into adjacent areas.	Would result in no changes in the distribution of noxious weeds. The City of Aurora actively manages noxious weeds on their open space lands.	Construction of the Proposed Action will cause 75.41 acres of soil disturbance. Soil disturbance from construction equipment would create favorable conditions for noxious weeds to be introduced and become established, or to further spread.
Biological Resources - Wildlife (FHU, 2016f – Appendix A8)	The study area provides habitat for big game, predators and other mammals, and migratory birds and raptors. The TCGC corridor contains a high density of terrestrial and avian wildlife activity. Some of the wildlife habitat within the study area has been disturbed to some extent by human activity (recreation and development). White-tailed deer have been observed in the study area and multiple deer movement corridors have been identified. Numerous species of raptor nest within the study area and the aggregate ponds are intensely used by waterfowl.	Would result in no impacts to species habitat.	Wildlife foraging and nesting habitat would be directly impacted by the 55.9 acres of vegetation that would be permanently removed due to the construction of impervious surfaces in the shortgrass prairie and jurisdictional SB 40 areas. The Proposed Action would create a barrier to wildlife movement through the TCGC. The Proposed Action would impact adjacent nesting birds (including raptors), and create long-term disturbances to migratory birds (including waterfowl). Wildlife mortality due to construction activities and habitat loss could also occur. Would avoid direct impacts to the Bald Eagle High Activity Area and several other known raptor nests. The bridge spans would provide large animal crossing accommodation, where an estimated 12-foot high x 700-foot long span bridge would provide sufficient permeability for wildlife to

Resource	Context	No Action Alternative	Proposed Action
			move along the TCGC. Wildlife species sensitive to indirect human disturbance (noise and visual disturbance) would be impacted most during the duration of construction. Because of the mobility of many species, they are generally capable of avoiding activities causing disturbance. Some types of erosion control measures could entangle animals. Some types of temporary construction fencing could entangle ground-nesting and low-flying migratory birds. Otherwise, permanent wildlife friendly fencing will be used.
Biological Resources - Aquatic Resources (FHU, 2016f – Appendix A8)	Sand Creek, Coal Creek, Murphy Creek, and aggregate ponds are all located in the study area. However, these aquatic resources are not identified as important fish streams. The northern leopard frog has been found on sections of Coal Creek upstream from the study area.	Would result in no impacts to aquatic resources.	Would directly impact Sand Creek with the addition of a bridge structure and necessary riprap, over the creek. Would indirectly impact Sand Creek with pollutants from the roadway entering the creek, including pollutants associated with vehicles and roadway maintenance (petroleum, ice melt, sand, etc.) Would indirectly impact Sand Creek due to additional shading of the stream. Water quality BMPs will treat most runoff and potentially improve water quality in other areas (capturing runoff from agricultural lands).

Resource	Context	No Action Alternative	Proposed Action
Biological Resources - Special Status Species – Federal Threatened/ Endangered Species (FHU, 2016f – Appendix A8)	The study area contains potential suitable habitat for one federally listed species: ▪ Ute ladies'-tresses orchid (*Spiranthes diluvialis*) – Federally Threatened.	Would result in no impacts to the Ute ladies'-tresses orchid.	The Proposed Action would result in the direct loss of 4.5 acres of potential suitable habitat (i.e. the riparian areas associated with Sand Creek, Coal Creek, and other potential habitat).
Biological Resources - Special Status Species – Bald Eagle (FHU, 2016f – Appendix A8)	The study area contains known winter roost sites for the Bald Eagle (*Haliaeetus leucocephalus*), protected under the Bald and Golden Eagle Protection Act. Bald Eagles feed on prairie dogs and waterfowl in the study area during periods when streams, rivers, lakes, and reservoirs freeze over in the winter. No active or in-active Bald Eagle nests are found in the study area.	Would result in no impacts to the Bald Eagle.	The Proposed Action would result in the direct loss of 4.5 acres of cottonwood and herbaceous riparian land cover, which could be potential nesting habitat for the Bald Eagle. Also, the Proposed Action is within CPW Winter Range and approximately 440 feet north of a Bald Eagle High Activity Area, which could cause changes in Bald Eagle activity in the area.
Biological Resources - Special Status Species – State Threatened Species (FHU, 2016f – Appendix A8)	The study area contains existing colonies of black-tailed prairie dogs, which is preferred habitat by the Western Burrowing Owl (*Athene cunicularia*), a state threatened species. However, no previous Western Burrowing Owls have been found in the study area.	Would result in no impacts to the Western Burrowing Owl.	The Proposed Action would result in the direct loss of 22.8 acres of known prairie dog colonies and other local wildlife populations due to the construction of the roadway. Impacts are estimated since no Western Burrowing Owls have been observed in the study area previously. No mitigation is required for the species addressed, but minimization measures have been identified to lessen the impact and are listed in Appendix D.

Resource	Context	No Action Alternative	Proposed Action
Biological Resources - Special Status Species – State Species of Special Concern (FHU, 2016f – Appendix A8)	Special Status Species – Black-tailed prairie dog: The study area contains existing colonies of black-tailed prairie dogs (*Cynomys ludovicianus*), a state species of special concern.	Would result in no impacts to the black-tailed prairie dog.	Would result in the direct loss of 22.8 acres of known prairie dog colonies due to the construction of the roadway. Would result in the direct loss of 55.9 acres of potential habitat for other sensitive species due to the construction of impervious surfaces. Wildlife mortality due to construction activities and habitat loss could also occur. A reduction of other local wildlife populations would also result due to the loss of the prairie dogs and their habitat. Wildlife species sensitive to indirect human disturbance (noise and visual disturbance) would be impacted most during the duration of construction. Because of the mobility of many species, they are generally capable of avoiding activities causing disturbance. It is anticipated that less sensitive wildlife species would return to habitat adjacent to the Proposed Action once construction is complete. No mitigation is required for the species addressed, but minimization measures have been identified to lessen the impact and are listed in Appendix D.

Resource	Context	No Action Alternative	Proposed Action
Biological Resources - Special Status Species – Migratory Birds (FHU, 2016f – Appendix A8)	Special Status Species – American Peregrine Falcon, Ferruginous Hawk, Long-billed Curlew, Mountain Plover, and Swift Fox: The study area contains existing suitable habitat for the following sensitive bird species: ▪ American Peregrine Falcon (*Falco peregrinus anatum*) – State Special Concern ▪ Ferruginous Hawk (*Buteo regalis*) – State Special Concern ▪ Long-billed Curlew (*Numenius americanus*) – State Special Concern ▪ Mountain Plover (*Charadrius montanus*) – State Special Concern ▪ Swift Fox (*Vulpes velox*) – State Special Concern	Would result in no impacts to the wildlife corridor.	Would potentially disrupt foraging activities for all of these sensitive species. Would put pressure on more sensitive birds (Ferruginous Hawks, Mountain Plover, etc.) and cause them to potentially move further away from previously used habitat. Would put pressure on more sensitive birds (Ferruginous Hawks, Mountain Plover, etc.) and cause them to potentially move further away from previously used habitat. No mitigation is required for the species addressed, but minimization measures have been identified to lessen the impact and are listed in Appendix D.
Biological Resources - Special Status Species – State Species of Special Concern (FHU, 2016f – Appendix A8)	Special Status Species – Northern leopard frog: The study area contains existing suitable habitat for the northern leopard frog.	Would result in no impacts to the northern leopard frog.	Could impact northern leopard frog habitat if construction activities occur between March 1 and July 31 or if pesticide application was not restricted during the period of frog metamorphosis (June to August).

Appendix D

Summary of Biological Mitigation Commitments

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Vegetation	Removal of Vegetation (clearing and grubbing)	A revegetation plan will be developed in final design in coordination with the City of Aurora, CDOT, CPW, and USACE. The revegetation plan will be incorporated into the SWMP and seed mixes (also identified in the Storm Water Management Plan) to be used will be specific to upland areas, riparian areas, and wetland areas. Specific objectives of the revegetation plan will be identified, such as selecting native plants and seed mixes for revegetation that blend the vegetation with existing vegetation, are consistent with vegetation types, growth habits, and soil types, use of native species, mimic surrounding native plant densities and minimizing the spread of noxious and invasive weeds. The revegetation plan will use adaptive restoration methods and match with native plant communities present with the Triple Creek Greenway Corridor. The seed mix used for revegetation will be approved by the City of Aurora Parks, Recreation, and Open Space and CDOT.	City of Aurora CDOT Design Engineering	Design
Vegetation	Removal of Vegetation (clearing and grubbing)	Minimize the amount and time period of disturbance to allow revegetation of disturbed areas.	City of Aurora	Design Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Vegetation	Removal of Vegetation (clearing and grubbing)	Avoid disturbance to existing trees, shrubs, and vegetation, to the maximum extent possible. Identify staging areas and avoidance areas in final plans.	City of Aurora	Design Construction
Vegetation	Removal of Vegetation (clearing and grubbing)	All disturbed areas will be revegetated with native grass and forb species. Seed, mulch, and mulch tackifier will be applied in phases throughout construction. Native trees and shrubs will be planted where appropriate. The seed mix and plantings for revegetation will be coordinated with CDOT and approved by the City of Aurora.	City of Aurora	Construction
Vegetation	Temporary work areas (partial clearing and grubbing)	Areas where vegetation is not completely cleared or grubbed will use geo-textile or other protection measures to leave roots/stumps of trees (such as cottonwood) or shrubs (such as sandbar willow) to regenerate after construction is complete.	City of Aurora	Design Construction
Vegetation	Removal of Vegetation (clearing and grubbing)	Temporary erosion control blankets will have flexible natural fibers.	City of Aurora	Design Construction
Vegetation	Removal of Vegetation (clearing and grubbing)	Best management practices such as erosion bales, silt fences, or other sediment control device will be used as sediment barriers and filters adjacent to wetlands, surface waterways, and at inlets where appropriate	City of Aurora	Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Vegetation	Removal of Vegetation (clearing and grubbing)	Temporary and permanent check dams will be used where appropriate to slow the velocity of water through roadside ditches and in swales.	City of Aurora	Construction
Vegetation	Removal of Vegetation (clearing and grubbing)	Work areas will be limited as much as possible to minimize construction impacts to vegetation	City of Aurora	Construction
Vegetation	Removal of Vegetation (clearing and grubbing)	Clearing and grubbing operations will be limited to the non-nesting season of migratory birds and the non-winter roost season of Bald Eagles. This leaves a period between September 1 and November 1 to remove vegetation in the TCGC, unless a qualified biologist can be hired by the City of Aurora or the contractor.	City of Aurora	Design Construction
Vegetation	Removal of Vegetation in Riparian Areas	A Formal SB 40 Wildlife Certification will be required during final design, prior to project construction. The SB 40 certification will identify the total number of SB 40 trees and aerial square footage of SB 40 shrubs that will be removed as part of project construction. A proper mitigation ratio of trees and shrubs will be identified and planted on-site. These planting locations will either be identified in the SWMP or final design plan set.	City of Aurora CDOT Environmental	Design Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Noxious Weeds	Spread of noxious weeds	A CDOT Standard Specification Section 217 (Herbicide Treatment) will be incorporated into project design and implemented during construction. Cleaning and disposal of weed infested soil shall be included in the cost of Item 626 Mobilization. Noxious weed populations will be mapped and shown in the final design plan set or SWMP.	City of Aurora	Design Construction
Noxious Weeds	Spread of noxious weeds	During final design, detailed weed mapping of the study area will be updated. Mapping will be included in the final design plan set and construction documents along with appropriate control methods for noxious weeds.	City of Aurora	Design Construction
Noxious Weeds	Spread of noxious weeds	Following noxious weeds mapping and inventory, the potential for spread of identified noxious weeds due to disturbance by construction activities will be analyzed including potential for noxious weeds to spread into wetlands or other sensitive areas. The information will be added to the Specification 217 and final design plan set and construction documents.	City of Aurora	Design Construction
Noxious Weeds	Spread of noxious weeds	Use of herbicides will include selection of appropriate herbicides and timing of herbicide spraying.	City of Aurora	Design Construction
Noxious Weeds	Spread of noxious weeds	Certified weed-free hay and/or mulch will be used in all revegetated areas.	City of Aurora	Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Noxious Weeds	Spread of noxious weeds	All construction vehicles will be cleaned of dirt/soil before off-loading at the project to prevent the introduction of noxious weeds. Project staging areas will be treated for noxious weeds prior to construction.	City of Aurora	Construction
Noxious Weeds	Spread of noxious weeds	Project design and construction engineer will coordinate with the Arapahoe County weed supervisor, CDOT, local governing bodies, and landowners to assure proper noxious weed management activities.	City of Aurora CDOT Construction	Design Construction
Noxious Weeds	Spread of noxious weeds	No fertilizers will be used on the project site.	City of Aurora	Construction
Wetlands	Temporary impacts to wetlands	Fence wetlands to be protected during construction.	City of Aurora	Design Construction
Wetlands	Temporary impacts to wetlands	After construction, remove temporary fill/materials used for protecting wetlands from permanent impact and remove all construction debris.	City of Aurora	Construction
Wetlands	Temporary impacts to wetlands	Temporary BMPs (such as installing erosion logs, bales, silt fence, etc.) will be used to capture sediments from disturbed areas during construction.	City of Aurora	Construction
Wetlands	Temporary impacts to wetlands	Check temporary impact areas following construction to confirm there are not permanent impacts.	City of Aurora	Construction
Wetlands	Permanent impacts to wetlands	The bridge over Sand Creek will be designed to minimize permanent and temporary impacts to wetlands to the maximum practicable extent.	City of Aurora	Design Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Wetlands	Permanent impacts to wetlands	Seed and mulch disturbance areas adjacent to wetlands to reduce erosion and promote revegetation; plant supplemental vegetation as needed.	City of Aurora	Construction
Wetlands	Permanent impacts to wetlands	Specific monitoring of construction activities in and near wetlands will be done to ensure protection of wetlands	City of Aurora	Design Construction
Wetlands	Permanent wetland losses	Final impacts will require a Section 404 permit under the Clean Water Act (CWA) and mitigation will be required for all wetland impacts. In coordination with CDOT, mitigation will be identified on-site or wetland credits will be purchased to meet Section 404 permit requirements. A Section 404 permit will be acquired after final design, prior to construction.	City of Aurora	Design
Wildlife	Disruption and loss of existing habitats and movement corridors	A revegetation plan will be developed in final design plan set and/or construction documents in coordination with the City of Aurora, CDOT, CPW, Arapahoe County, and the USACE for vegetation restoration in areas disturbed by construction activities.	City of Aurora CDOT Environmental	Design Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Wildlife	Disruption and loss of existing habitats and movement corridors	The new span bridge over Sand Creek is sized to facilitate movement of large animals and will maintain a natural bottom substrate to promote wildlife usage. The area under the span bridge will accommodate a regional trail, the floodplain, and wildlife movement. Mature habitat adjacent to this new span bridge shall be retained, as much as practicable during construction. The design of the bridge will be done in close coordination with a qualified wildlife biologist to facilitate elements specific to wildlife. The potential for incorporating standard wildlife fencing associated with the bridge will also be evaluated. Enhancement of vegetation adjacent to this span bridge and any wildlife crossing design elements will be evaluated during final design and will be done in close coordination with a qualified wildlife biologist. Wildlife crossing design will incorporate applicable recommendations and guidelines as identified in the FHWA *Wildlife Crossing Structure Handbook – Design and Evaluation in North America*. The new span bridge will include sufficient spacing for wildlife movement on either side of Sand Creek and maintain a natural substrate for wildlife usage (deer and smaller).	City of Aurora	Design Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Wildlife	Disruption and loss of existing habitats and movement corridors	The new span bridge will include sufficient spacing for wildlife movement on either side of Sand Creek and maintain a natural substrate for wildlife usage (deer and smaller). Lighting under the new span bridge will not be provided in order to promote usage by wildlife. Enhancement of vegetation adjacent to the span bridge will be evaluated during final design.	City of Aurora	Design
Wildlife	Disruption and loss of existing habitats and movement corridors	A revegetation plan will be incorporated into the SWMP during final design in coordination with the City of Aurora Parks, Recreation and Open Space, CDOT, CPW, and the USFWS for use along the Proposed Action alignment in areas disturbed during construction. Specific objectives of the revegetation plan would be identified, such as blending the vegetation with existing vegetation, use of native species, and minimizing the spread of noxious and invasive weeds.	City of Aurora	Design Construction
Wildlife	Erosion control measures could entangle animals	Temporary erosion control blankets will have flexible natural fibers.	City of Aurora	Design Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Wildlife	Disruption to nesting birds habitat	If construction is to commence between January 1 and October 31, to avoid impacts to nesting raptors and migratory birds in accordance with the Migratory Bird Treaty Act. The City will incorporate a CDOT Special Specification 240 (Protection of Migratory Birds) as part of the final plan set. The Specification 240 will be modified, as needed, to provide protections for any migratory birds that may be present outside of the typical nesting season. A qualified biologist will conduct a nest survey prior to construction. If active nests are found, coordination with CPW and the USFWS is required to determine an appropriate course of action, which may include, but is not limited to, a delay in construction to avoid the breeding season. In addition, due to the presence of two known active Great-horned Owl (*Bubo virginianus*) nests in the study area, a qualified biologist will conduct a nest survey prior to construction if construction occurs after January 1.	City of Aurora, CDOT Environmental	Prior to Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Special Status Species – Federal Threatened/ Endangered Species	Potential loss of Ute ladies'-tresses orchid habitat	A qualified biologist will conduct a survey a season prior to construction for Ute ladies'-tresses orchid habitat during the blooming season of the orchid (late July through August) to identify if the orchid is present. If no survey is conducted, then presence must be assumed. Coordinate with the USFWS during final design for effects determination. Incorporate erosion control BMPs to avoid sediment in wetlands and along Sand Creek, where potential habitat exists. The City will implement the BMPs identified in the Central Shortgrass Prairie Programmatic Biological Opinion in areas of presumed presence for state species of special concern. The City will consult with the USFWS to confirm the proposed effects on the Ute ladies'-tresses orchid and obtain any necessary clearances prior to construction activities taking place. Mitigation may be required if any plants are found and cannot be avoided by the Proposed Action. Mitigation measures will be identified in coordination with the USFWS prior to construction activities occurring. Minimize disturbance and vegetation removal in potential habitat areas.	City of Aurora, CDOT Environmental USFWS	Design Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Special Status Species – Species with other Federal Protection	Potential loss of Bald Eagle winter-roost habitat	Monitoring for eagle winter-roosts and active eagle nests will continue up to and during construction. Close coordination will occur with USFWS and CPW. A meeting will be scheduled with these agencies no less than 6 months prior to construction activities to determine eagle activity and identify any existing nests. Surveys will be conducted within close proximity of the project from November 15 through August 15 each year to identify winter-roosting locations and active nest locations. Should active winter-roosts or active eagle nests be identified, the appropriate mitigation, such as sequencing of construction activities and construction timing and duration restrictions, will be determined through coordination with USFWS and CPW. Ongoing coordination will occur with USFWS and CPW to discuss monitoring results during the November 15 through August 15 dates for the duration of the project.	City of Aurora	Design Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Special Status Species – Colorado State Threatened/Endangered Species	Potential loss of Western Burrowing Owl habitat associated with black-tailed prairie dog colonies.	A qualified biologist will conduct a survey prior to construction for nesting Western Burrowing Owls in prairie dog colonies if construction occurs between March 15 and October 31. If nesting burrowing owls are found, then coordination with CPW and USFWS must take place to identify mitigation. Mitigation will include providing a 150-foot buffer around any active burrowing owl burrows.	City of Aurora	Prior to Construction
Special Status Species – Colorado State Species of Special Concern – Swift Fox	Potential loss of habitat for the Swift Fox (*Vulpes velox*)	A qualified biologist will conduct a survey prior to construction to identify the presence of swift fox or their dens. If dens are identified, coordination with CPW will occur to identify more site-specific mitigation.	City of Aurora	Prior to Construction
Special Status Species – Colorado State Species of Special Concern – Black-tailed prairie dog	Loss of Black-tailed prairie dogs (*Cynomys ludovicianus*)	Surveys for black-tailed prairie dogs will occur during final design and prior to construction. The City of Aurora's policy on removal/relocation of prairie dogs will be followed. Preference will be given to passive relocation and non-lethal removal.	City of Aurora	Prior to Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Special Status Species – Colorado State Species of Special Concern	Potential loss of habitat for: ▪ American Peregrine Falcon (*Falco peregrinus anatum*) – State Special Concern ▪ Ferruginous Hawk (*Buteo regalis*) – State Special Concern ▪ Long-billed Curlew (*Numenius americanus*) – State Special Concern ▪ Mountain Plover (*Charadrius montanus*) – State Special Concern Swift Fox (*Vulpes velox*) – State Special Concern	Coordination will occur with the USFWS whenever an active migratory bird nest is found to identify appropriate species-specific protection. Minimize disturbance and vegetation removal in potential habitat areas. A revegetation plan will be incorporated into the SWMP during final design in coordination with the City of Aurora Parks, Recreation, and Open Space, CPW, CDOT, and the USFWS for use along the Proposed Action alignment in areas disturbed during construction. Specific objectives of the revegetation plan will be identified, such as blending the vegetation with existing vegetation, use of native species, and minimizing the spread of noxious and invasive weeds.	City of Aurora	Design Prior to Construction Construction

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Special Status Species – Colorado State Species of Special Concern	Potential loss of habitat for the northern leopard frog	A survey will be conducted between May 1 and September 1 prior to construction to determine if Northern Leopard Frogs are present in the Proposed Action footprint. If frogs are found, coordination with CPW will occur to safely remove any tadpoles or adults and relocate them to a protected location. Pesticide application near permanent bodies of water will be restricted during the period of frog metamorphosis (June to August).	City of Aurora	Prior to Construction Construction Maintenance