TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

4.11 Wetlands, Waters of the U.S., and Open Water

This section describes wetland resources and other waters of the U.S. within the project area. Wetland resources are protected under Section 404 of the Clean Water Act and Executive Order 11990, *Protection of Wetlands*. The Clean Water Act requires coordination with the U.S. Army Corps of Engineers (USACE) and resource agencies such as the EPA and the U.S. Fish and Wildlife Service (USFWS) when impacts occur to wetlands that are considered waters of the U.S. The U.S. Department of Transportation Order 5660.1A, *Preservation of the Nation's Wetlands* (U.S. Department of Transportation, 1978), provides guidance on wetland mitigation assessment. CDOT has incorporated this and other FHWA environmental guidance into its *Environmental Stewardship Guide* (CDOT, 2003d), which emphasize efforts to avoid and minimize all wetland impacts.

Before initiating field studies as part of the Valley Highway EIS process, previous studies conducted in the area were collected and reviewed. These included National Wetland Inventory mapping (USFWS, 2004b) and Natural Resource Conservation Service (NRCS) soil mapping reports (NRCS, 1971; and NRCS, 1980), covering the project area. During field work, National Wetland Inventory maps were reviewed to locate areas for further investigation and to ensure that all previously mapped areas were documented in this study.

Wetlands and open water in the project area were delineated from January 7 through January 13, 2004. Wetland determinations were based on documenting the presence of diagnostic environmental characteristics for vegetation, hydrology, and soils as outlined in the *U.S. Army Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987). Routine Wetland Delineation Forms for representative wetlands in the project area were completed and are contained in the I-25 Valley Highway EIS *Wetland Delineation Report* (FHU and ERO Resources, 2004b). Since the wetland delineation was conducted during the winter, the area was reassessed the week of June 7, 2004 during the growing season to verify wetland boundaries. No significant deviations were identified between the winter mapping and growing season conditions.

The boundaries of wetlands, open water, and ditches in the project area were mapped using one of two methods: digitizing boundaries drawn in the field by hand on 1"=200' orthographically rectified aerial photographs or via data gathered with a global positioning system (GPS) unit.

4.11.1 Current Conditions

The majority of vegetation communities in the project area are upland communities associated with undeveloped areas of highway right-of-way or with public parks. Riparian communities along the South Platte River, typically dominated by Siberian elm *(Ulmus pumila)*, are limited to narrow strips of vegetation on the margin of open water areas. Narrower strips of wetland communities create a fringe along shore lines of lakes and stream channels. Open water area consists of lakes in public parks and the South Platte River channel.

4.11.1.1 Uplands / Riparian Areas

The upland areas tend to be dominated by drought-tolerant, non-native, and weedy species. Annual weeds such as kochia (*Kochia scoparia*) and cheatgrass (*Bromus tectorum*) dominate vacant lots, disturbed areas, and other undeveloped areas in the project area. Kentucky

bluegrass (*Poa pratensis*) and landscape trees and shrubs typically dominate the irrigated parts of the project area. Upland communities are described in more detail in **Section 4.12** *Vegetation and Wildlife*.

Throughout the project area, the South Platte River has been channelized and straightened. The banks are generally steep and protected by riprap. Riparian vegetation occurs along the banks of the river, sometimes growing in a thin layer of soil over and between the riprap stones. Vegetation on the steep banks (in non-wetland areas) is dominated by Siberian elm and smooth brome (*Bromus inermis leyss*). Other species that occur along the upper banks of the river include crested wheatgrass *(Agropyron cristatum),* cheatgrass, kochia, dogbane *(Apocynum cannabinum)*, poison hemlock *(Conium maculatum)*, showy milkweed *(Asclepias speciosa)*, diffuse knapweed *(Centauria diffusa)*, and whitetop *(Cardaria draba)*. Snowberry *(Symphoricarpos occidentalis)*, rabbitbrush *(Chrysothamnus nauseosus)*, Russian olive *(Elaeagnus angustifolia)*, and sandbar willow *(Salix exigua)* are occasionally present understory (i.e., vegetation beneath trees). A few scattered plains cottonwoods *(Populus deltoides)* and peach-leaf willows *(Salix amygdaloides)* are also present along the banks of the river.

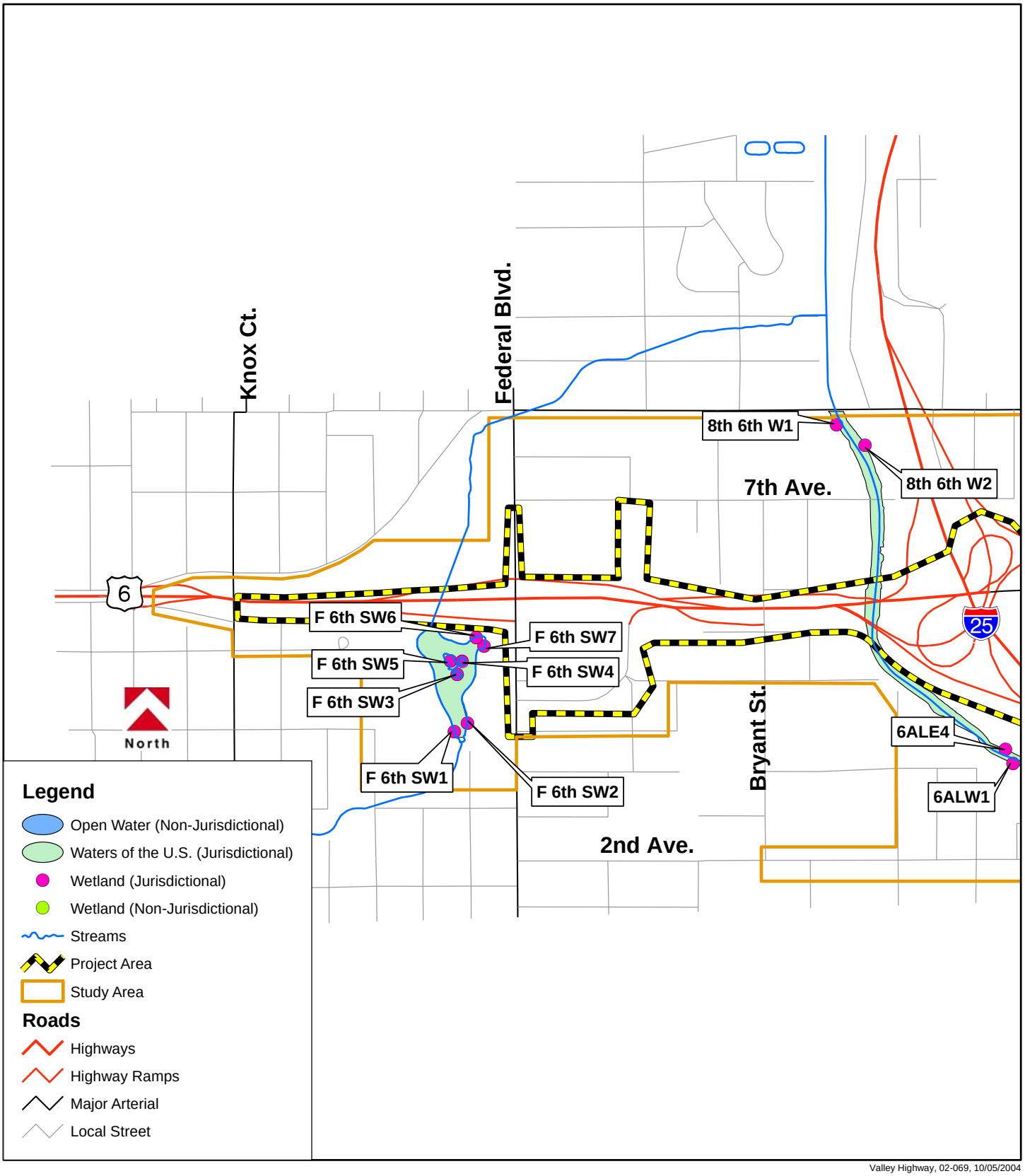
4.11.1.2 WETLANDS

A total of 2.01 acres of wetlands in the project area were identified and delineated during field investigations. The areas include shrub wetlands and herbaceous wetlands. Locations of these wetlands are shown in **Figures 4.11-1**, **4.11-2**, and **4.11-3** for the northern, central, and southern project areas, respectively. Detailed maps of the wetlands are contained in the I-25 Valley Highway EIS *Wetland Delineation Report*. Area wetlands were classified according to the wetland classification system outlined in *Classification of Wetlands and Deepwater Habitats of the United States* (USFWS, 1979).

Wetlands in the project area fall into one of three Cowardin classification systems:

- Lacustrine, littoral, emergent, (LLE) – the wetland fringes around lakes and a detention pond in the project area fall into this class.
- Palustrine, scrub-shrub wetland (PSS) – wetlands along the South Platte River that are dominated by sandbar willow fall into this class.
- Palustrine, emergent, persistent wetland (PEP) – wetlands along the South Platte River that are dominated by herbaceous species, such as reed canarygrass and poison hemlock, fall into this class.

In places, there is a narrow bench or terrace at the bottom of the riprap banks. This terrace is typically about 2 to 3 feet above the ordinary high water mark and generally lacks wetland characteristics except for a narrow 1 to 2 feet wide fringe immediately adjacent to the river. These areas were generally mapped as having a 1 to 2 feet wide fringe of wetlands. Wetland vegetation along the river is dominated by Emory's sedge *(Carex emoryi)*, reed canarygrass *(Phalaris arundinacea)*, and sandbar willow. Other species that occur less frequently include bulrush *(Scripus lacustris)*, broad-leaf cattail *(Typha latifolia)*, poison hemlock, dogbane, Baltic rush *(Juncus balticus)*, barnyard grass *(Echinochloa crus-galli)*, Canada thistle (*Cirsium arvense*), meadow fescue *(Festuca pratensis)*, and curly dock *(Rumex crispus)*.



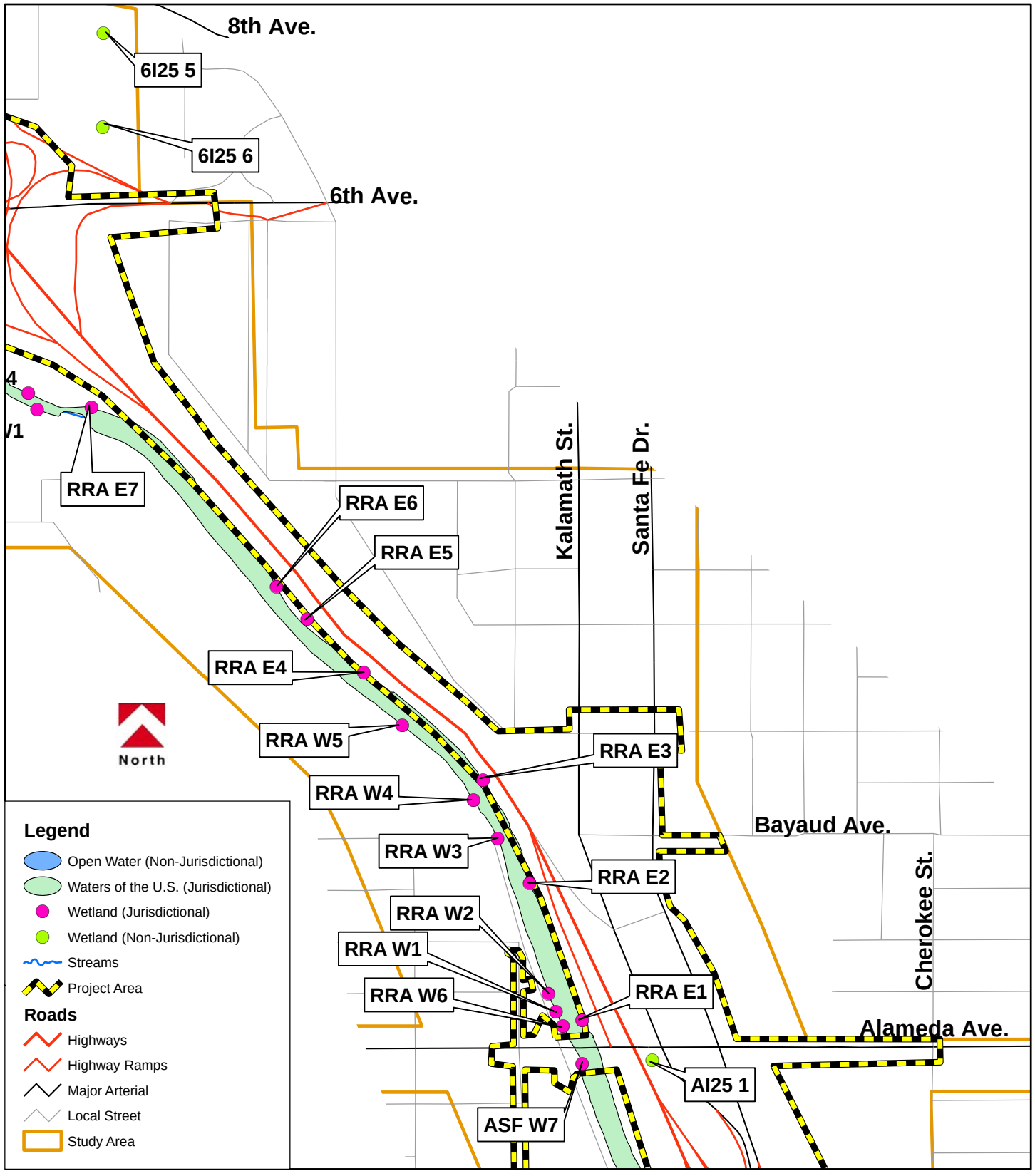
Valley Highway, 02-069, 10/05/2004

0 250 500 1,000 Feet

Wetlands, Waters of the U.S., Open Water-Northern Project Area

Valley Highway - Logan to 6th Ave. Environmental Impact Statement (EIS)

Figure 4.11-1



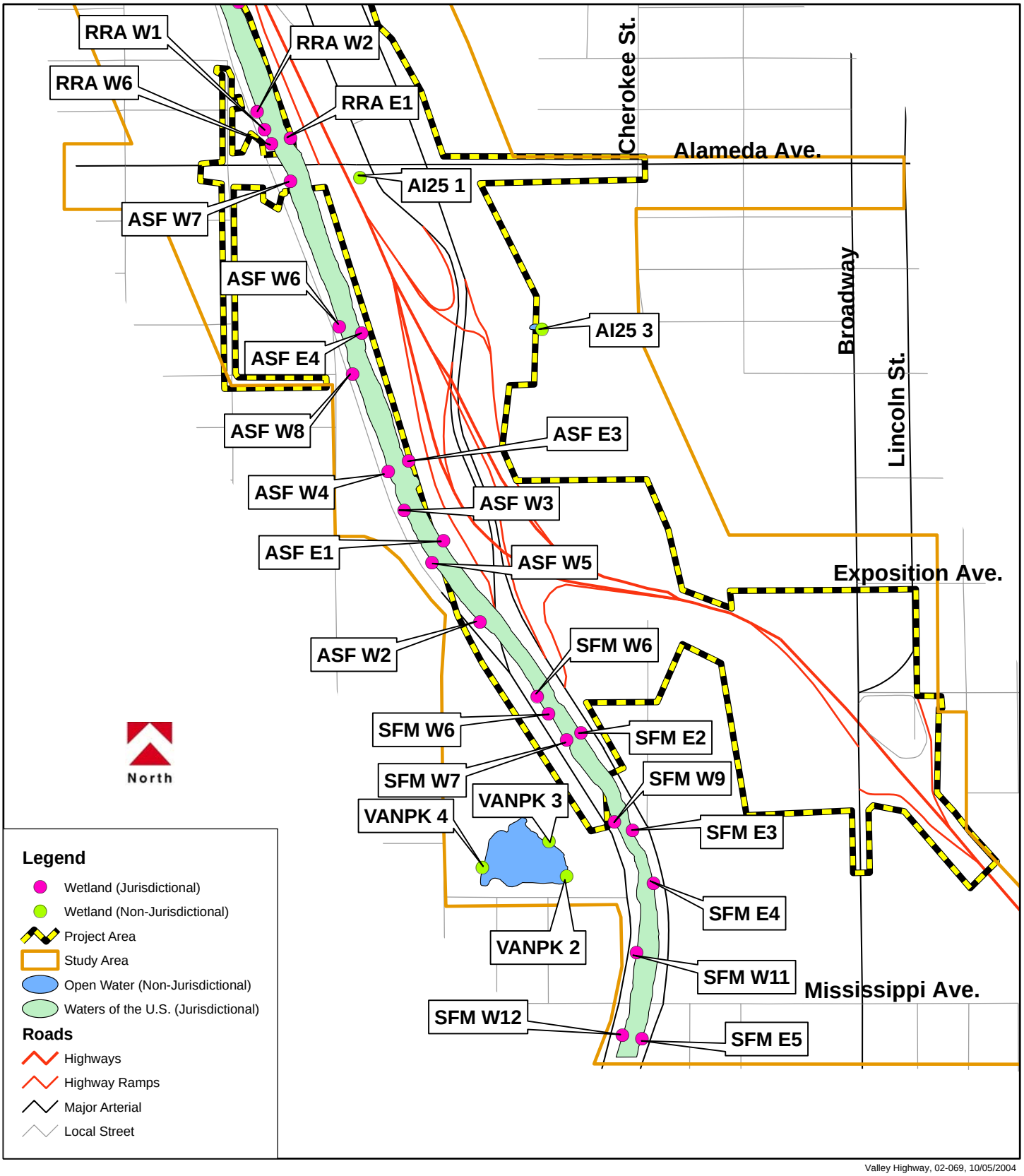
Valley Highway, 02-069, 10/27/2004

0 250 500 1,000 Feet

Wetlands, Waters of the U.S., Open Water-Central Project Area

Valley Highway - Logan to 6th Ave. Environmental Impact Statement (EIS)

Figure 4.11-2



Valley Highway, 02-069, 10/05/2004

0 250 500 1,000 Feet

Wetlands, Waters of the U.S., Open Water-Southern Project Area

Valley Highway - Logan to 6th Ave. Environmental Impact Statement (EIS)

Figure 4.11-3

There are approximately 45.33 acres of open water areas in the project area. Areas of open water in the project area include the channel of the South Platte River, Vanderbilt Lake, Barnum Park Lake, and a detention pond near Home Depot at 500 S. Santa Fe Drive. The preliminary determination of whether these areas are considered waters of the U.S. is discussed in the following section. As with the wetlands, open waters were classified according to the Cowardin classification system (USFWS, 1979) and included in one of two classes:

- **Lacustrine, limnetic, unconsolidated bottom (LLU)** – The deep portions of Vanderbilt Lake and Barnum Park Lake fall into this class. Generally, this classification system is found below the ordinary high water mark. The depth of Vanderbilt Lake is 12 feet (City and County of Denver, 2004c) and the depth of Barnum Lake is assumed to be similar.
- **Riverine, unconsolidated bottom (RU)** – The South Platte River falls into this class. These areas are typically unvegetated and are subject to scour and sediment deposition.

4.11.1.3 PRELIMINARY DETERMINATION OF JURISDICTION

The I-25 Valley Highway *Wetlands Delineation Report* (FHU and ERO Resources, 2004b) was submitted to the USACE for review on March 8, 2004. USACE provided a preliminary jurisdictional determination in a letter dated March 27, 2004, a copy of which is included in **Appendix A,** *Agency Coordination*. Within the project area, USACE has made a preliminary determination that the South Platte River, Weir Gulch, Barnum Park Lake, and their adjacent wetlands are considered to fall under USACE jurisdiction. The South Platte River is a water of the U.S. since it is a tributary to the Platte River, which is navigable. Barnum Park Lake is a water of the U.S. since it is on Weir Gulch, a tributary to the South Platte River. Four other water/wetlands, including Vanderbilt Lake, a detention pond near Home Depot, a drainage ditch between US 6 and 8th Avenue, and a seep at I-25 and Alameda do not have apparent surface connections to the South Platte River; therefore, the USACE considers these waters isolated and not under USACE jurisdiction. **Tables 4.11-1** and **4.11-2** summarize the classification, surface area, and jurisdictional status for wetlands and open water in the project area.

Although certain wetlands may not fall under USACE jurisdiction and therefore are not afforded protection under the Clean Water Act and Executive Order 11990, CDOT policy requires that impacts to all wetlands be avoided and minimized to the greatest possible extent. Therefore, unavoidable impacts to all wetlands will be mitigated under this project.

Table 4.11-1 Area and Jurisdictional Status of Wetlands

Wetland	Classification	Jurisdictional (Y/N)	Area	
			Acres	Square Feet
6ALE4	PSS	Y	0.019	828
6ALW1	PSS	Y	0.018	784
8TH 6TH W1	PSS	Y	0.051	2,222
8TH 6TH W2	PEP	Y	0.006	261
ASF E1	PSS	Y	0.440	19,166
ASF E3	PEP	Y	0.057	2,483

Table 4.11-1 Area and Jurisdictional Status of Wetlands (continued)

Wetland	Classification	Jurisdictional (Y/N)	Area	
			Acres	Square Feet
ASF E4	PEP	Y	0.018	784
ASF W2	PEP	Y	0.008	348
ASF W3	PEP	Y	0.007	305
ASF W4	PEP	Y	0.003	131
ASF W5	PEP	Y	0.005	218
ASF W6	PEP	Y	0.003	131
ASF W7	PEP	Y	0.005	218
ASF W8	PEP	Y	0.003	131
F 6TH SW 1	LLE	Y	0.009	392
F 6TH SW 2	LLE	Y	0.016	697
F 6TH SW 3	LLE	Y	0.053	2,309
F 6TH SW 4	LLE	Y	0.050	2,178
F 6TH SW 5	LLE	Y	0.162	7,057
F 6TH SW 6	LLE	Y	0.005	218
F 6TH SW 7	LLE	Y	0.003	131
RRA E1	PEP	Y	0.012	523
RRA E2	PSS	Y	0.049	2,134
RRA E3	PEP	Y	0.097	4,225
RRA E4	PEP	Y	0.020	871
RRA E5	PEP`	Y	0.110	4,792
RRA E6	PEP	Y	0.012	523
RRA E7	PSS	Y	0.018	784
RRA W1	PEP	Y	0.003	131
RRA W2	PEP	Y	0.006	261
RRA W3	PSS	Y	0.002	87
RRA W4	PSS	Y	0.029	1,263
RRA W5	PSS	Y	0.012	523
RRA W6	PSS	Y	0.002	87
SFM E2	PEP	Y	0.003	131
SFM E3	PSS	Y	0.015	653
SFM E4	PSS	Y	0.011	479
SFM E5	PSS	Y	0.009	392
SFM W11	PEP	Y	0.018	784
SFM W12	PEP	Y	0.010	436
SFM W4	PEP	Y	0.003	131
SFM W6	PEP	Y	0.002	87
SFM W7	PSS	Y	0.009	392
SFM W9	PSS	Y	0.092	4,008
		Subtotal Jurisdictional	1.485	64,689
AI25 1	PEP	N	0.010	436
AI25 3	LLE	N	0.070	3,049
6I25 5	PSS	N	0.130	5,663
6I25 6	PSS	N	0.198	8,625
VANPK 2	LLE	N	0.014	610
VANPK 3	LLE	N	0.105	4,574
VANPK 4	LLE	N	0.002	87
		Subtotal Non-Jurisdictional	0.529	23,044
		Total	**2.014**	**87,733**

Source: FHU and ERO Resources, 2004b

LLE - lacustrine, limnetic, unconsolidated bottom PEP – palustrine, emergent, persistent wetland

PSS – palustrine, scrub-shrub wetland

Table 4.11-2 Area and Jurisdictional Status of Open Water

Open Water	Classification	Jurisdictional (Y/N)	Area	
			Acres	Square Feet
F6thSW WUS 1	LLU	Y	4.15	180,774
SPR WUS	RU	Y	37.530	1,634,807
		Subtotal Jurisdictional	41.683	1,815,711
VANPK OW 1	LLU	N	3.604	156,990
AI25 OW1	LLU	N	0.045	1,960
		Subtotal Non-Jurisdictional	3.649	158,950
Total			**45.332**	**1,974,662**

Source: FHU and ERO Resources, 2004b

LLU – lacustrine, limnetic, unconsolidated bottom RU – riverine, unconsolidated bottom

4.11.1.4 WETLAND FUNCTIONS

An understanding of wetland functions can assist in the analysis and mitigation of potential impacts. A variety of studies have recognized that wetlands provide particular functions to the environment (Adamus et al., 1991; FHWA,1983; Smith et al., 1995). Wetland functions are the physical, chemical and biological processes or attributes vital to the integrity of wetland systems (Adamus et al., 1991). Various researchers and methods recognize a variety of wetland functions that typically are related to water quality, biodiversity, hydrological, and ecological processes. All wetlands do not perform all functions, nor do wetlands perform all functions equally.

Wetland values, such as recreation and uniqueness, are attributes not necessarily important to the integrity of wetland systems; however, these values are perceived as being valuable to society (Adamus et al., 1991). Similar to functions, all wetlands do not provide all values and the values that are provided are not provided equally.

Most of the wetlands in the project area are palustrine wetlands that occur along the South Platte River and are supported by surface water. Although many of the plant species in the wetlands are considered noxious weeds (e.g., Canada thistle, cheatgrass, and Russian olive), all the wetland types have a high functional rating for general wildlife habitat because streams and rivers and their associated riparian communities provide diverse habitat types for a variety of species. Many of the wetlands have a functional rating of moderate to low because of the restricted nature of the wetlands. For example, flood attenuation and storage is low in areas with a wetland fringe only 1 or 2 feet wide. A detailed functional assessment of wetlands in the project area, including functional assessment data sheets, is provided in the *Wetland Delineation Report* (FHU and ERO Resources, 2004b).

4.11.2 Consequences of the Alternatives

4.11.2.1 NO ACTION ALTERNATIVE

The No Action Alternative would result in no direct impacts such as water quality degradation, since untreated stormwater runoff would continue at historic levels.

4.11.2.2 SYSTEMS ALTERNATIVES 1, 2, AND 3

Given the small size of wetlands that would be impacted and given the level of preliminary design completed to date, it is difficult to quantify potential temporary impacts. In order to avoid underestimating the amount of necessary compensatory mitigation, all impacts are considered to be permanent for this EIS. Impacts to wetlands and open water from the systems alternatives, including the Preferred Alternative, are summarized in **Tables 4.11-3** and **4.11-4,** respectively and are detailed below.

The types of impacts associated with the system alternatives would be very similar and are discussed together. Construction of the proposed system alternatives would potentially result in wetland impacts that are either direct or indirect. Direct impacts include temporary or permanent filling or draining. Indirect impacts include an increase in nonpoint source pollution such as petroleum products, de-icer, and sediment into wetlands and streams or changes to supportive hydrology of wetlands not directly impacted. Water quality impacts are discussed in **Section 4.9** *Water Resources.*

Direct impacts to wetlands and other waters of the U.S. associated with the system alternatives would result from construction on existing or new bridges over the South Platte River, from stormwater drainage outfalls to the South Platte River, and from roadway and interchange reconfiguration. Estimated acreages of potential impacts associated with system elements were determined by overlaying the conceptual designs for the system alternatives with the wetland and waters of the U.S. maps. Several small outfalls are located along the South Platte River, just outside of the project limits shown in the project diagrams. Potential impacts associated with these outfalls were included in the analysis.

For roadway bridges across the South Platte River, impacts were assumed to extend no more than 50 feet upstream and downstream of the bridge and roadway footprint. For the pedestrian bridge, impacts were assumed to extend 25 feet upstream and downstream of the bridge footprint. Outfalls to the South Platte River were assumed to impact a 25 ft^2 area centered on the end of the culvert. These assumptions were made to ensure that potential temporary impacts associated with equipment access and other construction activities would not be underestimated during the EIS process.

4.11.2.3 Preferred Alternative

Because the Preferred Alternative combines elements of the other system alternatives, the types of impacts associated with the Preferred Alternative would be essentially the same as those previously discussed for System Alternative 1, 2, and 3. Given the small size of wetlands that would be impacted and given the level of preliminary design completed to date, it is difficult to quantify potential temporary impacts. In order to avoid underestimating the amount of necessary compensatory mitigation, all impacts are considered to be permanent for this EIS. Impacts to wetlands and open water from the Preferred Alternative and the other alternatives are summarized in **Tables 4.11-3** and **4.11-4,** respectively and are detailed below.

Construction of the Preferred Alternative would result in wetland impacts that are either direct or indirect. Direct impacts include temporary or permanent filling or draining. Indirect impacts include an increase in nonpoint source pollution such as petroleum products, de-icer, and

sediment into wetlands and streams or changes to supportive hydrology of wetlands not directly impacted. Water quality impacts are discussed in **Section 4.9** *Water Resources.*

Direct impacts to wetlands and other waters of the U.S. associated with the Preferred Alternative would result from construction on existing or new bridges over the South Platte River, from stormwater drainage outfalls to the South Platte River, and from roadway and interchange reconfiguration. Estimated acreages of potential impacts associated with the Preferred Alternative were determined by overlaying the conceptual design with the wetland and waters of the U.S. maps. Several small outfalls are located along the South Platte River, just outside of the project limits shown in the project diagrams. Potential impacts associated with these outfalls were included in the analysis.

For roadway bridges across the South Platte River, impacts were assumed to extend no more than 50 feet upstream and downstream of the bridge and roadway footprint. For the pedestrian bridge, impacts were assumed to extend 25 feet upstream and downstream of the bridge footprint. Outfalls to the South Platte River were assumed to impact a 25 square foot area centered on the end of the culvert. These assumptions were made to ensure that potential temporary impacts associated with equipment access and other construction activities would not be underestimated during the EIS process.

Table 4.11-3 Preliminary Estimates of Direct Impacts to Wetlands

Jurisdictional Wetlands	Jurisdictional (Y/N)	Area of Impacts							
		Alternative 1		Alternative 2		Alternative 3		Preferred Alternative	
		Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet
ASF E1	Y	0.197	8,500	0.197	8,500	0.197	8,500	0.197	8,500
ASF W2	Y	0.007	300	0.007	300	0.007	300	0.007	300
ASF W7	Y	0.004	150	0.004	150	0.004	150	0.004	150
RRA E1	Y	0.012	500	0.012	500	0.012	500	0.012	500
RRA E2	Y	0.043	1,850	0.043	1,850	0.005	200	0.043	1,850
RRA W4	Y	0	0	0	0	0.004	150	0	0
RRA W6	Y	0.001	50	0.001	50	0.001	50	0.001	50
Jurisdictional Wetland Subtotal		0.264	11,350	0.264	11,350	0.230	9,850	0.264	11,350
Non-Jurisdictional Wetlands	Jurisdictional (Y/N)	Area of Impacts							
		Alternative 1		Alternative 2		Alternative 3		Preferred Alternative	
		Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet
AI25 1	N	0.010	400	0.010	400	0.010	400	0.010	400
AI25 3	N	0	0	0.007	300	0	0	0	0
Non-Jurisdictional Wetland Subtotal		**0.010**	**400**	**0.017**	**700**	**0.010**	**400**	**0.010**	**400**
Total Wetlands		**0.274**	**11,750**	**0.281**	**12,050**	**0.240**	**10,250**	**0.274**	**11,750**

Table 4.11-4 Preliminary Estimates of Direct Impacts to Open Water

Jurisdictional Open Water	Jurisdictional (Y/N)	Area of Impacts							
		Alternative 1		Alternative 2		Alternative 3		Preferred Alternative	
		Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet
SPR WUS	Y	0.45	19,600	0.45	19,600	0.45	19,600	0.45	19,600
Jurisdictional Open Water Subtotal		**0.45**	**19,600**	**0.45**	**19,600**	**0.45**	**19,600**	**0.45**	**19,600**
Non-Jurisdictional Open Water	**Jurisdictional (Y/N)**	**Area of Impacts**							
		Alternative 1		**Alternative 2**		**Alternative 3**		**Preferred Alternative**	
		Acres	**Square Feet**	**Acres**	**Square Feet**	**Acres**	**Square Feet**	**Acres**	**Square Feet**
AI25 OW1	Y	0.045	1,950	0.045	1,950	0.045	1,950	0.045	1,950
Non-Jurisdictional Open Water Subtotal		**0.045**	**1,950**	**0.045**	**1,950**	**0.045**	**1,950**	**0.045**	**1,950**
Total Open Water		**0.495**	**21,550**	**0.495**	**21,550**	**0.495**	**21,550**	**0.495**	**21,550**

Note: Estimates are based on bridge footprint. Actual impacts due to pier placement will be much less.

4.11.3 Mitigation Measures

During development of the system alternatives, FHWA and CDOT advanced a single I-25 mainline alternative because it best avoided the South Platte River (See **Chapter 2.0** *Alternatives)*. The result is that none of the system alternatives would cause major impacts to the South Platte River. Smaller unavoidable impacts, as previously described, would result from the system alternatives.

FHWA and CDOT policy requires compensatory mitigation for permanent impacts to both jurisdictional and non-jurisdictional wetlands. Wetland mitigation is typically done on a 1:1 basis; however, a Clean Water Act Section 404 permit that is issued by the USACE for jurisdictional impacts may require higher ratios if unique or high quality wetlands are impacted. Preliminary estimates of direct impacts to wetlands are summarized in **Table 4.11-3**. More accurate estimates of temporary and permanent impacts to wetlands will be made during final design and permitting. The Wetland Finding is presented in Appendix C.

During final design, additional efforts will be taken to minimize permanent wetland impacts, such as minimizing culvert lengths and minimizing the use of riprap for stream bank protection and stormwater outfalls. Wetland mitigation design will be determined during final design. It is likely that use of a wetland bank will be the appropriate mitigation method.

Temporary and indirect impacts to wetlands will be mitigated through the use of construction BMPs, which will include the following:

- Erosion prevention, including temporary soil stabilization measures (surface roughening, terracing, mulching, and blankets) and structures such as berms or swales, with or without a diversion channel, to prevent and/or slow runoff across disturbed areas and/or divert runoff to sediment basins
- Sediment control measures, including straw bales, silt fences, sediment traps and/or sediment basins
- Water quality treatments measures to capture and treat runoff and to prevent runoff from entering the South Platte River, including water quality ponds (See Section 4.9 Water Resources)
- Use of designated areas for vehicle staging to minimize disturbance of vegetated areas
- Revegetation of disturbed areas as quickly as possible with native vegetation throughout phases of construction
- Installation of temporary fencing around areas of vegetation and wetlands not to be disturbed
- No dewatering will be allowed in wetland areas
- Keep cranes and other equipment for bridge demolition out of the river or streambank area to the greatest extent possible
- Construction of a crane pad if cranes or other equipment cannot be kept out of the river

Post-construction BMPs are identified in **Section 4.9** *Water Resources* and would adequately protect wetlands and waters of the U.S.