

Chapter 4. Cumulative Effects

Which Resources Could be Affected by the Action Alternative and Result in Cumulative Impacts?

- Land Use
- Wetlands
- Water Quality

Chapter 4. Cumulative Effects

4.1 Introduction

This chapter addresses cumulative effects for the Preferred Alternative, which is the US 34 Action Alternative, also called the Proposed Action.

Cumulative effects are defined as:

...the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or persons undertake such actions.

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Part 1508.7 Council on Environmental Quality [CEQ] Regulations).

For this study, the Colorado Department of Transportation (CDOT) followed guidance outlined by CEQ (1997) and the Federal Highway Administration (FHWA) in Executive Order 13274 and *Indirect and Cumulative Impacts Work Group, Draft Baseline Report*, March 15, 2005.

4.2 Why Are Cumulative Effects Considered?

While cumulative effects may be minor when viewed as individual direct and indirect effects, they can add to the effects of other actions and eventually lead to environmental change. It can be difficult to measure and assess cumulative effects because they can be separate from a proposed project in time and location. Cumulative effects can be positive or negative.

4.3 What is the Cumulative Effects Methodology?

Baseline. To identify cumulative effects, a baseline was established which included development activities from a specified period of time for past actions, added to present and reasonably foreseeable future actions. This baseline established the effects, which have occurred or would occur without the Proposed Action, representing the No Action Alternative conditions.

Timeframe. The timeframe used for this analysis extended approximately 25 years into the past and 25 years into the future, with the period of existing conditions covering the approximately three-year study timeframe (2005 to 2007). Past recorded information on growth and development, as well as changes to natural environment indicators such as wetlands and impervious surface, was available for this timeframe. The extension to the 2030 travel demand forecast year reflects the reasonably foreseeable future based on land use and transportation planning.

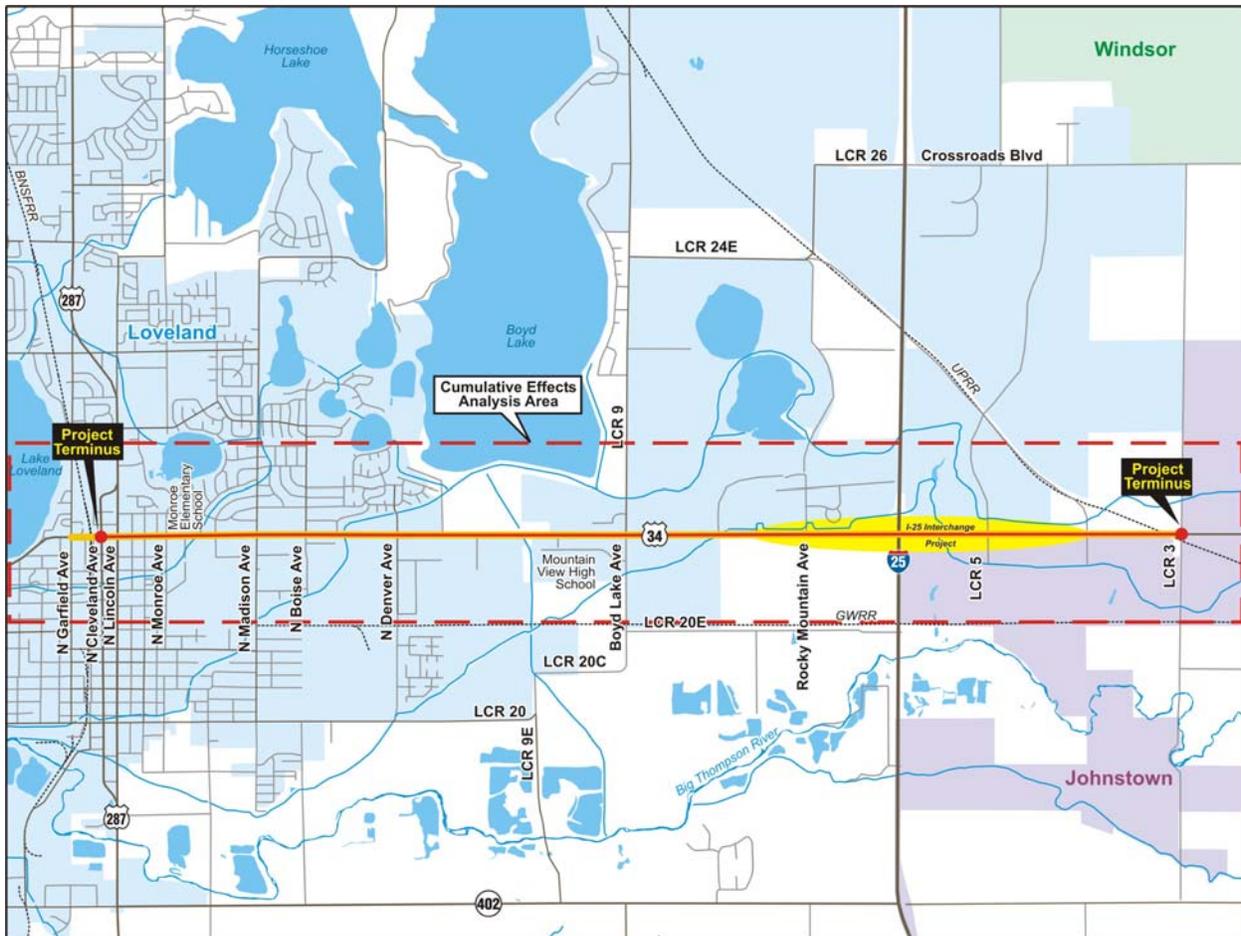
Affected Resources. For the Proposed Action, few direct or indirect effects were identified for human and community or natural resources. After elimination of resources for which there were no impacts or those for which impacts were identified as contained totally within the physical US 34 corridor, three resources remained. For this EA, the resources that have been carried forward for cumulative effects analysis are

land use changes, wetlands, and water quality. To determine the potential for cumulative effects on these resources, the impacts of the Proposed Action were added to the baseline.

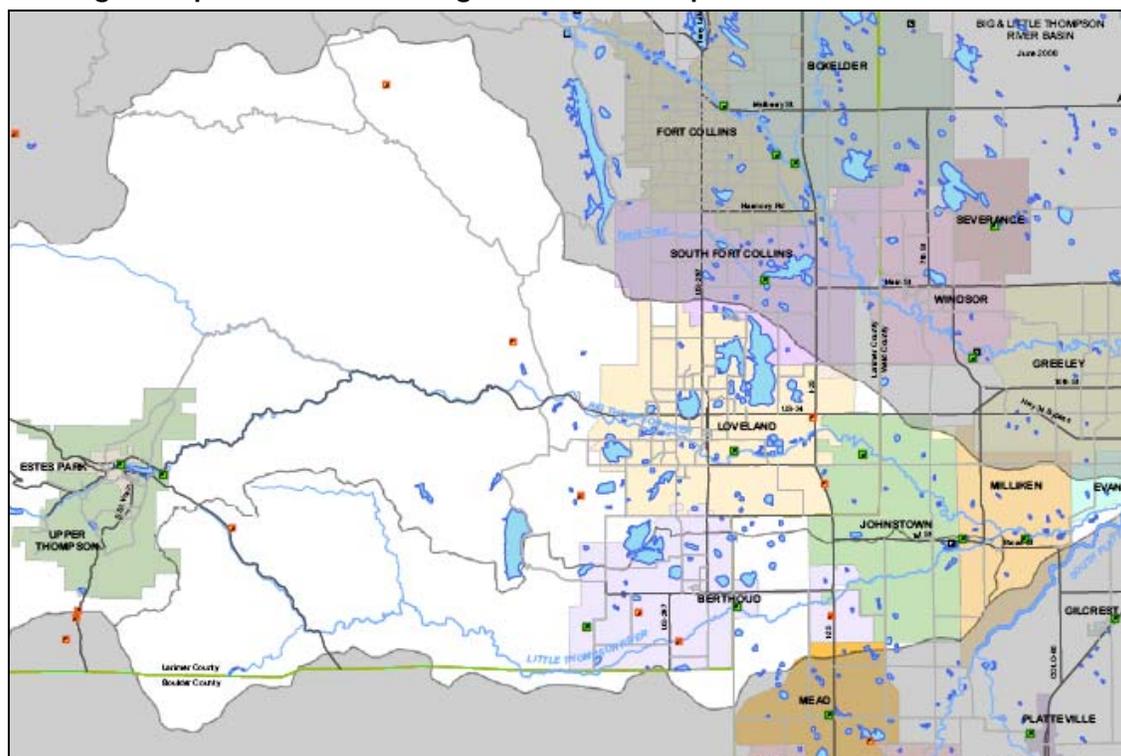
Geographic Boundaries. Due to the localized nature of the Proposed Action, the geographic boundaries were generally set at one-half mile on either side of the project corridor (see Exhibit 4-1). This area is referred to as the **Cumulative Effects Analysis Area**. A qualitative discussion is also included to accommodate water quality concerns within the Big Thompson Watershed (see Exhibit 4-2).

Data Sources. Resource data were collected from readily available sources for the Cumulative Effects Analysis Area. Data on past and existing conditions were obtained from the US Army Corps of Engineers, City of Loveland Current Planning and Transportation Engineering divisions and Town of Johnstown Planning Office.

Exhibit 4-1
Geographic Boundaries for Cumulative Effects Analysis Area



**Exhibit 4-2
Big Thompson Watershed: Big and Little Thompson River Basin Boundaries**



Source: North Front Range Water Quality Planning Association 2005. *Areawide Water Quality Management Plan (208 Plan) for Larimer and Weld Counties - 2005 Update*. <http://www.nfrwqpa.org/awqmp.shtml>

4.4 What Are Past Actions and Conditions?

4.4.1 Land Use Changes

US 34 has always been a major route for tourist traffic in Colorado. Distant past actions include gradual development of the area, beginning in proximity to historic downtown Loveland near US 287 and extending east to the project terminus at LCR 3. Known in Loveland as East Eisenhower Boulevard, the local route was called 14th Street in the 1930s. The US 34 designation came later, although this route was designated as Primary Road 51 running from Loveland to Granby through Rocky Mountain National Park as early as 1913. Tourists traveling along this route in the 1920s roughed it at auto camps that lined the road; in the 1930s these gave way to motor courts that provided simple cabins with bathrooms and kitchenettes. By 1947, seven auto camps/motor courts were located along 14th Street (now US 34) in Loveland. Between the 400 and 600 blocks of East Eisenhower Boulevard, Estate Services (Columbine Camp, 5LR9881) is the only remaining tourist camp from the late 1930s (Litvak 2000). US 34 widening to four lanes dates to the 1960s.

Farming and ranching activities in the Loveland area date to the mid-1800s. The first irrigation water was diverted from the Big Thompson River in 1861. Sugar beets and the opening of the Great Western Sugar Company factory east of town in 1901 dominated the Loveland area in the early 1900s. Agriculture and the tourist trade sustained Loveland through the mid-20th century.

The western portion of the project corridor passes through the historically developed area of Loveland. The development of the area adjacent to US 34 west of North Monroe Avenue dates to the early 1900s.

The area between North Monroe Avenue and North Boise Avenue was annexed into the city and developed before 1990. By 2000, most of the area north of US 34 to LCR 3E had been annexed into the city.

Development in the larger Big Thompson Watershed includes the following communities: Estes Park, Loveland, Berthoud, Johnstown, Milliken and Evans. Much of the area west of Loveland, including Rocky Mountain National Park, 32 miles to the west, is forested, undeveloped or includes low-density development.

4.4.2 Wetlands

Pre-settlement wetlands were probably found along streams and rivers and in landscape depressions. Riparian systems associated with the Big Thompson and Little Thompson rivers are outside the Cumulative Effects Analysis Area for this project. After reviewing the US Army Corps of Engineers permitted wetland impacts for the years of 1977 to 2005, it appears no permits were issued within the Cumulative Effects Analysis Area during that time.

Historic agricultural land use supported small low-functioning wetlands along irrigation ditches. Irrigation ditches within the Cumulative Effects Analysis Area include: Little Barnes Ditch, Boyd Lake Outlet Exchange, Greeley and Loveland Ditch, and Farmers Ditch.

4.4.3 Water Quality

Two levels of analysis area were identified for water quality. A qualitative discussion on the Big Thompson Watershed is followed by a discussion on water quality within the localized Cumulative Effects Analysis Area.

The Big Thompson Watershed extends from the Continental Divide to its confluence with the South Platte River. Major water features near but not adjacent to US 34 include the Big Thompson River, Lake Loveland, and Boyd Lake. Smaller lakes in the area include: Silver Lake, Lower Hoffman Lake and Equalizer Lake. Irrigation ditches that intersect US 34 include Little Barnes Ditch, the Boyd Lake Outlet Exchange, Greeley and Loveland Ditch, and Farmers Ditch.

Within the watershed, development at local communities has converted natural landscapes into impervious surfaces. Water now runs off of these impervious surfaces, carrying pollutants directly into ditches, rivers and lakes, instead of filtering through the soil into underground aquifers.

Within the Cumulative Effects Analysis Area for the Proposed Action, one-half mile on either side of US 34, past development has resulted in increased impervious surface areas adjacent to US 34. Stormwater runoff from the analysis area eventually finds its way to the Big Thompson River located south of US 34. The portion of US 34 between North Garfield and North Boise avenues is subject to intermittent flooding due to the inability of the existing stormwater system to handle storm events. Some developing areas east of North Boise Avenue are subject to sheet flow during storm events. This situation is due to past action and continues as a current condition.

4.5 What Are Existing Actions and Conditions?

Exhibit 4-3 provides a summary of resource impacts within the Cumulative Effects Analysis Area by highway segment and by time frame.

**Exhibit 4-3
Cumulative Effects Analysis Summary by Resource by Highway Segment**

Resource within ½ mile either side of US 34	Past Actions and Conditions (to 2005)	Existing Actions and Conditions (2005 –2007)	Reasonably Foreseeable Future Actions and Conditions (to 2030)
Land Use Changes			
N Garfield Ave – N Denver Ave	Development completed by 2000.	Small scale re-development such as the Colorado Commercial Brokers (NW of N Monroe Ave intersection).	Re-development only, including the McKee Medical Center.
N Denver Ave – Boyd Lake Ave	25% development completed by 2000.	50% development completed by 2007. Examples include Skyline Center for Health (2.6 acres) and Lowe's (4.7 acres).	Potential for additional development up to 200 acres; however, none is identified at this time. Land use plans assume full development of this area.
Boyd Lake Ave – I-25	North side development annexed and in progress by 2000. South side undeveloped by 2000.	Completion of projects approved in prior years as a part of the Centerra Development (400 acres). No additional development on south side.	Potential for additional development up to 400 acres; however, none is identified at this time. Land Use Plans assume full development of this area.
I-25 – LCR 3	North side annexed by 2000, neither side developed by 2000.	Developments in progress include: 670,000-sf Centerra Promenade Shops and associated Centerra development of 400 acres on north side and 2534 on south side (400+ acres).	East of LCR 3 at US 34: 65.5-acre Miracle on 34 (NE of LCR 3 and US 34) and 165-acre Iron Horse development (SE of LCR 3 and US 34).
Wetlands			
N Garfield Ave – N Denver Ave	No US Army Corps of Engineers wetland permits applied for between 1977 and 2005.	Several US Army Corps of Engineers wetland permits issued between 2005 and 2007. Total of 0.09 acres of impacts with a total of 0.03 acres of required mitigation.	The low to medium functional value wetlands associated with existing irrigation ditches may be compromised further by developers who may choose to pipe ditches or concrete line ditches that are currently earth-lined, to minimize impacts to proposed development projects.
N Denver Ave – Boyd Lake Ave			
Boyd Lake Ave – I-25			
I-25 – LCR 3			
Water Quality			
N Garfield Ave – N Denver Ave	No direct impacts on surface water. Stormwater flooding problems exist.	No measurable added impervious surface, area at full buildout.	No measurable added impervious surface, area at full buildout.
N Denver Ave – Boyd Lake Ave	No direct impacts on surface water. Some stormwater flooding problems exist.	Additional impervious surface related to development of 7.3 acres noted above.	Additional impervious surface related to remaining 200 acres of undeveloped land may occur. Entire area is included for development in city-approved land use plan.
Boyd Lake Ave – I-25	Minimal impervious surface on south side.	Additional impervious surface related to development of 400 acres noted above.	Additional impervious surface related to remaining 400 acres of undeveloped land may occur. Entire area is included for development in city approved land use plan.
I-25 – LCR 3	Minimal impervious surface on either side	Additional impervious surface related to development of 800 acres noted above.	Additional development of 230 acres immediately east of LCR 3 is proposed. This will further decrease impervious surface.

4.5.1 Land Use Changes

During the current project analysis years (2005 – 2007), the task of identifying the land use activities along US 34 has been dynamic, with ongoing new proposals, plans and construction. Exhibit 4-3 confirms that, based on approved plans, there is little undeveloped space remaining in the Cumulative Impact Analysis Area. In recent years the most rapid development has occurred along the I-25 corridor. Previous agriculture land use has been replaced with large-scale retail outlets and mixed-use residential, especially just west of the I-25 corridor east to LCR 3.

For additional development, land use and planning information, see Chapter 3, Section 3.1.4 and Exhibit 3-2.

Approved land uses for both the City of Loveland and Town of Johnstown are shown earlier in this EA in Exhibit 3-2. Within the Cumulative Impact Analysis Area, no plans for undeveloped or open space areas remain. Development types include mixed-use residential and activity center mixed-use (employment and retail/commercial). The Loveland Growth Management Area extends on both sides of US 34 from US 287 to I-25 and on the north side to Larimer County Road 3. The Johnstown Growth Management Area extends from east of I-25 past the end of the Proposed Action at LCR 3 to WCR 19.

Due to the rapidly developing nature of the corridor and associated changes in land use, CDOT, the local municipalities, and adjacent landowners are frequently coordinating minor access and safety improvements along US 34, including cross-street improvements and local utility and storm drainage projects. Recent projects include but are not limited to the Loveland storm sewer project in the vicinity of US 34 between North Madison and North Boise avenues (2005) and the Centerra implementation of a triple-left-turn access at Centerra Parkway or LCR 5 (2005).

4.5.2 Wetlands

Approximately 0.28 acres (13,994 square feet) of wetlands are present adjacent to the US 34 corridor based on field surveys conducted in June 2006. Most of these wetlands occur along the irrigation ditches that intersect US 34. The wetland functional values were rated low to medium for these wetlands.

For additional wetland information, see Chapter 3, Section 3.6.3 and Exhibit 3-19.

The US Army Corps of Engineers issued several permits from 2005 to 2007 for the Cumulative Impact Analysis Area. These impacts amounted to a total of 0.09 acres of impacts with a total of 0.03 acres of required mitigation.

4.5.3 Water Quality

The Big Thompson watershed has experienced significant population growth in recent years. Changes in land use, increased growth, and the conversion of agricultural lands to developed lands have collectively affected water resources and water quality over time.

For additional water quality information, see Chapter 3, Section 3.6.4.

Development within the Cumulative Impact Analysis Area includes conversion of over 1,200 acres of land from rural to urban uses, as was noted in Exhibit 4-3. A portion of this will be included in building footprints and parking lots, contributing to increased impervious surface areas.

4.6 What Are Foreseeable Future Actions and Conditions?

This section includes future actions and conditions associated with transportation planning as well as land use changes, wetlands and water quality.

4.6.1 Foreseeable Future Transportation Planning

Foreseeable future actions in the US 34 study area include rapidly changing land uses, with remnants of rural residential or farm uses converting to activity center uses consistent with local land use plans. The existing and proposed land uses along US 34 include regional activity centers with corridor commercial development and employment. These patterns are supported by both Loveland and Johnstown land use plans. Foreseeable future actions also include transportation plans discussed in the sections that follow.

4.6.1.1 How is the CDOT *US 34 Corridor Optimization Plan* relevant to the US 34 EA?

CDOT's *US 34 Corridor Optimization Plan Final Report*, March 2003 (COP), analyzed a 25-mile segment of US 34 extending from I-25 east through the town of Kersey.

The only portion of the COP relevant to the US 34 EA is the segment between I-25 and LCR 3. The COP calls for the interim construction of signalized intersections with dual-left-turn lanes and a right-turn lane along all four approaches, together with the implementation of advanced signal timing for the following locations: LCR 5, LCR 3E, and LCR 3. In addition, it recommends ultimately building grade-separated interchanges at these locations (LCR 5, LCR 3E, and LCR 3) per the US 34 Access Control Plan, dependent upon funding.

4.6.1.2 What does the US 34 Access Control Plan include?

A separate and overlapping effort to the COP included the development of *US 34 Access Control Plan Final Report*, May 2003 (ACP). The ACP includes detailed discussion of the following intersections: LCR 5 (Centerra Parkway/Thompson Parkway), LCR 3E (Larimer Parkway), the UPRR Crossing, and LCR 3. Although interim recommendations are to maintain or construct signalized intersections for the crossing

highways, the ultimate access control plan is for three grade-separated highway interchanges and a grade-separated railroad crossing. Due to the close proximity of each of these intersections and the railroad crossing to those next to them, planning and construction of all of these is expected to be coordinated with the reconstruction of the I-25/US 34 interchange. Exhibit 4-4 illustrates the locations of these intersections.

Exhibit 4-4
US 34 Access Control Plan Interim Plan Intersection and Ultimate Plan Grade Separation Locations



4.6.1.3 What are CDOT's plans for I-25?

The interim I-25 and US 34 interchange improvement project is in progress at this time. This action involves I-25 interchange ramp revisions only.

FHWA and the Federal Transit Administration (FTA), in cooperation with CDOT, have initiated preparation of the North I-25 Environmental Impact Statement (EIS) to identify and evaluate multimodal transportation improvements along approximately 70 miles of the I-25 corridor from the Fort Collins-Wellington area to Denver. The EIS will address the I-25 and US 34 interchange.

4.6.1.4 What are CDOT's plans for SH 402 and Crossroads Boulevard?

SH 402 is located approximately 2 miles south of US 34. Studies for the proposed widening of SH 402 between US 287 and I-25 are in progress. The proposed SH 402 project is to widen existing two-lane SH 402 to four lanes. Future year 2030 travel demand modeling for US 34 already included planned improvements to SH 402.

Improvements to widen Crossroads Boulevard to four lanes and connect it with "O" Street in Greeley provide a parallel facility approximately 2 miles north of US 34 and east of I-25.

4.6.1.5 Summary of Reasonably Foreseeable Future Transportation Projects

The following is a summary of reasonably foreseeable future transportation projects in addition to the Proposed Action within and near the Cumulative Effects Analysis Area:

- Minor access and safety improvements along US 34
- Cross-street improvements along US 34
- Local utilities and storm drainage projects
- Interim I-25 and US 34 Interchange Project
- Ultimate I-25 and US 34 Interchange Project
- COP and ACP supported grade separations at LCR 5, LCR 3E, UPRR and LCR 3
- Widening of SH 402 (outside but adjacent to Cumulative Effects Analysis Area)
- Widening of Crossroads Boulevard (outside but adjacent to Cumulative Effects Analysis Area)

4.6.2 Land Use

The following is a summary of reasonably foreseeable future land use changes based on known development projects within the Cumulative Effects Analysis Area:

- Additional improvements to the McKee Medical Center proposed for completion in 2007
- 65.5-acre Miracle on 34 located in the northeast quadrant of LCR 3 and US 34
- 165-acre Iron Horse development located in the southeast quadrant of LCR 3 and US 34 (including the 63,000-square-foot Federal Express distribution center proposed to open in June 2007)
- Continued development of land adjacent to and within one-half mile of US 34 consistent with local planning goals (approved land use plans)

4.6.3 Wetlands

Based on the past and present trends and lack of wetlands in the Cumulative Effects Analysis Area, few wetland impacts are anticipated. The low to medium functional value wetlands associated with existing irrigation ditches may be compromised further by developers who choose to pipe ditches underground to minimize impacts on proposed development projects.

4.6.4 Water Quality

The Big Thompson Watershed continues to experience population growth, which will continue to affect water resources and water quality over time.

Based on the land use changes proposed for the foreseeable future, an additional 230+ acres of development is expected to occur in the foreseeable future. The remaining undeveloped area in the Cumulative Effects Analysis Area is less than 600 acres.

4.7 What Are the Resource Impacts from the Baseline Condition?

4.7.1 Land Use

Land use within the study area has rapidly changed in the past few years from agriculture production to urban development. The highway widening project is clearly a response to increased travel demand at a regional level. As is evidenced daily in the corridor, the implementation of large-scale commercial and business development, supporting perhaps the largest development of its kind in the north Front Range, is progressing without regard for the proposed widening of US 34.

4.7.2 Wetlands

Impacts on wetlands and other waters of the US include increased erosion, sedimentation, and rapid runoff from paved and non-vegetated surfaces, leading to stream incision and loss of wetland hydrology, area invasion by weed and nonnative plant species, and increased concentrations of chemicals such as nitrogen, phosphorus, and heavy metal. However, there are few existing wetlands within the Cumulative Effect Analysis Area. The low to medium functional value wetlands associated with existing irrigation ditches may be compromised further by developers who choose to pipe ditches underground to minimize impacts to proposed development projects. The amount of wetland loss would be negligible.

4.7.3 Water Quality

The Big Thompson Watershed has experienced significant population growth in recent years. Changes in land use, increased growth, and the conversion of agricultural lands to developed lands have collectively impacted water resources over time. Development throughout the Cumulative Effect Analysis Area will increase the impervious surface area, change runoff characteristics, and potentially degrade water quality.

The effects of development and urbanization in the Big Thompson Watershed are the primary water quality concerns in Larimer County. Population growth has resulted in an increase in impervious surfaces, increased water use and increased stormwater runoff. Development activities and proposed transportation projects including but not limited to the Interim and Ultimate I-25 Interchange projects along US 34 would increase stormwater runoff peak flows due to increased impervious surface area and would increase certain types of water pollutant sources. However, these projects will include permanent best management

practices (BMPs) in the design as well as requirements under CDOT, Larimer County and City of Loveland MS4 permits.

4.8 What Are the Cumulative Effects From the Action Alternative?

4.8.1 Land Use

A total of 12.62 acres of commercial and 4.17 acres of residential and agricultural property will be changed to highway use with this project. Land use changes continue within the Cumulative Effect Analysis Area without regard to the proposed Action Alternative.

4.8.2 Wetlands

Permanent impacts from the Action Alternative would decrease the size of certain wetlands. The Action Alternative is projected to impact approximately 376 square feet of four different wetlands, out of a total of 13,994 square feet of wetlands. This assumes the construction of a retaining wall to protect wetlands 9a/9b and 10. Without the retaining wall, impacts increase to a total of 618 square feet.

Most direct impacts on wetland areas are offset by compensatory mitigation due to regulatory requirements in Section 404 of the Clean Water Act and CDOT requirements. Replacement wetlands would be developed adjacent to US 34 or in the study area. CDOT would replace lost wetlands on a 1:1 basis, resulting in no net loss of wetlands. There is an absence of historic wetlands within the Cumulative Effect Analysis Area.

4.8.3 Water Quality

Stormwater runoff from the US 34 Cumulative Effect Analysis Area and highway corridor eventually finds its way to the Big Thompson River. The portion of US 34 between North Garfield and North Boise avenues is subject to intermittent flooding due to the inability of the existing stormwater system to handle storm events. Some developing areas east of Boise Avenue are subject to sheet flow during storm events.

Potential Action Alternative impacts would include increased highway stormwater runoff because of an approximate 51.5-acre increase in impervious surface area; and increased potential for highway runoff pollutants due to a projected increase in traffic by year 2030 of 40 percent at the western end of the project to over 100 percent at the eastern end. Coordination with local municipalities and developers, together with implementation of BMPs, would handle expected increases in stormwater and pollutants for this corridor.

The pattern of conversion of rural open lands to residential, commercial, and retail land uses increases impervious surface areas and has the potential to impact water quality; however, local, county and state government regulations associated with land development projects protect water quality. CDOT will work with the City of Loveland, Town of Johnstown, and adjacent developers to identify and implement permanent BMPs to address the expansion of US 34 as developments progress between Boyd Lake Avenue east to LCR 3.

4.9 Mitigation

No measures beyond those previously listed in Chapter 3, Exhibit 3-20 would be necessary.