EXECUTIVE SUMMARY

The Jefferson Parkway Public Highway Authority (JPPHA) proposes roadway improvements in the northwest Denver metropolitan region to fulfill long-time local and regional needs. The JPPHA proposes to bring over $400 million of needed investment to the region's transportation system through a public-private partnership for this project. This System Level Study analyzes the need, impacts, and benefits of proposed improvements and requests approval for connections to state facilities, through Colorado Department of Transportation (CDOT) 1601 Policy and Procedure, so the project may be included in the fiscally constrained Regional Transportation Plan (RTP). This is the first of a multi-step effort. Upon approval of this document by the CDOT Chief Engineer and review by the Colorado Transportation Commission, the project will be submitted to the Denver Regional Council of Governments (DRCOG) for inclusion in the RTP and for air quality conformity analysis. Subsequent analyses will include appropriate detailed environmental studies and public involvement opportunities for state highway access at SH 128, SH 72 and SH 93 for the Ultimate Project.

PROJECT DESCRIPTION AND LOCATION

Jefferson County, the City and County of Broomfield, and the City of Arvada established the Jefferson Parkway Public Highway Authority (JPPHA) in May 2008.[1] The mission of the JPPHA is to fulfill transportation needs in the area by completing a portion of the last remaining unbuilt section of the Denver metropolitan beltway system. The Jefferson Parkway is proposed to be a toll facility from SH 128 near Interlocken Loop to SH 93 near 64th Avenue Parkway, located predominately in unincorporated Jefferson County. This project is nearly identical to the tollway portion of the Combined Alternative (Recommended Alternative) that was studied at length by the Colorado Department of Transportation (CDOT) and documented in the *Northwest Corridor Transportation and Environmental Planning Study (TEPS)*.

This system analysis includes a Northwest Parkway Regional Arterial Extension, proposed improvements that would connect the western terminus of the Northwest Parkway at 96th Street with the northern terminus of the proposed Jefferson Parkway at SH 128. These improvements are within the jurisdiction of the Northwest Parkway Public Highway Authority. This separate and foreseeably fundable project is

The Ultimate project includes two different roadway classifications: tollway and major regional arterial. From the Northwest Parkway to SH 128, the facility is classified as a major regional arterial. From SH 128 to just north of the 64th Avenue Parkway, the facility is classified as a tollway. This portion is the Jefferson Parkway.

[1] In 2003, Arvada, Broomfield and Jefferson County initiated a local effort to complete the beltway's remaining 20 miles but postponed that effort at CDOT's request. CDOT then initiated the Northwest Corridor Study and put forth extensive effort to gain consensus from local governments. However, due to lack of funds to construct the project and the inability to reach consensus, CDOT officially dropped the project on June 2, 2008.

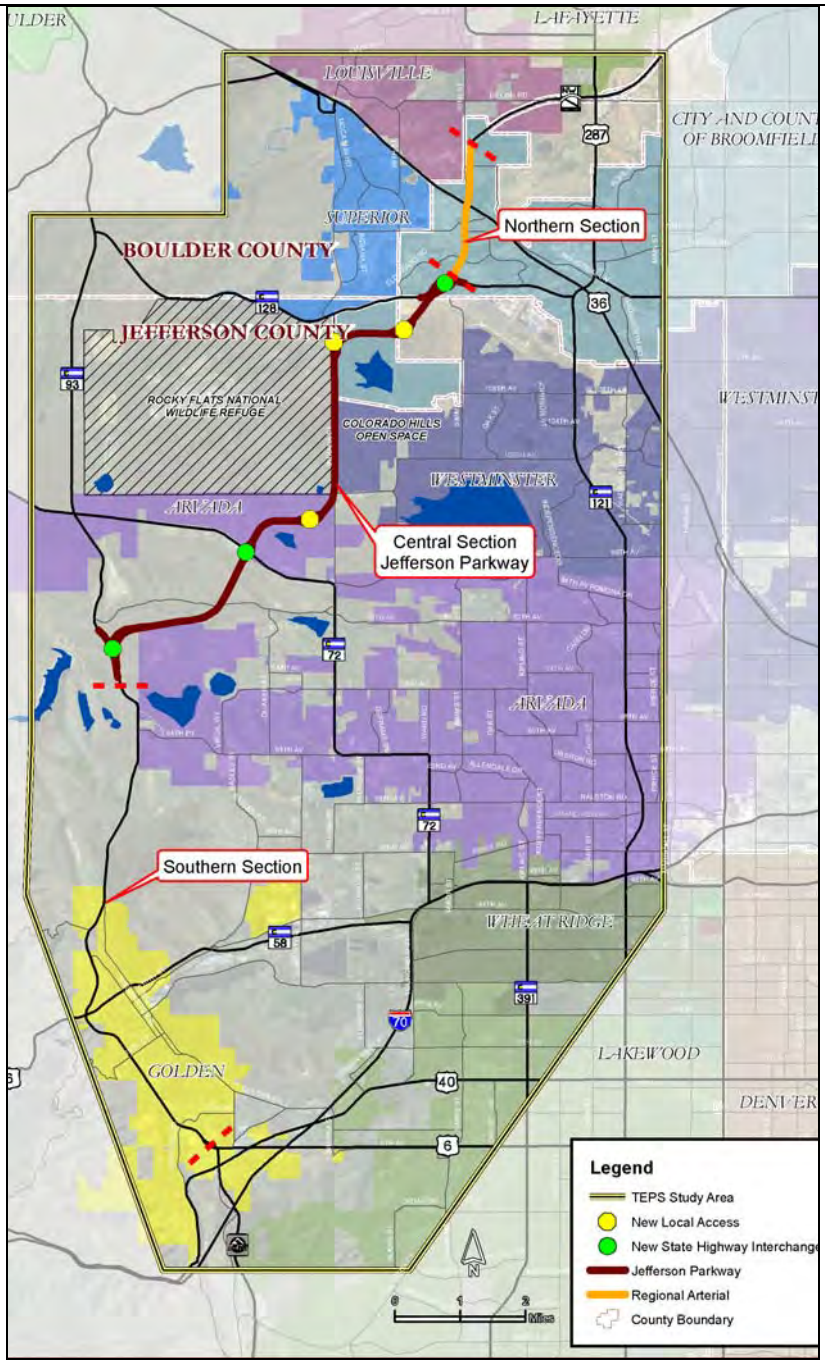
essentially the regional arterial, northern section of the Combined Alternative (Recommended Alternative) from the *TEPS*.

The proposed action is presented with two levels of improvements: a general opening day 2015 Phased Project and a 2035 Ultimate Project.

The CDOT Northwest Corridor Study Area or *TEPS* Study Area, divided the area into three sections: northern, central and southern, and represents a broad area that extends west of SH 93, north of US 36, east of SH 121 and south to I-70 and C-470. The Ultimate Project is physically located within the northern and central sections of the Northwest Corridor Study Area. The Northwest Parkway Regional Arterial Extension is located in the Northern Section. The Jefferson Parkway is located within the Central Section of the Northwest Corridor Study Area. Figure ES-1 illustrates the study area and sections.

The intent of the JPPHA is to implement the Jefferson Parkway project as a green project utilizing sustainable design and construction practices, including but not limited to the use of LED lighting, ITS programs, and non-stop tolling such as license plate tolls, as well as solar and wind power sources as appropriate.

FIGURE ES-1. NORTHWEST CORRIDOR STUDY AREA



Source: Stantec, 2009

PROJECT PURPOSE AND NEED

The **purpose** of the proposed Jefferson Parkway project is to provide a new transportation facility between SH 128 and SH 93 to be financed, designed, built, operated, and maintained as a toll road through a public-private partnership with associated separately committed and funded improvements to the connection between the Northwest Parkway and SH 128. Implementation of this project provides a significant contribution to the

completion of the "470" beltway around the Denver metropolitan region. The Northwest Corridor alignment has been included on regional plans since 1987 when the W-470 project became a part of the 2010 Regional Transportation Plan, even though this project has not yet appeared in a fiscally constrained transportation plan.

The proposed project will fulfill the following project **needs**:

- Transportation goals and objectives for enhanced connectivity, functionality and capacity within Jefferson County, City and County of Broomfield and the City of Arvada - Completion of the project is expected to re-focus traffic from a congested local system.
- Transportation goals and objectives for improved regional connectivity - Completion of the Ultimate Project will be a significant step toward completion of the northwest portion of the urban beltway. Completing the beltway will result in removal of through traffic off of local streets onto the beltway and will provide a travel corridor for traffic traveling to and from the west and northeast portions of the state attracting trips away from congested I-25, I-76, I-70, and more local routes such as SH 121 or SH 93.
- Local land use, economic development, or growth objectives - Jefferson County, City and County of Broomfield and the City of Arvada have planned around and for this project for over 20 years. For example, the City of Arvada has carried this circumferential highway in their transportation plans since as early as 1965. Both Broomfield and Arvada have asked for additional urban center recognition on the DRCOG Metro Vision 2035 Plan for development projects within this corridor.
- Improve transportation safety - Jefferson Parkway will provide a reliable non-congested alternative to travel in the corridor. Also portions of SH 93 from 64th Avenue Parkway north have accident rates more than double the state average (CDOT Traffic Engineering Branch, 2008). Jefferson Parkway may improve traffic safety along SH 93 through a reduction in future traffic on SH 93 north of the Parkway interchange.
- Multi-modal transportation objectives - Opportunity for future transit corridor development within the project right-of-way will be created.
- Funding and revenue requirements - The toll revenues will provide a funding source (approximately $400 million) in lieu of federal, state and local funding resources, which are not available for this corridor.

ALTERNATIVES ANALYSIS

The alignment and general design concepts associated with the Jefferson Parkway and connection to the north reflect the result of the robust CDOT agency and public involvement process that led to the Combined Alternative (Recommended Alternative). In keeping with goals of the CDOT Procedural Directive 1601.1, the system level study presented in this document relies on the previous extensive, in-depth, and generously funded Northwest Corridor studies and minimizes duplicative alternative and environmental analyses and public outreach processes.

Seventy-three build alternatives were identified in the CDOT *TEPS* process. The Combined Alternative (Recommended Alternative) resulting from that process is the basis for the Ultimate Project identified in this 1601 System Level Study. Figure ES-2 illustrates the CDOT recommended alternative. The Ultimate Project differs from the *TEPS* Recommended Alternative by not including:

1. Regional Arterial (Southern Section). The Ultimate Project does not include improvements on SH 93 and US 6 through Golden because this section is outside the JPPHA jurisdiction. Also, these improvements are assumed to be the responsibility of CDOT and/or area governments, and no funding or project commitment is available at this time.

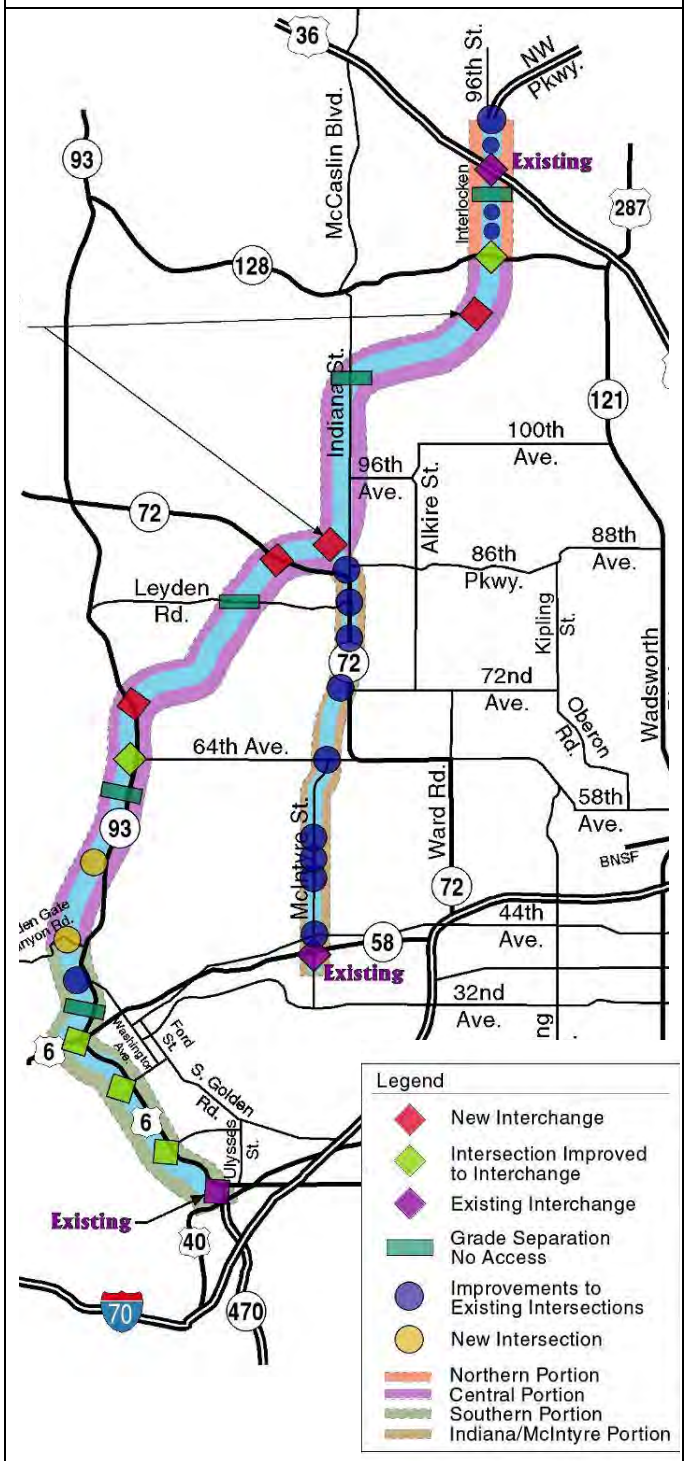
2. Principal Arterial (Indiana Street/McIntyre Street). The Ultimate Project does not include the 7.5 mile principal arterial alignment improvements on Indiana Street and McIntyre Street due to lack of local support. Elimination of this arterial segment also greatly reduces project impacts to adjacent properties.

The general opening day 2015 Phased Project and 2035 Ultimate Project are described as follows. Figures ES-3 and ES-4 illustrate each scenario.

2015 Phased Project

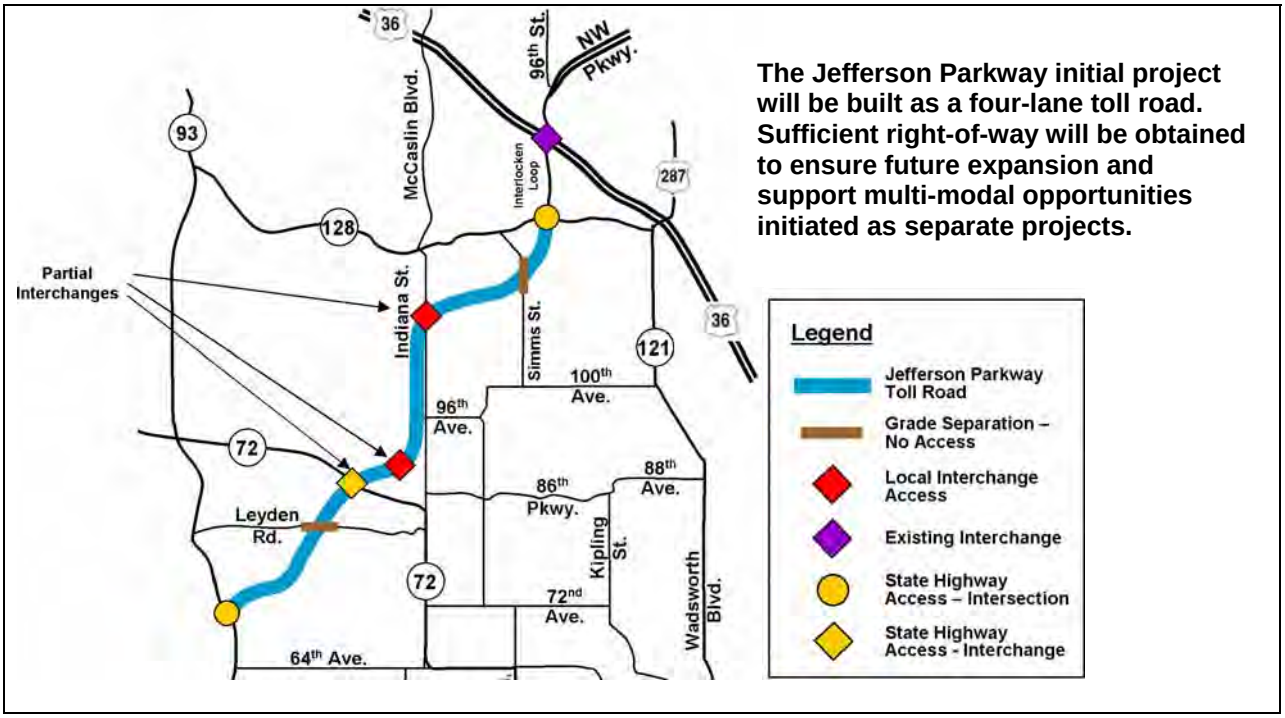
In order to make the Ultimate Project financially feasible, the project is planned to be constructed in phases. The Jefferson Parkway initial project will be built as a four-lane toll road and is planned to be open by 2015. Sufficient right-of-way will be obtained to ensure future expansion and support multi-modal

FIGURE ES-2. CDOT *TEPS* RECOMMENDED ALTERNATIVE



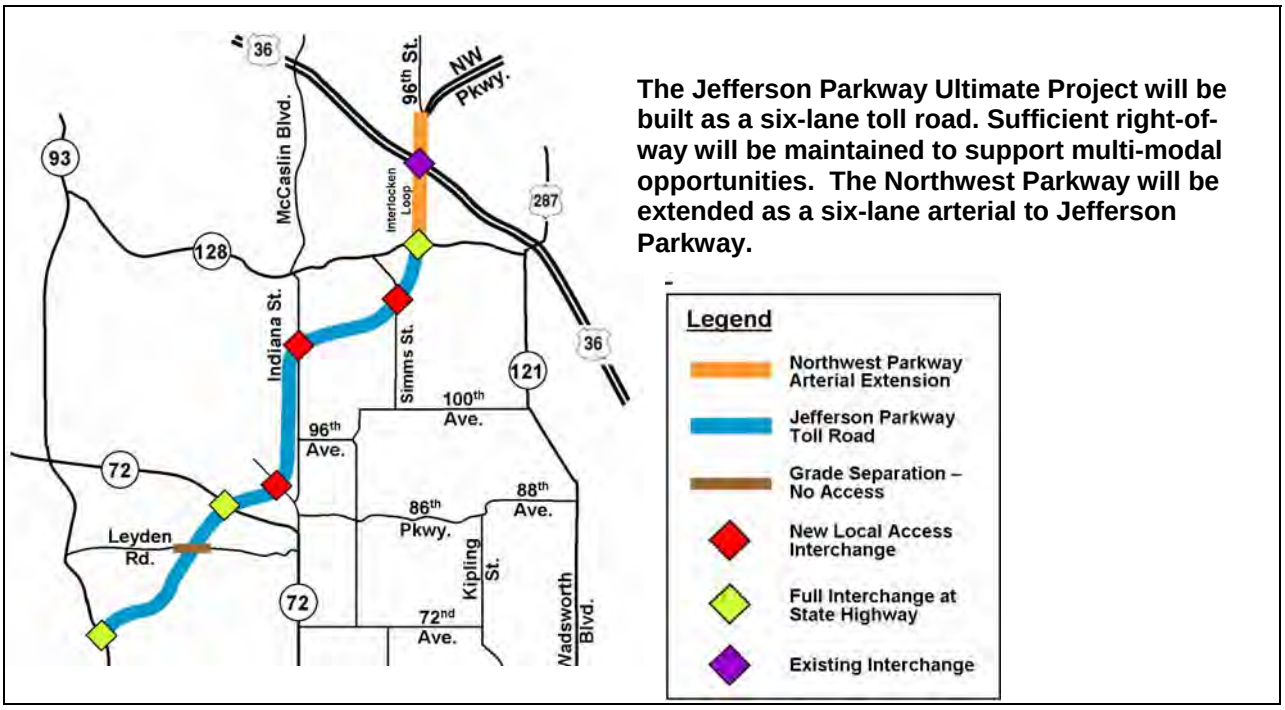
Source: Compiled by FHU, 2007. Originally *TEPS* Figure 2.4-24.

FIGURE ES-3. 2015 PHASED PROJECT



Source: Stantec.2009

FIGURE ES-4. 2035 ULTIMATE PROJECT



Source: Stantec.2009

opportunities initiated as separate projects. The 2015 Phased Project is for construction of an affordable functional facility with at-grade intersections at project termini (SH 128 and a new signal north of 64th Avenue Parkway at SH 93). One additional state highway access is proposed as a half interchange leading to and from the north at SH 72.

Local access is also proposed as part of the phased project for the north end of Indiana Street, and at Cimarron Parkway (Candelas development area). Local traffic on Indiana Street will continue to operate independent of the tollway but at a slower speed due to traffic calming. Also, Simms Street will be relocated to the west over the Jefferson Parkway to be constructed in association with the future improvements to the Rocky Mountain Metropolitan Airport by Jefferson County. Future exit and entrance ramps are planned as the need arises.

The Northwest Parkway arterial extension improvements were not included in the 2015 model run because the Northwest Parkway Public Highway Authority (NWPPHA) plans to fund these improvements in the 2017 time frame. The contract with Brisa[2] has incentives for the Northwest Parkway if the Jefferson Parkway connection is completed by 2017.

2035 Ultimate Project

The Jefferson Parkway Ultimate Project will be constructed as a six-lane toll road. Sufficient right-of-way will be maintained to support future multi-modal opportunities. Full interchanges will be implemented for all three state highway connections: SH 128, SH 72 and SH 93 as well as the local access at Cimarron Parkway.

The connection between SH 128 and the Northwest Parkway will be implemented by 2035. This connection will include a six-lane regional arterial with signals at select locations, will utilize the existing interchange at US 36 and will support a full interchange at SH 128. Funding of this Northern Section of the project is within the jurisdiction of the NWPPHA. The NWPPHA contract with Brisa requires upgrades in this area when the level of service is worse than D.

LAND USE, DEVELOPMENT NEEDS AND CHALLENGES

Land Use and Development Patterns along Project Corridor

The Northwest Corridor Study Area includes portions of Boulder County, the City and County of Broomfield, Jefferson County, and seven incorporated municipalities. Based on extensive public and agency involvement during the *TEPS* process all agencies except Golden generally support or are neutral about the project including: Arvada, Lafayette, Lakewood, Louisville, Superior, Westminster, and Wheat Ridge. The City of Golden has consistently opposed improvements that would extend south through that community. Within the 157 square miles of land that make up the Northwest Corridor Study Area, almost every type of land use and zoning designation is represented. Land uses vary from agriculture and open space to commercial and industrial

[2] Brisa Auto-Estradas de Portugal, S.A./Companhia de Concessoes Rodoviarais private partner with the NWPPHA for the Northwest Parkway toll road.

developments. Approximately 6,200 acres comprise the Rocky Flats National Wildlife Refuge with over 400 acres of wetlands. Because zoning varies among the 11 jurisdictions, there are over 100 distinct zoning categories within the study area. All jurisdictions include zoning designations for residential, mixed use, commercial, industrial, agricultural, public, open space, and planned development.

Northern Section. The Northern Section of proposed regional arterial roadway passes through Louisville and Broomfield from the Northwest Parkway terminus to approximately SH 128 and is bisected by US 36. North of US 36, land consists of open space, agricultural, public, and commercial uses with many of the parcels undeveloped. The recently acquired Conoco Phillips Campus (formerly StorageTek), in Louisville is expected to employ 7000 workers and is located north of US 36 along the Northwest Parkway in the vicinity of 96th Street. South of US 36 the most prominent land use is the employment/commercial area associated with the Interlocken Technology Park and Flatiron Crossing Mall, a retail center. City and County of Broomfield has identified this as an urban activity center. The current DRCOG model does not include this urban center.

Central Section. The Central Section begins at SH 128. South of SH 128 there is a large parcel of public land owned by Jefferson County that is used for the Rocky Mountain Metropolitan Airport (formerly the Jefferson County Airport) as well as the future Great Western Business Park (a business/industrial development) to the southeast of the airport.

The proposed Jefferson Parkway continues south parallel to Indiana Street. Land use on both sides of Indiana Street consists of parks/open space. Rocky Flats National Wildlife Refuge occupies the west side of Indiana Street, while parks/open space owned by Broomfield and Westminster, including Broomfield's Great Western Reservoir, and Westminster's Colorado Hills Open Space, occupy the east side of Indiana Street.

Next, the Jefferson Parkway is proposed to pass through Arvada and unincorporated Jefferson County. In this portion of the study area, the proposed alignment would turn southwest from Indiana Street at 96th Avenue passing through undeveloped land to SH 72 just west of Welton Reservoir. While much of this area is characterized by undeveloped land within unincorporated Jefferson County, the Arvada Comprehensive Plan identifies industrial/office, low density residential, and open space and parks as future land uses in the area south of SH 72 in addition to the development plans already approved north of SH 72. The Candelas development to the north of SH 72 has been identified by the City of Arvada as an urban activity center. The current DRCOG model does not include this urban center. The new alignment would continue to the southwest to SH 93.

Future Land Use Forecasts – Updates to 2035

DRCOG provides information on forecasted 2035 land uses for the entire metropolitan area and the COMPASS_2.0_Version 95, Cycle 2 2008 (2008-C2) was used to forecast land use as well as traffic for this System Level study. As a part of this analysis, the 2030 *TEPS* data was

updated to 2035 for land use and transportation modeling purposes. Growth and development is projected to continue within the study area through 2035. According to the area land use plans, there is very little undeveloped land remaining in the study area, other than areas described below (urban center and small area updates).

A 5.5 percent increase in population and a 6.1 percent increase in employment totals were forecasted between 2030 and 2035 for the *TEPS* area by DRCOG. Figure ES-1 illustrates the jurisdictions found within the study area as well as the Northwest Corridor Study Area. These growth rates are shown as slightly less than the metro area as a whole. The metro area totals show an average population increase of 8.8 percent and an employment increase of 7.1 percent from 2030 to 2035. City and County of Broomfield adjustments between 2030 and 2035 show a 12 percent population increase and a 10 percent employment increase.

Urban Center Updates – 2 Urban Centers to be Added to Northwest Corridor

Urban Centers are concentrated areas of high-density, pedestrian-oriented mixed-use development. They accommodate new population growth within the urban area, create opportunities for people to live near where they work, support transit use and more efficiently use existing infrastructure. The DRCOG Metro Vision 2035 currently recognizes 88 urban centers within the region. Downtown Golden is identified as an Urban Center in the 2008-C2 model. Subsequent to that model cycle, the City and County of Broomfield requested that the US 36 and Interlocken Loop Activity Center be recognized as an Urban Center. The City of Arvada has also requested recognition of the Candelas Activity near SH 72 and SH 93 as an Urban Center. These mixed use centers will stimulate and attract more trips. Absence of two key urban centers in the 2008 Cycle 2 model meant that fewer trips were focused in these areas adjacent to the Proposed Jefferson Parkway, while Downtown Golden would have attracted more trips under this designation. This data is not reflected in the JPPHA Model.

The addition of two urban centers to the DRCOG model will result in more trips in the Northwest Corridor Study Area regardless of construction of the Jefferson Parkway's Ultimate Project.

Small Area Land Use Updates – Additional Employment Forecast

Although the DRCOG has updated land use information for the 2035 Metro Vision planning purposes, the JPPHA Program Management Team met with planners from the City and County of Broomfield, the City of Arvada, and Jefferson County to fine tune land use data for over 150 traffic analysis zones. Household information remained reasonably consistent with the DRCOG model with an increase of 2.7% in 2015 and 2.0% in 2035. The more significant change was shown for 2035 employment with an increase of 13% over the DRCOG numbers. (No measurable change was identified for 2015 employment over the DRCOG numbers.)

Small Area land use development will also result in more trips in the Northwest Corridor Study Area regardless of construction of the Jefferson Parkway's Ultimate Project.

The 2035 No Build model run with the updated local government employment data, resulted in average daily traffic trip increases of as much as 17,000 on Interlocken Loop, 8,000 on SH 93 north of 64th Avenue Parkway, and 4,000 trips on SH 93 south of 64th Avenue Parkway. This information was not used as the basis for the general traffic and operations forecasting used in this study; however, this was used to generate future toll road revenue estimates.

Land Use and Development Conclusions

Development in the Northwest Corridor Study area is planned to occur regardless of the proposed project, and roadway improvements in the area will ultimately be required. Earlier transportation improvements, however, would allow for more employment opportunities, for local and regional residents. Land use plans support the need for the completion of the Jefferson Parkway with the associated Northwest Parkway arterial extension to meet travel demand for the two new urban centers, and area employment needs by 2035.

TRANSPORTATION SYSTEM LEVEL IMPACTS

Existing Traffic and Safety

Volume data (2004 *TEPS* data) show that the fully access-controlled freeway facilities of the National Highway System carry the largest volumes of traffic, including I-70, US 36, US 6 east of C-470, and C-470, with weekday traffic volumes ranging from 85,500 vehicles on US 6 west of C-470 to 176,900 vehicles on I-70 near Wadsworth Boulevard.

Among surface arterial streets, the highest daily traffic volumes are found on Wadsworth Boulevard (more than 52,000 vehicles per day), US 6 west of its transition between a freeway and regional arterial (more than 44,000 vehicles per day), and Ward Road north of I-70 (over 39,000 vehicles per day).

Level of service (LOS) is described by letter designations ranging from A to F, with LOS A representing essentially uninterrupted flow, and LOS F representing a breakdown of traffic flow with excessive congestion and delay. *TEPS* 2004 data for LOS were calculated for select intersections within the Northwest Corridor Study Area; however, none operated at LOS F at that time; LOS D and E were identified along SH 93.

Crash data was identified for SH 93 between west 58th and SH 128 for 2000 through 2006. Nine fatalities and 175 injury accidents were identified for that time period. Portions of this highway have accident rates more than twice the state average (CDOT Traffic Engineering Branch, 2008).

DRCOG 2015 AND 2035 Traffic and Operations

In order to assess how the highway network within the study will function with the addition of the Jefferson Parkway project, it was necessary to prepare a set of reasonable travel forecasts. The DRCOG 2008-C2 model was used to generate daily, weekday AM peak hour and PM peak hour

link volume forecasts for the following scenarios: 2015 No Build, 2015 with Phased Project, 2035 No Build, and 2035 Ultimate Project.

While the use of the DRCOG model without adjustment reveals the most conservative forecast information, it still portrays a network where the No Build for both 2015 and 2035 reveal congested roadways with failing levels of service throughout the Northwest Corridor Study Area.

With no corridor upgrades by 2035 or with only the Northwest Parkway upgrades and Jefferson Parkway, levels of service on adjacent roads are at the point of failure for both the No Build and Build options. System operation improvements will occur only after the entire corridor is upgraded. Note that the Ultimate Project itself will function well through 2035 forecasted years.

Table ES-1 illustrates 2015 operations needs throughout the corridor to maintain LOS D or E. Some of these needs pertain to opening day for the Parkway connections. Congestion related improvements will be examined during Parkway design and included as appropriate to ensure that the Parkway operations are acceptable in 2015. Detailed assessment of project transportation impacts will be made during forthcoming final design activities at which time, needed congestion related improvements for the opening day scenario(s) will be determined.

Table ES-1. 2015 SYSTEM LEVEL NEEDS AND MITIGATION CONCEPTS

Intersection	No Build	Phased Project	Mitigation	Jurisdiction	Build with Mitigation
	AM/PM LOS				AM/PM LOS
US 36/Interlocken (North Ramp)	E/E	F/F	WB 2nd right turn lane NB 2nd left turn lane NB 3rd thru lane	NWPPHA NWPPHA NWPPHA	D/C
US 36/Interlocken (South Ramp)	F/C	F/F	EB 2nd turn lane NB/SB 3rd thru lane	NWPPHA NWPPHA	E/E
SH 128/Interlocken	F/D	F/F	NB/SB 3rd thru lanes WB 2nd left turn lane	NWPPHA JPPHA	C/D
SH 93/SH 72	F/E	E/F	NB/SB 2nd thru lanes	Out of Jurisdiction	D/D
SH 93/64th Avenue	A/A	E/D	WB 2nd right turn lane (+ NB receiving lane)	JPPHA	B/D
SH 93/Washington	C/C	F/E	EB left turn lane WB right turn lane	Out of Jurisdiction	D/D
SH 72/64th Avenue	C/D	E/F	EB 2nd left turn lane	Out of Jurisdiction	D/C
SH 72/86th Avenue	E/E	F/F	NB/SB 2nd thru lanes EB/WB/NB 2nd left turn lanes	Out of Jurisdiction	D/D
64th Avenue/Ward	D/C	E/E	WB 2nd left turn lane	Out of Jurisdiction	D/D

Source: Stantec, 2009

Discussion that follows focuses on select locations of Interlocken Loop, SH 128, Indiana Street, SH 72, and portions of SH 93. These discussions are based on the 2015 and 2035 traffic and operations data included in this report.

Interlocken Loop. Using DRCOG data, Interlocken Loop will run 22,700 trips a day in 2015 without the project and 35,300 trips with the project. The intersection at SH 128 will operate at approximately Level of Service F, until portions of the interchange are built. The results for 2035 are also for a poor level of service in the area north of SH 128, regardless of the project. Long term solutions for this location include additional grade-separated movements from SH 128 north to 96th St which will need to be built by the Northwest Parkway.

SH 128. SH 128 will run 15,000 trips a day in 2015 west of Jefferson Parkway regardless of the project. By 2035, travel will increase to 19,000 with the No Build and remain at 15,000 with the construction of the Parkway. Parkway LOS at SH 128 is shown as F in 2015 improving to B by 2035 with completion of the regional arterial connection with Northwest Parkway.

Indiana Street. Indiana Street daily traffic volumes will decrease by 12,000 in 2015 with the construction of Jefferson Parkway and decrease by 20,000 along the portions parallel to the Jefferson Parkway. The intersection of Indiana and SH 128 (where the Parkway is not adjacent to Indiana) will operate at an improved level of service in 2015 with the implementation of the project, but by 2035 operations will be poor regardless of the Parkway. LOS at Indiana and SH 72 will decrease from E to F in 2015 with the implementation of the Ultimate Project. LOS F is forecasted for both scenarios for 2035.

SH 72. Traffic on SH 72 west of Jefferson Parkway to SH 93 will run at approximately 10,000 trips in 2015, increasing by 1,000 trips with the construction of the Parkway. By 2035, SH 72 will carry just under 15,000 trips with a reduction of 3,000 trips shown with construction of the Ultimate Project. Parkway LOS at SH 72 will be B in 2015 and C by 2035.

SH 93. SH 93 traffic (north of 64th Avenue Parkway) will generally flow at 23,000+ trips per day in 2015 without the project. The 2035 No Build continues with this trend at 24,000 to 30,000 trips per day.

- The SH 128 intersection with SH 93 will operate at LOS D in 2015 and worsening to LOS E by 2035 without the project. With implementation of the project, LOS B occurs in 2015, but by 2035 LOS F will occur at SH 128 and SH 93.
- SH 72 and SH 93 will operate at LOS E and F regardless of the project.
- Further to the south, LOS at SH 93 is not influenced by the Parkway to the extent that LOS F is anticipated at SH 58 and US 6 locations by 2015 with or without the project.
- The Jefferson Parkway connection with SH 93 would operate at LOS E-F in 2015 without congestion related improvements, but upon completion of the interchange will be a freeflow connection by 2035.

Jefferson Parkway Toll Road and Northwest Parkway Arterial Benefits

Completion of the Ultimate Project will be a significant step toward completion of the northwest portion of the urban beltway. Completing the beltway will result in removal of through traffic off of local streets onto the beltway and will provide a travel corridor for traffic traveling to and from the west and northeast portions of the state.

It is clear that the Jefferson Parkway and associated Northwest Parkway extension are needed to provide transportation links that will enable Jefferson County, City and County of Broomfield, and Arvada to complete planned development for the Interlocken and Candelas Urban Centers and other associated development within the Northwest Corridor Study Area. By 2015, under the most conservative of forecasts, Jefferson Parkway will carry 18-24,000 trips per day that won't be going on other streets. Conservatively, by 2035, Jefferson Parkway and extended Northwest Parkway will carry 23–39,000 trips per day. With completion of improvements to the Southern Section, the Jefferson Parkway could approach 70,000+ trips that would not use parallel roadways.

The Jefferson Economic Council (JEC) noted that the economic and fiscal Impacts on Jefferson County of development in the Northwest Corridor area with construction of the roadway is nearly double the impact without the roadway (JEC, 2007). Recognizing the current economic decline nationally and the continued dedication of developers and businesses within the Northwest Corridor Study Area, it remains likely that a beneficial level of economic and fiscal impacts will occur.

Completion of the Southern Section Would Provide Further Benefits

The traffic analysis indicates that there are both congestion and traffic safety needs for the project. Once improvements are made to SH 93, including the section through Golden, an improved alternate route for trips moving in the northwest portion of the region will be available. This route will facilitate travel and relieve congestion on both local and arterial streets in the study area.

The 2035 Ultimate Project model run based on a completed regional arterial link in the Southern Section and updated small area employment showed Jefferson Parkway traffic more than double what is shown without Southern Section improvements. Daily traffic numbers were forecasted in the 70,000+ range. Completion of this link resulted in reductions to parallel arterials such as SH 121 (Wadsworth, Simms and Indiana Streets) and increased demands for trips along SH 58.

Completion of the entire beltway connection, including the Southern Section, will dramatically increase Parkway use and reduce trips on parallel streets.

Significant reductions in traffic on I-25, I-76 and I-70 in the northwest quadrant of the Denver metropolitan area are expected to occur upon completion of the entire beltway.

PROJECT ENVIRONMENTAL IMPACTS AND MITIGATION

All environmental impacts identified are based on the worse case scenario and larger project footprint that was identified in the *TEPS*. Note that elimination of the Southern Section, regional and principal arterial improvements, significantly reduced environmental impacts. As the Jefferson Parkway Ultimate Project design is refined, the direct impacts are expected to decrease.

To the extent applicable environmental impacts, best management construction practices and mitigation described for the 2035 Ultimate Project also apply to the 2015 Phased Project. Future agency involvement with the JPPHA and Jefferson Parkway will occur specifically in relationship to the following activities:

- Environmental Analysis for the Phased and Ultimate Access to SH 128 - to accommodate CDOT access requirements and provide public involvement opportunities as appropriate
- Environmental Analysis for the Phased and Ultimate Access to SH 72 - to accommodate CDOT access requirements and provide public involvement opportunities as appropriate
- Environmental Analysis for the Phased and Ultimate Access to SH 93 - to accommodate CDOT access requirements and provide public involvement opportunities as appropriate
- Potential coordination of impact details and mitigation with the USFWS for impacts to the Rocky Flats Wildlife Refuge as identified in the CCP/EIS.
- Coordination project-wide with appropriate federal, state and local agencies regarding compliance with but not limited to the Clean Water Act, the Endangered Species Act, and the Migratory Bird Treaty Act.

Cumulative impacts assessed in the *TEPS* process did not identify large impacts in proportion to activities underway regardless of the proposed project. Many area jurisdictions anticipate full buildout within the next 20 to 30 years resulting in a number of development and infrastructure projects in the Northwest Corridor Study Area. These reasonably foreseeable future projects would result in associated cumulative impacts of a larger magnitude than the direct impacts associated with the implementation of the proposed Ultimate Project.

The following environmental consequences and mitigation table summarizes the worse case impacts associated with the Ultimate Project (combined Northern and Central Sections) for all project resources.

Table ES-2. ENVIRONMENTAL CONSEQUENCES AND MITIGATION SUMMARY

Resource Area	No Build	Ultimate Project[1]
Land Use	Continued population and employment growth are expected in the area without the proposed improvements. It is possible that the rate of development may occur at a slower rate if no improvements are made. The No Build is not consistent with Jefferson County, City and County of Broomfield or City of Arvada land use and transportation plans.	Land would be converted from an existing use to a transportation use along the Ultimate Project Route. Up to 80[2] of these acres may be acquired from Rocky Flats Wildlife Refuge. This acquisition is consistent with Refuge plans. These effected areas are compatible with future development and land use within the corridor.
Social Conditions	Potential direct and indirect impacts on communities caused by traffic congestion and impaired mobility (i.e., increased air pollution and noise, longer travel times, neighborhood traffic intrusion, deteriorating safety conditions, and lengthened emergency response time).	Improved traffic operations (level of service) will reduce congestion and improve mobility. Local traffic patterns will be refocused as a result of the implementation of the Ultimate Project.
Environmental Justice	Potential impacts from unmitigated noise and congestion to all populations.	No evidence of disproportionately high and adverse effects to low-income or minority populations along the Ultimate Project alignment.
Economic	The No Build is not consistent with Jefferson County, City and County of Broomfield or City of Arvada land use and transportation plans and as such will not support economic development already approved or planned.	Jobs created from construction include direct and indirect employment. One business relocation is anticipated. There is a potential loss of annual tax base related to right-of-way acquisition. The Ultimate Project will also provide improvement to commercial and regional activity center access.
Right of Way	No Right of Way is required if no improvements are made.	The Ultimate Project would require three residential relocations and one business relocations. Right-of-way acquisition and dedications for the Jefferson Parkway are in progress by the JPPHA and associated entities.
Air	Regardless of which alternative is selected, no alternative will result in exceeding air quality standards. Due to cleaner vehicles, future daily air pollutant levels for most pollutants are predicted to be lower than current levels, even with more vehicles on the roads. Total particulate matter levels may increase in the future because of more vehicles, but the preliminary analysis indicates the concentrations would meet the NAAQS.	
Noise	The number of predicted impacted receivers in the Northwest Corridor Study Area for all three corridor sections (may represent more than one residence) in 2030 is: 56 residential and no commercial. There are currently 39 residential properties and no commercial properties impacted under existing conditions.	Two apartment buildings and one single family residential site will be impacted for the Ultimate Project under the 2030 model. (2035 update was not done for this level of analysis.) The CDOT *TEPS* recommended noise mitigation for one apartment building location (Camden Interlocken).

Resource Area	No Build	Ultimate Project[1]
Water Quality	Continued growth in the area will result in increased impervious surface area with no roadway Best Management Practices (BMPs) except for minor improvements.	Approximately 125 additional acres of impervious surface area will contribute to potential water quality impacts. BMPs and coordination with local, county and state jurisdictions MS4 permit requirements for storm water management mitigation are necessary.
Wetlands and Waters of the US	No impacts will occur except for those associated with future growth within the study area.	Based on the larger *TEPS* study footprint, the Ultimate project will directly affect 2.45 acres of wetlands; 1.13 acres are jurisdictional. Avoidance and minimization during design and construction and compensatory mitigation are required by the USACE and CDOT. Appropriate 404 Permits will be acquired.
Floodplains	No impacts will occur except for impacts associated with future growth within the study area.	The Ultimate Project crosses the 100 year flood plain at Rock Creek, Woman Creek, Upper Big Dry Creek, Barbara Gulch, and Leyden Gulch and Ralston Creek. CLOMR /LOMR are required during design.
Vegetation, Wildlife, T&E	No impacts are associated with this except for those associated with future growth within the study area.	Loss of habitat will occur within the construction footprint. Noxious weed management will be necessary. Re-seed as appropriate, noxious weed management plan will be developed and implemented. Loss of xeric tallgrass prairie will occur. Coordination with Rocky Flats Wildlife Refuge will occur to minimize harm and identify mitigation as appropriate. Elk and deer movement corridors will be disrupted. Additional wildlife and birds could be disrupted. Mitigation may include improved crossing for small mammals, fencing and/or controlled crossings for deer and elk when desired. Fifteen acres of Preble's meadow jumping mouse habitat will be impacted. Coordination with USFWS will occur to identify mitigation commitments. Bald eagle winter range and prairie dog habitat will be impacted, including 12 acres of the Broomfield Great Western Reservoir prairie dog relocation area. Prairie dog mitigation will be implemented as appropriate. Minimization of bald eagle activity disruption will be coordinated with CDOW MBTA compliance and appropriate nest survey Loss of riparian habitat (SB 40) will be identified during design and associated mitigation coordinated with CDOW. Ute ladies'-tresses orchid and burrowing owl surveys and mitigation as needed
Visual	No additional visual impacts if no proposed improvements are made.	The combination of regional arterial and tollway has some degree of visual impact. Coordination with associated communities and keeping design consistent with the corridor is recommended to minimize visual impacts.

Resource Area	No Build	Ultimate Project[1]
Historic	The No Build would leave historic and archaeological resources in their present state for the short term.	Two historic properties will be affected by the Ultimate Project. The State Historic Preservation Office (SHPO) has concurred with findings of No Adverse Effect these properties. One archaeological site has been identified for which a finding of No Historic Properties Affected has been made. Recommendations are to update the SHPO as the project progresses to ensure continued status of no impacts.
Paleontological	All alternatives have the potential to adversely impact paleontological resources. Monitoring may be required during initial construction excavation activities.	
Hazardous Materials	No Impacts.	Right-of-way concerns: ▪ 4 parcels with recognized environmental conditions ▪ 23 parcels with sites of concern A site-specific risk assessment may be needed to document that the project would not pose an unacceptable risk to human health and the environment during and after construction at Rocky Flats Wildlife Refuge (RFETS). Additional studies, remediation, and site specific health and safety plans are recommended.
Utilities	No impacts are expected except for impacts associated with future growth within the study area.	Utility impacts related to the Ultimate Project will be identified during design and coordinated with appropriate utility companies.
Parks and Recreation	No impacts will occur except for those associated with future growth within the study area.	6.48 acres of direct impacts to parks, recreation areas, open space and trails may occur. The following resources will be impacted by the Ultimate Project: ▪ Omni Interlocken Golf Course ▪ StorageTek Drive Trail ▪ Interlocken Loop Bike Trails ▪ Little Dry Creek-SH 72 Trail ▪ Big Dry Creek-Upper Twin Lakes Trail ▪ Leyden Gulch Trail Coordination with owner agencies regarding minimization of resource disruptions and mitigation will occur. Landscaping as appropriate, preservation of trail crossings, and replacement of paved trails in a similar location are recommended mitigation actions.
Farmland	No impacts will occur, except for impacts associated with future growth within the study area.	Farmland Impacts will be identified to the extent applicable in future EAs, since areas included in urban land use plan areas are not subject to the Farmland Protection Act.
Geology	No impacts will occur, except for those associated with future growth within the study area.	Alignment locations through expansive soils and known faults will be clarified during design related geotechnical analyses and future EAs as applicable.

Resource Area	No Build	Ultimate Project[1]
Construction	No impacts will occur.	Impacts from construction activities include traffic disruption, air and noise. Water quality and wildlife impacts are detailed above. BMPs will be employed to minimize construction impacts as appropriate.
Energy	Least amount of impacts occur with the No Build.	*TEPS* shows 4.3% more energy consumed for the Combined Alternative (Recommended Alternative) than the No Build alternative. No additional analyses have been conducted at this time.
Section 4(f) (only relevant regarding federal transportation involvement)	No impacts will occur.	Historic Properties - potential *de minimis* use of both properties noted under Historic above. Parks and Trails - potential *de minimis* use of all public parks and trails noted under Parks and Recreation above. Wildlife and Waterfowl Refuge - potential *de minimis* use of Great Western Reservoir noted under Vegetation, Wildlife and T&E Impacts to resources will be minimized and coordination with appropriate agencies will occur as identified for specific resources above.
Rocky Flats National Wildlife Refuge	No impacts will occur.	Should right-of-way be acquired, coordination with the USFWS will occur as appropriate.

[1] Impacts of both the Northern and Central Sections are combined as the Ultimate Project for this table.
[2] The Rocky Flats Final CCP & EIS identifies up to 99 acres along the entire east side of the Refuge.
Source: Originally *TEPS* Table 4.26-1. Modified by Stantec for Ultimate Project

PUBLIC INVOLVEMENT PROCESS

CDOT conducted an extensive agency and public outreach process during the five years of the *TEPS* study process. The Ultimate Project described in this System Level Study is based on that outcome.

The *TEPS* Combined Alternative (Recommended Alternative) was the result of modifications to better fit community context. It was also intended to integrate water quality ponds and wildlife corridor crossings, minimize impacts to parks and recreation areas, eligible historic features and archaeological resources. The northern portion was modified to improve local access to the Interlocken/Flatiron Crossing area. This alternative was designed largely as a result of the intense agency and public involvement process.

Governmental entities and regional stakeholders were included throughout the robust outreach and public involvement process. The Combined Alternative (Recommended Alternative) was supported by most jurisdictions; however, full consensus was not achieved. The JPPHA will

facilitate public and agency involvement as appropriate to future project actions including but not limited to continuing application for access permits to SH 128, SH 72 and SH 93.

PHASING AND FUNDING

Due to potential funding constraints, the Jefferson Parkway has been preliminarily planned as improvements plus new construction that will provide basic links to the existing State Highway system and arterial roadways, but will be expanded and improved over time to accommodate larger traffic volumes and achieve better efficiency. The initial construction cost estimate is $204 million (year of expenditure dollar terms). This cost includes construction of the mainline facility, half interchanges leading to and from the north at SH 72 and Cimarron Parkway, access to Indiana Street, and intersection improvements to SH 128 and SH 93, totaling $128 million. Adding soft costs, utility work, right of way, and tolling equipment costs, brings the total to approximately $204 million.

The initial construction is expected to take place under a design-build contract beginning at the end of 2010 and lasting approximately three years. Enhancements to the facility totaling approximately $354 million will take place over time between 2020 and 2050.

Based on system needs analyses performed by comparing the 2035 DRCOG land use with the 2015 transportation network, the trigger for improvement would be a policy to maintain LOS D or better at each state highway intersection. If the area develops at the rate expected by DRCOG, some improvements may be required prior to 2035. Identification of dates is tentative and would need to be adjusted based on economic conditions, land use changes, and other transportation network improvements within the corridor that would generate traffic operational needs that support the implementation of the interchange improvements.

The intent of this project is to build and improve the road to the level required in order to maintain unrestricted traffic flow along the facility but not to spend funds on improvements that are not needed. This process of staging improvements over the life of the facility will be followed by the Parkway Authority. The Jefferson Parkway is committed to a policy to improve and expand our project over time in a manner that maintains traffic flow at a level of service D or better at the key study area intersections.

The Jefferson Parkway Public Highway Authority expects to enter into an agreement with a private entity which will develop, finance, design, build, operate and maintain the project.

The project is expected to be procured in a design-build / concession format. The Jefferson Parkway Public Highway Authority (JPPHA) expects to enter into an agreement with a private entity which will develop, finance, design, build, operate and maintain the project for a predetermined time period allowing a fair return prior to handing the asset back to the JPPHA. Ownership of the facility will remain with the JPPHA. The agreement will provide all requirements for initial construction as well as ongoing operations and maintenance. No public funding (state or federal) is currently anticipated to be dedicated for the construction, operation,

or maintenance of the facility during the development or concession periods. Concession returns and debt repayment will be provided through toll revenue collection on the Parkway.

The preliminary financial plan consists of about 70% of taxable debt and 30% equity contribution. Standard market based assumptions for debt issuance including interest rates, issuance costs, debt service coverage ratios, and reserve accounts are incorporated into the analysis. Given a stable political environment and stable financial markets, an investment grade traffic and revenue study, and a feasible construction approach, the project is considered financially feasible in that the project revenues are expected to cover all initial and ongoing project costs while generating a reasonable return to the private partner.

SUMMARY AND CONCLUSIONS

The JPPHA project offers a significant transportation infrastructure public-private funding opportunity of as much as $400 million to the Northwest Corridor Study area with very few community and environmental impacts. In addition to funding and minimal impacts, the following opportunities are associated with this project:

- Complete an additional portion of the beltway around the Denver metro area, leading to future attraction of trips from interstate facilities (I-25, I-70, I-76) upon completion of the entire beltway.
- Improve local and regional transportation system connectivity and functionality providing an improved connection between Northwest Parkway in Broomfield County and SH93 in Jefferson County.
- Expand capacity to support land use planning and meet population and employment growth forecasts for Jefferson County, City and County of Broomfield, and City of Arvada.
- Specifically to provide transportation links for the Interlocken and Candelas Urban Centers and other existing and new development.
- Provide opportunities to reduce travel time and improve reliability of travel in a corridor
- Support opportunities for transit mode choices by providing space within the project cross-section for future options.
- Utilize CDOT identified route location based on five years of public and agency input with minimal impacts to community and natural environment
- Improve safety at connections and by providing a reliable travel route in a corridor where heavy congestion is forecasted.

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JEFFERSON PARKWAY
SYSTEM LEVEL STUDY

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1.0 INTRODUCTION - PURPOSE AND NEED

The Jefferson Parkway Public Highway Authority (JPPHA) proposes roadway improvements in the northwest Denver metropolitan region to fulfill long-time local and regional needs. The JPPHA proposes to bring over $400 million of needed investment to the region's transportation system through a public-private partnership for this project. This System Level Study analyzes the need, impacts, and benefits of proposed improvements and requests approval for connections to state facilities, through Colorado Department of Transportation (CDOT) 1601 Policy and Procedure, so the project may be included in the fiscally constrained Regional Transportation Plan (RTP). This is the first of a multi-step effort. Upon approval of this document by the CDOT Chief Engineer and review by the Colorado Transportation Commission, the project will be submitted to the Denver Regional Council of Governments (DRCOG) for inclusion in the RTP and for air quality conformity analysis. Subsequent analyses will include appropriate detailed environmental studies and public involvement opportunities for state highway access at SH 128, SH 72 and SH 93 for the Ultimate Project.

1.1 PROJECT DESCRIPTION AND LOCATION

Jefferson County, the City and County of Broomfield, and the City of Arvada established the Jefferson Parkway Public Highway Authority (JPPHA) in May 2008.[1] The mission of the JPPHA is to fulfill transportation needs in the area by completing a portion of the last remaining unbuilt section of the Denver metropolitan beltway system. The Jefferson Parkway is proposed to be a toll facility from SH 128 near Interlocken Loop to SH 93 near 64th Avenue Parkway,located predominately in unincorporated Jefferson County. This project is nearly identical to the tollway portion or central section of the Combined Alternative (Recommended Alternative) that was studied at length by the Colorado Department of Transportation (CDOT) and documented in the *Northewest Corridor Transportation and Environmental Planning Study* (*TEPS*). In keeping with the mission of the JPPHA, this System Level Study is submitted to CDOT.

This system analysis also includes a Northwest Parkway Regional Arterial Extension, proposed improvements that would connect the western terminus of the Northwest Parkway at 96th Street with the northern terminus of the proposed Jefferson Parkway at SH 128. These improvements are within the jurisdiction of the Northwest Parkway Public Highway Authority. This separate and foreseeably fundable project is essentially the regional arterial, northern section of the Combined Alternative (Recommended Alternative) from the *TEPS*.

[1] In 2003, Arvada, Broomfield and Jefferson County initiated a local effort to complete the beltway's remaining 20 miles but postponed that effort at CDOT's request. CDOT then initiated the Northwest Corridor Study and put forth extensive effort to gain consensus from local governments. However, due to lack of funds to construct the project and the inability to reach consensus, CDOT officially dropped the project on June 2, 2008.

The proposed action is presented with two levels of improvements: a general opening day 2015 Phased Project and a 2035 Ultimate Project.

The CDOT Northwest Corridor Study Area or *TEPS* Study Area, divided into three sections: northern, central and southern, represents a broad area that extends west of SH 93, north of US 36, east of SHS 121 and south to I-70 and C-470. The Ultimate Project is physically located within the northern and central sections of the Northwest Corridor Study Area. The Northwest Parkway Regional Arterial Extension is location in the northern section. The Jefferson Parkway is located within the central section of the Northwest Corridor Study Area.

1.1.1 *TEPS* Status and Project Comparison

Due to declining funding and a lack of community consensus, CDOT decided not to complete the Northwest Corridor Environmental Impact Statement, a federally-required study necessary to identify impacts of transportation improvements funded by federal dollars. Instead, data collected was used to create a new *Northwest Corridor Transportation and Environmental Planning Study (TEPS)* that was made available to the public in July 2008 for use by other governmental agencies or the private sector should an entity decide to move forward with a future project that does not involve federal funding. The *TEPS* is hereby incorporated by reference as a part of the current *Jefferson Parkway System Level Study* as applicable. The *TEPS* contains in-depth analyses of northwest corridor alternatives, environmental impacts and mitigation options, and a record of public involvement activities that are relevant to the current project. The complete *TEPS* is available on-line at http://www.dot.state.co.us/NorthwestCorridorEIS/finalreport.cfm (also see attached CD).

The *Northwest Corridor Transportation and Environmental Planning Study* (*TEPS*) is hereby incorporated by reference as a part of the current *Jefferson Parkway System Level Study.*

The Ultimate Project contains similar elements of the Combined Alternative (Recommended Alternative) from the *TEPS* as noted above: the regional arterial, northern section and the tollway, central section.

The Ultimate Project does not include the 7.5 mile principal arterial alignment improvements on Indiana Street and McIntyre Street that were a part of the *TEPS* Recommended Alternative. These improvements have been eliminated due to lack of local support. Also elimination of this arterial segment greatly reduces project impacts to adjacent properties.

Because the jurisdiction of the JPPHA only extends south to 64th Avenue, the Ultimate Project also does not include the regional arterial, southern section of the project described in the *TEPS*. This section would run south of the 64th Avenue Parkway to C-470. These improvements are assumed to be the responsibility of CDOT and/or area governments, and no funding or project commitment is available at this time. Some discussion on this section of the corridor is included due to the potential for the proposed Ultimate Project to result in indirect and cumulative impacts to this section of the corridor.

The Ultimate Project is a merged and packaged alternative bringing together two different roadway classifications: tollway and major regional arterial. From the Northwest Parkway to SH 128, the facility is classified as a major regional arterial. (This would be an extension of the Northwest Parkway.) From SH 128 to just north of the 64th Avenue Parkway, the facility is classified as a tollway. (This is the proposed Jefferson Parkway project.) From this point south to C-470, no improvements are committed at this time. The total length to connect the existing Northwest Parkway with C-470 is 20.1 miles.

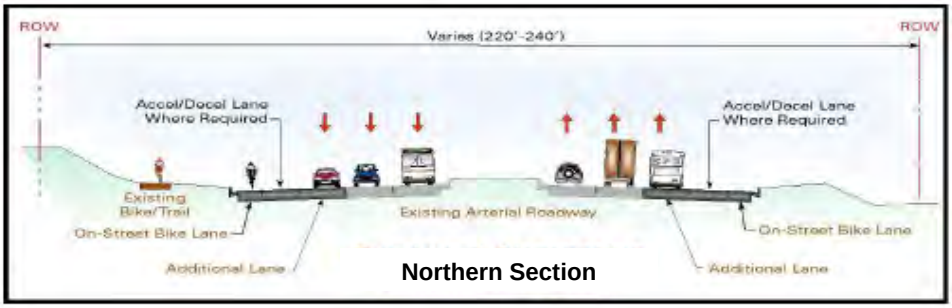
The Ultimate Project includes two different roadway classifications: tollway and major regional arterial. From the Northwest Parkway to SH 128, the facility is classified as a major regional arterial. From SH 128 to just north of the 64th Avenue Parkway, the facility is classified as a tollway.

The alignment between Northwest Parkway and SH 93 is a mixture of a high-speed tollway facility (55–70 mph posted speed) that is fully access controlled with the use of interchanges and a lower-speed major regional arterial facility (45–55 mph posted speed) that is access-controlled with the use of interchanges and intersections. Spacing between interchanges is generally one mile or greater (see Figure 1-1). The alignment between Northwest Parkway and SH 93 consists of four to six through lanes with an overall width ranging from 122 feet to 144 feet as measured from edge of outside shoulder to edge of outside shoulder. A regional bike trail was proposed along the alignment of the Combined Alternative. The Ultimate Project will take this commitment into consideration.

The intent of the JPPHA is to implement the Jefferson Parkway project as a green project utilizing sustainable design and construction practices, including but not limited to the use of LED lighting, ITS programs, and non-stop tolling such as license plate tolls, as well as solar and wind power sources as appropriate.

1.1.2 Northern Section

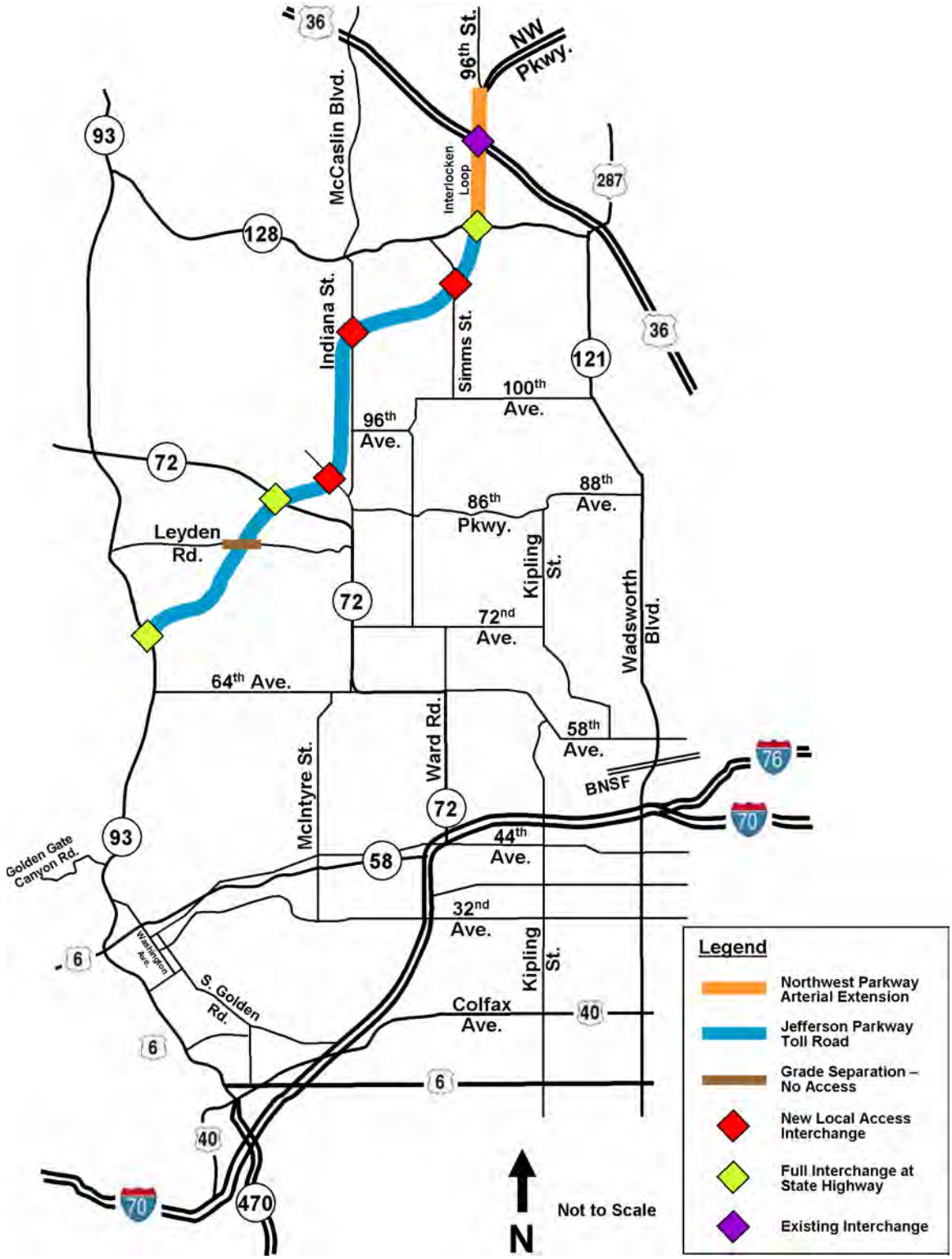
The northern section is proposed as a regional arterial by 2035 and extends between SH 128 and 96th Street on the north (Interlocken area). The Northwest Parkway Public Highway Authority has responsibility for maintenance and improvements to this section of roadway contingent on the construction of the Central Section described below.



Northern Section

The northern section of the alignment begins at the intersection of Northwest Parkway and 96th Street and follows the existing alignment of 96th Street and Interlocken Loop to SH 128. Improvements to both 96th Street and Interlocken Loop will include widening to six through lanes and adding on-street bike lanes in each direction. Existing access to and from US 36 and commercial and residential areas, including

Figure 1-1. ULTIMATE PROJECT



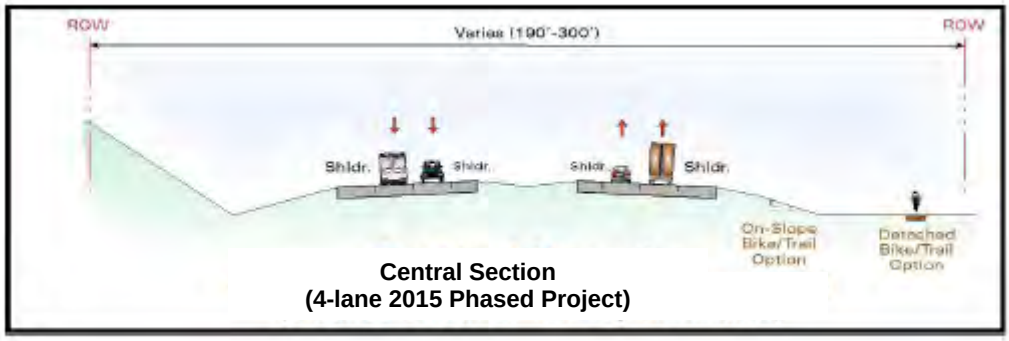
Source: Compiled by Stantec, 2009

the Flatiron Crossing Mall, along this section of the alignment will be maintained much as it is today. This is consistent with the US 36 Corridor DEIS (*US 36 Corridor Draft Environmental Impact Statement/Draft Section 4(f) Evaluation*, July 2007). At the SH 128 interchange, the major regional arterial will transition to a tollway. Southbound travelers will be required to pay tolls after they pass through this interchange.

The northern section consists of curb and gutter and three 11-foot through lanes in each direction, no inside shoulders, 10-foot outside shoulders, 6-foot on-street bike lanes, and a 28-foot raised landscaped median. This is consistent with the typical roadway configuration of the Northwest Parkway for at-grade facilities.

1.1.3 Central Section

The tollway section extending from the SH 128 interchange to north of the 64th Avenue Parkway interchange is within the jurisdiction of the Jefferson Parkway Public Highway Authority (JPPHA) and is called the Jefferson Parkway.



Central Section
(4-lane 2015 Phased Project)

The central section begins at the SH 128 interchange and follows an alignment south to the 64th Avenue Parkway interchange. This section is primarily located in undeveloped rural areas. From the SH 128 interchange, the alignment heads southwest through open ground where a local interchange with the future Eldorado Boulevard will be constructed. This interchange will serve planned future development in the area. Plans for this area include the future relocation of Simms Street proposed in association with the future improvements to the Rocky Mountain Metropolitan Airport. Future exit and entrance ramps are planned as the need arises.

Jefferson Parkway crosses to the west side of Indiana Street near Walnut Creek. Ramps will be designed for the northbound exit and southbound entrance movements from Jefferson Parkway to Indiana Street in this area. Local traffic on Indiana Street will continue to operate independent of the tollway but at a slower speed due to traffic calming. The Jefferson Parkway alignment then parallels Indiana Street, potentially to the west along the eastern boundary of the Rocky Flats Wildlife Refuge.

The alignment continues south along the west side of Indiana Street beyond 96th Avenue and turns southwest where a local access to Cimarron Parkway (Candelas access) will be constructed. The initial construction will include two ramps providing Jefferson Parkway access to and from the north at Cimarron Parkway with the ultimate construction including completion of

the two remaining ramps. The alignment continues southwest through undeveloped land to SH 72 where a new interchange will be constructed. Planned future development in this area will be served by this interchange.

The new alignment will bridge across Leyden Road and interchange with SH 93. This interchange will provide access to Boulder from SH 93 to the north. From this interchange to the south, SH 93 will remain uninterrupted by the tollway lanes. The Ultimate Project tollway alignment parallels SH 93 on the west to a point north of the 64th Avenue Parkway interchange that will serve as a connection to community facilities within the area such as the Jefferson County North Athletic Complex. Just north of this interchange, the tollway transitions to the existing facility and follows the alignment of SH 93.

The tollway alignment from SH 128 to the transition contains four lanes with 12-foot through lanes, 8 foot inside shoulders, 12-foot outside shoulders, and a 56-foot depressed grass median. Adequate median width is provided in order to ensure that future transportation improvements are not precluded. The existing SH 93 facility has a two lane section with 12-foot through lanes and generally substandard shoulders.

1.1.4 Southern Section - No Committed Improvements

This section utilizes the existing facility through 2035 and runs south of the 64th Avenue Parkway to C-470. At this time no improvements are assumed, and no funding commitments have been identified by CDOT and or other area governments.

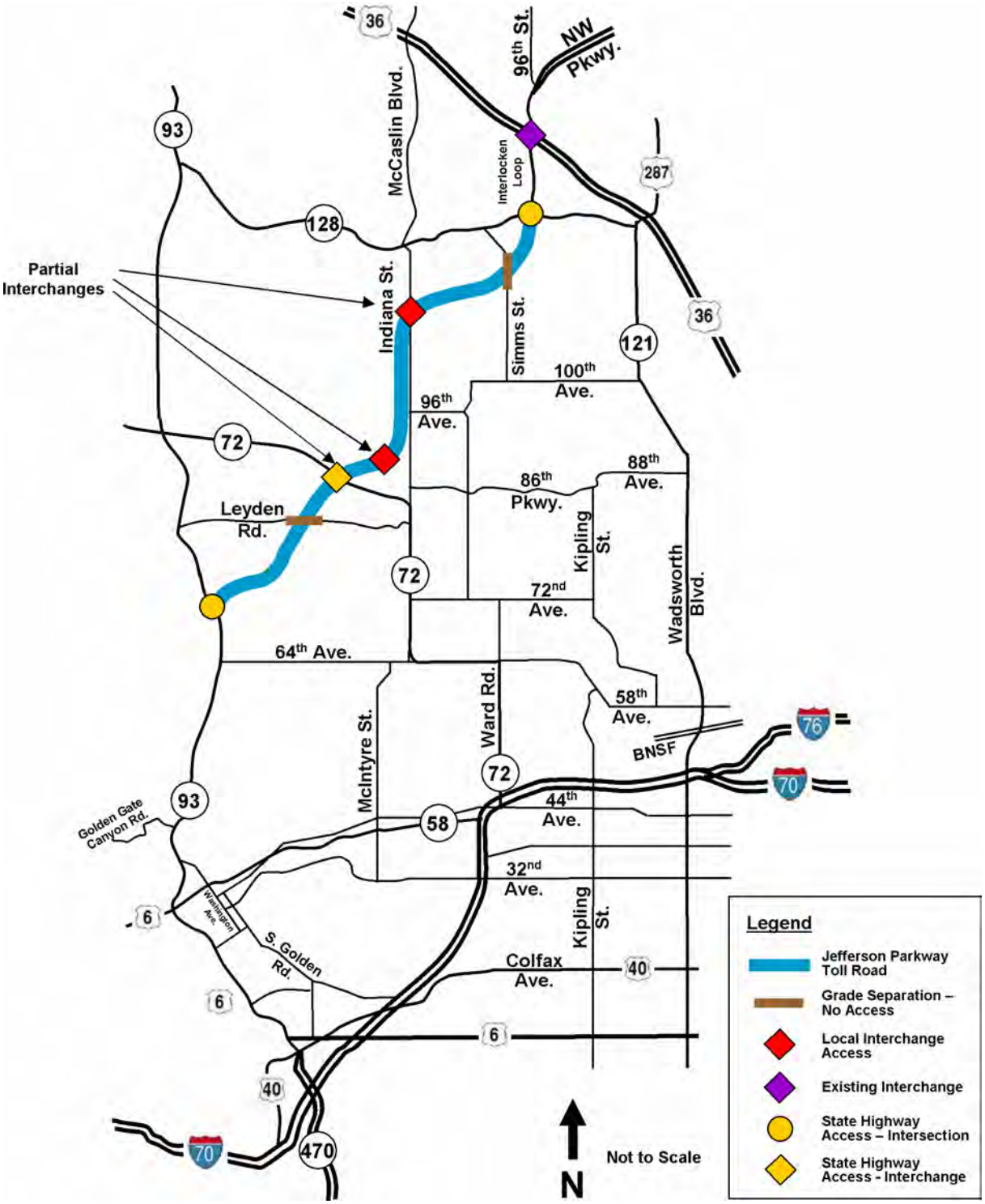
Continuing south, the alignment remains on existing SH 93. The US 6/SH 58 interchange provides a regional connection to westbound US 6 to the west and SH 58 to the east. Westbound US 6 continues to provide access through Clear Creek Canyon to Blackhawk and Central City and SH 58 provide access to downtown Golden and I-70. Regional traffic will connect to C-470 utilizing the existing ramps that connect to US 6.

1.1.5 2015 Phased Project

The initial phase of the Jefferson Parkway Tollway will provide an affordable functional facility with at-grade intersections at project termini (SH 128 and a new signal north of 64th Avenue Parkway at SH 93) and half interchanges leading to and from the north at SH 72, at the north end of Indiana Street, and at Cimarron Parkway.

In order to make the Ultimate Project financially feasible, the project is planned to be constructed in phases. The initial phase, planned to be open by 2015, will involve construction of an affordable functional facility with at-grade intersections at project termini (SH 128 and a new signal north of 64th Avenue Parkway at SH 93) and half interchanges leading to and from the north at SH 72, at the north end of Indiana Street, and at Cimarron Parkway (see Chapter 2.3 for more details). The phased project is illustrated on Figure 1-2.

Figure 1-2. 2015 PHASED PROJECT



Source: Compiled by Stantec, 2009

1.2 PROJECT HISTORY AND CONTEXT

The proposed Ultimate Project will fill a significant section of the remaining gap in the "470" circumferential beltway around the Denver metropolitan area. The other sections are identified as follows:

- **C-470**. The 26 mile C-470 Parkway was completed from I-70 near 6th Avenue on the northwest to I-25 near County Line Road to the southeast in 1990 by the Colorado Department of Transportation.
- **E-470.** The 47-mile E-470 was completed in 2002 from I-25 near 160th Avenue on the north, south and east joining C-470 at I-25 near County Line Road. E-470 was developed as a toll facility by the E-470 Public Highway Authority, formed under Colorado statutes by the governmental jurisdictions of Adams, Arapahoe, and Douglas Counties and the City of Aurora in 1985. DRCOG included all portions of E-470 in the 2010 Regional Transportation Plan, adopted in 1987.
- **W-470**. To provide connectivity for the remaining portion of this circumferential highway, the W-470 Public Highway Authority was created by the Counties of Adams and Jefferson, and the Cities of Arvada, Broomfield, Golden, Lafayette, Louisville, Superior and Westminster in 1987. The W-470 Authority pursued the development of a toll facility from I-25/E-470 near 160th Avenue to I-70/C-470. The proposed alignment generally followed the current Northwest Parkway alignment from I-25 to US 36 and 88th Avenue then followed Indiana Street, SH 72, SH 93, and US 6. DRCOG conducted the W-470 study with participation from most communities in the project study area. In 1987, DRCOG officially designated W-470 as part of the *2010 Regional Transportation Plan* with the notation that the alignment and interchanges were under study and subject to change. The W-470 Public Highway Authority pursued a special election for a vehicle registration fee to fund the development process. The ballot issue was defeated, and the authority discontinued the study.
- **SH 93.** During the period from 1987 to 1989, CDOT, the City of Golden, Jefferson County, and affected property owners collaborated on the planning, funding, and dedication of right-of-way for the construction of the SH 93 Bypass to the west of Golden. This facility was constructed in 1992 and extended SH 93 from Washington Avenue to the intersection of US 6 and SH 58.
- **C-470 extension.** In January 1995, the City of Golden proposed to extend C-470 to US 6 from I-70 which was consistent with the DRCOG *2015 Interim Regional Transportation Plan*. CDOT, Jefferson County, and the City of Golden entered into Intergovernmental Agreements in 1997 to fund and construct this extension. CDOT completed Phase I in 1999 and Phase II in 2005. This provides access to westbound I-70 from southbound C-470 and also provides access to northbound C-470 from eastbound I-70.
- **Northwest Parkway.** The Northwest Parkway Public Highway Authority was formed by Broomfield County, Weld County, and the City of Lafayette in June 1999 as a result of the Colorado Public Highway Authority Act. The Northwest Parkway tollway opened on November 24, 2003. It extends 10 miles from E-470 at I-25 to the north and west, circling southward to just north of US 36 at the current 96th Street/US 36 interchange.

In addition to the *TEPS*, studies on the remaining link (between the Northwest Parkway terminus at 96th Street and the C-470 extension) include:

- *Northwest Quadrant Feasibility Study* (January 2001) commissioned by Jefferson County and the Cities of Arvada, Golden, Lakewood, Westminster, and Wheat Ridge.
- Golden's Plan for the Highway 6 & 93 Corridor (commonly referred to as the *Muller Study*, August 2002) commissioned by the City of Golden.
- In November 2003, CDOT began a formal EIS process to study transportation improvements that would provide a connection between the Northwest Parkway and C-470.
- In June 2004, the City of Arvada conducted a separate analysis titled *Tollway Corridor Investigation Study* to assess the feasibility of a tolled roadway between SH 128 and SH 93 at 64th Avenue Parkway. This was a limited analysis that studied only a portion of the corridor and was not associated with the EIS.
- In November 2004, RTD's FasTracks initiative was passed to fund several transit corridors throughout the Denver metropolitan area. Transit corridors along US 36 and US 6 will connect the Denver central business district with the project study area. These planned transit corridors are part of the Northwest Corridor "No Action" scenario.

- **Jefferson Parkway.** In 2008, Jefferson County, the City and County of Broomfield, and the City of Arvada created the Jefferson Parkway Public Highway Authority (JPPHA). The mission of the JPPHA is to complete a portion of the last remaining unbuilt section of the Denver metropolitan beltway system as a toll facility from SH 128 near Interlocken Loop to SH 93 near 64th Avenue Parkway.

Mission: The Jefferson Parkway Public Highway Authority (JPPHA) will complete a portion of the last remaining unbuilt section of the Denver metropolitan beltway, the Jefferson Parkway, through a public-private partnership to finance, design, build, operate, and maintain the Parkway.

1.3 PROJECT PURPOSE AND NEED

1.3.1 Jefferson Parkway Project Purpose and Need

The **purpose** of the proposed Jefferson Parkway project is to provide a new transportation facility between SH 128 and SH 93 to be financed, designed, built, operated, and maintained as a toll road through a public-private partnership with associated separately committed and funded improvements to the connection between the Northwest Parkway and SH 128. Implementation of this project provides a significant contribution to the completion of the "470" beltway around the Denver metropolitan region. The Northwest Corridor alignment has been included on regional plans since 1987 when the W-470 project became a part of the 2010 Regional Transportation Plan, even thought this project has not yet appeared in a fiscally constrained transportation plan.

The proposed project will fulfill the following project **needs**:

- Transportation goals and objectives for enhanced connectivity, functionality and capacity within Jefferson County, City and County of Broomfield and the City of Arvada - Completion of the project is expected to re-focus traffic from the local street system.
- Transportation goals and objectives for improved regional connectivity - Completion of the Ultimate Project will be a significant step toward completion of the northwest portion of the urban beltway. Completing the beltway will result in removal of through traffic off of local streets onto the beltway and will provide a travel corridor for traffic traveling to and from the west and northeast portions of the state attracting trips away from congested I-25, I-76, I-70, and more local routes such as SH 121 or SH 93.
- Local land use, economic development, or growth objectives - Jefferson County, City and County of Broomfield and the City of Arvada have planned around and for this project for over 20 years. For example, the City of Arvada has carried this circumferential highway in their transportation plans since as early as 1965. Both Broomfield and Arvada have asked for additional urban center recognition on the DRCOG Metro Vision 2035 Plan for development projects within this corridor.
- Improve transportation safety - Jefferson Parkway will provide a reliable non-congested alternative to travel in the corridor. Also portions of SH 93 from 64th Avenue Parkway north have accident rates more than double the state average (CDOT Traffic Engineering Branch, 2008). Jefferson Parkway may improve traffic safety along SH 93 through a reduction in future traffic on SH 93 north of the Parkway interchange.
- Multi-modal transportation objectives - Opportunity for future transit corridor development within the project right-of-way will be created.
- Funding and revenue requirements - The toll revenues will provide a funding source (approximately $400 million) in lieu of federal, state and local funding resources, which are not available for this corridor.

1.3.2 Correlation with *TEPS* Purpose and Need

The proposed project purpose and needs are consistent with the purpose and needs as identified in the *TEPS*. The key difference is that the current project does not include a southern section (neither the regional arterial not the principle arterial segments).

The **purpose** of transportation improvements identified for the Northwest Corridor in the *TEPS* is to enhance the connectivity, functionality, and capacity of the inter-regional and regional system from the vicinity of US 36 and the Northwest Parkway to the vicinity of SH 58, I-70, or C-470. This enhanced system will better accommodate the movement of people, goods, and services.

Deficiencies in the current roadway system create the **need** for better system connectivity, capacity, reliability, and intermodal connections. The *TEPS* identified the following details on need:

- System Connectivity and Functionality - Enhance the corridor's inter-regional and regional system for a more direct, well connected, and functional roadway system.

- Travel Demand and Capacity - Expand and enhance the system capacity to respond to future demand increases and improve inter-regional and regional movements of people, goods, and services.
- Travel Reliability - Reduce the variability of travel times and improve driver expectancy.
- Modal Inter-Relationships - Expand highway systems to provide enhanced access to transit choices to improve mobility through intermodal connections.

1.4 SUBMITTAL REQUIREMENTS

An Inter-Governmental Agreement (IGA) has been developed between the applicant, JPPHA, and CDOT, and this System Level Study is required under CDOT Policy Directive 1601. An IGA has been signed between CDOT and JPPHA. This policy directive dictates that all requests for new interchanges and major improvement to existing interchanges be reviewed and evaluated in a fair and consistent manner and that sufficient information be available to make an informed decision.

The purpose of this System Level Study is to identify the short and long-term environmental, community, safety and operation impacts of the proposed project intersections with existing state highways. Type 2 Improvements associated with the proposed Jefferson Parkway tollway project, are for new interchanges/intersections that are not on the interstate system or freeway system and are modifications or reconfigurations to existing interchanges. Type 2 system interchange requests may combine the System Level Study with the NEPA document prepared in compliance with the CDOT *Environmental Stewardship Guide* and submitted for approval by the Chief Engineer. Due to the complexity of this project and at the request of the Chief Engineer, this system level study will be presented to the Highway Commission.[2]

The Policy Directive also recognizes that each request has unique circumstances and strives to reduce duplication in analyses. To this end, it is recognized that the proposed project is not a single interchange request. This project consists of three separate phased intersection (2015) to interchange (2035) connections to three state highways: SH 128, SH 72, and SH 93, the interconnecting roadway between as well as the future connection from SH 128 to the Northwest Parkway (not a state highway).

Because no federal or state funding will be used for this project, and because an extensive environmental study has already been completed in the form of the *TEPS,* a separate (or duplicative) environmental analysis was not conducted for this project for the system level analysis. However, updated impact and mitigation plans for all sensitive environmental resources will be prepared prior to construction, based on the findings from review of the *TEPS.* Any changes in project footprint or impact area will also be identified. Additional environmental compliance and documentation is found in Chapter 4.

[2] CDOT and JPPHA 1601 Process Pre-Application meeting on November 7, 2008.

The project funding plan will be a major component of the IGA, identifying responsibilities for the construction of the proposed project, ownership of the project and on-going maintenance. Chapter 5 contains a summary of the appropriate funding information.

1.5 STUDY PROCESS

All phases of the *TEPS* process are incorporated into this study by reference. The *TEPS* process included analysis of all relevant planning material and baseline data for an understanding of current conditions and future 2030 plans. The JPPHA Program Management Team has taken that information and developed updates to the long term 2030 traffic forecasts to 2035 for conditions in the area. General population growth of 5.1 percent and employment increases of 6.1 percent are reflected in the 2035 forecast. Identification of alternatives and associated impact and screening analysis has all been accomplished within the *TEPS* based on the 2030 traffic modeling where applicable. The *TEPS* alignment footprint for the Northern and Central Sections represents a worse case scenario for potential project impacts. The current project definition reflects the elimination of the Southern Section regional arterial and the Indiana/McIntyre principal arterial improvements. Additional project definition details are found in Chapter 2 and network assumptions and transportation forecasts comparing No Build and the Build project are detailed in Chapter 3.

1.6 PUBLIC INVOLVEMENT

1.6.1 Public Involvement Program Activity Summary

Northwest Corridor project coordination began through CDOT with the publication of a notice of intent, in the *Federal Register* on July 21, 2003, advising the public that an EIS would be prepared for a proposed transportation improvement project in Boulder, Broomfield, and Jefferson Counties. The stakeholder mailing list exceeded 11,000. A project website was maintained throughout, newsletters were issued, meetings were held with agencies and interested public. Focus group meetings were held on key sensitive environmental resources, scoping meetings were held, corridor consensus and technical support committees were formed and meetings were held between 2004 and 2008.

The CDOT and consultant study team hosted four rounds of public meetings in January, April and October 2004 and May/June 2005. Thirteen meetings were hosted at locations in Golden, Arvada, Westminster, Louisville, and Broomfield. Attendance ranged from approximately 40 to 1,000 per meeting. A citizens' working group was also formed during this time period and special outreach activities were also promoted. Public and agency coordination are summarized in detail in *Chapter 6: Agency and Public Involvement* and *Chapter 7: Public Coordination* of the *TEPS.* Table 1-1 provides a listing of all agency and public outreach conducted during the *TEPS* studies.

While the proposed project elements have been the subject of detailed public involvement through the *TEPS* process, additional outreach is not a required separate element for the system level study documentation process since the focus of this analysis is compatibility with

the existing and planned state and federal-aid transportation system. Nonetheless, the JPPHA holds regular meetings that are open to the public, and includes meeting minutes and other project information on their website at www.JPPHA.org. Subsequent Environmental Assessment processes associated with each State Highway access will include full public involvement.

The JPPHA and the JPPHA Program Management Team have full access to public process summaries and concerns for the currently proposed project. Additional public involvement and outreach will be facilitated in association with the environmental assessment activities outlined in Chapter 4 for the interchanges with the state highway system at SH 128, SH 72 and SH 93.

Table 1-1. AGENCY AND PUBLIC INVOLVEMENT SUMMARY

Type of Activity	Meeting Date	Approximate Attendance
Focus Groups: Noise Environ Justice Wildlife (TES) Water Quality Wetlands Hazardous Waste Cultural Resources Air Quality Geology and Soils Land Use	03-16-04,05-26-05 03-19-04 03-31-04,06-30-05 04-02-04,06-14-05,06-16-05 04-15-04,06-30-05 04-20-04 04-23-04,07-12-05 05-04-04,06-14-05 05-17-04 08-15-04,08-15-05	These were small group meetings with agency and government experts on these topics.
Scoping Meetings:	12-11-03 01-21-04	CDOT and FHWA Agency Meeting
Corridor Consensus Committee (CCC):	2004: 7 meeting (Feb-Nov) 2005: 6 meetings (Jan - Oct) 2006: 1 meeting (05-01-06) 2008: 1 meeting (06-09-08)	Local government, agencies, non-profit groups
Technical Support Committee (TSC):	2004: 7 meetings, 1 workshop 2005: 7 meetings, 2 workshops	Technical and professional staff appointed by CCC
Public Meetings: Scoping: Purpose & Need Early Alternatives Comparison Various Topics Various Topics	4 rounds, 13 meetings: 2004: 1st Qtr Jan 27,28 & 29 2nd Qtr Apr 14,15 & 21 4th Qtr Oct 19,25,26 & 28 2005: May 24,26 & Jun 2	 478 attendees 788 attendees 1,482 attendees 798 attendees
Citizen Working Group (CWG): Aesthetics Air Quality Traffic/Land Use/Cumulative Water Quality Wildlife/Open Space/Wetlands	2004: May 2005: July/August	78 attendees 124 attendees
Small Group Presentations:	2004: 4 2005: 14 2007: 1	Various groups

Source: Compiled from *TEPS* by Stantec, 2009

1.6.2 Public Comment Trends (from *TEPS* Chapter 7.1.12)

The type and degree of concerns evolved from the first public scoping meeting in January 2004 to the last public meeting in May 2005. Both the public and study team became better informed about alternatives, transportation concerns, and environmental concerns. As expected, the team received a greater quantity of comments during meetings. Criteria and screening of alternatives were important throughout the process as well as environmental concerns, especially air quality, noise, community cohesion, and wildlife. Transportation safety and analysis became more important in the middle of the process. During 2004, the project team hosted a series of three public meetings with approximately 2,750 people in attendance. Viewpoints were consistently expressed throughout the study regarding the criteria and screening process of alternatives.

One series of meetings was hosted during 2005. The public voiced opinions regarding the screening process of the alternatives. They express their views of the remaining alternatives that will be further analyzed in the study. Environmental concerns, particularly air quality, noise, and community cohesion were high in the first two quarters, but dropped dramatically during the second half of the year. The quantity of comments plunged as the study team began to draft the document. Most public involvement comments were inquiries of Citizen Working Groups or the status of the study. As the study team continued to draft the document, very few comments were received in 2006, 2007, and 2008.

1.6.3 Transitions from CDOT *TEPS* Combined Alternative (Recommended Alternative) to Jefferson Parkway

CDOT's Combined Alternative (Recommended Alternative) represents the balance of future transportation needs to the 2030 horizon with community and environmental impacts better than any of the other alternatives considered. Governmental entities and regional stakeholders were included throughout the robust outreach and public involvement process just described. The Combined Alternative (Recommended Alternative) was supported by most jurisdictions; however, full consensus was not achieved.

The Combined Alternative (Recommended Alternative) was the result of modifications to better fit community context. It was also intended to integrate water quality ponds and wildlife corridor crossings, minimize impacts to parks and recreation areas, eligible historic features and archaeological resources. The northern portion was modified to improve local access to the Interlocken/Flatiron Crossing area. This alternative was designed largely as a result of the intense agency and public involvement process.

The Jefferson Parkway System Level Study focuses on two sections of the CDOT Combined Alternative (Recommended Alternative), the northern section (where funding commitments are identified to connect the planned Jefferson Parkway from SH 128 to the north to the existing Northwest Parkway, toll road) and the central section (the Jefferson Parkway itself that will connect SH 128 with SH 93). The southern section of the CDOT Combined Alternative (Recommended Alternative) is outside the jurisdiction of the JPPHA and does not have committed funding from any source or a consensus on design from the City of Golden.

The alignment and general design concepts associated with the Jefferson Parkway and connection to the north reflect the result of the robust CDOT agency and public involvement process that led to the Combined Alternative (Recommended Alternative). In keeping with goals of the CDOT Procedural Directive 1601.1, the system level study presented in this document relies on the previous extensive, in-depth, and generously funded Northwest Corridor studies and minimizes duplicative alternative and environmental analyses and public outreach processes.

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2.0 ALTERNATIVES

The JPPHA Ultimate Project was developed subsequent to the CDOT *TEPS* study. Of benefit to the current JPPHA study is the alternatives process that has already been completed through the *TEPS* process. There is no need to duplicate that analysis. Alternatives were created and evaluated through an extensive process during the *TEPS* analysis and are described in depth in Chapter 2 of the *TEPS* document. The *TEPS* process extended five years including agency and public involvement with several levels of screening.

2.1 OBJECTIVES

The following steps were included in the *TEPS* study:

- Development of Purpose and Need and Project Goals and Objectives
- Development of Evaluation Criteria
- Development, Evaluation, and Screening of Range of Alternatives
- Identification of Alternatives
- Refinement of Alternatives
- Identification of a Recommended Alternative

TEPS project goals and objectives are to meet the purpose and need to:

> Enhance system connectivity, respond to travel demand, provide travel reliability and enhance modal inter-relationships. Alternatives analysis also responded to the desire for practicality and feasibility while minimizing impacts to human and/or natural environment.

JPPHA project goals and objectives complement the *TEPS* study as described in Chapter 1 of the current analysis. The JPPHA project includes local as well as regional transportation and land use objectives. *TEPS* alternatives that overlap the JPPHA project include: Tollway, Regional Arterial, and Combined Alternative (Recommended Alternative).

2.2 ALTERNATIVES ANALYSIS

2.2.1 *TEPS* Alternatives Summary

The *TEPS* analysis process is summarized here to illustrate the magnitude of analyses that have been conducted. A wide range of possible alternatives was pre-screened for fatal flaws, eliminating alternatives that would have bisected important natural resource areas (wildlife refuge, major lakes or reservoirs), high population areas (east of Wadsworth Boulevard) or rugged terrain (west into the foothills, or North and South Table Mountains).

Five transportation types were generally matched with six general alignment concepts, resulting in 73 build alternatives. The five transportation types identified were: freeway, tollway, major regional arterials, principal arterials, and transit systems. Sixty-seven alternatives were eliminated based on three primary factors:

- Engineering or construction feasibility and costs
- Ability to meet the project purpose and need
- Environmental impacts

The remaining six alternatives were re-examined and two additional combination alternatives were formed into alternatives. Of these eight, four (three aligned along Indiana Street/McIntyre Street and one combination alternative) resulted in greater environmental impacts without providing additional purpose and need benefits than the other four. These were eliminated.

Four build alternatives were carried forward for detailed environmental analyses. Some refinements were made to maintain a balance of environmental and community impacts. The final alternatives included:

No Action (or No Build) Alternative – included recently completed and committed projects only.

Freeway Alternative – a 20.3 - mile high-speed facility (55-65 mph posted speed) to connect the Northwest Parkway in Broomfield with C-470 in Golden, included 11 new or improved interchanges and four to six through lanes.

Tollway Alternative – a 20.3 - mile high-speed facility (55-65 mph posted speed) to connect the Northwest Parkway in Broomfield with C-470 in Golden, included seven new or improved interchanges and four tolled lanes throughout.

Regional Arterial Alternative – a 22.4 – mile facility (45-55 mph posted speed) to connect the Northwest Parkway in Broomfield with C-470 in Golden, included six new or improved interchanges and numerous new or improved intersections with four to six through lanes throughout.

Combined Alternative – The Combined Alternative was a merged and packaged alternative bringing together three different roadway classifications: tollway, major regional arterial, and principal arterial. From the Northwest Parkway to SH 128, the facility was classified as a major regional arterial. From SH 128 to the 64th Avenue Parkway, the facility was classified as a tollway. From this point south to C-470, the facility is again classified as a major regional arterial. The total length of this alignment is 20.1 miles. This alignment was packaged with a 7.5-mile principal arterial alignment on Indiana Street and McIntyre Street.

The alignment between Northwest Parkway and C-470 is a mixture of a high-speed tollway facility (55–65 mph posted speed) that is fully access controlled with the use of interchanges and a lower-speed major regional arterial facility (45–55 mph posted speed) that is access controlled with the use of interchanges and intersections. Spacing between interchanges is generally one mile or greater. The Indiana Street/McIntyre Street alignment is a principal arterial

that is a lower-speed facility (40–50 mph posted speed) and is access controlled with the use of intersections and driveways. Figure 2-1 illustrates the CDOT *TEPS* Combined Alternative (Recommended Alternative).

The alignment and general design concepts associated with the Jefferson Parkway and connection to the north reflect the result of the robust CDOT agency and public involvement process that led to the Combined Alternative (Recommended Alternative). In keeping with goals of the CDOT Procedural Directive 1601.1, the system level study presented in this document relies on the previous extensive, in-depth, and generously funded Northwest Corridor studies and minimizes duplicative alternative and environmental analyses and public outreach processes.

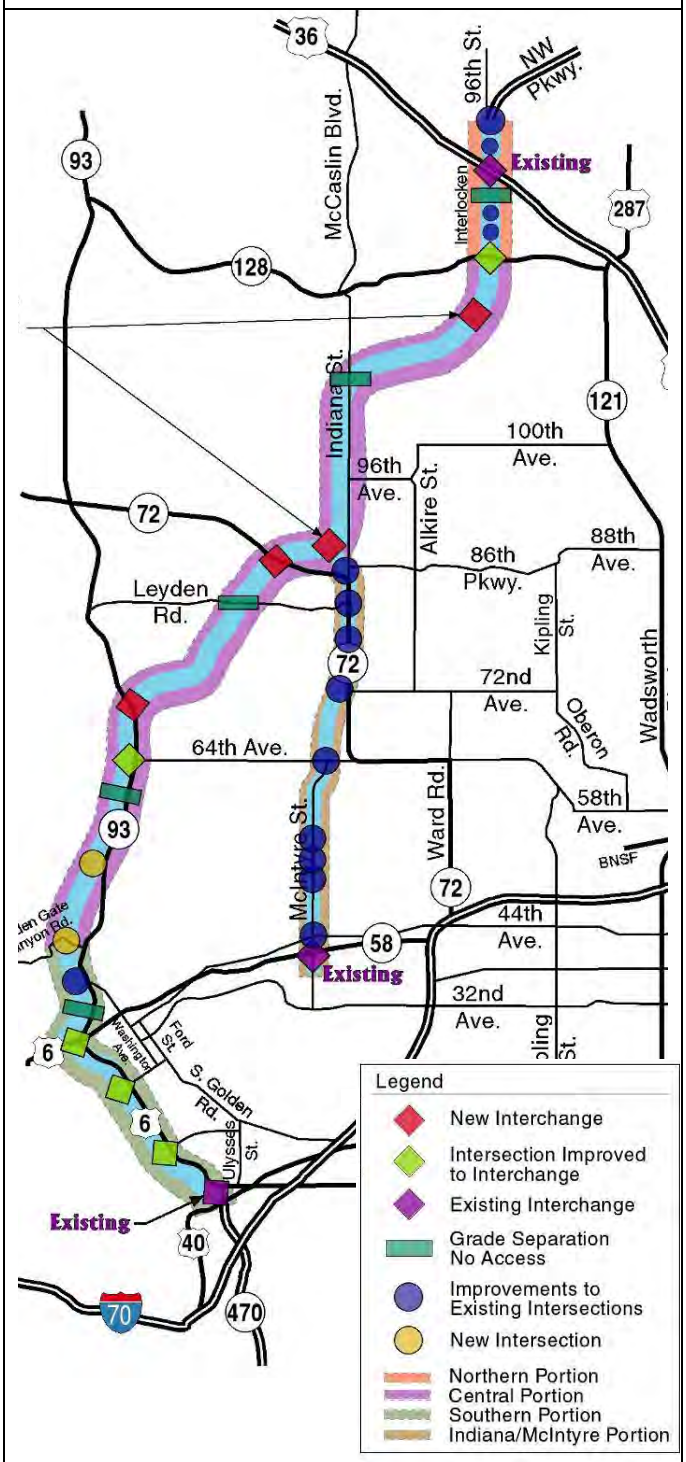
2.2.2 JPPHA Ultimate Project

The *TEPS* recommended alternative was the Combined Alternative described above. Generally, the regional arterial (northern section only) and tollway portion (central section) of this alternative have been carried forward in the current System Level Study as the Ultimate Project.

TEPS alternatives analysis summarized above led to the Recommended Alternative on which the Ultimate Project is based. The Ultimate Project differs from the Recommended Alternative by not including:

1. Regional Arterial (Southern Section). The Ultimate Project does not include improvements on SH 93 and US 6 through Golden because this section is outside the JPPHA jurisdiction. Also, these improvements are assumed to be the

Figure 2-1. CDOT *TEPS* RECOMMENDED ALTERNATIVE



Source: Compiled by FHU, 2007. Originally *TEPS* Figure 2.4-24.

responsibility of CDOT and/or area governments, and no funding or project commitment is available at this time.

2. Principal Arterial (Indiana Street/McIntyre Street). The Ultimate Project does not include the 7.5 mile principal arterial alignment improvements on Indiana Street and McIntyre Street due to lack of local support. Elimination of this arterial segment also greatly reduces project impacts to adjacent properties.

Details of the 2015 Phased Project and the Ultimate Project are described in the sections that follow.

2.3 DESCRIPTION OF 2015 PHASED PROJECT

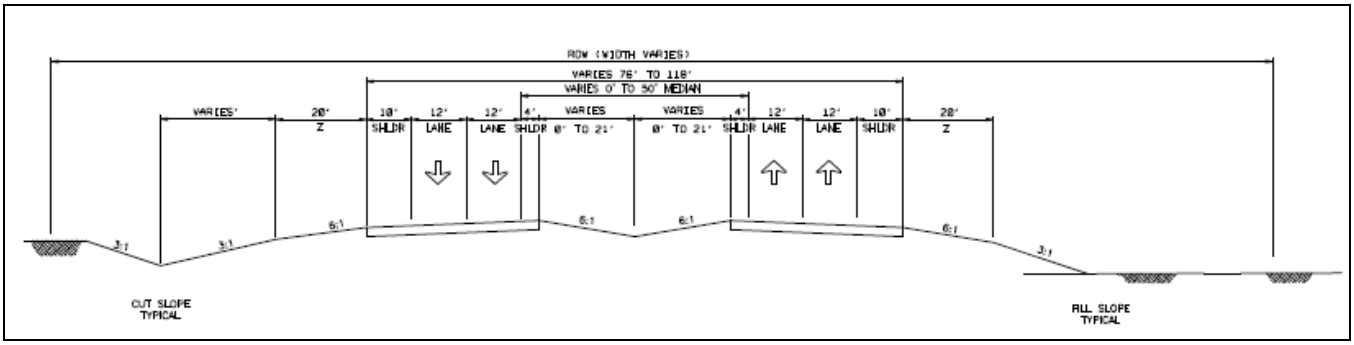
2.3.1 Proposed Cross Section - 2015 Phased Project

The proposed cross section for the 2015 phased project for the Jefferson Parkway is shown in Figure 2-2.

2.3.2 Connections to Northwest Parkway

Existing connections to the Northwest Parkway will be retained in 2015 with an anticipation of improvements to the Northern Section being funded as early as 2017. The Northwest Parkway Public Highway Authority contract with Brisa[1] includes incentives for the Northwest Parkway of the Jefferson Parkway connection is completed by 2017.

Figure 2-2. 2015 CROSS SECTION FOR JEFFERSON PARKWAY



Source: PB Americas, 2009

2.3.3 Intersection at SH 128

Figure 2-3 illustrates the 2015 signalized intersection layout for SH 128 at Jefferson Parkway and Interlocken Loop.

[1] Brisa Auto-Estradas de Portugal, S.A./Companhia de Concessoes Rodoviarais private partner with the NWPPHA for the Northwest Parkway toll road.

2.3.4 Local Access at Simms

Simms Street will be relocated to the west over the Jefferson Parkway to be planned in association with the future improvements to the Rocky Mountain Metropolitan Airport by Jefferson County. Future exit and entrance ramps are planned as the need arises.

2.3.5 Local Access at Indiana

Jefferson Parkway will cross Indiana near Walnut Creek. Access to Indiana Street will provide for a northbound Parkway exit and southbound entrance movements from the Parkway to Indiana Street. Local traffic on Indiana Street will continue to operate independent of the tollway but at a slower speed due to traffic calming.

2.3.6 Local Connections at Cimarron Parkway

Initial construction includes the two ramps to the north of Cimarron Parkway, that will provide Jefferson Parkway access to and from the north.

2.3.7 Connections at SH 72

Figure 2-4 illustrates the 2015 partial interchange layout proposed for SH 72 at Jefferson Parkway. This includes structures across Barbara Gulch, Union Pacific Railroad and a proposed extension of the Welton Reservoir.

2.3.8 Intersection at SH 93

Figure 2-5 illustrates the 2015 signalized intersection layout for SH 93 north of 64th Avenue Parkway. This design includes the relocation of an existing Pioneer Sand and Gravel access.

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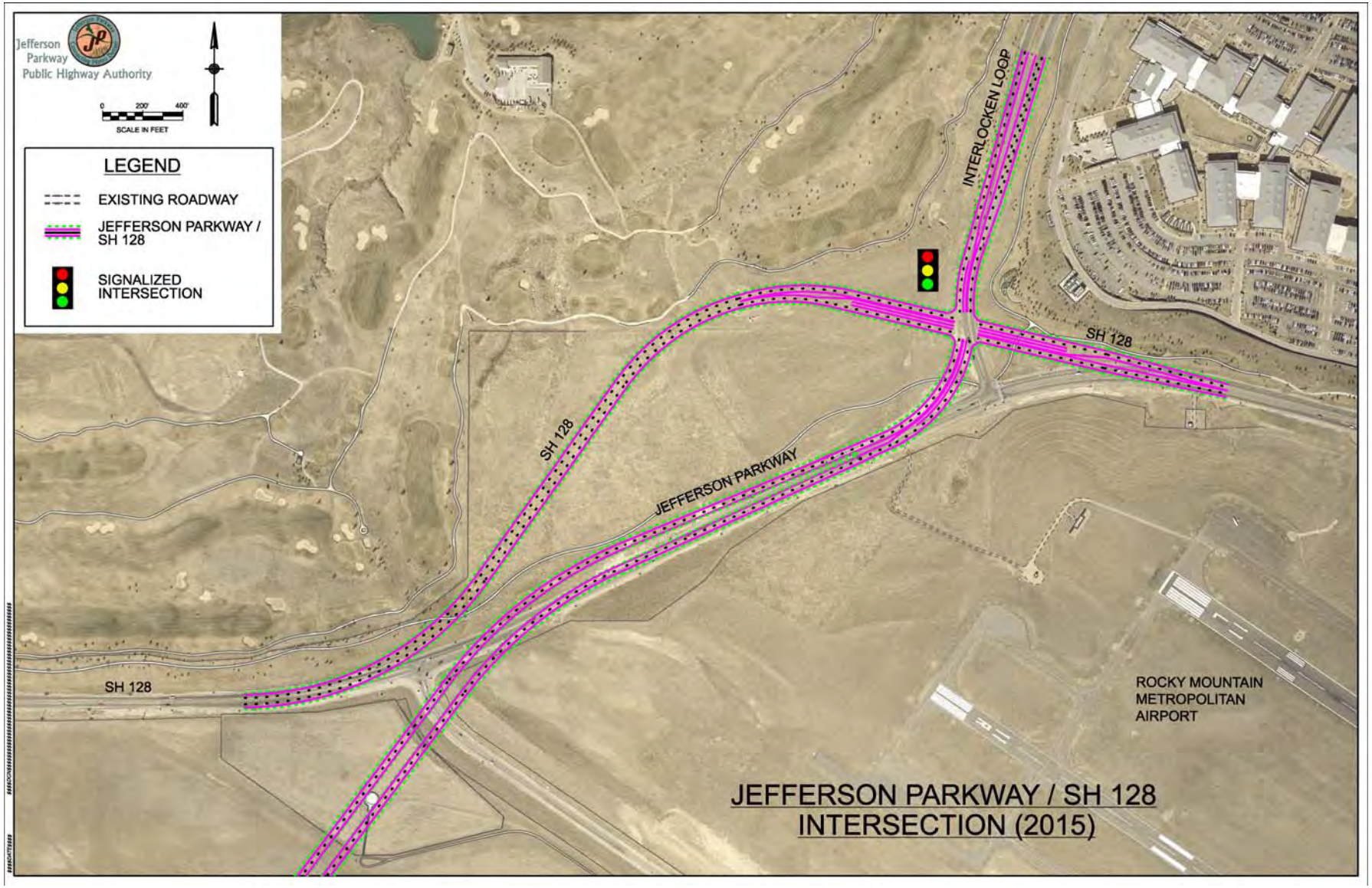

Figure 2-3. 2015 SIGNALIZED INTERSECTION AT SH 128

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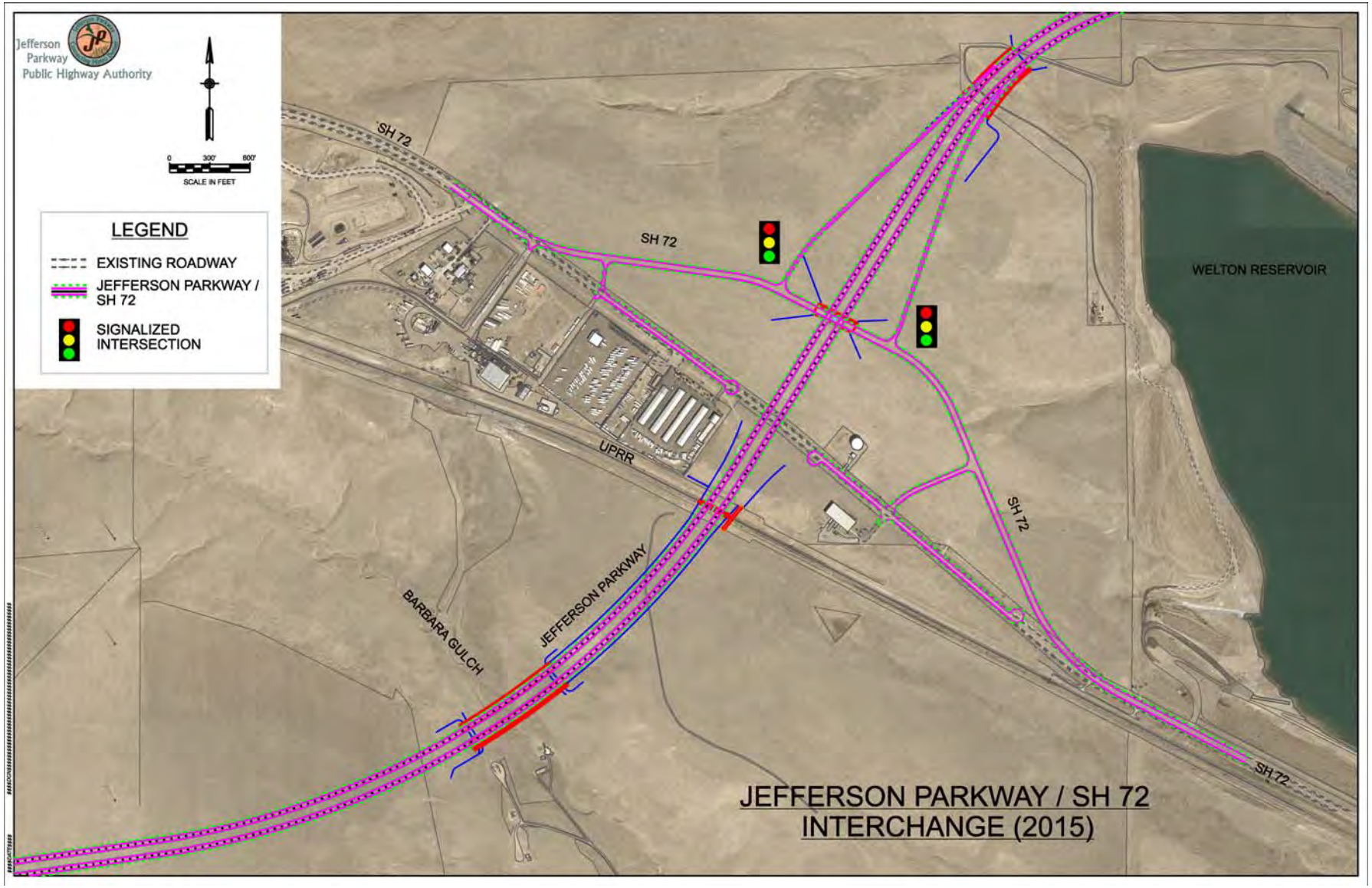

Figure 2-4. 2015 PARTIAL INTERCHANGE AT SH 72

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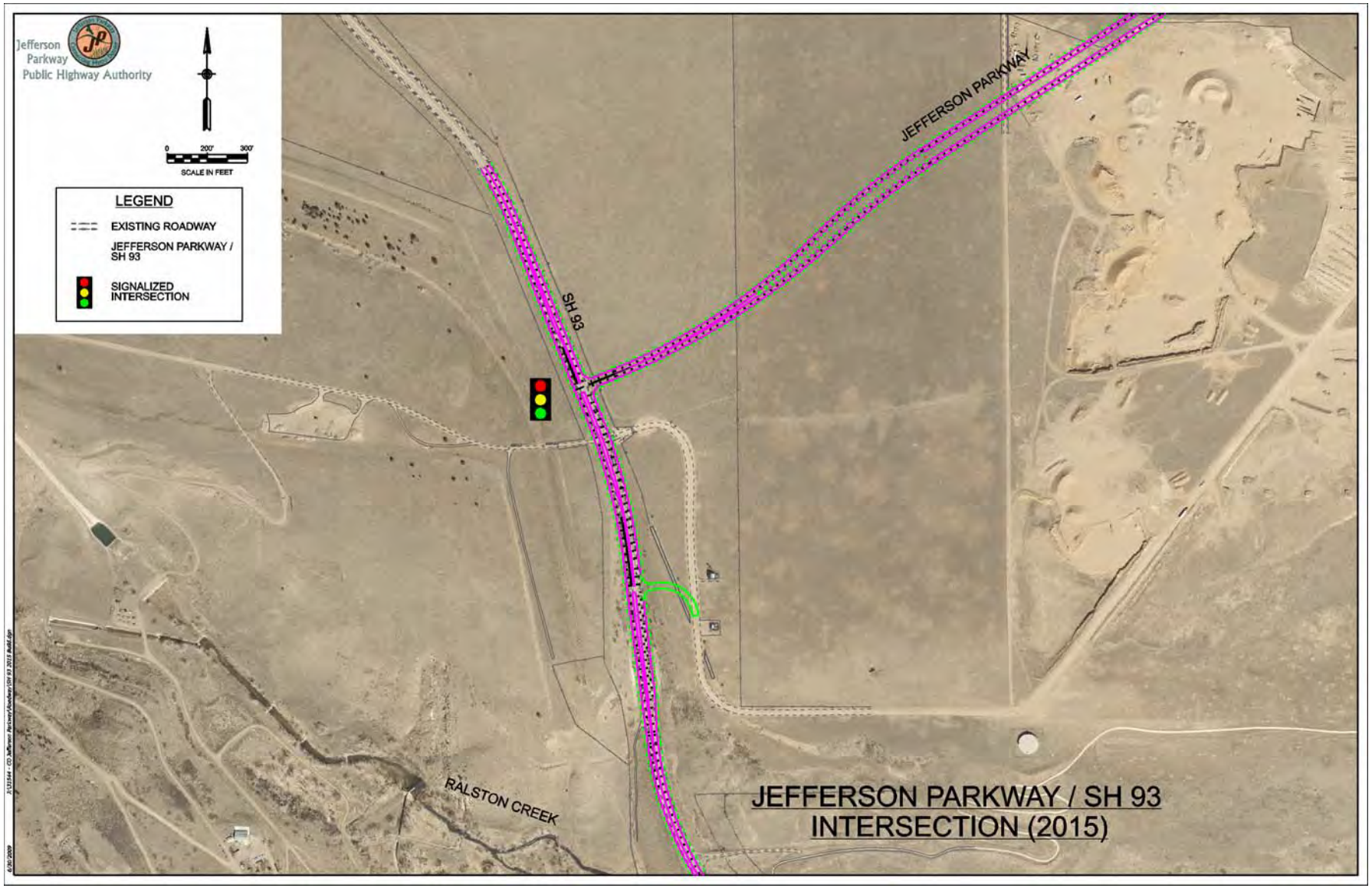

Figure 2-5. 2015 SIGNALIZED INTERSECTION AT SH 93

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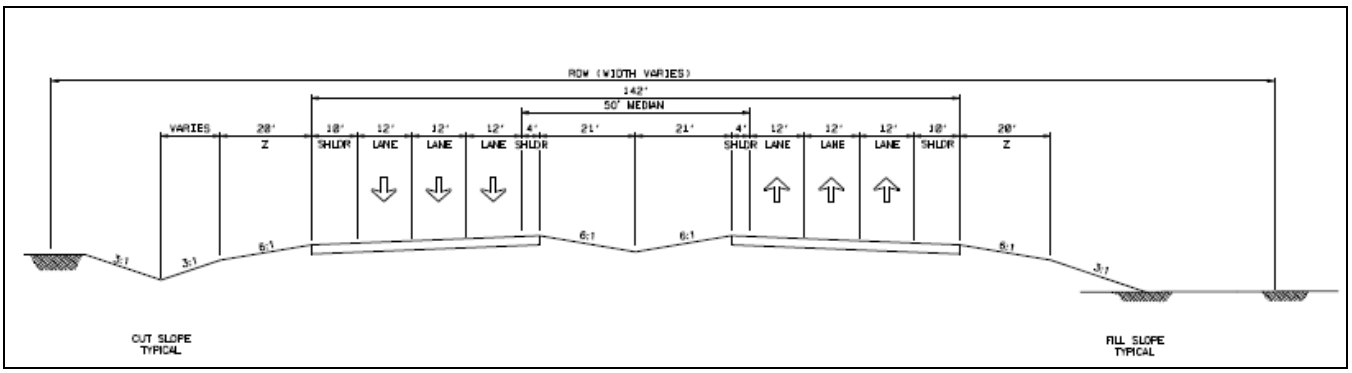
2.4 DESCRIPTION OF 2035 ULTIMATE PROJECT

2.4.1 Proposed Cross Section - 2035 Ultimate Project

The proposed cross section for the 2035 Ultimate Project for the Jefferson Parkway is shown in Figure 2-6.

Figure 2-6. 2035 CROSS SECTION FOR JEFFERSON PARKWAY



Source: PB Americas, 2009

2.4.2 Connections to Northwest Parkway

The connection between SH 128 and the Northwest Parkway will be implemented by 2035. This connection will include a six-lane regional arterial with signals at select locations, will utilize the existing interchange at US 36 and will support a full interchange at SH 128. The NWPPHA contract with Brisa requires upgrades when the level of service is worse than LOS D.

2.4.3 Interchange at SH 128

Figure 2-7 illustrates the full interchange connection proposed at SH 128 for Jefferson Parkway and Interlocken Loop. Access to Simms will be relocated by Jefferson County prior to implementation of this improvement.

2.4.4 Local Access at Simms Street

Future exit and entrance ramps are planned as the need arises for the Simms access to Jefferson Parkway.

2.4.5 Local Access at Indiana Street

Access at Indiana Street continue as designed for the 2015 Phased project.

2.4.6 Local Access at Cimarron Parkway

Full interchange access is anticipated for Cimarron Parkway and Jefferson Parkway by 2035.

2.4.7 Interchange at SH 72

Figure 2-8 illustrates the completed interchange connection proposed at SH 72 for Jefferson Parkway.

2.4.8 Interchange at SH 93

Figure 2-9 illustrates the full interchange connection proposed at SH 93 for Jefferson Parkway. This design includes structures over SH 93.

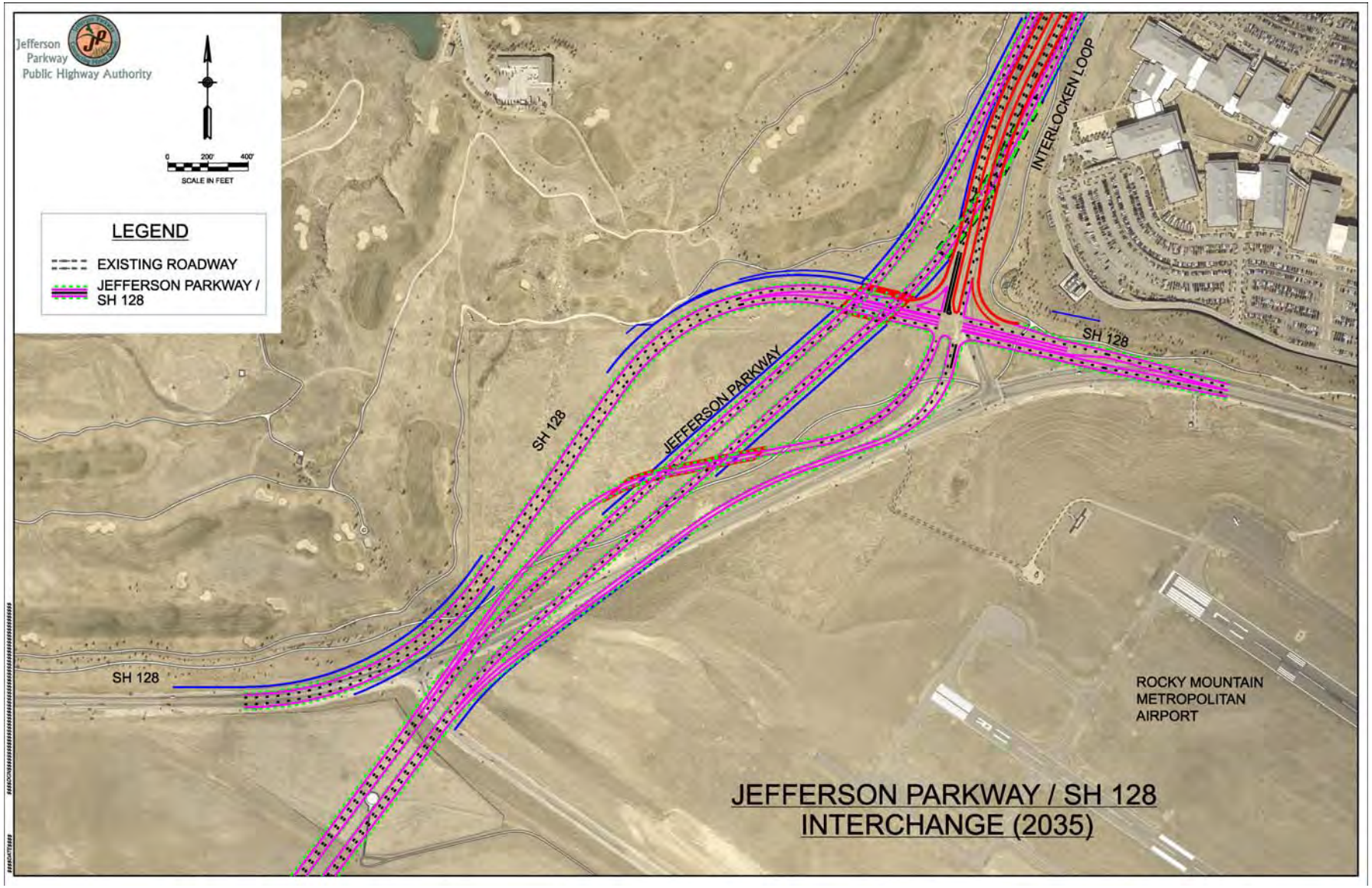


Figure 2-7. 2035 INTERCHANGE AT SH 128

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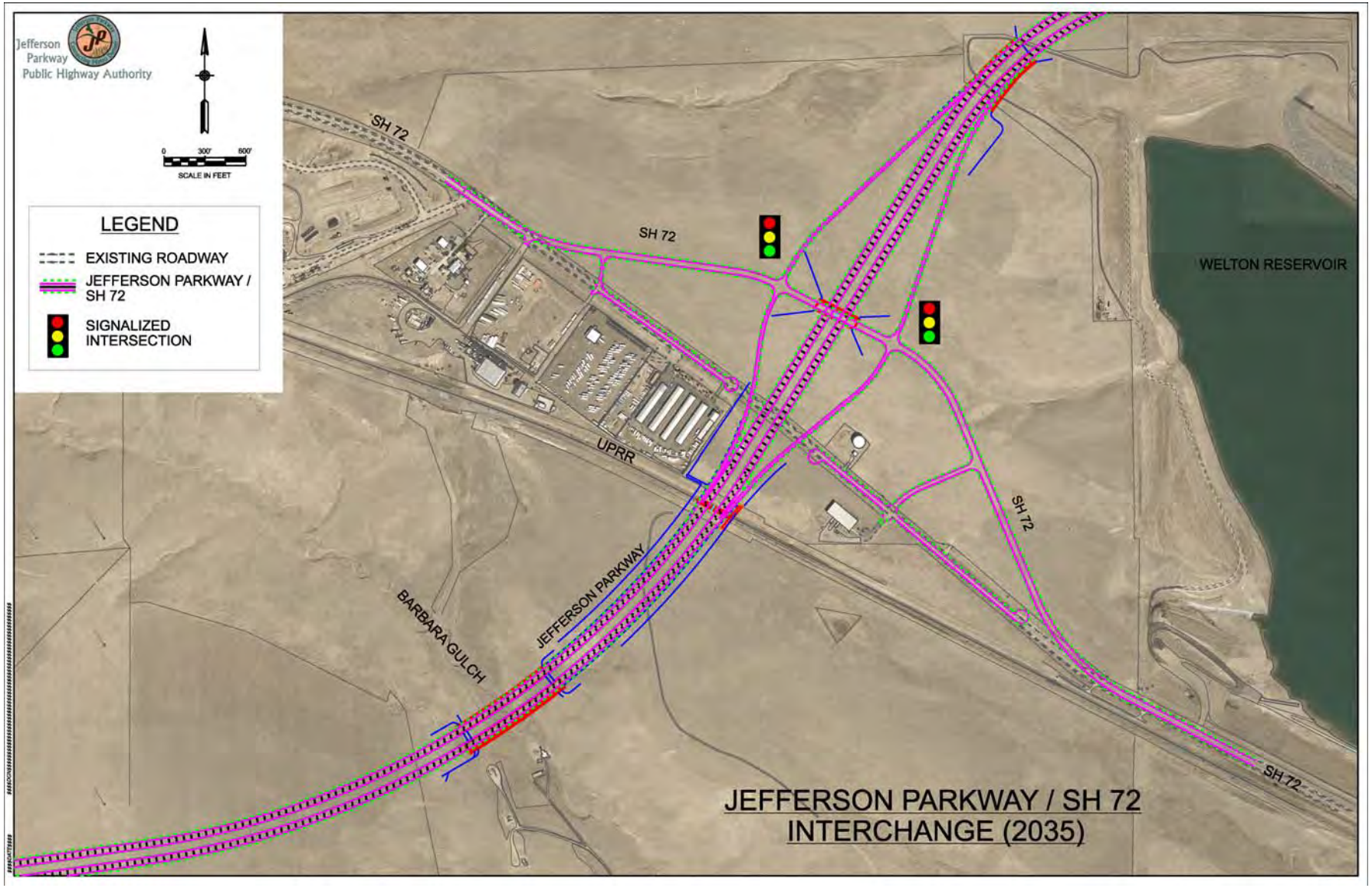

Figure 2-8. 2035 FULL INTERCHANGE AT SH 72

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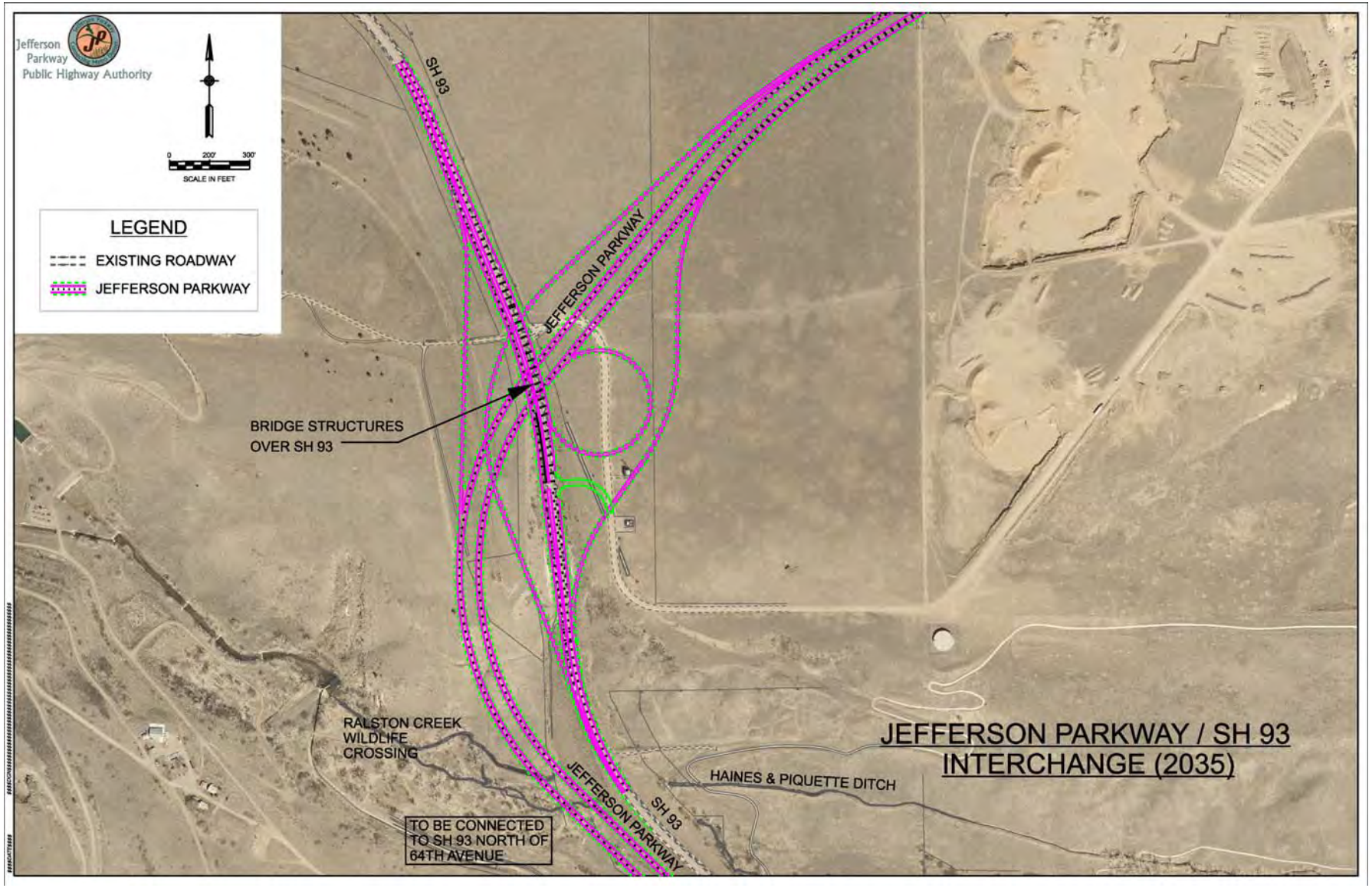

Figure 2-9. 2035 INTERCHANGE AT SH 93

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3.0 TRANSPORTATION

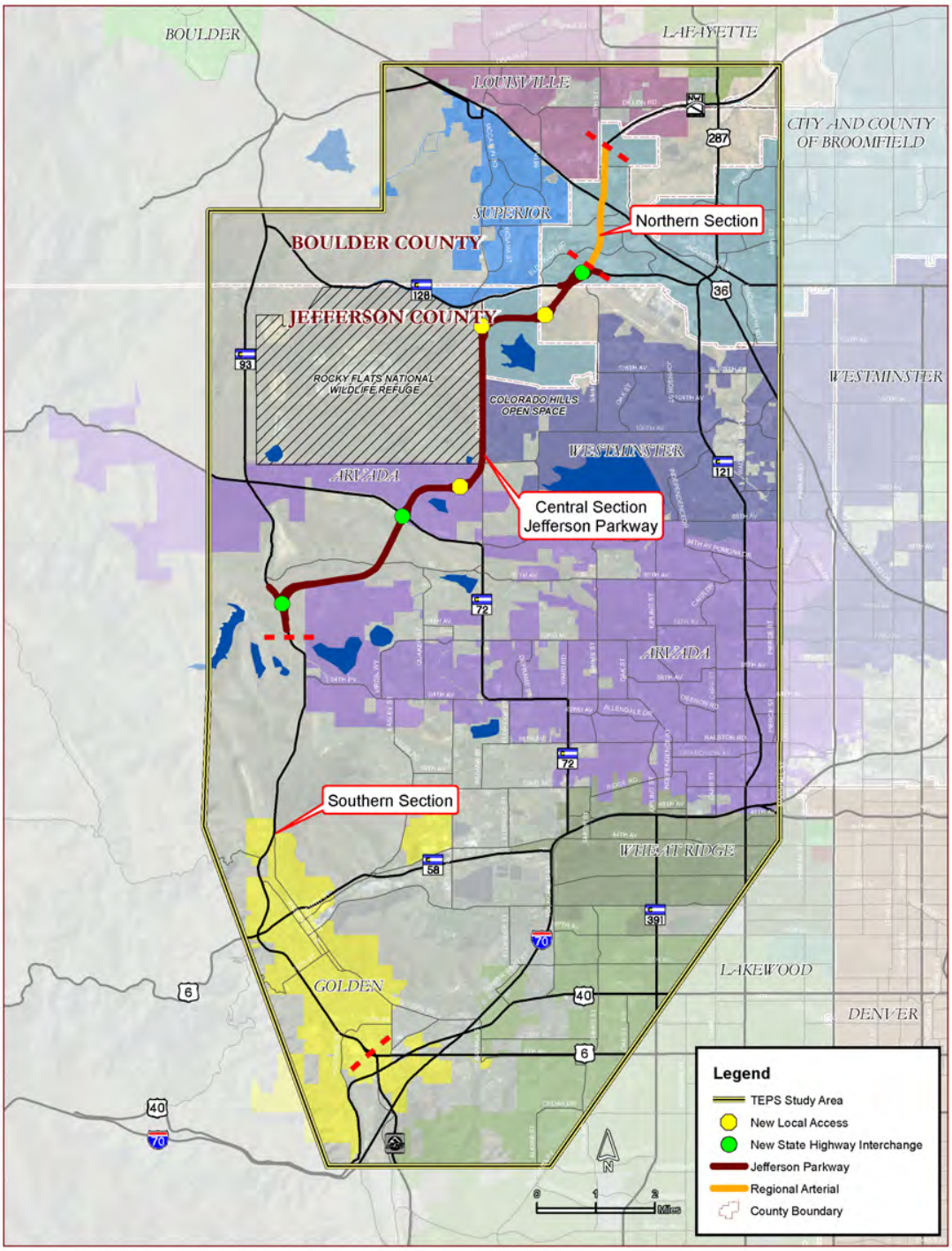
3.1 EXISTING CONDITIONS - LAND USE, DEVELOPMENT NEEDS AND CHALLENGES

3.1.1 Land Use and Development Patterns along Project Corridor

The Northwest Corridor Study Area includes portions of Boulder County, the City and County of Broomfield, Jefferson County, and seven incorporated municipalities. Based on extensive public and agency involvement during the *TEPS* process all agencies except Golden generally support or are neutral about the project including: Arvada, Lafayette, Lakewood, Louisville, Superior, Westminster, and Wheat Ridge. The City of Golden has consistently opposed improvements that would extend south through that community. Figure 3-1 identifies the Northwest Corridor Study Area and municipalities. Within the 157 square miles of land that make up the Northwest Corridor Study Area, almost every type of land use and zoning designation is represented. Land uses vary from agriculture and open space to commercial and industrial developments. Approximately 6,200 acres comprise the Rocky Flats National Wildlife Refuge with over 400 acres of wetlands. Because zoning varies among the 11 jurisdictions, there are over 100 distinct zoning categories within the study area. All jurisdictions include zoning designations for residential, mixed use, commercial, industrial, agricultural, public, open space, and planned development. Figures 3-2 and 3-3 illustrate land use plans for City and County of Broomfield and City of Arvada showing their relationship with the proposed project.

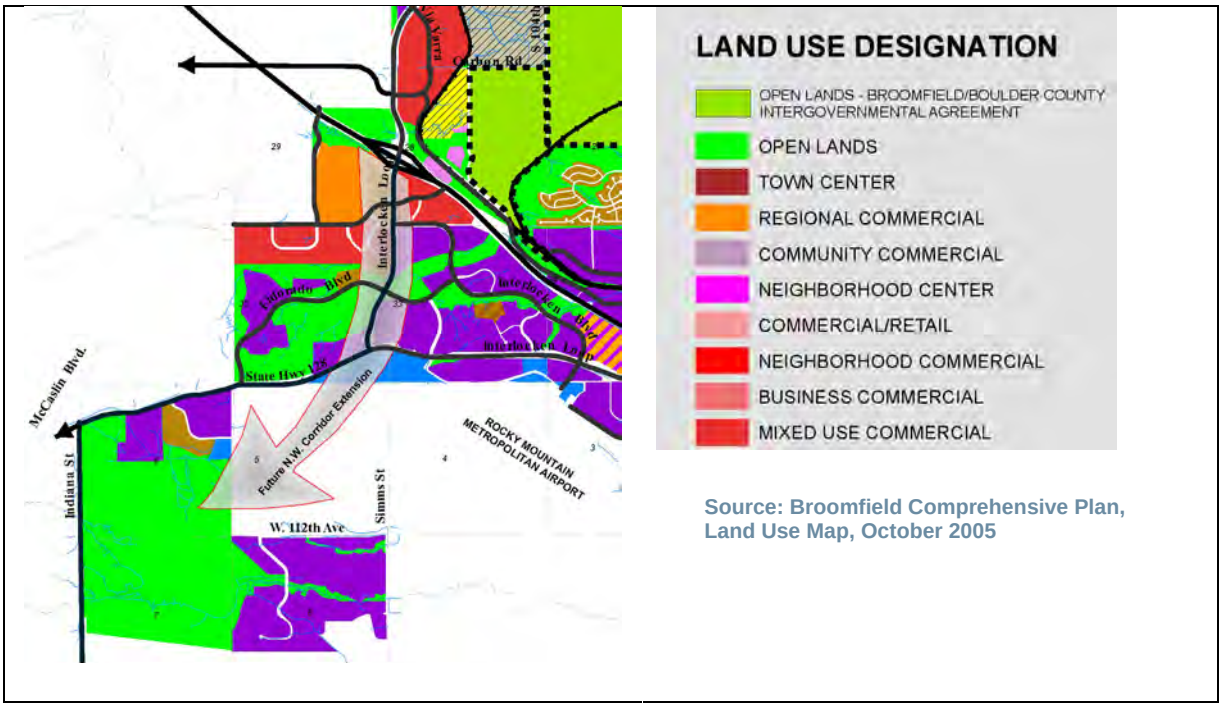
Northern Section. The Northern Section of proposed regional arterial roadway passes through Louisville and Broomfield from the Northwest Parkway terminus to approximately SH 128 and is bisected by US 36. North of US 36, land consists of open space, agricultural, public, and commercial uses with many of the parcels undeveloped. The recently acquired Conoco Phillips Campus (formerly StorageTek), in Louisville is expected to employ 7000 workers and is located north of US 36 along the Northwest Parkway in the vicinity of 96th Street. South of US 36 the most prominent land use is the employment/commercial area associated with the Interlocken Technology Park and Flatiron Crossing Mall, a retail center. City and County of Broomfield has identified this as an urban activity center. The current DRCOG model (COMPASS_2.0_Version 95, cycle 2 2008 or 2008-C2) does not include this urban center.

Figure 3-1. NORTHWEST CORRIDOR STUDY AREA



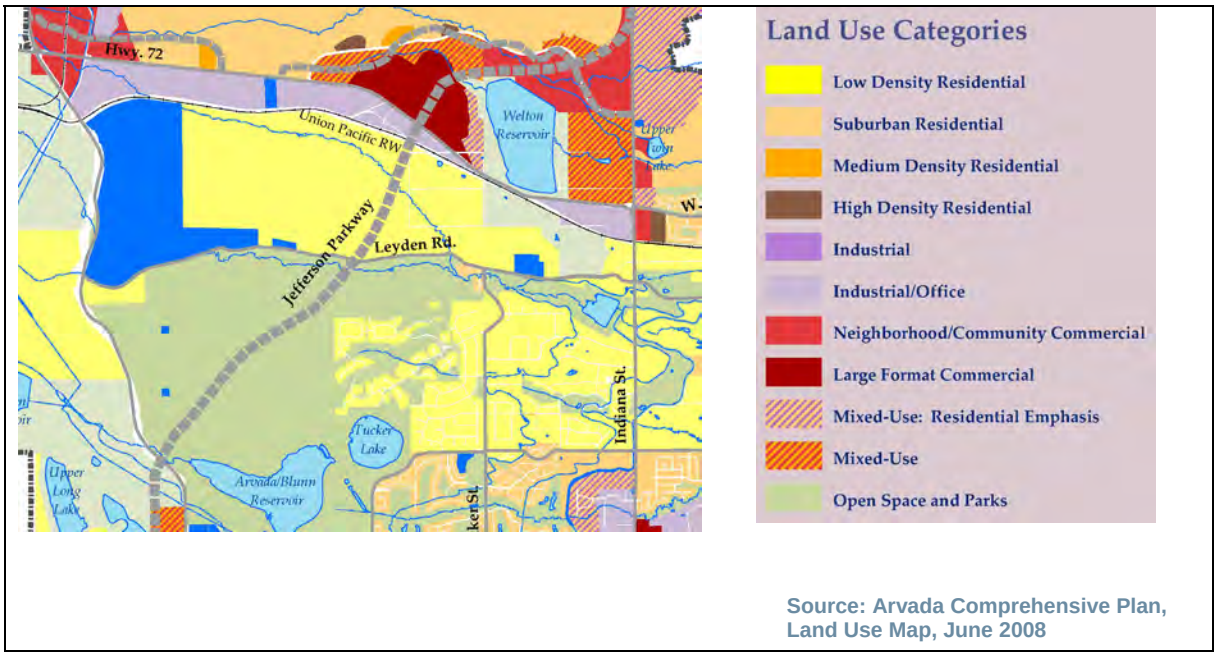
Source: Compiled by Stantec, 2009

Figure 3-2 CITY AND COUNTY OF BROOMFIELD LAND USE



Source: Broomfield Comprehensive Plan, Land Use Map, October 2005

Figure 3-3 CITY OF ARVADA LAND USE



Source: Arvada Comprehensive Plan, Land Use Map, June 2008

Central Section. The Central Section begins at SH 128 and extends south from SH 128 at Interlocken Loop. South of SH 128 there is a large parcel of public land owned by Jefferson County that is used for the Rocky Mountain Metropolitan Airport (formerly the Jefferson County Airport) as well as the future Great Western Business Park (a business/industrial development) to the southeast of the airport. Jefferson Parkway passes through publicly owned land in Broomfield, including a prairie dog relocation area. The public land is currently in use as theBroomfield Police Department, Detention Center, and Training Facility. The proposed Jefferson Parkway continues south parallel to Indiana Street.

Jefferson Parkway is proposed to follow along Indiana Street. Land use on both sides of Indiana Street consists of parks/open space. Rocky Flats National Wildlife Refuge occupies the west side of Indiana Street, while parks/open space owned by Broomfield and Westminster, including Broomfield's Great Western Reservoir, and Westminster's Colorado Hills Open Space, occupy the east side of Indiana Street. To the southeast is Standley Lake, which is surrounded by the Standley Lake Regional Park and also owned by Westminster. This site is the location of the Woman Creek Reservoir/Standley Lake Protection Project. Generally, this segment of roadway is characterized by open space with some agricultural operations near 96th Avenue.

Next, the Jefferson Parkway is proposed to pass through Arvada and unincorporated Jefferson County. In this portion of the study area, the proposed alignment turns southwest from Indiana Street at 96th Avenue passing through undeveloped land to SH 72 just west of Welton Reservoir. While much of this area is characterized by undeveloped land within unincorporated Jefferson County, the Arvada Comprehensive Plan identifies industrial/office, low density residential, and open space and parks as future land uses in the area south of SH 72 in addition to the development plans already approved north of SH 72. The Candalas development to the north of SH 72 has been identified by the City of Arvada as an urban activity center. The current DRCOG 2008-C2 model does not include this urban center. The new alignment would continue to the southwest to SH 93.

Denver Water Department property lies along the west side of SH 93 extending from SH 72 to 64th Avenue. The proposed Jefferson Parkway improvement extends to just north of the 64th Avenue Parkway.

Southern Section. The Southern Section of the corridor includes an additional stretch of SH 93 and passes through unincorporated Jefferson County, Arvada, and Golden. Features along this portion of the study area are open space including the Arvada-Blunn Reservoir Recreation Area, North Table Mountain Park (a classified conservation site by the Colorado Natural Heritage Program), and White Ranch Park (recreational open space). The Pioneer Sand Company has a gravel pit immediately south of the Arvada-Blunn Reservoir. The area approaching Golden includes low density residential developments transition to higher densities with some commercial uses. The Canyon Point Commercial Center marks the transition from a rural landscape to a more urban landscape. Near C-470, there is a large parcel of public land upon which the Jefferson County Administration Building is located. Zoning along SH 93 includes open space/parks, mixed use, rural/low-density residential, office, retail and industrial. Downtown Golden is identified as an Urban Center in the DRCOG 2008-C2 model.

3.1.2 Existing Transportation Network

The existing transportation network in the study area includes the roadway network, pedestrian/bicycle facilities, transit routes, railroads, and aviation facilities.

3.1.2.1 Roadway Network

The Northwest Corridor Study Area is generally defined by SH 93 on the west, Wadsworth Boulevard (SH 121) on the east, US 6 on the south, and US 36 and Northwest Parkway on the north. Major roadways in the study area fall into the three general categories described in this section: National Highway System, other US and state highways, and other local government arterial streets.

FHWA has designated a National Highway System consisting of roads between and within urbanized areas that form the backbone of the nation's roadways. The routes designated as part of the National Highway System are identified. The US Congress designated these routes for the critical and efficient movement of goods and people. Connectivity with these facilities is important to increase effectiveness of this system. The roads within the study area that are designated as parts of the National Highway System are listed here with their current number of through lanes:

- Interstate 70 (I-70)–six lanes
- US Highway 6 (US 6)–four to six lanes
- US Highway 36 (US 36)–four lanes
- State Highway 93 (SH 93)–two to three lanes
- State Highway 121 (SH 121 or Wadsworth Boulevard)–four to six lanes
- Northwest Parkway–four lanes
- C-470–four lanes

One US highway and three state highway routes within the study area are not part of the National Highway System:

- US Highway 40 (US 40 or Colfax Avenue)–four lanes
- State Highway 58 (SH 58)–four lanes
- State Highway 72 (SH 72)–two- and four-lane portions of Ward Road, 64th Avenue, Indiana Street, and the east-west SH 72 segment between SH 93 and Indiana Street
- State Highway 128 (SH 128)–two lanes

There are also numerous principal and minor arterial streets maintained by counties or municipalities.

3.1.2.2 Pedestrian/Bicycle Mobility

There are presently pedestrian and bicycle facilities throughout the study area:

- Bicycle/pedestrian trail along the east side of US 6 from C-470 to 19th Street (much of which is within the existing CDOT right-of-way)

- Trail segments located near 64th Avenue
- Bicycle/pedestrian trails along either side of Interlocken Loop between SH 128 and US 36

3.1.2.3 Transit Routes

The Denver RTD operates a network of regional, express, and local bus routes that serve the study area. Regional bus route G travels SH 93 along the western edge of the study area. Additional north-south bus connections are provided via routes 76 (Wadsworth), 100 (Kipling), and east-west routes include 72 (72nd Avenue), 52 (52nd-Pearl), and CC (SH 72). There are twelve park-n-Ride facilities in and around the study area, including six in the US 36 corridor.

The RTD is currently implementing the FasTracks plan, a twelve-year comprehensive plan to build and operate high-speed rail lines and expand and improve bus service and park-n-Ride facilities throughout the region. The FasTracks plan includes two light rail corridors that will connect downtown Denver with the study area: the West Corridor, which will terminate at the Jefferson County Government Center at US 6/Johnson Road in Golden, and the Gold Line, which will terminate at I-70/SH 58 in Wheat Ridge. Two other rapid transit corridors are included in the US 36 corridor, with specific characteristics of those corridors being refined through the current US 36 FEIS process. Additionally, suburb-to-suburb bus service enhancements are planned along SH 93 from Golden to Boulder, as well as routes using SH 72, Wadsworth Boulevard, Kipling Street, and other study area streets.

3.1.2.4 Rail

The Union Pacific Railroad currently operates an east-west line along the south side of SH 72. This line crosses beneath SH 93 and over Indiana Street. The Burlington Northern Santa Fe Railroad operates another east-west line located farther south, extending along SH 58. This line has its western terminus in Golden and crosses SH 58, Table Mountain Parkway, McIntyre Street and Ward Road (SH 72) at grade.

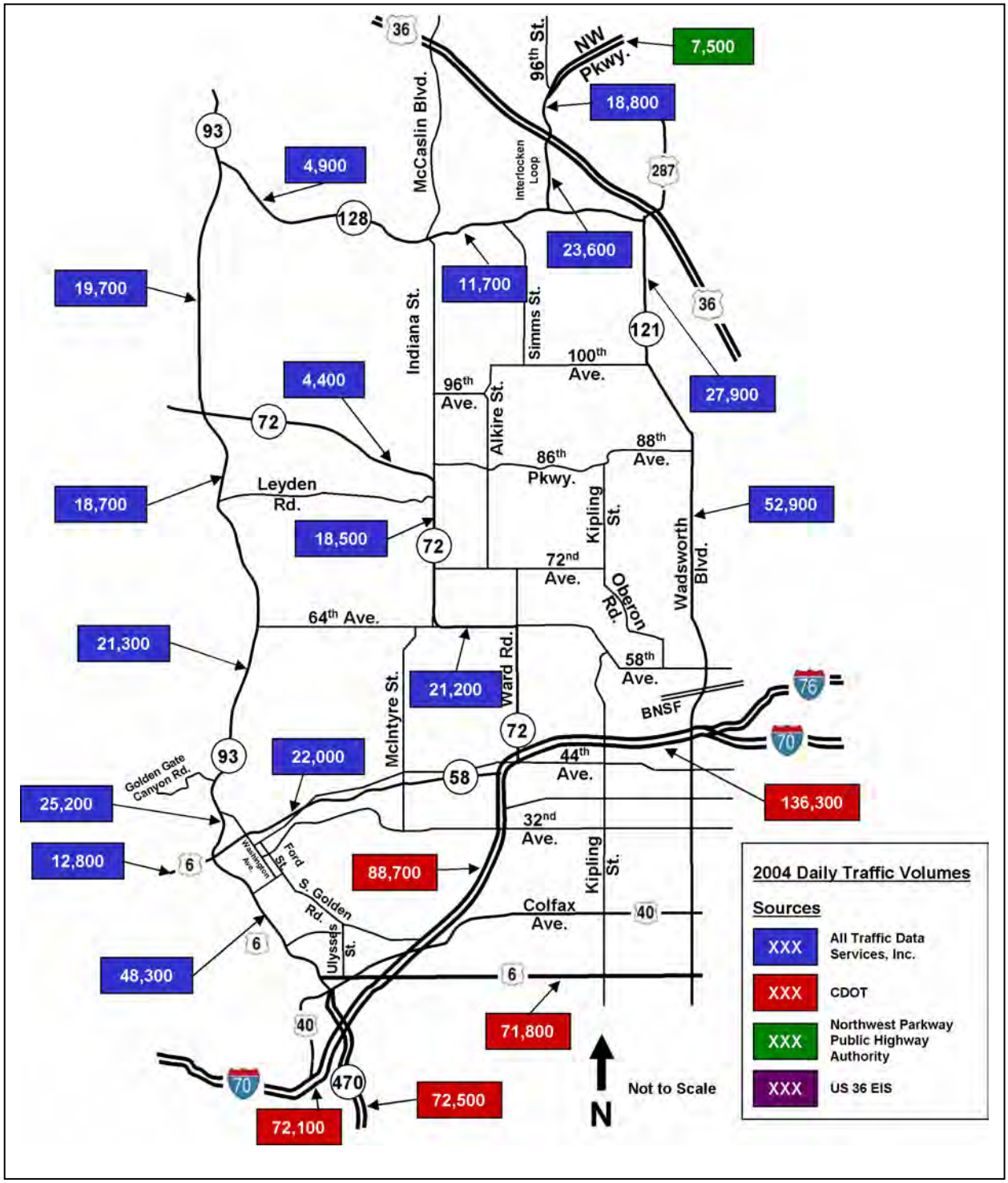
3.1.2.5 Aviation

The Rocky Mountain Metropolitan Airport (formerly the Jefferson County Airport) is a corporate/general aviation airport located southwest of the SH 128/Wadsworth Boulevard intersection. According to the Jeffco Airport Master Plan Update, prepared in 2000, the number of annual aircraft operations is forecast to increase from 164,000 in 1998 to approximately 241,000 in 2020.

3.1.3 Traffic Volumes

Daily traffic volumes were compiled from available data from several sources. All daily traffic volumes are related to typical weekdays. Traffic volumes were collected from CDOT, the Northwest Parkway Public Highway Authority, and the US 36 EIS project. Additional traffic volumes were recorded during May 2004 to fill identified gaps (see Figure 3-4).

Figure 3-4. EXISTING TRAFFIC DATA (2004)



Source: Originally TEPS Figure 3.1-4, modified by Stantec

Weekday AM and PM peak hours are typically the most congested periods on urbanized area roads, and thus weekday volume data are generally used to assess levels of congestion or levels of service. Since some study area roadways carry substantial volumes of recreation-oriented traffic, Saturday and Sunday traffic counts were performed. Comparison of weekend traffic to weekday traffic volumes confirmed that weekday volumes are higher on study area roads; therefore, evaluation of typical weekday AM and PM peak periods is appropriate for this study.

Volume data show that the fully access-controlled freeway facilities of the National Highway System carry the largest volumes of traffic, including I-70, US 36, US 6 east of C-470, and C-470, with weekday traffic volumes ranging from 85,500 vehicles on US 6 west of C-470 to 176,900 vehicles on I-70 near Wadsworth Boulevard.

Among surface arterial streets, the highest daily traffic volumes are found on Wadsworth Boulevard (more than 52,000 vehicles per day), US 6 west of its transition between a freeway and regional arterial (more than 44,000 vehicles per day), and Ward Road north of I-70 (over 39,000 vehicles per day).

3.1.4 Traffic Operations

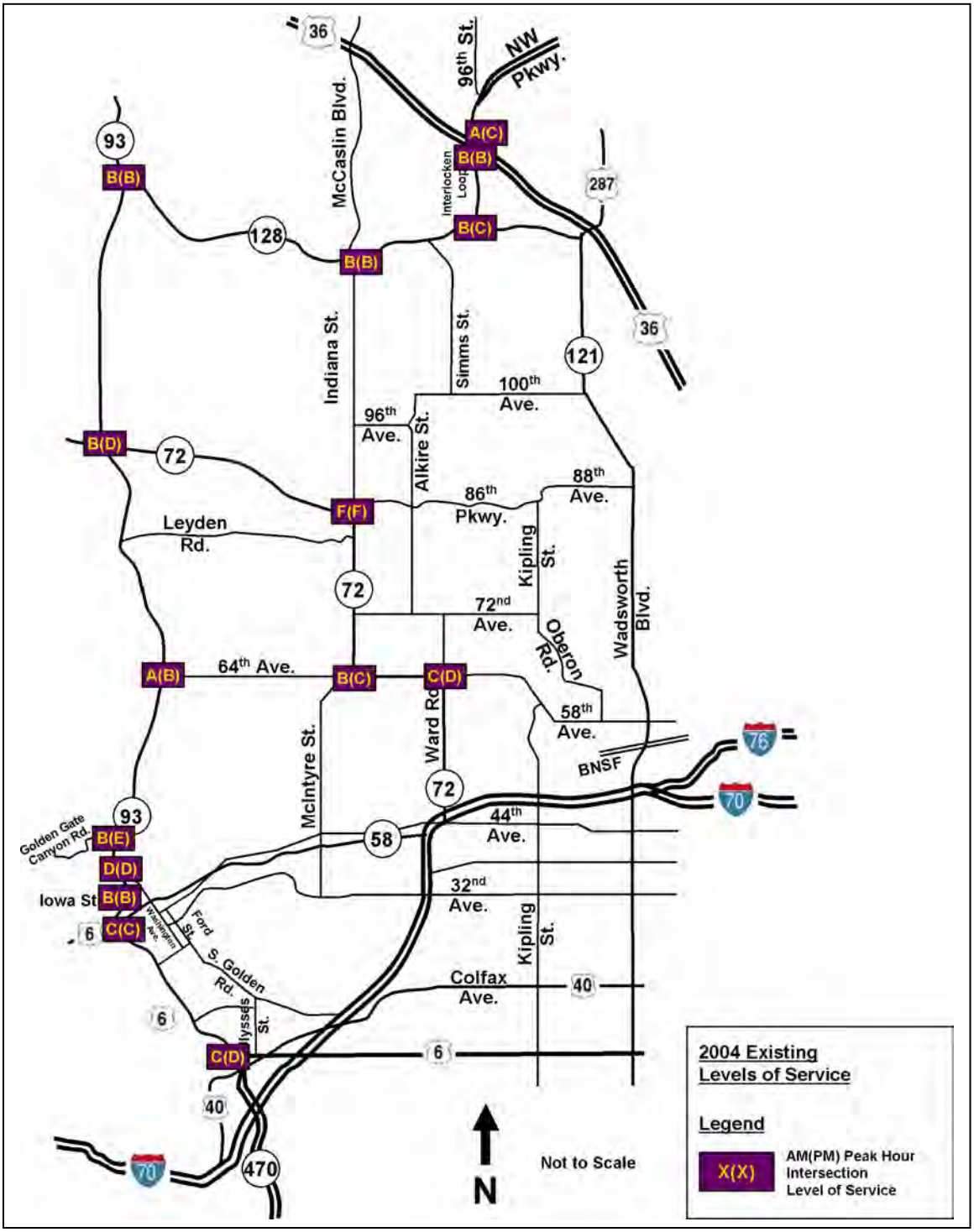
3.1.4.1 Capacity Analysis

This section discusses the methodology and the existing levels of service for the study area. Level of service is described by letter designations ranging from A to F, with LOS A representing essentially uninterrupted flow, and LOS F representing a breakdown of traffic flow with excessive congestion and delay.

For analysis of a signalized intersection, a LOS rating is calculated for an intersection as a whole. Level of service analysis of an unsignalized intersection yields a LOS rating for each critical vehicle movement. The Synchro© software analysis package and methodology (Albeck and Husch, 2003) was utilized to calculate LOS ratings for signalized and unsignalized intersections throughout the study area. According to the software documentation, Synchro's© HCM signalized analysis provides a full implementation of the HCM (Transportation Research Board, 2000) Signalized Operations method. However, the Synchro© implementation does calculate the effects of signal progression and actuated signal green times differently than the HCM.

As stated in the *TEPS*, level of service analyses were conducted for AM and PM peak hours of vehicle travel, and are documented (see Figure 3-5). LOS calculations were prepared for thirteen key intersections within the study area, as required by CDOT, using the existing traffic volumes, intersection geometry, and signal phasing. All of the intersections are currently controlled by traffic signals.

Figure 3-5. EXISTING INTERSECTION LEVELS OF SERVICE (2004)



Source: Originally *TEPS* Figure 3.1-5, modified by Stantec using data from *TEPS* Traffic Analysis

3.1.5 Accident History

3.1.5.1 SH 93 Crash Data

In preparation for this study, the JPPHA Program Management Team collected crash data for just under nine miles of SH 93 between West 58th Avenue and SH 128. This portion of SH 93 is generally an older road with numerous roadside obstructions. In the period between Jan 1, 2000 and August 31, 2006, there were 9 fatalities, 175 person injury accidents, and 378 property damage accidents (Traffic Engineering Branch, September 29, 2008). Portions of SH 93 have an accident rate that is more than twice the state average (4.93 v 1.48).

3.1.5.2 Safety Forecasts SH 93 from TEPS

Safety performance of alternatives has been used as another indicator of travel reliability, since traffic operations can be greatly influenced by the frequency of traffic accidents and the ability to clear and allow traffic to bypass accidents and incidents.

For the *TEPS*, accident statistics for the most recent available 5-year period (January 1, 1999, through December 31, 2003) were compiled for all state highways in the study area. CDOT used a procedure known as the Safety Performance Function (SPF), directly relating accidents per year per mile to the traffic volumes experienced on many types of facilities and applied it to 2030 forecasts.

Using the measure of number of predicted accidents, the No Build Alternative along SH 93 is expected to have more than twice as many accidents as the Ultimate Project between SH 58 and SH 72 (149 v 69) and approximately the same number of accidents between SH 72 and SH 128 (46 v 49) for 2030.

Results in the *TEPS* note that the new tollway portion of the Combined Alternative (Recommended Alternative), the Jefferson Parkway portion of the Ultimate Project, would have a more favorable accident experience than the arterial portions since tollways have higher design standards and fewer access points resulting in a better overall safety expectation.

The proposed project also provides an opportunity for context sensitive safety improvements to mitigate known wind and winter blowing snow issues along portions of the project corridor.

3.1.6 Opportunities and Constraints

From the standpoint of transportation, there are a mix of opportunities and constraints for this study area. Details of these bulleted items are found elsewhere in this study.

<u>Opportunities</u> (See Chapter 1 for additional discussion on project purpose and need):

- Complete an additional portion of the beltway around the Denver metro area, leading to future attraction of trips from interstate facilities (I-25, I-70, I-76) upon completion of the entire beltway
- Improve local and regional transportation system connectivity and functionality providing an improved connection between Northwest Parkway in Broomfield County and SH93 in Jefferson County
- Expand capacity to support land use planning and meet population and employment growth forecasts for Jefferson County, City and County of Broomfield, and City of Arvada
- Specifically to provide transportation links for the Interlocken and Candelas Urban Centers and other existing and new development including but not limited to the Conoco Phillips Campus
- Provide opportunities to reduce travel time and improve reliability of travel in a corridor where competition for future transportation infrastructure funding is high
- Support opportunities for transit mode choices by providing space within the project cross-section for future options
- Utilize CDOT identified route location based on five years of public and agency input with minimal impacts to community and natural environment
- Improve safety at connections and by providing a reliable travel route in a corridor where heavy congestion is forecasted

Constraints and Challenges (See Chapter 4 for additional discussion on project environmental impacts and mitigation):

- Avoidance when possible, then minimization of and mitigation of impacts to sensitive resources (wetlands, wildlife habitats, parks/trails)
- Provide additional analyses, remediation, site specific health and safety plans for hazardous conditions (hazardous materials, geology)
- Address community concerns
- Location of Southern Section outside of JPPHA jurisdiction, leaving uncertain planning and funding commitment status for future transportation needs

3.2 FORECASTED CONDITIONS

3.2.1 Future Land Use Forecasts – Updates to 2035

All of the incorporated jurisdictions have adopted comprehensive land use plans to guide growth and development in their communities. In accordance with Colorado Revised Statute 30-28-106 (C.R.S. 30-28¬106), Jefferson County, Boulder County, and City and County of Broomfield have adopted comprehensive plans to guide the physical development of unincorporated areas within their respective counties.

Growth and development is projected to continue within the study area through 2035. According to the area land use plans, there is very little undeveloped land remaining in the study area, other than areas described below (urban center and small area updates).

As area plans are updated, the jurisdictions are calculating what amount of land is available for development and determining what types of development they would like to see based on a desired mix by build out. There is also a greater focus on redevelopment at higher densities, infill and more mixed use and higher density developments.

In addition to roadway improvements, jurisdictions have addressed the development needs associated with transit improvements, particularly FasTracks. FasTracks includes 119 miles of rail, 18 miles of Bus Rapid Transit (BRT), and approximately 57 additional rapid transit stations. Within the study area are portions of the Gold Line, West Corridor, and the US 36 Corridor.

The Denver Regional Council of Governments (DRCOG) provides information on forecasted 2035 land uses for the entire metropolitan area. The most recent DRCOG forecast, finalized in late 2008, is referred to as the COMPASS_2.0_ Version 95, Cycle 2 2008 (2008-C2). DRCOG's land use forecasts include household and employment forecasts by traffic analysis zone (TAZ). The metropolitan area includes a total of 2,664 TAZs of which 281 are included in the *TEPS* study area.

A 5.5 percent increase in population and a 6.1 percent increase in employment totals were forecasted between 2030 and 2035 for the *TEPS* TAZs. Figure 3-1 illustrates the jurisdictions found within the study area as well as the general TAZ study area. These growth rates are shown as slightly less than the metro area as a whole. The metro area totals show an average population increase of 8.8 percent and an employment increase of 7.1 percent from 2030 to 2035.

Individual TAZs in the *TEPS* study area in the DRCOG 2008-C2 data include a wide variety of changes between 2030 and 2035, some due to fine tuning of data, while others show large percent changes due to small initial 2030 numbers for small area TAZs. Summarizing changes by location presents some noticeable growth or build out patterns. City and County of Broomfield TAZ adjustments between 2030 and 2035 show a 12 percent population increase and a 10 percent employment increase. The Westminster, Lakewood and Golden areas show increases that generally mirror the metro area average, while Arvada and Wheat Ridge numbers are conservatively less than the metro area patterns. These 2035 forecasts reflect in-fill of areas not previously developed, or redevelopment.

3.2.2 Urban Center Updates – 2 Urban Centers to be Added to Corridor

Urban Centers are concentrated areas of high-density, pedestrian-oriented mixed-use development. They accommodate new population growth within the urban area, create

The addition of two urban centers to the DRCOG model will result in more trips in the Northwest Corridor Study Area regardless of construction of the Jefferson Parkway's Ultimate Project.

opportunities for people to live near where they work, support transit use and more efficiently use existing infrastructure. The DRCOG Metro Vision 2035 currently recognizes 88 urban centers within the region. Downtown Golden is identified as an Urban Center in the 2008 C2 model. Subsequent to that model cycle, the City and County of Broomfield requested that the US 36 and Interlocken Loop Activity Center be recognized as an Urban Center. The City of Arvada has also requested recognition of the Candelas Activity near SH 72 and SH 93 as an Urban Center. These mixed use centers will stimulate and attract more trips. Absence of two key urban centers in the 2008 Cycle 2 model meant that fewer trips were focused in these areas adjacent to the Proposed Jefferson Parkway, while Downtown Golden would have attracted more trips under this designation. This data is not reflected in the JPPHA Model.

3.2.3 Small Area Land Use Updates – Additional Employment Forecast

Small Area land use development will also result in more trips in the Northwest Corridor Study Area regardless of construction of the Jefferson Parkway's Ultimate Project.

Although the DRCOG has updated land use information for the 2035 Metro Vision planning purposes, the JPPHA Program Management Team met with planners from the City and County of Broomfield, the City of Arvada, and Jefferson County to fine tune land use data for over 150 traffic analysis zones. Household information remained reasonably consistent with the DRCOG model with an increase of 2.7% in 2015 and 2.0% in 2035. The more significant change was shown for 2035 employment with an increase of 13% over the DRCOG numbers. (No measurable change was identified for 2015 employment over the DRCOG numbers.)

The 2035 No Build model run with the updated local government employment data, resulted in average daily traffic trip increases of as much as 17,000 on Interlocken Loop, 8,000 on SH 93 north of 64th Avenue Parkway, and 4,000 trips on SH 93 south of 64th Avenue Parkway. This information was not used as the basis for the general traffic and operations forecasting used in this study. Additional discussion on this Revised 2009 Scenario is found in the Chapter 5, Section 5.2 Project Funding.

3.2.4 Land Use and Development Conclusions

Development in the Northwest Corridor Study area is planned to occur regardless of the proposed project, and roadway improvements in the area will ultimately be required. Earlier transportation improvements, however, would allow for more employment opportunities, for local and regional residents. Land use plans support the need for the completion of the Jefferson Parkway with the associated Northwest Parkway arterial extension to meet travel demand for the two new urban centers, and area employment needs by 2035.

3.2.5 Future Transportation Network - Traffic Volumes

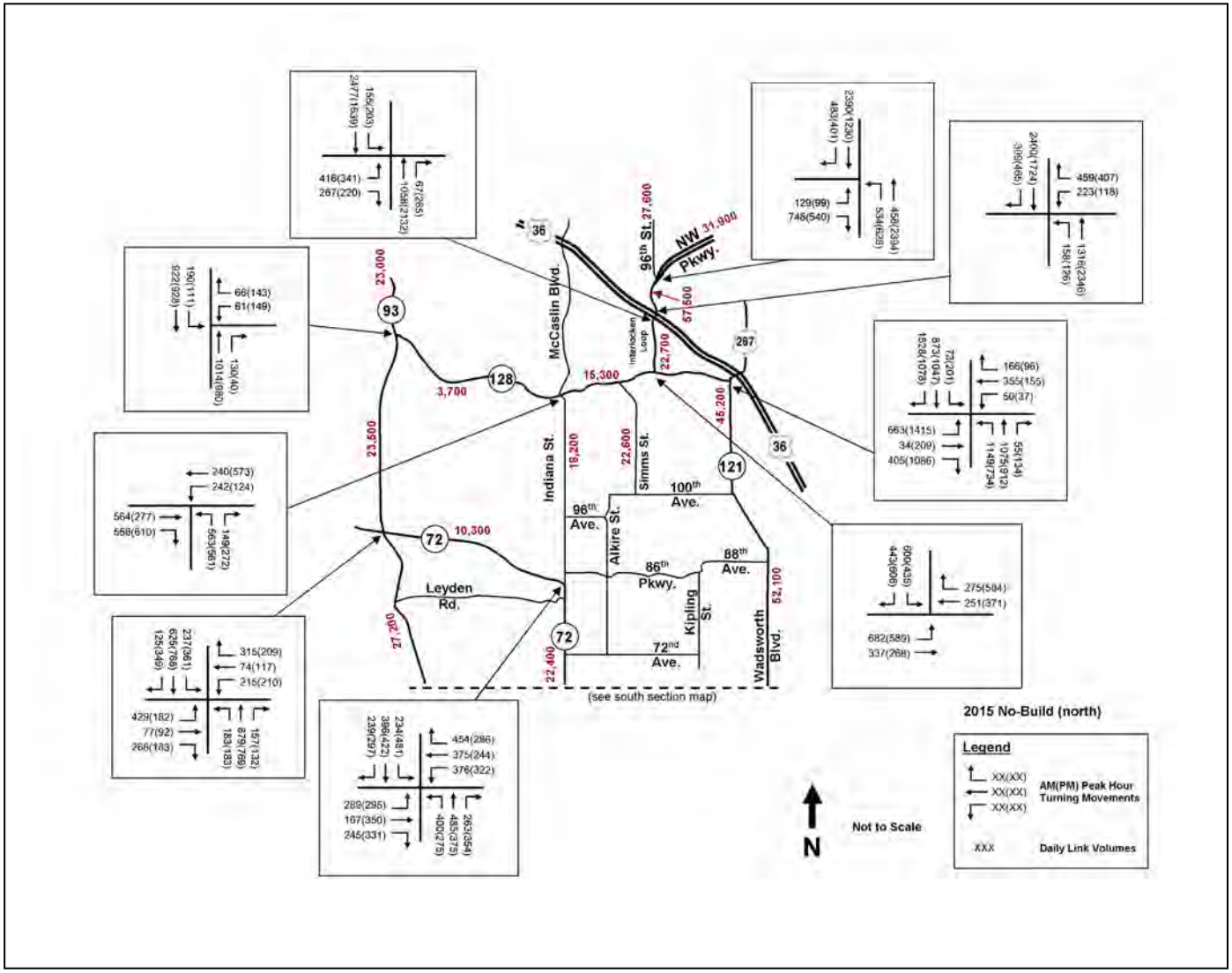
In order to assess how the highway network within the study will function with the addition of the Jefferson Parkway project, it was first necessary to prepare a set of reasonable travel forecasts. The DRCOG 2008-C2 model was used to generate daily, weekday AM peak hour and PM peak hour link volume forecasts for the following scenarios: 2015 No Build, 2015 with Phased Project, 2035 No Build, and 2035 Ultimate Project. An initial estimated toll rate of $0.29 per mile (in 1996 dollars – a requirement for the DRCOG model) was used for the modeling of the tollway portion for the traffic forecasting only.

The AM and PM peak hour link volumes needed to be converted to turning movement volumes in order to be able to analyze intersection operations. Stantec employed a linear programming model to make this conversion to turning movement volumes, which are illustrated on Figures 3-6 through 3-13.

3.2.5.1 Comparison with TEPS Traffic Data

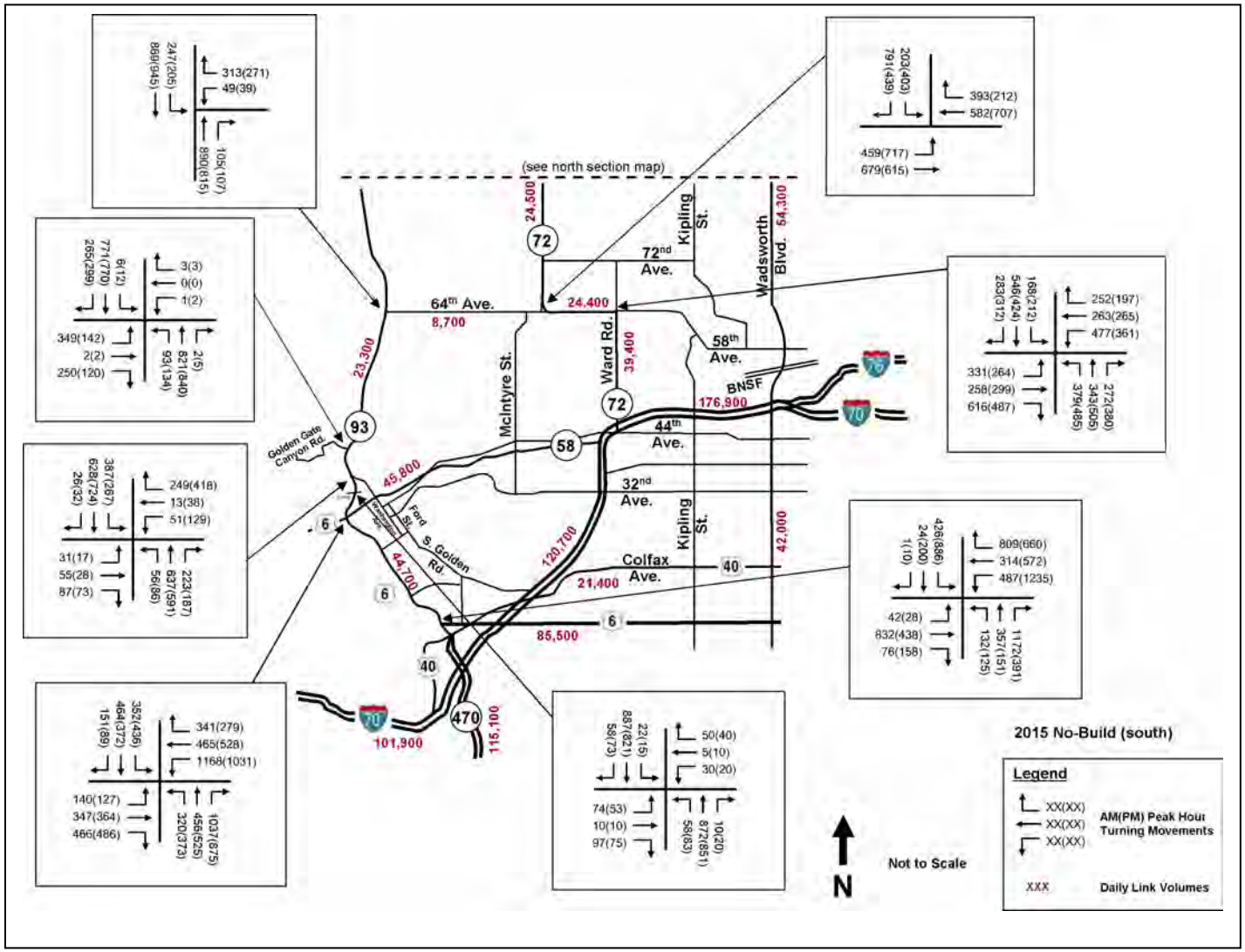
The CDOT *TEPS* traffic data forecasts were for 2030 and not 2035. Comparison of *TEPS* 2030 No Build Alternative with *TEPS* Combined Alternative (Recommended Alternative) 2030 information yields similar results to the current study. Under the No Build, Levels of Service (LOS) for intersections within the corridor ranged between LOS D and F. The same can be true for other intersections within the study area.

Figure 3-6. 2015 NO BUILD TRAFFIC VOLUMES - Part A



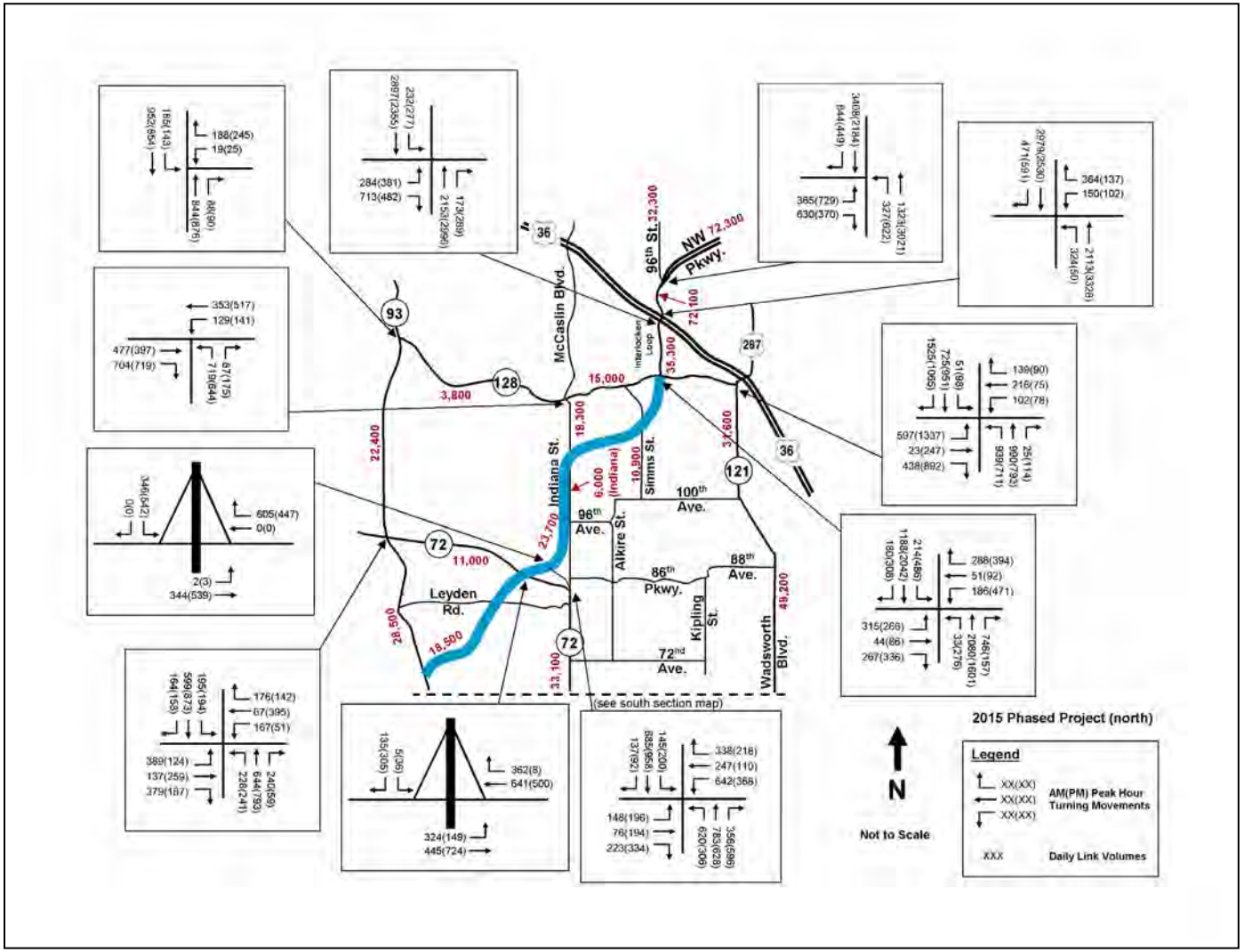
Source: Stantec, 2009

Figure 3-7. 2015 NO BUILD TRAFFIC VOLUMES - Part B



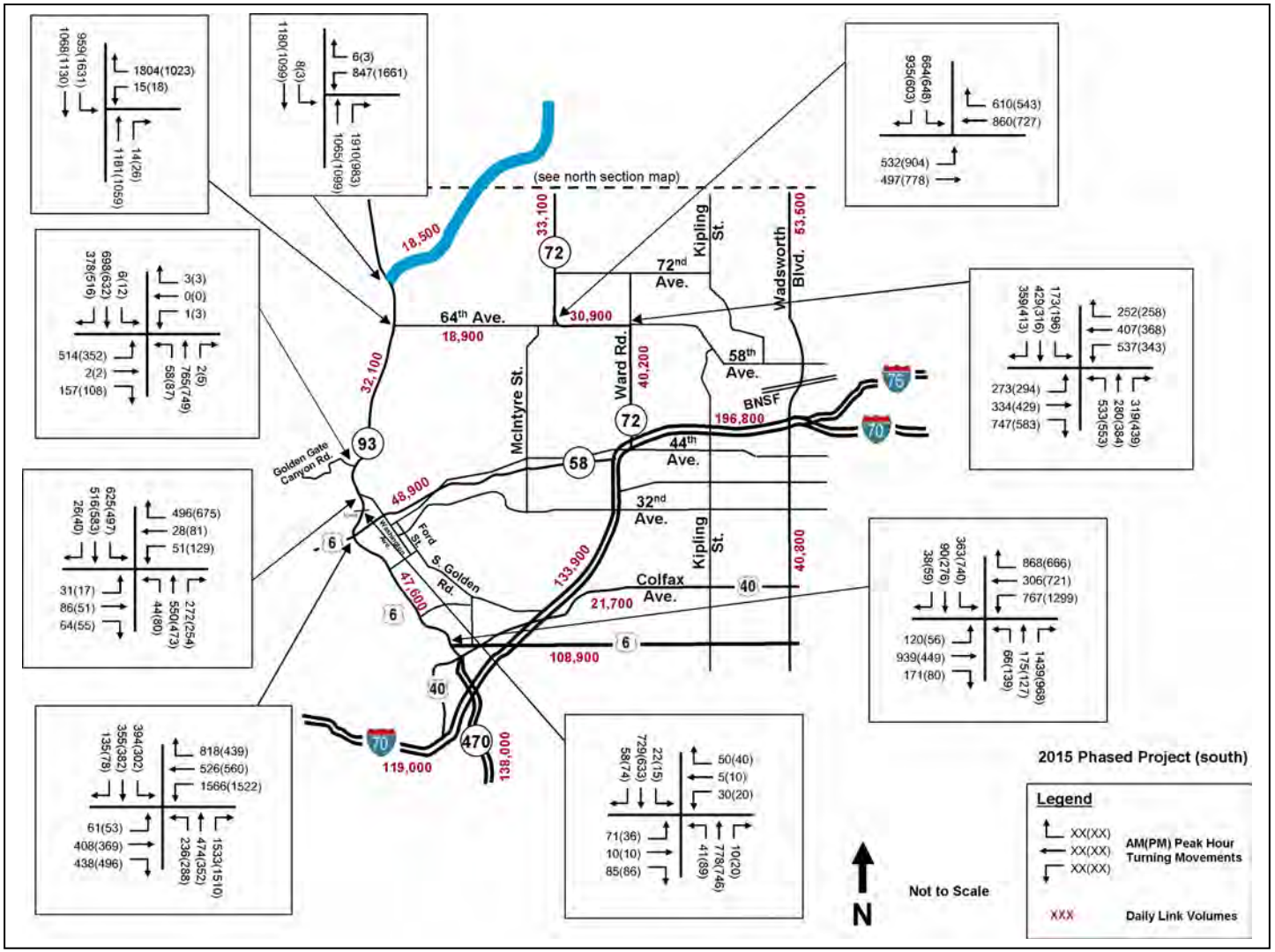
Source: Stantec, 2009

Figure 3-8. 2015 PHASED PROJECT TRAFFIC VOLUMES - Part A



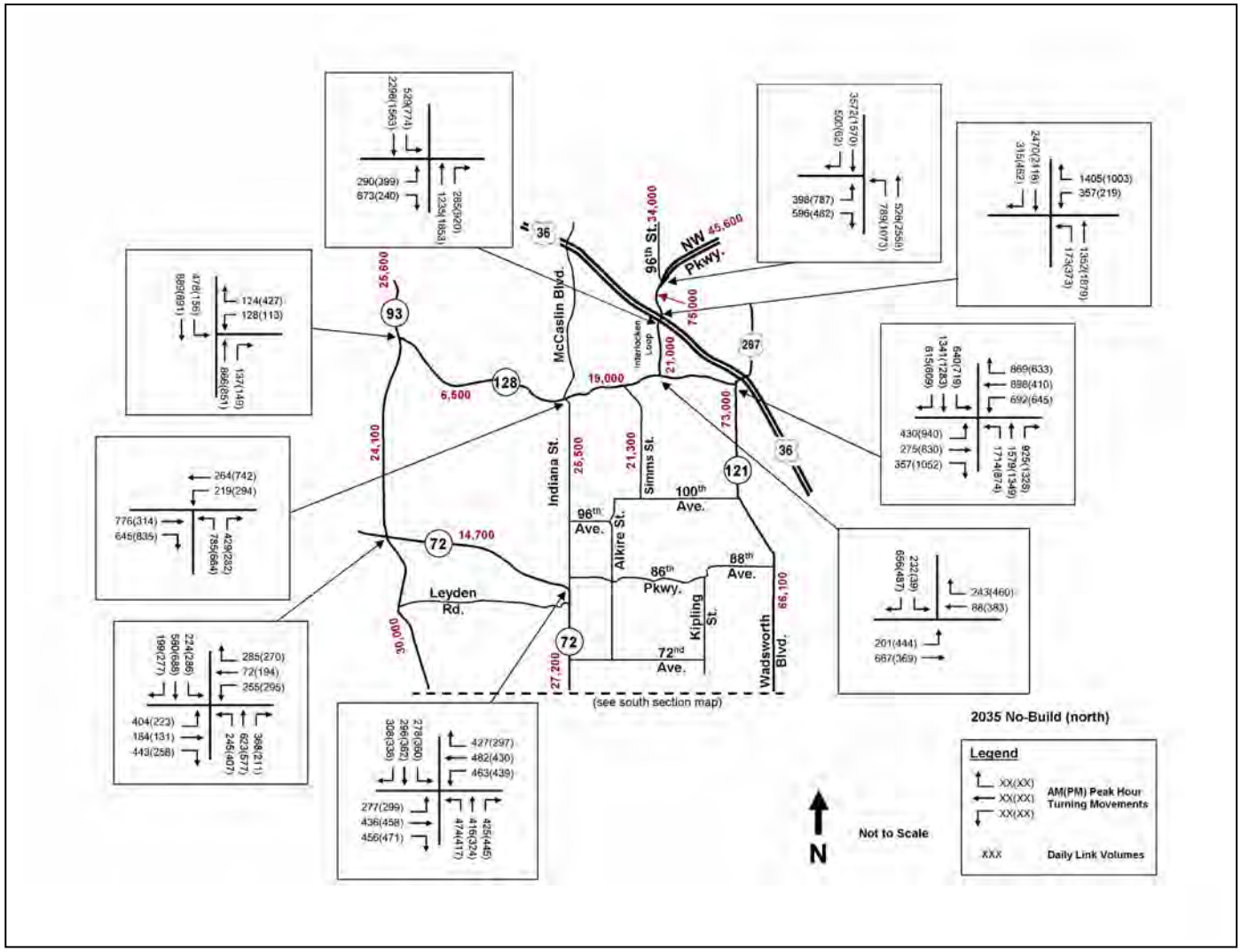
Source: Stantec, 2009

Figure 3-9. 2015 PHASED PROJECT TRAFFIC VOLUMES - Part B



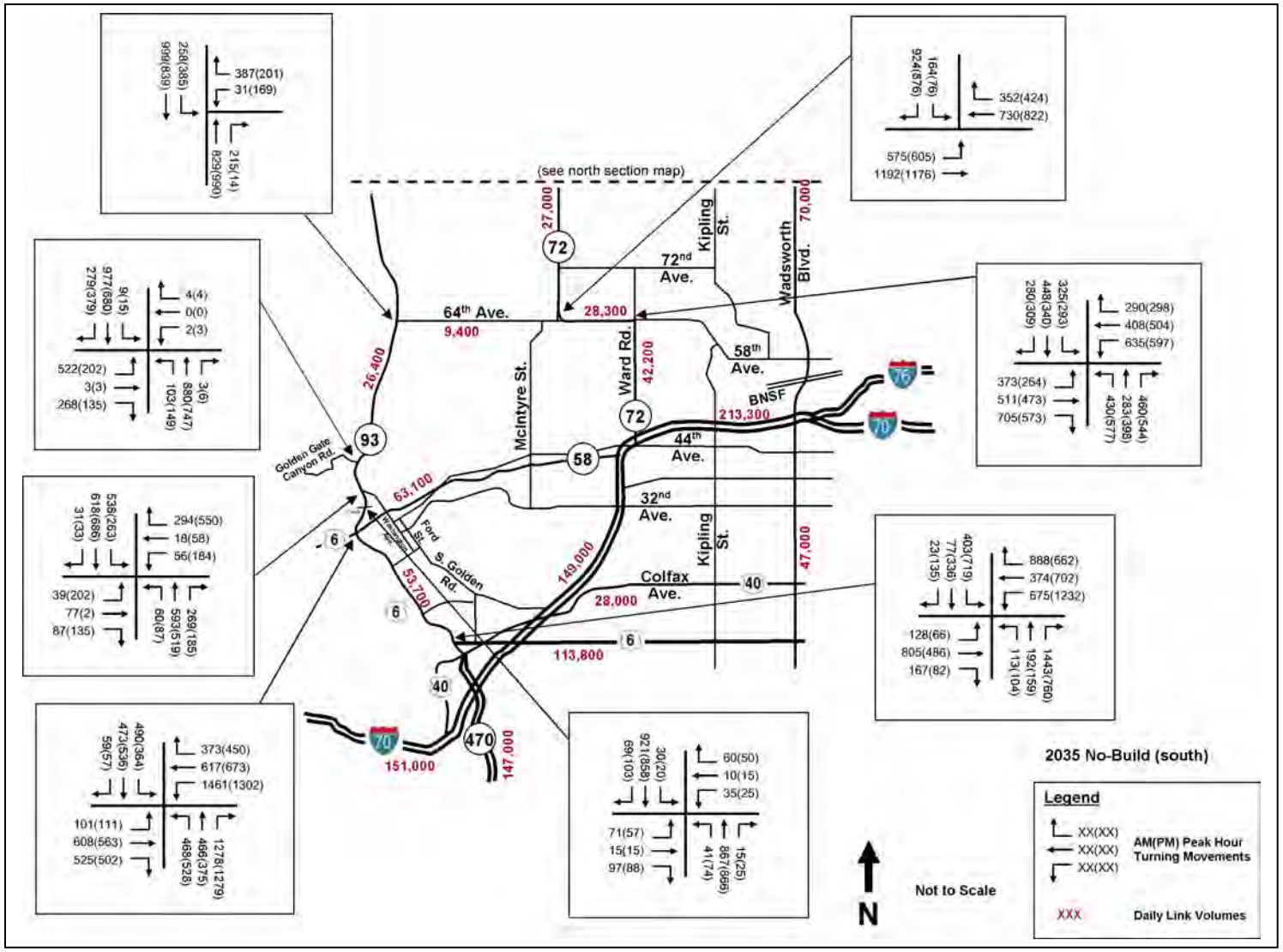
Source: Stantec, 2009

Figure 3-10. 2035 NO BUILD TRAFFIC VOLUMES - Part A



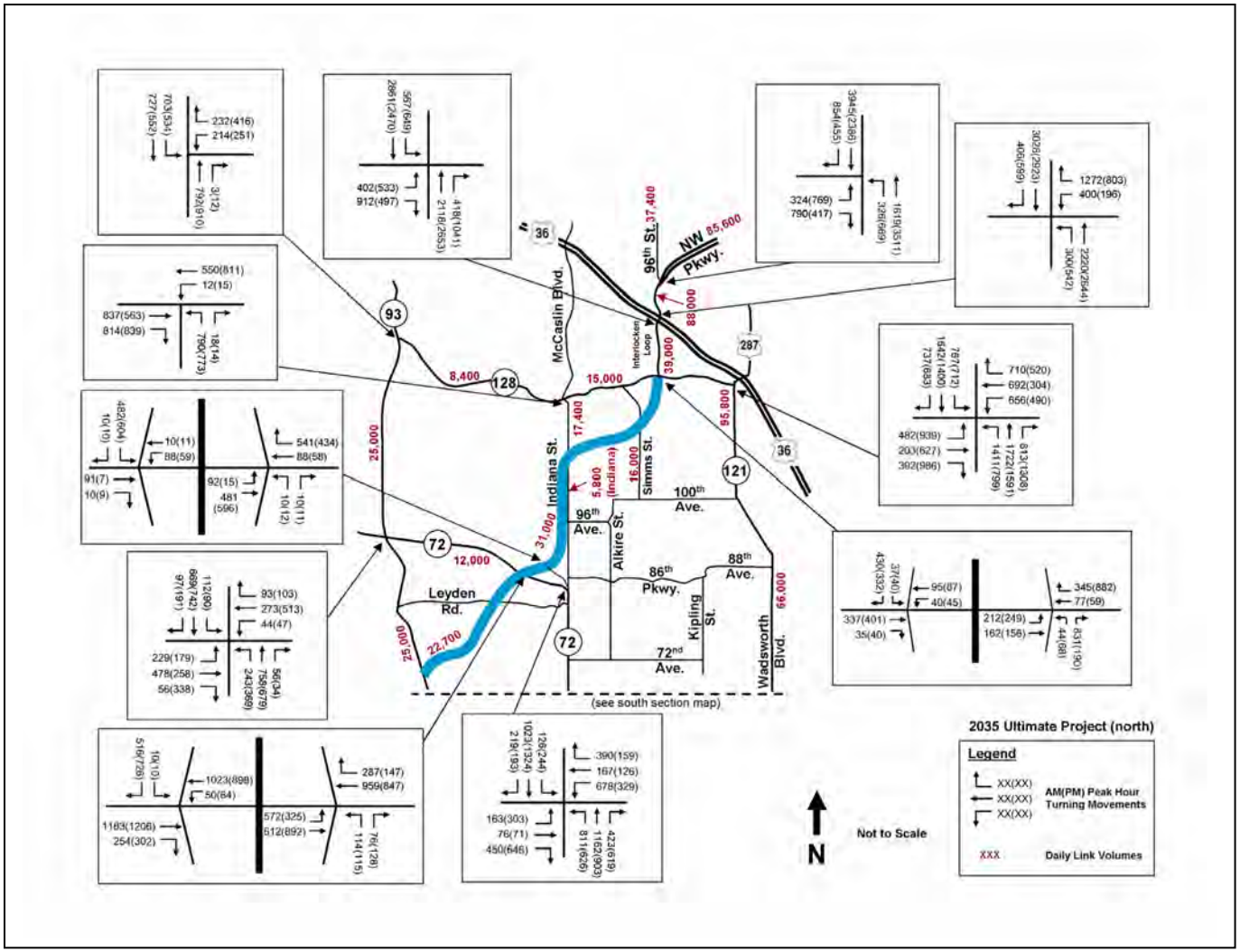
Source: Stantec, 2009

Figure 3-11. 2035 NO BUILD TRAFFIC VOLUMES - Part B



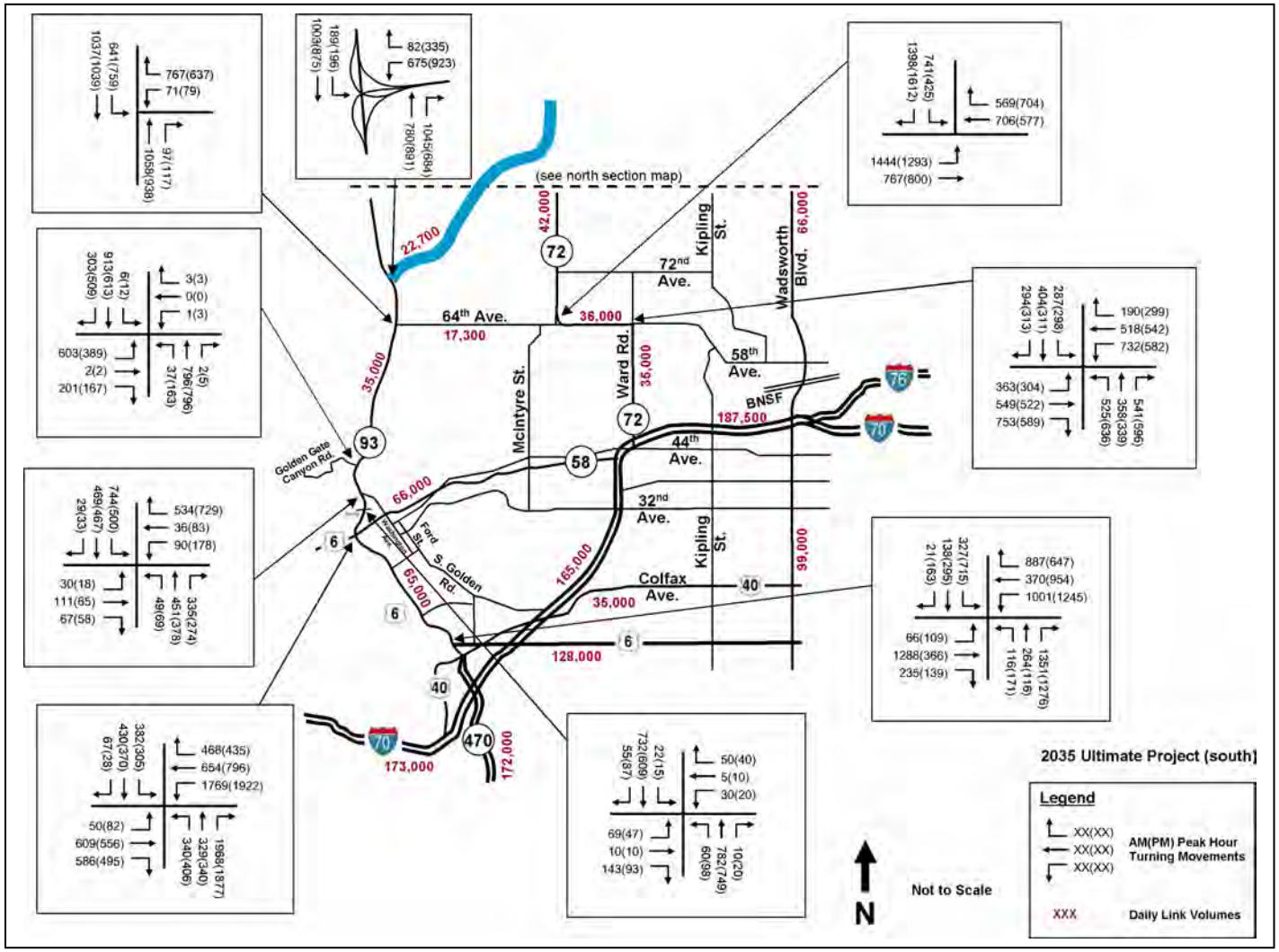
Source: Stantec, 2009

Figure 3-12. 2035 ULTIMATE PROJECT TRAFFIC VOLUMES - Part A



Source: Stantec, 2009

Figure 3-13. 2035 ULTIMATE PROJECT TRAFFIC VOLUMES - Part B



Source: Stantec, 2009

3.2.6 Future Transportation Network - Traffic Operations

Traffic operations at the study area intersections were analyzed using methodologies in the Transportation Research Board's Highway Capacity Manual 2000 and the software Synchro (Version 7). Levels of Service at key study area intersections are illustrated below in Figures 3-14 through Figure 3 - 17. Note that for the Phased Project and Ultimate Project scenarios, auxiliary lanes and traffic control upgrades were included at Parkway intersections and interchanges.

The Phased Jefferson Parkway will open by 2015 with signalized intersections at SH 128 and SH 93 north of 64th Avenue Parkway and partial interchanges at Indiana Street, SH 72, and Cimarron Parkway.

The Jefferson Parkway portion of the 2035 Ultimate Project is envisioned with interchanges at SH 128, SH 72 and SH 93. Additional completed local interchanges would be at Simms Street, and Cimarron Parkway.

While the use of the DRCOG model without adjustment reveals the most conservative forecast information, it still portrays a network where the No Build for both 2015 and 2035 reveal congested roadways with failing levels of service throughout the Northwest Corridor Study Area.

With no corridor upgrades by 2035 or with only the Northwest Parkway upgrades and Jefferson Parkway, levels of service on adjacent roads are at the point of failure for both the No Build and Build options. LOS D is typically the acceptable level of service for system operations; however, in come urban areas, LOS E can be accepted.[2] System operation improvements will occur only after the entire corridor is upgraded.

Note that the Ultimate Project itself will function well through 2035 forecasted years. Table 3-1 illustrates 2015 operations needs throughout the corridor to maintain LOS D or E. Some of these needs pertain to opening day for the Parkway connections. Congestion related improvements will be examined during Parkway design and included as appropriate to ensure that the Parkway operations are acceptable in 2015. Discussion that follows focuses on select locations of Interlocken Loop, SH 128, Indiana Street, SH 72, and portions of SH 93. These discussions are based on the 2015 and 2035 traffic and operations data included in this report.

Interlocken Loop. Using DRCOG data, Interlocken Loop will run 22,700 trips a day in 2015 without the project and 35,300 trips with the project. The intersection at SH 128 will operate at approximately Level of Service F, until portions of the interchange are built. The results for 2035 are also for a poor level of service in the area north of SH 128, regardless of the project. Long term solutions for this location include additional grade-separated movements from SH 128 north to 96th St which will need to be built by the Northwest Parkway.

[2] The Rural and Urban Arterial category from the American Association of State Highway and Transportation Officials (AASHTO) design guide recommends that urban arterials and their auxiliary facilities (turning lanes, intersections, and interchanges) should generally be designed for LOS C. Although LOS C is optimal for urban settings, heavily developed areas may use LOS D as an appropriate standard (*AASHTO Green Book, A Policy on Geometric Design of Highways and Streets*, fourth edition).

SH 128. SH 128 will run 15,000 trips a day in 2015 west of Jefferson Parkway regardless of the project. By 2035, travel will increase to 19,000 with the No Build and remain at 15,000 with the construction of the Parkway. Parkway LOS at SH 128 is shown as F in 2015 without congestion related upgrades, improving to B by 2035 with completion of the regional arterial connection with Northwest Parkway.

Indiana Street. Indiana Street daily traffic volumes will decrease by 12,000 in 2015 with the construction of Jefferson Parkway and decrease by 20,000 along the portions parallel to the Jefferson Parkway. The intersection of Indiana and SH 128 (where the Parkway is not adjacent to Indiana) will operate at an improved level of service in 2015 with the implementation of the project, but by 2035 operations will be poor regardless of the Parkway. LOS at Indiana and SH 72 will decrease from E to F in 2015 with the implementation of the Ultimate Project. LOS F is forecasted for both scenarios for 2035.

SH 72. Traffic on SH 72 west of Jefferson Parkway to SH 93 will run at approximately 10,000 trips in 2015, increasing by 1,000 trips with the construction of the Parkway. By 2035, SH 72 will carry just under 15,000 trips with a reduction of 3,000 trips shown with construction of the Ultimate Project. Parkway LOS at SH 72 will be B in 2015 and C by 2035.

SH 93. SH 93 traffic (north of 64th Avenue Parkway) will generally flow at 23,000+ trips per day in 2015 without the project. The 2035 No Build continues with this trend at 24,000 to 30,000 trips per day.

- The SH 128 intersection with SH 93 will operate at LOS D in 2015 and worsening to LOS E by 2035 without the project. With implementation of the project, LOS B occurs in 2015, but by 2035 LOS F will occur at SH 128 and SH 93.
- SH 72 and SH 93 will operate at LOS E and F regardless of the project.
- Further to the south, LOS at SH 93 is not influenced by the Parkway to the extent that LOS F is anticipated at SH 58 and US 6 locations by 2015 with or without the project.
- The Jefferson Parkway connection with SH 93 would operate at LOS E-F in 2015 without congestion related improvements, but upon completion of the interchange will be a freeflow connection by 2035.

3.2.7 Northwest Corridor Study Area Transportation Needs and Mitigation

Table 3-1 provides a comparison of No Build to Build results for key congested areas in 2015 and Table 3-2 provides similar information for 2035, identifying system level needs and mitigation concepts. Information for 2035 is less accurate due to the potential for changes in economic conditions, land use changes, and other transportation network improvements. Identification of jurisdiction does not imply a commitment to implement the mitigation. The JPPHA is expected to provide congestion related mitigation as appropriate to ensure the operation of the Jefferson Parkway in 2015 (or opening day) as indicated. Detailed assessment of project transportation impacts will be made during forthcoming final design activities at which time, needed congestion related improvements for the opening day scenario(s) will be determined.

Table 3-1. 2015 System Level Needs and Mitigation Concepts

Intersection	2015 No Build	2015 Phased Project	Mitigation	Jurisdiction	Build with Mitigation
	AM/PM LOS				AM/PM LOS
US 36/Interlocken (North Ramp)	E/E	F/F	WB 2nd right turn lane NB 2nd left turn lane NB 3rd thru lane	NWPPHA NWPPHA NWPPHA	D/C
US 36/Interlocken (South Ramp)	F/C	F/F	EB 2nd turn lane NB/SB 3rd thru lane	NWPPHA NWPPHA	E/E
SH 128/Interlocken	F/D	F/F	NB/SB 3rd thru lanes WB 2nd left turn lane	NWPPHA JPPHA	C/D
SH 93/SH 72	F/E	E/F	NB/SB 2nd thru lanes	Out of Jurisdiction	D/D
SH 93/64th Avenue	A/A	E/D	WB 2nd right turn lane (+ NB receiving lane)	JPPHA	B/D
SH 93/Washington	C/C	F/E	EB left turn lane WB right turn lane	Out of Jurisdiction	D/D
SH 72/64th Avenue	C/D	E/F	EB 2nd left turn lane	Out of Jurisdiction	D/C
SH 72/86th Avenue	E/E	F/F	NB/SB 2nd thru lanes EB/WB/NB 2nd left turn lanes	Out of Jurisdiction	D/D
64th Avenue/Ward Road	D/C	E/E	WB 2nd left turn lane	Out of Jurisdiction	D/D

Source: Stantec, 2009

Table 3-2. 2035 System Level Needs and Mitigation Concepts

Intersection	2035 No Build	2035 Ultimate Project	Mitigation	Jurisdiction	2035 Build with Mitigation
	AM/PM LOS				AM/PM LOS
SH 128/SH 93	E/D	F/F	NB 2nd thru lane	Out of Jurisdiction	D/D
SH 128/Indiana	F/D	F/E	NB 2nd thru lane	Out of Jurisdiction	C/C
SH 72/SH 93	E/F	F/F	NB/SB 2nd thru lanes NB 2nd left turn lane	Out of Jurisdiction	D/D
SH 72/64th Avenue	D/D	F/F	EB 2nd and 3rd left turn lanes SB 2nd right turn lane	Out of Jurisdiction	D/D

Source: Stantec, 2009

3.2.8 Phased Project System Failure Dates

The Phased Project, planned to be opened by 2015, includes construction of Jefferson Parkway with at-grade signalized intersections at project termini (SH 128 and SH 93 north of 64th Avenue Parkway) and half interchanges leading to and from the north at SH 72 and Cimarron Parkway.

An analysis was conducted to identify when these intersections and those adjacent to the proposed Jefferson Parkway would require significant improvement to the 2015 interim road network in order to function at a Level of Service D or better.

Failure “choke points” will occur along the SH93 corridor regardless of whether or not the Jefferson Parkway is built. The SH 93 corridor is in need of improvements to handle the existing and the expected traffic. If the Parkway is built before other improvements are made in the corridor, choke points will occur sooner along the unimproved sections of SH 93 because the existence of the Jefferson Parkway will attract through trips off of local streets in the surrounding network. The analysis indicates that attracting through trips onto a road that is designed to accommodate the trips, the Parkway, will relieve congestion and improve safety on local adjacent streets.

The LOS of an intersection ranges from A to F, characterizing the operational conditions of the traffic flow. Intersection LOS is based on vehicle seconds of delay. LOS A represents the best, free-flow conditions where vehicles experience delays of 10 seconds or less. LOS F indicates the worst-case “failing” scenario with high congestion, a complete breakdown of traffic flow and high vehicular delays exceeding 80 seconds for signalized intersections. For the purposes of this assessment, LOS F, representing the worst condition, was considered the point where traffic delays are unacceptable and significant improvements would be required.

The assessment began with an analysis of the proposed 2015 Phased Project facility using 2015 land use assumptions. Some intersections would already operate at LOS F by 2015 with the opening of the Phased Project. (See Table 3-1 above.) A second analysis was conducted using the DRCOG 2035 land use assumptions with the 2015 Phased Project facility. Additional intersections dropped to LOS F with the 2035 land use, while some intersections that were “fixed” with improvements under the 2015 land use assumptions would fail again with the 2035 land use assumptions.

To determine the failure “choke point” year for key intersections for the Phased Project, the JPPHA Program Management Team interpolated between the delay calculated for 2015 land use and 2035 land use, to determine the year when 80 seconds of average delay would be reached. Table 3-3 provides information on failure years. The reader is strongly cautioned that these dates are tentative and will be adjusted based on economic conditions, land use changes, and other transportation network improvements within the corridor that would generate traffic operational needs that support the implementation of the interchange improvements.

Jefferson Parkway data is highlighted in yellow. The upgrade dates are tentative and will be adjusted as the project planning progresses, the project is implemented and actual conditions occur.

Table 3-3. Level of Service "Choke Point" Failure Assessment Years Based on PM Peak Hour Level of Service

Intersection	2015 LOS	2015 Delay (Seconds)	Improvement (to LOS D)	2035 LOS+	2035 Delay+	Failure Year[1]
Interlocken / US 36 NB Ramps	F	121	WB 2nd right turn lane, NB 2nd left turn lane, NB 3rd thru lane	E	70	-
Interlocken / US 36 SB Ramps	F	191	EB 2nd right turn lane, NB/SB 3rd	F	85	2031
Interlocken / SH 128/Jefferson Parkway	F	177	NB/SB 3rd thru lanes, WB 2nd left turn lane	F	201	2019
SH 128 / Indiana	C	24	-	F	126	2026
SH 128 / SH 93	B	16	-	F	109	2029
SH 72 / SH 93	F	99	NB/SB 2nd thru lanes	F	87	2032
SH 72 / Jefferson Pkwy	B	11	-	F	134	2026
SH 72 / Indiana	F	151	NB/SB 2nd thru lanes, EB/WB/NB 2nd left turn lanes	F	106	2027
SH 93 / Jefferson Pkwy	F	398	NB/SB 2nd thru lanes, WB 2nd left turn lane[2]	F	169	2019
SH 93 / 64th Avenue	D	40	WB 2nd right turn lane (AM mitigation)	F	108	2026
SH 72 (Indiana) / 64th	F	81	EB 2nd left turn lane	F	90	2032
SH 72 (Ward) / 64th	E	66	WB 2nd left turn lane	F	84	2033
SH 93 / Golden Gate	C	32	-	D	45	-
SH 93 / Washington	E	63	EB separate left turn lane, WB separate right turn lane	E	79	-
SH 93 / Iowa	A	7	-	A	8	-
SH 93 / SH 58 / US 6	F	224	WB 3rd left turn lane, NB/EB 2nd right turn lanes	F	140	2021
US 6 / C-470	F	122	NB 2nd left turn lane, SB separate right turn lane	F	216	2020

[1]These dates are tentative and will be adjusted based on economic conditions, land use changes, and other transportation network improvements within the corridor that would generate traffic operational needs that support the implementation of the interchange improvements.

[2] Improvement to LOS E

+ Includes 2015 improvements

Source: Stantec, 2009

3.2.9 Jefferson Parkway Toll Road and Northwest Parkway Arterial Benefits

Completion of the Ultimate Project will be a significant step toward completion of the northwest portion of the urban beltway. Completing the beltway will result in removal of through traffic off of local streets onto the beltway and will provide a travel corridor for traffic traveling to and from the west and northeast portions of the state.

It is clear that the Jefferson Parkway and associated Northwest Parkway extension are needed to provide transportation links that will enable Jefferson County, City and County of Broomfield, and Arvada to complete planned development for the Interlocken and Candelas Urban Centers and other associated development within the Northwest Corridor Study Area. By 2015, under the most conservative of forecasts, Jefferson Parkway will carry 18-24,000 trips per day that won't be going on other streets. Conservatively, by 2035, Jefferson Parkway and extended Northwest Parkway will carry 23–39,000 trips per day. With completion of improvements to the Southern Section, the Jefferson Parkway could approach 70,000+ trips that would not use parallel roadways.

The Jefferson Economic Council (JEC) noted that the economic and fiscal Impacts on Jefferson County of development in the Northwest Corridor area with construction of the roadway is nearly double the impact without the roadway (JEC, 2007). Recognizing the current economic decline nationally and the continued dedication of developers and businesses within the Northwest Corridor Study Area, it remains likely that a beneficial level of economic and fiscal impacts will occur.

3.2.10 Completion of the Southern Section Would Provide Further Benefits

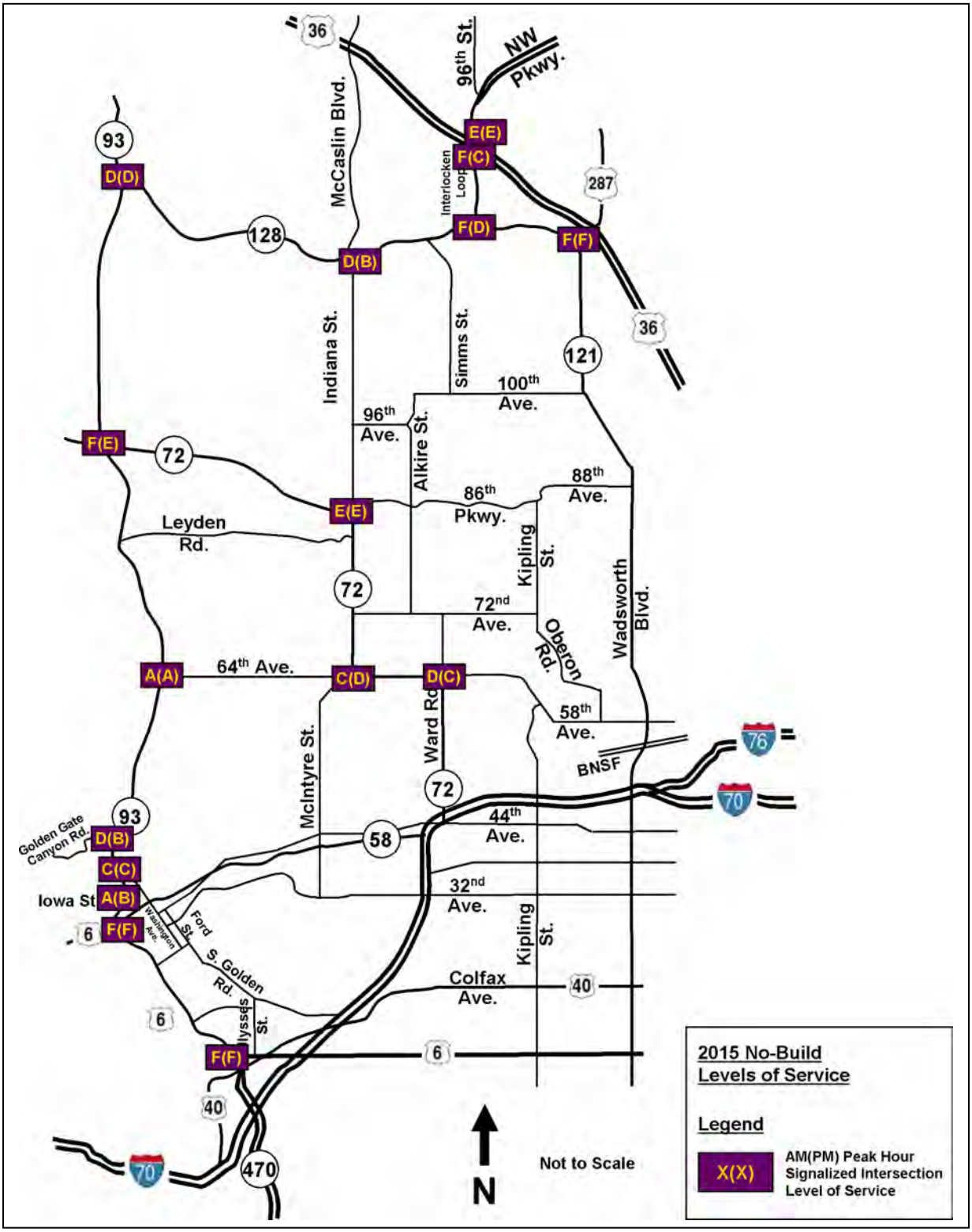
The traffic analysis indicates that there are both congestion and traffic safety needs for the project. Once improvements are made to SH 93, including the section through Golden, an improved alternate route for trips moving in the northwest portion of the region will be available. This route will facilitate travel and relieve congestion on both local and arterial streets in the study area.

The 2035 Ultimate Project model run based on a completed regional arterial link in the Southern Section and updated small area employment showed Jefferson Parkway traffic more than double what is shown without Southern Section improvements. Daily traffic numbers ranged in the 70,000+ range. Completion of this link resulted in reductions to parallel arterials such as SH 121 (Wadsworth, Simms and Indiana Streets) and increased demands for trips along SH 58.

Completion of the entire beltway connection, including the Southern Section, would dramatically increase Parkway use and reduce trips on parallel streets.

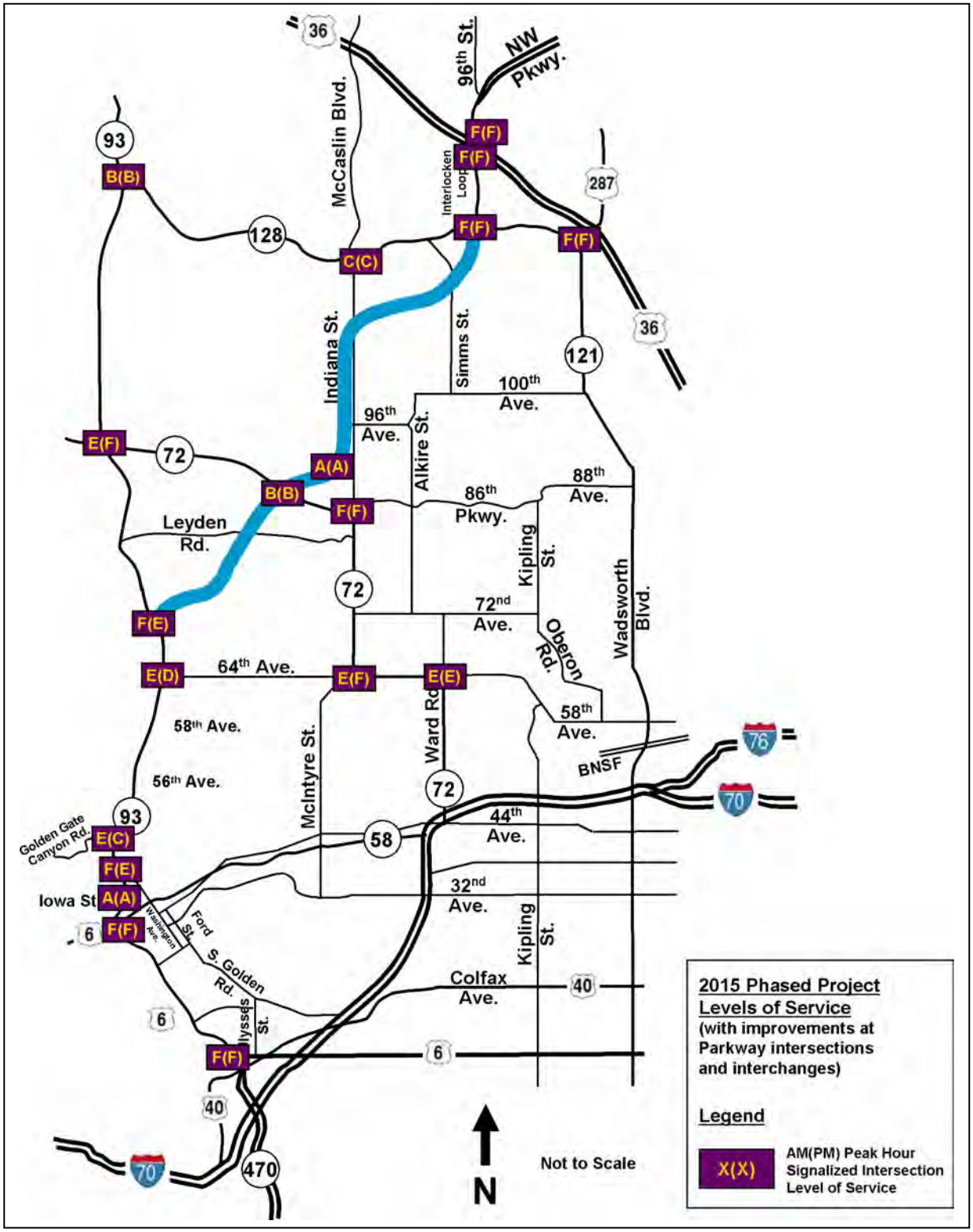
Significant reductions in traffic on I-25, I-76 and I-70 in the northwest quadrant of the Denver metropolitan area are expected to occur upon completion of the entire beltway.

Figure 3-14 2015 NO BUILD LEVELS OF SERVICE



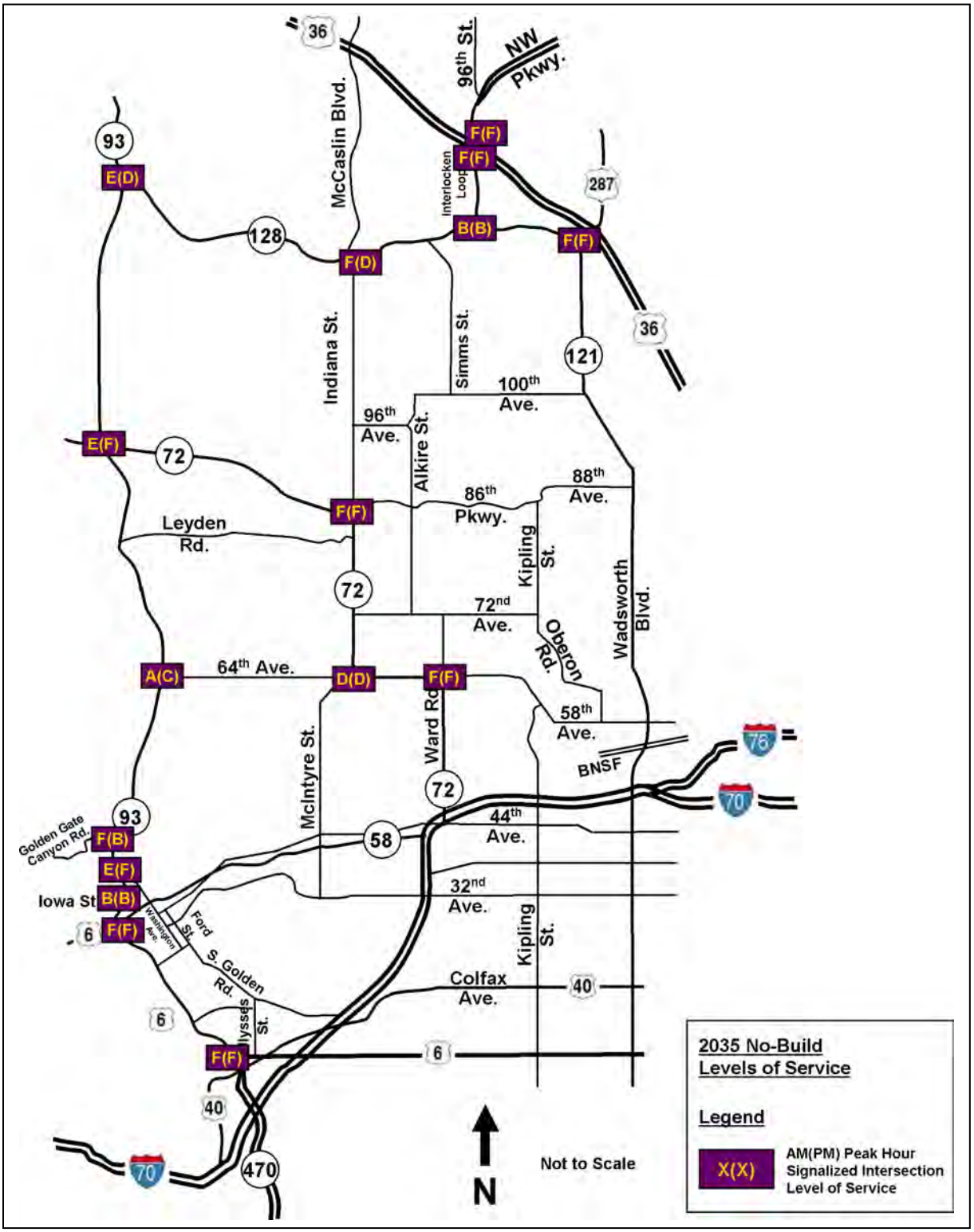
Source: Stantec, 2009

Figure 3-15. 2015 PHASED PROJECT LEVELS OF SERVICE



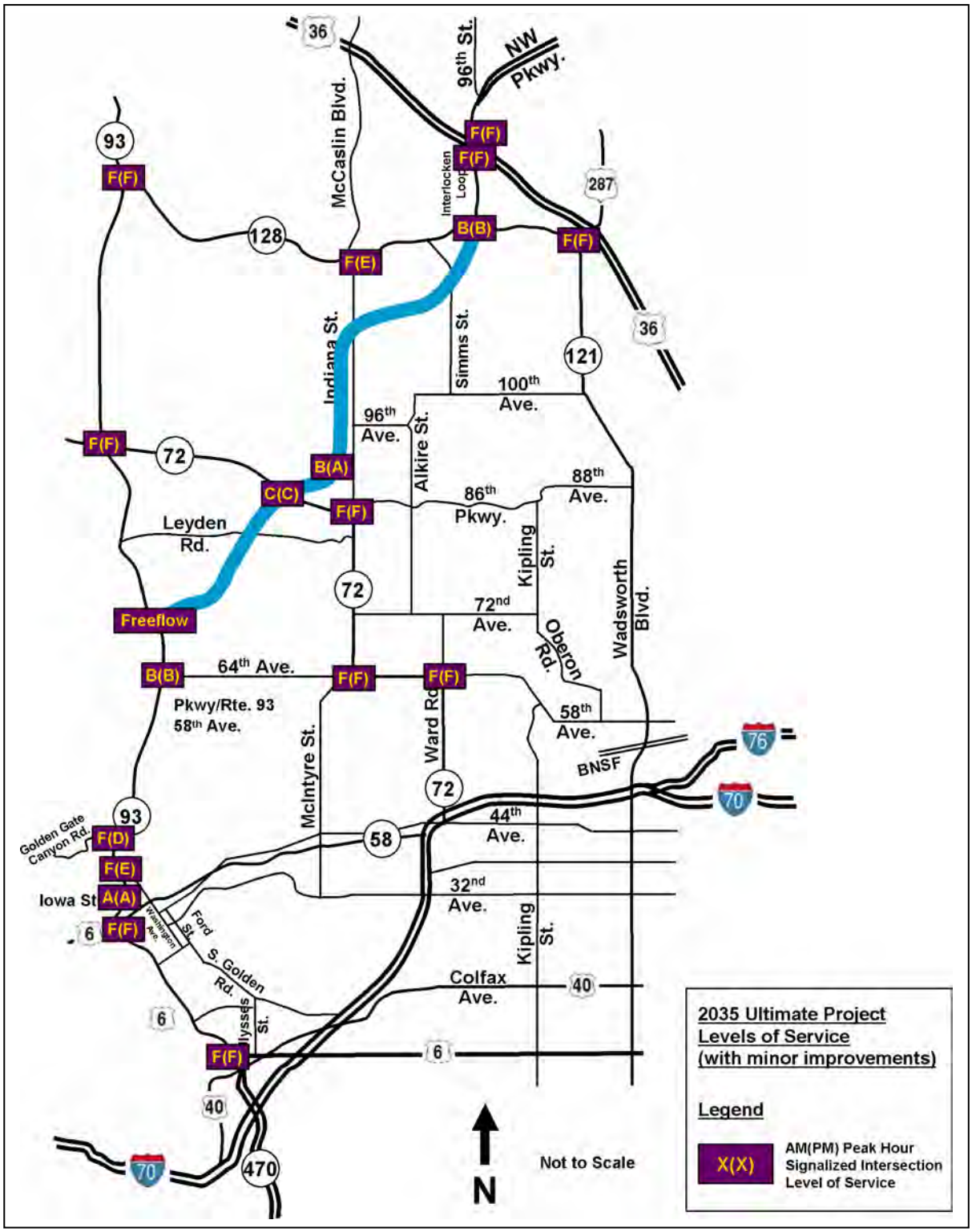
Source: Stantec, 2009

Figure 3-16 2035 NO BUILD LEVELS OF SERVICE



Source: Stantec, 2009

Figure 3-17. 2035 ULTIMATE PROJECT LEVELS OF SERVICE



Source: Stantec, 2009

4.0 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES AND MITIGATION

4.1 AFFECTED ENVIRONMENT

The CDOT *Northwest Corridor Transportation Planning and Environmental Study (TEPS)* made available to the public in July 2008 contains full disclosure environmental analysis for a series of alternatives, including the No Build (or No Action) and the Combined Alternative (Recommended Alternative) which includes the Ultimate Project identified for this study.

Based on the results of the *TEPS*, there are a number of environmental resources that will require additional evaluation as this project moves forward. As the project footprint and design are refined, additional or updated studies are anticipated. The additional evaluations will be included in site specific environmental assessments as appropriate. Prior to construction of the transportation improvements, various permits and approvals from federal and state agencies will be required. Best Management Practices (BMPs) will be applied.

The US Fish and Wildlife Service (USFWS), *Rocky Flats National Wildlife Refuge Final Comprehensive Conservation Plan & EIS*, (September 2004) and *Record of Decision* (February 2005) included a general analysis of impacts to the Refuge from the potential transportation improvements associated with the up to 300 feet of right-of-way to be made available along the west edge of Indiana Street as identified in the Refuge Act (*Rocky Flats National Wildlife Refuge Act of 2001 S. 1438*). The Department of Energy (DOE) transferred the Refuge property to the Department of Interior USFWS in the summer of 2007. The *TEPS* study identified similar details for the entire corridor and is the basis for the discussion in this chapter. As relevant, acreages of specific resources within the 300 feet of right-of-way are identified in the discussions that follow.

The objective of the current discussion is to identify sensitive resources within the Ultimate Project study area that will require updated and/or additional analysis. The following resources have been identified based on review of *TEPS* resource analyses:

- Air Quality
- Noise
- Water Quality
- Wetlands
- Vegetation, Wildlife and T&E
- Hazardous Materials
- Parks and Recreation Areas
- Historic Properties

Each of these resources is summarized below. The *TEPS* and associated technical studies include detailed analyses on each of these resources. The Affected Environment description for each of these eight resources is defined within the Northwest Corridor or *TEPS* Study Area and also a smaller 2035 Ultimate Project Study Area when appropriate. The 2015 Phased Project footprint is treated as the same as the 2035 Ultimate Project for consideration in this analysis. The *TEPS* study area is the same area on which traffic analysis has been based in Chapter 3.

Where appropriate, the larger study area is discussed in three sections. Figure 4-1 illustrates theses study areas and sections.

The Affected Environment is defined within the Northwest Corridor or *TEPS* Study Area and also a smaller 2035 Ultimate Project Study Area when appropriate. The larger study area is divided into three sections: northern, central and southern.

Northern Section. The northern section includes the Flatiron Crossing Mall/Interlocken Area, Superior, and Broomfield, and extends from the western terminus of Northwest Parkway near 96th Street to the northeast corner of the Rocky Flats National Wildlife Refuge[1] south of the intersection of SH 128 and Indiana Street. This area generally includes the proposed improvements associated with the connection of the Northwest Parkway at 96th Street to the Jefferson Parkway at SH 128. This regional arterial connection is part of the 2035 Ultimate Project.

Central Section. The central portion consists of the Rocky Flats area, Westminster, and Arvada and includes the area between Indiana Street and SH 93 from and including SH 128 south to 64th Avenue Parkway. SH 72 and 82nd Avenue (Leyden Road) extend east-west from Indiana Street to SH 93. This area includes all of the proposed improvements associated with the Jefferson Parkway and is part of the 2015 Phased Project and the 2035 Ultimate Project.

Southern Section. The southern portion includes the Golden Area and extends from 64th Avenue Parkway south to C-470. This area is a part of the original *TEPS* study area, and the current system level study Chapter 3 Transportation analyses. It is also included in the current affected environment section due to the potential for system level transportation and/or cumulative environmental impacts.

4.1.1 Air Quality

The study area for the Air Quality includes the entire Northwest Corridor.

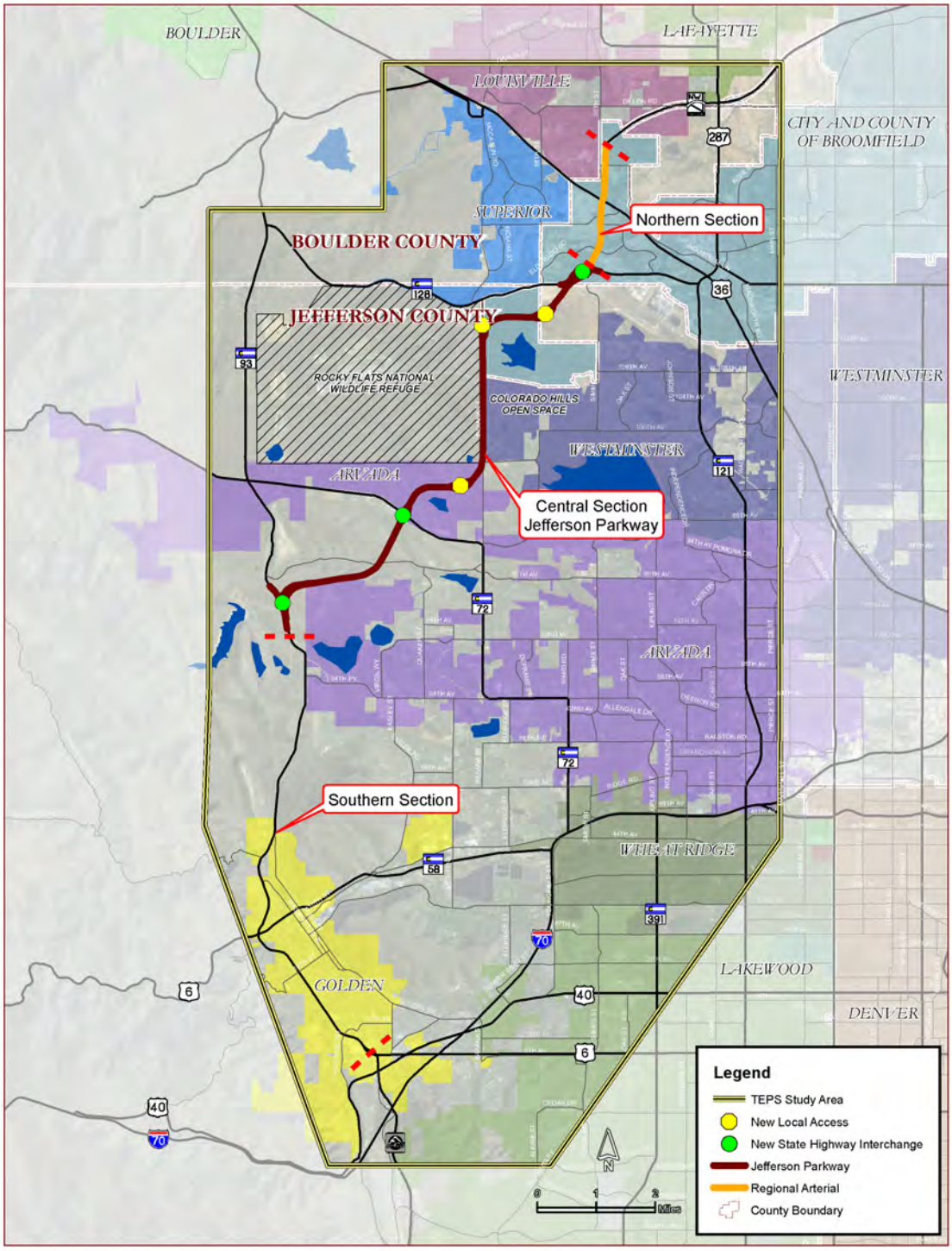
4.1.1.1 National Ambient Air Quality Standards

The Clean Air Act and its amendments led to the creation of National Ambient Air Quality Standards (NAAQS) by United States Environmental Protection Agency (EPA) for criteria air pollutants: carbon monoxide (CO), sulfur dioxide, ozone (O_3), suspended particulate matter (PM_{10}), nitrogen dioxide, and lead. Most of the NAAQS have been in force for several decades, but in 1997 EPA modified the O_3 standard from 1 hour to 8 hours and added a standard for very fine particulate matter ($PM_{2.5}$). Implementation of the two newest NAAQS began in 2004.

The Denver metropolitan region has been in attainment of the sulfur dioxide, nitrogen dioxide, and lead NAAQS since monitoring began. The Denver metropolitan region had been a nonattainment area for CO, O_3 (1-hour), and PM_{10} since the early 1970s, so those pollutants

[1] The *TEPS* study and some resources contained in the current study refer to what is now the Rocky Flats National Wildlife Refuge as the Rocky Flats Environmental Technology Site (RFETS).

FIGURE 4-1. NORTHWEST CORRIDOR STUDY AREA



Source: Stantec, 2009

have historically been concerns in the study area. EPA reclassified the Denver metropolitan region as an attainment/maintenance area in 2001 and 2002 for CO, O_3 (1-hour), and PM_{10}, and regional maintenance plans are now in effect for all of these pollutants.

Several air quality monitoring stations, including two within the study area (Rocky Flats and the National Renewable Energy Laboratory), have measured exceedences of the 8-hour O_3 NAAQS. Often some of the highest O_3 concentrations in the Denver metropolitan region each year are measured in the study area.

From this monitoring data, the Denver area air quality agencies learned that there would be an O_3 problem under the 8-hour NAAQS and created an Early Action Compact with EPA in 2002 to begin reducing O_3 concentrations. Despite efforts in an Early Action Compact for Ozone (EAC 2002), the Denver and North Front Range areas failed to achieve the 8-hour ozone standard due to high readings in 2007. The area is now considered a non-attainment area for ozone and the Colorado Department of Public Health and Environment (CDPHE) is required to revise the SIP based on current air quality data. In response, the CDPHE developed the Denver Metro Area and North Front Range Ozone Action Plan in 2008 (CDPHE 2008b). Implementation of this plan would include a proposed revision to the SIP. The plan was approved by the Regional Air Quality Council and the North Front Range Transportation and Air Quality Planning Council in September 2008. A public hearing and SIP approval took place on December 11, 2008, through the Colorado Air Quality Control Commission.

4.1.1.2 Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. FHWA has also issued interim guidance for air toxics analysis (FHWA, 2006a). Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

4.1.1.3 Monitoring Issues

Some questions were raised by the public about project-specific air quality monitoring. The Air Pollution Control Division (APCD) is responsible for air quality monitoring in the Denver metropolitan area; CDOT and FHWA do not perform ambient air quality monitoring.

4.1.1.4 Rocky Flats Air Quality

Another potential localized air quality concern raised was the RFETS. Because of the nature of the site, radionuclides could be transported off-site through the air or become airborne from soil disturbance during construction. APCD conducted a multi-year air monitoring program around Rocky Flats through December 2005 (APCD, 2006). These data did not show evidence of airborne radionuclides exiting Rocky Flats.

4.1.1.5 Conformity Requirements

The completion of this System Level Study is part of the process leading to the inclusion of the Ultimate Project in the fiscally constrained RTP needed to demonstrate regional air quality conformity.

In nonattainment and attainment/ maintenance areas, the Clean Air Act requires that fiscally constrained long-range regional transportation plans (RTPs), transportation improvement programs (TIPs), and individual projects cannot: cause new violations of the NAAQS, increase the frequency or severity of existing violations of the NAAQS, or delay attainment of the NAAQS.

Although included in the Regional Transportation Plan for over 20 years, neither the Ultimate Project nor the CDOT Combined Alternative (Recommended Alternative) have been included in either the fiscally constrained RTP or TIP. The proposed project must be included in a conforming and fiscally constrained RTP before regional conformity can be demonstrated. The completion of this System Level Study is part of the process leading to the inclusion of the proposed project in the fiscally constrained RTP. The proposed project supports inclusion of the northern and central project elements only in the RTP.

4.1.2 Noise

The study area for Noise includes the entire Northwest Corridor for identification of noise receivers; however the focus for the current analysis is the area in proximity to the Ultimate Project.

4.1.2.1 Noise Measurements

4.1.2.2

Measurements were taken at a number of locations in the study area to document existing ambient conditions. These locations included residential, park, commercial, and undeveloped areas along the alternative alignments that were under consideration during the *TEPS* screening of alternatives. Actual traffic counts, including the number of large trucks, were collected when traffic was visible during the noise measurement periods (see *Northwest Corridor Supporting Document-Noise Impact Assessment*).

Areas where existing traffic noise exceeds the standard are outside the Ultimate Project Study Area in the Southern Section of the Northwest Corridor Study Area.

Table 4-1 identifies noise measurement locations in proximity to the Ultimate Project as well as the southern section of the Northwest Corridor. The measurements indicate that the existing traffic noise environment exceeded the applicable CDOT Noise Abatement Criteria (NAC) at select locations in the Northwest Corridor Study Area, but none within the Ultimate Project (Northern and Central Sections).

Table 4-1. NOISE MEASUREMENT RESULTS

Number*	Project Section	Location	Measured Leq (dBA)	Land Use Category	CDOT NAC (dBA)
4	Southern	North Table Mountain Open Space	52	D	none
7	Southern	1800 block Parfet Estates	66	B	66
8	Southern	400 block Snowberry Court	59	D	none
9	Southern	300 block Lily Lane	57	B	66
10	Southern	Lily Lane at SH 58	62	B	66
15	Central	Indiana Street at Woman Creek	68	D	none
16	Southern	100 Jefferson County Parkway	70	C	71
17	Central	Arvada Reservoir Open Space	46	D	none
28	Northern	Near Camden Apartments	64	B	66
29	Northern	Omni Interlocken golf course	65	B	66
30	Northern	StorageTek Drive	61	D	none
33	Southern	Near 16700 block W. 1st Avenue	76	D	none
35	Southern	Mitchell Elementary School, Rubey Drive	63	B	66

Land Use Category B - exterior for residences, motels, schools, churches
Land Use Category C - exterior for developed lands not in categories A or B
Land Use Category D - undeveloped lands
* Numbers are from original *TEPS* table and were part of a larger sample area.
Source: FHU field data, 2004-2006, taken from original *TEPS* Table 4.7-2

4.1.2.3 Noise Model

A noise model was constructed to evaluate existing conditions on a broader basis than allowed by the measurements alone. The traffic model used the major existing roads that could be affected by the build alternative, with existing (2004) traffic volumes and road layouts. Approximately 980 noise receivers were modeled within the Northwest Corridor. Although there are model receivers that were calculated to have existing traffic noise above the respective NAC during either the AM or PM peak hours, none of these were identified along the Ultimate Project. All were in the southern section and all were Category B properties (homes and parks). No commercial receivers were estimated to exceed the CDOT Category C NAC. The existing conditions model results agree with the measurement results in that several Category B areas currently meet or exceed the CDOT NAC and were therefore impacted.

4.1.3 Water Quality

Water resources within the Northwest Corridor Study Area, including surface water, groundwater, and the drainage system are described briefly in this section (also see *Northwest Corridor Supporting Technical Document-Water Resources*). Water resources specifically relevant to the Ultimate Project are also identified. The federal Clean Water Act and CDOT's Municipal Separate Storm Sewer System (MS4) permit require the analysis and management of water quality for this project. The primary regulation that manages and specifies water quality is the federal Clean Water Act.

4.1.3.1 Surface Water

The Northwest Corridor Study Area lies within the middle portion of the South Platte River Basin. The major tributaries of the South Platte River that either are in or receive water from the study area are Boulder Creek, Big Dry Creek, and Clear Creek. Six smaller watersheds are in the larger Clear Creek Watershed:

- Leyden Creek
- Ralston Creek
- Van Bibber Creek
- Clear Creek (Beaver Brook to South Table Mountain)
- Clear Creek (South Table Mountain to Denver)
- Clear Creek (Denver to Mouth)

Numerous streams and rivers are contained within these watersheds. Reservoirs include drinking water supplies for the City of Arvada and the City and County of Denver.

4.1.3.2 Groundwater

Within the study area, groundwater is typically found in both shallow aquifers and in deeper bedrock aquifers. The shallow aquifers consist of one or more of the following: largely unconsolidated alluvium, weathered fractured bedrock at or near the ground surface, and other permeable surficial deposits such as colluvium or landslide deposits, all of which may be hydraulically connected. In general, groundwater in the study area flows from west to east.

Bedrock aquifers in the study area are sedimentary units, including the Tertiary/Cretaceous Denver Formation, the Cretaceous Arapahoe Formation, the lower part of the Cretaceous Laramie Formation, and the Cretaceous Fox Hills Sandstone.

4.1.3.3 Uses

While only a few of the streams in the study area have surface flows year-round, all of the streams, including ephemeral and intermittent streams, have designated uses that the stream must attain. Clear Creek is an exception to this general description because it receives substantial flows throughout the year making it the only true perennial stream in the study area.

The only other perennial stream in the study area is a segment of Ralston Creek that crosses Indiana Street.

All of the major lakes and reservoirs in the study area are man-made. The largest of the lakes and reservoirs in the study area are used for municipal drinking water sources (Standley Lake, Arvada Reservoir, Ralston Reservoir, Upper and Lower Long Lake, and Welton Reservoir). The designated uses for the lakes and reservoirs vary within the study area.

One of the unique surface water characteristics of the study area is the abundance of irrigation canals in the southern section. The three main canals (Church Ditch, Croke Canal, and Farmers Highline Canal) divert water from Clear Creek and convey the water throughout the study area, providing water for drinking water supplies, other reservoirs, and agricultural purposes outside of the study area.

The 6,240-acre Rocky Flats National Wildlife Refuge is located in the central section of the study area. The site is operated by the USFWS (also *see Northwest Corridor Supporting Technical Document-Modified Environmental Site Assessment*). The surface waterbodies that occur on the Rocky Flats National Wildlife Refuge are Rock Creek, Walnut Creek, Woman Creek, and a series of man-made ditches with holding ponds along their length.

4.1.3.4 Impaired Streams

There are three stream segments in the study area that do not meet their designated uses and have been identified as requiring Total Maximum Daily Load (TMDL) analysis. A TMDL is an analysis and allotment of loads to sources of water discharge in a watershed that will assist in improving the water quality of a stream so that the designated uses can be met. Two segments are portions of Clear Creek and one is for Ralston Creek below the Arvada Reservoir. None of the impaired streams are within the study area for the Ultimate Project.

4.1.3.5 Drinking Water Sources

The water supply for the City of Arvada (Arvada Reservoir and Ralston Reservoir) is located in the west central portion of the study area. Clear Creek supplies the City of Golden's drinking water. Water is taken out of Clear Creek approximately one mile upstream (west) from the intersection of US 6/SH 93/SH 58 and is piped underground into two holding ponds. The water from Standley Lake Reservoir is used as a municipal water supply for the Cities of Westminster, Northglenn, and Thornton. Clear Creek supplies 96 percent of the reservoir's water via three irrigation ditches (Church Ditch, Croke Canal, or Farmers Highline Canal). Denver Water has water storage and distribution lines within the study area, most notably Ralston Reservoir.

4.1.3.6 Non-potable Water Supplies

Great Western Reservoir is the largest non-potable reservoir in the study area. Non-potable water is used for watering golf courses, parks, and so on, but is not used for drinking water or household uses. The City and County of Broomfield is currently considering the expansion of

Great Western Reservoir to address the growing population in the area and their non-potable water needs.

Table 4-2 illustrates water resources located in proximity to the Ultimate Project by project section.

Table 4-2. WATER RESOURCES SUMMARY FOR ULTIMATE PROJECT

Location	Water Resource
Northern Section	Boulder Creek Watershed Streams: Rock Creek
Central Section	Big Dry Creek Watershed Streams: Walnut Creek, Woman Creek, Upper Big Dry Creek.
	Big Dry Creek Watershed Reservoirs: Great Western Reservoir, Welton Reservoir, Woman Creek Reservoir, and Standley Lake
	Clear Creek Watershed Streams: Leyden Creek and Ralston Creek

4.1.4 Wetlands

TEPS wetland scientists conducted preliminary wetland determinations for the entire Northwest Corridor Study Area. They identified approximately 2,142 acres of wetlands and 3,263 acres of waterbodies. Wetland scientists conducted more detailed wetland determinations within 100 feet of the proposed right-of-way (reduced wetland assessment area) of the Northwest Corridor (all three sections) including the Ultimate Project.

Based on the detailed wetland determination studies, 173 wetland sites totaling approximately 61 acres are present within this reduced wetland assessment area. Wetlands are located throughout the landscape in association with natural drainages, seep areas, ponded sites, and irrigation and roadside ditches. The *Rocky Flats Final CCP & EIS* identified approximately 3.5 acres of wetlands within 99 acres of potential transportation right-of-way.

The wetlands are distributed among five groupings of Colorado Natural Heritage Program wetland plant associations, although some wetlands encompass several associations. From most to least common, the wetland plant associations are sandbar willow, cattail/bulrush, grass, sedge/rush, and peach-leaved willow. All of the wetland plant associations are in the Cowardin palustrine system (non-tidal wetlands dominated by trees, shrubs, and emergent vegetation). Wetland classes within the palustrine system include emergent (cattail/bulrush, grass, sedge/rush) and scrub-shrub (sandbar willow, peach-leaved willow). Some wetlands have areas of aquatic bed vegetation (algae, duckweed).

Investigations also noted bodies of open water such as lakes, waterways, and ponds, which are non-wetland open waters, some of which fall under the jurisdiction of U.S. Army Corps of Engineers (USACE). From north to south, natural waterways with flows or bed and bank characteristics crossed by the proposed Northwest Corridor Study Area defined for the CDOT

Combined Alternative (Recommended Alternative) which includes the Ultimate Project are: Rock Creek, Walnut Creek, Woman Creek, Big Dry Creek, Leyden Gulch, Van Bibber Creek, Tucker Gulch, Chimney Gulch, and Clear Creek as well as several unnamed drainages with an apparent connection to a known water of the United States (U.S.). Seventeen ponds, including nine apparently without wetlands, are present in the study area; some ponds may be waters of the U.S.

For the purposes of the Northwest Corridor study, scientists used the Montana Wetland Field Evaluation Form and Instructions to evaluate functions of wetlands in the study area. It is a rapid functional assessment process designed primarily to address wetland resources associated with highways and other linear projects.

For each evaluated wetland, the method scores each function on a scale of 0.1 (lowest) to 1.0 (highest) "functional points." Typically, wetlands that are larger and more diverse receive more points. Table 4-3 summarizes wetlands by functional category in proximity to the Combined Alternative (Recommended Alternative) that includes the Ultimate Project. This table provides order of magnitude information, showing very few acres that are Category I or II wetlands.

Most of the wetlands in the Northwest Corridor Study Area are common less diverse habitats, Category III.

TABLE 4-3. AREA OF WETLANDS IN EACH FUNCTIONAL CATEGORY WITHIN THE REDUCED WETLAND ASSESSMENT AREA

Functional Category	Area	Combined Alternative (Recommended Alternative)*
Category I - exceptionally high quality	1.49 acres	0.65 acres
Category II - common diverse habitat	6.81 acres	0.21 acres
Category III - common less diverse habitat	46.54 acres	15.94 acres
Category IV - small, isolated, lack diversity	5.84 acres	2.21 acres

*This includes all three corridor sections.

Source: Compiled by FHU and ERO Resources, 2007, Originally *TEPS* Table 4.9-2.

Riparian areas are present and located adjacent to most streams and many of the larger ditches. Typical trees and shrubs include native plains cottonwood, box elder, hawthorn, and chokecherry as well as non-native Russian-olive (noxious weed), elm, and green ash. There are about 36 riparian areas within the reduced wetland assessment areas.

4.1.5 Vegetation, Wildlife and T&E

Plant and animal resources in the study area have been categorized as Vegetation; Wildlife; and Threatened, Endangered, and State Sensitive Species. The descriptions that follow are for the entire Northwest Corridor Study Area.

The Colorado Wildlife Commission and Colorado Division of Wildlife (a division of the Department of Natural Resources) regulate non-endangered wildlife at the state level. Federal protection also occurs for non-endangered wildlife under the *Fish and Wildlife Coordination Act of 1934* and the *Migratory Bird Treaty Act of 1918*.

The *Fish and Wildlife Coordination Act* requires consultation with the USFWS and the state wildlife agency to prevent loss of and damage to wildlife resources from projects that may impound, divert, control, or otherwise modify the waters of any stream or water body. The *Migratory Bird Treaty Act* provides for protection of all native migratory game and non-game birds with exceptions for the control of species that cause damage to agricultural or other interests. Similar protections and prohibited activities are included in the *Bald and Golden Eagle Protection Act*.

Executive Order 13112 directs federal agencies whose activities may affect the status of invasive species to control populations of such species in a cost-effective and environmentally sound manner, monitor invasive species populations, and provide for restoration of native species and habitat conditions in ecosystems that have been invaded. Although, this project is not federally funded, JPPHA has decided to follow the intent the Executive Order.

At the state level, the *Colorado Noxious Weed Act* was enacted to control and eradicate noxious weeds on public and private lands (35-5.5-101, et seq., CRS). Executive Order D 006 99 (1999) by the Governor of Colorado directed state departments to reduce the spread of noxious weeds resulting from their activities, to develop integrated weed management plans, and to cooperate with the state weed coordinator and the weed control efforts of local governments.

Plant and animal species whose populations have declined to a point where extinction is imminent are afforded legal protection under federal and state laws. Federally listed threatened and endangered species and designated critical habitat are regulated by the *Endangered Species Act of 1973*. The US Fish and Wildlife Service (USFWS) is authorized to identify species in danger of extinction and provide for their management and protection. USFWS also maintains a list of species of special concern. Colorado also has enacted laws and adopted regulations to protect state-designated threatened and endangered species, in addition to the federally listed species. Under Colorado's *Nongame, Endangered, or Threatened Species Conservation Act,* state-designated threatened or endangered species are protected.

4.1.5.1 Vegetation

Overall, natural vegetation communities dominate the landscape in the west and north portions of the study area, and developed urban lands are most common in the east and south portions. Developed urban lands with landscaped lawns, forbs, shrubs, and trees are present in residential and commercial areas. Developed urban lands also contain some disturbed sites.

The xeric tallgrass community in and around Rocky Flats is believed to be the largest example remaining in Colorado and perhaps in North America. ***TEPS*** **p. 4.11-7**

Portions of the tallgrass prairie community are located on Rocky Flats National Wildlife Refuge. The *Rocky Flats Final CCP & EIS* identified approximately 9 acres of xeric tallgrass prairie within the 99 acres of potential transportation right-of-way. Mixed grass prairie is the most common vegetation type of the study area. Most of the open grasslands, as well as the flat summits of North and South Table Mountains, are mixed grass prairie communities. Agricultural and pasturelands are generally located in the central and northern portions of the study area. Riparian areas are scattered along most of the major streams and ditches. Dry (xeric) upland shrublands are mainly located in the southwest portion of the study area on the sideslopes of North and South Table mountains and the lower slopes of the Front Range foothills.

4.1.5.2 Wildlife

The study area provides habitat that supports seasonal and year-round elk and deer use. Elk are increasingly common in the foothills on the western edge of the study area, with most areas serving as winter range. Mule deer are common throughout the study area and are known to occur within almost all available habitat types, although they are most often found in upland or riparian shrublands. East-west movement of deer, elk, and other wildlife through the study area typically occurs along riparian corridors, but may also occur in open grassland areas. Wildlife connections within the Northwest Corridor include:

- Rock Creek
- Walnut Creek
- Woman Creek
- Upper Big Dry Creek
- Leyden Gulch
- Ralston Creek
- Van Bibber Creek
- North Table Mountain
- Area between the foothills and the Fossil Trace Golf Course along US 6.

Avian, reptilian, amphibian and aquatic species are also found within the study area.

4.1.5.3 Threatened and Endangered

Federally threatened and endangered species are protected under the Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. 1531 et seq.). A potential effect on a federally listed species or its habitat resulting from a project with a federal action requires consultation with the USFWS under Section 7 of the ESA. Several federally listed threatened and endangered species potentially occur in the study area:

- Colorado butterfly plant (Gaura neomexicana coloradensis) - Threatened
- Ute ladies'-tresses orchid (Spiranthes diluvialis) - Threatened
- Bald eagle (Haliaeetus leucocephalus) - Threatened[2]

[2] The bald eagle was officially delisted from protection under the ESA on June 28, 2007. It is still offered some protection under the Bald and Golden Eagle Protection Act of 1940 as amended in 1978 and under the Migratory bird Treat Act.

- Black-footed ferret (Mustela nigripes) - Endangered
- Preble's meadow jumping mouse (Zapus hudsonius preblei) - Threatened

Although not federally listed, wildlife species of particular interest that are known to occur or potentially occurring in the study area and have been listed by the Colorado Division of Wildlife (CDOW) as threatened, endangered, or of special concern (SC) in the state of Colorado, or have been described as rare, vulnerable, or imperiled in the state by the Colorado Natural Heritage Program (CNHP) are described below:

Preble's meadow jumping mouse and prairie dog habitats are found within the Ultimate Project Study Area.

- Black-tailed prairie dog
- Burrowing owl
- Plains sharp-tailed grouse
- Butterflies (various)
- Amphibians (various)
- Fish (various)

The *Rocky Flats Final CCP & EIS* identified approximately 2 acres prairie dog colonies and 77 acres of suitable habitat, as well as 8.5 acres of Preble's mouse habitat within the 99 acres of potential transportation right-of-way.

4.1.5.4 Wildlife Refuges and Conservation Areas

The **Rocky Flats National Wildlife Refuge** is located in the central portion of the study area. Rocky Flats National Wildlife Refuge encompasses about 6,200 acre of predominantly undisturbed grassland and shrubland habitat similar to those described for other undeveloped lands in the study area. Refuge vegetation communities of particular interest include the rare xeric tallgrass and tall upland shrubland communities.

Two Ponds National Wildlife Refuge is the smallest urban unit in the National Wildlife Refuge System, Two Ponds is located in Arvada, southeast of the intersection of Kipling Street and 80th Avenue. Two Ponds covers 72.2 acres and is managed for the benefit of vanishing wetlands and native wildlife species.

Standley Lake Regional Park is located east of Indiana Street, south of the intersection of 100th Avenue and Simms Street in the central portion of the study area. It was designated as a regional park in 1998 and is owned and managed by the City of Westminster. Standley Lake is an artificial reservoir created in the middle of the short grass prairie, and includes prairie, lake, and wetland ecosystems that attract a variety of birds and mammals.

Prairie Dog Relocation Areas. The Cities of Broomfield and Westminster have designated areas within their open space lands for prairie dog relocations. Relocation areas within Westminster include Colorado Hills Open Space and Standley Lake Regional Park. Broomfield has created an actively managed wildlife refuge area for prairie dog habitat at Great Western Reservoir.

4.1.6 Hazardous Materials

A Modified Phase I Environmental Site Assessment (MESA) was performed to evaluate whether properties within the study area had potential or known soil, groundwater, or surface water contamination. Sites within the Northwest Corridor Study Area were assessed for recognized environmental conditions and potential environmental conditions. Sites with recognized environmental conditions and sites of concern within the study area are discussed below.

Sites have been identified in the Northwest Corridor Study Area:
- **Recognized environmental conditions (presence or likely presence of any hazardous substances or petroleum products based on existing or past release data)**
- **Sites of concern (conditions that may be present but are not confirmed without additional study)**

4.1.6.1 Northern Section

This area has historically been used for ranching purposes. Abandoned coalmines are located to the east of the western terminus of Northwest Parkway. At the northern extent of this portion, the Burlington Northern and Santa Fe (BNSF) railroad tracks cross the Northwest Parkway. No evidence of potential soil and groundwater impacts associated with the railroad tracks and crossings were identified during the site reconnaissance. However, impacts to soil and groundwater along the railroad corridor may exist due to undocumented events and an accumulation of drips, leaks, spills, and hydrocarbon exhaust residue over time. Based on the unknown conditions along the railroad corridor, the railroad right-of-way is a site of concern.

Several areas of known contaminated soil and groundwater have been identified in the northern portion of the study area. Lead-contaminated soils, associated with a former pistol and rifle shooting range, are located to the west of Interlocken Loop. Although remediated, soils containing low levels of lead from this site were used as fill in nearby road construction. Leaking Underground Storage Tank (LUST) sites are present in the northern portion that may impact soil or groundwater quality in the study area. More recently, the area in general has developed as commercial and retail use, which includes nearby gasoline stations and other service related businesses. No substantial areas of contaminated soil or groundwater were identified along the proposed alternative alignment footprints.

4.1.6.2 Central Portion

A number of landfills are located in this portion. The BFI Foothills landfill is an active solid waste site located at SH 93 and Leyden Road. No identified groundwater or methane concerns are identified with this site. Historical landfills with known methane are located in the Leyden Road and Indiana Street area in addition to 68th Avenue and Joyce Street.

The Union Pacific railroad parallels the south side of SH 72 and is located between SH 72 and Barbara Gulch. The railroad track crosses Indiana Street just south of the intersection of Indiana Street and SH 72 to the east, and crosses SH 93 just south of the intersection of SH 93 and SH 72 to the west. No evidence of soil and groundwater impacts were identified as associated with

the railroad tracks during the site reconnaissance. However, impacts to soil and groundwater along the railroad corridor may exist due to undocumented events and an accumulation of drips, leaks, spills, and hydrocarbon exhaust residue over time. Based on the unknown conditions along the railroad corridor, this is a site of concern.

This area also has a mining history that includes coal, uranium, aggregate, and clay prospecting and development.

Rocky Flats Environmental Technology Site (RFETS). RFETS consists of approximately 6,200 acres between SH 128 and SH 72, and between SH 93 and Indiana Street. Former U.S. Department of Energy (DOE) operations at RFETS included the production of nuclear weapons parts (1951 to 1989) and fabrication of stainless steel components (1951 to 1992). Approximately 384 acres near the center of the site are referred to as the former Industrial Area where many of the on-site structures and operations were located. The Industrial Area is approximately 1.5 miles west of Indiana Street and north of SH 72. The remaining acreage surrounding the Industrial Area is referred to as the former Buffer Zone. The Buffer Zone borders Indiana Street to the west and is located approximately 0.5 mile north of SH 72.

Remediation of the Rocky Flats Environmental Technology Site (RFETS) has been ongoing since 1992.

Remediation of historical site operations, which includes activities with hazardous substances such as uranium, plutonium, other metals and chlorinated hydrocarbons, has been ongoing at this site since 1992. The site has undergone an Independent Validation and Verification process to ensure that on-site contaminants and cleanup actions have met standards and action levels set forth in the Rocky Flats Cleanup Agreement (RFCA). After remediation efforts were physically completed in October of 2005, the DOE transferred management of the site from the Environmental Management unit to the Legacy unit. Upon the finalized site closure in July 2007, the jurisdiction and control over most of the land was transferred to USFWS to be operated as the Rocky Flats National Wildlife Refuge as set forth in the Rocky Flats National Wildlife Refuge Act of 2001. DOE will maintain authority of certain parts of the Industrial Area where contaminants still exist and are undergoing long-term remediation. This area is closed to the public.

Both the CDPHE and the EPA monitor and evaluate air, surface water, groundwater, and soil conditions at RFETS, in addition to implementing remedial actions. Remedial investigations have indicated that elevated levels of hazardous substances, including radionuclides, metals, and chlorinated hydrocarbons have been released to the environment.

Historical on-site structure fires and material releases have resulted in radionuclide contamination of surface soils within the Industrial Area, Buffer Zone, and properties to the east of Indiana Street. Plutonium-239/240 and americium 241 have been identified as the primary contaminants in surface soil in the vicinity of the Northwest Corridor study area (DOE, 1997b) (see Figure 4-2 and Figure 4-3). Plutonium concentrations in surface soil in the vicinity of Indiana Street range from less than 0.2 picoCuries per gram (pCi/g) to 10 pCi/g (DOE, EPA, and

CDPHE, 1996). Americium concentrations range from 0.04 pCi/g to 0.9 pCi/g (DOE, EPA, and CDPHE, 1996). These concentrations are above background levels found in the environment. Plutonium environmental background levels in the Rocky Flats Area have been determined as 0.09 pCi/g (DOE, 1997a; DOE 1997b). Although above background, these levels are below the Rocky Flats Clean-up Agreement (RFCA) action levels for plutonium and americium in surface soil, which are 50 pCi/g and 74 pCi/g, respectively (DOE, EPA, and CDPHE, 2003). The action levels were calculated to be protective of a wildlife refuge worker, a rural resident in the event the land use was not restricted to a wildlife refuge, and ecological resources (DOE, EPA, and CDPHE, 2003).

Extensive sampling programs over the years developed considerable data on radionuclides in soil at Rocky Flats and showed that plutonium and americium concentrations in surface soil along both sides of Indiana Street that might be disturbed by road construction. This area comprises the only off-site Operable Unit (OU) 3. These soils were investigated as part of the OU 3 RCRA Facility Investigation/Remedial Investigation (RFI/RI) and the OU 3 Corrective Action Decision/Record of Decision (CAD/ROD) (DOE, 1997b).

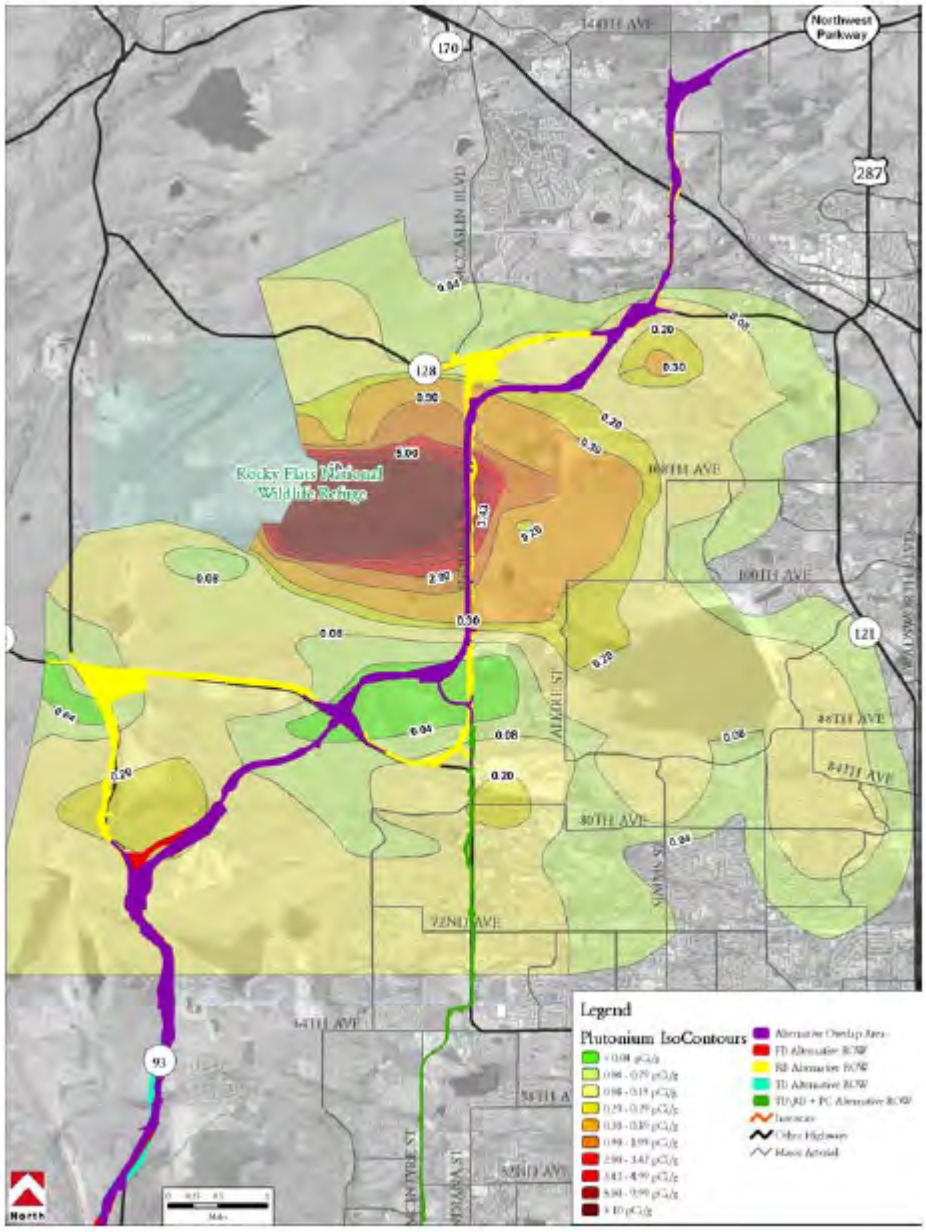
The highest concentration of plutonium, which was approximately 6.5 pCi/g, occurred in a surface soil sample located approximately 0.3 mile east of the intersection of the east access road and Indiana Street. The concentration of americium, which was 0.5 pCi/g, was identified in a surface soil sample immediately east of the same intersection (DOE, 1997b).

Plutonium and americium concentrations in surface soil along Indiana are considered protective of human health and the environment.

These concentrations were well below the site action level of 50 picocuries per gram for plutonium and 74 picocuries per gram from americium (DOE, 2005) and were considered protective of human health and the environment and a no action determination was made. The First Five-Year Review for this OU in 2002 concluded that these concentrations are still protective of human health and the environment (DOE, 2002b).

Other affected media within RFETS includes groundwater, surface water, and sediment. Groundwater plumes containing volatile organic compounds (VOCs), nitrates, and uranium do not extend to any of the property boundaries and are not expected to impact the proposed build alternatives (DOE, 2004b). Recent sampling data (March 2005) indicates radionuclide exceedences have occurred in surface water and sediment samples along Woman Creek and Walnut Creek drainages in close proximity to Indiana Street (DOE, 2005a). A system of

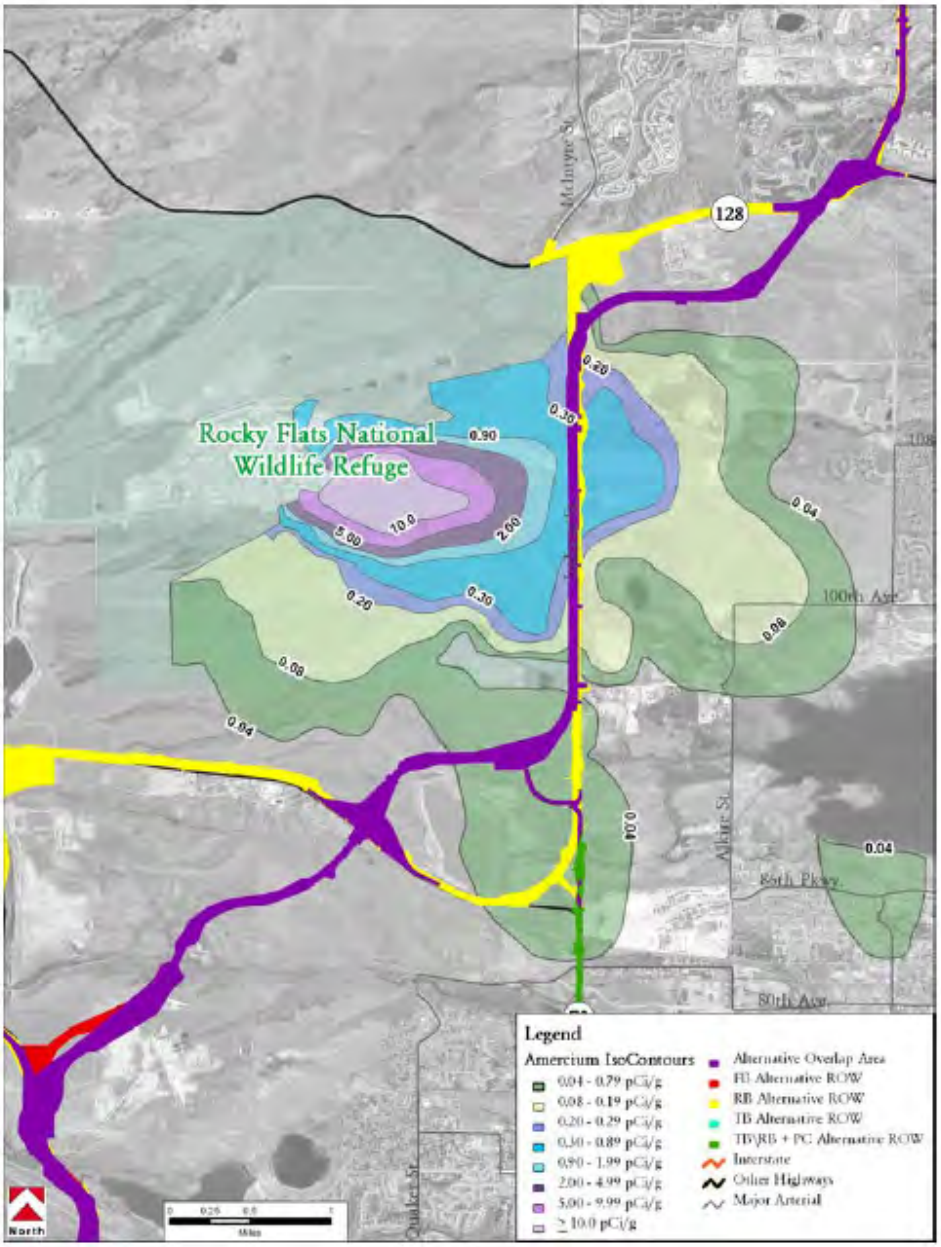
FIGURE 4-2. PLUTONIUM ISOCONTOURS IN THE STUDY AREA



Polygons were created from isocontours, which were created in Dynamic Graphics using kriged data from M. Iggy Litaor, EG&G Geosciences January 1995, as mapped in the 1996 Final RFI/RI report. In order to close the polygon shapefiles, the open-ended isocontours were closed by connecting their end points. ERM made no attempt to extrapolate or interpret data other than what was provided in the original figure in the Final RFI/RI report. Information obtained from Water Quality Control Commission Regulations #93 and #94.

Source: US Department of Energy. June 1996. Final RFI/RI Report OU 3 (OU 3 Offsite Areas); Figure 4-6A. Originally *TEPS* Figure 4.15-3

FIGURE 4-3. AMERICIUM ISOCONTOURS IN THE STUDY AREA



Polygons were created from isocontours, which were created in Dynamic Graphics using kriged data from M. Iggy Litaor, EG&G Geosciences January 1995, as mapped in the 1996 Final RFI/RI report. In order to close the polygon shape files, the open-ended isocontours were closed by connecting their end points. ERM made no attempt to extrapolate or interpret data other than what was provided in the original figure in the Final RFI/RI report. Information obtained from Water Quality Control Commission Regulations #93 and #94.

Sources: US Department of Energy, June 1996. Final RFI/RI Report OU3 (OU 3 Offsite Areas) Figure 4-6B. Originally *TEPS* Figure 4.15-4

continuous air monitoring stations is located along the RFETS property perimeter. Since at least 1998, no radionuclide exceedences have occurred.

Rocky Flats Industrial Park. Additional industrial property uses in the central portion of the study area, known as the Rocky Flats Industrial Park, have been concentrated along SH 72 between SH 93 and Indiana Street. Known VOC and metal contaminated soil and groundwater are present in the vicinity of the Rocky Flats Industrial Park. Contaminated groundwater has migrated off-site and onto property on the north side of SH 72. Industrial use and petroleum tanks have led to contaminated soils and groundwater on properties to the west of Rocky Flats Industrial Park and the section along Indiana Street south to 64th Avenue.

4.1.6.3 Southern Portion

Former mining and industrial properties were located along SH 93 immediately north of Golden. Several of the mined areas were subsequently used for waste disposal and became landfill sites resulting in contaminated soil and groundwater and methane gas generation. Waste rock from historical mining was observed along this route. Industrial properties were located in the vicinity of Pine Ridge Road and SH 93, which has lead to localized areas of soil and groundwater contamination.

4.1.7 Parks and Recreation Areas

Fifteen parks and recreation areas and 45 trails are identified in proximity to the Ultimate Project.

There are 240 existing parks and recreational areas in the Northwest Corridor Study Area. Parks range from regional, multi-use facilities to neighborhood pocket parks. There also are open space parcels that function as recreational areas because they are publicly accessible and provide recreational opportunities, mostly in the form of trails. Trails provide access as well as an opportunity for recreational activity. Generally, trails are public, multi-purpose areas that are used for non-motorized recreational purposes, such as hiking, biking, jogging, strolling, skating, mountain biking, walking, and horseback riding. A list of the existing parks and recreational areas in proximity to the Ultimate Project is provided on Table 4-4.

TABLE 4-4. ULTIMATE PROJECT PARK AND RECREATIONAL RESOURCES

Name	Description
Arvada - Central Section	
41 Russell Park	Neighborhood park
54 Arvada/Blunn Reservoir Open Space	Multiuse open space for recreational trails, fishing, and public utility purposes.
55 School Stadium Complex	Sports complex
61 Mountain Shadows Open Space	Open space trail property

Name	Description
62 Pattridge Open Space	Multi-use open space for recreational trails, non-recreational public and utility purposes
Broomfield - Northern Section	
86 Varra Park	Neighborhood park
91 Parkway Circle Open Space	Open space trail property
94 Miner's Park	Neighborhood park
Private - Northern Section	
178 Omni Interlocken Golf Course	Regional recreational facility - Northern Section
180 Sun Microsystems Recreation Area	Community recreational facility - Northern Section
Superior - Northern Section	
190 Coyote Ridge Open Space	Open space with recreational opportunities
191 Rock Creek Open Space	Open space with recreational opportunities
Westminster - Central Section	
211 Colorado Hills Open Space	Open space with recreational opportunities
220 Stanley Lake Park	Regional park
221 Stoney Creek Golf Course	Regional recreational facility

Source: Originally *TEPS* Table 4.17-1. Modified by Stantec.

4.1.7.1 Regional Parks and Recreational Facilities

The study area has several parks and recreational parcels that are important regional amenities. Regional parks typically involve jurisdictional partnerships that contribute to the development and maintenance of the park. These areas serve residents throughout the Front Range and are regionally recognized. Also, privately and publicly owned and managed golf courses in the study area qualify as regional resources.

4.1.7.2 Community Parks and Recreational Facilities

While generally smaller than regional parks, community parks and recreational resources provide opportunities for community activities and facilities. Community parks often have a diverse selection of amenities that serve residents within three miles of the park.

4.1.7.3 Neighborhood Parks and Recreational Facilities

These parks are smaller parcels that generally serve residents within 0.5 mile of the park. They often include playgrounds, picnic facilities, paved trails, tennis courts, basketball courts, large grass areas, and landscaping. Neighborhood parks are commonly dispersed throughout a city

according to a typical 0.5-mile radius and feature easy access for residents in the surrounding area.

4.1.7.4 Sports Complexes

The study area contains several publicly owned parcels with facilities and fields dedicated to sporting events. Tennis courts and baseball, softball, soccer, and football fields constitute parcels that qualify as sports complexes.

4.1.7.5 Open Space

Open space areas include land and water parcels that remain in a predominantly natural or undeveloped state. The intention of open space acquisition varies from growth management to habitat protection and/or passive recreation. However, it must be noted that not all open space allows public access or use. Many areas defined as open space are used as conservation easements or agricultural lands. Smaller open space parcels are often coordinated with neighboring open space acquisitions to create buffers or corridors. Jurisdictional authority belongs to either the county open space department or municipal parks and recreation departments. Open space properties are publicly accessible and offer one or more recreational opportunities, usually in the form of trails.

4.1.7.6 Trails

Over 64 recreational trails have been built or are planned by various public and private entities and compose the regional and local pedestrian, bicycle and equestrian recreational network within the Northwest Corridor Study Area. Forty-five of these are in proximity to the Ultimate Project. Many trails are located on recreational properties and are not identified separately. Future trails (including those planned for the Rocky Flats Wildlife Refuge) are often conceptual in location and are also not identified.

4.1.8 Historic Properties

Historic and archaeological resources are tangible remains of past human activity and include archaeological artifacts, features, and sites, as well as historical buildings, structures, districts, and features, at least 45 years old. Generally, a 50-year age threshold is applied to properties to qualify them for consideration in environmental studies. Section 106 of the National Historic Preservation Act (NHPA) directs federal agencies to consider the effects of proposed federally sponsored or assisted undertakings on historic properties.

4.1.8.1 Overview

The Northwest Corridor Study Area occupies portions of Boulder County, Broomfield County, and Jefferson County, and extends from Broomfield south to Golden, and extends from the Front Range foothills east to the ridges and valleys of the South Platte River watershed. The area is drained by a series of perennial streams, all reliable water sources potentially utilized initially by Native Americans, followed by Euro-Americans. Based on archaeological data for the

Platte River Basin summarized by Gilmore et al. (1999), the South Platte River watershed is known to have been occupied by prehistoric aboriginal groups extending back to the earliest (Clovis) stage of the Paleoindian period. The prehistory of the project area is detailed in an archaeological survey report prepared by Centennial Archaeology, Inc. (Centennial) for the Northwest Corridor (Painter et. al., 2005).

Historical use of the study area commenced in the mid nineteenth century and is primarily associated with themes of settlement, agriculture, irrigation, and community development. Other relevant themes include transportation system development and coal and clay mining. These historical themes are discussed in existing narrative context documents, including the Colorado Plains Historic Context (Mehls, 1984), and the Colorado Engineering Context (King, 1984). The history of the study area is detailed in the historic architectural survey report prepared by Felsburg Holt & Ullevig (Marmor, 2005).

4.1.8.2 Resources in Study Area - Based on Combined Alternative (Recommended Alternative) Alignment

The Northwest Corridor Area of Potential Effects (APE) combines a 60-foot-wide archaeological survey corridor within which direct impacts could be expected to occur, and the parcel boundaries of properties containing features at least 45 years old as determined through field reconnaissance and review of County Assessor's property records for the Combined Alternative (Recommended Alternative) that includes the Ultimate Project. A total of eight National Register of Historic Places (NRHP)-eligible historic and archaeological sites were identified within the APE.

Of the eight NRHP-eligible sites, only one prehistoric archaeological site was identified. The seven eligible historic sites reflect the predominant agricultural character of the area. One of these is a late nineteenth to early twentieth-century ranch. Three sites are segments of two separate historic irrigation canals, the Welch Ditch and Church Ditch. One specialized building, a church once serving the needs of this low-density agricultural community is also among the sites identified. Non-agricultural sites identified include the Golden Fire Brick Company Historic District (5JF3854), located near Golden, north of Golden Gate Canyon Road and west of SH 93, as well as one historic Denver & Rio Grande Western Railroad segment. Only three of these sites are found in proximity to the Ultimate Project and are shown on Table 4-5.

Three NRHP eligible properties have been identified in proximity to the Ultimate Project.

TABLE 4-5. ULTIMATE PROJECT
NRHP-ELIGIBLE HISTORIC AND ARCHAEOLOGICAL RESOURCES

Site Name/Address	Location	Site Number	Site Type
Denver & Rio Grande Western Railroad segment	Central Section	5JF2346.6	Historic Linear- Railroad
Church/McKay Ranch 9600 Indiana Street	Central Section	5JF2779	Historic Farm/Ranch
Brookes Stone Circle Site	Not Disclosed	5JF3195	Prehistoric Occupation Site

Source: Originally *TEPS* Table 4.13-1. Modified by Stantec, 2009

4.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION SUMMARY

For the purposes of this system level study, environmental impacts and mitigation associated with the Ultimate Project are summarized in the table below. Table 4-6 excludes impacts associated with the Southern Section and the principal arterial portion (Indiana Street to McIntyre Street) of the *TEPS* Combined Alternative (Recommended Alternative). The elimination of these elements results in a significant reduction in environmental consequences due to the close proximity of existing development to the southern portion and the principal arterial portion. All environmental impacts identified are based on the worse case scenario and larger project footprint that was identified in the *TEPS*. As the Jefferson Parkway Ultimate Project design is refined, the direct impacts are expected to decrease.

Impacts are based on the worse case scenario and are expected to decrease as the Ultimate Project design is refined.

To the extent applicable environmental impacts, best management construction practices and mitigation described for the 2035 Ultimate Project also apply to the 2015 Phased Project. Future agency involvement with the JPPHA and Jefferson Parkway will occur specifically in relationship to the following activities:

- Environmental Analysis for the Phased and Ultimate Access to SH 128 - to accommodate CDOT access requirements and provide public involvement opportunities as appropriate
- Environmental Analysis for the Phased and Ultimate Access to SH 72 - to accommodate CDOT access requirements and provide public involvement opportunities as appropriate
- Environmental Analysis for the Phased and Ultimate Access to SH 93 - to accommodate CDOT access requirements as appropriate
- Potential coordination of impact details and mitigation with the USFWS for impacts to the Rocky Flats Wildlife Refuge as identified in the CCP/EIS.

- Coordination project-wide with appropriate federal, state and local agencies regarding compliance with but not limited to the Clean Water Act, the Endangered Species Act, and the Migratory Bird Treaty Act.

Additional coordination and compliance with state and/or local agencies will be as required and as provided for by the JPPHA and its contractors in the spirit of environmental stewardship and best management practices.

TABLE 4-6. ULTIMATE PROJECT ENVIRONMENTAL CONSEQUENCES AND MITIGATION SUMMARY FOR ALL *TEPS* RESOURCES

Resource Area	No Build	Ultimate Project[1]
Land Use	Continued population and employment growth are expected in the area without the proposed improvements. It is possible that the rate of development may occur at a slower rate if no improvements are made. The No Build is not consistent with Jefferson County, City and County of Broomfield or City of Arvada land use and transportation plans.	Land would be converted from an existing use to a transportation use along the Ultimate Project Route. Up to 80[2] of these acres will be acquired from Rocky Flats Wildlife Refuge. This acquisition is consistent with Refuge plans. These effected areas are compatible with future development and land use within the corridor.
Social Conditions	Potential direct and indirect impacts on communities caused by traffic congestion and impaired mobility (i.e., increased air pollution and noise, longer travel times, neighborhood traffic intrusion, deteriorating safety conditions, and lengthened emergency response time).	Improved traffic operations (level of service) will reduce congestion and improve mobility. Local traffic patterns will be refocused as a result of the implementation of the Ultimate Project.
Environmental Justice	Potential impacts from unmitigated noise and congestion to all populations.	No evidence of disproportionately high and adverse effects to low-income or minority populations along the Ultimate Project alignment.
Economic	The No Build is not consistent with Jefferson County, City and County of Broomfield or City of Arvada land use and transportation plans and as such will not support economic development already approved or planned.	Jobs created from construction include direct and indirect employment. One business relocation is anticipated. There is a potential loss of annual tax base related to right-of-way acquisition. The Ultimate Project will also provide improvement to commercial center access.
Right of Way	No Right of Way is required if no improvements are made.	The Ultimate Project would require three residential relocations and one business relocations. Right-of-way acquisition and dedications for the Jefferson Parkway are in progress by the JPPHA and associated entities.
Air	Regardless of which alternative is selected, no alternative will result in exceeding air quality standards. Due to cleaner vehicles, future daily air pollutant levels for most pollutants are predicted to be lower than current levels, even with more vehicles on the roads. Total particulate matter levels may increase in the future because of more vehicles, but the preliminary analysis indicates the concentrations would meet the NAAQS.	

Resource Area	No Build	Ultimate Project[1]
Noise	The number of predicted impacted receivers in the Northwest Corridor Study Area for all three corridor sections (may represent more than one residence) in 2030 is: 56 residential and no commercial. There are currently 39 residential properties and no commercial properties impacted under existing conditions.	Two apartment buildings and one single family residential site will be impacted for the Ultimate Project under the 2030 model. (2035 update was not done for this level of analysis.) The CDOT *TEPS* recommended noise mitigation for one apartment building location (Camden Interlocken).
Water Quality	Continued growth in the area will result in increased impervious surface area with no roadway Best Management Practices (BMPs) except for minor improvements.	Approximately 125 additional acres of impervious surface area will contribute to potential water quality impacts. BMPs and coordination with local, county and state jurisdictions MS4 permit requirements for storm water management mitigation are necessary.
Wetlands and Waters of the US	No impacts will occur except for those associated with future growth within the study area.	Based on the larger *TEPS* study footprint, the Ultimate project will directly affect 2.45 acres of wetlands; 1.13 acres are jurisdictional. Avoidance and minimization during design and construction and compensatory mitigation are required by the USACE and CDOT. Appropriate 404 Permits will be acquired.
Floodplains	No impacts will occur except for impacts associated with future growth within the study area.	The Ultimate Project crosses the 100 year flood plain at Rock Creek, Woman Creek, Upper Big Dry Creek, Barbara Gulch, and Leyden Gulch and Ralston Creek. CLOMR /LOMR are required during design.

Resource Area	No Build	Ultimate Project[1]
Vegetation, Wildlife, T&E	No impacts are associated with this except for those associated with future growth within the study area.	Loss of habitat will occur within the construction footprint. Noxious weed management will be necessary. Re-seed as appropriate, noxious weed management plan will be developed and implemented. Loss of xeric tallgrass prairie will occur. Coordination with Rocky Flats Wildlife Refuge will occur to minimize harm and identify mitigation as appropriate. Elk and deer movement corridors will be disrupted. Additional wildlife and birds could be disrupted. Mitigation may include improved crossing for small mammals, fencing and/or controlled crossings for deer and elk when desired. Fifteen acres of Preble's meadow jumping mouse habitat will be impacted. Coordination with USFWS will occur to identify mitigation commitments. Bald eagle winter range and prairie dog habitat will be impacted, including 12 acres of the Broomfield Great Western Reservoir prairie dog relocation area. Prairie dog mitigation will be implemented as appropriate. Minimization of bald eagle activity disruption will be coordinated with CDOW MBTA compliance and appropriate nest survey Loss of riparian habitat (SB 40) will be identified during design and associated mitigation coordinated with CDOW. Ute ladies'-tresses orchid and burrowing owl surveys and mitigation as needed
Visual	No additional visual impacts if no proposed improvements are made.	The combination of regional arterial and tollway has some degree of visual impact. Coordination with associated communities and keeping design consistent with the corridor is recommended to minimize visual impacts.
Historic	The No Build would leave historic and archaeological resources in their present state for the short term.	Two historic properties will be affected by the Ultimate Project. The SHPO has concurred with findings of No Adverse Effect these properties. One archaeological site has been identified for which a finding of No Historic Properties Affected has been made. Recommendations are to update the SHPO as the project progresses to ensure continued status of no impacts.
Paleontological	All alternatives have the potential to adversely impact paleontological resources. Monitoring may be required during initial construction excavation activities.	

Resource Area	No Build	Ultimate Project[1]
Hazardous Materials	No Impacts.	Right-of-way concerns: ▪ 4 parcels with recognized environmental conditions ▪ 23 parcels with sites of concern A site-specific risk assessment may be needed to document that the project would not pose an unacceptable risk to human health and the environment during and after construction at Rocky Flats Wildlife Refuge (RFETS). Additional studies, remediation, and site specific health and safety plans are recommended.
Utilities	No impacts are expected except for impacts associated with future growth within the study area.	Utility impacts related to the Ultimate Project will be identified during design and coordinated with appropriate utility companies.
Parks and Recreation	No impacts will occur except for those associated with future growth within the study area.	6.48 acres of direct impacts to parks, recreation areas, open space and trails may occur. The following resources will be impacted by the Ultimate Project: ▪ Omni Interlocken Golf Course ▪ StorageTek Drive Trail ▪ Interlocken Loop Bike Trails ▪ Little Dry Creek-SH 72 Trail ▪ Big Dry Creek-Upper Twin Lakes Trail ▪ Leyden Gulch Trail Coordination with owner agencies regarding minimization of resource disruptions and mitigation will occur. Landscaping as appropriate, preservation of trail crossings, and replacement of paved trails in a similar location are recommended mitigation actions.
Farmland	No impacts will occur, except for impacts associated with future growth within the study area.	Farmland Impacts will be identified to the extent applicable in future EAs, since areas included in urban land use plan areas are not subject to the Farmland Protection Act.
Geology	No impacts will occur, except for those associated with future growth within the study area.	Alignment locations through expansive soils and known faults will be clarified during design related geotechnical analyses and future EAs as applicable.
Construction	No impacts will occur.	Impacts from construction activities include traffic disruption, air and noise. Water quality and wildlife impacts are detailed above. BMPs will be employed to minimize construction impacts as appropriate.
Energy	Least amount of impacts occur with the No Build.	*TEPS* shows 4.3% more energy consumed for the Combined Alternative (Recommended Alternative) than the No Build alternative. No additional analyses have been conducted at this time.

Resource Area	No Build	Ultimate Project[1]
Section 4(f) (only relevant regarding federal transportation involvement)	No impacts will occur.	Historic Properties - potential *de minimis* use of both properties noted under Historic above. Parks and Trails - potential *de minimis* use of all public parks and trails noted under Parks and Recreation above. Wildlife and Waterfowl Refuge - potential *de minimis* use of Great Western Reservoir noted under Vegetation, Wildlife and T&E Impacts to resources will be minimized and coordination with appropriate agencies will occur as identified for specific resources above.
Rocky Flats National Wildlife Refuge	No impacts will occur.	Should right-of-way be acquired, coordination with the USFWS will occur as appropriate.

[1] Impacts of both the Northern and Central Sections are combined as the Ultimate Project for this table.

[2] The Rocky Flats Final CCP & EIS identifies up to 99 acres along the entire east side of the Refuge.

Source: Originally *TEPS* Table 4.26-1. Modified by Stantec for Ultimate Project

Environmental consequences to sensitive environmental resources outlined in Section 4.1 are described below for the Ultimate Project (northern and central sections of the Northwest Corridor Study Area described in Section 4.1).

Potential mitigation opportunities for the Rocky Flats Wildlife Refuge, based on the assumption of project right-of-way acquisition from the Refuge, are summarized in a separate discussion at the end of this chapter. Impacts associated with the 300 foot right-of-way for the Ultimate Project are identified throughout the analysis.

A cumulative impacts discussion summary based on the *TEPS* and the Ultimate Project has been included as a separate section.

4.2.1 Air Quality

The Ultimate Project is not anticipated to exceed air quality standards.

The Ultimate Project (Northern and/or Central Sections) is not anticipated to exceed air quality standards. Due to cleaner vehicles, future daily air pollutant levels for most pollutants are predicted to be lower than current levels, even with more vehicles on the roads. Total particulate matter levels may increase in the future because of more vehicles, but the preliminary analysis indicates the concentrations would meet the NAAQS.

A regional air quality conformity analysis has not been provided for this project at this time. The proposed project must be included in a conforming and fiscally constrained RTP before regional conformity can be demonstrated. This action is expected in the summer of 2009.

4.2.2 Noise

4.2.2.1 Impacts

For the Ultimate Project, noise impact results are based on the 2030 traffic model used in the *TEPS* analysis. Three residential areas are impacted based on this information:

- One apartment building along SH 128 - Camden Interlocken (Northern Section)
- One apartment building in Broomfield - Stone Gate (Central Section)
- One residential property at SH 93 and 96th Avenue (Central Section)

FIGURE 4-4. NOISE IMPACT AREAS

Source: Compiled by FHU, 2006, Modified from *TEPS* Figure 4.7-10

4.2.2.2 Mitigation

To permit the evaluation of potential noise barriers, computer models of barriers protecting the impacted areas were developed and the models were re-run to assess barrier effectiveness (see *Northwest Corridor Supporting Document-Noise Impact Assessment*). Results from the traffic noise mitigation evaluations for barriers located on project right-of-way are summarized below.

Noise barriers are recommended for one apartment building for the Ultimate Project.

CDOT guidelines state that for a traffic noise mitigation action to be reasonable, the cost-benefit should be no more than $4,000/receiver/decibel of noise reduction (CDOT 2002). Values higher than that are deemed unreasonable; however, cost-benefit is not the only consideration for reasonableness (CDOT 2002). Isolated receivers (e.g., dispersed homes) are a special case worth noting in this context. For a wall protecting a single receiver to be reasonable, the barrier could be no more than about 670 square feet if it reduces noise by 5 dBA or no more than about 1,300 square feet if it reduces noise by 10 dBA, assuming $30/square foot of barrier. It is a rare situation where barriers of those small sizes provide that much noise reduction. Therefore, it is usually not reasonable to construct barriers for isolated receivers. The traffic noise barriers that were evaluated for this study were assessed for feasibility and reasonableness at both the Camden Interlocken and Stonegate Apartment complexes. The required 5 dBA noise reduction could not be obtained Stonegate.

Noise barriers currently recommended for the Ultimate Project are only at Camden Interlocken in the northern section. Recommended barriers are located within the proposed right-of-way. The barriers evaluated may require adjustments based on Ultimate Project final design.

Additional information on noise barriers is found in the technical report *(Northwest Corridor Supporting Document - Noise Impact Assessment*).

The recommended mitigation actions would not eliminate all of the calculated traffic noise impacts; some residual impacts would remain and receivers for which no noise mitigation is proposed would continue to be subject to noise impacts.

4.2.3 Water Quality

4.2.3.1 Impacts

The types of impacts described are generally common to both the Northern and Central Sections unless indicated.

Surface Water. Generally, physical impacts to water resources associated with roadways occur as the result of the addition of impervious surfaces. Impervious surface areas, such as roadways, accelerate runoff that normally would be detained by vegetated soils. The associated increase in water velocity can cause erosion to occur by scouring the banks of receiving waters. Downcutting of exposed soil around discharge pipes would occur if water velocities were dramatically increased. Both of these conditions would add to the amount of sediment that comes from the roadway to the receiving water and exacerbate the impacts from sedimentation

Increasing impervious surfaces cause increases in runoff and cause impacts to water quality. Currently all of the stormwater runoff is being collected and distributed, which concentrates stormwater flows. This concentration of runoff combined with the increases in impervious surfaces would produce an increase in runoff volumes, which would worsen the impacts of the increased runoff velocity. The Ultimate Project will increase impervious surface by approximately 125 acres over existing conditions.

The impacts associated with runoff velocities and volumes are expected to be the greatest in the northern developed areas of the corridor where a portion of the adjacent land cover is already impervious surfaces. Rainfall runoff from the impervious surfaces of the roadways would be added to the runoff generated from the developed areas. The undeveloped part of the study area, mainly in the central portion, is not anticipated to have major impacts associated with runoff velocities and volumes due to its large areas of pervious land where rainfall is absorbed by the soil.

The Ultimate Project has a large increase in constituent loading the Big Dry Creek Watershed. In the Big Dry Creek and Leyden Creek Watersheds, the alignment is located along currently undeveloped land where no roadway currently exists, thus creating a new source of constituent loading.

The expected probable range of pollutant removals for extended detention ponds extends to 55, 60, and 75 percent of total phosphorus, total zinc, and total suspended solids, respectively. This means that an extended detention pond will be able to bring the Ultimate Project constituent

loads down to the No Build levels for total suspended solids and total zinc in all watersheds, and for total phosphorus in all except the Big Dry Creek Watershed.

Based on the LRR (literature reported range) and the EPR (expected probable range), total phosphorus can be reduced to the No Build levels with retention ponds in the Big Dry Creek Watershed.

Groundwater. Groundwater impacts associated with shallow, or alluvial, aquifers could include the alteration of recharge areas; disrupting, enhancing, or redirecting groundwater discharge; and changing hydraulic connectivity within or between aquifers.

Altering groundwater recharge areas by adding fill over shallow aquifers, cutting into shallow aquifers, removing aquifer material, increasing impervious surfaces, or redirecting runoff through detention ponds causes effects to shallow aquifers. These impacts can include exposing the surface area of the aquifer, changing the surface gradient across the aquifer, changing infiltration rates, and the quantity and distribution of groundwater flows. Each of these affects the ability of the aquifer to recharge according to historic conditions.

Impacts associated with groundwater discharge could be caused by cutting into, adding fill, or altering natural discharge paths, such as seeps or wetlands. These conditions affect the leakage within and between aquifers, affect surface seeps, alter evaporation and transpiration rates, and thus alter water tables. These impacts would be anticipated to occur in shallow aquifers.

Drainage System. The major impact of the Ultimate Project would be to existing drainage systems. The increased runoff would require some of the existing systems to be enlarged. Any future development that occurs adjacent to the roadway has potential to affect the drainage system, but generally will have very little impact on the Ultimate Project. For state highways impacts to the drainage system are limited by CDOT's access permit process. Development plans directly adjacent or discharging to the CDOT right-of-way are reviewed by CDOT to ensure that release rates do not have any adverse impacts. The flow release rate of additional discharges must meet historical channel conditions. As appropriate, the JPPHA Program Management Team will coordinate with CDOT, Jefferson County, City and County of Broomfield and the City of Arvada to minimize impacts to drainage systems adjacent to the Jefferson Parkway. Regional arterial improvements in the northern section will be the responsibility of the Northwest Parkway Public Highway Authority and associated entities.

Temporary Construction Impacts. Construction has the ability to impact water quality in the study area. Of primary concern is the exposure of large areas of open ground and soil to rainfall, which can result in severe erosion, and consequently sedimentation in receiving waters. The large areas of open ground occur from cuts for the roadway, stockpiling soil for fill, and grading activities.

The demolition and construction of bridges in and near stream channels would have the potential to add sediments and other debris directly into streams. Construction of caissons for bridge piers may require dewatering activities that may release contaminated water into a stream.

During construction, areas are needed for washing out concrete trucks. The runoff water from these activities is extremely caustic and will cause impacts if released to adjacent streams or waterbodies. Groundwater impacts from construction activities would be similar to those of surface water. For instance, the construction of bridges, including caissons, could result in the dewatering of shallow groundwater. Dewatering activities near groundwater recharge zones could also potentially introduce contaminants into shallow groundwater. BMPs could be utilized to minimize impacts associated with construction activities.

During construction activities, the drainage system would need to be protected from erosion sediment. Both the ditches and outfalls would need to be protected to prevent erosion. Any connections made to existing storm sewer systems may require the upsizing of the downstream pipes to handle added capacity.

The existing storm sewer system in the Interlocken Technology Park would need to be further investigated to assess the potential impacts as a result of the Ultimate Project northern section improvements. This area has a storm sewer system and appears to use common detention. Both roadway detention and development detention are used as water features on development property or the Omni Interlocken Golf Course. The capacity of these facilities has not been analyzed, and the potential use of these ponds for additional runoff is unknown at this time.

4.2.3.2 Mitigation

Outfall protection should be provided and energy dissipaters should be implemented where needed. Special attention to detention would be required in Interlocken to account for highway improvements and future development. There is potential for coordinated use of detention ponds that needs to be investigated.

Any runoff during construction and after completion located adjacent to Rock Flats National Wildlife Refuge, along Indiana Street, must follow the existing drainage patterns. Great Western Reservoir and the containment reservoir should ultimately receive the runoff to prevent any possible contamination associated with contaminated soils.

Any construction near or within delineated floodplains should comply with federal requirements set forth by Executive Order 11988, Floodplain Management, and applicable FHWA and FEMA requirements. Conditional Letters of Map Revision or Letter of Map Revision (LOMR or LOMR) will be coordinated during design as appropriate.

The study area complies with CDOT's MS4 permit. Coordination with adjacent municipalities to meet the MS4 permit requirements of those communities will be required during the final design of the Ultimate Project.

The alignment for the Ultimate Project crosses a tributary at the western end of Welton Reservoir. Plans at the reservoir include increasing water surface in the vicinity of Jefferson Parkway. The JPPHA Program Management Staff will coordinate with reservoir planners to ensure that any project associated water quality ponds for treatment of highway runoff, would be designed as retention/infiltration ponds, with no discharge to the reservoir.

Best management practices and storm water management planning together in coordination with local, county and state jurisdictions in addition to the wildlife refuge is expected to minimize water quality impacts.

4.2.4 Wetlands

4.2.4.1 Impacts

The Ultimate Project would directly impact approximately 2.45 acres of wetlands, and 1.13 acres are expected to be jurisdictional.

Impacts to wetlands, open water, and riparian areas were based on impacts within 100 feet of the proposed right-of-way. Total Ultimate Project direct impacts to wetlands are 2.45 acres. In addition, there are impacts to minor areas of open water (0.09 acre) that are likely waters of the United States, for example, stream crossings. Major areas of open water that are likely waters of the United States are tabulated separately. Wetland impacts for the Ultimate Project include a number of stream crossings. Since USACE requires a Clean Water Act Section 404 Individual Permit for impacts to waters of the United States and adjacent wetlands greater than 0.5 acre, the Ultimate project would require an Individual Permit.

Assessing wetlands impacts using only the acreage of direct impacts does not take into account differences in the functional quality of the impacted wetlands. Using direct impacts means that impacts to high quality (Category I) wetlands are considered the same as impacts to low quality (Category IV) wetlands. A second way to assess wetland impacts is to consider impacts to reflect functional differences between wetlands. For the weighted impact assessment, a functional assessment was done for each wetland that would be impacted by the Ultimate Project as shown on Table 4-7 below.

TABLE 4-7. FUNCTIONAL VALUES OF ULTIMATE PROJECT WETLAND IMPACTS

Functional Category	Ultimate Project Impacts
Category I - exceptionally high quality	.47 acre
Category II - common diverse habitat	none
Category III - common less diverse habitat	1.69 acre
Category IV - small, isolated, lack diversity	.29 acre

Direct Impacts. The Ultimate Project would cause direct impacts to wetlands and bodies of open water within the alternative footprint as a result of fill placement caused by construction of transportation improvements such as roadway widening and realignment, new alignments, and intersection improvements. Roadside ditches, wet meadows, creeks, and ditches, and their associated wetlands would be impacted. The Jefferson Parkway portion of the Ultimate Project will impact at total of 2.34 acres of wetlands, 1.13 of which are jurisdictional. The northern section, regional arterial will impact a total of 0.113 acres of wetlands.

From north to south, the following major irrigation ditches and streams would be directly impacted: Goodhue Ditch, Rock Creek, Walnut Creek, and Woman Creek.

Senate Bill 40 (33-5-101-107, CRS 1973 as amended) requires any agency of the state to obtain wildlife certification from the Colorado Division of Wildlife (DOW) when the agency plans construction in "...any stream or its bank or tributaries...". To the extent applicable the project will comply with Senate Bill 40.

The Ultimate Project would impact less than .09 acre of open water, an insignificant amount in relation to the 3,263 acres of open water estimated to be present in the entire Northwest Corridor Study Area.

Indirect Effects. The Ultimate Project would cause indirect effects to wetlands located within and adjacent to areas of construction. The most general indirect effect would result from the increase in impervious surfaces caused by additional lanes or added roadway shoulders.

Other indirect effects to wetlands would include the decrease or elimination of upland tree and/or shrub buffers between the proposed roadway and wetlands adjacent to Walnut Creek, and Woman Creek. Buffers filter pollutants before they reach wetlands, streams, and lakes as well as provide upland areas for wildlife.

Because the Ultimate Project, primarily follows existing roadways, many adjacent wetlands currently receive indirect effects from roadway activity and maintenance practices. Nonetheless, the magnitude of indirect effects would increase with an increased area of roadway.

4.2.4.2 Mitigation

Since USACE requires a Clean Water Act Section 404 Individual Permit for impacts to waters of the U.S. and adjacent wetlands greater than 0.5 acre, the Ultimate Project may require an Individual Permit, depending on the project phasing. Appropriate Wetlands Delineation and Findings Reports will be provided with future NEPA documentation.

Avoidance and Minimization Measures. Impacts to wetlands and stream crossings should continue to be avoided and minimized as much as practical during the final design process, and the design should comply with the policy of Executive Order 11990 regarding impacts to wetlands to the extent applicable.

Best Management Practices from the *Erosion Control and Storm Water Quality Guide* (CDOT, 2002) should be implemented during construction to reduce the potential for wetlands to be indirectly affected by sedimentation from accelerated erosion or by hazardous materials (e.g., fuel, equipment lubricants).

Compensatory Mitigation. Although efforts would be made during Ultimate Project development to avoid and minimize impacts to wetlands and streams, impacts would result from the construction. Section 404 of the Clean Water Act would require compensatory mitigation for permanent, direct impacts to wetlands under the jurisdiction of USACE and to other waters of the U.S. Additionally, at the direction of Executive Order 11990 and Department of Transportation Order 5660.1A, FHWA and CDOT should also mitigate for permanent, direct impacts to non-jurisdictional wetlands. Mitigation of non-jurisdictional wetlands outside the purview of CDOT will be at the discretion of the JPPHA and/or appropriate area government. In Colorado, all compensatory wetland mitigation would be implemented on a 1:1 basis based on acres of direct impacts.

Wetland mitigation could be implemented either onsite or offsite through wetland restoration or creation, or offsite through the purchase of mitigation credits from an USACE-approved wetland mitigation bank. Onsite mitigation could maintain the existing level of functions of impacted wetlands.

4.2.5 Vegetation, Wildlife and T&E

4.2.5.1 Impacts

Impacts are generally common to both the Northern and Central Sections unless specified. Due to the higher level of development in the Northern Section, there are generally fewer impacts to these resources.

Vegetation

The Ultimate Project would result in the direct loss of habitat, both permanent and temporary; within the construction footprint. In addition to herbaceous vegetation, trees and shrubs likely

would be removed during construction. The mixed grass vegetation community would be the most affected by road construction, followed by agricultural and pasture lands. With the exception of wetlands, riparian, and xeric tallgrass habitat types, the vegetation communities affected are commonly found along the Colorado Front Range.

The introduction of noxious weeds could occur in areas disturbed during construction. The new roadway alignments and more paved areas are likely to accelerate introduction of weed species into adjacent vegetation communities.

Wildlife

Mammals. Movement of elk and deer between foothills habitat and habitat areas to the east would likely be disrupted by proposed Ultimate Project transportation improvements at a number of elk and deer movement corridors including:

- Northern Section - Rock Creek
- Central Section - Walnut Creek, Woman Creek, Upper Big Dry Creek, and Leyden Gulch

Nevertheless, specific design elements can be incorporated at some of these locations to support elk and deer movement. The generally broad movement patterns of elk and deer would be redirected to funnel animals to proposed crossing structures. Depending on the nature of development adjacent to the Ultimate Project, it may be preferable not to support large animal wildlife movement through certain areas.

In order to better accommodate wildlife movement, the *TEPS* includes design recommendations for elk and deer crossing structures (see *Northwest Corridor Supporting Technical Document-Vegetation and Wildlife*). These recommendations include using bridges where possible, maximizing culvert sizes, and providing a dry area or ledge in crossings shared with drainages. Potential crossings and structure recommendations will be reevaluated during project design and will also be coordinated with the Rocky Flats Wildlife Refuge as appropriate.

Although much of the Ultimate Project corridor is currently disrupted by existing roads, the Ultimate Project would result in higher traffic volumes and speeds, resulting in a potential for increased in elk and deer mortality from collisions with vehicles.

Potential direct impacts of the Ultimate Project on other smaller mammals includes loss of habitat, especially wetlands, riparian, and grassland habitat; disruption of migration, dispersal, and other movement patterns, especially along riparian corridors, and increased mortality from collisions with automobiles. The installation of new crossings at Woman Creek and Walnut Creek, would benefit these other mammals.

Birds. Raptors requiring large trees for nesting could be affected where the Ultimate Alternative would cross major drainages such Leyden Gulch, which support large cottonwoods. Raptors would be affected where nest trees would be cut or where transportation improvements would

be so close to nests that the raptors would abandon them. The Ultimate Project would result in losses of habitat supporting prey species such as prairie dogs and other small mammals.

Songbirds associated with mixed grassland, wetland, and riparian habitat types would be directly affected through the loss of nesting, migratory, winter, and year-round habitat. Because grassland is the habitat most likely to be affected, ground-nesting birds such as vesper sparrows, western meadowlarks, and horned larks would be particularly vulnerable to impacts.

Reptiles and Amphibians. Reptiles and amphibians would be directly impacted by the Ultimate Project through the loss and fragmentation of wetlands, open water, grassland, and shrubland habitat. However, measures designed to mitigate effects to wetlands, Ute ladies'-tresses orchid, and Preble's meadow jumping mouse would also benefit reptiles and amphibians through the restoration and enhancement of wetland habitat and the replacement of existing culverts with larger or more numerous culverts or with bridges. In addition, reptiles and amphibians occupying wetlands and riparian areas could be impacted by contaminants in runoff that enters streams or other water bodies.

Aquatic Resources. Disturbance of habitat during the construction phase of the Ultimate Project could temporarily impact aquatic species potentially present in the area. In many places, such as at Walnut Creek, Woman Creek, and Upper Big Dry Creek, stream habitat would be modified, and potentially improved, through the replacement of existing culverts with larger or more numerous culverts or bridges or through construction of storm water quality facilities.

De-icing chemicals in roadway runoff could affect aquatic species if the effectiveness of water quality measures is compromised by structural failure or inadequate maintenance. Runoff during unusual periods of high precipitation that exceed storm water detention capacities could scour the streambed or deposit sediment and physically impact habitat for aquatic species.

Threatened and Endangered Species

Construction of an Ultimate Project could potentially impact threatened and endangered species within the study area. The potential impacts to these species are summarized as follows:

Colorado Butterfly Plant. Given that no known populations occur in or near the study area and that the nearest population is introduced, the proposed project is unlikely to adversely affect the Colorado butterfly plant. However, based on the quality of potential habitat present, final presence/absence surveys are recommended prior to construction at Leyden Gulch east of SH 93, and Ralston Creek.

Ute ladies'-tresses Orchid. During the *TEPS*, surveys were conducted throughout the Northwest Corridor (Walnut Creek, Woman Creek, big Dry Creek, Leyden Gulch, Ralston Creek, and Van Bibber Creek) and no populations of the orchid

Jefferson Parkway (Central Section) intersects the following drainages: Walnut Creek, Woman Creek, Upper Big Dry Creek, Leyden Gulch and Ralston Creek.

All environmental impacts identified are based on the worse case scenario and larger project footprint that was identified in the *TEPS*.

As the Jefferson Parkway Ultimate Project design is refined, the direct impacts are expected to decrease were documented. Previously known populations are present in the Clear Creek floodplain and as a result, within one year prior to construction, final presence/absence surveys for Ute ladies'-tresses orchid will be performed at Leyden Gulch east of SH 93 and Ralston Creek (both within the Clear Creek drainage). Assuming that populations of Ute ladies'-tresses orchid observed during preconstruction surveys are protected during construction as a No Work Zone, the Ultimate Project would have no direct impacts on Ute ladies'-tresses orchid. If preconstruction surveys for the species identify a population immediately downstream of construction, the Ultimate Project could have an adverse indirect effect on the species. There would be an indirect effect if construction permanently changed groundwater conditions supporting the population and the area became too dry to support the species. A downstream population would also be indirectly effected if flows in the creek were altered by construction and downstream scouring occurred that removed all or part of the population.

Black-footed Ferret. The Northwest Corridor study area is included in the block clearance area, where the black-footed ferret is assumed to be absent. Thus, the Ultimate Project would have no effect on the black-footed ferret.

Preble's Meadow Jumping Mouse. The Ultimate Project would impact habitat occupied by Preble's at Walnut Creek and Woman Creek. Approximately 15 acres of known Preble's habitat would be impacted (up to 8.5 acres along Refuge right-of-way). A portion of the impacted areas would be revegetated and restored. Although disturbed during the construction phase, existing movement corridors (culverts) at Walnut Creek and Woman Creek would be enlarged, to provide increased opportunities for dispersal by Preble's. In addition to direct impacts to their habitat, the Ultimate Project could result in mortality of individual Preble's during construction. The Ultimate Project would likely have an adverse effect on the species in the short term due to habitat disturbance and possible mortality, but in the long term, improved movement corridors may have a beneficial effect.

Bald Eagle.[3] The Ultimate Project would not encroach upon the established nest or winter roost buffers for the bald eagle. The project alignment is over one mile from the Standley Lake nest, which is well beyond the one-half-mile disturbance buffer.

The Ultimate Project would directly impact 272 acres of bald eagle winter range and 35 acres of prairie dog habitat within three miles of the Standley Lake bald eagle range spread between Great Western Reservoir and Standley Lake. The Ultimate Project would also result in the

[3] The bald eagle was officially delisted from protection under the ESA on June 28, 2007. It is still offered some protection under the Bald and Golden Eagle Protection Act of 1940 as amended in 1978 and under the Migratory bird Treat Act and is protected in Colorado under House Bill 1304.

disturbance, degradation, or elimination of prairie dog colonies that provide an important food source for both nesting and overwintering bald eagles.

Platte River Species. Given the absence of suitable habitat, the Ultimate Project would have no direct impact on the whooping crane, least tern, Eskimo curlew, piping plover, pallid sturgeon, or western prairie fringed orchid.

Species of State Concern

Black-tailed Prairie Dog. Prairie dogs are found throughout the northern half of the study area where suitable habitat exists. The Ultimate Project would result in both temporary and permanent losses to prairie dog habitat, directly impacting approximately 116 acres of overall prairie dog habitat. The majority of impacts on prairie dogs would occur east of Indiana Street and south of SH 128. The Ultimate Project would result in direct impacts to approximately 12 acres of Broomfield's Great Western Reservoir prairie dog relocation area, causing both permanent and temporary losses, as well as fragmentation of habitat.

Burrowing Owl. Potential habitat for the burrowing owl in the study area essentially overlaps with prairie dog habitat; thus, the owl could be directly affected by the loss of habitat associated with the build alternatives. Burrowing owl surveys would be conducted prior to construction to determine their presence in potentially affected habitat. Mitigation measures would be developed for any nesting burrowing owls found in the surveys.

Plains Sharp-tailed Grouse. The sharp-tailed grouse is considered extirpated from the area. No further reintroduction efforts are planned in Boulder or Jefferson counties before 2010; therefore, no direct impacts to sharp-tailed grouse are anticipated.

Butterflies. State-listed butterflies could be affected, through loss and fragmentation of tallgrass, mixed grass, shrubland, and riparian habitat, where host plants and nectar sources occur. In addition, increased traffic volumes and speeds from the proposed alternatives could result in increased mortality of these butterflies.

Reptiles and Amphibians. The common garter snake, the midget faded rattlesnake, and the northern leopard frog could be impacted through loss or fragmentation of habitat resulting from construction and increased mortality from traffic. However, stream habitat potentially occupied by the garter snake and the northern leopard frog would be improved in some places through the replacement of existing culverts with larger or more numerous culverts or free-spanning bridges. Measures designed to mitigate effects to wetlands, Ute ladies'-tresses orchid, and Preble's would also benefit reptiles and amphibians through the restoration and enhancement of wetland habitat.

Aquatic Resources. Rock Creek below Lindsey Pond is beyond the target area for the northern redbelly dace and the common shiner reintroductions. Since these species are probably not present in Rock Creek downstream of Lindsey Pond, the Ultimate Project would not be likely to

affect the northern redbelly dace and common shiner. Although habitat for the Iowa darter does not occur within the construction footprint, increased siltation of stream habitat resulting from construction activities could temporarily affect downstream habitat. Runoff could also result in reduced water quality and altered stream hydrology, which could degrade habitat for the Iowa darter downstream of the construction zone.

Wildlife Refuges

The Ultimate Project (Central Section – Jefferson Parkway) would be located within the proposed 300-foot transportation right-of-way corridor along the eastern boundary of the Rocky Flats National Wildlife Refuge. In the *Rocky Flats National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement* (USFWS, 2004), the USFWS determined that the transfer of a 300-foot-wide corridor designated for transportation improvements would not adversely affect the management of the refuge. For additional discussion see section 4.2.9.

Broomfield's Great Western Reservoir Open Space would be affected. As previously described, about 12 acres of black-tailed prairie dog colonies in the area would be impacted by construction of the new stretch of roadway. These impacts would reduce the acreage available for relocating prairie dogs, but the remaining area would remain capable of supporting viable prairie dog colonies and would not be affected. Broomfield would continue to manage the site as a black-tailed prairie dog relocation area.

The Ultimate Project would have no direct impact on Two Ponds National Wildlife Refuge, Standley Lake Regional Park, or Colorado Hills Open Space.

4.2.5.2 Mitigation

Vegetation

To mitigate for direct impacts to vegetation, all disturbed areas not permanently impacted by the Ultimate Project should be replanted as soon as possible following construction with drought tolerant, native grasses and wildflowers appropriate for replacement of the impacted vegetation type. Minimization and avoidance of impacts to xeric tallgrass vegetation is recommended where possible in the Central Section (Jefferson Parkway).

Prior to construction, all appropriate weed surveys of the project area should be conducted and a Noxious Weed Management Plan should be implemented.

Wildlife

Mammals. A combination of fencing, channelization methods and the construction of crossing structures designed to maintain or improve wildlife movement corridors would minimize impacts. Specific designs for improved wildlife crossings should be developed during final design.

Birds. Migratory birds and their eggs and nests are protected under the Migratory Bird Treaty Act (MBTA). With the exception of house sparrow, rock dove (common or feral pigeon), and European starling, all wild birds commonly found in the United States are protected by the MBTA, even species such as magpie and great horned owl that tend to be present throughout the year. All active nests are protected, including those in the trunks of trees, on the ground, and underground. To avoid impacting active migratory bird nests, construction activities and vegetation removal should be conducted outside of the breeding season (April 1 to August 31), whenever possible. A nest survey should be conducted prior to construction.

A raptor nest survey should be conducted prior to construction to identify those near the Ultimate Project. Specific mitigation measures for impacts to nesting raptors should be developed in coordination with the CDOW and the USFWS prior to construction.

For unavoidable impacts to bald eagle foraging areas in black-tailed prairie dog colonies, individual prairie dogs should be relocated when possible. An alternative to relocating prairie dogs from impacted areas to non-impacted habitat could be to enhance habitat for alternative bald eagle prey species such as rabbits, waterfowl, and fish. Given the difficulty in finding available prairie dog relocation sites, and the effect of plague on the reliability of prairie dogs as a prey source, this approach may be more beneficial to bald eagles in the long term.

Lighting plans should be developed during final design to reduce the impacts of roadway lighting on nests and, where practical, berms would be used to screen the roadway.

Reptiles/Amphibians. Mitigation measures described for wetlands and small mammals, such as mitigating wetland impacts on site when possible and accommodating small mammal movement with culverts and bridges would also benefit reptiles and amphibians. Additionally, mesh fencing overlaying the lower portions of the wildlife fencing would minimize the number of reptiles and amphibians crossing roadways. Measures should be implemented to minimize and avoid impacts to water quality, which would reduce potential impacts to amphibians.

Aquatic Resources. To offset temporary impacts to aquatic species from habitat disturbance, aquatic habitats would be restored following construction.

Threatened and Endangered Species

Colorado Butterfly Plant. Potential Colorado butterfly plant habitat within the construction footprint, including Leyden Gulch east of SH 93 and Ralston Creek should be surveyed during the flowering season just prior to construction. In the unlikely event Colorado butterfly plant is found within the construction footprint, specific conservation measures should be developed in coordination with the USFWS. Conservation measures could include avoiding impacts by establishing a No Work Zone or, in the event of unavoidable impacts, enhancing adjacent or off-site habitat.

Ute ladies'-tresses Orchid. Potential Ute ladies'-tresses orchid habitat within the construction footprint including Leyden Gulch and Ralston Creek should be surveyed according to USFWS protocol during the flowering season just prior to construction. If Ute ladies'-tresses orchid is found within the footprint, specific conservation measures should be developed in coordination with the USFWS. Conservation measures could include avoiding impacts by establishing a No Work Zone or, in the event of unavoidable impacts, enhancing an adjacent or off-site habitat. Potential indirect effects to downstream populations should be avoided by designing project elements to maintain existing groundwater and stream flow conditions.

Preble's Meadow Jumping Mouse. A number of conservation measures should be implemented during final design to minimize impacts to Preble's and to enhance or create habitat. Design measures to minimize impacts include developing a lighting plan to avoid and minimize lighting glare and illumination beyond the right-of-way in Preble's habitat, designing drainage crossings with the smallest footprint of disturbance possible, and accommodating Preble's movement in drainage crossing designs in known occupied and high-potential habitats.

Measures to minimize impacts to known occupied habitat during construction should be included such as stockpiling construction materials in bare areas where possible, rather than on top of existing vegetation; informing construction workers why it is important to limit impacts to vegetated habitat outside of the work area; and supervising work on a daily basis to ensure compliance with mitigation.

Specifics of the conservation measures should be developed in coordination with the USFWS during final design and prior to construction. Documentation of the final conservation measures should include plans and specifications for creation/enhancement of Preble's habitat.

Species of State Concern

Black-tailed Prairie Dog. In areas where avoidance of prairie dog colonies is not possible, suitable prairie dog relocation sites should be identified and/or approved removal methods should be coordinated with CDOW. To help determine adequate mitigation measures, an assessment of habitat quality and number of individual prairie dogs should be conducted for prairie dog colonies that would be directly impacted by construction. Prairie dogs would only be removed in areas where they might be directly impacted. Prairie dogs would likely recolonize some areas temporarily disturbed during construction. In lieu of relocation, prairie dogs can be donated to appropriate ferret and raptor rehabilitation programs. Due to proximity to the Great Western Reservoir prairie dog relocation area, coordination with the City and County of Broomfield will be required.

Burrowing Owl. Prairie dog colonies should be surveyed for burrowing owls prior to any work that would disturb them between March 1 and October 31. Prairie dog removal and construction should be scheduled to occur outside the burrowing owl breeding season. If burrowing owls were found within the construction footprint, nests should be left undisturbed during construction.

Butterflies. No mitigation measures are specifically recommended for state-listed butterflies; however, implementing BMPs such as using native seed mixes including grasses and forbs commonly occurring in butterfly habitat to revegetate areas disturbed as a result of construction would help minimize impacts to these butterflies.

4.2.6 Hazardous Materials

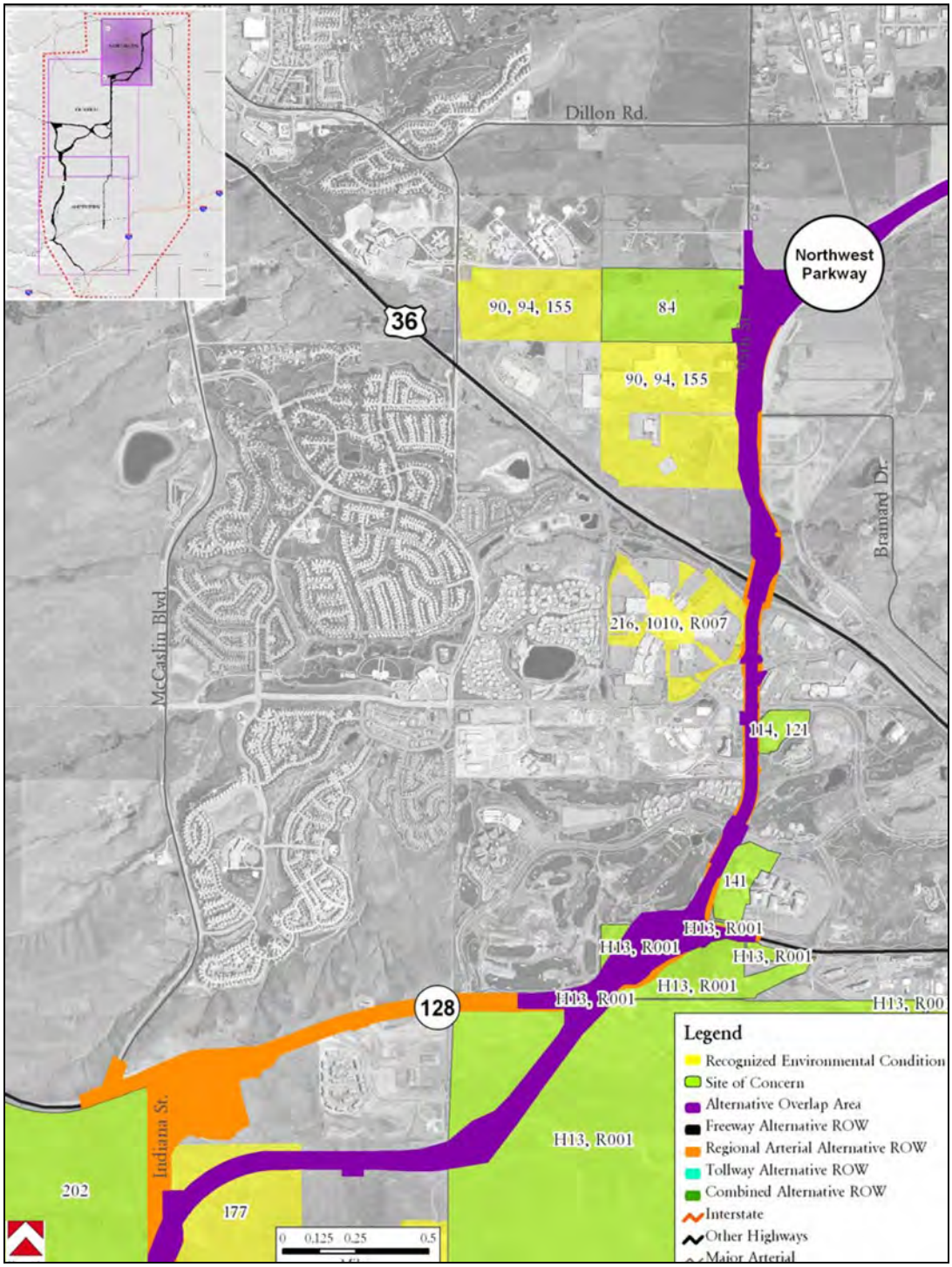
4.2.6.1 Impacts

Impacts for both Northern and Central Sections are described and site details include section location. To determine the environmental consequences of the Ultimate Project, sites of concern and sites with recognized environmental conditions were evaluated based upon the potential or recognized release, past release, or material threat of a release of any hazardous substances or petroleum products into the soil, groundwater, or surface water. Impacts were evaluated to determine whether they directly or indirectly impact the Ultimate Project. Direct impacts are associated with potential right-of-way acquisition sites that have potential or recognized (current or historic) environmental conditions. Indirect impacts are associated with sites of concern and sites with recognized environmental conditions within the study area that have potential or recognized environmental conditions that are not associated with right-of-way acquisition but may lead to potential impacts associated with materials management, worker health and safety, or final engineering design. Therefore, areas of contaminated soil and groundwater must be identified for planning efforts related to properties (sites) within the study area so that avoidance or mitigation measures can be implemented when reasonably possible.

The Ultimate Project could require the acquisition of all or portions of 4 parcels designated as sites with recognized environmental conditions, and 23 parcels designated as sites of concern.

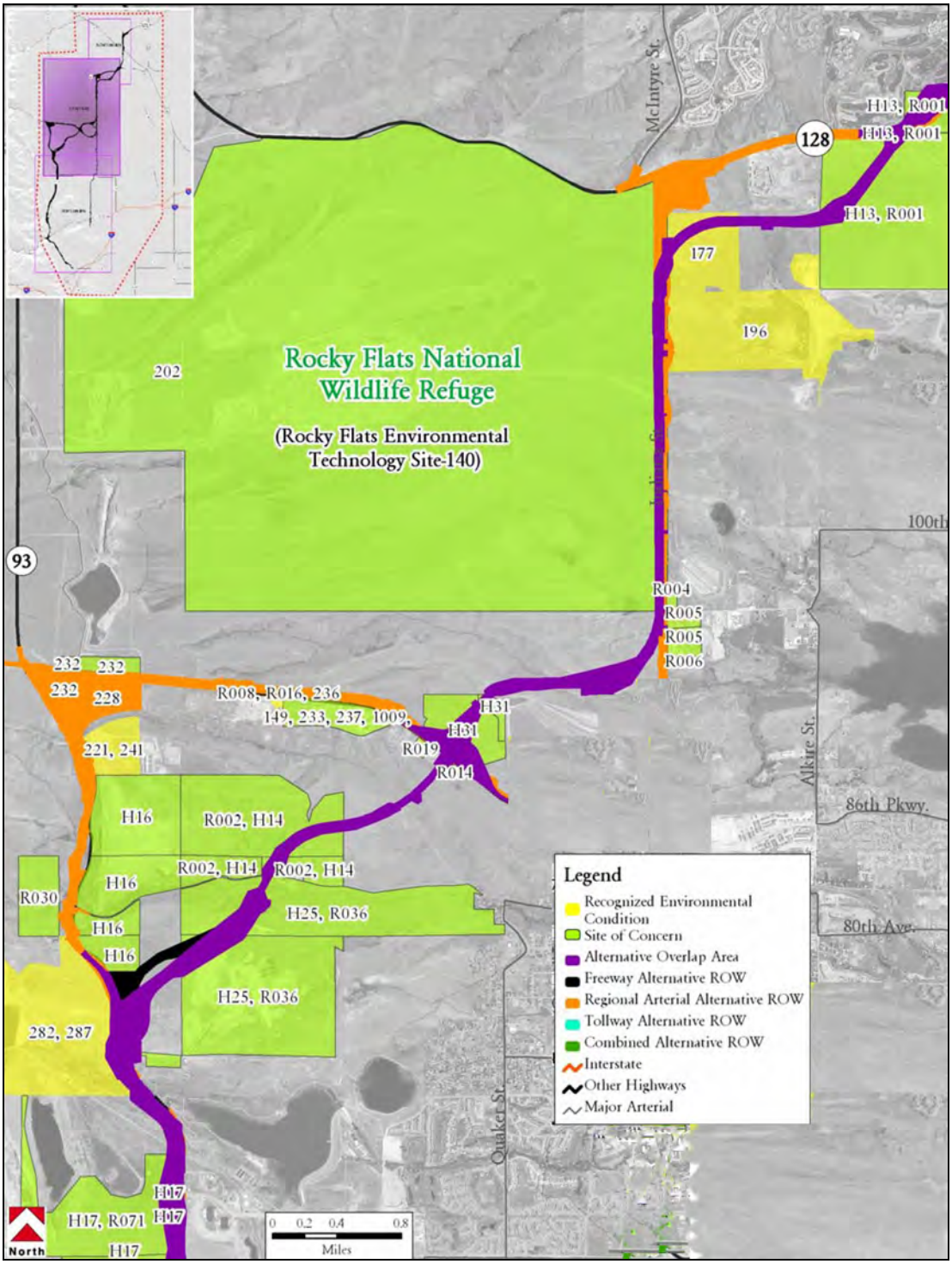
TEPS recommendations were made regarding sites of concerns and sites with recognized environmental conditions. Recommendations include conducting an Initial Site Assessment (ISA), a Preliminary Site Investigation (PSI), or preparing a Materials Management/Health & Safety (MM/H&S) plan.

FIGURE 4-5. SITES OF CONCERN AND SITES WITH RECOGNIZED ENVIRONMENTAL CONDITIONS – NORTHERN PORTION



Source: Compiled by FHU, 2006, Modified from *TEPS* Figure 4.15-1

Figure 4-1. SITES OF CONCERN AND SITES WITH RECOGNIZED ENVIRONMENTAL CONDITIONS – CENTRAL PORTION



Source: Compiled by FHU, 2006, Modified from *TEPS* Figure 4.15-2

TABLE 4-8. SUMMARY OF SITES OF CONCERN AND SITES WITH RECOGNIZED ENVIRONMENTAL CONDITIONS

Site Identification Number	Environmental Conditions[1]	Acquisitions P=Partial F=Full	Description	Mitigation[2]		
				ISA	PSI	MMP and H&S
Northern Section						
84	Concern	P	RCROS-SQG			
90,94,115	Recognized	P	UST. LUST. RCIRS-SQG			
H13, R001	Concern	4 parcels, P & F	Rocky Mountain Metropolitan Airport runways (formerly Jefferson County Airport). Unknown petroleum and chemical use, storage, or disposal practices.	X		
114,121	Concern	P	AST. UST. No leaks or spills reported. Unknown site conditions.	X		
141	Concern	P	AST. No leaks or spills reported. Unknown site conditions.	X		
Central Section						
177	Recognized	P	ERNS.			X
196	Recognized	P	Historical Landfill.		X	X
202	Concern	P	UST. No leaks or spills reported. Unknown site conditions.	X		
H31	Concern	2 parcels, P	General land disturbance; unknown site conditions. West of Welton Reservoir	X		
R023	Concern	F	Large partially buried AST observed at the northwest corner of the reservoir	X		X
R014	Concern	F	Manufacturers of plastic injected molded telephone components. Unknown site conditions. Proto-Tel property.	X		X
R002, H14	Concern	3 parcels, P	Former Leyden Mine. Historic underground coal mine until 1950 and natural gas storage. Potential methane concerns. General land disturbance; potential dumpsites.	X	X	X

Site Identification Number	Environmental Conditions[1]	Acquisitions P=Partial F=Full	Description	Mitigation[2]		
				ISA	PSI	MMP and H&S
H25, R036	Concern	P	Historic quarry (Pioneer Sand & Gravel Quarry). Large disturbed excavated and filled area. Settling ponds/northeast corner of mined area. Dump located northwest of ponds. An operations area consisting of equipment storage, ASTs, 55-gallon drums and debris is located at the northwest corner of the site.	X		X
282, 287	Recognized	P	Landfill, UST, AST. Multiple structures; unknown site conditions; Ralston sludge drying beds located to south of structures. North Table Mountain Water & Sanitation property. Ralston Sludge Drying Bed Facility/Ralston Reservoir.	X	X	X
R004	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.	X		
R005	Concern	P	Nursery. Large equipment storage; unknown herbicide/pesticide and petroleum use, storage or disposal practices.	X		
R071, H17	Concern	P	Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage or disposal practices. Unknown site conditions. Numerous sites along Highway 93. Potential dumpsites. Potential methane concerns.	X	X	X
H17	Concern	3 parcels , F & P	Numerous sites along Highway 93. Potential dumpsites. Potential methane concerns.	X	X	X

[1] Recognized Environmental Conditions – Sites within the study area with the presence or likely presence of any hazardous substances or petroleum products under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.

Sites of Concern – Sites within the study area with environmental conditions that may be present but could not be confirmed without additional inspection or investigation.

[2] ISA - Initial Site Assessment, PSI - Preliminary Site Investigation, MM/H&S plan - Materials Management/Heath& Safety plan.

Source: Originally *TEPS* Table 4.15-1. Modified by Stantec, 2009.

The Ultimate Project could require the acquisition of all or portions of 4 parcels designated as sites with recognized environmental conditions, and 23 parcels designated as sites of concern. Figure 4-5 and Figure 4-6 illustrate the locations of these parcels and Table 4-8 describes the sites. Additional information concerning these sites and other less important sites with recognized environmental conditions and sites of concern including a detailed discussion of these sites are available in the *Northwest Corridor Supporting Technical Document-Modified Environmental Site Assessment*. Hazardous materials concerns associated with the project are discussed.

Indirect impacts are not associated with right-of-way acquisition but they could lead to potential impacts associated with materials management and worker health and safety. The Ultimate Project would require excavation during construction in the vicinity of the Rocky Flats Industrial Park. Known heavy metal soil contamination and VOC soil and groundwater contamination is present in the area. JPPHA and the contractor would coordinate with EPA and CDPHE throughout final design and construction.

4.2.6.2 Mitigation

Implementation of the following suggested mitigation would result in the minimization of environmental impacts related to the disturbance of sites with recognized environmental conditions or sites of concern.

Right-of-Way Acquisition. The suggested right-of-way acquisition process for sites with potential and recognized environmental conditions includes:

- Site reconnaissance, historical land use review, and database search
- Investigation performed on properties with potential environmental conditions
- Detailed, comprehensive investigation that further delineates the magnitude of contamination on a property

It is important to note that a PSI or Remedial Investigation/Feasibility Study (RI/FS) may be recommended based on the findings of an ISA. Sites where a PSI or RI/FS are expected to be required have been identified on Table 4-8.

Contaminated Soil and Groundwater Management. Several direct and indirect impacts from soil and groundwater contamination were identified in the study area. Prior to construction, additional assessments may be conducted at sites with known soil or groundwater contamination to determine the presence of direct or indirect impacts to the alternative footprints.

Areas with known soil contamination may require hazardous waste and solid waste management. A materials handling plan for contaminated media should be prepared prior to construction. Any required permitting, waste profiling, and manifesting for off-site disposal of contaminated soil should be described in the materials handling plan.

Water collected in excavations due to seepage of groundwater or collection of surface water runoff typically requires a construction dewatering permit regardless of the water quality. The permit is issued by the CDPHE Water Quality Control Division in accordance with Section 402 of the Clean Water Act/Colorado Discharge Permit System. Discharge of groundwater to a municipal storm sewer may also require a discharge permit from the respective municipality. For sites where groundwater treatment is necessary to improve water quality, routine operation, maintenance, monitoring, and regulatory reporting requirements are usually needed to meet compliance standards.

Sites with existing remedial measures such as environmental media monitoring stations (i.e., sediment, surface water, groundwater, and air) and engineered controls (i.e., capped waste facilities) may require coordination with applicable regulatory agencies to avoid, minimize, or mitigate impacts from the project.

Regulated Materials Clearance. Environmentally regulated materials may be present in buildings and structures that may be demolished as part of the project. Prior to demolition of any structures, an asbestos, lead-based paint, and miscellaneous hazardous materials survey should be conducted at each parcel where applicable. Regulated materials abatement should be conducted and in accordance with relevant Occupational Safety and Health Administration (OSHA) regulatory details. Basic regulatory requirements for the type of materials that may be encountered in the study area are summarized in this section.

AST and UST Management. AST and UST sites will be acquired for right-of-way in the Ultimate Project. A detailed review of Office of Public Safety (OPS) files related to these properties should identify the results of any site investigations conducted, remedial systems or actions installed at the properties, and quarterly monitoring requirements. In the event that any of these sites are identified as having active leaking tanks, coordination with OPS may be required prior to parcel acquisition. If site characterization and/or remediation have not been completed, it may be required by OPS to complete these activities after acquisition. The OPS requirements may include:

- Removal of any underground storage tanks
- Excavation and management of petroleum contaminated soil

- Modifications to or redesign of remediation systems
- Replacement of any monitoring wells destroyed during construction
- Long-term groundwater monitoring

During the right-of-way acquisition process, additional properties may require similar actions depending on the results of the Initial Site Assessments.

Asbestos and Materials Containing Lead-Based Paint. By law, all friable asbestos-containing materials (ACM) must be removed from structures, including bridges, prior to demolition and soils if encountered in excavated landfill or building debris, buried utilities, or other ACM. The contractor performing the asbestos abatement is required to be licensed to perform such work and obtain permits from the CDPHE. Improper abatement can lead to release of asbestos in soils and the need for soil remediation.

Third party certification is required to document that the abatement was completed in accordance with regulatory requirements. The certification is needed to obtain the demolition permits for the structures. All ACM must be bagged and labeled for transport and disposal at a facility permitted to accept ACM.

Lead-based paint may need to be removed prior to demolition if the lead is leachable at concentrations greater than regulatory levels. Where lead-based painted surfaces would be removed via torching, additional health and safety monitoring requirements are applicable.

Other Regulated Materials. Prior to demolition, regulated materials must be removed from any structures and appropriately recycled or disposed. Bills of lading or waste manifests may be completed to document proper management of these materials. Typical materials include PCB-containing ballasts, fluorescent bulbs, mercury-containing equipment (i.e., switches, meters), electronic equipment, containerized regulated liquids such as paints, solvents, oil, grease, chemicals, pesticides, and herbicides, and CFC-containing equipment (equipment must be emptied before equipment is removed).

Health and Safety Plans. Prior to construction activities, health and safety plans for hazardous materials should be developed. In addition, some site-specific requirements may be applicable as discussed in this section.

Landfill/Mine Gas Management. Because construction may occur overlying and within 1,000 feet of abandoned landfills or coal mines within the study area, the health and safety plan may need to include assessing and monitoring air quality at all utility trenches, drainage structures, and similar underground construction (i.e., caissons) areas prior to and during intrusive activities to assure worker safety. Under 29 Code of Federal Regulations (CFR) Part 1926.651(g) Specific Excavation Requirements, Hazardous Atmosphere, OSHA requires testing the atmosphere of excavations greater than four feet in depth before employees enter the excavation where oxygen deficient (less than 19.5 percent oxygen) environments exist or could reasonably be expected to exist. OSHA also requires that precautions be taken to prevent

employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres.

Monitoring equipment should be capable of meeting the set standards of one percent of the lower explosives limit for flammable gas with an instrument measurement increment of one percent and 19 percent oxygen with an instrument measurement increment of 0.1 percent.

Rocky Flats Environmental Technology Site (RFETS). A site-specific risk assessment may be needed to document that the project would not pose an unacceptable risk to human health and the environment during and after construction. In addition, a site-specific materials management plan and health and safety plan may be required for construction in the RFETS area where impacted surface water and sediment may be present in Woman Creek and Walnut Creek crossings and where soils contain low concentrations of actinides. Such plans typically include a description of engineering controls needed to prevent contaminant mobilization and cross contamination within and outside the alternative footprint during construction, personnel protective equipment and protocols needed for worker health and safety, and monitoring requirements needed to demonstrate that activities are protective of human health and the environment.

A site-specific risk assessment may be needed to document that the project would not pose an unacceptable risk to human health and the environment during and after construction at RFETS.

4.2.7 Parks and Recreation Areas

4.2.7.1 Impacts

Concerns were heard from municipalities relative to the consideration of impacts to a larger "system" of parks in addition to assessing impacts to each park individually. Larger parks and open space systems have been intentionally developed or planned in a number of locations throughout the study area. These locations consist of linear parks, trails, and open space parcels that follow primary drainages, as well as other public and private open space parcels and easements to preserve open space and habitats. There is a potential impact to the larger park system but the Ultimate Project has been designed in an effort to maintain continuity and connectivity to these larger systems of parks through maintaining and enhancing the current system of trails. There is potential for the Ultimate Project to affect the visual quality of the parks and open space lands. Another concern is access to and from the parks, recreation areas, or open space parcels. In addition, wildlife movement between some open space parcels may be modified due to the proposed roadway improvements. However, wildlife crossings and habitat connectivity have been incorporated in the Ultimate Project.

6.48 acres of direct impacts to parks, recreation areas, open space and trails. The following resources will be impacted by the Ultimate Project:

- **Omni Interlocken Golf Course**
- **StorageTek Drive Trail**
- **Interlocken Loop Bike Trails**
- **Little Dry Creek-SH 72 Trails**
- **Big Dry Creek-Upper Twin Lakes Trails**
- **Leyden Gulch Trail**

Indirect effects were approximated for parcels that were located within 300 feet of the footprint for effects to parks and recreational areas may consist of an increase in traffic that could affect safety, access, and noise levels at the facility; loss of vegetation serving as a visual buffer due to clearing and grubbing; change of access; and an increase in emissions from vehicles.

The Ultimate Project impacts approximately 6.48 acres of parks and recreational resources. The impacts of this alternative are primarily associated with constructing a roadway on a new alignment, constructing retaining walls or cut and fill slopes associated with roadway widening, and improving existing intersections.

Facilities or activities likely to be affected and the extent of impacts by section are described below:

Northern Section

The **Omni Interlocken Golf Course** would experience a 2.69-acre impact associated with the new interchange at SH 128. No impacts to the functional features of the golf course are anticipated with this alternative.

The **StorageTek Drive Trail** would experience a 0.57-acre impact due to widening of the roadway between the US 36 interchange and Tape Drive.

The **Interlocken Loop Bike Trails** would experience a 2.66-acre impact for the at-grade widening of Interlocken Loop. This would require a relocation of most of the Interlocken Loop Bike Trails and other intersecting trail linkages. Approximately 2.66 acres of trail would be relocated onto a new, nearby easement due to roadway widening and retaining wall construction.

Central Section

The **Little Dry Creek-SH 72 Trails** would experience a 0.3-acre impact associated with roadway widening. The Little Dry Creek-SH 72 Trail is a 6-mile long existing and planned off-street, hard surface trail. This trail is owned and managed by the City of Arvada and is located in Arvada, where it will follow along the Little Dry Creek drainage and SH 72 from near SH 93, east to Indiana Street. Portions of this trail have already been constructed between Indiana Street and Alkire Street as a detached hard surface trail parallel to 86th Parkway. The trail west of Indiana Street follows the SH 72 planned trail alignment. The city has proposed an underpass at Indiana Street to accommodate pedestrian and bicyclist traffic between the east and west segments of the Upper Twin Lake Trail, Little Dry Creek Trail, and other local trails but currently has no dedicated funding. This trail network is cited in the Arvada Parks, Open Space and Trails Master Plan (2001) as one of four important east-west trail system linkages providing regional connections for the purpose of recreation.

The **Big Dry Creek-Upper Twin Lakes Trails** impacts would eliminate a short piece of trail where it intersects Indiana Street. Approximately 0.05 acres of trail would be lost to roadway widening.

The **Leyden Gulch Trail** would experience a 0.21-acre impact. The Leyden Gulch Trail is a planned and existing 8-mile long off-street, soft surface trail. The existing trail is owned and managed by the City of Arvada. The proposed trail runs east/west, starting west of SH 93 on the west and running east to connect with trails within the Leyden Lake Open Space. A fork of the trail at SH 93 runs south along the SH 93 alignment to just north of Arvada Blunn Reservoir, where it turns northwest and runs up to the north side of Ralston Reservoir, terminating just west of it. This publicly owned trail is designated for recreation and is primarily used by equestrians. A trailhead and parking lot are in place and Arvada proposes to replace the soft surface with a hard surface trail in the future. Approximately 0.21 acres of trail would be affected by right-of-way needs under new bridges associated with this alternative. However, the bridge right-of-way acquisition would not affect the alignment, function, or activities associated with the trail.

4.2.7.2 Mitigation

Northern Section

Omni Interlocken Golf Course mitigation should include landscaping of nearby unaffected portions of the existing golf course to accommodate new course layout and cart path connectivity.

StorageTek Drive Trail mitigation should include preservation of the existing cross culvert used as a pedestrian crossing or a new grade-separated crossing under StorageTek Drive should be constructed to maintain pedestrian access. StorageTek Drive Trail should be replaced with a paved trail in a similar location with comparable function and attributes.

Interlocken Loop Bike Trails affected area of the trails should be replaced with a paved trail in a similar location with comparable function and attributes. Landscaping and irrigation systems affected by construction activities should be repaired and/or replaced.

Central Section

Little Dry Creek-SH 72 Trails impacted areas should be replaced with a paved trail in a similar location with comparable function and attributes. Additionally, accommodations should be made for future trail continuity and connectivity.

Big Dry Creek-Upper Twin Lakes Trails affected trail system should be replaced with a paved trail in a similar location with comparable function and attributes. Additionally, accommodations should be made for future trail continuity and connectivity.

Leyden Gulch Trail. Construction of permanent structures would not impair the proposed trail alignment; the right-of-way under the bridge and adjacent to the trail should remain in a natural state.

4.2.8 Historic Properties

4.2.8.1 Impacts

Two historic properties, both in the Central Section, will be affected by the Ultimate Project and each is described below.

Two historic properties will be affected by the Ultimate Project. The SHPO has concurred with findings of No Adverse Effect for both of the properties.

Denver & Rio Grande Western Railroad (5JF2346.6). One segment of this historic railroad located west of Indiana Street and just south of SH 72 would be subject to direct impacts from the Ultimate Project. The proposed new tollway would cross the railroad via an underpass. Approximately 1,000 feet of the railroad would be temporarily realigned south of the existing railroad alignment to allow construction of the underpass structure while maintaining the operability of the rail line. Once construction is completed, the temporary realignment would be removed, and the historic (current) railroad alignment would be maintained. Construction of the new underpass structure would require a permanent easement for a 280-foot-long by 150-foot-wide (0.96 acre) swath of railroad right-of-way to accommodate the underpass and railroad bridge structure. Construction of the new underpass would also alter the segment visually. Since the railroad is a linear facility that must be crossed by the new tollway, avoidance of impacts is impossible. The Ultimate Project will affect a very small portion of the overall rail line, and will not substantially diminish the characteristics that render the site eligible for the NRHP. The SHPO has concurred on a determination of no adverse effect to the resource.

Church/McKay Ranch – 9600 Indiana Street (5JF2779). The Ultimate Project will leave existing Indiana Street in place in the vicinity of the Church/McKay Ranch, but the new 4-lane divided tollway will be built directly west of and parallel to Indiana Street. The new tollway will be depressed approximately 10 feet below the existing grade, necessitating installation of retaining walls along the margins of the facility, including one closely following the western edge of existing Indiana Street. There will be no direct impacts to the historic property. In terms of indirect impacts, depression of the new tollway will limit the visual impact. Additionally, existing Indiana Street serves as an existing visual buffer between the site and the proposed new transportation facility. With respect to noise impacts, a modest increase is expected to occur as a result of the project. Existing AM and PM noise levels are 62.1 dB and 63.5 dB respectively, and computer modeling indicates that the Ultimate Project will yield slightly higher AM and PM noise levels of 68.1 dB (net increases of 6.0 dB for AM and 4.6 dB for PM.). These impacts are insufficient to diminish the qualities that render the property eligible for the NRHP, and the SHPO has concurred on a determination of no adverse effect to the resource.

Brookes Stone Circle Site (5JF3195). The Ultimate Project was designed to stay as far away from the site as possible. There will be no direct impacts to the site, and it is far enough from the proposed tollway that no substantial changes in visual character or noise would occur. The SHPO has concurred that there will result in no historic properties affected with respect to site 5JF3195.

4.2.8.2 Mitigation

The SHPO has concurred with findings of No Adverse Effect for both of the historic properties. (A finding of No Historic Property Affected was made for the Brookes Stone Circle Site.) These determinations will need to be reviewed and additional coordination with the SHPO may be required if design changes are made to the Ultimate Project, the passage of time requires that the resources be re-examined, and/or the definition of the federal undertaking changes. No mitigation is required.

4.2.9 Rocky Flats Wildlife Refuge

All Impacts to the Refuge are associated with the Jefferson Parkway (Central Section). The US Fish and Wildlife Service, *Rocky Flats National Wildlife Refuge Final Comprehensive Conservation Plan & EIS*, (September 2004, CCP/EIS) and *Record of Decision* (February 2005) included a general analysis of impacts to the Refuge from the potential transportation improvements associated with the up to 300 feet of right-of-way made available along the west edge of Indiana Street by the Department of Energy and identified in the Refuge Act (*Rocky Flats National Wildlife Refuge Act of 2001 S. 1438*). The conclusion of the USFWS studies was that:

> "Based on this analysis, and the need for future coordination and consultation associated with any transportation improvement along Indiana Street, the Service finds that transfer of a corridor up to 300 feet wide would not adversely affect the management of the Refuge."

4.2.9.1 Impacts

Further refinement of right-of-way requirements and project footprint will be made during design. Coordination with USFWS will determine extent of impacts. The USFWS *Final CCP/EIS* summarizes impacts based on potential transfer width of right-of-way for the entire eastern edge of the Refuge. The impact summary shown below in Table 4-9 is based on a 300-foot right-of-way the length of the Refuge or 98.7 acres. The CDOT *TEPS* identifies a smaller right-of-way need based on the Combined Alternative (Recommended Alternative) which is similar to the current Ultimate Project at 80 acres.

TABLE 4-9. ROCKY FLATS WILDLIFE REFUGE POTENTIAL RESOURCE IMPACTS WITHIN 300-FOOT RIGHT-OF-WAY WIDTH

Resource	Transferred Width (300 feet)
Area (acres)	98.7
Soils	Loss of soil productivity of paved area
Water Resources (length of stream/ditches - feet)	5,133
Vegetation (acres) Wetlands Mesic mixed grassland Reclaimed mixed grassland Riparian shrubland/woodland Xeric tallgrass grassland Xeric needle and thread grassland Other	 3.5 61.0 17.5 0.7 4.0 9.2 2.8
Wildlife (acres) Prairie dog suitable habitat Prairie dog active colony	 76.6 1.9
Threatened, Endangered, and Candidate Species Preble's habitat (acres)	8.5
Cultural Resources (number of sites)	1
Public Use/Recreation Trails (feet) Trail connections Parking areas	 2,000 2 1
Visual	Easterly views from portions of the Refuge may be affected, depending on road grade and viewer location
Noise	Increased noise levels may affect wildlife use and visitor use in portions of the Refuge
Air Quality	May affect air quality in the eastern portion of the Refuge from increased concentrations of gaseous pollutants

Source: USFWS, *Final Comprehensive Conservation Plan & EIS*, Chapter 4 Environmental Consequences, Page 192.

4.2.9.2 Mitigation

Mitigation details will be determined through coordination and consultation with the USFWS should right-of-way be acquired. The following types of mitigation have been identified in the *CCP/EIS*.

Water Quality - Identify and implement storm water runoff best management practices.

Noxious Weeds - Identify and implement construction best management practices and develop and implement a Noxious Weed Management Plan.

Wildlife Corridors - Work with USFWS to design and construct small animal crossings with a focus on stream corridor and possibly upland locations and fencing to prevent large animal crossings (deer and elk) into developed areas east of the Refuge.

Noise and Aesthetics - To the extent practicable, work with the USFWS to include noise-reducing techniques and light emission reduction to minimize effects to wildlife and Refuge aesthetics.

Public Use Facilities - Coordinate with the USFWS on the location of refuge trail heads, trail crossings, parking areas and other facilities to maximize safe and reasonable Refuge access.

Natural Resource Issues - Update site specific studies and identify minimization of harm and avoidance approaches for these resources:

- Water resources
- Wetlands
- Vegetation (including xeric tall grass)
- Prairie dog habitat and colonies
- Preble's meadow jumping mouse habitat

4.2.10 Cumulative Impact Summary

The *TEPS* includes an in-depth cumulative impact assessment of implementation of the entire project connection between the Northwest Parkway and C-470. That assessment includes the following definitions:

The *TEPS* identified the following boundaries for the Northwest Corridor Cumulative Impact Study Area: the Dakota Hogback on the west, Sheridan Boulevard on the east, Baseline Road on the north, and US 285 and Morrison Road on the south. The past 35 years (starting 1970) and present to future extending to 2030 were also identified in the *TEPS*. A detailed historical setting and list of reasonably foreseeable future projects in the study area were described. Conclusions on environmental consequences from the *TEPS* study are summarized as follows:

The reasonably foreseeable future projects would have the same cumulative impacts regardless of the implementation of a Northwest Corridor build alternative. Many area jurisdictions anticipate full buildout within the next 20 to 30 years.

4.2.10.1 Land Use (Growth)

The cumulative land use impacts would be a result of growth and development already expected to occur in specific areas identified by the cities and counties in the Northwest Corridor Cumulative Impact Study Area. For additional land use discussion see Chapter 3 of the current

document. To the extent that undeveloped land remains available for development in the entire Northwest Corridor or the Ultimate Project portion, development is expected to occur under the No Build, but not as quickly or at the same high density as under the Build. Subsequent to the publication of the *TEPS*, additional development projects are underway adjacent to the proposed Ultimate Project.

4.2.10.2 Air Quality

Since the Ultimate Project as represented by the Combined Alternative (Recommended Alternative) in the *TEPS* was found not to cause violations of the NAAQS and the emissions of most pollutants are expected to be lower in the future, the cumulative impacts to air quality as a result of the Ultimate Project would be minimal. Mitigation measures for air quality are not required. The regional conformity analysis must still be completed for the Ultimate Project.

4.2.10.3 Noise

As the total amount of vehicle travel in the Northwest Corridor Cumulative Impact Study Area increases and the region's population increases, noise levels will continue to increase. From a cumulative standpoint, as the study area continues to grow, noise levels can be expected to increase in the foreseeable future regardless of the implementation of the Ultimate Project. Project specific noise mitigation is recommended as appropriate.

4.2.10.4 Water Quality

Cumulative water quality impacts are primarily dependent on future changes in the hydrologic conditions adjacent to the roadway for the Ultimate Project. The most significant changes to the hydrologic conditions are associated with changes in impervious surfaces in the watershed. It is difficult to accurately predict future changes.

Diminishing quality and quantities of water that recharge water supplies, and increases in the amount of pollution in receiving waters are both possible cumulative effects that can have even further impact on the environment. Impacts to water resource can result in adverse effects on wildlife from diminished water quality and on human water consumption due to both limits of water availability and impacts to water quality. As the population continues to grow, a decrease in water levels due to extraction for domestic use could occur.

Implementation of appropriate water quality best management practices in association with the Ultimate Project, are within the jurisdiction of the JPPHA. No other mitigation measures are applicable.

4.2.10.5 Wetlands

Under the No Build, wetland degradation and loss is anticipated to continue as growth and development continue to occur in undeveloped areas. Within the Northwest Corridor Cumulative Impact Study Area, a total of 244 acres of wetlands are located on land that is considered developable, and impacts to these wetland habitats can be expected.

Given the large amount of wetlands in protected areas (approximately half of those in the Northwest Corridor Cumulative Impact Study Area) and that the impact of the Ultimate Project represents less than 1 percent of wetlands in the entire area, the incremental impact of the Ultimate Project would not cause unacceptable deterioration of wetlands or wetland function. Project level mitigation of wetlands impacts can result in zero net loss.

4.2.10.6 Vegetation, Wildlife and Threatened or Endangered Species

The No Build would have not direct loss of wildlife habitat or vegetation. Current traffic patterns and congestion would continue to increase due to foreseeable residential and commercial development. Increases in traffic volumes would likes increase the number of wildlife/vehicle conflicts in the Northwest Corridor Cumulative Impact Study Area.

The Ultimate Project would result in the disturbance, degradation, or elimination of Preble's meadow jumping mouse habitat as well as general wildlife habitat. Regardless, the reasonably foreseeable future projects, residential and commercial as well as transportation projects, would contribute to loss and degradation of wildlife habitat. The developable lands within the Northwest Corridor Cumulative Impact Study Area contain approximately 15 percent of the overall wildlife habitat. Overall impacts to wildlife habitat from the Ultimate Project would result in less than 3 percent of the overall habitat in the Cumulative Impact Study Area. As mentioned previously, 65 percent of the habitat within the Study Area falls within protected lands. Project level mitigation is expected to minimize the impacts noted above.

4.2.10.7 Impacts to the Southern Section

Project improvements to the Southern Section of the Northwest Corridor Study Area are not committed to due to lack of community support and available funding. Chapter 3 describes the No Build and Build impacts to the transportation network adjacent to the 2015 Phased Project and the 2035 Ultimate Project, including to the Southern Section. As discussed throughout the cumulative impact analysis above, the No Build will not eliminate impacts associated with development and traffic congestion that is not tied to the Ultimate Project. There are two levels of transportation impact associated with the Build. One is the attraction to the Ultimate Project corridor of regional trips that can result in decreases in travel demand on major facilities such as I-25. The second is the refocus of trips within the locale near the Ultimate Project resulting in reduction of travel demand on some facilities and increases on others. Some of theses refocused trips will impact the Southern Section.

The elimination of project improvements to the Southern Section does result in the elimination of all direct project level impacts associated with new or improved highway facilities between the Jefferson Parkway terminus on SH 93 and C-470 to the south. The Ultimate Project as defined will not result in any direct environmental impacts to the Southern Section.

4.2.11 Ultimate Project Summary of Impacts and Mitigation

Based on the detailed resources analyses provided in the CDOT *TEPS* for the eight key resources described in the current chapter, the following table summarizes the worse case impacts associated with the Ultimate Project (Northern and Central Portion Corridors). Mitigation is also summarized (Table 4-10). After application of standard construction best management practices or BMPs, there are few impacts that will require mitigation.

TABLE 4-10. ULTIMATE PROJECT IMPACT AND MITIGATION SUMMARY

Resource	Impact	Mitigation
Air Quality		
NW Parkway Corridor Extension (Northern)	Not expected to exceed standards	None required
Jefferson Parkway (Central)	Not expected to exceed standards	None required
Noise		
NW Parkway Corridor Extension (Northern)	One apartment (Camden Interlocken)	Noise barrier recommended
Jefferson Parkway (Central)	One apartment and one residential Property	None recommended
Water Quality		
NW Parkway Corridor Extension (Northern)	Increased impervious surface and construction impacts to adjacent water resources	BMPs and coordination with local, county and state jurisdictions MS4 permit requirements for storm water management mitigation
Jefferson Parkway (Central)	Increased impervious surface and construction impacts to adjacent water resources	BMPs and coordination with local, county and state jurisdictions MS4 permit requirements for storm water management mitigation
Wetlands		
NW Parkway Corridor Extension (Northern)	.113 acres total impacts, .002 acres of jurisdictional wetlands	Avoidance and minimization during design and construction and compensatory mitigation are required by the USACE and CDOT. Appropriate 404 Permits will be acquired.
Jefferson Parkway (Central)	2.34 acres total impacts 1.13 acres of jurisdictional wetlands	Avoidance and minimization during design and construction and compensatory mitigation are required by the USACE and CDOT. Appropriate 404 Permits will be acquired.
Vegetation, Wildlife and T&E		
NW Parkway Corridor Extension (Northern)	Common vegetation and wildlife habitat loss	Noxious weed management will be necessary. Re-seed as appropriate, noxious weed management plan. MBTA compliance and appropriate nest survey

Resource	Impact	Mitigation
Jefferson Parkway (Central)	Common vegetation and wildlife habitat loss Xeric tallgrass prairie Deer and elk crossings Bald eagle winter range Preble's meadow jumping mouse habitat (15 acres) Prairie Dog habitat (116 acres, including 12 acres of Broomfield relocation area)	Noxious weed management will be necessary. Re-seed as appropriate, noxious weed management plan MBTA compliance and appropriate nest survey Avoidance and minimization of harm, then coordination of mitigation with Rocky Flats Wildlife Refuge, City and County of Broomfield and appropriate agencies Minimization of bald eagle activity disruption will be coordinated with CDOW Mitigation to include improved crossing for small mammals, fencing and/or controlled crossings for deer and elk when desired Prairie dog mitigation as appropriate. Ute ladies'-tresses orchid and burrowing owl surveys as needed Loss of riparian habitat (SB 40) will be identified during design and associated mitigation coordinated with CDOW.
Hazardous Materials		
NW Parkway Corridor Extension (Northern)	7 sites of concern 1 recognized condition	Additional studies, remediation, health and safety plans based on site
Jefferson Parkway (Central)	16 sites of concern 3 recognized conditions RFETS	Additional studies, remediation, health and safety plans based on site
Park and Recreation Areas		
NW Parkway Corridor Extension (Northern)	Omni Interlocken Golf Course (2.69 acres) StorageTek Drive Trail (0.57 acres) Interlocken Loop Bike Trails (2.66 acres)	Coordination with owner agencies regarding minimization of resource disruptions and mitigation will occur. Landscaping as appropriate, preserve trail crossings, replace paved trails in similar location
Jefferson Parkway (Central)	Little Dry Creek - SH 72 Trails (0.3 acres) Big Dry Creek-Upper Twin Lakes Trails (0.05 acres) Leyden Gulch Trail (0.21 CRES) Rocky Flats Wildlife Refuge Interface (See Section 4.2.9)	Coordination with owner agencies regarding minimization of resource disruptions and mitigation will occur. Landscaping as appropriate, preserve trail crossings, replace paved trails in similar location Coordinate mitigation with USFWS
Historic Properties		
NW Parkway Corridor Extension (Northern)	None Identified	None required

Resource	Impact	Mitigation
Jefferson Parkway (Central)	3 Identified - No Adverse Effect (2) or No Historic Property Affected (1)	Update SHPO as project progress to ensure continued status of no impacts
Rocky Flats National Wildlife Refuge		
NW Parkway Corridor Extension (Northern)	None Identified	None required
Jefferson Parkway (Central)	To be clarified during design	To be coordinated with USFWS as appropriate.

5.0 FUNDING AND PHASING

5.1 PROJECT COST AND PHASING

Due to potential funding constraints, the Jefferson Parkway has been preliminarily planned as improvements plus new construction that will provide basic links to the existing State Highway system and arterial roadways, but will be expanded and improved over time to accommodate larger traffic volumes and achieve better efficiency. The initial construction cost estimate shown in Table 5-1 is $204 million (year of expenditure dollar terms (YOE)). This cost includes construction of the mainline facility, half interchanges leading to and from the north at SH 72 and Cimarron Parkway, access to Indiana Street, and intersection improvements to SH 128 and SH 93, totaling $128 million. Adding soft costs, utility work, right of way, and tolling equipment costs, brings the total to approximately $204 million.

Table 5-1. INITIAL CONSTRUCTION COST (YOE, YEAR OF EXPENDITURE DOLLAR TERMS)

Items	Percentage	Dollar Total
Construction Bid Items	**NA**	**$127,694,700**
Contingencies	10.00%	$ 12,769,500
ITS	1.00%	$ 1,404,600
Drainage	2.00%	$ 2,809,300
Signing and Striping	2.00%	$ 2,893,600
Construction Signing & Traffic Control	4.00 %	$ 5,902,900
Mobilization	4.00%	$ 6,139,000
Total Construction Bid Items		$159,613,600
Utilities	4.00%	$ 6,384,500
Subtotal Construction Costs		**$165,998,100**
Construction Engineering	4.00%	$ 6,639,900
Materials Testing	4.00%	$ 6,639,900
Design Engineering	5.00%	$ 8,299,900
Right-of-Way	NA	$ 6,000,000
Tolling Equipment		$ 10,000,000
TOTAL PROJECT COST		**$203,577,800**

Source: PB Americas, April 2009

The initial construction is expected to take place under a design-build contract beginning at the end of 2010 and lasting approximately three years. Enhancements to the facility totaling approximately $354 million will take place over time between 2020 and 2050. Table 5-2 lists these items which are expected to be paid from ongoing toll revenues.

Based on system needs analyses performed by comparing the 2035 DRCOG land use with the 2015 transportation network, the trigger for improvement would be a policy to maintain LOS D or better at each state highway intersection. If the area develops at the rate expected by DRCOG, some improvements may be required prior to 2035. Tentative dates and congestion related improvements are shown on in Chapter 3 on Table 3-3. These dates are tentative and will be adjusted based on economic conditions, land use changes, and other transportation network improvements within the corridor that would generate traffic operational needs that support the implementation of the interchange improvements.

Table 5-2. JEFFERSON PARKWAY EXPECTED CAPACITY ENHANCEMENT PROJECTS (YOE)

Year	YOE Cost	Improvement
2020	$ 2,959,000	Finish Indiana Blvd Connection
2027	$ 39,966,000	SH 93/Jefferson Parkway Interchange
2030	$ 34,431,000	SH 128/Jefferson Parkway Interchange
2033	$ 3,708,000	Finish SH 72 Interchange
2035	$ 48,695,000	Capacity Expansion
2040	$ 77,131,000	Upgrade SH 128 Interchange
2045	$ 62,334,000	Capacity Expansion
2050	$ 84,630,000	Capacity Expansion
TOTAL	$353,854,000	

Source: PB Americas, April 2009

5.2 PROJECT FUNDING

The project is expected to be procured in a design-build / concession format. The Jefferson Parkway Public Highway Authority (JPPHA) expects to enter into an agreement with a private entity which will develop, finance, design, build, operate and maintain the project for a predetermined time period allowing a fair return prior to handing the asset back to the JPPHA. Ownership of the facility will remain with the JPPHA. The agreement will provide all requirements for initial construction as well as ongoing operations and maintenance. No public funding (state or federal) is currently anticipated to be dedicated for the construction, operation, or maintenance of the facility during the development or concession periods. Concession returns and debt repayment will be provided through toll revenue collection on the Parkway.

The Jefferson Parkway Public Highway Authority expects to enter into an agreement with a private entity which will develop, finance, design, build, operate and maintain the project.

Several alternative land use scenarios were evaluated ranging from the DRCOG forecast which was developed assuming no parkway development to the Jefferson Economic Development

study (JEC, 2007) which assumed commercial development approximately twice as intense as the DRCOG data. One of the scenarios analyzed (the Revised 2009 Scenario) was selected to be input to the traffic and revenue forecasting model, and the resulting revenue forecast was used to develop the preliminary project financial plan. This scenario represents the most current local perspectives on land use forecasts for the study area, however, it does not attempt to quantify what actual land use changes in the study area could be if the Jefferson Parkway were built.[1]

The Revised 2009 Scenario presents a reasonable revision to the previous DRCOG forecast but is considered conservative by the team, relative to a Jefferson Parkway 'build' scenario. It was developed using the DRCOG 2008-C2 data as a starting point and infusing this forecast with current data from jurisdictions within the study area. The team met with planners from the City and County of Broomfield, the City of Arvada, and Jefferson County to discuss the DRCOG data in light of the most recent development trends in Arvada, Broomfield, and Jefferson County. The planning staffs provided TAZ-level revisions for household and employment data to the areas of the JPPHA study area within their jurisdiction that resulted in changes to over 150 TAZs, both upward and downward. In summary, household numbers did not change significantly (less than 3 percent); however, 2035 employment estimates increased by 13 percent. Table 5-3 summarizes the results of the Revised 2009 Scenario.

Table 5-3. 2009 SMALL AREA UPDATES

JPPHA Study Area	Households		Annual Growth	Annual Growth Rate	Jobs		Annual Growth	Annual Growth Rate
	2015	2035			2015	2035		
2008-C2 Data	112,300	148,200	1,800	1.4%	192,800	242,400	2,480	1.2%
Revised 2009	115,300	151,100	1,790	1.4%	193,300	273,800	4,030	1.8%
Difference	3,000	2,900	--	--	500	31,400	--	--
% Difference	2.7%	2.0%	--	--	0.3%	13.0%	--	--

Source: Jefferson County, City and County of Broomfield, City of Arvada, Prepared by PB Americas, April 2009

Land use information adjustments by local government were as follows:

City and County of Broomfield. For 2015, Broomfield subtracted 1,000 jobs. No other revisions were made for 2015 or 2035.

City of Arvada. For 2015, Arvada added 2,200 households and 1,200 jobs. For 2035, Arvada added 2,200 households and 9,000 jobs (near the Parkway and SH 72, and north of I-70 near Wheat Ridge).

[1] A third party report prepared for the Jefferson County Economic Council states that a significantly higher proportion of regional jobs would be located in the corridor if the Jefferson Parkway were constructed, due to enhanced access to underdeveloped, commercially zoned land (JEC, 2007).

Jefferson County. For 2035, Jefferson County added 22,000 jobs in three areas (near the Parkway and SH 72, south of SH 58 near Golden, and in the Airport area). No other revisions were made for 2015 or 2035.

Using the Refined 2009 land use scenario, a preliminary toll revenue forecast was developed for use in structuring concession options. The resulting revenue forecast is shown in Table 5-4.

The gross revenue forecast shown in Table 5-4 was used as a starting point to calculate Net Revenues available for debt service and equity contribution amounts. A preliminary funding plan was developed using this revenue stream, considering annual operations and maintenance expenses, periodic major rehabilitation, and expansion costs.

The preliminary financial plan consists of about 70% of taxable debt and 30% equity contribution. Standard market based assumptions for debt issuance including interest rates, issuance costs, debt service coverage ratios, and reserve accounts are incorporated into the analysis. Given a stable political environment and financial markets, an investment grade traffic and revenue study, and a feasible construction approach, the project is considered financially feasible in that the project revenues are expected to cover all initial and ongoing project costs while generating a reasonable return to the private partner.

Table 5-4. JEFFERSON PARKWAY TOLL REVENUE FORECAST

Year	Annual Transactions	Annual Revenue
2013	3,861,000	$ 7,444,000
2014	4,542,000	$ 9,339,000
2015	5,263,000	$ 11,496,000
2016	5,735,000	$ 13,098,000
2017	5,931,000	$ 14,135,000
2018	6,127,000	$ 15,211,000
2019	6,323,000	$ 16,327,000
2020	6,519,000	$ 17,481,000
2021	6,715,000	$ 18,676,000
2022	6,910,000	$ 19,910,000
2023	7,106,000	$ 21,183,000
2024	7,302,000	$ 22,495,000
2025	7,498,000	$ 23,847,000
2026	7,694,000	$ 25,239,000
2027	7,890,000	$ 26,670,000
2028	8,086,000	$ 28,140,000
2029	8,281,000	$ 29,650,000
2030	17,141,000	$ 62,528,000
2031	19,065,000	$ 71,691,000
2032	21,059,000	$ 81,517,000
2033	22,302,000	$ 88,611,000
2034	22,748,000	$ 92,547,000
2035	23,203,000	$ 96,605,000
2036	23,667,000	$ 99,522,000
2037	24,141,000	$102,498,000
2038	24,623,000	$105,564,000
2039	25,116,000	$108,721,000
2040	25,618,000	$111,974,000

Source: Stantec, March 2009

6.0 SUMMARY AND CONCLUSIONS

This System Level Study analyzes the need, impacts, and benefits of proposed improvements and requests approval for connections to state facilities, through Colorado Department of Transportation (CDOT) 1601 Policy and Procedure, so the project may be included in the fiscally constrained Regional Transportation Plan (RTP). This is the first of a multi-step effort. Upon approval of this document by the CDOT Chief Engineer and review by the Colorado Transportation Commission, the project will be submitted to the Denver Regional Council of Governments (DRCOG) for inclusion in the RTP and for air quality conformity analysis. Subsequent analyses will include appropriate detailed environmental studies and public involvement opportunities for state highway access at SH 128, SH 72 and SH 93 for the Ultimate Project.

The JPPHA project offers a significant transportation infrastructure public-private funding opportunity of as much as $400 million to the Northwest Corridor Study area with very few community and environmental impacts. In addition to funding and minimal impacts, the following opportunities are associated with this project:

- Complete an additional portion of the beltway around the Denver metro area, leading to future attraction of trips from interstate facilities (I-25, I-70, I-76) upon completion of the entire beltway.
- Improve local and regional transportation system connectivity and functionality providing an improved connection between Northwest Parkway in Broomfield County and SH93 in Jefferson County.
- Expand capacity to support land use planning and meet population and employment growth forecasts for Jefferson County, City and County of Broomfield, and City of Arvada.
- Specifically to provide transportation links for the Interlocken and Candelas Urban Centers and other existing and new development.
- Provide opportunities to reduce travel time and improve reliability of travel in a corridor
- Support opportunities for transit mode choices by providing space within the project cross-section for future options.
- Utilize CDOT identified route location based on five years of public and agency input with minimal impacts to community and natural environment
- Improve safety at connections and by providing a reliable travel route in a corridor where heavy congestion is forecasted.