

ENERGY TECHNICAL REPORT
FOR THE
6TH AVENUE PARKWAY EXTENSION
ENVIRONMENTAL ASSESSMENT

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LIST OF ACRONYMS

AFB.....	Air Force Base
CDOT	Colorado Department of Transportation
E-470	E-470 Tollway
EA.....	Environmental Assessment
SH 30	State Highway 30
VMT	vehicle miles traveled

1. INTRODUCTION TO ANALYSIS

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

1.1 Proposed Action

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

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

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

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

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

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

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

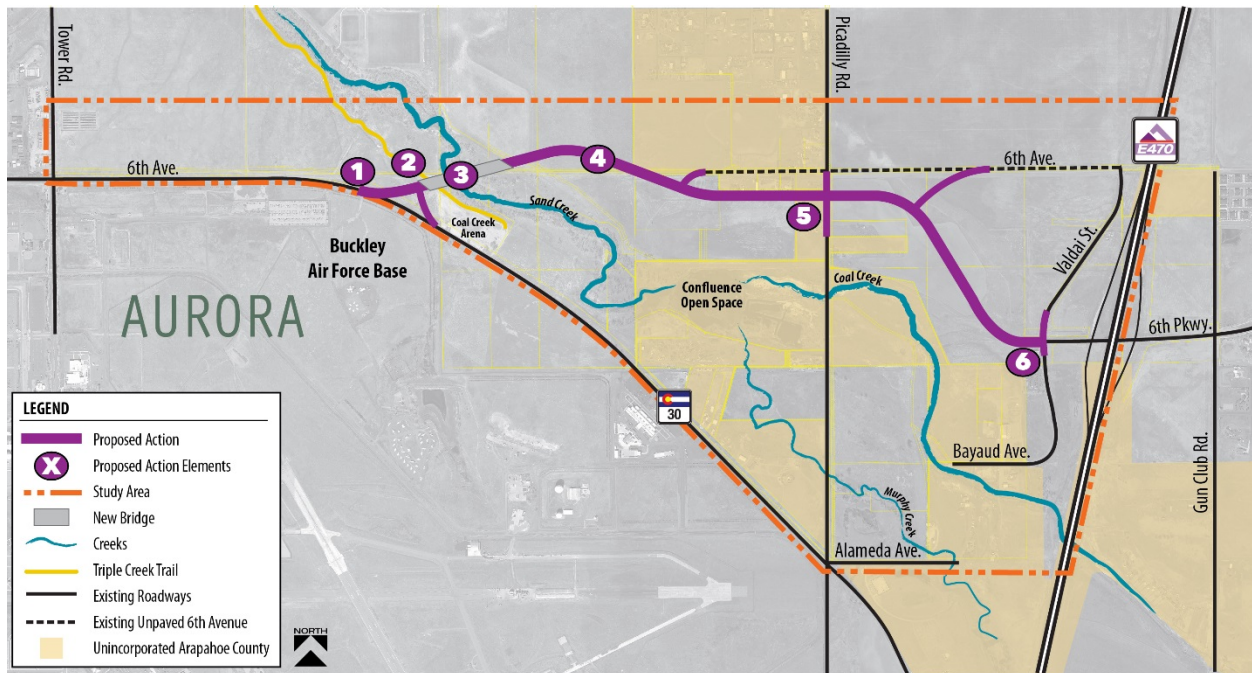
Element 4. 6th Avenue Parkway arterial roadway: The 6th Avenue Parkway extension would consist of a 144-foot wide, six-lane arterial roadway (three lanes in each direction) with a raised vegetated median. There would be curb and gutter and 10-foot wide sidewalks on the north and south sides of the roadway.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

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

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

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

Figure 1 Proposed Action and Study Area



Note: Numbers in graphic correspond with text above.

1.2 No Action Alternative

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

1.3 Summary/Abstract of Technical Report

Energy resources would be affected by the Proposed Action in several ways. The primary energy consideration is the use of petroleum and other fuels to power vehicles constructing, using and maintaining the transportation facilities. Other energy considerations include increases in electrical energy use associated with project operational features, such as traffic signals and lights, as well as increased energy use associated with construction activities. The study area includes several existing transportation facilities. These facilities are already heavily used and consequently represent a substantial consumer of energy.

2. AFFECTED ENVIRONMENT

2.1 *Related Plans and Policies*

The *City of Aurora's 2009 Comprehensive Plan Update* was adopted by City Council on June 7, 2010. The Comprehensive Plan identifies energy efficiency and economic growth goals. The study area is within the E-470 Corridor Zoning District. This District addresses land use for more than 11,000 acres of land and represents the most significant master planning effort in the City's history. The E-470 corridor within the study area has been identified by the City of Aurora as one of their nine strategic areas critical to the city's economy and identity.

2.2 *Description of Existing Conditions*

Existing energy consumption is directly related to the local land uses. The land uses in the study area have been predominantly rural with agricultural land use and scattered, low-density residential development. Buckley Air Force Base (AFB), located immediately south and west of the study area, was built in 1942 and has been in use since 1948. The study area has started to experience an increase in development since the late 1990s, directly related to the completion of E-470 through Aurora.

2.3 *Known Future Conditions/Issues*

Energy consumption is anticipated to stay the same in the western portion of the study area. This includes the open space of the Triple Creek Greenway Corridor, which includes Sand Creek, Triple Creek Trail, and Coal Creek Arena, the residential New World West Subdivision, and Buckley AFB. Energy consumption will increase in the eastern half of the study area, as development along E-470 continues and as land use changes. New development is anticipated to be a mix of commercial, retail, and residential properties.

3. IMPACT EVALUATION

3.1 *Methodology for Impact Evaluation*

3.1.1 Description of Methodology Used

This analysis evaluates and compares energy consumption for the construction (short term) and operation (long term) of the transportation systems for the Proposed Action and the No Action Alternative. This analysis is for the 6th Avenue Parkway Extension from SH 30 to E-470.

3.2 *No Action Alternative*

Impacts to energy resources under the No Action Alternative would be similar to impacts occurring under current conditions. The same basic transportation facilities would be available. Vehicle Miles Traveled (VMT) in the study area would increase over time, leading to increased traffic congestion. This, in turn, would result in even less efficient fuel use by all vehicles in or traveling through the study area during peak periods.

3.3 *Proposed Action*

The construction and operation of transportation improvements associated with the Proposed Action would require energy consumption. Future (2035) traffic congestion would be reduced relative to the No Action Alternative. Travel time in the study area would be reduced and more vehicles could use the project highways in a given period.

The construction envisioned for the Proposed Action would consume more energy than the No Action Alternative, since the No Action Alternative would leave the existing road alignments with no improvements. Because the Proposed Action would be on a new alignment, traffic conflicts and delays and resulting fuel consumption during construction may be lower than the Proposed Action. Overall, the differences are expected to be minor and are relevant only during the relatively brief construction period.

The main energy consumption for the corridor in ongoing operations will be to power vehicles. Energy would also be consumed through maintenance of the roadway, such as winter snow plowing or pavement repairs, although this is expected to be much less energy than used by vehicles. Other operational items, such as street lights or traffic signals, are not a major consideration for this project and so have been excluded.

The vast majority of vehicles, now and into the foreseeable future, are expected to be powered by petroleum-based fossil fuels. Other vehicle fuels can include natural gas or electricity, but their usage rate is relatively low and would not be affected by this project so they were deemed to be inconsequential for this analysis.

Table 1 presents the predicted 2035 VMT for the alternatives within the study corridor. The Proposed Action would increase energy usage in the corridor by 0.5 percent above the No Action Alternative because the Proposed Action would attract new users to the roadway that would not use the roadway under the No Action Alternative.

Appendix A provides a compiled table of the impacts for insertion into the EA.

Table 1 Comparison of Alternatives' Daily Vehicle Miles Traveled and Fuel Use in the Project Corridor

Alternative	Predicted 2035 Daily VMT (1000s of miles)	Daily VMT Change from 2035 No Action (miles)	Estimated Change in Daily VMT and Fuel Consumption Versus No Action (percent)
No Action Alternative	3,060	0	0
Proposed Action	3,078	18,000	0.5%

Engine friction, rolling resistance, and accessories (for example, air conditioning) can reduce fuel efficiency at lower speeds. Adding cold engine starts or stop-and-go driving conditions can also increase fuel consumption. Overall, because the two alternatives are not expected to differ substantively in these traffic characteristics in the project corridor, these characteristics will not materially distinguish energy usage.

3.3.1 Potential Permits

No permits are required for the Proposed Action.

4. MITIGATION

Several opportunities for energy conservation during construction will be available through the Proposed Action. Recycled materials, such as asphalt, will be used to the maximum extent possible. The construction contractor will conduct disruptive activities during periods of lower traffic volumes to reduce the number of idling vehicles. The contractor will keep equipment well maintained, minimize equipment idling, and encourage carpooling to and from the work site. Staging areas will be located as close to the construction as possible.

Appendix B provides a compiled table of the mitigation measures for insertion into the EA.

5. REFERENCES

City of Aurora. 2009. Comprehensive Plan.

Appendix A Resource Impact Table

Resource	Context	No Action Alternative	Proposed Action
Energy	<p>The construction and operation of transportation improvements associated with the Proposed Action would require energy consumption.</p>	<p>Vehicle Miles Traveled (VMT) in the study area would increase over time, leading to increased traffic congestion. This, in turn, would result in even less efficient fuel use by all vehicles in or traveling through the study area during peak periods.</p>	<p>The construction envisioned for the Proposed Action would consume more energy than the No Action Alternative, since the No Action Alternative would leave the existing road alignments with no improvements. Because the Proposed Action would be on a new alignment, traffic conflicts and delays and resulting fuel consumption during construction may be lower. Overall, the differences are expected to be minor and are relevant only during the relatively brief construction period.</p> <p>The Proposed Action would increase energy usage in the corridor by 0.5 percent above the No Action Alternative.</p>

Appendix B Resource Mitigation Table

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6 th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Energy	Energy consumption due to construction	Recycled materials, such as asphalt, will be used to the maximum extent possible. The construction contractor will conduct disruptive activities during periods of lower traffic volumes to reduce the number of idling vehicles. The contractor will keep equipment well maintained, minimize equipment idling, and encourage carpooling to and from the work site. Staging areas will be located as close to the construction as possible.	Construction	Construction