Appendix 1: End Note Sources and Web Links to Supporting Documentation.

APPLICATION ENDNOTES

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Additional Web Links to Supporting Documentation

APPLICANT & PROJECT PARTNERS

Colorado Department of Transportation:	http://www.dot.state.co.us
Regional Transportation District:	http://www.rtd-denver.com
Adams County:	http://www.co.adams.co.us/
City of Arvada:	http://arvada.org/
City & County of Broomfield:	http://www.ci.broomfield.co.us/
City of Boulder:	http://www.bouldercolorado.gov
Boulder County:	http://www.bouldercounty.org/
City & County of Denver:	http://www.denvergov.org
Jefferson County:	http://www.jeffco.us
City of Louisville:	http://www.louisvilleco.gov/
Town of Superior:	http://www.townofsuperior.com/
City of Westminster	http://www.ci.westminster.co.us/
36 Commuting Solutions:	http://36commutingsolutions.org

ENVIRONMENTAL CLEARANCE/PLANNING DOCUMENTS

U.S. 36 Environmental Impact Statement:	http://www.us36eis.com
Consensus Recommendation of U.S. 36 Preferred Alternative Committee:	https://www.communicationsmgr.com/projects/US36/docs/2008-0709_US36_Preferred_Alternative_Committee_-_Combined_Alternative_Recommendation_FORMALIZED_FINAL_with_signatures.pdf
History of U.S. 36 Corridor:	http://www.36commutingsolutions.org/linked_documents/Boulder%20Turnpike%20History%208-14-09%20(2).pdf
FasTracks Program:	http://www.rtd-fastracks.com
Denver Regional Council of Governments (DRCOG) Fiscally-Constrained Transportation Plan:	http://www.drcog.org/documents/2035%20MVRTP_revisedMarch09_Ch5.pdf

STATE OF GOOD REPAIR

AASHTO's Rough Roads Report:	http://roughroads.transportation.org/RoughRoads_FullReport.pdf
US 36 Corridor Draft EIS Chapter 1: Purpose and Need:	https://www.communicationsmgr.com/projects/US36/docs/Chapter_1.pdf
TRIP, Future Mobility in the State of Colorado: Meeting the Need for Safe & Efficient Mobility:	http://www.tripnet.org/ColoradoFutureMobilityReportJan08.pdf
TRIP, America's Top 5 Transportation Headaches:	http://www.tripnet.org/Transportation_Headaches_Report_Jan_2009.pdf

ECONOMIC COMPETITIVENESS

Green Jobs in Colorado:	http://www.edf.org/page.cfm?tagID=34065&state=CO
Colorado's New Energy Economy:	http://www.edf.org/page.cfm?tagID=43269
CO-Labs, The Impact of Federally Funded Research Laboratories in Colorado:	http://www.co-labs.org/downloads/CO-LABS%20Impact%20Study%20Results%20May%202008.pdf
Defining, Estimating & Forecasting the Renewable Energy & Energy Efficiency Industries in the U.S. and in Colorado:	http://www.ases.org/images/stories/ASES/pdfs/CO_Jobs_Final_Report_December2008.pdf

LIVABILITY

HOP, SKIP & JUMP Bus Service:	http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=8825&Itemid=2973
BikeLinks 36 Bicycle Map:	http://www.36commutingsolutions.org/linked_documents/US36BikeMapvf.pdf
U.S. 36 Commuter Guide:	http://www.36commutingsolutions.org/linked_documents/U%20S%20%2036%20Commuter%20Guide%20Map%20Final%2012-10.pdf
RTD Eco Pass Program:	http://www.rtd-denver.com/EcoPass.shtml
Transit Oriented Development:	http://www.rtd-fastracks.com/media/uploads/main/12-21-07RTDTODStatus2007.pdf

SUSTAINABILITY

DRCOG Sustainability Café Workshop:	http://www.drcog.org/documents/WhatWouldSustainableLookLike.pdf
Colorado Greenhouse Gas (GHG) Inventory:	http://www.cdphe.state.co.us/ap/down/GHGEIJan07.pdf
Colorado Climate Change Policy Fact Sheet:	http://epa.gov/climatechange/wycd/stateandlocalgov/states/co.html#ccap
CDOT Policy Directive1901, Air Quality & GHG Emissions:	http://internal/PolicyGovernRelations/tracking/PDs%20for%20Web/1901-0%20CDOT%20Policy%20on%20Air%20Quality%2005%202009.pdf

SAFETY

Average Accident Claim Costs for Property Damage and Physical Injury:	http://www.iii.org/media/facts/statsbyissue/auto

Appendix 2: Typical Section and Geospatial maps for $550M, $260M, and $160M Projects.

To view files in Appendix 2, please copy and paste the following link into your Web browser:

ftp://ftp.ch2m.com/US_36_TIGER_GRANT

If needed: Username: US36TIGER

Password: TIGERGRANT

Appendix 3: U.S. 36 Corridor Community Transit Oriented Development (TOD) and Area Plans.

Links to Area Plans and Transit Oriented Development (TOD) Plans Along U.S. 36

There are a total of over 560 acres of approved TOD plans specifically associated with Bus Rapid Transit (BRT) in various communities along U.S. 36. In addition, there are existing dense and mixed use areas on either end of the BRT corridor in Denver and Boulder.

City of Boulder

The following link connects to the City of Boulder's Transit Village Area Plan (TVAP) Web page. http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=5346&Itemid=2277.

TVAP covers an area exceeding 160 acres where there will be one terminus for BRT in Boulder and a future Northwest Rail Station.

Table 1. A Snapshot of Boulder's TVAP.

	Units	Affordable Units	Population	Jobs
Phase 1	1,239	323	2,478	1,662
Phase 2	842	141	1,684	2,592
Total	2,081	464	4,162	4,254

Existing Boulder dense and mixed use districts that will be served by a BRT include the University of Colorado main campus, University Hill and Downtown Boulder. The following link provides accurate, current data on the City of Boulder's population and employment estimates and projections and includes the transit village area plan estimates:
http://www.bouldercolorado.gov/files/PDS/2009_community_data_report.pdf.

City of Louisville

The City of Louisville has designated Opportunity Area #5 in its Comprehensive Plan as a TOD in relationship with U.S. 36 BRT. The data for Louisville's BRT TOD area is as follows:

Table 2. Louisville Proposed TOD.

Elements	Data
Acreage	81.91 acres (3,568,000 square feet)
Proposed Residential Population	295 (134 units)
Current Employment	657 employees (21 businesses)

The following link provides on-line information regarding the City of Louisville:
http://www.louisvilleco.gov/LinkClick.aspx?fileticket=YAWfabDatDM%3d&tabid=195

Town of Superior

The town of Superior is located directly across U.S. 36 from the City of Louisville. Superior has two concepts for a town center that connects with U.S. 36. The following link provides information about Concept A:
http://www.townofsuperior.com/Portals/7/Documents/PDFs/Misc/Town%20Center/SuperiorA060407.pdf

The following is the link to Concept B:

http://www.townofsuperior.com/Portals/7/Documents/PDFs/Misc/Town%20Center/SuperiorB060407.pdf

The link below provides additional information regarding the Town of Superior.

http://www.townofsuperior.com/tabid/262/~/tabid/181/TownOfSuperior/Business/FormsPermits/tabid/183/~/Community/AboutSuperior/tabid/184/Default.aspx

City and County of Broomfield

The City & County of Broomfield Council approved two TODs approved: Arista and a portion of Original Broomfield.

Arista includes urban apartments, condominiums, and live/work lofts surrounded by several parks. Residential development is integrated with office and retail. The focal point of Arista is the Broomfield Event Center, a 7,500-seat auditorium/arena that house sports, concerts and special events.

Table 3. Arista TOD.

	Current	Ultimate
Acreage	64.3	189
Population	550	2,200
Employment	950	2,870

The Original Broomfield Neighborhood Plan (adopted in 2008) has identified an area east of the U.S. 36 BRT station as a future TOD area. The area stretches from U.S. 36 to the Burlington Northern Santa Fe Railroad (BNSF) tracks. Because there is no TOD development in this area right now, the following are the ultimate or build-out numbers:

Table 4. Original Broomfield TOD.

Assumptions		
Acreage	31.6	TOD Area in Original Broomfield
Est. Population	1,975	25/du/ac with hh size of 2.5
Est. Employment	765	25% of area developed as retail/commercial with .35 FAR = 344,124/450

Arista and Original Broomfield's TOD are linked by a pedestrian bridge over US 36 connecting to a bus rapid transit station.

The following link connects to information about the City and County of Broomfield.

http://www.broomfield.org/planning/demographics/index.shtml

City of Westminster

The following chart outlines the approved TODs associated with BRT in the City of Westminster.

Table 5. Projected Employment & Population by Land Use for the Westminster Urban Reinvestment Project at Full Build-Out.

Commercial	Square Footage	Sq. Ft. Per Employee	Projected Employment
Retail	1,125,000	1,000	1,125
Office	2,310,000	250	9,240
Total	3,435,000	n/a	10,365
Residential	**No. Units**	**Person per Household**	**Projected Population**
Residential Units	2,300	2.0	4,600

*Based on square feet for each land use identified in Van Meter Williams Pollack plan, December 2008.
Source: City of Westminster, July 2009.

The following is a link to more information about Westminster:

http://www.ci.westminster.co.us/25.htm

Appendix 4: U.S. 36 Cost / Benefit Methodology, Data and the DYNASMART-P Technical Memo.

Net Present Value Factor	7.00%											
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Benefits												
- Toll Revenues			8,036,550	8,599,109	9,201,046	9,845,119	10,534,278	11,271,677	12,060,695	12,904,943	13,808,289	14,774,869
- Value of Person Hours Saved/Productivity Gained			52,157,655	55,808,691	59,715,299	63,895,370	68,368,046	73,153,809	78,274,576	83,753,796	89,616,562	95,889,721
- Safety Analysis			156,986	167,975	179,733	192,315	205,777	220,181	235,594	252,085	269,731	288,612
- Emissions Offset			284,784	304,719	326,049	348,873	373,294	399,424	427,384	457,301	489,312	523,564
- Construction Employment Income	10,265,170	82,121,362	10,265,170		-	-	-	-	-	-	-	-
- Supporting Industries Employment Income	4,551,766	36,414,124	4,551,766									
- Induced Employment Income	12,794,358	102,354,865	12,794,358									
- Long Term Employment Income (Incremental Wages Average)	-	40,042,184	82,907,342	128,748,946	177,728,076	230,013,783	285,783,466	345,223,271	408,528,504	475,904,064	547,564,900	623,736,484
- Reduction in Low Income Households using Transit			135,312,000	144,783,840	154,918,709	165,763,018	177,366,430	189,782,080	203,066,825	217,281,503	232,491,208	248,765,593
- Benefit for Constructing in 2012 vs. 2035			187,585,396									
- Vehicle Maintenance Cost Reduction			30,150,000	32,260,500	34,518,735	36,935,046	39,520,500	42,286,935	45,247,020	48,414,312	51,803,313	55,429,545
Total Benefits	27,611,294	260,932,535	524,202,007	370,673,779	436,587,648	506,993,524	582,151,789	662,337,377	747,840,597	838,968,004	936,043,316	1,039,408,389
Costs												
- Capital Construction	86,666,667	86,666,667	86,666,667									
- Operation Maintenance for Managed Lane			5,864,425	6,274,935	6,714,180	7,184,173	7,687,065	8,225,159	8,800,921	9,416,985	10,076,174	10,781,506
Total Costs	86,666,667	86,666,667	92,531,092	6,274,935	6,714,180	7,184,173	7,687,065	8,225,159	8,800,921	9,416,985	10,076,174	10,781,506
Current year surplus/(deficit)	(59,055,373)	174,265,868	431,670,915	364,398,845	429,873,467	499,809,351	574,464,724	654,112,218	739,039,677	829,551,019	925,967,142	1,028,626,883
Annual Net Present Value	(54,921,497)	150,722,549	347,217,523	272,589,288	299,057,972	323,371,744	345,655,925	366,029,299	384,604,439	401,488,016	416,781,094	430,579,405
Cumulative Net Present Value	($54,921,497)	$95,801,052	$443,018,575	$715,607,863	$1,014,665,835	$1,338,037,579	$1,683,693,504	$2,049,722,802	$2,434,327,241	$2,835,815,257	$3,252,596,351	$3,683,175,755

Assumptions/Calculations:
- The inflation and deflation factors are both 7%

- **Cost Benefit Analysis Ratio**	= Cumulative Net Present Value in 2035	$	10,511,832,238	
	/ Total Project Cost	$	260,000,000	
	Cost Benefit Analysis Ratio =		**40**	**to 1**

BRT Project Cost Benefit Analysis

2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
15,809,110	16,915,748	18,099,850	19,366,840	20,722,519	22,173,095	23,725,212	25,385,976	27,162,995	29,064,404	31,098,913	33,275,837	35,605,145	38,097,505
102,602,002	109,784,142	117,469,032	125,691,864	134,490,295	143,904,615	153,977,938	164,756,394	176,289,342	188,629,595	201,833,667	215,962,024	231,079,366	247,254,921
308,815	330,432	353,562	378,312	404,794	433,129	463,448	495,890	530,602	567,744	607,486	650,010	695,511	744,196
560,213	599,428	641,388	686,285	734,325	785,728	840,729	899,580	962,551	1,029,929	1,102,024	1,179,166	1,261,708	1,350,027
-	-	-	-	-	-	-	-	-	-	-	-	-	-
704,655,310	790,569,413	881,738,914	978,436,593	1,080,948,480	1,189,574,483	1,304,629,041	1,426,441,804	1,555,358,351	1,691,740,938	1,835,969,276	1,988,441,357	2,149,574,305	2,319,805,274
266,179,184	284,811,727	304,748,548	326,080,947	348,906,613	373,330,076	399,463,181	427,425,604	457,345,396	489,359,574	523,614,744	560,267,776	599,486,520	641,450,577
59,309,613	63,461,286	67,903,576	72,656,827	77,742,805	83,184,801	89,007,737	95,238,279	101,904,958	109,038,305	116,670,987	124,837,956	133,576,612	142,926,975
1,149,424,248	1,266,472,177	1,390,954,872	1,523,297,667	1,663,949,829	1,813,385,927	1,972,107,286	2,140,643,526	2,319,554,194	2,509,430,489	2,710,897,097	2,924,614,125	3,151,279,167	3,391,629,476
11,536,212	12,343,746	13,207,809	14,132,355	15,121,620	16,180,134	17,312,743	18,524,635	19,821,359	21,208,854	22,693,474	24,282,018	25,981,759	27,800,482
11,536,212	12,343,746	13,207,809	14,132,355	15,121,620	16,180,134	17,312,743	18,524,635	19,821,359	21,208,854	22,693,474	24,282,018	25,981,759	27,800,482
1,137,888,037	1,254,128,430	1,377,747,063	1,509,165,312	1,648,828,209	1,797,205,794	1,954,794,543	2,122,118,891	2,299,732,835	2,488,221,635	2,688,203,622	2,900,332,108	3,125,297,408	3,363,828,994
442,973,619	454,049,595	463,888,624	472,567,653	480,159,510	486,733,103	492,353,626	497,082,739	500,978,751	504,096,788	506,488,954	508,204,488	509,289,902	509,789,131
$4,126,149,374	$4,580,198,969	$5,044,087,593	$5,516,655,246	$5,996,814,756	$6,483,547,859	$6,975,901,485	$7,472,984,223	$7,973,962,974	$8,478,059,762	$8,984,548,717	$9,492,753,204	$10,002,043,107	$10,511,832,238

$160M U.S. 36 Managed Lane/BRT

Net Present Value Factor	7.00%											
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Revenues/Cost Benefits												
- Toll Revenues			4,990,250	5,339,568	5,713,337	6,113,271	6,541,200	6,999,084	7,489,020	8,013,251	8,574,179	9,174,371
- Value of Person Hours Saved/Productivity Gained			32,048,730	34,292,141	36,692,591	39,261,072	42,009,347	44,950,002	48,096,502	51,463,257	55,065,685	58,920,283
- Safety Analysis			121,010	129,481	138,544	148,242	158,619	169,723	181,603	194,316	207,918	222,472
- Emissions Offset			142,899	152,902	163,605	175,057	187,311	200,423	214,453	229,465	245,527	262,714
- Construction Employment Income	6,317,028	50,536,222	6,317,028		-	-	-	-	-	-	-	-
- Supporting Industries Employment Income	2,801,086	22,408,691	2,801,086									
- Induced Employment Income	7,873,451	62,987,610	7,873,451									
- Long Term Employment Income (Incremental Wages Average)	-	24,624,757	50,985,560	79,176,789	109,297,503	141,451,664	175,748,367	212,302,087	251,232,930	292,666,904	336,736,196	383,579,464
- Reduction in Low Income Households using Transit			135,312,000	144,783,840	154,918,709	165,763,018	177,366,430	189,782,080	203,066,825	217,281,503	232,491,208	248,765,593
- Benefit for Constructing in 2012 vs. 2035			99,141,441									
- Vehicle Maintenance Cost Reduction			30,150,000	32,260,500	34,518,735	36,935,046	39,520,500	42,286,935	45,247,020	48,414,312	51,803,313	55,429,545
Total Revenue	16,991,565	160,557,281	369,883,455	296,135,220	341,443,024	389,847,372	441,531,775	496,690,333	555,528,353	618,263,007	685,124,026	756,354,442
Expenses												
- Capital Construction	53,333,333	53,333,333	53,333,333									
- Operation Maintenance for Managed Lane			4,586,000	4,907,020	5,250,511	5,618,047	6,011,311	6,432,102	6,882,349	7,364,114	7,879,602	8,431,174
Total Expenses	53,333,333	53,333,333	57,919,333	4,907,020	5,250,511	5,618,047	6,011,311	6,432,102	6,882,349	7,364,114	7,879,602	8,431,174
Current year surplus/(deficit)	(36,341,768)	107,223,947	311,964,122	291,228,200	336,192,513	384,229,325	435,520,464	490,258,231	548,646,004	610,898,893	677,244,424	747,923,268
Annual Net Present Value	(33,797,844)	92,737,992	250,930,525	217,853,840	233,885,221	248,592,601	262,053,043	274,339,588	285,521,461	295,664,256	304,830,117	313,077,911
Cumulative Net Present Value	($33,797,844.18)	$58,940,147.76	$309,870,672.92	$527,724,513.26	$761,609,734.36	$1,010,202,335.58	$1,272,255,378.10	$1,546,594,966.08	$1,832,116,427.22	$2,127,780,683.02	$2,432,610,799.63	$2,745,688,710.57

Assumptions/Calculations:
- The inflation and deflation factors are both 7%

- **Cost Benefit Analysis Ratio**	= Cumulative Net Present Value in 2035	$	7,596,768,341	
	/ Total Project Cost	$	160,000,000	
	Cost Benefit Analysis Ratio =		**47**	**to 1**

Project Cost Benefit Analysis

2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
9,816,577	10,503,737	11,238,999	12,025,729	12,867,530	13,768,257	14,732,035	15,763,278	16,866,707	18,047,377	19,310,693	20,662,441	22,108,812	23,656,429
63,044,703	67,457,832	72,179,880	77,232,472	82,638,745	88,423,457	94,613,099	101,236,016	108,322,537	115,905,115	124,018,473	132,699,766	141,988,749	151,927,962
238,045	254,708	272,538	291,615	312,028	333,870	357,241	382,248	409,006	437,636	468,270	501,049	536,123	573,651
281,104	300,781	321,836	344,364	368,470	394,263	421,861	451,392	482,989	516,798	552,974	591,682	633,100	677,417
-	-	-	-	-	-	-	-	-	-	-	-	-	-
433,342,145	486,176,774	542,243,317	601,709,526	664,751,300	731,553,075	802,308,220	877,219,461	956,499,320	1,040,370,571	1,129,066,728	1,222,832,542	1,321,924,532	1,426,611,536
266,179,184	284,811,727	304,748,548	326,080,947	348,906,613	373,330,076	399,463,181	427,425,604	457,345,396	489,359,574	523,614,744	560,267,776	599,486,520	641,450,577
59,309,613	63,461,286	67,903,576	72,656,827	77,742,805	83,184,801	89,007,737	95,238,279	101,904,958	109,038,305	116,670,987	124,837,956	133,576,612	142,926,975
832,211,372	912,966,846	998,908,695	1,090,341,479	1,187,587,491	1,290,987,799	1,400,903,375	1,517,716,277	1,641,830,913	1,773,675,375	1,913,702,868	2,062,393,212	2,220,254,449	2,387,824,547
9,021,356	9,652,851	10,328,551	11,051,549	11,825,158	12,652,919	13,538,623	14,486,327	15,500,369	16,585,395	17,746,373	18,988,619	20,317,822	21,740,070
9,021,356	9,652,851	10,328,551	11,051,549	11,825,158	12,652,919	13,538,623	14,486,327	15,500,369	16,585,395	17,746,373	18,988,619	20,317,822	21,740,070
823,190,016	903,313,995	988,580,144	1,079,289,930	1,175,762,333	1,278,334,880	1,387,364,752	1,503,229,950	1,626,330,543	1,757,089,980	1,895,956,495	2,043,404,593	2,199,936,627	2,366,084,477
320,463,392	327,039,356	332,855,787	337,960,000	342,396,777	346,208,489	349,435,222	352,114,890	354,283,346	355,974,485	357,220,344	358,051,197	358,495,645	358,580,698
$3,066,152,102.82	$3,393,191,458.66	$3,726,047,245.35	$4,064,007,245.79	$4,406,404,023.04	$4,752,612,512.43	$5,102,047,734.82	$5,454,162,625.28	$5,808,445,971.48	$6,164,420,456.44	$6,521,640,800.54	$6,879,691,997.98	$7,238,187,642.99	$7,596,768,341.43

Project Benefit Calculations and Assumptions Sheet

Project	Daily Toll Revenue ($)	Annual Peaks Days for Toll Revenue	Annual Revenue ($)	Annual Maintenance Cost per Family	Annual Average Daily Trips	Annual Maintenance Costs Saved with Road Impr.	Total Person Hours Saved a Year with Project	SOV Travel Time Saved/Year	SOV Travel Savings	Commercial Travel Time Saved/Year	Commercial Travel Savings	HOV Travel Time Saved/Year	HOV Travel Savings	Transit Travel Time Saved/Year	Transit Travel Savings	Value of Person Hours Saved a year	Construction Employment Income	Supporting Industries Employment Income	Induced Employment Income	Gallons Saved per Year	Benefit of Emission Reduction
$260M -2012	$19,961	250	**$4,990,250**	$335	90,000	$ 30,150,000	2,400,000	1,802,400	$27,937,200	350,400	$16,293,600	494,400	$ 7,663,200	17,010	$ 263,655	$52,157,655	$ 102,651,702	45,517,655	$127,943,581	1,108,750	$ 284,784
$160M - 2012	$32,146	250	**$8,036,550**	$335	90,000	$ 30,150,000	1,470,000	1,103,970	$17,111,535	214,620	$ 9,979,830	302,820	$ 4,693,710	17,010	$ 263,655	$32,048,730	$ 63,170,278	28,010,864	$78,734,512	556,350	$ 142,899

Assumptions/Calculations:

Annual Toll Revenue - Daily Revenue * 250 days a year on average peak traffic

Annual Maintenance Cost Saved - Annual cost for family for vehicle on rough road is $335 * Annual Average Daily Trips 90,000

SOV Travel Time Saved/Year - $15.5 for value of time * number of hours saved.

Commercial Travel Time Saved/Year - $46.5 for value of time * number of hours saved.

HOV Travel Time Saved/Year - $15.5 for value of time * number of hours saved * 2 people per carpool vehicle

Transit Travel Time Saved/Year - $15.5 for value of time * number of hours saved. Assumes current 13,000 transit riders * 26% increase with project completion.

Value of Person Hours Saved a year - SOV+ Commercial + HOV + Transit Travel Time Saved a Year

Emissions Savings -

1 metric ton = 1000 kgs or 2205 lbs = 1 cubic meter of water

Equation to Calculate Tiger Grant Benefits

# of gallons of gas	X	19.29825 lbs of CO2 *0.88932 lb per mi	/	2205 lbs	=	Metric Tons	X	$33

= Dollars of global emissions benefits of reducing CO2 emissions

$260M U.S. 36 Managed Lane/BRT Project Cost Benefit Ana

Inflation Rate	7.00%												
Net present value factor	7.00%												
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
2012 Project Costs - Inflated	$ 260,000,000	$ 278,200,000	$ 297,674,000	$ 318,511,180	$ 340,806,963	$ 364,663,450	$ 390,189,891	$ 417,503,184	$ 446,728,407	$ 477,999,395	$ 511,459,353	$ 547,261,508	$ 585,569,813
2035 Project Costs - Deflated	$ 187,585,396	$ 201,704,727	$ 216,886,803	$ 233,211,616	$ 250,765,179	$ 269,639,977	$ 289,935,459	$ 311,758,558	$ 335,224,256	$ 360,456,189	$ 387,587,301	$ 416,760,538	$ 448,129,611

Cost Benefit for building in 2012 **$ 187,585,396**

Assumptions/Calculations:
- The inflation and deflation factors are both 7%
- Inflate the 2012 Project Cost of $260M by 7% per year to 2035. Then subtract the 2035 inflated cost by the project cost and deflate it back by 7% to 2012. The 2012 deflated number is the benefit of doing the project in 2012.

alysis for Building in 2012 vs 2035.

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
$	626,559,700	$ 670,418,879	$ 717,348,201	$ 767,562,575	$ 821,291,955	$ 878,782,392	$ 940,297,159	$ 1,006,117,960	$ 1,076,546,217	$ 1,151,904,453	$ 1,232,537,764	$ 1,318,815,408	$ 1,411,132,486
$	481,859,797	$ 518,128,814	$ 557,127,757	$ 599,062,104	$ 644,152,800	$ 692,637,419	$ 744,771,419	$ 800,829,482	$ 861,106,970	$ 925,921,473	$ 995,614,488	$ 1,070,553,212	$ 1,151,132,486

$160M U.S. 36 Managed Lane/BRT Project Cost Benefit Ana

Inflation Rate	7.00%												
Net present value factor	7.00%												
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
2012 Project Costs - Inflated	$ 160,000,000	$ 171,200,000	$ 183,184,000	$ 196,006,880	$ 209,727,362	$ 224,408,277	$ 240,116,856	$ 256,925,036	$ 274,909,789	$ 294,153,474	$ 314,744,217	$ 336,776,312	$ 360,350,654
2035 Project Costs - Deflated	$ 99,141,441	$ 106,603,700	$ 114,627,634	$ 123,255,521	$ 132,532,818	$ 142,508,406	$ 153,234,845	$ 164,768,651	$ 177,170,592	$ 190,506,013	$ 204,845,176	$ 220,263,630	$ 236,842,613

Cost Benefit for building in 2012 **$ 99,141,441**

Assumptions/Calculations:
- The inflation and deflation factors are both 7%
- Inflate the 2012 Project Cost of $260M by 7% per year to 2035. Then subtract the 2035 inflated cost by the project cost and deflate it back by 7% to 2012. The 2012 deflated number is the benefit of doing the project in 2012.

alysis for Building in 2012 vs 2035.

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
$	385,575,200	$ 412,565,464	$ 441,445,047	$ 472,346,200	$ 505,410,434	$ 540,789,164	$ 578,644,406	$ 619,149,514	$ 662,489,980	$ 708,864,279	$ 758,484,778	$ 811,578,713	$ 868,389,222
$	254,669,476	$ 273,838,146	$ 294,449,620	$ 316,612,494	$ 340,443,542	$ 366,068,325	$ 393,621,855	$ 423,249,306	$ 455,106,781	$ 489,362,130	$ 526,195,838	$ 565,801,977	$ 608,389,222

Managed Lane Average vs General Purpose Lane Speed Average in AM Peak			
Project Description	**Managed Lane Average Travel Time in AM Peak**	**GP Average Time in AM Peak**	**Managed Lane vs GP Average Time Savings AM Peak**
$160M - 2012	10.80	23.70	12.90
$260M - 2012	9.80	23.70	13.90

Assumptions/Calculations**:**

Managed Lane vs General Purpose Lane Speed Average Savings - Manage Lane Average AM Speed (mph) - General Purpose Speed Average AM Speed (mph)

Tolling Revenue for Managed Lanes							
Year	Scenario	Daily VMT (veh-miles)	Daily Revenue ($)	Annual VMT (veh-miles)	Annual Revenue ($)	Minimum Toll Rate ($/mile)	Maximum Toll Rate ($/mile)
2012	$160M	23,458	$19,961	5,864,425	$4,990,250	$0.25	$2.00
2012	$260M	45,172	$32,146	11,292,975	$8,036,550	$0.25	$2.00
2035	$160M	27,314	$20,251	6,828,400	$5,062,825	$0.25	$2.00
2035	$260M	38,554	$29,509	9,638,475	$7,377,200	$0.25	$2.00

Assumptions/Calculations**:**

Annual Toll Revenue - Daily Revenue * 250 days a year on average peak traffic

Dynasmart Modeling -

The calculation of the toll revenue was performed by tracking individual vehicles which traverse HOT lanes with various prices set by the HOT lane pricing algorithm. These are collected from the locations of the proposed gantries given in the implementation plan. The toll rate was based on a variable tolling scheme that used a congestion pricing algorithm. Whenever the link would hit a certain density or drop below a certain speed, the toll rate would increase. This would keep the vehicles moving at a minimal speed of 50 mph. Since the toll was congestion responsive, the toll rate is directly dependant on the adjoined general purpose lanes and the HOT lane speed.

CO2 Calculators

last updated September 2, 2009

	MPG Input (mi/gal)	CO_2 Output (lb/mi)	CO_2 Output (g/mi)		
MINE	21.7	0.88932	403.3956	21.7	= the 2009 CAFÉ mpg standard for Colorado's avg fleet mix
CALIF.	40		222.3882 (CO_2 Equiv)		

ASSUMPTION: Average gasoline is a saturated C8

C_8H_{18}

	ATOMS (number)	ATOMIC WEIGHT	AGGREGATE MASS
H	18	1	18
C	8	12	96
TOTAL MASS			**114**

$C_8H_{18} + (12.5)O_2 = (8)CO_2 + (9)H_2O$

CO_2

C	8	12	96
O	16	16	256
TOTAL MASS			352

multiple = 3.087719

Water

H	18	1	18
O	9	16	144
			162

multiple = 1.421053

ASSUMPTION: one gallon gasoline = 6.25 pounds

SO:

ONE GALLON OF GASOLINE WILL PRODUCE 19.29825 pounds of CO_2 and: 8.881579 pounds of water

1 metric ton = 1000 kgs or 2205 lbs = 1 cubic meter of water

Equation to Calculate Tiger Grant Benefits

# of gallons of gas	X	19.29825 lbs of CO2 *0.88932 lb per mi	/	2205 lbs	=	Metric Ton	X	$33

= Dollars of global emissions benefits of reducing CO2 emissions

Option Evaluated	Metric Tons of Emissions	Dollars Calculated at $33 Per Metric Ton	Cost Savings of Emissions Reductions From No Action
No Action	$ -	$ -	-
$160M - 2012	$ 4,330	$ 142,899	$ 142,899
$260M - 2012	$ 8,630	$ 284,784	$ 284,784
$160M - 2035	$ 1,542	$ 50,895	$ 50,895
$260M - 2035	$ 6,069	$ 200,280	$ 200,280

No Action	**Gallons Saved**	**lbs**	**lbs**	**lbs**	**$**
	-	19.29825	0.88932	2205	33
$160M - 2012	**Gallons Saved**	**lbs**	**lbs**	**lbs**	**$**
	556,350	19.29825	0.88932	2205	33
$260M - 2012	**Gallons Saved**	**lbs**	**lbs**	**lbs**	**$**
	1,108,750	19.29825	0.88932	2205	33
$160M - 2035	**Gallons Saved**	**lbs**	**lbs**	**lbs**	**$**
	198,150	19.29825	0.88932	2205	33
$260M - 2035	**Gallons Saved**	**lbs**	**lbs**	**lbs**	**$**
	779,750	19.29825	0.88932	2205	33

Assumptions:

The fuel consumption results include the average fuel consumption for both auto and trucks over the simulated AM and PM periods. The average fuel consumption for auto in the 2012 AM no-build scenario is 0.2378 gallons, whereas that for trucks is 0.397 gallons. The total fuel consumption for AM and PM periods in the no-build scenario is 139,128 and 137,904 gallons, respectively. After computing the fuel consumption statistics for $100M, $200M scenarios, it was found that $100M scenario would save 556,350 gallons of fuel annually compared with the no-build scenario. The annual fuel saving form the $200M scenario is 1.11 million gallons and that for the $550M scenarios is 1.54 million gallons. The annual fuel saving for the three build-out scenarios at the Year 2035 is 198K, 780K.

Sustainability Analysis

Project	VMT Reduction	Gallons Saved per Year	Cost Savings of Emissions
$260M - 2012	39,689	1,108,750	$ 284,784
$160M - 2012	14,261	556,350	$ 142,899

Assumptions/Calculations:

VMT Reduction - Based on Dynasmart Model shows VMT 3,051,059 in No Build. Sbutract that by VMT with $160M project (3,036,798) and $260M projects (3,011,370)

Cost Savings of Emissions -

1 metric ton = 1000 kgs or 2205 lbs = 1 cubic meter of water

Equation to Calculate Tiger Grant Benefits

# of gallons of gas	X	19.29825 lbs of CO2 *0.88932 lb per mi	/	2205 lbs	=	Metric Ton	X	$33

= Dollars of global emissions benefits of reducing CO2 emissions

Economic Job Creation Analysis: U.S. 36 Managed Lanes/BRT Project		
	Assuming 7% of Cost is ROW	
	260M	160M
Construction Oriented Employment Income	$ 102,651,702	$ 63,170,278
Construction Oriented Employment Person-Years	2,479	1,526
Supporting Industries Employment Income	$ 45,517,655	$ 28,010,864
Supporting Industries Employment Person-years	1,124	692
Induced Employment Income	$ 127,943,581	$ 78,734,512
Induced Employment Person-years	3,630	2,234
Total Employment Income	**$ 276,112,938**	**$ 169,915,654**
Total Person-years	**7,234**	**4,452**

Assumptions/Calculations:

*The 1997 report refers to a total of 47,500 jobs supported, that included a 20% state match of funds so that measured the impact of $1.25 billion

Adhered to Federal Highway Administration Employment Impacts of Highway Infrastructure Investment, February 23, 2009
http://www.fhwa.dot.gov/policy/otps/pubs/impacts/index.htm

US. 36 Corridor Long Term Employment Cost Benefit

Growth rate	1.02		1.025				
Year	**Employment**	**Average annual wage**	**Total Wages**	**incremental workers**	**inc worker*aver wage**	**Percentage based on Project Cost**	**inc worker*aver wage**
2010	202,278	$ 52,000	10,518,456,000		$0		**$0**
2011	206,324	$ 53,300	10,997,045,748	4,046	$215,628,348	11%	**$24,624,757**
2012	210,450	$ 54,633	11,497,411,330	8,172	$446,458,495	11%	**$50,985,560**
2013	214,659	$ 55,998	12,020,543,545	12,381	$693,316,889	11%	**$79,176,789**
2014	218,952	$ 57,398	12,567,478,276	16,674	$957,070,954	11%	**$109,297,503**
2015	223,331	$ 58,833	13,139,298,538	21,053	$1,238,631,033	11%	**$141,451,664**
2016	227,798	$ 60,304	13,737,136,621	25,520	$1,538,952,428	11%	**$175,748,367**
2017	232,354	$ 61,812	14,362,176,338	30,076	$1,859,037,540	11%	**$212,302,087**
2018	237,001	$ 63,357	15,015,655,361	34,723	$2,199,938,093	11%	**$251,232,930**
2019	241,741	$ 64,941	15,698,867,680	39,463	$2,562,757,481	11%	**$292,666,904**
2020	246,576	$ 66,564	16,413,166,159	44,298	$2,948,653,205	11%	**$336,736,196**
2021	251,507	$ 68,229	17,159,965,220	49,229	$3,358,839,441	11%	**$383,579,464**
2022	256,537	$ 69,934	17,940,743,637	54,259	$3,794,589,714	11%	**$433,342,145**
2023	261,668	$ 71,683	18,757,047,473	59,390	$4,257,239,702	11%	**$486,176,774**
2024	266,902	$ 73,475	19,610,493,133	64,624	$4,748,190,168	11%	**$542,243,317**
2025	272,240	$ 75,312	20,502,770,570	69,962	$5,268,910,031	11%	**$601,709,526**
2026	277,684	$ 77,194	21,435,646,631	75,406	$5,820,939,578	11%	**$664,751,300**
2027	283,238	$ 79,124	22,410,968,553	80,960	$6,405,893,824	11%	**$731,553,075**
2028	288,903	$ 81,102	23,430,667,622	86,625	$7,025,466,025	11%	**$802,308,220**
2029	294,681	$ 83,130	24,496,762,999	92,403	$7,681,431,362	11%	**$877,219,461**
2030	300,574	$ 85,208	25,611,365,715	98,296	$8,375,650,787	11%	**$956,499,320**
2031	306,586	$ 87,338	26,776,682,855	104,308	$9,110,075,054	11%	**$1,040,370,571**
2032	312,718	$ 89,522	27,995,021,925	110,440	$9,886,748,929	11%	**$1,129,066,728**
2033	318,972	$ 91,760	29,268,795,423	116,694	$10,707,815,602	11%	**$1,222,832,542**
2034	325,351	$ 94,054	30,600,525,614	123,073	$11,575,521,298	11%	**$1,321,924,532**
2035	331,858	$ 96,405	31,992,849,530	129,580	$12,492,220,105	11%	**$1,426,611,536**
Totals	64.1%	85.4%	493,439,086,496	1,551,655	125,169,976,084		**$ 14,294,411,269**

Assumptions/Calculations**:**

Incremental Worker Average Wage = Increase in employment compared to previous year * Annual Wage* Project % to employment

US. 36 Corridor Long Term Employment Cost Benefit for $260M

Growth rate	1.02		1.025				
Year	**Employment**	**Average annual wage**	**Total Wages**	**incremental workers**	**inc worker*aver wage**	**Percentage based on Project Cost $260M**	**inc worker*aver wage**
2010	202,278	$ 52,000	10,518,456,000		$0		**$0**
2011	206,324	$ 53,300	10,997,045,748	4,046	$215,628,348	19%	**$40,042,184**
2012	210,450	$ 54,633	11,497,411,330	8,172	$446,458,495	19%	**$82,907,342**
2013	214,659	$ 55,998	12,020,543,545	12,381	$693,316,889	19%	**$128,748,946**
2014	218,952	$ 57,398	12,567,478,276	16,674	$957,070,954	19%	**$177,728,076**
2015	223,331	$ 58,833	13,139,298,538	21,053	$1,238,631,033	19%	**$230,013,783**
2016	227,798	$ 60,304	13,737,136,621	25,520	$1,538,952,428	19%	**$285,783,466**
2017	232,354	$ 61,812	14,362,176,338	30,076	$1,859,037,540	19%	**$345,223,271**
2018	237,001	$ 63,357	15,015,655,361	34,723	$2,199,938,093	19%	**$408,528,504**
2019	241,741	$ 64,941	15,698,867,680	39,463	$2,562,757,481	19%	**$475,904,064**
2020	246,576	$ 66,564	16,413,166,159	44,298	$2,948,653,205	19%	**$547,564,900**
2021	251,507	$ 68,229	17,159,965,220	49,229	$3,358,839,441	19%	**$623,736,484**
2022	256,537	$ 69,934	17,940,743,637	54,259	$3,794,589,714	19%	**$704,655,310**
2023	261,668	$ 71,683	18,757,047,473	59,390	$4,257,239,702	19%	**$790,569,413**
2024	266,902	$ 73,475	19,610,493,133	64,624	$4,748,190,168	19%	**$881,738,914**
2025	272,240	$ 75,312	20,502,770,570	69,962	$5,268,910,031	19%	**$978,436,593**
2026	277,684	$ 77,194	21,435,646,631	75,406	$5,820,939,578	19%	**$1,080,948,480**
2027	283,238	$ 79,124	22,410,968,553	80,960	$6,405,893,824	19%	**$1,189,574,483**
2028	288,903	$ 81,102	23,430,667,622	86,625	$7,025,466,025	19%	**$1,304,629,041**
2029	294,681	$ 83,130	24,496,762,999	92,403	$7,681,431,362	19%	**$1,426,441,804**
2030	300,574	$ 85,208	25,611,365,715	98,296	$8,375,650,787	19%	**$1,555,358,351**
2031	306,586	$ 87,338	26,776,682,855	104,308	$9,110,075,054	19%	**$1,691,740,938**
2032	312,718	$ 89,522	27,995,021,925	110,440	$9,886,748,929	19%	**$1,835,969,276**
2033	318,972	$ 91,760	29,268,795,423	116,694	$10,707,815,602	19%	**$1,988,441,357**
2034	325,351	$ 94,054	30,600,525,614	123,073	$11,575,521,298	19%	**$2,149,574,305**
2035	331,858	$ 96,405	31,992,849,530	129,580	$12,492,220,105	19%	**$2,319,805,274**
Totals	64.1%	85.4%	493,439,086,496	1,551,655	125,169,976,084	1,551,655	**$ 23,244,064,559**

Assumptions/Calculations:

Incremental Worker Average Wage = Increase in employment compared to previous year * Annual Wage* Project % to employment

U.S. 36 Corridor Households with Low Incomes - Summary

Municipality	Estimate HH	Percent HH	Average Income	Percent Benefit for Wages using Transit	Reduce Household Cost for Transit
Arvada*	6,336	16%	$ 25,000	16%	$ 25,344,000
Boulder City*	10,538	26%	$ 25,000	16%	$ 42,152,000
Broomfield*	2,336	6%	$ 25,000	16%	$ 9,344,000
Commerce City*	2,530	6%	$ 25,000	16%	$ 10,120,000
Downtown Denver zip 80202**	1,288	3%	$ 25,000	16%	$ 5,152,000
Federal Heights**	1,614	4%	$ 25,000	16%	$ 6,456,000
Lafayette*	1,666	4%	$ 25,000	16%	$ 6,664,000
Louisville**	742	2%	$ 25,000	16%	$ 2,968,000
Superior**	269	1%	$ 25,000	16%	$ 1,076,000
Westminster*	6,509	16%	$ 25,000	16%	$ 26,036,000
Total households	33,828	100%	$ 25,000	16%	$ 135,312,000

Sources: *U.S. Census Bureau, American FactFinder,
2005-2007 American Community Survey
**U.S. Census 2000

Note: A low income household is defined as having an annual household income of $25,000 or less

Assumptions/Calculations**:**

Reduce Low Income Household Cost for Transit - Low Income Households * Avg. Income* % cost savings for transit

Safety Analysis

Crash Type	Annual Number of Crashes	Percent Reduction with improvements to Corridor	Number of Crashes Reduced Annually Corridor Wide	Percent of corridor miles w/$260M Project	Number of Crashes Reduced Annually w/$260M Project	Average Cost of Accidents (2007)	Annual Crash Savings for $260M Project	Percent of corridor miles w/$160M Project	Number of Crashes Reduced Annually w/$160M Project	Average Cost of Accidents	Annual Crash Savings for $160M Project
Physical Damage Only	428	10%	42.80	48%	21	$ 3,131	**$ 64,323**	37%	16	$ 3,131	**$ 49,583**
Injury	157	10%	15.70	48%	8	$ 12,296	**$ 92,663**	37%	6	$ 12,296	**$ 71,427**
Fatal	1.33	10%	0.13	48%	0	$ -	**$ -**	37%	0	$ -	**$ -**
Total	586	0	59	1	28	$ 15,427	**$ 156,986**	1	22	$ 15,427	**$ 121,010**

Assumptions/Calculations:

Safety Cost Savings - Annual Number of Crashes * 10% reduction in crashes with improvement to corridor * % of the miles of project improvement * average cost of accident

US36 VALUE PRICING SCENARIO ANALYSIS

TECHNICAL MEMO

PREPARED FOR COLORADO DEPARTMENT OF TRANSPORTATION

DYNUST RESEARCH LABORATORY

UNIVERSITY OF ARIZONA

September 09

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Colorado Department of Transportation

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1 INTRODUCTION

The Colorado Department of Transportation (CDOT) in cooperation with the Federal Highway Administration (FHWA) engaged the DynusT Research Laboratory at the University of Arizona to perform a Dynasmart model of proposed managed lane improvements on the US 36 corridor. The $80,000 effort was jointly funded by CDOT and FHWA and was completed in close cooperation with the modeling staff at the Denver Regional Council of Governments (DRCOG) – the region's metropolitan planning organization. An additional $20,000 was recently awarded by FHWA through the Technology Transfer program to continue refinement of the Dynasmart model and to ensure that DRCOG and CDOT staff are trained sufficiently to utilize the model to evaluate other proposed corridor improvements regionwide.

This memo provides summaries of all analyses performed for value pricing scenarios by the DynusT Research Laboratory at the University of Arizona. The report includes performance data for the managed lane concept on the U.S. 36 corridor at varying funding levels. At higher funding levels, a greater distance of managed lanes can be built. The goal of this memo is to provide useful information in a concise format to support CDOT TIGER grant proposal preparation. Detailed modeling methodologies, processes and outputs are not included in this report.

The performance measures are listed in the following chapters. They include overall simulation statistics, city-to-city travel time, average speeds for US36 corridor HOT and GP lane facilities, transit travel time in comparison with GP lane traffic, fuel consumption, and toll revenue.

OVERALL SIMULATION STATISTICS

1.1 SYSTEM BOUNDARY

The study area for the US 36 corridor analysis as shown in Figure 1-1 is approximately 250 square miles. The study area boundaries are given as follows:

- **North boundary:** Baseline Rd. from Colorado 93 to Washington St.
- **East boundary:** Washington St. from Baseline Rd. to E. 88th Ave., then Dahlia St. from E 88th Ave to E. 64th Ave.
- **South boundary:** E. 64th Ave. from Dahlia St. to Colorado 93
- **West Boundary:** Colorado 93 from E 64th St. to Baseline Rd.

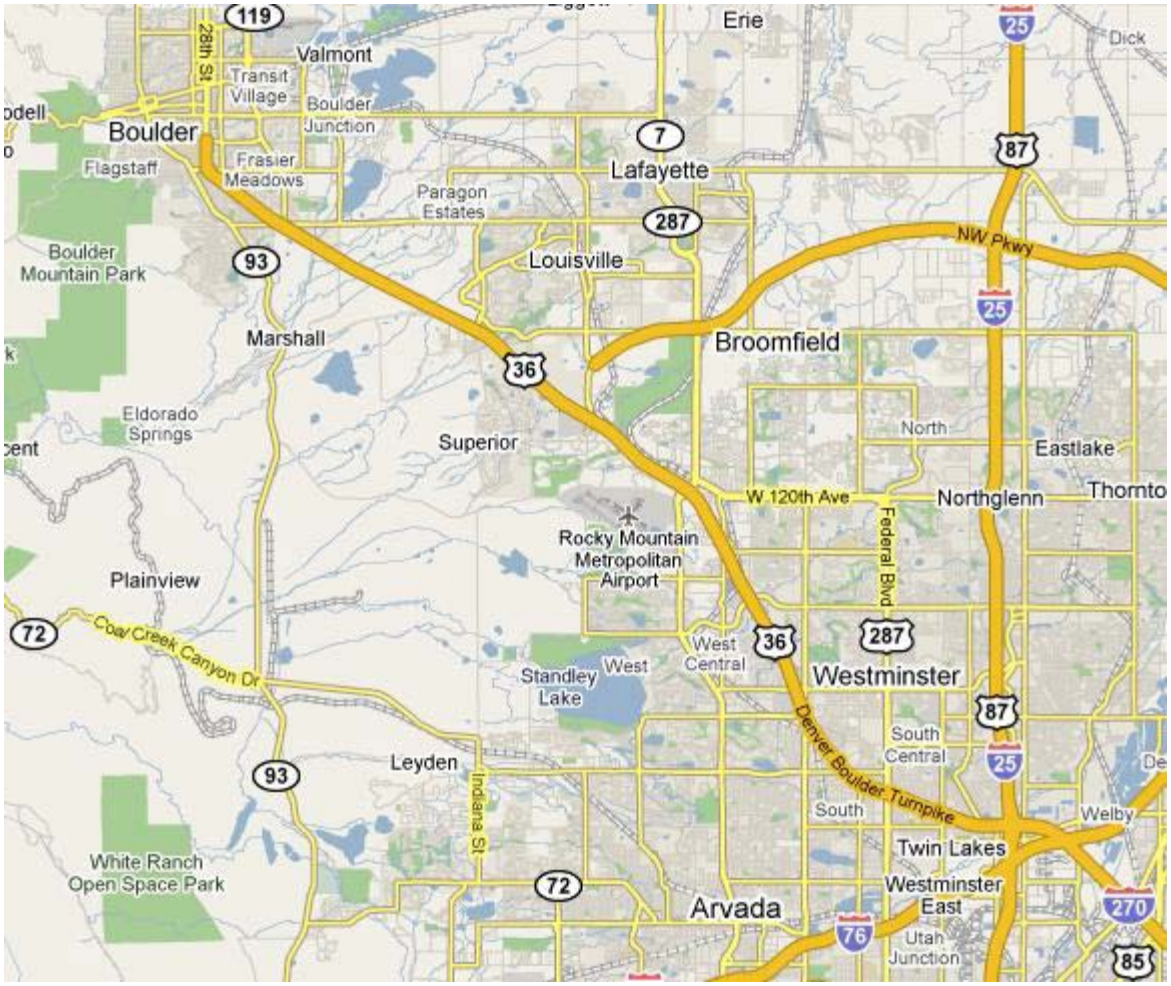


Figure 1-1 US 36 Colorado Value Pricing Study Area

1.2 BASIC SIMULATION STATISTICS

The overall modeling effort for the US 36 in total was 4 base models. This project was approached from two different planning years: 2012 representing opening year the proposed facility would be built and 2035 being a future planning year. Each planning year was split into two time periods: AM Peak and PM Peak. The following table describes each base model and network simulation statistics:

Table 1-1 Simulation Statistics for all Scenarios

Model Year	2012						2035					
Time Period	AM Peak			PM Peak			AM Peak			PM Peak		
Time Description	6:30am – 10:30am			3:30pm – 7:30pm			6:30am – 10:30am			3:30pm – 7:30pm		
# Vehicles	534,865			669,298			649,527			889,811		
Vehicle Class %	SOV	HOV	COM	SOV	HOV	COM	SOV	HOV	COM	SOV	HOV	COM
	75.1	10.3	14.6	74.4	7.7	17.9	76.6	10.7	12.7	70.3	13.0	16.7

Each base model entailed 3 scenarios, each described below:

1. No Build: Network conditions modeled as is for model year
2. $160 Million Build: HOT lanes modeled on US 36 in both directions from Federal Blvd. to Wadsworth Parkway (Broomfield)
3. $260 Million Build: HOT lanes modeled on US 36 in both directions from Federal Blvd. to Interlocken Interchange

The following are the sub area network VMT for each scenario for 2012 and 2035 AM/PM:

Table 1-2 Sub Area Network VMT for all Scenarios

	2012		2035	
	AM Peak	PM Peak	AM Peak	PM Peak
	VMT	VMT	VMT	VMT
No Build	3,051,059	3,138,360	3,456,821	3,802,004
$160 M	3,036,798	3,133,814	3,449,578	3,849,079
$260 M	3,011,370	3,146,198	3,424,753	3,832,784

1.3 CORRIDOR-WIDE AVERAGE TRAVEL TIME

Travel time information from the scenario simulations were collected from vehicles that originated among four municipalities located within about 1-mile along the US36 corridor. In the AM peak period, the travel time saving for the $160M scenario is 3.87% compared to the no-build scenario. The saving for the $260M scenario is 4.91%. The saving for the PM period drops to 1.47% and 2.54% respectively. The AM-PM difference is primarily due to spreading of departing traffic over a longer period in the AM period, leading to a lesser degree of congestion.

The AM no-build scenario for 2035 was found to perform better than the 2012 scenario. Further investigation found that future improvements on I-25 (capacity expansion) and US36 (interchange improvement) result in considerable improvement in traffic flow on I-25, which directly alleviates the traffic spillback into US36 from the US36-I25 interchange. Overall with these improvement projects, the AM travel time is about the same as the 2012 level. However, it is noteworthy that the PM travel time is significantly longer than the 2012 PM travel time. Compared with the no-build scenario, both build-out scenarios improve travel time by 3.26% and 2.3% respectively.

Table 1-3 Summaries of Corridor-Wide Average Travel Time

	2012				2035			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Avg. TT	Saving (%)	Avg. TT	Savings (%)	Avg. TT	Saving (%)	Avg. TT	Saving (%)
No Build	15.69	--	9.21	--	14.66	--	27.36	--
$160 M	15.08	3.87%	9.08	1.47%	14.67	-0.02%	26.47	3.26%
$260 M	14.92	4.91%	8.98	2.54%	14.65	0.10%	26.73	2.30%

Considering 250 days/year, these saving can be translated into total annual travel time saving as shown in Table 1-4. The $160M scenario would yield 1.47 and 2.75 million hours savings in 2012 and 2035 respectively, while $260M yields a higher 2.0 million and 1.98 million hours saving.

Table 1-4 Annual Travel Time Saving Compared with No-Build Scenario

Scenario	Year 2012 (million hours)	Year 2035 (million hours)
$160 M	1.47	2.75
$260 M	2.00	1.98

2 AVERAGE SPEED

This section describes the average speeds along the US36 corridor. The east limit of analysis was the Federal Hwy/US36 Interchange, and the western limit of analysis was the Baseline/US36 Interchange. The speeds were collected for each link along EB and WB separately, and averaged over the respective peak hour.

The tables below show the averaged speeds over the entire corridor. The overall observations across all scenarios are:

- For each Peak/Year, the average speed of the GP lane increased as the limits of construction increased.
- The 2012 AM and PM show that no improvement was present for GP lane speeds in the $160 Million build scenario. It was observed that traffic at the Wadsworth Interchange is still rather congested. However, the limits for the $260 Million scenario allowed traffic to experience higher speed at this interchange, increasing the average travel speed.
- Most of the scenarios had an average speed for the HOT lanes around 65 mph, well above the target minimum speed of 50 mph.
- The eastbound speeds in 2035 are much higher compared to 2012, which can be attributed to the increase in lanes on I-25.

2.1 2012 - AM PEAK

In this scenario, HOT lanes exceed the target minimum speed of 50 mph for all build scenarios. No significant GP lane speed improvements are observed with the build scenarios over the No-Build scenario; in some cases a slight reduction in GP lane speeds was observed.

Table 2-1 2012 AM Peak Average Speed

Scenario	Facility (HOT/GP)	Direction	Scenario Average Speed (mph)	No-build Average Speed (mph)	Speed Improvement (mph)
$160 Million	HOT	Eastbound	62.79[1]	-	-
$160 Million	GP	Eastbound	40.82	41.92	NI*[2]
$160 Million	HOT	Westbound	63.10	-	-
$160 Million	GP	Westbound	45.66	45.80	NI*
$260 Million	HOT	Eastbound	62.31	-	-
$260 Million	GP	Eastbound	43.36	41.92	+1.44
$260 Million	HOT	Westbound	58.27	-	-
$260 Million	GP	Westbound	44.93	45.80	NI*

*Asterisk stand for no improvement observed

2.2 2012 – PM PEAK

The 2012 PM peak scenarios exhibit similar trends to the AM peak scenarios, with the $260M project exhibiting slight improvement in GP speed in the WB direction. $160M performs slightly worse than the No-Build scenario for GP lane speed, but only by a small margin. Overall, HOT lanes operate at above target speed.

Table 2-2 2012 PM Peak Average Speed

Scenario	Facility (HOT/GP)	Direction	Scenario Average Speed (mph)	No-build Average Speed (mph)	Speed Improvement (mph)
$160 Million	HOT	Eastbound	64.98	-	-
$160 Million	GP	Eastbound	42.51	45.52	NI*
$160 Million	HOT	Westbound	64.98	-	-
$160 Million	GP	Westbound	49.16	50.20	NI*
$260 Million	HOT	Eastbound	64.96	-	-
$260 Million	GP	Eastbound	42.48	45.52	NI*
$260 Million	HOT	Westbound	64.77	-	-
$260 Million	GP	Westbound	50.69	50.20	+0.49

* Asterisk stand for no improvement observed

[1] HOT lanes are above the 50 mph target speed

[2] GP does not yield significant improvement because congestion still exists downstream near the I-25 Interchange

2.3 2035 - AM PEAK

In 2035 AM period, both build-out scenarios exhibit GP lane speed improvement from 2.86% ($160M) to 5.58% ($260M). HOT lanes achieve above target speeds. However, WB traffic appears to be underperforming for the reason explained in the footnote section.

Table 2-3 2035 AM Peak Average Speed

Scenario	Facility (HOT/GP)	Direction	Scenario Average Speed (mph)	No-build Average Speed (mph)	Speed Improvement (mph)
$160 Million	HOT	Eastbound	64.41	-	-
$160 Million	GP	Eastbound	47.69	44.83	+2.86
$160 Million	HOT	Westbound	63.00	-	-
$160 Million	GP	Westbound	41.39	45.73	NI*[3]
$260 Million	HOT	Eastbound	64.70	-	-
$260 Million	GP	Eastbound	50.68	44.83	+5.83
$260 Million	HOT	Westbound	64.10	-	-
$260 Million	GP	Westbound	41.47	45.73	NI*

* Asterisk stand for no improvement observed

2.4 2035 – PM PEAK

In the 2035 PM peak period, improvement for EB traffic continues for both build-out scenarios. The WB speed generally reduces to a lower level compared with the AM traffic.

Table 2-4 2035 PM Peak Average Speed

Scenario	Facility (HOT/GP)	Direction	Scenario Average Speed (mph)	No-build Average Speed (mph)	Speed Improvement (mph)
$160 Million	HOT	Eastbound	54.88	-	-
$160 Million	GP	Eastbound	41.26	39.14	+2.12
$160 Million	HOT	Westbound	64.60	-	-
$160 Million	GP	Westbound	34.42	39.80	NI*[4]
$260 Million	HOT	Eastbound	57.62	-	-
$260 Million	GP	Eastbound	42.55	39.14	+3.41
$260 Million	HOT	Westbound	64.60	-	-
$260 Million	GP	Westbound	35.73	39.80	NI*

* Asterisk stand for no improvement observed

[3] With the new improvements to the Wadsworth Interchange, more traffic goes west towards Boulder, which increase the density and congests US36. The limits of construction on the $160 Million build and $260 Million build are close to this interchange, and discharge traffic from the HOT lane into the general purpose lane. The additional traffic plus the already congested roadway yields the above results.

[4] This drop in speed is consistent with the AM Peak, but has a higher demand which gives lower speeds.

3 TRANSIT TRAVEL TIME VS AUTO GP LANE TRAVEL TIME

This section provides comparative results between several transit routes taking the HOT lane and an alternative auto route between the same O-D pair but taking a GP lane facility. All the transit routes over the AM and PM peak periods along the US36 corridor were coded into the model and the travel time was extracted from bus vehicles' actual experienced travel time from simulation. All bus routes traversing US36 are assumed to take the HOT lane facilities. Buses also get on and off US36 at designated locations to pick up passengers. However, the travel times reported in this section include only the running time, excluding the dwell time at each bus stop to ensure consistent comparison.

3.1 2012 – AM PEAK

The AM peak in 2012 shows general purpose (GP) lane improvements in average travel time savings when compared with the No Build scenario for the $260 m case. With the $160 M scenario, GP travel times decline, but only slightly. There is significant time savings for bus routes employing HOT lanes versus the GP lanes in both scenarios. The savings for $160M and $260M scenarios are 54.31% and 51.94% respectively.

Table 3-1 2012 AM GP vs. HOT/Bus Travel Time

Scenario	Facility (BUS/GP)	Scenario Average Travel Time (min)	No-build Average Travel Time (min)	Scenario GP vs. No Build (%)	Scenario BUS Savings vs. Scenario GP (%)	Scenario BUS Savings vs. No Build (%)
$160 Million	BUS	10.85	-	-	54.31	-
	GP	23.74	23.33	-1.76	-	53.51
$260 Million	BUS	9.80	-	-	51.94	-
	GP	20.39	23.33	12.61	-	58.01

3.2 2012 – PM PEAK

Similar to 2012 AM Peak, the $260 Million case demonstrates GP lane travel time improvements. The $160 Million case gave GP lane travel time improvement only for those travelling from Denver to Broomfield and Westminster. Overall, an 8.89% decline in GP travel speeds was observed with the $160 M case. However, bus routes illustrate positive improvements with $260 Million case showing the greatest improvement.

Table 3-2 2012 PM GP vs. HOT/Bus Travel Time

Scenario	Facility (BUS/GP)	Scenario Average Travel Time (min)	No-build Average Travel Time (min)	Scenario GP vs. No Build (%)	Scenario BUS Savings vs. Scenario GP (%)	Scenario BUS Savings vs. No Build (%)
$160 Million	BUS	13.74	-	-	29.18	-
	GP	19.40	17.82	-8.89	-	22.89
$260 Million	BUS	10.52	-	-	34.72	-
	GP	16.12	17.82	9.54	-	40.95

3.3 2035 – AM Peak

Travel along HOT lanes for bus routes demonstrate significant travel time savings, but travel time in the GP lanes declines somewhat for each scenario.

Table 3-3 2035 AM GP vs. HOT/Bus Travel Time

Scenario	Facility (BUS/GP)	Scenario Average Travel Time (min)	No-build Average Travel Time (min)	Scenario GP vs. No Build (%)	Scenario BUS Savings vs. Scenario GP (%)	Scenario BUS Savings vs. No Build (%)
$100 Million	BUS	12.12	-	-	56.13	-
	GP	27.64	22.74	-21.50	-	46.70
$200 Million	BUS	10.75	-	-	59.65	-
	GP	26.65	22.74	-17.16	-	52.73

3.4 2035 – PM Peak

Overall, the scenarios proposed do provide travel time savings, particularly along the HOT lanes. In all cases, the GP lanes are also marginally improved.

Table 3-4 2035 PM GP vs. HOT/Bus Travel Time

Scenario	Facility (BUS/GP)	Scenario Average Travel Time (min)	No-build Average Travel Time (min)	Scenario GP vs. No Build (%)	Scenario BUS Savings vs. Scenario GP (%)	Scenario BUS Savings vs. No Build (%)
$100 Million	BUS	21.62	-	-	37.70	-
	GP	34.70	40.91	15.19	-	47.16
$200 Million	BUS	17.62	-	-	53.55	-
	GP	37.93	40.91	7.29	-	56.94

4 FUEL CONSUMPTION

The fuel consumption results as displayed in Table 4-1 (for 2012) and Table 4-2 (for 2035) include the average fuel consumption for both auto and trucks over the simulated AM and PM periods. The average fuel consumption for auto in the 2012 AM no-build scenario is 0.2378 gallons, whereas that for trucks is 0.397 gallons. The total fuel consumption for AM and PM periods in the no-build scenario is 139,128 and 137,904 gallons, respectively. After computing the fuel consumption statistics for the $160M and $260M scenarios, it was found that $160M scenario would save 556,350 gallons of fuel annually compared with the no-build scenario. The annual fuel saving form the $260M scenario is 1.11 million gallons.

Table 4-1 2012 Scenario fuel consumption improvement for the study area

Year	Scenario	Auto (gal/veh)	Improve. (%)	Truck (gal/veh)	Improve. (%)	Total (gal/day)	Improve. (%)	Improve. (gal/day)	Improve. (gal/yr)
AM	NB	0.2378	-	0.3907	-	139,128	-	-	-
PM	NB	0.1820	-	0.3165	-	137,904	-		
AM	$160M	0.2356	0.91%	0.3871	0.91%	137,857	0.90%	**2225.4**	**556,350**
PM	$160M	0.1811	0.49%	0.3126	1.21%	136,949	0.60%		
AM	$260M	0.2367	0.47%	0.3891	0.42%	138,492	0.45%	**4435.0**	**1,108,750**
PM	$260M	0.1788	1.76%	0.2995	5.37%	134,104	2.68%		

The annual fuel savings for the build-out scenarios at the Year 2035 is 198K and 780K. The fuel savings of the $260M scenario is significantly higher than the $160M scenario.

Table 4-2 2035 Scenario fuel consumption improvement for the study area

Year	Scenario	Auto (gal/veh)	Improve. (%)	Truck (gal/veh)	Improve. (%)	Total (gal/day)	Improve. (%)	Improve. (gal/day)	Improve. (gal/yr)
AM	NB	0.2275	-	0.4200	-	163,645	-	-	-
PM	NB	0.2274	-	0.5202	-	245,841	-		
AM	$160M	0.2254	0.90%	0.4103	2.30%	161,682	1.20%	**3192.6**	**198,150**
PM	$160M	0.2267	0.32%	0.5156	0.89%	244,612	0.50%		
AM	$260M	0.2247	1.23%	0.4095	2.49%	161,200	1.49%	**3119.1**	**779,750**
PM	$260M	0.2268	0.23%	0.5183	0.37%	245,167	0.27%		

5 TOLL REVENUE

The calculation of the toll revenue was performed by tracking individual vehicles which traverse HOT lanes with various prices set by the HOT lane pricing algorithm. These are collected from the locations of the proposed gantries given in the implementation plan. The toll rate was based on a variable tolling scheme that used a congestion pricing algorithm. Whenever the link would hit a certain density or drop below a certain speed, the toll rate would increase. This would keep the vehicles moving at a minimal speed of 50 mph. Since the toll was congestion responsive, the toll rate is directly dependant on the adjoined general purpose lanes and the HOT lane speed. Furthermore, the variable toll rate was set at a minimum of $0.25 per mile, in order to not compete with RTD's regional express bus fare.

Table 5-1 shows the total revenue and vehicle miles traveled (VMT) generated by the new HOT lane. One can see that in 2012, the daily VMT is 23K miles, equivalent to 5.8M miles annually. The daily VMT for the $260M scenario increases to 45K miles daily, equivalent to 11.2M VMT annually. The annual revenue for the HOT lanes is predicted to be nearly $5M for the $160M scenario and this figure increases to over $8 M for the $260M scenario.

The annual VMT for 2035 does not necessarily increase, so daily revenue stays in the same range as observed for 2012. Likewise the annual revenue for both scenarios is similar to those for 2012.

One should note that based on DRCOG's suggestion, the value-of-time (VOT) used for 2035 was set as the same as that used for 2012 ($15.5 for auto and $46.5 for trucks). Future VOT is likely to increase, resulting in a higher revenue forecast. That is to say that the *current revenue figures for 2035 shown* in Table 5-1 *could be considered as a conservative estimate and are reported in current year dollars.*

Table 5-1 Toll Revenue

Year	Scenario	Daily VMT (veh-miles)	Daily Revenue ($)	Annual VMT (veh-miles)	Annual Revenue ($)	Minimum Toll Rate ($/mile)	Maximum Toll Rate ($/mile)
2012	$160M	23,458	$19,961	5,864,425	$4,990,250	$0.25	$2.00
2012	$260M	45,172	$32,146	11,292,975	$8,036,550	$0.25	$2.00
2035	$160M	27,314	$20,251	6,828,400	$5,062,825	$0.25	$2.00
2035	$260M	38,554	$29,509	9,638,475	$7,377,200	$0.25	$2.00

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	NB				NB				NB				NB			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		8.21	23.67	50.99	Boulder	8.09	39.83	58.66	Boulder	9.39	25.47	41.81	Boulder	2.75	6.99	14.78
Broomfield	4.11		10.39	29.82	Broomfield	11.29		25.6	50.02	Broomfield	12.7		23.27	40.37	Broomfield	5.99		4.71	15.51
Westminste	17.8	10.91		18.05	Westminste	38.92	26.33		28.4	Westminste	33.93	22.27		16.43	Westminste	10.53	7.23		13.79
Denver	32.13	25.08	13.05		Denver	65.81	51.99	20		Denver	48.39	36.96	25.26		Denver	13.94	11.28	7.15	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	NB				NB				NB				NB			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		8.14	23.59	33.1	Boulder	8.13	39.58	49.36	Boulder	9.3	25.37	35.36	Boulder	2.9	6.91	16.24
Broomfield	3.99		9.65	19.23	Broomfield	10.55		25.9	35.21	Broomfield	12.92		23.9	35.22	Broomfield	5.89		4.58	14.33
Westminste	16.38	11.23		9.46	Westminste	39.69	28.77		11.88	Westminste	33.94	22.25		10	Westminste	10.74	7.24		9.9
Denver	33.21	24.72	12.88		Denver	65.51	51.87	20.17		Denver	48	37.05	25.44		Denver	14.16	11	7.51	

NO BUILD AM 2012

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		7.11	23.99	41.56	23.33438
Broomfield	8.5225		15.9925	33.93	
Westminste	25.295	16.685		19.1675	
Denver	40.0675	31.3275	16.365		

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		7.1175	23.8625	33.515	21.29896
Broomfield	8.3375		16.0075	25.9975	
Westminste	25.1875	17.3725		10.31	
Denver	40.22	31.16	16.5		

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	100M				100M				100M				100M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		8.81	17.25	54.24	Boulder	3.08	23.52	54.65	Boulder	3.18	20.08	33.39	Boulder	3.07	7.2	14.17
Broomfield	7.31		13.24	39.21	Broomfield	18.45		21.13	60.03	Broomfield	22.69		27.01	42.93	Broomfield	7.13		6.32	13.12
Westminste	22.21	16.33		23.25	Westminste	47.87	33.34		48.61	Westminste	38.97	26.88		28.21	Westminste	9.25	6.61		8.43
Denver	33.67	25.06	13.06		Denver	56.39	41.08	9.33		Denver	44.73	35.22	17.31		Denver	13.91	11.33	7.48	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	100M				100M				100M				100M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		5.88	9.75	18.94	Boulder	3.24	7.36	16.5	Boulder	3.07	7.26	16.13	Boulder	3	6.99	15.75
Broomfield	5.72		5.33	14.06	Broomfield	12.08		4.94	13.55	Broomfield	17		5.32	14.23	Broomfield	4.3		4.69	13.68
Westminste	10.34	4.85		10.04	Westminste	16.93	5.04		10.93	Westminste	19.85	4.94		13.92	Westminste	7.27	4.76		9.84
Denver	16.81	10.73	6.9		Denver	24.19	13.02	8.58		Denver	31.42	17.17	13.57		Denver	13.22	10.82	6.81	

100M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		4.535	17.0125	39.1125	23.74458
Broomfield	13.895		16.925	38.8225	
Westminste	29.575	20.79		27.125	
Denver	37.175	28.1725	11.795		

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.7975	7.84	16.83	10.84833
Broomfield	9.775		5.07	13.88	
Westminste	13.5975	4.8975		11.1825	
Denver	21.41	12.935	8.965		

AVERAGE TRAVEL TIMES VS NO BUILD % IMPROVEMENT

GP

	Boulder	Broomfield	Westminste	Denver
Boulder		36.22%	29.09%	5.89%
Broomfield	-63.04%		-5.83%	-14.42%
Westminste	-16.92%	-24.60%		-41.52%
Denver	7.22%	10.07%	27.93%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminste	Denver
Boulder		16.26%	53.92%	56.97%
Broomfield	29.65%		70.04%	64.25%
Westminste	54.02%	76.44%		58.77%
Denver	42.41%	54.09%	23.99%	

	Sc GP vs. I	Sc bus vs.	Sc bus vs NB
	-1.76%	54.31%	53.51%

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminste	Denver
Boulder		46.59%	67.32%	59.50%
Broomfield	-14.70%		68.30%	59.09%
Westminste	46.24%	70.65%		41.66%
Denver	46.57%	58.71%	45.22%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	200M				200M				200M				200M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		4.08	14.35	50.98	Boulder	3.34	20.07	50.22	Boulder	3.45	18.08	36.35	Boulder	3.17	7.41	14.08
Broomfield	4.57		12.65	39.11	Broomfield	15.73		14.99	57	Broomfield	16.59		21.47	44.68	Broomfield	3.87		5.46	12.06
Westminste	19.6	14.89		22.16	Westminste	31.09	15.39		46.89	Westminste	29.8	18.44		31.93	Westminste	7.94	5.14		7.82
Denver	29.97	22.58	9.39		Denver	39.17	22.7	13.99		Denver	38.59	30.56	13.72		Denver	14.18	11.21	7.85	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	200M				200M				200M				200M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.56	8.48	17.93	Boulder	3.4	7.79	17.26	Boulder	3.56	7.69	16.58	Boulder	3.45	7.29	16.19
Broomfield	3.88		5.01	14.02	Broomfield	4.8		5.17	14.43	Broomfield	4.91		4.86	13.94	Broomfield	3.52		4.79	13.83
Westminste	7.78	4.81		10.02	Westminste	11.7	6.79		11.03	Westminste	8.82	5.69		10.07	Westminste	7.73	4.86		10.04
Denver	13.95	11.28	7.68		Denver	18.45	14.04	9.87		Denver	21.08	23.67	13.84		Denver	13.31	10.64	6.87	

200M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.51	14.9775	37.9075	20.39083
Broomfield	10.19		13.6425	38.2125	
Westminste	22.1075	13.465		27.2	
Denver	30.4775	21.7625	11.2375		

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.4925	7.8125	16.99	9.799167
Broomfield	4.2775		4.9575	14.055	
Westminste	9.0075	5.5375		10.29	
Denver	16.6975	14.9075	9.565		

AVERAGE TRAVEL TIMES VS NO BUILD

GP

	Boulder	Broomfield	Westminste	Denver
Boulder		50.63%	37.57%	8.79%
Broomfield	-19.57%		14.69%	-12.62%
Westminste	12.60%	19.30%		-41.91%
Denver	23.93%	30.53%	31.33%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminste	Denver
Boulder		0.50%	47.84%	55.18%
Broomfield	58.02%		63.66%	63.22%
Westminste	59.26%	58.87%		62.17%
Denver	45.21%	31.50%	14.88%	

	Sc GP vs. I	Sc bus vs.	Sc bus vs NB
	12.61%	51.94%	58.01%

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminste	Denver
Boulder		50.88%	67.43%	59.12%
Broomfield	49.81%		69.00%	58.58%
Westminste	64.39%	66.81%		46.32%
Denver	58.33%	52.41%	41.55%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	550M				550M				550M				550M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		6.72	16.71	59.63	Boulder	3.36	22.07	60.9	Boulder	6.66	18.3	31.51	Boulder	3.21	7.38	14.18
Broomfield	5.37		13.76	39.15	Broomfield	11.91		18.41	62.64	Broomfield	15.93		19.91	35.66	Broomfield	5.36		4.94	12.19
Westminste	23.29	15.73		22.26	Westminste	41.84	31		51.82	Westminste	36.86	23.6		28.38	Westminste	9	6.42		7.93
Denver	30.06	22.42	8.9		Denver	57.2	43.71	19.77		Denver	39.24	27.92	17.36		Denver	14.13	11.41	7.45	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	550M				550M				550M				550M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.25	7.25	16.04	Boulder	3.59	7.76	16.92	Boulder	3.33	7.27	16.09	Boulder	3.3	7.13	16.02
Broomfield	3.57		5.23	13.57	Broomfield	6.08		4.83	14.06	Broomfield	4.24		5.1	13.82	Broomfield	3.46		4.69	13.72
Westminste	7.38	4.66		10.34	Westminste	11.5	7.57		9.95	Westminste	7.65	4.91		10.96	Westminste	7.88	4.89		9.84
Denver	14.72	11.77	7.84		Denver	16.73	13.56	9.09		Denver	22.41	19.2	14.33		Denver	13.17	10.82	7.08	

550M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		4.9875	16.115	41.555	22.7825
Broomfield	9.6425		14.255	37.41	
Westminste	27.7475	19.1875		27.5975	
Denver	35.1575	26.365	13.37		

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.3675	7.3525	16.2675	9.553542
Broomfield	4.3375		4.9625	13.7925	
Westminste	8.6025	5.5075		10.2725	
Denver	16.7575	13.8375	9.585		

AVERAGE TRAVEL TIMES VS NO BUILD

GP

	Boulder	Broomfield	Westminste	Denver
Boulder		29.85%	32.83%	0.01%
Broomfield	-13.14%		10.86%	-10.26%
Westminste	-9.70%	-15.00%		-43.98%
Denver	12.25%	15.84%	18.30%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminste	Denver
Boulder		32.48%	54.37%	60.85%
Broomfield	55.02%		65.19%	63.13%
Westminste	69.00%	71.30%		62.78%
Denver	52.34%	47.52%	28.31%	

	Sc GP vs. I	Sc bus vs.	Sc bus vs NB
	2.37%	58.07%	59.06%

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminste	Denver
Boulder		52.64%	69.35%	60.86%
Broomfield	49.11%		68.97%	59.35%
Westminste	65.99%	66.99%		46.41%
Denver	58.18%	55.83%	41.43%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	NB				NB				NB				NB			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		6.63	13.32	22.9	Boulder	11.44	17.81	26.89	Boulder	18.07	34.59	EXC	Boulder	EXC	EXC	EXC
Broomfield	2.95		6.68	15.37	Broomfield	3.01	6.37	16.29	Broomfield	4.75	9.21	24.85	Broomfield	12.02	17.16	EXC
Westminste	9.27	6.32		9.03	Westminste	10.6	7.67	9.82	Westminste	17.92	11.95	14.88	Westminste	EXC	23.36	16.37
Denver	23.53	19.36	13.16		Denver	24.36	21.05	13.77	Denver	EXC	67.33	42.92	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	NB				NB				NB				NB			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		6.55	13.51	22.1	Boulder	11.46	17.75	26.63	Boulder	18.35	34.71	EXC	Boulder	EXC	EXC	EXC
Broomfield	3.28		7.23	15.43	Broomfield	3.19	6.59	15.69	Broomfield	4.19	8.73	21.3	Broomfield	11.37	16.54	EXC
Westminste	9.4	6.14		8.71	Westminste	10.66	7.49	8.93	Westminste	21.83	11.73	11.53	Westminste	EXC	25.82	15.33
Denver	20.38	17.18	10.86		Denver	21.85	18.56	10.85	Denver	55.45	44.61	27.75	Denver	EXC	EXC	EXC

NO BUILD PM 2012

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		12.04667	21.90667	24.895	17.81757
Broomfield	5.6825		9.855	18.83667	
Westminste	12.59667	12.325		12.525	
Denver	23.945	35.91333	23.28333		

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		12.12	21.99	24.365	17.07847
Broomfield	5.5075		9.7725	17.47333	
Westminste	13.96333	12.795		11.125	
Denver	32.56	26.78333	16.48667		

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	100M				100M				100M				100M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		6.06	11.73	23.27	Boulder	10.29	16.25	31.13	Boulder	24.59	35.01	EXC	Boulder	EXC	EXC	EXC
Broomfield	3.67		8.53	20.2	Broomfield	3.79	8.28	21.14	Broomfield	6.7	11	39.38	Broomfield	16.35	14.42	EXC
Westminste	9.51	6.05		11.38	Westminste	10.54	6.95	13.63	Westminste	25.28	14.65	24.41	Westminste	EXC	27.21	EXC
Denver	20.52	17.53	12.46		Denver	22.39	19.06	13.44	Denver	58.71	47.27	30.37	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	100M				100M				100M				100M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		4.94	8.97	19.05	Boulder	9.18	13.13	26.59	Boulder	23.13	25.66	EXC	Boulder	EXC	EXC	EXC
Broomfield	3.44		4.82	13.87	Broomfield	4.21	5.56	16.87	Broomfield	6.71	6.23	26.2	Broomfield	13.18	6.15	EXC
Westminste	7.75	4.69		10.53	Westminste	7.82	5.59	12.28	Westminste	14.28	5.04	17.87	Westminste	EXC	7.7	EXC
Denver	19.37	14.65	10.72		Denver	19.62	14.33	10.62	Denver	32.57	19.92	16.88	Denver	EXC	EXC	EXC

100M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		13.64667	20.99667	27.2	19.40139
Broomfield	7.6275		10.5575	26.90667	
Westminste	15.11	13.715		16.47333	
Denver	33.87333	27.95333	18.75667		

AVERAGE TRAVEL TIMES VS NO BUILD % IMPROVEMENT

GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-13.28%	4.15%	-9.26%
Broomfield	-34.23%		-7.13%	-42.84%
Westminste	-19.95%	-11.28%		-31.52%
Denver	-41.46%	22.16%	19.44%	

	Sc GP vs. I	Sc bus vs.	Sc bus vs NB
Denver	-8.89%	29.18%	22.89%

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		12.41667	15.92	22.82	13.73917
Broomfield	6.885		5.69	18.98	
Westminste	9.95	5.755		13.56	
Denver	23.85333	16.3	12.74		

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminste	Denver
Boulder		9.01%	24.18%	16.10%
Broomfield	9.73%		46.10%	29.46%
Westminste	34.15%	58.04%		17.69%
Denver	29.58%	41.69%	32.08%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-3.07%	27.33%	8.34%
Broomfield	-21.16%		42.26%	-0.76%
Westminste	21.01%	53.31%		-8.26%
Denver	0.38%	54.61%	45.28%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	200M				200M				200M				200M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		4.42	10.56	19.98	Boulder	3.88	10.33	19.61	Boulder	17.08	25.7	54.53	Boulder	EXC	EXC	EXC
Broomfield	3.75		7.39	16.56	Broomfield	4.21	7.72	17.63	Broomfield	4.98	11.27	29.59	Broomfield	13.67	13.36	EXC
Westminste	9.68	6.27		9.77	Westminste	10.46	6.17	10.27	Westminste	20.65	13.37	18.46	Westminste	EXC	12.3	EXC
Denver	18.77	15.88	10.46		Denver	18.81	15.97	11.52	Denver	46.76	35.46	19.1	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	200M				200M				200M				200M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.36	7.26	15.32	Boulder	3.38	7.38	15.35	Boulder	3.39	7.34	24.94	Boulder	EXC	EXC	EXC
Broomfield	3.59		5.08	12.43	Broomfield	3.72	4.82	12.78	Broomfield	3.71	5.46	18.67	Broomfield	3.92	6.15	EXC
Westminste	7.99	4.69		8.76	Westminste	7.78	4.69	9.03	Westminste	9	5.2	12.92	Westminste	7.52	4.79	25.78
Denver	16.99	14.23	10.68		Denver	17.3	14.43	10.46	Denver	21.76	18.23	14.62	Denver	EXC	EXC	EXC

200M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		8.46	15.53	31.37333	16.11764
Broomfield	6.6525		9.935	21.26	
Westminste	13.59667	9.5275		12.83333	
Denver	28.11333	22.43667	13.69333		

AVERAGE TRAVEL TIMES VS NO BUILD

GP

	Boulder	Broomfield	Westminste	Denver
Boulder		29.77%	29.11%	-26.02%
Broomfield	-17.07%		-0.81%	-12.86%
Westminste	-7.94%	22.70%		-2.46%
Denver	-17.41%	37.53%	41.19%	

	Sc GP vs. I	Sc bus vs.	Sc bus vs NB
Denver	9.54%	34.72%	40.95%

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.376667	7.326667	18.53667	10.52083
Broomfield	3.735		5.3775	14.62667	
Westminste	8.0725	4.8425		14.1225	
Denver	18.68333	15.63	11.92		

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminste	Denver
Boulder		60.09%	52.82%	40.92%
Broomfield	43.86%		45.87%	31.20%
Westminste	40.63%	49.17%		-10.05%
Denver	33.54%	30.34%	12.95%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminste	Denver
Boulder		71.97%	66.56%	25.54%
Broomfield	34.27%		45.43%	22.35%
Westminste	35.92%	60.71%		-12.75%
Denver	21.97%	56.48%	48.80%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	550M				550M				550M				550M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.68	10.09	19.5	Boulder	3.73	9.53	18.79	Boulder	13.16	25.49	56.36	Boulder	10.3	EXC	EXC
Broomfield	3.78		7.31	16.27	Broomfield	3.67	7.61	16.64	Broomfield	5.32	14.86	40.03	Broomfield	13.44	10.95	EXC
Westminste	9.26	6.5		10.03	Westminste	9.17	6.3	10.7	Westminste	21.47	13.77	20.66	Westminste	EXC	19.52	29.55
Denver	19.03	16.46	11.29		Denver	18.77	15.97	10.84	Denver	42.97	36.75	23.44	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	550M				550M				550M				550M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.29	7.19	15.02	Boulder	3.24	7.37	15.34	Boulder	4.55	8.58	27.66	Boulder	3.26	7.28	EXC
Broomfield	3.46		5.12	12.61	Broomfield	3.46	4.87	12.7	Broomfield	3.58	5.36	20.04	Broomfield	4.47	10.57	EXC
Westminste	7.76	4.79		8.71	Westminste	7.52	5.09	9.8	Westminste	8.11	5.32	15.26	Westminste	7.32	4.99	26.23
Denver	16.86	14.43	10.49		Denver	16.72	14.47	10.51	Denver	25.16	18.92	15.78	Denver	EXC	EXC	EXC

550M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		7.7175	15.03667	31.55	16.92361
Broomfield	6.5525		10.1825	24.31333	
Westminste	13.3	11.5225		17.735	
Denver	26.92333	23.06	15.19		

AVERAGE TRAVEL TIMES VS NO BUILD

GP

	Boulder	Broomfield	Westminste	Denver
Boulder		35.94%	31.36%	-26.73%
Broomfield	-15.31%		-3.32%	-29.07%
Westminste	-5.58%	6.51%		-41.60%
Denver	-12.44%	35.79%	34.76%	

	Sc GP vs. I	Sc bus vs.	Sc bus vs NB
Denver	5.02%	35.31%	38.56%

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.585	7.605	19.34	10.94785
Broomfield	3.7425		6.48	15.11667	
Westminste	7.6775	5.0475		15	
Denver	19.58	15.94	12.26		

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminste	Denver
Boulder		53.55%	49.42%	38.70%
Broomfield	42.88%		36.36%	37.83%
Westminste	42.27%	56.19%		15.42%
Denver	27.27%	30.88%	19.29%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminste	Denver
Boulder		70.24%	65.28%	22.31%
Broomfield	34.14%		34.25%	19.75%
Westminste	39.05%	59.05%		-19.76%
Denver	18.23%	55.62%	47.34%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	NB				NB				NB				NB			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.18	8.92	33.2	Boulder	3.28	11.49	48.37	Boulder	3.19	7.65	17.13	Boulder	EXC	EXC	EXC
Broomfield	4.89		6.71	26.72	Broomfield	9.72	12.37	42.46	Broomfield	10.88	4.47	33.3	Broomfield	EXC	EXC	EXC
Westminste	15.72	11.36		18.62	Westminste	21.22	11.55	30.53	Westminste	29.84	17.47	31.88	Westminste	EXC	EXC	EXC
Denver	36.21	29.53	18.77		Denver	60.54	49.33	37.95	Denver	51.34	35.47	23.58	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	NB				NB				NB				NB			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.2	8.77	18.8	Boulder	3.3	11.25	20.75	Boulder	3.17	7.69	16.99	Boulder	EXC	EXC	EXC
Broomfield	4.64		6.62	16.08	Broomfield	9.78	12.46	21.74	Broomfield	11.97	4.33	14.22	Broomfield	EXC	EXC	EXC
Westminste	15.91	10.08		9.37	Westminste	24.47	13.96	10.46	Westminste	27.96	14.36	9.65	Westminste	EXC	EXC	EXC
Denver	35.8	29.59	18		Denver	60.69	49.46	37.24	Denver	46.18	36.41	26.26	Denver	EXC	EXC	EXC

NO BUILD AM - 2035

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.216667	9.353333	32.9	22.74556
Broomfield	8.496667		7.85	34.16	
Westminste	22.26	13.46		27.01	
Denver	49.36333	38.11	26.76667		

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.223333	9.236667	18.84667	18.65583
Broomfield	8.796667		7.803333	17.34667	
Westminste	22.78	12.8		9.826667	
Denver	47.55667	38.48667	27.16667		

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	100M				100M				100M				100M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.47	8.14	32.74	Boulder	3.38	7.95	36.69	Boulder	3.21	7.56	20.64	Boulder	EXC	EXC	EXC
Broomfield	6.27		7.8	28.39	Broomfield	9.44	13.01	43.38	Broomfield	14.58	5.15	25.4	Broomfield	EXC	EXC	EXC
Westminste	21.28	16.08		22.51	Westminste	51.69	41.91	33.98	Westminste	61.84	50.75	21.4	Westminste	EXC	EXC	EXC
Denver	37.61	28.6	16.82		Denver	62.94	51.4	23.34	Denver	80.71	66.19	28.68	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	100M				100M				100M				100M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.9	7.27	16.61	Boulder	3.76	7.15	16.71	Boulder	3.64	7.2	16.4	Boulder	EXC	EXC	EXC
Broomfield	5.75		5.12	14.04	Broomfield	9.41	5.21	13.95	Broomfield	12.21	4.77	16.49	Broomfield	EXC	EXC	EXC
Westminste	9.65	4.74		10.08	Westminste	14.75	6.97	11.17	Westminste	16.15	4.77	13.59	Westminste	EXC	EXC	EXC
Denver	18.64	13.61	9.51		Denver	25.77	16.89	11.81	Denver	32.61	24.19	21.95	Denver	EXC	EXC	EXC

100M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.353333	7.883333	30.02333	27.63694
Broomfield	10.09667		8.653333	32.39	
Westminste	44.93667	36.24667		25.96333	
Denver	60.42	48.73	22.94667		

AVERAGE TRAVEL TIMES VS NO BUILD % IMPROVEMENT

GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-4.25%	15.72%	8.74%
Broomfield	-18.83%		-10.23%	5.18%
Westminste	-101.87%	-169.29%		3.88%
Denver	-22.40%	-27.87%	14.27%	

	Sc GP vs.	Sc bus vs.	Sc bus vs NB
	-21.50%	56.13%	46.70%

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.766667	7.206667	16.57333	12.12333
Broomfield	9.123333		5.033333	14.82667	
Westminste	13.51667	5.493333		11.61333	
Denver	25.67333	18.23	14.42333		

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-12.33%	8.58%	44.80%
Broomfield	9.64%		41.83%	54.22%
Westminste	69.92%	84.84%		55.27%
Denver	57.51%	62.59%	37.14%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-17.10%	22.95%	49.63%
Broomfield	-7.38%		35.88%	56.60%
Westminste	39.28%	59.19%		57.00%
Denver	47.99%	52.16%	46.11%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	200M				200M				200M				200M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.69	8.41	31.74	Boulder	3.78	10.39	38.03	Boulder	3.44	8.58	19.52	Boulder	EXC	EXC	EXC
Broomfield	6.62		6.69	27.86	Broomfield	12.95	13.37	41	Broomfield	16.39	5.36	27.66	Broomfield	EXC	EXC	EXC
Westminste	21.3	15.82		21.67	Westminste	40.13	24.7	32.38	Westminste	56.53	37.66	24.99	Westminste	EXC	EXC	EXC
Denver	39.09	29.47	18.02		Denver	65.31	48.59	38	Denver	69.14	53.95	37.11	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	200M				200M				200M				200M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.76	7.29	16.5	Boulder	3.76	7.39	17.3	Boulder	3.77	7.34	16.46	Boulder	EXC	EXC	EXC
Broomfield	4.3		5.18	14.03	Broomfield	4.48	5.12	14	Broomfield	4.56	4.72	14.2	Broomfield	EXC	EXC	EXC
Westminste	7.7	4.74		10.05	Westminste	11.62	7.2	11.06	Westminste	8.71	4.82	10.22	Westminste	EXC	EXC	EXC
Denver	16.22	13.54	9.66		Denver	23.78	20.4	16.04	Denver	21.36	19.64	16.13	Denver	EXC	EXC	EXC

200M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.636667	9.126667	29.76333	26.64833
Broomfield	11.98667		8.473333	32.17333	
Westminste	39.32	26.06		26.34667	
Denver	57.84667	44.00333	31.04333		

AVERAGE TRAVEL TIMES VS NO BUILD

GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-13.06%	2.42%	9.53%
Broomfield	-41.07%		-7.94%	5.82%
Westminste	-76.64%	-93.61%		2.46%
Denver	-17.19%	-15.46%	-15.98%	

	Sc GP vs.	Sc bus vs.	Sc bus vs NB
	-17.16%	59.65%	52.73%

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.763333	7.34	16.75333	10.75139
Broomfield	4.446667		5.006667	14.07667	
Westminste	9.343333	5.586667		10.44333	
Denver	20.45333	17.86	13.94333		

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-3.48%	19.58%	43.71%
Broomfield	62.90%		40.91%	56.25%
Westminste	76.24%	78.56%		60.36%
Denver	64.64%	59.41%	55.08%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-16.99%	21.53%	49.08%
Broomfield	47.67%		36.22%	58.79%
Westminste	58.03%	58.49%		61.34%
Denver	58.57%	53.14%	47.91%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	550M				550M				550M				550M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.75	8.56	32.62	Boulder	3.45	7.89	41.1	Boulder	3.5	8	21.5	Boulder	EXC	EXC	EXC
Broomfield	6.39		8.34	29.92	Broomfield	11.08	12.87	44.92	Broomfield	13.15	4.95	24.09	Broomfield	EXC	EXC	EXC
Westminste	22.81	16.19		22.23	Westminste	39.72	26.85	36.81	Westminste	51.05	36.56	21.26	Westminste	EXC	EXC	EXC
Denver	37.83	29.83	17.29		Denver	56.59	43.11	32.82	Denver	EXC	62.98	42.58	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	550M				550M				550M				550M			
	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver	Boulder	Broomfield	Westminste	Denver
Boulder		3.69	7.34	16.53	Boulder	3.67	7.24	16.35	Boulder	3.6	7.22	16.5	Boulder	EXC	EXC	EXC
Broomfield	4.17		5.12	14.03	Broomfield	3.92	5.02	13.94	Broomfield	4.72	4.72	14.6	Broomfield	EXC	EXC	EXC
Westminste	7.59	4.78		10.02	Westminste	11.39	7.35	11.16	Westminste	8.97	4.76	10.39	Westminste	EXC	EXC	EXC
Denver	15.95	13.54	9.53		Denver	21.47	18.53	13.86	Denver	28.82	28.52	26.03	Denver	EXC	EXC	EXC

550M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.566667	8.15	31.74	25.82778
Broomfield	10.20667		8.72	32.97667	
Westminste	37.86	26.53333		26.76667	
Denver	47.21	45.30667	30.89667		

AVERAGE TRAVEL TIMES VS NO BUILD

GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-10.88%	12.87%	3.53%
Broomfield	-20.13%		-11.08%	3.46%
Westminste	-70.08%	-97.13%		0.90%
Denver	4.36%	-18.88%	-15.43%	

	Sc GP vs.	Sc bus vs.	Sc bus vs NB
	-13.55%	56.44%	50.53%

HOT

	Boulder	Broomfield	Westminste	Denver	Average TT
Boulder		3.653333	7.266667	16.46	11.25111
Broomfield	4.27		4.953333	14.19	
Westminste	9.316667	5.63		10.52333	
Denver	22.08	20.19667	16.47333		

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-2.43%	10.84%	48.14%
Broomfield	58.16%		43.20%	56.97%
Westminste	75.39%	78.78%		60.68%
Denver	53.23%	55.42%	46.68%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminste	Denver
Boulder		-13.58%	22.31%	49.97%
Broomfield	49.74%		36.90%	58.46%
Westminste	58.15%	58.17%		61.04%
Denver	55.27%	47.00%	38.46%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP			116357	GP				GP				GP			
Build	NB				NB				NB				NB			
	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver
Boulder		3.56	17.5	36.26	Boulder	7.12	50.35	71.55	Boulder	4.77	EXC	EXC	Boulder	EXC	EXC	EXC
Broomfield	3.93		9.5	22.77	Broomfield	16.65	37.78	58.21	Broomfield	39.72	46.05	78.38	Broomfield	EXC	EXC	EXC
Westminst	17.13	9.82		14.33	Westminst	49.65	21.73	19.18	Westminst	54.6	18.61	22.66	Westminst	EXC	4.89	29.67
Denver	62.92	40.97	32.55		Denver	119.48	84.21	67.41	Denver	EXC	77.9	77.29	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	NB				NB				NB				NB			
	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver
Boulder		3.65	17.9	30.07	Boulder	7.36	50.32	65.02	Boulder	5.09	EXC	EXC	Boulder	EXC	EXC	EXC
Broomfield	3.94		8.7	19.61	Broomfield	20.96	39.79	49.12	Broomfield	37.69	48.64	71.91	Broomfield	EXC	EXC	EXC
Westminst	17.25	10.04		14.68	Westminst	51.8	22.89	20.89	Westminst	54.05	18.83	21.71	Westminst	EXC	5.16	29.39
Denver	42.84	31.45	20.63		Denver	20.96	73.23	58.4	Denver	EXC	EXC	EXC	Denver	EXC	EXC	EXC

NO BUILD PM 2035

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminst	Denver	Average TT
Boulder		5.15	33.925	53.905	40.9141
Broomfield	20.1		31.11	53.12	
Westminst	40.46	13.7625		21.46	
Denver	91.2	67.69333	59.08333		

HOT

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminst	Denver	Average TT
Boulder		5.366667	34.11	47.545	32.31896
Broomfield	20.86333		32.37667	46.88	
Westminst	41.03333	14.23		21.6675	
Denver	31.9	52.34	39.515		

	Boulder	Broomfield	Westminst	Denver
Boulder		-4.21%	-0.55%	11.80%
Broomfield	-3.80%		-4.07%	11.75%
Westminst	-1.42%	-3.40%		-0.97%
Denver	65.02%	22.68%	33.12%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	100M				100M				100M				100M			
	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver
Boulder		4.36	16.46	33.62	Boulder	6.47	30.51	52.42	Boulder	3.23	7.18	24	Boulder	EXC	EXC	EXC
Broomfield	5.8		9.68	23.74	Broomfield	31.52	25.87	47.5	Broomfield	34.61	22.56	46.96	Broomfield	EXC	EXC	EXC
Westminst	19	7.55		16.5	Westminst	60.68	28.54	29.85	Westminst	EXC	46.91	35.52	Westminst	EXC	EXC	14.45
Denver	62.42	35.83	25.67		Denver	97.36	61.86		Denver	EXC	EXC	73.42	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	100M				100M				100M				100M			
	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver
Boulder		4.29	13.8	24.54	Boulder	4.04	17.62	31.47	Boulder	3.57	7.18	24	Boulder	EXC	EXC	EXC
Broomfield	6.65		5.05	15.65	Broomfield	29.58	14.5	29.07	Broomfield	28.93	15.04	31.47	Broomfield	EXC	4.73	17.71
Westminst	13.63	4.83		11.34	Westminst	31.3	4.92	23.63	Westminst	31.16	7.71	27.01	Westminst	EXC	5.18	14.28
Denver	38.71	19.63	16.7		Denver	70.23	37.32	39.06	Denver	EXC	EXC	EXC	Denver	EXC	EXC	EXC

100M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminst	Denver	Average TT
Boulder		4.686667	18.05	36.68	34.70125
Broomfield	23.97667		19.37	39.4	
Westminst	39.84	27.66667		24.08	
Denver	62.42	66.595	53.65		

AVERAGE TRAVEL TIMES VS NO BUILD % IMPROVEMENT

GP

	Boulder	Broomfield	Westminst	Denver
Boulder		9.00%	46.79%	31.95%
Broomfield	-19.29%		37.74%	25.83%
Westminst	1.53%	-101.03%		-12.21%
Denver	31.56%	1.62%	9.20%	

	Sc GP vs. I	Sc bus vs.	Sc bus vs NB
	15.19%	37.70%	47.16%

HOT

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminst	Denver	Average TT
Boulder		3.966667	12.86667	26.67	21.62014
Broomfield	21.72		9.83	23.475	
Westminst	25.36333	5.66		19.065	
Denver	54.47	28.475	27.88		

	Boulder	Broomfield	Westminst	Denver
Boulder		15.36%	28.72%	27.29%
Broomfield	9.41%		49.25%	40.42%
Westminst	36.34%	79.54%		20.83%
Denver	12.74%	57.24%	48.03%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminst	Denver
Boulder		22.98%	62.07%	50.52%
Broomfield	-8.06%		68.40%	55.81%
Westminst	37.31%	58.87%		11.16%
Denver	40.27%	57.94%	52.81%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	200M				200M				200M				200M			
	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver
Boulder		4	15.97	33.08	Boulder	7.92	32.5	56.34	Boulder	3.38	28.25	57.63	Boulder	EXC	EXC	EXC
Broomfield	6.72		9.59	23.96	Broomfield	29.42	29	53.06	Broomfield	38.62	23.05	53.58	Broomfield	EXC	23.05	EXC
Westminst	20.58	7.77		17.22	Westminst	51.61	21.57	29.04	Westminst	EXC	32.22	36.08	Westminst	EXC	18.2	EXC
Denver	63.25	36.71	25.96		Denver	110.12	78.89	55.82	Denver	EXC	79.55	70.09	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	200M				200M				200M				200M			
	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver
Boulder		3.79	12.94	23.28	Boulder	3.84	15.91	32.64	Boulder	3.83	7.33	28.86	Boulder	EXC	EXC	EXC
Broomfield	3.97		5.22	15.58	Broomfield	4.93	14.51	31.1	Broomfield	5.32	9.11	28.38	Broomfield	EXC	4.73	EXC
Westminst	8.31	5.05		11.7	Westminst	9.3	4.83	26.64	Westminst	8.92	9.22	24.59	Westminst	EXC	5.36	27.69
Denver	21.76	18.83	15.93		Denver	44.94	40.74	40.86	Denver	EXC	EXC	EXC	Denver	EXC	EXC	EXC

200M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminst	Denver	Average TT
Boulder		5.1	25.57333	49.01667	37.92965
Broomfield	24.92		21.1725	43.53333	
Westminst	36.095	19.94		27.44667	
Denver	86.685	65.05	50.62333		

AVERAGE TRAVEL TIMES VS NO BUILD

GP

	Boulder	Broomfield	Westminst	Denver
Boulder		0.97%	24.62%	9.07%
Broomfield	-23.98%		31.94%	18.05%
Westminst	10.79%	-44.89%		-27.90%
Denver	4.95%	3.90%	14.32%	

	Sc GP vs. I	Sc bus vs.	Sc bus vs NB
	7.29%	53.55%	56.94%

HOT

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminst	Denver	Average TT
Boulder		3.82	12.06	28.26	17.61965
Broomfield	4.74		8.3925	25.02	
Westminst	8.843333	6.115		22.655	
Denver	33.35	29.785	28.395		

	Boulder	Broomfield	Westminst	Denver
Boulder		25.10%	52.84%	42.35%
Broomfield	80.98%		60.36%	42.53%
Westminst	75.50%	69.33%		17.46%
Denver	61.53%	54.21%	43.91%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminst	Denver
Boulder		25.83%	64.45%	47.57%
Broomfield	76.42%		73.02%	52.90%
Westminst	78.14%	55.57%		-5.57%
Denver	63.43%	56.00%	51.94%	

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	GP				GP				GP				GP			
Build	550M				550M				550M				550M			
	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver
Boulder		4.17	21.54	37.37	Boulder	8.48	42.34	66.83	Boulder	3.41	19.68	41.73	Boulder	EXC	EXC	EXC
Broomfield	5.02		13.26	26.22	Broomfield	20.12	43.12	66.61	Broomfield	21.43	23.72	47.59	Broomfield	EXC	12.82	25.06
Westminst	14.09	7.93		17.35	Westminst	33.32	15.24	30.84	Westminst	36.68	19.49	31.03	Westminst	EXC	9.49	15.36
Denver	52.77	36.13	26.56		Denver	91.36	74.02	60.04	Denver	EXC	74.76	69.71	Denver	EXC	EXC	EXC

Departure Time	7:00				8:00				9:00				10:00			
Lane Use (GP/HOT)	HOT				HOT				HOT				HOT			
Build	550M				550M				550M				550M			
	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver	Boulder	Broomfield	Westminst	Denver
Boulder		3.67	7.35	17.14	Boulder	3.67	7.26	24.6	Boulder	3.66	7.26	25.32	Boulder	3.61	7.23	19.31
Broomfield	3.97		4.93	14.79	Broomfield	4.62	5.24	20.14	Broomfield	6.4	4.83	21.97	Broomfield	4	4.73	17.4
Westminst	7.77	4.84		10.87	Westminst	8.08	4.97	19.39	Westminst	10.69	6.02	18.85	Westminst	7.4	4.84	15.01
Denver	21.41	18.71	15.96		Denver	51.8	43.94	41.75	Denver	EXC	EXC	EXC	Denver	EXC	EXC	EXC

550M

AVERAGE TRAVEL TIMES

GP

	Boulder	Broomfield	Westminst	Denver	Average TT
Boulder		5.353333	27.85333	48.64333	34.37424
Broomfield	15.52333		23.23	41.37	
Westminst	28.03	13.0375		23.645	
Denver	72.065	61.63667	52.10333		

AVERAGE TRAVEL TIMES VS NO BUILD

GP

	Boulder	Broomfield	Westminst	Denver
Boulder		-3.95%	17.90%	9.76%
Broomfield	22.77%		25.33%	22.12%
Westminst	30.72%	5.27%		-10.18%
Denver	20.98%	8.95%	11.81%	

	Sc GP vs. I	Sc bus vs.	Sc bus vs NB
	15.98%	54.61%	61.86%

HOT

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS GP

	Boulder	Broomfield	Westminst	Denver	Average TT
Boulder		3.6525	7.275	21.5925	15.60354
Broomfield	4.7475		4.9325	18.575	
Westminst	8.485	5.1675		16.03	
Denver	36.605	31.325	28.855		

	Boulder	Broomfield	Westminst	Denver
Boulder		31.77%	73.88%	55.61%
Broomfield	69.42%		78.77%	55.10%
Westminst	69.73%	60.36%		32.21%
Denver	49.21%	49.18%	44.62%	

HOT % IMPROVEMENT AVERAGE TRAVEL TIMES VS NO BUILD GP

	Boulder	Broomfield	Westminst	Denver
Boulder		29.08%	78.56%	59.94%
Broomfield	76.38%		84.14%	65.03%
Westminst	79.03%	62.45%		25.30%
Denver	59.86%	53.73%	51.16%	

Appendix 5: U.S. 36 Wage Certification & Planning Certification Letters.

STATE OF COLORADO

DEPARTMENT OF TRANSPORTATION
Chief Engineer
4201 E. Arkansas Ave. #262
Denver, CO 80222
(303) 757-9206
(303) 757-9656 Fax

The Honorable Ray LaHood
Secretary, U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

RE: U.S. 36 MANAGED LANE/BRT PROJECT

Dear Mr. Secretary,

In accordance with Colorado Department of Transportation (Department) policies and practices, I hereby certify that the Department will comply with the requirements of subchapter IV of chapter 41 of title 40, United States Code as required by the Recovery Act if selected for a TIGER Discretionary Grant.

Thank you for your consideration.

Sincerely,
COLORADO DEPARTMENT OF TRANSPORTATION

Pamela Hutton

Pamela Hutton, P.E.
Chief Engineer

State of Colorado }
}
City and County of Denver }

Signed this 14th day of September, 2009 by Pamela Hutton

My Commission Expires: 5·11·11

Jennifer Fogel
Notary Public

Seal

JENNIFER FOGEL NOTARY PUBLIC STATE OF COLORADO

STATE OF COLORADO

DEPARTMENT OF TRANSPORTATION
Division of Transportation Development
4201 E. Arkansas Ave. #262
Denver, CO 80222
(303) 757-9206
(303) 757-9656 Fax

September 14, 2009

The Honorable Ray LaHood
Secretary, U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

RE: U.S. 36 MANAGED LANE/BRT PROJECT

Dear Mr. Secretary,

Several U.S. 36 Corridor Projects are currently in Colorado's Statewide Transportation Improvement Program in accordance with Colorado Department of Transportation (Department) policies and practices.

I hereby certify that if the Department is successful in securing a TIGER Discretionary Grant for the proposed U.S. 36 Managed Lane/BRT Project, this Project also will be included in the relevant planning documents prior to grant award consistent with applicable State and Federal laws.

Please feel free to contact me with any questions at (303) 757-9525

Sincerely,
COLORADO DEPARTMENT OF TRANSPORTATION

Jennifer Finch
Division of Transportation Development Director

State of Colorado }
}
City and County of Denver }

Signed this 14th day of Sept., 2009 by Jennifer Finch

My Commission Expires: 5.11.11

Jennifer Fogel
Notary Public

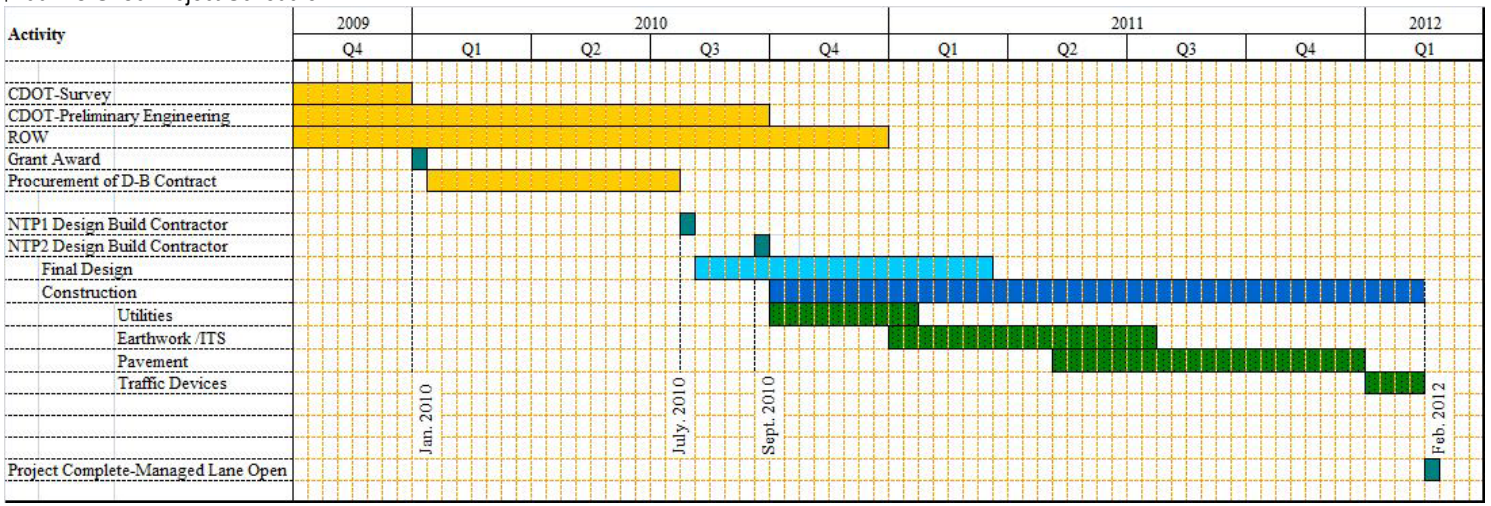
Seal

JENNIFER FOGEL NOTARY PUBLIC STATE OF COLORADO

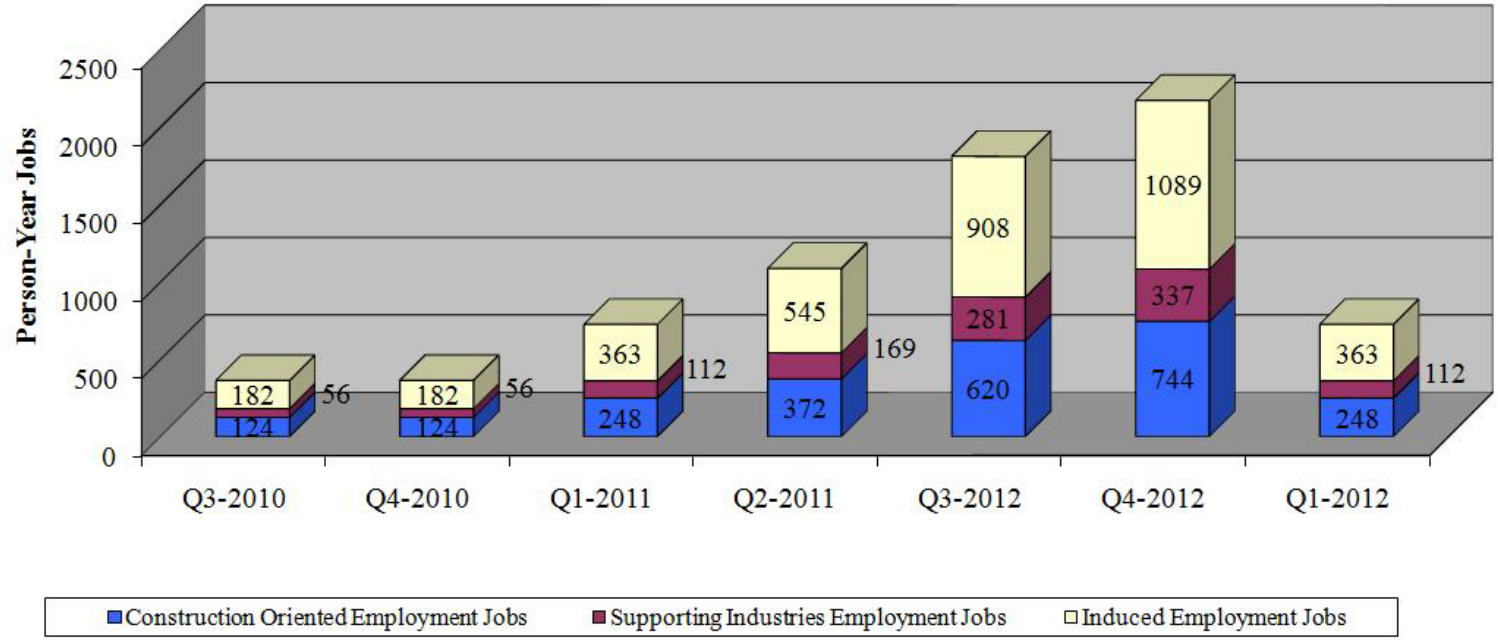
Appendix 6: U.S. 36 Project Schedule and Projected Quarterly Job Creation.

Proposed $260 million project schedule and person-year job creation.

$260M U.S. 36 Project Schedule.



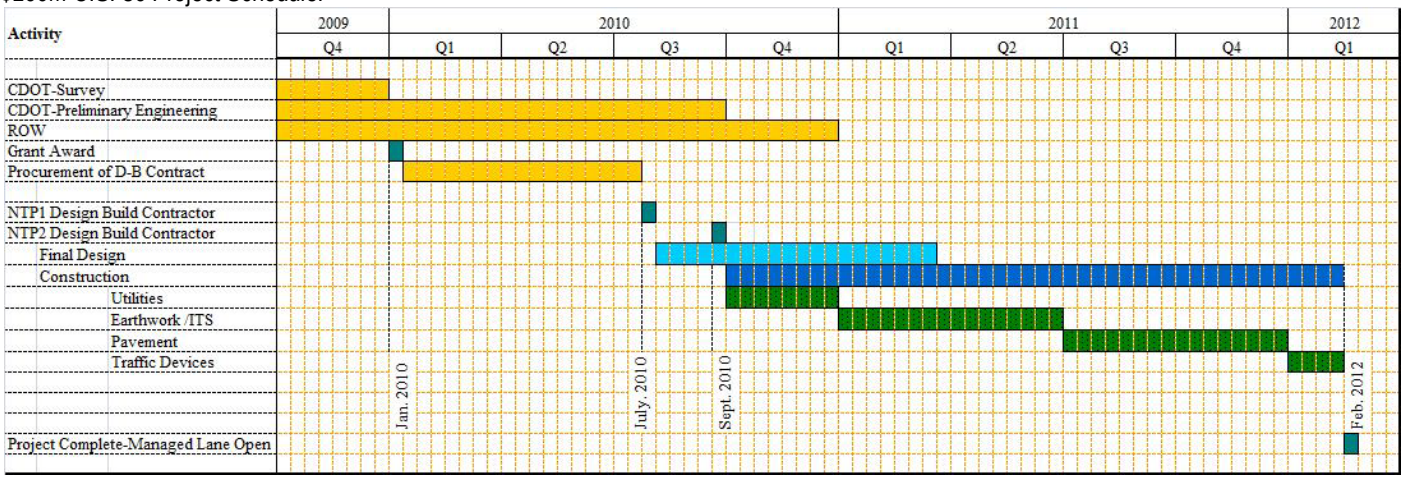
Estimated Employment Impacts of U.S. 36 Highway Infrastructure Investment - Person-Year Jobs per Quarter.



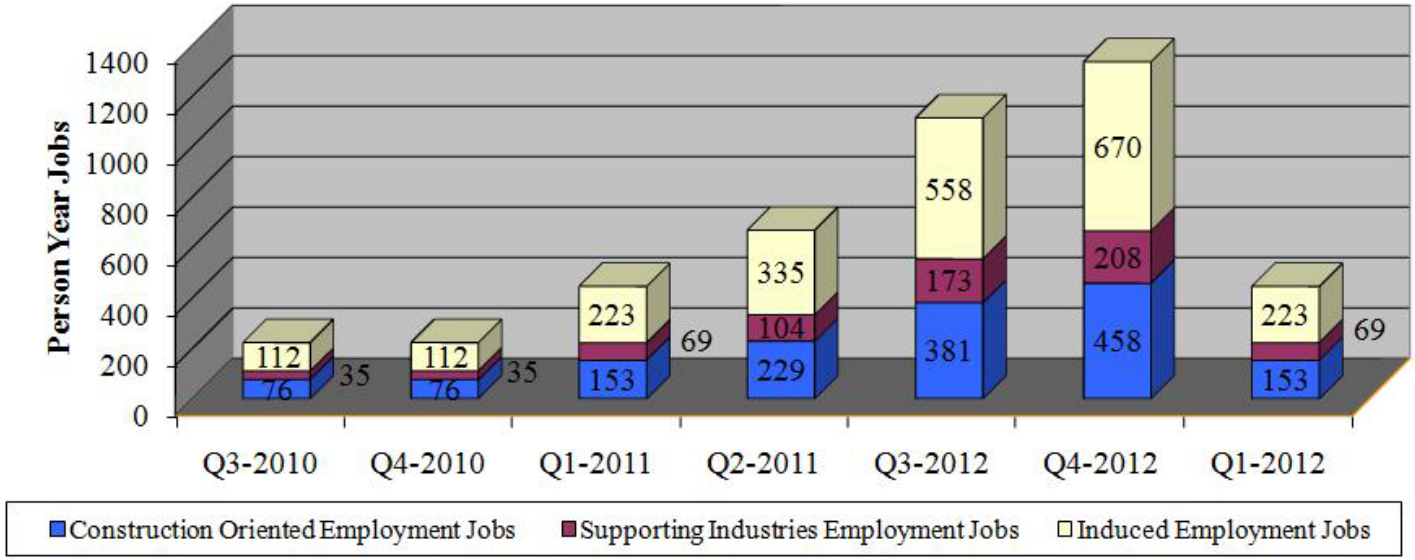
September 15, 2009

Proposed $160 million project schedule and person-year job creation.

$160M U.S. 36 Project Schedule.



Estimated Employment Impacts of U.S. 36 Highway Infrastructure Investment - Person-Year Jobs per Quarter.



Appendix 7: Letters of Support for the U.S. 36 Managed Lanes / BRT Project.

To view files in Appendix 7, please copy and paste the following link into your Web browser:

ftp://ftp.ch2m.com/US_36_TIGER_GRANT

If needed: Username: US36TIGER

Password: TIGERGRANT