



***commuter rail facility***

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**Commuter Rail Maintenance Facility  
Supplemental Environmental Assessment  
Transportation Systems Technical Memorandum  
*Supplement to  
FasTracks Commuter Rail Environmental Documents  
Incorporated by Reference***

**Prepared by:  
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for the  
Federal Transit Administration  
and the  
Regional Transportation District**

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# 1 Acronyms and Abbreviations

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2	BNSF	BNSF Railway Company
3	CRMF	Commuter Rail Maintenance Facility
4	DMU	diesel multiple unit
5	DRCOG	Denver Regional Council of Governments
6	DUS	Denver Union Station
7	EMU	electric multiple unit
8	<i>FasTracks Plan</i>	<i>FasTracks Transit Systems Plan</i>
9	FHWA	Federal Highway Administration
10	FRA	Federal Railroad Administration
11	FTA	Federal Transit Administration
12	I-#	Interstate
13	ITE	Institute of Transportation Engineers
14	LOS	level of service
15	<i>Metro Vision Plan</i>	<i>Metro Vision 2030 Regional Transportation Plan</i>
16	ROW	right-of-way
17	RTD	Regional Transportation District
18	SEA	Supplemental Environmental Assessment
19	TBD	to be determined
20	TOFC	trailer-on-flatcar
21	TRB	Transportation Research Board
22	UP	Union Pacific Railroad



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## 1.0 INTRODUCTION

This Transportation Systems Technical Memorandum is prepared in support of the Commuter Rail Maintenance Facility (CRMF) Supplemental Environmental Assessment (SEA) included in the Regional Transportation District (RTD) *FasTracks Transit Systems Plan (FasTracks Plan)*. The *FasTracks Plan* proposes to build and operate commuter and light rail transit service and expand and improve bus service and park-n-Rides throughout the Denver region. The primary goal of this project is to support the operations and maintenance of the commuter rail components of the FasTracks regional transit system by constructing a cost-effective and environmentally sustainable CRMF.

## 2.0 PROPOSED PROJECT DESCRIPTION

Two alternatives are evaluated in the CRMF SEA:

- No Action Alternative
- Preferred Alternative – CRMF at the Fox North Site and the shared alignment

### 2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no new transit projects would be constructed within the project impact area. Improvements made by Gold Line and Northwest Rail are assumed not to occur under the No Action Alternative. This assumption is made so as to evaluate the full potential impacts of the shared alignment and CRMF.

### 2.2 PREFERRED ALTERNATIVE

The Preferred Alternative includes two components, the shared alignment between DUS and Pecos Street and the CRMF at the Fox North Site.

#### 2.2.1 SHARED ALIGNMENT

The Preferred Alternative includes the track alignment extending approximately 3.5 miles from Denver Union Station (DUS) to Pecos Street. This portion of track would include four structures to navigate over the South Platte River and other roadways and rail track along the route.

The shared alignment would share portions of track between DUS and the proposed CRMF with the other four FasTracks commuter rail projects. The track alignment extending from the CRMF to Pecos Street would be shared with the Gold Line and the Northwest Rail projects. The portion of track extending from DUS to the CRMF would be shared by the Gold Line, East corridor, North Metro corridor, and the North West Rail corridor.

#### 2.2.2 CRMF

The Preferred Alternative includes the CRMF at the Fox North Site. The CRMF at the Fox North Site encompasses approximately 38 acres and is generally bounded by 48<sup>th</sup> Avenue on the south, 54<sup>th</sup> Avenue on the north, Fox Street on the east, and the BNSF Railway Company (BNSF) trailer-on-flatcar (TOFC) Yard and Union Pacific Railroad (UP) North Yard on the west. The CRMF would include facilities to repair, maintain, clean, fuel, and store the FasTracks commuter rail vehicles.

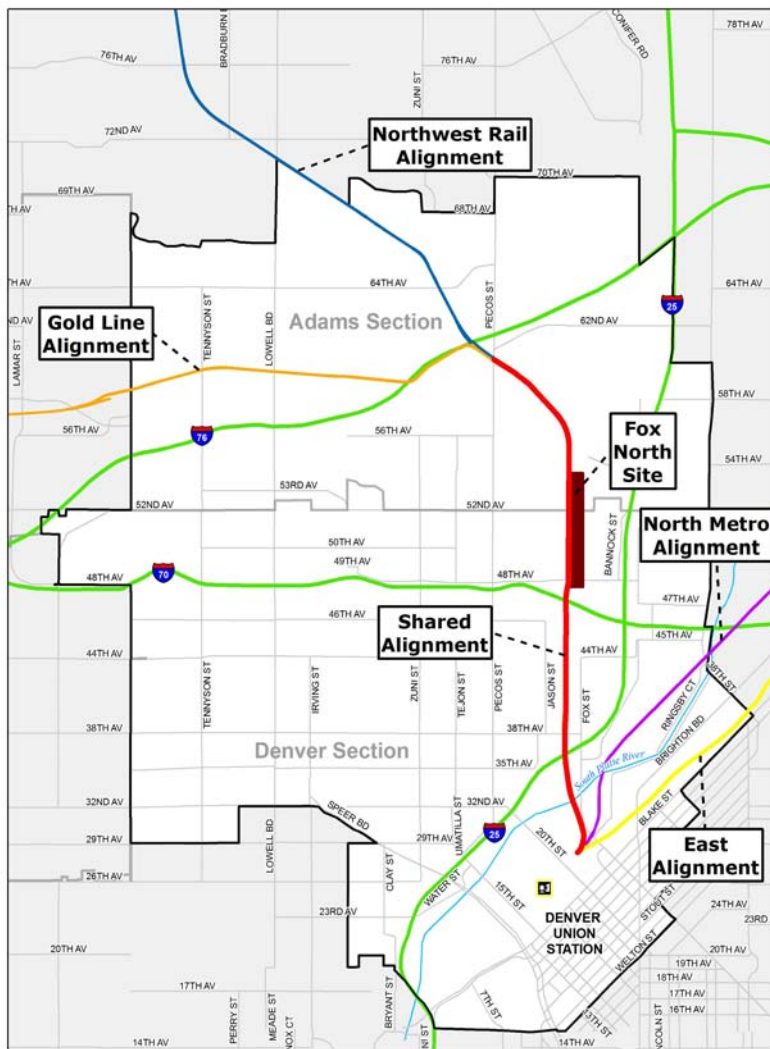
The footprint of the Preferred Alternative falls within two jurisdictions. The portion of the CRMF footprint south of 52<sup>nd</sup> Avenue is located within the City and County of Denver. The portion of the footprint north of 52<sup>nd</sup> Avenue is located within Adams County.

39 Due to requirements for the CRMF to serve two different commuter rail technologies for the four  
40 FasTracks commuter rail corridors, the CRMF yard would accommodate both electric multiple unit  
41 (EMU) and diesel multiple unit (DMU) vehicles.

## 42 2.3 STUDY AREA

43 The study area for this SEA is a subset of the Gold Line project study area (Denver and Adams  
44 County sections) that encompasses the northwestern portion of the City and County of Denver and  
45 part of Adams County, as depicted on Figure 1.

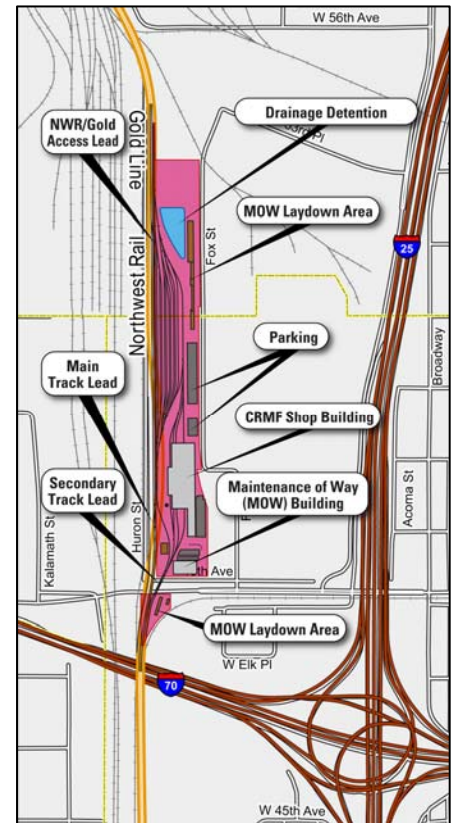
46 **Figure 1: Study Area**



67 Source: CRMF Team, 2009



Figure 2: CRMF Location of Uses



Source: CRMF Team, 2009.

68

69 **2.3.1 CRMF SITE LAYOUT**

70 The facility would include a maintenance shop, employee  
71 facilities, administrative offices, employee parking facilities, and a  
72 maintenance-of-way (MOW) building and MOW laydown areas for  
73 outdoor storage of large pieces of equipment. MOW is the RTD  
74 department responsible for maintaining the track along the  
75 commuter rail corridors. At the CRMF, the MOW requires space  
76 for offices, storage of equipment (indoor and outdoor), and  
77 parking. Figure 2 displays the proposed locations of these uses at  
78 the Fox North Site.

79

80 **3.0 TRANSPORTATION SYSTEMS**

81 This technical memorandum presents the existing transportation  
82 facilities and services in the study area and the anticipated  
83 environmental impacts of the No Action Alternative and the  
84 Preferred Alternative presented previously.

85 **3.1 SUMMARY OF RESULTS**

86 This section summarizes the impacts of the No Action Alternative  
87 and the Preferred Alternative on future transit, roadway, freight,  
88 bicycle, and pedestrian facilities in the study area.

88 The Preferred Alternative would assist in providing the commuter  
89 rail service component of the FasTracks program by providing the  
90 facilities necessary and required by the Federal Railroad Administration (FRA) to operate and  
91 maintain commuter rail service in the Denver Metro area.

92 **Shared Alignment**

93 The shared alignment would have no transportation system impacts.

94 **CRMF**

- 95
- 96 • The Commuter Rail Maintenance Facility (CRMF) would result in a small increase in traffic flow  
97 into and out of the Fox North Site. The proposed CRMF is assumed to have 300 employees,  
98 which would generate 906 trips per day. With implementation of the Preferred Alternative, 731  
99 daily trips related to existing private business operations would be displaced. Therefore, the  
100 Preferred Alternative would result in an additional 175 trips per day into and out of the Fox North  
101 Site.
  - 102 • Truck traffic to the Fox North Site would be reduced as a result of the CRMF. Existing businesses  
103 that generate truck traffic would be replaced by the CRMF traffic (primarily employee traffic) that  
104 does not typically include heavy truck traffic.
  - 105 • One intersection evaluated for the CRMF is expected to operate beyond an acceptable a.m.  
106 peak-hour Level of Service (LOS) F for the southbound left turn. The 48<sup>th</sup> Avenue/Fox Street  
(unsignalized) intersection is expected to be impacted by the CRMF for study years 2015 and

107 2030. However, re-striping 48<sup>th</sup> Avenue east of Fox Street would mitigate these impacts and bring  
 108 the southbound left turn LOS back to acceptable levels and improve conditions compared to the  
 109 No Action Alternative.

- 110 • The CRMF would have no effect on existing or future rail freight movements, transit, bicycle, or  
 111 pedestrian facilities or services.

### 3.2 PURPOSE OF THE TRANSPORTATION ANALYSIS

112 The purpose of the transportation analysis conducted for this SEA is to identify the changes in  
 113 transportation operations service quality as a result of the Preferred Alternative, including the CRMF  
 114 and shared alignment.

### 3.3 TRANSIT SERVICE

#### 3.3.1 EXISTING TRANSIT SERVICE

115 No existing transit service is provided within a reasonable walking distance of the Fox North Site.  
 116 The closest bus route is the number 8, which operates on Lincoln Street, over a half-mile to the east.

#### 3.3.2 FUTURE TRANSIT SERVICE AND OPERATIONS

117 Aside from the support of commuter rail transit for the FasTracks program, the CRMF and shared  
 118 alignment between DUS and Pecos Street are not anticipated to directly impact future transit service  
 119 in the study area. No commuter rail stations are planned in association with the CRMF. Two shared  
 120 Northwest Rail and Gold Line commuter rail stations would be located approximately one mile from  
 121 the CRMF, the 41<sup>st</sup> Avenue East station south of the CRMF, and the Pecos Station north of the  
 122 CRMF.

### 3.4 EXISTING AND FUTURE ROADWAY CONDITIONS

#### 3.4.1 CHANGES IN TRAFFIC VOLUMES

123 In comparison to the No Action Alternative, the Preferred Alternative would only slightly increase  
 124 traffic to the Fox North Site, due to the businesses moving off the site. In this discussion of traffic, a  
 125 “trip” is defined as a vehicle either arriving at or departing the site (one person commuting to the site  
 126 makes two “trips” per day). Table 1 presents the net number of trips that are assumed to be added to  
 127 the Fox North Site by the relocation of the private businesses from the proposed site and the  
 128 implementation of the Preferred Alternative.

129 **Table 1: Fox North Site Trip Generation**

	Estimated Employees	Daily		AM Peak Hour		PM Peak Hour	
		Rate	Trips	Rate	Trips	Rate	Trips
Removed by Displaced Businesses	242	3.02	731	0.48	116	0.51	123
Added by Preferred Alternative	300	3.02	906	0.48	144	0.51	153
Net Added by Preferred Alternative	58		175		28		30

Source: Federal Transit Authority (FTA), 2008b; CRMF Team, 2009; ITE, 2008.  
 Trip rates are expressed in trips per employee.

130 It is anticipated that 731 daily trips occur with the other existing private commercial land uses on the  
 131 Fox North Site, including an estimated 116 a.m. peak-hour trips and 123 p.m. peak-hour trips.

132 According to Institute of Transportation Engineers data for general light industrial land uses, about 83  
133 percent of morning peak trips are inbound to the site, and about 79 percent of evening peak trips are  
134 outbound from the site.

135 The proposed CRMF is assumed to have 300 employees, which would be expected to generate  
136 about 906 daily, 144 a.m. peak-hour, and 153 p.m. peak-hour trips. This represents a net increase  
137 over the No Action Alternative of 203 daily trips, 32 a.m. peak-hour trips, and 34 p.m. peak-hour trips.

### **3.4.2 IMPACTS TO LOCAL INTERSECTIONS**

138 The following intersections have been analyzed with respect to the direct traffic impacts of the  
139 proposed CRMF (see Figure 3):

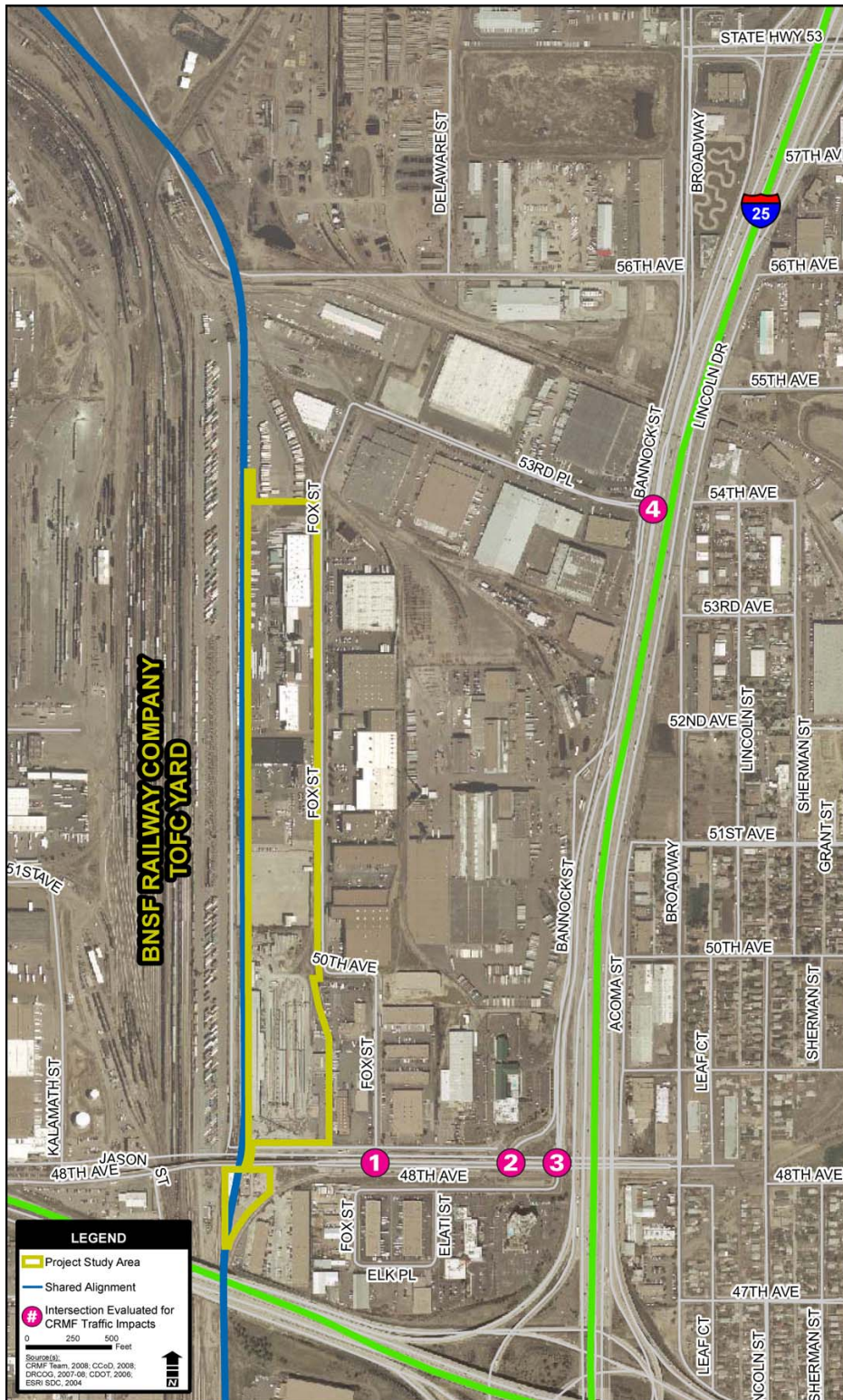
- 140 1. 48<sup>th</sup> Avenue and Fox Street (Fox traffic stops)
- 141 2. 48<sup>th</sup> Avenue and Bannock Street (Bannock traffic stops)
- 142 3. 48<sup>th</sup> Avenue and Interstate 25 (I-25) Southbound Off-Ramp (all-way stop)
- 143 4. 53<sup>rd</sup> Place and Bannock Street (signal)

### ***METHODOLOGY***

144 This project used the regional travel demand forecasting model developed and distributed by the  
145 Denver Regional Council of Governments (DRCOG) to estimate 2015 and 2030 traffic volumes. In  
146 addition, traffic counts of vehicles and pedestrians at the intersections indicated above were collected  
147 and evaluated to serve as a starting point for traffic growth forecasts. The growth forecasts produced  
148 by the DRCOG model reflect the regional land use and transportation projects in the DRCOG *Metro*  
149 *Vision 2030 Regional Transportation Plan (Metro Vision Plan)* (DRCOG 2005). These forecasts were  
150 used in conjunction with traffic generation estimates for the proposed CRMF (and the land uses it  
151 would replace) to develop intersection turning-movement estimates.



152 **Figure 3: Intersections Evaluated for CRMF Traffic Impacts**



Source: CRMF Team, 2009.

153 For the purpose of projecting travel demand, the No Action Alternative assumes that the four  
154 FasTracks commuter rail lines would be built, but that the CRMF would be located at an unidentified  
155 alternate site outside the study area for this project. Intersection turning movement data, geometric  
156 information, and traffic control equipment data were used to calculate estimated intersection delay  
157 using the methods described in Transportation Research Board (TRB) Special Report 209 (*Highway  
158 Capacity Manual*), 2000 edition. Synchro™ software (version 7) by Trafficware was used to perform  
159 the necessary calculations of delay, and the impact evaluation is based on those calculations. See  
160 Appendix A for attached Synchro™ data.

### **IMPACT EVALUATION**

161 Impacts are determined based on the difference in projected a.m. and p.m. peak hour average  
162 intersection delay between the No Action Alternative and the Preferred Alternative. Intersection  
163 operations quality is most often and most simply expressed using LOS, which assigns letter grades  
164 ranging from A (best) to F (worst) for ranges of estimated average delay per vehicle. These ranges  
165 are defined separately for signalized and unsignalized intersections, as shown in Table 2. LOS F is  
166 characterized as high delay and frequent occurrences of vehicles arriving at the back of a queue  
167 while the signal for them is red, then being unable to pass through the intersection during the  
168 following green time.

169 **Table 2: Intersection Level of Service Definitions (average delay, seconds per vehicle)**

Level of Service	Signalized Intersection	Unsignalized Intersection
A	0 to 10.0	0 to 10.0
B	10.1 to 20.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0
D	35.1 to 55.0	25.1 to 35.0
E	55.1 to 80.0	35.1 to 55.0
F	80.1 or greater	55.1 or greater

Source: TRB, 2000.

170 At signalized and all-way stop intersections, the delay estimates for all traffic movements are  
171 averaged, weighted by traffic volume, for the whole intersection. At unsignalized intersections, the  
172 movement that experiences the most delay is used to determine the intersection LOS. This is done  
173 because traffic movements at unsignalized intersections that are not required to stop or yield (such as  
174 through movements on the main street) basically experience no delay. Including these movements in  
175 a weighted average would result in very low delay estimates that do not represent the operation of  
176 the intersection.

177 The LOS rating deemed acceptable can vary by community, facility type, and traffic control type  
178 (signalized versus unsignalized). At urban signalized intersections, LOS D is generally recognized as  
179 the worst acceptable condition. On a case-by-case basis, the City and County of Denver may  
180 determine that intersection delays beyond the LOS D threshold are acceptable.

181 For the No Action Alternative, the intersection LOS conditions are reported. An impact of the CRMF  
182 in the Preferred Alternative is defined at any given intersection by either of the following two  
183 conditions:

- 184 • If there is a difference in LOS grade between the No Action and Preferred Alternative or the  
 185 Preferred Alternative has a LOS worse than D (E or F)
- 186 • If the No Action LOS is either E or F and the Preferred Alternative increases intersection delay by  
 187 10 percent or more

188 **Results**

189 **EXISTING CONDITIONS**

190 Under existing conditions, the land uses on the Fox North Site generate a fair amount of traffic on a  
 191 daily basis, but relatively little of that traffic is generated during the traditional peak street traffic hours  
 192 of 7:30 to 8:30 a.m. and 4:30 to 5:30 p.m. This condition is typical of industrial areas, where business  
 193 hours often start and end slightly earlier than in commercial areas.

194 The existing intersection analysis LOS results are shown in Table 3. The results shown for the first  
 195 two intersections represent LOS and delay for the southbound left-turn movement because they are  
 196 one-way stop-controlled, and the southbound left turn is the movement with the most delay. Results  
 197 for the last two intersections are volume-weighted averages for all movements.

198 **Table 3: Existing Intersection Level of Service Results**  
 199 **(average delay, seconds per vehicle)**

Intersection	AM Peak Hour	PM Peak Hour
48 <sup>th</sup> Avenue/Fox Street	D (32.4)	C (21.5)
48 <sup>th</sup> Avenue/Bannock Street	C (16.8)	B (14.6)
48 <sup>th</sup> Avenue/I-25 Southbound Off-Ramp	A (9.8)	B (10.3)
53 <sup>rd</sup> Place/Bannock Street	A (5.1)	B (12.4)

Source: URS, Analysis with Synchro 7, 2009.

200 Existing intersection conditions are characterized by LOS D or better in both the a.m. and p.m. peak  
 201 hours. No existing operational problems are evident from either field review or analysis.

202 **3.4.3 NO ACTION ALTERNATIVE**

203 **Direct Impacts**

204 The 2015 and 2030 No Action Alternative intersection LOS analysis results are shown in Table 4.  
 205 The results shown for the first two intersections represent LOS and delay for the southbound left-turn  
 206 movement because they are one-way stop-controlled, and the southbound left turn is the movement  
 207 with the most delay. Results for the last two intersections are volume-weighted averages for all  
 208 movements.

209 **Table 4: No Action Alternative Intersection Level of Service Results (average delay,**  
 210 **seconds per vehicle)**

Intersection	AM Peak Hour	PM Peak Hour
<b>Year 2015 Results</b>		
48 <sup>th</sup> Avenue/Fox Street	E (53.3)	D (29.0)
48 <sup>th</sup> Avenue/Bannock Street	C (23.2)	C (17.8)
48 <sup>th</sup> Avenue/I-25 Southbound Off-Ramp	B (10.8)	B (11.6)
53 <sup>rd</sup> Place/Bannock Street	A (5.4)	B (15.0)



Intersection	AM Peak Hour	PM Peak Hour
<b>Year 2030 Results</b>		
48 <sup>th</sup> Avenue/Fox Street	F (83.2)	E (37.4)
48 <sup>th</sup> Avenue/Bannock Street	D (32.5)	C (20.8)
48 <sup>th</sup> Avenue/I-25 Southbound Off-Ramp	B (11.6)	B (12.7)
53 <sup>rd</sup> Place/Bannock Street	A (6.2)	B (16.8)

Source: URS, Analysis with Synchro 7, 2009.

211 Land use and traffic in the vicinity of the Fox North Site are expected to remain somewhat stable.  
 212 DRCOG predicts modest increases in land use intensity but no changes in general land use types  
 213 that would bring about drastic changes in traffic generation. The increase in traffic, particularly along  
 214 48<sup>th</sup> Avenue, would result in increased delay for southbound left-turning vehicles at the 48<sup>th</sup>  
 215 Avenue/Fox Street intersection, such that unacceptable LOS could result in the 2030 a.m. peak hour.  
 216 Delay in the 2015 a.m. peak hour (53.3 seconds per southbound left-turning vehicle) is very near the  
 217 LOS F threshold of 55 seconds per vehicle. Even though the southbound left turn from Fox Street to  
 218 48<sup>th</sup> Avenue is expected to have only about 30 vehicles in the a.m. peak hour (one every two minutes,  
 219 on average), delays are expected to be high, as east-west traffic on 48<sup>th</sup> Avenue limits opportunities  
 220 for southbound left-turning vehicles to enter the intersection.

221 Truck traffic under the No Action Alternative is anticipated to experience the same increases in delay  
 222 as overall traffic. Existing truck traffic to and from the Fox North Site would continue.

223 No future changes in traffic control are anticipated for the four intersections analyzed.

224 **INDIRECT IMPACTS**

225 The No Action Alternative would locate the CRMF elsewhere. This location, which has not been  
 226 determined, would likely be located along one of the four FasTracks commuter rail lines. The location  
 227 of this facility could have minor localized traffic impacts (or benefits) wherever it is located, depending  
 228 on whether it replaces land uses with lower (or higher) traffic activity than the CRMF. What is known  
 229 is that the CRMF is anticipated to generate approximately 900 daily trips, wherever it is eventually  
 230 located.

231 **TEMPORARY CONSTRUCTION IMPACTS**

232 Because no significant land use changes or public facility improvements are anticipated in  
 233 conjunction with the No Action Alternative, there are no associated temporary construction impacts.

234 **3.4.4 PREFERRED ALTERNATIVE**

235 **DIRECT IMPACTS**

236 The 2015 and 2030 Preferred Alternative intersection analysis LOS results are shown in Table 5.  
 237 The results shown for the first two intersections represent LOS and delay for the southbound left-turn  
 238 movement because they are one-way stop-controlled, and the southbound left turn is the movement  
 239 with the most delay. Results for the last two intersections are volume-weighted averages for all  
 240 movements.

241 **Table 5: Preferred Alternative Intersection Level of Service Results (average delay, seconds per**  
 242 **vehicle)**

Intersection	AM Peak Hour	PM Peak Hour
<b>Year 2015 Results</b>		
48 <sup>th</sup> Avenue/Fox Street	F (58.9)	D (29.6)
48 <sup>th</sup> Avenue/Bannock Street	C (23.4)	C (17.8)
48 <sup>th</sup> Avenue/I-25 Southbound Off-Ramp	B (10.7)	B (11.5)
53 <sup>rd</sup> Place/Bannock Street	A (5.9)	B (15.5)
<b>Year 2030 Results</b>		
48 <sup>th</sup> Avenue/Fox Street	F (94.5)	E (38.4)
48 <sup>th</sup> Avenue/Bannock Street	D (32.9)	C (20.8)
48 <sup>th</sup> Avenue/I-25 Southbound Off-Ramp	B (11.6)	B (12.6)
53 <sup>rd</sup> Place/Bannock Street	A (6.2)	B (17.4)

Source: URS, Analysis with Synchro 7, 2009.

243 The Preferred Alternative results in an impact at one intersection. The increased traffic that would  
 244 result from the Preferred Alternative would cause an increase in delay that meets the definition of an  
 245 impact for the southbound left-turn movement at the 48<sup>th</sup> Avenue/Fox Street intersection in both the  
 246 2015 and 2030 study years. In 2015, the Preferred Alternative would result in the LOS worsening  
 247 from E (acceptable) to F (unacceptable). In 2030, the No Action LOS would be F, but the CRMF  
 248 would result in an increase in intersection delay from 83.2 seconds per vehicle to 94.5 seconds per  
 249 vehicle. This increase of 14 percent is beyond the 10-percent threshold defined as an impact for this  
 250 project.

251 Truck traffic to and from the Fox North Site is anticipated to decrease with the CRMF, as the existing  
 252 businesses that generate truck traffic would be removed from the site and replaced by CRMF traffic.  
 253 The CRMF would primarily generate employee traffic that would include few heavy trucks.

254 **INDIRECT IMPACTS**

255 The facilities displaced by the CRMF in the Preferred Alternative would be closed permanently,  
 256 consolidated with other facilities, or relocated by their owners. There are currently no indications as  
 257 to which of these courses any particular business owner will take. If the facilities are relocated to  
 258 another location, there could be impacts to transportation facilities in those locations. Given that each  
 259 of these facilities by itself employs relatively few people, it is unlikely that the indirect impacts of  
 260 relocating any one business would require mitigation.

261 **TEMPORARY CONSTRUCTION IMPACTS**

262 Construction of the CRMF would result in temporary increases in traffic for construction workers,  
 263 materials, and equipment. All construction traffic, like the eventual site traffic, is expected to pass  
 264 through either the 48<sup>th</sup> Avenue/Fox Street intersection or the 53<sup>rd</sup> Place/ Bannock Street intersection.  
 265 These intersections, as well as 48<sup>th</sup> Avenue/Bannock Street and 48<sup>th</sup> Avenue/I-25 southbound off-  
 266 ramp, are all wide enough and have sufficient capacity to accommodate construction vehicles easily.  
 267 Construction traffic volumes are expected to be light compared to surrounding street volumes and to  
 268 occur primarily outside the morning and evening peak hours.



269 **ROADWAY MITIGATION**

270 The intersection impact defined previously results from vehicles having to wait too long to find a gap  
 271 in traffic to enter the intersection. This delay stems from the fact that as the 48<sup>th</sup> Avenue/Fox Street  
 272 intersection is currently designed, southbound left-turning vehicles must find an acceptable gap in  
 273 westbound, eastbound left, and eastbound through traffic simultaneously. While the installation of a  
 274 traffic signal at this location would mitigate the identified impact, it is not necessary. Instead, the  
 275 mitigation proposed is to re-stripe 48<sup>th</sup> Avenue east of Fox Street so that the median is designated as  
 276 a two-way left-turn lane. Two-way left-turn lanes serve the specific purpose of providing a refuge for  
 277 left-turning vehicles desiring to enter or leave a main street. The presence of such a refuge allows  
 278 southbound left-turning vehicles, in this case, to select a gap in westbound traffic (and eastbound left-  
 279 turning traffic) independently of the gap in eastbound through traffic. This process is called “two-  
 280 stage gap acceptance” and can substantially reduce the delay associated with a minor-street left turn.

281 The existing arrangement east of Fox Street is a 19-foot-wide westbound lane, a 10-foot-wide painted  
 282 median area, and a 19-foot-wide westbound lane, for a total curb-to-curb width of 48 feet. The  
 283 revised arrangement proposed is three 16-foot-wide lanes (one westbound, two eastbound). The re-  
 284 striping measure has been tested for its ability to mitigate the LOS impact, and the results of this  
 285 testing are presented in Table 6. Peak-hour (p.m.) results are also shown for information.

286 **Table 6: 48<sup>th</sup> Avenue/Fox Street Impact Mitigation Test Results (average delay, seconds per**  
 287 **vehicle)**

Alternative	AM Peak Hour	PM Peak Hour
<b>Year 2015 Results</b>		
No Action Alternative	E (53.3)	D (29.0)
Preferred Alternative, before mitigation	F (58.9)	D (29.6)
Preferred Alternative, with mitigation	C (23.3)	C (15.7)
<b>Year 2030 Results</b>		
No Action Alternative	F (83.2)	E (37.4)
Preferred Alternative, before mitigation	F (94.5)	E (38.4)
Preferred Alternative, with mitigation	D (27.8)	C (17.1)

Source: URS, Analysis with Synchro 7, 2009.

288 The LOS results shown in the Table 4.4-6 indicate that the proposed mitigation measure (re-striping  
 289 48<sup>th</sup> Avenue east of Fox Street) would mitigate the impacts of the Preferred Alternative. The  
 290 Preferred Alternative would also result in a substantial LOS improvement over the No Action  
 291 Alternative for both a.m. and p.m. peak hours for years 2015 and 2030. The mitigation is not  
 292 expected to have any impacts other than the possible temporary, short-term disruption of traffic  
 293 during the re-striping process.

294 **RAIL CROSSING MITIGATION**

295 As indicated for the Gold Line project and based on RTD’s Grade Crossing Evaluation Methodology,  
 296 Table 7 presents the rail crossing treatments proposed for the shared alignment at-grade crossings in  
 297 2015 between DUS and Pecos Street.

298 **Table 7: Existing Rail Crossing Locations and Treatments**

Street	Existing Rail Crossing Treatment	Rail Crossing Recommendations between DUS and Pecos Street (2015)
I-25	Grade Separated	Grade Separated
BNSF Railway Company Yard	None	At-Grade – dual gates
West 38 <sup>th</sup> Avenue	Grade Separated	Grade Separated
Interstate 70 (I-70)	Grade Separated	Grade Separated
West 48 <sup>th</sup> Avenue	Grade Separated	Grade Separated
West 48 <sup>th</sup> Avenue Frontage	None	Fenced with signal
Pecos Street	At-Grade – gates	Grade Separated <sup>1</sup>
Pecos Street <sup>2</sup>	At-Grade – gates	At-Grade – dual gates

Source: Gold Line Team, 2008.

<sup>1</sup> Grade separation improvements by Adams County, currently unfunded.

<sup>2</sup> Assumes the grade separation at Pecos Street is not funded and constructed.

299 Most at-grade crossings would be upgraded to meet FRA safety standards and Quiet Zone  
 300 requirements by implementing quad gates and signalization, where appropriate.

### 3.4.5 PARKING DEMAND

#### ***DIRECT IMPACTS***

301 The proposed CRMF will be designed with sufficient parking to accommodate employee and  
 302 visitor/delivery parking demand (300 spaces).

#### ***INDIRECT IMPACTS***

303 No indirect impacts related to parking are anticipated in relation to the Preferred Alternative.

#### ***TEMPORARY CONSTRUCTION IMPACTS***

304 Temporary construction activities could require the use of some right-of-way (ROW) along Fox Street  
 305 that could currently be used for on-street parking if not all construction activities can be  
 306 accommodated on-site. In that event, the businesses affected would need to accommodate their  
 307 parking needs on their own property.

#### ***MITIGATION***

308 No direct parking impacts are identified for the CRMF; therefore, no traffic mitigation is required.

## 3.5 RAIL FREIGHT MOVEMENTS

### 3.5.1 EXISTING RAIL FREIGHT FACILITIES

309 The Preferred Alternative would have no impact on current rail freight operations because the  
 310 commuter rail technology would not share track with the freight operations. Concerns raised by the  
 311 railroad companies with respect to RTD’s Gold Line project negatively affecting freight operations in  
 312 the North Yard resulted in the addition of shared alignment for the Preferred Alternative, which  
 313 completely avoids these conflicts.

314 Additionally, all crossings of the UP and the BNSF track are grade separated, including: the  
 315 consolidated mainline (CML), the Jersey Cutoff, UP and BNSF track at Utah Junction, and the UP  
 316 Moffat line just west of Sheridan Boulevard. Centerline to centerline track clearances are typically 25  
 317 feet with some areas of 50-foot clearances.

### **3.5.2 FUTURE RAIL FREIGHT FACILITIES**

318 For the past few years, BNSF and Colorado Department of Transportation have been studying the  
319 possibility of relocating through freight traffic east of the Front Range. Local freight service would  
320 remain in the area along the shared alignment; however, this may decrease the number of trains,  
321 particularly on the Adams County and Denver segments. The project is currently unfunded and no  
322 plans have been made to implement this concept.

323 Implementation of the Preferred Alternative would have no negative impacts on future freight  
324 operations.

### **3.5.3 MITIGATION**

325 Rail freight facilities are not anticipated to be impacted by the Preferred Alternative; therefore,  
326 mitigation is not required.

## **3.6 PEDESTRIAN AND BICYCLE FACILITIES**

### **3.6.1 EXISTING FACILITIES**

327 There are existing sidewalks along the north side of 48<sup>th</sup> Avenue. There are no existing bicycle  
328 facilities within one mile of the proposed site. There are no known pedestrian or bicycle facility  
329 enhancement projects planned at this time.

### **3.6.2 FUTURE FACILITIES**

330 No impacts to future pedestrian or bicycle facilities are anticipated as a result of the Preferred  
331 Alternative.

### **3.6.3 MITIGATION**

332 Pedestrian and bicycle facilities are not anticipated to be impacted by the Preferred Alternative;  
333 therefore, mitigation is not required.

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## **APPENDIX A: SYNCHRO DATA**

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# Synchro Existing Conditions

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Lanes, Volumes, Timings  
3: 48th & Fox

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	171	295	238	52	24	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1541	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1541	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.78	0.92	0.80	0.68	0.55	0.60
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	219	321	298	76	44	80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	219	321	374	0	44	80
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	73	9	7	145	232	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.603			
Satd. Flow (perm)	1504	1346	955	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		12				164
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.76	0.75	0.44	0.79	0.92	0.81
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	96	12	16	184	252	164
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	12	16	184	252	164
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

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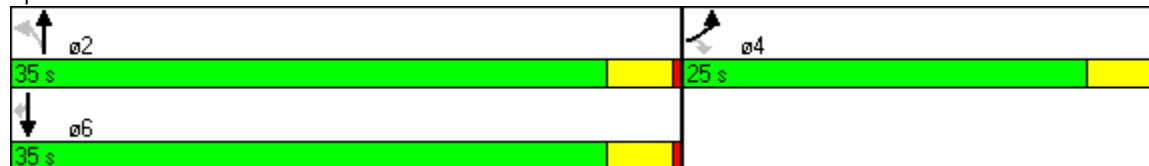


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	7.6	7.6	22.4	22.4	22.4	22.4
Actuated g/C Ratio	0.24	0.24	0.72	0.72	0.72	0.72
v/c Ratio	0.26	0.04	0.02	0.16	0.22	0.16
Control Delay	12.1	5.7	4.6	4.6	4.9	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	5.7	4.6	4.6	4.9	1.7
LOS	B	A	A	A	A	A
Approach Delay	11.4			4.6	3.6	
Approach LOS	B			A	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	31.3
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.26
Intersection Signal Delay:	5.1
Intersection Capacity Utilization	22.9%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

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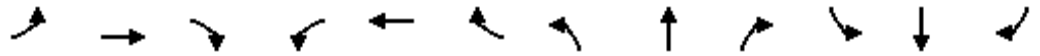
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕	↗	↖		↘	↘
Volume (vph)	92	199	190	39	87	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>			0.973			0.850
Fl <sub>t</sub> Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1541	0	1504	1346
Fl <sub>t</sub> Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1541	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.82	0.80	0.86	0.70	0.64	0.78
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	112	249	221	56	136	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	112	249	277	0	136	147
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.3%
	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕		↕	↕	↕
Volume (vph)	0	223	8	3	127	0	26	0	22	23	3	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990						0.932				0.850
Flt Protected				0.950				0.976		0.950		
Satd. Flow (prot)	0	1585	0	1770	1583	0	0	1694	0	1504	1863	1346
Flt Permitted				0.950				0.976		0.950		
Satd. Flow (perm)	0	1585	0	1770	1583	0	0	1694	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.86	0.40	0.75	0.98	0.92	0.81	0.92	0.69	0.72	0.75	0.88
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	259	20	4	130	0	32	0	32	32	4	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	279	0	4	130	0	0	64	0	32	4	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	28.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
3: 48th & Fox

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	→	←	↖	↙	↙
Volume (vph)	69	267	337	15	45	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1572	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1572	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.75	0.88	0.93	0.75	0.75	0.85
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	92	303	362	20	60	164
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	303	382	0	60	164
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.8%
ICU Level of Service	A
Analysis Period (min)	15



Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	208	7	6	240	171	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.639			
Satd. Flow (perm)	1504	1346	1012	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		8				64
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.58	0.71	0.75	0.76	0.91	0.84
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	359	10	8	316	188	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	359	10	8	316	188	64
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

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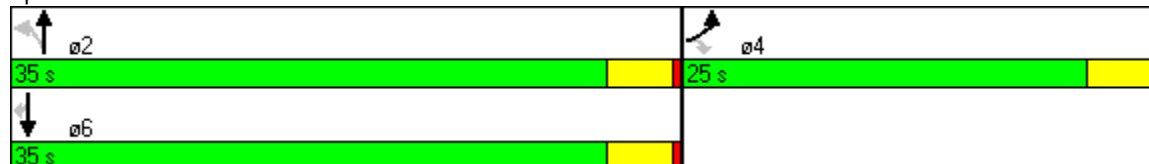


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	13.8	13.8	14.4	14.4	14.4	14.4
Actuated g/C Ratio	0.38	0.38	0.39	0.39	0.39	0.39
v/c Ratio	0.63	0.02	0.02	0.51	0.30	0.11
Control Delay	15.4	5.7	8.2	12.6	10.1	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	5.7	8.2	12.6	10.1	3.6
LOS	B	A	A	B	B	A
Approach Delay	15.1			12.5	8.5	
Approach LOS	B			B	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	36.5
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	12.4
Intersection LOS:	B
Intersection Capacity Utilization	30.8%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

PM  
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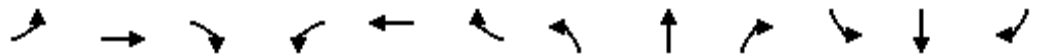
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	122	163	221	75	42	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.966			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1529	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1529	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.87	0.87	0.81	0.82	0.62	0.80
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	140	187	273	91	68	153
Shared Lane Traffic (%)						
Lane Group Flow (vph)	140	187	364	0	68	152
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

PM  
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↖			↕		↖	↖	↖
Volume (vph)	0	161	21	3	198	0	79	0	28	38	4	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980						0.954				0.850
Flt Protected				0.950				0.968		0.950		
Satd. Flow (prot)	0	1587	0	1770	1583	0	0	1720	0	1504	1863	1346
Flt Permitted				0.950				0.968		0.950		
Satd. Flow (perm)	0	1587	0	1770	1583	0	0	1720	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.89	0.66	0.38	0.92	0.92	0.73	0.92	0.50	0.68	0.50	0.72
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	181	32	8	215	0	108	0	56	56	8	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	213	0	8	215	0	0	164	0	56	8	88
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.4%
ICU Level of Service	A
Analysis Period (min)	15

8

9

10

11

12

13

# Synchro

## 2015 No Action Conditions

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Lanes, Volumes, Timings  
3: 48th & Fox

AM  
1/8/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	202	348	281	61	28	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.972			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1539	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1539	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.78	0.92	0.80	0.68	0.55	0.60
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	259	378	351	90	51	95
Shared Lane Traffic (%)						
Lane Group Flow (vph)	259	378	441	0	51	95
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
1/8/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	86	11	8	171	273	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.579			
Satd. Flow (perm)	1504	1346	917	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		15				194
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.76	0.75	0.44	0.79	0.92	0.81
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	113	15	18	216	297	194
Shared Lane Traffic (%)						
Lane Group Flow (vph)	113	15	18	216	297	194
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0



Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

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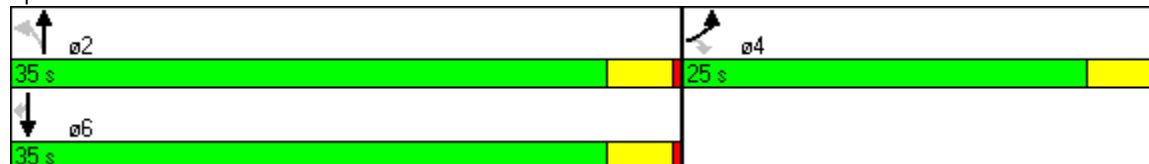


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	8.1	8.1	22.4	22.4	22.4	22.4
Actuated g/C Ratio	0.26	0.26	0.71	0.71	0.71	0.71
v/c Ratio	0.29	0.04	0.03	0.19	0.27	0.19
Control Delay	12.3	5.6	4.9	5.0	5.4	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	5.6	4.9	5.0	5.4	1.8
LOS	B	A	A	A	A	A
Approach Delay	11.5			5.0	4.0	
Approach LOS	B			A	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	31.7
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.29
Intersection Signal Delay:	5.4
Intersection Capacity Utilization	25.8%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

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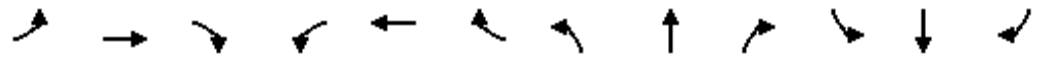
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	108	235	224	46	103	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1541	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1541	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.82	0.80	0.86	0.70	0.64	0.78
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	132	294	260	66	161	174
Shared Lane Traffic (%)						
Lane Group Flow (vph)	132	294	326	0	161	174
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

AM  
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↑			↕		↕	↑	↕
Volume (vph)	0	263	9	4	150	0	31	0	26	27	4	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991						0.932				0.850
Flt Protected				0.950				0.976		0.950		
Satd. Flow (prot)	0	1585	0	1770	1583	0	0	1694	0	1504	1863	1346
Flt Permitted				0.950				0.976		0.950		
Satd. Flow (perm)	0	1585	0	1770	1583	0	0	1694	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.86	0.40	0.75	0.98	0.92	0.81	0.92	0.69	0.72	0.75	0.88
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	306	23	5	153	0	38	0	38	38	5	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	328	0	5	153	0	0	76	0	38	5	70
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	31.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
3: 48th & Fox

PM  
1/8/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	81	315	397	18	53	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1572	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1572	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.75	0.88	0.93	0.75	0.75	0.85
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	108	358	427	24	71	193
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	358	451	0	71	193
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

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1/8/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	248	8	7	283	202	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Fl <sub>t</sub> Permitted	0.950		0.620			
Satd. Flow (perm)	1504	1346	982	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		7				76
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.58	0.71	0.75	0.76	0.91	0.84
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	428	11	9	372	222	76
Shared Lane Traffic (%)						
Lane Group Flow (vph)	428	11	9	372	222	76
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (ft)	20	20	20	100	100	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	20	6	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)				94	94	
Detector 2 Size(ft)				6	6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

PM  
1/8/09

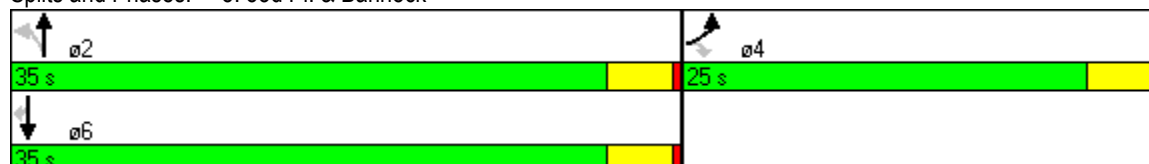


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	16.7	16.7	15.7	15.7	15.7	15.7
Actuated g/C Ratio	0.41	0.41	0.38	0.38	0.38	0.38
v/c Ratio	0.70	0.02	0.02	0.61	0.36	0.13
Control Delay	18.7	6.8	8.6	15.5	11.5	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	6.8	8.6	15.5	11.5	3.4
LOS	B	A	A	B	B	A
Approach Delay	18.4			15.4	9.4	
Approach LOS	B			B	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	40.8
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	15.0
Intersection LOS:	B
Intersection Capacity Utilization:	35.3%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

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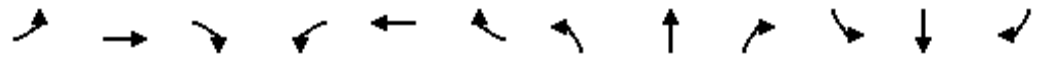
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	144	192	261	88	50	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.966			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1529	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1529	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.87	0.87	0.81	0.82	0.62	0.80
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	166	221	322	107	81	180
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	221	429	0	81	180
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.4%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

PM  
1/8/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↖			↕		↖	↖	↖
Volume (vph)	0	190	25	4	233	0	93	0	33	45	5	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980						0.954				0.850
Flt Protected				0.950				0.968		0.950		
Satd. Flow (prot)	0	1588	0	1770	1583	0	0	1720	0	1504	1863	1346
Flt Permitted				0.950				0.968		0.950		
Satd. Flow (perm)	0	1588	0	1770	1583	0	0	1720	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.89	0.66	0.38	0.92	0.92	0.73	0.92	0.50	0.68	0.50	0.72
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	213	38	11	253	0	127	0	66	66	10	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	251	0	11	253	0	0	193	0	66	10	103
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.0%
ICU Level of Service	A
Analysis Period (min)	15



15

16

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## **Synchro 2015 Build Conditions**

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Lanes, Volumes, Timings  
3: 48th & Fox

AM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	214	348	281	64	28	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.971			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1537	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1537	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.78	0.92	0.80	0.68	0.55	0.60
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	274	378	351	94	51	98
Shared Lane Traffic (%)						
Lane Group Flow (vph)	274	378	445	0	51	98
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.9%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
3/11/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	89	11	8	171	273	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.579			
Satd. Flow (perm)	1504	1346	917	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		15				204
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.76	0.75	0.44	0.79	0.92	0.81
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	117	15	18	216	297	204
Shared Lane Traffic (%)						
Lane Group Flow (vph)	117	15	18	216	297	204
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
3/11/09

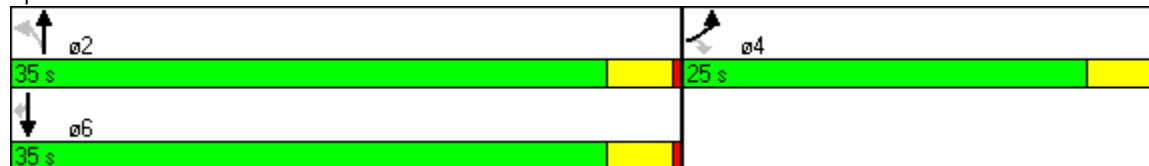


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	8.2	8.2	21.2	21.2	21.2	21.2
Actuated g/C Ratio	0.24	0.24	0.63	0.63	0.63	0.63
v/c Ratio	0.32	0.04	0.03	0.22	0.30	0.22
Control Delay	13.2	5.6	5.0	5.6	6.1	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	5.6	5.0	5.6	6.1	1.9
LOS	B	A	A	A	A	A
Approach Delay	12.4			5.6	4.4	
Approach LOS	B			A	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	33.9
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.32
Intersection Signal Delay:	5.9
Intersection LOS:	A
Intersection Capacity Utilization	26.0%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

AM  
3/11/09



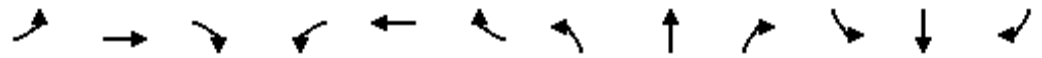
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	108	235	227	46	103	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1541	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1541	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.82	0.80	0.86	0.70	0.64	0.78
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	132	294	264	66	161	174
Shared Lane Traffic (%)						
Lane Group Flow (vph)	132	294	330	0	161	174
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.4%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

AM  
3/11/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	↔
Volume (vph)	0	263	9	4	149	0	31	0	26	27	4	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991						0.932				0.850
Flt Protected				0.950				0.976		0.950		
Satd. Flow (prot)	0	1585	0	1770	1583	0	0	1694	0	1504	1863	1346
Flt Permitted				0.950				0.976		0.950		
Satd. Flow (perm)	0	1585	0	1770	1583	0	0	1694	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.86	0.40	0.75	0.98	0.92	0.81	0.92	0.69	0.72	0.75	0.88
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	306	23	5	152	0	38	0	38	38	5	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	328	0	5	152	0	0	76	0	38	5	75
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	31.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
3: 48th & Fox

PM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	84	315	397	19	53	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1572	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1572	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.75	0.88	0.93	0.75	0.75	0.85
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	112	358	427	25	71	205
Shared Lane Traffic (%)						
Lane Group Flow (vph)	112	358	452	0	71	205
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.0%
Analysis Period (min)	15
	ICU Level of Service A



Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

PM  
3/11/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	259	8	7	283	202	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.620			
Satd. Flow (perm)	1504	1346	982	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		7				79
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.58	0.71	0.75	0.76	0.91	0.84
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	447	11	9	372	222	79
Shared Lane Traffic (%)						
Lane Group Flow (vph)	447	11	9	372	222	79
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

PM  
3/11/09

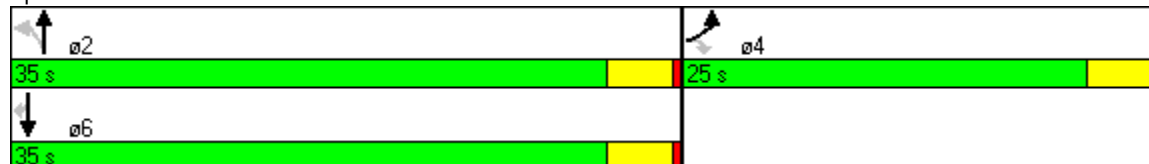


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	17.5	17.5	15.7	15.7	15.7	15.7
Actuated g/C Ratio	0.42	0.42	0.38	0.38	0.38	0.38
v/c Ratio	0.71	0.02	0.02	0.62	0.37	0.14
Control Delay	19.2	6.6	8.7	16.2	11.8	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	6.6	8.7	16.2	11.8	3.4
LOS	B	A	A	B	B	A
Approach Delay	18.9			16.0	9.6	
Approach LOS	B			B	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	41.5
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	15.5
Intersection LOS:	B
Intersection Capacity Utilization	35.9%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

PM  
3/11/09



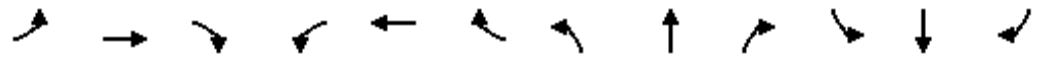
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	144	192	262	88	50	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.966			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1529	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1529	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.87	0.87	0.81	0.82	0.62	0.80
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	166	221	323	107	81	180
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	221	430	0	81	180
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

PM  
3/11/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	190	25	4	233	0	93	0	33	45	5	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980						0.954				0.850
Flt Protected				0.950				0.968		0.950		
Satd. Flow (prot)	0	1588	0	1770	1583	0	0	1720	0	1504	1863	1346
Flt Permitted				0.950				0.968		0.950		
Satd. Flow (perm)	0	1588	0	1770	1583	0	0	1720	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.89	0.66	0.38	0.92	0.92	0.73	0.92	0.50	0.68	0.50	0.72
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	213	38	11	253	0	127	0	66	66	10	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	251	0	11	253	0	0	193	0	66	10	104
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.1%
ICU Level of Service	A
Analysis Period (min)	15

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23

24

25

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# **Synchro**

## **2015 Build with Mitigation Conditions**

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Lanes, Volumes, Timings  
3: 48th & Fox

PM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	84	315	397	19	53	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1572	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1572	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.75	0.88	0.93	0.75	0.75	0.85
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	112	358	427	25	71	205
Shared Lane Traffic (%)						
Lane Group Flow (vph)	112	358	452	0	71	205
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

PM  
3/11/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	259	8	7	283	202	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.620			
Satd. Flow (perm)	1504	1346	982	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		7				79
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.58	0.71	0.75	0.76	0.91	0.84
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	447	11	9	372	222	79
Shared Lane Traffic (%)						
Lane Group Flow (vph)	447	11	9	372	222	79
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0



Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

PM  
3/11/09

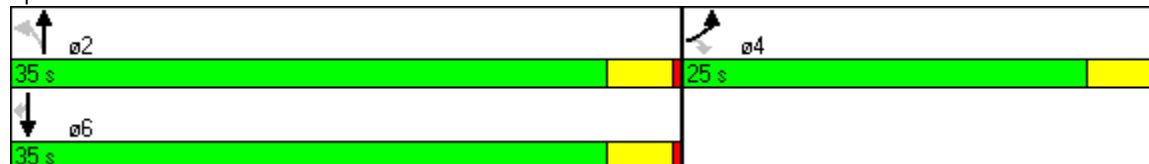


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	17.5	17.5	15.7	15.7	15.7	15.7
Actuated g/C Ratio	0.42	0.42	0.38	0.38	0.38	0.38
v/c Ratio	0.71	0.02	0.02	0.62	0.37	0.14
Control Delay	19.2	6.6	8.7	16.2	11.8	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	6.6	8.7	16.2	11.8	3.4
LOS	B	A	A	B	B	A
Approach Delay	18.9			16.0	9.6	
Approach LOS	B			B	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	41.5
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	15.5
Intersection LOS:	B
Intersection Capacity Utilization	35.9%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

PM  
3/11/09



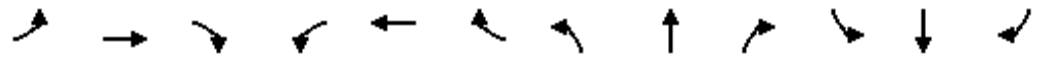
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	144	192	262	88	50	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.966			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1529	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1529	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.87	0.87	0.81	0.82	0.62	0.80
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	166	221	323	107	81	180
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	221	430	0	81	180
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

PM  
3/11/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	190	25	4	233	0	93	0	33	45	5	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980						0.954				0.850
Flt Protected				0.950				0.968		0.950		
Satd. Flow (prot)	0	1588	0	1770	1583	0	0	1720	0	1504	1863	1346
Flt Permitted				0.950				0.968		0.950		
Satd. Flow (perm)	0	1588	0	1770	1583	0	0	1720	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.89	0.66	0.38	0.92	0.92	0.73	0.92	0.50	0.68	0.50	0.72
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	213	38	11	253	0	127	0	66	66	10	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	251	0	11	253	0	0	193	0	66	10	104
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
3: 48th & Fox

AM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	214	348	281	64	28	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.971			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1537	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1537	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.78	0.92	0.80	0.68	0.55	0.60
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	274	378	351	94	51	98
Shared Lane Traffic (%)						
Lane Group Flow (vph)	274	378	445	0	51	98
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.9%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
3/11/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	89	11	8	171	273	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Fl <sub>t</sub> Permitted	0.950		0.579			
Satd. Flow (perm)	1504	1346	917	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		15				204
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.76	0.75	0.44	0.79	0.92	0.81
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	117	15	18	216	297	204
Shared Lane Traffic (%)						
Lane Group Flow (vph)	117	15	18	216	297	204
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

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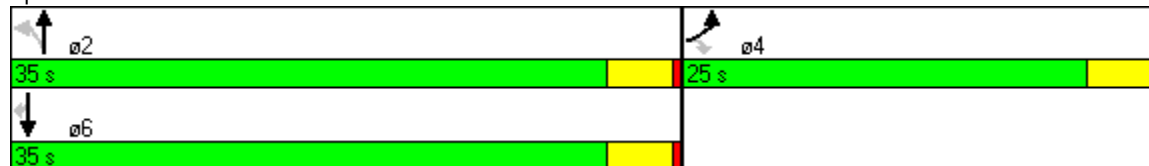


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	8.2	8.2	21.2	21.2	21.2	21.2
Actuated g/C Ratio	0.24	0.24	0.63	0.63	0.63	0.63
v/c Ratio	0.32	0.04	0.03	0.22	0.30	0.22
Control Delay	13.2	5.6	5.0	5.6	6.1	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	5.6	5.0	5.6	6.1	1.9
LOS	B	A	A	A	A	A
Approach Delay	12.4			5.6	4.4	
Approach LOS	B			A	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	33.9
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.32
Intersection Signal Delay:	5.9
Intersection LOS:	A
Intersection Capacity Utilization	26.0%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	108	235	227	46	103	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1541	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1541	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.82	0.80	0.86	0.70	0.64	0.78
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	132	294	264	66	161	174
Shared Lane Traffic (%)						
Lane Group Flow (vph)	132	294	330	0	161	174
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.4%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

AM  
3/11/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↗			↕		↖	↗	↗
Volume (vph)	0	263	9	4	149	0	31	0	26	27	4	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991						0.932				0.850
Flt Protected				0.950				0.976		0.950		
Satd. Flow (prot)	0	1585	0	1770	1583	0	0	1694	0	1504	1863	1346
Flt Permitted				0.950				0.976		0.950		
Satd. Flow (perm)	0	1585	0	1770	1583	0	0	1694	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.86	0.40	0.75	0.98	0.92	0.81	0.92	0.69	0.72	0.75	0.88
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	306	23	5	152	0	38	0	38	38	5	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	328	0	5	152	0	0	76	0	38	5	75
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	31.0%
ICU Level of Service	A
Analysis Period (min)	15



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## **Synchro**

# **2030 No Action Conditions**

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Lanes, Volumes, Timings  
3: 48th & Fox

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	222	383	309	67	31	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.972			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1539	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1539	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.78	0.92	0.80	0.68	0.55	0.60
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	285	416	386	99	56	103
Shared Lane Traffic (%)						
Lane Group Flow (vph)	285	416	485	0	56	103
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
1/8/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	95	12	9	188	301	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Fl <sub>t</sub> Permitted	0.950		0.563			
Satd. Flow (perm)	1504	1346	891	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		16				214
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.76	0.75	0.44	0.79	0.92	0.81
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	125	16	20	238	327	214
Shared Lane Traffic (%)						
Lane Group Flow (vph)	125	16	20	238	327	214
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

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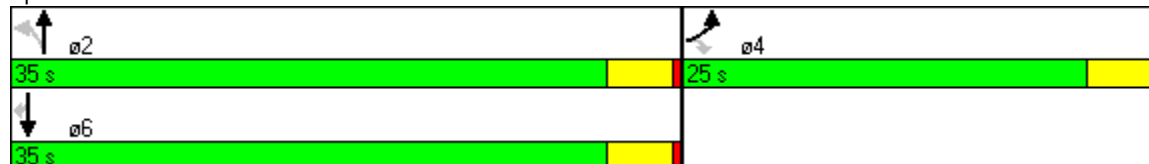


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	8.5	8.5	21.7	21.7	21.7	21.7
Actuated g/C Ratio	0.24	0.24	0.63	0.63	0.63	0.63
v/c Ratio	0.34	0.05	0.04	0.24	0.33	0.23
Control Delay	13.7	5.8	5.1	5.8	6.4	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	5.8	5.1	5.8	6.4	1.9
LOS	B	A	A	A	A	A
Approach Delay	12.8			5.8	4.6	
Approach LOS	B			A	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	34.7
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.34
Intersection Signal Delay:	6.2
Intersection Capacity Utilization	27.8%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

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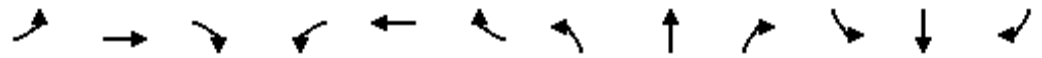
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	119	258	247	51	113	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1541	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1541	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.82	0.80	0.86	0.70	0.64	0.78
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	145	323	287	73	177	191
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	322	360	0	177	191
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	289	10	4	165	0	34	0	29	30	4	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991						0.932				0.850
Flt Protected				0.950				0.976		0.950		
Satd. Flow (prot)	0	1586	0	1770	1583	0	0	1694	0	1504	1863	1346
Flt Permitted				0.950				0.976		0.950		
Satd. Flow (perm)	0	1586	0	1770	1583	0	0	1694	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.86	0.40	0.75	0.98	0.92	0.81	0.92	0.69	0.72	0.75	0.88
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	336	25	5	168	0	42	0	42	42	5	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	361	0	5	168	0	0	84	0	42	5	78
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
3: 48th & Fox

PM  
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	90	346	437	19	58	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1572	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1572	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.75	0.88	0.93	0.75	0.75	0.85
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	120	393	470	25	77	212
Shared Lane Traffic (%)						
Lane Group Flow (vph)	120	393	495	0	77	212
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.5%
ICU Level of Service	A
Analysis Period (min)	15



Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	270	9	8	311	222	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.601			
Satd. Flow (perm)	1504	1346	952	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		8				83
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.58	0.71	0.75	0.76	0.91	0.84
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	466	13	11	409	244	83
Shared Lane Traffic (%)						
Lane Group Flow (vph)	466	13	11	409	244	83
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

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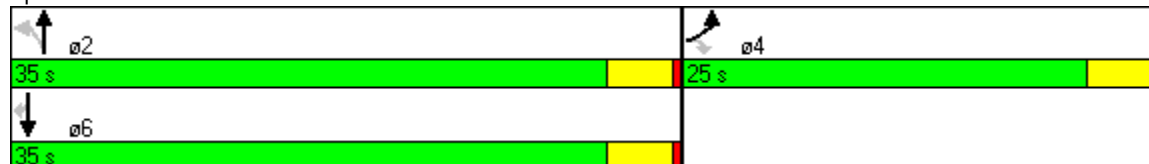


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	18.5	18.5	16.8	16.8	16.8	16.8
Actuated g/C Ratio	0.42	0.42	0.38	0.38	0.38	0.38
v/c Ratio	0.73	0.02	0.03	0.67	0.40	0.15
Control Delay	21.4	7.2	8.6	17.5	12.2	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.4	7.2	8.6	17.5	12.2	3.2
LOS	C	A	A	B	B	A
Approach Delay	21.0			17.3	9.9	
Approach LOS	C			B	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	43.7
Natural Cycle:	45
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	16.8
Intersection LOS:	B
Intersection Capacity Utilization	38.0%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

PM  
1/8/09



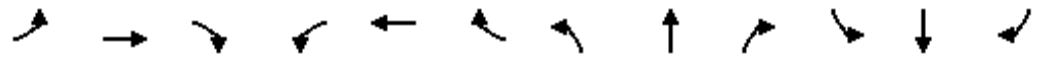
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	158	211	287	97	54	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.966			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1529	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1529	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.87	0.87	0.81	0.82	0.62	0.80
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	182	243	354	118	87	198
Shared Lane Traffic (%)						
Lane Group Flow (vph)	182	243	472	0	87	198
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

PM  
1/8/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↑			↕		↖	↑	↗
Volume (vph)	0	209	27	4	257	0	103	0	36	49	5	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980						0.954				0.850
Flt Protected				0.950				0.968		0.950		
Satd. Flow (prot)	0	1587	0	1770	1583	0	0	1720	0	1504	1863	1346
Flt Permitted				0.950				0.968		0.950		
Satd. Flow (perm)	0	1587	0	1770	1583	0	0	1720	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.89	0.66	0.38	0.92	0.92	0.73	0.92	0.50	0.68	0.50	0.72
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	235	41	11	279	0	141	0	72	72	10	114
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	276	0	11	279	0	0	213	0	72	10	114
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.5%
ICU Level of Service	A
Analysis Period (min)	15

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38

39

40

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## **Synchro 2030 Build Conditions**

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Lanes, Volumes, Timings  
3: 48th & Fox

AM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	234	383	309	70	31	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.972			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1539	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1539	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.78	0.92	0.80	0.68	0.55	0.60
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	300	416	386	103	56	107
Shared Lane Traffic (%)						
Lane Group Flow (vph)	300	416	489	0	56	107
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
3/11/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	98	12	9	188	301	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Fl <sub>t</sub> Permitted	0.950		0.563			
Satd. Flow (perm)	1504	1346	891	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		16				223
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.76	0.75	0.44	0.79	0.92	0.81
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	129	16	20	238	327	223
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	16	20	238	327	223
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0



Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
3/11/09

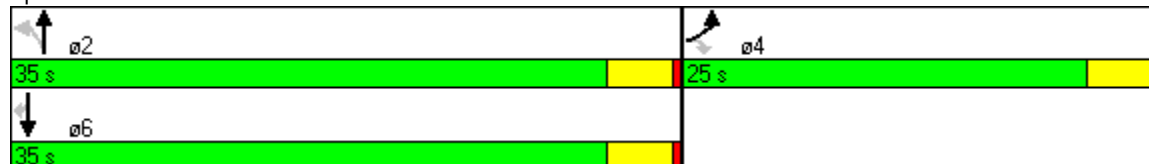


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	8.6	8.6	21.7	21.7	21.7	21.7
Actuated g/C Ratio	0.25	0.25	0.63	0.63	0.63	0.63
v/c Ratio	0.35	0.05	0.04	0.24	0.33	0.24
Control Delay	13.8	5.8	5.1	5.9	6.5	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	5.8	5.1	5.9	6.5	1.9
LOS	B	A	A	A	A	A
Approach Delay	12.9			5.8	4.7	
Approach LOS	B			A	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	34.7
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.35
Intersection Signal Delay:	6.2
Intersection Capacity Utilization	27.9%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

AM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	119	258	250	51	113	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1541	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1541	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.82	0.80	0.86	0.70	0.64	0.78
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	145	323	291	73	177	191
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	322	364	0	177	191
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

AM  
3/11/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↑			↕		↖	↑	↗
Volume (vph)	0	289	10	4	164	0	34	0	29	30	4	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991						0.932				0.850
Flt Protected				0.950				0.976		0.950		
Satd. Flow (prot)	0	1586	0	1770	1583	0	0	1694	0	1504	1863	1346
Flt Permitted				0.950				0.976		0.950		
Satd. Flow (perm)	0	1586	0	1770	1583	0	0	1694	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.86	0.40	0.75	0.98	0.92	0.81	0.92	0.69	0.72	0.75	0.88
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	336	25	5	167	0	42	0	42	42	5	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	361	0	5	167	0	0	84	0	42	5	83
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
3: 48th & Fox

Timing Plan: PM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	93	346	437	20	58	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1572	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1572	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.75	0.88	0.93	0.75	0.75	0.85
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	124	393	470	27	77	224
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	393	497	0	77	224
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.7%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

Timing Plan: PM

3/11/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	284	9	8	311	222	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.595			
Satd. Flow (perm)	1504	1346	942	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		7				86
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.58	0.71	0.75	0.76	0.91	0.84
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	490	13	11	409	244	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	490	13	11	409	244	86
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

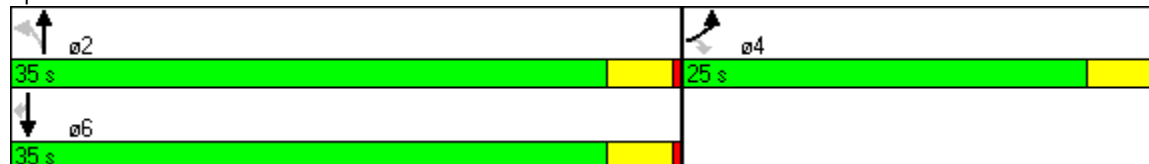


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	19.7	19.7	16.8	16.8	16.8	16.8
Actuated g/C Ratio	0.44	0.44	0.38	0.38	0.38	0.38
v/c Ratio	0.74	0.02	0.03	0.69	0.41	0.15
Control Delay	21.9	7.6	8.6	18.5	12.5	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	7.6	8.6	18.5	12.5	3.2
LOS	C	A	A	B	B	A
Approach Delay	21.5			18.2	10.1	
Approach LOS	C			B	B	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	44.7
Natural Cycle:	45
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	17.4
Intersection LOS:	B
Intersection Capacity Utilization	38.8%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

Timing Plan: PM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	158	211	288	97	54	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.966			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1529	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1529	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.87	0.87	0.81	0.82	0.62	0.80
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	182	243	356	118	87	198
Shared Lane Traffic (%)						
Lane Group Flow (vph)	182	243	474	0	87	198
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

Timing Plan: PM

3/11/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↗			↕		↖	↗	↗
Volume (vph)	0	209	27	4	257	0	103	0	36	49	5	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980						0.954				0.850
Flt Protected				0.950				0.968		0.950		
Satd. Flow (prot)	0	1587	0	1770	1583	0	0	1720	0	1504	1863	1346
Flt Permitted				0.950				0.968		0.950		
Satd. Flow (perm)	0	1587	0	1770	1583	0	0	1720	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.89	0.66	0.38	0.92	0.92	0.73	0.92	0.50	0.68	0.50	0.72
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	235	41	11	279	0	141	0	72	72	10	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	276	0	11	279	0	0	213	0	72	10	115
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.6%
ICU Level of Service	A
Analysis Period (min)	15



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44

45

46

47

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## **Synchro**

# **2030 Build with Mitigation Conditions**

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Lanes, Volumes, Timings  
3: 48th & Fox

AM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	234	383	309	70	31	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.972			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1539	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1539	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.78	0.92	0.80	0.68	0.55	0.60
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	300	416	386	103	56	107
Shared Lane Traffic (%)						
Lane Group Flow (vph)	300	416	489	0	56	107
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
3/11/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	98	12	9	188	301	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.563			
Satd. Flow (perm)	1504	1346	891	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		16				223
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.76	0.75	0.44	0.79	0.92	0.81
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	129	16	20	238	327	223
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	16	20	238	327	223
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

AM  
3/11/09

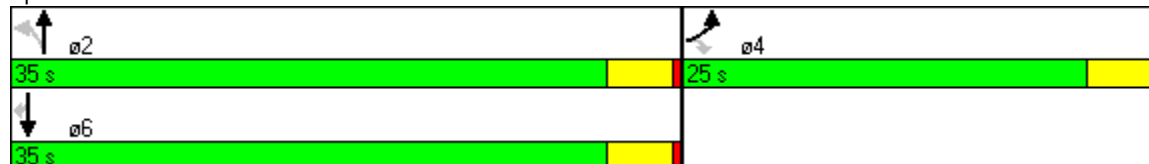


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	8.6	8.6	21.7	21.7	21.7	21.7
Actuated g/C Ratio	0.25	0.25	0.63	0.63	0.63	0.63
v/c Ratio	0.35	0.05	0.04	0.24	0.33	0.24
Control Delay	13.8	5.8	5.1	5.9	6.5	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	5.8	5.1	5.9	6.5	1.9
LOS	B	A	A	A	A	A
Approach Delay	12.9			5.8	4.7	
Approach LOS	B			A	A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	34.7
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.35
Intersection Signal Delay:	6.2
Intersection Capacity Utilization	27.9%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

AM  
3/11/09



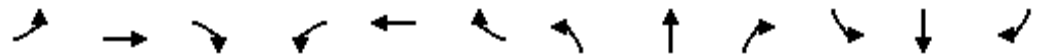
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	119	258	250	51	113	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1541	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1541	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.82	0.80	0.86	0.70	0.64	0.78
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	145	323	291	73	177	191
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	322	364	0	177	191
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

AM  
3/11/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↖			↕		↖	↖	↖
Volume (vph)	0	289	10	4	164	0	34	0	29	30	4	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991						0.932				0.850
Flt Protected				0.950				0.976		0.950		
Satd. Flow (prot)	0	1586	0	1770	1583	0	0	1694	0	1504	1863	1346
Flt Permitted				0.950				0.976		0.950		
Satd. Flow (perm)	0	1586	0	1770	1583	0	0	1694	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.86	0.40	0.75	0.98	0.92	0.81	0.92	0.69	0.72	0.75	0.88
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	336	25	5	167	0	42	0	42	42	5	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	361	0	5	167	0	0	84	0	42	5	83
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
3: 48th & Fox

PM  
3/11/09



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕	↗	↖		↘	↘
Volume (vph)	93	346	437	20	58	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1572	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1572	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		1000	800		1100	
Travel Time (s)		17.0	13.6		25.0	
Peak Hour Factor	0.75	0.88	0.93	0.75	0.75	0.85
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	124	393	470	27	77	224
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	393	497	0	77	224
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.7%
	ICU Level of Service A
Analysis Period (min)	15



Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

PM  
3/11/09



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	284	9	8	311	222	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	100			300
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1504	1346	1504	1583	1583	1346
Flt Permitted	0.950		0.595			
Satd. Flow (perm)	1504	1346	942	1583	1583	1346
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		7				86
Link Speed (mph)	30			40	40	
Link Distance (ft)	702			3816	682	
Travel Time (s)	16.0			65.0	11.6	
Peak Hour Factor	0.58	0.71	0.75	0.76	0.91	0.84
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	490	13	11	409	244	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	490	13	11	409	244	86
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	35.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0	21.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings  
5: 53d Pl. & Bannock

PM  
3/11/09

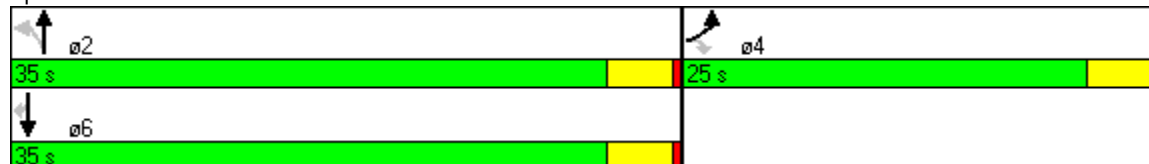


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	19.7	19.7	16.8	16.8	16.8	16.8
Actuated g/C Ratio	0.44	0.44	0.38	0.38	0.38	0.38
v/c Ratio	0.74	0.02	0.03	0.69	0.41	0.15
Control Delay	21.9	7.6	8.6	18.5	12.5	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	7.6	8.6	18.5	12.5	3.2
LOS	C	A	A	B	B	A
Approach Delay	21.5			18.2	10.1	
Approach LOS	C			B	B	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	44.7
Natural Cycle:	45
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	17.4
Intersection LOS:	B
Intersection Capacity Utilization	38.8%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 5: 53d Pl. & Bannock



Lanes, Volumes, Timings  
6: 48th & Bannock

PM  
3/11/09



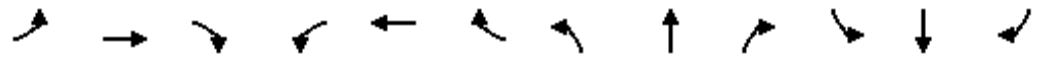
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	158	211	288	97	54	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			0	0	300
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.966			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1504	1583	1529	0	1504	1346
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1504	1583	1529	0	1504	1346
Link Speed (mph)		40	40		30	
Link Distance (ft)		800	265		100	
Travel Time (s)		13.6	4.5		2.3	
Peak Hour Factor	0.87	0.87	0.81	0.82	0.62	0.80
Heavy Vehicles (%)	20%	20%	20%	20%	20%	20%
Adj. Flow (vph)	182	243	356	118	87	198
Shared Lane Traffic (%)						
Lane Group Flow (vph)	182	243	474	0	87	198
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
8: 48th & I-25 SB Off

PM  
3/11/09



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↑			↕		↖	↑	↗
Volume (vph)	0	209	27	4	257	0	103	0	36	49	5	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0	200		200
Storage Lanes	0		0	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980						0.954				0.850
Flt Protected				0.950				0.968		0.950		
Satd. Flow (prot)	0	1587	0	1770	1583	0	0	1720	0	1504	1863	1346
Flt Permitted				0.950				0.968		0.950		
Satd. Flow (perm)	0	1587	0	1770	1583	0	0	1720	0	1504	1863	1346
Link Speed (mph)		40			40			30				30
Link Distance (ft)		265			735			247				664
Travel Time (s)		4.5			12.5			5.6				15.1
Peak Hour Factor	0.92	0.89	0.66	0.38	0.92	0.92	0.73	0.92	0.50	0.68	0.50	0.72
Heavy Vehicles (%)	2%	20%	2%	2%	20%	2%	2%	2%	2%	20%	2%	20%
Adj. Flow (vph)	0	235	41	11	279	0	141	0	72	72	10	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	276	0	11	279	0	0	213	0	72	10	115
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.6%
ICU Level of Service	A
Analysis Period (min)	15