

3.0 D&RG Conceptual Alignments Evaluation

The following sections evaluate the five D&RG conceptual alignments. Using the same criteria as used in the Final EIS, UDOT evaluated the alignments according to the following:

- Impacts to existing development, which include:
 - Relocation impacts (residential, business, and utilities)
 - Impacts on community cohesion, including impacts to schools and churches
 - Impacts on travel patterns, accessibility, and walkability
 - Noise and visual impacts
 - Impacts on Section 4(f) and historic properties
 - Impacts on environmental justice populations
- Impacts to wetlands
- Costs

UDOT evaluated the conceptual alignments, and the findings of this evaluation are presented on two levels. First, each of the five D&RG conceptual alignments was evaluated in its entirety—from terminus to terminus—and compared against the Supplemental EIS Alternative E in its entirety. Second, because the D&RG alignments and Alternative E are the same through much of the North Corridor, each alignment was evaluated link by link to compare their similarities and differences.

For the purposes of evaluating impacts associated with the D&RG conceptual alignments, a variable right-of-way width (“footprint”) was used. For detailed information regarding the right-of-way width, see the findings in the *Legacy Parkway Technical Memorandum: Right-of-Way Issues* (HDR 2004). For each alignment, the right-of-way width was determined on a parcel-by-parcel basis. In areas where there were no wetlands or development, the right-of-way width used was 95 m (312 ft). In areas of existing development or wetlands, the right-of-way and/or the highway footprint was narrowed to 80 m (264 ft) to minimize impacts.

As an example of this variable footprint, UDOT might have reasons to purchase 95 m (312 ft) or more of right-of-way but impact only about 80 m (264 ft), or a width equal to the highway footprint. The highway footprint depends on the required height of the roadway in any specific location (for example, at an interchange or street crossing) and on the resulting height of the roadway embankment. Also, an alignment might impact a property such that the non-impacted portion of the parcel would be “landlocked” (not accessible by road). In this situation, the entire parcel would have to be purchased. The result of this procedure is a “variable width” right-of-way and/or footprint. This variable width

was used to determine the impacts and costs for each D&RG conceptual alignment.

3.1 Impacts to Existing Development

In the Final EIS, the D&RG regional corridor was rejected due in part to the “high impact on existing land development.” This section documents the impacts to existing development from the D&RG conceptual alignments. All of the numbers and analysis in this section are based on the refined D&RG conceptual alignments and reflect a more detailed level of analysis than what was conducted for the Final EIS.

“Impacts to existing development” essentially means impacts to the built environment, which in turn means an impact on people, their communities, utilities, and their public and social institutions. This section summarizes community concerns about the project’s impacts on the built environment, analyzes the numbers and types of buildings that would need to be taken, and discusses the effects of relocations on the surrounding cities and neighborhoods.

3.1.1 Public Sentiment

In addition to the public involvement conducted for the MIS and original EIS, a formal scoping process for the Supplemental EIS was also conducted. This was not required under NEPA, but was done to ensure complete public involvement in the environmental process. The scoping process for the Supplemental EIS began with the publication of the Notice of Intent (NOI) in the *Federal Register* on April 1, 2003, and ended on June 1, 2003. A full list of the public involvement activities and the comments received is included in the Supplemental EIS.

Through these public involvement activities, the communities in the study area identified specific community impacts associated with alignments in the D&RG regional corridor. See Appendix B of Attachment 1. The communities did not support building the Legacy Parkway along any alignment in the D&RG regional corridor because of the following impacts:

- Severe residential and business displacements
- Inconsistency with general plans
- Loss of tax base
- Loss of community cohesion and quality of life
- Visual and noise impacts
- Negative impacts on travel patterns and accessibility (longer trips for emergency vehicles to access existing development west of the DR&G alignments as well as longer trips for daily activities)

In particular, communities were concerned that a major new roadway in the D&RG corridor would create a physical and social barrier in the area that would sever neighborhoods and communities west of the alignments and negatively affect community cohesion. Members of the community stated that their cities had already experienced a loss of community cohesion from the placement of I-15 and the Union Pacific Railroad tracks and did not want further social impacts from an additional barrier on neighborhoods that had grown since then.

Community residents stated that the impacts associated with splitting neighborhoods or cities are not fully accounted for in the costs of relocating homes and businesses because the impact of splitting communities falls on those who remain rather than on those who are relocated. Section 5.6 of Attachment 1 provides additional details on the impacts of specific D&RG conceptual alignments. Based on these community concerns, UDOT conducted an analysis to more accurately quantify these community impacts. More information on social impacts and community cohesion is presented below.

3.1.2 Relocations

Table 3-1 below identifies relocation impacts on residences, businesses, and major utilities associated with each of the D&RG conceptual alignments. Table 3-1 groups the impacts by the municipalities that would be most impacted by the D&RG alignments. Impacts to the two other municipalities in the study area (Centerville and Farmington) would be the same for the D&RG alignments and Alternative E. Buildings within an alignment's right-of-way were included in the calculations of the number of relocations. Relocation impacts were determined using aerial imagery, Davis County parcel information, tax records, and field surveys to distinguish between residential and industrial/business structures and between a main building and an ancillary feature such as a barn or shed. A full description of the methodology for determining relocation impacts is presented in Section 5.4 of Attachment 1.

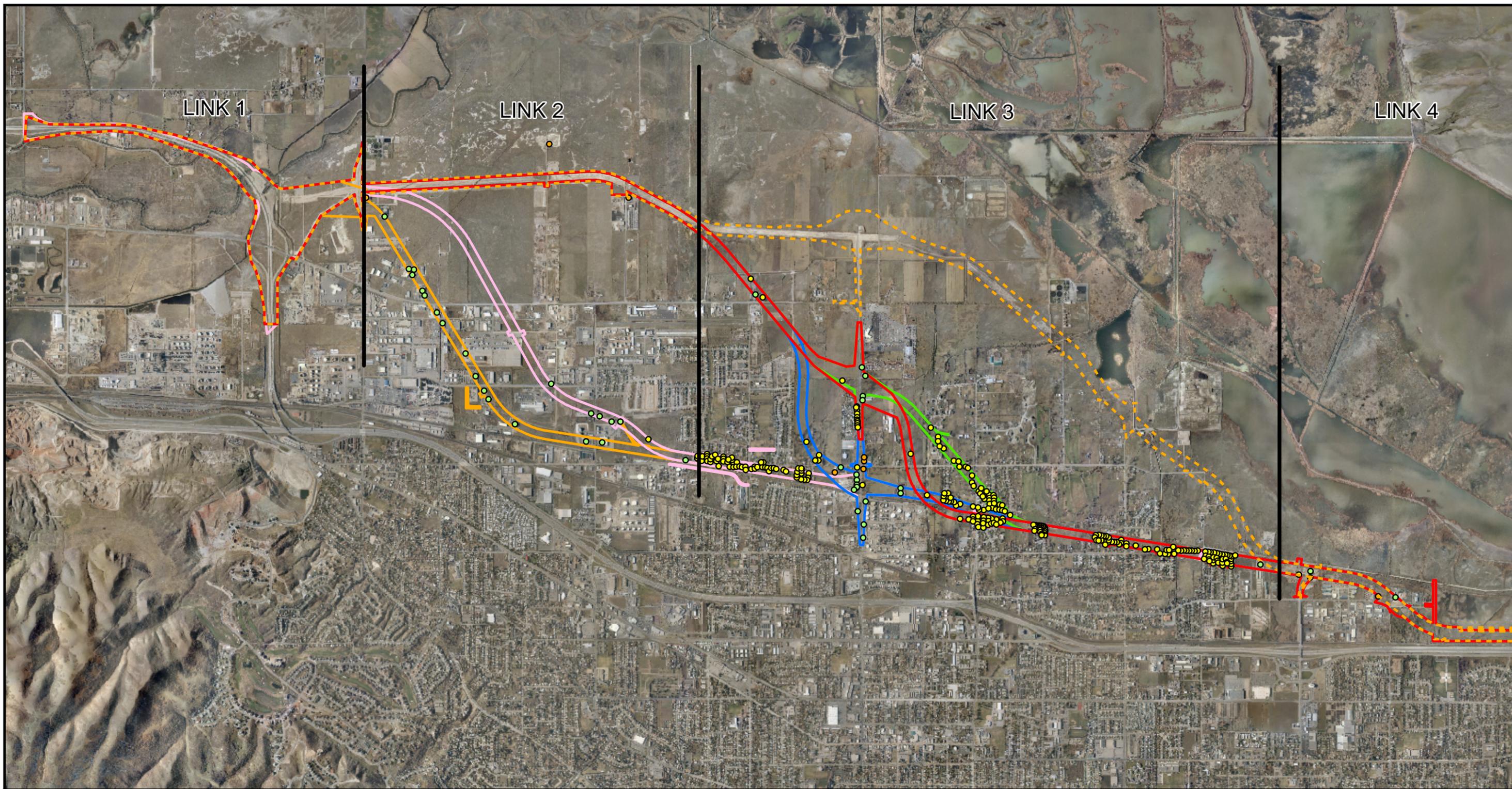
Table 3-1. Comparison of D&RG Alignment Relocations with Supplemental EIS Alternative E Relocations

Alignment (right-of- way width)	Relocations	Residential Relocations as a Percent of Total Households ^a			Major Utility Impacts
		North Salt Lake	Woods Cross	West Bountiful	
Alternative E (95 m)	Residential–4	NA ^b	NA ^b	NA ^b	Petroleum–5
	Business–14				Water–6
	Total–18				Power–5
					Gas–5
					Total–21
DRG1 (80–95 m)	Residential–193	0	3.5	9.3	Petroleum–13
	Business–86				Water–15
	Total–279				Total–28
DRG2 (80–95 m)	Residential–196	<1	3.5	9.3	Petroleum–9
	Business–46				Water–13
	Total–242				Total–22
DRG3 (80–95 m)	Residential–129	0	<1	9.5	Petroleum–4
	Business–39				Water–9
	Total–168				Total–13
DRG4 (80–95 m)	Residential–128	0	1	8.9	Petroleum–4
	Business–21				Water–10
	Total–149				Total–14
DRG5 (80–95 m)	Residential–139	0	1	9.8	Petroleum–4
	Business–20				Water–9
	Total–159				Total–14

^a Percentages are based on the population distribution in the 2000 U.S. census. The percentage is calculated based on the number of residential relocations relative to the number of existing residences in the city.

^b Alternative E would not displace populations in North Salt Lake, Woods Cross, or West Bountiful.

The relocation impacts on existing development under the D&RG conceptual alignments range from 149 to 279 residential and business relocations and from 13 to 28 major utility relocations, compared to 18 residential and business relocations and 21 major utility relocations under the Supplemental EIS Alternative E (see Figure 3-1, Relocations). See Section 5.5 of Attachment 1 for a more detailed description of utility line impacts.



LEGEND

- - - Preferred Alternative
- - - DRG 1
- - - DRG 2
- - - DRG 3
- - - DRG 4
- - - DRG 5
- Residential Relocation
- Commercial Relocation
- Industrial Relocation

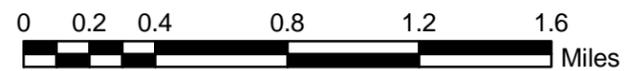
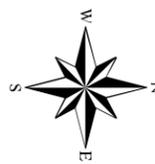


Figure 3-1
Relocations



See Figure 3-6, Link Impact Summary, for the number of relocation impacts in each link for each of the alternatives. See Table 3-2 for relocations in Links 2 and 3. Additional information is presented for Links 2 and 3 in this section and following sections because the D&RG conceptual alignments vary from each another, and from Alternative E, in these two corridor links only.

In West Bountiful, all D&RG alignments would result in about a 10% reduction in the total number of existing households. Woods Cross would experience a 3.5% reduction in the total number of households with DRG1 and DRG2. These relocation impacts will have corresponding negative impacts to the local tax base and remaining neighborhoods.

Table 3-2. Relocations within Corridor Links 2 and 3

Alignment	Residential Displacements in Link 2	Residential Displacements in Link 3	Business Displacements in Link 2	Business Displacements in Link 3
Alternative E	0	0	2	1
DRG1	0	189	51	24
DRG2	3	189	11	24
DRG3	0	125	2	26
DRG4	0	124	2	8
DRG5	0	135	2	7

3.1.3 Community Cohesion

According to the FHWA (Technical Advisory T 6640.8A, 1987), changes in neighborhoods or community cohesion can include splitting neighborhoods, isolating a portion of a neighborhood or an ethnic group, generating new development, changing property values, or separating residents from community facilities. This section describes the community cohesion impacts anticipated from the D&RG conceptual alignments.

Community cohesion is the unity and sense of belonging that individuals have with their neighbors, the surrounding neighborhoods, and the suburb or city that they share. Community cohesion is important for the growth of viable communities. In addition to having a shared location, individuals achieve a sense of community through other common bonds, including racial and ethnic characteristics, school attendance, religious affiliation, and use of commercial districts.

Highways can be detrimental to communities when they bisect the community or interfere with other social bonds that promote cohesion. Although highways can promote economic growth and expansion in an area, they can also cause adverse social effects that may offset the economic benefits. For example, if a highway is

built through a community, potential negative impacts can include isolation, loss of housing, and segregation of the two halves of the community.

All of the D&RG conceptual alignments would place a four-lane freeway through established residential and commercial developments. These alignments would need to be elevated on bridges to cross over surface streets and railroad tracks. Also, ramps with embankments and possibly elevated bridges would be required at locations with interchanges. Where surface streets are not routed over or under the alignment, they would be terminated with cul-de-sacs or frontage roads running parallel to the freeway, cutting off movements across the alignment.



Because the alignments would be in close proximity to residential areas, UDOT noise abatement policy (UDOT 08A2-1) would likely require installation of noise walls. Since the Legacy Parkway would be a high-speed, controlled-access facility, the entire right-of-way would be fenced to keep pedestrians and bicyclists from crossing at unsafe locations. The earthen ramps, elevated bridges, noise walls, and fences would also cause visual impacts along the alignment.

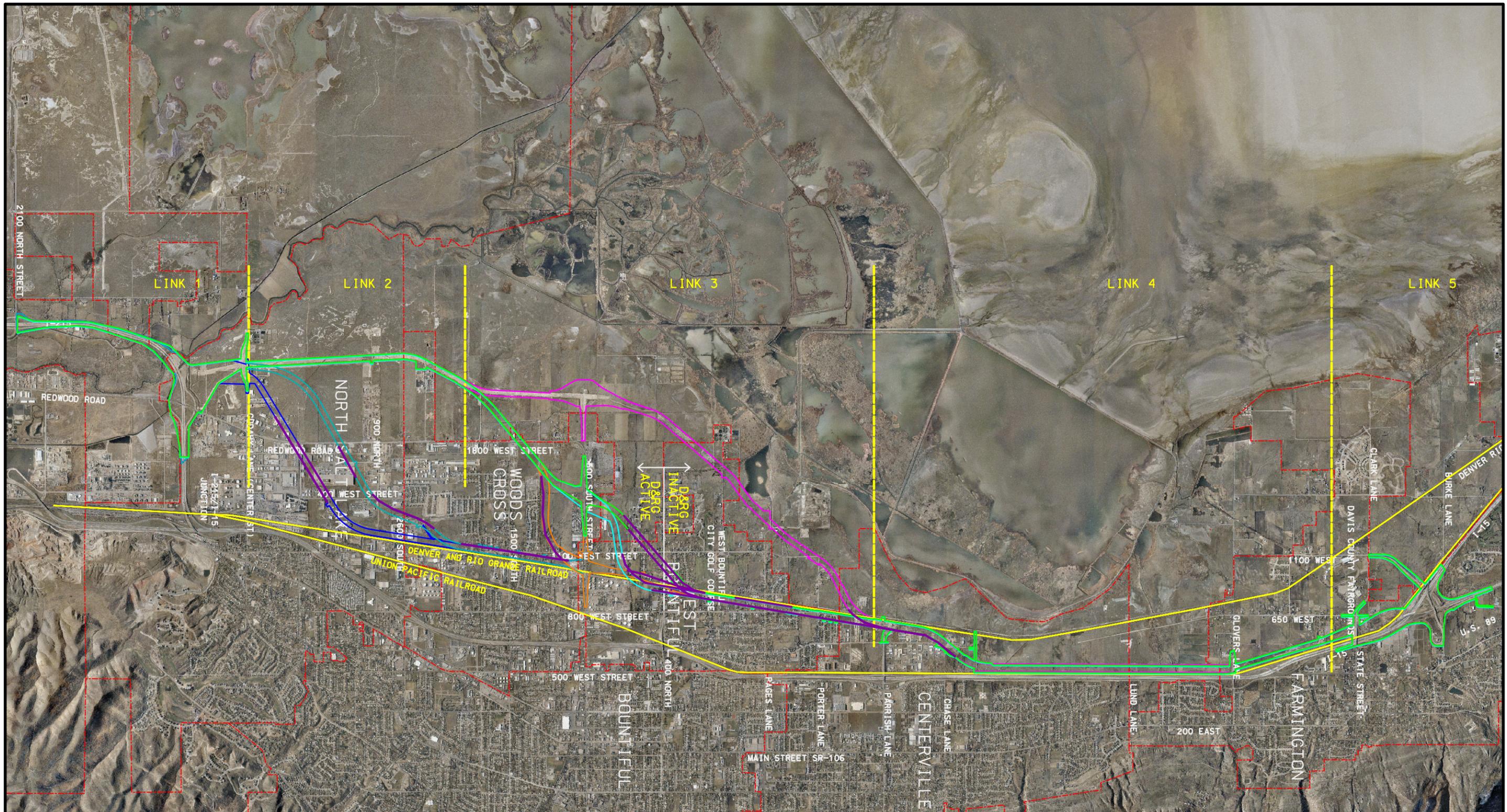
Table 3-3 below quantifies the physical barriers that would be created with each of the D&RG conceptual alignments compared to the Supplemental EIS Alternative E. See Figure 3-2, Noise Walls, Figure 3-3, Retaining Walls, and Figure 3-4, Bridges and Cul-de-Sacs, for the locations of these the physical barriers along the D&RG alignments.

Table 3-3. Community Impacts

Alignment	Number of Bridges (Cross Streets)	Number of Cul-de-Sacs and Cut-Off Roads	Length of Noise Wall, m (ft)^a	Length of Retaining Wall Not Including Termini Interchanges, m (ft)^a
Alternative E	4	4	0 (0)	500 (1,640)
DRG1	12	14	10,270 (33,694)	4,921 (16,145)
DRG2	12	17	11,990 (39,337)	4,921 (16,145)
DRG3	10	9	5,930 (19,455)	3,829 (12,562)
DRG4	10	8	5,600 (18,373)	3,773 (12,379)
DRG5	10	8	6,120 (20,079)	3,149 (10,331)

^a Estimates only. More detailed design would be required to determine the exact lengths.

In some cases, the alignments would make it more difficult for residents to access schools, places of worship, community centers, and businesses, which would disrupt the residents' sense of community cohesion.



LEGEND

	DRG1		LINK DESIGNATION
	DRG2		RAILROAD
	DRG3		JURISDICTIONAL BOUNDARIES
	DRG4		NOISE WALLS
	DRG5		
	ALT E		

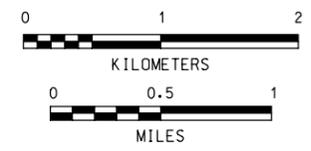
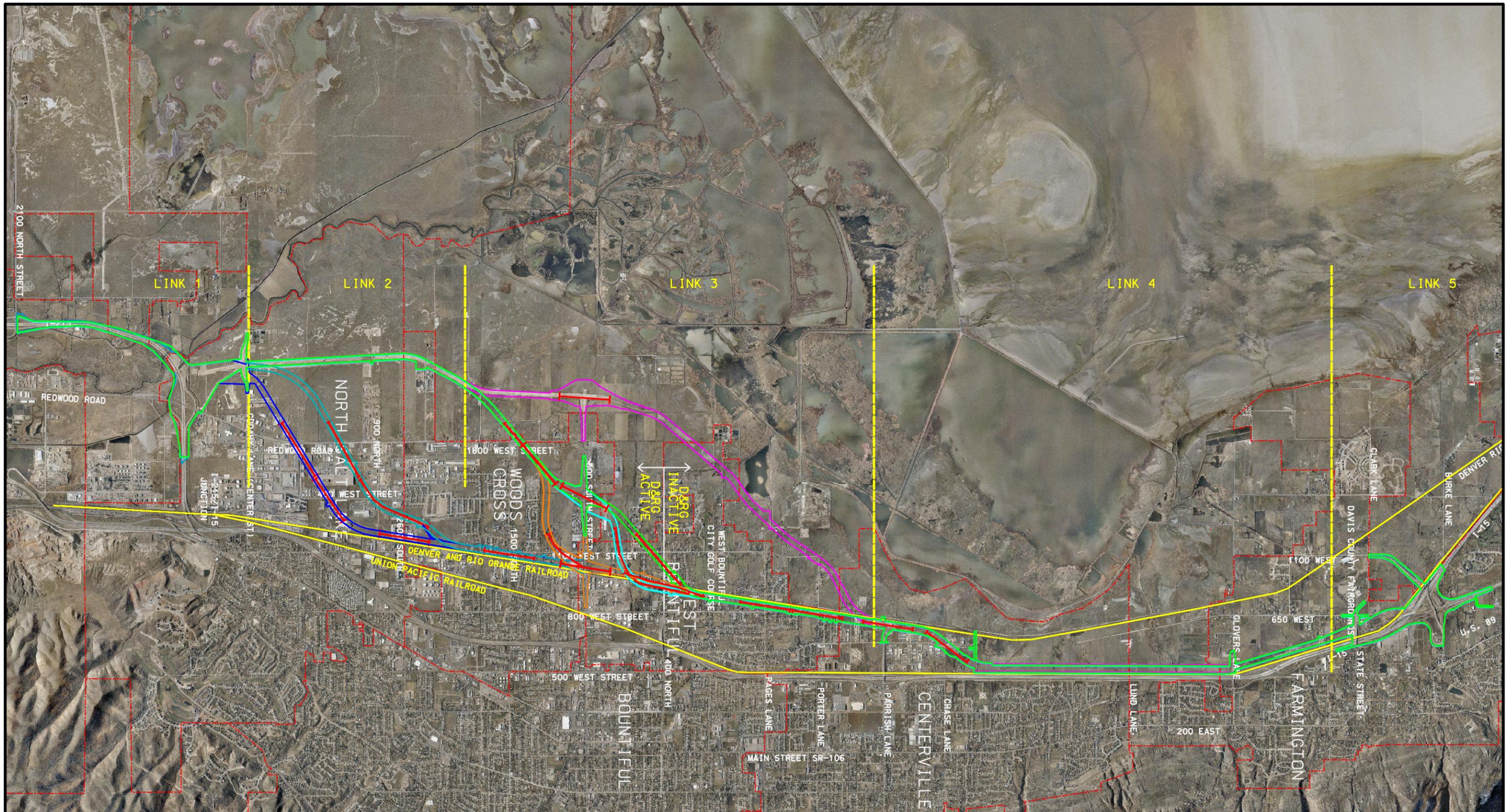


Figure 3-2

NOISE WALLS



LEGEND			
	DRG1		LINK DESIGNATION
	DRG2		RAILROAD
	DRG3		JURISDICTIONAL BOUNDARIES
	DRG4		RETAINING WALLS
	DRG5		
	ALT E		

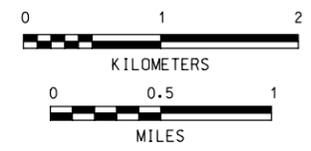
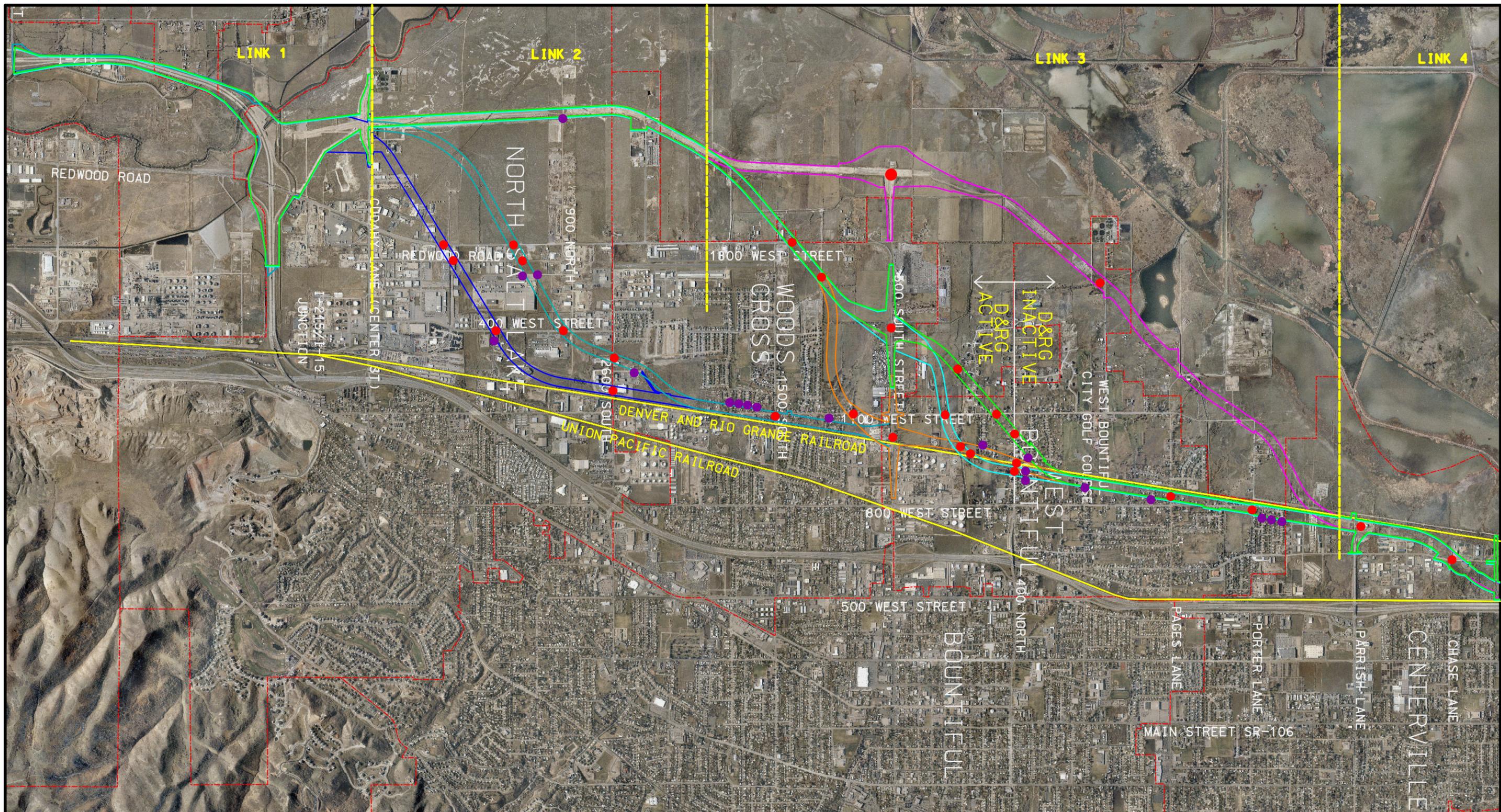


Figure 3-3

RETAINING WALLS



LEGEND			
	DRG1		LINK DESIGNATION
	DRG2		RAILROAD
	DRG3		JURISDICTIONAL BOUNDARIES
	DRG4		BRIDGES
	DRG5		CUL-DE-SAC
	ALT E		

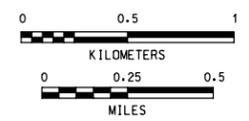
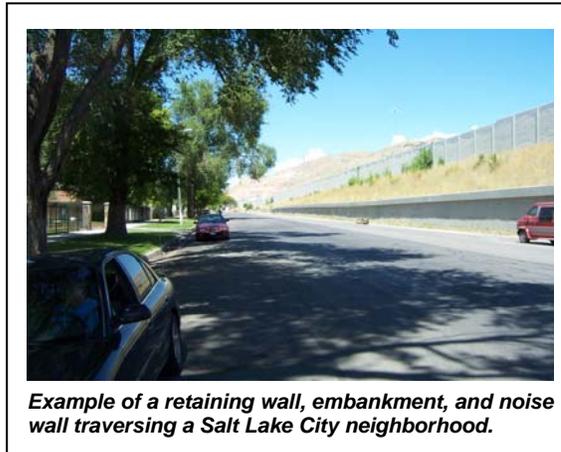


Figure 3-4

BRIDGES AND CUL-DE-SACS

With respect to the physical barriers separating sections of the community from each other and from local schools, Table 3-4 and Table 3-5 below summarize these impacts for the three communities that would be most affected by the D&RG conceptual alignments. These tables show the distributions of overall population and school-age children on various sides of the existing and potential future barriers in these three communities.⁷ These tables are discussed in the context of the affected communities.



The community cohesion impacts associated with the D&RG conceptual alignments are adverse and would substantially affect the communities of North Salt Lake, Woods Cross, and West Bountiful.

- **North Salt Lake.** For North Salt Lake, conceptual alignments DRG1 and DRG2 would severely affect the industrial and commercial businesses west of I-15. These impacts involve major employers, including an oil refinery and manufacturing businesses. If these businesses are relocated, employees who had previously lived close by might move to avoid a longer commute. Other employees might have a shorter commute after these businesses relocate. Additionally, residents of the recently constructed homes on either side of Redwood Road would be west of the Legacy Parkway and would be isolated from the North Salt Lake community.

Table 3-4 shows that a relatively small percentage of North Salt Lake's population would be isolated west of the conceptual alignments or between the D&RG railroad and I-15. The Foxboro development, which is currently under construction west of Redwood Road and east of

⁷ Estimates of population on various sides of these physical barriers were obtained from 2000 Census Block data. Estimates of elementary school children crossing these barriers were obtained directly from counts of locations of school children obtained from Janet Gibbons, Davis County Schools, based on anticipated 2004-05 enrollment.

Alternative E, had zero population in 2000. The number of residences will increase in this part of the city when it is completely developed. The anticipated level of development is high enough that the Davis County School District plans to begin building a new elementary school in the Foxboro development in 2005. For DRG1 or DRG2, residences to the west would be isolated from the North Salt Lake community, which would affect cohesion. Table 3-5 shows that currently only about five students would have to cross DRG1 to get to school.

- **Woods Cross.** Woods Cross would be adversely affected by all of the D&RG conceptual alignments, although DRG1 and DRG2 would cause the highest number of residential displacements. DRG1 and DRG2 would split Woods Cross in half. As a result, the part of Woods Cross west of the Legacy Parkway would no longer be cohesive with the rest of Woods Cross. Alignments DRG3, DRG4, and DRG5 would also divide the community, but more along a north-south basis rather than east-west. With alignments DRG3 through DRG5, Woods Cross would be isolated from West Bountiful and other areas to the north. Most of the existing community would remain cohesive but isolated. However, new development west of the D&RG corridor would no longer be cohesive with the rest of Woods Cross. Table 3-4 shows that DRG1 and DRG2 would isolate over 30% of the population west of the alignment.
- **West Bountiful.** West Bountiful would be severely affected by all D&RG conceptual alignments, which would split West Bountiful in half (similar to the situation in Woods Cross). West Bountiful was incorporated as a municipality in 1962 partially because the construction of I-15 isolated it from the east side of Bountiful. A similar situation could arise within West Bountiful itself from the D&RG alignments. Community cohesion impacts would result from both bisecting the community and removing residential property. About 10% of West Bountiful's entire housing stock would be removed with any of the D&RG conceptual alignments.

Table 3-4. Population Proportions of Communities^a

Alignment	West of Roadway	Between Roadway and D&RG Railroad	Between D&RG Railroad and UP Railroad	Between UP Railroad and I-15
North Salt Lake				
Alternative E	<1%	<1%	1%	19%
DRG1	<1%	<1%	1%	19%
DRG2	<1%	<1%	1%	19%
DRG3	<1%	<1%	1%	19%
DRG4	<1%	<1%	1%	19%
DRG5	<1%	<1%	1%	19%
Woods Cross				
Alternative E	2%	35%	6%	55%
DRG1	37%	0%	6%	55%
DRG2	33%	4%	6%	55%
DRG3	8%	29%	6%	55%
DRG4	4%	33%	6%	55%
DRG5	4%	33%	6%	55%
West Bountiful				
Alternative E	0%	35%	53%	12%
DRG1	28%	6%	53%	12%
DRG2	28%	6%	53%	12%
DRG3	28%	6%	53%	12%
DRG4	24%	11%	53%	12%
DRG5	17%	18%	53%	12%

^a Proportions are based on the population distribution in the 2000 U.S. census. Table rows do not add up to 100% because some of these communities' populations live east of I-15, outside of the study area.

Table 3-5. Travel Patterns for Local Elementary School Children

	Alternative E		DRG 1		DRG 2		DRG 3		DRG 4		DRG 5	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Washington Elementary												
Students west of the alignment	0	0%	5	2%	0	0%	0	0%	0	0%	0	0%
Within the alignment and subsequently displaced	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Between the alignment and I-15	305	100%	300	98%	305	100%	305	100%	305	100%	305	100%
Total Elementary enrollment	305	100%	305	100%	305	100	305	100%	305	100%	305	100%
Woods Cross Elementary												
Students west of the alignment	0	0%	290	44%	290	44%	15	2%	5	1%	5	1%
Within the alignment and subsequently displaced	0	0%	20	3%	20	3%	10	2%	20	3%	20	3%
Students between the alignment and the UP corridor	367	56%	57	9%	57	9%	342	52%	342	52%	342	52%
Between the UP corridor and I-15	288	44%	288	44%	288	44%	288	44%	288	44%	288	44%
Total Elementary enrollment	655	100%	655	100%	655	100%	655	100%	655	100%	655	100%
West Bountiful Elementary												
Students west of the alignment	0	0%	170	32%	170	32%	170	32%	170	32%	140	26%
Within the alignment and subsequently displaced	0	0%	20	4%	20	4%	20	4%	20	4%	30	6%
Between the alignment and I-15	530	100%	340	64%	340	64%	340	64%	340	64%	360	68%
Total Elementary enrollment	530	100%	530	100%	530	100%	530	100%	530	100%	530	100%

The numbers presented for elementary school students west of the alignment are likely increasing for conceptual alignments DRG1 and DRG2. The Foxboro development is located west of Redwood Road in North Salt Lake, and residents are starting to occupy homes in that development.

Public Schools

The D&RG conceptual alignments would affect the service areas of two schools in the Davis County School District: West Bountiful Elementary and Woods Cross Elementary. The 2003–2004 service area boundaries are shown in Figure 3-5, School Boundaries and Church Locations. Alignments DRG1 and DRG2 bisect the service areas of both schools; DRG3, DRG4, and DRG5 primarily affect the service area for West Bountiful Elementary.

Alternative E traverses to the west of most development on the western edge of West Bountiful Elementary's service area. With the exception of five houses in West Bountiful, there is currently no housing west of Alternative E. The planned Legacy Nature Preserve would take up most of the land west of Alternative E, so future residential development west of Alternative E would be limited and few potential future students would be affected. Public officials support Alternative E as the western barrier to development.

West Bountiful Elementary Walkability

Current Conditions. West Bountiful Elementary draws students from all directions, but primarily from the north and west. Major north-south streets that children have to cross include 1100 West and 800 West. Based on the number and distribution of residences in the area, slightly less than half of the school's students currently cross 800 West, and a much smaller percentage cross both streets.⁸ Major east-west streets include 500 South, 400 North, and Page's Lane. No students cross 500 South because it is the southern boundary of the school's service area, about half of the students cross 400 North, and about one-third of the students cross Page's Lane. About one-third or less of the students cross the current D&RG alignment. Very few students cross the Union Pacific alignment.

Future Impacts. As shown in Figure 3-6, Link Impact Summary, all of the D&RG conceptual alignments bisect West Bountiful and the West Bountiful Elementary service area. Students who have to cross any of the D&RG alignments (half of the students or less) would experience adverse impacts to their travel patterns. Students who travel to school by automobile or bus would experience minor adverse impacts because the vehicles would need to follow the major streets to cross the highway. Students who walk or ride bicycles to school from west or north of the alignments would also have to follow these major streets to cross the highway.

⁸ Estimates of the numbers of elementary school children crossing these barriers were obtained directly from counts of locations of school children obtained from Janet Gibbons, Davis County Schools, based on anticipated 2004–2005 enrollment.

Woods Cross Elementary Walkability

Current Conditions. Woods Cross Elementary lies in the northeast quadrant of its service area, which lies entirely west of I-15. Major north-south streets in the area that students have to cross include 1800 West (Redwood Road). An extremely low percentage of students live west of Redwood Road; this area is not yet developed and the Foxboro development currently under construction will contain a new elementary school. The Foxboro development is located in North Salt Lake and would include the southwestern-most corner of the Woods Cross Elementary school boundary.

Future Impacts. As shown in Figure 3-5, School Boundaries and Church Locations, DRG1 and DRG2 bisect Woods Cross, leaving about half of its student population on the west side of the alignment. The impacts in this case are similar to those for West Bountiful. With the exception of a section of development on the south side of 500 South, DRG3, DRG4, DRG5, and Alternative E should have no impact on school children's travel patterns or safety.



Churches

Current Conditions. Several religious buildings on the west side of I-15 are affiliated with the Church of Jesus Christ of Latter-day Saints (LDS). Congregations of this church are called wards, which are defined by geographic boundaries. Two or three wards typically hold worship services and other activities at one meetinghouse. These meetinghouses are shown in Figure 3-5, School Boundaries and Church Locations. Church members attend religious services and social gatherings at these meetinghouses throughout the week.

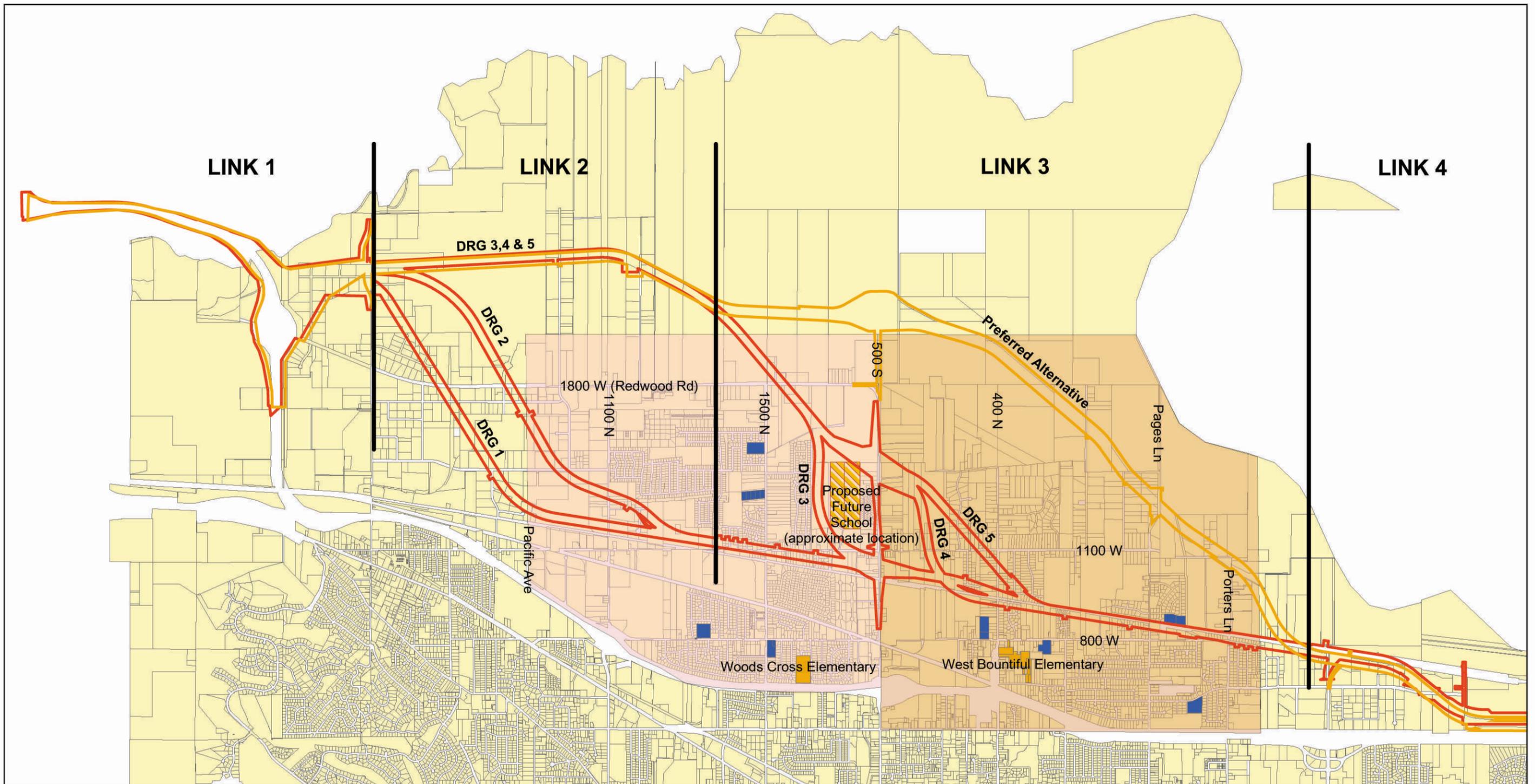
Future Impacts. The LDS Church does not make its ward boundary information publicly available. For this evaluation, UDOT obtained meetinghouse locations from parcel ownership data and the LDS Church's online meetinghouse locator.

Residential areas were also determined from the parcel data. General conclusions regarding the community cohesion impacts on church members were based on the geographic relationships between the D&RG conceptual alignments, meetinghouse locations, and residential areas.

The D&RG conceptual alignments would likely bisect several established LDS wards. Members of these congregations would experience minor adverse impacts because they would need to follow major streets to cross the highway. The alignments would also prevent easy pedestrian and bicycle access to the ward's meetinghouse for members on the other side of the alignment. Pedestrians and bicyclists would need to either travel by car or use major streets with heavier traffic. Because of these inconveniences, the alignments would reduce the sense of cohesion felt by ward members. The LDS church leadership could possibly redraw the ward boundaries so that the highway does not divide wards.



Where a controlled or limited-access freeway crosses through a school district or church ward/district, it interferes with pedestrians' ability to walk to the institution and can cause adverse impacts to community cohesion. The costs of such impacts can include busing students to school and higher private transportation costs.



LEGEND

- | | |
|--|--|
|  Preferred Alternative | Elementary School Boundaries |
|  DRG Alignments |  Woods Cross |
| Community Buildings |  West Bountiful |
|  Church | |
|  Public School | |
|  Proposed Future School | |

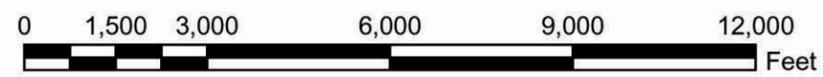


Figure 3-5.
School Boundaries and Churches.

Travel Patterns, Accessibility, and Walkability

The D&RG conceptual alignments would bisect communities, school districts, and LDS church wards and would create cul-de-sacs, dead-end streets, and bridges with ramps on earthen embankments. These changes would have a major impact on local travel patterns. Trips that currently are relatively direct trips on a gridded street pattern would instead require circuitous routes to access an overpass or underpass to cross the highway.



Controlled-access freeways often cut off local streets and bisect the surrounding neighborhoods. The freeway negatively impacts community cohesion and adds time and distance to trips that must now cross the freeway.

Trips involving vehicles would require a few additional minutes per trip. Residents who live along streets with a highway overpass or underpass would likely experience greater impacts (impacts that used to be distributed and shared across the gridded street network). Overall, the D&RG alignments would increase vehicle-miles traveled.

Pedestrians and bicyclists would experience greater impacts than vehicle travelers. The more circuitous routes required to cross over or under the D&RG alignments could add considerably to their travel time and inconvenience, and elevated highway crossings would also be more inconvenient than level streets. It is likely that pedestrians and bicyclists would use vehicles for some trips due to the increased inconvenience, which would add to the number of automobiles on the street network and contribute to traffic impacts.

All of the D&RG conceptual alignments would adversely impact community walkability by introducing another physical barrier to pedestrians in a corridor that is already bisected by the UPRR tracks and I-15. The following key components of walkability would be impacted by the alignments:

- **Direct Access.** Individuals are more likely to walk when they can take a direct route to their destination.
- **Visual Characteristics.** Pleasant scenery also encourages walking. Placing highway bridges in the developed areas of communities would introduce adverse visual impacts.



Controlled-access freeways create a barrier to pedestrians. Pedestrian overpasses can help mitigate the impacts, but climbing stairs, out-of-direction travel, and lack of accessibility features that meet American Disability Act standards can still be inconvenient for pedestrians.



To cross the barrier created by a controlled-access freeway, residents often must travel parallel to the freeway to the nearest crossing location.

Because Alternative E mostly traverses at the edge of existing and proposed future development, it would have little effect on local travel patterns because there would be fewer reasons for residents to cross the alignment.

Table 3-6 quantifies the physical barriers created by the D&RG conceptual alignments and Supplemental EIS Alternative E that could affect local accessibility and travel patterns (see Figure 3-4, Bridges and Cul-de-Sacs). Every cut-off street may lead to a longer trip or greater inconvenience for travelers.

Table 3-6. Changes to Travel Patterns Caused by Physical Barriers

Alignment	Number of Bridges (Cross Streets)	Number of Cul-de-Sacs and Cut-Off Roads
Alternative E	4	4
DRG1	12	14
DRG2	12	17
DRG3	10	9
DRG4	10	8
DRG5	10	8

Visual and Noise Impacts

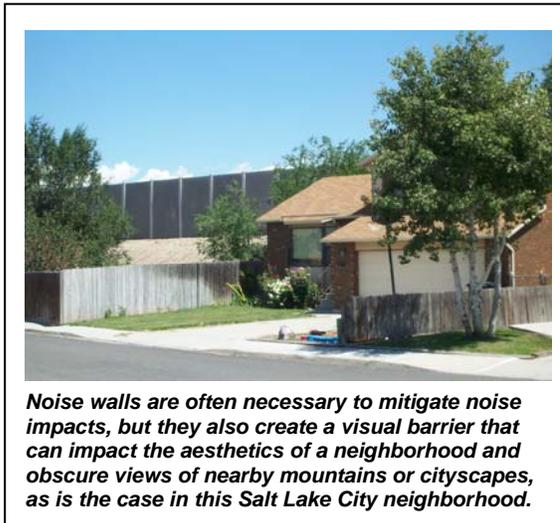
The D&RG conceptual alignments would go through established residential areas and so would cause major impacts on local viewsheds and increase ambient noise levels in residential neighborhoods adjacent to the alignments. This section describes the visual and noise impacts that could be anticipated.



The D&RG alignments would cross over a number of existing surface streets. At every location where two facilities cross, either the freeway or the cross street would be raised on an embankment. Traffic noise has its greatest impact at receptors locations closest to the roadway, which is one of the reasons that highway designers try to avoid placing highways through existing residential and

commercial development. Areas with adjacent residential properties would likely qualify for noise walls according to UDOT's Noise Abatement Policy (UDOT 08A2-I). The noise walls would add to the height of the overall facility and would increase the visual impacts.

Properties that are adjacent to the freeway (especially residences) are likely to experience the greatest visual and noise impacts. Many of these properties would have views of the surrounding city or distant mountains completely obstructed. Even with noise walls, the properties closest to a facility often experience noise increases. Properties that are more distant would have only a portion of their viewshed obstructed and the noise impacts would be less.



Noise walls are often necessary to mitigate noise impacts, but they also create a visual barrier that can impact the aesthetics of a neighborhood and obscure views of nearby mountains or cityscapes, as is the case in this Salt Lake City neighborhood.

Table 3-7 identifies the number of residential properties adjacent to the various alignments and the length of noise walls and retaining walls that would be constructed. These measurements provide a surrogate for the level of noise and visual impacts that could be anticipated. A higher number of residential properties adjacent to the alignment indicates a greater number of people directly affected by noise and visual impacts. A greater length of noise walls indicates a higher level of visual impacts and also indicates the length of the alignment that is likely to experience noise impacts. The length of retaining walls indicates the length of the alignment that would be raised and also indicates the length of the alignment that would experience visual impacts from a retaining wall.

Table 3-7. Noise and Visual Impacts Measures

Alignment	Residential Properties Adjacent to the Alignment	Length of Noise Wall, m (ft)^a	Length of Retaining Wall Not Including Termini Interchanges, m (ft)^a
Alternative E	7	0 (0)	500 (1,640)
DRG1	125	10,270 (33,694)	4,921 (16,145)
DRG2	129	11,990 (39,337)	4,921 (16,145)
DRG3	115	5,930 (19,455)	3,829 (12,562)
DRG4	89	5,600 (18,373)	3,773 (12,379)
DRG5	114	6,120 (20,079)	3,149 (10,331)

^a Estimates only. More detailed design would be required to calculate the exact lengths.

Environmental Justice

As defined in Executive Order 12898, environmental justice issues address the proportionality of impacts from a project; that is, whether the adverse impacts from a project's construction and operation are disproportionately borne by minority or low-income households. Conversely, environmental justice also considers whether the positive impacts from a project are shared by these households. The D&RG conceptual alignments were analyzed for environmental justice issues using FHWA recommended procedures, and no environmental justice issues were identified.

3.2 D&RG Wetland Impacts

To complete the analysis, the D&RG conceptual alignments were surveyed in July 2003 for wetlands that were not previously delineated for the evaluation in the Final EIS. Reference materials used included National Wetlands Inventory mapping, aerial photography, and the Intermountain (Region 8) List from the *National List of Plant Species That Occur in Wetlands* (Reed 1988). Field surveys of the general composition of vegetation and hydrology were conducted on and adjacent to the right-of-way for the five D&RG conceptual alignments. Areas that appeared to exhibit predominantly hydrophytic vegetation and/or wetland hydrology were drawn on aerial imagery.

Many areas appeared very dry, apparently due to drought conditions and seasonal effects, but still exhibited hydrophytic vegetation and wetland hydrology indicators. If such areas consisted of vegetation dominated by plant species that occur in wetlands, they were identified as wetlands whether or not they exhibited other wetland criteria. Acreage impacts on the wetlands were calculated by determining the acreage located in the alignment right-of-way and those that would likely fall within the footprint of the roadway.

Table 3-8 below identifies the estimated direct impacts to wetlands within the D&RG conceptual alignments compared to Alternative E. See Figure 3-6, Link Impact Summary, for wetland impacts in each link for each of the alternatives. See Table 3-9 below for wetland impacts in Links 2 and 3. Links 1, 4, and 5 are the same for all alternatives (see Section 3.4, Summary of Impacts). Direct impacts on wetlands associated with each D&RG alignment ranged from about 105 to 114 acres of wetlands, compared to about 113 acres under Alternative E.

Through final detailed design for Alternative E, UDOT determined that 14 acres of wetlands within the right-of-way—primarily in the north (Link 5) and south (Link 1) interchanges, where all of the D&RG alignments and Alternative E are the same—would not be impacted during construction. These interchange areas would be similar for all alternatives because the design of the interchanges is based on the area needed to accommodate the ramps that connect to the roadway, not the right-of-way of the roadway itself. Therefore, this 14-acre reduction of wetland impacts was applied to all alternatives. Within the Alternative E right-of-way, UDOT has proposed changes that avoid an additional 2 acres of wetland impacts.⁹ These 2 acres are in addition to the wetland impacts avoided in the right-of-way at interchanges.

⁹This value is determined by subtracting the estimated 16 acres of wetland impacts that can be avoided within the right-of-way from the total wetland acres that are located within the alignment right-of-way (as a result of the

Table 3-8. Wetland Impacts (in Acres)

Alignment	Wetland Located within ROW	Difference from Alt. E Based on ROW	Wetland Impact within Footprint ^a	Difference from Alt. E Based on Footprint
Alternative E	113	—	97	—
DRG1	105	-8	86	-11
DRG2	114	+1	93	-4
DRG3	111	-2	90	-7
DRG4	110	-3	89	-8
DRG5	106	-7	86	-11

^a This includes the 14-acre reduction in wetland impacts identified by the design-builder plus the savings associated with the use of the 80-m (264-ft) footprint width in wetland areas and in areas of existing development; for Alternative E this avoidance is about 2 acres and varies for the D&RG conceptual alignments.

Table 3-9. Wetland Impacts in Links 2 and 3 (in Acres)

Alignment	Wetland Impacts in Link 2	Wetland Impacts in Link 3	Total Wetland Impacts in Links 2 and 3
Alternative E	9.2	28.5	37.7
DRG1	7.2	22.9	30.1
DRG2	18.0	21.1	39.1
DRG3	9.2	26.0	35.2
DRG4	9.2	25.0	34.2
DRG5	9.2	21.4	30.6

design-build approach at interchanges and the use of an 80-m (264-ft) reduced footprint to avoid wetland and other impacts). An estimated 14 acres could be avoided at the north and south interchanges, and for Alternative E an additional 2 acres could be avoided by using a reduced footprint in other locations along the alignment that have wetland resources within the right-of-way.

3.3 D&RG Alignment-Specific Costs

Section 2.0, D&RG Corridor Reevaluation, presents the regional cost estimates that were updated for the Supplemental EIS. Cost estimates also were developed and refined for the specific alignments within the D&RG regional corridor as well as for an alignment that follows the Alternative E alignment to represent the Great Salt Lake regional corridor. These cost estimates were based on a variable right-of-way width of 80 to 95 m (264 to 312 ft). Detailed cost estimates for the D&RG and Great Salt Lake regional corridors and the specific alignments within these corridors are included in Attachment 1 (Appendices A and C).

Table 3-10 below summarizes the cost estimates from the Final EIS, the updated 2004 regional corridor costs estimates (planning-level costs), and the range of estimated cost for the specific alignments within the D&RG and Great Salt Lake regional corridors. The revised regional corridor cost estimates show that costs of a highway within these corridors have increased since June 2000 when the cost estimates were prepared for the Final EIS. The increase in the regional alignment cost estimates can be attributed primarily to inflation between 2000 and 2004, refining the cost-estimating assumptions, and applying a consistent cost-estimating methodology.

Table 3-10 also shows that the refined alignment-specific cost estimates are lower than the estimates developed using a corridor-level approach. The main reason for this difference is that the refined alignment-specific cost estimates have fewer unknowns and therefore have lower contingencies. However, the corridor-level cost estimates should not be directly compared with those prepared for the more refined alignments because the cost-estimating methodology, assumptions, and associated contingencies used to develop these estimates are different and such a comparison would not be valid.

Table 3-11 below shows the costs for each specific D&RG conceptual alignment and Alternative E. Also see Figure 3-6, Link Impact Summary.

Table 3-12 below presents the estimated cost of each alternative within Links 2 and 3. Links 2 and 3 are presented separately because they are the only links where the D&RG alignments vary from each other and from Alternative E.

Table 3-10. Summary of Cost Estimates (in millions)

Regional Corridor	Final EIS Regional Estimate 2000	Regional Alignment Estimate 2004 ^a	Alignment-Specific Estimate 2004
Alternative E	\$300	\$439	\$416
D&RG	\$460	\$589	\$515 to \$611

^a Estimates includes construction materials, right-of-way, and estimated wetland mitigation. Pre-award engineering, stipends, and incentives are items specific to the contract to construct the Legacy Parkway and were not included in the above estimates or the estimates in the Final EIS. These items were included in the total cost of the Legacy Parkway project (\$451 million) which was publicized after the Final EIS was published.

Table 3-11. Alignment-Specific Costs

Alignment	Length Varying from Alternative E (miles) ^a	Length along D&RG Railroad (miles)	Alignment-Specific Cost (millions) ^b	Cost Difference Alternative E (millions)	Percent Cost Increase over Alternative E
Alternative E	—	—	\$416	—	—
DRG1	6.2	4.5	\$611	\$195	47%
DRG2	6.2	3.6	\$608	\$192	46%
DRG3	4.5	2.5	\$532	\$116	28%
DRG4	4.4	2.2	\$516	\$100	25%
DRG5	4.3	1.5	\$515	\$99	24%

^a Length varying is the length, in miles, that the D&RG conceptual alignments and Alternative E follow separate alignments. For the remainder of the 14 total miles of the North Corridor, the alternatives alignments are identical.

^b Estimates includes construction materials, right-of-way, and estimated wetland mitigation but do not include items specific to the contract to construct the Legacy Parkway (pre-award engineering, stipends, and incentives).

Table 3-12. Alignment-Specific Costs in Links 2 and 3

Alignment	Link 2 (millions)	Link 3 (millions)	Total Cost for Links 2 and 3 (millions) ^a
Alternative E	\$22.21	\$77.11	\$99.32
DRG1	\$103.51	\$190.25	\$293.76
DRG2	\$100.71	\$190.25	\$290.96
DRG3	\$22.21	\$192.62	\$214.83
DRG4	\$22.21	\$177.11	\$199.32
DRG5	\$22.21	\$175.57	\$197.78

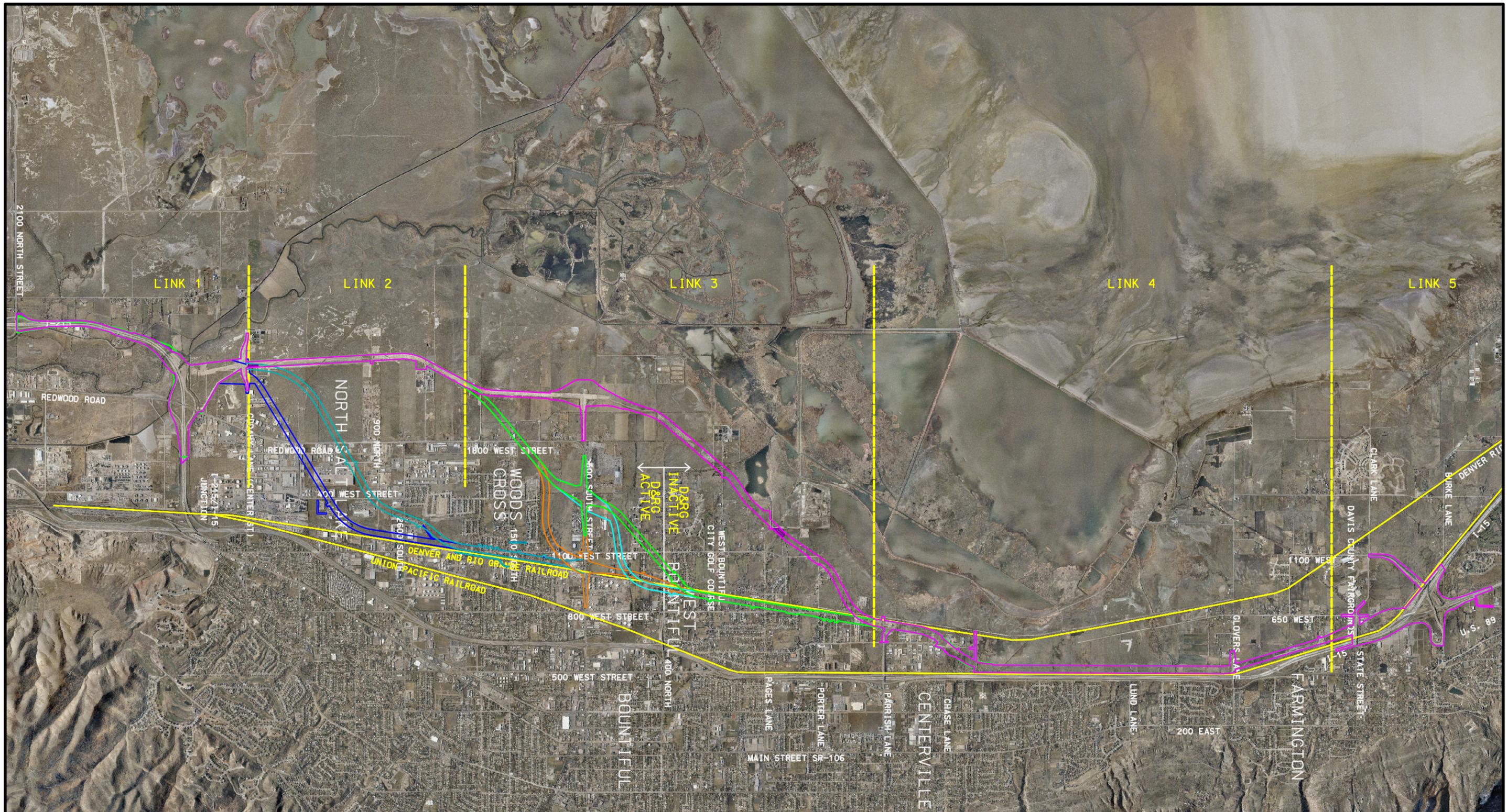
^a The estimated cost of the conceptual alignments in Links 1, 4, and 5 is \$317.02 million.

3.4 Summary of Impacts

Because the D&RG conceptual alignments are similar to Alternative E in much of the North Corridor, the study team divided the North Corridor into five subareas, or links, to examine in more detail the areas where the conceptual alignments differ and their associated impacts. See Figure 3-6, Link Impact Summary, for impacts to wetlands, relocations, and estimated cost within each link. As shown in Figure 3-6, impacts to wetlands and relocations are identical in Links 1, 4, and 5 (because the alternatives are identical in these links). These three areas contain over 75 acres of the wetland impact associated with Alternative E (about two-thirds of the total impacted acreage) based on the wetlands in the right-of-way. In other words, two-thirds of the wetland impacts would be the same regardless of the alternative developed.

Of the links that vary among the alternatives, Link 3 has the largest amount of wetland impacts. Within this link, Alternative E would have 28.5 acres of wetland impacts compared to about 21.1 to 26 acres for the D&RG conceptual alignments. Within Link 3, the D&RG alignments would save between 2.5 and 7.4 acres of wetlands at an additional cost of about \$98 million to \$116 million compared to Alternative E. Avoiding these 2.5 to 7.4 acres of wetland impacts would require between 124 and 189 more residential relocations and between 6 and 25 more business relocations.

In Link 2, only conceptual alignments DRG1 and DRG2 vary from Alternative E. Within this link, DRG1 would avoid 2 acres of wetlands compared to Alternative E (7.2 acres versus 9.2 acres). Avoiding these 2 acres of wetlands would require 51 additional business relocations (for DRG1) and would cost about \$81 million more than Alternative E. DRG2 would impact 8.8 more wetland acres than Alternative E (18.0 acres versus 9.2 acres). Within Link 2, DRG2 would have 3 residential and 11 business relocations and an estimated cost of \$101 million, or about \$79 million more than Alternative E.



LEGEND

- DRG1
- DRG2
- DRG3
- DRG4
- DRG5
- ALT E
- LINK DESIGNATION
- RAILROAD

ALTERNATIVE	LINK1			COST (MILLIONS)
	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	
DRG1	0	0	19.7	66.63
DRG2	0	0	19.7	66.63
DRG3	0	0	19.7	66.63
DRG4	0	0	19.7	66.63
DRG5	0	0	19.7	66.63
ALT E	0	0	19.7	66.63

ALTERNATIVE	LINK2			COST (MILLIONS)
	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	
DRG1	0	51	7.2	103.51
DRG2	3	11	18.0	100.71
DRG3	0	2	9.2	22.21
DRG4	0	2	9.2	22.21
DRG5	0	2	9.2	22.21
ALT E	0	2	9.2	22.21

ALTERNATIVE	LINK3			COST (MILLIONS)
	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	
DRG1	189	24	22.9	190.25
DRG2	189	24	21.1	190.25
DRG3	125	26	26.0	192.62
DRG4	124	8	25.0	177.11
DRG5	135	7	21.4	175.57
ALT E	0	1	28.5	77.11

ALTERNATIVE	LINK4			COST (MILLIONS)
	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	
DRG1	2	5	41.4	86.25
DRG2	2	5	41.4	86.25
DRG3	2	5	41.4	86.25
DRG4	2	5	41.4	86.25
DRG5	2	5	41.4	86.25
ALT E	2	5	41.4	86.25

ALTERNATIVE	LINK5			COST (MILLIONS)
	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	
DRG1	2	6	14.2	164.14
DRG2	2	6	14.2	164.14
DRG3	2	6	14.2	164.14
DRG4	2	6	14.2	164.14
DRG5	2	6	14.2	164.14
ALT E	2	6	14.2	164.14

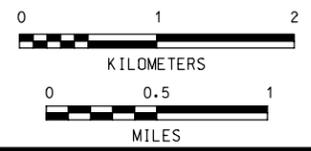


Figure 3-6

LINK IMPACT SUMMARY