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Josh,

As we discussed, attached are a few appendices from the 2014 UDOT Study on the Alternatives Development and Screening Methodology, the Alternatives Feasibilities, as well as the Executive Summary. Please give me a call with any questions.

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Alternatives-Development and Screening Methodology Report

Uinta Basin Rail

Utah Department of Transportation
UDOT Project Number S-R399(169)

January 2, 2014

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1.0 Introduction

The purpose of this report is to describe the proposed alternatives-development and screening process that will be used for the Uinta Basin Railroad (UBRR) feasibility process. The process consisted of the following five basic phases:

1. Developing preliminary project railroad alternatives
2. Applying first-level (Level 1 – Purpose and Need) screening criteria, identifying alternatives that will move to the next level, and refining alternatives that pass the first-level screening
3. Applying second-level (Level 2 – Construction and Operation Feasibility) screening criteria based on initial desk-top review of constructability and rail operations feasibility to identify alternatives that pass level 2 screening and will be analyzed in level 3 screening (– Natural and Built Environment)
4. Applying third-level (Level 3 – Natural and Built Environment) screening criteria based on impacts to the natural and human environment to identify alternatives that would under go a final field verification constructability review.
5. Applying a field review (Level 4 -Alternative Feasibility) of the potential constructability of the alternatives to determine which alternatives are feasible and practicable and would be evaluated in detail in the EIS

The alternatives-development and screening process described in this report will provide critical information about how well an alternative satisfies the project’s purpose and whether it is reasonable and feasible. The criteria used in the screening analyses will be used to generate measures that will let the lead agencies systematically and objectively identify reasonable alternatives and screen out unreasonable alternatives. The entire process will take place over several months.

2.0 Reasons Why Alternatives Might Be Eliminated

2.1 CEQ Regulations and Guidance

According to National Environmental Policy Act (NEPA) regulations and the Council of Environmental Quality (CEQ), there are three primary reasons why an alternative might be determined to be not reasonable and eliminated from further consideration.

1. The alternative does not satisfy the purpose of the project (Level 1 Screening).
2. The alternative is determined to be not practical or feasible from a technical and/or economic standpoint (Level 2 and 4 screening) .
3. The alternative substantially duplicates another alternative; that is, it is otherwise reasonable but offers little or no advantage for satisfying the project’s purpose, and it has impacts and/or costs that are similar to or greater than those of other, similar alternatives (Level 3 screening).

2.2 Clean Water Act Requirements

Because the area of analysis for the project supports federally regulated wetlands, the project team will also consider the *Clean Water Act Section 404(b)(1) Guidelines for Specification of Disposal*

What is the area of analysis for the UBRR project?

The area of analysis is described in Section 4.1.1, Area of Analysis.

Sites for Dredged or Fill Material and Executive Order 11990, Protection of Wetlands, during alternatives development. If an action alternative is ultimately selected and that alternative would discharge fill material to wetlands (which are classified as *special aquatic sites*), then the project team would need to demonstrate that the selected alternative complies with Section 404(b)(1) of the Clean Water Act.

The Section 404(b)(1) guidelines state that “no discharge of dredged or fill material [to Section 404–regulated waters] shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences” [Section 230.10(a)]. This section of the guidelines further states that:

4. For the purpose of this requirement, practicable alternatives include but are not limited to:
 - a. Activities which do not involve a discharge of dredged or fill material into the waters of the United States or ocean waters;
 - b. Discharges of dredged or fill material at other locations in waters of the United States or ocean waters;
5. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant which could reasonably be obtained, utilized, expanded, or managed in order to fulfill the basic purpose of the proposed activity may be considered.
6. Where the activity associated with a discharge which is proposed for a special aquatic site (as defined in Subpart E of the guidelines) does not require access or proximity to or siting within the special aquatic site in question to fulfill its basic purpose (i.e., is not water dependent), practicable alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise. In addition, where a discharge is proposed for a special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge into a special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise.

2.3 Section 4(f)/Section 6(f) Requirements

Section 4(f) (49 United States Code [USC] 303) of the Department of Transportation Act of 1966 applies to publicly owned parks, recreation areas, and wildlife and waterfowl refuges and publicly or privately owned significant historic properties. The requirements of Section 4(f) apply only to agencies within the U.S. Department of Transportation (USDOT) (for example, the Federal Railroad Administration).

Section 4(f) and Section 6(f) prohibit USDOT agencies from approving the use of any Section 4(f) land for a transportation project, except as follows:

- First, the USDOT agency can approve the use of Section 4(f) land by making a determination that (1) there is no prudent and feasible alternative that would avoid the use of the Section 4(f) resource *and* (2) the project includes all possible planning to minimize harm to that property.
- Second, the USDOT agency can approve the use of Section 4(f) property by making a finding of *de minimis* impact for that property.

An alternative that would have substantially more Section 4(f) impacts could be eliminated during the screening process.

3.0 Overview of the Alternatives-Development and Screening Process

3.1 Alternatives-Development Phase

The alternatives-development phase consists of identifying preliminary alternatives (consisting of railroad corridors) that potentially meet the purpose of the project (see Section 3.2.1, Purpose of the Project, and Section 3.2.2, Need for the Project). In general, each alternative must provide economically useful railroad freight transportation service between the locations in the Uinta Basin that generate and receive substantial freight volumes and the national railroad network of the United States. Based on these requirements, the project team will develop several potential corridors. After the preliminary list of corridors is developed, the corridors will be put through the screening phases.

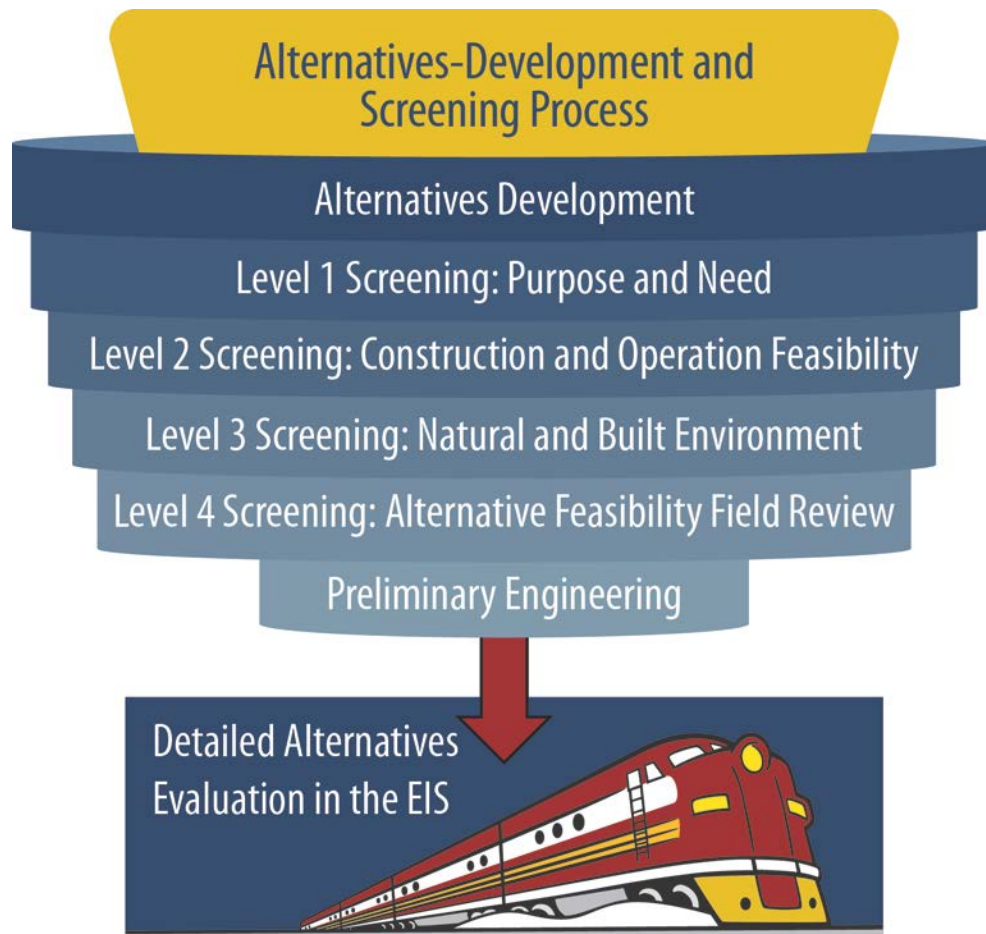
3.2 Alternatives-Screening Phases

The screening process tests each alternative using criteria that identify whether each alternative reasonably meets the project's purpose and is acceptable from technical, environmental, and logistical, and cost perspectives.

The four phases of alternatives screening will be supported by technical analyses to help the project team refine alternatives and identify those options that meet the purpose of the project. This report explains how the process will occur and the criteria that will be applied. The results of the screening process will be fully documented in a report.

Beginning in Section 4.0 below, this report describes the information that will be developed in the alternatives-development and screening phases. Figure 1 below presents an overview of the alternatives-development and screening process. As shown in Figure 1, the project's purpose and need are the foundation of the alternatives-development and screening process.

Figure 1. Alternatives-Development and Screening Process



3.2.1 Purpose of the Project

The purpose of the UBRR project is to reduce shipping costs and expand market access for commodities transported to and from the Uinta Basin by constructing a freight rail line that connects the Uinta Basin to the national common-carrier freight railroad system with direct access to the two western United States Class 1 railroads (BNSF and UP).

3.2.2 Need for the Project

The Uinta Basin is a geographical area in east-central Utah that includes the communities of Vernal, Duchesne, Roosevelt, Altamont, Jensen, Naple, Ballard, Myton, and Tabiona as well as smaller, unincorporated communities. The basin contains extensive deposits of economically valuable minerals including large deposits of soda ash and phosphate. Also found within this region are substantial deposits of crude oil, natural gas, oil shale, oil sands, gilsonite, natural asphalt, limestone, bentonite, heavy clay, aggregate materials, bauxite, and low-sulfur coal. Agriculture is also an important part of the Uinta Basin's economy and includes cattle, alfalfa,

What are Class I and Class III railroads?

A Class I railroad is a railroad with annual operating revenues of \$433.2 million or more. A Class III railroad, or a short line railroad, is a rail company with an annual operating revenue of less than \$34.7 million.

corn, potatoes, and other field and orchard crops. The above commodities benefit from being transported in large bulk shipments to market by rail, which provides more transportation efficiency and reduces cost.

The needs for the project are the need for reduced shipping rates for commodities transported to and from the Uinta Basin and the need for expanded market access for the commodities produced in the Uinta Basin. The Uinta Basin does not have rail service except with a lengthy intermediate truck or pipeline haulage between the basin and the national railroad network beyond the basin. The cost of the intermediate truck haulage combined with the commodity, network, and capacity limitations of pipelines result in higher costs of transportation for commodities transported to and from the Uinta Basin and limit the access to markets for commodities produced in the basin (commodities such as oil, gilsonite, and grain) compared to the access that would be expected if the basin had direct access to the national railroad network. In general, as transportation costs increase, economic competitiveness decreases, economic potential is reduced, and economic activity decreases. Freight rail service provides producers with cost-effective transportation, especially for heavy and bulky commodities.

The need for the project is summarized below.

- **No rail service.** There is no rail service to the Uinta Basin.
- **Higher cost to ship by truck.** Commodities are transported into and out of the basin primarily by truck. The average revenue per ton-mile for rail-hauled freight in the United States was \$0.0376, whereas the average revenue per ton-mile for truck-hauled freight in the United States was \$0.1654. The lower cost of rail transportation means that a producer can transport a commodity 4.3 times farther by rail than by truck for the same cost.
- **Distance to the national rail network.** Transportation of commodities that are not suitable for pipeline transportation between the Uinta Basin and national markets requires either a truck haul between the commodity's origin and destination or a truck haul for the portion of the commodity's route between the Uinta Basin and a transload facility on the national railroad network. The nearest rail lines are between 112 and 154 miles on rural highways from Vernal, the largest city in the basin.
- **Limited ability for pipelines to ship all commodities.** Pipelines are not suitable for transporting the wide variety of commodities, such as aggregate and agricultural products produced and consumed in the Uinta Basin. In addition, the capacity and market reach of the existing pipeline network is limited by having relatively fixed origins and destinations. Pipelines are technically limited in the variety of commodities they can carry.
- **Limited market access.** The use of trucks to ship many commodities into and out of the Uinta Basin limits large-scale access to the national market because of the higher transportation cost of trucks and the reduced technical ability to ship some commodities.
- **Limited capacity to ship by truck.** Truck shipments into and out of the basin are capacity-constrained to the size of the truck. This constraint can be overcome only by using more trucks to ship the commodity, which increases the transportation cost. A rail line would enable commodities to be moved without being subject to the same capacity constraints and at a reduced transportation cost.

What is a ton-mile?

A ton-mile is a common transportation measure that equals 1 ton of freight moved 1 mile, accounting for both the freight volume transported as well as the distance the freight is carried.

3.3 Agency and Public Involvement

Before initiating the NEPA process for the UBRR EIS, the project team will use this screening report to determine potential railroad alignments that would connect the Uinta Basin to the national railroad network. The alternatives developed during the screening phase will be provided to the public for review and comment during the EIS scoping phase. As appropriate, the team will evaluate new alternatives suggested during the EIS process along with any suggested revisions to the screening criteria.

3.4 Tools Used

Geographic information system (GIS)–based information will be used during the screening analyses to help the project team understand the locations and extents of a number of resources. Some GIS data are managed by the State of Utah, Cities, or Counties and are readily available to the team. The data that will be checked regularly include layers that show streets, parcels, land ownership, parks, and land-use designations. The team will also use other layers available from the State that provide information such as the locations of rivers, streams, and water bodies; jurisdictional boundaries (such as city and county boundaries); wildlife habitats; and geology.

What is GIS software?

GIS software analyzes geographical data. A GIS file usually contains different sets of data, or layers, that can be overlaid onto a map.

4.0 Alternatives-Development and Screening Process

4.1 Alternatives Development

4.1.1 Area of Analysis

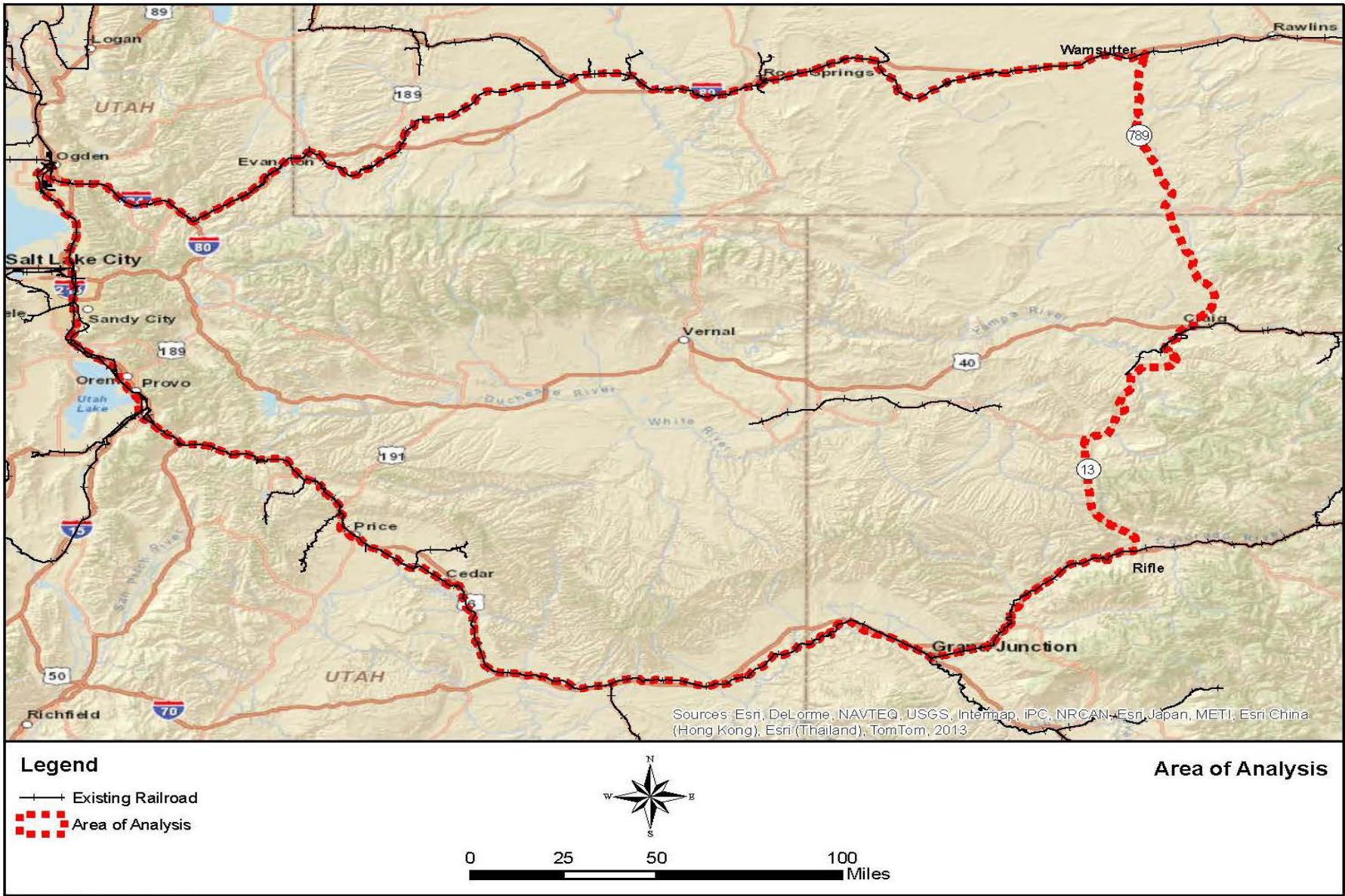
To develop the list of preliminary alternatives, the project team determined an area of analysis, which is the limits of possible alternative corridors suitable for constructing a commercially viable railroad connecting the communities and the major freight-generating and -consuming areas of the Uinta Basin with the national railroad network. The team developed the area of analysis by studying the existing national railroad network surrounding or approaching the Uinta Basin and the elements of this network that the proposed UBRR could connect to (see Figure 2 below). In general, the following elements of the national railroad network surround or approach the Uinta Basin:

- To the north, a Union Pacific Railroad (UP) line runs east-west through southern Wyoming between Cheyenne, Wyoming, and Ogden, Utah. Interstate 80 (I-80) parallels this route.
- To the east, the Uinta Basin is approached by a UP branch line originating at Bond, Colorado, and terminating at Axial, Colorado, west of Craig, Colorado. (Although it is a branch line, this line is constructed and maintained to main track standards.) U.S. Highway 40 parallels this route between Steamboat Springs, Colorado, and Craig, Colorado.
- To the south, a UP line runs east-west through central Utah between Rifle, Colorado, Grand Junction, Colorado, and Provo, Utah. BNSF Railway has trackage rights on part of this line (between Denver, Colorado, and Stockton, California), which connects at either end with BNSF's own network. Utah Railway, a Class III (short-line) railroad, also has trackage rights on this line (Utah Railway owns one of the two main tracks between Provo, Utah, and Thistle, Utah). I-70 parallels this route between Grand Junction, Colorado, and Green River, Utah, and U.S. Highway 6 parallels this route between Green River, Utah, and Provo, Utah.
- To the west, a UP line runs north-south between Provo, Utah, and Ogden, Utah. BNSF has trackage rights on this line (Utah Railway operates some of the freight services on this line for BNSF as a contractor). Interstate 15 (I-15) parallels this route.

What are trackage rights?

Trackage rights are an agreement between railroads in which the owner grants another railroad company use of its railroad line.

Figure 2. UBRR Area of Analysis



The area of analysis is defined as follows:

- North border: The UP main track between its intersection with Wyoming State Highway 789 and Ogden, Utah.
- East border: Wyoming State Highway 789 between its intersection with the UP main track east of Wamsutter, Wyoming, and the Colorado border, and Colorado State Highway 13 between the Wyoming border and its intersection with the UP main track near Rifle, Colorado.
- South border: The UP main track between Rifle, Colorado, and Provo, Utah.
- West border: The UP main track between Provo, Utah, and Ogden, Utah.

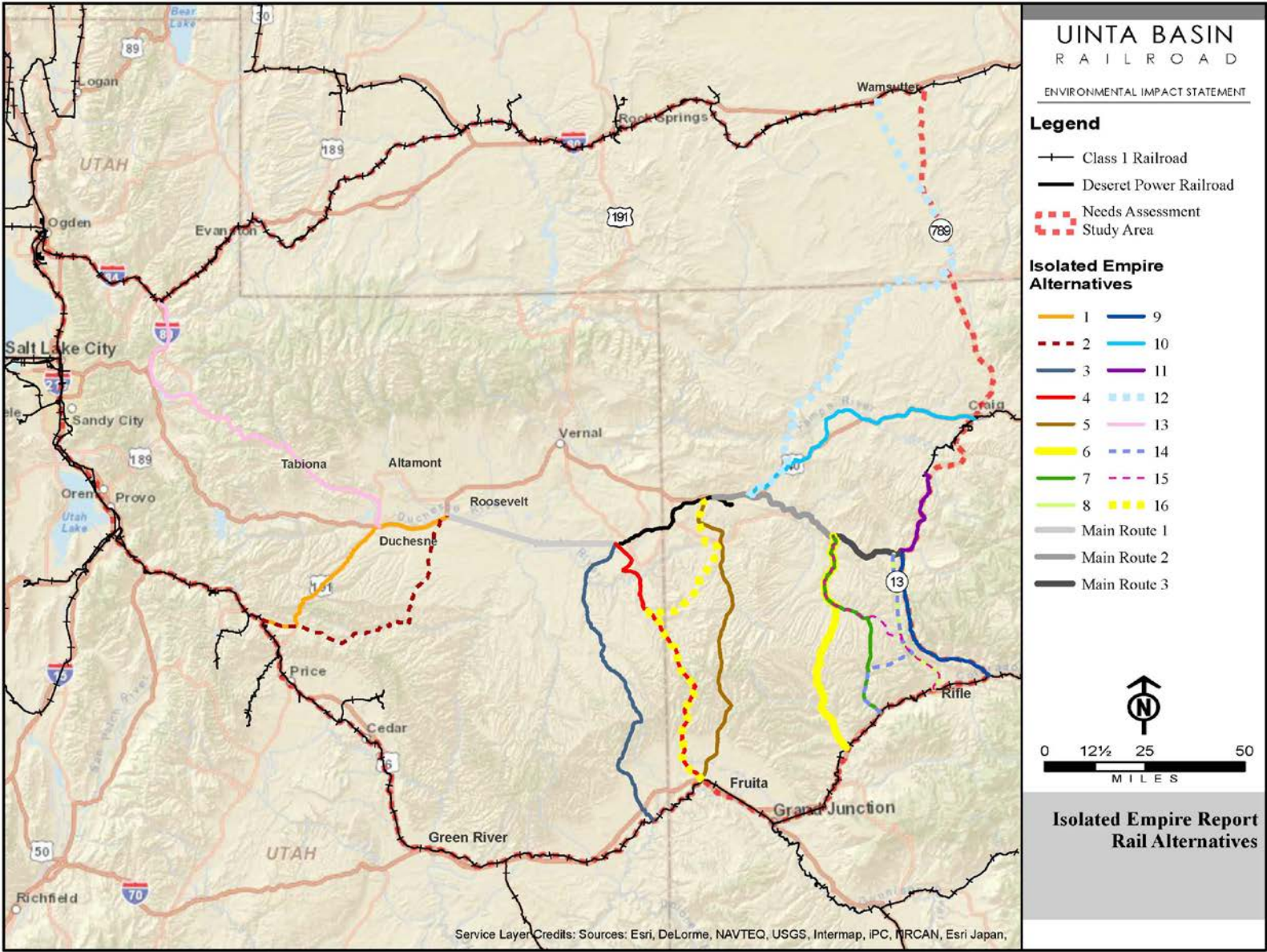
4.1.2 Development of Preliminary Alternatives

In the first phase of the alternatives-development and screening process, the project team will identify a list of potential alternatives. All of the initial alternatives must be applicable to the area of analysis and must present a type of solution that could meet the project purpose and basic need for a new freight railroad. For example, the alternatives must be compatible with the area's topography, climate, and available technology and must be capable of addressing the basic need of providing a freight railroad that connects to another existing railroad. Therefore, the project team will use the following criteria to develop the preliminary alternatives:

- The freight railroad alternatives must connect to an existing railroad within the area of analysis in order to provide a connection to the national railroad network.
- The freight railroad alternatives must meet basic topography requirements such as avoiding steep terrain or large spans.
- The freight railroad alternatives must reduce local truck travel to the railroad to the greatest degree economically practical with acknowledgement that future development may occur in different locations in the Uinta Basin. The alternative must also provide a range of access across the basin to support the economic viability of the railroad for all commodities.

In addition to reviewing the criteria used to develop new alignments, the project team reviewed a previous study, *Feasibility Report for the Isolated Empire Rail Project* (DMJM Harris 2001), for potential railroad alignments to evaluate in the UBRR EIS. As defined in this study, the purpose of the Isolated Empire Rail Project was to review the feasibility of extending a heavy-duty commercial freight rail line to connect the remote areas of northwestern Colorado and northeastern Utah to the national railroad network. The study evaluated 16 alignments, which will be re-evaluated in the UBRR EIS (see Figure 3 below).

Figure 3. Isolated Empire Report Rail Alternatives



4.2 Alternatives Screening

4.2.1 Level 1 Screening – Ability to Meet the Project’s Purpose

The purpose of Level 1 screening is to identify alternatives that meet the purpose of the project. Alternatives that are determined to not meet the purpose of the project will be considered unreasonable for NEPA purposes and not practicable for Clean Water Act Section 404(b)(1) purposes and will not be carried forward for further analysis.

What is the purpose of Level 1 screening?

The purpose of Level 1 screening is to identify alternatives that meet the purpose of the project.

Level 1 alternative screening is the first major decision point at which alternatives can be eliminated based on specific screening criteria. During Level 1 screening, the preliminary alternatives will be screened against the following purpose criteria:

- The alternative must connect the Uinta Basin to existing railroad alignments served by both UP and BNSF in order to reduce shipping costs (through competitive pricing between railroads) by providing competitive freight transportation services to the shippers and receivers in the Uinta Basin.

Providing a connection to only one of these railroads’ systems could result in higher transportation costs than what could be realized if producers had competitive pricing from two Class 1 railroads. A single connection could increase net prices for commodities extracted, harvested, or manufactured in the basin or increase consumer prices for commodities consumed in the basin.

- The alternative must reduce truck travel distance on local, state, and federal roads to the railroad line within the basin by providing a range of access points for all commodities. Providing multiple access points will also support the economic viability of the railroad by providing access to more commodities to ship.

Providing a range of access points across the basin would allow more direct connections to transload facilities, thereby potentially reducing truck travel from the shippers across the basin on local, state, and federal roads to the railroad line. Providing a range of access points would reduce truck transportation cost and related road congestion. This would also provide shippers and receivers in the basin with an equal opportunity to share in the reduced transportation cost of the railroad, thus increasing economic competition in the basin for goods and commodities consumed or produced in the basin.

The preliminary alternatives that are not eliminated during Level 1 screening will be further refined to identify a more specific alignment and then evaluated in the Level 2 screening process.

4.2.2 Level 2 Screening –Construction and Operation Feasibility

The purpose of Level 2 screening is to determine which of the alternatives are feasible and practicable; that is, which rail alignments can be feasibly and practicably constructed and operated. During Level 2 screening, the project team will first determine which alternatives that passed Level 1 screening are feasible alternatives under NEPA and will then evaluate the same group of alternatives that passed Level 1 screening to determine whether they are practicable under the Section 404(b)(1) guidelines.

Level 2 screening will be conducted by reviewing the topography of the alignments and aerial images of the alignments. The following specific process will be used:

What is the purpose of Level 2 screening?

The purpose of Level 2 screening is to determine which of the alternatives are feasible and practicable; that is, which rail alignments can be feasibly and practicably constructed and operated.

1. The project team will develop basic alignments and footprints using a standard right-of-way width (100 feet) for the alternatives carried forward from Level 1 screening. During this step, the team will attempt to minimize impacts to natural resources and the built environment. (Alternatives that pass the screening will go through additional refinement during the engineering process for the EIS.)
2. Project engineers will review the alignments and area topography to make sure they meet basic requirements for railroad design. Preliminary engineering will be performed during Level 2 screening to ensure that railroad alternatives meet basic engineering geometric requirements. During the development of the alternatives, the locations of tunnels will be identified in areas with steep topography.
3. The alternatives' footprints will be rendered as digital GIS files, and a GIS analysis will be performed to determine the amount of the railroad grade and the length of the railroad line.
4. The project team will create segments for each unique alignment for the alternatives considered in Level 2 screening. Because some alternatives might have common segments, the team might be able to combine the segments to determine the total Level 2 screening impacts for each alternative. When developing the segments for the new alignments, the team will use GIS data to show the locations of resources in order to minimize impacts to the natural and built environment where reasonably possible.
5. The alternatives will then be screened against the Level 2 criteria as follows:
 - o Trains of up to 150 cars must be operable. The alternative must be able to haul all commodities and goods that are currently commonly hauled by the national railroad network and must have the capability to expand its capacity to serve likely potential future freight volumes generated in the basin. To operate a train of 150 cars the rail grade can't exceed 2.4%.
 - o As many as 24 trains per day must be operable. To operate 24 trains a day the rail grade can't exceed 3%.
 - o Average train speeds between terminals, exclusive of meet and pass events, must be at least 30 miles per hour (mph). To maintain a speed of 30 mph the rail grade can't exceed 2.4%.

- o The alternative must not be impractical to construct due to high canyon walls, high water flow that fills the canyon floor, or a lack of continuous bench or beach for a railroad line.
- o Railroad grades must not exceed 2.4%.

For Level 2 screening, the main criterion for determining whether an alternative is practicable will be the railroad grade (ruling grade). The ruling grade on a railway line is established by comparing trains of the maximum tonnage and length that is expected to be operated on that line on a regular basis, with the characteristics of grade and curvature of that railway line. In broad terms, a ruling grade is the average ascending grade over enough of a distance on an ascent that a train cannot overcome it by momentum, and that establishes the amount of braking horsepower that is required to safely descend. A ruling grade might not necessarily be the maximum grade on a railway line, if it is much shorter than the length of a typical train.

What is a ruling grade?

A ruling grade is the grade that is the sustained grade on a railway line, ascending or descending, which defines the maximum tonnage of train that can be economically and safely operated over that railway line.

For the UBRR project, the criterion for the ruling grade is 2.4%. Main-track railways in North America that are intended for heavy and frequent trains have historically had a ruling grade of 2.4% as the steepest grade that is economically and safely operable. In fact, the *de facto* standard ruling grade in the United States is slightly less, at 2.2%. A 2.4% ruling grade is at present encountered on only two major rail lines in the United States: eastward on UP's ascent of Donner Pass in California, which lies on UP's main track between northern California and Chicago, and westward on UP's ascent of Soldier Summit in Utah, which lies on UP's main track between Denver and Salt Lake City via Grand Junction, Colorado.

Railways that were intended for light traffic, light trains, or temporary operation often used steeper grades, and railways that were built in the frontier West prior to 1900 sometimes used steeper grades with the idea that a permanent route with lesser grades would be established once traffic levels increased as a result of permanent settlement and industry. Notably, railways with steeper grades have been bypassed, closed, or reduced to local or irregular traffic since 1900.

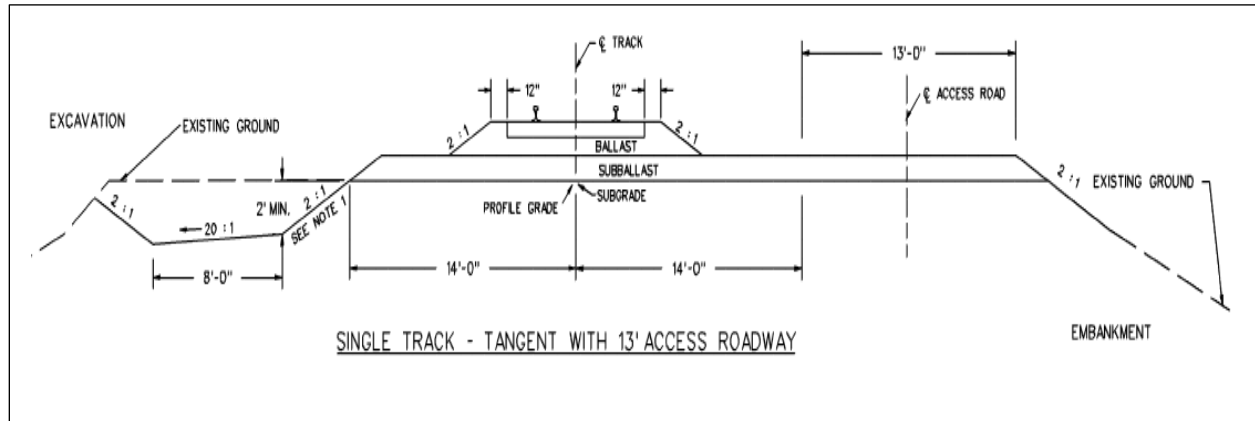
- In 1994, Southern Pacific sold its Siskiyou Summit route in California, with 3.0% grades ascending in both directions to its summit, to a short-line railroad, which subsequently closed it to through traffic in 2008.
- In 1996, UP closed its Tennessee Pass route in Colorado, which had a 3.0% grade ascending eastward.
- In 2009, BNSF Railway removed all freight traffic from its Raton Pass route in Colorado and New Mexico, which had up to 3.3% grades ascending in both directions to its summit.

At present, the only railway line in the United States that is used for freight service and that exceeds a 2.4% ruling grade is BNSF Railway's Main Track #3, which ascends eastward on Cajon Pass in California. This track is used only for descending trains with very high braking horsepower per ton, not for ascending trains or bulk (unit) freight trains such as would be operated on the UBRR. Since Cajon Pass is at a low altitude in a warm climate, air brake performance is not degraded as it is at high altitudes and very cold climates, as would be experienced on the UBRR. (In the winter, trains descending Soldier Summit in Utah are often limited in train length or separated in two to reduce difficulties in braking that would be experienced with full-length trains.)

Screening-Level Right-of-Way Widths

Part of the first step in determining an alternative's impacts is determining its right-of-way width. The right-of-way that will be used in Level 2 and 3 screening is based on a 100-foot-wide right-of-way for main tracks between terminals and on actual footprints for freight terminals. In general, this right-of-way width will be sufficient for constructing, operating, and maintaining the rail line. In a few areas, a wider right-of-way might be required for cuts and fills. Figure 4 shows the proposed right-of-way widths that will be used for screening.

Figure 4. UBRR Cross-Section



4.2.3 Level 3 Screening – Natural and Built Environment

The purpose of Level 3 screening is to determine which of the alternatives advanced from Level 2 screening are reasonable and will be evaluated in Level 4 screening (alternative feasibility field review). The reasonable alternatives will be determined by collectively evaluating the alternatives that were found to meet the purpose of the project in Level 1 screening while considering the impacts to the natural and built environment, the estimated project costs, logistical considerations, and overall feasibility.

Level 3 Screening Criteria and Analysis

During Level 3 screening, the potential alternatives will be measured against the criteria in Table 1 below. The screening will focus on how well each alternative meets the purpose of the project, the alternative's impacts to the natural and built environments, and estimated project costs. Alternatives that are not eliminated during Level 3 screening will be carried forward into Level 4 screening.

What is the purpose of Level 3 screening?

The purpose of Level 3 screening is to determine which of the alternatives advanced from Level 2 screening are reasonable and will be evaluated in Level 4 screening (alternative feasibility field review).

Table 1. Level 3 Screening Criteria

Criterion	Measure
Cost	Estimated project cost (general).^a
Impacts to natural resources	- Acres of wetlands and other waters of the U.S. affected.^b - Acres of sensitive wildlife habitat affected. - Number of drainage crossings (includes streams, canals, or ditches). - Number and acres of Agriculture Protection Areas affected. - Acres of irrigated prime or unique farmland affected.^c - Acres of floodplain affected. - Acres of wilderness areas or wilderness study areas affected (areas of critical environmental concern, recreation management area, etc.).
Impacts to the built environment	- Number and area of parks and trails affected. - Acres of open recreation areas affected (U.S. Forest Service, Bureau of Land Management, tribal, state, county, or local). - Number of community facilities affected. - Number of potential property acquisitions, including residential, business, and utility acquisitions. - Number of Section 4(f)/Section 6(f) uses.^d - Number of cultural resources affected (for example, historic and archaeological resources).^e - Number of existing water and commodity wells/sites affected.

^a Cost is based on relative cost to the lowest alternative..

^b Based on Clean Water Act requirements, an alternative with a substantially greater number of wetland impacts could be eliminated from detailed study.

^c This metric estimates the effects on soils identified by the U.S. Department of Agriculture as being prime or unique that are irrigated and actively farmed.

^d Based on the requirements of Section 4(f) of the Department of Transportation Act of 1966 and Section 6(f) of the Land and Water Conservation Fund Act, an alternative with a substantially greater number of Section 4(f) or Section 6(f) impacts could be eliminated from detailed study.

^e Sites include eligible, unknown eligibility, and sites on the National Register of Historic Places.

To conduct Level 3 screening, the project team will use GIS software to estimate how each alternative would affect the resources identified in Table 1 above. The amount of impacts will be determined based on the right-of-way needed for each potential alternative (see the section titled Screening-Level Right-of-Way Widths on page 14). The following process will be used:

1. The alternatives' footprints will be rendered as digital GIS files, and a GIS analysis will be performed to determine the amount of impacts from each alternative,
2. The alternatives' effects on the resources listed in Table 1 above will be compared to determine the reasonable alternatives to be advanced to Level 4 screening.

GIS analysis will also be used to determine property impacts. Residential and commercial properties adjacent to alternatives will be digitized. If the right-of-way for an alternative would go over a property structure, the impact will be considered a relocation. If no structure would be affected and only undeveloped property would be within an alternative's right-of-way, the impact will not be considered a relocation. To ensure consistency, a quality control (QC) check will be conducted by reviewing the alternatives' footprints using Google Earth imagery.

What is a relocation?

A relocation occurs when constructing an alternative would require purchasing an occupied structure, such as a home or business. The residents or business would need to relocate.

The project team will collectively evaluate the alternatives for their ability to meet the project's purpose as well as their impacts, costs, and so on. If an alternative is determined to have substantially higher impacts or costs without having substantially higher benefits, it will be considered unreasonable for NEPA purposes and will not be carried forward for detailed analysis in the EIS. Similarly, alternatives that have substantially higher costs, logistical difficulties, technical issues, or other substantial adverse impacts to waters of the U.S. will be considered not practicable for Clean Water Act Section 404(b)(1) purposes and will not be carried forward. Alternatives with substantial Section 4(f) uses could be eliminated on a similar basis. Appendix A provides the methodology for developing the screening-level cost estimates.

The alternatives that pass Level 3 screening will be further evaluated in Level 4 screening.

4.2.4 Level 4 Screening – Alternative Feasibility Field Review

The initial review of each alternative for constructability and the feasibility of rail operations will be conducted as part of Level 2 screening. This Level 2 evaluation will be a "desktop" review using aerial photographs and topographic maps to determine any initial fatal flaws regarding the constructability of an alternative.

What is the purpose of Level 4 screening?

The purpose of Level 4 screening is to conduct a field review to determine whether an alternative can be constructed.

The alternatives that pass Levels 1, 2, and 3 screening will be reviewed in the field as part of Level 4 screening to determine, based on field observations, whether the alternative can be constructed. The field review will include items such as topography, water courses, slope stability, wetlands and other natural environment features, existing infrastructure (roads, electrical lines, pipelines, etc.), community facilities, and existing buildings. Based on the field observations, the project team will conduct an evaluation of each alternative to determine whether the alternative is feasible.

The alternatives that pass Level 4 screening will be advanced for detailed study in the Draft EIS. The alternatives considered in detail in the Draft EIS will go through additional engineering design and further refinement to optimize their performance and reduce their impacts.

The final results of the screening process will be presented in a report that also describes the process and outcomes of each phase.

4.2.5 Screening Results: Alternatives Carried Forward for Detailed Study in the EIS

The alternatives that are not eliminated during the screening process will be further refined through preliminary engineering before detailed impact analyses begin for the EIS. This preliminary engineering will include details such as horizontal and vertical alignments; railroad siding locations; bridge types and locations; transload facilities and freight terminals such as unit train loading loops, railroad communications, and train-control systems; railroad utility power lines; and construction, operation, and maintenance access roads. Each alternative will be designed to a similar level of detail. Once the preliminary design work is complete, the expected effects of the alternatives will be identified and compared at an equal level of detail as required by NEPA.

The screening process is designed to be dynamic throughout the EIS process. If a new alternative or refinement of an alternative is developed or arises later in the process, it will be subject to the same screening process as all of the other alternatives as described in this report.

Appendix A. Screening-Level Cost Estimates Methods

1.0 Introduction

The purpose of this appendix is to document the process used to develop preliminary cost estimates for the alternatives analyzed during the Uinta Basin Railroad (UBRR) Level 2 screening process. The cost estimates will be used to assist the project team in the screening process and to develop a better understanding of the magnitude of the differences among the alternatives. The cost estimates in this appendix are preliminary and are based on other similar and recent railroad construction projects.

During Level 3 screening, it was not possible for the project team to include every possible cost of the project, since only geographic information system (GIS) alignments were developed, and many details that would be determined with additional engineering design were unknown. However, the estimates were calculated the same way for each alternative and provided a reasonable, relative comparison in costs between the alternatives. More-detailed cost estimates will be developed for the alternatives evaluated in detail in the Environmental Impact Statement (EIS) and will be based on a more-detailed level of preliminary engineering.

2.0 General Assumptions

The construction costs in this appendix have been developed based on similar railroad projects. These costs were based on actual construction costs and are intended to be used to compare the UBRR Level 3 screening alternatives.

Railroad construction costs per mile in Level 3 screening do not include detailed right-of-way (ROW) acquisition costs, major structures, or development of freight terminals, transload facilities, or unit-train loading loops. Items included in the costs per mile include engineering, mobilization, earthwork, track, typical drainage structures, train-control and communications systems, and maintenance access roads.

A basic right-of-way width of 100 feet was used to develop costs for the alternatives.

3.0 Right-of-Way and Railroad Construction Cost Estimates

3.1 Residential and Agricultural Relocation Cost Estimate

In Level 3 screening, the number of structures affected by the alternatives' ROW was calculated using GIS software. To determine the cost of residential or agricultural structures, local property information was used. Table 3-1 shows the median property values in 2009 and the average sales values in the third quarter of 2013 for the counties in the UBRR area of analysis.

Table 3-1. Property and Sales Values in the UBRR Area of Analysis

County	2009 Median Property Value ^a	3rd Quarter 2013 Median Sales Value ^b
Duchesne	\$156,675	\$190,000
Uintah	\$183,345	\$199,800

^a Source: City-data.com, no date

^b Source: Utah Realtors, no date

For the Level 3 screening cost estimate, the average third-quarter 2013 sales information was used. Based on these data, the average cost of a residential property in the UBRR area of analysis was \$194,900. The project team used a value of \$200,000 for each residential property for the screening cost estimate. Additionally, a value of \$35,000 for relocation costs was assumed for each affected residential parcel as part of the screening cost estimate.

3.2 Business Relocations Cost Estimate

For the different business relocation categories, costs per relocation/acquisition were determined by using costs from previous EIS projects and samplings of property values taken from www.utahrealestate.com.

3.2.1 Agricultural

The relocation/acquisition of agricultural businesses was estimated based on an analysis of GIS data. The cost estimate used a value of \$750,000 for each agricultural relocation/acquisition. Additionally, a value of \$35,000 for relocation costs was assumed for each affected agricultural parcel as part of the screening cost estimate.

Table 3-2. Cost Estimate for Farm/Ranch Acquisitions

Sample	County	Price ^a
Sample 1	Uintah	\$395,000
Sample 2	Uintah	\$995,000
Sample 3	Duchesne	\$220,000
Sample 4	Duchesne	\$334,900
Sample 5	Duchesne	\$550,000
Sample 6	Duchesne	\$889,000
Sample 7	Duchesne	\$1,200,000
Sample 8	Duchesne	\$1,295,000
Average		\$734,862

The cost estimate used a value of \$750,000 for each agricultural acquisition.

^a Prices obtained from www.utahrealestate.com.

3.2.2 Commercial or Industrial

Table 3-3. Cost Estimate for Industrial Business Acquisitions

Sample	County	Price ^a
Sample 1	Duchesne	\$149,900
Sample 2	Duchesne	\$165,000
Sample 3	Duchesne	\$194,000
Sample 4	Duchesne	\$220,000
Sample 5	Duchesne	\$240,000
Sample 6	Duchesne	\$389,900
Sample 7	Duchesne	\$399,000
Sample 8	Duchesne	\$400,000
Sample 9	Duchesne	\$659,000
Sample 10	Uintah	\$181,900
Sample 11	Uintah	\$210,000
Sample 12	Uintah	\$265,000
Sample 13	Uintah	\$279,900
Sample 14	Uintah	\$299,900
Sample 15	Uintah	\$399,000
Sample 16	Uintah	\$445,000
Sample 17	Uintah	\$534,900
Sample 18	Uintah	\$549,900
Sample 19	Uintah	\$762,300
Sample 20	Uintah	\$795,000
Sample 21	Uintah	\$799,000
Sample 22	Uintah	\$895,000
Sample 23	Uintah	\$899,900
Sample 24	Uintah	\$990,000
Sample 25	Uintah	\$1,200,000
Sample 26	Uintah	\$1,200,000
Sample 27	Uintah	\$1,200,000
Average		\$566,288

The cost estimate used a value of \$575,000 for each industrial acquisition.

^a Prices obtained from www.utahrealestate.com.

Additionally, a value of \$35,000 for relocation costs was assumed for each affected industrial parcel as part of the screening cost estimate.

3.2.3 Utility

The utility relocation cost estimate used the same value as the industrial relocation/acquisition value. The cost estimate used a value of \$500,000 for each utility relocation/acquisition.

3.2.4 Institutional

The institutional relocation/acquisition cost estimate used the same value as the commercial or industrial relocation/acquisition value, which was \$575,000. The cost estimate used a value of \$575,000 for each institutional property relocation/acquisition. Additionally, a value of \$35,000 for relocation costs was assumed for each affected institutional parcel as part of the screening cost estimate.

3.2.5 Oil and Gas Industrial

The oil and gas industrial relocation/acquisition cost estimate for a relocated oil well was assumed at \$2,000,000 per oil well. A pad can have a single or multiple oil wells. For example, a pad with two wells would have a relocation cost of \$4,000,000.

3.3 Land Value Cost Estimate

For the various land-use categories identified in Level 2 screening using GIS data, unit costs per square foot of land type were estimated by taking a sampling of listed properties for each category from www.landandfarm.com. The price, acreage, and cost per square foot are shown in Table 3-4 through Table 3-7. Where listings could not be found for certain categories (Institutional, Open Space, and Protection Area), the project team evaluated GIS data and determined that these land-use categories had similar attributes to other land-use categories that would likely cause them to be valued similarly. This is described more in the following sections.

3.3.1 Agricultural

Table 3-4. Cost Estimate for Agricultural Land Value

Sample	Price	Acres	Cost per Square Foot
Sample 1	\$1,050,000	200.0	\$0.12
Sample 2	\$905,000	160.0	\$0.13
Sample 3	\$910,000	180.0	\$0.12
Sample 4	\$185,000	37.13	\$0.11
Sample 5	\$389,000	54.26	\$0.16
Sample 6	\$39,000	6.4	\$0.14
Sample 7	\$219,000	240.0	\$0.02
Average	\$528,143	125	\$0.12

The cost estimate used a value of \$0.25 per square foot for agricultural property.

3.3.2 Commercial or Industrial

Table 3-5. Cost Estimate for Commercial or Industrial Land Value

Sample	Price	Acres	Cost per Square Foot
Sample 1	\$315,000	45.0	\$0.16
Sample 2	\$140,000	20.0	\$0.16
Sample 3	\$762,300	1.71	\$10.23
Sample 4	\$1,947,500	18.91	\$2.36
Sample 5	\$3,950,000	43.86	\$2.07
Sample 6	\$762,300	3.75	\$4.67
Sample 7	\$2,911,986	13.37	\$5.00
Sample 8	\$2,090,880	8.0	\$6.00
Sample 9	\$1,474,000	5.64	\$6.00
Sample 10	\$160,000	4.25	\$0.86
Average	\$1,451,396	16.45	\$3.75

The cost estimate used a value of \$5.00 per square foot for commercial property.

3.3.3 Institutional

Evaluation of GIS data indicates that institutional land uses would have attributes similar to those of commercial or industrial land uses. The cost estimate used a value of \$5.00 per square foot for institutional property.

3.3.4 Open Space

Evaluation of GIS data indicates that open-space land uses would have attributes similar to those of agricultural land uses. The cost estimate used a value of \$0.25 per square foot for open-space property.

3.3.5 Protection Area

Evaluation of GIS data indicates that protection-area land uses would have attributes similar to those of agricultural land uses. The cost estimate used a value of \$0.25 per square foot for protection-area property.

3.3.6 Recreational or Dispersed Residential

Table 3-6. Cost Estimate for Recreational or Dispersed Residential Land Value

Sample	Price	Acres	Cost per Square Foot
Sample 1	\$29,900	5.0	\$0.14
Sample 2	\$74,900	5.6	\$0.31
Sample 3	\$29,900	25.7	\$0.03
Sample 4	\$59,900	10.0	\$0.14
Sample 5	\$32,900	10.0	\$0.08
Sample 6	\$19,900	10.0	\$0.05
Sample 7	\$34,900	20.0	\$0.04
Sample 8	\$39,900	10.0	\$0.09
Sample 9	\$27,900	10.0	\$0.06
Sample 10	\$75,000	24.0	\$0.07
Sample 11	\$50,000	5.0	\$0.23
Sample 12	\$4,500	0.25	\$0.41
Sample 13	\$1,290,000	42.78	\$0.69
Sample 14	\$49,000	120.0	\$0.01
Sample 15	\$18,000	40.0	\$0.01
Sample 16	\$20,000	40.0	\$0.01
Sample 17	\$15,000	40.0	\$0.01
Sample 18	\$315,000	45.0	\$0.16
Sample 19	\$140,000	20.0	\$0.16
Sample 20	\$187,000	5.0	\$0.86
Sample 21	\$142,500	10.0	\$0.33
Sample 22	\$25,000	5.0	\$0.11
Sample 23	\$190,000	36.54	\$0.12
Sample 24	\$38,000	0.79	\$1.10
Sample 25	\$4,000,000	213.27	\$0.43
Sample 26	\$54,000	1.4	\$0.89
Average	\$267,812	29	\$0.25

The cost estimate used a value of \$0.25 per square foot for recreational or dispersed residential property. Data from www.landandfarm.com.

3.3.7 Residential

Table 3-7. Cost Estimate for Residential Land Value

Sample	Price	Acres	Cost per Square Foot
Uintah County average	\$202,058	9.88	\$2.06

The cost estimate used a value of \$2.00 per square foot for residential property. This is for platted residential lots. Data from Utah multiple listing service.

3.4 Railroad Cost Estimate

Construction costs from representative and recent railroad construction projects were used to estimate the costs per mile for the UBRR. Based on these projects, a capital cost estimate of \$8 million per mile for a new railroad alignment and \$100 million per mile for a tunnel is assumed, inclusive of earthwork, track, drainage structures, signal and communications, and maintenance access roads, but exclusive of land acquisition, relocation of existing land uses, and environmental mitigation. Representative projects are few as new railroad construction on new alignments in the U.S. has been rare since the 1920s, and railroad projects are highly variable in terms of topography, anticipated railroad traffic levels, and requirements for grade crossing signaling, grade crossing structures, and terminal trackage. The UBRR project would require extensive earthwork because of the area topography.

3.4.1 Yucca Mountain Railroad

The proposed Yucca Mountain Railway Draft Environmental Statement compared several alignments connecting the proposed Yucca Mountain nuclear waste storage facility with the national railroad network. The railroad would be a single-track railroad with sidings for train meet/pass events, and equipped with a Centralized Traffic Control signaling system. Terminal facilities were relatively limited. The alignment costs ranged from \$4.8 to \$13 million per mile in 2013 dollars, depending upon the alignment chosen and the amount of excavation required. The alignments with greater excavation had the highest cost per mile

3.4.2 Ely Energy Center Railroad

A 97-mile new railroad, parallel to the abandoned Nevada Northern Railway, between Shafter, Nevada, and the proposed Ely Energy Center near Ely, Nevada, was proposed in 2006. The railroad would be a single-track railroad with sidings for train meet/pass events, and equipped with a Centralized Traffic Control signaling system. Terminal facilities were relatively modest. The estimated cost of the railroad's main track was \$3.2 million per mile in 2013 dollars. The proposed alignment had only minor drainage structures and minor earthwork.

3.4.3 DM&E Railroad, Powder River Basin Extension

A 260-mile extension of the Dakota, Minnesota & Eastern Railroad from Wall, South Dakota, to the Powder River Basin Coal Field in Wyoming, was proposed in 2001. The cost of construction of the new-build alignment including 600 miles of rehabilitation of the existing DM&E was \$3.0 million/mile. The proposed new-build alignment had more than 20 major structures and moderate earthwork.

3.4.4 Estimated Railroad Costs

Due to the mountainous topography between the national railroad network and the Uinta Basin, and the anticipated requirement for grade-separation of paved public roadways and signaling of private and low-traffic public roadways, an initial estimate of cost of the UBRR is \$8 million/mile for the railroad and \$100 million/mile for a tunnel.

3.4.5 Structures over Local Roads

The project team also assumed a cost of \$1,512,000 for the cost of structures over the railroad alignment. The team based this cost assumption on each structure having a width of 84 feet and a length of 100 feet. The cost per square foot was assumed to be \$180 per square foot for structures over local roads. Therefore, $8,400 \text{ square feet} \times \$180/\text{square foot} = \$1,512,000$ per structure.

3.5 Wetland Mitigation Cost

The project team contacted the UDOT wetland specialist regarding wetland mitigation costs in Utah. UDOT recently calculated the cost per acre for the Utah County Wetland Mitigation Bank, which was constructed in 2009. Including design, land cost, monitoring, and construction, the estimated cost was \$125,000 per acre. According to UDOT, the cost per acre was high because this mitigation bank is in an urban area. UDOT stated that mitigation costs would likely be less in the UBRR area of analysis because land costs are lower in rural areas such as the area of analysis. Land cost is the largest factor in the overall cost of wetland mitigation sites (Johnson 2011).

For the Level 2 screening cost analysis, the project team assumed a cost of \$125,000 per acre at a mitigation ratio of 2:1, meaning that, for every acre of wetland affected, the mitigation costs would be \$250,000.

4.0 References

DMJM Harris

- 2001 Feasibility Report for the Isolated Empire Rail Project. Prepared for the Utah Department of Community and Economic Development.

Johnson, Terry

- 2011 Personal communication between Terry Johnson, UDOT Senior Landscape Architect, and Vince Izzo of HDR regarding wetland mitigation costs. April 7.



Alternatives Feasibility Report

Uinta Basin Rail

Utah Department of Transportation
Duchesne and Uintah Counties
UDOT Project Number S-R399(169)

June 25, 2014

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1.0 Introduction

Uintah and Duchesne Counties (the Counties) are responsible for economic development in Utah's Uinta Basin. As part of that responsibility, the Counties consider opportunities to expand and improve infrastructure to support economic development. This alternatives analysis evaluates the Counties' options for building a freight rail line into the Uinta Basin from the existing Class 1 rail system. The Utah Department of Transportation (UDOT) is working with the Counties' to examine the feasibility of a new freight rail line serving the Uinta Basin.

1.1 Project Overview and Objectives

The purpose of the Uinta Basin Railroad (UBRR) is to reduce shipping costs and expand market access for commodities transported to and from the Uinta Basin by constructing a freight rail line that connects the Uinta Basin to the national common-carrier freight rail system with direct access to the two western United States Class 1 railroads (BNSF Railway [BNSF] and Union Pacific Railroad [UP]). The objectives of the project are to develop an alignment that would to the extent possible:

What are Class 1 railroads?

Class 1 railroads are carriers with annual carrier operating revenues of \$433.2 million or more in 2011.

- Connect to an existing Class 1 rail line within the area of analysis in order to provide a connection to the national rail network.
- Meet basic topography requirements such as minimizing the need to traverse steep terrain.
- Reduce local truck travel distances to the rail line to the greatest degree economically practical with acknowledgement that future development could occur in different locations in the Uinta Basin.
- Provide a range of access across the basin to support the economic viability of the railroad for all commodities.
- Be designed and constructed to Class 1 railroad standards to be easily maintained.
- Enhance constructability by minimizing the route length and maximizing areas with favorable geotechnical conditions.
- Minimize impacts to privately owned land and local communities and, where practicable, avoid environmentally sensitive areas.

1.2 Project Setting

The Uinta Basin is in the northeast corner of Utah and is located almost entirely in Duchesne and Uintah Counties. The basin is rural and has a population of about 51,000, which is mostly in and around the communities of Duchesne, Roosevelt, and Vernal. These three communities are connected by the east-west, two-lane U.S. Highway 40 (U.S. 40).

The Uinta Basin is within the Colorado Plateau physiographic province. The basin is a bowl-shaped structural and sedimentary feature that trends roughly east to west, has a maximum width of about 115 miles, and covers an area of about 10,890 square miles. The basin is bounded on the north by the Uinta Mountains and on the east by the Douglas Creek Arch, with portions of the Wasatch Range and the Roan Cliffs forming its southern and western boundaries. The basin is a high desert with elevations that

range from about 4,632 feet in the eastern part near the Green River to about 6,867 feet in the southwestern part near Gilsonite Draw.

The vegetation in the basin consists of typical Intermountain Basin shrubland associations. This region mixes an array of geographic substrates, topographic features, climatic regimes, soil types, and other physical factors to produce a mosaic of floristic components and associated natural habitats. These communities are often mixed, transitional, or widely distributed (BLM 2013).

The Uinta Basin—known since pioneer times as the Isolated Empire—contains extensive deposits of economically valuable minerals including large deposits of soda ash and phosphate. Also found within this region are substantial deposits of crude oil, natural gas, oil shale, oil sands, gilsonite, natural asphalt, limestone, bentonite, heavy clay, aggregate materials, bauxite, and low-sulfur coal. Agriculture is also an important part of the Uinta Basin’s economy and includes cattle, alfalfa, corn, potatoes, and other field and orchard crops.

1.3 Background

At present, the Uinta Basin is isolated from the national rail network. The existing transportation infrastructure consists of two-lane rural highways connecting the basin to the national highway network, natural gas and crude oil pipelines, and a phosphate ore slurry pipeline. The principal truck route connecting the Uinta Basin to the rest of the country is U.S. 40, a two-lane rural highway that provides access to Salt Lake City to the west and rural northwestern Colorado to the east. In addition, U.S. Highway 191 (U.S. 191), a rural two-lane highway, traverses the basin from north to south.

The Counties intend to reduce shipping costs for and expand the market reach of commodities transported to and from residents and businesses in the Uinta Basin by constructing a new rail line that connects the economic and potential shipping centers of the basin with the national common-carrier rail network. This rail connection would provide (1) a less expensive, safer, and more reliable freight transportation alternative to trucks and (2) flexibility of routing and capacity and the ability to transport all commodities produced within the basin that are not technically or economically feasible to transport by pipeline.

This proposed rail line, which is referred to as the Uinta Basin Railroad (UBRR), is intended to provide the residents and businesses in the Uinta Basin with the capacity, cost-effectiveness, and market reach that will enable the shipment of the commodities presently or anticipated in the future to be consumed in or produced in the Uinta Basin at a reduced transportation cost compared to truck shipments and with greater market reach and flexibility than pipeline shipments.

1.4 Report Objectives and Contents

The Counties and UDOT have prepared this report to identify and evaluate alignment alternatives for the UBRR. The objectives of the report are to (1) identify, develop, refine, and analyze feasible and practicable alignment alternatives and (2) propose alignment alternative(s) for consideration in an Environmental Impact Statement (EIS) that will likely be prepared by the Surface Transportation Board (STB) for the project. The STB would be the lead agency under the National Environmental Policy Act (NEPA) for preparing the EIS.

STB’s Office of Environmental Analysis (OEA) is responsible for conducting the environmental review process and making recommendations to STB. OEA, together with any cooperating agencies, would decide which alternative(s) proposed in this report or suggested from other sources would be studied in the EIS and would independently verify the results of this feasibility report.

The process for identifying and evaluating alternative alignments consisted of the following five basic phases:

1. Develop preliminary rail alternatives.
2. Apply first-level (Level 1, Ability to Meet the Project's Purpose) screening criteria, identify alternatives that would move to the next level, and refine alternatives that pass the Level 1 screening.
3. Apply second-level (Level 2, Constructability and Operational Feasibility) screening criteria based on an initial "desktop" review of constructability and rail operations feasibility to identify alternatives that pass Level 2 screening and would be analyzed in Level 3 screening (impacts evaluation).
4. Apply third-level (Level 3, Natural and Built Environment) screening criteria based on impacts to the natural and human environment to identify alternatives that would undergo a final field verification constructability review.
5. Conduct a field review (Level 4, Alternative Feasibility Field Review) of the potential constructability of the alternatives to determine which alternatives are feasible and practicable and would be further refined.

The alternatives-development and screening process described in this report provides critical information about how well an alternative would satisfy the purpose of the UBRR project and whether an alternative would be feasible and practicable. The criteria used in the screening analyses generated measures that allowed the UBRR team to systematically and objectively identify feasible and practicable alternatives and screen out alternatives that were not feasible or practicable.

What is the UBRR team?

The UBRR team consists of Uintah and Duchesne Counties, the Utah Department of Transportation (UDOT) and the rail consultant.

1.5 Reasons Why Alternatives Might Be Eliminated

1.5.1 CEQ Regulations and Guidance

According to the Council on Environmental Quality (CEQ) and NEPA regulations, there are three primary reasons why an alternative might be determined to be not reasonable and eliminated from further consideration.

1. The alternative does not satisfy the purpose of the project.
2. The alternative is determined to be not practical or feasible from a technical and/or economic standpoint.
3. The alternative substantially duplicates another alternative; that is, it is otherwise reasonable but offers little or no advantage for satisfying the project's purpose, and it has impacts and/or costs that are similar to or greater than those of other, similar alternatives.

1.5.2 Clean Water Act Requirements

Because federally regulated wetlands and other waters of the United States are present within the area of analysis for the project, the UBRR team will also consider the *Clean Water Act Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material* and Executive Order 11990, Protection of Wetlands, during alternatives development. If an action alternative is ultimately selected and that alternative would discharge fill material to wetlands (which are classified as *special aquatic sites*), then the UBRR team would need to demonstrate that the selected alternative complies with Section 404(b)(1) of the Clean Water Act.

The Section 404(b)(1) guidelines state that “no discharge of dredged or fill material [to Section 404–regulated waters] shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences” [Section 230.10(a)]. This section of the guidelines further states that:

1. For the purpose of this requirement, practicable alternatives include but are not limited to:
 - a. Activities which do not involve a discharge of dredged or fill material into the waters of the United States or ocean waters;
 - b. Discharges of dredged or fill material at other locations in waters of the United States or ocean waters;
2. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant which could reasonably be obtained, utilized, expanded, or managed in order to fulfill the basic purpose of the proposed activity may be considered.
3. Where the activity associated with a discharge which is proposed for a special aquatic site (as defined in Subpart E of the guidelines) does not require access or proximity to or siting within the special aquatic site in question to fulfill its basic purpose (i.e., is not water dependent), practicable alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise. In addition, where a discharge is proposed for a special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge into a special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise.

1.5.3 Section 4(f) Requirements

Section 4(f) (49 United States Code [USC] 303) of the Department of Transportation Act of 1966 applies to publicly owned parks, recreation areas, and wildlife and waterfowl refuges and publicly or privately owned significant historic properties. The requirements of Section 4(f) apply only to agencies within the U.S. Department of Transportation (USDOT) (for example, the Federal Railroad Administration). The requirements of Section 4(f) do not apply to STB.

For the UBRR project, the Counties might seek federal funds, loans, or grants from the Federal Railroad Administration. If this were to occur, Section 4(f) requirements would apply as part of the NEPA process, and the Federal Railroad Administration would serve as a cooperating agency in preparing the EIS.

Section 4(f) prohibits USDOT agencies from approving the use of any Section 4(f) land for a transportation project, except as follows:

- First, the USDOT agency can approve the use of Section 4(f) land by making a determination that (1) there is no prudent and feasible alternative that would avoid the use of the Section 4(f) resource *and* (2) the project includes all possible planning to minimize harm to that property.
- Second, the USDOT agency can approve the use of Section 4(f) property by making a finding of *de minimis* impact for that property.

An alternative that would have substantially more Section 4(f) impacts could be eliminated during the screening process.

What is a *de minimis* impact?

For publicly owned public parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact is one that would not adversely affect the activities, features, or attributes of the property. For historic sites, a finding of *de minimis* impact means the USDOT agency has determined that either the project would not affect the historic property or the project would have “no adverse effect” on the historic property.

1.5.4 Section 6(f) Requirements

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965 (16 USC 4601-4 and subsequent sections) states that properties acquired or developed with LWCF funds cannot be converted to a use other than public outdoor recreation without the approval of the Secretary of the U.S. Department of the Interior. Section 6(f) requirements apply to all federal, state, and local agencies.

1.6 Summary of the Project’s Purpose and Need

As shown in Figure 1 on page 7, the project’s purpose and need are the foundation of the alternatives development and screening process.

Purpose of the Project. The purpose of the UBRR project is to reduce shipping costs and expand market access for commodities transported to and from the Uinta Basin by constructing a freight rail line that connects the Uinta Basin to the national common-carrier freight rail system with direct access to the two western United States Class 1 railroads (BNSF Railway [BNSF] and Union Pacific Railroad [UP]).

Need for the Project. The Uinta Basin is a geographical area in east-central Utah that includes the communities of Vernal, Duchesne, Roosevelt, Altamont, Myton, Ballard, Naples, and Tabiona as well as smaller, unincorporated communities. The basin contains extensive deposits of economically valuable minerals including large deposits of soda ash and phosphate. Also found within this region are substantial deposits of crude oil, natural gas, oil shale, oil sands, gilsonite, natural asphalt, limestone, bentonite, heavy clay, aggregate materials, bauxite, and low-sulfur coal. Agriculture is also an important part of the Uinta Basin’s economy and includes cattle, alfalfa, corn, potatoes, and other field and orchard crops. The above types of commodities benefit from being transported in large bulk shipments to market by rail, which provides transportation efficiency and reduces cost.

The needs for the project are the need for reduced shipping rates for commodities transported to and from the Uinta Basin and the need for expanded market access for the commodities produced in the Uinta Basin. The Uinta Basin does not have access to rail service except via a lengthy intermediate truck or pipeline haulage between the basin and the national rail network beyond the basin. The cost of the intermediate truck haulage combined with the commodity, network, and capacity limitations of pipelines result in higher costs of transportation for commodities transported to and from the Uinta Basin and limit the access to markets for commodities produced in the basin (commodities such as oil, gilsonite, and grain) compared to the access that would be expected if the basin had direct access to the national rail

network. In general, as transportation costs increase, economic competitiveness decreases, economic potential is reduced, and economic activity decreases (Thisse 2009). Freight rail service provides producers with cost-effective transportation, especially for heavy and bulky commodities (AASHTO 2002).

The need for the project is summarized below.

- **No rail service.** There is no rail service to the Uinta Basin.
- **Higher cost to ship by truck.** Commodities are transported into and out of the basin primarily by truck. The average revenue per ton-mile for rail-hauled freight in the United States was \$0.0376, whereas the average revenue per ton-mile for truck-hauled freight in the United States was \$0.1654. The lower cost of rail transportation means that a producer can transport 4.3 times more commodity by rail than by truck for the same cost.
- **Distance to the national rail network.** Transportation of commodities that are not suitable for pipeline transportation between the Uinta Basin and national markets requires either a truck haul between the commodity's origin and destination or a truck haul for the portion of the commodity's route between the Uinta Basin and a transload facility on the national rail network. The nearest rail lines are between 112 and 154 miles on rural highways from Vernal, the largest city in the basin.
- **Limited ability for pipelines to ship all commodities.** Pipelines are not suitable for transporting the wide variety of commodities, such as aggregate and agricultural products, produced and consumed in the Uinta Basin. In addition, the capacity and market reach of the existing pipeline network is limited by having relatively fixed origins and destinations. Pipelines are technically limited in the variety of commodities they can carry.
- **Limited market access.** The use of trucks to ship many commodities into and out of the Uinta Basin limits large-scale access to the national market because of the higher transportation cost of trucks and the reduced technical ability to ship some commodities.
- **Limited capacity to ship by truck.** Truck shipments into and out of the basin are capacity-constrained to the size of the truck. This constraint can be overcome only by using more trucks to ship the commodity, which increases the transportation cost. A rail line would enable commodities to be moved without being subject to the same capacity constraints and at a reduced transportation cost.

What is a ton-mile?

A ton-mile is a common transportation measure that equals 1 ton of freight moved 1 mile, thereby accounting for both the freight volume transported as well as the distance the freight is carried.

2.0 Overview of the Alternatives-Development and Screening Process for Alternatives into the Uinta Basin

Figure 1 illustrates the alternative development and screening process.

Figure 1. Alternatives-Development and Screening Process



2.1 Alternatives-Development Process

The first phase in the alternatives-development and screening process was identifying a list of preliminary alternatives. To be considered a preliminary alternative, an alternative had to be applicable to the area of analysis for identifying preliminary alternatives (see page 8) and had to present a type of solution that could potentially meet the project's purpose and basic transportation needs. For example, an alternative had to be compatible with the area's topography, climate, and available technology and had to provide a connection to an existing Class 1 railroad. In general, each alternative must provide economically useful rail freight transportation service between the locations in the Uinta Basin that generate and receive substantial freight volumes and the national rail network of the United States. Based on these requirements, the UBRR team developed potential rail corridors.

2.1.1 Identification of Preliminary Alternatives

The UBRR team used several methods to identify and develop preliminary alternatives. In addition to suggestions from UBRR team members, alternatives were also identified from previous studies.

Area of Analysis for Identifying Preliminary Alternatives

To develop the list of preliminary alternatives, the UBRR team determined an area of analysis, which is the limits of possible alternative corridors suitable for constructing a commercially viable railroad connecting the communities and the major freight-generating and freight-consuming areas of the Uinta Basin with the national rail network. The team developed the area of analysis by studying the existing national rail network surrounding or approaching the Uinta Basin and the elements of this network that the proposed UBRR could connect to (see Figure 2 below). The area of analysis is defined as follows:

- **North border:** The UP main track between its intersection with Wyoming State Highway 789 and Ogden, Utah.
- **East border:** Wyoming State Highway 789 between its intersection with the UP main track east of Wamsutter, Wyoming, and the Colorado border, and Colorado State Highway 13 between the Wyoming border and its intersection with the UP main track near Rifle, Colorado.
- **South border:** The UP¹ main track between Rifle, Colorado, and Provo, Utah.
- **West border:** The UP main track between Provo, Utah, and Ogden, Utah.

Alternatives Identified by the UBRR Team

Early in the first phase of the alternatives-development and screening process, the UBRR team identified a list of potential alternatives. The team used the following criteria to develop the preliminary alternatives:

- The freight rail alternatives must connect to an existing rail line within the area of analysis in order to provide a connection to the national rail network.
- The freight rail alternatives must meet basic topography requirements such as minimizing the need to traverse steep terrain.
- The freight rail alternatives must reduce local truck travel distances to the rail line to the greatest degree economically practical with acknowledgement that future development could occur in different locations in the Uinta Basin. The alternative must also provide a range of access across the basin to support the economic viability of the railroad for all commodities.

Using these criteria, the UBRR team developed alternatives shown in Figure 3 below.

Alternatives Developed in Previous Studies

In addition to the alternatives developed by the UBRR team, the UBRR team included the alternatives developed as part of the Isolated Empire Rail Project (DMJM Harris 2001). The purpose of this project was to review the feasibility of extending a heavy-duty commercial freight rail line to connect the remote areas of northwestern Colorado and northeastern Utah to the national rail network. The project evaluated 16 alignments, all of which were included in the alternatives-development and screening process for the UBRR project (see Figure 4 below).

¹ BNSF maintains track rights with the UP main track on the southern and western borders of the analysis area.

Figure 2. Area of Analysis

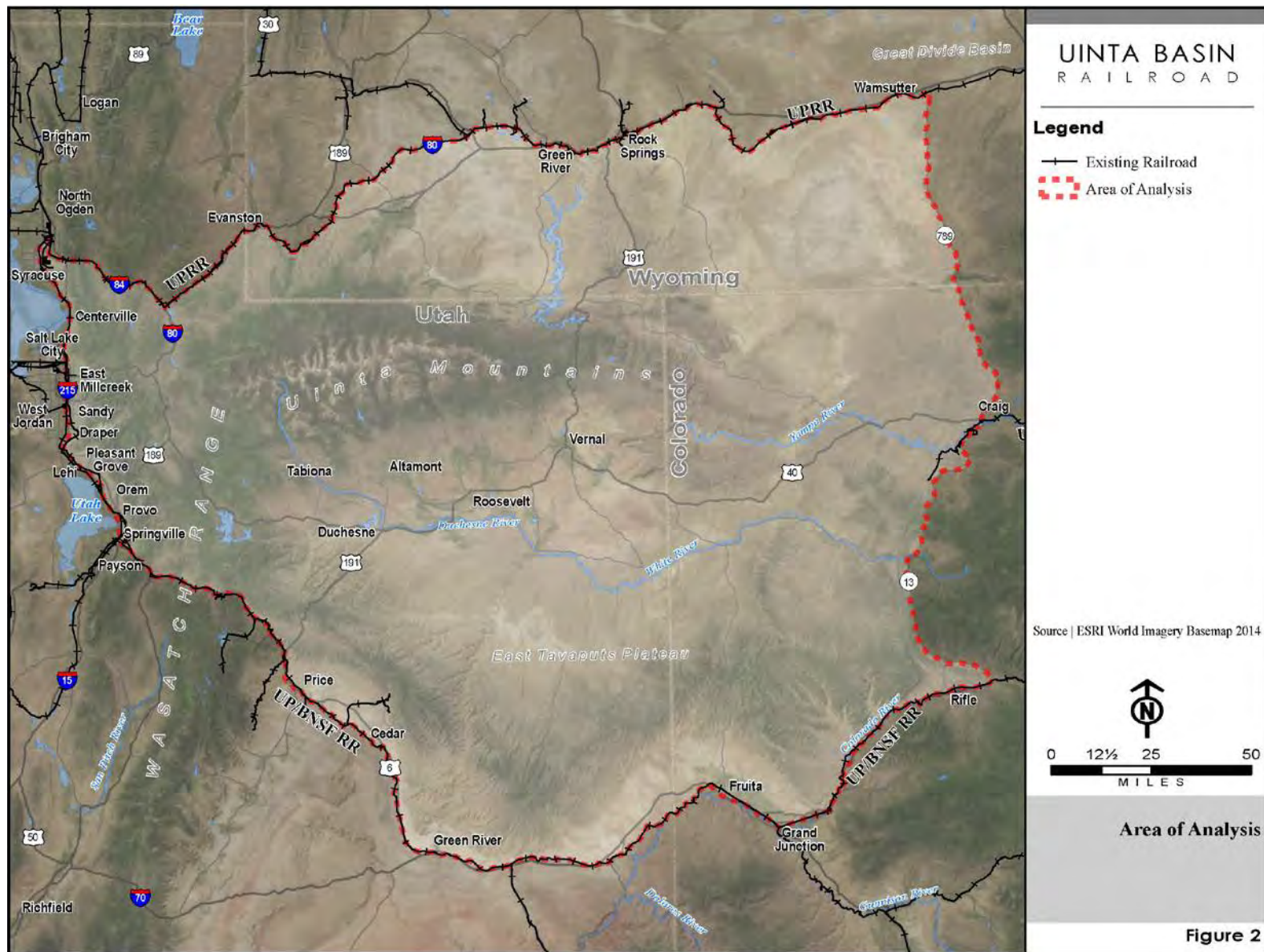


Figure 3. UBRR Team Alternatives

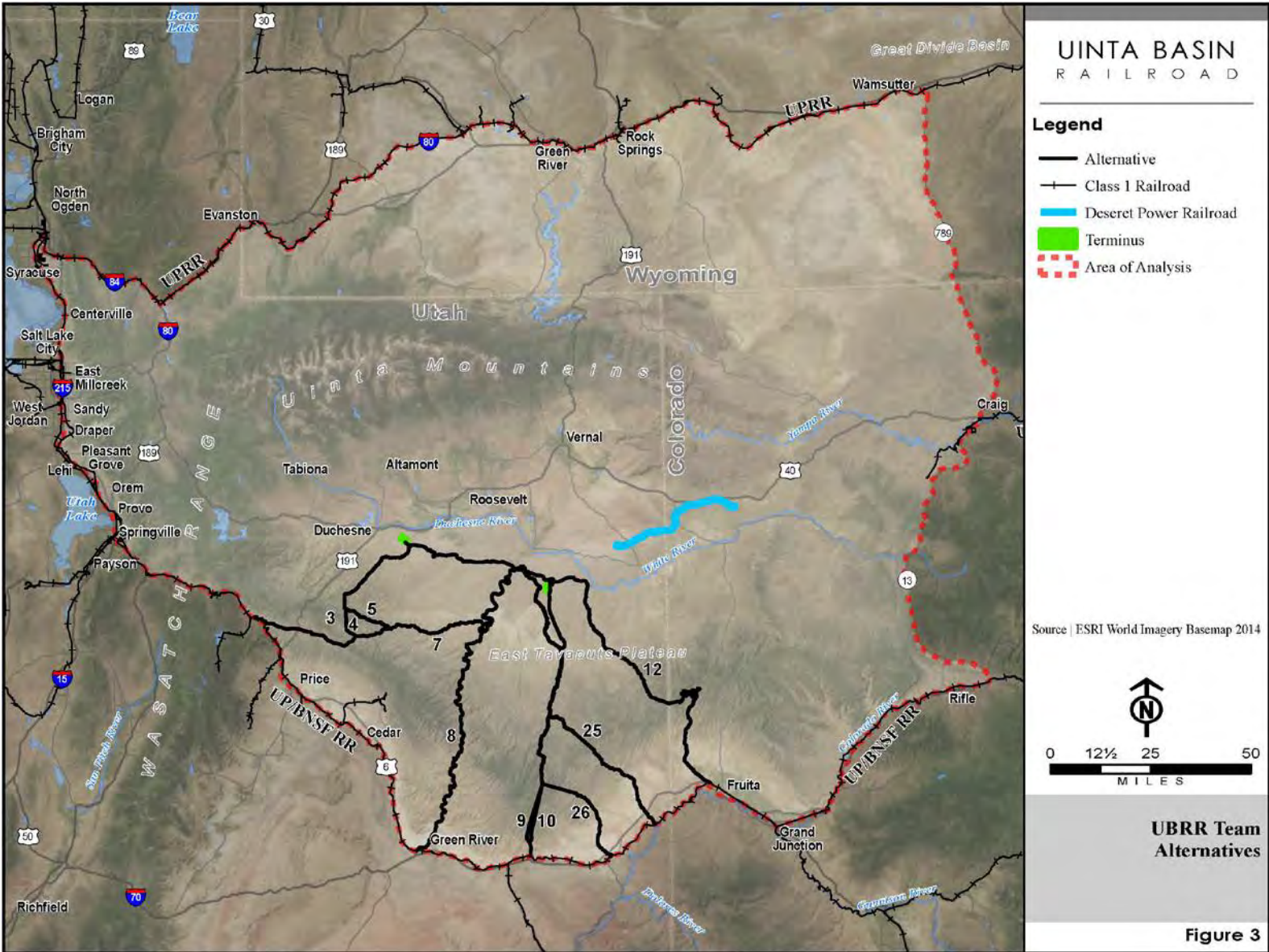
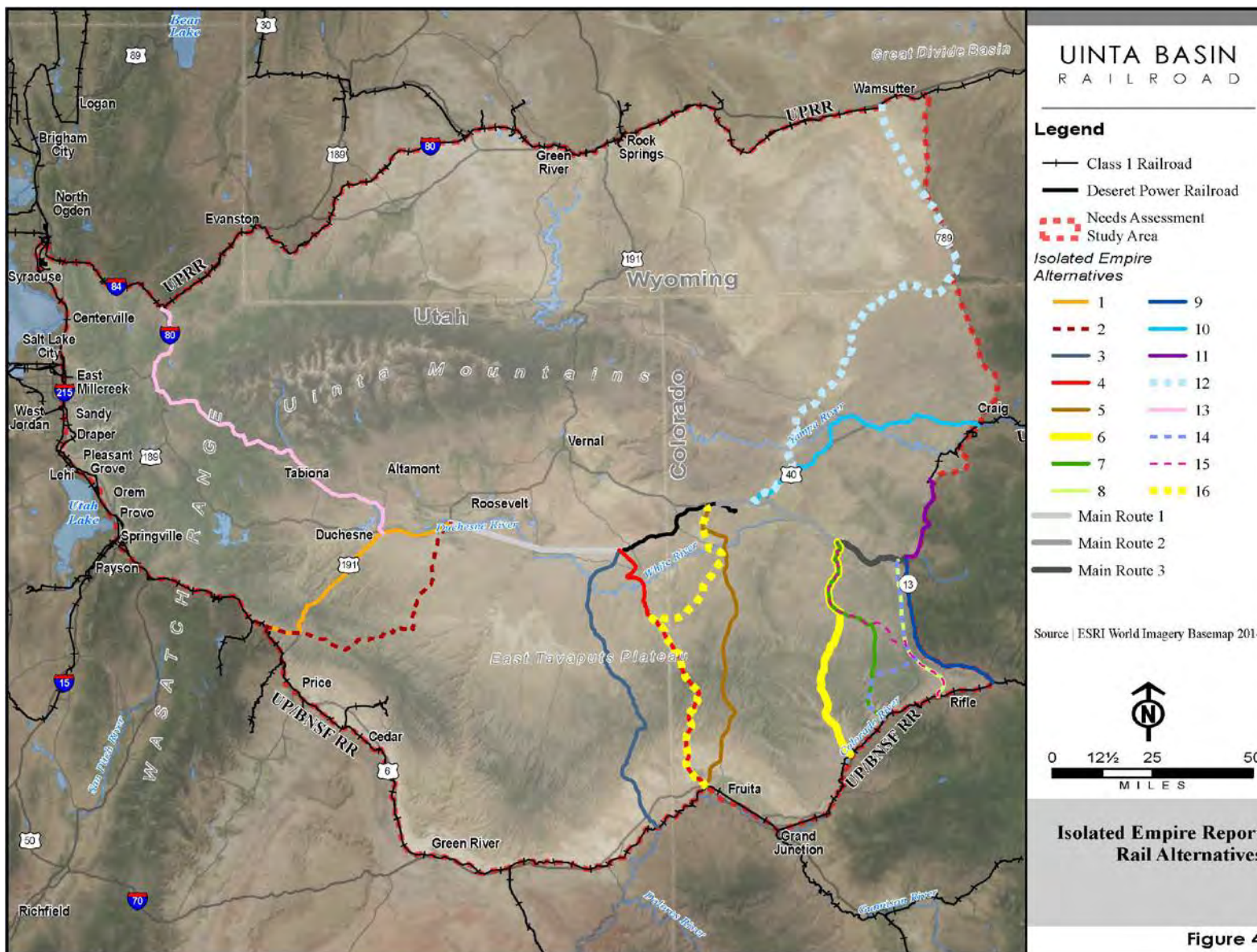


Figure 4. Isolated Empire Report Rail Alternatives



2.1.2 List of Preliminary Alternatives

Based on a previous study and input from the UBRR team, the team identified 26 preliminary alternatives. The 26 preliminary alternatives included various connections to existing rail lines surrounding the Uinta Basin that are served by Class 1 railroads.

The primary consideration in developing these preliminary alternatives was basic topography requirements. For example, the team avoided placing alternatives in steep canyons or on high mountain ranges with steep grades where rail operations would be impractical or impossible.

The preliminary alternatives are listed in Table 1 and shown in Figure 5 following the table. A detailed map of each alternative is provided in Appendix A, UBRR Alternative Maps. In Table 1, UP/BNSF means that UP owns the main track with BNSF having trackage rights.

Table 1. List of Preliminary Alternatives into the Uinta Basin

Alt.	Route Length (miles)	Tunnel(s) Length (miles)	Description
1	157	12.4	Alternative 1 starts at Echo, Utah, at the UP rail line and heads southeast through Kamas, Utah, paralleling the Provo River up the divide toward Wolf Creek Pass at an elevation of 9,000 feet (by the way on a single tunnel) and down the Duchesne River valley eastward to Duchesne, Utah. The alternative then heads east and terminates at Seep Ridge Road about 10 miles southeast of the Green River.
2	97	6.5	Alternative 2 starts in Kyune, Utah (southeast of Soldier Summit) at the UP/BNSF ^a rail lines adjacent to U.S. Highway 6 (U.S. 6). The alternative heads east along Emma Park Road to U.S. Highway 191 (U.S. 191) and then follows U.S. 191 north through Indian Canyon to Duchesne, Utah. One tunnel would be used to connect the alignment. The alternative then heads southeast and terminates at Seep Ridge Road about 10 miles southeast of the Green River.
3	104	9.1	Alternative 3 starts in Kyune, Utah (southeast of Soldier Summit) at the UP/BNSF rail lines adjacent to U.S. 6. The alternative heads east along Emma Park Road, crossing U.S. 191, then heads east on Whitmore Park Plateau just west of Nine Mile Canyon Road. Three tunnels connect the alternative to Sowers Canyon, where the alternative heads northeast to Antelope Canyon. From there, the alternative heads both west and east. The west segment heads west, terminating 6 miles southeast of Duchesne, Utah, and the east segment heads southeast, terminating at Seep Ridge Road about 10 miles southeast of the Green River.
4	112	7.0	Alternative 4 starts in Kyune, Utah (southeast of Soldier Summit) at the UP/BNSF rail lines adjacent to U.S. 6. The alternative heads east along Emma Park Road, crossing U.S. 191, then east on Whitmore Park Plateau to Nine Mile Canyon Road. The alternative then heads north up Nine Mile Canyon to Minnie Maud Canyon, then heads west along Minnie Maud Road for about 3 miles. Two tunnels connect the alternative to Sowers Canyon, where the alternative heads north to Antelope Canyon. From there, the alternative heads both west and east. The west segment heads west, terminating 6 miles southeast of Duchesne, Utah, and the east segment heads southeast, terminating at Seep Ridge Road about 10 miles southeast of the Green River.
5	125	2.4	Alternative 5 starts in Kyune, Utah (southeast of Soldier Summit) at the UP/BNSF rail lines adjacent to U.S. 6. The alternative heads east along Emma Park Road, crossing U.S. 191, then heads east on Whitmore Park Plateau to Nine Mile Canyon Road. The alternative then heads north up Nine Mile Canyon to Argyle Canyon, then heads west in the canyon for about 13 miles to a tunnel connecting the alternative to Sowers Canyon. From there, the alternative heads north to Antelope Canyon, where the alternative heads both west and east. The west segment heads west, terminating 6 miles southeast of Duchesne, Utah, and the east segment heads southeast, terminating at Seep Ridge Road about 10 miles southeast of the Green River.

Table 1. List of Preliminary Alternatives into the Uinta Basin

Alt.	Route Length (miles)	Tunnel(s) Length (miles)	Description
6	110	5.3	Alternative 6 starts in Kyune, Utah (southeast of Soldier Summit) at the UP/BNSF rail lines adjacent to U.S. 6. The alternative heads east along Emma Park Road, crossing U.S. 191, then heads east on Whitmore Park Plateau to Nine Mile Canyon Road. It then follows Nine Mile Canyon Road to Gate Canyon and then north up Gate Canyon to one tunnel, following Wells Draw Road to the South Myton Bench, where the alternative splits. One segment heads southeast, terminating at Seep Ridge Road about 10 miles southeast of the Green River, and the other segment heads west, terminating 6 miles southeast of Duchesne, Utah.
7	144	0.5	Alternative 7 starts in Kyune, Utah (southeast of Soldier Summit) at the UP/BNSF rail lines adjacent to U.S. 6. The alternative heads east along Emma Park Road, crossing U.S. 191, then heads east on Whitmore Park Plateau to Nine Mile Canyon Road, following Nine Mile Canyon Road to the Green River. The alternative heads north at the Green River to Wild Horse Bench, where this alternative splits both west and east. The west segment heads west, terminating 6 miles southeast of Duchesne, Utah, and the east segment heads southeast, terminating at Seep Ridge Road about 10 miles southeast of the Green River.
8	159	3.2	Alternative 8 starts near the junction of U.S. 6 and Interstate 70 (I-70) at the UP/BNSF rail lines. The alternative follows the Green River to Wild Horse Bench, where the alternative heads both west and east. The west segment heads west, terminating 6 miles southeast of Duchesne, Utah, and the east segment heads southeast, terminating at Seep Ridge Road about 10 miles southeast of the Green River.
9	120	12.3	Alternative 9 starts 6 miles east of Crescent Junction, Utah, at the UP/BNSF rail lines and heads north via Thompson Canyon, Bogart Canyon, and She Canyon, then generally follows Willow Creek. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
10	120	11.3	Alternative 10 starts 6 miles east of Crescent Junction, Utah, at the UP/BNSF rail lines and heads north via Sego Canyon, Bogart Canyon, and She Canyon, then generally follows Willow Creek. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
11	129	3.2	Alternative 11 starts 35 miles east of Crescent Junction, Utah, at the UP/BNSF rail lines at Agate Siding Road. The alternative heads up the Westwater Creek drainage along Book Cliffs Road. The alternative heads northeast along East Canyon and then follows Sweetwater Canyon northward to Middle Bitter Creek Road. The alternative follows Middle Bitter Creek Road to the Bitter Creek Drainage and north up the drainage, following Bitter Creek Road. Then the alternative heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
12	145	5.0	Alternative 12 starts in Mack, Colorado, at the UP/BNSF rail lines and heads north via Baxter Pass Road to Railroad Canyon, where the alternative heads west to Bitter Creek Canyon. The alternative follows Bitter Creek to East Bench, then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
13	132	6.8	Alternative 13 starts in Mack, Colorado, at the UP/BNSF rail lines and heads north via Baxter Pass Road, generally following the abandoned Uintah Railway route. The alternative heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.

Table 1. List of Preliminary Alternatives into the Uinta Basin

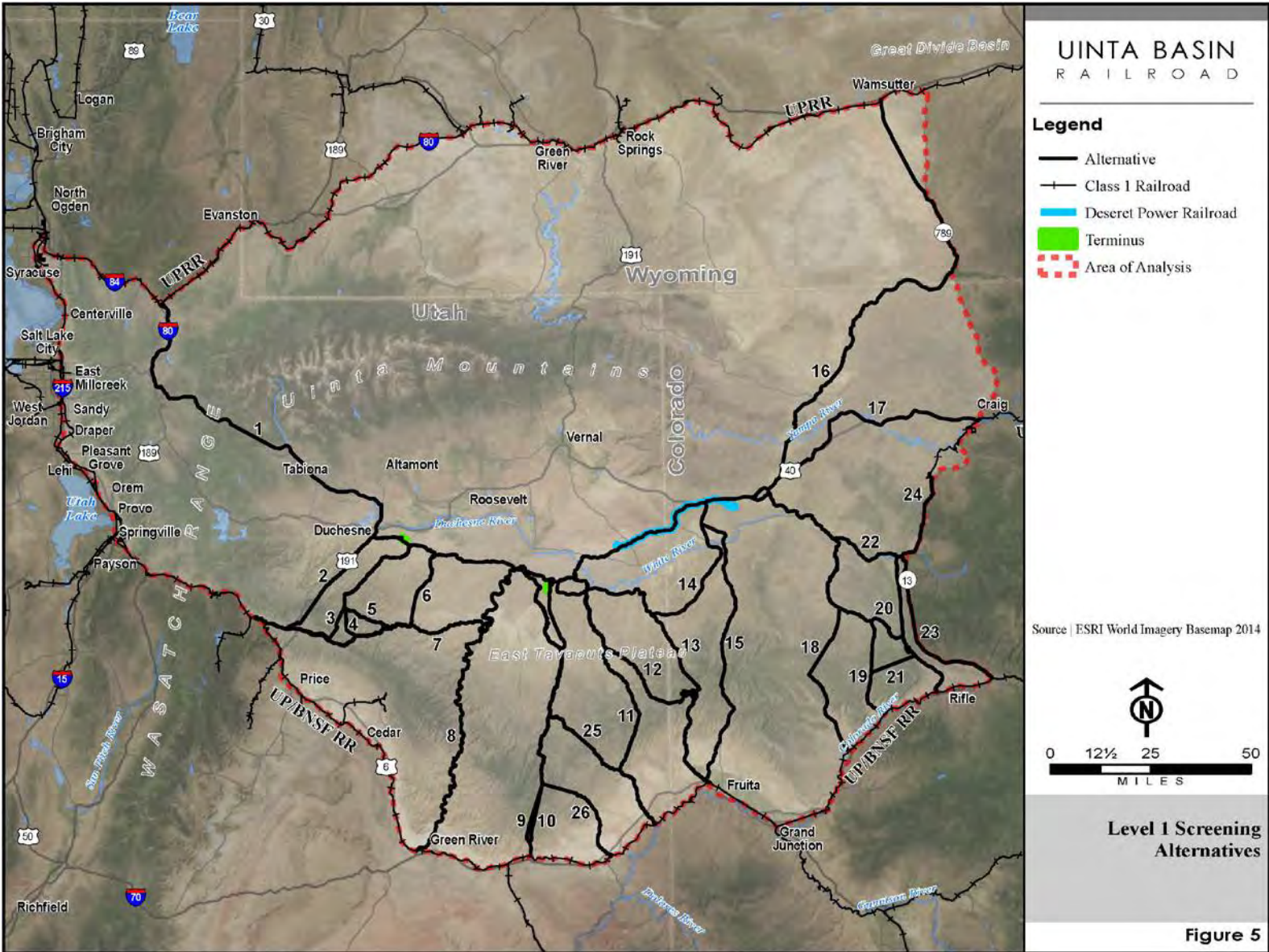
Alt.	Route Length (miles)	Tunnel(s) Length (miles)	Description
14	190	4.8	Alternative 14 starts in Mack, Colorado, at the UP/BNSF rail lines and heads north via Baxter Pass, generally following the abandoned Uintah Railway route. North of the pass, the alternative travels along Evacuation Creek, then heads northeast along Rio Blanco County Highway 23 to Rangely, Colorado. West of Rangely, the alternative runs along the Blue Mountain Highway to the Desert Western Railroad. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
15	178	3.2	Alternative 15 starts in Mack, Colorado, at the UP/BNSF rail lines and heads north via Douglas Pass, following Colorado State Highway 139 to Rangely, Colorado. The alternative continues north to a point immediately south of Coal Oil Rim, heads west to Blue Mountain Road, heads north following Blue Mountain Road to the Desert Western Railroad, then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
16	248	8.0	Alternative 16 starts in Wamsutter, Wyoming, at the UP rail line and heads south along Wamsutter Road to Wyoming State Highway 789 to Baggs, Wyoming. The alternative follows the Little Snake River to the confluence with the Yampa River, crossing the Yampa River just west of the junction of Park Service Road and County Road 143. The alternative follows County Road 143 to U.S. Highway 40 (U.S. 40), then connects to the Desert Western Railroad. The alternative then heads southwest, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
17	181	4.7	Alternative 17 starts in Craig, Colorado, at the UP rail line and heads southwest along U.S. 40 to Maybell, Colorado, where the alternative follows the Yampa River to Cedar Springs Draw, then heads south back to U.S. 40 to connect to the Desert Western Railroad. The alternative then heads southwest, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
18	200	9.1	Alternative 18 starts in DeBeque, Colorado, at the UP/BNSF rail lines and heads north up Roan Creek following County Road 204 to Clear Creek Road, then heads north along Clear Creek Road to Tom Creek, following Tom Creek north to the Book Cliffs. At the Book Cliffs, the alternative heads north to West Willow Creek. The alternative follows West Willow Creek to Willow Creek, then follows Willow Creek to Piceance Creek. The alternative follows Piceance Creek to Highway 64, then heads north to connect to the Desert Western Railroad. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
19	194	8.8	Alternative 19 starts in Parachute, Colorado, at the UP/BNSF rail lines, extending the existing American Soda Rail Spur northward along County Road 215 to Schutte Creek, then north to Piceance Creek. The alternative follows Piceance Creek to Colorado State Highway 64, then heads north to connect to the Desert Western Railroad. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
20	202	0.0	Alternative 20 starts in Rifle, Colorado, at the UP/BNSF rail lines and heads north following Colorado State Highway 13 to Piceance Creek. The alternative then follows Piceance Creek west and north to Colorado State Highway 64, then heads north to connect to the Desert Western Railroad. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.

Table 1. List of Preliminary Alternatives into the Uinta Basin

Alt.	Route Length (miles)	Tunnel(s) Length (miles)	Description
21	174	12.0	Alternative 21 starts in Parachute, Colorado, at the UP/BNSF rail lines, extending the existing American Soda Rail Spur northward along County Road 215 to the East Middle Fork Parachute Creek, where the alternative heads northeast to Colorado State Highway 13. The alternative follows State Highway 13 north to the connection with Colorado State Highway 64 near Meeker, Colorado. Near Meeker, the alternative heads west along State Highway 64 to connect to the Desert Western Railroad. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
22	200	0.0	Alternative 22 starts in Rifle, Colorado, at the UP/BNSF rail lines and heads north following Colorado State Highway 13 to the connection with Colorado State Highway 64 near Meeker, Colorado. Near Meeker, the alternative heads west along State Highway 64 to connect to the Desert Western Railroad. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
23	203	8.3	Alternative 23 starts in Newcastle, Colorado, at the UP/BNSF rail lines and heads northwest along Elk Creek, then west past Rifle Gap State Park. The alternative heads along West Rifle Creek adjacent to County Road 252, then north to Piceance Creek toward Meeker, Colorado, along Flag Creek. The alternative heads west along State Colorado Highway 64 to connect to the Desert Western Railroad. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
24	183	4.7	Alternative 24 starts in Axial, Colorado, at the UP rail line at the ColoWyo Mine and heads southward along Colorado State Highway 13 to Meeker, Colorado. The alternative heads west along Colorado State Highway 64 to connect to the Desert Western Railroad. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
25	134	7.9	Alternative 25 starts 35 miles east of Crescent Junction, Utah, at the UP/BNSF rail lines at Agate Siding Road. The alternative heads up the Westwater Creek drainage along Book Cliffs Road. At Preacher Canyon, the alternative enters a tunnel heading northwest to Rock Springs Canyon, then to Kelly Canyon to Willow Creek. The alternative heads along Willow Creek, then splits. One segment heads east to Seep Ridge Road about 6 miles southeast of the Green River, and the other segment heads west to a point 6 miles southeast of Duchesne, Utah.
26	141	9.9	Alternative 26 starts 27 miles east of Crescent Junction, Utah, at the UP/BNSF rail lines and heads north adjacent to Cisco Springs Road and then enters Cottonwood Canyon. At the intersection of Cottonwood and Upper Cottonwood Canyons, the alternative enters a tunnel heading northwest to She Canyon, then heads north to Willow Creek. The alternative splits, with one segment heading east to Seep Ridge Road about 6 miles southeast of the Green River and the other segment heading west to a point 6 miles southeast of Duchesne, Utah.

^a In this table, UP/BNSF means that UP owns the main track with BNSF having trackage rights.

Figure 5. Level 1 Screening Alternatives



2.2 Screening Process

The primary purpose of alternatives screening was to determine whether feasible and practicable rail alternatives were available that could connect to existing rail lines outside the Uinta Basin that are served by Class 1 railroads.

The UBRR team developed a common alignment for the proposed alternatives in the basin that would be used by all the 26 alternatives to allow an equal comparison of the alternatives (see Figure 6 on page 20). The common alignment has a western end point southeast of Duchesne, Utah, and an eastern end point about 10 miles south of Ouray, Utah, which is adjacent to the Green River.

After determining the feasible and practicable alternatives (see Section 7.0, Results of Preliminary Screening for Alternatives into the Uinta Basin) into the basin from the existing rail network, the UBRR team evaluated several alternatives within the basin that would provide a reasonable and practicable alignment to connect to the alternatives into the basin. Section 8.0, Overview of the Alternatives-Development and Screening Process for Alternatives within the Uinta Basin, describes the screening process for these alignments.

What was the purpose of alternatives screening?

The primary purpose of alternatives screening was to determine whether feasible and practicable rail alternatives were available that could connect to existing rail lines outside the Uinta Basin that are served by Class 1 railroads.

3.0 Level 1 Screening: Ability to Meet the Project's Purpose

The purpose of Level 1 screening was to identify alternatives that meet the purpose of the project. Alternatives that were determined to not meet the purpose of the project were considered unreasonable for NEPA purposes and not practicable for Clean Water Act Section 404(b)(1) purposes and were not carried forward for further analysis in Level 2 screening.

What was the purpose of Level 1 screening?

The purpose of Level 1 screening was to identify alternatives that meet the purpose of the project.

3.1 Level 1 Screening Criteria

Level 1 screening was the first major decision point at which alternatives were eliminated based on specific screening criteria. During Level 1 screening, the preliminary alternatives were screened against the following purpose criteria:

- The alternative must provide the Uinta Basin with two carrier access by connecting to existing rail lines served by both UP and BNSF in order to provide the opportunity for competitive pricing between railroads by providing competitive freight transportation services to the shippers and receivers in the Uinta Basin.

Providing a connection to only one of these railroads' systems could result in higher transportation costs than what could be realized if producers had competitive pricing from two Class 1 railroads. A connection to a single Class 1 railroad could increase net prices for commodities extracted, harvested, or manufactured in the basin or increase consumer prices for commodities consumed in the basin.

- The alternative must reduce truck travel distance on local, state, and federal roads to the rail line within the basin by providing a range of access points for all commodities. Providing multiple access points will also support the economic viability of the UBRR by providing access to more commodities to ship.

Providing a range of access points across the basin would allow more direct connections to transload facilities, thereby reducing truck travel from the shippers across the basin on local, state, and federal roads to the rail line. Providing a range of access points would reduce truck transportation cost and related road congestion. This would also provide shippers and receivers in the basin with an equal opportunity to share in the reduced transportation cost of the UBRR, thus increasing economic competition in the basin for goods and commodities consumed or produced in the basin.

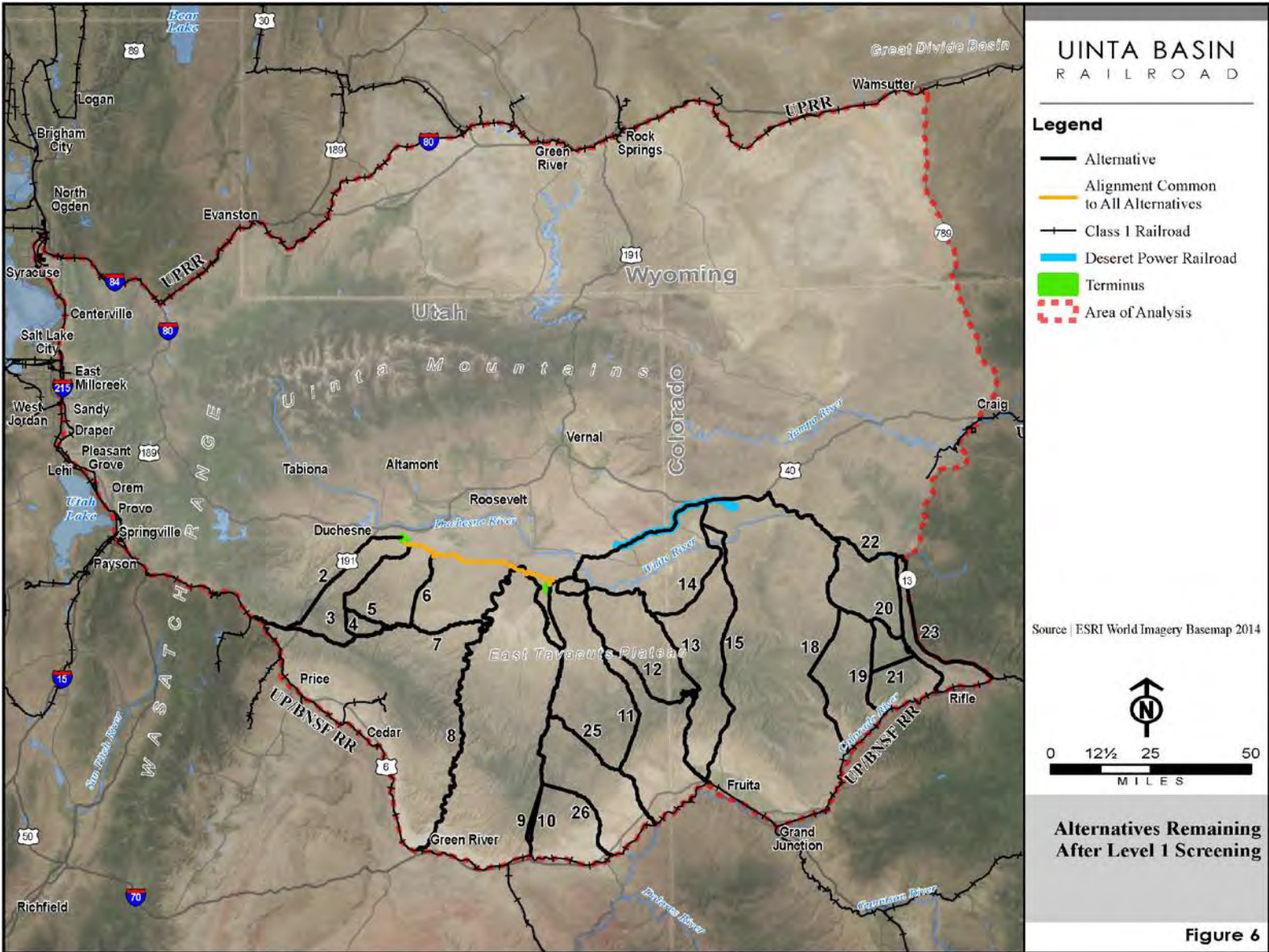
3.2 Level 1 Screening Results

The Level 1 screening results are summarized in Table 2 below. Of the 26 preliminary alternatives, Alternatives 1, 16, 17, and 24 did not pass Level 1 screening. These alternatives were eliminated because they did not provide a connection to rail lines served by the two Class 1 railroads (UP and BNSF) south and west of the Uinta Basin. The eliminated alternatives provided access to the UP rail line only. As a result of the Level 1 screening, the remaining 22 alternatives were advanced to Level 2 screening (see Figure 6 following the table).

Table 2. Level 1 Screening Results: Ability to Meet the Project's Purpose

Alt.	Level 1 Screening Criteria	
	Does the Alternative Connect to Both the UP and BNSF Rail Lines?	Does the Alternative Reduce Truck Travel Distance on Local, State, and Federal Roads to the Rail Line?
1	No	Yes
2	Yes	Yes
3	Yes	Yes
4	Yes	Yes
5	Yes	Yes
6	Yes	Yes
7	Yes	Yes
8	Yes	Yes
9	Yes	Yes
10	Yes	Yes
11	Yes	Yes
12	Yes	Yes
13	Yes	Yes
14	Yes	Yes
15	Yes	Yes
16	No	Yes
17	No	Yes
18	Yes	Yes
19	Yes	Yes
20	Yes	Yes
21	Yes	Yes
22	Yes	Yes
23	Yes	Yes
24	No	Yes
25	Yes	Yes
26	Yes	Yes

Figure 6. Alternatives Remaining after Level 1 Screening



4.0 Level 2 Screening: Constructability and Operational Feasibility

The purpose of Level 2 screening was to determine which alternatives are feasible and practicable based on their constructability and operational feasibility. The UPRR team made this determination by reviewing topography and aerial images.

What was the purpose of Level 2 screening?

The purpose of Level 2 screening was to determine which alternatives are feasible and practicable based on their constructability and operational feasibility.

4.1 Methodology

As described in the *Alternatives-Development and Screening Methodology Report*, the UPRR team used the following process to evaluate the 22 alternatives advanced from Level 1 screening:

1. The team developed basic alignments and footprints, based on a 100 foot right-of-way width, for the alternatives carried forward from Level 1 screening. During this step, the team attempted to minimize impacts to natural resources and the built environment.
2. Project engineers reviewed the alignments and the topography of the surrounding area to make sure that they met basic requirements for rail design. Preliminary engineering was performed during Level 2 screening to ensure that rail alternatives met basic engineering geometric requirements. During the development of the alternatives, the project engineers also identified the locations of tunnels in areas of steep topography.
3. The alternatives' footprints were rendered as digital GIS (geographic information system) files, and a GIS analysis was performed to determine the amount of the track grade and the length of the rail line.
4. The team created segments for each unique alignment for the alternatives considered in Level 2 screening. When developing the segments for the new alignments, the team used GIS data to show the locations of resources in order to minimize impacts to the natural and built environment where reasonably possible.
5. The alternatives were then screened against the Level 2 criteria listed in Table 3 on page 23.

4.2 Level 2 Screening Criteria

The main criterion used in Level 2 screening to determine whether an alternative was feasible and/or practicable was track grade, since the grade affects how and whether a train can operate. Grade is the factor that determines the number of cars that can be used per train, the number of trains that can operate per day, and a train's average speed.

For the UBRR project, the criterion for the grade is 2.4%. For mainline railways in North America intended for heavy and frequent trains, a grade of 2.4% has historically been considered the steepest grade that is economically and safely operable. The *de facto* standard limiting grade in the United States is slightly less, at 2.2%. (For more information, see the *Alternatives-Development and Screening Methodology Report*.)

Therefore, any alternative that exceeded 2.4% grade was determined not to be feasible and/or not practicable. In addition, an alternative was considered impractical to construct if it would be constructed in a canyon with high canyon walls, a high water flow that fills canyon floor, or a lack of continuous bench or beach for a rail line.

4.3 Level 2 Screening Results

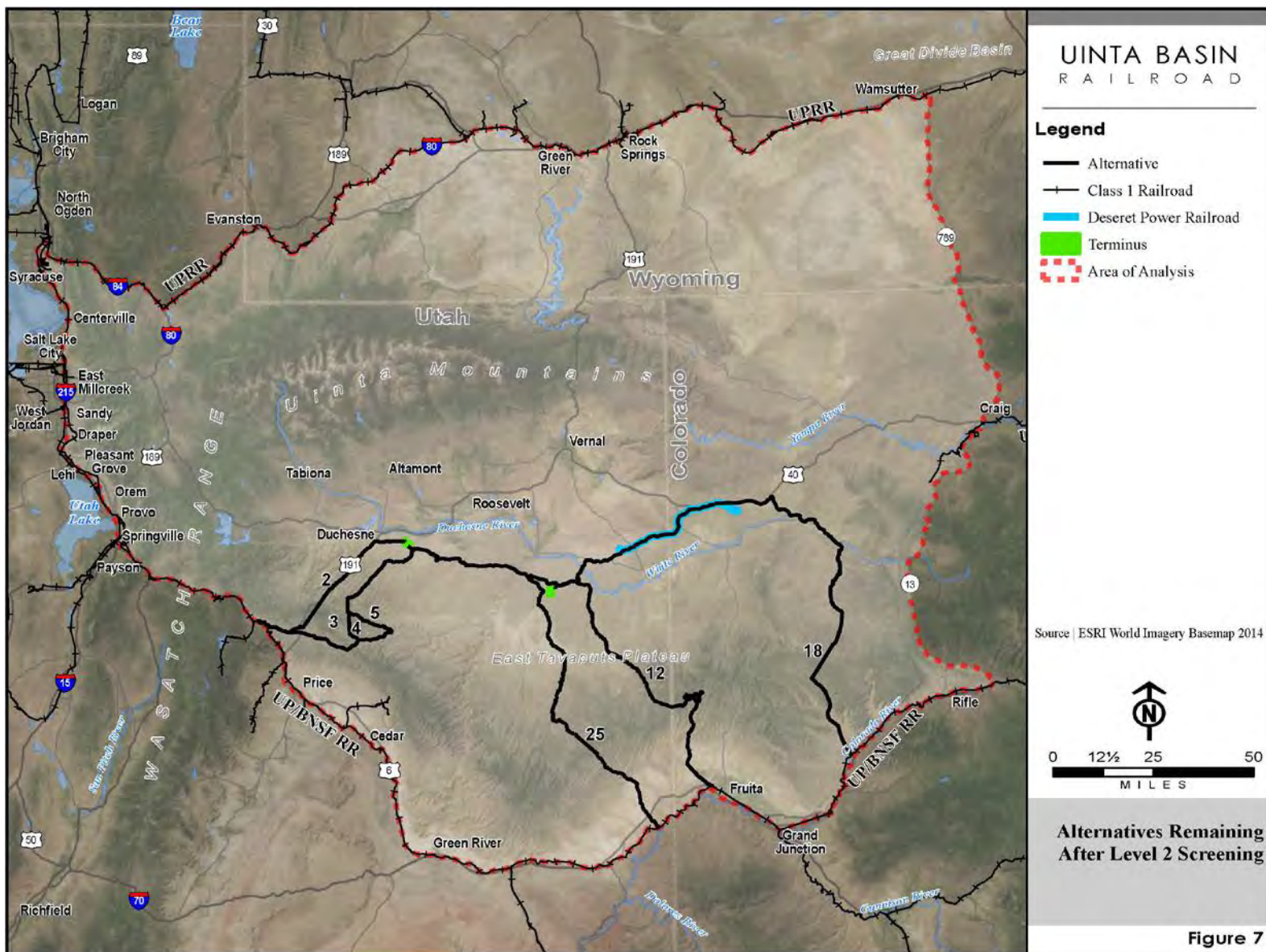
Of the 22 alternatives considered in Level 2 screening, 13 alternatives (Alternatives 6, 9, 10, 11, 13, 14, 15, 19, 20, 21, 22, 23, and 26) were eliminated because the grade of the alternative exceeded 2.4%. Two alternatives (Alternatives 7 and 8) were eliminated because they were located in the Green River Canyon, where it would be impractical to construct a rail line because of the height of canyon walls, a high water flow that fills canyon floor, or a lack of continuous bench or beach for a rail line. The alternatives that passed Level 2 screening were advanced for Level 3 screening (impacts to the natural and human environment; see Figure 7 following Table 3 below).

Table 3. Level 2 Screening Results: Constructability and Operational Feasibility

Alternatives-Screening Criterion	2	3	4	5	6	7	8	9	10	11	12	13	14	15	18	19	20	21	22	23	25	26
<i>Constructability/Operations</i>																						
Trains of up to 150 cars must be operable (yes/no) (No = grades exceed 2.4%)	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	No	No	Yes	No
As many as 24 trains per day must be operable (yes/no) (No = grades exceed 3%)	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Average train speeds between terminals, exclusive of meet and pass events, must be at least 30 miles per hour (mph) (yes/no) (No = grades exceed 2.4%)	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	No	No	Yes	No
Grades are at or below 2.4% (No = grades exceed 2.4%)	Yes (2.4%)	Yes (2.0%)	Yes (2.0%)	Yes (2.2%)	No (3.5%)	Yes (2.0%)	Yes (1.5%)	No (4.0%)	No (3.8%)	No (4.2%)	Yes (2.2%)	No (2.7%)	No (2.7%)	No (4.0%)	Yes (2.4%)	No (2.5%)	No (2.5%)	No (2.5%)	No (2.5%)	No (2.8%)	Yes (2.4%)	No (4.0%)
Impractical to construct due to height of canyon walls, high water flow that fills canyon floor, and lack of continuous bench or beach for a rail line (yes/no) (Yes = the alternative is impractical to construct)	No	No	No	No	No	Yes – Alternative follows Green River. Impractical to construct due to height of canyon walls, high water flow that fills canyon floor, and lack of continuous bench or beach for a rail line.	Yes – Alternative follows Green River. Deep canyon walls and river floodplain prohibit construction of a rail line.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

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Figure 7. Alternatives Remaining after Level 2 Screening



5.0 Level 3 Screening: Natural and Built Environment

The purpose of Level 3 screening was to determine which of the alternatives advanced from Level 2 screening are evaluated in Level 4 screening (alternative feasibility field review). The alternatives carried forward into Level 4 screening were determined by collectively evaluating their impacts to the natural and built environment and their estimated project costs. Table 4 on page 28 lists the Level 3 screening criteria.

What was the purpose of Level 3 screening?

The purpose of Level 3 screening was to determine which of the alternatives advanced from Level 2 screening are evaluated in Level 4 screening (alternative feasibility field review).

During the Level 3 screening process, the UBRR team found that none of the alternatives would avoid affecting the natural and built environment. The UBRR area of analysis contains suburban areas, resource-development infrastructure (such as oil pads, pipelines, and roads), farmland, sensitive wildlife and plant species, cultural resources, rivers and streams, wildlife habitat, and wetlands. Because of the high density of these community and natural resources, the team found that, in all situations, avoiding or minimizing impacts to one resource would cause additional impacts to other resources.

Since no alternatives would avoid affecting the natural and built environment, the UBRR team collectively evaluated each of the alternatives to determine which alternatives would best meet the purpose of the project with the lowest overall levels of impacts to the natural and built environment while still meeting the requirements of Section 404(b)(1) of the Clean Water Act and Section 4(f) of the Department of Transportation Act of 1966.

5.1 Methodology

As described in the *Alternatives-Development and Screening Methodology Report*, the UBRR team used the following process to evaluate the eight alternatives that were advanced from Level 2 screening:

1. The alternatives' footprints were rendered as digital GIS files, and a GIS analysis was performed to determine the amount of impacts for each alternative. Because many alternatives had common segments, the UBRR team was able to combine the segments to calculate the total Level 3 screening impacts for each alternative. When developing the segments the UBRR team used GIS data to show the locations of resources in order to minimize impacts to the natural and built environment where reasonably possible.
2. The alternatives' effects on the resources listed in Table 4 on page 28 were compared to determine the reasonable alternatives to be advanced to Level 4 screening.

During Level 3 screening, the UBRR team collectively evaluated the alternatives advanced from Level 2 screening for their ability to meet the project's purpose as well as their impacts and costs. If an alternative was similar to another alternative and was determined to have substantially higher impacts or costs without having substantially higher benefits, it was considered unreasonable for NEPA purposes and was not carried forward into Level 4 screening.

The alternatives that passed Level 3 screening were advanced into Level 4 screening.

5.2 Assumptions

The *Alternatives-Development and Screening Methodology Report* explains the Level 3 screening process and methodologies. To summarize, during Level 3 screening, the UBRR team used available resource data from local, state, and Federal agencies (see Appendix D) and GIS software to estimate how each alternative would affect the resources listed in Table 4 on page 28. The team used GIS analysis to estimate how each alternative might affect resources such as wetlands, waters of the U.S., wildlife habitat, farmland, existing and planned parks and trail systems, cultural resources, and community facilities (such as schools, senior centers, fire stations, and community gathering places). No field studies were conducted as part of gathering Level 3 screening data.

The UBRR team also used GIS analysis to identify the expected number of impacts to homes and businesses, potential property acquisitions, and potential community impacts. Using aerial photographs from 2012, the team reviewed the structures within or adjacent to the alternative alignments as represented in a data layer in a GIS file. If a structure was not within an alternative's right-of-way, the team concluded that the associated property would not need to be acquired.

5.2.1 Right-of-Way Widths

The amount of impacts to the resources listed in Table 4 on page 28 was determined based on the estimated right-of-way width and the typical cross-section of the rail alignment. In the Level 3 screening process, the right-of-way that the UBRR team assumed would be required is based on a 100-foot-wide right-of-way for main tracks between terminals and on actual footprints for freight terminals. In general, this right-of-way width would be sufficient for constructing, operating, and maintaining the rail line.

5.2.2 Costs

To summarize, the UBRR team used construction costs from representative and recent rail construction projects to estimate the costs per mile for the UBRR. Based on these projects, the team assumed a construction cost estimate of \$8 million per mile for a new rail alignment inclusive of earthwork, track, drainage structures, signal and communications, and maintenance access roads but exclusive of land acquisition, relocation of existing land uses, and environmental mitigation.

The team found few representative rail projects, since new rail construction on new alignments in the United States has been rare since the 1920s, and rail projects are highly variable in terms of topography, anticipated rail traffic levels, and requirements for grade-crossing signaling, grade-crossing structures, and terminal trackage. Nonetheless, the UBRR team used the following to calculate project costs:

- **Construction Costs.** The construction costs were based on the length of each facility included with each alternative. An estimated cost per mile (\$8 million per mile) for each facility type was used for the construction cost estimates.
- **Tunnel Costs.** Tunnel costs were based on an estimated cost of \$100 million per mile.
- **Relocation Costs.** Relocation costs were estimated by multiplying the number of estimated relocations by the estimated relocation cost for each category of relocation (residential, agricultural, commercial, industrial, institutional, and utility).
- **Right-of-Way Costs.** The right-of-way costs were estimated by multiplying the number of acres of each type of land use by the estimated right-of-way cost for each type of land use. The land-use acreages were calculated by overlaying the footprint of each alternative onto the land-use data layer in the GIS file.

- Wetland Mitigation Costs.** Wetland mitigation costs were estimated by assuming a cost of \$250,000 per acre of affected wetland. This cost was based on a recently completed Utah Department of Transportation (UDOT) wetland mitigation bank, where the cost of creating 1 acre of wetland was estimated to be \$125,000. Mitigation ratios for wetland impacts generally range from 1:1 to 3:1 (meaning that 1 to 3 acres of new wetlands are created for every 1 acre affected; Johnson 2011). The mitigation ratio depends on the type, quality, and jurisdictional status of the affected wetlands. Because these variables were not known during the alternatives screening process, the UBRR team assumed a mitigation ratio of 2:1 to conservatively estimate the costs.

5.3 Level 3 Screening Criteria

The screening criteria used in Level 3 screening are listed in Table 4.

Table 4. Level 3 Screening Criteria

Criterion	Measure
Cost	Estimated project cost (general).^a
Impacts to natural resources	- Acres of wetlands and other waters of the U.S. affected.^b - Acres of sensitive wildlife habitat affected. - Number of drainage crossings (includes streams, canals, or ditches). - Number and acres of Agriculture Protection Areas affected. - Acres of irrigated prime or unique farmland affected.^c - Acres of floodplain affected. - Acres of wilderness areas or wilderness study areas affected (areas of critical environmental concern, recreation management area, etc.).
Impacts to the built environment	- Number and area of parks and trails affected. - Acres of open recreation areas affected (U.S. Forest Service, Bureau of Land Management [BLM], tribal, state, county, or local). - Number of community facilities affected. - Number of potential property acquisitions, including residential, business, and utility acquisitions. - Number of Section 4(f)/Section 6(f) uses.^d - Number of cultural resources (for example, historic and archaeological resources) affected. ^e - Number of existing water and commodity wells/sites affected.

^a Cost is based on an alternatives' cost relative to that of the lowest-cost alternative.

^b Based on Clean Water Act requirements, an alternative with a substantially greater number of wetland impacts could be eliminated from detailed study.

^c This metric estimates the effects on soils identified by the U.S. Department of Agriculture as being prime or unique that are irrigated and actively farmed.

^d Based on the requirements of Section 4(f) of the Department of Transportation Act of 1966 and Section 6(f) of the Land and Water Conservation Fund Act, an alternative with a substantially greater number of Section 4(f) or Section 6(f) impacts could be eliminated from detailed study.

^e Sites include eligible sites, sites with unknown eligibility, and sites on the National Register of Historic Places.

5.4 Level 3 Screening Results

Table 5 below shows the results of Level 3 screening for each of the alternatives advanced to Level 3 screening. Appendix B, Level 3 Screening Results, provides a graphical depiction of the resources evaluated in Table 5. Based on the Level 3 screening evaluation, of the seven alternatives advanced to Level 3 screening, Alternatives 2, 3, 12, and 25 were carried forward into Level 4 screening (see Figure 8 following Table 5) and Alternatives 4, 5, and 18 were eliminated from further study.

5.4.1 Level 3 Screening Evaluation

This section explains why each alternative that advanced to Level 3 screening was eliminated during Level 3 screening or was advanced to Level 4 screening. This section also includes a description of the alternative's impacts and a determination for each alternative evaluated in Level 3 screening.

To evaluate the alternatives, the UBRR team grouped them into western and eastern alternatives based on their location relative to the Green River. Alternatives 2, 3, 4, and 5 are west of the Green River, and Alternatives 12, 18, and 25 are east of the Green River. Figure 7 on page 25 shows these alternatives; detailed maps of each alternative are provided in Appendix A, UBRR Alternative Maps.

If an alternative shared a similar alignment as another alternative and was determined by the team to have substantially higher impacts or costs without having substantially higher benefits, it was considered unreasonable for NEPA purposes. The team also considered Clean Water Act compliance by evaluating the alternatives' impacts to wetlands.

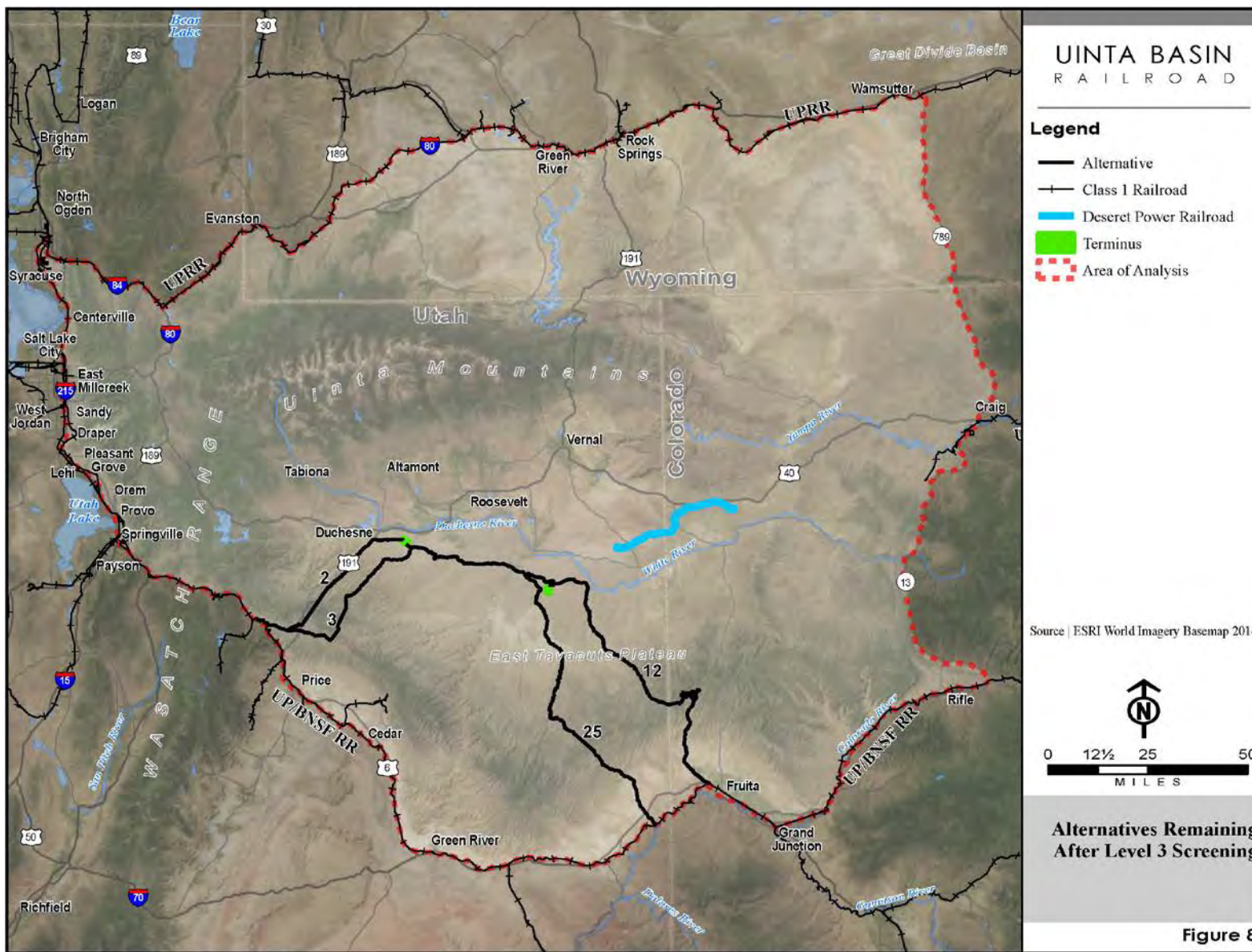
During the Level 3 screening evaluation, the team decided not to use floodplains as a screening factor because the completeness of floodplain data varied between alternatives. Therefore, the analysis would not accurately indicate the alternatives' impacts on floodplains.

As a result of the Level 3 screening evaluation, of the seven alternatives advanced to Level 3 screening, Alternatives 2, 3, 12, and 25 were carried forward into Level 4 screening (see Figure 8 following Table 5) and Alternatives 4, 5, and 18 were eliminated from further study.

Table 5. Level 3 Screening Results: Natural and Built Environment

Screening Criterion	Alternative						
	2	3	4	5	12	18	25
<i>Cost, Technology, and Logistics</i>							
Estimated project cost (general)	1.22	1.28	1.20	1.00	1.32	1.71	1.43
<i>Impacts to Natural Resources</i>							
Acres of wetlands and other waters of the U.S. affected	12.5	25.9	26.4	34.7	43.5	52.1	38.5
Acres of sensitive wildlife habitat affected	1,358	1,409	1,490	1480	1,618	2,300	1,481
Linear feet of drainage crossings (includes streams, canals, or ditches)	100,898	102,273	109,786	122,701	114,829	135,937	112,370
Number and acres of Agriculture Protection Areas affected	0	0	0	0	0	0	0
Acres of irrigated prime or unique farmland affected	6	15	39	38	11	247	57
Acres of wilderness areas or wilderness study areas affected (areas of critical environmental concern, recreation management area, etc.)	42	42	42	95	42	62	60
<i>Impacts to the Built Environment</i>							
Number and area of parks and trails affected	0	0	0	0	0	0	0
Number of community facilities affected	0	0	0	0	0	0	0
Number of potential property acquisitions, including residential, business, and utility acquisitions	15	15	16	15	18	18	14
Number of Section 4(f)/Section 6(f) uses	1	1	1	1	1	2	1
Number of cultural resources (for example, historic and archaeological resources) affected	21	22	28	52	40	46	99
Number of existing water and commodity wells/sites affected	1	1	1	1	1	9	1

Figure 8. Alternatives Remaining after Level 3 Screening



Western Alternatives (West of the Green River)

Alternatives 2, 3, 4, and 5 are west of the Green River. Of these, Alternatives 3, 4, and 5 are similar alternatives that start in Kyune, Utah, and share a common alignment in Sowers Canyon.

Alternative 2 (Indian Canyon Option)

Description

Alternative 2 starts in Kyune, Utah (southeast of Soldier Summit) at the UP/BNSF rail lines adjacent to U.S. 6. The alternative heads east along Emma Park Road to U.S. 191 and then follows U.S. 191 north through Indian Canyon to Duchesne, Utah, and then heads southeast and terminates at Seep Ridge Road about 10 miles southeast of the Green River.

Determination

Alternative 2 was advanced to Level 4 screening because it would have the lowest overall impact on wetlands, the lowest impact on sensitive wildlife habitat, the lowest amount of streams impacted, the lowest amount of prime or unique farmland impacted, only one Section 4(f) resource impacted, the fewest number of cultural resources impacted, and the third-lowest overall cost of the Level 3 alternatives.

Cost. Alternative 2 would have the third-lowest cost of the seven alternatives considered in Level 3 screening.

Wetlands. Alternative 2 would have the lowest amount of wetlands impacted at 12.5 acres.

Sensitive Wildlife Habitat. Alternative 2 would have the lowest amount of sensitive wildlife habitat impacted at 1,358 acres. Of that habitat, the two types of habitat with the greatest impacts would be greater sage grouse habitat (1,190 acres) and the black-footed ferret habitat (122 acres).

Wilderness Areas. Alternative 2 would impact 42 acres of two Bureau of Land Management (BLM) Areas of Critical Environmental Concern (ACEC), which was the lowest impact along with Alternatives 3, 4, and 12.

Streams. Alternative 2 would have the lowest number of drainage crossings at 100,898 linear feet.

Prime and Unique Farmland. Alternative 2 would have the lowest amount of irrigated prime and unique farmland impacted at 6 acres.

Section 4(f) uses. Alternative 2 would use 3 acres of one Section 4(f) resource (a wildlife refuge), which was the lowest impact along with Alternatives 3, 4, 5, 12, and 25.

Cultural Resources. Alternative 2 would have the fewest number of cultural resources impacted (21 sites).

Property Acquisitions. Alternative 2 would have the second-fewest property acquisitions (15 businesses consisting of oil production sites).

Alternatives 3, 4, and 5 (Sowers Canyon Options)

Alternatives 3, 4, and 5 are similar alternatives that start in Kyune, Utah, and share a common alignment in Sowers Canyon. Since the three alternatives have three areas with a common alignment and would provide similar operational benefits, the UBRR team decided to evaluate these alternatives as a group to determine which were reasonable under NEPA and practicable under the Clean Water Act Section 404(b)(1) guidelines.

Descriptions

Alternatives 3, 4, and 5 start in Kyune, Utah (southeast of Soldier Summit) at the UP/BNSF rail lines adjacent to U.S. 6. The alternatives head east along Emma Park Road to U.S. 191, then head east on Whitmore Park Plateau. The only variation of these alternatives is in how they connect to Sowers Canyon.

- **Alternative 3.** Just west of Nine Mile Canyon Road, three tunnels connect the alternative to Sowers Canyon.
- **Alternative 4.** The alternative enters Nine Mile Canyon along Nine Mile Canyon Road. The alternative heads north up Nine Mile Canyon to Minnie Maud Canyon, then heads west along Minnie Maud Road for about 3 miles. Two tunnels connect the alignment to Sowers Canyon.
- **Alternative 5.** The alternative enters Nine Mile Canyon along Nine Mile Canyon Road. The alternative heads north up Nine Mile Canyon to Argyle Canyon, then heads west in the canyon for about 13 miles to a tunnel that connects the alternative to Sowers Canyon.

Once in Sowers Canyon, all three alternatives head north to Antelope Canyon, where the alternatives head both west and east. The west segment heads west, terminating 6 miles southeast of Duchesne, Utah, and the east segment heads southeast, terminating at Seep Ridge Road about 10 miles southeast of the Green River.

Determination

Of the three Sower Canyon alternatives, Alternative 3 was advanced to Level 4 screening for having the lowest overall impact on wetlands, the lowest impact on sensitive wildlife habitat, the lowest amount of streams impacted, the lowest amount of prime or unique farmland impacted, only one Section 4(f) resource impacted, and the fewest number of cultural resources impacted. Overall, Alternative 3 would have the fewest impacts to the natural and cultural environment compared to Alternatives 4 and 5 and would provide similar benefits in terms of meeting the project's purpose.

Cost. Of the three alternatives, Alternative 5 would have the lowest cost because it would require only a single tunnel. Alternative 3 would have the highest cost because it would require three tunnels.

Wetlands. Of the three alternatives, Alternative 3 would have the lowest impacts (25.9 acres) followed by Alternative 4 (26.4 acres) and Alternative 5 (34.7 acres).

Sensitive Wildlife Habitat. Of the three alternatives, Alternative 3 would have the lowest impacts (1,409 acres, of which the two types of habitat with the greatest impacts would be greater sage grouse habitat [1,256 acres] and black-footed ferret habitat [122 acres]) followed by Alternative 5 (1,480 acres, of which the two types of habitat with the greatest impacts would be greater sage grouse habitat [1,328 acres] and black-footed ferret habitat [122 acres]) and Alternative 4 (1,490 acres, of which the two habitat types with the greatest impacts would be greater sage grouse habitat [1,338 acres] and black-footed ferret habitat [122 acres]).

Wilderness Areas. Of the three alternatives, Alternatives 3 and 4 would have the same impact on wilderness areas (42 acres of two BLM ACECs) followed by Alternative 5 (95 acres of four BLM ACECs).

Streams. Of the three alternatives, Alternative 3 would have the lowest impacts (102,273 linear feet) of drainage crossings followed by Alternative 4 (109,787 linear feet) and Alternative 5 (122,701 linear feet).

Prime and Unique Farmland. Of the three alternatives, Alternative 3 would have the lowest impacts (15 acres) followed by Alternative 5 (38 acres) and Alternative 4 (39 acres).

Section 4(f) uses. All three alternatives would use 3 acres of one Section 4(f) resource (a wildlife refuge).

Cultural Resources. Of the three alternatives, Alternative 3 would have the lowest impacts (22 sites) followed by Alternative 4 (28 sites) and Alternative 5 (52 sites).

Property Acquisitions. Of the three alternatives, Alternatives 3 and 5 would have the lowest impacts (15 businesses) followed by Alternative 4 (16 businesses consisting of oil production sites).

During the development of alternatives, the initial alternative in the area of Nine Mile Canyon was Alternative 6, which followed the existing Nine Mile Canyon Road. Nine Mile Canyon is known for its extensive rock art and other cultural resources created by the Fremont culture and the Ute people. Because of the sensitive nature of this canyon, the UBRR team developed Alternatives 3, 4, and 5 to minimize or avoid impacts to these sensitive cultural resources. Of the three alternatives, only Alternative 3 completely avoids Nine Mile Canyon.

Eastern Alternatives (East of the Green River)

Alternatives 12, 18, and 25

Descriptions

- **Alternative 12.** Alternative 12 starts in Mack, Colorado, at the UP/BNSF rail lines and heads north via Baxter Pass Road to Railroad Canyon, where the alternative heads west to Bitter Creek Canyon. The alternative follows Bitter Creek to East Bench, then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
- **Alternative 18.** Alternative 18 starts in DeBeque, Colorado, at the UP/BNSF rail lines and heads north up Roan Creek following County Road 204 to Clear Creek Road, then heads north along Clear Creek Road to Tom Creek, following Tom Creek north. At the Book Cliffs, the alternative heads north to West Willow Creek. The alternative follows West Willow Creek to Willow Creek, then follows Willow Creek to Piceance Creek. The alternative follows Piceance Creek to Highway 64, then heads north to connect to the Desert Western Railroad. The alternative then heads west, crossing Seep Ridge Road about 6 miles southeast of the Green River and terminating 6 miles southeast of Duchesne, Utah.
- **Alternative 25.** Alternative 25 starts 35 miles east of Crescent Junction, Utah, at the UP/BNSF rail lines at Agate Siding Road. The alternative heads up the Westwater Creek drainage along Book Cliffs Road. At Preacher Canyon, the alternative enters a tunnel heading northwest to Rock Springs Canyon, then to Kelly Canyon to Willow Creek. The alternative heads along Willow Creek, then splits. One segment heads east to Seep Ridge Road about 6 miles southeast of the Green River, and the other segment heads west to a point 6 miles southeast of Duchesne, Utah.

Determination

Of the three eastern alternatives, Alternatives 12 and 25 were advanced to Level 4 screening. Alternative 18 was eliminated from consideration in Level 4 screening for having the greatest wetland impacts, the greatest impacts on sensitive wildlife habitat, the greatest impacts to irrigated prime and unique farmland, the highest amount of streams impacted, the greatest impact to wilderness areas, the only alternative that would be within 100 meters (328 feet) of two schools, the most Section 4(f) resources used, and the highest cost of any of the seven Level 3 alternatives. Overall, Alternative 18 would have the most impacts to the natural and human environment of any of the Level 3 alternatives without providing any additional benefit in terms of meeting project's purpose.

Cost. Of the three alternatives, Alternative 12 would have the lowest cost.

Wetlands. Of the three alternatives, Alternative 25 would have the lowest impacts (38.5 acres) followed by Alternative 12 (43.5 acres) and Alternative 18 (52.1 acres).

Sensitive Wildlife Habitat. Of the three alternatives, Alternative 25 would have the fewest impacts (1,481 acres, of which the two types of habitat with the greatest impacts would be greater sage grouse habitat [1,170 acres] and black-footed ferret habitat [310 acres]) followed by Alternative 12 (1,618 acres, of which the two types of habitat with the greatest impacts would be greater sage grouse habitat [1,030 acres] and black-footed ferret habitat [578 acres]) and Alternative 18 (2,300 acres, of which the two types of habitat with the greatest impacts would be greater sage grouse habitat [1,491 acres] and black-footed ferret habitat [770 acres]).

Wilderness Areas. Of the three alternatives, Alternative 12 would have the fewest impacts on wilderness areas (42 acres of three BLM ACECs) followed by Alternative 25 (42 acres of two BLM ACECs and 18 acres of two Wilderness Study Areas) and Alternative 18 (62 acres of five BLM ACECs).

Streams. Of the three alternatives, Alternative 25 would have the fewest impacts on drainage crossings (112,370 linear feet) followed by Alternative 12 (114,829 linear feet) and Alternative 18 (135,937 linear feet).

Prime and Unique Farmland. Of the three alternatives, Alternative 12 would have the lowest impacts (11 acres) followed by Alternative 25 (57 acres) and Alternative 18 (246 acres).

Section 4(f) uses. Of the three alternatives, Alternatives 12 and 25 would use 3 acres of one Section 4(f) resource (a wildlife refuge), and Alternatives 18 would use 27 acres of two Section 4(f) resources (federal and state wildlife refuge/areas).

Cultural Resources. Of the three alternatives, Alternative 12 would have the lowest impacts (40 sites) followed by Alternative 18 (46 sites) and Alternative 25 (99 sites).

Property Acquisitions. Of the three alternatives, Alternatives 25 would have the lowest impacts (14 businesses) followed by Alternative 12 (three homes and 15 businesses) and Alternative 18 (one home and 17 businesses). The business impacts are direct takes of oil production sites.

5.4.2 Level 3 Screening Section 404(b)(1) Practicability Review

Seven alternatives were evaluated as part of Level 3 screening.

Alternative 18 would have the highest acres of wetland impacts (52.1 acres) of any of the seven alternatives.

Alternative 4 (26.4 acres) and Alternative 5 (34.7 acres) would have fewer acres of wetland impacts than would Alternative 25 (38.5 acres) and Alternative 12 (43.5 acres). However, because Alternatives 4 and 5 would be located within the sensitive cultural area of Nine Mile Canyon and could impact the cultural resources in this canyon, they were determined to be not practicable under Section 404(b)(1).

Alternatives 4, 5, and 18 were eliminated from further study in Level 3 screening. Alternative 2 (12.5 acres) and Alternative 3 (25.9 acres) would have the lowest wetland impacts of any of the seven Level 3 alternatives and so were advanced to Level 4 screening, along with Alternatives 12 and 25.

6.0 Level 4 Screening: Alternative Feasibility Field Review

6.1 Level 4 Screening Criteria

From February 24 to February 26, 2014, the UBRR team conducted Level 4 screening (alternative feasibility field review) on the four alternatives (Alternatives 2, 3, 12, and 25) that passed Level 3 screening. The purpose of Level 4 screening was to determine, based on field observations, whether an alternative could be constructed. The field review included items such as topography, water courses, slope stability, wetlands and other natural environment features, existing infrastructure (roads, electrical lines, pipelines, and so on), community facilities, and existing buildings.

What was the purpose of Level 4 screening?

The purpose of Level 4 screening was to determine, based on field observations, whether an alternative could be constructed.

6.2 Level 4 Screening Results

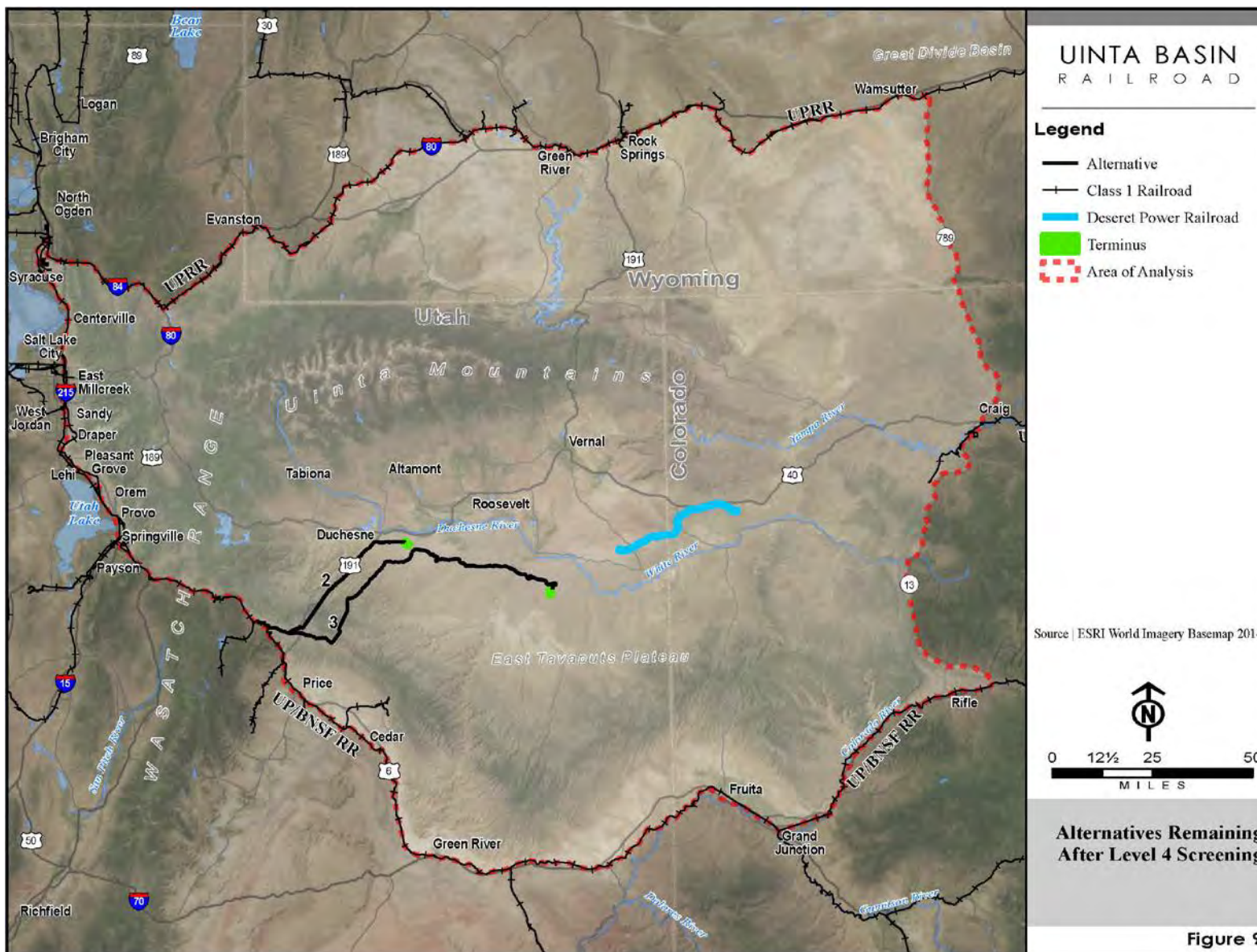
Appendix C, Level 4 Screening Field Review, provides the detailed field review report for Level 4 screening.

After the field review, the team developed more-refined digital maps and determined that Alternative 25 would have a grade of 2.8%. This grade would not pass the Level 2 grade criterion of 2.4%, so Alternative 25 was eliminated. Also, Alternative 25 would be built in Willow Creek Canyon. Based on the field review, the team determined that the canyon was narrow, the canyon had numerous curves, and the valley floor had a high likelihood of flooding.

After reviewing Alternative 12, the team determined that the steep slopes and loose material in the Baxter pass area would make construction and operation of a rail line not feasible or practicable. The team determined that, given the steep slopes, it would not be possible to build the main rail line along with sidings and the area would be susceptible to rock slides, thereby making long-term operation difficult.

Based on the feasibility field review, the UBRR team determined that Alternatives 2 and 3 would be feasible to construct based on field observations and that Alternatives 12 and 25 would not be feasible or practicable to construct (see Figure 9 below).

Figure 9. Alternatives Remaining after Level 4 Screening



7.0 Results of Preliminary Screening for Alternatives into the Uinta Basin

Using the four-level screening process, the UBRR team determined that Alternatives 2 and 3 are both feasible and practicable alternatives and would be evaluated further (see Section 10.0, Alternatives Refinement and Evaluation). Of the seven alternatives that met both the purpose and 2.4%-grade requirements from Level 1 and 2 screening, Alternatives 2 and 3 would have the least amount of impacts to wetlands, sensitive wildlife habitat, drainages, wilderness areas, Section 4(f) resources, and cultural resources. These two alternatives will undergo additional engineering refinement to further avoid natural and human resources (see Section 10.0).

8.0 Overview of the Alternatives-Development and Screening Process for Alternatives within the Uinta Basin

As described in Section 7.0, Results of Preliminary Screening for Alternatives into the Uinta Basin, based on the screening criteria, the UBRR team determined that Alternatives 2 and 3 were reasonable and practicable alternatives to construct a rail line into the Uinta Basin. This section evaluates alternatives to connect to Alternatives 2 and 3 inside the basin.

8.1 Screening Process for Alternatives within the Uinta Basin

8.1.1 Screening Criteria

To evaluate the alternatives within the Uinta Basin, the UBRR team streamlined the screening criteria, since the need to connect to both Class 1 railroads had been addressed with the south connection points of Alternatives 2 and 3. The screening criteria were divided into three categories: (1) transportation connections, (2) constructability and operational feasibility (see Section 4.0, Level 2 Screening: Constructability and Operational Feasibility), and (3) impacts to the natural and built environment (see Section 5.0, Level 3 Screening: Natural and Built Environment). The screening criteria for constructability and operational feasibility and for impacts to the natural and built environment are the same as those described in Sections 4.0 and 5.0.

Part of the project purpose is to reducing shipping costs. Within the basin, the rail line, including transload facilities, should be located in an area near major transportation corridors that can be readily accessed by trucks and personnel from the main industrial, population, and resource-development centers.

To help the UBRR team better understand the transportation needs in the basin, the team conducted interviews with potential rail users in April 2014. For the rail line to be commercially viable, potential rail users asked that the selected alternative be located in an area that will be readily used by potential shippers and receivers. The potential users interviewed said that they would benefit from two different types of rail terminals:

- An outbound terminal where they could truck resources for loading into rail cars
- An inbound terminal to receive materials required for drilling new wells and construction projects, materials such as drill stems, well casings, collection pipes, fracturing sand, cement, drilling fluids, and lumber

Potential users said that a site in the western area of the basin that is readily accessible to U.S. 40 and U.S. 191 at Duchesne, and that is reached from Duchesne, would be a preferred location for transloading outbound shipments. Potential users who were asked about a potential southern location in the Seep Ridge Road area south of the Green River said that the location is probably too far from the bases of operation for the producers and the trucking companies.

Potential users suggested several potential locations for a terminal that could receive inbound shipments of fracturing sand, tubular steel, cement, etc. Some preferred a location on the basin's west side, near Duchesne, while others expressed interest in a location on the basin's east side that would be readily accessible from Roosevelt, Vernal, or both along U.S. 40. Potential users said that terminals must be near major infrastructure and roads, must have good truck access, and must be easily reached from urban areas such as Vernal, Duchesne, and Roosevelt. Based on the interviews, the UBRR team developed the following criteria for determining transload locations:

- **Are the transload facilities for the alternative inside the basin near U.S. 40, the major transportation facility?** Transload facilities near U.S. 40 would reduce trucking distances because the highway provides a centrally located trucking route between existing businesses in Duchesne, Roosevelt, and Vernal and the resource-development areas north and south of the highway.
- **Are the transload facilities and connecting alternatives located near the cities of Duchesne, Roosevelt, and Vernal?** Potential users said that a site in the western area of the basin that is readily accessible to U.S. 40 and U.S. 191 at Duchesne, and that is reached from Duchesne, would be a preferred location for transloading outbound shipments. Potential users suggested several potential locations for a terminal that could receive inbound shipments of fracturing sand, tubular steel, cement, etc. Some preferred a location on the basin's west side, near Duchesne, while others expressed interest in a location on the basin's east side that would be readily accessible from Roosevelt, Vernal, or both.

8.1.2 Alternatives-Development Process

Three potential alternatives within the basin were developed based on topography and proximity to cities and existing road networks. All three alternatives connect to Alternatives 2 and 3 and head east across the basin between the cities of Duchesne and Vernal. These alternatives are shown in Figure 10 below and described in Table 6 following the figure.

Figure 10. Alternatives within the Uinta Basin

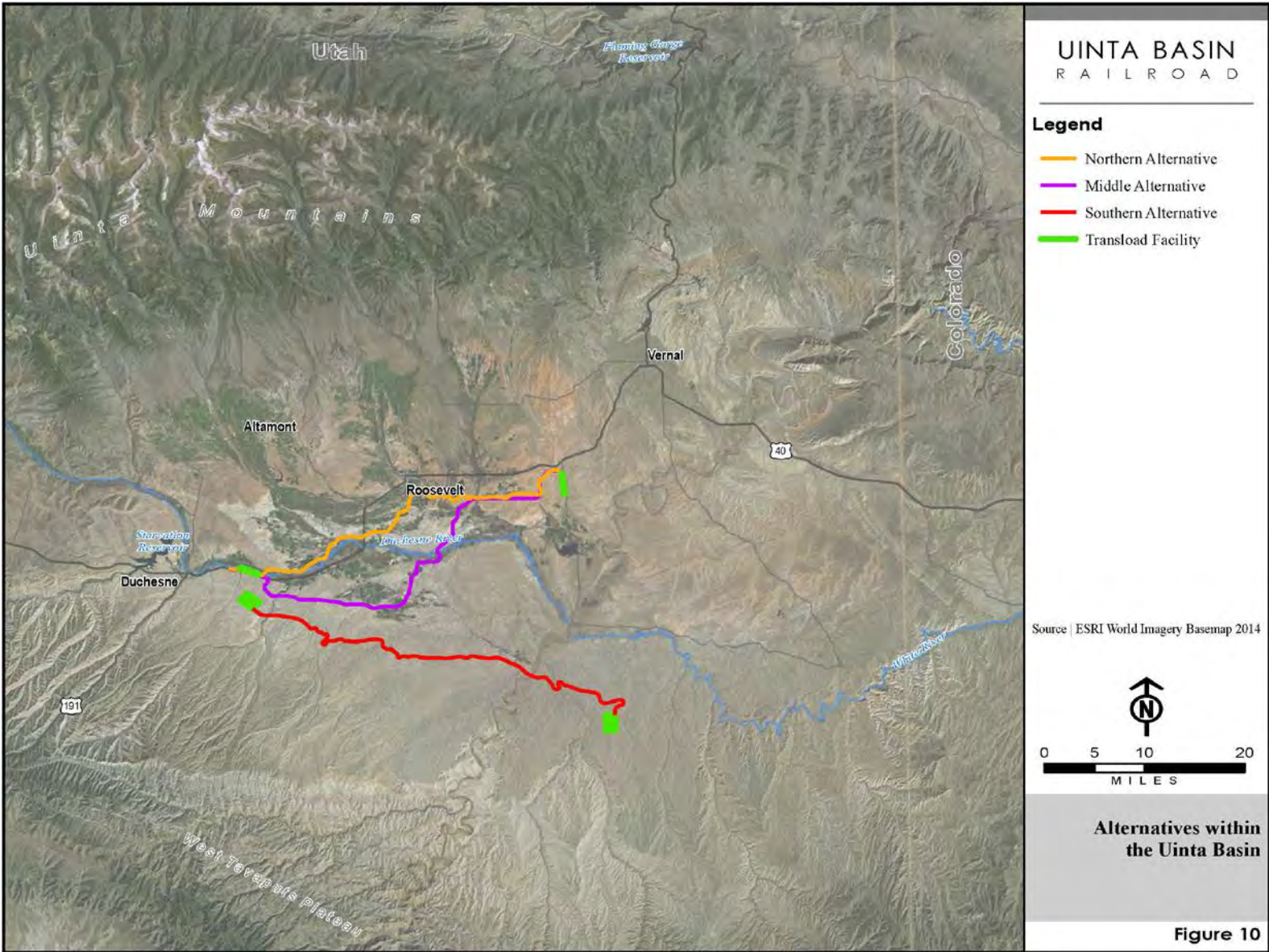


Table 6. List of Preliminary Alternatives within the Uinta Basin

Alt.	Route Length (miles)	Description
North	43	The west transload facility is about 3 miles east of Duchesne, Utah, immediately south of U.S. 40. From the transload facility, the alignment crosses U.S. 40 and the Duchesne River to the north about 1 mile west of Bridgeland, Utah. The alignment follows the Duchesne River to the east on the bench above the river and crosses U.S. 40 again about 1 mile north of Myton, Utah. From the crossing, the alignment heads east south of U.S. 40 to the second transload facility at the junction of U.S. 40 and state Route (SR) 88.
Middle	50	The west transload facility is about 3 miles east of Duchesne, Utah, immediately south of U.S. 40. From the transload facility, the alignment heads southeast onto the bluff about 2 miles south of Bridgeland, Utah, and then heads east. The alignment crosses 5880 West about 5.5 miles south of Myton, Utah, then heads northeast to the second transload facility at the junction of U.S. 40 and SR 88.
South	46	The west transload facility is about 5 miles east of Duchesne, Utah, and about 3 miles south of U.S. 40. From the transload facility, the alignment heads east southeast and crosses the Green River about 7 miles south of Ouray, Utah, and connects to the second transload facility just east of SR 88 about 10 miles south of the Green River.

8.1.3 Transportation Connection Screening

As discussed in Section 8.1.1, Screening Criteria, potential rail users said that a transload facility in the western area of the basin that is readily accessible to U.S. 40 and U.S. 191 at Duchesne, and that is reached from Duchesne, would be a preferred location for transloading outbound shipments. Potential users also said that terminals must be near major infrastructure and roads, must have good truck access, and must be easily reached from urban areas such as Vernal, Duchesne, and Roosevelt along U.S. 40.

As shown in Table 7, only the North and Middle Alternatives meet the transportation connection criteria, since their transload facilities and rail alignment would be located near Duchesne, near U.S. 40, and close to both Roosevelt and Vernal, Utah. Both of these alternatives' transload facilities would be immediately adjacent to U.S. 40, thereby providing excellent truck and personnel access from the cities in the basin.

Table 7. Transportation Connection Screening Results

Alternatives-Screening Criterion	North Alternative	Middle Alternative	South Alternative
Are the transload facilities and the alternative alignment near U.S. 40, the major transportation facility?	Yes	Yes	No
Are the transload facilities and alternative alignments located near the cities of Duchesne, Roosevelt, and Vernal?	Yes	Yes	No

The South Alternative's western transload facility would be about 5 miles east of Duchesne and 3 miles south of U.S. 40, and its eastern transload facility would be about 26 miles south of the junction of U.S. 40 and SR 88 (10 miles south of the Green River). Although these locations would benefit resource development on the south side of the basin, they would require long travel distances from resource-development areas north of U.S. 40 and from the cities in the basin, thus increasing the amount of truck travel for all resources and materials developed and used in the basin compared to the North and Middle Alternatives.

In addition, the west transload facility for the South Alternative would require a new hard-surface road to be built from U.S. 40, while the other transload facilities for the North and Middle Alternatives are immediately adjacent to existing paved roads. The South Alternative would also require a major bridge crossing of the Green River (about 900 feet long) and would cross a BLM-designated Area of Critical Environmental Concern associated with the Green River floodplain that was established to protect sensitive species in this riparian floodplain area.

None of the proposed transload facilities would be adjacent to urban population centers, so they would minimize land-use and operational conflicts with communities.

8.1.4 Constructability and Operational Feasibility Screening

The North and Middle Alternatives meet all constructability and feasibility screening criteria.

8.1.5 Natural and Built Environment Screening

Table 8 below shows the results of the natural and built environment screening for the North and Middle Alternatives. Of the two alternatives, the Middle Alternative was considered feasible and practicable because it would have fewer wetland impacts (19 acres less), fewer linear feet of stream crossings, fewer acres of prime farmland affected, no property acquisitions, and fewer cultural resources affected.

Because of the proximity of the North Alternative to developed areas, it would have 27 homes within 100 feet of the rail alignment, while the Middle Alternative would have seven. The Middle Alternative would affect more acres of sensitive wildlife habitat (183 acres), of which 178 acres are greater sage grouse habitat and 5 acres are black-footed ferret habitat. The North Alternative would affect 146 acres of greater sage grouse habitat and 1 acre of black-footed ferret habitat.

Overall, the North Alternative would have more impacts on the natural and human environment than would the Middle Alternative without providing any additional benefit in terms of meeting the project's purpose. Therefore, the North Alternative was eliminated from detailed consideration.

8.1.6 Section 404(b)(1) Practicability Review for Alternatives within the Uinta Basin

Of the two alternatives evaluated for impacts to the natural and built environment, the Middle Alternative would have fewer impacts on wetlands (3 acres) than the North Alternative (22 acres). The North Alternative was eliminated because of its higher impacts on most resources than the Middle Alternative.

Table 8. Alternatives within the Basin Screening Results: Natural and Built Environment

Screening Criterion	Alternative	
	North	Middle
<i>Cost, Technology, and Logistics</i>		
Estimated project cost (general)	Lowest	Highest
<i>Impacts to Natural Resources</i>		
Acres of wetlands and other waters of the U.S. affected	22	3
Acres of sensitive wildlife habitat affected	183	147
Linear feet of drainage crossings (includes streams, canals, or ditches)	16,982	26,636
Number and acres of Agriculture Protection Areas affected	0	0
Acres of irrigated prime or unique farmland affected	17	30
Acres of wilderness areas or wilderness study areas affected (areas of critical environmental concern, recreation management area, etc.)	0	0
<i>Impacts to the Built Environment</i>		
Number and area of parks and trails affected	0	0
Number of community facilities affected	0	0
Number of potential property acquisitions, including residential, business, and utility acquisitions	0	6
Number of Section 4(f)/Section 6(f) uses	0	0
Number of cultural resources (for example, historic and archaeological resources) affected	14	19
Number of existing water and commodity wells/sites affected	0	0

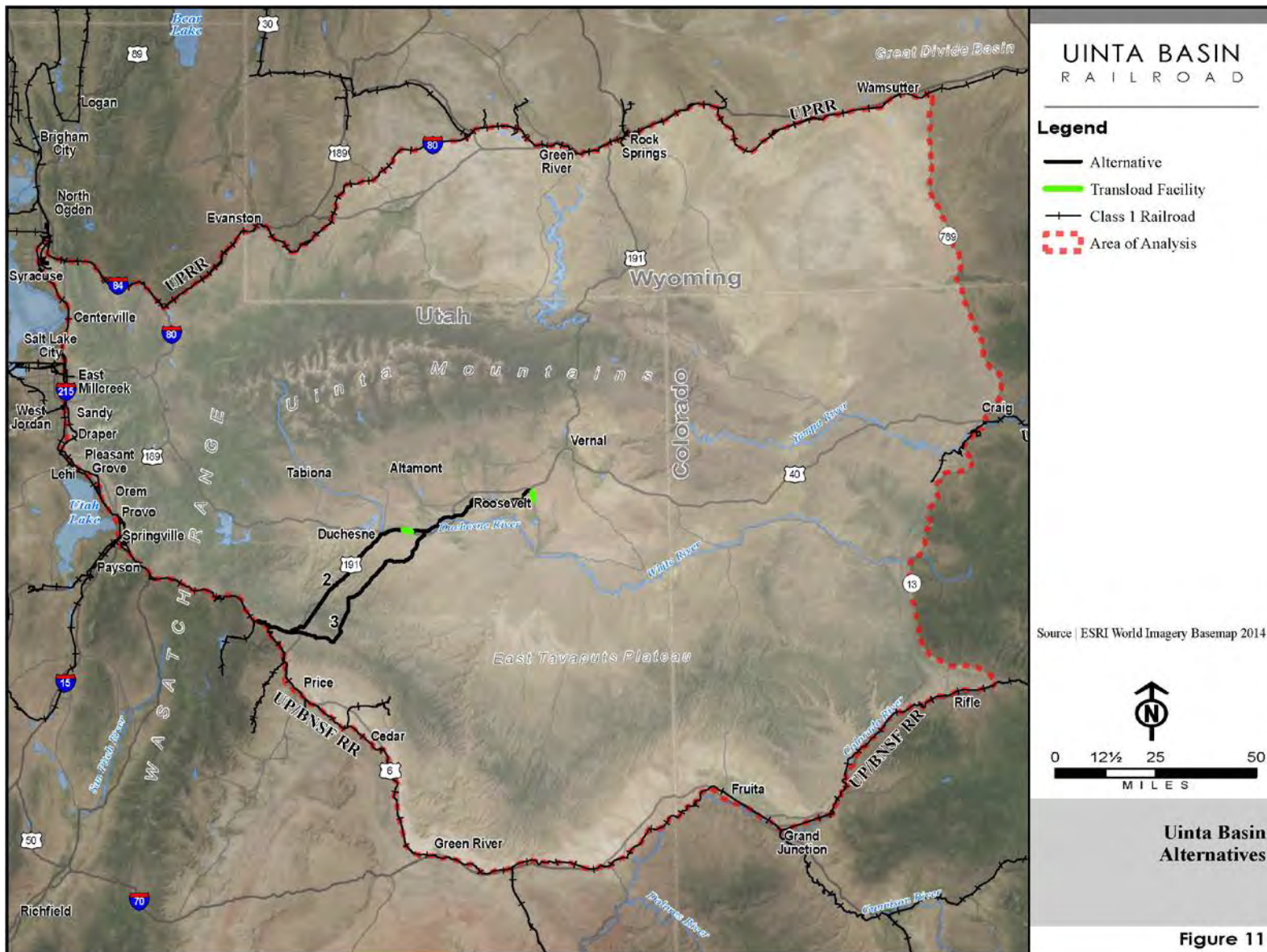
8.1.7 Results of Screening for Alternatives within the Uinta Basin

Using the screening process, **the UBRR team determined that the Middle Alternative is both feasible and practicable.** Of the three alternatives within the Uinta Basin, the Middle Alternative met the transportation connection requirements and would have the least amount of impacts to wetlands, drainages, wilderness areas, and cultural resources. The Middle Alternative will undergo additional engineering refinement to further avoid natural and human resources (see Section 10.0, Alternatives Refinement and Evaluation).

9.0 Results of Preliminary Screening

Using the screening process, the UBRR team determined that Alternatives 2 and 3 were both feasible and practicable alternatives for a rail alignment into the Uinta Basin and that each alternative would connect to the Middle Alternative inside the Uinta Basin. Figure 11 below shows the results of the screening process.

45



10.0 Alternatives Refinement and Evaluation

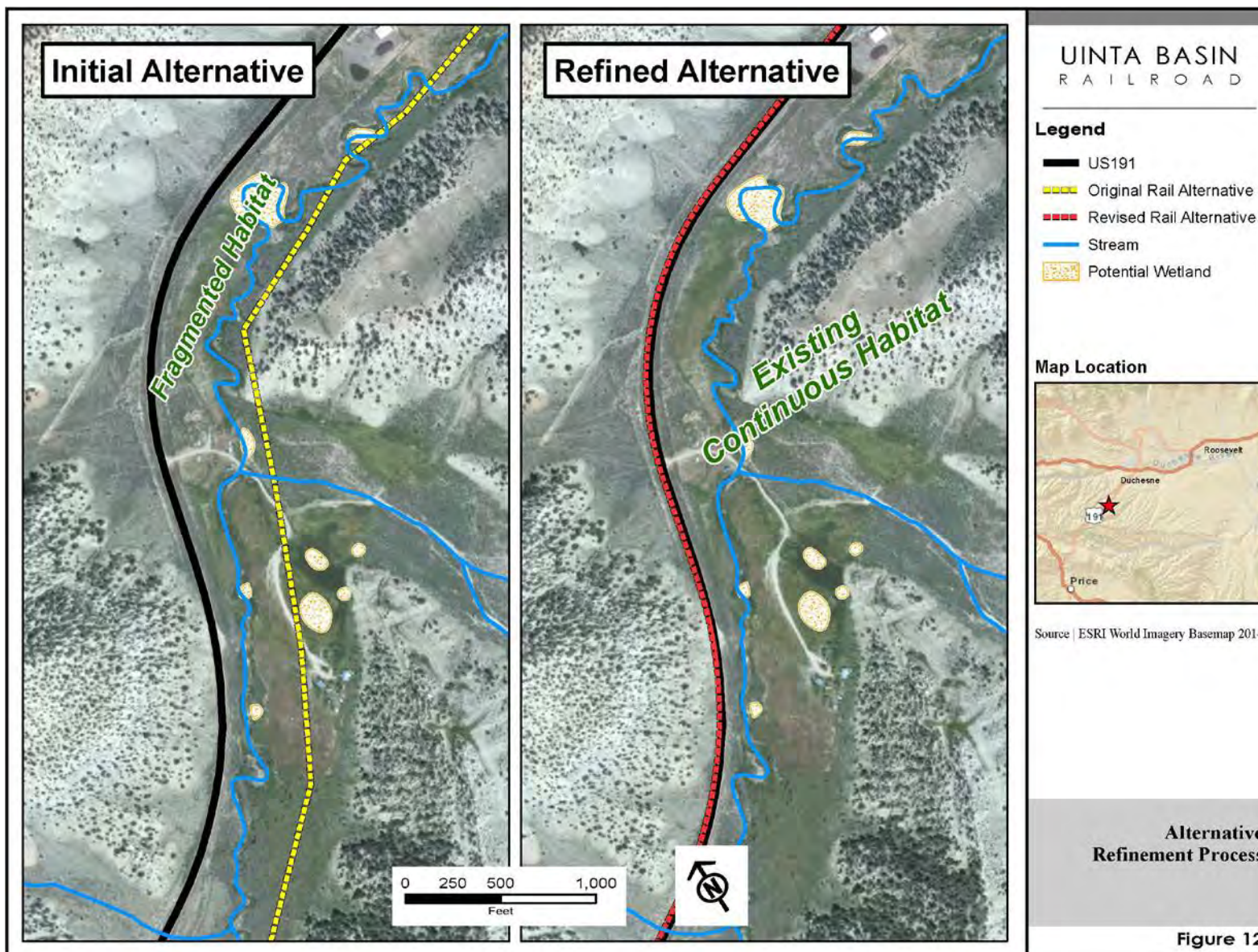
10.1 Refinement Process

The UBRR team further developed Alternatives 2 and 3 to improve their operational feasibility and avoid and minimize impacts to the natural and built environment. The evaluation process included the following steps:

- Perform more-refined engineering to ensure operational feasibility
- Determine basic locations of sidings and terminal facilities
- Refine local road access locations across the proposed rail line
- Refine alternatives to avoid and minimize impacts to the natural and built environment.

To avoid and minimize impacts to the natural and built environment, the UBRR team looked at opportunities to co-locate the proposed rail line with existing transportation facilities (highways and local roads). By locating impacts from the rail line where there were already impacts (such as habitat fragmentation, impacts to habitat for sensitive species, wetland and stream impacts, and divisions of agricultural land and other private property) from existing roads and highways, impacts from the rail line could be avoided and/or minimized where possible. Figure 12, Alternative Refinement Process, provides an example of the refinement process.

Figure 12. Alternatives-Refinement Process



10.2 Evaluation Process

10.2.1 Natural and Built Environment

Table 9 shows the results of the refinement process for Alternatives 2 and 3.

Table 9. Alternatives 2 and 3 Refinement Results – Natural and Built Environment

Screening Criterion	Alternative	
	2	3
<i>Impacts to Natural Resources</i>		
Acres of wetlands and other waters of the U.S. affected	3	12
Acres of sensitive wildlife habitat affected	1,110	1,324
Linear feet of drainage crossings (includes streams, canals, or ditches)	58,922	55,137
Number and acres of Agriculture Protection Areas affected	0	0
Acres of irrigated prime or unique farmland affected	17	18
Acres of wilderness areas or wilderness study areas affected (areas of critical environmental concern, recreation management area, etc.)	0	0
<i>Impacts to the Built Environment</i>		
Number and area of parks and trails affected	0	0
Number of community facilities affected	0	0
Number of potential property acquisitions, including residential, business, and utility acquisitions	7 ^a	6 ^a
Number of Section 4(f)/Section 6(f) uses	1 ^b	1 ^b
Number of cultural resources (for example, historic and archaeological resources) affected	26	29
Number of existing water and commodity wells/sites affected	0	0

^a Acquired properties would be existing or abandoned oil pads.

^b Alternative would cross a state Wildlife Management Area. Property ownership and wildlife management status would need to be verified during the environmental process to determine the property's Section 4(f) status.

As shown in Table 9 above, Alternative 2 would have less wetland, sensitive species habitat, and cultural resources impacts than Alternative 3. Although it is not shown by the numbers in the table, the most substantial difference between Alternatives 2 and 3 is the location. Alternative 2 would be located in Indian Canyon adjacent to U.S. Highway 191 (US 191), an existing two-lane highway. By combining the rail and highway facilities in a canyon that is already affected by an existing highway and associated vehicle traffic, Alternative 2 would fragment less habitat and overall disturb less wildlife than would

Alternative 3. Alternative 3 in Sowers Canyon would be a new transportation facility in a canyon that does not have a high-traffic paved road (see Figure 13). Thus, Alternative 3 would have a greater potential to fragment wildlife habitat and disturb wildlife than would Alternative 2.

Figure 13. Photograph Comparison of Alternatives 2 and 3 in Canyons



Alternative 2 – US 191 in Indian Canyon

Alternative 3 – Sowers Canyon

10.2.2 Land Ownership

As shown in Table 10, both alternatives would cross federal, state, tribal, and private land. Alternative 2 would affect about 196 acres less land than would Alternative 3.

Table 10. Status of Land Affected by Alternatives 2 and 3

in acres

Land Status Type	Alternative 2	Alternative 3
Bureau of Land Management	702	726
U.S. Forest Service	163	138
Ute Tribe	<1 ^a	111
State of Utah	454	39
Private	1,312	1,414
Total	2,232	2,428

^a Alternative 2 crosses Ute Tribe land in Indian Canyon; however, UDOT owns the right-of-way for U.S. 191 in Indian Canyon, and the alternative would be within the UDOT-owned right-of-way. This alternative would probably not affect land managed by the Ute Tribe.

10.3 Alternatives-Refinement and Evaluation Results

Using the four-level screening process, the UBRR team determined that Alternatives 2 and 3 were the only feasible and practicable alternatives of the original 26 alternatives evaluated. Based on the alternatives-refinement process, the UBRR team recommends that Alternative 2 be carried forward for consideration under NEPA and that Alternative 3 be eliminated from detailed consideration based on the additional impacts to the natural environment and the alternative's higher cost as shown in Table 5, Level

3 Screening Results: Natural and Built Environment. Both alternatives use similar alignments except for the portions in Indian Canyon and Sowers Canyon and provide the same operational benefits; however, Alternative 3 would have greater impacts to wetlands (9 more acres), sensitive wildlife habitat (214 acres), and cultural resources (one more site). In addition, Alternative 3 would involve developing a new transportation facility in a relatively undisturbed canyon, whereas Alternative 2 would be built in a canyon with an existing highway that already causes transportation-related impacts to the natural environment. Finally, Alternative 2 would affect about 196 acres less of federal, state, tribal, and private land.

11.0 UBRR's Proposed Alternative Alignment

For this feasibility report, the activities included completing preliminary engineering and evaluation of about 3,700 miles of new rail. The objective of the work completed to date has been to identify a set of reasonable, feasible, and practicable corridor alternatives for consideration in the EIS that will likely be prepared by STB's Office of Environmental Analysis (OEA) under NEPA.

Based on the information in this feasibility report, the UBRR team believes that Alternative 2 meets the team's objectives for this project and recommends that Alternative 2 be carried forward for detailed evaluation in the NEPA process. The UBRR team recognizes that STB may, at its discretion, decide to study the presented alignment, recommend modifications to the presented alignment, or recommend additional or different alignments for study. The UBRR team also recognizes that the technical studies to support the EIS are ongoing and that other impacts or engineering issues might be discovered along any of the proposed alignments.

12.0 References

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2002 Freight Rail Bottom-Line Report.

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2009 How Transport Costs Shape the Spatial Pattern of Economic Activity.
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Appendix A. UBBR Alternative Maps

Appendix B. Level 3 Screening Results

Appendix C. Level 4 Screening Field Review

Introduction

From February 24 to February 26, 2014, Level 4 screening (alternative feasibility field review) was conducted on the four alternatives (Alternatives 2, 3, 25, and 12) that passed Level 3 screening. The purpose of Level 4 screening was to determine, based on field observations and professional judgment, whether an alternative could be constructed.

What was the purpose of Level 4 screening?

The purpose of Level 4 screening was to determine, based on field observations, whether an alternative could be constructed.

The field review included observations of factors that influence the feasible and practicable construction, operation, and maintenance of a rail line, factors such as topography; water courses; slope stability; wetlands and other natural environment features; existing linear infrastructure such as roads, electrical transmission lines, and pipelines; community facilities; and existing buildings and land uses such as agriculture and natural resource extraction and processing.

This appendix provides the results of the field review of each alternative to determine whether the alternative was feasible and practicable. Note that the information in this appendix is based on field observations. As additional engineering, surveys, and geotechnical investigations are conducted, that new information might change the results of this field review.

Field Review Team

During the 3-day field review, the field review team consisted of four consultants and three UDOT staff. The primary evaluation of the alternatives was conducted by the consultants based on their experience in railroad engineering and construction, railroad operations, and environmental analysis. The experience of the staff is listed below.

Railroad Operations – Mark Hemphill, HDR, Inc. Mark Hemphill has 31 years of experience in the railroad industry in train operations, strategic planning, commercial and economic analysis, capacity analysis and service design, train control and communications systems, and rolling stock selection, procurement, and maintenance. He has developed the functional design and led the planning for proposed new railroads in Nevada, Oregon, Alaska, and the Middle East. During the field review, he provided input on the operations, functional feasibility, and practicality of each alternative.

Railroad Engineering and Construction – Donald McCammon, HDR, Inc. Don McCammon has 32 years of experience in railroad engineering and construction and an additional 6½ years in highway construction. His background includes site reconnaissance of potential rail alignments including observations of geotechnical, roadway interaction, railroad bridges and drainage structures, constructability and construction access, and environmental impacts such as channel shifts and wetlands crossed (including potential suggestions for realignments to reduce or avoid impacted areas). He has performed this work in the United States, Mexico, Colombia, and the Middle East. He also has an extensive background as a consultant to railroads and public agencies providing railroad-related engineering services from planning to construction management. As a former railroad employee, he has performed track and bridge construction from initial clearing and grubbing through grading to opening the new track for trains, and with this knowledge he looks at the feasibility of potential corridors for contractor access, material laydown areas, and construction methodologies.

Environmental Analysis – Vince Izzo, HDR, Inc. Vince Izzo has 23 years of experience preparing environmental analysis and NEPA reviews for transportation projects. His specialty is linear projects on new alignments, including managing over 100 miles of new freeway alignments in Utah in environments similar to the Uinta Basin. During his career, he has managed wetland delineations, cultural resource surveys, wildlife habitat reviews, and community surveys.

Geographical Information Systems – Shawn Frye, HDR, Inc. Shawn Frye has 15 years of experience in GIS analysis and environmental reviews. During the field review, Shawn assisted the team with using tablet computers, taking notes and pictures, and locating routes.

In addition to the consultant team, the following UDOT staff attended the 3-day field review:

- John Thomas, project manager
- Craig Hancock, project engineer
- Brandon Weston, environmental manager

Field Equipment

Prior to the field review, the team had developed base maps for each alternative using aerial images and digital terrain data. These initial alternatives were general. The alternatives were loaded onto tablet computers with GPS (global positioning system) locators. This technology helped the team determine their location in relationship to the alternatives and provided the following base information that the team used during their field review:

- Centerline of the alternatives
- Grades and curves of the alternatives
- Constructability, operability, and maintainability of the alternatives
- Land ownership and land uses
- Topographic maps
- Aerial maps
- Wetlands
- Existing infrastructure and utilities, such as electrical transmission lines, pipelines, oil and natural gas well pads, oil and gas production and processing facilities, and roads

In addition to the tablet computers, the field team used hard-copy maps depicting the proposed alternatives. These maps included preliminary milepost (MP) locations for each alternative. During the review, the team used the tablets to take photographs of various features of each of the reviewed alternatives. These photographs, as well as photographs taken with digital cameras, could be referenced using GPS to the location on each alternative. Field notes were also taken on the tablets and hard-copy maps. This information was used to develop this appendix.

Field Conditions

Field conditions were good during the field review, with above-normal temperatures (60 degrees Fahrenheit) and clear skies. The alternative alignments were free of snow and road conditions were generally dry at elevations up to about 8,000 feet, which enabled the team to access the lower-elevation parts of each alternative. Unimproved roads at higher elevations were still snow packed and/or muddy, making these parts of the alternatives inaccessible. As a result, the team was not able to review these parts of the alternatives. However, the areas that were accessed and the visual proximity to the inaccessible parts provided a good indication of the feasibility and practicability of the alternative for construction, operation, and maintenance.

Review of Alternatives

Alternative 2

The field team reviewed Alternative 2 on February 24, 2014. The alignment was generally followed from its origin about 10 miles east of Soldier Summit, Utah, to its termination near Duchesne, Utah, using county-maintained roads and U.S. 191.

The review began at the location where Alternative 2 would connect to the existing UP main track between Denver, Colorado, and Salt Lake City, Utah, adjacent to U.S. 6 east of Soldier Summit, Utah. This location is about MP 642 on UP's Provo Subdivision; the nearest railroad timetable station is Kyune, Utah. The UP line between Helper, Utah, and Provo, Utah, consists of two main tracks that use centralized traffic control as their method of operation; trains operate in either direction on each track as determined by the train dispatcher. BNSF has trackage rights on this main track between Denver Colorado, and Salt Lake City, Utah.

At this location, the UP main tracks ascend westward on an approximately 0.5% grade and use a series of mostly 6-degree reverse curves to follow the Price River in a narrow valley. The field team observed that the UP main tracks would likely need to be realigned at the location where they connect to the UBRR in order to introduce tangents into the main tracks for the turnouts required for the connection. The general location of the proposed connection is shown in Photo C-1.

The initial general alignment cut across several steep slopes directly above the Price River and the UP main tracks. The team determined that the alignment would be improved by modifying it from what was shown on the initial general alignment. This modification would shift the alignment about 0.5 mile farther east after it leaves the UP connection. The alignment would then remain on a bench above the Price River canyon until it enters the Emma Park area at about MP 3.0 of the alignment.



Photo C-1. UP Connection Point, MP 0.0 of Alternative 2, near Kyune, Utah. *UP main track in foreground. Red line illustrates approximate location of UBRR.*

The team generally followed Alternative 2 using Kyune Pass and Emma Park Road to the road's junction with U.S. 191, then followed U.S. 191 to a point near the proposed railroad-west (geographic south) portal of an 8.6-mile-long tunnel that would route the UBRR under the main ridge separating the Price River and Green River drainages. At this point, U.S. 191 climbs over the main ridge. The team rejoined Alternative 2 near the proposed railroad-east (geographic north) portal of the tunnel near the headwaters of Indian Creek. This location would be about MP 22 of Alternative 2. Photo C-2 illustrates this location.



Photo C-2. Approximate Location of Railroad-East (Geographic-North) Tunnel Portal, MP 22 of Alternative 2.

From the railroad-east tunnel portal of Alternative 2, the alignment descends in Indian Creek Canyon to a location about 2 miles south of Duchesne, Utah. At this point, the alignment turns eastward, departs the canyon, and ends at the location of a proposed railroad terminal facility. The canyon is also occupied by U.S. 191.

Numerous gas and oil production well pads are located in the canyon. Oil and natural gas liquids appear to be collected from these production well pads by truck. Photo C-3 illustrates one of the well pads and the trucks being used to service the well.

Some areas of the canyon floor are used as pastureland and for growing hay. Several residences and cattle corrals are located in conjunction with the pastureland and hay-growing areas.



Photo C-3. Typical Oil Well Pad near MP 32 of Alternative 2. Red line indicates approximate location of Alternative 2.

Photos C-3 through C-6 show general conditions in Indian Creek Canyon along Alternative 2. Grades, curvature, and topography appeared to be acceptable along Alternative 2 with generally enough space to place the rail line to avoid undercutting steep slopes. Such undercutting could result in future landslides. Based on the team's observations, neither U.S. 191 nor oil and gas production facilities and pipelines would need to be extensively relocated. Note that, with Alternative 2, additional engineering will need to be conducted to verify that U.S. 191, utilities, oil well production facilities and associated pipelines, and steep slopes can be avoided.

Given the narrow nature of parts of the canyon, the stream channel would likely need to be shifted or the channel relocated, and some impacts to wetlands are likely to occur in order to avoid undercutting canyon walls, avoid passing through oil well production facilities, and limit impacts on agricultural and grazing land and residences.

The team observed that U.S. 191 would provide access for construction equipment during the construction of the rail line. Construction will need to consider sight distances for construction access roads from U.S. 191 due to the curvature and grade of the highway. The team does not know at this time whether additional access would be needed for tunnel construction headings and vertical ventilation shafts along the proposed tunnel alignment.

Based on field observations, the team determined that Alternative 2 is feasible and practicable to construct, operate, and maintain, provided that (1) gradients not greater than 2.4% can be achieved, (2) the rail line can be located a sufficient distance from the canyon walls in Indian Creek Canyon to avoid the potential for rockslides and landslides, and (3) the proposed 8.6-mile-long tunnel is also feasible and practicable to construct.



Photo C-4. Looking North (Railroad-East) in Indian Creek Canyon near MP 21 of Alternative 2.



Photo C-5. Looking North (Railroad-East) in Indian Creek Canyon near MP 36 of Alternative 2.



Photo C-6. Looking South (Railroad-West) in Indian Creek Canyon near MP 24 of Alternative 2.

Alternative 3

The field team reviewed Alternative 3 on February 24 and 25, 2014. The alignment was generally followed from its origin about 10 miles east of Soldier Summit, Utah, to its termination near Duchesne, Utah, using county-maintained roads and U.S. 191.

Alternative 3 uses the same connection point to the UP main track as Alternative 2 and shares a common alignment with Alternative 2 until the vicinity of the location where Alternative 2 crosses U.S. 191. The observations and comments in the Alternative 2 section apply to Alternative 3 from the connection point with the UP main track to the U.S. 191 crossing.

Alternative 3 was reviewed starting on February 24 at its connection to the existing UP main track adjacent to U.S. 6 east of Soldier Summit, Utah, and continuing to the approximate location of the south portal of the first of one or more tunnels that would route Alternative 3 under the main ridge dividing the Price River and Green River drainages (see Photo C-7).



Photo C-7. Alignment and Railroad-West (Geographic-South) Portal of Tunnel 1 near MP 21.5 of Alternative 3.

On February 25, the review continued from a starting point about 4 miles south of County Road 12000 West/Sowers Canyon Road and its intersection with U.S. 40 and continuing south along the alignment in Sowers Canyon and onto U.S. Forest Service (USFS) Road 152 beyond the Ashley National Forest boundary to the approximate location of the north tunnel portal of the tunnel(s) that would pass under the main ridge near MP 33 of Alternative 3. Sowers Canyon Road would provide access for construction equipment during the construction of the rail line. The road is currently used by heavy trucks that serve the oil and gas industry in the canyon.

Photo C-8 shows the approximate location of the proposed railroad-east (geographic-north) tunnel portal area in a side canyon of Sowers Canyon. The team identified several additional potential locations for the railroad-east tunnel portal near the headwaters of Sowers Canyon.



Photo C-8. Alignment and Railroad-East (Geographic-North) Portal of Tunnel 3 near MP 33 of Alternative 3.

Photos C-9 and C-10 show the general conditions along Alternative 3. Grades, curvature, and topography appeared to be acceptable along Alternative 3, with sufficient space to place the rail line to avoid undercutting steep slopes. Such undercutting could result in future rockslides or landslides onto the rail alignment. Overall, Sowers Canyon has a broad and open floor that would allow the alignment to be located to avoid some of the wetlands, streams, and oil and gas production infrastructure in the canyon. An overhead electric transmission line would likely need to be relocated.

Given the meandering nature of the stream channel, which was dry during the team's visit, segments of the stream channel would need to be shifted and potentially relocated to fit the rail line within the valley bottom lands. Wetlands were also observed along the route. These wetlands might be impacted by the rail line, although avoidance might be possible in certain locations by slightly shifting the alignment from its initial general location. There would likely be some impacts on land currently used for farming and grazing.

Based on field observations, the team determined that Alternative 3 is feasible and practicable to construct, operate, and maintain, provided that (1) gradients not greater than 2.4% can be achieved, (2) the rail line can be located a sufficient distance from the canyon walls in Sowers Canyon to avoid the potential for rockslides and landslides, and (3) the proposed 9.1-mile-long tunnel(s) is (are) also feasible and practicable to construct.



Photo C-9. Sowers Canyon, MP 36±, looking Geographic-North (Railroad-East). *Photo shows general characteristics of canyon floor and side walls of canyon.*



Photo C-10. Sowers Canyon, MP36±, looking Geographic-South (Railroad-West) toward Upper Canyon near Headwaters. *Photo shows general characteristics of canyon floor, incised stream channel, and side walls of canyon.*

Alternative 25

The field team reviewed Alternative 25 on February 25, 2014. The alignment was followed generally, and only in the Willow Creek drainage, starting about 9.25 miles south of Ouray, Utah, where the alignment would leave the proposed eastern terminal of the rail line and ending at the junction of Uintah County roads 5120 (Willow Creek) and Buck Gulch. The existing road in the canyon could provide appropriate access for construction equipment during construction, since parts of the road are maintained by the County and are used by heavy trucks that serve the oil and gas industry in the area.

Photos C-11 and C-12 show the general conditions along Alternative 25 in Willow Creek Canyon. The grades and topography in the lower part of the canyon (MP 63 to 87) appeared acceptable, with enough space to place the rail line to avoid undercutting most steep slopes. Such undercutting could result in landslides or falling rocks.

Similar to the streams in Indian Creek Canyon (Alternative 2) and Sowers Canyon (Alternative 3), some segments of the stream channel in Willow Creek Canyon would need to be shifted and relocated. However, the stream in Willow Creek Canyon is much more deeply incised, meanders from side to side of the canyon to a greater extent, and appears to carry a much larger volume of water. Flowing water was observed at the locations where the county road crossed or was adjacent to the stream.



Photo C-11. Willow Creek Canyon, MP 79±, looking Geographic-South (Railroad-West) in Lower Canyon.

Photo shows general characteristics of deeply incised stream channel meandering from side to side of canyon.



Photo C-12. Willow Creek Canyon, MP 61, looking Geographic-South (Railroad-West) in the Vicinity of Buck Gulch. *Photo shows constriction of canyon at this point.*

As the team passed Buck Gulch, MP 62±, the canyon became narrow, with numerous tight meanders making it difficult to avoid the stream and the canyon walls. This constriction is illustrated in Photo C-12. Constructing a rail alignment south of Buck Canyon's confluence with Willow Creek Canyon would require cutting through this section of Willow Creek Canyon's steep walls between meanders, thereby causing many shifts in the stream channel and requiring a succession of deep cuts, stream crossings, and tunnels. Even with the incorporation of these engineering features, the rail alignment would have a large number of high-degree curves, which are not desirable from the standpoints of operating and future maintenance costs.

Additionally, the narrow canyon and channel south of Buck Gulch appear to be prone to floods that fill the canyon bottom with water and cause the channel to shift, making sustainable operation and maintenance of a rail line difficult. Wetlands were also observed along the alignment. These wetlands might be affected, although avoidance might be possible in certain locations. Willow Creek Canyon also has natural gas pipelines, oil and gas production facilities, and land used for farming and grazing that would likely be impacted.

After the field review, the team obtained digital terrain maps and applied them to the general alignment used in the field review. The team determined that the ruling grade for Alternative 25 would be 2.8%, which exceeds the 2.4% maximum grade screening criterion for operation of the rail line. Accordingly, Alternative 25 was eliminated from further consideration.

Alternative 12

The field team reviewed Alternative 12 on February 26, 2014. The alternative was generally followed from its origin at Mack, Colorado, to the former site of Atchee, Colorado, at the base of Baxter Pass using Mesa County Road 4 from Mack to the Garfield County border, and from there on Garfield County Road 201 to Atchee. This alternative crosses the Grand Valley from Mack to the base of the Book Cliffs about 10 miles north of Mack, then uses West Salt Creek Canyon to the point where the canyon begins to rise steeply above Atchee. From Atchee, Alternative 12 would climb the canyon walls using shelf construction, tunnels through ridges, and viaducts over ravines. The alternative would climb from an elevation of 6,400 feet at Atchee to an elevation of 8,400 feet at Baxter Pass, where Alternative 12 would cross the main ridge separating the Colorado River and Green River drainages. At Atchee, the road was too muddy for the team to further review Alternative 12.

The review began at the location where Alternative 12 would connect to the existing UP main track between Denver, Colorado, and Salt Lake City, Utah, near Mack. This location is about MP 469.5 on UP's Green River Subdivision and is between the east and west control points of the Mack siding. The UP main track between Grand Junction, Colorado, and Helper, Utah, consists of one main track with controlled sidings at approximately 8-mile-long intervals and uses centralized traffic control as its method of operation. BNSF has trackage rights on this main track between Denver and Salt Lake City.

At this location, the UP main track descends westward on an approximately 0.8% grade. The main track curves to the south through 44 degrees on a 1-degree, 52-foot curve at this location; a connection wye would need to straddle to the east and west of this curve. Photo C-13 shows the location of the proposed connection to the UP line.



Photo C-13. UP Connection Point, MP 0.0 of Alternative 2 at Mack, Colorado. *UP main track is in background. Looking railroad-west toward the entrance to Ruby Canyon and the Colorado River.*

The existing road between Mack and Atchee could provide access during construction. The road is maintained by the Counties and is used by heavy trucks that serve the oil and gas industry in the area.

Alternative 12 crosses open, rolling desert between Mack and the entrance to Salt Creek Canyon. The alignment generally follows the former roadbed of the Uintah Railway, a narrow-gauge (3 feet between the rails) railroad abandoned in 1939. This alignment would likely have some impacts on agricultural land uses and potentially impacts on residences nearby. Numerous natural gas and natural gas liquids pipelines follow and cross the alignment between Mack and Atchee. Some segments of these lines would likely need to be relocated.

Photo C-14 illustrates general conditions along Alternative 12 in West Salt Creek Canyon. From the entrance of the canyon, the grades and topography appeared to be acceptable along Alternative 12, with sufficient space in the lower part of the canyon to place the rail line to avoid most steep slopes that could result in landslides. Similar to Alternatives 2, 3, and 25, the stream in the canyon would need to be shifted in some locations and relocated, and wetlands would be impacted. Elk were also seen in the canyon.



Photo C-14. West Salt Creek Canyon, MP 23±, looking Geographic-North (Railroad-West). *Photo shows steep canyon side walls.*

For the first 28 miles of Alternative 12 from Mack, MP 0, to Atchee, MP 28, the grades and curvature would be moderate. At Atchee, Alternative 12 would need to climb out of the canyon to a summit tunnel near Baxter Pass. The old Uintah Railway used a narrow gage, a 7.5% ruling grade, and 66-degree curves to surmount Baxter Pass. To maintain the maximum acceptable ruling grade of 2.4% and the maximum curvature of 10 degrees, this segment of Alternative 12 would use a series of loops that would enable the

alignment to switch back and would follow the side canyon to reach the railroad-east (geographic-south) portal of the summit tunnel. A single, long tunnel from the vicinity of Atchee to a point north of Baxter Pass would not be feasible or practicable, since the tunnel would be more than 20 miles long. Photos C-15 and C-16 illustrate the general geologic and topographic characteristics of this area.

The canyon walls generally consist of interspersed shale and sandstone layers that are at their angle of repose, with large blocks of broken sandstone perched on the shale slopes. The sandstone formations are fractured and weathered and are highly susceptible to block failure. The shale layers are loose and unconsolidated and have a high potential for landslides. Construction would require benching into the canyon walls with breakout upward to the ridge lines and with very large amounts of spoil cast downward. There would be an extremely high risk of continual landslides which would have a high potential for carrying away large portions of the rail line, causing lengthy disruption to train service and greatly increasing maintenance costs. In addition, to operate the rail line on the long, ascending grade from Atchee to the summit tunnel, at least one siding for trains to meet and pass would be required mid-climb, and another would be required at the summit tunnel.



Photo C-15. Baxter Pass above Atchee, Colorado, MP 28.5±, Looking Geographic West. *The alignment of the old Uintah Railway is visible crossing the face of the ridge, ascending from right to left using a 7.5% grade. Note the large landslide area crossing the Uintah Railway grade that has broken out to the ridge line near the middle of the photograph. The hummocky area below the old Uintah Railway grade appears to be a sizeable landslide.*



Photo C-16. Cliff Faces above Atchee, MP 29.5±. *Alternative 12 would cross this cliff face about mid-height (red line). Note weathered sandstone outcroppings and interspersed shale layers.*

The steep slopes and sheer sandstone formations would make construction of the widened bench needed for a siding extremely difficult without extreme cuts, large double-track viaducts, and massive rock and soil stabilization efforts. These geological features are not feasible or practicable for construction, maintenance, and operation of a rail line. Based on field observations, the team concluded that Alternative 12 would not be feasible or practicable to construct and operate.

Common Segment Review

The Common Segment is proposed to run in a generally east-west direction from endpoints near Ouray, Utah, and Duchesne, Utah. A freight terminal would be located at both ends of the Common Segment. The terminals would be the transfer points for freight between the UBRR and trucks, industries, and storage facilities. Portions of the Common Segment between Duchesne and Ouray were field reviewed on February 24 and 25, 2014.

The west end terminus and proposed yard location is about 3 miles southeast of Duchesne and at the north end of Alternatives 2 and 3. It appears to be located in a feasible and constructible location and has good access to U.S. 40 and the commercial and industrial activity centered on Duchesne. About 30 feet of earth would be cut on the south side of the terminal area and 30 feet of earth fill on the north side of the terminal area. As the Common Segment leaves the terminal area and heads east, it crosses the valley of Sowers Canyon on an approximately 50-foot-high embankment. Additional work is needed to identify a roadway alignment to provide access to this terminal area that is feasible and practical for freight shippers and receivers.

The east end terminus is about 10 miles southeast of Ouray in an area of relatively rough terrain with numerous oil and gas wells within the terminal footprint. This location is distant from the industrial and commercial activity centered at Roosevelt and Vernal. Other than well drilling and production, there is no

industrial and commercial activity in the vicinity of the east end terminus. The field team observed that a more feasible and practical location for this terminus, one with flatter terrain and fewer oil and gas wells, would be about 5 miles directly north.

Although Utah State Route 88 provides direct access to both the originally proposed east end terminal location and the location farther north, the team noted that the east end terminus location is 25 miles from U.S. 40 and so might not be the best location for potential shippers. A location closer to Roosevelt and Vernal might be preferable. The UBRR team will be obtaining additional user and shipper information in order to determine the appropriate location for an east end terminus to serve the Uinta Basin.



Photo C-17. Common Segment MP 1.0 Crossing Sowers Road. *View is looking south on Sowers Canyon Road. Red shaded area shows approximate height of railroad embankment.*

Summary

Alternatives 2 and 3 appear to be reasonable and practicable based on the field review. Alternative 12 appears to be not reasonable and not practicable between Atchee and Baxter Pass based on the field review. The segment of Alternative 25 north of Buck Canyon that was reviewed in the field was reasonable and practicable, but the segment south of Buck Canyon does not appear to be reasonable and practical. Further, the maximum ruling grades on Alternative 25 would be in excess of 2.4%, so this alternative is not feasible on that basis.

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Appendix D. Environmental Screening Data Sources

Utah Planning and Environmental Linkages (uPEL) data was used for the Utah portions of the Uinta Basin study area. For Colorado, an area not covered by uPEL data, and for some environmental topics not covered in uPEL (i.e., potential property acquisitions) new geographic Information Systems (GIS) data was identified and compiled, and created for the study area.

All data downloaded or created for the screening analysis were formatted by BIO-WEST, Inc. Data required manipulation to obtain coverage study-wide and to describe the features identified for analysis. The datasets were reprojected to UTM NAD83 Zone 12N, clipped to the study boundary, merged with related datasets to obtain full coverage, and attributes were added to describe the data in more detail when necessary and to identify sources. Spatially redundant features were removed when data were merged to avoid the double counting of features.

Once the data was formatted an overlay analysis was performed that calculated the acreage of features intersected by the buffered alignments. Buffered alignment data provided to BIO-WEST were used for the analysis. The acreage and characteristics of the features intersected was then entered into the Screening Matrix, and uPEL reports were created for the Utah alignments. The following tables detail some information about each dataset used in the screening analysis, including uPEL data. Please see the uPEL user guide for more detailed information on uPEL data.

Topic	Data Sources						
	Source	Data Name	Contact Information	State	Link	Download Date	Publication Date
Archeological / Cultural Resources	Colorado Office of Archeology and Historic Preservation	Spreadsheet of site intersections	oahp@state.co.us	CO	N/A	1/29/2014	1/29/2013
	Utah Division of State History	Archeological and cultural sites	Arie Leeflang, (801) 245-7245	UT	N/A	12/3/2013	12/3/2013
Digitizing Notes:	For Colorado, BIO-WEST sent the buffered alignments to the Office of Archaeology and Historic Preservation, and the Office returned a spreadsheet detailing the number of site intersections by alignment and the eligibility status of those sites.						
Community Facilities	U.S. Geological Survey, United States Board on Geographic Names	Geographic Names Information System (GNIS) query	gnis_manager@usgs.gov	CO, UT	Source	1/22/2014	8/13/2013
Digitizing Notes:	The point locations for community facilities were digitized, merged, and buffered by 100 meters. School locations were buffered by 500 meters. The following facility types were included: airports, ambulance services, cemeteries, churches, city/county buildings, fire departments, hospitals, museums, police stations, post offices, schools, trailheads, and other features of local importance.						
Drainages / Streams / Rivers	U.S. Geological Survey	National Hydrography Dataset	ask@usgs.gov	CO, UT	Source	12/5/2013	UT 12/23/2013 CO 8/29/2013
Digitizing Notes:	Intersections are broken down by feature type: artificial path, canal, stream, river, etc. Artificial Paths refer to rivers and streams that are too wide or unconstrained to determine a true center line, i.e., where rivers travel through reservoirs or other wide corridors.						
Floodplains	Federal Emergency Management Agency	Special Flood Hazard Areas – High Risk	N/A	Limited	N/A	1/14/2014	6/13/2012
Digitizing Notes:	Limited extent of data in study area.						
Lakes / Waterbodies	U.S. Geological Survey	National Hydrography Dataset	ask@usgs.gov	CO, UT	Source	12/5/2013	UT 12/23/2013 CO 8/29/2013
Digitizing Notes:	Intersections are broken down by feature type.						
Landownership	Bureau of Land Management (BLM)	Statewide Landownership	N/A	CO	Source	12/9/2013	1/16/2013
	Bureau of Land Management, State of Utah School and Institutional Trust Lands Administration (SITLA)	Landownership	TLA-GIS@utah.gov, http://trustlands.utah.gov	UT	Source	9/16/2011	9/16/2011
Digitizing Notes:	SITLA and BLM data were used to define landownership for the study area.						

Topic	Data Sources						
	Source	Data Name	Contact Information	State	Link	Download Date	Publication Date
Parks / Recreation Areas (Section 4(f) and 6(f) properties)	Colorado Parks and Wildlife	Public Access Properties	N/A	CO	Source	1/14/2014	10/29/2013
	Garfield County CO	Park and Recreation Areas	N/A	CO	Source	1/14/2014	4/14/2008
	Mesa County CO	Parks	N/A	CO	Source	1/14/2014	1/14/2014
	Mesa County CO	Parcels (extraction of recreation properties)	N/A	CO	Source	1/14/2014	1/14/2014
	Federal Highway Administration	Section 4(f) Overview	N/A	U.S.	Source	1/14/2014	1/14/2014
	National Parks Service – Land and Water Conservation Fund	Land and Water Conservation Fund (LWCF)	N/A	U.S.	Source	1/21/2014	1/21/2014
	Automated Geographic Reference Center	Local Parks	N/A	UT	Source	9/16/2011	9/16/2011
	BLM, SITLA, Duchesne County	State and National Parks (Landownership data)	N/A	CO, UT	N/A	2011–2013	N/A
Digitizing Notes:	Data used to depict parks in the Colorado portion of the Uinta Basin study area are a compilation of four data sources. Duplicate park locations were identified by name, visually confirmed, and manually removed. Section 4(f) and Section 6(f) determinations were made based on property type and LWCF funding.						
Population Characteristics	U.S. Census Bureau	American Community Survey (2007–2011)	N/A	CO, UT	Source	1/22/2014	1/22/2014
Digitizing Notes:	Full block groups intersected by the study area were extracted from the original data. The area in square miles and the density per square mile for each block group were calculated by BIO-WEST.						
Potential Property Acquisitions	BIO-WEST	Property Points; Homes/Structures, Oil Pads/wells, Power Transmission Structures	N/A	CO, UT	N/A	Ongoing	Ongoing
Digitizing Notes:	Buildings, homes, farm structures, oil well pads, and major power line structures were identified along all potential routes using 1-foot aerial photographs from the ESRI World Imagery Service. Images in the service were taken in 2010 and 2011. The dates of images vary by location. All features observed within 150 meters of the routes were digitized within the GIS software using points. Features were then buffered with a 100-meter buffer. Overlay analysis was performed manually using the select by location tool. Results were tabulated in the screening matrix.						

Topic	Data Sources						
	Source	Data Name	Contact Information	State	Link	Download Date	Publication Date
Prime Farmland	Natural Resources Conservation Service	gSSURGO	N/A	CO, UT	Source	1/15/2014	UT 11/12/2012 CO 11/20/2012
	U.S. Department of Agriculture	National Land Cover Dataset (NLCD)	N/A	CO	Source	1/15/2014	2001
	Utah Division of Water Resources	Water Related Land Use	Eric Edgley (801) 538-7274	UT	Source	1/15/2014	1/7/2014
	Uintah County	Agriculture Protection Areas	Community Development (435) 781-5336	UT	N/A	1/15/2014	1/15/2014
Digitizing Notes:	Prime and important farmland soil types were extracted from the SSURGO datasets for Colorado and Utah and were clipped to the study area. The Colorado soils were then constrained to the agricultural areas identified in the NLCD. The Utah soils were constrained to the agricultural areas identified in the Water Related Land Use data. A dataset of prime and important farmland soils types in the areas of existing agriculture was produced. Agriculture Protection Areas do not exist in Colorado within the study area boundary or in Duchesne County, Utah.						
Water Wells / Source Protection	Colorado Division of Water Resources	Well locations	Office of the State Engineer	CO	Source	1/14/2014	1/14/2014
	Utah Division of Drinking Water	Source Protection Zones	N/A	UT	N/A	2010	2010
	Utah Division of Water Rights	Well data extraction	Mark Jensen and Rich Emerson, Department of Environmental Quality	UT	Source	1/30/2014	1/30/2014
Digitizing Notes:	Data were clipped to the study area boundary and merged.						
Wetlands	U.S. Fish and Wildlife Service	National Wetlands Inventory Data (existing digital data)	N/A	CO	Source	1/22/2014	Sept. 2012
	U.S. Fish and Wildlife Service	National Wetlands Inventory Data (existing digital data)	N/A	UT	N/A	9/21/2011	10/1/2010
	U.S. Fish and Wildlife Service (via AGRC)	Manually Digitized NWI Scanned data	N/A	UT	N/A	9/21/2011	4/29/2009
	BIO-WEST	Wetlands	BIO-WEST	CO, UT	N/A	Ongoing	Ongoing
Digitizing Notes:	The two National Wetlands Inventory (NWI) Datasets were clipped and merged for the study area. Where data coverage was absent along the 50 feet of right-of-way for the eight designated alignments (dated January 21, 2014), BIO-WEST manually digitized the wetlands from NWI scanned maps at a scale of 1:5,000. Scanned map data were accessed through the NWI ArcGIS map service. Wetland class attributes were also added based on notes in the scanned maps.						

Topic	Data Sources						
	Source	Data Name	Contact Information	State	Link	Download Date	Publication Date
Wilderness Areas	Bureau of Land Management	Wilderness Study Areas	N/A	CO, UT	ArcGIS Online Service	1/29/2014	May 2012
	Bureau of Land Management	Area of Critical Environmental Concern	N/A	CO, UT	ArcGIS Online Service	1/29/2014	May 2012
	Utah AGRC, BLM, U.S. Forest Service and SITLA	Wilderness Areas	N/A	UT	Source	1/29/2014	2000
Digitizing Notes:	Data were clipped to the study area boundary and merged.						
Wildlife Habitat (ESA Species)	Colorado Division of Wildlife (via the Colorado Oil and Gas Conservation Commission)	Wildlife Habitat Data	N/A	CO	Source	11/25/2013	10/24/2013
	Colorado Parks and Wildlife	Species Activity Mapping (SAM) Data	N/A	CO	Source	1/14/2014	10/24/2013
	Southwest Regional Gap	Animal Habitat Model Data	N/A	CO, UT	Source	1/24/2014	2007
	U.S. Fish and Wildlife Service	Critical Habitat Data	N/A	CO, UT	Source	1/14/2014	3/27/2012
	Utah Division of Wildlife Resources	Wildlife Habitat Data	N/A	UT	Source	1/24/2014	7/1/2006
	Colorado Parks and Wildlife	Colorado Endangered Species List		CO	Source	1/24/2014	1/24/2014
	U.S. Fish and Wildlife Service	County Species List Search Page	N/A	CO, UT	Source	1/24/2014	1/24/2014
	Utah Division of Wildlife Resources	Utah Sensitive Species List by County	N/A	UT	Source	1/24/2014	3/29/2011
Digitizing Notes:	Habitat data were compiled for Endangered Species Act (ESA) wildlife species for the study area. Redundant habitat locations for individual species were removed when multiple data sources were compiled. Data could not be found for the June sucker and least chub; however, the fish species do not appear to reside in the study area, please see distribution map links. Colorado habitat data include the following species: Mexican spotted owl, greater sage grouse, Gunnison sage grouse, western yellow-billed cuckoo, bonytail, razorback sucker, humpback chub, Colorado pikeminnow, greenback cutthroat trout, black-footed ferret, lynx, wolverine, river otter, and kit fox. Utah habitat data include the following species: Mexican spotted owl, greater sage grouse, western yellow-billed cuckoo, bonytail, razorback sucker, humpback chub, Colorado pikeminnow, black-footed ferret, and lynx.						

Topic	Data Sources						
	Source	Data Name	Contact Information	State	Link	Download Date	Publication Date
Wildlife Species Occurrence (ESA Species)	Utah Natural Heritage Program	Species Occurrence Data	N/A	UT	N/A	12/23/2013	12/23/2013
	Utah Division of Wildlife	Threatened and Endangered Species by Quad	N/A	UT	Source	1/24/2014	5/10/2013
	Colorado Natural Heritage Program	Species Occurrence Data	N/A	CO	Pending	Pending	Pending
Digitizing Notes:	Colorado Data request pending budget approval and data-sharing agreement.						
Wildlife Refuges (Section 4(f) Property Type)	U.S. Fish and Wildlife Service	Wildlife Refuges	N/A	UT, CO	Source	12/11/2013	
Digitizing Notes:	Data were clipped to the study area boundary.						



Uinta Basin Railroad Feasibility Study Summary Report

Uinta Basin Rail

Utah Department of Transportation
UDOT Project Number S-R399(169)

January 9, 2015

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Acronyms and Abbreviations

APE	area of potential effects
AREMA	American Railway Engineering and Maintenance-of-Way Association
BLM	Bureau of Land Management
BNSF	BNSF Railway
CAPEX	capital cost
CEVP	Cost Estimating Validation Process
CTC	Centralized Traffic Control
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FRA	Federal Railroad Administration
HDR	HDR Engineering, Inc.
mph	miles per hour
OPEX	operating and maintenance cost
PBA	public benefit analysis
PTC	Positive Train Control
PV	present value
RTC	Rail Traffic Controller (RTC) software
S.R. 88	State Route 88
SHPO	State Historic Preservation Office
STB	Surface Transportation Board
SUWA	Southern Utah Wilderness Alliance
U.S. 191	U.S. Highway 191
U.S. 40	U.S. Highway 40
U.S. 6	U.S. Highway 6
UBETS	Uinta Basin Energy and Transportation Study
UBRR	Uinta Basin Railroad
UDOT	Utah Department of Transportation
UDWR	Utah Division of Wildlife Resources
UP	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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1.0 Introduction

In 2013, the Utah state legislature funded a study by the Utah Department of Transportation (UDOT) to explore potential transportation improvements in the Uinta Basin. Uintah and Duchesne Counties directed the effort and identified the need to explore the feasibility of a new freight rail line (Uinta Basin Railroad, or UBRR) in and out of the basin and requested that UDOT use the funding to provide technical support to determine the feasibility. If a freight rail line was found to be feasible, the Counties requested that UDOT support development of an Environmental Impact Statement (EIS) that would evaluate the expected impacts and obtain the necessary approvals to build the rail line.

What is the UBRR team?

The UBRR team consists of Uintah and Duchesne Counties, UDOT, and rail and environmental planning consultants.

This summary report provides the history of the Uinta Basin Rail Feasibility Study and summarizes the work that was completed to determine the feasibility of the project. The Uinta Basin Rail Feasibility Study evaluated a proposed 100-mile rail line designed to provide freight rail service between the Uinta Basin and the two national freight rail lines that pass through Utah about 50 miles to the south (Figure 1). The results of the feasibility analysis showed that two alignments are feasible to construct, with one alignment being preferred (Alternative 2 along U.S. Highway 191). However, on December 1, 2014, Uintah and Duchesne Counties informed UDOT of their determination that the return on investment for the rail line was insufficient to justify the expense of construction. Consequently, a notice of intent to prepare an EIS was never released.

2.0 History

The Uinta Basin—known since pioneer times as the Isolated Empire—contains extensive deposits of economically valuable minerals, including large deposits of soda ash and phosphate. Also found within this region are substantial deposits of crude oil, natural gas, oil shale, oil sands, gilsonite, natural asphalt, limestone, bentonite, heavy clay, aggregate materials, bauxite, and low-sulfur coal. Agriculture is also an important part of the Uinta Basin’s economy and includes cattle, alfalfa, corn, potatoes, and other field and orchard crops. At present, the Uinta Basin is isolated from the national rail network.

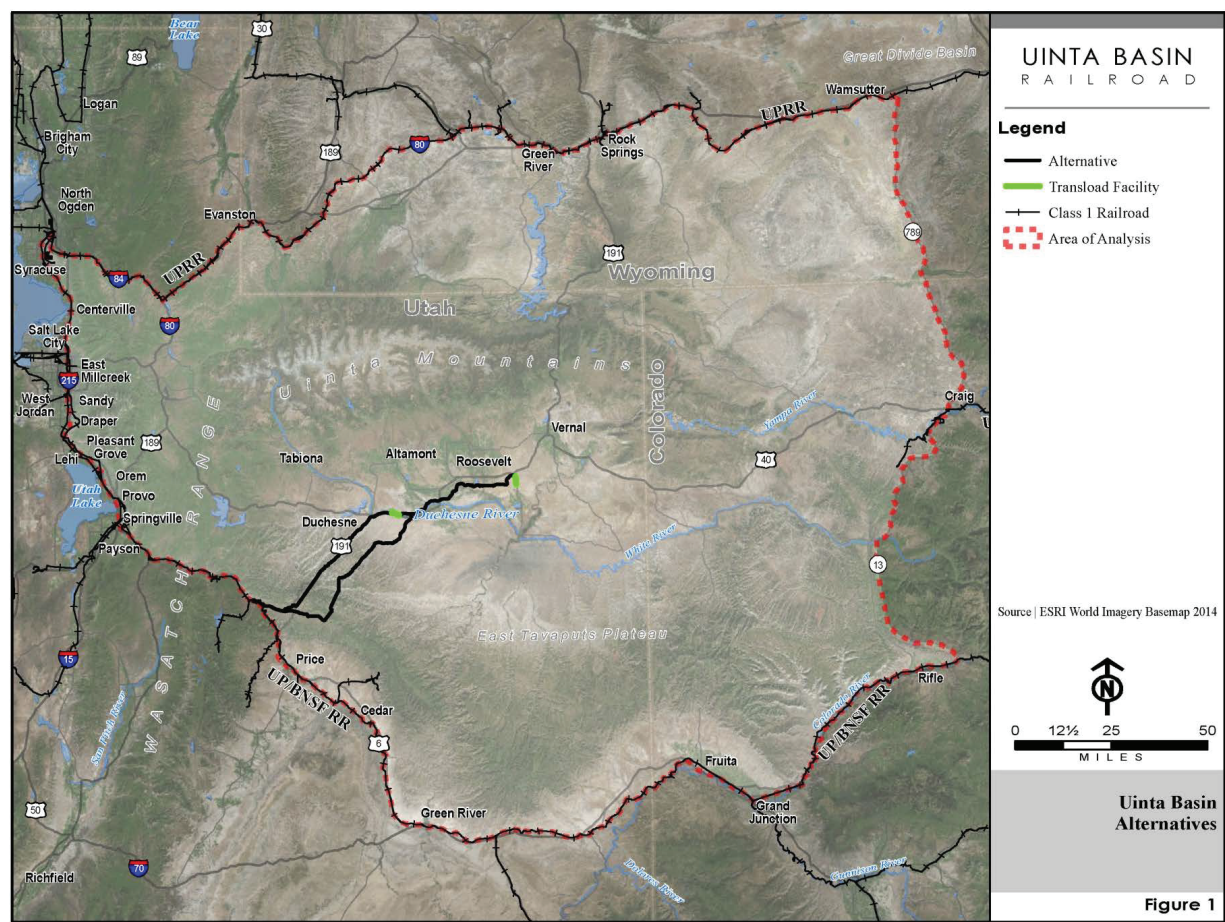
Past studies evaluated the potential for rail alignments into the basin. In 2001, the Utah Department of Community and Economic Development studied the feasibility of constructing a freight rail line (the Isolated Empire Rail) into northeastern Utah (Uinta Basin) and northwestern Colorado (DMJM Harris 2001). The primary need identified for a new rail line was that northeastern Utah and northwestern Colorado do not have the rail, highway, or waterway transportation infrastructure that is required to link their natural resources to markets in the rest of the United States. Although feasible rail alignments that connected to competing Class 1 railroads were identified in the DMJM Harris report, no rail line was constructed.

What are Class 1 railroads?

Class 1 railroads are carriers with annual carrier operating revenues of \$433.2 million or more.

With the more recent increase in gas and oil production, the State of Utah again began to investigate transportation options into the basin starting with the Uinta Basin Energy and Transportation Study in 2013 and the Uinta Basin Rail Feasibility Study in 2014. These studies are described in more detail below.

Figure 1. Uinta Basin Alternatives



2.1 Uinta Basin Energy and Transportation Study (UBETS)

In 2013 and prior to the Uinta Basin Rail Feasibility Study, UDOT prepared the Uinta Basin Energy and Transportation Study (UBETS). UBETS was needed to understand the effect of transportation limitations in Duchesne and Uintah Counties on future oil and gas production in the Uinta Basin. The study was sponsored by Duchesne County, Uintah County, the Uintah Transportation Special Service District, and UDOT. It sought to answer three questions:

- What is the likely path of growth for energy production in the basin?
- Is transportation capacity limiting future energy production?
- If so, what is the opportunity cost of failing to address transportation system limitations?

UBETS was designed to ensure a rigorous, credible, conservative estimate of future production value as well as the potential loss to the state's economy due to transportation constraints. Additionally:

- The study was based on data collected from the U.S. Geological Survey, the Utah Geological Survey, the U.S. Energy Information Administration, UDOT, and respected academic institutes.
- The study included multiple rounds of stakeholder workshops and engaged a large number of producers and other industry participants through an extensive interview process.
- The results were a product of quantitative risk analysis, including assessment of a wide variety of production constraints, price uncertainty, production input requirements, and mode substitution.

The study showed that 2012 basin-area oil and gas production was worth about \$2.5 billion; extraction was expected to grow quickly. The product of the study was an estimate of the value of potential extraction lost due specifically to transportation constraints—more than \$30 billion of lost oil and gas production over 30 years (undiscounted). The study also estimated the opportunity cost resulting from the constrained transportation system in terms of tax revenue, private rents and royalties, jobs, transportation user cost savings, and environmental and safety effects to be a present value of more than \$10 billion of net benefits and almost 27,000 long-term, high quality jobs (Table 1).

Table 1. Opportunity Cost of Constrained Oil and Gas Transportation Capacity in the Uinta Basin, Present Value^a (over 30 Years)

Revenues and User Benefits (millions)		Environmental and Social Costs (millions)		Macroeconomic Impact	
Profit, rents, dividends, and private royalties ^b	\$3,784	Site emissions and ecological impacts	(\$1,246)	Total regional output (millions)	\$34,794
State and local tax revenue	\$2,756	Vehicle emissions	(\$24)	Total labor income (millions)	\$11,791
User cost savings	\$4,943	Safety impacts	(\$101)	Long-term jobs ^c	26,802
Total	\$11,483	Total	(\$1,371)		

^a 3% discount rate.

^b Represents the portion of total macroeconomic output that is additional private citizen/corporate "profit" net of expenses and resource depletion.

^c Assumes a 10-year term of employment.

The study indicated potentially significant returns resulting from additional strategic investment in transportation infrastructure in the basin. The added annual oil and gas production represents about 7% of the state's gross domestic product (GDP). Of the \$180 million average annual added tax revenues, the Utah School and Institutional Trust Lands Administration royalties alone would add about \$25 million

per year directly to public education. The study noted that, in order to capture these opportunities and realize the lost revenues, further assessment of transportation investment options, production regulation and policies, and environmental impact mitigation strategies would be necessary.

2.2 Uinta Basin Rail Feasibility Study

Motivated by the results of UBETS, the Utah state legislature funded an environmental study to look at transportation investment options and the associated environmental impacts. The funds were directed through UDOT to support Duchesne and Uintah Counties in looking at potential options. Based on the need to reduce energy transportation cost, expand transportation capacity, and improve market reach, the Counties decided to undertake the Uinta Basin Rail Feasibility Study.

The study was designed to determine whether it is feasible to construct a rail line into and out of the basin. It included a cost-benefit analysis to determine the rail line's return on investment. If the rail line were determined to be feasible, a notice of intent to start an EIS process would be issued. The Surface Transportation Board (STB), which responsible for approving any freight rail connection to the existing national rail network, was invited to lead the EIS effort. STB confirmed that it would be the lead federal agency if an EIS process were initiated.

The feasibility process started in November 2013 and concluded in December 2014.

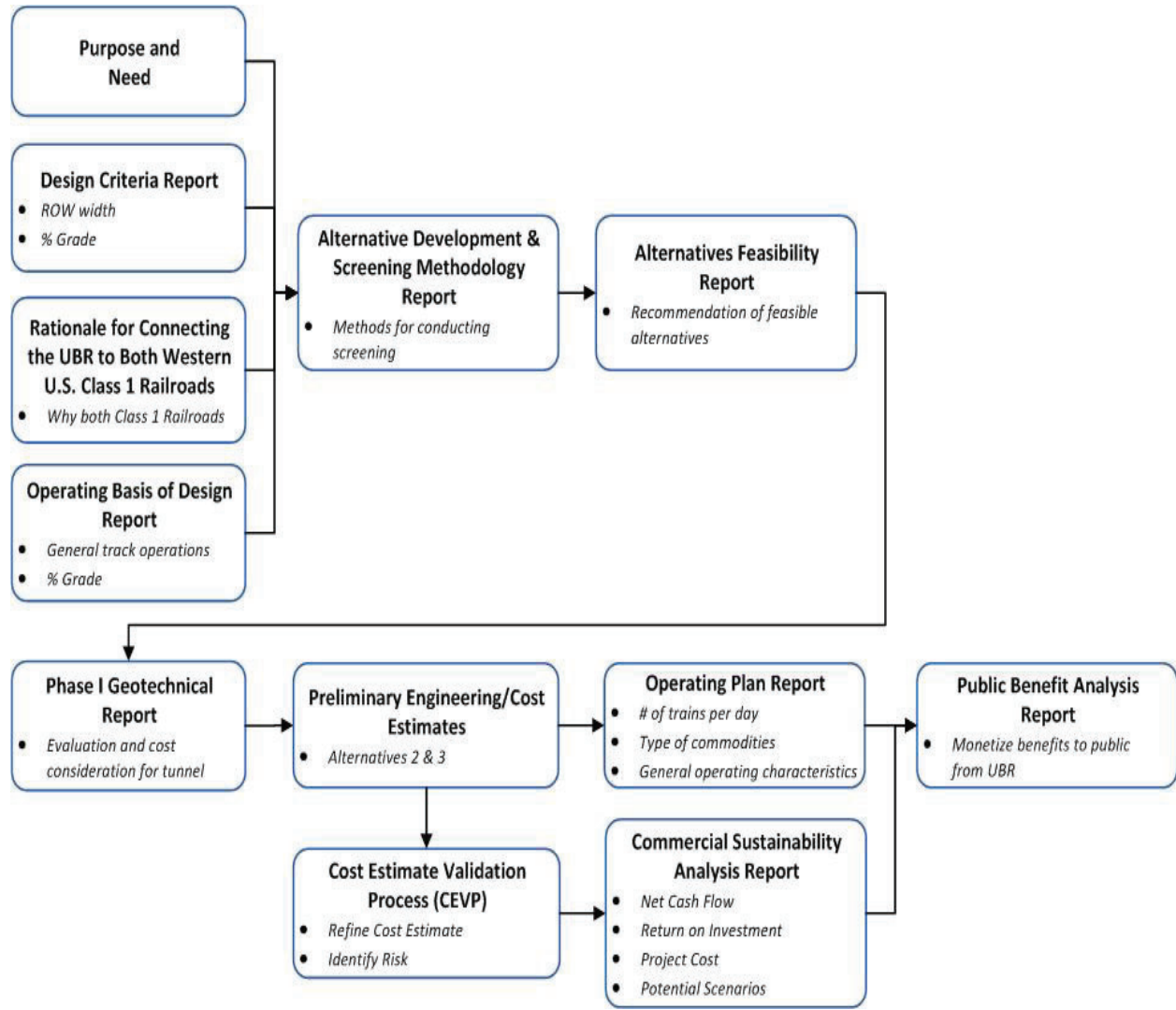
3.0 Overview of the Uinta Basin Rail Feasibility Study Process

For the Uinta Basin Rail Feasibility Study, a series of studies and technical reports were prepared to assist decision-makers in evaluating the proposed rail project and to make a decision regarding the feasibility based on the information provided. This section provides a summary of each report.

The technical reports are divided between Phase 1 (Alternatives Development and Feasibility) and Phase 2 (Field Studies and Environmental Discipline Reports). The primary purpose of the technical reports was to determine the engineering feasibility of the project and, if feasible, to provide information to STB so that an EIS could be prepared for the UBRP. During Phase 1 (April 2014), UDOT determined that two alternatives were feasible from an engineering standpoint (economic evaluation was not completed until November 2014). UDOT decided to conduct environmental field surveys of those alignments prior to the winter of 2014 so that, if an EIS were started, there would be no schedule delay due to missing a summer field survey season.

The technical reports for Phase 1 are shown in Figure 2 below. The primary purpose of Phase 1 was to determine whether there are feasible rail alternatives into the Uinta Basin and, if so, to develop preliminary engineering and cost estimates for those alternatives. In addition, Phase 1 provided a preliminary evaluation of how the rail line would be operated, the commercial analysis or return on investment, and what would be the public benefit of the rail line.

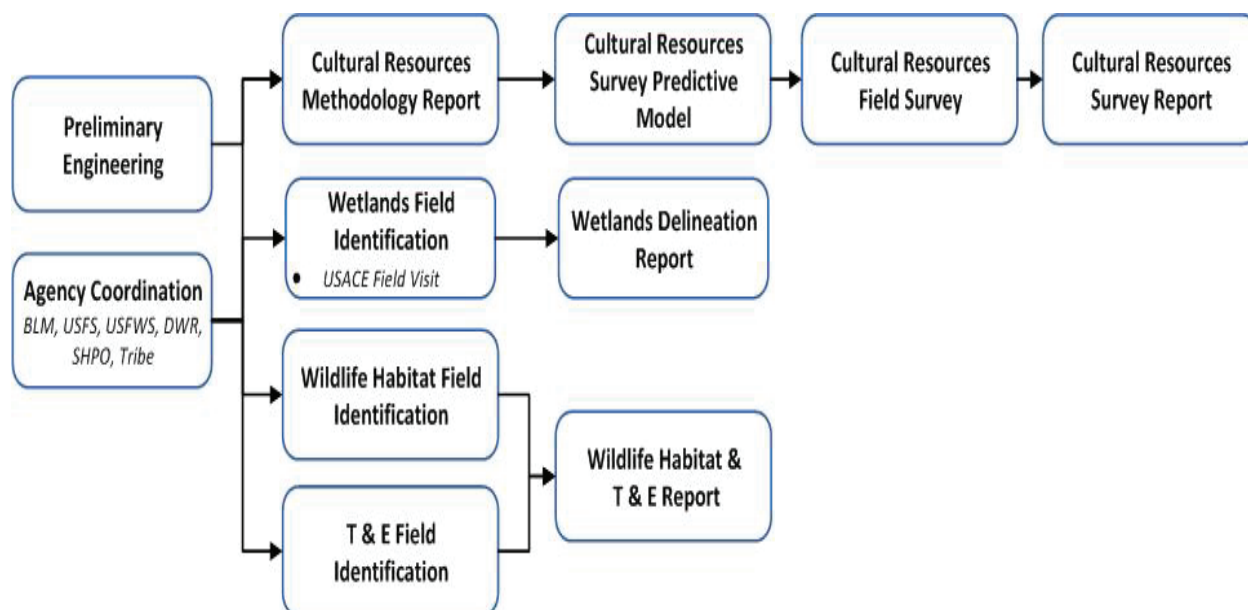
Figure 2. Phase 1 Alternative Development and Feasibility Reports



Phase 2 included conducting the environmental field surveys for the feasible alternatives and developing the baseline environmental discipline reports. Figure 3 below shows the process for developing this information.

During Phases 1 and 2, UDOT collected a substantial amount of data in GIS (geographic information systems) format from resource agencies and during the field surveys to help prepare the technical reports. The technical reports are provided in the appendices of this summary report.

Figure 3. Phase 2 Field Surveys and Resource Reports



3.1 Phase 1 Reports

3.1.1 Purpose of and Need for the Uinta Basin Railroad

This report identified why the UBRR is needed and the purpose of the project. The purpose of and need for the project are summarized below.

Need for the Project

The Uinta Basin is a geographical area in east-central Utah that includes the communities of Vernal, Duchesne, Roosevelt, Altamont, Myton, Ballard, Naples, and Tabiona as well as smaller, unincorporated communities. The basin contains extensive deposits of economically valuable minerals, including large deposits of soda ash and phosphate. Also found within this region are substantial deposits of crude oil, natural gas, oil shale, oil sands, gilsonite, natural asphalt, limestone, bentonite, heavy clay, aggregate materials, bauxite, and low-sulfur coal. Agriculture is also an important part of the Uinta Basin's economy and includes cattle, alfalfa, corn, potatoes, and other field and orchard crops. The above types of commodities benefit from being transported in large bulk shipments to market by rail, which provides transportation efficiency and reduces cost.

The needs for the project include the need for reduced shipping rates for commodities transported to and from the Uinta Basin and the need for expanded market access for the commodities produced in the Uinta Basin. The Uinta Basin does not have access to rail service except via lengthy intermediate truck or pipeline haulage between the basin and the national rail network beyond the basin. The cost of the intermediate truck haulage combined with the commodity, network, and capacity limitations of pipelines result in higher costs of transportation for commodities transported to and from the Uinta Basin and limit the access to markets for commodities produced in the basin (commodities such as oil, gilsonite, and grain) compared to the access that would be expected if the basin had direct access to the national rail network.

In general, as transportation costs increase, economic competitiveness decreases, economic potential is reduced, and economic activity decreases. Freight rail service provides producers with cost-effective transportation, especially for heavy and bulky commodities. The need for the project is summarized below.

- **No rail service.** There is no rail service to the Uinta Basin.
- **Higher cost to ship by truck.** Commodities are transported into and out of the basin primarily by truck. The average revenue per ton-mile for rail-hauled freight in the United States is \$0.0376, whereas the average revenue per ton-mile for truck-hauled freight in the United States is \$0.1654 (U.S. Department of Transportation, Bureau of Transportation Statistics 2007). The lower cost of rail transportation means that a producer can transport a commodity 4.3 times farther by rail than by truck for the same cost.
- **Distance to the national rail network.** Transportation of commodities that are not suitable for pipeline transportation between the Uinta Basin and national markets requires either a truck haul between the commodity's origin and destination or a truck haul for the portion of the commodity's route between the Uinta Basin and a transload facility on the national rail network. The nearest rail lines are between 112 and 154 miles on rural highways from Vernal, the largest city in the basin.
- **Limited ability for pipelines to ship all commodities.** Pipelines are not suitable for transporting the wide variety of commodities, such as aggregate and agricultural products, produced and consumed in the Uinta Basin. In addition, the capacity and market reach of the existing pipeline network is limited by having relatively fixed origins and destinations. Pipelines are technically limited in the variety of commodities they can carry.
- **Limited market access.** The use of trucks to ship many commodities into and out of the Uinta Basin limits large-scale access to the national market because of the higher transportation cost of trucks and the reduced technical ability to ship some commodities.
- **Limited capacity to ship by truck.** Truck shipments into and out of the basin are capacity-constrained to the size of the truck. This constraint can be overcome only by using more trucks to ship the commodity, which increases the transportation cost. A rail line would enable commodities to be moved without being subject to the same capacity constraints and at a reduced transportation cost.

Purpose of the Project

Based on the need, the purpose of the UBRR project is to reduce shipping costs and expand market access for commodities transported to and from the Uinta Basin by constructing a freight rail line that connects the Uinta Basin to the national common-carrier freight railroad system, with direct access to the two western U.S. Class 1 railroads (BNSF Railway and Union Pacific Railroad).

The project purpose was used to assist the UBRR team in screening potential alternatives to determine which alternative(s) would be feasible.

The complete report is provided in Appendix A, Purpose of and Need for the Uinta Basin Railroad.

3.1.2 Design Criteria Report

This report described the design standards that were used to develop the proposed UBRR. The design standards informed the refinement of alternatives and the conceptual engineering. The track components conformed to the latest version of the American Railway Engineering and Maintenance-of-Way Association's (AREMA) standards. The design of track components was compatible with existing components whenever appropriate. Track design at a minimum met or exceeded Federal Railroad Administration (FRA) Class 4 track safety standards. Communications and signal design took into account the best practices in the AREMA *C&S Manual* and would comply with FRA standards.

The report described the design requirements for horizontal and vertical alignments, turnout requirements, clearances, roadbed, at-grade crossings, access and maintenance roads, yard design, sidings, train control, signaling and communications, drainage and bridge structures, and tunnels. The complete report is provided in Appendix B, Design Criteria Report.

3.1.3 Rationale for Connecting the Uinta Basin Railroad to Both Western U.S. Class 1 Railroads Report

This report described why the purpose of and need for the UBRR states that the UBRR should connect to both of the western U.S. Class 1 railroads. There are two Class 1 railroads that serve the majority of the western United States: BNSF Railway (BNSF) and Union Pacific Railroad (UP). The rationale for connecting to both of the western U.S. Class 1 railroads was that this would enable the UBRR to have competitive access to the national rail network. If the UBRR were to connect to only one of the two railroads, there would be no competition for rail service to the UBRR, and the single railroad to which the UBRR would connect would, if it chose, be able to dictate terms and conditions of service that could be economically damaging to the UBRR.

Access to only one Class 1 would create a substantial risk that shippers on the UBRR would pay greater costs for rail transportation than if it were to connect to both of the two western Class 1 railroads. This would conflict with another principle of the purpose and need for the UBRR: that it must enable shippers to reduce transportation costs.

Figure 4 below shows the Class 1 railroads that surround the basin. Figure 5 below shows the proposed UBRR connection to the UP rail line adjacent to U.S. 6.

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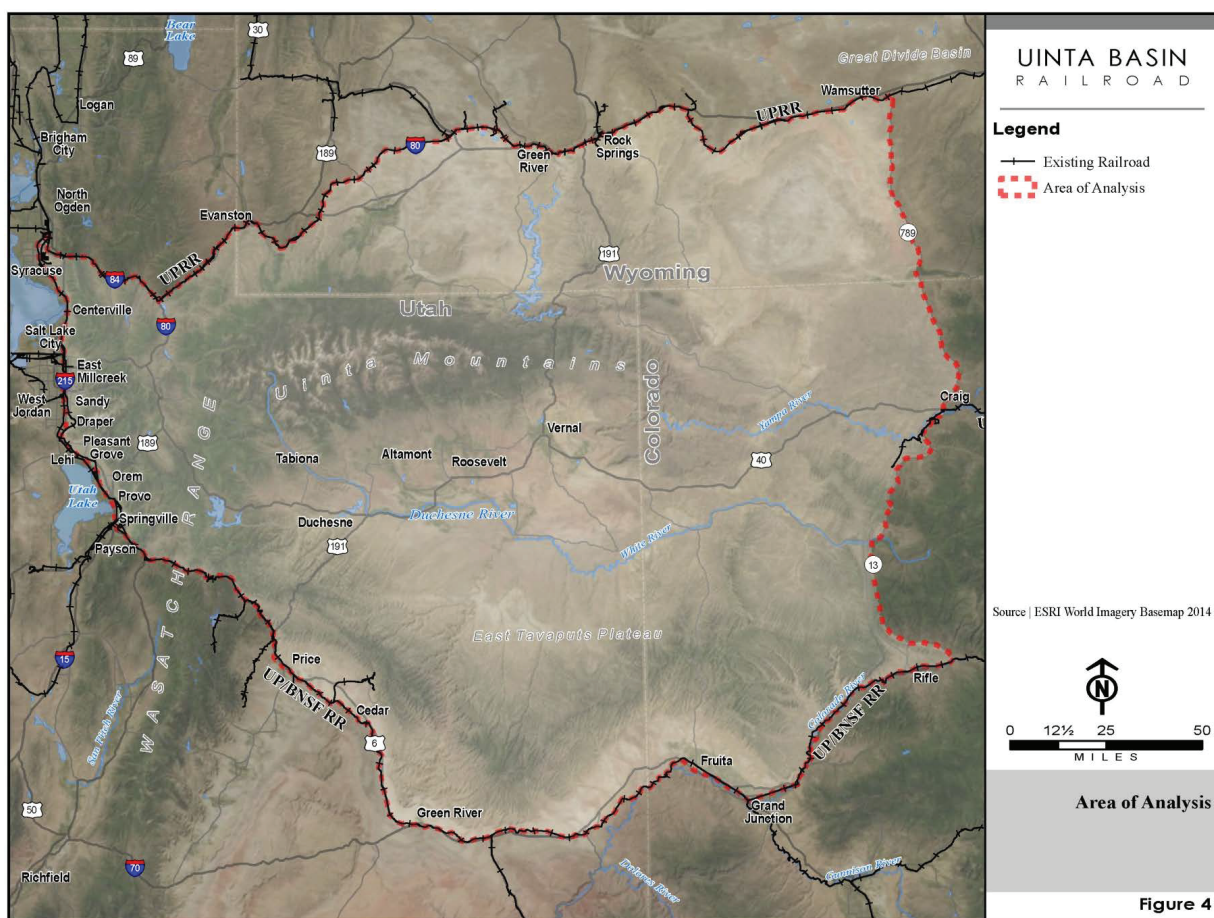
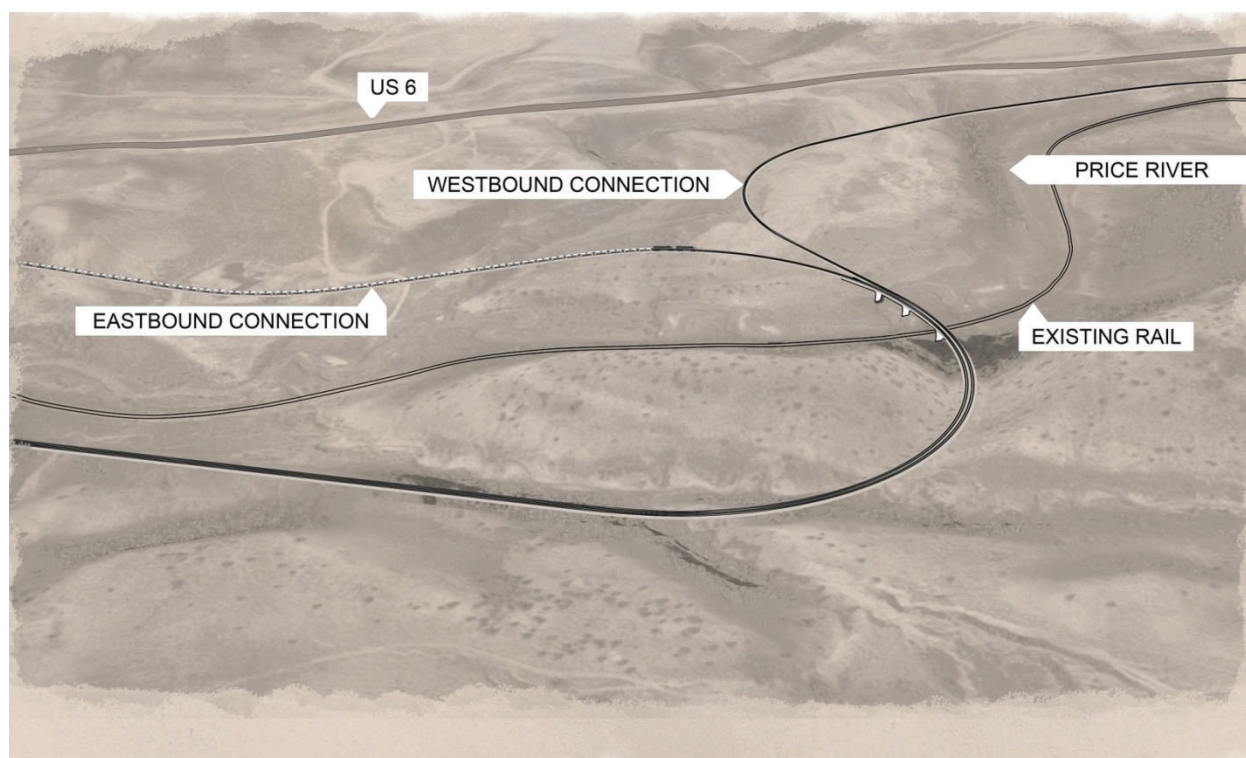


Figure 5. UBRR Connection to the Class 1 Rail Network



The complete report is provided in Appendix C, Rationale for Connecting the Uinta Basin Railroad to Both Western U.S. Class 1 Railroads.

3.1.4 Operating Basis of Design Report

This report described the Operating Basis of Design for the proposed UBRR. An Operating Basis of Design is a statement of the functional and operating requirements of a railroad that influences engineering design decisions. Examples of functional and operating requirements include ruling grade, average speed of trains, typical maximum length of trains, and number and type of trains per day. Engineering decisions based on these functional and operating requirements include maximum grades, maximum degree of curvature, length and number of sidings, and number of main tracks.

The UBRR team determined that the UBRR would be a freight-only railroad (no passenger-rail service) based on the project's need to reduce freight-rail transportation cost. The two freight train types anticipated for the UBRR were (1) unit (or bulk) trains that haul a single commodity in one uniform car type for a single shipper between one origin-and-destination pair and (2) manifest (or mixed freight) trains that haul many commodities in carload volumes, each carload with its own shipper and origin-and-destination pair. No intermodal, automotive, or perishable trains were anticipated.

Based on the potential commodity shipments, the UBRR team determined that up to 11 trains a day would use the UBRR, which meant that it would require only a single-track railroad. The maximum ruling grade was determined to be 2.4%, with the main track design speed on the basis of curvature not less than 25 miles per hour (mph) in mountainous terrain and 60 mph in non-mountainous terrain.

The complete report is provided in Appendix D, Operating Basis of Design Report.

3.1.5 Alternatives-Development and Screening Methodology Report

The purpose of this report was to describe the proposed alternatives-development and screening process and methodology that was used for the UBRR alternatives feasibility process (see Section 3.1.6, Alternatives Feasibility Report). The report was provided to stakeholders prior to the alternatives-development and screening process to get buy-in on the methods used to develop and screen alternatives. The process consisted of the following five basic phases:

1. Developing preliminary project railroad alternatives
2. Applying first-level (Level 1 – Purpose and Need) screening criteria, identifying alternatives that will move to the next level (Level 2), and refining alternatives that pass the first-level screening
3. Applying second-level (Level 2 – Construction and Operation Feasibility) screening criteria based on initial desktop review of constructability and rail operations feasibility to identify alternatives that pass Level 2 screening and will be analyzed in Level 3 screening
4. Applying third-level (Level 3 – Natural and Built Environment) screening criteria based on impacts to the natural and human environment to identify alternatives that will under go a final field verification constructability review (Level 4)
5. Applying a field review (Level 4 – Alternative Feasibility) of the potential constructability of the alternatives to determine which alternatives are feasible and practicable

The report describes the screening criteria that were established for each of the five phases to determine the feasible alternatives and the data and tools used. Figure 4 above shows the study area used to develop feasible alternatives. The area is defined by the existing Class 1 railroads that surround the Uinta Basin as follows:

- **North border:** The UP main track between its intersection with Wyoming State Highway 789 and Ogden, Utah
- **East border:** Wyoming State Highway 789 between its intersection with the UP main track east of Wamsutter, Wyoming, and the Colorado border, and Colorado State Highway 13 between the Wyoming border and its intersection with the UP main track near Rifle, Colorado
- **South border:** The UP¹ main track between Rifle, Colorado, and Provo, Utah
- **West border:** The UP main track between Provo, Utah, and Ogden, Utah

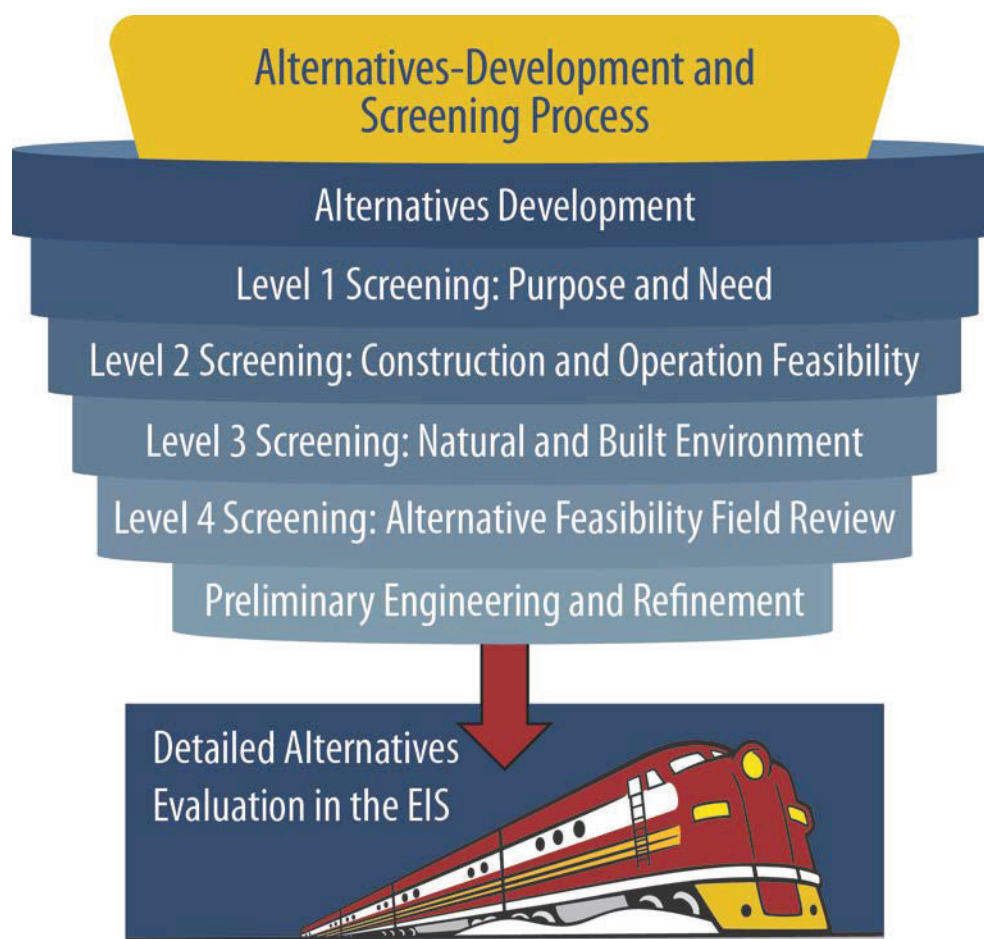
The complete report is provided in Appendix E, Alternatives-Development and Screening Methodology Report.

3.1.6 Alternatives Feasibility Report

This report documented the alternatives feasibility evaluation process using the screening criteria developed in the Alternatives-Development and Screening Methodology Report. The report documented the processes and conclusions from each step of the screening process shown in Figure 6 below.

¹ BNSF maintains track rights with the UP main track on the southern and western borders of the analysis area.

Figure 6. Alternatives-Development and Screening Process

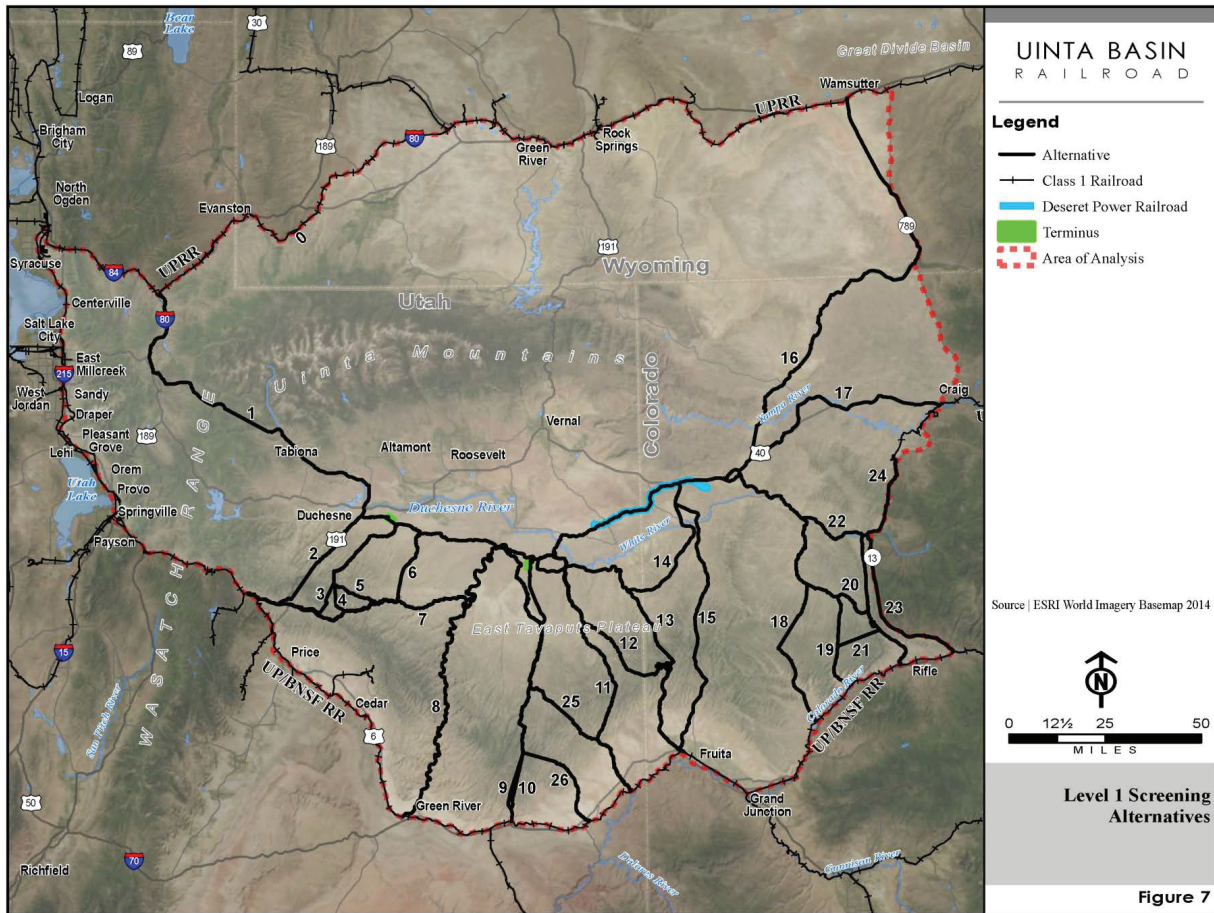


Alternatives Developed

In all, 26 alternatives were developed within the area of analysis to evaluate in the screening process (Figure 7 below). First, the UBRR team included the alternatives developed as part of the Isolated Empire Rail Project (DMJM Harris 2001). The purpose of this project was to review the feasibility of extending a heavy-duty commercial freight rail line to connect the remote areas of northwestern Colorado and northeastern Utah to the national rail network. The project evaluated 16 alignments, all of which were included in the alternatives-development and screening process for the UBRR project. After reviewing these alternatives, the UBRR team developed 10 additional alternatives. The main criteria used to develop these alternatives are as follows:

- The freight rail alternatives must connect to an existing rail line within the area of analysis in order to provide a connection to the national rail network.
- The freight rail alternatives must meet basic topography requirements such as minimizing the need to traverse steep terrain.
- The freight rail alternatives must reduce local truck travel distances to the rail line to the greatest degree economically practical with acknowledgement that future development could occur in different locations in the Uinta Basin. The alternative must also provide a range of access across the basin to support the economic viability of the railroad for all commodities.

Figure 7. Level 1 Screening Alternatives



Alternatives-Screening Process

During the alternatives-screening process, the four levels of screening were applied to the 26 alternatives. The two criteria that had the greatest effect on screening were:

- **The Level 1 criterion that the alternative must provide the Uinta Basin with two-carrier access by connecting to existing rail lines served by both UP and BNSF.** This will provide the opportunity for competitive pricing between railroads by providing competitive freight transportation services to the shippers and receivers in the Uinta Basin. This criterion eliminated four alternatives: 1, 16, 17, and 24.
- **The Level 2 criterion that the UBRR have a grade of no more than 2.4%.** For main-track railways in North America intended for heavy and frequent trains, a grade of 2.4% has historically been considered the steepest grade that is economically and safely operable. The *de facto* standard ruling grade in the United States is slightly less, at 2.2% (for more information, see the Alternatives-Development and Screening Methodology Report). This criterion eliminated 13 alternatives: 6, 9, 10, 11, 13, 14, 15, 19, 20, 21, 22, 23, and 26. In order to maintain the 2.4% grade, all of the alternatives that passed Level 2 screening required tunnels between 7 and 9 miles long.

In addition to the alternatives eliminated by the above criteria, two were eliminated because they were within the Green River canyon, and the floodplain and steep canyon walls would make it impracticable to build a rail line (Alternatives 7 and 8). During Level 3 screening, Natural and Built Environment, three alternatives were eliminated. Two alternatives were eliminated because they were within Nine Mile Canyon, which is known for its extensive rock art and other cultural resources created by the Fremont culture and the Ute people. They also had greater wetland impacts than another nearby alternative (Alternatives 4 and 5). The final alternative was eliminated from consideration for having the greatest wetland impacts, the greatest impacts on sensitive wildlife habitat, the greatest impacts on irrigated prime and unique farmland, and the highest cost (Alternative 18).

From February 24 to February 26, 2014, the UBRR team conducted Level 4 screening (alternative feasibility field review) on the four alternatives that passed Level 3 screening (Alternatives 2, 3, 12, and 25). After the field review, the team developed more-refined digital maps and determined that one of the remaining four alternatives had a grade of 2.8% (Alternative 25). This grade would not pass the Level 2 grade criterion of 2.4%, so the alternative was eliminated. When considering the remaining three alternatives, the UBRR team determined that the steep slopes and loose material in the Baxter Pass area would make construction and operation of Alternative 12 not feasible or practicable.

Feasible Alternatives

Using the four-level screening process, the UBRR team determined that Alternatives 2 and 3 were both feasible and practicable alternatives and would be evaluated (see Figure 1 above, Uinta Basin Alternatives). Of the seven alternatives that met both the project purpose and the 2.4%-grade requirements from Level 1 and 2 screening, Alternatives 2 and 3 would have the least amount of impacts to wetlands, sensitive wildlife habitat, drainages, wilderness areas, Section 4(f) resources, and cultural resources.

Using the four-level screening process, the UBRR team determined that Alternative 2 (about 96 miles long with one 8-mile tunnel) and Alternative 3 (about 113 miles long with three tunnels totaling 9 miles) were the only feasible and practicable alternatives of the original 26 alternatives evaluated. Based on the alternatives-refinement process that was conducted on the two alternatives; the UBRR team

recommended that Alternative 2 be carried forward for consideration and that Alternative 3 be eliminated from detailed consideration based on its additional impacts to the natural environment and the alternative's higher cost.

Both alternatives would use similar alignments except for the portions in Indian Canyon and Sowers Canyon and would provide the same operational benefits. However, Alternative 3 would have greater impacts on wetlands (9 more acres), sensitive wildlife habitat (214 acres), and cultural resources (one more site). In addition, Alternative 3 would involve developing a new transportation facility in a relatively undisturbed canyon, whereas Alternative 2 would be built in a canyon with an existing highway that already causes transportation-related impacts to the natural environment. Finally, Alternative 2 would affect about 196 fewer acres of federal, state, tribal, and private land.

Both alternatives included rail terminals within the Uinta Basin as shown in Figure 8 and Figure 9 below.

Figure 8. Duchesne Terminal

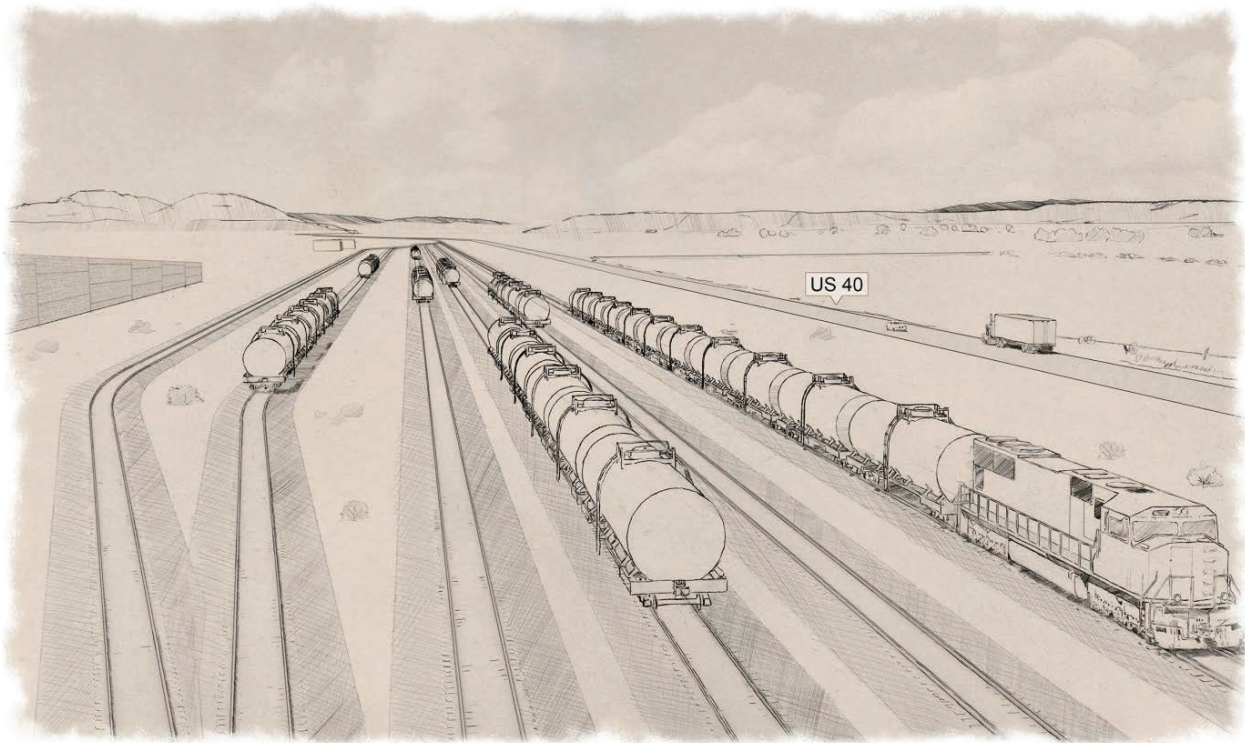
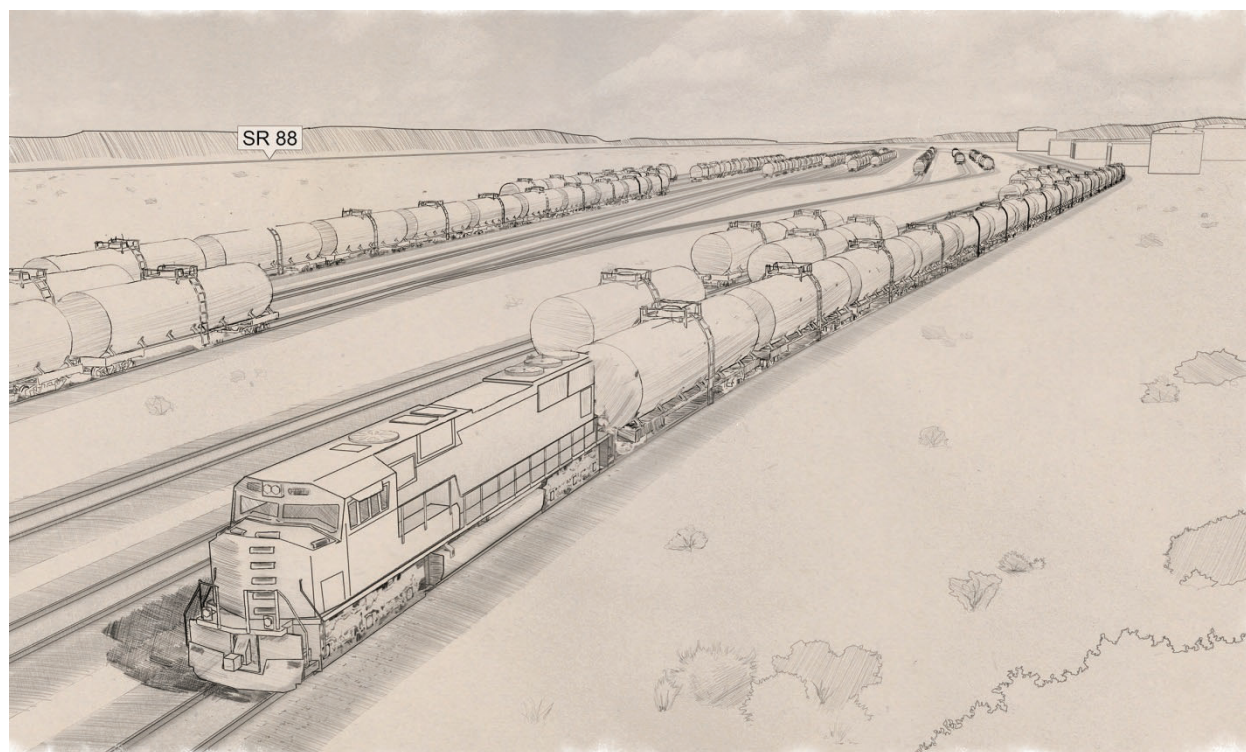


Figure 9. U.S. 40 and S.R. 88 Terminal



The complete report is provided in Appendix F, Alternatives Feasibility Report.

3.1.7 Phase 1 Geotechnical Report

To assist with the preliminary engineering and cost estimate, a geotechnical review of the two alignments was conducted using existing literature. The main purpose of the evaluation was to look at the feasibility of the proposed tunnels and to assist in reviewing potential tunnel options.

The complete report is provided in Appendix G, Phase 1 Geotechnical Report.

3.1.8 Preliminary Engineering/Cost Estimate

Preliminary Engineering

The primary challenge for developing a feasible UBRR alignment was topography. The Uinta Basin is bounded on the north by the Uinta Mountains and on the east by the Douglas Creek Arch, with portions of the Wasatch Range and the Roan Cliffs forming its southern and western boundaries. The basin is a high desert with elevations that range from about 4,632 feet in the eastern part near the Green River to about 6,867 feet in the southwestern part near Gilsonite Draw. The Uinta Basin—known since pioneer times as the Isolated Empire—does not have an existing rail line because the mountains that surround the basin make finding a route with an acceptable grade difficult.

For the UBRR project, the criterion for the ruling grade was 2.4%. For main-track railways in North America intended for heavy and frequent trains, a grade of 2.4% has historically been considered the steepest grade that is economically and safely operable. The *de facto* standard ruling grade in the United States is slightly less, at 2.2%. A 2.4% ruling grade is at present encountered on only two major rail lines

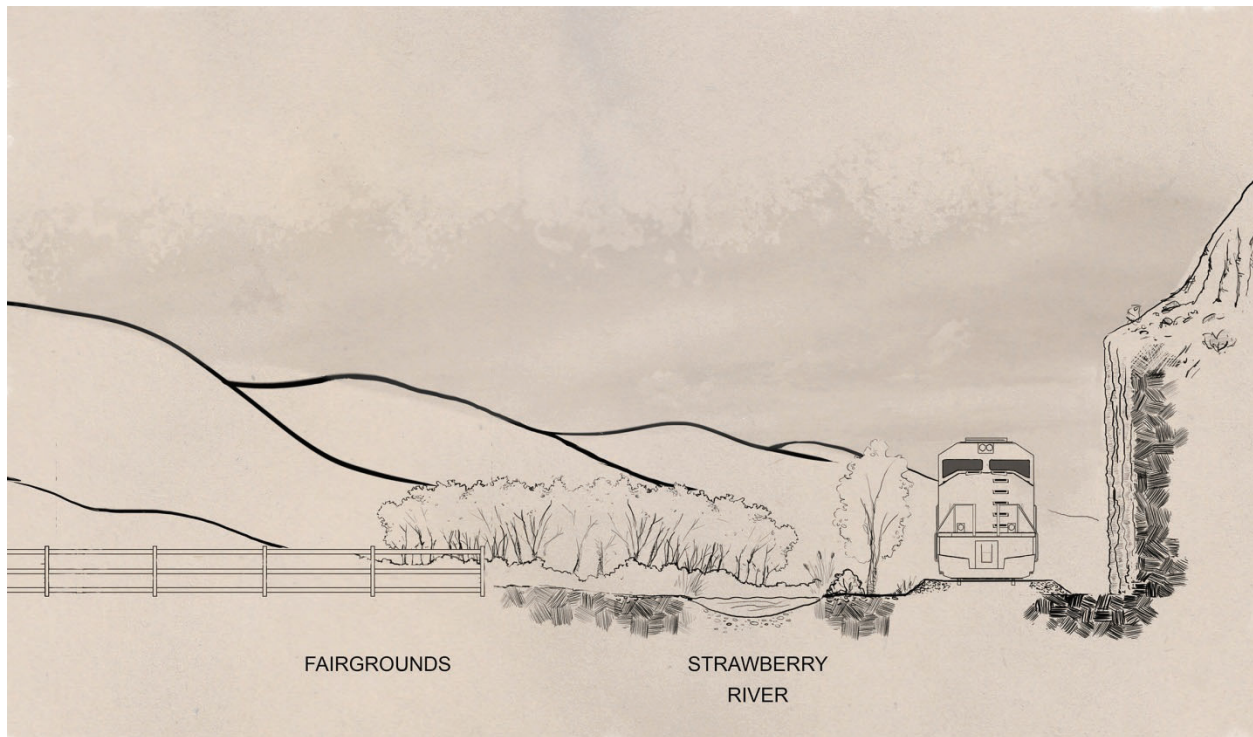
in the United States: eastward on UP's ascent of Donner Pass in California, which lies on UP's main track between northern California and Chicago, and westward on UP's ascent of Soldier Summit in Utah, which lies on UP's main track between Denver and Salt Lake City via Grand Junction, Colorado.

Trying to maintain a ruling grade of 2.4% was the limiting factor on most of the 26 alternatives evaluated. As a result, most of the alternatives required long tunnels in order to maintain the 2.4% ruling grade. Even with tunnels, 13 of the 26 alternatives were eliminated because they could not meet the 2.4% criterion.

Another engineering challenge that also contributed to high cost was the walls needed to shore up the steep terrain and loose material in many of the canyons. In many locations, avoiding the steep walls of a canyon meant placing the rail line in the bottom of the canyon, which would require relocating streams in several locations. The associated cut-and-fill requirements meant that large amounts of soil would need to be disposed of (for example, for Alternative 2).

In addition, in order for Alternative 2 to avoid tribal land near Duchesne, the rail alignment would have to be located between a steep bluff and the Strawberry River, a configuration that required an extensively high and long wall. Figure 10 shows this proposed concept. Some of the walls proposed for the project were 50 to 60 feet high and over 100 feet long.

Figure 10. Duchesne Fairground Alignment



Preliminary engineering was conducted for the two feasible alignments only (Alternatives 2 and 3). Because the project did not progress beyond the initial feasibility evaluation, the amount of preliminary engineering was conceptual (less than 5% of final engineering) and was based on available low-resolution topographical information (± 15 -foot contours) and approximate locations of land ownership. The process of acquiring geotechnical data consisted of reviewing existing literature on the terrain surrounding the basin. Although several tunneling techniques were discussed, because there was no detailed geotechnical information, a final technique was never developed.

The proposed tunnels were the primary reason for the high cost of the project and for extending the proposed construction schedule from 2016 to 2025. The evaluation showed that a 29-foot-diameter rail tunnel between 8 and 9 miles long could take 2 years to complete, require long lead times (a year or more) to obtain the necessary equipment, and require a large number of skilled laborers. During peak construction periods for the project, projections of 3,000 workers were estimated. This size of workforce would overwhelm the existing city infrastructure of the local small communities, requiring separate camps with upgraded infrastructure to be built to house the workers. Figure 11 and Figure 12 below show the proposed tunnel concepts.

Figure 11. South Tunnel and U.S. 191 Crossing

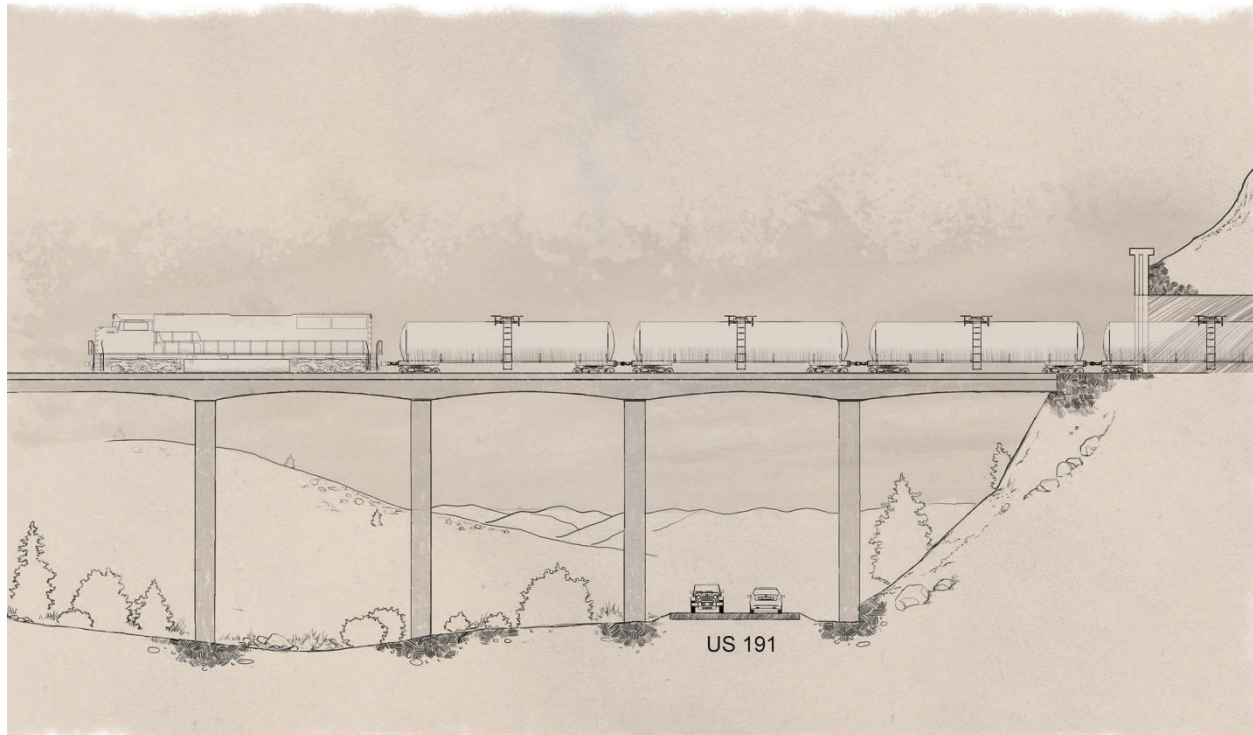
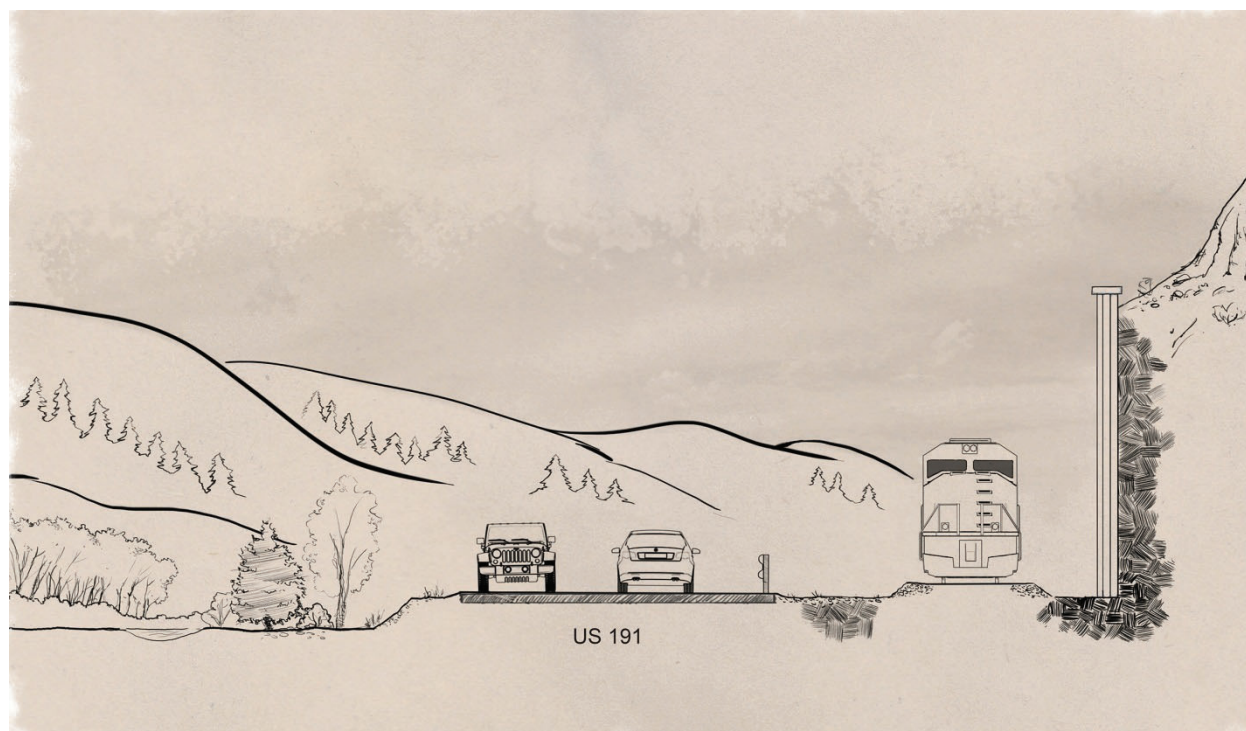


Figure 12. North Tunnel and U.S. 191 Crossing



For Alternative 2 in Indian Canyon, the UBRR team determined that UDOT owned about 100 feet of the right-of-way for U.S. 191. This included UDOT having a quick claim deed for the 100-foot right-of-way across tribal land. To avoid impacts to tribal land and private property, UDOT developed the alignment so that the rail line and highway could be co-located within the 100-foot right-of-way. Using this approach minimized impacts to adjacent properties, wetlands, farmland, stream channels, and wildlife habitat. Figure 13 below is a diagram of this approach.

Figure 13. U.S. 191 Corridor Proposed Design



Appendix H, Cost Estimates and Design Maps, provides the preliminary engineering plan sheets.

Cost Estimates

Based on the conceptual engineering, the UBRR team developed a cost estimate for Alternatives 2 and 3. Because of the conceptual nature of the engineering, a 25% contingency was added to the cost estimate. The estimates were later revised as part of the Cost Estimating Validation Process (CEVP) described in Section 3.1.10, Cost Estimating Validation Process (CEVP). The initial cost estimate for Alternative 2 was \$2.97 billion and for Alternative 3 was \$3.05 billion. Appendix H, Cost Estimates and Design Maps, provides the preliminary cost estimates.

Operational Planning

Operational planning for the UBRR consisted of a preliminary plan based on initial conversations with potential shippers and the connecting railroads: UP, BNSF, and Utah Railway. The Operating Plan projected tentative freight commodities, volumes, and the service need of shippers based on these conversations and comparable operations on other railways in the United States. The Operating Plan selected tentative locations for shipper facilities, types of facilities, how shippers might interact with facilities, and the tentative method of interchange with UP, BNSF, and Utah Railway, but without any definite agreement by shippers and the connecting railroads that these locations and methods would actually be implementable. In particular, the Operating Plan could not project the most important aspect of all for a rail line—who would own, operate, maintain, and market its services—since these factors were not established at the time the Operating Plan was prepared.

To advance an Operating Plan beyond the preliminary stage, commercial agreements would need to be made with shippers and connecting railroads and for a definitive plan for who would own, operate, maintain, and market the rail line.

Because the Operating Plan did not have definitive agreements in place—these agreements had not even been discussed (beyond the fact that the connecting railroads stated they would be required)—certain technical aspects of the Operating Plan remained tentative and based on comparables. These technical aspects would need to be finalized and validated before selecting a final connection point with the UP line and before selecting and designing any terminals or shipper facilities. The technical aspects could even affect the alignment and ultimate extent of the UBRR within the Uinta Basin. UP, the owner of the main track to which the UBRR was proposed to connect, stated that the following technical documentation must be prepared prior to its agreeing to interchange with or physically connect with the UBRR:

- A train dynamics study demonstrating that the in-train forces on the UBRR, and through the connection with UP, were equal to or less than the in-train forces on the UP main track between Helper and Provo, Utah. This study would baseline the UP main track's train dynamic forces for the same trains proposed to operate on the UBRR and would compare them to what would be experienced on the UBRR.
- An operations simulation model, using the Rail Traffic Controller (RTC) software, of the UP main track between Helper and Provo in conjunction with the UBRR, including a baseline model of the UP main track between Helper and Provo demonstrating that trains connecting to the UBRR would not delay or cause capacity or fluidity loss to UP, particularly at the connection, and that trains could operate on the proposed UBRR alignment and its main track/siding configuration, with adequate running speed. This model would also demonstrate running times and train delay on the UBRR, enabling a commercial agreement to be made with UP for run-through locomotives, trains, or crews, thereby avoiding a costly and inefficient interchange yard at the connection.
- Commercial agreements with shippers sufficiently advanced to describe the car supply, volumes, commodities, origin-destination pairs, trans-shipment points on the UBRR, and the nature, ownership, and configuration of shipper and receiver facilities on the UBRR.
- A formal interchange agreement with UP and a formal construction and maintenance agreement for the connection with the UP line.
- Detailed engineering documentation of the UBRR, showing:
 - Quality of track that would be constructed and maintained
 - Specification of track materials
 - Specification of engineering standards that would be followed, such as geometry, turnout size, track centerline spacing, and clearances and loading gauge
 - Signalization type, standards that would be followed, and equipment that would be used
 - Positive Train Control (PTC) and Centralized Traffic Control (CTC) systems interface with UP's systems
 - Communications systems interface with UP's systems
 - Data transfer systems interface with UP's systems
 - Interoperability of track, signalization, and Positive Train Control systems

These studies and agreements would be necessary to advance the UBRR to construction and operation. Upon development of these studies and agreements, a final Operating Plan and a System Safety Plan could be developed. These plans could change the UBRR's proposed physical plant, such as location of the main track and shipper facilities, the configuration of the main track and the locations of sidings, the vertical and horizontal alignment, the locations and configuration of terminals, and the locations and configuration of the connection with the UP line. Submission of the Operating and System Safety Plans to FRA, and approval by FRA, would be required before the UBRR could begin operation. Prior approval of FRA would be desired by UP to avoid rework or redesign.

3.1.9 Operating Plan Report

This report described the preliminary Operating Plan for the proposed UBRR. The purpose of the preliminary Operating Plan was to describe how the UBRR would be operated as a functioning railroad and to summarize the anticipated metrics of the railroad's operations in order to inform the development of the engineering design, environmental analysis, and economic and commercial analysis of the UBRR. Metrics of operations include maximum train length, anticipated train frequency, maximum and average speeds, and other basic facts that inform the analysis of the railroad's performance and its means and methods of providing transportation services. The report described the general characteristics of the UBRR, provided a detailed freight forecast for five different scenarios, described the capacity of the rail line, described its general maintenance plan, and noted special considerations for the proposed tunnel(s) that would likely be incorporated into the railroad's alignment.

Some key elements addressed in the plan include:

- The length of train would be up to 120 cars, but the UBRR would be able to handle 150 cars.
- The typical 120-car unit train on the UBRR would be 7,564 feet long (including two buffer cars), the typical 80-car manifest train would be 4,960 feet long, and the maximum 150-car manifest train would be 9,300 feet long, exclusive of locomotives. Allowing six locomotives per train at 75 feet each, manifest train lengths would normally not exceed 9,750 feet.
- The average number of trains per day forecasted for the UBRR could range from a low of 4 trains per day in Scenario 1 (low oil and gas production level) to a maximum of 10.6 trains per day in Scenario 5 (maximum oil and gas production level). This is "both ways" train volumes, so the total train trips per day. Typical peak daily train volumes might be 50% higher than the yearly average, which would equal 6.0 trains per day for Scenario 1 and 15 trains per day for Scenario 5.
- The UBRR would need only one main track with sidings located at suitable intervals for meet-and-pass events.
- The minimum clear length of sidings should be 10,000 feet.
- Operating speeds would be between 10 and 40 mph depending on grade, with a maximum allowable speed of 60 mph in flat terrain.
- UBRR's main track Method of Operation would be Centralized Traffic Control (CTC) with a Positive Train Control overlay. CTC is the U.S. standard method for operating trains on all but low-density lines; it uses signals adjacent to the track to provide instructions from dispatchers in a central office to engineers operating the trains. PTC is a system that automatically prevents trains from exceeding speed limits or exceeding their authorized track limits.
- Two terminals were proposed: one 2 miles east of Duchesne immediately south of U.S. 40 and the other south and west of the intersection of U.S. 40 and S.R. 88.

The complete report is provided in Appendix I, Operating Plan Report.

3.1.10 Cost Estimating Validation Process (CEVP)

Following the 5% preliminary engineering and cost estimate process for the feasibility study noted in Section 3.1.8, Preliminary Engineering/Cost Estimate, UDOT undertook a Cost Estimating Validation Process (CEVP) to better define the cost and risk associated with project construction. CEVP is an intense workshop where transportation projects are examined by a team of top engineers and risk managers from local and national private firms and public agencies. For the UBRR CEVP process, the participants had extensive first-hand experience with large-project programming and delivery, including freight railroad, tunneling, construction methods, and large-project program management. The CEVP workshop participants used systematic project-review and risk-assessment methods to evaluate the quality of the information and to identify and describe cost and schedule risks. Importantly, the process examined how risks could be lowered and cost vulnerabilities managed or reduced.

The UBRR team reviewed the current base cost estimate during the CEVP workshop on October 6–10, 2014. The purposes of the CEVP workshop were to:

- Quantify uncertainty in project cost and schedule
- Identify and quantify cost and schedule risks and opportunities
- Identify potential risk-mitigation strategies to set the stage for risk management

Base Cost Estimate

The UBRR team reviewed the current cost estimate during the October workshop. The “base” cost estimate resulting from the workshop was \$2,665 million in 2014 dollars. This base cost reflected the cost of the UBRR if everything were to go as planned—without risk, opportunity, contingency, or inflation. The base estimate reflected the best available information concerning project scope and cost and was considered by the workshop participants to be the most appropriate estimate of the UBRR’s cost.

Key Results

The CEVP results indicated, at an 80% confidence level, that the UBRR could be constructed at a total project cost of \$3,146 million in 2014 dollars and \$4,476 million in year-of-expenditure dollars, compared to the base cost estimate of \$2,665 million in 2014 dollars.

The three largest risks associated with project cost were (1) the potential need to change the alignment in the Emma Park vicinity (mean cost impact of \$121 million in 2014 dollars), (2) challenges associated with managing a project of this size and complexity (mean impact of \$117 million in 2014 dollars), and (3) having to avoid or relocate oil wells for construction (mean impact of \$67 million in 2014 dollars).

Cost-saving opportunities were dominated by using a tunnel-boring machine in tunnel construction (mean cost savings of \$176 million in 2014 dollars). Other cost-saving opportunities were optimizing earthwork across the alignment (mean cost savings of \$32 million in 2014 dollars) and modifying the alignment through Indian Canyon (mean cost savings of \$25 million in 2014 dollars).

The CEVP results indicated, at an 80% confidence level, that the UBRR could be completed by September 2026 compared to the base schedule estimate (that is, without schedule risk) of September 2022. The most critical schedule risks were delays in completing the EIS (average delay to the project of 22 months) and legal challenges to the project’s Record of Decision (average delay to the project of 10 months). The largest schedule opportunity could result from changing the tunneling method from using all drill-and-blast to using a tunnel-boring machine (average savings of over 6 months).

The complete report is provided in Appendix J, Cost and Risk Analysis for the Uinta Basin Rail Project.

3.1.11 Commercial Sustainability Analysis Report

The purpose of this report was to summarize the commercial sustainability and commercial feasibility of the proposed UBRR. *Commercial sustainability* is defined as the capability of the UBRR to develop sufficient revenue to internally fund its ongoing operating and maintenance cost (OPEX). *Commercial feasibility* is defined as the capability of the UBRR to develop sufficient revenue to internally fund the debt service required to repay its capital cost (CAPEX).

Traffic Forecast

In order to determine UBRR's commercial sustainability and commercial feasibility, the UBRR team developed a freight traffic forecast. *Freight traffic* is the rail industry's term for the goods and commodities presented by shippers to a railroad for transportation. The UBRR team developed five different traffic forecast scenarios using different assumptions about the future freight potential of the Uinta Basin. The freight traffic forecast was used to develop a revenue forecast. An OPEX forecast was developed for each scenario, and a CAPEX was separately determined through conceptual engineering. CAPEX was defined solely as the physical infrastructure of the UBRR rail line: its track, structures, signals and communications, and fixed facilities. Rolling stock—the locomotives and freight cars that would equip the UBRR's trains—would be provided by connecting railroads or shippers. Maintenance machinery is included in the OPEX forecast (Table 2).

Table 2. Freight Traffic Scenarios

Revenue	Revenue Scenario				
	1	2	3	4	5
Crude oil produced from conventional oil, proven reserves only	✓	✓	✓	✓	✓
Inbound oil- and gas-drilling materials required for development of proven reserves only	✓	✓	✓	✓	✓
Gilsonite	✓	✓	✓	✓	✓
Crude oil potential reserves		✓	✓	✓	✓
Inbound oil- and gas-drilling materials for recovery of potential oil reserves		✓	✓	✓	✓
Crude oil produced from oil sands			✓	✓	✓
Crude oil produced from oil shale				✓	✓
Phosphate concentrate produced from newly developed mines					✓

Return on Investment

Given the uncertainty in the UBRR's financing method, the UBRR team made various simplified assumptions to analyze the potential cost of the capital required to build the rail line. The project was assumed to be fully debt-financed by a tax-exempt issuer through 30-year bonds with a 5% coupon issued at par and a level payment structure with all proceeds received in 2018 when construction for the UBRR would begin. The interest during construction was assumed to be capitalized and pre-funded in the bond issue, which would result in higher debt service costs but would delay payments until the project started generating cash, thereby reflecting a typical revenue bond structure. Other likely pre-funded costs such as the cost of issuance and a debt reserve fund were omitted. The bond yield was assumed to be conservatively higher than current historically low market rates, but a detailed and focused analysis of financing methods would be needed to identify a true expected cost of capital.

Under these simplified financing assumptions, the total project capital costs of nearly \$4.5 billion (includes \$ 300 million in upfront owner cost not included in the bond par value) and capitalized interest of \$1.4 billion result in a bond par value of \$5.6 billion and an annual debt service of \$395 million. An inflation rate of 4.6% was applied to revenues, as well as operating and maintenance costs based on the inflection factor used for the cost estimate.

As shown in Figure 14 through Figure 16 and Table 3 below, only Scenarios 4 and 5 would have a positive return on investment and net cash flow.

Figure 14. Net Present Value

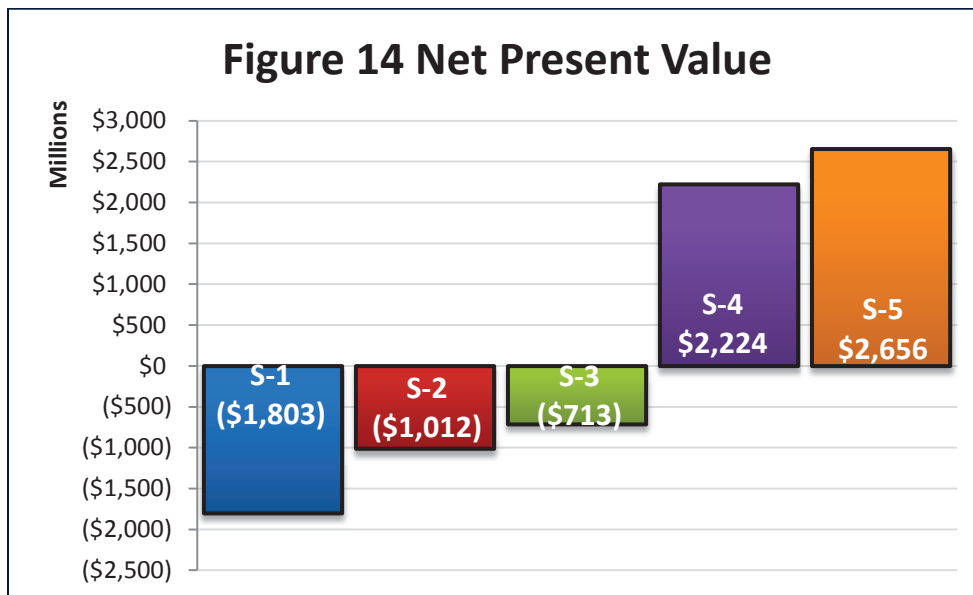


Figure 15. Return on Investment

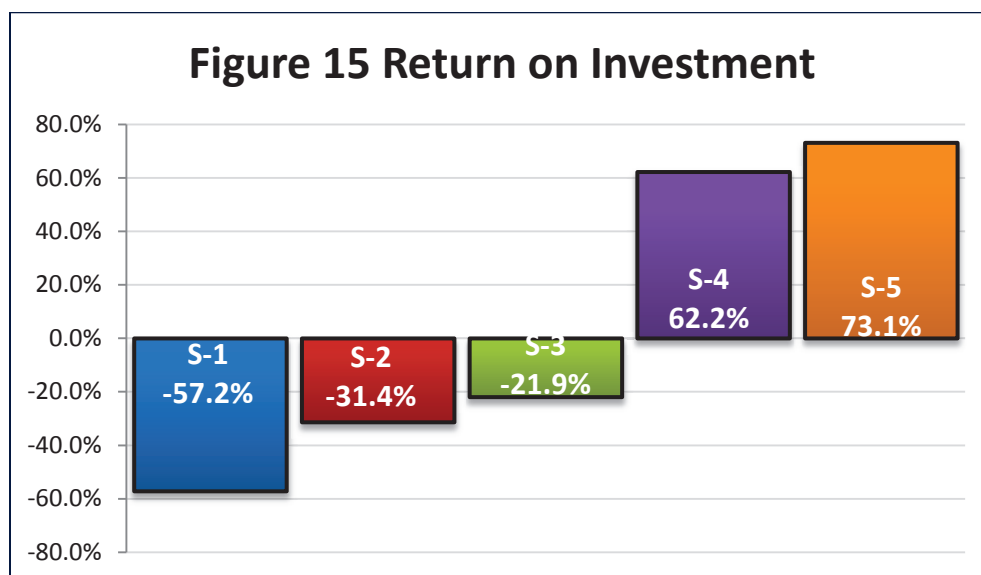
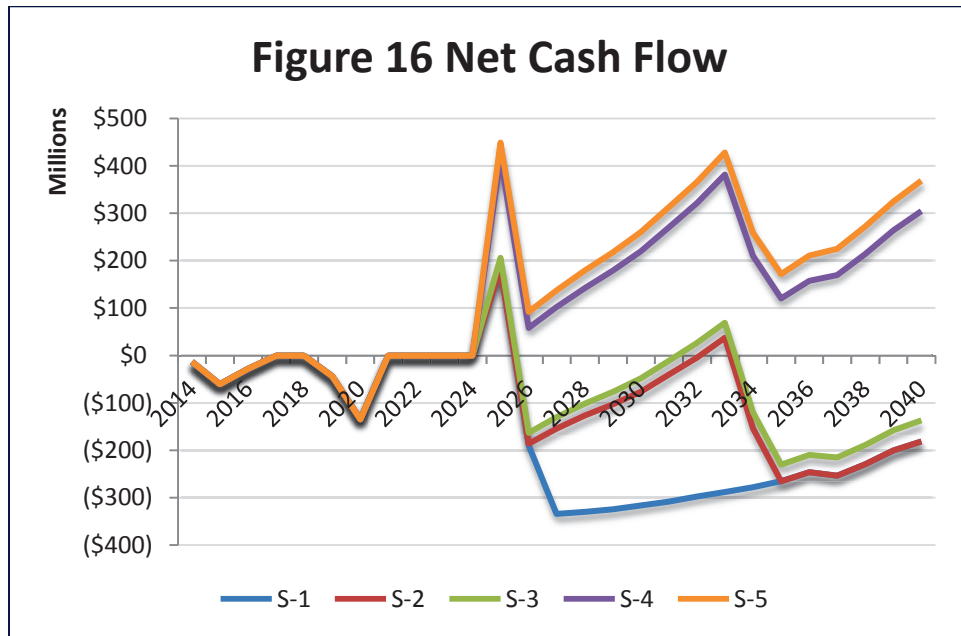


Table 3. Financial Metrics of the UBRR for Five Traffic Scenarios, 2020–2040

Scenario	Net Present Value (millions \$)	Return on Investment (%)	Internal Rate of Return (%)
1	(\$1,803)	–57.2%	N/A
2	(\$1,012)	–31.4%	N/A
3	(\$713)	–21.9%	N/A
4	\$2,224	62.2%	22.1%
5	\$2,656	73.1%	23.7%

N/A = not applicable

Figure 16. Net Cash Flow



The complete report is provided in Appendix K, Commercial Sustainability Analysis Report.

3.1.12 Public Benefit Analysis Report

This report describes the methodology, data inputs, and results of a public benefit analysis (PBA) conducted for the UBRR. The purpose of a PBA is to quantify and monetize benefits that would accrue to the general public in the future from the construction of a project. Typically these are benefits that are not captured by the project itself through user fees, tolls, or use charges, but instead are outcomes that provide broad social benefits. For example, a transportation infrastructure project that avoids highway congestion due to a lower volume of heavy truck traffic provides a public benefit that is not captured by the strict financial viability of the project.

Public benefits can also be outcomes that result in avoided public expenditures. For example, a project that results in reduced highway maintenance costs—a public expenditure which is collected in part through general income tax revenues—provides a public benefit.

The following tables and figures summarize the public benefits results. The results of the PBA are expressed in terms of present value (PV) by discounting the public benefits into present-day (year 2013) dollars using both 7% (Table 4 and Figure 17 below) and 3% (Table 5 and Figure 18 below) discount rates.

Table 4. Overall Results, Benefit-Cost Analysis of Alternatives Relative to Base Case – PV (7%)

in millions of 2013 dollars

Variable	Public Benefit Analysis for Years 2014–2049 – PV (7%)				
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Transportation cost savings	\$21	\$38	\$42	\$87	\$94
Congestion cost savings	\$17	\$29	\$32	\$58	\$63
Pavement maintenance cost savings	\$52	\$90	\$97	\$178	\$193
Accident cost savings	\$19	\$33	\$35	\$64	\$69
Emission cost savings	\$29	\$42	\$45	\$73	\$78
Incremental inventory costs	(\$0.02)	(\$0.06)	(\$0.07)	(\$0.29)	(\$0.30)
Net public benefits	\$139	\$231	\$250	\$460	\$498

Scenario 1: Conventional Oil, Proven Reserves + Gas Materials + Gilsonite

Scenario 2: Conventional Oil, Potential Reserves + Gas Materials + Gilsonite

Scenario 3: Conventional Oil, Potential Reserves + Gas Materials + Gilsonite + Oil Sands

Scenario 4: Conventional Oil, Potential Reserves + Gas Materials + Gilsonite + Oil Sands + Oil Shale

Scenario 5: Conventional Oil, Potential Reserves + Gas Materials + Gilsonite + Oil Sands + Oil Shale + Phosphate

Figure 17. Overall Results, Benefit-Cost Analysis of Alternatives Relative to Base Case – PV (7%)

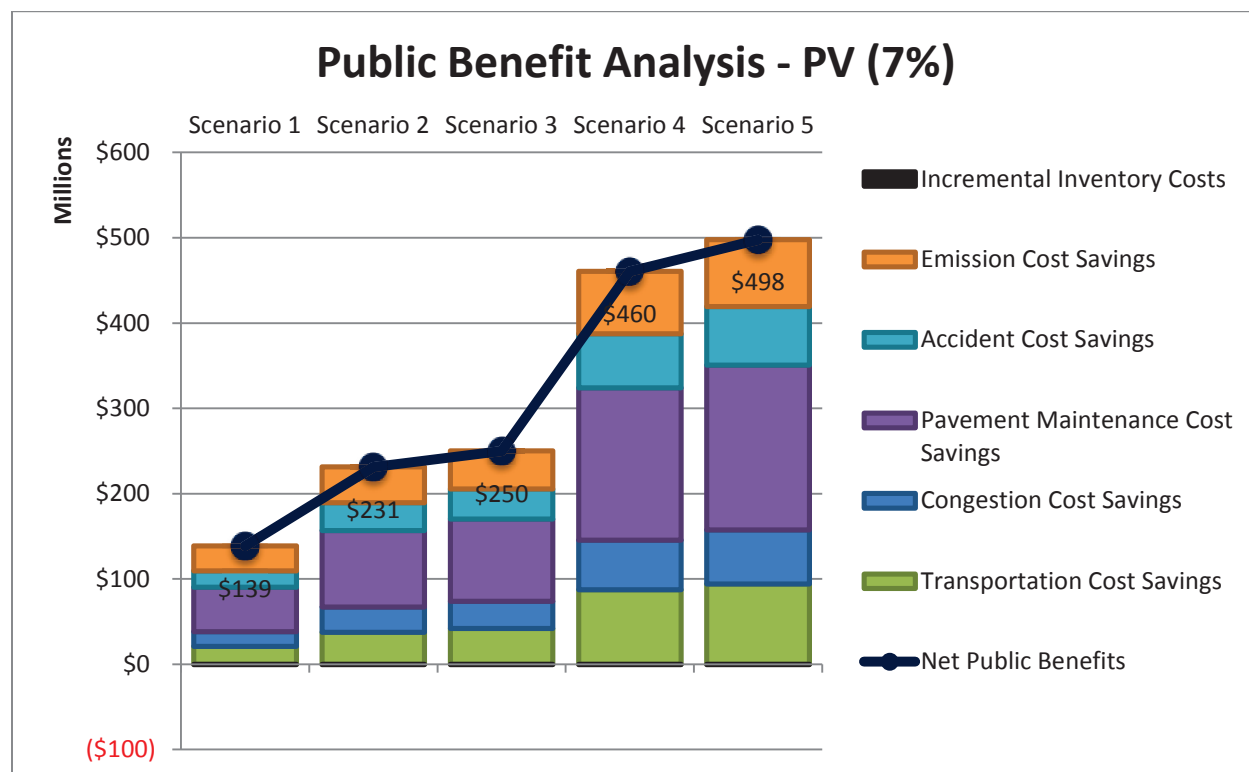


Table 5. Overall Results, Benefit-Cost Analysis of Alternatives Relative to Base Case – PV (3%)

in millions of 2013 dollars

Variable	Public Benefit Analysis for Years 2014–2049 – PV (3%)				
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Transportation cost savings	\$47	\$78	\$87	\$187	\$202
Congestion cost savings	\$39	\$61	\$66	\$125	\$136
Pavement maintenance cost savings	\$118	\$187	\$202	\$382	\$415
Accident cost savings	\$43	\$68	\$73	\$136	\$147
Emission cost savings	\$24	\$33	\$34	\$43	\$45
Incremental inventory costs	(\$0.04)	(\$0.11)	(\$0.14)	(\$0.62)	(\$0.63)
Net public benefits	\$270	\$427	\$464	\$873	\$944

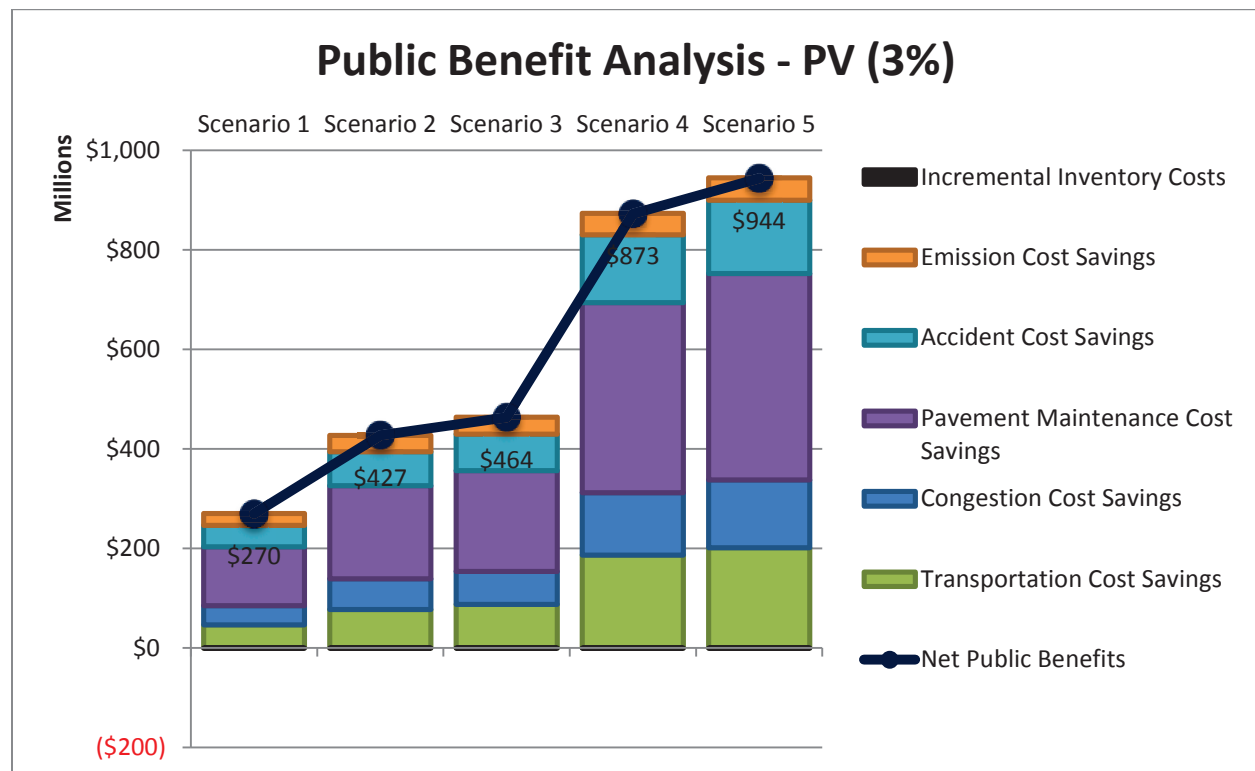
Scenario 1: Conventional Oil, Proven Reserves + Gas Materials + Gilsonite

Scenario 2: Conventional Oil, Potential Reserves + Gas Materials + Gilsonite

Scenario 3: Conventional Oil, Potential Reserves + Gas Materials + Gilsonite + Oil Sands

Scenario 4: Conventional Oil, Potential Reserves + Gas Materials + Gilsonite + Oil Sands + Oil Shale

Scenario 5: Conventional Oil, Potential Reserves + Gas Materials + Gilsonite + Oil Sands + Oil Shale + Phosphate

Figure 18. Overall Results, Benefit-Cost Analysis of Alternatives Relative to Base Case – PV (3%)


The complete report is provided in Appendix L, Public Benefit Analysis Report.

3.2 Phase 2 Reports

3.2.1 Cultural Resources

As part of the feasibility evaluation, an archaeological, architectural, and paleontological resources survey was conducted in the summer and fall of 2014. Because of the sensitive nature of the material in these reports, they are not included in this summary report.

Cultural Resources Methods Report

The purpose of this report was to document the process proposed by UDOT to identify historic properties in the study area for the UBRR project. The report explained the methods proposed by UDOT to identify historic properties as part of the project's feasibility study process. The report was reviewed by the Utah State Historic Preservation Office (SHPO), STB, the Bureau of Land Management, and the U.S. Forest Service. All of the agencies approved the methods identified in the report for use in the feasibility process and the National Environmental Policy Act process if the project were to proceed to that phase.

Archaeological Resources Report

Archaeologists conducted a Class II, reconnaissance-level pedestrian archaeological survey of two proposed routes for the UBRR. The archaeological analysis consisted of a Class I background records search and a Class II survey of selected portions of the two proposed routes based on a predictive model created specifically for the project.

Prior to the survey, a records search and literature review was conducted. Records from the Utah SHPO in Salt Lake City indicated that numerous previous cultural resource surveys were conducted near or within the UBRR's area of potential effects (APE). In addition, multiple previously recorded archaeological sites were also located with the project's APE.

Also, as part of the UBRR project, a predictive model was created to guide the archaeological survey because completing a 100% survey of both alternatives was not feasible for this stage of the project. The predictive model for the UBRR project had a goal of identifying areas with high probabilities of containing unrecorded sites and therefore guiding future archaeological surveys to be conducted at a later stage.

Between September 9 and October 23, 2014, archaeologists conducted a Class II reconnaissance-level archaeological survey consisting of revisiting several previously recorded archaeological sites and conducting a pedestrian archaeological survey of approximately 669 acres in northeastern Utah aimed at evaluating the efficacy of the predictive model.

A total of 33 previously recorded archaeological sites were revisited. Archaeologists attempted to revisit 4 additional previously recorded sites, but were not successful. The archaeological survey resulted in the discovery and documentation of 1 new archaeological site and 20 isolated finds. In total, 19 archaeological sites were recommended eligible for the National Register of Historic Places.

Architectural Resources Report

In November 2014, a survey of architectural resources was conducted following the Utah SHPO Reconnaissance-Level Survey Standard Operating Procedure. The boundary for the survey was 0.5 mile in each direction from the centerline of Alternatives 2 and 3. During the survey, 47 properties were identified.

Of the 47 buildings of historic age that were surveyed for this project, 14 dated to 1900–1912, 18 dated to 1913–1945, and 15 dated to 1946–1972. Nearly all of the early properties (1905–1912) were vernacular log homestead cabins or log barns in rural areas, whereas those from the middle period were more commonly single-family Bungalows or Period Revival cottages in Duchesne. The Post-World War II–era properties were seven single-family dwellings, one church/meetinghouse, two bridges, and three commercial buildings. Stylistically, the post-war dwellings were dominated by single-family Ranch and Split-Level residences. More than half of the historic properties were documented in Duchesne. The early log cabins and barns were found primarily on tribal land in Uintah County and in Sowers Canyon in Duchesne County.

Of these 47 properties, six were recommended eligible/significant (ES). One of these is presently listed on the National Register of Historic Places: the Indian Canyon Guard Station at about 30000 South and U.S. 191. Of the remaining properties, 35 were recommended eligible-contributing (EC), and six were recommended ineligible/non-contributing (NC) due to loss of integrity.

Twelve properties were identified in a Preservation Pro search prior to survey. Of the 12 properties, five properties were observed to have been demolished and new structures built in their place: 205 South 500 East, 215 South 300 East, 400 East 400 South (a bridge), 510 East 400 South, and 590 East 400 South. All of the demolished properties are located in Duchesne, Utah, and the UBRR team recommends that their eligibility status be changed to ineligible. The eligibilities for the remaining 7 previously documented properties remain the same.

Paleontological Resources Report

For the UBRR project, a literature review of paleontological resources was conducted. No field survey was performed for the project. Fossil locality data for the study area were requested from the Utah Geological Survey, and known researchers in the Uinta Basin were contacted. Requests for existing paleontological records were sent to the Utah State Paleontologist, Dr. James Kirkland; Dr. Randy Irmis at Natural History Museum of Utah; Dr. Steven Sroka at the Utah Field House of Natural History State Park Museum; Martha Hayden at the Utah Geological Survey; Brooks Britt at Brigham Young University; Alex Dutchak at the University of Alberta; Gabriel Bowen at the University of Utah; and Ben Burger at Uinta Basin Applied Technology College.

The purposes of these requests were to (1) determine whether any previously recorded fossil localities were present in the study area, (2) assess the potential for disturbing these localities during construction, and (3) evaluate the paleontological sensitivity in the APE. No current research areas were discovered during the inquiry in the study area. Only Dr. Randy Irmis and Dr. Gabriel did not respond. The Utah Geological Survey database has 966 recorded fossil localities within 1 mile of the study area. Due to the high number of localities, only those within 0.5 mile of Alternatives 2 and 3 were identified in the paleontological resources report. A total of 136 paleontological resources were identified within this area.

3.2.2 Wetlands Report

UDOT conducted a survey and delineation of all potential waters of the U.S., including wetlands, within the project wetland survey area. The survey area was about 12,608 acres and extended northward and eastward from the proposed Price River UP connection point east of Soldier Summit near U.S. 6 to the proposed siding next to the intersection of U.S. 40 and S.R. 88 between Roosevelt and Vernal, Utah.

All areas within the wetland survey area were assessed to the degree necessary to determine the presence or absence of jurisdictional wetlands and other waters of the U.S. per the guidelines established by the U.S. Army Corps of Engineers. Seventy wetlands totaling 96.69 acres within the survey area were delineated and mapped as potentially jurisdictional wetlands. All of these wetlands have been classified as either palustrine emergent marsh or palustrine scrub-shrub.

Other waters of the U.S. were categorized as perennial and intermittent, ephemeral, canals and ditches, and open water. Twenty-seven perennial and intermittent features totaling 172.62 acres within the survey area were mapped, and 199 ephemeral drainages totaling 19.58 acres were mapped. In terms of constructed features, 24 canals and ditches totaling 3.01 acres were mapped, along with 8 open-water ponds totaling 2.68 acres.

The complete report is provided in Appendix M, Waters of the U.S. Delineation Report.

3.2.3 Biological Resources Report

This report described the baseline environmental conditions for biological resources (excluding wetlands) within the proposed UBRR alignments. The report described the environmental setting along the rail alignments and the field methods that were used to map land cover and evaluate habitat. The report also described the vegetation communities and other land cover types that were mapped along the UBRR alignments during field surveys conducted during 2014, the noxious-weed infestations that were observed, and the availability of potential habitat to support federally listed threatened and endangered species.

As part of the process, UBRR representatives met with representatives with the Bureau of Land Management (Vernal and Price Offices), the U.S. Forest Service, the Utah Department of Natural Resources, the Utah Division of Wildlife Resources, and the U.S. Fish and Wildlife Service to identify areas of concern. Below is a list of those concerns:

- Potential impact to sage-grouse habitat and lek in the Emma Park area from temporary construction activities, and noise and visual impacts from operation.
- Potential impacts to Barneby ridge-cress in Indian Canyon from construction activity. Associated dust from operation could also be a concern.
- Potential impacts to Uinta Basin Penstemon flower, Uinta Basin hookless cactus, and Pariette cactus near the eastern portion of the alignment near the Green River from construction activity. Associated dust from operation could also be a concern.
- Potential impacts to Ute ladies'-tresses in the Duchesne River from construction and operation activities.

What is a lek?

A lek is a sage-grouse strutting ground used during breeding season.

The UBRR would be located within the Intermountain Desert Province, which covers the physiographic section called the Great Basin and the northern Colorado Plateau in Utah. Although much of this area is

made up of separate basins with no external drainage, the project area would be within the drainage basin of the Green (and Colorado) River. The lower parts of many basins have heavy accumulations of alkaline and saline salts. Many mountains rise steeply from the semiarid, sagebrush-covered plains. These mountains are generally well covered by vegetation, and their upper elevations usually have sparse conifer forests.

Sagebrush is typical in broad basins between mountain ranges, plains, and foothills between 5,000 and 7,500 feet. Other important plants in the sagebrush belt are antelope bitterbrush (*Purshia tridentata*), shadscale (*Atriplex confertifolia*), fourwing saltbush (*Atriplex canescens*), rabbitbrush (*Ericameria* spp.), spiny hopsage (*Grayia spinosa*), and horsebrush (*Tetradymia* spp.). These shrubs tolerate alkali to varying degrees, and this tolerance is essential to their survival on the poorly drained soils widespread in the region. On soils with the highest concentrations of salt, even these shrubs are unable to grow; they are replaced by plant communities dominated by greasewood (*Sarcobatus* spp.) or saltgrass (*Distichlis spicata*).

Above the sagebrush belt at elevation 5,000 to 8,000 feet lies a woodland zone dominated by pinyon pine (*Pinus edulis*) and juniper (*Juniperus* spp.), similar to the pinyon-juniper woodland of the Colorado Plateau. In the montane belt above the woodland zone, ponderosa pine (*Pinus ponderosa*) generally occupies the lower and more exposed slopes and Douglas fir (*Pseudotsuga menziesii*) the higher and more sheltered ones. These areas range from 8,000 to 13,000 feet in elevation within the Uinta Basin. In the subalpine belt, the characteristic trees are subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*). Only a few mountains rise high enough to support an alpine belt.

This region supports a great variety of wildlife species. In winter, seasonal changes force many birds and mammals to move from the mountains into the sagebrush semidesert, where they find suitable habitat alongside the area's permanent residents.

Common mammals are coyotes (*Canis latrans*), pronghorn antelopes (*Antilocapra americana*), mountain lions (*Puma concolor*), bobcats (*Lynx rufus*), and badgers (*Taxidea taxus*). Smaller species include whitetail prairie dogs (*Cynomys leucurus*), deer mice (*Peromyscus maniculatus*), whitetail jackrabbits (*Lepus townsendii*), and porcupines (*Erethizon dorsatum*). During severe winters, elk (*Cervus canadensis*) and mule deer (*Odocoileus hemionus*) move into the lower-elevation basins.

Bird species range from burrowing owls (*Athene cunicularia*) to such specialized species as sage sparrows (*Amphispiza belli*) and sage thrashers (*Oreoscoptes montanus*), both found only in sagebrush habitat. Common raptors include American kestrels (*Falco sparverius*) and golden eagles (*Aquila chrysaetos*) along with ferruginous hawks (*Buteo regalis*) and other species of western hawks.

The complete report is provided in Appendix N, Biological Resources Report.

4.0 Overview of the Stakeholder-Involvement Process

Internal communication among the UBRR team started before the launch of the project, with UDOT regularly meeting with key elected officials in the Uinta Basin throughout the summer of 2013. The project officially kicked off on December 17 and 18, 2013, in HDR's Salt Lake City offices with meetings that included officials from Uintah and Duchesne Counties and representatives from UDOT and HDR.

The kickoff meeting participants decided that the project's Steering Committee would meet monthly at a location in the basin. For several months, this meeting was rotated between the Uintah County offices and the Duchesne County offices. Eventually, the UBRR team decided that the Duchesne County offices were the most central location for everyone, so the monthly project coordinating meetings were held there during the last 6 months of the project.

4.1 Executive and Steering Committees

The organizational structure of the UBRR team consisted of two committees: an Executive Committee, which was given decision-making authority, and a Steering Committee, which was the larger group that attended monthly meetings with UDOT and HDR staff. The Executive Committee consisted of:

- Sen. Kevin Van Tassell (State Senate District 26)
- Commissioner Mike McKee (Uintah County Commissioner)
- Commissioner Ron Winterton (Duchesne County Commissioner)

The Steering Committee included the Executive Committee members plus the following:

- Commissioner Darlene Burns (Uintah County commissioner)
- Commissioner Mark Raymond (Uintah County commissioner)
- Commissioner Kent Peatross (Duchesne County commissioner)
- Commissioner Kirk Wood (Duchesne County commissioner)
- Tammie Lucero (Uintah County economic development director)
- Cheri McCurdy (Uintah Transportation Special Service District)
- Adam Massey (Vernal Area Chamber of Commerce)
- Bill Stringer (Uintah County land-use planner)
- Troy Ostler (Uintah County engineering, with CIVCO Engineering)
- Irene Hansen (Duchesne County economic development director)
- Mike Hyde (Duchesne County Planning and Zoning)
- Don Winterton (Duchesne Transportation Special Service District)
- John Thomas (UDOT project manager)
- Brandon Weston (UDOT environmental manager)
- Vince Izzo (HDR)
- Joanna Alvord (HDR)
- Joe Walker (HDR)

4.2 Uinta Basin Stakeholder Meetings

As a matter of communications strategy, Executive Committee members asked that team members try to keep the project low key until after a notice to intent to prepare the UBRR EIS was issued. Still, a number of meetings were held with key constituent groups in the Uinta Basin to provide project information and updates. In all of these meetings, UDOT took the lead. UDOT discussed project background, explained the methodology being used to screen the 26 alternatives, and described the preferred alternative that emerged through the feasibility process. These presentations included:

- Ute Tribe Cultural Resources (July 10, 2014)
- Uinta Basin Energy Summit (September 4, 2014)
- Vernal Area Chamber of Commerce (September 16, 2014)
- Roosevelt City Council (September 16, 2014)
- Ute Tribe Business Committee (September 17, 2014)
- Vernal City Council (September 17, 2014)
- KVEL Radio Energy Today program (September 19, 2014)
- Myton City Council (October 9, 2014)
- Duchesne City Council (October 14, 2014)

4.3 Nongovernmental Organization Meetings

A number of meetings were held with nongovernmental organizations (NGOs) that have special interest in projects such as the UBRR. Those meetings included:

- **April 22, 2014 – Meeting with the Southern Utah Wilderness Alliance (SUWA).** UDOT described the process that the project was following in establishing rail alternatives and screening for feasibility. SUWA officials asked about possible road and pipeline options. UDOT made a commitment to keep SUWA apprised of project progress.
- **May 15, 2014 – Meeting with the Salt Lake Chamber of Commerce.** A representative from UDOT made a presentation to the Chamber similar to other presentations UDOT had been giving. Building on the foundation of the UBETS, the representative spoke to the Chamber about the alternatives being explored, the screening methods being used, and the two alternatives being considered by the UBRR team.
- **June 24, 2014 – Meeting with the Sierra Club.** UDOT described the process that the project was following in establishing rail alternatives and screening for feasibility. Sierra Club officials expressed concerns about air quality issues and the risks associated with transporting crude oil by rail. UDOT made a commitment to keep the Sierra Club apprised of project progress.
- **August 7, 2014 – Follow-up meeting with SUWA.** UDOT updated SUWA officials on project progress. UDOT stated that Duchesne and Uintah County officials and UDOT agreed that there was one feasible option for the UBRR (Alternative 2). SUWA officials asked who will build the rail line. UDOT pointed out that no money for construction had been identified. UDOT determined that future discussions with SUWA would be held as the project proceeds.

4.4 Agency Meetings

During the UBRR feasibility process, UDOT held a series of meetings with resource agencies to collect data, identify areas of concern with the development of the UBRR, and seek assistance in developing methodologies in conducting field surveys for wildlife, wetlands, and cultural resources. Below is a summary of those meetings. In addition to these meetings, there were numerous conference calls with the agencies.

- May 1, 2014 – Meeting with STB and FRA in Washington, DC. Items discussed included lead and cooperating agencies for an EIS, the STB EIS process, the project applicant, federal funds, the EIS schedule, and the need for a third-party contractor.
- July 1, 2014 – Meeting with the U.S. Army Corp of Engineers (USACE) to discuss wetland survey methodologies. USACE concurred with the proposal to conduct a full wetland delineation along proposed alignments.
- July 1, 2014 – Meeting with the Utah SHPO. Purpose of the meeting was to review the cultural resources survey methodology provided to the SHPO for review. The SHPO approved the field methodology.
- July 2, 2014 – Meeting with the U.S. Fish and Wildlife Service (USFWS) to discuss threatened and endangered species. Main issues identified were air quality and noise impacts on sage-grouse, listed fish species, Ute ladies'-tresses, raptors, clay phacelia, and Uinta Basin hookless cactus.
- July 10, 2014 – Meeting with the U.S. Forest Service and the Bureau of Land Management (BLM) Vernal Office to provide an overview of the project. Issues discussed included land transfers, roadless area impacts, scenic byways, visual assessments, cultural resources, special-use permits, sage-grouse, and sensitive species.
- July 17, 2014 – STB, USACE, and Utah Division of Wildlife Resources (UDWR) field review of the UBRR alignments. Key issues discussed included sage-grouse, construction requirements, rail operations, connection to the Class 1 railroads, and river crossings.
- July 21, 2014 – Meeting with UDWR to discuss potential issues with the UBRR. Issues discussed included sage-grouse, wildlife fencing, and sensitive fish species in the Strawberry and Duchesne Rivers.
- August 11, 2014 – Meeting with the BLM Price Office to provide an overview of the project. Issues discussed included sage-grouse, cultural resources, and visual assessment.
- September 9, 2014 – Meeting with the U.S. Environmental Protection Agency (EPA) in Denver to discuss the UBRR. Issues identified included cumulative and indirect impacts, air quality, tribal permits and boundaries, and EPA permitting authority on tribal land.
- October 2, 2014 – Meeting with USFWS, BLM, and UDWR in the field at Emma Park, Utah, to discuss potential impacts and avoidance measures to sage-grouse from the UBRR.
- November 13, 2014 – Meeting with USFWS to discuss survey protocol for the Uinta Basin hookless cactus, Barneby ridge-cress, and Uinta Basin Penstemon flower.

4.5 Project Website

4.5.1 Website Structure

As part of the UBRR communications plan, a project website was created. Hosted on the UDOT server, the website (www.udot.utah.gov/uintabasinrail) was launched on September 4, 2014, with the Six-County Infrastructure Coalition identified as the project owner. The website included:

- A home page presenting project background information along with a prominent link to an interactive map of the coalition's preferred feasible alternative
- A Process page that described the study process and the environmental process that would eventually be initiated
- A Library page with links to project technical documents and maps
- An FAQ page, with answers to frequently asked questions about the project
- A Comments page, where visitors to the website could fill out a form to leave comments or ask questions about the project

4.5.2 Website Comments

Comments and questions submitted through the website went to the UBRR team via iRealm comment-tracking software. The UBRR team responded to the questions and filed the comments for future inclusion in the public record. Website comments that were processed included:

- Requests for information about how to secure work on the UBRR project
- Requests to be added to the project email update list
- Several requests for clarification of a letter from UDOT to property owners in the area informing them that engineers would be on their property to conduct environmental research
- Two comments expressing concerns about the proposed project alignment:

Unbelievable that you would choose the route in which you did. First of all Indian Canyon is very narrow as is, adding a railroad is crazy! Yes, I grew up in Indian Canyon and the thoughts of cement walls holding up the hillside infuriate me. What about the open range, on the National Forest. Livestock are allowed by permits to graze on both sides of SR. 191, now they will have to stay out of the way of vehicle's and a train. You say that the rail will stay inside of the existing right of way, not sure how you can build such a thing without disturbing private property. One more thing is there are several roads and property access's on the proposed side of the canyon, how will I be able to access them? Now to Duchesne, we have one of the best Fairgrounds in the state. Your railroad is going to completely destroy the back drop of our grounds. When this is done all you will be able to see is a cement wall. Not to mention the homes you will be traveling by on east side of town, I am sure property values next to the rail will decrease. I know there are other options, options that don't include removing half of a canyon's hillside, and half of Duchesne City's backyard. There are miles of unoccupied land east of Indian Canyon, and east of Duchesne City. It seems east is the direction your heading. WHY NOT?

As the recent deadly accidents with moving oil by rail has shown that Oil should be moved by pipelines not by rail or trucks. Increase your fees for moving oil by trucks. As it is the oil development companies should pay 100% for any freight transportation method. The resources can be held in reserve until they can raise their own funds to pay for all aspects of the resources development.

4.3 Media

At the request of the Executive Committee, media efforts for the UBRR were primarily reactive. There were, however, several media stories that required project-wide coordination:

- In June, UDOT made a presentation to the Utah Transportation Commission. As a result of that presentation, the *Salt Lake Tribune* asked for an interview with UDOT, and the resulting story was picked up and circulated by national news services.
- In July, KUER Radio decided to do a radio version of the UBRR story. KUER interviewed UDOT at the KUER studio and also spoke to Commissioner Mike McKee.
- In August, the *Vernal Express* did a story about the UBRR with Sen. Kevin Van Tassell as the story's primary source.
- Beginning in September, newspapers in Moab began covering the question of whether Grand County should join other counties to make what would be called the Seven-County Infrastructure Coalition. During the next couple of months, the coverage of this issue was fairly intense, as the political season turned up strong and outspoken opposition to the move. The UBRR project was often mentioned as a driver for the Coalition.
- In late September, UDOT spent an hour on the air in Vernal as part of radio station KVEL's Energy Today radio program. UDOT explained the status of the UBRR, with discussion of the feasibility studies, the process of screening through 26 railway alternatives, and the current focus on one or two primary alternatives.
- In early October, the *Salt Lake Tribune* picked up on the Seven-County Infrastructure Coalition story and published a story plus an editorial expressing reservations about the Coalition and the UBRR.
- On December 8, 2014, the *Salt Lake Tribune* reported on a letter sent from Uintah and Duchesne County officials to UDOT stating that "it appears that the return on investment is insufficient to justify the expense of a railroad project," essentially announcing the end of the UBRR study.

5.0 Conclusion

The purpose of the UBRR feasibility process was to determine whether there were viable alignments that could be constructed into the Uinta Basin, and, if so, whether they were financially feasible to construct based on resource production levels in the basin. After evaluating 26 potential alignments, UDOT determined that two alignments of about 100 miles each, Alternatives 2 and 3, could meet construction and operation requirements.

Preliminary engineering and cost estimates were developed for these two alternatives so that the return on investment could be evaluated. As part of the return-on-investment evaluation, five resource-development scenarios were developed. Based on the project's construction cost, UDOT determined that only two high-production scenarios would result in a positive return on investment. The two high-production scenarios would require that oil shale and sands technology be proven, that the price of oil remain above \$85 a barrel, and that no pipeline would be constructed that would compete with oil transportation by rail.

The feasibility study showed that two alignments would be feasible to construct, with Alternative 2 through along U.S. 191 being preferred by UDOT. Nonetheless, on December 1, 2014, Uintah and Duchesne Counties informed UDOT of their determination that the return on investment for the rail line was insufficient to justify the \$4.5-billion construction cost. The Counties also concluded that the \$300 million in upfront cost to the owner to plan and implement construction was too costly. Consequently, a notice of intent to prepare an EIS for the UBRR was never released.

6.0 References

DMJM Harris

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- 2007 National Transportation Statistics, Table 3-21: Average Freight Revenue Per Ton-Mile. www.bts.gov/publications/national_transportation_statistics/html/table_03_21.html. Accessed November 27, 2013.

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