

EXECUTIVE SUMMARY

ES.1 Proposed Action

Utah Transit Authority (UTA) is proposing to build and operate a commuter rail line through Utah and Salt Lake Counties (see Figure 1-1, Provo to Salt Lake City FrontRunner Location Map). This project is called the Provo to Salt Lake City FrontRunner project (Proposed Action).

ES.2 Project Need and Purpose

The Proposed Action would establish commuter rail service linking Provo and Salt Lake City. Increasingly, this mode of transportation has been recognized as an important component of the multimodal transportation system to meet regional transportation needs.

The Wasatch Front, and in particular Utah and Salt Lake Counties, are experiencing rapid growth. The population of these two counties comprises approximately 57 percent of the state's total population and over 80 percent of all jobs. Future increases in both population and employment growth rates are expected to be more than twice those of the nation for the next three decades (GOPB, 2005b).

Increasingly, development patterns in the two-county study area are dispersed with a greater number of activity and employment centers along the corridor. An increase in interregional travel patterns is also creating additional travel demand for both roadways and transit between the two counties, which are linked by only one highway and one major arterial. By 2030, traffic volumes are forecast to more than double and would exceed the capacity of existing and planned roadway infrastructure used by both personal vehicles and bus transit services. Moreover, physical constraints and topography at the Point of the Mountain near the Utah–Salt Lake County line limit opportunities to expand the existing roadway infrastructure.

Forecasted traffic congestion is expected to be severe, commute periods are expected to increase in duration, and frustrated commuters would likely try to use alternative parallel roadways. The expansion of the commuter rail service on its own right-of-way has strong political support and is a vital component in the development of a multimodal transportation system in the region largely because operation would be more reliable than highways and major arterials.

As such, the purpose of the Proposed Action is to meet the following objectives:

- Facilitate the safe and efficient movement of people within the corridor between Provo and Salt Lake City through 2030;
- Provide efficient, high-capacity regional transit service in the project corridor;
- Enhance economic potential in the corridor by improving access to existing and planned employment and activity centers; and,
- Support regional plans and policies that call for the provision of a balanced transportation system.

ES.3 Alternatives

The analysis of the Proposed Action presented in this Draft Environmental Study Report (Draft ESR) is based on substantial alternatives analysis and screening. This effort included preliminary engineering studies, environmental research and analysis, and extensive agency and public involvement outreach. These efforts facilitated UTA's objective to involve all potential stakeholders in a collaborative process to identify a single commuter rail line project from the many alternative alignments, route termini, modes, and stations originally proposed for the project.

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Two key technical studies, both of which identified a commuter rail line serving Utah and Salt Lake Counties, were the *1998 Regional Commuter Rail Feasibility Study* (WFRC and MAG, November 1998) and the *2001 Inter-Regional Corridor Alternatives Analysis Study* (IRCAA). Both studies considered the former Denver and Western Rio Grande Railroad mainline and the Union Pacific Railroad (UPRR) Provo Subdivision Line as potential corridors between Payson in Utah County and Brigham City in Box Elder County. The 2001 IRCAA Study evaluated the same corridor, but proposed use of the old Denver and Rio Grande Western Alignment south of Salt Lake City and only identified 13 stations. The 1998 Regional Commuter Rail Feasibility Study identified more than 60 potential locations for stations.

The commuter rail concept was initiated with the start of the Weber County to Salt Lake City Commuter Rail project study, but that project did not address the corridor south of the Salt Lake City Intermodal Center where the northern commuter rail line terminated. While this study initially looked at a corridor from Salt Lake City to Payson, travel demand analysis conducted as part of the multimodal I-15 South Environmental Impact Statement (EIS) project in Utah County indicated that there would be little demand for expanded transit services south of Provo. With this analysis, the termini of the Proposed Action became Provo in the south and the Salt Lake City Intermodal Center in the north.

The development of alternatives for the Proposed Action was initially part of the multimodal I-15 South EIS project. Following the scoping process for that project, there were several alignments, two types of vehicles and up to 19 stations to evaluate for the commuter rail portion of the multimodal project. To screen these alternatives, a five step screening process took place (see Figure 2-2). This screening process involved consultation with local government planning agencies, coordination with stakeholders and other state agencies, and public outreach activities. Conceptual engineering, transportation and traffic analysis, and preliminary environmental impact assessment also occurred. Through this screening process, various alternatives were eliminated from detailed environmental analysis. The selected Proposed Action includes construction of the commuter rail line along the UTA-owned right-of-way adjacent to the existing Union Pacific Railroad (UPRR) rail corridor with up to eight stations. This alternative is described in detail in the next section.

ES.4 Description of the Proposed Action

The 45-mile commuter rail line would extend from Provo in Utah County to Salt Lake City in Salt Lake County. UTA would own and operate the commuter rail line. It would be constructed in an existing rail corridor on UTA-owned right-of-way located adjacent to the existing UPRR right-of-way. The commuter rail service is proposed to have eight stations. Bus service would be rerouted to serve the new commuter rail stations and each station would also be provided with parking for passenger vehicles. The proposed stations include the following locations:

- Provo University Avenue Station,
- Orem University Parkway Station,
- Vineyard Station,
- American Fork/Pleasant Grove Interchange Station,
- Lehi Station,
- Draper/Bluffdale Station,
- Sandy/South Jordan Station,
- Murray Vine Street Station, and
- Salt Lake City Intermodal Center Station (currently under construction as part of the Weber County to Salt Lake City Commuter Rail project).

The Proposed Action would provide convenient frequent rail services. Trains would run every 15 minutes in the peak direction during the peak hour—that is northbound in the morning and southbound in the afternoon. During the daytime non-peak periods the trains would run every 30 minutes, and during the evening and night periods, the trains

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would run hourly, with reduced Saturday service. During the peak periods, the planned commuter rail service would be competitive with auto travel time in the corridor.

The proposed commuter rail line would be continuing with commuter rail service that extends to the north of Salt Lake City. The Weber County to Salt Lake City Commuter Rail project is currently under construction and is expected to go into service in 2008. Together, the Weber County to Salt Lake City Commuter Rail project and the Proposed Action would provide continuous transit service between Utah, Salt Lake, Davis, and Weber Counties.

ES.5 Summary of Transportation Impacts and Mitigation

The Proposed Action would create some impacts to existing transportation infrastructure and traffic mobility primarily in and around station locations. The following six areas of impact were analyzed in an effort to determine the severity of impacts and establish preliminary efforts for mitigation.

Light Rail & Other Transit Impacts

Express bus ridership throughout the region is expected to decline by about 35 percent under the Proposed Action, while BRT and LRT volumes decrease by a small percentage. Some of the decrease in express bus ridership is due to the elimination of three parallel express bus routes with implementation of the Proposed Action. With the extension of the commuter rail system from Weber County to Salt Lake County, commuter rail ridership is expected to increase by about 135 percent.

Impacts to Grade Crossings

Traffic impacts at grade crossings were analyzed for the Proposed Action. Guidelines developed by the Los Angeles County Metropolitan Transportation Authority were applied to each of the 55 crossings in the transit corridor. The guideline separates crossings into one of three thresholds. In-depth analysis was conducted for each crossing that fell into the threshold two category. Crossings that fell into the threshold one category were not analyzed in depth, as these crossings traverse roadways with low average daily trips (ADT) volumes and are usually in more isolated areas. There were no grade crossings in the threshold three category.

Three crossings fell within threshold two. The first one, the 11400 South crossing in Jordan Gateway, will be grade-separated in the future and does not require further analysis. The other two crossings are Lehi Main Street and Murray-Holladay Road (4800 South) in Murray. The crossing at 400 South, Orem (threshold one) was also selected for study because of its proximity to the intersection of 400 South and Geneva Road.

The analysis shows Murray-Holladay Road and the intersection of 4800 South and Commerce Drive will operate acceptably.

The results of the analysis show that Lehi Main Street and its intersection with 500 West will operate *unacceptably*. The 95th percentile queue lengths of the westbound traffic are expected to extend into the crossing. However, the no build queue length is expected to be slightly longer than the build queue lengths, due to improved gate performance (real time predictors). Analysis suggests the rail crossing does not make conditions at the intersection worse and level of service at this intersection is expected to remain unchanged at LOS F. No mitigation is proposed at the grade crossing.

The results of the analysis show 400 South and its intersection with Geneva Road will operate *unacceptably*. Analysis shows the 95th percentile of westbound queue (2030 build) at the intersection extends into the commuter rail crossing. The no build alternative does not show queue lengths that extend beyond the location of the at-grade crossing. To reduce queuing problems associated with the 400 South intersection and the nearby grade crossing, it is recommended that traffic signal preemption be utilized at the 400 South and Geneva Road intersection.

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Impacts to Bicycles and Pedestrians

Any impacts to various trails, sidewalks, pathways, and road routes near the stations would be addressed as part of the design process to mitigate potential negative effects. Bicycle and pedestrian facilities disturbed by the project will be replaced.

As improvements are made to the railway and track, corresponding enhancements to designated at-grade crossings should be made to ensure that existing and future bicycle/pedestrian movement across the corridor meets the expectations of various municipalities as outlined in their respective planning documents. Such considerations could also be made for non-designated grade-separated crossings on a case-by-case basis.

Impacts to Rail Operations

The commuter rail track would be a single track with sections of passing track. The Proposed Action would require coordination with Union Pacific as there would be some interlocking crossings from the Union Pacific mainline that would cross the commuter rail track to existing freight sidings. All Union Pacific lines would be kept operational during construction.

Impacts to Parking

Each proposed station would include an off-street park-and-ride lot. Because all park-and-ride lots would be designed to meet or exceed 2030 parking demand, no on-street parking impacts are expected by 2030.

Impacts to Traffic Operations

Table ES-1 summarizes the degree to which the commuter rail stations would impact traffic operations. An intersection is considered affected if the addition of the commuter rail station causes the level of service (LOS) to drop below LOS D under the build scenario. Table ES-1 also indicates the percent of overall traffic volumes that are related to the proposed station for intersections where level of service falls below LOS D as a result of the station.

Table ES-1: Summary of Traffic Impacts

Station	Intersection Impacts		Summary of Analysis
	2010	2030	
Provo University Avenue	Yes	No	<ul style="list-style-type: none"> Freedom Blvd./Provo 920 South: LOS D (no build) to LOS E (build) in year 2010 Station traffic is approximately 3% of overall traffic at intersection in 2010 build scenario Freedom Blvd./Provo 920 South widened to two-lane roundabout by 2030 and forecasted to operate at LOS B for 2030 no build and 2030 build condition
Orem University Parkway	Yes	No	<ul style="list-style-type: none"> 1100 South/Geneva Road: LOS D (no build) to LOS F (build) in year 2010 Station traffic is approximately 6% of overall traffic at intersection in 2010 build scenario
Vineyard	N/A	No	<ul style="list-style-type: none"> No transportation impacts are anticipated.



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Table ES-1: Summary of Traffic Impacts–Continued

Station	Intersection Impacts		Summary of Analysis
	2010	2030	
American Fork Main Street (w/ Diamond)	No	Yes	<ul style="list-style-type: none"> • Delay at AF Main Street and I-15 NB ramps increases by an average of 2.2 seconds, enough to fall from LOS D to LOS E • Station traffic is approximately 2% of overall traffic at intersection in 2010 build scenario
American Fork Main Street (w/ SPUI)	No	No	<ul style="list-style-type: none"> • No transportation impacts are anticipated.
Lehi	No	No	<ul style="list-style-type: none"> • No transportation impacts are anticipated.
Draper/Bluffdale	N/A	No	<ul style="list-style-type: none"> • No transportation impacts are anticipated.
Sandy/South Jordan	Yes	No	<ul style="list-style-type: none"> • 10200 South/South Jordan: LOS D (no build) to LOS F (build) in year 2010. • Station traffic is approximately 10% of overall traffic at intersection in 2010 build scenario
Murray Vine Street	No	No	<ul style="list-style-type: none"> • No transportation impacts are anticipated

Under the 2010 build scenario, which includes planned highway and road improvements, a few intersections near the Provo University Avenue, Orem University Parkway, and Sandy/South Jordan Stations are expected to change from LOS D or better in the 2010 no build to LOS E or F. These intersections include Freedom Boulevard/Provo 920 South at the Provo University Avenue Station, 1100 South/Geneva Road at the Orem University Parkway Station, and 10200 South/Jordan Gateway at the Sandy/South Jordan Station.

The intersection of Freedom Boulevard/Provo 920 South at the Provo University Avenue Station is expected to operate at LOS B under the 2030 no build and build conditions. This is due to the proposed widening of Freedom Boulevard expected to occur prior to 2030. Therefore no mitigation is proposed for this station.

The westbound movement of 1100 South and Geneva Road is expected to degrade to LOS F under the 2010 build scenario from LOS D under the 2010 no build scenario. However, overall projected growth in the area is expected to cause this unsignalized intersection to operate below LOS D under the 2030 no build scenario. Any addition of traffic, either from general projected growth in the area or volumes related to the proposed station, would cause this intersection to further degrade in level of service. Given the potential impacts under the build scenario, UTA will work with the city to pay a fair share of the cost of a traffic signal or other traffic control measures to return the intersection to LOS D, if the impacts cannot be mitigated during the final design efforts of UTA.

Orem City may want to consider improvements to the intersection of 1100 South and Geneva Road. A signal at this intersection would improve side street operations and allow traffic to access the Orem University Parkway Station more efficiently. The intersection of 1100 South at Geneva Road meets *Manual of Uniform Traffic Control Devices* (MUTCD) signal warrant criteria under both the build and the no build scenarios. However, the addition of a signal at

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this location violates UDOT's signal spacing policy of ½ mile between signals; therefore UDOT would have to consider whether a variance to this policy is warranted. If a signal were installed at this intersection, traffic operations would improve to LOS A for the 2010 build scenario and LOS B for the 2030 build scenario.

The unsignalized intersection of 10200 South and Jordan Gateway is forecasted to operate at LOS F under the 2010 build scenario, compared to LOS D under the 2010 no build scenario. However, this intersection is expected to operate under failing conditions as a result of overall projected growth in the area by the year 2030 and not from impacts caused by the proposed station. Therefore, no mitigation is proposed at this intersection as part of the Proposed Action.

It is suggested that the City of South Jordan work with UTA and UDOT during future planning to consider improvements to the intersection of 10200 South and Jordan Gateway. Possible improvements the City of South Jordan may want to consider for the future no build or build scenario is installation of a traffic signal at this location. This intersection meets MUTCD signal warrant criteria, and a signal would help mitigate the congestion associated with side street traffic.

ES.6 Summary of Environmental Impacts and Mitigation

ES.6.1 Land Use

ES.6.1.1 Impacts

ES.6.1.1.1 Project Corridor

New commuter rail service is anticipated within many of the local general plans for jurisdictions along the project corridor. Generally, these plans call for transportation facilities that are intended to accommodate a variety of transportation modes within local jurisdictions. Proposed transportation facilities are encouraged to be compatible with future growth and development planned for local jurisdictions, and to provide local and regional mobility. A number of jurisdictions also include goals that are intended to coordinate transportation with projected land use and development patterns for their municipalities. The Proposed Action would be consistent with this general goal of encouraging a variety of transportation modes that serve planned growth in the project corridor.

Except for changes in land use where property is being acquired, the Proposed Action would not result in adverse impacts on local land uses. After construction, the new commuter rail service would benefit adjacent land uses and provide an alternative to I-15 for regional travel.

Changes in land use would occur as a result of the Proposed Action improvements and options. Some property acquisitions would occur along the mainline of the project corridor. Where property is acquired to support the Proposed Action, that land would be converted from current use to transportation use. The amounts to be acquired would vary along the project route, with the greatest amount of potential acquisition occurring to commercial/industrial land. Smaller amounts of public, residential, agricultural, and undeveloped land would also be acquired along the proposed corridor.

ES.6.1.1.2 Potential Station Areas

Businesses in the vicinity of the proposed stations would benefit from improved accessibility for their employees and customers. In addition, improved transit access would improve the convenience and desirability of nearby residential and commercial properties. Increased access to transit would also support higher-density development, although local jurisdictions would determine the actual permitted densities and types of uses. The indirect effects of the Proposed Action would support existing and future development in some locations.

ES.6.1.1.3 Parkland

No parkland would be acquired or displaced by the Proposed Action. In addition, access to parklands would not change or be restricted. Although some parklands may experience increased use with more access to public transportation, no adverse effects are anticipated.

ES.6.1.1.4 Farmland

The Proposed Action could require the acquisition of farmlands that are part of Agricultural Protection Areas, because the alignment passes through lands designated as such in the proposed American Fork Main Street Station area where the existing diamond interchange design option is being considered. This station is approximately 11 acres in size, and is one of two potential stations in the area near the I-15/Main Street interchange. Only one of these stations would be built. The American Fork SPUI Interchange station is the preferred option and is not in an Agricultural Protection Area. Owners of any type of farmland that would be acquired for the Proposed Action would be compensated for the fair market value of their property. Where farmland is acquired and converted to transit and transit-related use, future agriculture use would be precluded.

ES.6.1.2 Mitigation

In general, with the exception of direct total and partial acquisition of the properties discussed in Section 4.2, the overall land use impacts within the project corridor and at station areas would be positive. Since no adverse land use or parkland impacts are identified, no mitigation measures are necessary.

For the potential acquisition of 11 acres of Agricultural Protection Farmland, compliance with Section 17-41-406 of the Utah State Code would be followed. Section 17-41-405 of the Utah State Code restricts the powers of eminent domain by a political body to condemn property. If condemnation of land is necessary for any purpose, the applicable legislative body and the advisory board may only approve the condemnation if it would not have an unreasonably adverse effect on the preservation and enhancement of agriculture within the agricultural protection area, or if there is no reasonable and prudent alternative to the use of the land. Agricultural property owners whose property would be acquired for the Proposed Action would be compensated at the fair market value.

No mitigation measures are necessary for indirect impacts to farmland. Local planning boards can implement measures to limit the conversion of farmland, such as zoning designations or purchasing open space.

ES.6.2 Social and Economic Conditions and Relocations

ES.6.2.1 Impacts

The Proposed Action would likely have limited direct impacts on population and demographics. Parcel acquisition and residential and business relocations would be minimal compared to the total number of residents and businesses in the region. Moreover, if they choose to, residents and/or businesses would be able to relocate within the region.

The Proposed Action would create permanent jobs related to operation and maintenance of the system. For example, commuter rail operators, maintenance workers, vehicle cleaners, security personnel, and mechanics would be needed to sustain the system's daily operations. New transit-related jobs would be created within the UTA system. These additional jobs would produce expendable income for workers and create new sales tax revenues.

The Proposed Action would change travel patterns to and from station areas, which could alter circulation near residential areas. Since many rail passengers would be expected to drive to park-and-ride locations, there would be more vehicular traffic going to and from station areas than under existing conditions. However, the project corridor already has a predominant car culture (rather than a public transit culture). Therefore, although the traffic circulation at or adjacent to stations may change somewhat, this change would not significantly alter community character.

The Proposed Action would provide accessibility for residents and businesses near stations. A station would provide pedestrian-accessible transit opportunities for residents living within approximately ¼-mile of a station.

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Both full and partial parcel acquisitions would occur along the project corridor. The Proposed Action would affect up to 324 parcels in station areas and other areas along the corridor. Up to 77 full parcel acquisitions and 246 partial acquisitions from affected tracts of land would occur. In many instances, the amount of land to be acquired for additional commuter rail corridor right-of-way would be relatively small, and would result in partial acquisitions from adjacent parcels. The total parcel area to be acquired for the proposed station area and corridor improvements would be approximately 204 acres. Potential corridor right-of-way acquisitions would result in displacing a total of 39 buildings in the project corridor. This would include 16 commercial and 23 residential buildings, depending on the final design.

The greatest amount of potential land acquisition along the project corridor would occur at the proposed station sites. The area to be acquired for stations would vary by station, and would range from approximately 5.3 to 19.1 acres in size. The area to be acquired for all proposed stations combined would be approximately 128 acres.

The proposed station sites would also likely require commercial and residential building displacements along the project corridor. Proposed station sites where building displacements would potentially be needed would include the Provo, Orem, American Fork, and Murray station sites. Up to 30 of the total potential building displacements that may occur would be displaced for station sites.

ES.6.2.2 Mitigation

As UTA conducts property acquisition and relocation activities for the project, the agency will follow all applicable state guidelines and regulations regarding relocation assistance and property acquisition. The underlying purpose of state requirements is to offset or eliminate any financial hardship to private individuals or entities as a result of property acquisition for public purposes. No individual or family would be required to relocate until adequate, decent, safe, and sanitary housing is available, and relocation assistance would be provided to businesses in finding new space. As UTA does not have the power of eminent domain, UTA will work with Provo, Orem, Vineyard, Pleasant Grove, American Fork, Lehi, Bluffdale, Draper, South Jordan, Sandy, Midvale, Murray, South Salt Lake City, Salt Lake City, Utah and Salt Lake Counties, and the State of Utah to acquire necessary properties or easements.

ES.6.3 Air Quality

ES.6.3.1 Impacts

The Proposed Action is not expected to cause ambient air pollutant concentrations that exceed the National Ambient Air Quality Standards (NAAQS), for the following reasons:

- Construction impacts would be minimized by compliance with the fugitive dust control plans required by state law.
- The Proposed Action is included in conforming long-range transportation plans, so emissions are not expected to cause regional impacts.
- Forecast traffic volumes at most intersections that serve proposed project-related transit stations are less than UDOT's Carbon Monoxide (CO) hot-spot screening values, which indicates that future CO concentrations are likely to be well below the NAAQS.
- The EPA's existing and proposed future locomotive emission regulations will minimize air quality impacts at receptors along the rail lines and near stations.

In the absence of formal EPA guidance on the evaluation of the effects of toxic air pollutants, it is important to note that the Proposed Action has been evaluated for purposes of conformity with the State Implementation Plan (SIP). The traffic analysis for the Proposed Action projects a regional decrease in vehicle miles traveled (VMT) per day. A project-related reduction in VMT will result in a reduction in regional emissions of air pollutants, including mobile source air toxics.

ES.6.3.2 Mitigation

A fugitive dust plan will be implemented for all construction activities along the project corridor. Dust control measures may include planting vegetative cover, providing synthetic cover, providing watering or chemical stabilization, and/or providing windbreaks.

ES.6.4 Noise and Vibration

ES.6.4.1 Impacts

ES.6.4.1.1 Noise

The train operations of the Proposed Action will increase the existing noise level by 0 to 1 dBA in 2030. The change in noise levels will be barely perceptible for most people. The Proposed Action train operations will have no impacts, based on the Federal Transit Administration (FTA) noise impact criteria.

Although there will be no noise impacts from operating trains, warning devices at grade crossings should produce a minimum sound level of 96 dBA at 100 feet forward of the locomotive, per federal guidelines. Warning horns cause a sharp increase in noise for a short period of time, which may cause a potential annoyance to residents living near at-grade crossings. There are 22 at-grade crossings with sensitive-receiver land uses nearby, where the warning devices resulted in a noise impact (Table 4.4-6)

ES.6.4.1.2 Vibration

The Proposed Action will have approximately 64 commuter rail trains a day and would have vibration impacts if ground vibration levels exceed the FTA criteria of 75 VdB for residential buildings and other structures where people normally sleep. No land use has been identified along the project corridor that has vibration-sensitive equipment that would be subject to lower vibration impact criteria.

ES.6.4.2 Mitigation

ES.6.4.2.1 Noise

No moderate or severe noise impacts have been identified for the train operations, so no noise mitigations measures are needed for operational noise.

For horns on each lead locomotive, Federal Railroad Administration (FRA) requires a minimum sound level of 96 dBA at 100 feet forward of the locomotive. In the Final Environmental Impact Statement for the Weber County to Salt Lake Commuter Rail Project, four treatment and mounting options for train horns were evaluated to minimize the noise impact from horns and still achieve the FRA's safety requirement (see Section 4.4 Noise and Vibration). If train horn configuration option 4 were used for the Proposed Action, there would be no impact at any of the grade crossings. This is the horn configuration that has been selected for all of UTA's commuter rail locomotives.

Using the modified train horn configuration will only address noise from transit operations. The grade crossing intersection will still have high noise levels due to freight operation train horns. The creation of "quiet zones" by the cities in areas where there are sensitive buildings would be the preferred method to address all residual train horn noise impacts. Creation of "quiet zones" requires the local governmental entity to install supplementary safety measures at the grade crossings that are at least equivalent to a locomotive horn. Supplementary safety measures include, but are not limited to, signs warning that trains do not sound horns at the crossing and gates, traffic control or other barriers to prevent careless movement over the crossing. All "quiet zones" require the approval of the FRA. UTA will assist cities in the creation of quiet zones.

ES.6.4.2.2 Vibration

Predicted ground-borne vibration from the Proposed Action for sites 2, 3, 5, 7, L and M, representing 74 buildings, are between 0 to 4 decibels greater than the impact threshold (Table 4.4-6) (Figure 4.4-1). However, there is a

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chance that the actual ground-borne vibration levels will be below the impact threshold. During final design, a more detailed vibration impact analysis will be conducted to determine specific vibration impacts and appropriate mitigation, if needed.

Ground-borne vibrations from the Proposed Action for sites I and M2, representing 204 buildings, are 5 decibels greater than the impact threshold (Table 4.4-6) (Figure 4.4-1). Vibration control measures can range from operational changes, such as the reduction of train speeds in these areas, to special track support systems, resilient fasteners, ballast mats, etc., to building modifications. During final design, a more detailed vibration impact analysis should be conducted to determine appropriate vibration control measures, if needed.

ES.6.5 Water Resources

ES.6.5.1 Impacts

ES.6.5.1.1 Surface Waters

The Proposed Action would cross the Provo River, Spring Creek, Dry Creek in Lehi, Jordan River, Dry Creek in Sandy, Little Cottonwood Creek, Big Cottonwood Creek, and Mill Creek. In addition, numerous smaller surface waters and a few canals (East Jordan, Utah and Salt Lake, South Jordan, Lake Bottom, and Jordan and Salt Lake City) would be crossed by the Proposed Action or located adjacent to its construction activities. At each of these surface water bodies, bridges, culverts, or other drainage features may be implemented as part of the Proposed Action. The potential impacts of these features on the surface water channels could include flow constrictions, channel alterations, decreases in vegetative cover near crossings, and decreases in channel slope stability.

The Proposed Action stations could alter local drainage patterns and increase the stormwater runoff rate and volume from the project site as a result of the stations' impermeable surfaces (approximately 90 acres total). These increased flows could alter stormwater flows if they were not captured before flowing into local surface waters. However, stormwater from station park-and-ride lots would be managed in accordance with state and municipal guidance. Stormwater management solutions would be developed during design.

Increased runoff and impermeable surfaces would also increase the potential for the transport of pollutants to local surface waters. Pollutants, such as heavy metals, oil and grease, and sediments, could enter surface waters from station areas. The other project features, such as the railway track, would not be considered significant sources of pollutants or runoff because the track beds would be largely permeable and because operation of the commuter rail would generally contribute only minor amounts of lubricants and other pollutants (Utah Transit Authority, 2007).

Detention basins would be included as part of the Proposed Action to capture additional runoff. The detention basins would provide some water quality treatment, particularly by settling sediments from the stormwater.

Stream alteration permits would be required for most, if not all, of the surface water crossings discussed above and would require implementation of best management practices (BMPs). Implementation of the mitigation measures for surface water conveyance and erosion and scour protection described below would mitigate potential surface water impacts of the Proposed Action.

ES.6.5.1.2 Floodplain

Portions of the Proposed Action would be located within FEMA-designated 100-year floodplains associated with the surface waters traversed by the project, as shown in Figure 4.5-4. Installation of the project features, including bridges, in these floodplains could alter floodflows or the extent of the floodplain.

Implementation of the floodplain conveyance and surface water conveyance mitigation measures described below would mitigate the potential floodplain impacts of the Proposed Action. These features would ensure that the natural floodplain values of the study area would not be diminished.

ES.6.5.1.3 Groundwater

Although the Proposed Action could contribute to adverse effects on the existing water quality of the shallow aquifer in the study area, the effects would be insignificant. Implementation of the mitigation measures to protect surface water quality described below would also mitigate the potential groundwater quality impacts of the Proposed Action.

ES.6.5.2 Mitigation

The Proposed Action would require a Section 404 permit from the U.S. Army Corps of Engineers (Corps) and preparation of specific design standards that ensure that project features (bridge abutments, footings, and other elements in the floodplain) do not reduce the capacity of the channels upstream or downstream of the structures or increase channel erosion. During final design, and in coordination with the Corps, UTA would undertake specific floodplain studies. These analyses would consider the final engineering of railway structures and drainage facilities across the floodplains, indicate the full extent of impact to the floodplains, and indicate appropriate drainage mitigation, such as floodplain equalization culverts. The intent of the Section 404 permit is to ensure that channel capacity for stormwater flow is maintained. UTA would also be required to comply with local floodplain ordinances and to obtain permits from local jurisdictions in the area for work within the 100-year floodplain. This would include Salt Lake County's Jordan River Meander Ordinance.

Surface water conveyance structures would be constructed to allow for the free movement of water in either direction, to minimize increases in channel gradients, and to minimize concentrated discharges to waterways in the project corridor. These structures would be installed where existing hydrologic connections would be cut off by project features. Types of surface water conveyances that may be used include culverts, a series of small culverts, French drains, corrugated strip drains, synthetic drainage nets, and gravel layers. These features would be designed to pass surface water through the project's features in the direction of existing flow.

Stream alteration permits from the Utah Department of Natural Resources, Division of Water Rights, would be required and obtained for the river and stream crossings that result in a major stream alteration or modification.

In addition, UTA would contact the operators of canals (i.e., irrigation facilities) before construction begins and would fully comply with the irrigation companies' requirements to protect these facilities.

Stormwater runoff from the project corridor, particularly the station locations, would be treated to remove oils, grease, sediments, and heavy metals. Stormwater from station park-and-ride lots would be managed in accordance with Utah and municipal guidance. Stormwater management solutions would be developed during design. Final selection of BMPs would consider input from UDEQ and the Corps. Maintenance of these water quality treatment features would be performed by UTA. Because the Proposed Action would require a Section 404 permit, the UDEQ Division of Water Quality would evaluate the project to provide water quality certification (a Section 401 permit).

For wells located in the right-of-way of the project corridor, UTA would either purchase the groundwater rights from the owner or pay for a transfer of the rights.

ES.6.6 Wetlands

ES.6.6.1 Impacts

It was assumed that direct impacts associated with the Proposed Action would be limited to the area within the proposed limits of disturbance and that all of the area within the proposed right-of-way would be directly affected by conversion to track and station use.

Construction of the Proposed Action's facilities, including station and flyover structure options, would require the placement of fill material in portions of several jurisdictional wetlands and other waters of the U.S. Construction of these facilities, excluding the station and flyover structure options, would directly impact 12.93 acres of jurisdictional wetlands and 0.59 acre of other waters of the U.S. (see Table 4.6-3). Direct impacts from placement of fill in

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jurisdictional wetlands and other waters of the U.S. during construction of station and flyover structure options are quantified separately (Table 4.6-4).

ES.6.6.2 Mitigation

The following mitigation measures and those discussed in Section 4.5, Water Resources and Floodplains, would minimize impacts to wetlands and other waters of the U.S. during project construction:

- The Wetlands Delineation Report identifies and maps wetlands that occur adjacent to the Proposed Action's footprint, for protection during construction.
- Where wetlands are present adjacent to the limits of disturbance, installing protective fencing at the limits of the construction area (outside which all construction activities would be excluded) would prevent incidental adverse effects on adjacent wetlands.
- In areas with shallow groundwater or areas that frequently carry surface water flows, installing culverts or other water conveyance structures to maintain existing hydrologic connectivity would avoid impacts on wetland hydrology.
- Using BMPs during all phases of construction (including permanent BMPs after construction) would reduce impacts from sedimentation and erosion. These include berms, brush barriers, check dams, erosion control blankets, filter strips, sandbag barriers, sediment basins, sheet mulching, silt fences, straw-bale barriers, surface roughening, and diversion channels.

UTA would provide compensatory mitigation for direct impacts on wetlands from implementation of the Proposed Action. The goal of compensatory mitigation is to replace the major wetland functions, vegetation communities, and area lost as a result of the Proposed Action. Enhancing, restoring, or constructing wetlands of the same type as the wetlands filled during construction of the Proposed Action would compensate for the loss of wetland functions. Mitigation will be based on replacing the Functional Units lost due to implementing the Proposed Action. Functional Units are calculated by multiplying the Functional Points of a wetland by the acreage of wetland that will be directly impacted. By applying the same Utah Department of Transportation (UDOT) Wetland Functional Assessment Method to the wetland mitigation site before and after implementation of the mitigation plan, the number of Functional Units gained at the mitigation site can be calculated.

A wetlands mitigation and monitoring plan, prepared in coordination with the Corps and in conjunction with the Clean Water Act (CWA) Section 404 permitting process, will enhance the success of wetland compensation by providing detailed guidance for implementing the compensation measures. This plan will identify the location and size of the mitigation site that will be selected with Corps approval. The plan will also describe all phases of mitigation, including site layout, construction details, and success monitoring. The site layout will include a detailed base map that outlines the exact location of the mitigation site, different planting zones, details on the sources of wetland hydrology, and techniques to be used to create a viable, functioning site.

Mitigation monitoring will be performed annually and will include documenting progress toward meeting the success criteria, identifying problems that require remedial action, and determining measures for short- and long-term management and maintenance of the mitigation site. This will determine whether compensation has been successful. Final mitigation success will be verified by the Corps.

ES.6.7 Wildlife

ES.6.7.1 Impacts

In general, the project corridor provides limited habitat for wildlife, and available habitat is marginal or poor in quality. Habitat loss resulting from the Proposed Action would likely be limited to minor localized effects. Vegetation clearing, earthmoving, and other construction activities have the potential to destroy migratory bird nests and habitat for small mammals, so some birds and small mammals would likely be displaced during construction. Nearly all bird species

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are protected under the MBTA, which prohibits destruction or disturbance of nests that would result in loss of eggs or young. Migratory bird nests are most likely to occur in the riparian and wetland habitat types, but nesting birds may also be present in upland and urban vegetative communities.

Effects on aquatic biological resources may result from releases of sediment or toxic materials during construction and the loss of riparian/wetland habitat. However, effects on wetlands and riparian areas would be minimal, and assuming that no permanent disturbance would occur below the ordinary high water mark (OHWM) of the Jordan River and that BMPs are properly employed during construction, no substantial effects on aquatic biological resources are expected.

In addition to habitat loss, linear transportation projects have the potential to sever wildlife migration corridors. Because the project corridor parallels the adjacent, existing Union Pacific Railroad mainline right-of-way, very little wildlife habitat fragmentation is likely to occur. As detailed previously, the project corridor is composed primarily of urban land uses; so the available wildlife habitat is already highly disturbed.

However, the Jordan River ecosystem is highly important to migratory birds, serving as a corridor between Utah Lake and the Great Salt Lake. The Proposed Action may limit wildlife movement on a small scale but is not likely to substantially disrupt the Jordan River corridor. The Proposed Action's design would accommodate wildlife movement by maintaining and enhancing existing railroad drainage culverts, as well as crossings of irrigation canals and the Provo, American Fork, and Jordan Rivers.

The principal potential effects on threatened, endangered, and special-status species could include the direct loss of habitat. Effects on these species would be primarily related to the amount of direct permanent habitat loss. The Proposed Action could result in reducing some species' population size within the project corridor through incidental mortality or displacement from disturbance. However, because of the existing high level of disturbance within the project corridor, the overall effect of these losses alone would not affect the long-term viability of any of these species in the region.

ES.6.7.2 Mitigation

In addition to applicable regulatory guidelines, the project team will implement the following long-term minimization measures:

- Minimize land disturbance and clearing during construction;
- Restore/revegetate disturbed sites at the completion of construction;
- Minimize activities that would permanently alter the banks, slopes, and riparian areas of surface water bodies;
- Ensure that all structures that span surface water bodies (especially the Jordan River) do not encroach on the ordinary high water level and have adequate clearance for wildlife passage;
- Where possible, locate structures outside the Jordan River meander corridor (i.e., its riparian area); and
- Where practical, new drainage crossing structures will provide for high flows, movement of sediment and debris, and fish passage.

Specific effects on wildlife resources resulting from the Proposed Action will be determined with appropriate regulatory agencies during the permitting process.

ES.6.8 Hazardous Materials

ES.6.8.1 Impacts

Operation and maintenance would require the use of a controlled amount of hazardous materials along the project corridor and at maintenance locations. The use of these materials would result in the creation of hazardous waste during normal operation of the commuter rail line. Hazardous material use would be limited to minimal quantities of materials such as paint, parts washers, degreasers, and lubricants.

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Operation of the Proposed Action would also require maintaining additional commuter rail vehicles. These additional maintenance and commuter rail operations are not expected to contribute to substantial increases in hazardous material generation or local air emissions.

During construction, there is the potential for hazardous material impacts to occur because of the historical presence of hazardous materials within the existing freight rail corridor and the surrounding area. Nine hazardous material sites have been identified as having the potential to contribute to hazardous material conditions (Table 4.8-1). Figure 4.8-1 provides the locations of each hazardous material site shown in the table.

ES.6.8.2 Mitigation

UTA would implement all existing UTA policies and procedures for handling and disposing of the hazardous materials used for the commuter rail vehicles and associated maintenance machinery. No additional mitigation measures would be needed during operation.

If construction of the Proposed Action leads to the exposure of the public or construction workers to concentrations of hazardous materials that exceed acceptable regulatory levels, there could be an adverse impact. The project would be approached and implemented in a manner that is consistent with applicable state and federal regulations for hazardous materials, and appropriate precautions would be taken against exposure of the public or workers to contaminated materials. Additionally, construction methods would be used to prevent mixing and potential cross-contamination of soil from differing depths and locations.

Soil and groundwater sampling should be completed at areas along the project corridor that may already be impacted by hazardous materials and where construction may occur. These data would be used to delineate areas containing hazardous materials so that construction methods may be defined to minimize the potential for adverse impact and to mitigate contaminated areas as necessary for completion of the project. Additionally, in areas known to contain hazardous materials, the project design would focus on avoiding contact with impacted media. Engineering controls (e.g., dust mitigation, temporary soil covers, and groundwater extraction) and personal protective equipment for construction workers would be used to reduce the potential for public or worker exposure to hazardous materials where necessary.

If media containing regulated contaminants is encountered during construction, coordination with Utah Department of Environmental Quality (UDEQ) and EPA would be implemented. If contaminant concentrations in the media exceed state or federal action levels, the areas involved would be evaluated for appropriate response actions. It should also be noted that if contact with hazardous materials occurs during construction, completion of the Proposed Action would result in a condition of decreased potential for future exposure because of removal and/or capping (pavement, clean material, new railroad track, and ballast) of hazardous materials.

ES.6.9 Historic Sites

ES.6.9.1 Impacts

ES.6.9.1.1 Archaeological Resources

Potential direct impacts of the Proposed Action are considered for five historic archeological properties, located within the archaeological Area of Potential Effect (APE), that are eligible for listing in, or meet the criteria to be listed in, the National Register of Historic Properties (NRHP). These properties include the D&RGW Railroad mainline, South Jordan Canal, Utah and Salt Lake Canal, East Jordan Canal, and the Jordan and Salt Lake City Canal. None of these properties would be adversely affected.

Impacts on cultural resources that are not eligible for the NRHP are not considered significant effects and do not require mitigation. Table 4.9-4 shows the potential impacts on historic archaeological properties located along the project alignment.

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The area of potential effects has been highly disturbed by past farming, construction, and maintenance activities, and the potential for encountering buried prehistoric archaeological deposits is low. However, ground-disturbing activities associated with construction have the potential to unearth and damage previously undetected archaeological resources, including prehistoric human remains.

ES.6.9.1.2 Historic Structures

Table 4.9-5 lists eight historic structures that may be affected by the Proposed Action. These historic buildings are recommended as being eligible for the NRHP and given a State Historic Preservation Office (SHPO) rating of either A or B. Of the eight historic properties that could be affected by the Proposed Action, five buildings may be adversely affected through demolition and one building could be affected through the removal of a character-defining building feature. The other two structures may sustain adverse effects through increased groundborne vibration as a result of their close proximity to the proposed rail alignment.

ES.6.9.1.3 Paleontological Resources

The APE has been highly disturbed by past human activities, and the potential for encountering unique paleontological deposits is low. Neither of the two known paleontological localities would be affected by the Project. However, ground-disturbing activities associated with construction have the potential to unearth and damage previously undetected paleontological resources. Mitigation measures described below would minimize the potential for impacts.

ES.6.9.2 Mitigation

As no archaeological resources would be adversely affected, no mitigation measures are required.

Mitigation for historic structures will consist of intensive-level survey documentation. A qualified architectural historian who meets the Secretary of the Interior's standards for historian or architectural historian must conduct the fieldwork, research, and formal documentation of each building in accordance with the SHPO's Intensive Level Survey—Basic Survey Standards (Utah State Historic Preservation Office 2007b).

Mitigation for paleontological resources:

- If buried cultural resources, such as chipped stone, ground stone, historic debris, building foundations, or nonhuman bone, are inadvertently discovered during ground-disturbing activities, UTA's contractors will contact a qualified archaeologist who will determine the appropriate action to pursue regarding the resource.
- If human remains of Native American origin are discovered during ground-disturbing activities, UTA's contractors will comply with state laws relating to the disposition of Native American burials, following state regulation UCA 9-9-401 and the Utah Native American Graves Protection and Repatriation Act of 1992.
- If paleontological resources are unearthed before or during construction, UTA's contractors will notify a qualified paleontologist.