FrontRunner Forward

Strategic Double Track Recommended Service Alternative Overview – A Planning and Environmental Linkage Study

May 2025

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Acronyms and Abbreviations

CMAQ	Congestion Mitigation and Air Quality
DEQ	Department of Environmental Quality
E-ATC	automatic train control
EIS	Environmental Impact Statement
ESA	Environmental site assessment
ESR	Environmental Study Report
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
H.B.	house bill
I-15	Interstate 15
MAG	Mountainland Association of Governments
ML	Mainline
NEPA	National Environmental Policy Act
OCS	Overhead catenary system
OTP	On time performance
PEL	Planning and Environmental Linkage
PTC	positive train control
ROD	Record of Decision
ROW	right-of-way
RTP	Regional Transportation Plan
SCC	standard cost categories
TRI	Toxic Release Inventory
UDOT	Utah Department of Transportation
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
UTA	Utah Transit Authority
VHD	vehicle hours of delay
WFCCS	Wasatch Front Central Corridor Study
WFRC	Wasatch Front Regional Council

1. Introduction

1.1. FrontRunner Forward Program

FrontRunner is the Utah Transit Authority's (UTA) commuter rail system that currently provides service from Ogden to Provo along an 82-mile corridor, serving a total of 16 stations in Weber, Davis, Salt Lake and Utah Counties. Design and planning of the initial FrontRunner system was completed in 2008. After more than 14 years of successful service, UTA's FrontRunner is entering a new phase of improvements to create a more frequent, reliable, and convenient option for commuters and other travelers.

The "FrontRunner Forward Program" has been developed by UTA to better understand the region's future transportation needs and identify opportunities and strategies for how the FrontRunner system can support these needs. The FrontRunner Forward Program aims to create a long-term service vision for FrontRunner and identify improvements needed to meet the following goals:

1. Improve Reliability of FrontRunner
2. Increase Capacity on the FrontRunner corridor
3. Increase Ridership on FrontRunner
4. Meet the Forecasted Demand of Population and Economic Growth
5. Support Real Estate & Economic Development
6. Improve Air Quality

1.2. Strategic Double Track Project

The Wasatch Front is growing at a rapid pace, and its geography – bound on the east by the Wasatch Mountains, and on the west by Utah Lake, the Oquirrh Mountains, and Great Salt Lake – creates a natural growth boundary. I-15 and UTA's FrontRunner commuter rail are the two major options for north-south travel through the region. The population is predominately concentrated in Ogden, Salt Lake City, and Provo making the travel corridor very congested. With future growth, the corridor is projected to become congested further.

Recognizing the need to provide mobility choices and the desire to be proactive in preparing for increasing demands on this corridor, the Utah Legislature committed $450 million dollars to Utah Department of Transportation (UDOT) for this Project, including $375 million in bonds and $75 million in required UTA funds. Using these funds, UTA in partnership with UDOT are undertaking the Front Runner Strategic Double Track Project[1] (also referred to as "FrontRunner 2X") as the first investment in the commuter rail system as part of the FrontRunner Forward Program.

As FrontRunner is nearing capacity in the peak hours, the Strategic Double Track Project will increase train speeds, improve reliability, and allow more frequent service, which in turn will increase ridership, attract more local riders, and establish FrontRunner as the crucial backbone of transit along the Wasatch Front. To accomplish these goals, the Strategic Double Track Project adopted the following strategies:[2]

[1] For more information, see the FrontRunner Strategic Double Track Project website: https://frontrunner2x.utah.gov.

[2] UDOT and UTA, *FrontRunner Forward, Strategic Double Track Recommended Service Alternative Overview – A Planning and Environmental Linkages Study*, May 2023.

- Enable FrontRunner to operate at 15-minute frequencies during peak hours.
- Facilitate FrontRunner to operate with all-day 30-minute frequencies, resulting in improved on-time performance.
- Enhance corridor capacity by the increased frequency rather than operating longer trains on the existing schedule.
- Add trainsets to operate more service during peak hours.

To facilitate 15-minute service during peak hours, the Strategic Double Track Project adds double track in ten strategic locations where trains traveling in opposite directions would meet; this added double track would enable trains to pass and decrease dwell times at stations. The Strategic Double Track Project also realigns curves that slow down the trains at an eleventh location. With decreased dwell time at stations, UTA can add more trains to the FrontRunner system and in turn increase train frequency, expanding the line's peak-hour passenger capacity.

Service will increase from 60-minute headways during the off peak and 30-minute headways during the peak period to 30-minute headways during the off-peak and 15-minute headways during the peak periods. During the A.M. peak period, there will be four trains per hour southbound from Ogden to Provo, four trains per hour northbound from Provo to North Temple, and two trains per hour northbound from North Temple to Ogden. Service will be reversed in the P.M. peak period, with two trains per hour southbound from Ogden to Salt Lake Central, four trains per hour northbound from Provo to Ogden, and four trains per hour southbound from North Temple to Provo. This achieves an overall increase in seating available from 800 to 1,240 seats in the peak period and peak direction.

Through the increased reliability and capacity, the Strategic Double Track Project also is anticipated to increase ridership, meet the forecasted demand of population and economic growth, and solidify FrontRunner as the backbone of mobility in the Wasatch Front.

2. Purpose of this Document

This document, a Planning and Environmental Linkage Study (23 CFR 450 Appendix A), has been prepared to summarize the analyses and recommendations conducted that resulted in the Strategic Double Track Project. This document also includes reference to other potential future improvements to FrontRunner (see Chapter 11).

In 2021, UTA identified the need to examine improvements for increasing reliability and capacity for FrontRunner. This document outlines and describes the process in which alternatives were analyzed to reach this service goal. Ultimately, the Strategic Double Track Project was proposed as the Recommended Service Alternative for analysis under the National Environmental Policy Act (NEPA). This document will be used to inform subsequent environmental analyses under NEPA, and final design and track alignment for the Strategic Double Track Project. The corridor as a whole is presented in this document with supporting technical reports to address cumulative impacts that may result from project improvements. Corridor-level analyses were completed to study resources that may be affected by increased service planned following completion of the Strategic Double Track Project. Each double-track section will have its own NEPA document prepared (assumed to be a Categorical Exclusion) to evaluate more detailed impacts at each specific double-track location, the new station, and maintenance facility and will reference this document in support of the overall corridor analysis.

In the future, separate environmental documents will be prepared for other potential improvement projects from the FrontRunner Forward Program as needed and are not analyzed in this document.

The document is organized as follows: Chapter 3 summarizes previous studies conducted to-date, Chapter 4 describes existing and future conditions in the corridor, Chapter 5 describes the purpose and need for the project, Chapter 6 summarizes the service development considerations, Chapter 7 describes the Strategic Double Track Project, which is the Recommended Service Alternative that meets the project purpose and need, Chapter 8 discusses the environmental existing conditions and impacts, Chapter 9 summarizes agency coordination, stakeholder and community engagement, Chapter 10 describes funding scenarios and Chapter 11 summarizes the future of FrontRunner.

3. Previous Studies

Several previous studies have analyzed future transportation needs along the Wasatch Front, some of which focused on FrontRunner performance and potential expansion. These studies have shown the need for improvements along the corridor. Recent studies pertaining to FrontRunner are summarized below.

3.1. Initial Environmental Studies (2005 and 2007)

Environmental studies were completed prior to the original construction of the FrontRunner commuter rail line. The FrontRunner corridor was split into two sections for analysis: a North section (Ogden to Salt Lake City) and a South section (Salt Lake City to Provo).

The environmental analysis for the North section is published in an Environmental Impact Statement (EIS) (February 2005) and Record of Decision (ROD) (April 2005) [3]. The North EIS/ROD analyzed a 44-mile section for the northern commuter rail line, beginning at Pleasant View (approximately 8 miles north of Ogden) and ending in Salt Lake City. The environmental analysis for the South section is published in an Environmental Study Report (ESR) (October 2007) [4] and the Decision Document (January 2008)[5]. The South ESR/Decision Document analyzed a 45-mile section for the southern commuter rail line from Salt Lake City to Provo. In addition to the new track, eight stations in each section (for a total of 16 stations) were studied, each of which included park-and-ride facilities and feeder bus services. The environmental analyses assumed 20-minute frequency during peak periods weekdays, and 40-minute frequency during daytime non-peak periods weekdays, with limited service on the weekends.

FrontRunner began operations on the North section in 2008, and on the South section in 2012. FrontRunner currently operates with 30-minute frequency during peak periods and 60-minute frequency during off-peak periods, compared with the frequency studied in the environmental analyses described above.

[3] Utah Transit Authority. Weber County to Salt Lake City Commuter Rail Project FEIS/ROD. 2005.
[4] Utah Transit Authority. Provo to Salt Lake City FrontRunner Final Environmental Study Report. 2007.
[5] Utah Transit Authority. FrontRunner Decision Document. 2008

3.2. Wasatch Front Central Corridor Study (2017)

The 2017 Wasatch Front Central Corridor Study (WFCCS) (August 2017)[6] was prepared to address the needs of Utah's rapidly growing population, focusing on solutions for the I-15/FrontRunner corridor which is challenging due to the high demand but limited space. This study was conducted as a partnership with the Mountainland Association of Governments (MAG), Utah Department of Transportation (UDOT), Utah Transit Authority (UTA), and Wasatch Front Regional Council (WFRC).

The WFCCS developed three scenarios to compare potential approaches to increase capacity—from adding new travel lanes on I-15 ("build more") to only investing in transit ("manage more"). Based on these findings, WFCCS proposed a hybrid solution comprised of portions of all three scenarios that would improve travel time reliability, double transit ridership, reduce future travel time, and increase accessibility to jobs via transit. Part of that plan included doubling FrontRunner frequency and increased FrontRunner train speeds, which could be implemented following construction of additional double track sections and electrification.

3.3. Future of FrontRunner Study (2018)

Following the 2017 WFCCS, UTA conducted a more detailed analysis of increasing route frequency from 30-minute peak headways to 15-minute peak headways, as well as adding service on Sundays. This analysis studied options for electrifying the corridor (converting the push-pull diesel fleet to fully electric rail vehicles) and strategically double tracking sections of the corridor to increase frequency and adding extensions and new stations to increase ridership[7].

3.4. Regional Transportation Plans (2023)

In 2023, WFRC and MAG each released their 2023-2050 Regional Transportation Plans (RTP)[8,9] to set forth strategies for transportation investments within the region. These RTPs are significant pieces of a coordinated state-wide effort demonstrated in Utah's Unified Transportation plan. The WFRC RTP covers the Weber, Davis, and Salt Lake County section (from Ogden to north of Lehi) and includes 14.6 miles of FrontRunner double track and future electrification of the system. The WFRC 2023-2050 RTP also includes the Point of the Mountain project (see Section 3.5), which will connect the area of the former State Prison in Draper to the TRAX Blue Line at the Draper Station, and other connection points to the north and south. In addition, the WFRC RTP includes the addition of a new FrontRunner station in Bluffdale at the planned Point of the Mountain redevelopment at the former State Prison site.

The MAG RTP (called TransPlan50) covers the Utah County section of the FrontRunner corridor (from north of Lehi to Provo) and includes additional double track. TransPlan50 includes as a project the

[6] Wasatch Front Regional Council. Wasatch Front Central Corridor Study. 2005. https://wfrc.org/Studies/wfccs/WFCCS_Final_Report_Summary.pdf
[7] LTK Engineering Services. Future of FrontRunner Final Report. 2018. https://www.rideuta.com/-/media/Files/About-UTA/Reports/2019/C5016_UTA_Operations_Simulation_Tech_MemoV2_20190320.ashx
[8] https://wfrc.org/VisionPlans/RegionalTransportationPlan/2023_2050Plan/2023RTP.pdf
[9] Mountainland Association of Governments. Adopted 2019-2050 Regional Transportation Plan. 2019 https://mountainland.org/static/files/transportation/TransPlan50/TransPlan50.pdf

extension of the FrontRunner system beyond Provo to Payson (South Valley Extension), and future electrification of the system.

3.5. Point of the Mountain Transit (2019-Current)

The Transit Study for this project, initiated in 2019 and completed in 2023, evaluated multiple modes and alignments for transit between Draper and Lehi and providing service to the former Utah State Prison site in Draper. An Environmental Assessment analyzing multiple modes is estimated to be completed and signed by the end of June 2025, with an anticipated Finding of No Significant Impact (FONSI) by the end of September 2025. The anticipated mode selection of LRT is based on the findings from the Transit Study Update, coordination with project partners, stakeholders, and the public, and supported by the preliminary environmental review.

4. Existing and Future Corridor Conditions

Utah continues to realize sustained and rapid growth along the Wasatch Front. The geography of the Wasatch Front – bound on the east by the Wasatch Mountains, and on the west by Utah Lake, the Oquirrh Mountains, and Great Salt Lake – physically constrains this growth to the narrow corridor anchored by the major cities of Ogden, Salt Lake City, and Provo. As such, I-15 and UTA's FrontRunner commuter rail are the two major options for north-south travel through the region connecting Ogden and Provo to Salt Lake City.

The Strategic Double Track Project process began with data collection of existing transportation facilities. This included research on the existing transit system including the FrontRunner corridor (travel patterns, ridership, etc.) and population and employment growth projections, as described in further detail below. It was important to examine these factors as they provide valuable data on the project's purpose and needs, which were used to aid in the development of alternatives that meet the identified service goal of increased reliability and capacity.

4.1. Existing UTA Transit Network

UTA has a wide network of interconnected transit services that range from commuter rail, light rail (TRAX), bus rapid transit, streetcar, and fixed-route bus service, as shown on **Figure 4-1**. The TRAX and bus schedules are coordinated to meet arriving/departing FrontRunner trains where stations are close.

UTA has four light rail lines, including three TRAX lines (Red, Blue, Green) and one streetcar (S-Line). These lines share stations at North Temple, Salt Lake Central, and Murray Central. UTA also has numerous fixed-route bus service throughout their service area, including frequent buses (15-minute headways), regular buses (30 to 60-minute headways), limited buses (e.g., rush hour), and specialty buses (e.g., serving ski resorts and schools).

4.2. Existing FrontRunner System

FrontRunner currently has 16 stations spaced about 5 to 8 miles apart with center-island platforms and two station locations with side stations to accommodate both northbound and southbound trains as well as bus loops, park-and-ride facilities, and drop-off zones. The stations on this route (from north to south) include the following: Ogden, Roy, Clearfield, Layton, Farmington, Woods Cross, North Temple, Salt Lake Central, Murray Central, South Jordan, Draper, Lehi, American Fork, Vineyard, Orem Central, and Provo Central.

4.2.1 I-15/FrontRunner Corridor Travel Patterns

I-15 is the main north-south corridor for vehicles in the study area, a divided interstate parallel to the FrontRunner commuter rail line. I-15 is over capacity, and additional improvement projects are proposed. However, to mitigate travel congestion and accommodate the rapidly growing population, the WFCCS estimates that a road-only investment approach to addressing the need for expanded capacity would require 70% more miles of travel lanes by 2050, which is not feasible given the space available along this relatively dense built-up corridor. FrontRunner is the main alternative mode of transportation along this corridor, with an average of 19,887 daily weekday riders in 2019. A 2019 Onboard Survey indicated that 71% of the commuter rail users are “choice” riders, while 29% are transit-dependent riders.

4.2.2 FrontRunner Travel Time and Frequency

The existing time for a FrontRunner train car to travel the entire length of the corridor from Ogden to Provo is 2 hours and 8 minutes, based on the August 2023 schedule.

Currently, UTA operates FrontRunner service with 30-minute frequency in the peak hours (generally from 5 a.m. – 9 a.m., 4 p.m. – 8 p.m.) and hourly service in the off-peak hours during the weekdays. UTA also operates FrontRunner service with 60-minute frequency on Saturday. UTA does not operate FrontRunner on Sundays.

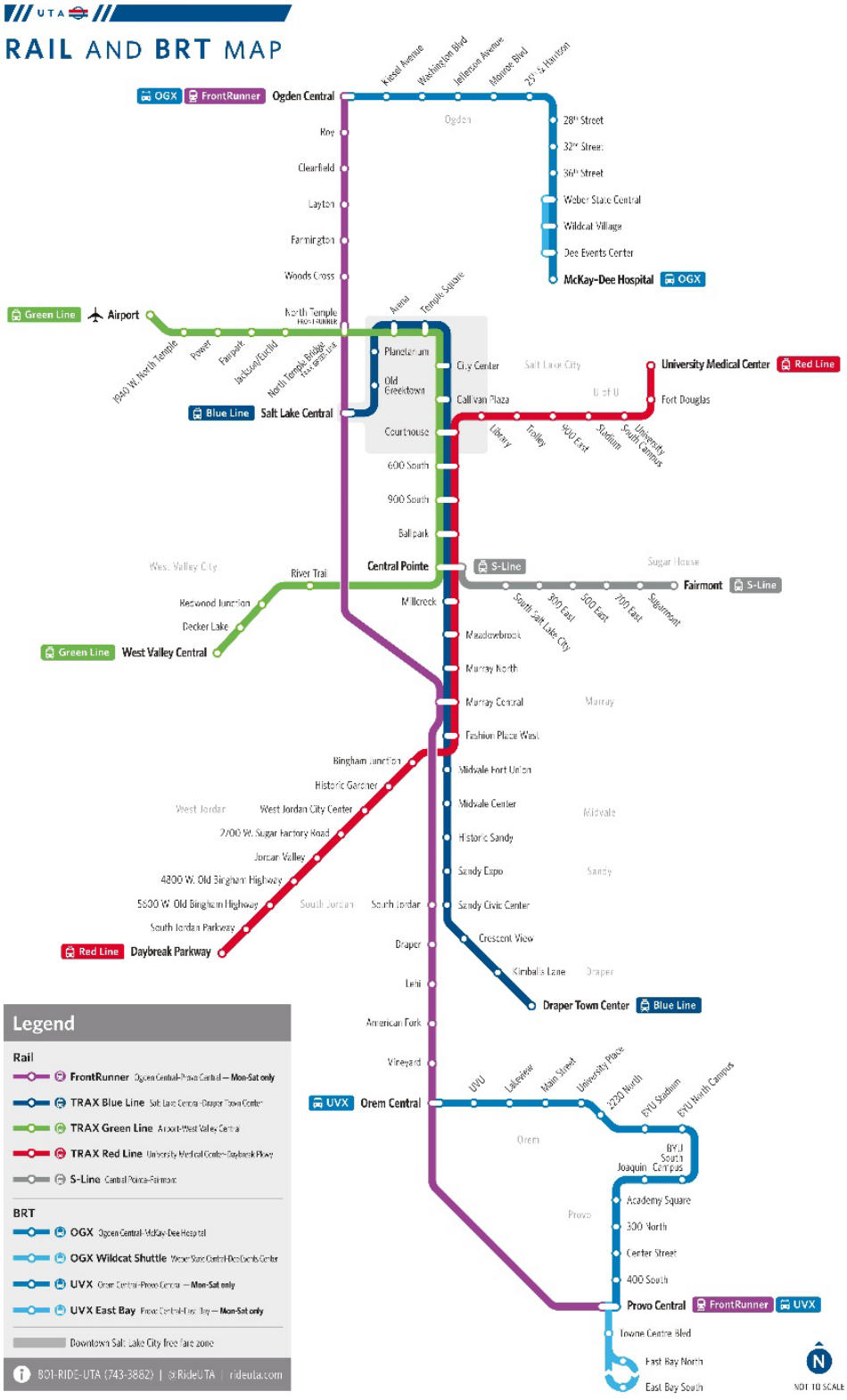

Figure 4-1. UTA FrontRunner and TRAX Map (UTA 2023)

4.2.3 I-15/FrontRunner Corridor Delay

Vehicular traffic congestion is anticipated to increase as the population grows. Vehicle Hours of Delay (VHD) are expected to increase as projected travel demand significantly outpaces the capacity of existing roads and those being currently built. According to recent estimates, total VHD is anticipated to increase from 1 million in 2014 to over 3.7 million in 2040 in Utah[10]. Increased VHD contributes to lower levels of productivity as people spend more time in traffic, negatively impacting the regional economy. Delay varies by year and depends on the type and extent of the incident.

The current FrontRunner system has 60.5 miles of single track (74%) and 21.5 miles of double- track sections (26%) throughout the corridor. When a delay occurs at one point on the FrontRunner tracks, it can cause logistical challenges and additional delays throughout the system. This issue often cascades for several hours as trains are slowed or held at stations to make meets at unplanned locations. For example, in 2019 (the most recent pre-Covid data), about 15% of train runs used an unplanned meet location, a direct result of attempting to handle delay. Various issues can cause delay, such as line and signal, mechanical, electrical, and train car issues. At times, trains may have to wait to let a train in the other direction pass.

Typically, most incidents for FrontRunner, such as mechanical issues or excessive boarding times of passengers, are resolved without creating a delay in the train schedule. The following data illustrates current average delay on FrontRunner:

- On average (mean), trains from Ogden to SLC incurred between 4.5 and 5.5 minutes of delay during the peak, versus 4.1 minutes during the off-peak.
- On average (mean), trains from SLC to Provo incurred between 3.1 and 4.5 minutes of delay during the peak, versus 2.8 minutes during the off-peak.
- The average weekday (Monday – Thursday) daily on-time performance (OTP)[11] from 2019 was 82%. As expected, on-time performance was higher during off-peak compared with peak (92% vs 77%, respectively).

UTA's goal is to provide 95% OTP in both the peak and off-peak times.

4.2.4 FrontRunner Ridership

There was an average of 19,887 riders per day on FrontRunner in 2019 (pre COVID pandemic 2020-2022). Ridership is expected to grow as a result of demographic growth, both due to population and employment increases and as a result of the associated diversion to FrontRunner from congested roadways (I-15 and other corridors) and local transit (TRAX and bus). The projected ridership presented in **Table 4.1** reflect projected increases in ridership due to proposed changes in the FrontRunner schedule which include a change in service from hourly off peak and 30-minute peak service to 30-minute off-peak and 15-minute peak service.

[10] https://rideuta.com/-/media/Files/Doing-Business/TOD/TOD_Policy_Procedures_Final.ashx?la=en
[11] OTP is defined by UTA as trains departing at their scheduled time

Table 4.1. Existing and Projected FrontRunner Ridership

Scenario	Ridership (average person trips per day)		Percentage Increase (2019 to 2040)
	2019	2040	
FrontRunner Baseline Service (No Build)	19,887	24,851	25%
FrontRunner Strategic Double Track (Project)	19,887	35,562	43%

Note: Ridership was forecasted through Simplified Trips-on-Project Software (STOPS) modeling

4.2.5 FrontRunner Signal System

The FrontRunner is currently operating on a traditional fixed signal block system controlled by a microprocessor-based system, specifically, integrated vital processor interlocking (iVPI). After the initial installation of the signal control system, Positive Train Control (PTC) was overlaid through an Enhanced Automatic Train Control (E-ATC) system to achieve the necessary functionality of PTC. These systems are sufficient for the train operation schedule in use today. However, the current system limits operational flexibility and expansion necessary to reduce overall run-time and increase corridor throughput. Signal modifications would allow UTA to increase frequency, reduce travel time, and allow for 15-minute peak service.

4.2.6 FrontRunner At-Grade Road/Rail Crossings

There are 69 at-grade crossings along the corridor, comprised of 59 public and 10 private crossings; one of the public crossings is for pedestrians only. In addition, there are 79 grade-separated crossings where FrontRunner either passes over or under the cross street. Although no new grade separations are proposed as part of the Strategic Double Track Project, UTA and UDOT continue to monitor the need for safety improvements at locations where roads cross rail lines at-grade. At-grade crossing analyses utilize the USDOT Grade Crossing Separation Criteria, and separate environmental evaluations will be completed as required as traffic and train volumes grow. Grade crossing analyses consider the road traffic volume, the volumes of FrontRunner and UPRR trains, the location (urban vs. rural), historic crash data on FrontRunner and UPRR rail lines, and existing safety measures in place. Improvements may include measures such as:

- Additional protective devices (raised curb/barriers/fencing, active (signals, gates), and passive (signs, pavement markings) traffic warning devices
- Crossing closure and removal
- Grade separation

The WFRC RTP includes projects to grade separate seven existing at-grade crossings, and the MAG RTP includes projects to grade separate two existing at-grade crossings.

4.3. Population & Employment Forecasts

Currently, 80% of the population in Utah is concentrated along the Wasatch Front, extending from Brigham City to Nephi. Growth throughout Utah, and particularly in this area, is increasing at a rate above Utah's average growth rate. A 2022 report released by the Kem C. Gardner Policy Institute projected that Utah is anticipated to reach 4 million residents by 2032 and 5 million by 2050. Utah

County is projected to be the fastest-growing county during that time, with over 30% of the state population growth happening there. Salt Lake County will remain the largest county.

It is estimated that there will be an addition of 1.3 million jobs to the Utah economy by 2060. Two-thirds of this growth will be in the Wasatch Front, covering both Salt Lake and Utah counties. This employment growth will be more concentrated than population growth, and it is anticipated that Salt Lake County will add more jobs than residents over the next 40 years.

Between 2019 and 2050, city areas within 10 miles of the FrontRunner corridor are poised to capture over half of the population growth of the entire state. **Figure 4-2** shows the projected changes in commute time along I-15 from 2019 to 2050 along the FrontRunner corridor. The areas with the most population growth are also the areas with the highest projected increase in commute time.

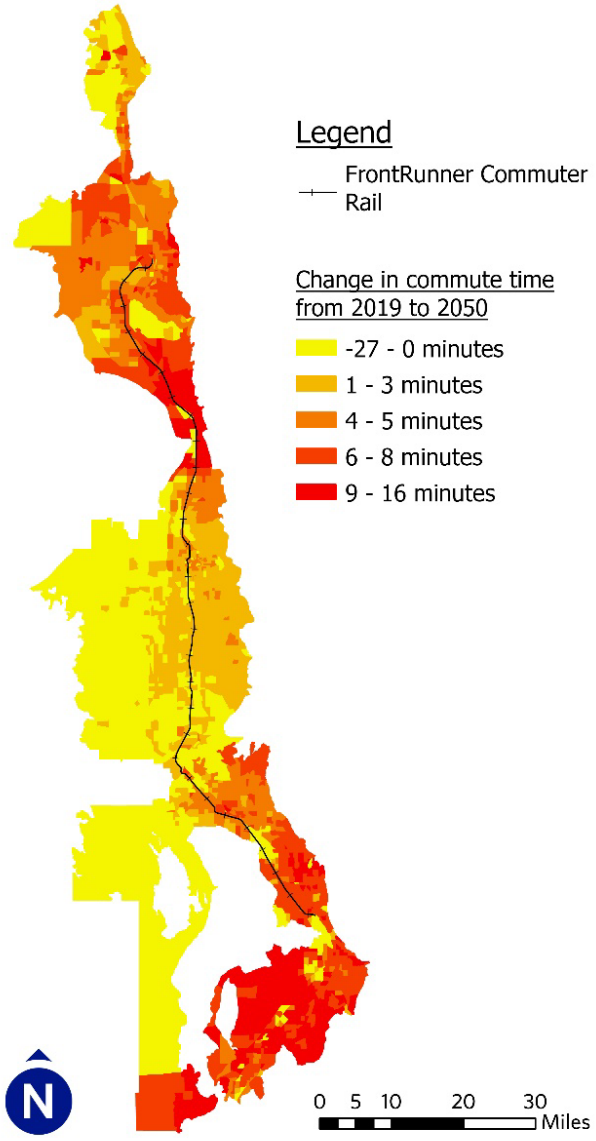

Figure 4-2. Projected Change in Auto Commute Time (2019 to 2050)

5. Purpose and Need

This analysis identifies the core issues to be addressed, defines the extent of the deficiencies, and establishes how the benefits of the potential improvements are measured. The Purpose and Need provides the framework for the evaluation of the alternative improvements to reach the identified service goal of increased reliability and capacity, leading to the study's recommendations.

5.1. Project Need

Utah is the fastest growing state in the Country, with 80% of the population concentrated in the greater Wasatch Front. As more people travel through the FrontRunner corridor, traffic volumes and delays will increase. The FrontRunner corridor currently suffers from a lack of reliability and insufficient passenger capacity. These issues are projected to be exacerbated by the forecasted demand generated by population and economic growth. These challenges are critical needs for the FrontRunner corridor as population and usage increases.

5.2. Project Purpose

The following are purposes of the Strategic Double Track Project, which correlate with the FrontRunner Forward Program objectives:

- Improve reliability of FrontRunner
- Increase capacity on the FrontRunner corridor
- Increase ridership on FrontRunner
- Meet the forecasted demand of population and economic growth
- Solidify FrontRunner as the backbone of the transit system in the Wasatch Front

5.2.1 Improve Reliability of FrontRunner

As discussed in Chapter 4, FrontRunner's existing system presents logistical challenges due to the service operating on a largely single-track system (74% single track). This limits the frequency of train service and reduces reliability when trains are delayed due to large passenger loads, equipment malfunctions or other incidents. It also limits FrontRunner's ability to recover the schedule once there is a delay and can lead to cascading delays throughout the span of service.

UTA FrontRunner had an average daily peak period on-time performance of 77%, which is significantly lower than UTA's overall system on-time performance average of 90% and UTA's TRAX light rail service average of 94%. UTA has a goal of 95% on-time performance for FrontRunner.

Strategic double tracking allows trains to better recover if delayed and improves overall schedule reliability. Systemwide capacity increases also enables increased frequency, which the FrontRunner forward program has also identified as a critical improvement necessary for increased reliability.

Reliability is consistently reported as a top factor influencing overall trip satisfaction. Frequent service results in a shorter wait time when a train is missed or when the exact schedule is not known by a passenger, provides riders with flexibility, and enables passengers to choose trips that arrive closer to their desired time. Increasing frequency of FrontRunner also facilitates more efficient transfers to UTA bus and Trax lines, positively impacting the system as a whole.

5.2.2 Increase Capacity on FrontRunner

Ridership and capacity analysis has determined that FrontRunner is operating at or over capacity during peak hours. FrontRunner ridership, without implementation of the Strategic Double Track Project, is projected to increase by 25% due to regional growth. As FrontRunner is already operating near or over capacity, operating FrontRunner at the current system capacity is unsustainable and will not meet the ridership demands of regional growth.

Additionally, the FrontRunner corridor has long been recognized as a vital yet congested corridor. I-15 is the only major north-south road for high-speed vehicular traffic within Utah and is critical for inter-state trucking and travel, as well as for local service for residents of the Wasatch Front[12]. The needed right-of-way (ROW) to expand I-15 is becoming harder to purchase, as business and homes continue to develop along the corridor.

5.2.3 Increase Ridership on FrontRunner

Ridership is affected by increases in population and job growth, as well as diversion from other modes due to FrontRunner service improvements or parallel roadway congestion. The FrontRunner Forward Program primarily assessed potential increases in ridership through the FTA Simplified Trips-On-Project (STOPS)a travel demand model process, evaluating for the year 2040.

The model utilizes the American Community Survey 2010 Census Transportation Planning Products geography, linked transit values based on the results of the 2019 UTA onboard survey, trips/journey to Work (JTW) by auto ownership, unlinked/linked trips ratio based on the results of the 2019 UTA onboard survey, general transit feed specification (GTFS) connectors, and kiss-and-ride (KNR) and park-and-ride (PNR) factors.

This implementation of STOPS utilizes the incremental mode based on a 2019 onboard transit survey to represent transit trip productions and attractions by zone. The survey was conducted from September through December 2019.

The STOPS model anticipates ridership increases of approximately 43% with implementation of the Strategic Double Track Project, as compared to 25% growth without implementation of the Project.

From an operations perspective, increased service frequency, improved reliability, and reduced travel time are factors expected to result in increased ridership on FrontRunner. The increased service will also alleviate capacity-constrained trains operating during the peak commute hours.

5.2.4 Meet the Forecasted Demand of Population and Economic Growth

As described in Wasatch Front Regional Council's adopted 2023-2050 RTP (Wasatch Choice 2050), from 2010 to 2020, the population of Utah increased at an annual rate of 1.7%, while the number of jobs in the state increased far more quickly, at an annual rate of 2.6% over the same ten-year period. Today, the average resident on the Wasatch Front spends about an hour commuting by car or by transit to and from work each day. Without building planned transportation investments and adopting land use

[12] Utah I-15 Now Case Study: SHRP and TRB, 2007

policies as outlined in the Wasatch Choice 2050, average commute times for the Wasatch Front's growing population are projected to grow to over an hour and forty minutes by the year 2050.

A 2019 study published by the University of Minnesota examined access to jobs in cities across the country by different modes of transportation. The data represents the number of jobs a typical worker residing in the city can reach within different travel times by a combination of transit and walking. In Salt Lake City in 2019, this study found that 150,262 jobs could be reached by transit within 60 minutes of travel (**Table 5.1**).

Table 5.1. Salt Lake City: Number of Jobs Reachable by Transit by Number of Minutes, 2019

10 min	20 min	30 min	40 min	50 min	60 min
503	4,007	15,399	40,587	84,604	150,262

Note: Adapted from UMN Access Across America: Transit 2019

As the population in the Wasatch Front Region grows, it is necessary to plan for transit options that can effectively serve both existing and new population and employment centers. More robust transit options, such as the Strategic Double Track Project, are needed to meet the forecasted demand of population and employment growth.

5.2.5 Solidify FrontRunner as the Backbone of the Transit System in the Wasatch Front

The existing FrontRunner corridor is 82 miles long with 16 stations. As a transit system connecting major destinations within the region, FrontRunner serves as the backbone of the transit system in the Wasatch Front. Improvements to FrontRunner would improve the entire UTA system through faster, more reliable, and more frequent service. More reliable service would encourage riders to use not only FrontRunner but the entire UTA system.

UTA has a wide network of interconnected transit services that range from commuter rail, light rail (TRAX), bus rapid transit, streetcar, and fixed-route bus service. Stations such as the North Temple, Salt Lake Central, Murray Central, Orem Central, and Provo Central stations are hubs of transportation with multiple routes and modes connecting at these stations. The Intermodal Hub at the FrontRunner Salt Lake Central Station includes connections to UTA buses, TRAX and Amtrak. North Temple also links FrontRunner to the airport TRAX route.

As the region continues to grow, FrontRunner service expansion is necessary to meet the travel demand on the FrontRunner corridor. To obtain the long-term goals for this transportation corridor, UTA must make incremental investments in the commuter rail system. Potential future improvements could include electrification, extension of FrontRunner, and improvements to train fleet sets, as noted in Section 11.

6. Service Development and Considerations

6.1. Current FrontRunner Service

As previously described, FrontRunner currently operates at a frequency of 30-min peak service and 60-min off-peak service. The current system is 74% single track and 26% double track. The FrontRunner corridor is a Class 4 rail corridor with top operating speeds of 79 mph governed by the standards and

requirements of the Federal Railroad Administration (FRA). FrontRunner is full Positive Train Control (PTC) certified. The system is a push-pull diesel operation using MP-36 locomotive engines to push/pull Bombardier Bi-Level Coach and Cab[13] cars. The initial system was opened in April 2008 and the existing rail vehicle fleet has approximately reached its mid-life.

6.2. FrontRunner Development Strategy and Process

In January 2021, UTA initiated work on a service development study intended to examine how best to support the purpose and need described in Chapter 5. This process started with examining three key areas:

- In order to improve reliability and capacity as well as grow ridership, understand the impact various service initiatives have on infrastructure investment
- Better understand how the system currently operates with regard to speed, functionality, and variability
- Understand how variability could impact future service and investments

UTA examined factors related to service (customer-facing elements such as the timetable), operations (all non-revenue behind-the-scenes elements needed to run the railway) and infrastructure (what is needed to support the plan), and their relationship to one another in an iterative manner.

UTA utilized the rail operations planning tool Viriato, which is a tool designed to represent the rail system including the existing and future infrastructure and vehicle performance. It enables the planner to visualize and assess service, operations, and infrastructure elements of the rail system and develop timetables and other graphic outputs of the network. This process allowed different combinations of service, operations, and infrastructure to be tested to assess performance outcomes, constraints, and/or benefits. The planning parameters include both policy or community-based inputs, such as markets to be served, as well as technical parameters such as dwell and turn times. UTA developed service-based performance goals related to the following:

- Ability to add more peak-period service
- Improve overall travel time and reliability
- Improve overall regional connectivity

Further inputs included assumptions for signal system performance (e.g., how closely or far apart trains can run) as well as vehicle performance characteristics (e.g., braking and acceleration profiles). Finally, the current railway infrastructure as well as known physical constraints were considered in assessing where and how future infrastructure changes could support service and operations.

6.3. Operations Planning Analysis

The operations planning analysis found that strategically placed infrastructure investments would yield improved regular all-day 30-minute service and allow for additional peak frequency via an overlay service, which would essentially slot an additional train within the regular 30-minute pattern. UTA examined both all-stop and express[14] service to achieve 15-minute peak frequency.

[13] "Cab" cars provide the ability for an operator to run the train from the back end when in push mode
[14] "Express" is used to refer to skipping some or all stations between two points.

UTA also examined the existing rider demand to help inform service and operations development. In 2019, the demand on the south end of the corridor, or trips between Provo and Salt Lake City, was higher overall, was more bidirectional, and was more distributed throughout the day compared with 2021 volumes due to the pandemic beginning in March 2020. Travel patterns are expected to resemble pre-pandemic travel patterns going forward, therefore 2019 ridership data was used in the analysis.

For trips between Ogden and Salt Lake City, the travel is primarily peak direction focused (from Ogden to Salt Lake City in the morning and the reverse in the evening). For trips between Provo and Salt Lake City, travel is less peak direction focused. **Figure 6-1** shows the distribution of trips across the FrontRunner corridor.

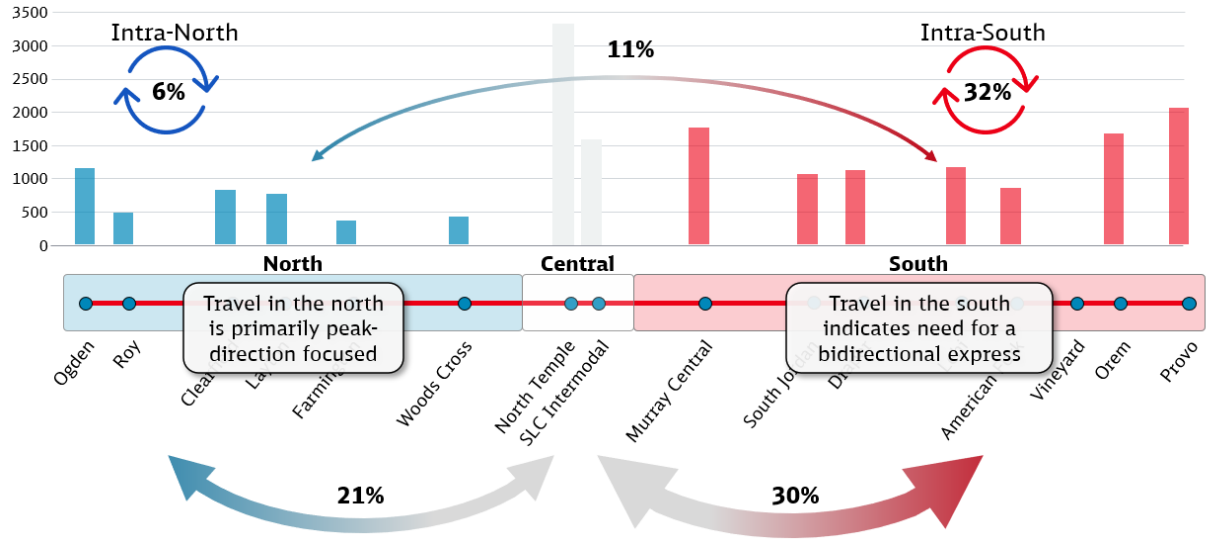

Figure 6-1. FrontRunner Market Demand (2019 Ridership Data)

The layout of existing double track sections in the north allows for regular 30-minute service and is also well designed for 15-minute service. The longest single-track section in the north (between Ogden and Salt Lake City) is the 6.37-mile section between the Roy and Clearfield sidings. The fastest the existing fleet can traverse this section is approximately 5.5 minutes. Accounting for a minimum two-minute safe separation time between opposing trains to allow trains to clear an interlocking and signals to reset, the minimum viable headway in the north (as constrained by this section) is 15 minutes. This, in combination with relatively short sections of single-track in the north, allows for 30-minute headways with little additional dwell needed to ensure meets between opposing trains have proper separation.

The south (between Provo and Salt Lake City) has a greater number of significant single-track sections than the north, with three single-track sections each being greater than 5 miles long. The longest single-track section is between the Draper and Lehi sidings. The existing fleet can traverse this 6.71-mile section in approximately 6.7 minutes. Accounting for a two-minute safe separation time, the minimum viable headway in the south is approximately 17 minutes. 15-minute service in the south is therefore not possible with the existing infrastructure. Even 30-minute service is challenging, as long dwells of up to five minutes are necessary at several stations to safely make meets between opposing trains.

As stated previously, delays incurred during the peak are often difficult to manage and may not be fully resolved until the off-peak period. When operating 30-minute service on the existing infrastructure, train meets are often planned close to the two-minute minimum separation time at switches due to the combined impact of long single-track and short double-track sections described above. This imparts fragility to the schedule as delayed trains often delay the other trains they meet, which causes a deleterious cycle and allows delay to propagate until the service level is reduced to one train per hour. The FrontRunner corridor today does not provide many opportunities for trains to make up their delay without impacting meets with opposing trains.

Additionally, FrontRunner is operating at or near capacity. A peak hour station-to-station passenger loadings analysis was conducted. The corridor operates northbound and southbound equally each day. In the northbound direction, loads for September 2019 averaged 46,890 as compared to the southbound direction which averaged 48,891. Southbound was determined to be the peak direction. Peak hour was established through assessing the daily loads for each train at every station-to-station section for the southbound direction in September 2019. This analysis established 4:30 PM to 5:30 PM as the peak hour. **Table 6.1** shows the passenger loadings analysis along the FrontRunner corridor.

Table 6.1. Peak Hour Southbound Section Loads

Section	Average Load	Percent of Seats Filled
Ogden Station to Roy Station	95	12%
Roy Station to Clearfield Station	124	16%
Clearfield Station to Layton Station	153	19%
Layton Station to Farmington Station	170	21%
Farmington Station to Woods Cross Station	187	23%
Woods Cross Station to North Temple Station	198	25%
North Temple Station to Salt Lake Central Station	533	67%
Salt Lake Central Station to Murray Central Station	**700**	**87%**
Murray Central Station to South Jordan Station	**833**	**104%**
South Jordan Station to Draper Station	**846**	**106%**
Draper Station to Lehi Station	**820**	**102%**
Lehi Station to American Fork Station	**686**	**86%**
American Fork Station to Orem Central Station	523	65%
Orem Central Station to Provo Central Station	326	41%

The results of the analysis for the station-to-station sections between Ogden to Provo demonstrated that FrontRunner is near or over capacity at five corridor sections. All project improvements are needed in order for UTA to provide the increased service that will resolve the capacity issues in the peak hour peak direction.

6.4. Alternatives Analysis

To develop a service alternative that would meet the purpose and need described in Chapter 5, UTA studied a range of infrastructure scenarios.

6.4.1 Infrastructure Scenarios

Building on the operational planning analysis, three new infrastructure scenarios were developed to potentially meet the identified purpose and need:

- Option 1: Increase all-day service frequency
  - Add four double track sections and one rail realignment section to allow for trains to meet and operate reliably to allow for all-day service every 30-minutes in both directions
  - Improve signal system
- Option 2: Increase peak-hour service frequency
  - Add four additional double track sections to allow two additional trains per hour during the peak, enabling a timetable with trains about every 15 minutes during the peak
  - Purchase 10 new trainsets to achieve this level of train service
- Option 3: Introduce 15-minute express service
  - The double track and rail realignment projects and rail vehicle procurement listed in Options 1 and 2 are necessary to allow for 15-minute express service
  - Platform safety modifications required at stations being skipped to allow trains to run-through stations at 79 mph

Options 1 and 2 would meet the purpose and need as well as provide immediate benefits to FrontRunner service. Therefore, UTA and UDOT recommended advancement of Options 1 and 2. Ultimately, combining improvements from Options 1 and 2 lead to the development of the Recommended Service Alternative of the Strategic Double Track Project, which is discussed in detail in Chapter 7.

The Strategic Double Track Project is anticipated to meet the project purpose and need with the following benefits:

- Improve reliability of the system by allowing trains to meet more effectively and recover more quickly from delay, with a goal of 95% on-time performance
- Increase capacity on the FrontRunner corridor by increasing service to 30-minute headways during the off-peak and 15-minute headways during the peak periods
- Increase ridership on FrontRunner up to approximately 43% between 2019 and 2040 by decreasing travel time and making other improvements
- Support regional and state goals for regional transit which inspires economic development

7. Recommended FrontRunner Strategic Double Track Project

UTA recommends advancing the Strategic Double Track Project as the Recommended Service Alternative for analysis in NEPA. This includes the following elements, which are described in the following sections:

- Strategic double track and rail realignment sections
- Signal system improvements
- Procurement of rail vehicles
- New Station in Bluffdale

7.1. Strategic Double Track and Rail Realignment Sections

To achieve the Strategic Double Track Project, a total of eleven projects are proposed: ten projects to strategically double track sections of FrontRunner commuter rail, and the eleventh project to realign the existing rail line at Warm Springs. These project locations are listed on **Table 7.1** (listed from north to south). Each project section is described below.

The double track and rail realignment project sections would individually improve reliability, reduce delays of the FrontRunner service, and increase capacity of the system. The primary benefits would be experienced in the location of each double track section, but reducing localized delays also has system-wide benefits. Benefits of each individual double track project section would be experienced regardless of other improvements to the FrontRunner system. Construction of the project sections would also help facilitate increased service.

Table 7.1. Mileposts for Double Track and Realignment Project Sections

Double Track and Rail Realignment Project Sections	*North UTA Milepost*	*South UTA Milepost*	*Length (Miles)*	*County*
North of Clearfield Double Track	N 29.9	N 26.2	3.7	Davis
North of Woods Cross Double Track	N 11	N 8.3	2.7	Davis
Beck Yard Double Track	N 5.3	N 3.5	1.8	Salt Lake and Davis
Warm Springs Rail Realignment	N 2.6	N 1.5	1.1	Salt Lake
South of Salt Lake Double Track	S 2.0	S 4.2	2.2	Salt Lake
South of Murray Double Track	S 7.25	S 8.8	1.55	Salt Lake
South of Draper Double Track	S 17.3	S 20.4	3.1	Salt Lake
North of Lehi Double Track	S 22.5	S 24.6	2.1	Salt Lake and Utah
North of American Fork Double Track	S 25.85	S 34.1	8.25	Utah
North of Orem Double Track	S 36.8	S 38.5	1.7	Utah
North of Provo Double Track	S 43.2	S 43.9	0.7	Utah

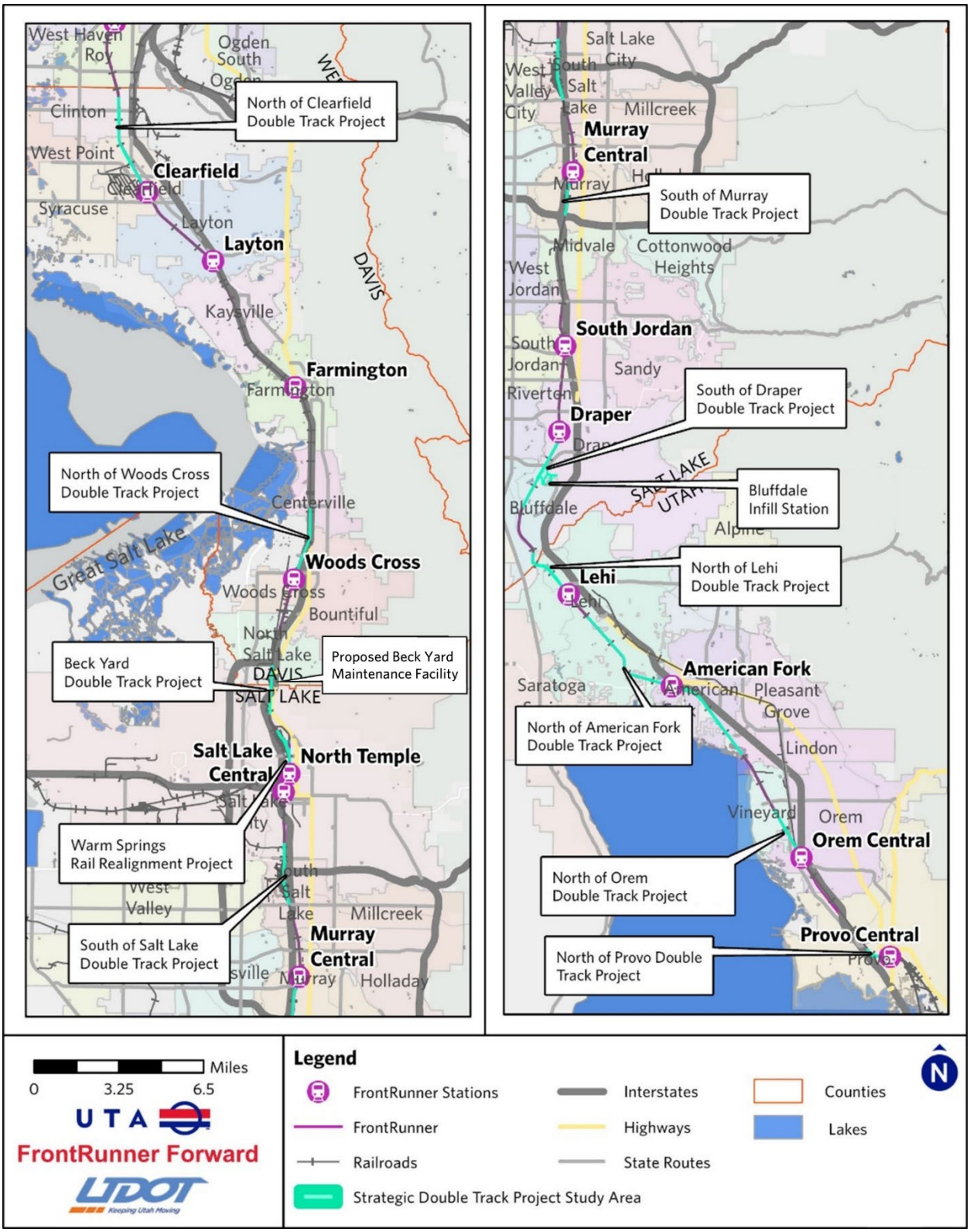

Figure 7-1. FrontRunner Strategic Double Track Project Sections

7.1.1 North of Clearfield Double Track Project

This project section extends from north of the Clearfield Station to the 2300 North grade crossing, as shown on **Figure 7-1**. This would allow for a future meet north of the existing Clearfield siding. It includes double track of approximately 3.7 miles of the FrontRunner Commuter Rail system. The anticipated work would consist of constructing new FrontRunner mainline track, shifting existing FrontRunner mainline track, removing an existing turnout, constructing a new turnout, constructing retaining walls, modifying existing at-grade crossings, extending casings and culverts, relocating utilities and power poles, removing buildings, and widening the existing trackbed.

UTA mainline (ML) No. 2 would have an offset of 15 feet east from UTA ML No. 1 except where it ties into the existing track at the Clearfield Station. The curves and spirals for this section are designed for a 79-mph design speed except for the turnout curve at the north end. New grade crossings for UTA ML No. 2 would need to be constructed. There would be a turnout removal at the end of the existing Clearfield siding.

7.1.2 North of Woods Cross Double Track Project

This project section extends from north of the Woods Cross Station to the existing siding at about 2000 North in West Bountiful, as shown on **Figure 7-1**. This project would improve operations by removing the need for the southbound slowdown between the Clearfield & Layton Stations. In addition, the project would allow for a meet at Woods Cross and avoids a meet conflict south of Layton. The improvements consist of double track of approximately 2.7 miles of the FrontRunner Commuter Rail system. The anticipated work would consist of constructing new FrontRunner mainline track, shifting existing FrontRunner mainline track, removing two existing turnouts, replacing a turnout, constructing retaining walls, modifying the existing at-grade crossing, extending casings and culverts including a large box culvert, burying and piping the Davis County Canal, relocating utilities and power poles, removing buildings, and widening the existing trackbed.

UTA ML No. 2 would have an offset of 15 feet east from UTA ML No. 1 except where it ties into the existing track at the Woods Cross Station. The curves and spirals for UTA ML No. 2 were designed for a 79-mph design speed. New grade crossings would be built for the new mainline of track. The existing turnouts at the end of the existing Woods Cross and Centerville sidings would be removed, the turnout at the north end of the Centerville siding would be replaced, and a new #20 turnout installed at the south end of the project.

7.1.3 Beck Yard Double Track Project

This project section extends from just north of 1800 North to just south of the I-215 overpass, as shown on **Figure 7-1**. This project would improve frequency and operations by reducing the length of the single-track section at the north end of Salt Lake City. The improvements consist of double track of approximately 1.8 miles of the FrontRunner Commuter Rail system. The anticipated work would consist of constructing new FrontRunner mainline track, shifting existing FrontRunner mainline track, removing an existing turnout, constructing a new turnout, replacing yard track turnouts and connections, reconstructing the UTA ballast/gravel access road under I 15, extending casings and culverts, relocating utilities, and widening the existing track bed.

UTA ML No. 2 will have an offset of 15 feet east from UTA ML No. 1 except where it ties into the existing Beck Yard siding. UTA ML No. 1 would not be relocated. The curves and spirals for the new UTA ML No. 2 were designed for a 79-mph design speed except for the turnout curve at the north end. The existing paved UTA access road will would be reconstructed between UTA ML No. 2 and the closest I-15 pier. There would be a turnout removal at the south end of this project and a new #24 TO installed at the north end of the project.

7.1.4 Warm Springs Rail Realignment Project

This project section extends roughly from 600 North to 1200 North, as shown on **Figure 7-1**. This project would increase the FrontRunner Commuter Rail system design speed to 60 mph near the UTA Warm Springs Diesel Shop, originally designed at 40 mph and 50 mph although the existing employee timetable currently limits speed in this section to 30 mph. The anticipated work would consist of realigning UTA mainline and yard tracks, shifting and realigning adjacent UP yard tracks, replacing yard track turnouts and connections, modifying the existing at-grade crossings for the maintenance access road in the UTA and UP yards, relocating power poles and utilities, and relocating the existing UP wind tunnel. This project would improve the overall travel time system-wide by straightening the curve to allow for increased speed. In addition, this project may enable the expansion of the yard if needed for a new fleet. The total length of this realignment is approximately 1.1 miles.

UTA ML No. 1 and UTA ML No. 2 would be offset 15 feet from each other. All curves were designed for 60 mph, except for the initial curves at the south end of the project, which were designed for 79 mph. Various UTA and UPRR yard tracks would need to be shifted to incorporate the new UTA ML No. 2.

7.1.5 South of Salt Lake Double Track Project

This project section extends from about 3100 South in South Salt Lake City to just south of 1700 South in Salt Lake City, as shown on **Figure 7-1**. This project would lengthen the 1700 South Siding to the south, from its current location to just north of the 3300 South bridge structure. This project would contribute to increased frequency in the south (up to 15 minutes), and it would help avoid constructing a challenging section of double track under the I-15 bridge at 900 South. The total length of this project is approximately 2.2 miles. The anticipated work would consist of constructing new UTA mainline, removing an existing turnout, constructing a new turnout, replacing yard track turnouts and connections, constructing retaining walls including a soil nail wall for the 2100 South abutment, extending casings and culverts, removing buildings/structures, constructing a new bridge, relocating utilities, and widening the existing track bed.

UTA ML No. 2 would be constructed east of UTA ML No. 1 without shifting the existing track, which would align UTA ML No. 2 east of the I-15/SR-201 bridge piers. UTA ML No. 2 would have an offset of 15 feet to the east from UTA ML No. 1 except where it veers east of the I-15/SR-201 bridge piers. All curves were designed for 79 mph except for the turnout curve at the south end. There would be a turnout removal at the end of the existing Salt Lake siding.

7.1.6 South of Murray Double Track Project

This project section extends from north of the I-215 railroad bridge to the Murray Central Station, as shown on **Figure 7-1**. This project would contribute to increased frequency in the south (up to 15 minutes) by improving meets. The project would add double track of approximately 1.55 miles of the

FrontRunner Commuter Rail system while limiting impacts to adjacent properties. The anticipated work would consist of constructing new FrontRunner mainline track, shifting existing FrontRunner mainline track, constructing UP mainline and siding track, shifting existing UP mainline and siding track, removing an existing turnout, constructing a new turnout, replacing UPRR track turnouts and connections, constructing a new bridge over 5300 South, modifying the existing 5900 South at-grade crossing, extending casings and culverts, relocating utilities, and widening the existing track bed.

UTA ML No. 2 would have an offset of 15 feet east from UTA ML No. 1 except where it ties into the existing track at the Murray Station. All curves were designed for 79 mph except for the turnout curve at the south end and the curve north of 5300 South. The design speed for the curve north of 5300 South was 45 mph due to its proximity to Murray Central Station. There would be a turnout removal at the end of the existing Murray siding.

7.1.7 South of Draper Double Track Project

This project section extends from the 1300 West grade crossing in Bluffdale to the Draper Station, as shown on **Figure 7-1**. This project would improve frequency and operations by reducing the length of the single-track section through the Jordan Narrows. The project adds double track of approximately 3.1 miles of the FrontRunner Commuter Rail system while limiting impacts to the Union Pacific Railroad and Galena-Soónkahni Preserve. The anticipated track work would consist of constructing new FrontRunner mainline track, shifting existing FrontRunner mainline track, removing an existing turnout, constructing a new turnout, constructing a new bridge over Bangerter Highway and 14600 South, constructing new retaining walls, extending a canal box culvert over the Jordan and Salt Lake City Canal, modifying an existing private access road at-grade crossing, extending casings and culverts, relocating utilities, and widening the existing track bed.

UTA ML No. 2 will would have an offset of 15 feet east from UTA ML No. 1 except where it ties into the existing track at the Draper Station. All curves and spirals are designed for 79 mph except for the turnout curve at the south end. There will would be a turnout removal at the end of the existing Draper siding.

7.1.8 North of Lehi Double Track Project

This project section extends from north of the Lehi Station to the southernmost curve in the Jordan Narrows “S-Curve” area, as shown on **Figure 7-1**. This project would improve frequency and operations by reducing the length of the single-track section through the Jordan Narrows. It includes double track of approximately 2.1 miles of the FrontRunner Commuter Rail system while limiting impacts to the Union Pacific Railroad, Jordan River, Thanksgiving Point Golf Club, and Asphalt Material Inc Bluffdale Gravel Pit located near the Jordan Narrows “S-Curve.” The anticipated work would consist of constructing new FrontRunner mainline track, shifting existing FrontRunner mainline track, removing an existing turnout, constructing a new turnout, constructing retaining walls, relocating utilities, and widening the existing track bed.

UTA ML No. 2 would have an offset of 15 feet west from UTA ML No. 1 except where it ties into the existing track at the Lehi Station and at the curves in the Jordan Narrows. UTA ML No. 1 would be realigned through the first Jordan Narrows curve by up to 15 feet to limit impacts to the Jordan River for the construction of UTA ML No. 2. The curves and spirals for UTA ML No. 1 and No. 2 were designed for

79 MPH except for the turnout curve at the north end and the first Jordan Narrows curve for each track. Each Jordan Narrows curve was designed to match the existing 45 to 50 MPH design speed located in the Jordan Narrows "S-Curve" area. The Jordan Narrows "S-Curve" is an area of the FrontRunner Commuter Rail System where the design speed is reduced due to the curvature needed to navigate the existing terrain. The project would include constructing a new bridge over the Jordan River, and extending the existing East Jordan Canal box culvert. There would be a turnout removal at the end of the existing Lehi siding.

7.1.9 North of American Fork Double Track Project

This project section includes two segments of double track. The first extends from north of the American Fork Station to the south side of 2100 North in Lehi, as shown on **Figure 7-1**. This project would allow for a meet near American Fork, rather than adding dwell time at Lehi. The second double track segment extends from approximately one mile north of W Vineyard Road to the south side of the American Fork Station. These two segments would contribute to improved meets in the south by reducing single-track constraints. Together, these two segments include double track length of approximately 8.25 miles of the FrontRunner Commuter Rail system. The anticipated work would consist of constructing new mainline track, shifting existing FrontRunner mainline track, removing an existing turnout, constructing a new turnout, constructing retaining walls, constructing a new bridge over the waste ditch near Allred Park, modifying existing at-grade crossings, relocating utilities, extending casings, removing buildings, and widening the existing track bed.

UTA ML No. 2 would have an offset of 15 feet west from UTA ML No. 1 except where it ties into the existing track at the American Fork station. The curves and spirals for UTA ML No. 1 and No. 2 were designed for 79 MPH except for the turnout curve at the north end and the right-hand and left-hand curves at 400 West in Lehi. Travel speeds on these 400 West curves were designed for 50 mph. The project would include constructing retaining walls, constructing a new bridge over the American Fork River, extending multiple culverts to accommodate the widened track bed, removing existing turnouts, relocating utilities including a signal house adjacent to 5750 West, and widening the existing track bed.

7.1.10 North of Orem Double Track Project

This project section would be constructed north of the existing Orem Central Station and extend along the FrontRunner corridor until merging with the existing double track in the southern part of Vineyard, a distance of about 1.7 miles, as shown on **Figure 7-1**.

The anticipated track work would consist of constructing a new UTA ML No. 2, shifting approximately 6,800 linear feet of track, reprofiling 900 linear feet of track, removing 4,300 linear feet of track, removing existing turnouts at both ends of the section and south of Geneva Road, removing crossing panels, removing signals north of Geneva Road, and widening the existing track bed. Both permanent right-of-way acquisition and temporary construction easements would be required for the Project.

7.1.11 North of Provo Double Track Project

This project section would be constructed north of the existing Provo Central Station and extend along the FrontRunner corridor until merging with the existing double track just north of 900 West in Provo, a distance of about 0.7 miles, as shown on **Figure 7-1**.

The anticipated track work would consist of constructing a new UTA ML No. 2, shifting approximately 700 linear feet of track, constructing a 1,200-linear-foot retaining wall, extending one culvert to accommodate the widened track bed, removing existing turnouts at both ends of the section, relocating utilities (including three signal houses), and widening the existing track bed. Both permanent right-of-way acquisition and temporary construction easements would be required for the Project.

7.2. Development of New Bluffdale Infill Station

Included in the WRFC 2023-2050 RTP as a Phase 1 project, this project will develop a new FrontRunner station to be located in Bluffdale near the old Utah State Prison site (The Point). The proposed new station would be located between Bangerter Highway (State Route 154) and 14600 South in Bluffdale, as shown on **Figure 7-1**. The station would include a new platform to access FrontRunner, bus bays, and parking areas. The new station would also require double tracking in several locations to maintain the operational improvements resulting from the Strategic Double Track Project (15-minute peak-hour frequencies) while also considering FrontRunner Forward's Phase 2 goal of incremental investment locations along the FrontRunner corridor where existing ridership is strong.

During the 2024 legislative session, the State of Utah allocated an approximately $50 million to this project.

7.3. Signal System Improvements

Currently, the FrontRunner is operating in a PTC certified environment with an FRA-approved system software that has been developed, tested, and deployed for the current train schedule. UTA proposes improvements to the signal system to accommodate increased frequency of train runs and provide additional operational flexibility for overall run time and throughput. The following upgrades are proposed, and will be investigated through coordination with FTA:

- Modernize braking calculations: The development and installation of a new braking calculation would maximize run time capacity based on the proposed train schedule. This will be critical for determining the best safety case for all speed change locations.
- Update block design and advanced train control hardware: The existing iVPI has functional restrictions such as traffic change timing that take more than one minute to turn traffic after a train leaves the block. A new vital processor card would allow for corrections in the processing of vital time to allow for a reduction in the overall run time.

The Project also includes location specific signaling modifications, separate from the system-wide improvements mentioned above.

7.4. Procurement of Rail Vehicles

To support the peak frequency overlay, UTA would need to add rail vehicles to the fleet to achieve the number of trains running per hour. Providing two additional trains per hour per direction during the two-hour morning and afternoon peaks requires eight additional trainsets to be used in revenue service. To run this service consistently, two additional trainsets are required so that all trains can be maintained on a regular interval. UTA will pursue procuring 10 Diesel Multiple Units (DMUs) to support this level of service.

7.5. Maintenance Facility Capacity Expansion

To accommodate the addition of the 10 new DMUs necessary to support a higher frequency of service and increased passenger throughput capacity, it will be necessary to increase UTA's maintenance and storage capacity. The preferred approach to expanding capacity is to construct a new Maintenance Facility at Beck Yard, adjacent to the location of the Beck Yard Double Track Project, as shown on **Figure 7-1**. The new Beck Street Maintenance facility would be located withing the WFRC MPO region, and primarily located within Davis County. A small portion of trackwork to support access to the maintenance facility will be located across the county border in Salt Lake County. This will be the subject of further study to confirm site location feasibility and design. An alternative is to retrofit the existing FrontRunner train maintenance facility at Warm Springs to accommodate the additional DMUs. However, some challenges associated with the aging infrastructure at the Warm Springs maintenance facility must be further evaluated for retrofitting.

8. Affected Environment and Environmental Consequences

8.1. Environmental Analysis Process

A desktop review of environmental resources was conducted for the Strategic Double Track Project. This analysis will be used to guide the subsequent NEPA and final design phases for each project section. Information is based on readily available national and state-level GIS shapefiles; field surveys were not conducted as part of this study but will be conducted as a part of the NEPA process as applicable.

If signal system improvements require construction to install new equipment, additional environmental review would be conducted. The procurement of rail vehicles would not require environmental review.

8.2. Study Area

As previously stated, FrontRunner commuter rail runs along an 82-mile corridor between Ogden and Provo. For most of its length, the rail corridor runs parallel to a Union Pacific Railroad line and I-15. **Figure 8-1** shows a map of the study area, illustrating the FrontRunner corridor. The rail corridor is located to the east side of both the Great Salt Lake and Utah Lake and passes through four counties: Weber, Davis, Salt Lake, and Utah Counties.

The study area for environmental considerations is 800 feet wide (400 feet on either side of the railroad centerline), with a few areas extended based on potential improvements. This is anticipated to be wide enough to encompass permanent and temporary impacts from the implementation of the Strategic Double Track Project.

Figure 8-1. Map of FrontRunner Corridor

8.3. Resources Not Present

There are various resources found throughout Utah that are not found in the study area. These resources are not anticipated to be impacted by the Strategic Double Track Project:

- Paleontological resources
- Cemeteries, hospitals, and libraries

8.4. Existing Conditions

Existing conditions within the study area are shown on a series of 14 map panels from north to south, illustrated on **Figure 8-2** to **Figure 8-8**. More detailed exhibits of the double track and rail realignment project sections will be prepared as part of the NEPA documents for each section.

In the areas directly affected by a double track or rail realignment improvement, permanent and temporary impacts will be evaluated during the NEPA process which is expected to be cleared through Categorical Exclusions for each project section.

Additional analyses were conducted at the corridor-wide level during the NEPA process to analyze resources that may be affected by the increased service along the FrontRunner corridor. These include technical memorandums for noise and vibration, traffic and safety at the at-grade crossings, cultural resources, and air quality.

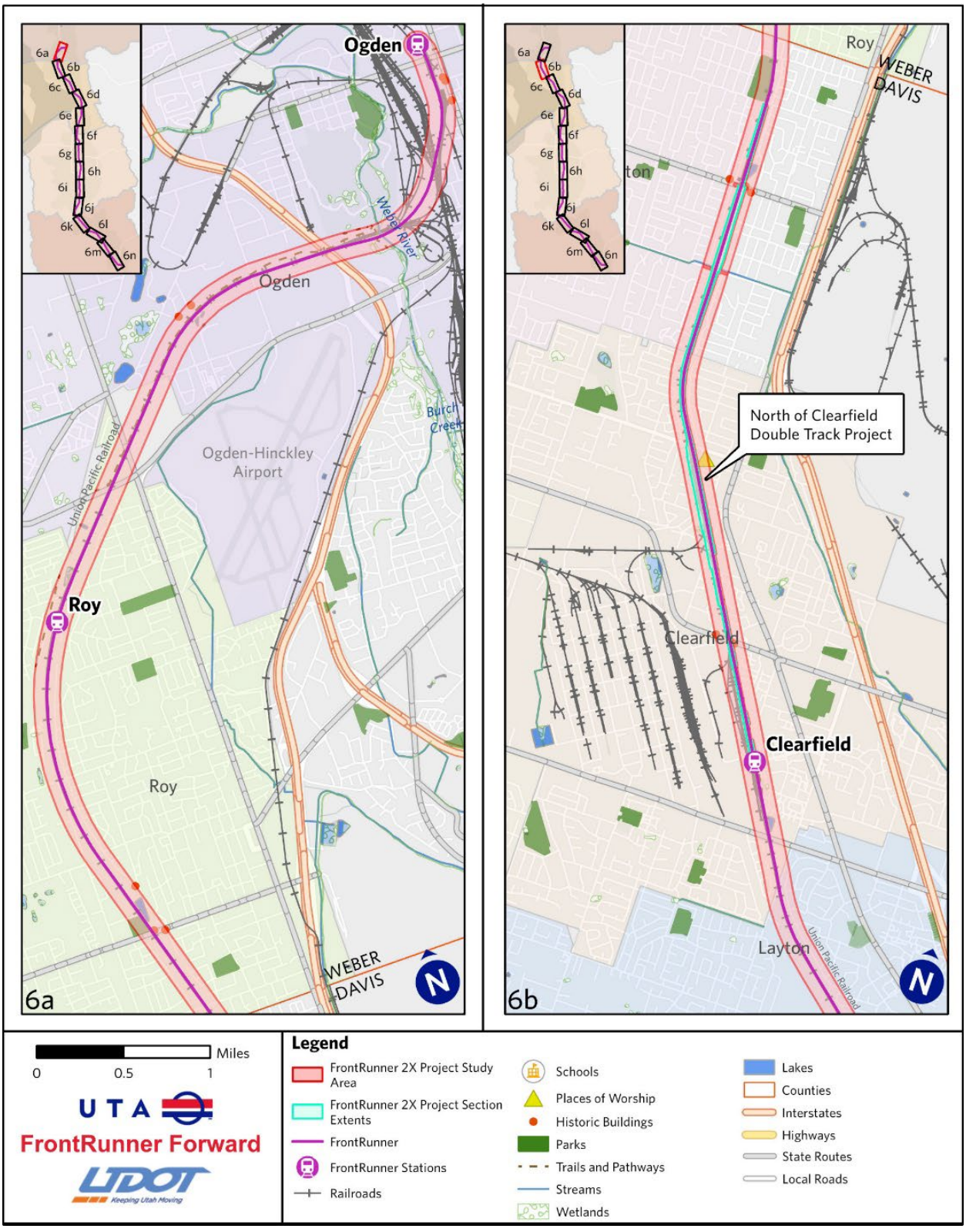

Figure 8-2. Environmental Resource Map – Ogden to Layton

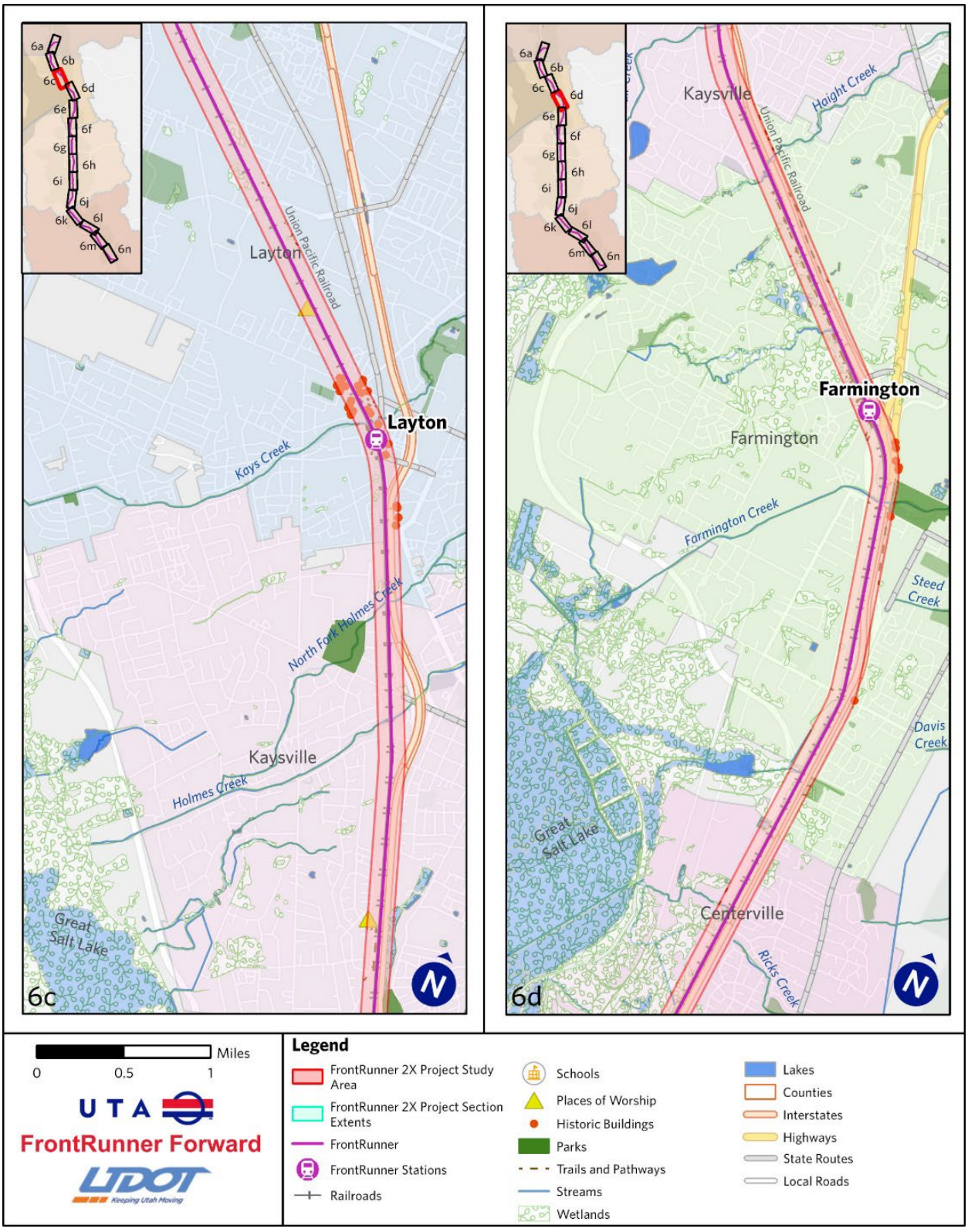

Figure 8-3. Environmental Resource Map – Layton to Centerville

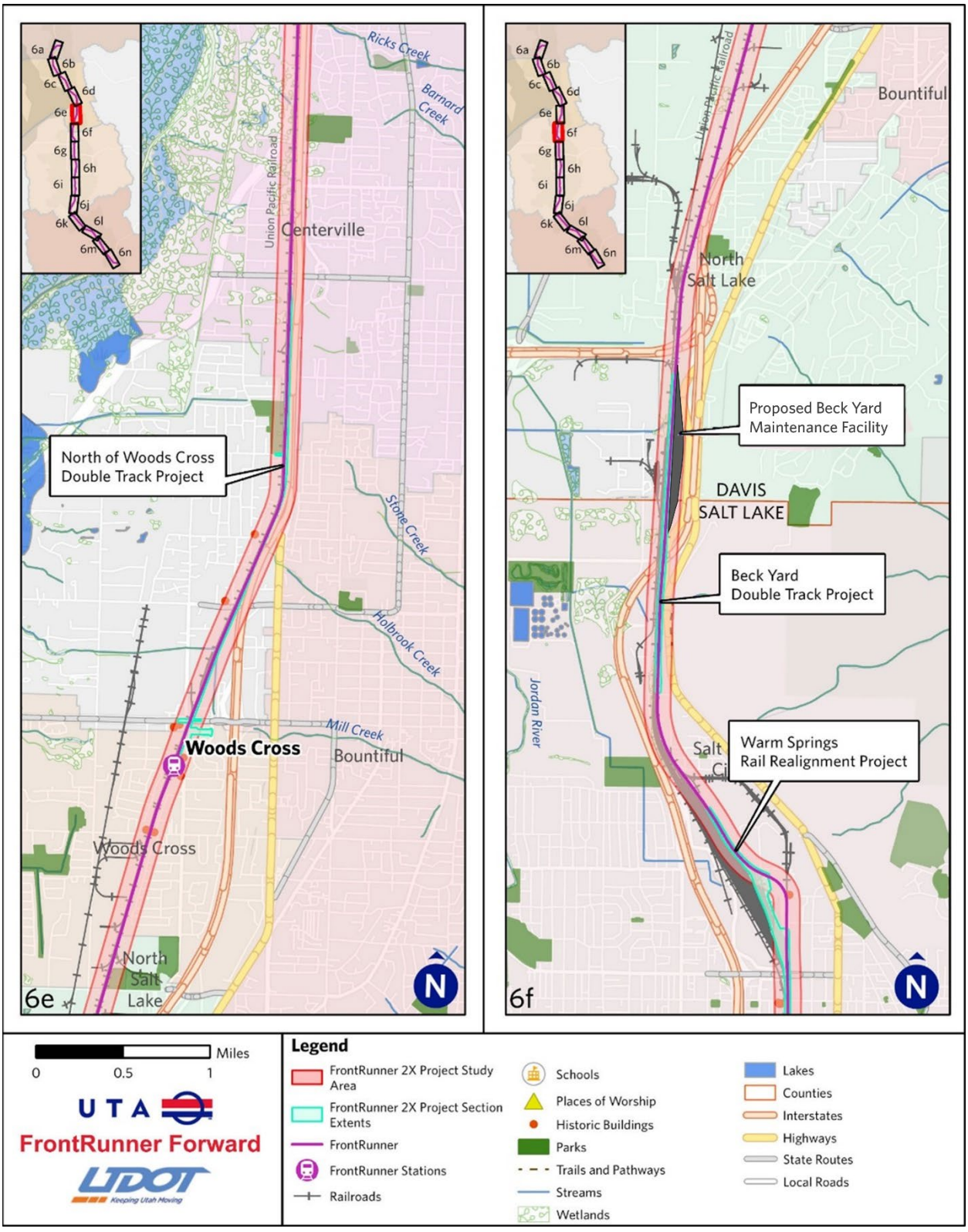

Figure 8-4. Environmental Resource Map – Centerville to Salt Lake City

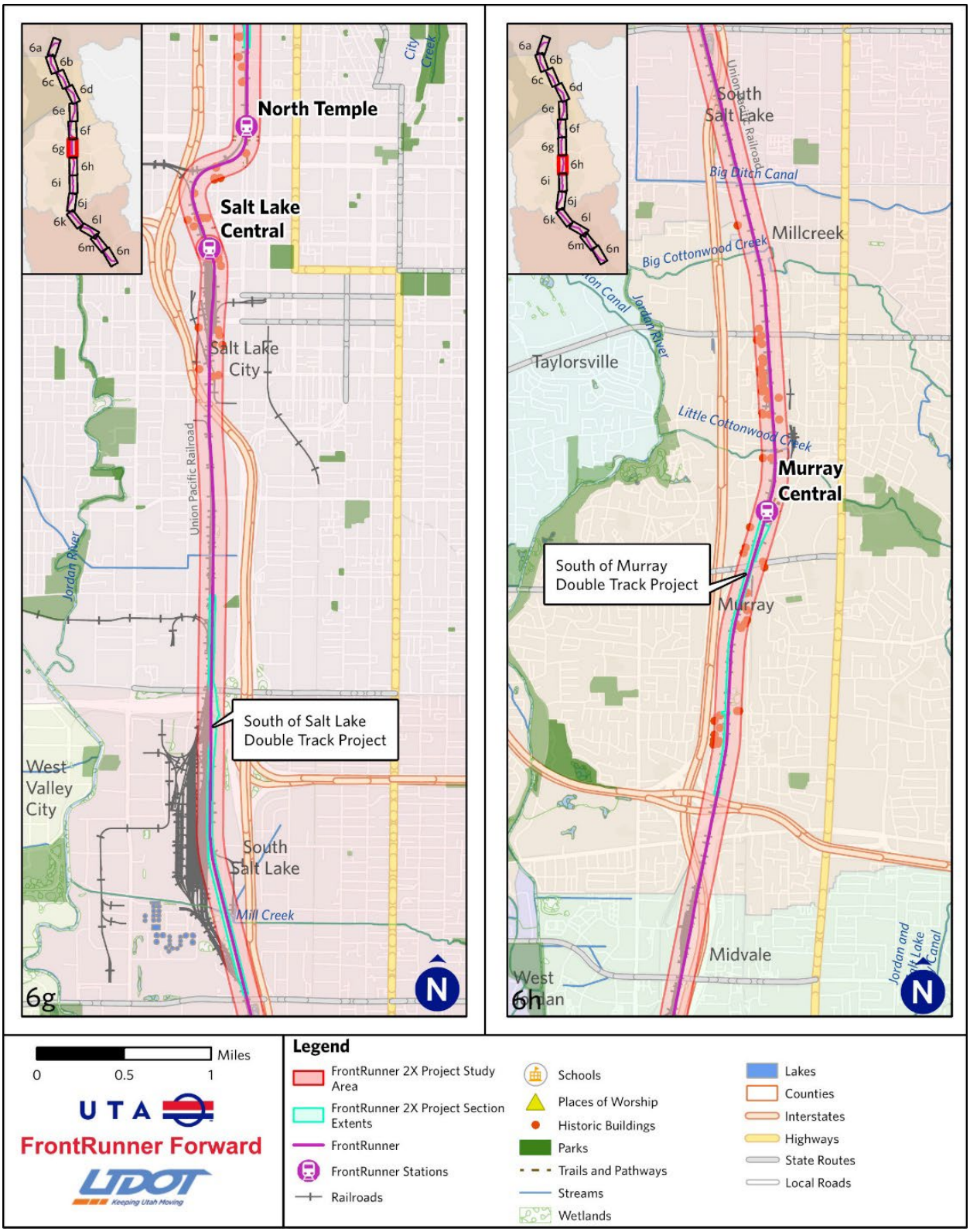

Figure 8-5. Environmental Resource Map – Salt Lake City to Midvale

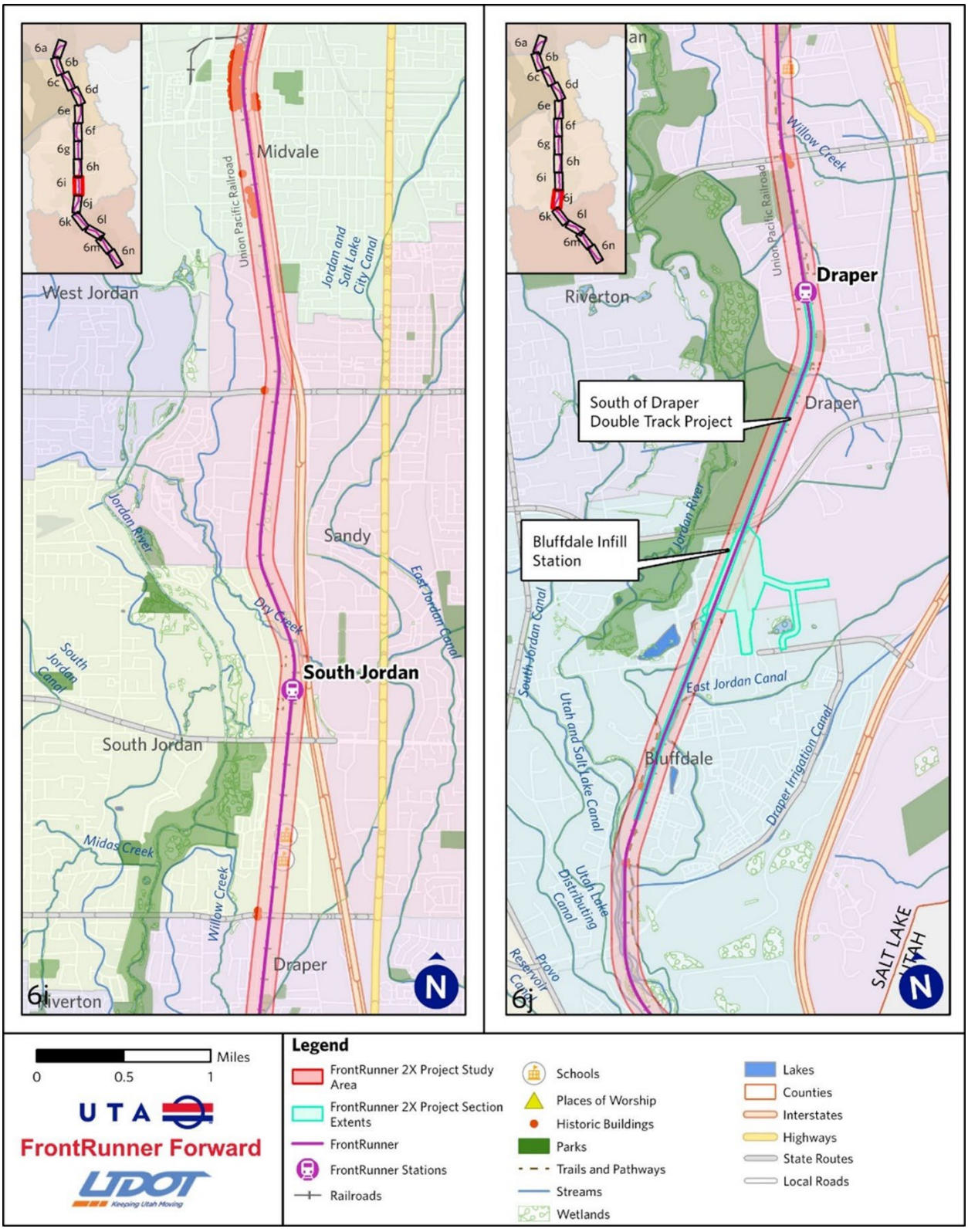

Figure 8-6. Environmental Resource Map – Midvale to Draper

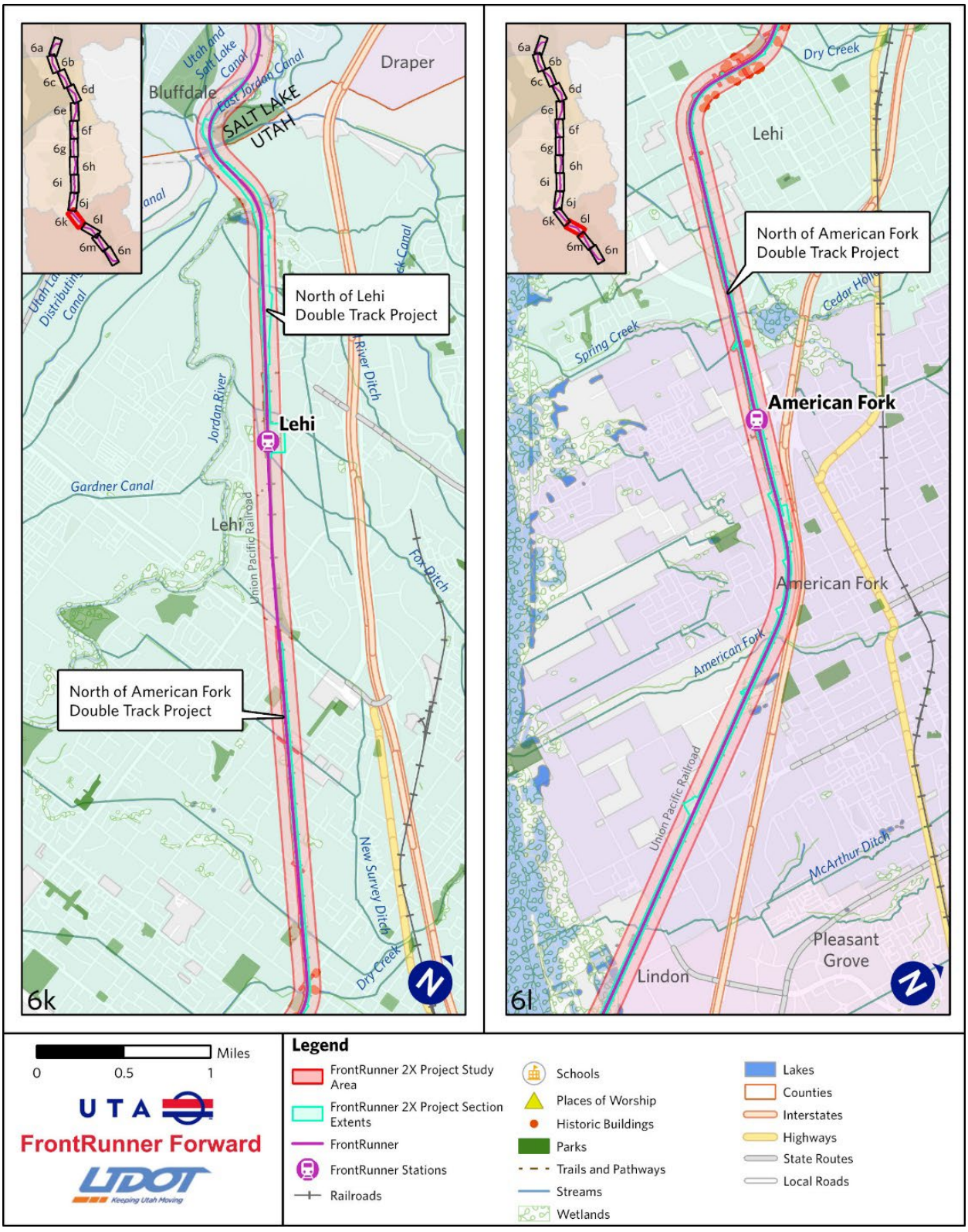

Figure 8-7. Environmental Resource Map – Draper to American Fork

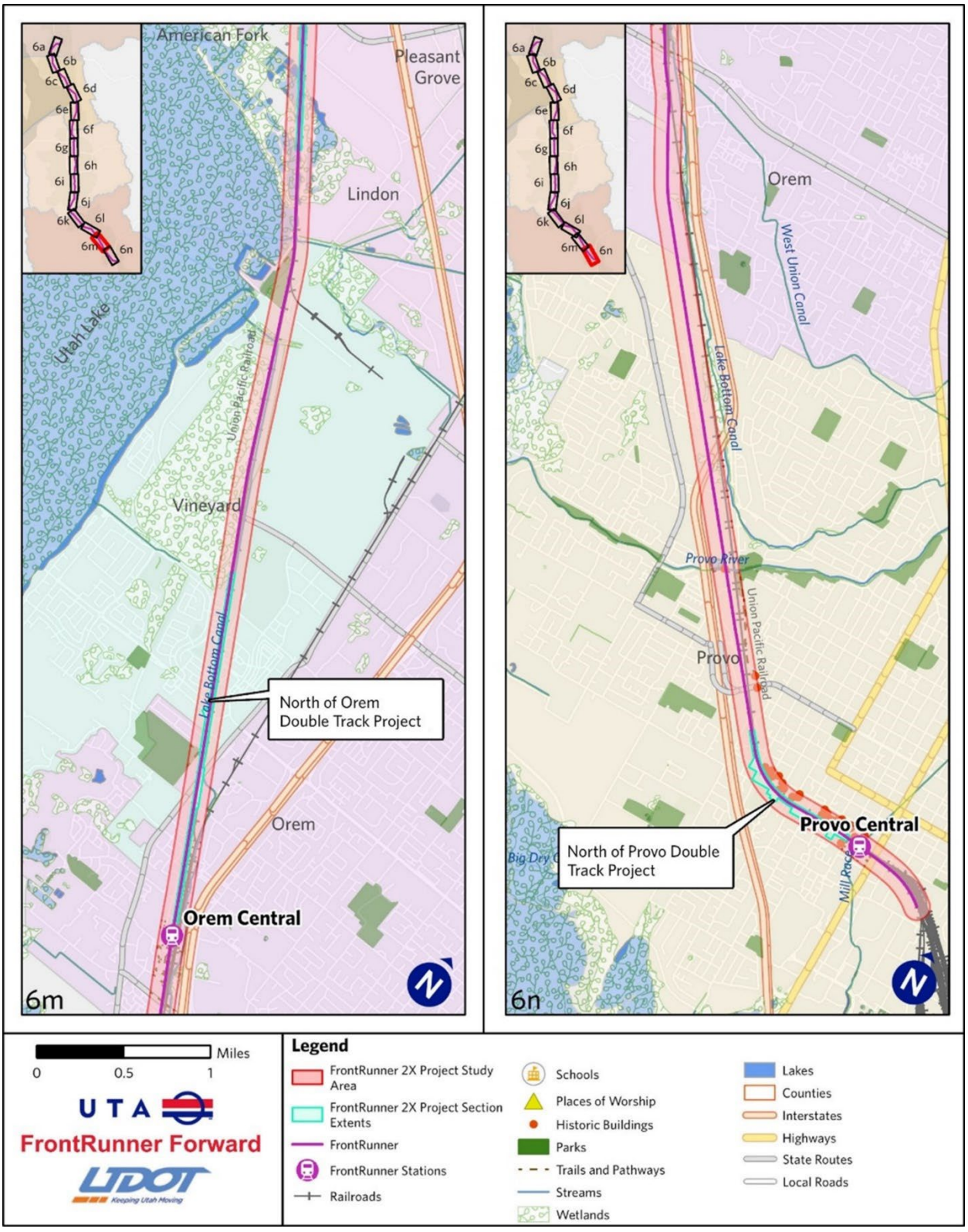

Figure 8-8. Environmental Resource Map – American Fork to Provo

8.4.1 Natural Resources

Throughout the study area, there are floodplains, ponds, rivers, streams and creeks, canals, and wetlands. The FrontRunner is near both the Great Salt Lake and Utah Lake and crosses the Jordan, American Fork and Provo Rivers. There is a spring located just south of 2300 North in Salt Lake City. Animal habitats were also reviewed via GIS, indicating that FrontRunner traverses through the natural habitats of the California quail and ring-necked pheasant. Other natural resources surround the area but are only found outside of the study area.

Construction could result in a change in impervious area within current floodplain and floodway boundaries. Coordination with local jurisdictions including the Federal Emergency Management Agency (FEMA) will be conducted as required for potential impacts and permitting for work within floodplains and floodways. Additionally, identification of Waters of the U.S. will be conducted, and Section 404 permits with the U.S. Army Corps of Engineers (USACE) and the associated Section 401 permits with the Department of Environmental Quality (DEQ) will be prepared at the Categorical Exclusion level where required. Potential habitat of threatened and endangered species will be reviewed, and Section 7 coordination will be conducted if warranted. Work in or near natural streams may require a stream alternation permit through the Utah Division of Water Rights.

8.4.2 Community Resources and Facilities

FrontRunner passes through numerous communities, and a variety of community facilities are in the study area including four childcare locations, two golf courses, five mobile home areas, three schools, and one place of worship.

Community resources also include neighborhoods and business nodes. Although the projects are along existing rail lines and will not create new divisions within communities, the individual project NEPA documents will evaluate potential impacts to community resources such as changes in access, land use and development patterns, and neighborhood cohesiveness.

8.4.3 Recreational and Park Facilities

There are several trails and pathways in the study area, 16 of which cross the existing rail line. In addition, there are 23 parks in the study area and the Galena-Soónkahni Preserve in Draper. Any time a trail or path is a part of a FrontRunner grade-crossing, there are ample safety precautions taken to promote safety such as sidewalks, signage, lights, and gates.

Public recreational resources that are potential Section 4(f) resources will be evaluated further during the NEPA process, and minimization or mitigation measures identified during that process will be incorporated into the final designs. No Section 6(f) resources are known within the study area.

8.4.4 Cultural Resources

Historic resources were defined as those listed on the National Register of Historic Places, or previously identified as eligible for listing on the National Register. New studies will be conducted as part of the NEPA process for the double track and rail realignment project sections.

Historic resources within the study area are generally located in areas of large population. There are five historic trails that cross the FrontRunner corridor, although none are anticipated to be affected by the Project. Several archaeological sites are within the study area, including the historical Union Pacific

Railroad and historical Denver & Rio Grande Western Railroad which parallel sections of the existing UTA FrontRunner track. There are historic buildings in the study area, primarily residential with some industrial and commercial sites.

As the Project progresses into further design, consultation under Section 106 will continue to identify historic properties and evaluate effects, and a potential use of Section 4(f) historic resources will be determined. Previously documented resources with field determinations should be re-evaluated and potential additional historic resources could be identified during field surveys. Minimization or mitigation measures identified during those processes will be incorporated into the final designs. Based on data collection and survey of the corridor in 2022 and 2025, effects to cultural resources are minor in nature and consistent of strip takes for right-of-way purposes. Most resources are avoided entirely. To date, the project results in no adverse effect and no historic properties effected for resource identified and has received concurrence from the State Historic Preservation Office. The Recommended Service Alternative is not anticipated to collectively result in significant impacts to cultural resources along the FrontRunner corridor with implementation of all improvements.

8.4.5 Potential Hazardous Material Sites

Throughout the study area, there are various solid waste landfills, an oil and gas well and field, brownfields, dry cleaners, superfund sites, hazardous waste areas, sites from the EPA's Toxic Release Inventory (TRI) Program. There is an abandoned oil and gas field near Farmington, as well as an oil and gas well north of Centerville. Most environmental incidents within the corridor are associated with Union Pacific Railroad.

A review of potential risk from hazardous material sites will be conducted during the NEPA phase, and a Phase I environmental site assessment (ESA) will be conducted if required during final designs.

8.4.6 Noise and Vibration

To prevent noise pollution, the entire FrontRunner corridor has been designated a quiet zone. This excuses FrontRunner trains from following the FRA guideline of sounding their horns 15 to 20 seconds prior to arriving at a crossing. Noises from the existing FrontRunner corridor come from daily train operations and warning devices at grade crossings, such as lights and gates. The FrontRunner trains can also sound their horn if needed in case of an emergency or for some obstruction on the tracks.

Noise and vibration may increase as a result of the double track and rail realignment projects, and a noise and vibration analysis will be conducted as part of the NEPA phase for those projects. Separate analyses have been conducted along the entire corridor in 2023 and 2025 to evaluate the potential for noise increases along the FrontRunner corridor as a result of the proposed service increase that is planned if all project sections are built. Full implementation of the project would add 27 to 33 trains with increased service from 30-minute headways to 15-minute headways during the peak periods.

The corridor level noise and vibration analysis for service increase, incorporating all proposed double track locations, indicated that there would be moderate noise impacts to sensitive receivers in the following double track sections:

- North of Woods Cross (five moderate impacts)
- North of American Fork (four moderate impacts)

- North of Orem (one moderate impact)
- North of Provo (moderate impact at one single-family residence and at 22 multi-family units in six buildings).

Noise mitigation will be examined during final design at these locations.

For the remainder of the sensitive receivers along the corridor, the increase in noise and vibration levels from service increase would not be large enough to exceed the thresholds for impact.

Additional noise and vibration assessments will be completed during the NEPA phase for each project. The noise impacts identified because of service increase will be addressed in the noise sections of the NEPA documents.

8.4.7 Air Quality

The counties comprising the project corridor contain areas designated by the Environmental Protection Agency (EPA) as nonattainment of the National Ambient Air Quality Standard (NAAQS) for ozone and particulate matter with a diameter less than or equal to 2.5 micrometers ($PM_{2.5}$) and maintenance areas for carbon monoxide (CO) and particulate matter with a diameter less than or equal to 10 micrometers (PM_{10}). As a result of these designations, the project is subject to the air quality conformity requirements of the state implementation plan for each pollutant.

Air quality may change as a result of the double track, rail realignment, new station, and new maintenance facility projects, and an air quality conformity analysis will be conducted as part of the NEPA phase for those projects. In addition, the project includes purchase of 10 diesel multiple units (DMUs).

Separate analyses have been conducted along the entire corridor in 2023 and 2025 to evaluate the potential air quality impacts along the FrontRunner corridor as a result of the proposed infrastructure improvements and proposed service increase that is planned if all project sections are built. The increased service along the corridor, additional service at a new station, and operations at the new maintenance facility may result in increased air pollutant emissions, as trains decelerate and accelerate in and out of a station, or idle at a maintenance facility, but is not expected to result in “hot spots” of substantially elevated localized ambient air pollutant concentrations. In addition, air emissions can be largely offset by the reduction in local emissions as commuters switch from personal vehicles to train travel. The project is not of local air quality concern, and a quantitative hot-spot analysis is not warranted. The Recommended Service Alternative is not anticipated to collectively result in significant impacts to air quality with implementation of all improvements.

8.4.8 Traffic and Safety

There are 69 existing at-grade crossings along the FrontRunner corridor (see Section 4.2.6 for more information). Traffic and safety may change as a result of the double track and rail realignment projects, and a traffic and safety analysis will be conducted as part of the NEPA phase for those projects. A separate analysis has been conducted along the entire corridor to evaluate the potential for traffic and safety impacts along the FrontRunner corridor as a result of the proposed service increase that is planned if all project sections are built. The Recommended Service Alternative is not anticipated to collectively result in significant impacts to traffic and safety at the at-grade crossings with implementation of all improvements.

8.4.9 Potential Right-of-Way Acquisition

Based on preliminary plans, some ROW is needed for the Project. **Table 8.2** shows the total anticipated ROW acquisition for each project section based on concept-level designs.

The Project would occur primarily within the existing FrontRunner corridor, which is UTA-owned railroad right-of-way. Most of the anticipated ROW acquisition would be from UPPR with narrow strip acquisitions from the backs of adjacent properties. However, some residents and businesses may need to be relocated. Any potential displacement would be identified in the NEPA phase. Any acquisitions would comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 USC Chapter 61) and FTA procedures.

Table 8.1. Potential Right-of-Way Acquisition of the Project

Project	Total Right-of-Way Acquisition (Acres)
North of Clearfield Double Track	4.2
North of Woods Cross Double Track	4.3
Beck Yard Double Track	0
Beck Yard Maintenance Facility	5 to 7*
Warm Springs Rail Realignment	13.9
South of Salt Lake Double Track	11.3
South of Murray Double Track	14.1
South of Draper Double Track	17.1
Bluffdale Infill Station	29.7
North of Lehi Double Track	3.5
North of American Fork Double Track	22.1
North of Orem Double Track	2.7
North of Provo Double Track	1.1
Total	**131.0***

* Total calculated assuming 7 acres for the Maintenance Facility

8.5. Next Steps for Analysis of Environmental Impacts

Additional environmental studies will be carried out to further analyze the environmental impacts of these project sections, both temporary and permanent. Individual NEPA evaluations expected to be Categorical Exclusions will be prepared for each of the ten double track projects and the rail realignment project. The environmental review for the Bluffdale infill station and the Back Yard maintenance facility could be included with the adjacent double track project (the South of Draper Double Track Project and the Beck Yard Double Track Project) if determined appropriate by FTA. Within these Categorical Exclusions, the information collected will help to better define the project scope for environmental analysis for each of the identified project improvements, identify potential impacts and mitigation, and determine if other environmental laws and permits apply.

If signal system improvements require construction to install new equipment, additional environmental review would be conducted. The procurement of rail vehicles would not require environmental review.

9. Agency Coordination, Stakeholder, and Community Engagement

UTA, in partnership with UDOT, is committed to involving state and local agencies, area stakeholders and the public as the project evolves. Engagement efforts will build on successful outreach and communications processes established by both UTA and UDOT during previous planning efforts. UTA and UDOT will prioritize transparency through open dialogue, informing stakeholders how the long-term vision will serve community needs.

9.1. Agency Coordination

Resource agencies have specific technical experience and regulatory expertise on potential environmental impacts associated with the Strategic Double Track Project and future FrontRunner improvements. The project team will work with representatives from different federal, state and local agencies, including elected officials. Alongside these groups, the project team works with representatives from UDOT, WFRC and MAG.

9.2. Stakeholder and Community Engagement

Engagement will be conducted by UDOT and UTA and will be tailored based on the needs and potential impacts in each project section. Engagement may include a combination of corridor-level communication and project-specific, one-on-one meetings, etc. Initial engagement has included meetings with each municipality as well as WFRC and MAG. Future engagement will include meetings with affected property owners.

10. Funding Summary

10.1. Committed External Funding Sources

With the passing of H.B. 433 by the Utah State Legislature in March 2021 and through additional funding, UDOT has received $845 million in funding committed to service and frequency improvements to the FrontRunner system, a new Bluffdale station, and purchase of additional rail engines and train sets.

10.2. Potential Additional Funding Sources

Potential additional funding sources include local funding (e.g., UTA, State) as well as several federal programs which may include but are not limited to the following:

- FTA Capital Investment Grants Program (Small Starts, New Starts, Core Capacity)
- FTA Rail Vehicle Replacement
- U.S. Department of Transportation (USDOT) Better Utilizing Investments to Leverage Development (BUILD)
- USDOT National Infrastructure Project Assistance (Mega)
- USDOT Transportation Infrastructure Finance and Innovation Act (TIFIA)
- Federal Railroad Administration (FRA) Railroad Crossing Elimination Program
- Federal Highway Administration (FHWA) Rail-Highway Crossings (Section 130) Program

10.3. Next Steps to Obtain Funding

As discussed previously, the State of Utah has allocated local funds to the project. UDOT and UTA are in the process of pursuing federal funding through the Core Capacity Capital Investment Grants Program. The Project was accepted into Project Development in November 2022 and FTA announced that the Project is included in President Biden's Fiscal Year 2024 Budget Request to Congress for $318.6M of the $671.09M requested through the Core Capacity Program. The project is advancing toward entry into engineering.

11. FrontRunner Future - Long Term Planning

The Strategic Double Track Project will achieve growth overall for the FrontRunner system and increase overall regional mobility. However, UTA and UDOT anticipate that further investments will be needed to support the fast-growing Wasatch Front. As such, UTA intends to prepare a longer-range planning effort through the FrontRunner Forward Program. Included in this effort, UTA will further explore the needed elements to increase services all day, examine the appropriate future fleet, expand the system, and other improvements such as further investment in the signal system and stations.