

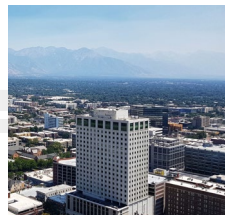
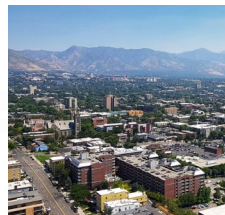
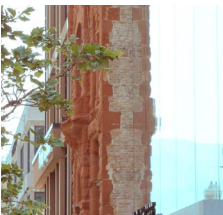
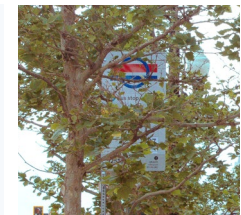
# TECHLINK TRAX STUDY



## FINAL REPORT JANUARY 2025

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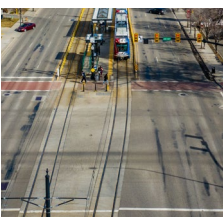
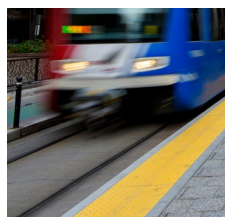
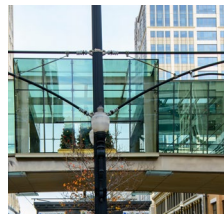
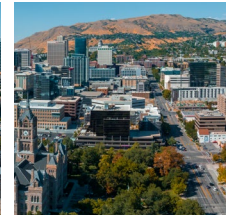
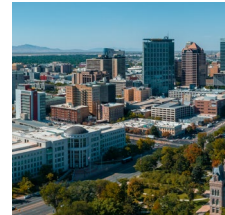
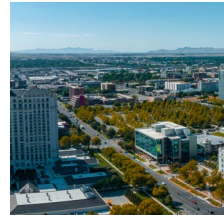


# LIST OF ACRONYMS

<b>CBO</b>	Community-based Organization	<b>RAISE</b>	Rebuilding American Infrastructure with Sustainability and Equity
<b>CO</b>	Carbon Monoxide	<b>RDA</b>	Redevelopment Agency of Salt Lake City
<b>D&amp;RGW</b>	Denver and Rio Grande Western Railroad	<b>ROW</b>	Right-of-Way
<b>EA</b>	Environmental Assessment	<b>RTP</b>	Regional Transportation Plan
<b>EJScreen</b>	Environmental Justice Screening and Mapping Tool	<b>SLCPU</b>	Salt Lake City Public Utilities
<b>EPA</b>	Environmental Protection Agency	<b>STOPS</b>	Simplified Trips-on-Project Software
<b>FOLR</b>	Future of Light Rail	<b>TAC</b>	Technical Advisory Committee
<b>FTA</b>	Federal Transit Administration	<b>TRAX</b>	UTA light rail service
<b>FTN</b>	Frequent Transit Network	<b>UDOT</b>	Utah Department of Transportation
<b>GHG</b>	Greenhouse gas	<b>UTA</b>	Utah Transit Authority
<b>NEPA</b>	National Environmental Policy Act	<b>V/C</b>	Volume over Capacity
<b>NoTe</b>	North Temple District	<b>WFRC</b>	Wasatch Front Regional Council
<b>O&amp;M</b>	Operations and Maintenance		
<b>PM</b>	Particulate Matter		



# CHAPTER 1. STUDY OVERVIEW





The Utah Transit Authority (UTA) in collaboration with the Redevelopment Agency of Salt Lake City (RDA), Salt Lake City, the University of Utah, Wasatch Front Regional Council (WFRC), and the Utah Department of Transportation (UDOT) have completed the TechLink TRAX Study that analyzed the following:

- Additional light rail (TRAX) service between the Salt Lake City International Airport and the University of Utah, including a new track spur into Research Park via a new Orange Line.
- Realignment of the existing TRAX Red Line through the Granary District and connecting into the Ballpark Station.
- Potential operational changes that switch the termini for the Blue and Green TRAX Lines.

The purpose of the study was to identify a Locally Preferred Alternative that can move forward into environmental review. The study followed a transparent and collaborative process that included the following steps (see also **FIGURE 1.1**):

- 1. Collected Data and Developed Corridor Context** – Data was collected and documented to develop an understanding of existing and future conditions within the study area, with a pointed emphasis on understanding past and current inequities for disadvantaged populations and identifying opportunities to promote sustainable and resilient infrastructure.
- 2. Determined Study Goals and Purpose and Need** – Purpose and Need statements were developed to identify key challenges that should be addressed by the project and the desired outcomes for the project to achieve.

- 3. Identified Project Alternatives** – Building on previous studies, a range of potential alternatives was developed to address the Purpose and Need of the project.
- 4. Performed Alternatives Screening and Preliminary Environmental Analysis** – Qualitative and quantitative evaluation criteria were developed and analyzed to understand how well each alternative meets the Purpose and Need. This step included a preliminary environmental analysis of built and natural resources within the study area to inform the transition into a National Environmental Policy Act (NEPA) study.
- 5. Recommended a Locally Preferred Alternative and Prepared the Final Report** – Based on the alternative evaluation, a Locally Preferred Alternative was selected, and the process was documented in this Final Report.

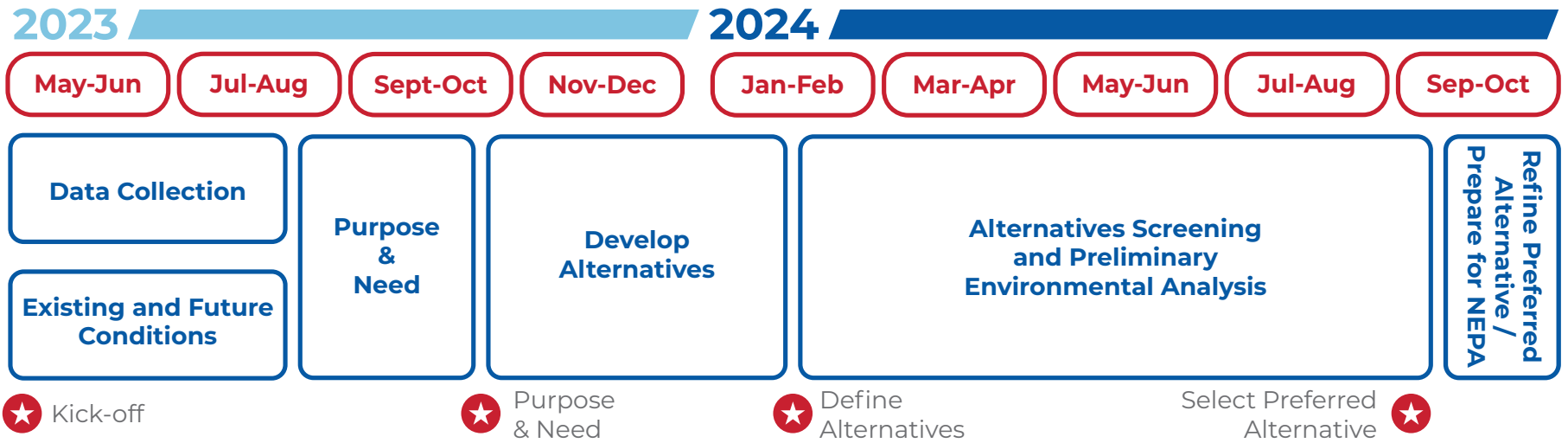
Detailed findings of this study are included in the appendices attached to this Final Report and are referenced throughout to guide the reader to more detailed information.

The TechLink TRAX Study was funded by the federal program Rebuilding American Infrastructure with Sustainability and Equity (RAISE). This U.S. Department of Transportation-funded grant focuses on improving road safety, revitalizing communities, and creating economic opportunity. This study was conducted with RAISE grant priorities and criteria at the forefront.





**FIGURE 1.1 Steps and Timeline for the TechLink TRAX Study**

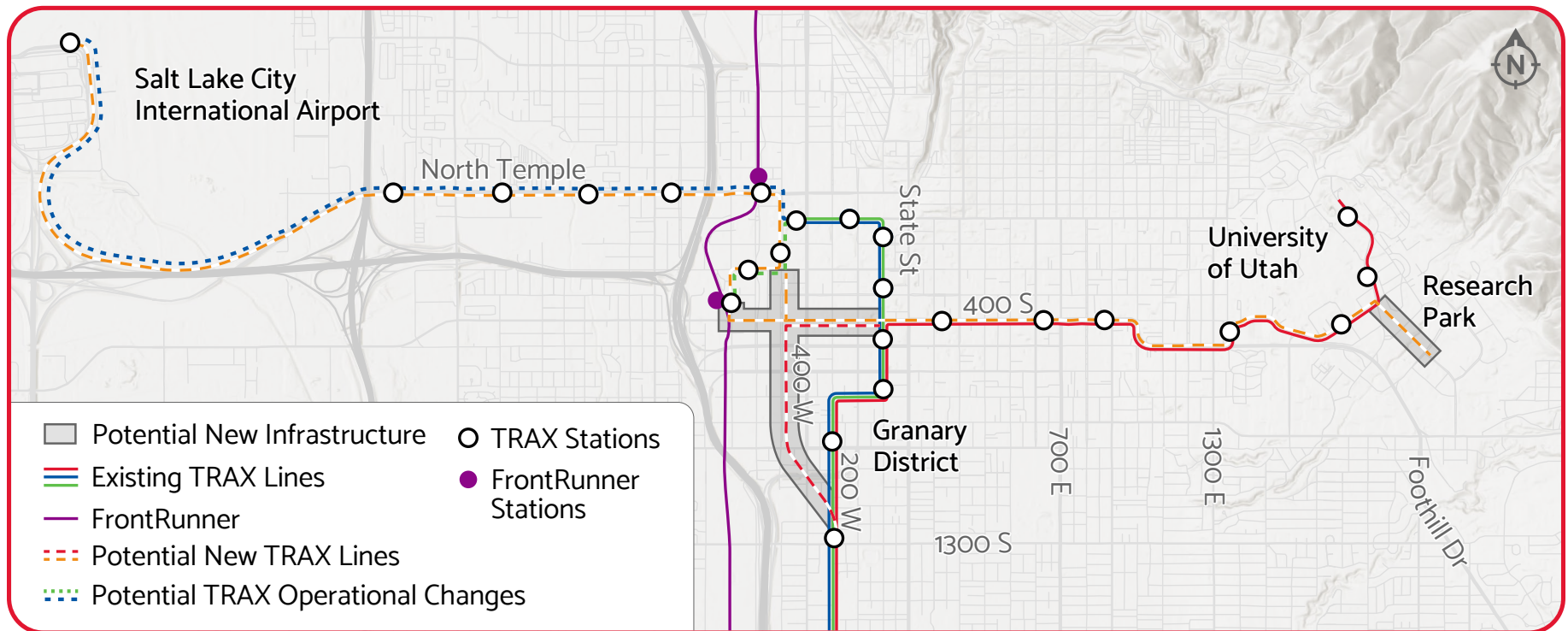


## 1.1 STUDY AREA

The TechLink study area for the purposes of this planning study extends generally from the Salt Lake City International Airport on the west side of Salt Lake City through the downtown area and east into the University of Utah and Research Park campuses (approximately 7.75 miles in direct point-to-point distance) and from the Salt Lake City International Airport

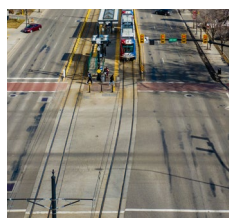
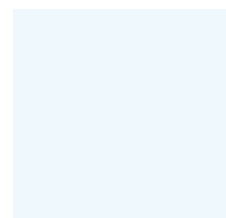
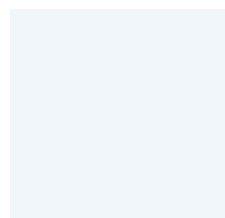
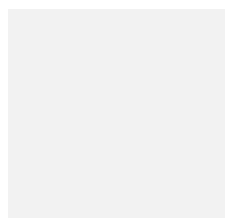
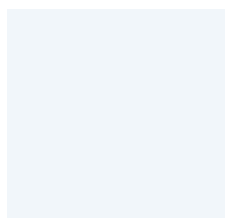
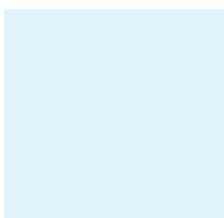
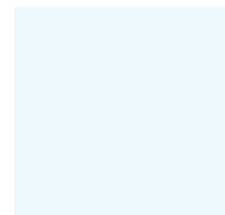
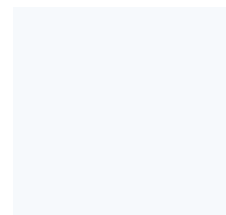
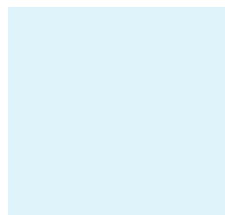
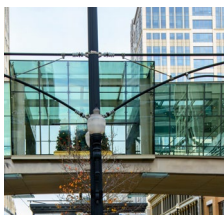
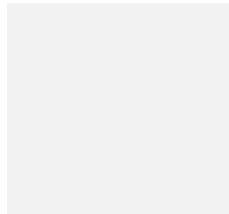
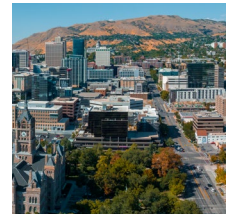
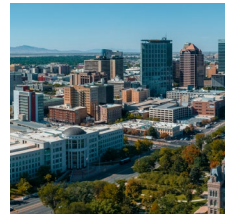
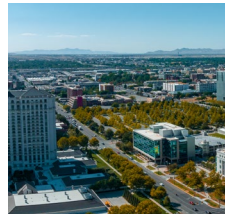
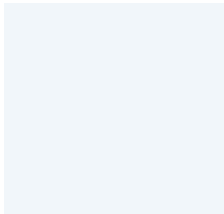
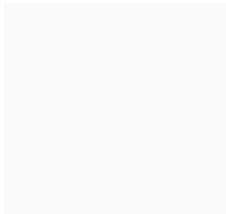
south to the TRAX Ballpark Station at 1300 South (see [FIGURE 1.2](#)). Within the study area, potential new infrastructure was considered along 400 South from 600 West to Main Street, 400 West from 400 South to 1300 South, and in Research Park from the Mario Capecchi Drive and South Campus Drive intersection southeast to Arapeen Drive.

**FIGURE 1.2 Study Area Map**





# CHAPTER 2. LOCALLY PREFERRED ALTERNATIVE





## 2.1 RECOMMENDATION

Based on the detailed alternatives evaluation results (see [CHAPTER 8](#)) and coordination among stakeholders, a Locally Preferred Alternative was selected (see [FIGURE 2.1](#)). A more detailed design concept can be found in [APPENDIX A](#).

**The Locally Preferred Alternative includes transit service envisioned as part of [Alternative 3 – Direct on 400 West](#), specifically:**

- **A new Orange TRAX Line that would provide bidirectional service from the Salt Lake City International Airport to the University of Utah and into Research Park.**
  - ***Locally Preferred Alternative definition:*** The TRAX Orange Line would start at the Salt Lake City International Airport and, using existing light rail infrastructure from the Airport, run along North Temple and turn south at 400 West, continuing to use existing infrastructure to 200 South. From 200 South, the Orange Line would continue south on new infrastructure along 400 West to 400 South. At 400 South, the alignment would head east along new infrastructure on 400 South (shared with the realigned Red Line, see next bullet point) that extends to Main Street. At Main Street, the Orange Line would continue east along 400 South using existing infrastructure and continue into the University of Utah using existing infrastructure on South Campus Drive. At the South Campus Drive and Mario Capecchi Drive intersection, the Orange Line would turn to the southeast, travel along new infrastructure, and connect into Arapeen Drive, where the alignment would then terminate.
- **A realigned bidirectional Red Line along 400 West that would provide service through the Granary District and connect to the Ballpark Station.**
  - ***Locally Preferred Alternative definition:*** The Red Line would travel from the current northern terminus at University Medical Center Station and utilize existing infrastructure to 400 South and Main Street. From there, the Red Line would be realigned to continue west using new infrastructure along 400 South (shared with the Orange Line), turn south at 400 West, and then connect to the Ballpark Station, using the defunct Ballpark Spur (historically also called the American Spur) near 900 South. The Red Line would continue south along the spur and reconnect into existing infrastructure at the Ballpark Station.
- **Eight new stations:**
  - 300 South (Orange Line)
  - West Temple (75 West/400 South) Station (shared Orange and Red Lines)
  - Pioneer Park (325 West/400 South) Station (shared Orange and Red Lines)
  - Mario Capecchi Station (Orange Line)
  - Arapeen Station (Orange Line)
  - 600 South Station (Red Line)
  - 800 South Station (Red Line)
  - 300 West Station (Red Line)
- **Modified Blue Line and Green Line operations** that would switch the northern termini so the Blue Line would terminate at the Salt Lake City International Airport and the Green Line would terminate at Salt Lake Central Station. No new infrastructure would be required as part of this operational change.



In addition, it is also desired that the following supporting components continue to advance with the TechLink Locally Preferred Alternative either concurrently or as potential separate future projects:

- **Potential future connection to Salt Lake Central Station for either operational redundancy or future revenue service.**

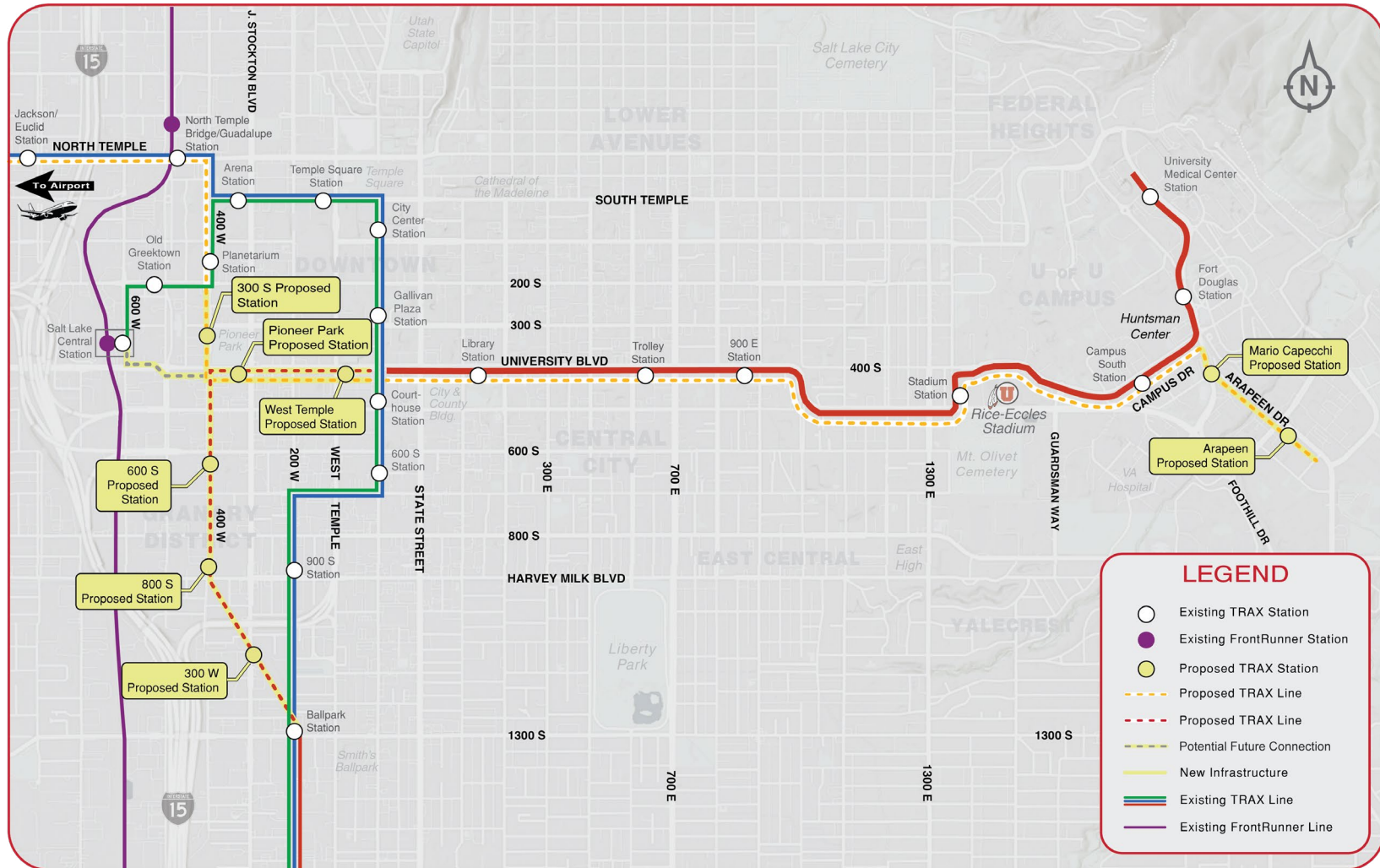
Since this connection could potentially occur in the future as part of a separate project, costs and other features associated with this potential connection are not included as part of the key characteristics of the Locally Preferred Alternative described in this section.

- This potential future connection would start at Salt Lake Central Station and, using new infrastructure, travel south on 600 West and turn east onto 400 South. The alignment would continue on the north side of the 400 South Viaduct and transition to a center-running alignment at 500 West. It would continue east to 400 West and join the infrastructure proposed as part of the Locally Preferred Alternative. No new stations would be proposed in this section. A crossover (a railway track configuration that allows trains to move from one track to the other) would be required along 400 South to ensure operational capabilities of the Green Line end of line and the Orange Line continuing through Salt Lake Central Station.
- This potential future connection should be included as part of the next steps for the TechLink TRAX Project environmental clearance to enable its potential future feasibility.

- **Establish a permanent pedestrian connection through the Rio Grande Building** to enhance access between the new Orange Line, Salt Lake Central Station, and the redevelopment that is anticipated to occur between 400 West and 600 West. The advancement of this connection should continue to be pursued as part of TechLink until a separate effort can be defined. As with the potential future rail connection to Salt Lake Central Station, costs, if any, and other features associated with this potential connection are not included as part of the key characteristics of the Locally Preferred Alternative.



**FIGURE 2.1 TechLink Locally Preferred Alternative**





The selection of the Locally Preferred Alternative was based on key findings from the detailed alternatives evaluation ([CHAPTER 6](#)). The Locally Preferred Alternative provides:


- The lowest cost alternative (capital costs and operations and maintenance [O&M] costs).
- Increased operational efficiency and reduction in travel time on the Orange Line.
- Slight reduction in right-of-way (ROW) and environmental impacts.

- Enhanced customer experience/perception (per public comment).
- Similar transit connections and projected ridership as other alternatives.
- Direct service to key economic redevelopment opportunities along 400 South and the Granary District and proximal service (within 0.3 miles) to the Rio Grande District and Salt Lake Central Redevelopment.
- An option to go to Salt Lake Central Station in the future, if desired.


### KEY CHARACTERISTICS OF THE PREFERRED ALTERNATIVE




**Mode:**  
Light Rail




**Length of New Revenue Track:**  
2.8 miles




**New Stations:**  
8




**Projected Ridership (Daily Boardings at New Stations):**  
3,750 (2023) and 5,700 (2045)




**Travel Times:**  
Orange Line – 45 minutes; Red Line – 65 minutes



**Transit Reliability:**  
96%



**Capital Costs:**  
\$400M



**Operations and Maintenance Costs:**  
Increase of \$17M/year over existing costs



## 2.2 REFINEMENTS

As a result of findings from the alternatives evaluation and preliminary environmental analysis, minor refinements were made to the Locally Preferred Alternative alignment, primarily along 400 South. For the purpose of providing a conservative project footprint for the analysis and cost estimate, the study team assumed all existing roadway features would be retained (general purpose lanes, shoulders, etc.). However, in certain areas, the footprint was reduced to avoid substantial impacts. This occurred primarily in areas where large multifamily housing is under construction and also at Pioneer Park. To accommodate light rail guideway and a platform in the block between 300 West and 400 West south of Pioneer Park, reduction of either an existing travel lane or a planned multimodal facility would be required to avoid impacts outside the existing curb-to-curb section.

As survey is completed in future phases and additional information is gathered, it is anticipated that refinements will continue to occur along the alignment, namely:

- **400 South** – Additional coordination with UDOT and Salt Lake City in conjunction with advancing design to minimize potential right-of-way impacts and curves at intersections.
- **Ballpark Spur** – Potential opportunities to be considered for speed improvements and a siding along the spur.

- **South Campus Drive** – Both the roundabout and Mario Capecchi Drive intersection may need to be refined to mitigate potential adverse traffic impacts.
- **Minor modifications to station locations** – Primarily in the vicinity of Pioneer Park and potentially in the Granary District, including the 300 West Station.

## 2.3 ADDITIONAL PLANNING-LEVEL CONSIDERATIONS

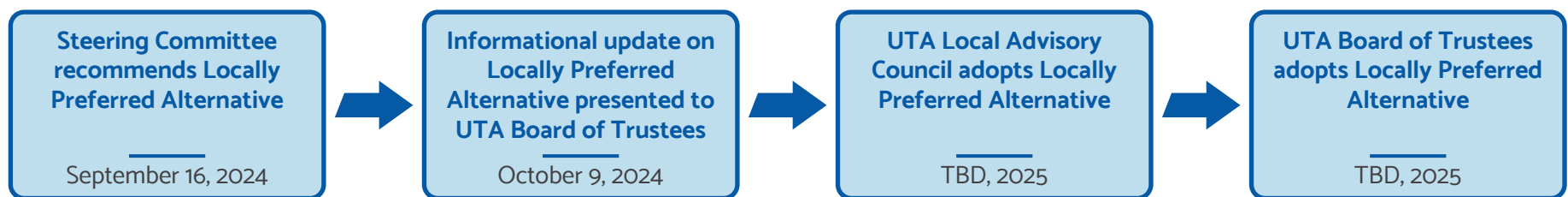
Several separate planning efforts should be advanced to improve mobility and access for pedestrians to the TRAX system relevant to this project:

- Additional study is needed for the existing TRAX alignment along South Campus Drive to enhance campus permeability.
- Enhanced access is needed between 400 West and 600 West through the Rio Grande Building.

## 2.4 ADOPTION OF THE LOCALLY PREFERRED ALTERNATIVE

The path for adoption of the Locally Preferred Alternative is depicted in **FIGURE 2.2**.

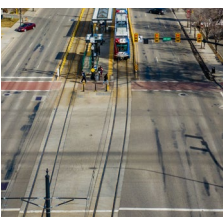
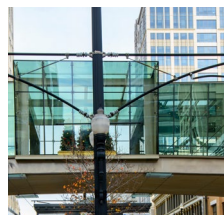
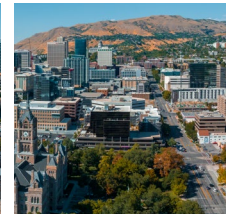
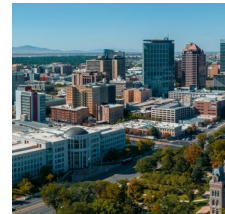
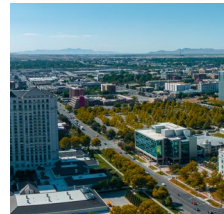
**FIGURE 2.2 Locally Preferred Alternative Adoption Process**







# CHAPTER 3. EXISTING AND FUTURE CONDITIONS





Salt Lake City is a vibrant, high-commuter, high-visitation city, with many attractive destinations and employment centers for the region. In addition, the Wasatch Front region is highly polycentric, leading to high demand for bidirectional travel to destinations in and out of Salt Lake City. In order to better understand and accommodate future travel needs, a variety of datasets were collected and analyzed to inform the development and evaluation of alternatives for subsequent phases of this study.

This section provides an overview of existing (2023) and planned (2050) transit and transportation conditions, including a high-level analysis of forecasted travel demand in the TechLink TRAX study area. Information captured below reflects major transit, roadway, multimodal conditions, environmental constraints, and socioeconomic conditions. Extensive analysis of these conditions and others can be found in the Existing and Future Conditions Report (**APPENDIX B**).

**Planning Context:** The TechLink TRAX Study builds on several past transit and transportation planning efforts, including:

- UTA Downtown Salt Lake City Rail Extensions and Connections Feasibility Study (2021)
- University of Utah Research Park Strategic Vision (2021)
- UTA Future of Light Rail (FOLR) Study (2023)

This study leverages and refines recommendations developed in these previous studies.

### 3.1 HOW PEOPLE ARE TRAVELING IN THE STUDY AREA TODAY AND IN THE FUTURE

The study area hosts a diversity of travel behaviors and needs, and an origin-destination analysis aided in the development and evaluation of how well the transit alternatives can meet those needs.

Geographic areas were defined into small districts (Granary District, Salt Lake City International Airport, and University of Utah) to measure where people start and end their transportation trips. Origin and destination patterns were analyzed for all trips taken by all modes of transportation to key areas/destinations in the study area.

#### The Granary District

The areas with the largest number of daily trips that begin in the Granary District also end either within the Granary District or in adjacent districts in downtown Salt Lake City, indicating that the largest portion of trips are local. Trips originating in the Granary District are expected to increase by 146% by 2050.

#### The Salt Lake City International Airport

Trips originating at the Salt Lake City International Airport have destinations that are widespread throughout central and north Salt Lake and Davis Counties, reflecting the Airport as a more regional destination. Trips starting from the Airport are expected to increase by 120% by 2050.

#### The University of Utah

Most trips starting on the University of Utah campus end east of I-15, showing a fairly localized trip pattern within the Salt Lake City urban core. 2050 trip projections indicate that trips made from the University of Utah and Research Park increase significantly, with Research Park alone seeing a 209% increase in new trips originating from the area.

## 3.2 MOBILITY AND CONGESTION TODAY AND IN THE FUTURE

The Salt Lake City area has an established roadway network that is heavily built out, offering limited opportunities to build additional roadway infrastructure for the future. WFRC’s Regional Transportation Plan (RTP), which programs planned projects out through 2050, does not identify any capacity improvements (new roadways or widened roadways) in the study area. Only operational improvements, active transportation, and transit improvements have been identified.

Understanding traffic conditions for today and out to 2050 helps inform how travel demand will change over time and what considerations must be taken into account when looking at transit alignments and major trip generators.

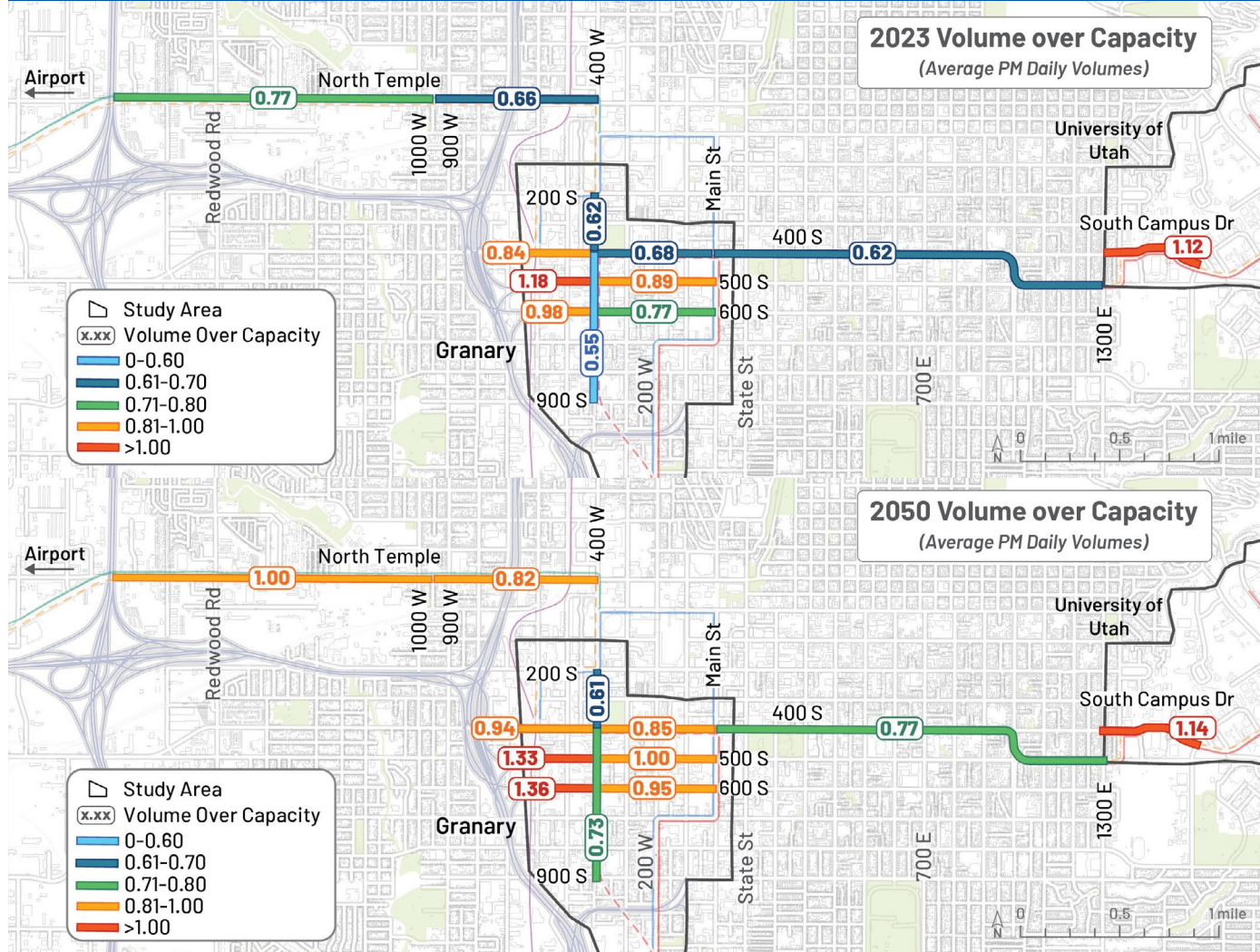
To understand existing (2023) and future (2050) congestion conditions, corridor segments in the study area were analyzed for volume over capacity (v/c) ratios (see [FIGURE 3.1](#)). A v/c ratio compares the volume of traffic to the theoretical capacity of the facility to accommodate traffic. A v/c ratio of less than 1.0 indicates the corridor is under capacity, a value of 1.0 indicates the corridor is operating at capacity, and a v/c ratio over 1.0 indicates the corridor is operating over capacity and likely to experience substantial congestion. All values provided in this analysis are for v/c during PM peak hours (typically 4:00 p.m. to 6:00 p.m.).

In 2023, segments of 500 South, 600 South, and South Campus Drive are nearing or at capacity. In 2050, congestion increases and segments of 400 South, 500 South, 600 South, and South Campus Drive continue to experience near or over-capacity conditions.





**FIGURE 3.1 Volume Over Capacity (V/C) Ratios for Major Corridors in the Study Area (for 2023 and 2050)**





### 3.3 EXISTING AND FUTURE TRANSIT SERVICE

Understanding current and planned transit service and infrastructure helped inform how well the alternatives would connect into and interact with the broader transit system. The study focused on being forward-compatible with already-planned service and infrastructure where applicable.

#### UTA Transit

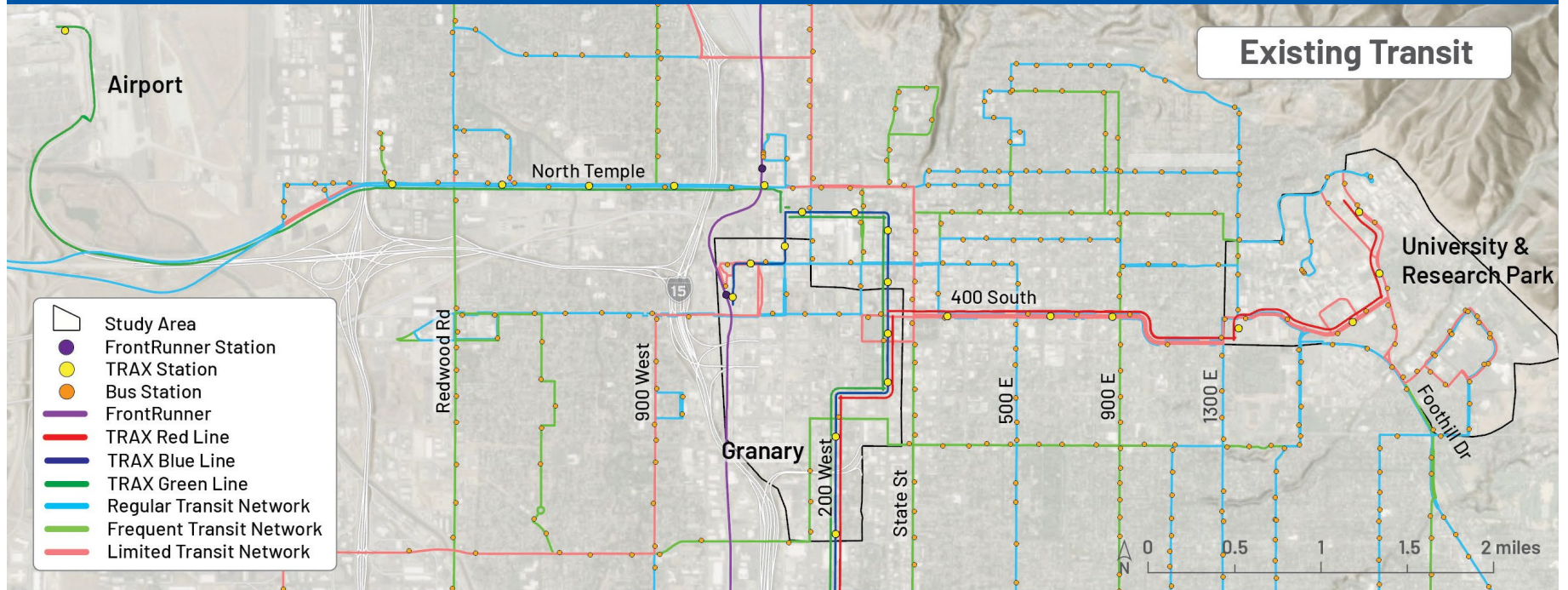
UTA's FrontRunner regional commuter rail, TRAX light rail, and various types of bus routes service the study area. In addition, strong multimodal networks on the gridded transportation system exist in the downtown Salt Lake City core (see [FIGURE 3.2](#)). The TRAX Red, Blue, and Green Lines were pertinent to this study as increased use of existing shared rail lines was explored. Currently, these three services share the same track between Courthouse Station and Central Pointe Station, causing operational and reliability concerns that can strongly affect service systemwide if there is an issue on or near the track. In addition, the Blue Line and Green Line share track between Arena Station and Gallivan Plaza Station in downtown Salt Lake City. Within the TechLink study area, there are two FrontRunner stations at Salt Lake Central Station and North Temple Station. The Frequent Transit Network (FTN) in the area is focused on enhancing connections to additional destinations for riders.

**Of Note:** The Granary District, south of 400 South, is not currently well served by transit. TRAX borders the neighborhood on the east side at 200 West. One of this study's focuses, as identified through this existing and future conditions analysis, was to bring transit into this district.

#### University of Utah Transit

The University of Utah is a major transit destination within the UTA service area. The TRAX Red Line currently serves the University as well as numerous UTA bus routes, including frequent routes. The University also provides shuttle and on-demand service for circulation throughout the campus. The University has substantial plans for additional development throughout the campus as well as Research Park, which are expected to further increase transit demand. The University of Utah is currently in the process of developing a Physical Development Plan that will guide additional future transportation and transit investments on campus.

**FIGURE 3.2 Existing UTA Transit Routes**

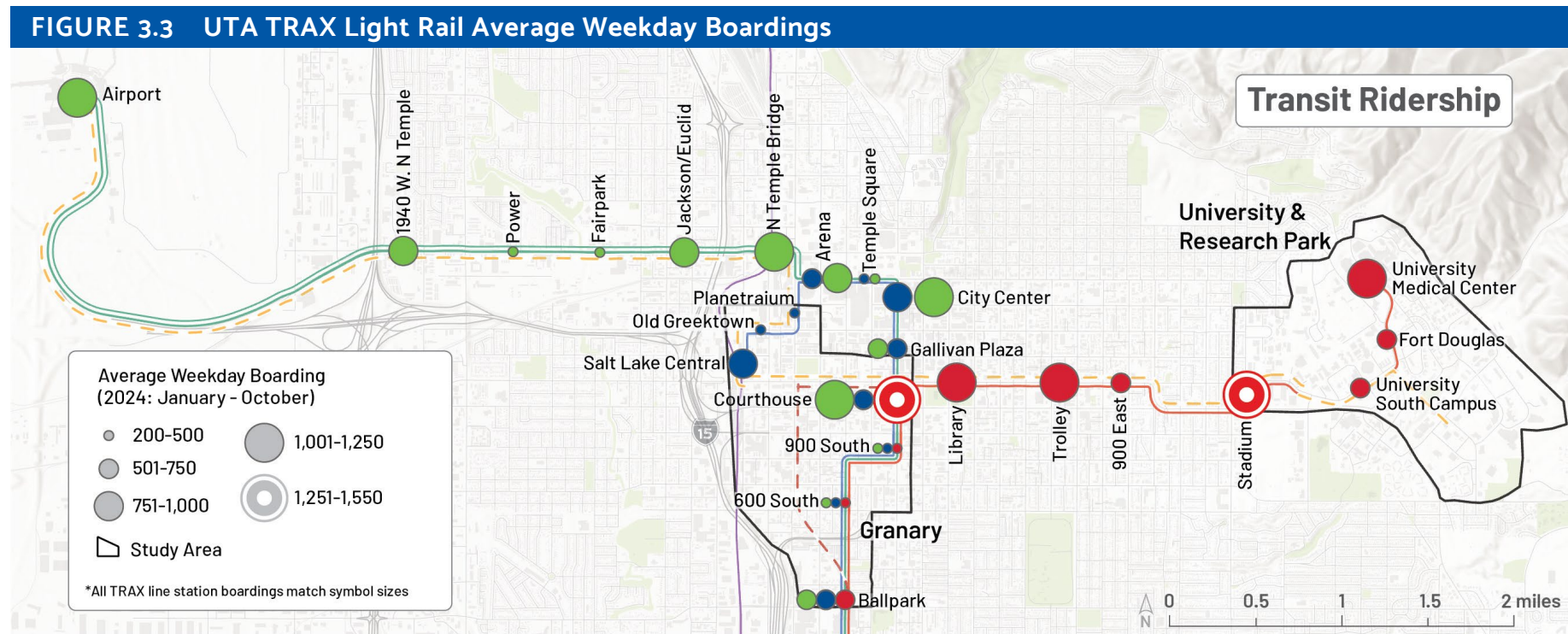




### 3.4 TRANSIT RIDERSHIP

UTA’s light rail systemwide average weekday boardings varied between 66,052 and 45,742 boardings pre-pandemic (2017-2019). During the 2020 COVID-19 pandemic, weekday boardings dropped from 56,176 boardings in February to 15,321 boardings in April. Throughout 2020, average weekday boardings remained below 21,866 boardings. Current ridership trends show average weekday boardings increasing towards pre-pandemic levels. Through September 2024, systemwide average weekday boardings were 41,929.

**FIGURE 3.3** captures boardings at light rail stations in the study area on the Red, Blue, and Green Lines. This indicates high ridership and utilization along the Red Line (notably at Courthouse and Stadium Stations) as well as higher ridership at Salt Lake Central Station and City Center Station on the Blue Line. The Airport Station is also a top boarding station. Daily ridership for the stations in the study area are included below in **TABLE 3.1**. The Courthouse Station has the highest number of daily boardings in the entire TRAX system, at approximately 3,100 per day.





**TABLE 3.1 Daily Average Total Midweek Boardings: January–October 2024**

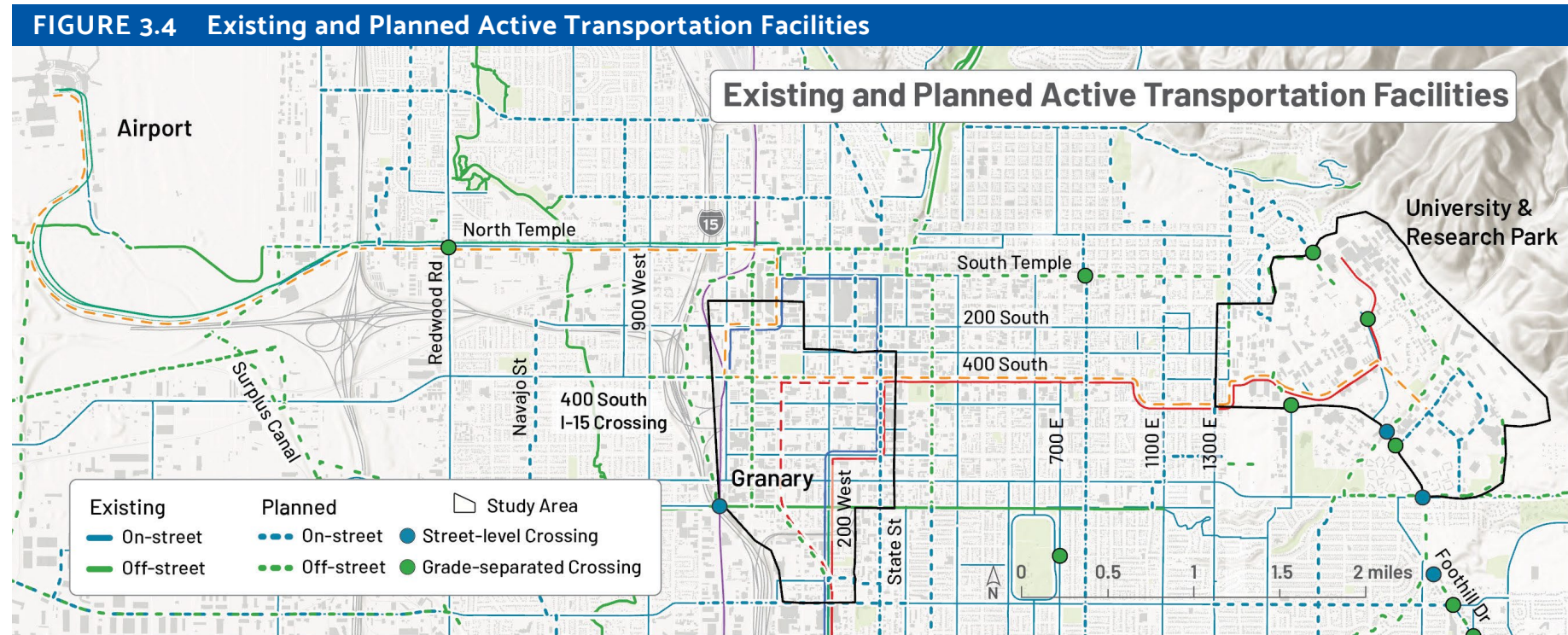
Station Name	Total	Red	Blue	Green	Station Name	Total	Red	Blue	Green
<b>Courthouse</b>	3,118	1,364	703	1,051	<b>Library</b>	1,028	1,028	NA	NA
<b>City Center</b>	2,102	NA	926	1,176	<b>Jackson/Euclid</b>	859	NA	NA	859
<b>Ballpark</b>	1,814	618	517	679	<b>Salt Lake Central</b>	850	NA	850	NA
<b>Stadium</b>	1,516	1,516	NA	NA	<b>1940 W. N. Temple</b>	806	NA	NA	806
<b>Arena</b>	1,344	NA	543	801	<b>University South Campus</b>	732	732	NA	NA
<b>Gallivan Plaza</b>	1,264	NA	559	705	<b>900 East</b>	653	653	NA	NA
<b>Trolley</b>	1,250	1,250	NA	NA	<b>Temple Square</b>	617	NA	261	356
<b>900 South</b>	1,192	415	344	433	<b>Fort Douglas</b>	592	592	NA	NA
<b>Airport</b>	1,172	NA	NA	1,172	<b>Fairpark</b>	490	NA	NA	490
<b>University Medical Center</b>	1,157	1,157	NA	NA	<b>Planetarium</b>	475	NA	475	NA
<b>600 South</b>	1,113	387	296	430	<b>Power</b>	424	NA	NA	424
<b>N. Temple Bridge</b>	1,105	NA	NA	1,105	<b>Old Greektown</b>	337	NA	337	NA



### 3.5 ACTIVE TRANSPORTATION EXISTING AND PLANNED FACILITIES

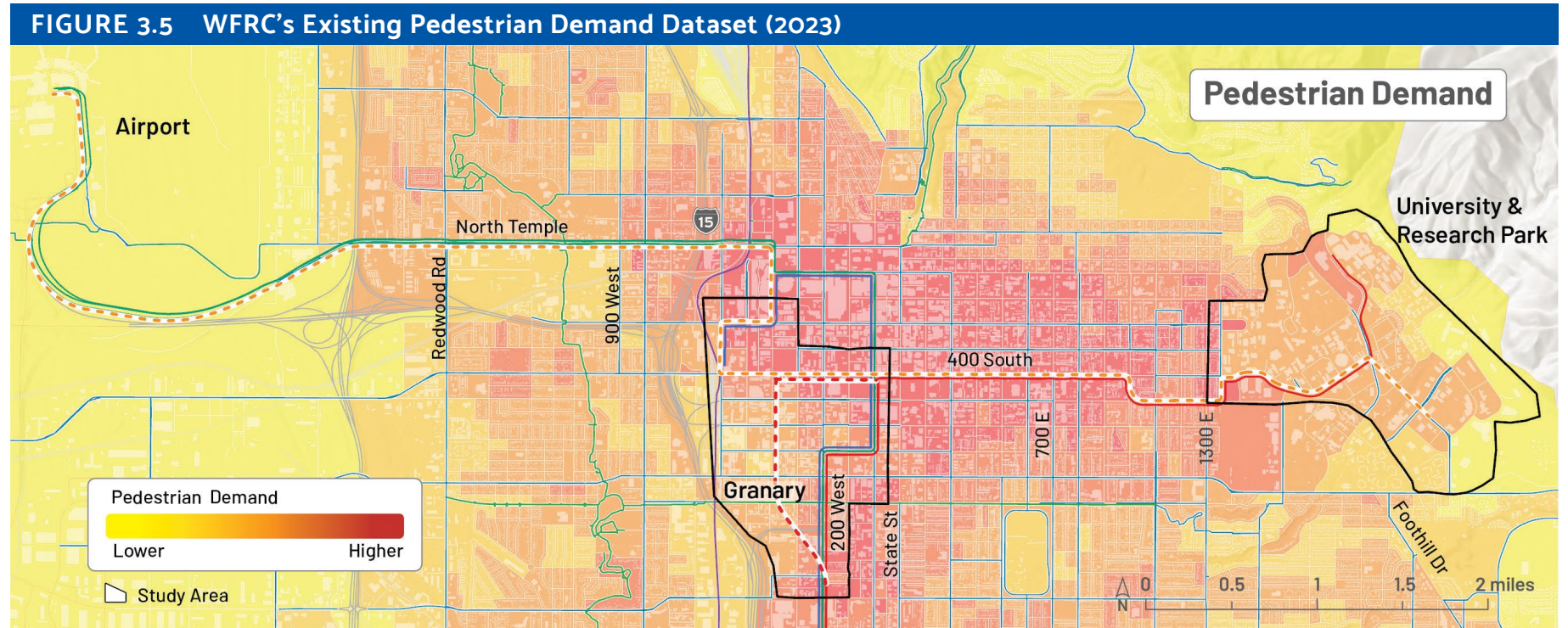
Salt Lake City’s gridded transportation network has helped provide contiguous active transportation (infrastructure for people walking, biking, and rolling) connections to destinations and to connect to the transit system. **FIGURE 3.4** shows the existing and planned active

transportation facilities in Salt Lake City and within the TechLink Study corridor. The alternatives development and evaluation phases of this study took into account making connections to these active transportation facilities, particularly those of regional significance.



Providing first/last mile connections to transit and providing transit service that is accessible to the regional active transportation network is a benefit for existing riders and a draw for new ones. The pedestrian

demand (see **FIGURE 3.5**) indicates a strong demand for walking, biking, and transit connectivity, particularly in the downtown area, the south Granary District area, and the University of Utah.







### 3.6 ENVIRONMENTAL JUSTICE POPULATIONS

The TechLink TRAX Study adhered closely to federal guidance on racial and environmental justice and closely considered underserved populations in the study area. Environmental justice populations, by federal definition, are comprised of 1) minority or 2) low-income populations. For the purpose of reviewing these data sets, the Environmental Protection Agency (EPA) Environmental Justice Screening and Mapping Tool (EJScreen) was utilized with data available at the Census Block Group level (see [FIGURE 3.6](#) and [FIGURE 3.7](#)).

Minorities include the following populations:

- Black or African American
- Hispanic or Latino
- Asian
- American Indian or Alaskan Native
- Native Hawaiian or Other Pacific Islander

[FIGURE 3.6](#) shows there are higher percentages of minority populations located around:

- The North Temple corridor, west of I-15
- 400 South, east of downtown
- South Temple, west of 200 West
- Between the Granary District and Ballpark neighborhoods
- Some concentrations of the University of Utah campus, likely due to diverse student populations

The area along I-15 on the west side near the Salt Lake City International Airport includes higher proportions of Hispanic/Latino populations, accounting for 40% of residents, compared to the Granary District at 20%, University of Utah and Research Park at 10%, and downtown at 16%. Addressing the challenges of transportation access, affordability, and connectivity in this region becomes imperative to ensure equitable mobility solutions for all residents.

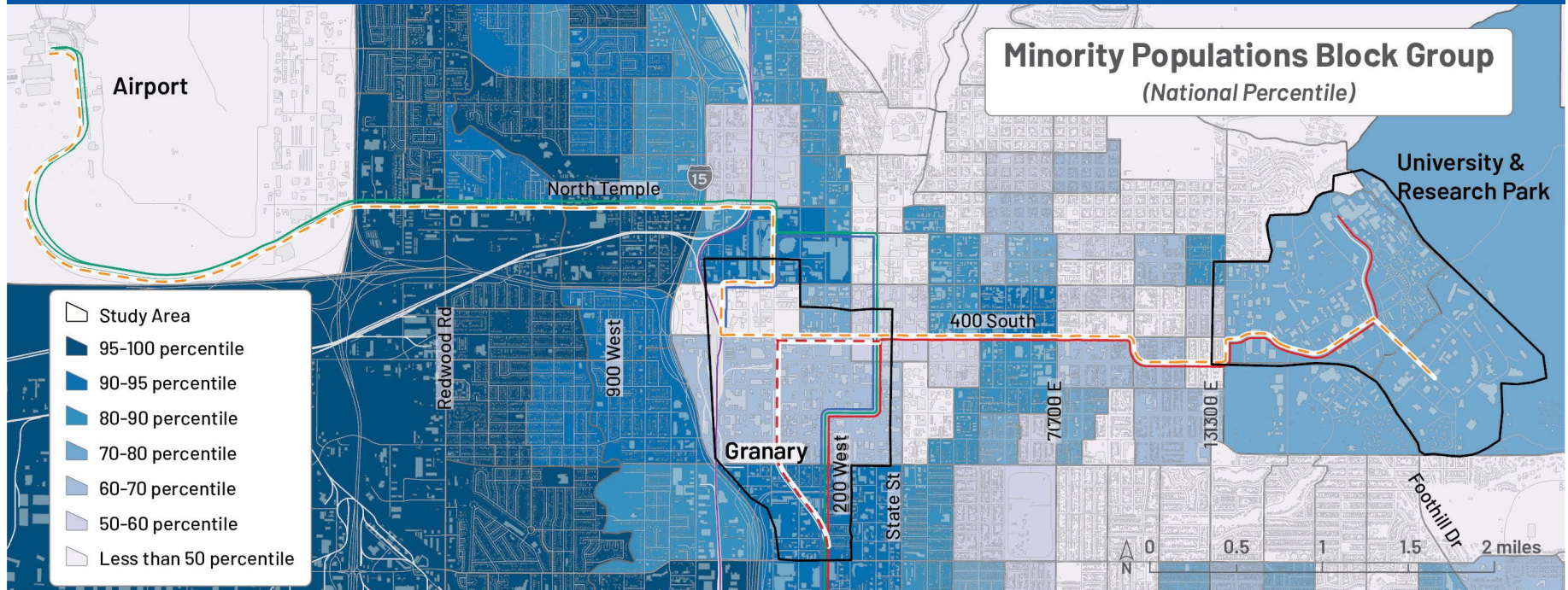
The federal definition of low income is based on the Federal Poverty Level, which is adjusted annually based on inflation. At the time of this report, the Federal Poverty Level for a single-person household was \$14,580 and \$30,000 for a family of four.

As shown in [FIGURE 3.7](#), there are higher concentrations of low-income populations along the North Temple corridor as well as at the University of Utah (primarily comprised of student populations).

The south end of the Granary District also has a higher concentration of these populations. The study team conducted an equity analysis as part of the alternatives evaluation to ensure that these populations would be equitably served by the future transit recommendations.

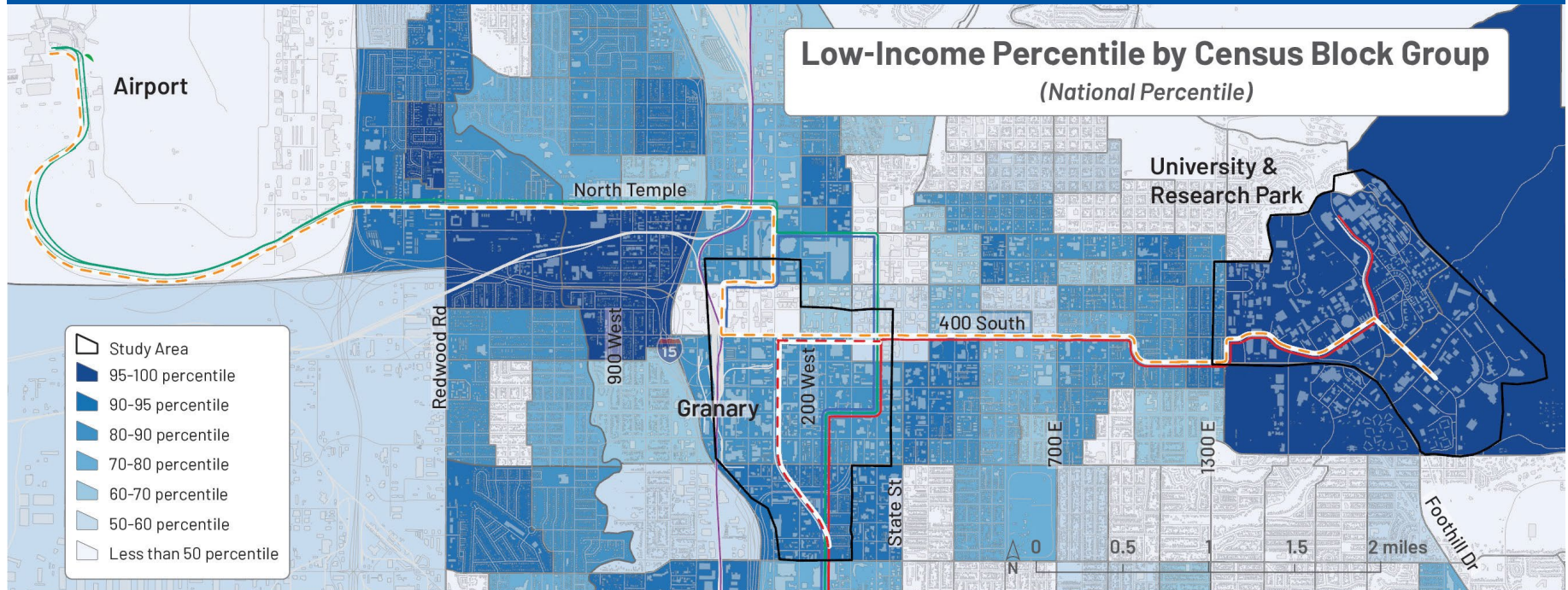
As higher proportions of both minority and low-income populations are present in the study area, TechLink would offer direct benefits to these populations by improving mobility and access to opportunities.

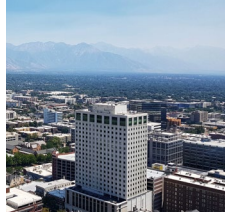
**FIGURE 3.6** Minority Populations in the TechLink TRAX Study Area



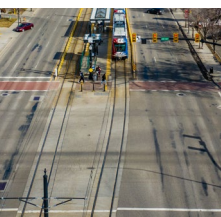
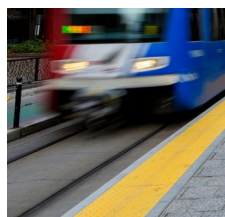
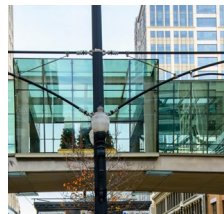
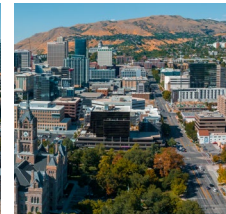
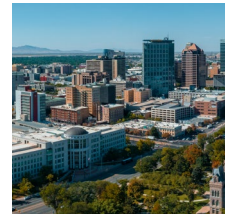
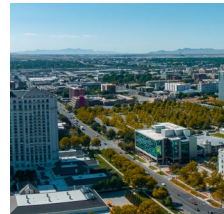


**FIGURE 3.7 Low-income Populations in the TechLink TRAX Study Area**





# CHAPTER 4. PURPOSE AND NEED





Purpose and Need, a term utilized during the NEPA environmental study process, is a statement developed to describe the underlying challenges surrounding a certain area or project and are used to help develop solutions to address those project needs and help measure their performance. A full report detailing the Purpose and Need approach can be found in **APPENDIX C**.

## 4.1 PROJECT PURPOSE

The Purpose of this project is to:

- Support the long-range transportation growth demand for local and regional trips with origins and destinations in Salt Lake City.
- Improve TRAX operational reliability and capacity throughout the region.
- Enhance access and mobility between existing and emerging areas of economic development, including technology and innovation centers in Salt Lake City.
- Increase access to opportunities (e.g., education, employment, and resources) for disadvantaged populations.
- Provide sustainable transportation options that minimize impacts to the environment.

### Key Definitions:

A project's **Purpose** defines the objectives to be achieved. A project's **Need** describes the underlying problems or conditions that the project should address.

## 4.2 PROJECT NEED

The Need for the project includes the following:

### 4.2.1 LOCAL AND REGIONAL TRAVEL DEMAND

**Need:** Regionally, the Wasatch Front is rapidly growing, with Salt Lake City remaining a dense urban center attracting commuters and visitors from throughout the region.

- Between 2020 and 2050, Salt Lake City's population and employment is expected to increase by 34% and 52%, respectively, as the city densifies and attracts high-tech and innovation companies to the downtown.
- An origin-destination analysis shows that for the Salt Lake City International Airport, Granary District, and the University of Utah, strong demand exists for local trips within Salt Lake City as well as regional trips.

**Need:** At a local level, roadway infrastructure in Salt Lake City is largely built out and additional transportation options are needed for residents, commuters, and visitors alike.

- WFRC's RTP indicates that all programmed roadway projects in the TechLink TRAX study area are exclusively operational improvements due to constraints in the built environment that do not allow for capacity improvements.
- Key segments of corridors in the study area show an increase in v/c ratio from 2023 to 2050 during peak periods, including 400 South, 500 South, 600 South, and South Campus Drive.



### 4.2.2 TRAX OPERATIONS AND CAPACITY

**Need:** TRAX Red Line, Green Line, and Blue Line share track in the heart of downtown, which can cause operational challenges that increase travel times and degrade reliability.

- The shared track extends from 400 South to 1300 South, with no alternate routes in this section. This leads to delays within the system when trains are bunched, there is heavy demand at intersections from motor vehicles and pedestrians, or an incident occurs along the tracks that causes a blockage.
- Implementation of the UTA FOLR Strategic Plan (2023) – a portion of which the TechLink TRAX Study is advancing – increases on-time performance from 92% to 96%.

**Need:** Capacity is limited in the existing TRAX system, and capital improvements are needed to increase capacity to accommodate future growth.

- The existing TRAX turning movement at the 400 South and Main Street intersection requires a dedicated traffic signal phase, which decreases the traffic capacity of the intersection. Additional service expansions cannot be accommodated within the existing track alignment.
- Surges in ridership demand at the start and end of major sporting and entertainment events at the University of Utah are challenging to accommodate within existing TRAX infrastructure.
- Ridership along 400 South maintains some of the highest daily boardings in the TRAX system. An additional TRAX service running on the existing track would help meet the capacity needs along this vital corridor by doubling all-day frequencies.

### 4.2.3 ACCESS AND CONNECTIVITY

**Need:** Land use conditions are rapidly changing along the corridors in the study area, triggering additional trip generation and demand for non-vehicular mode choices. Additional connections are needed to improve east-west connectivity.

- Salt Lake City’s land use is changing as industrial areas are being redeveloped as mixed-use, existing residential areas are densifying, and high-tech and institutionally related employment opportunities are increasing, specifically in the North Temple (NoTe) District, Depot District, Granary District, Ballpark Neighborhood, Central Business District, University of Utah, and Research Park.
- Forecasted trip types for 2023 and 2050 show strong mode shifts in the study area. Transit trips increase substantially from 19% to over 30% with a corresponding reduction in vehicle trips, which indicates a strong demand for transit over the coming decades.





#### 4.2.4 EQUITY

**Need:** High proportions of low-income and minority populations are present throughout the study area, which also coincides with areas of higher rent burden and limited access to vehicles.

- Thirteen of the 19 census tracts in the study area have a higher proportion of minority populations compared to Salt Lake County as a whole. Of those 13 census tracts, nine have more than 10% higher proportions of minority populations compared to Salt Lake County as a whole.
- Eighteen of the 19 census tracts in the study area have a higher proportion of low-income populations compared to Salt Lake County as a whole. Of those 18 census tracts, 14 have more than 10% higher proportions of low-income populations compared to Salt Lake County as a whole.
- A majority of these census tracts with higher proportions of minority and low-income populations also coincide with areas of higher rent burden and limited access to vehicles.

#### 4.2.5 SUSTAINABILITY

**Need:** Poor air quality is an area of concern within the study area. Greenhouse gas (GHG) and vehicle emissions are key drivers of poor air quality.

- The study area falls within the Salt Lake City nonattainment area for Particulate Matter equal to or smaller than 2.5 microns ( $PM_{2.5}$ ); the Northern Wasatch Front nonattainment area for the 8-hour average ozone standard; and within maintenance areas for carbon monoxide (CO), Particulate Matter equal to or smaller than 10 microns ( $PM_{10}$ ), and 1-hour ozone.

**Need:** There is a regional commitment to implementing sustainable strategies to improve air quality and reduce energy consumption.

- UTA, Salt Lake City, University of Utah, and WFRC have all adopted plans and commitments to sustainability, carbon reduction, and improved air quality, including UTA's 2023 Sustainability Report; Salt Lake City's Climate Positive 2040; University of Utah's Strategic Plan, Air Quality Strategic Task Force Strategic Plan, and others; and WFRC's Wasatch Choice Vision.

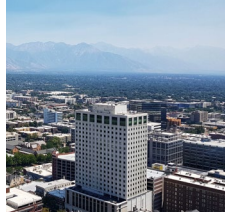
**Need:** Climate change will exacerbate existing air quality and urban heat island effects, and low-income and minority populations will likely be disproportionately affected.

- Studies have found that urban heat islands disproportionately affect low-income and minority populations.<sup>1</sup> In addition, a recent mapping of Salt Lake City urban heat islands shows that a substantial portion of the study area experiences an increased temperatures up to 8 degrees due to this effect, including in census tracts that have a larger proportion of low-income and minority populations.<sup>2</sup>

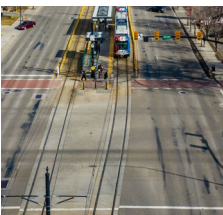
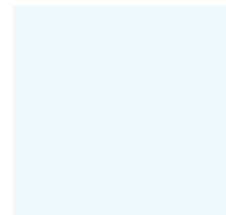
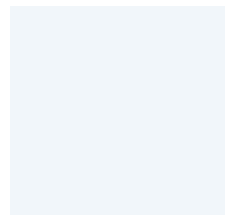
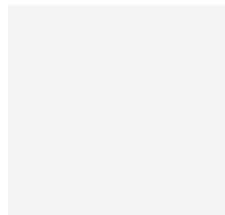
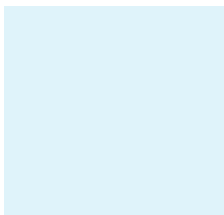
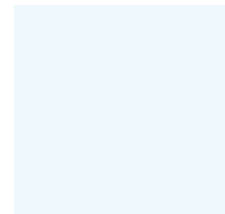
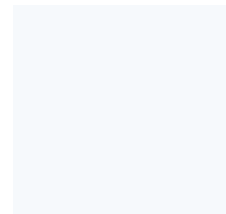
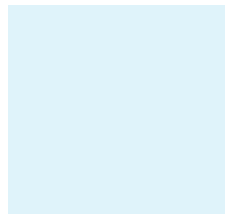
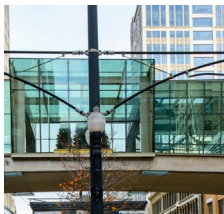
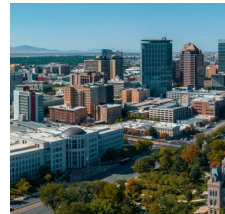
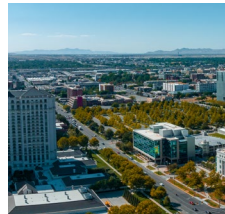
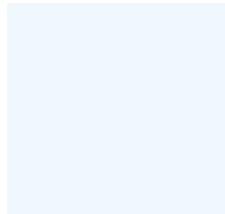
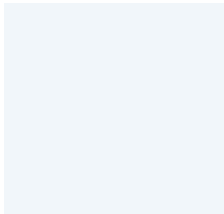
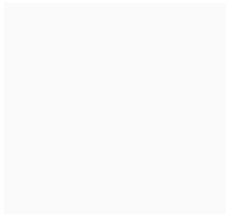
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1 Islands of Illness, Melba Newsome, Nature, September 2023.

2 Urban Heat Hot Spots in 65 Cities, July 2024, <https://www.climatecentral.org/climate-matters/urban-heat-islands-2024>



# CHAPTER 5. PUBLIC ENGAGEMENT





The following information summarizes public engagement and community outreach from the beginning of the TechLink TRAX Study in August 2023 through the end of September 2024. Additional detailed information about the full range of public engagement activities

conducted during this study are included in **APPENDIX D**. Public engagement occurred around three key milestones:

- Study launch
- Alternatives development
- Alternatives evaluation





Various engagement tools were utilized to ensure a broad spectrum of stakeholder and public feedback.

- Three Technical Advisory Committee (TAC) meetings
  - The TAC was composed of technical staff from UTA, UDOT, Salt Lake City, WFRC, and University of Utah. A full committee roster can be found in the Public Engagement Report (**APPENDIX D**).
- Three Steering Committee meetings
  - The Steering Committee was comprised of agency policy makers from UTA, UDOT, Salt Lake City, WFRC, and University of Utah. A full committee roster can be found in the Public Engagement Report (**APPENDIX D**).



- More than 3,200 direct mailers
- Digital advertisements
  - Geo-targeted social media ads with more than 70,000 impressions and nearly 6,000 engagements
  - On-board signage (buses and TRAX trains)
  - Organic social media posts
- Mass media with more than 10 stories across TV, radio, and print
- Study-specific website with public comment boxes and surveys
  - More than 8,000 visitors
- Ten in-person outreach events
  - Business and developer open house
  - Snax and TRAX station pop-up events
  - Season of Service
  - Granary District HoodahFest
  - Rose Park Neighborhood Center English Program
  - HEAL Utah Air, Art & Alternative Transportation Festival
  - Utah Pacific Islanders Health Coalition Spring Block Party
  - Circles Salt Lake Q&A session
- Community-based Organization (CBO) workshop and advertisements
- Four Salt Lake City Community Council presentations
- One Salt Lake City Council presentation



Throughout the study, more than 1,700 pieces of documented public feedback were submitted, in addition to verbal comments. Themes included:

- Support for transit and TRAX expansion.
- The need for additional transit service on the west side of the Salt Lake Valley.
- Support for the Orange Line’s connectivity between Salt Lake City International Airport, the University of Utah, and Research Park.
- A desire for fewer 90-degree TRAX turns through downtown.
- Preference for Alternative 3 because it has the fastest travel times and lowest costs to build and operate.
- Support for the resident-led Rio Grande Plan (this effort is being coordinated outside of the TechLink TRAX Study).



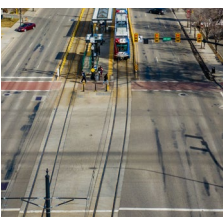
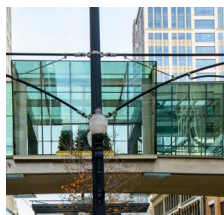
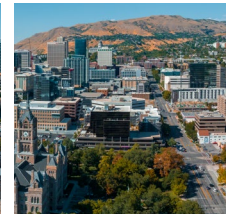
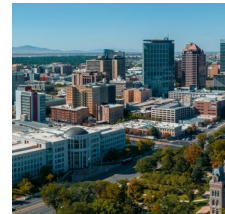
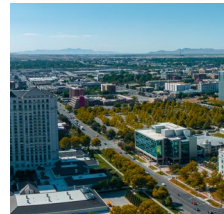
Public feedback is an important part of the study process. Combined with technical analysis, quantitative data, and partner agency input, the survey responses, email comments, and information gleaned from in-person meetings and events were reviewed and considered by the study team at each phase. Ultimately, the feedback helped refine the outcome of the study.







# CHAPTER 6. ALTERNATIVES





This section describes the alternatives developed for the TechLink TRAX Study. Alternatives were considered based on 1) scenarios that performed well in the UTA FOLR Strategic Plan (2023), and 2) alternatives that ensured new transit connections meet the Purpose and Need developed by the study team.

The FOLR Study set the framework for the TechLink TRAX Study, providing initial analysis and evaluation of alternatives with a general understanding of the best-performing alignments and connections. Because of this, the alternatives developed for the TechLink TRAX Study offer minor nuances between alternatives, as the general preferred scenarios have been vetted through that previous work.

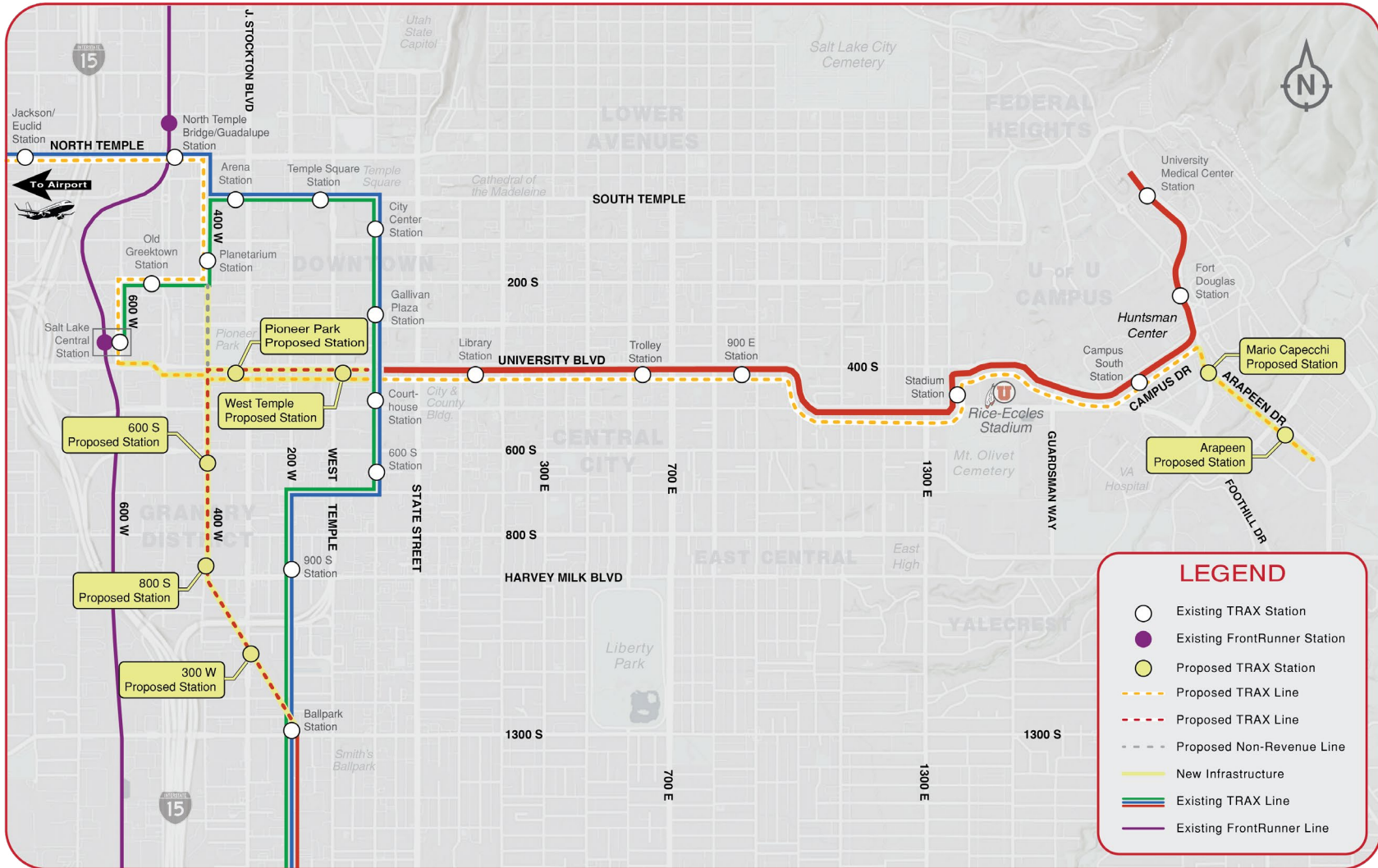
All alternatives include:

- **A new Orange Line** that would provide a direct connection from the Salt Lake City International Airport to the University of Utah and into Research Park. The new Orange Line would use existing light rail infrastructure along North Temple and 400 South west of Main Street. Key benefits:
  - Adds capacity through additional stations and added service on 400 South.
  - Extends TRAX into Research Park, which provides a necessary and additional transit connection.
  - Allows for increases to system capacity by adding a straight east-west movement through Main Street at 400 South.
- **A realigned Red Line** that would provide service through the Granary District. The realignment would extend the Red Line along 400 South west from Main Street to 400 West. From there, the alignment would continue south along 400 West, providing service to the Granary District. At 900 South, the realignment would head southeast to continue along the inactive Ballpark Spur to the Ballpark Station. Key benefits:

- Adds system capacity through additional stations and added service in a high-growth area.
- Adds system redundancy and therefore resiliency through new track infrastructure in the Granary District.
- Allows for increases to system capacity by adding a straight east-west movement through the Main Street and 400 South intersection.
- Connects the Granary District to the University of Utah (a key origin-destination pair).
- **Modified Blue Line and Green Line operations** that would switch the northern termini so the Blue Line would terminate at the Salt Lake City International Airport and the Green Line would terminate at Salt Lake Central Station. Key benefit:
  - Increases TRAX system ridership.

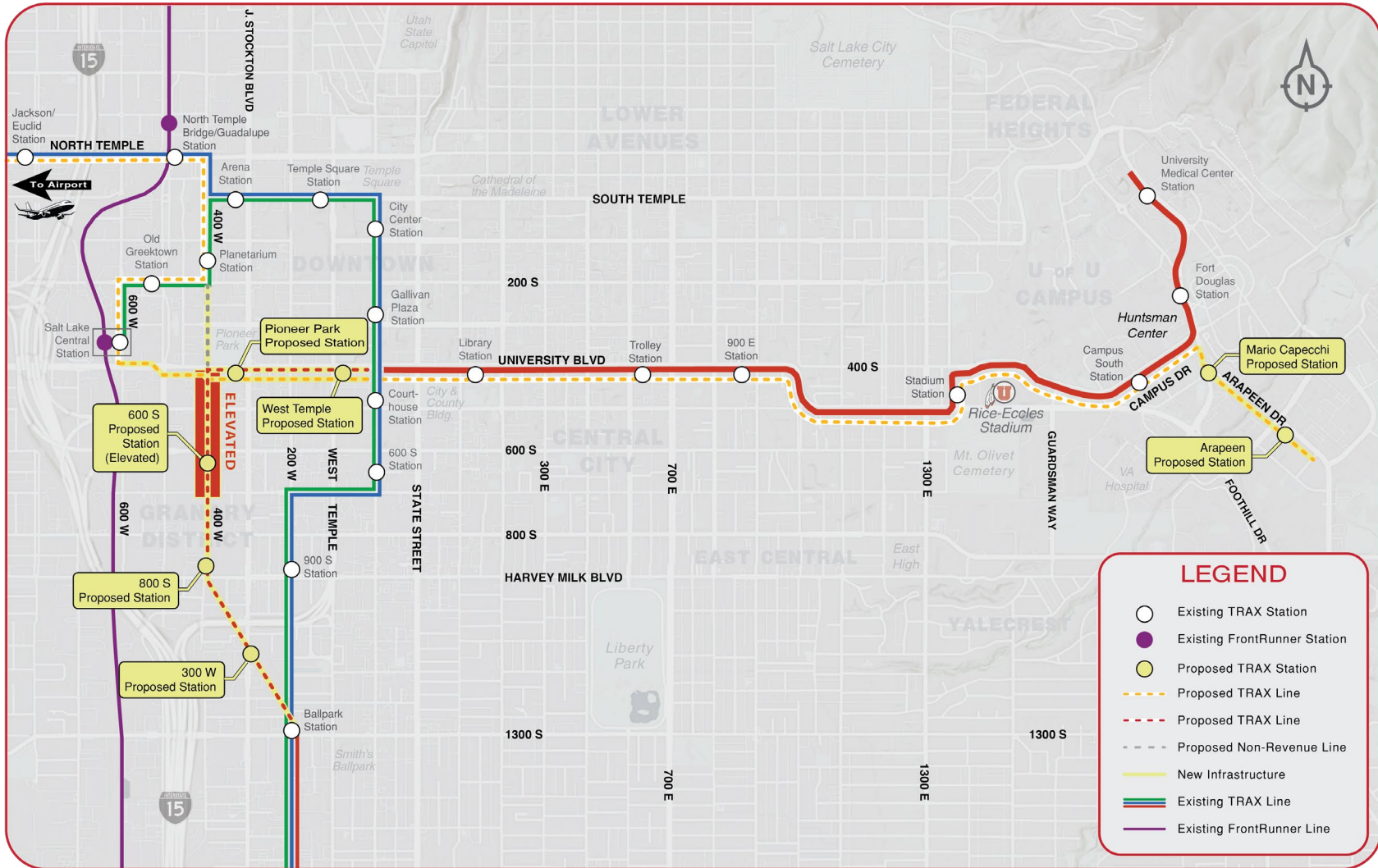
The alternatives are detailed below (see also [FIGURE 6.1](#) through [FIGURE 6.4](#)). A detailed memo of the alternatives development can be found in **APPENDIX E**.

**FIGURE 6.1 Alternative 1 – Future of Light Rail Baseline**



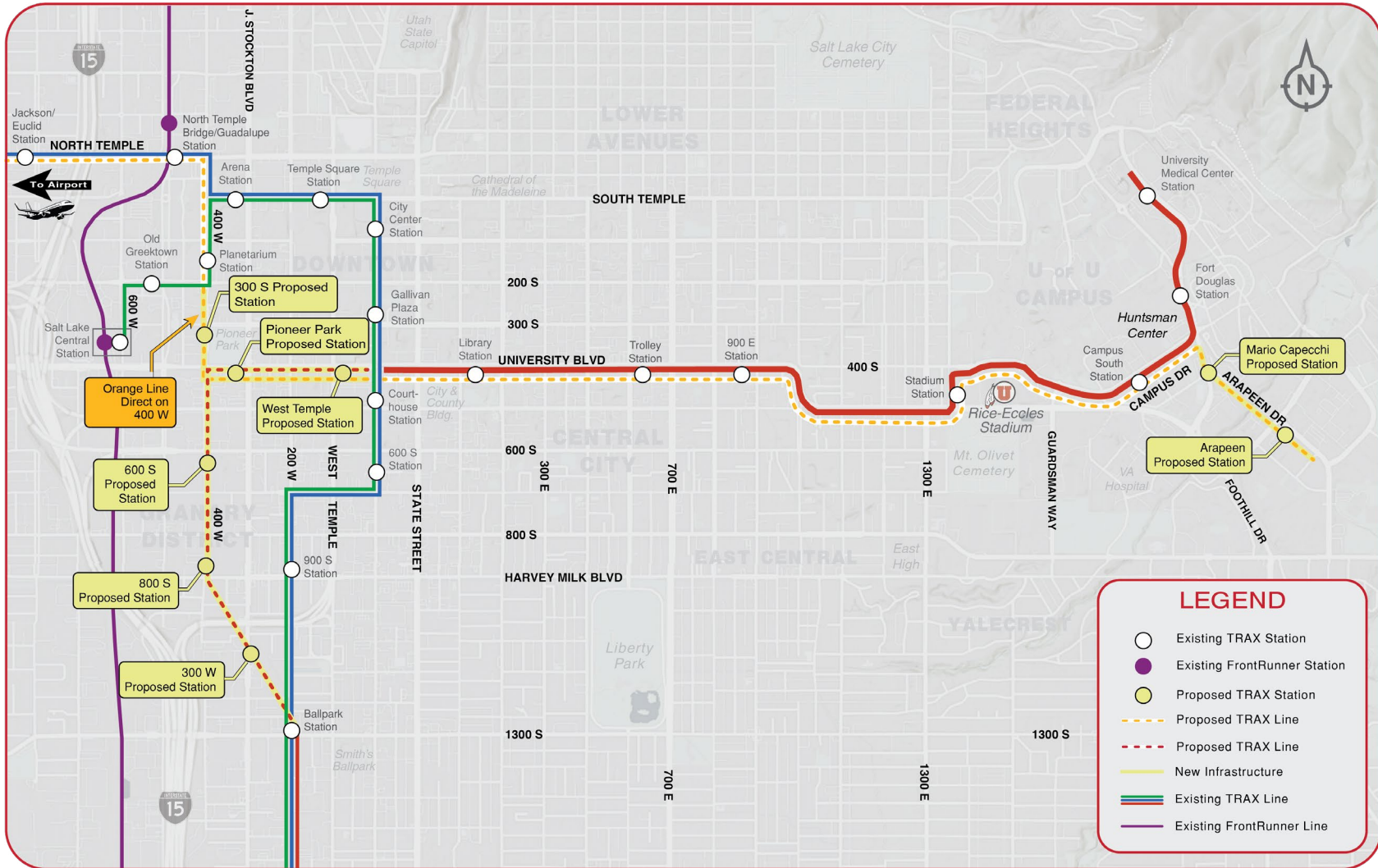


**FIGURE 6.2 Alternative 2 - Elevated on 400 West**

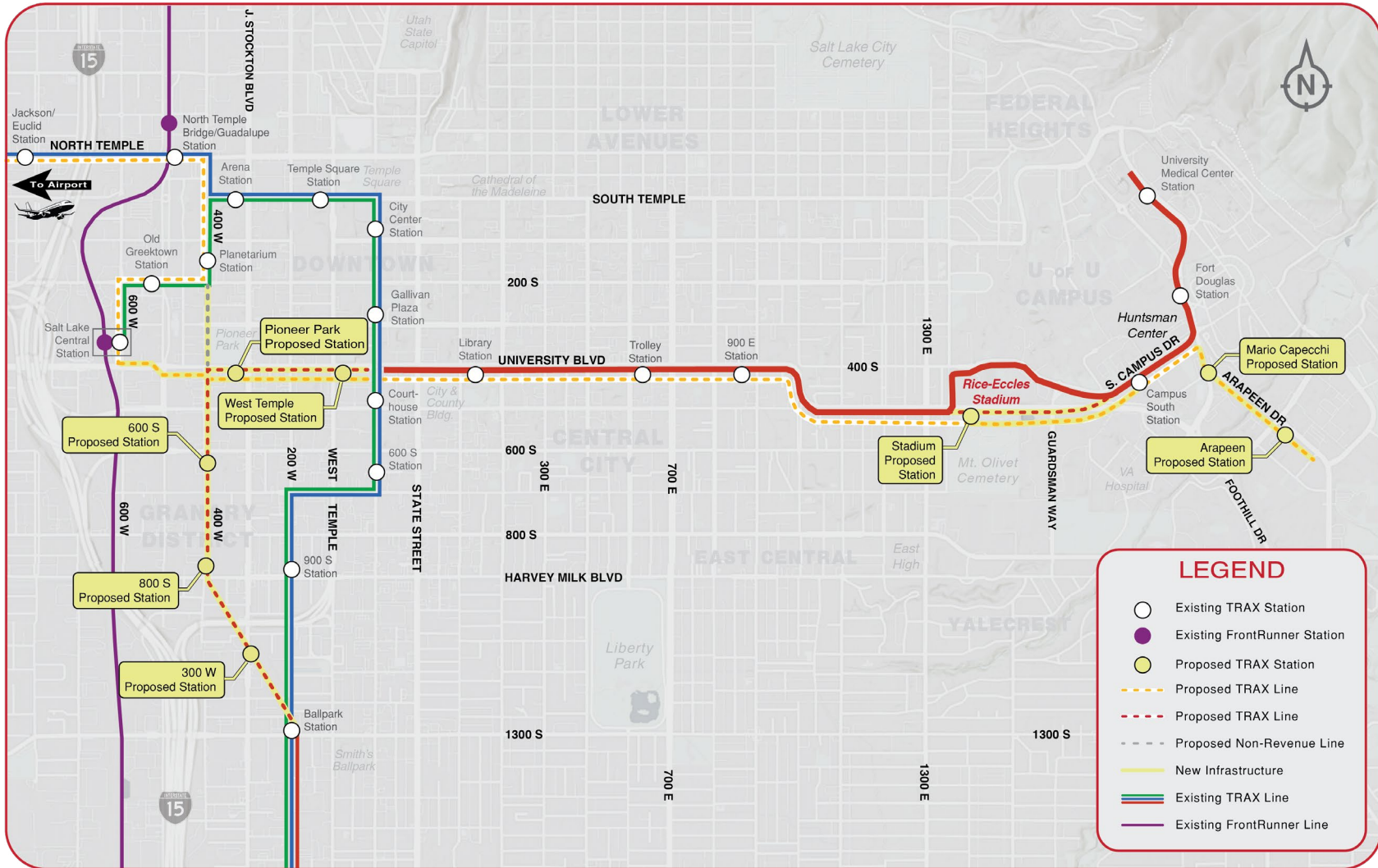




**FIGURE 6.3 Alternative 3 - Direct on 400 West**



**FIGURE 6.4 Alternative 4 - University of Utah Realignment**





## 6.1 ALTERNATIVE 1 - FUTURE OF LIGHT RAIL BASELINE

In this alternative, the proposed Orange Line would directly connect the Salt Lake City International Airport to the University of Utah and include a spur into Research Park connecting along Arapeen Drive. The Orange Line would use the existing TRAX infrastructure from the Salt Lake City International Airport east along North Temple to 400 West where it would turn south, then turn west onto 200 South, and then turn south on 600 West to connect to Salt Lake Central Station. From Salt Lake Central Station, the Orange Line would then continue on new infrastructure along 600 West, turning east onto 400 South, traveling on the north side of the 400 South viaduct, and continuing east on 400 South to connect to the existing TRAX infrastructure at the Main Street and 400 South intersection. The Orange Line would continue eastbound along the existing tracks to the South Campus Drive and Mario Capecchi Drive intersection, where it would turn southeast on new infrastructure and travel southeast to connect into Arapeen Drive. The Orange Line would serve the following new stations, two of which would be shared with the realigned Red Line:

- West Temple (75 West/400 South) Station (would also serve the proposed Red Line realignment)
- Pioneer Park (325 West/400 South) Station (would also serve the proposed Red Line realignment)
- Mario Capecchi Station
- Arapeen Station

The Red Line would be realigned to 400 West using the existing inactive rail corridor with new track infrastructure to serve the Granary District and provide a direct connection between the Granary District and the University of Utah. The realigned Red Line would utilize the new connection along 400 South as mentioned above, turn south at 400 West, and then connect to the Ballpark Station, using the defunct Ballpark Spur near 900 South. The new Red Line service on 400 West would include approximately five new stations, two shared with the Orange Line service:

- West Temple (75 West/400 South) Station (would also serve the proposed Orange Line)
- Pioneer Park (325 West/400 South) Station (would also serve the proposed Orange Line)
- 600 South Station
- 800 South Station
- 300 West Station

The northern termini of the Blue and Green Lines would switch in this alternative. This is an operational change and would not require new track infrastructure. At the South Temple and 400 West intersection, the Blue Line would turn north and follow the existing track to the Salt Lake City International Airport, and the Green Line would turn south and follow the existing tracks to terminate at Salt Lake Central Station.

Additionally, a new two-block non-revenue connector would be constructed on 400 West between 400 South and 200 South, adjacent to Pioneer Park. The connector would provide additional redundancy for the system.



## 6.2 ALTERNATIVE 2 – ELEVATED ON 400 WEST

Alternative 2 would follow the same alignment and service recommendations as Alternative 1. This alternative explores elevating the track on 400 West over 500 South and 600 South to avoid at-grade crossings of these two major UDOT arterials that connect to the on- and off-ramps of I-15 that carry heavy commuting traffic loads at peak times of the day.

## 6.3 ALTERNATIVE 3 – DIRECT ON 400 WEST

Alternative 3 includes similar elements from Alternative 1, except for the Orange Line alignment through the downtown area. This alternative proposes that the Orange Line turn north at 400 West from westbound travel on 400 South, providing a more direct connection to existing infrastructure and reducing the number of 90-degree turns in the light rail alignment.

The Orange Line would still directly connect the Salt Lake City International Airport to the University of Utah and include the extension into Research Park. The proposed Orange Line would follow the existing tracks from the Airport east along North Temple to 400 West, where it would turn south, and then continue on 400 West for an additional two blocks where new track and an additional station near Pioneer Park is proposed. The new connector along 400 West between 200 South and 400 South would no longer function as a non-revenue connector but as a full-service TRAX line. The new track would then turn east onto 400 South, connecting and continuing to the existing tracks at Main Street and 400 South. The Orange Line would continue along the existing tracks and would diverge from the Red Line at Arapeen Drive and serve two new stations (Mario Capecchi and Arapeen), ending at the heart of Research Park.

## 6.4 ALTERNATIVE 4 – UNIVERSITY OF UTAH REALIGNMENT

Alternative 4 has all the same elements from Alternative 1 with one exception: a realignment of the existing TRAX line at the University of Utah from South University Street and South Campus Drive (on the west and north side of the Rice-Eccles Stadium) to the south side of the stadium, along 500 South.

The Orange Line and Red Line would follow the existing Red Line tracks from downtown Salt Lake City along 400 South, through the S-Turn west of the stadium, and then directly onto 500 South. The realignment would have the Red Line and Orange Line stay on 500 South and would shift from center-running to side-running, shifting the tracks to the north side of 500 South and relocating the Stadium Station to the southwest side of the stadium. The Red Line and Orange Line would then connect back onto South Campus Drive east of the stadium and reconnect with the existing Red Line tracks. The Orange Line would continue along the existing alignment and then connect into Research Park via the proposed Arapeen Drive Connector. Note that this realignment could be included as an element for Alternatives 1, 2, or 3, but is considered explicitly as part of only Alternative 4 in this study.

No previous planning work had been completed prior to this study that defined the alignment and potential station relocation in this area. Therefore, the development of this alternative included an exploration of a wide range of alignment and station location options in collaboration with the University of Utah, Salt Lake City Public Utilities (SLCPU), and UDOT. The proposed alignment and station location advanced as Alternative 4 were developed to:





- Minimize impacts to elements of the built environment along 500 South, including the SLCPU drinking water reservoir, well, and related water utilities; the Rice-Eccles Stadium; and the Mount Olivet Cemetery and Reservoir.
- Provide a relocated Stadium Station location that is safe and accessible for high volumes of riders during events.
- Maintain vehicle capacity along 500 South (a UDOT-owned facility).
- Minimize challenges associated with the steep grades along 500 South.

## 6.5 400 SOUTH VIADUCT

The TechLink TRAX Study also explored various alternative alignment options for potential future TRAX light rail to traverse along the 400 South viaduct between 500 West and 600 West and to connect into the Salt Lake Central Station (applicable to Alternatives 1, 2, and 4). A report on the viaduct analysis can be found in **APPENDIX E, ATTACHMENT E1**. The UTA FOLR Study investigated several alternative alignment options (north of the viaduct, south of the viaduct, and split – one track on each side of the viaduct) in this area but did not select an alignment for how TRAX will traverse along the viaduct. As part of the TechLink TRAX Study, the study team considered a range of options, including:

- North Viaduct Option
- South Viaduct Option
- Split Viaduct Option
- Rebuild Viaduct Option

**Based on the initial analysis, the team further refined and explored design tradeoffs for the North and South Viaduct Options and removed the Split and Rebuild Viaduct Options from additional consideration.** The study team determined that the Split Viaduct Option would result in property impacts to both sides of the viaduct, whereas

with the North and South Viaduct Options, impacts would be limited to one side. To reduce total property impacts, the Split Viaduct Option was not considered as a potential alignment concept. Due to the substantial upfront capital cost and inefficient use of resources to replace a structure that still has 50+ years of useful life, the study team is not advancing the Rebuild Viaduct Option for further consideration.

**From a review of tradeoffs for the North and South Viaduct Options, the North Viaduct Option was selected as the preferred alignment option to traverse the 400 South viaduct.** This recommendation was advanced for the following reasons:

- Has lower cost.
- Minimizes impacts to private property and businesses on the south side of the viaduct by utilizing currently undeveloped parcels owned by the University of Utah and the RDA. A portion of these parcels has been preserved for potential future use as part of the TechLink TRAX Project.<sup>3</sup>
- Avoids potential safety concerns with light rail crossing the proposed 400 South multiuse trail on the south side of the viaduct.

Alternatives 1, 2, and 4 assume the North Viaduct Option as part of their alternative definition.

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<sup>3</sup> The RDA applied for and received a corridor preservation grant from Salt Lake County in 2021 to preserve 23 feet along the north side of the viaduct (north of the existing 400 South Frontage Road).



## 6.6 ALTERNATIVES CONSIDERED BUT NOT ADVANCED

### RED LINE REALIGNMENT ON 600 WEST

Several agencies and stakeholders have historically expressed interest in evaluating 600 West as an alignment for new service into the Granary District. A potential alignment along 600 West was considered in previous studies (Salt Lake City Downtown Streetcar Alternatives Analysis [2014] and Downtown Salt Lake City Rail Extension & Connections Feasibility Study [2021]) and described in greater detail in the Alternatives Development Report (**APPENDIX E**).

This concept of providing an alignment on 600 West was explored initially as part of this study. The concept maintains the same elements from Alternative 1 but shifts the Red Line realignment from 400 West to 600 West between 400 South and 700 South. The goal was to utilize the existing grade separation of the 500 South and 600 South viaduct on- and off-ramps at I-15 to avoid at-grade crossings that could potentially disrupt peak traffic demand.

Findings from previous studies are similar to observations made as part of this study. Realigning the Red Line along 600 West would skirt the Granary District, resulting in reduced ridership potential and poor performing economic development potential compared to 400 West.

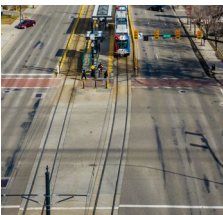
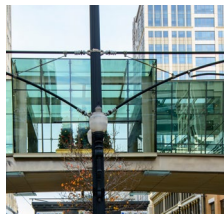
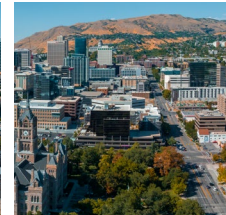
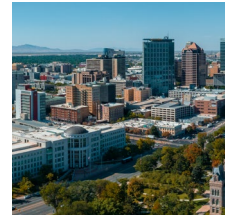
To clarify, the 400 West option would allow redevelopment along both sides of the corridor, whereas the 600 West option would only allow for redevelopment on the east side of the corridor due to over a dozen railroad tracks on the west side of the corridor and I-15 to the west. This alignment would also increase transit travel times by increasing the distance traveled (approximately 1 additional mile of track would be required) and introducing additional 90-degree turns. For these reasons, the study team, TAC, and Steering Committee recommended not advancing this alternative into the evaluation phase.

### 500 SOUTH AND 600 SOUTH ROADWAY GRADE SEPARATION

During the early portion of the TechLink TRAX Study, the concept of grade separating 500 South and 600 South in the Granary District was suggested as an option to provide enhanced operational efficiencies for light rail traveling in this area. As part of this idea, 500 and 600 South would travel below grade under 400 West, allowing the light rail alignment on 400 West to be at-grade and avoid crossing these two arterials. The large capital costs, significant construction impacts, and potential groundwater challenges make this a highly complex and impactful project. The large capital investment required was determined to be outside of the scope of this project.



# CHAPTER 7. ENVIRONMENTAL ANALYSIS





Environmental resources were evaluated to determine existing resources present in the study area that may be affected by or are relevant to the selection and refinement of an alternative to advance as the Locally Preferred Alternative. There are some resources that most likely would not be impacted by the alternatives that were evaluated, and those include prime and unique farmland and Section 6(f) resources. The resources that are more likely to be impacted by the alternatives include the following: land use and zoning, acquisitions and relocations, environmental justice populations, economics, cultural, historic and

archaeological resources, Section 4(f) resources, visual and aesthetic resources, noise and vibration, air quality, floodplains, traffic and transportation, public services and utilities, soils and geology, threatened and endangered species, energy, and more.

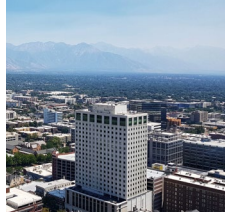
The anticipated environmental impacts are similar for all alternatives with slight variations. **TABLE 7.1** summarizes the differences in anticipated impacts on key environmental resources. A full memo detailing the environmental analysis can be found in **APPENDIX F**.

Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<b>Acquisitions and Relocations</b>	<ul style="list-style-type: none"> <li>• Potential ROW acquisition along 400 South, the Ballpark Spur, and within Research Park</li> <li>• One potential building demolition on the Ballpark Spur</li> </ul>			
			<ul style="list-style-type: none"> <li>• Fewer ROW acquisitions (no ROW acquisitions on 400 South west of 400 West)</li> </ul>	<ul style="list-style-type: none"> <li>• Potential additional ROW acquisition south of Rice-Eccles Stadium along 500 South</li> </ul>
<b>Cultural, Historic, and Archaeological Resources</b>	<ul style="list-style-type: none"> <li>• Potential <b>Adverse Effect</b> to Pioneer Park (<i>if</i> mature trees are removed along the southern edge of the park; however, it is anticipated that this impact would be avoided in future phases of design), Denver and Rio Grande Western (D&amp;RGW) Railroad, and Oregon Short Line Railroad</li> <li>• Potential <b>No Adverse Effect</b> to Salt Lake City Warehouse District, Exchange Place Historic District, buried trolley tracks, and Fort Douglas</li> </ul>			
			<ul style="list-style-type: none"> <li>• Fewer impacts to Salt Lake City Warehouse District (potential <b>No Adverse Effect</b>)</li> </ul>	<ul style="list-style-type: none"> <li>• Potential <b>No Adverse Effect</b> to Mt. Olivet Cemetery</li> </ul>
<b>Noise and Vibration</b>	<ul style="list-style-type: none"> <li>• Potential for increased vibration to one Category 1 receiver (Noorda Oral Health Sciences building), approximately 420 feet from proposed alignment</li> </ul>			
	<ul style="list-style-type: none"> <li>• 69 potential noise impacts</li> <li>• 26 potential vibration impacts</li> </ul>	<ul style="list-style-type: none"> <li>• 69 potential noise impacts</li> <li>• 26 potential vibration impacts</li> </ul>	<ul style="list-style-type: none"> <li>• 67 potential noise impacts</li> <li>• 24 potential vibration impacts</li> </ul>	<ul style="list-style-type: none"> <li>• 70 potential noise impacts</li> <li>• 26 potential vibration impacts</li> </ul>

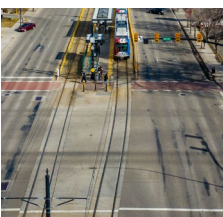
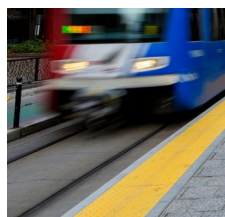
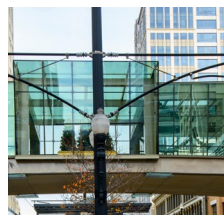
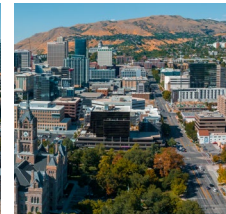
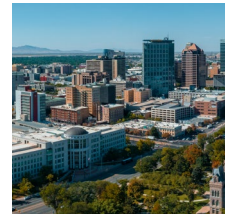
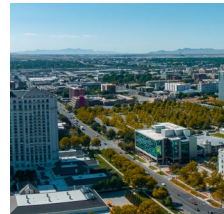




Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Section 4(f) Resources	<ul style="list-style-type: none"> <li>• Potential <b>greater than <i>de minimis</i> impact</b> to Pioneer Park (<i>if</i> mature trees are removed along the southern edge of the park; however, it is anticipated that this impact would be avoided in future phases of design)</li> <li>• Potential <b><i>de minimis</i> impact</b> to Salt Lake City Warehouse District, Exchange Place Historic District, and Fort Douglas</li> </ul>			
			<ul style="list-style-type: none"> <li>• Fewer impacts to Salt Lake City Warehouse District (potential <b><i>de minimis</i> impact</b>)</li> </ul>	<ul style="list-style-type: none"> <li>• Potential <b><i>de minimis</i> impact</b> to Mt. Olivet Cemetery</li> </ul>
Visual and Aesthetic Resources	<ul style="list-style-type: none"> <li>• Minimal visual impacts to the built environment as there are currently existing light rail lines throughout the study area and the concepts would be largely constructed in urbanized, developed areas</li> <li>• Higher potential for visual impacts to natural environment at Red Butte Creek crossing</li> </ul>			
		<ul style="list-style-type: none"> <li>• Noticeable change in visual character as a result of elevated line above 400 West</li> </ul>		
Water Resources	<ul style="list-style-type: none"> <li>• Potential to impact Red Butte Creek and pump station west of Red Butte Creek</li> </ul>			
				<ul style="list-style-type: none"> <li>• Potential to impact wells, covered water storage reservoir, and Mt. Olivet Reservoir south of Rice-Eccles Stadium along 500 South</li> </ul>
Wetlands and Waters of the U.S.	<ul style="list-style-type: none"> <li>• Potential impact to Red Butte Creek</li> </ul>			
				<ul style="list-style-type: none"> <li>• Potential to impact Mt. Olivet Reservoir (likely not jurisdictional)</li> </ul>



# CHAPTER 8. ALTERNATIVES EVALUATION





The purpose of the alternatives evaluation is to understand the benefits and tradeoffs between each alternative and determine how well each alternative meets the Purpose and Need.

### 8.1 FINDINGS

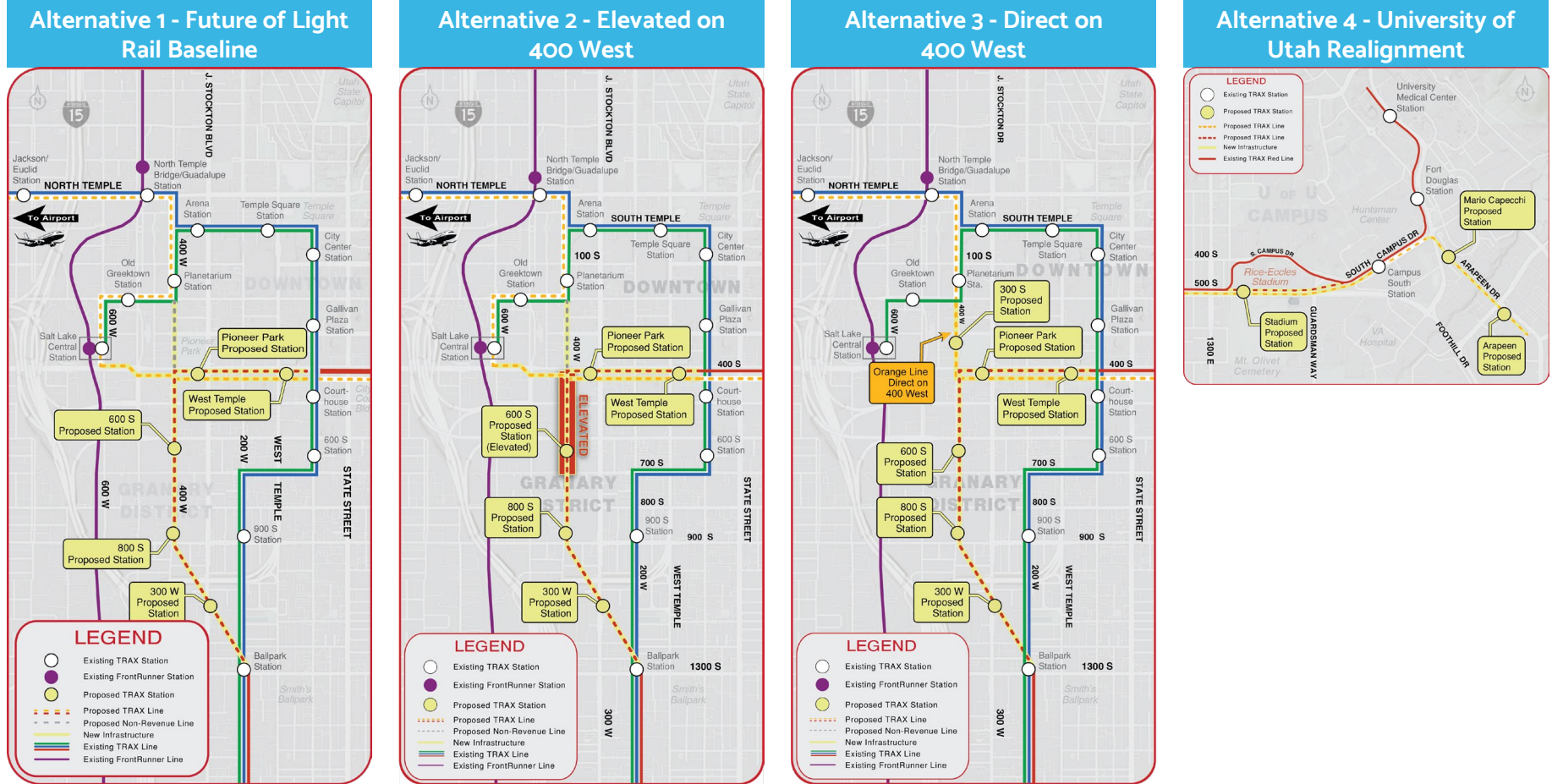
Because so much preliminary work was conducted in previous studies, this effort utilized a single-step alternatives screening process to evaluate alternatives and inform the selection of a Locally Preferred Alternative. The range of alternatives is described in [CHAPTER 6](#).

Alternatives 1, 2, 3, and 4 were all advanced into the evaluation process using the following criteria (see [TABLE 8.1](#)). The evaluation process was vetted through the TAC and the Steering Committee. The Alternatives Evaluation Memo can be found in [APPENDIX G](#), which includes detailed findings around ridership, travel times, operational performance and costs, economic development potential, access to opportunities, and an assessment of potential environmental impacts.

[FIGURE 8.1](#) shows the four alternatives advanced into the evaluation process.

TABLE 8.1 Evaluation Criteria		
Purpose/Need Elements	Proposed Criteria	Data Source
Support local and regional transportation growth in Salt Lake City	Ridership	Federal Transit Administration (FTA) Simplified Trips-on-Project Software (STOPS) model
Improve transit reliability and capacity	Transit travel times	RailOps model
	Transit reliability	
Enhance mobility between existing and emerging centers	Economic development potential	Quantitative redevelopment indicators: <ul style="list-style-type: none"> <li>• High-value commercial permits</li> <li>• Effective year built</li> <li>• Improvement value as percentage of land value</li> <li>• Population and employment density (now/future)</li> </ul> Qualitative understanding
Increase access to opportunity for disadvantaged populations	Increase access to opportunity for disadvantaged populations	<ul style="list-style-type: none"> <li>• EJScreen (access for minority/low-income populations)</li> <li>• Employment projections</li> </ul>
Provide sustainable transportation options	Potential for environmental impacts	Environmental analysis
	Capital and O&M costs	Design-based (capital costs) and from the UTA FOLR Study (O&M costs)

**FIGURE 8.1 Range of Alternatives**



All four alternatives generally performed similarly in the evaluation process due to their similarities in alignments, service, and station locations. Alternative 3 performed slightly better than the other alternatives in this technical alternatives evaluation, primarily due to

lower costs (less new track) and savings in transit travel time (offering a straight connection up 400 West rather than a circuitous connection to Salt Lake Central Station).



The summary of the evaluation results is found in [FIGURE 8.2](#) and described below:

FIGURE 8.2 Evaluation Results					
Proposed Criteria		Alternative 1 Future of Light Rail	Alternative 2 400 West Elevated	Alternative 3 Direct on 400 West	Alternative 4 U of U Realign
Weekday Ridership		Similar	Similar	Similar	Similar
Transit Travel Times and Reliability		<ul style="list-style-type: none"> <li>Orange Line travel time: 4 minutes slower</li> <li>Similar for other lines</li> </ul>	<ul style="list-style-type: none"> <li>Orange Line travel time: 4 minutes slower</li> <li>Similar for other lines</li> </ul>	<ul style="list-style-type: none"> <li>Orange Line travel time: 4 minutes faster</li> <li>Similar for other lines</li> </ul>	<ul style="list-style-type: none"> <li>Orange Line travel time: 4 minutes slower</li> <li>Similar for other lines</li> </ul>
Economic Development Potential		<ul style="list-style-type: none"> <li>Directly serves <u>potential redevelopment</u></li> <li>Close to existing development</li> </ul>	<ul style="list-style-type: none"> <li>Directly serves <u>potential redevelopment</u></li> <li>Close to existing development</li> </ul>	<ul style="list-style-type: none"> <li>Directly serves <u>existing development</u></li> <li>Close to potential redevelopment</li> </ul>	<ul style="list-style-type: none"> <li>Directly serves <u>potential redevelopment</u></li> <li>Close to existing development</li> </ul>
Access to Opportunity		Similar	Similar	Similar	Similar
Potential for Environmental Impacts		Primarily right-of-way, cultural/historic, noise/vibration	Slight increase in visual impact along 400 West	Slightly reduced impacts along 400 South	Slightly increased impacts along 500 South
Capital and Annual O&M Costs		Capital: \$460 M Annual O&M: +26%	Capital: \$510 M Annual O&M: +26%	Capital: \$400 M Annual O&M: +25%	Capital: \$570 M Annual O&M: +26%



**Weekday Ridership** – All alternatives performed similarly with a range in ridership (daily boardings at new stations) from 3,400-3,750 in 2023 and 5,400-5,700 in 2045.

**Transit Travel Times and Reliability** – For transit travel times, all alternatives performed similarly for Red Line travel times with an end-to-end trip of 64.5-65 minutes. The Orange Line travel time saw differences by alternative, with Alternatives 1, 2, and 4 taking a total trip time of 49.5-50 minutes and Alternative 3 being about 4.5 minutes faster at 45.5 minutes. Transit reliability was also similar between all alternatives, with an estimated on-time percentage of 96-98%, which is an improvement over the current UTA TRAX system on-time percentage of 90%.

**Economic Development Potential** – All alternatives would increase access to economic opportunity and support redevelopment potential. Alternatives 1, 2, and 4, routing through Salt Lake Central Station, would be farther from existing centers of population, employment, and recent development, but could provide more additional opportunities for potential redevelopment as part of the envisioned Rio Grande District Vision & Implementation Plan and UTA’s potential redevelopment of Salt Lake Central Station. Alternative 3, routing directly along the 400 West corridor to North Temple, would have fewer opportunities for potential redevelopment directly adjacent, but would be closer to development areas with high densities of existing employment and population.

**Access to Opportunity** – All alternatives performed similarly. By providing additional transit options, all alternatives would improve access to minority and low-income populations by approximately 4% and increase access to employment opportunities by approximately 10%.

**Potential for Environmental Impacts** – Alternative 1 would have potential impacts associated with ROW, cultural/historic resources, and noise and vibration. Alternative 2 would have slightly increased impacts compared to Alternative 1, which are associated with additional visual impacts along 400 West from the grade-separated structure. Alternative 3 would have slightly reduced impacts compared to Alternative 1 due to no track present along 400 South and 600 West, which would reduce ROW and cultural/historic resources impacts. Alternative 4 would have increased impacts compared to Alternative 1, with additional potential impacts to ROW, cultural/historic resources, and water resources along 500 South.

**Capital and Annual O&M Costs** – The capital costs of each alternative range from the lowest cost, Alternative 3 (\$400 M), to the highest cost, Alternative 4 (\$570 M). Alternatives 1 and 2 fall within that range at an estimated \$460 M and \$510 M, respectively. The annual O&M costs for Alternatives 1, 2, and 4 are similar at an increase of approximately \$18M over the existing TRAX O&M. Alternative 3 has the lowest O&M cost at an increase of approximately \$17M over the existing TRAX O&M. It is also worth noting that the reduced travel time for Alternative 3 could potentially require one less train set to operate the TRAX system compared to the other alternatives, thereby reducing both capital and O&M costs. This potential operational change should be modeled and verified in discussions with UTA TRAX operations in future phases of work.



## 8.2 ALTERNATIVES RECOMMENDED FOR ELIMINATION

Based on the alternatives evaluation findings presented above, it was proposed that both Alternatives 2 and 4 not advance for further consideration.

### 8.2.1 ALTERNATIVE 2 - ELEVATED ON 400 WEST

Alternative 2 performed similarly to other alternatives, with some operational efficiency benefits through grade separation of the Red Line over 500 and 600 South. However, analysis performed shows that the benefits from this grade separation would be minimal (minor overall end-to-end travel time savings and negligible changes in ridership) compared to the overall substantive added project cost. In addition, several project partners expressed concern over access to elevated stations, limitations related to street activation, and potential visual impacts. For these reasons, it was proposed that this alternative not move forward into additional phases of work.

### 8.2.2 ALTERNATIVE 4 - UNIVERSITY OF UTAH REALIGNMENT

Alternative 4 performed similarly to other alternatives and also would enhance campus permeability, which is a goal of the University of Utah. However, the substantive added cost, increase in potential impacts to resources along 500 South, with limited benefits to project goals do not make this a competitive alternative. For these reasons, it was proposed that this alternative not move forward into additional phases of work. It is noted that project partners support additional study for the existing TRAX alignment along South Campus Drive to enhance campus permeability.

## 8.3 ADDITIONAL FACTORS FOR CONSIDERATION - ALTERNATIVES 1 AND 3

The remaining alternatives – Alternatives 1 and 3 – performed similarly and additional considerations were taken into account to provide additional information. These additional factors were access to transit connections and walkshed access to economic redevelopment opportunities.

### 8.3.1 ACCESS TO TRANSIT CONNECTIONS

The study team looked at existing transit connections in the study area and also consulted with UTA service planners (see [FIGURE 8.3](#)). Key takeaways for how Alternatives 1 and 3 would provide connections to other transit service in the study area include:

- Both Alternatives 1 and 3 would provide similar direct access to local bus service, FrontRunner, and other TRAX lines. However, these connections could occur in different places.
- The differences between Alternatives 1 and 3 is where transfers would take place, not the overall availability or number of connections.
- Regardless of the alternative selected, the bus network would be optimized to serve the new TRAX stations.

### 8.3.2 WALKSHED ACCESS TO ECONOMIC REDEVELOPMENT OPPORTUNITIES

The study team looked specifically at transit access to Alternative 1 and 3 from proposed economic redevelopment opportunities, specifically a 5-minute and 15-minute walkshed (Figure 19). The 5-minute walkshed also depicts the added walkshed if direct access through the Rio Grande Building is provided.

**FIGURE 8.3 Alternatives 1 and 3 Transit Connections**



In **FIGURE 8.4**, the red-lined rectangle east of 600 West depicts the area that would potentially be redeveloped into the Rio Grande District, and the red-lined triangle west of 600 West is the proposed Salt Lake Central Station redevelopment. The proposed Rio Grande redevelopment would be served in close proximity to Alternative 1 (from the west) and Alternative 3 (from both the east and west) primarily within the 5-minute

walkshed. It is worth noting that access would be enhanced with direct access through the Rio Grande Building. The proposed Salt Lake Central Station redevelopment would be most directly served by Alternative 1 and indirectly served by Alternative 3, where it is just beyond the 5-minute walkshed.

**Key Takeaway:** A notable key finding from this analysis is that enhanced access between 400 West and 600 West through the Rio Grande Building would be critical for providing access to both Alternatives 1 and 3.

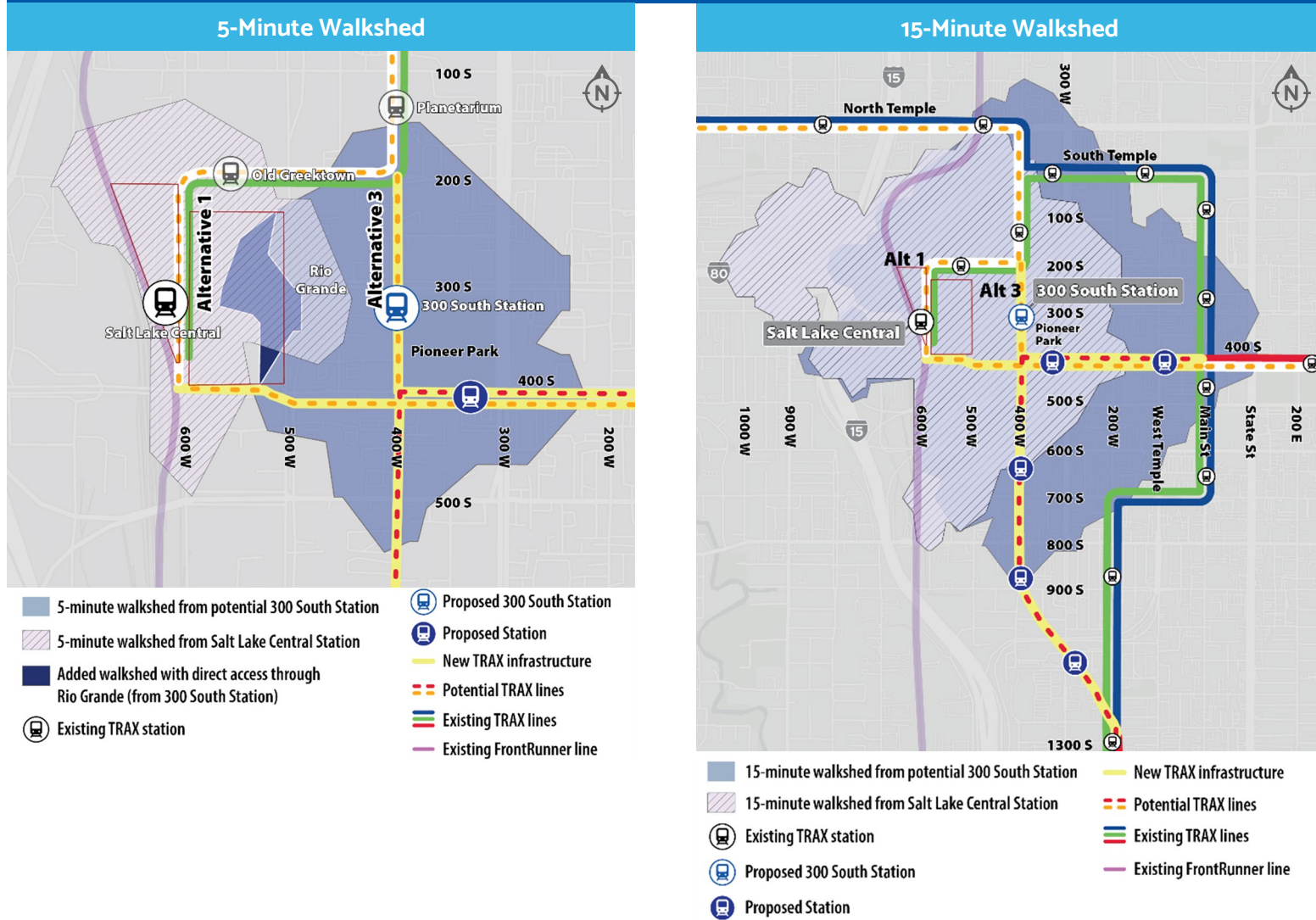
### 8.4 TECHNICAL RECOMMENDATION

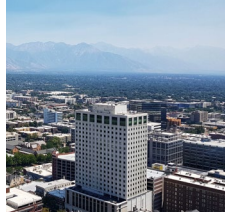
Based on the findings described above from the alternatives evaluation, the technical recommendation for the Locally Preferred Alternative is Alternative 3, which has the following advantages:

- Is the lowest cost alternative for both capital costs and annual O&M costs.
- Increases operational efficiency by offering higher transit reliability and a travel time on the Orange Line that is 4-5 minutes faster than the other alternatives.
- Provides a slight reduction in ROW and environmental impacts (cultural resources and noise/vibration).
- Offers an enhanced customer experience/perception (per public comment).
- Provides similar projected ridership as other alternatives.
- Directly serves key economic development opportunities along 400 South and the Granary District and proximal service (within 0.3 mile) to the Rio Grande District and Salt Lake Central Redevelopment.

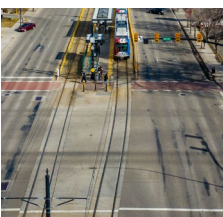
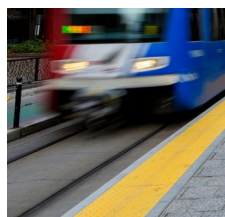
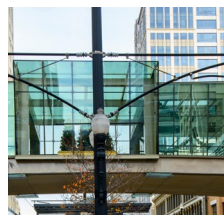
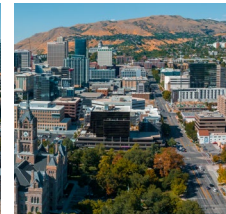
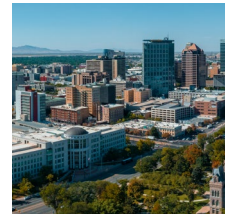
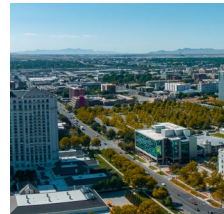


**FIGURE 8.4 Walkshed Access**





# CHAPTER 9. NEXT STEPS





As this project moves forward, additional coordination and planning are important in maintaining the vision, momentum, and decisions made as part of this initial study to optimize success for the project in the future.

**FIGURE 9.1** depicts the distinct steps that a project goes through from planning through construction. Since this study will conclude the Planning and Alternatives Analysis phase, UTA has secured funds to begin advancing the project into the Environmental Review phase of the project. This next step will include an environmental study (likely a federal NEPA Environmental Assessment [EA]) and preliminary design. Due to the potential need for resiliency, the study team recommends advancing both the Locally Preferred Alternative (Alternative 3) and Alternative 1 into additional detailed investigation as part of the EA. Delivering a federal NEPA document will ensure that the project is eligible to apply for federal funding opportunities.

Along with the environmental review, additional technical work should be explored to further the project understanding and development of a competitive project. This should include:

- **Optimization of FTA STOPS modeling**, which should also include coordination between Salt Lake City, UTA, University of Utah, and WFRC to potentially amend socioeconomic conditions in the project area to reflect potential population and employment changes most accurately.
- **Optimization of transit operations modeling**, primarily to understand the possibility of operating with one less train set<sup>4</sup> and also to provide information to further guide the discussion around the appropriate number of vehicles to operate the project.
- **Continued coordination with UDOT and Salt Lake City**, particularly to develop a cross-section on 400 South that maintains mobility and meets partners’ needs.

4 The reduced travel time for the Locally Preferred Alternative could potentially require one less train set to operate the TRAX system compared to the other alternatives, thereby reducing both capital and O&M costs. This potential operational change should be modeled and verified in discussions with UTA TRAX operations in future phases of work.

**FIGURE 9.1 Project Development Timeline**

