UNIVERSITY OF UTAH CAMPUS MOBILITY HUB STUDY

THE UNIVERSITY OF UTAH

WASATCH FRONT REGIONAL COUNCIL

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01

EXISTING CONDITIONS

"I think these mobility hubs will be great to encourage people to use public transit."

- MOBILITY HUB SURVEY PARTICIPANT

Executive Summary

The purpose of the University of Utah Campus Mobility Hub Study is to establish optimal locations for the siting of mobility hubs on or around campus. The intent of the hubs is to encourage mode shift through hub proximity to destinations and services, connectivity and seamless transfers, user-friendly programming and wayfinding, and increased safety and security by implementing pedestrian priority and placemaking elements.

This study reviews existing conditions and previous studies and analyzes those studies with collected data from public engagement and other sources to select preferred locations for the mobility hubs. Best practices and emerging trends are discussed and applicable case studies are outlined.

Conceptual designs for the preferred locations were created with tailored site specific program elements. These concepts are intented to help stakeholders visualize how the preferred hub sites could be developed. The information gathered for the existing conditions, best practices and emerging trends, case studies, public engagement, site selection and program development, preferred locations, concept designs, and funding and schedule are delineated in the chapters of this study.

Background

This chapter provides a review of existing conditions and agreements, master plans, current laws and regulations, and other relevant data that played a role in identifying locations for a future mobility hub. The University of Utah's campus is approximately 1,500 acres and is split into four sections: Main Campus, Health Sciences, Research Park, and Fort Douglas. The University is the largest employer in the State and has an additional 32,000 undergraduate and graduate student body of which only 15% live on campus. The Research Park employs an additional 15,000 people. The University Hospital, Huntsman Cancer Institute, and Primary Children's Hospital also receive thousands of patients and visitors each day. Adjacent to the campus is the Veterans Administration (VA) campus, which comprises approximately 80 acres and had more than 600,000 out-patient visits in the last year. The VA Campus is comprised of the Veterans Affairs Hospital, the US Department of Veterans Affairs, and other support services and facilities. The campus supports United States Veterans and their families. These populations contribute to the multimodal traffic arriving to and departing from the study area each day.

Existing Conditions

The University has four main campus areas: Main Campus, Health Sciences, Research Park, and Fort Douglas **as shown on Attachment B in the appendix.**

1. Main Campus

Main Campus serves as a gateway to the University and includes primary academic buildings. The area is bound by North Campus Drive, South Campus Drive, University Street, and Mario Capecchi Drive. TRAX Light Rail serves this campus along South Campus Drive and Mario Capecchi Drive at the Stadium TRAX Station, South Campus TRAX Station, Fort Douglas TRAX Station, and Medical Center TRAX Station. Students, faculty, and staff are regular commuters for Main Campus. Some surface parking lots and parking structures for vehicle commuters do not connect with established pathways, forcing pedestrians and bicyclists to navigate areas without designated sidewalks.

2. Health Sciences Campus

The Health Sciences Campus is made up of the University Hospital, Huntsman Cancer Center, Primary Children's Hospital, and Medical School buildings. This area is bounded by North Medical Drive, South Medical Drive, Mario Capecchi Drive, and Bonneville Shoreline Trail. The TRAX Light Rail serves the Medical Center TRAX Station on Mario Capecchi Drive. Health Sciences Campus serves the public, students, faculty, and staff. This campus, however, lacks clear pedestrian pathways. Most on campus pedestrian movements are served by underground connections or bridges between buildings.

3. Research Park Campus

Research Park incorporates research facilities, housing, and businesses, along with a few University Buildings such as the School of Dentistry and the University Orthopedic Center. The campus is bound by Red Butte Creek, Foothill Drive, Sunnyside Avenue, and Bonneville Shoreline Trail. Commuters for this campus are predominately employees and students. All roadways in Research Park Campus provide only one sidewalk, with bus and shuttle services provided on both sides of the roadway. Some surface parking lots, parking structures, and bicycle lanes for commuters do not connect with established pathways, forcing pedestrians and bicyclists to navigate these areas without sufficient designated

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FORT DOUGLAS OFFICER'S CLUB

pathways creating dangerous conditions. Research Park has no direct service from TRAX light rail, but is served by UTA bus routes and University Shuttles.

4. Fort Douglas

Fort Douglas comprises of student housing, University departments, and part of the U.S. Army Reserve. The campus area lies east of Mario Capecchi Drive and north of Wakara Way. Commuters for this campus include military, students, faculty, and staff. TRAX Light Rail serves Fort Douglas at the Fort Douglas TRAX Station located at the southern end of Mario Capecchi Drive. Only one bus station serves this campus. The campus is mainly accessed by private vehicles.

In addition to the four campuses listed above, another important area adjacent to the University is the George E. Wahlen Department of Veterans Affairs Medical Center (VA Campus) located south of Main Campus on Foothill Drive. This facility serves veterans, students, faculty, staff, and a variety of Salt Lake City residents. Since there are limited parking spaces at the medical center, most employees park in the Fort Douglas Campus and Sunnyside Park area and use the shuttle services. Transportation to the VA Campus is serviced by TRAX, bus, and VA shuttles.

Modes of Transportation

The campuses are surrounded by regional roadways that convey most of the trips generated in these areas. The campuses serve as a destination to students, the University faculty, and a variety of Salt Lake City residents that work at the Health Sciences or Research Park campuses. Additionally, the Health Sciences and VA Campuses are heavily visited.

A variety of transportation modes were identified in the study area.

a) Private Vehicles

Currently, single-occupant vehicles are the most common mode of transportation to get to the study area. Main vehicular access roads are 100 South, North Campus Drive, 1300 East, Guardsman, Foothill Drive, and South Campus Drive. Much of the vehicular traffic to the study area each day arrives via Foothill Blvd, 500 South, North Campus Drive/100 South, and South Campus Drive. Traffic counts on each of these roadways are significant.

b) University Owned and Operated Buses/Shuttles

The University operates several campus shuttles that circulate the campus on six different routes; however, there is currently no coordination between the TRAX and shuttle services. The Blue and Red shuttle services have the highest ridership, serving the outermost areas of the Main Campus and Health Sciences Campus and along Central Campus Drive. The campus shuttle system is free for users.

c) Utah Transit Authority

The Utah Transit Authority (UTA), provides several modes of public transportation for the University, including buses, Light Rail TRAX, Vanpool, and Carpool. Several buses run through the University area as well as the TRAX Red line (Light Rail), which runs between the University and South Jordan through the downtown area.

kutv.com

Riders can transfer downtown to the Frontrunner Commuter Rail, which runs north/south through the Salt Lake Valley from Ogden to Provo. They can also transfer to the TRAX Green or Blue lines that run to West Valley, the Salt Lake City International Airport, or Draper. TRAX Light Rail serves the southern end of the Main Campus along South Campus Drive and runs north to the intersection of Mario Capecchi Drive and North Medical Drive to serve the Health Sciences Campus. Currently, there are four main TRAX Stations on the University campus: Stadium, South Campus, Fort Douglas, and the Medical Center TRAX Station. The utilization of these stations has largely been determined by the campus topography. Because the Health Sciences Center is the highest area of the University and the Stadium TRAX Station is the lowest area, most students arrive at South Campus TRAX Station and depart downhill at the Stadium TRAX Station. Students and staff can use their University IDs to ride UTA buses, TRAX, and Frontrunner.

d) Shared Mobility

Shared mobility refers to a range of transportation modes that are shared among users. Over the course of just a few years, cities across the country have seen a dramatic change in the shared mobility landscape as non-profit organizations and for-profit companies have leveraged technology and current trends in mobility preferences to give people a wide array of shared mobility options. These modal options include bikesharing, scootersharing, carsharing, peer-to-peer ridesharing, on-demand services, and microtransit. This has resulted in an increase in options available for making short trips and more alternatives to the car, which aligns with many cities' goals, including Salt Lake City. However, a bi-product of these new mobility trends is the increased competition for space on streets and sidewalks and subsequent conflicts between road and sidewalk users. Shared mobility offerings in the Salt Lake region have significantly expanded in the last decade. From the formation of the City's GREENbike bike share system in 2011, shared mobility offerings have grown to include dockless bike share, dockless e-scooter and ride share fleets. Currently, shared mobility users in Salt Lake City have the choice of GREENbikes, Lime, Bird, Spin, Razor, Avail, Lyft, Uber, Enterprise, and Turo. GREENbike stations are limited to the downtown area and do not currently provide reasonable connections to the campuses. E-scooters are not currently permitted to establish drop-off hubs on the University campus, but scooters are often found on and around campus, left by users. **See Attachment D in the appendix for existing GREENbike stations in downtown Salt Lake City.**

e) Biking

In addition to the bike share programs mentioned above, biking to and from campus is an ever increasing mode. The University, in accordance with the 2011 University of Utah Bicycle Master Plan, is increasing the amount of bike and multi-use paths on and around campus. Salt Lake City is also increasing the amount of delineated paths around the campus following their 2015 Salt Lake City Pedestrian & Bicycle Master Plan These paths are making biking to, within, and from the campus easier.

f) Walking

Walking is a fundamental means of travel, particularly in a campus environment. Walking includes travel by foot, as well as the use of personal accessibility devices, such as wheelchairs, electric mobility chairs, and walkers.

Existing Agreements & Master Plans

Several local and regional studies have been completed that directly or indirectly impact the University of Utah Campus Mobility Hub Study. The Psomas team reviewed a variety of master plans, studies, and other data to better understand the current and future condition of the campus.

A data gathering/research matrix was developed to organize content. **A copy of this matrix can be found in Attachment A in the appendix.**

Below is a summary of our findings from the following studies:

- 2008 University of Utah Master Plan
- 2011 University of Utah Bicycle Master Plan
- University of Utah Research Park: The Vision Plan
- 2015 Salt Lake City Pedestrian & Bicycle Master Plan
- 2015 UTA First/Last Mile Strategies Study
- 2017 Transit Master Plan
- Wasatch Front Regional Council (WFRC) Regional Transportation Plan 2019–2050
- Foothill Drive Implementation Strategy

The University of Utah Master Plan (2008)

The University of Utah Master Plan was adopted by the University in 2008. The Plan provides guidelines to promote efficient development on campus through the University's vision and academic programs. The Plan recommends improvements on the University's land use, pedestrian and vehicular circulation, and infrastructure. The Plan includes transformative projects on campus and identifies three locations for potential mobility hubs located in Research Park, the Student Life Center near Main Campus, and the Health Sciences Center. These locations are centered where several modes of transportation align and are therefore recommended to be used as hubs to centralize the modes of transportation. Transit amenities recommended for these hubs include, campus shuttles, UTA buses, TRAX, bicycle stations, a coffee/snack bar, traveler information, and covered/indoor waiting areas. Several developments are proposed throughout the University campus. These developments include academic, research, clinical, retail, housing, and administrative buildings. Key projects that should be considered with locating a future mobility hub are listed below:

Main Campus

1. South Campus Walk

The proposed South Campus Walk located north of the South Campus TRAX Station will help the area become a major gateway to campus. The South Campus Walk will provide a safe pedestrian path connection to the center of Main Campus. The proposed parking structure suggested as part of this project has been constructed, just east of the David Eccles School of Business.

2. Student Life Center Mobility Hub Gateway

The Student Life Center acts as a gateway for the campus and provides an opportunity to use the George S. Eccles 2002 Legacy Bridge as a main pedestrian access between Main Campus and the eastern side of the University. The proposed project included

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underground parking for 800 cars beneath the Athletics Track facility located adjacent to the Student Life Center. The parking structure was not built and the mobility hub component to the Student Life Center was not implemented.

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3. Transit Center on Central Campus Drive to support the Frequent Transit Network (FTN)

The Frequent Transit Network is a grid-based network that provides fast, reliable, frequent, and stable services for several modes of transportation. A transit center is recommended on Campus Center Drive by the Salt Lake City Master Plan 2017 to support the features of the FTN. This transit center is one of two recommended to aid in the transfer of commuters using the FTN.

4. Downtown Streetcar connection to the University

The Salt Lake City Transit Master Plan 2017 supports the implementation of streetcars in downtown Salt Lake City. This includes an eastern connection to the University due to the demand in east-west commutes.

5. Stadium TRAX Apartments

As part of the Student Housing Master Plan for the University, providing on-campus-housing is intended to maintain student campus engagement.

6. Central Playing Fields for multi-recreational use

Like the new student housing facilities on campus, new athletic fields are intended to retain student engagement on campus.

7. Interdisciplinary Quad

The Interdisciplinary Quad Corridor would promote pedestrian and bicycle friendly environments. The Quad will act as a connection between interdisciplinary research facilities. Potential opportunities from this project include alternative circulation routes, such as non-vehicular connections between the Health Sciences Center and the College of Engineering and Sciences.

Health Sciences Campus

1. Medical Buildings with two public/clinical pedestrian bridges connecting to the existing University Hospital Building

The proposed Medical School for Clinical Functions and Research will provide a pedestrian bridge serving as a connection between the Medical TRAX Station and the University Hospital. This will also connect the Health Services Center to the Main Campus through the proposed Interdisciplinary Corridor. This project evolved into three projects: the ACC, Rehabilitation Center, and the MED which is still being designed.

2. UTA Transit Hub near University Hospital

The proposed UTA transit hub was recommended in the UTA Five-Year Mobility Plan to be located near the University Hospital. A study conducted in 2019 was intended to determine the transit hub's optimal location and time of construction.

Research Park Campus

1. Underground tunnel

An underground tunnel is proposed under Foothill Drive connecting Research Park Campus to Main Campus. The tunnel would help alleviate surface traffic and provide a safer path for pedestrians and cyclists.

2. Wakara Transportation Mall and Foothill Drive Improvements

A proposed Wakara Transportation Mall on Wakara Way would provide an on-street transportation center

to serve Research Park and the rest of campus. This would be a smaller, multimodal hub on the intersection of Wakara Way and Foothill Drive. Improvements on Foothill Drive include traffic control, HOV lanes, relocations of bus stops, and amenities to improve the safety of the waiting environment.

The University of Utah Bicycle Master Plan (2011)

The University of Utah Bicycle Master Plan was adopted by the University in 2011. Along with proposed bikeways, the Plan recommends various bicycle-friendly policies and programs to promote bicycle ridership among students, faculty, and staff. It also provides recommendations for the University to work with external entities such as UDOT, UTA, and Salt Lake City to improve bicycling conditions in locations that are important to the campus environment, but which are not under the University's direct control. The Plan's goals and objectives are:

- Provide safe and healthy routes for bicyclists through campus
- Improve the connection between bicyclists and transit on campus
- Create a complete campus bikeway network that is integrated into existing and future external bicycle facilities
- Increase bikeway enforcement
- Implement comprehensive education and encouragement programs targeted at students, faculty, and staff
- Support Campus Sustainability and Climate Action Plan

Key relevant recommendations for bike network infrastructure are shown in the attachments (located in the appendix) as listed:

- Attachment E – University of Utah Existing and Proposed Bikeway Facilities (2011–2014)
- Attachment F – University of Utah Existing and Proposed Bikeway Facilities (2015–2020)
- Attachment G – University of Utah Existing and Proposed Bikeway Facilities (After 2020)

Recommendations beyond the proposed network facilities include:

a) Long-term, secure bicycle parking at the following locations:
- o Student Union
- o Honors Housing
- o Married Student Housing
- o Marriott Library
- o University Hospital
- o Outdoor Program
- o Benchmark Plaza
- o Health Sciences Building
- o Business Building
- o Research Park

b) The Plan recommends the implementation of bicycle stations that could include the following services:
- o Bicycle repair (self-served or staffed)
- o Bicycle rental
- o Retail sales of bicycle-related equipment and accessories
- o 24-hour secure and covered bicycle parking
- o Restrooms, showers and/or changing facilities
- o Coffee shop
- o Convenient access to public transportation

c) The Plan recommends bicycle station locations at:
- o Proposed Engineering Mall
- o Health Sciences Campus
- o Research Park

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d) The Plan outlines better accommodations for bikes on Campus Shuttle (front mounted bike racks with capacity for three bicycles), UTA bus (add additional rear mounted bike racks with capacity for three bicycles, six total), and UTA TRAX (retrofit cars so that bicycles no longer block boarding doors using hook or rack systems)

e) Page 100 of the Plan recommends the University adopt a campus bike fleet that targets staff to reduce daytime auto trips

f) Page 103 of the Plan recommends the University adopt a campus bike sharing program

The University of Utah Research Park: The Vision Plan

The University of Utah Research Park (UURP) Vision Plan seeks to create a new long-term vision for the 50-year old UURP property. For decades the property has been a hub for entrepreneurial growth, job creation, and productivity. The vision for this effort is defined below:

The UURP is a next generation innovation community- a diverse, compact, and amenity-rich walkable district where emerging and established innovators can live, work, and collaborate on some of the most critical issues we face now and in the future.

Key values of the planning process include:

- Establish a vibrant and interdisciplinary mixed use environment
- Facilitate partnerships that will enable a dynamic innovation ecosystem
- Promote a compact and human-scale environment
- Lead with sustainable and resilient development and design strategies
- Prioritize multi-modal circulation to and through campus
- Foster intentional University connections and build neighborhood relationships

The UURP Vision Plan will fundamentally change the land use and transportation characteristics of the area. More compact development, density, and diversified land uses will create the need for a dditional transportation options. Though this redevelopment will take time, the need for enhanced transit and multimodal connections will continue to increase. Mobility hubs are planned to be a major component of this future transportation network. One of the primary elements of the proposed vision plan is the "campus circuit" which would connect UURP to the Health Sciences Campus and Main Campus via a reliable, frequient, and comfortable transportation spine. Mobility hubs on, or near, the campus circuit would help ensure convenient first-last mile connections to transit.

Salt Lake City Pedestrian & Bicycle Master Plan (2015)

The Salt Lake City Pedestrian and Bicycle Master Plan passed by City Council in 2015, provides framework, recommendations, and policies for the development of pedestrian and bicycle facilities as well as improvements, along with education, encouragement, and enforcement programs. The Plan's goals and objectives include:

- Integrating pedestrian and bicycle facilities with transit routes, stations, and stops
- Integrating walking and bicycling into community planning to enhance livability, health, transportation, the environment, and economic development
- Developing a safe, comfortable, and attractive walking and bicycling network that connects people of all ages, abilities, and neighborhoods to their destinations

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- Maintaining the walking and bicycling system year-round
- Promoting the safety and attractiveness of walking and bicycling through education, encouragement, and enforcement programs

Beginning in September 2010, Salt Lake City has conducted annual bicycle user counts during the second full week of September. These counts were taken at each location on Tuesday, Wednesday, and Thursday evenings (5–7pm) and Saturday and Sunday afternoons (12–2pm). Count locations from 2014 that maintained consistent high ridership included (those providing access to the Campuses are indicated in red):

- 800 E / 800 S
- 200 S / Main St
- Sunnyside / Arapeen
- Sunnyside / Guardsman
- Parley's Crossing

Key relevant recommendations for pedestrian and bicycle network infrastructure are shown in the maps and excerpts listed in the appendix:

- Attachment H — University of Utah Proposed Bicycle Network (0–10 Years)
- Attachment I — University of Utah Proposed Bicycle Network (10–20 Years)

UTA First/Last Mile Strategies Study (2015)

Adopted by UTA in 2015, the UTA First/Last Mile Strategies Study fulfills a goal made by the UTA Board of Trustees to develop first/last mile recommendations which could be applied throughout UTA's service area, as part of an overall effort to double ridership by 2020. The purpose of the study was to prioritize a short list of strategies that would be most effective in increasing system ridership. Below are key relevant strategies recommended in the Study:

a) Starting on page 3-1, the Study presents a first/last mile strategy toolbox consisting of tools currently deployed in the industry for making transit more convenient. Those related to bicycling are included in the following (tools already deployed within the UTA service area indicated in red):

- Short- and long-term bicycle parking
- Bicycle storage on transit
- Bike share programs
- Bike stations that provide services to bicycle commuters

b) Page 3-19 of the Study, "Communities with major universities tend to rely less on private automobiles and more on modes like transit, bicycling, and walking and therefore could respond differently to certain first/last mile strategies."

c) As a result of a strategy prioritization exercise, the Study shows that improvements for bicycle and pedestrian safety are ranked the highest priorities, showing that active transportation improvements for transit access render the highest return on investment. See Attachment J in the appendix for the prioritized improvements list found on Page 4-9 of the Study.

Salt Lake City Transit Master Plan (2017)

In 2017, Salt Lake City adopted the City's first ever Transit Master Plan, which establishes the City's vision and guided decisions as well as identifies investment priorities to meet the community's existing and future public transportation needs. Key relevant recommendations and strategies from the Plan are exhibited in the map and excerpts mentioned below:

a) One of the top four priorities from the Plan is to "Implement a variety of transit-supportive programs and transit access improvements that overcome barriers to using transit in terms of information, understanding, and access (including pedestrian and bicycle facilities and affordability)." The Plan outlines components of a complete transit system:

- Expanded frequent transit service
- Safe and convenient pedestrian and bicycle access
- Transit information and legibility
- On-demand services (ride hailing) and bike share
- High-quality stops and stations
- Flexible fare and pass programs
- Coordinated land use, parking, and placemaking policies
- Education and outreach

b) The Plan incorporates the proposed Frequent Transit Network Map (FTN), as shown in Attachment K — Salt Lake City Proposed Frequent Transit Network Map (see Appendix). Research Park and VA Medical Center campuses are identified for first/last-mile improvements (shaded in purple).

c) Key recommendations for improving bike and pedestrian access:

- Create pedestrian and bicycle routes using mid-block crossings and passageways, wide sidewalks, and signage (prioritize mid-block crossings along the FTN)
- Treat bike share as an extension of the transit system and prioritize expansion of GREENbike to provide connections to the FTN
- In partnership with the City's Pedestrian and Bicycle Program, designate a network of multi-use paths, neighborhood byways, and bike lanes that provide direct connections between local destinations and the FTN
- Strengthen the City's existing Complete Streets Ordinance (per the Pedestrian and Bicycle Master Plan) by integrating transit

d) The Design Your Transit System Tool identified that 43% of participants listed "improved access to transit on foot and by bike" as a priority (pg. 4-1)

e) Characteristics of good pedestrian access to transit (pg. 4-2):

- Well-marked intersection and mid-block crossings
- Traffic calming measures
- Exclusive pedestrian signal phases and/or a leading pedestrian interval
- Pedestrian-scale lighting
- Wayfinding
- Designing for disability

f) Characteristics of good bicycle access to transit (pg. 4-4)

- Protected bike lanes
- Protected intersections
- Bike lanes and bike boxes

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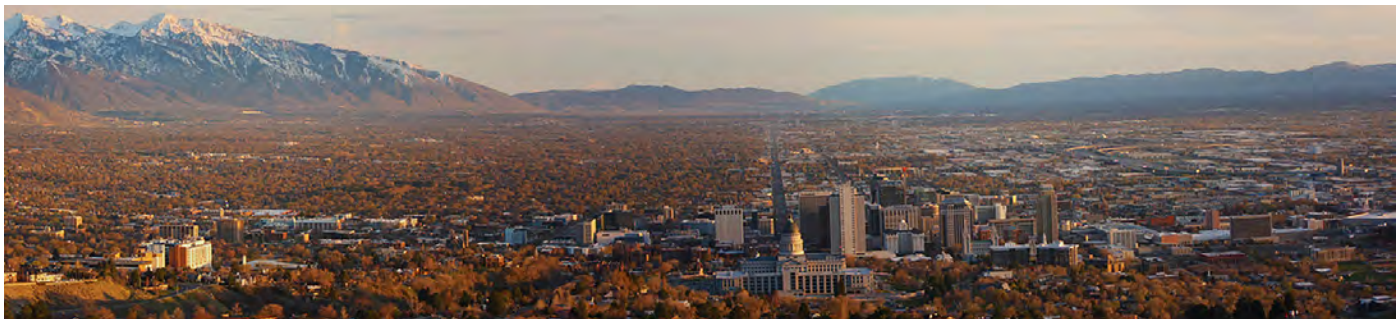

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- o Neighborhood byways
- o GREENbike integration
- o Smart placement of transit stops near bike facilities
- o Good bicycle amenities
  - Bike parking
  - Bikes on transit
  - Other end of trip facilities such as maintenance stations, showers, changing facilities

g) The Plan does not recommend geographically specific locations for bicycle and pedestrian improvements, but rather outlines general guidelines for improving access to transit by bike or foot as listed above

h) Mobility Hubs (pages 6–13 and 6–15):

- o The Plan recommends that mobility hubs be implemented along any FTN that integrate high ridership stops, bike share stations, bike fixit stations, and car sharing options
- o Key elements of a Mobility Hub are listed:
  - Accessible, universal design allows people of all ages and abilities to access transit stops/stations and nearby destinations
  - Shared mobility devices, including bike share stations, car share vehicles, and loading space for other private or shared mobility services
  - Secure, covered bicycle parking and access to the surrounding bicycle transportation network
  - Excellent pedestrian infrastructure within a half-mile walkshed
  - Placemaking elements (e.g. public art, seating, mix of land uses)

WFRC Regional Transportation Plan 2019–2050

The WFRC develops the Regional Transportation Plan (RTP) for the Salt Lake City-West Valley City and Ogden-Layton Urbanized Areas. The RTP is a fiscally constrained plan for roadway, transit, and other transportation facility improvements over the next 20-30 years. Designed to meet the travel demand of a growing population, the RTP is developed in accordance with federal guidelines.

It includes roadway, transit, and active transportation facilities paired with the appropriate land use that is identified, modeled, selected, and phased, with the help of region-wide transportation partners; local communities including planners, engineers, and elected officials; stakeholders; and the general public through an extensive planning process. Key phase I (2019-2030) RTP recommendations within the study area include:

- Transit service improvements on Foothill Drive , 400 S , and 900 S
- Bike lanes on Virginia Street, Fairfax Road, Wolcott Street, and Wasatch Drive
- University of Utah Transit Hub at South Campus Drive TRAX station
- Various shared use path and shared lane improvements on campus

Foothill Drive Implementation Strategy

The Foothill Drive Implementation Study sought to identify short-term and long-term strategies to address issues along the Foothill Drive corridor such as traffic congestion, neighborhood connections, safety, and transportation options. The study evaluated numerous alternatives including flex lanes, dedicated transit lanes, added capacity and improved active transportation facilities.

Key Recommendations include:

- The preferred alternative included the addition of a dedicated transit/HOV lane and sidepaths along both sides of Foothill Drive
- A transit mall was recommended near the intersection of Wakara and Foothill
- Development of the Red Butte Creek trail

- Development of a pedestrian bridge across Red Butte Creek at Arapeen Dr

Gaps in Data Received

Gaps identified from the data collected that could aid in locating potential mobility hub sites on the University campus are:

1. Ridership data collected over the school year for all modes.
2. Proposed developments in the Fort Douglas Campus that could potentially impact proposed modes of transportation.

Current Laws & Regulations

Design standards for UTA are found at https://www.rideuta.com/Doing-Business/UTA-Design-Information. This includes design criteria for BRT, CAD, Light Rail, Streetcar, and Commuter Rail.

Current design standards for the Utah Department of Transportation (UDOT) facilities can be found at https://www.udot.utah.gov/connect/business/design/. This website provides traffic impacts, project maps, standards and specifications, consultant and designer resources, transportation plan, Statewide Transportation Improvement Plan (STIP), and current projects and studies.

Federal Transit Administration requirements can be found at https://www.transit.dot.gov/regulations-and-guidance/transportation-planning/transportation-planning. This includes transportation planning for metropolitan, statewide, and non-metropolitan planning.

Salt Lake City Micromobility Licensing Agreements can be found on Salt Lake City Transportation's website (https://www.slc.gov/transportation/sharedmobility/), which provides information on the current state of shared mobility in Salt Lake City and guidelines for user safety, etiquette, and regulations, such as the law prohibiting sidewalk riding in the downtown area. In addition, the website also references the license agreement drafted by the City to ensure streamlined, safe, and reliable implementation of shared micromobility systems. That agreement outlines permitted zones of operation, maximum fleet numbers allowed in those zones, and requirements for device parking, device equipment standards, fees, and business operations. The agreement can be found at https://www.documentcloud.org/documents/5115814-Shared-Mobility-License-Salt-Lake-City.html. Devices may not be temporarily placed or left in the following areas:

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- Any bike rack operated by a different vendor
- Any UTA TRAX or FrontRunner boarding platform
- Within ten feet of any UTA bus stop sign
- Within fifteen feet of any ADA ramp or access of any kind
- Within fifty feet of any existing permitted docking system device dock, rack or corral for a shared mobility device or other shared vehicle

All referenced attachments in this chapter are located in the Appendix.

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02

BEST PRACTICES & EMERGING TRENDS

"The options for protected bicycle lanes to the medical school area are inadequate. As a bicyclist, I have to bike out of my way in order to get safely to the medical school campus."

- MOBILITY HUB SURVEY PARTICIPANT

Introduction

Mobility Hubs are a new and evolving concept in the United States, and best practices surrounding their planning, design, and operation are still largely being defined within the transportation industry. Research related to the outcomes and efficacy of varying approaches is limited, leaving case studies, local context, and creative problem solving to guide much of the planning and design process. This chapter outlines emerging mobility hub trends relevant to the University Utah Mobility Hub Study and are based on case studies, transit research, and academic and professional organization journal articles and studies.

Emerging Trends

Mobility hubs are a response to six major shifts in urban transportation trends.

1. **More Choices:** In addition to biking, walking, driving, and taking transit, many people have access to on-demand services such as private-for-hire rides (like taxis, Uber, and Lyft), scooter share, bike share, carsharing, and microtransit shuttles.

2. **New Players:** New business models have increased the role of the private sector in transportation and changed the nature of services operating in the public right-of-way.

3. **Behavior Change:** Trip-planning services are changing the way people make decisions about routes, mode, and cost to travel.

4. **Electrification:** Global trends toward electrification of vehicles, combined with locally-adopted goals for reduced greenhouse gas emissions, has increased demand for electric charging options as part of public infrastructure.

5. **E-Commerce:** E-commerce is reducing personal trips to retail stores and restaurants and exponentially increasing the volume of urban delivery and courier trips occurring.

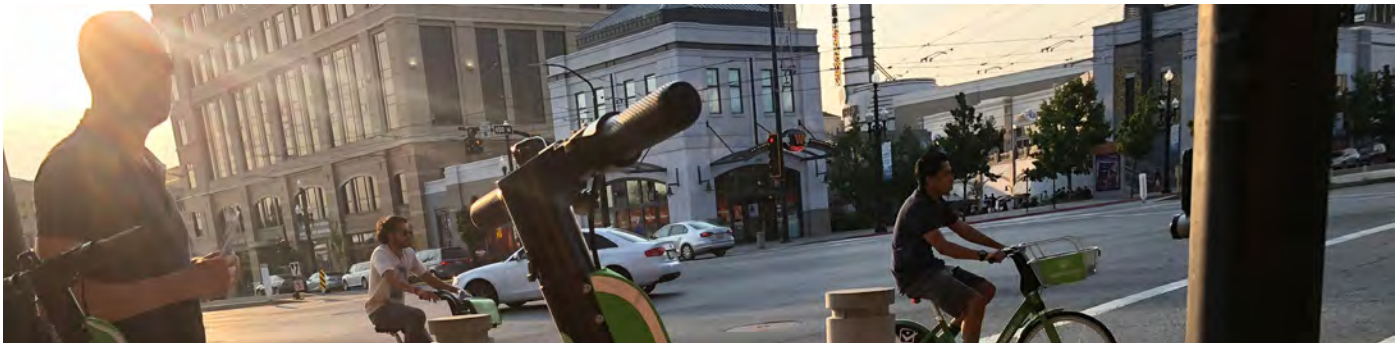
6. **Curb Space Demand:** There is increasing demand for curb space for elements like transit services, rideshare, pick-up and drop off, walkways, bikeways, and freight delivery.

What is Mobility?

Mobility refers to the way people get around, whether that is walking, bicycling, transit, driving, or some other mode. Planning for mobility provides a way to think about transportation systems as a whole with a focus on both how people move and where they are going. Mobility planning includes consideration for the ways in which modal choices interact and how people interface with these systems. While mobility does include use of personal vehicles, mobility planning prioritizes choice, redundancy in the transportation system, and opportunities to reduce single-occupancy vehicle trips. Current and emerging trends are reshaping how we think about those priorities, including **New Mobility** and **Shared Mobility**.

New Mobility refers to transportation services that are enabled or defined by digital technology. Technology-enabled mobility services have expanded the suite of options available for travelers and changed the nature of services operating in the right-of-way, accessing transit stops/stations, and operating in transit-limited areas.

Shared Mobility includes more traditional modes and new mobility services that are operated in a shared manner. This could include sharing a trip, such as with ridehailing services like Uber or Lyft, or having access to a shared fleet of vehicles, such as carshare or bikeshare. The shared

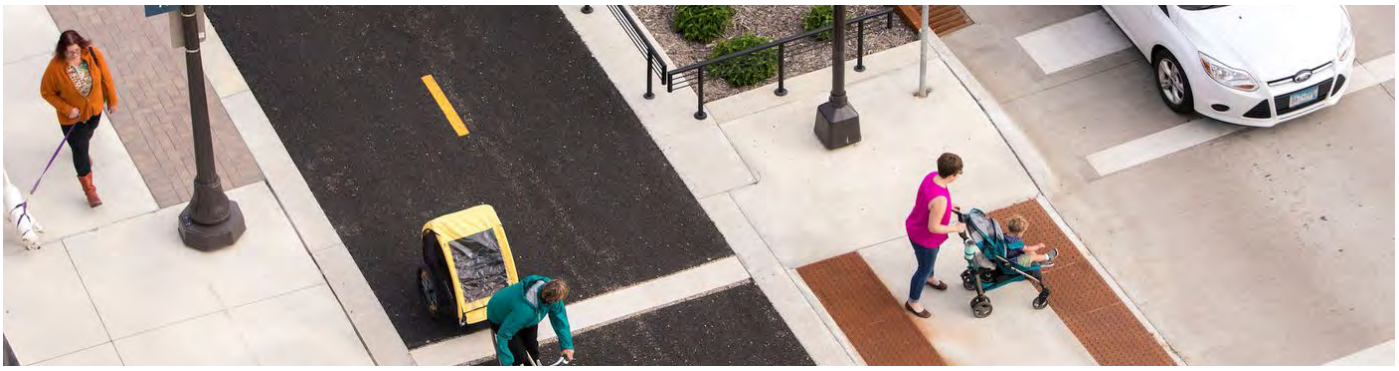


cyclingutah.com

TYPES OF SHARED MOBILITY	
BIKE SHARING	Provides users with on-demand access to bicycles at a variety of pickup and drop-off locations for one-way (point-to-point) or round-trip travel. Bikesharing systems can be further categorized by their operational models: station-based, dockless, and hybrid.
CAR SHARING	Offers members access to vehicles by joining an organization that provides and maintains a fleet of cars and/or light trucks. These vehicles may be located within neighborhoods, public transit stations, employment centers, universities, etc. The carsharing organization typically provides insurance, gasoline, parking, and maintenance. Members who join a carsharing organization typically pay a fee each time they use a vehicle (SAE International, 2018) (Shaheen et. al., 2016a) (Cohen & Shaheen, 2016).
SCOOTER SHARING	Allows individuals access to scooters by joining an organization that maintains a fleet of scooters at various locations. Scooter sharing models can include a variety of motorized and non-motorized scooter types. The scooter service provider typically provides gasoline or charge (in the case of motorized scooters), maintenance, and may include parking as part of the service. Users typically pay a fee each time they use a scooter. Trips can be roundtrip or one way.
SHUTTLES	Shared vehicles (typically vans or buses) that connect passengers from a common origin or destination to public transit, retail, hospitality, or employment centers. Shuttles are typically operated by professional drivers, and many provide complimentary services to the passengers
TAXI SERVICE	Provide prearranged and on-demand transportation services for compensation through a negotiated price, zone pricing, or taximeter (either traditional or GPS-based). Passengers can schedule trips in advance (booked through a phone dispatch, website, or smartphone app), street hail (by raising a hand on the street, standing at a taxi stand, or specified loading zone), or e-Hail (by dispatching a driver on-demand using a smartphone app).
RIDE SHARING	Defined as the formal or informal sharing of rides between drivers and passengers with similar origin-destination pairings. Ridesharing includes vanpooling, which consists of 7 to 15 passengers who share the cost of a van and operating expenses, and may share driving responsibility.
COURIER NETWORK SERVICES (CNS)	Also referred to as flexible goods delivery, CNS provides for-hire delivery services for monetary compensation via an online application or platform (such as a website or smartphone app) to connect couriers using their personal vehicles, bicycles, or scooters with freight.
MICROTRANSIT	Privately or publicly operated, technology-enabled transit service that typically uses multi-passenger/ pooled shuttles or vans to provide on-demand or fixed-schedule services with either dynamic or fixed routing.
PERSONAL VEHICLE SHARING	Defined as the sharing of privately-owned vehicles, where companies broker transactions between vehicle hosts and guests by providing the organizational resources needed to make the exchange possible (e.g., technology, customer support, driver and motor vehicle safety certification, auto insurance, etc.).
TRANSPORTATION NETWORK COMPANIES (TNCs)	Also known as ridesourcing and ridehailing, TNCs provide prearranged and on-demand transportation services for compensation in which drivers and passengers connect via digital applications. Digital applications are typically used for booking, electronic payment, and ratings.
AUTONOMOUS VEHICLES (AV)	AV are vehicles that can operate with varying levels of operation control without driver input. The National Highway Traffic Safety Administration created a scale of automation for vehicles that allows drivers to know specifically how autonomous their vehicles are from '0' (no automation) to '5' (fully automated with no human interaction needed).
PERSONAL AIR VEHICLE (PAV)	Also referred to as passenger drone, this emerging mode of transportation is still in its infancy but is likely to further shape mobility and development patterns in the coming decades. PAVs provide another form of autonomous vehicle while taking up no space in the typical right-of-way. In order for these vehicles to operate, greater regulation on routes and right-of-way designation is needed.

mobility model is based on short-term access and most often is on-demand. Shared mobility services also include micromobility options, which refer to small human- or electric-powered vehicles such as bikeshare, scooter share, or moped share.

While multimodal trips are most often thought of as walking or riding a bicycle to a transit stop or carpool pick up, New Mobility and Shared Mobility add a range of new options for how people get around, including new combinations that support multimodal trips. Organizing these options and helping people connect to them can improve utility of the system, and one method of accomplishing this is through implementation of mobility hubs.



curbed.com

What is a Mobility Hub?

Mobility hubs are "a central location for a variety of transport related services and amenities and strategic vehicle storage spaces to make it more convenient to combine modes within one trip" (Barth 2019). Mobility hubs most often prioritize transit connection, but not all mobility hubs are directly co-located with transit. In practice, mobility hubs develop as a collection of elements that make it easier to access the shared and active mobility network. These elements can be mixed and matched to create a hyperlocal transportation terminal that is customized for the location.

Mobility hubs are one tool to support the following objectives:

1. Increase access and convenience of multiple modes of transportation while supporting reduced single occupancy vehicle trips:

Mobility hubs are places that enable multimodal trips. Put simply, they allow visitors to arrive via one mode and depart another. Consolidating mobility options at mobility hub sites increases the convenience and practicality of choosing modes other than personal vehicles. While a segment of the trip may still utilize a single-occupancy vehicle trip in a personal vehicle, the additional mode or modes chosen for the remainder of the trip are self-powered or shared trips. The benefits of increased access can mean fewer drive alone trips and reduced vehicle miles traveled, reduced congestion, and recognition of the inequities in our transportation systems. Reducing single occupancy or personal vehicle trips also helps us to reduce greenhouse gas emissions and improve air quality while also creating a more balanced transportation system better serving those unable or uninterested in driving a personal vehicle.

2. Create a more seamless, desirable experience for transit linked trips:

Consistent with improved access and convenience, mobility hubs can create a more seamless experience with increased options for multimodal trips. Transfers can contribute to the time, planning, and resources necessary to complete a transit trip. Transferring between transit systems or lines is often cited as the biggest reason for travelers to either give up on riding transit or avoid the choice to take transit altogether. This can be because of the time added to the trip, complications of managing multiple fares or a transfer pass or unfamiliarity with the transit network.

A mobility hub co-locates several mode opportunities in one place, increasing the choices users have to fine tune the efficiency of their trip. A well-designed mobility hub and transportation network can also provide integrated payment options and real time transit information. The provision of additional shared mobility options at transit facilities can improve customer experience by reducing wait times associated with transfers, and increasing trip flexibility and reliability through the provision of on-demand app-based services.

3. Manage private mobility services to align with local goals:

Local governments are working to accommodate and partner with private mobility services which are different than the public mobility services of the past. Mobility hubs can help align the interests of the public and private sectors in partnerships to enable or regulate mobility options. While contracts and permits are the primary tools available to local jurisdictions for regulating shared mobility service providers, mobility hub planning offers an opportunity for designing specific areas for shared fleet parking, charging or pick up and drop off areas. Cities can require private mobility services to use mobility hubs as well as control

access to the mobility hubs and therefore incentivize or enforce city goals and policies. Moving private mobility services to mobility hubs may alleviate pressure on existing congested curbs or extend ridership access for equity concerns. Mobility hubs may also offer amenities desirable by the private mobility services like EV charging station, staff support for assisting unbanked riders to access services or ADA accessible infrastructure. Finally, private mobility providers whose business and operations model more closely match the goals and priorities of public stakeholders may be offered priority access to mobility hub sites.

4. Improve safety of mobility access

Mobility hubs organize the spaces for standing and stopping as well as parking and storage for various modes of transportation. Organizing these elements improves the functionality and safety of public space for all users, including those walking, using mobility assistance devices, biking, awaiting transit, and using shared mobility options.

The concentration of investment at mobility hub sites can work to achieve a variety of other objectives simultaneously, including:

- Urban design improvements, through the provision of public art, landscaping, lighting, and other amenities

mapc.org

- Transportation system enhancements, through the expansion of mobility options accessible to travelers
- Community development, through services and events available at mobility hub sites
- Economic development, by creating a vibrant space for locating businesses with increased traffic throughout the day
- Climate resilience and sustainability, through the installation of solar panels, energy storage infrastructure, and weather shelters
- Additionally, mobility hubs provide the opportunity to provide facility improvements for a diversity of modes and users simultaneously.

altaplanning.com

What Do Mobility Hubs Look Like?

Mobility Hub Components

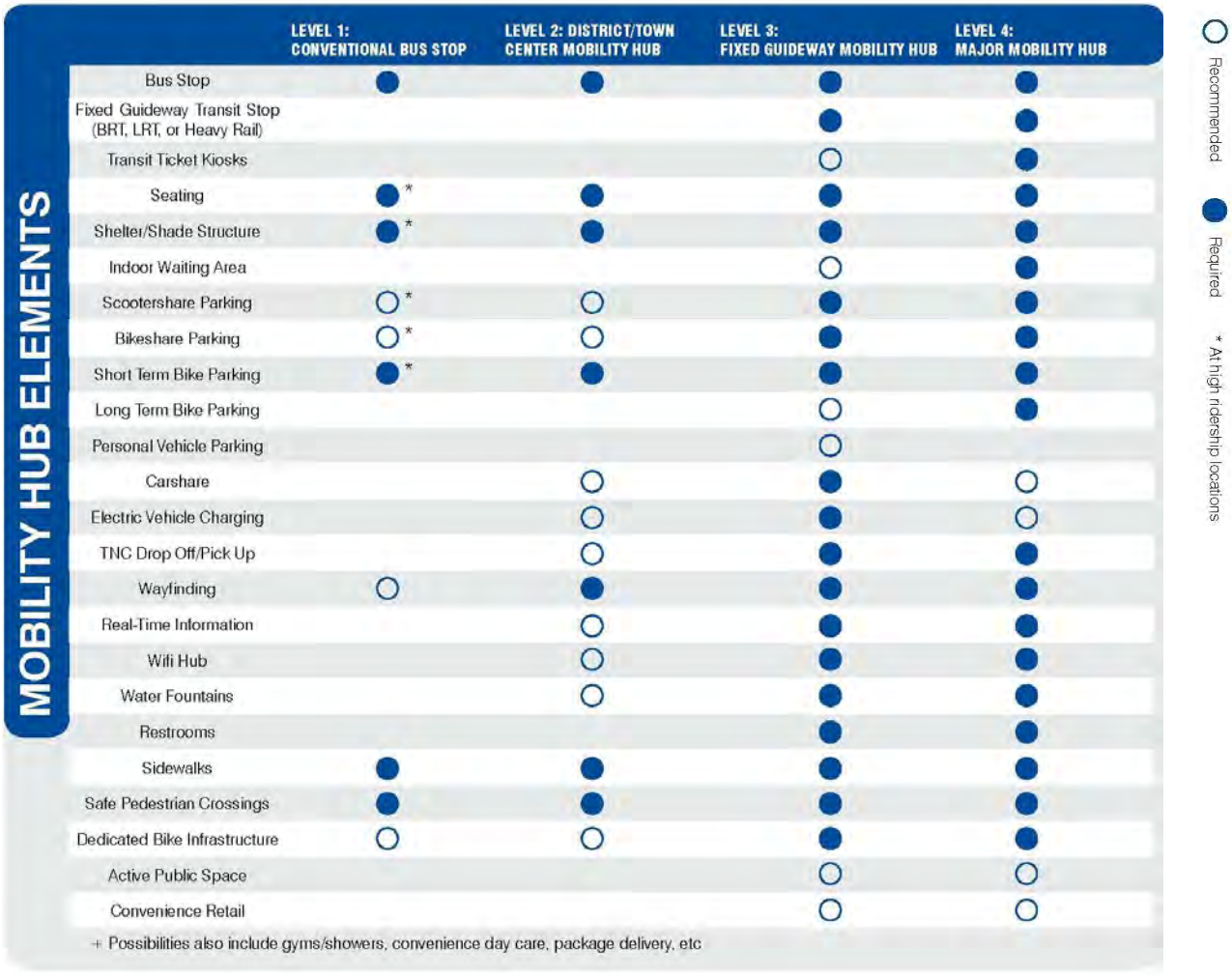
Mobility hubs may include a variety of elements to support different trip types. The combination and range of elements will vary based on the collection of modes and services available at each mobility hub location. The following image provides an example of common mobility hub elements and their applicability based on hub context and scale:
These elements require physical and digital infrastructure to support the range of options available with clear organization to facilitate user decision making and navigation of the space.

Considerations for Site Selection & Mobility Hub Design

To achieve the objectives outlined in the previous section, mobility hubs must be carefully sited and designed to support multimodal trips and improve the utility of shared mode options.

At minimum, mobility hub siting and design should feature:

- **Multimodal transfer opportunities with transit as the backbone service:** Transportation amenities and services at the site should integrated transit with shared mobility options such as bike share, scooter share, car share, or ridehailing.
- **Flexible design:** Spaces within Mobility Hubs should be flexible spaces to accommodate a variety of uses including: parking, active loading and unloading, seating, conversing, public art, vendor fairs, mobile markets, or Farmers Markets. The businesses and technologies of new mobility are ever changing and require a flexible urban design for low-cost, fast-changing, responsive space.
- **Enhanced urban design features and services that create a more comfortable and stimulating environment for mobility hub users:** These features and services could include lighting, security cameras, public art, landscaping, seating, food carts, and more.



- **Careful consideration of equity opportunities and challenges:** Mobility hub project teams must examine sidewalk, bike lane, and transit connectivity from historically underserved neighborhoods to mobility hub sites. Including infrastructure upgrades in the surrounding area may improve the ease and safety of low-income riders accessing mobility hub services. Additionally, project teams should consider how low-income and unbanked riders will access services present at the site. Including cash payment options and working with service providers to reduce or remove fines for low income riders reduces barrier to entry for many living within underserved communities.

In addition to siting and design, mobility hubs require features that are not part of the built infrastructure. **They rely upon a partnership of transportation services and programmatic alignment by the transportation services at that hub.** Done well, this allows for seamless transfers between modes with schedule alignments and universal fare payment options. Without coordinated operations at the core of the transportation system, a mobility hub cannot operate to its fullest ability.

Mobility Hub Best Practices

The following section outlines common themes emerging from review of mobility hub examples, existing literature, and emerging trends and practices. Limited research has been conducted to evaluate the effectiveness of strategies applied to built/operating mobility hubs. Additionally, local land use and transportation context substantially influences each mobility hub. The fast change of pace within the shared mobility and emerging technologies industry is presenting new opportunities/considerations for mobility hubs on an almost weekly basis. Within this dynamic landscape, the following have emerged as common themes when planning and designing mobility hubs:

1. **Cohesive, Human-scale Design:** When considering what differentiates a mobility hub from any other bus stop or station that may have a bike share station or shuttle pick-up nearby, the critical feature is cohesive and intentional design that connects multiple modes to one another and puts the needs of the individual traveler first. Thoughtful detail in design creates an experience that nudges travelers toward a preferred mode, when multiple options are provided, and this nudge is ultimately what enables a mobility hub to achieve performance targets and help in advancing transportation system goals.

www.pps.org

2. **Curbside Management:** Active loading and unloading are key components of a mobility hub, requiring a complex mix of transit and private mobility services. Organizing a safe and efficient space for this activity is critical for a successful mobility hub. Mobility hub design can help organize transportation amenities so they conflict less and offer safe pedestrian access.

3. **Parking for Desired Modes:** Availability of parking can serve existing demand, as well as induce demand. Cities and agencies are aligning mobility hub parking accommodations with local policy and transportation performance goals. This often means designing sites to accommodate and incentivize sustainable transportation options — such as modes that are electric-powered, low-or no-emission, human-powered, multi-passenger, and, in some cases, operated as a shared fleet. This can be achieved through a diversity of strategies, such as providing secure short-term and long-term parking for bicycles and boards, offering discounted or priority parking passes to carpoolers, placing electric charging infrastructure in highly visible locations, and limiting the availability of parking for personal, single-occupant, non-electric cars.

4. **Public Space (Placemaking):** Creating a comfortable and enjoyable public space through the installation of public art, landscaping, seating, lighting, and other pedestrian amenities will help activate mobility hub sites and create an environment for people to gather or linger.

5. **Retail & Amenities:** On-site or adjacent retail opportunities would also help activate mobility hub spaces. The presence of small coffee shops, food carts, or other user-serving businesses may reduce further trips, attract users to the site, and provide opportunities to enjoy the site while awaiting or deboarding transit. This can also serve to provide healthy food access in a food desert, or solve other equity issues in an area.

6. **Programming & Operations:** Beyond the physical infrastructure of the site, programming and operations decisions can improve the traveler experience and directly align with travel demand management (TDM) efforts. Ambassadors and integrated payment options are two examples.

   Multimodal Transit Cards can address the inconvenience of payment transactions, which is a significant barrier to transit use and multimodal trip linking. A single payment system or card that can pay for parking, fares on buses, trains, ferries, ride-sharing companies, and micro-mobiilty rentals may help reduce this inconvenience and encourage people to use multiple modes for a single trip.

7. **Wayfinding & User Information:** Enhanced wayfinding at and around the mobility hub sites should help direct users to the transportation services they need and key destinations they may wish to access. Additionally, real-time transit signage should give riders an estimate of when they should expect buses or rail vehicles to arrive. Nimble, digital signage and information kiosks can assist travelers with mobility planning, shared payment opportunities, and provide opportunity for other evolving applications as they emerge.

8. **First Mile/Last Mile Access:** Mobility hub projects may benefit from enhancements to sidewalk, bike lane, or transit connectivity to the site. These improvements include intersection design and should be packaged into the mobility hub project itself or pursued through separate near-term planning initiatives.

9. **Electrification:** Charging considerations for mobility hubs has increasingly included micromobility devices and electric bus options. New players in the private sector are creating micromobility docking stations that can be used to charge bikes or scooters (or potentially other e-devices) whether shared fleets or personal. They also create designated places for more organized parking of micromobility devices. Some cities are also exploring how hub charging infrastructure could provide publicly available charging of electric wheelchairs or electric mobility chairs to provide a new amenity for community members with disabilities.

10. **Urban Freight & Micro-Distribution:** Providing package distribution options, such as Amazon Lockers, could be a convenient amenity for riders utilizing mobility hubs. If well utilized, micro-distribution of urban freight to mobility hub sites may reduce VMT associated with online shopping trends. This is another rapidly changing and evolving sector, best practices include flexible spaces capable of accommodating many different types of deliveries, like drones or large trucks, depending on the location and scale of the mobility hub.

11. **Universal Access and ADA-compliant Accessibility (including non-English languages, paratransit access, adaptive programs, etc.):** Project teams should dedicate time and attention to examining the ADA-compliant accessibility of the mobility hub itself, in addition to the ADA-compliant accessibility of infrastructure leading to the site. Additionally, mobility hub sites should have space dedicated to wheelchair accessible vehicles and paratransit access. If community partnerships exist to offer micromobility programs for persons with disabilities, mobility hubs provide a natural location for community members to access them. This could adaptive bike share rental programs (such as three-wheeled hand cycles, recumbent cycles, and side-by-side tandem bikes), adaptive e-scooter share programs, and other expand transportation options for riders with mobility limitations. Charging infrastructure that allows persons with disabilities to re-power their personal electric wheelchairs or mobility devices is another consideration.

    Services at the mobility hub sites should offer accommodation for non-English speakers. Printed materials, wayfinding signage, and shared mobility apps should, at minimum, provide translations in English and Spanish.

Mobility Hub Examples

The project team reviewed a range of transit stations and mobility hubs to inform this study. Four noteworthy case studies are described in the following chapter. These examples vary in scale, characteristics, and purpose—ranging from a modernized transit center to a more complex co-location of shared mobility and micromobility options.

Oregon Health & Science University, Portland (OR)

www.ohsu.edu

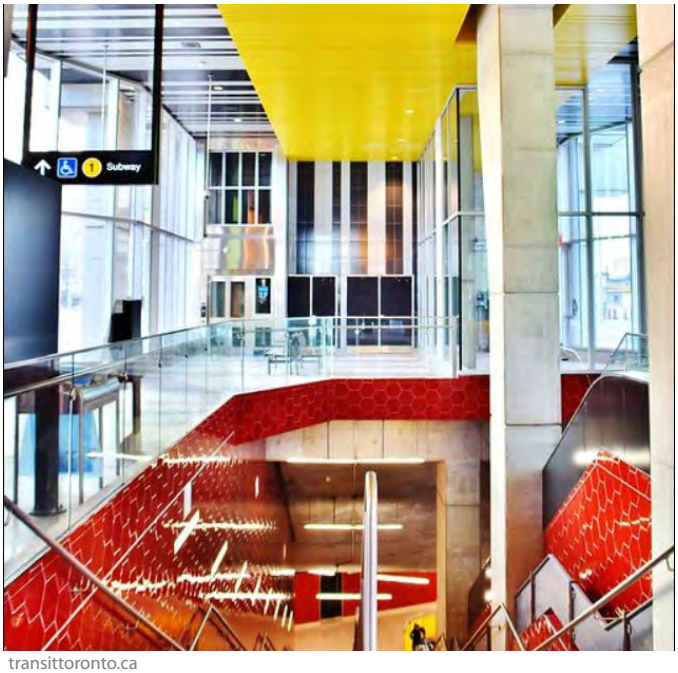
University of Denver

www.rtd-denver.com

Julia Carson Transit Center, Indianapolis (IN)

axisarch.com

Finch West Station, Toronto (ON)



transittoronto.ca

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03

CASE STUDIES

“I would be open to a bus or shuttle that takes me to/from TRAX to the VA. When I worked at ARUP there wasn't a way to get to TRAX which was frustrating. It would have been nice to get to the U Hospital, ARUP, and the VA with a shuttle. ”

- MOBILITY HUB SURVEY PARTICIPANT

Introduction

This chapter outlines four mobility hub case studies that serve college campuses and civic uses in the US. They represent a broad range of campus sizes, mobility hub definitions, and degrees of school involvement in the planning process. To identify these examples, the project team focused on multimodal integration sites that brand themselves as mobility hubs and include active participation from a college/university in the planning and design process. The locations of the chosen examples are:

- Oregon Heath and Science University, Portland (OR)
- University of Denver, Denver (CO)
- Julia Carson Transit Center, Indianapolis (IN)
- Finch West Station, Toronto (ON)

Oregon Health & Science University, Portland (OR)

Background

The Oregon Health and Science University (OHSU) aerial tram connects two campus centers: one within Portland's South Waterfront District and one at the top of Marquam Hill. Due to 500 feet of vertical rise and no direct road network connectivity between the two campus centers, aerial tram service was selected to fill high travel demand between the two facilities. The University co-funded the project with the Portland Bureau of Transportation (PBOT) and a handful of other South Waterfront District property owners. Since opening in 2006, the City of Portland has maintained ownership of the tram, while OHSU is responsible for operation. The tram carries approximately 10,000 riders per weekday, more than double the projections of ridership pre-construction.

Mobility Hub Attributes

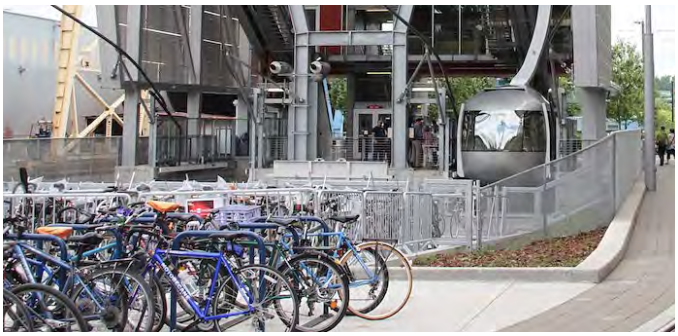
A host of mobility amenities have been installed to facilitate the OHSU South Waterfront connection, including:

- Expansion of Portland Streetcar's NS rail line with real-time transit display boards
- Off-street bike facilities
- High capacity bike parking
- Public bike share service
- OHSU student/employee bike share service

Beyond the immediate aerial tram station site, travelers can connect to bus and light rail service, as well as utilize dedicated pick-up and drop-off curb space nearby. The area is knit together and activated by public space and dining options that promote gathering and lingering.

Cost Estimate

The aerial tram project itself cost $57 million to construct, with $40 million provided by OHSU. Other multimodal improvements to the area, including streetcar expansion, on-street bike lanes, bicycle signals, and off-street bi-directional cycle track construction were funded as components of the SW Moody Avenue Improvements project.



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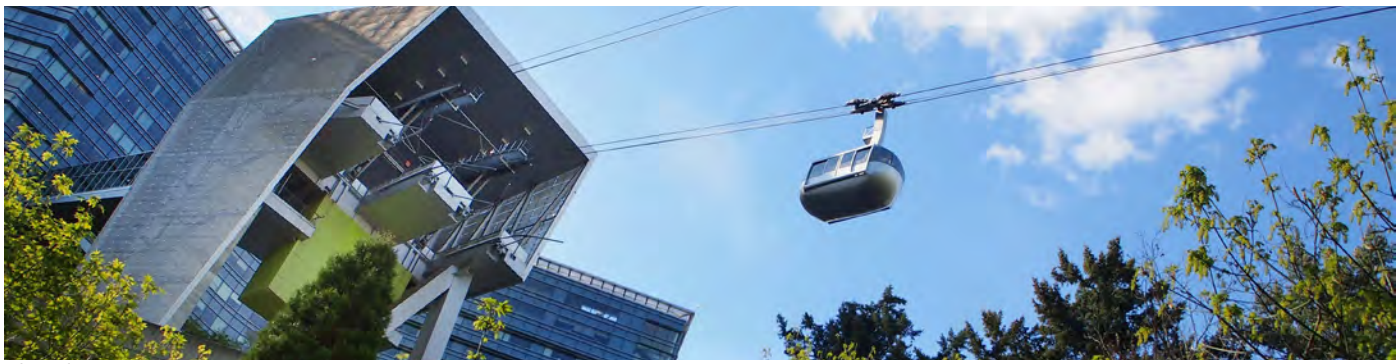


ohsu.edu

University of Denver

Background

The University of Denver is a mid-size private college in suburban Denver with adjacency to the University of Denver Light Rail Station. The University has served as a partner to the City in supporting incremental mobility upgrades to the station area since 2016. Geography students of the University have received the opportunity to participate in station area upgrades as a component of certain courses. The station was completed in 2016, and additional improvements may occur.

Mobility Hub Attributes

Partnership between the University, the City of Denver, and the Regional Transit District (RTD) has culminated in the following improvements to the station area:

1. Pedestrian upgrades to the intersection of University and Buchtel
2. Pedestrian upgrades to the intersection of University and Evans
3. Bikeway improvement to Buchtel
4. Car2Go carshare availability
5. Adjacency of modes including bus, light rail, carshare, bike, and pedestrian paths
6. Shared Mobility Pilots emphasizing light rail connection, including:
   - o Chariot microstransit service
   - o Ofo bike share pilot

Cost Estimate

The incremental mobility projects were funded from the following sources:

- $8 million in pedestrian improvements to intersections and bikeway installation funding through the City of Denver GO Bond.
- $200,000 in Denver Regional Council of Government grant funding for the multi-station area plan

wikipedia.com

flickr.com/photos/rtd-denver

Julia Carson Transit Center, Indianapolis (IN)

Background

Julia Carson Transit Center consolidates bus service, shared mobility opportunities, and enhanced passenger amenities for travelers accessing downtown Indianapolis. It is also home to the IndyGo (Indianapolis Public Transportation Corporation) customer service retail center headquarters.

Mobility Hub Attributes

Riders utilizing Julia Carson Transit Center benefit from a multitude of amenities and mobility options, including:

- 19 covered bus bays
- Free public access Wi-Fi
- Indoor waiting areas and outdoor waiting areas with enhanced urban design features
- Real-time transit display boards
- Off-street bi-directional cycle track
- Dock-based bike share station
- A conference room
- Administrative offices
- Bus operator lounge
- 700 square feet of retail space

Cost Estimate

The Julia M. Carson Transit Center cost $26.5 million to construct and was funded through the Federal Transit Administration's Capital Investment Grant program.

guidondesign.com

guidondesign.com

ecmsinc.net

Finch West Station, Toronto (ON)

Background

Finch West Station in Toronto offers a consolidation of mobility options, rider amenities, and enhanced design characteristics. As a component of the York University to Downsview Park subway line extension, the station most notably serves rail commuters. It was opened in 2017 and serves over 99,000 riders a day.

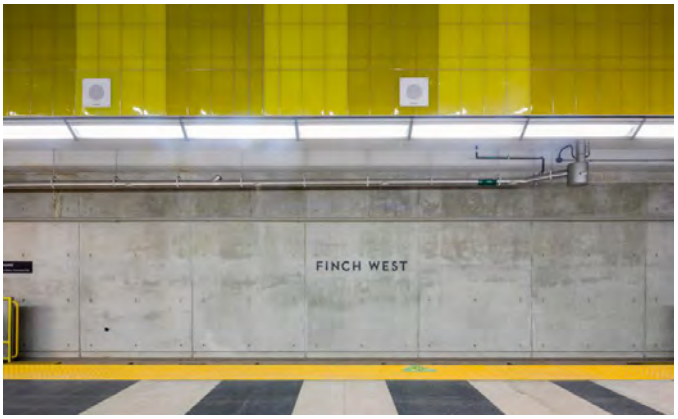
Mobility Hub Attributes

Mobility hub attributes present at Finch West Station include:

- Subway service
- Enclosed six bus bay terminal
- 100 secure bicycle parking spaces and 13 short-term spaces
- Passenger pick-up and drop-off zones
- 350 car commuter parking lot
- Contactless smart card fare collection
- Public Wi-Fi
- Enhanced urban design
- Close proximity to destinations, including York University
- Elevated substation facility with greenroof

Cost Estimate

Development of Finch West Station was financed through the Toronto-York Spadina subway extension. The 8.6 km rail extension featured the development of 6 stations and leveraged approximately $3 billion in funding from the City of Toronto, the Regional Municipality of York, the Province of Ontario, and the Government of Canada.



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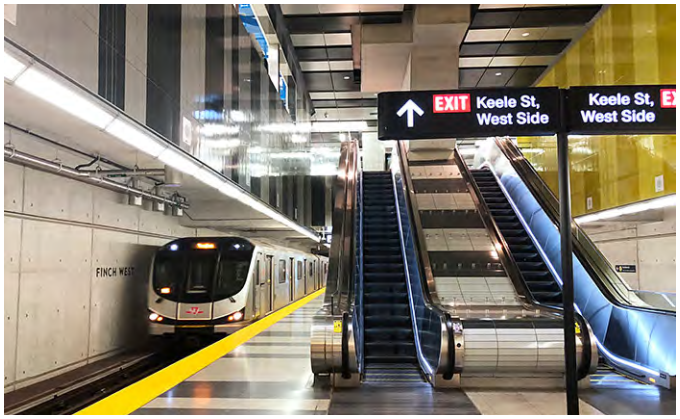


bondfield.com

04
PUBLIC ENGAGEMENT

"A separation of walking paths and bike/skateboard paths would be important. Perhaps an additional mobility hub closer to the dorms would be important as well, like the Fort Douglas TRAX stop also as a bus stop."

- MOBILITY HUB SURVEY PARTICIPANT

Introduction

The Public Involvement Plan, developed for this project and based on the schedule and budget, outlines the proposed target audiences, approach, schedule for conducting engagement, nature of input desired, and engagement tools. The input received throughout the process has informed the site selection, program development, preferred locations, and concept plans for the future mobility hubs. Modifications to the plan were made to account for the COVID-19 epidemic.

Target Audiences

The project study area includes the adjacent campuses of the University of Utah, the Veterans' Administration (VA), and Research Park. Potential mobility hub sites were considered across the study area. With that in mind, input was sought from community members across each of these three distinct locations.

Primary Target Audiences

a) Commuter audiences reflecting the full range of "shifts" being worked and pay scales (professional to operations staff) including:

- Research Park employees
- University of Utah employees
- University of Utah Medical Center employees
- VA employees
- Red Butte Garden employees
- Natural History Museum of Utah employees

b) University of Utah student audiences distinguished as follows:

- Commuter student (off campus housing)
- Residential students (off campus housing)

c) Frequent visitors to the VA who may have unique needs and preferences, with prioritization of regular clients/patrons of the VA.

Secondary Target Audiences

a) Community members who live in neighborhoods adjacent to the study area and did not fall within one of the categories noted as a primary target audience.

- This includes members of Salt Lake City's numerous community organizations, representing residents from:
  - Federal Heights / Greater Avenues
  - East Central / University Gardens
  - East Central
  - Yalecrest
  - Foothill / Sunnyside
  - Sunnyside East

b) Occasional or Infrequent Visitors: While not a priority audience, input may be garnered from a broad range of visitor that reflect the full range of destinations within the study area, such as:

- Special event attendees and University sports fans
- University of Utah Medical Center patients
- VA patients
- Research Park company clients
- Prospective students, parents, or other visitors touring the University
- Red Butte Garden visitors
- Natural History Museum of Utah visitors

Approach to Public Involvement

The table on the next page provides a summary of the project team's approach to public involvement that provided timely input. The input informed the planning and design phases of the study.

ENGAGEMENT TOOL	TARGET AUDIENCES	SCHEDULE FOR ENGAGEMENT	NATURE OF INPUT DESIRED
Online Survey	All	Launch end of September; Close end of October	User preferences related to multimodal transportation convenience, experience, and amenities; High demand or high need locations for mobility hub siting
Print Survey	University of Utah Students and Employees; VA Patients and Employees	October 2019	User preferences related to multimodal transportation convenience, experience, and amenities; High demand or high need locations for mobility hub siting
Intercept Surveys	Pedestrians at transit stops or in transit vehicles within the study area; pedestrians at primary parking lots; pedestrians along campus pathways and thoroughfares	October 2019	User preferences related to multimodal transportation convenience, experience, and amenities; High demand or high need locations for mobility hub siting
Boothing	University of Utah Students and Employees; VA Patients and Employees	October 2019	User preferences related to multimodal transportation convenience, experience, and amenities; High demand or high need locations for mobility hub siting. General promotion of the virtural open house.
Pop-up Event	Commuters; University of Utah Students	February – March 2020	User design considerations; priority of investments within and connecting to a mobility hub site
Virtual Open House	All	February – March 2020	User design considerations; priority of investments within and connecting to a mobility hub site
Website	All	Project Launch – Project Close	User design considerations; priority of investments within and connecting to a mobility hub site

Engagement Tools

The following engagement tools were developed and implemented to inform the planning process:

Virtual Open House

An online interactive series of informational pages that was available for a limited window of time and provided opportunities for sharing ideas or giving feedback.

Survey

A draft survey to gather information relevant to siting, design, and programming of a mobility hub in the study area; the survey was designed to take no more than five (5) minutes for participation.

- Online Survey: An online version of the survey with a shareable link
- Print Survey: A print-ready version of the survey for use at two (2) boothing events

Boothing

A table set-up at two (2) high traffic locations for four (4) hours each to increase participation in the survey by offering intercept surveys (printed version filled out with assistance) and opportunities to submit the online survey or experience at a laptop or tablet.

Pop-Up Event (Event Canceled due to COVID-19)

During the Concept Design phase of the study, work closely with the University to identify a location for and coordinate logistics to create a pop-up engagement event. The pop-up event used temporary, low-cost materials to test out design ideas and gather qualitative feedback from community members related to preferences for user experience, amenities, and programming.

Potential locations for pop-up events could include:

- Presidents Circle
- Stadium parking lot
- HPER Mall

Website (www.uofumobilityhubstudy.com)

A website to serve as an informational tool detailing the specifics of the project background, scope, study area, and potential hub locations. This site will also educate stakeholders on the contributing parties and project team,

and give descriptions of mobility hub elements, existing modes, and best practices for mobility hubs. The site is meant to provide an extra point of contact for additional feedback throughout the process.

In-Person Outreach

The project team conducted the following events:

VA Medical Center Public Outreach Event

The consultant team conducted in-person outreach at the VA Medical Center on October 30, 2019 from 8am to 12pm, resulting in 50 additional survey responses. The outreach booth attracted people with pamphlets, information boards, and three dozen donuts. Participants were eager to learn more about the project and share their thoughts about improved mobility in the study area. Several participants highlighted the importance of the VA shuttle and their frustration that this shuttle is no longer operative. Other participants desired that the crosswalk across Foothill be improved to increase the safety of those traveling from the South Campus Trax Station. Many participants highlighted that the VA Medical Center is physically separated from many other areas of campus, which presents a challenge for those needing to travel to other areas of campus, such as the Medical Campus or Research Park clinics. The lack of safe transportation and walking routes from the VA Medical Center to other areas of campus makes travel between these areas very uncomfortable and nearly impossible.

Marriott Library Public Outreach Event

The consultant team also conducted in-person outreach at the University of Utah Marriott Library on November 5, 2019 from 10am to 2pm, resulting in 90 additional survey responses. The outreach booth attracted people with pamphlets, information boards, and four dozen donuts. Participants were eager to learn more about the project – and grab some free donuts! – and shared important thoughts about mobility on campus. Several participants highlighted the importance of safe walking and biking routes through campus that connect the main campus to the medical campus, Research Park, the residential dormitories near Fort Douglas, and adjacent neighborhoods. Traveling by bike through campus requires navigating a maze of sidewalks, stairs, and buildings, and traveling by bike on major roads requires sharing the roadway with speeding cars and without any designated bicycle infrastructure. Participants also complained about the lack of parking on campus. In order to alleviate the parking concerns on campus, students highlighted that significant improvements need to be made to both access on campus and bike/transit connectivity to the neighborhoods and cities from which students and staff travel to campus.

Digital Outreach

The project team recommends the following outlets (below) for distributing digital engagement tools (online survey and VOH). This distribution would be led by the University of Utah and project partners, other project stakeholders, and interested partners:

TO WHOM	FORMAT	BY WHOM
Enrolled Students	Email with URL	University of Utah Student Affairs
VA employees	VA employees	VA
Research Park employees	Email with URL	Research Park employers
University of Utah employees	Email with URL	University of Utah Human Resources
University of Utah Medical Center employees	Email with URL	University of Utah Medical Center Human Resources
General Public	URL on websites	University of Utah, Research Park, VA, and others
Neighborhood Associations	Email with URL; URL on websites, if available	Salt Lake City; reference list of community organizations here
Transit Riders	Email with URL; URL on websites, if available	Utah Transit Authority
GreenBike members	Email with URL	GreenBike

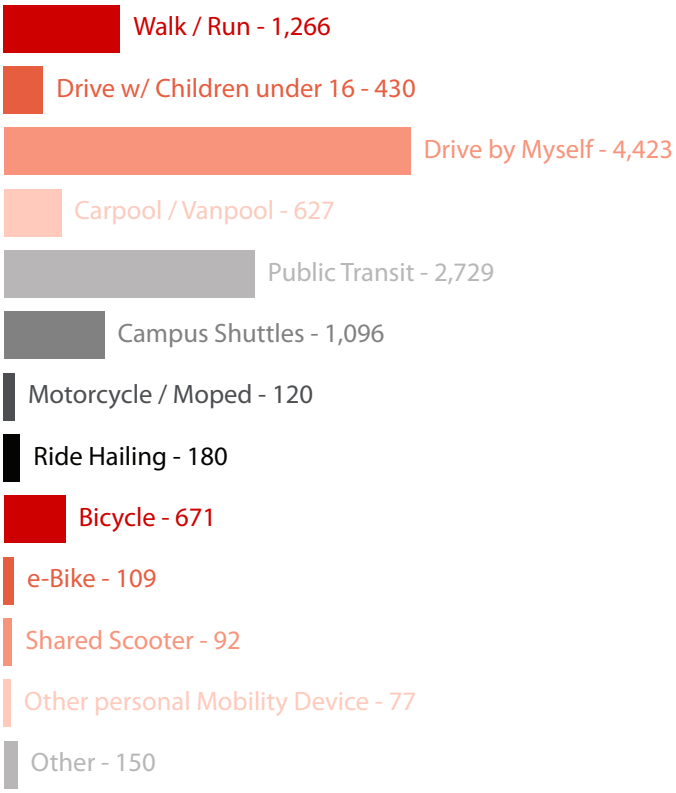
Survey and Website Results

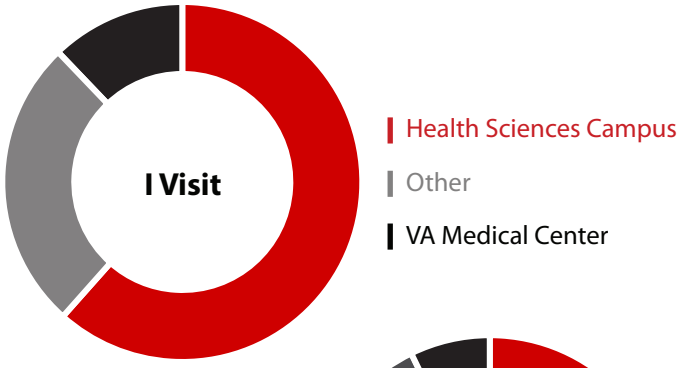
The following pages contain a summary of the survey results and website analytics for this study. The raw results from the survey are located in the appendix.

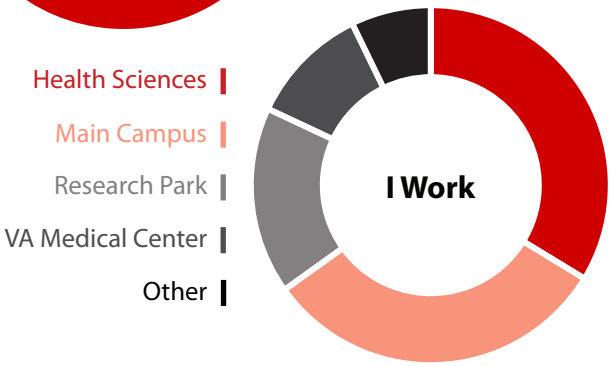
Mobility Hub Study Survey Phase I Key Findings

7,168 Survey Results

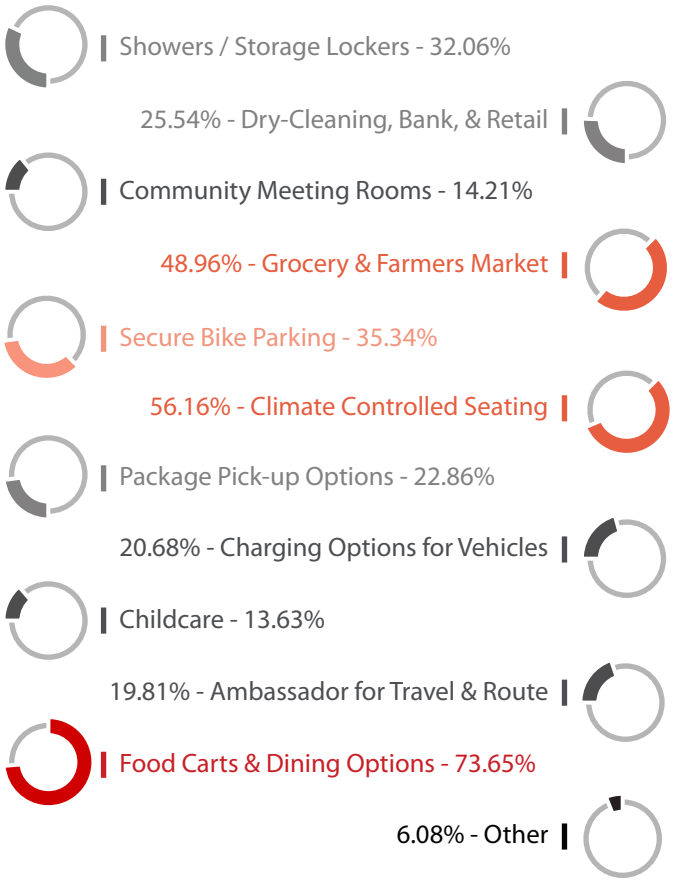
How do you typically travel to the study area?





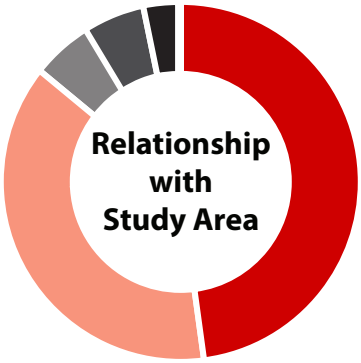


Which amenities would you use at a Hub?



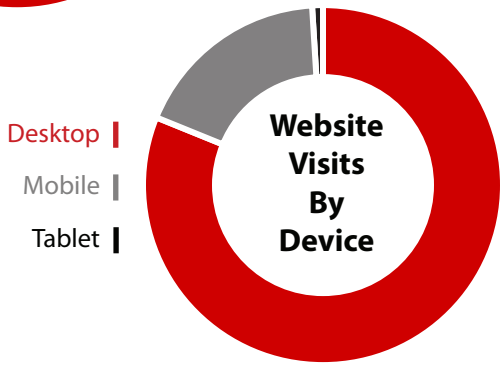
Mobility Hub Study Survey Phase II Key Findings

186 Survey Respondents



- Work within Study Area
- Are Students
- Local Residents
- Travel for Events
- Travel for Doctor

- Direct
- Social
- Organic Search
- Referral



- Desktop
- Mobile
- Tablet

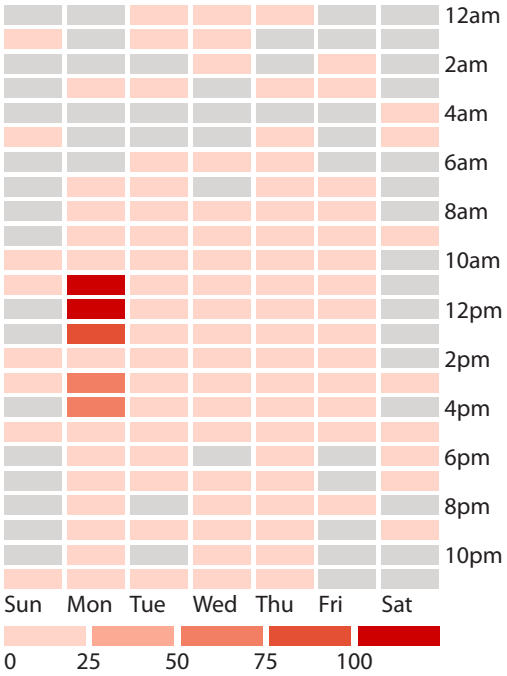
- Would Use Future Health Sciences Mobility Hub
- Would Use Future South Campus Mobility Hub
- Would Use Future 200 South Mobility Hub

U of U Mobility Hub Study Website Analytics

609 Unique Users

- University of Utah
- Outside Study Area
- VA Hospital

Website Visits By Time of Day




University of Utah
Campus
Mobility Hub Study
ABOUT
Click the items below to find out more
MOBILITY HUB
CAMPUS MOBILITY HUB
POTENTIAL HUB LOCATIONS


MOBILITY HUB ELEMENTS


UNIVERSITY OF UTAH
MOBILITY HUB STUDY
SURVEY
Start Survey
PROJECT TEAM
CONTACT US


Utah Utes

05

SITE SELECTION & PROGRAM DEVELOPMENT

"I think 200 South would be great for connecting to neighborhoods like The Avenues or Federal Heights where normal bus service isn't great. It would also be nice to have a quick way to get downtown for lunches or errands without having to use a car."

- MOBILITY HUB SURVEY PARTICIPANT

Introduction

This chapter identifies sites that are viable for development as a mobility hub, and sets forth the quantitative and qualitative process administered to establish and refine the mobility hub locations. The principles guiding mobility hub placement and typologies are also addressed.

Locating a Mobility Hub

Where do mobility hubs belong?

The Study partners have identified mobility hubs as a transportation system element that has the potential to advance goals related to mode share and congestion management, if developed and implemented strategically. The Mobility Hub Typology provides a framework for the early process of defining the mobility hub concept and illustrating its relationship to the study area's land use and transportation context. This relationship is rooted in an understanding that:

Transportation choice is influenced by:

- Land use density
- Multimodal transportation network density, including transit density and service level
- Density of destinations
- Community demographics and individuals' ability to access transportation options
- A range of policy and programmatic structures already in place in the study area (such as cost of parking, shared mobility service areas, and transportation demand management activities)

Mobility hub development is influenced by:

- Space within the public right-of-way
- Land use zoning (permitted uses)
- Availability and cost of parcels outside of the right-of-way
- Land owners
- Site constraints
- Scale of hub site design/intended programming
- Existing/prior investments in infrastructure (such as TRAX stations)

Planning & Siting Process

Mobility hub siting and planning must account for this range of factors. Success is contingent on identifying feasible locations for mobility hub investment that are also appropriately located to support transportation choice and advance locally-determined goals. While a Mobility Hub Typology does not identify these locations, it provides the foundation for how to identify those locations and how to program and design identified sites to best suit the area's varied contexts. The following section explains further how the Mobility Hub Typology fits within a planning and siting process.

An outcomes-driven approach to siting mobility hubs

STEP 1 — QUANTITATIVE ANALYSIS

A Suitability Analysis maps for the factors identified as influencing transportation choice to determine areas most suited for clustering transportation choices. The step is focused on measuring need and demand.

STEP 2 — TYPOLOGY

A Mobility Hub Typology is a tool for determining the type and scale of the mobility hub that would serve suitable areas based on anticipated demand and context.

STEP 3 — QUALITATIVE ANALYSIS

Building on the quantitative analysis, a Prioritization and Feasibility Analysis establishes criteria to further narrow areas of suitability based on alignment with goals and implementation considerations for candidate sites (such as available right-of-way, potential land acquisition or potential land-owner partnerships, and permitted uses).

STEP 4 — SITE DESIGN & PROGRAMMING

A conceptual design is crafted to fit within a selected site and reflect the appropriate mobility hub type. This step includes such details as access routes, ingress/egress, transit operational needs (e.g. number of bus bays, layover facilities, or similar), micromobility operational needs (e.g. parking capacity, payment kiosks, loading/unloading for rebalancing vehicles, or similar)

Quantitative Analysis

Methods

The quantitative mobility hub analysis measures relative demand for a mobility hub using four major inputs:

- **Origins** and **Destinations** – defined as work places, residences and activity centers
- **Transit Access** – defined as boardings and alightings at light rail stops, bus stops and campus shuttle stops
- **Active Transportation** – defined as bicycle and pedestrian network density, observed activity

These four inputs were used to create a hexagon-based heat map that indicates areas suitable for development of a mobility hub. Details of the analysis factors, data sources, and scoring methods are shown in the table on the following page. This table also shows a recommended weighting for each factor. This weighting reflects each criterion's expected influence in mobility hub performance. The screening analysis resulted in a heat map used to identify eight preliminary sites. These sites were assigned a tier based on their development timeline.

Tiered Hub Designations

- **Tier 1** are hub locations that have the capacity to be developed or redeveloped currently or near term (0 – 5 years).
- **Tier 2** are hub locations that have the capacity to be developed or redeveloped mid term (5 – 10 years)
- **Tier 3** are hub locations that have the capacity to be developed or redeveloped long term (10+ years).

Research Park Mobility Hub Quantitative Analysis

Executing a quantitative analysis for the siting of mobility hubs encountered some unique challenges in Research Park. Research Park is currently a predominantly auto-dependent development. This stems from many factors due to the era in which Research Park was planned and developed including ample vehicular parking, homogeneous zoning, limited biking and walking infrastructure, and limited transit options. Research Park is currently undergoing a master planning process which seeks to change its auto-dependent character into a rich, walkable district. However, the transportation and land use changes specified in the master plan will take time to implement.

While the intent of this study is to identify mobility hub sites, design improvements, and construct new infrastructure within approximately five years, Research Park will likely require more time before its land use and transportation infrastructure has evolved to fully support and leverage mobility hub investments. To account for this future substantial change in conditions, the Planning Team ran the future Research Park land use program through the "Origins and Destinations" analysis specified in the quantitative analysis. Transit access and active transportation inputs were not included given the uncertain nature and location of future improvements. This analysis demonstrated that given implementation of planned land use changes in Research Park, areas of high mobility hub suitability will develop over time. See page 40 for the Research Park Future Origins and Destinations Suitability.

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WEIGHT	ATTRIBUTE	DATA INPUTS	METHOD	SCORING	DATA SOURCE
	ANALYSIS FACTOR: **ORIGINS AND DESTINATION**				
X2	Daytime destination density	Building footprints, building square footage	Buildings with active daytime use are assigned an activity score based on square footage and activity multiplier based upon the ITE Trip Generation Manual	Hexagon is assigned a score of 1–6 based on natural jenks methods	University of Utah, ITE Trip Generation Manual, VA Salt Lake City Health Care System
	Nighttime destination density	Building inputs, residential population density, parcel/ land use data	Building footprints associated with residential use are assigned either a number of beds (residential dormitories) or an approximate population based on a calculation of square footage and an activity score is assigned.	Hexagon is assigned a normalized score of 1–6 based on natural jenks methods	University of Utah, Salt Lake City
	Activity Centers	Points of interest (e.g. restaurants, parks, libraries, museums, commercial locations, and other points of interest)	Point locations are assigned to each identified point of interest-based generator type and the ITE Trip Generation Manual	Hexagon is assigned a normalized score of 1–6 based on natural jenks methods	Open Street Map, ITE Trip Generation Manual
	ANALYSIS FACTOR: **TRANSIT ACCESS**				
X1.5	UTA Transit Ridership	Light rail / bus stop locations, daily boarding and alighting data	Daily station activity will be assigned to each stop location	Hexagon is assigned a normalized score of 1–6 based on natural jenks methods	UTA
	Campus shuttles	Stop locations, ridership per line	Daily station activity will be assigned to each stop location	Hexagon is assigned a normalized score of 1–6 based on natural jenks methods	University of Utah
	ANALYSIS FACTOR: **ACTIVE TRANSPORTATION**				
X1	Bicycle network density	Designated bicycle network	The density of designated bicycle infrastructure within the hexagon and within a 1/4 mile buffer will be reported.	Each hexagon will be assigned a normalized score of 1–6 based on natural breaks methods and reported network density	University of Utah, Salt Lake City
	Pedestrian network density	Designated pedestrian network	The density of designated pedestrian infrastructure within the hexagon and within a ¼-mile buffer will be reported.	Each hexagon will be assigned a normalized score of 1–6 based on natural breaks methods and reported network density	University of Utah, Salt Lake City
	Strava Activity	User commute routes	The density of user trips within each hexagon and within a ¼ mile buffer will be reported.	Each hexagon will be assigned a normalized score of 1–6 based on natural breaks methods and reported usership density	Strava
	Bicycle parking occupancy	Number of bicycles per designated bike rack	The number of bicycles parked at designated bike racks within the hexagon will be reported.	Each hexagon will be assigned a normalized score of 1-6 based on natural breaks methods and reported bicycle rack utilization	University of Utah

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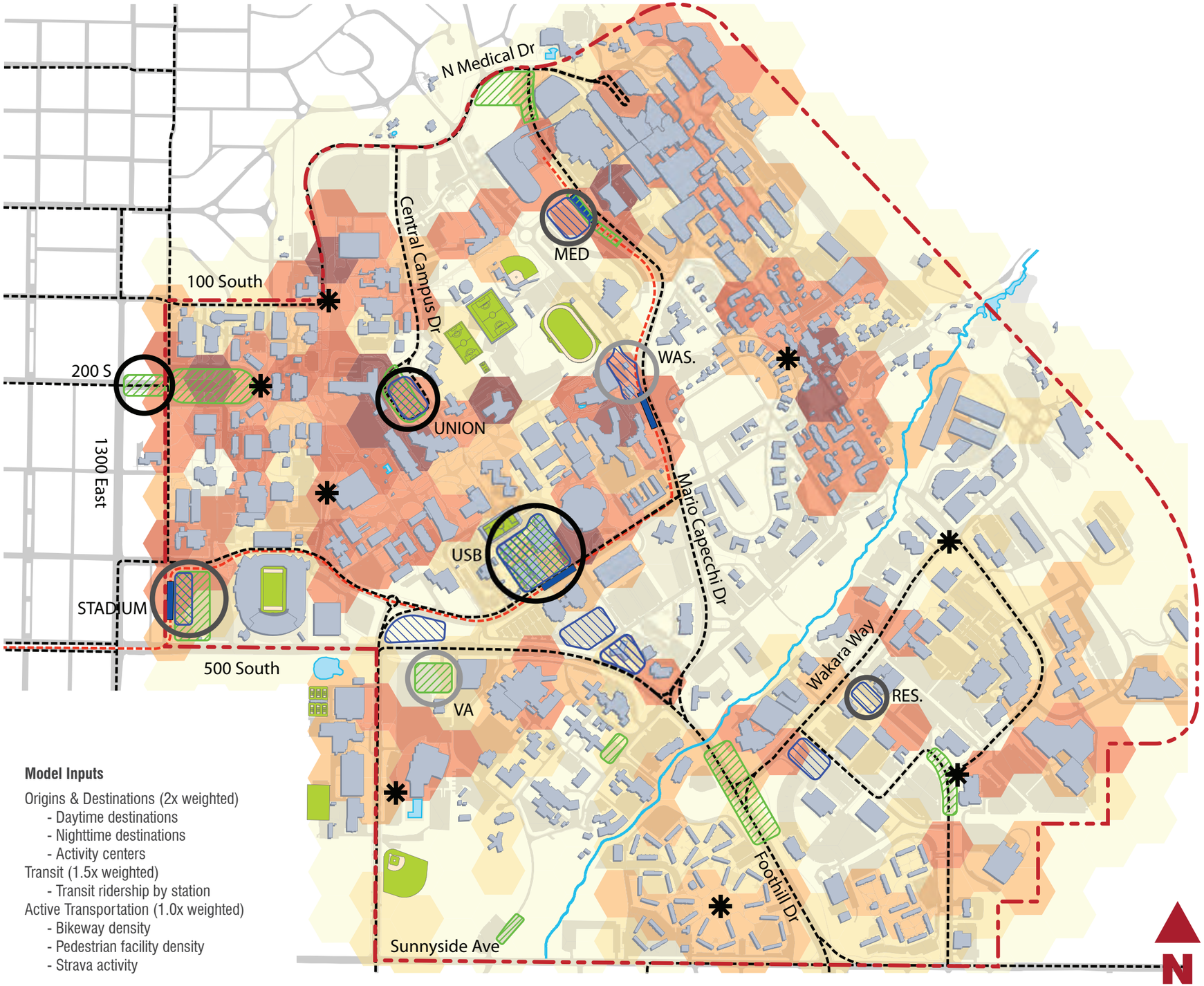
Composite Suitability Map for Mobility Hub Siting

Legend

- Higher Demand
- Lower Demand
- Stakeholder/Design Team Sites
- Existing Conditions Report Locations
- Micro Hub Locations
- Light Rail Line
- Light Rail Stations
- Bus Routes
- Tier 1 Hub
- Tier 2 Hub
- Tier 3 Hub

Potential Hub Summary

USB.	277,270 sf	6.4 ac
200 S	42,448 sf	0.9 ac
UNION	161,692 sf	3.7 ac
STADIUM	64,638 sf	1.5 ac
VA	72,458 sf	1.6 ac
WAS.	54,298 sf	1.3 ac
MED.	47,126 sf	1.1 ac
RES.	38,940 sf	0.9 ac



Model Inputs

Origins & Destinations (2x weighted)
- Daytime destinations
- Nighttime destinations
- Activity centers

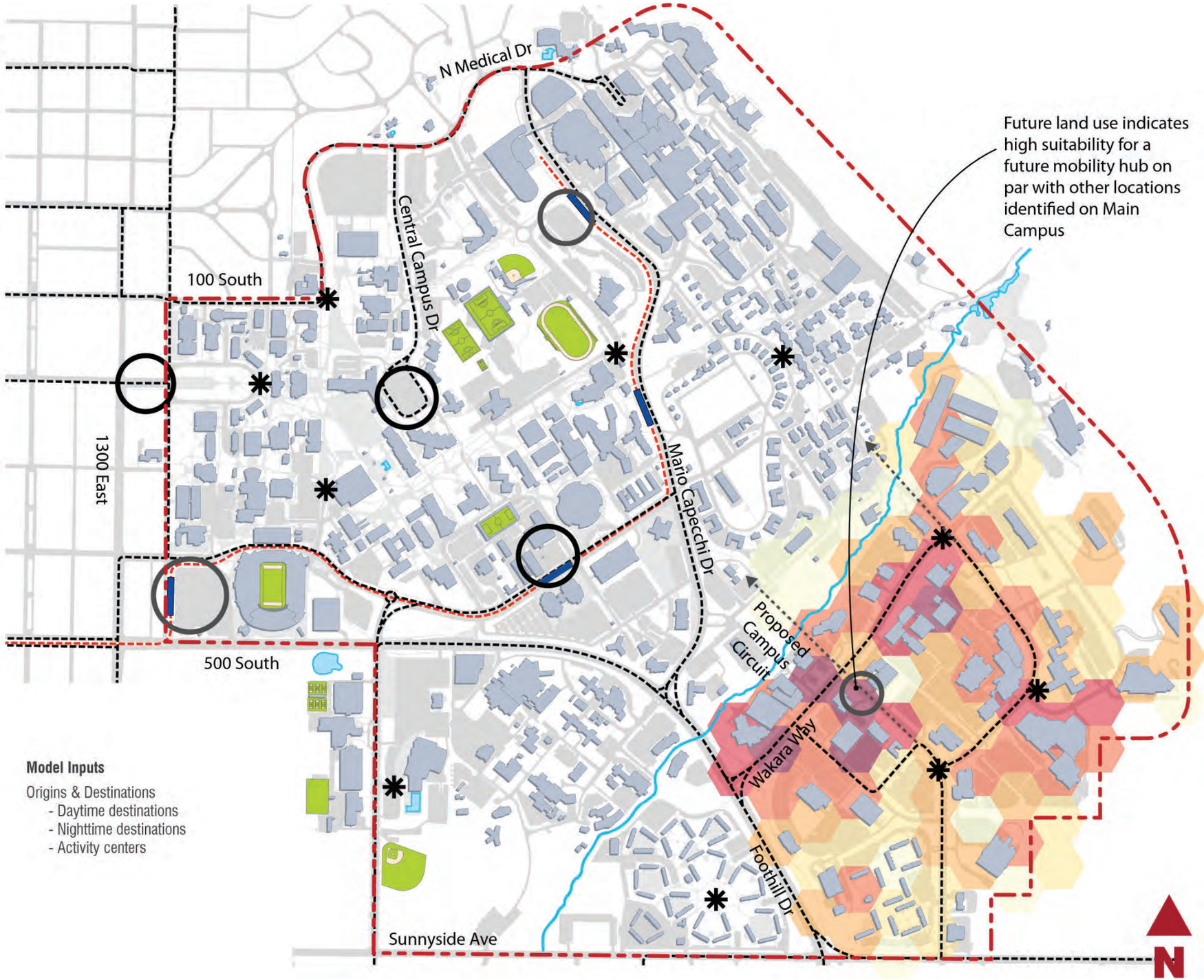
Transit (1.5x weighted)
- Transit ridership by station

Active Transportation (1.0x weighted)
- Bikeway density
- Pedestrian facility density
- Strava activity

University of Utah Research Park Future Land Use Mobility Hub Suitability

Legend

- Higher Demand
- Lower Demand
- 1/4 Mile Walkshed (5 min walk)
- Light Rail Line
- Light Rail Stations
- Bus Routes
- Large Hub
- Medium Hub
- Small Hub
- Micro Hub Locations



Model Inputs

Origins & Destinations
- Daytime destinations
- Nighttime destinations
- Activity centers

Mobility Hub Typologies

Mobility Hub typologies provide a foundation for identifying potential hub locations and for programing and designing selected sites to best suit the context. It includes three primary types: Large Hub, Small Hub, and Micro Hub. For each hub type, the collection of elements that allow the site to support seamless mobility connections are categorized in the following four ways:

- **Transit and Trip-making** includes design elements that support dynamic movements to and from the mobility hub site, including boarding and alighting for transit, pick-up and drop-off zones, and wayfinding and trip-planning signage. The common thread of this category is the fluidity of the action, occurring by the second and minute, with a high value for efficiency of movement and safe access to/from various modes.

- **Parking & Charging** includes design elements for stationary vehicles, whether parking personal vehicles, shared cars, shared micromobility devices, or electric vehicles that are accessing charging infrastructure. This zone is characterized by an end of trip action for the vehicle or device, whether short-term or long-term, and whether or not it is the end of trip for the individual.

- **Priority Access** includes design elements for human-scale travel to and from the site. This zone captures sidewalks, bike lanes, micromobility lanes, crossing treatments and similar investments that enable persons to safely and comfortably access the hub's other design elements.

- **Amenities** include complementary design elements that add value to the user's experience, but are not core to the function of using the site's transportation services. This could include public art, outdoor seating, complementary retail, shops, cafes, and restaurants, a playground, food cart pods, concierge services, and similar.

End-of-Line Bus Infrastructure Considerations

Adequate end-of-line infrastructure is an important consideration in providing frequent, efficient, and reliable bus service. While this infrastructure, including bus bays, layover areas, and restrooms, are not a required component of a successful mobility hub, they do offer opportunities for synergy with the goals of this plan.

In order to provide transit service upgrades as part of Salt Lake City's expanding Frequent Transit Network (FTN), UTA and SLC Transportation have expressed the need for adequate end-of-line infrastructure to improve the reliability of bus operations and allow for future service upgrades. These service upgrades would directly support the mode shift goals of the plan. End-of-line infrastructure also brings together multiple routes allowing for efficient transfers and opportunities to use transit to access more destinations. Finally, end-of-line facilities can also support campus shuttle operations while providing similar operational benefits.

Although there are numerous transit benefits to end-of-line facilities, there are associated impacts that need to be balanced with the needs and characteristics of each site. Potential impacts may include:

- Increased bus traffic and opportunities for conflicts with other modes
- Larger spatial requirements to accommodate turning movements and layovers
- Potential impacts to placemaking initiatives and pedestrian-friendly development

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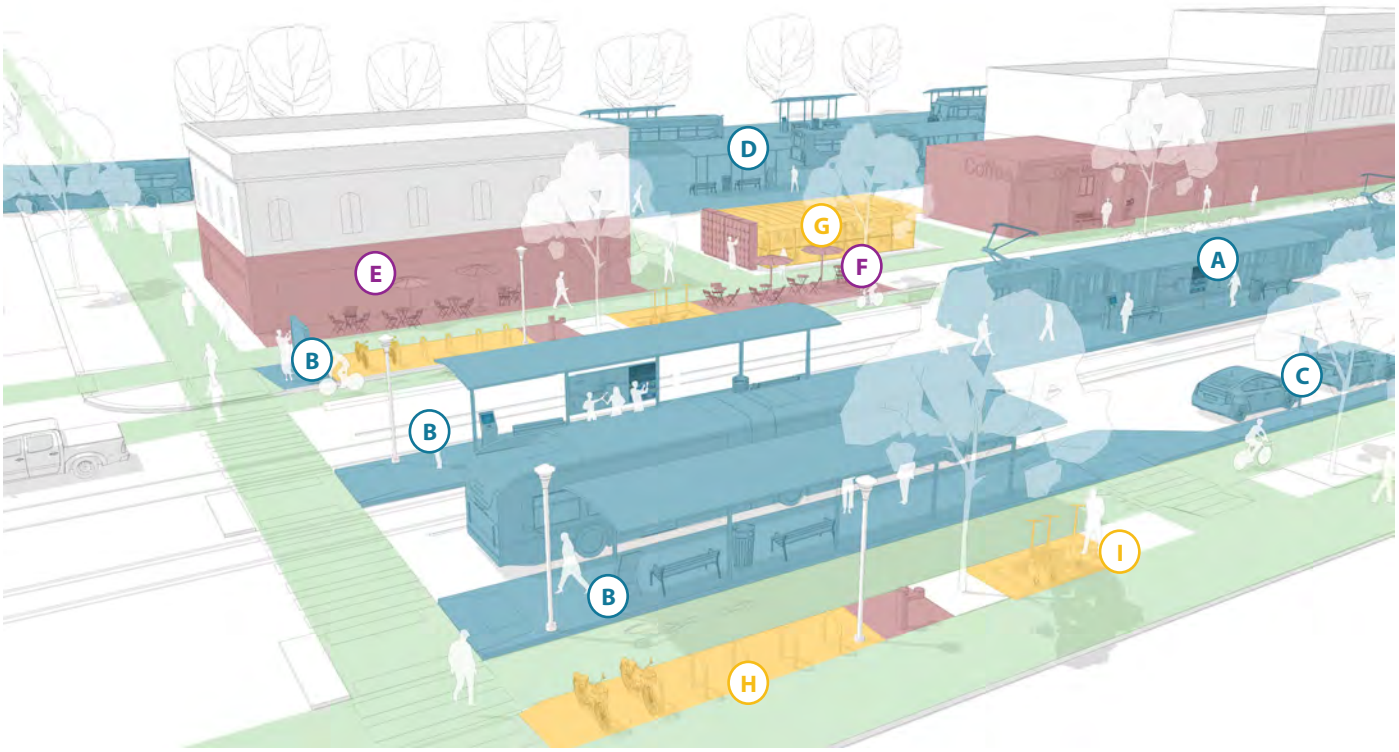
Mobility Hub Elements Matrix

	LARGE HUB	SMALL HUB	MICRO HUB
Bus and/or shuttle stop	●	●	●
Fixed guideway transit stop (BRT or LRT)	●	○	
Transit ticket kiosks	●	●	●
Seating	●	●	○
Shelter/Shade Structure	●	●	●
Indoor waiting area	●	○	
Bikeshare and scootershare parking	●	●	●
Short term bike parking	●	●	●
Long term bike parking	●	○	
Personal vehicle parking	○	○	
Carshare	○	●	○
Electric vehicle charging	○	●	○
TNC pick-up/drop-off	●	●	○
Wayfinding	●	●	●
Real-time information	●	●	●
Wifi hub	●	○	○
Water fountains	●	●	○
Restrooms	●	●	○
Sidewalks	●	●	●
Safe pedestrian crossings	●	●	●
Dedicated bike infrastructure	●	●	●
Active public space	●	○	○
Convenience retail	○	○	○
Possibilities also include gyms/showers, convenience day care, package delivery, etc.			

● Recommended ○ May be included



1. Large Mobility Hub

The Large Mobility Hub represents the largest of the three mobility hub types. It provides a vision of how mobility hubs could be assembled in highest demand areas where there is sufficient space and likely includes the widest variety of available modes. Mobility services extend beyond the right-of-way and are integrated with adjacent land uses.

Typical Application:

- TRAX Stations (high ridership)
- High frequency or high ridership bus route stops

Potential Design Features:

Transit & Trip Making Services

(A) Light rail accessible boarding area

(B) Trip planning information and ticket kiosks

(C) Passenger pick-up and drop-off

(D) End-of-line bus facilities, including accommodations for shuttle

Amenities

(E) Retail space for businesses that support trip-chaining, such as bike shops, grocery/convenience stores, or coffee shops

- Showers and lockers for bicyclists integrated into infill development

(F) Features that enhance sense of place

Parking & Charging Services

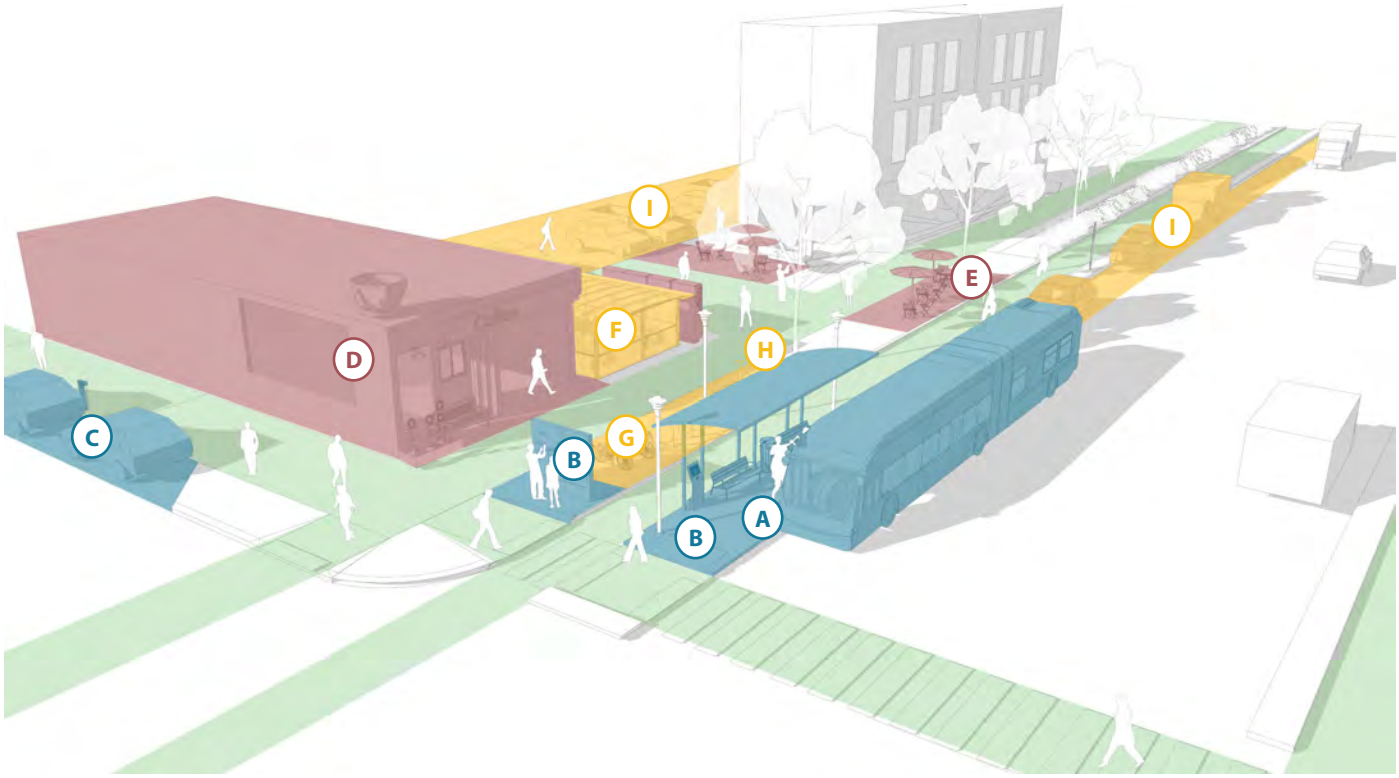
(G) Expanded long-term bicycle storage facilities

(H) Short term bike parking

(I) Designated micromobility parking

Priority Areas

- Comfortable and continuous walkways
- Comfortable and continuous bikeways
- Safe and frequent road crossings for people walking and biking



2. Small Mobility Hub

Small Mobility Hubs demonstrate how new technology can make it more convenient to pair transit with active transportation modes. It shows how a high demand bus stop could be upgraded with additional features where space allows. Long term bike storage and prioritized vehicle parking help facilitate longer trips where users may not return for a day or more. This could be a place to accommodate autonomous vehicle pick-up and drop-off in the future as well as other new technologies that access campus.

Typical Application:

- TRAX stations (low to moderate ridership)
- High ridership bus route stops

Potential Design Features:

Transit & Trip Making Services

(A) Accessible boarding area (Bus or TRAX)

(B) Trip planning information that is accessible to all and ticket kiosks to facilitate pre-boarding payment

(C) Passenger pick-up and drop-off
- Smaller scale end-of-line bus facilities as needed

Amenities

(D) Retail space for businesses that support trip-chaining, such as bike shops, grocery/convenience stores, delivery lockers, or coffee shops

(E) Features that enhance sense of place like seating and lighting

Parking & Charging Services

(F) Expanded long-term bicycle storage facilities

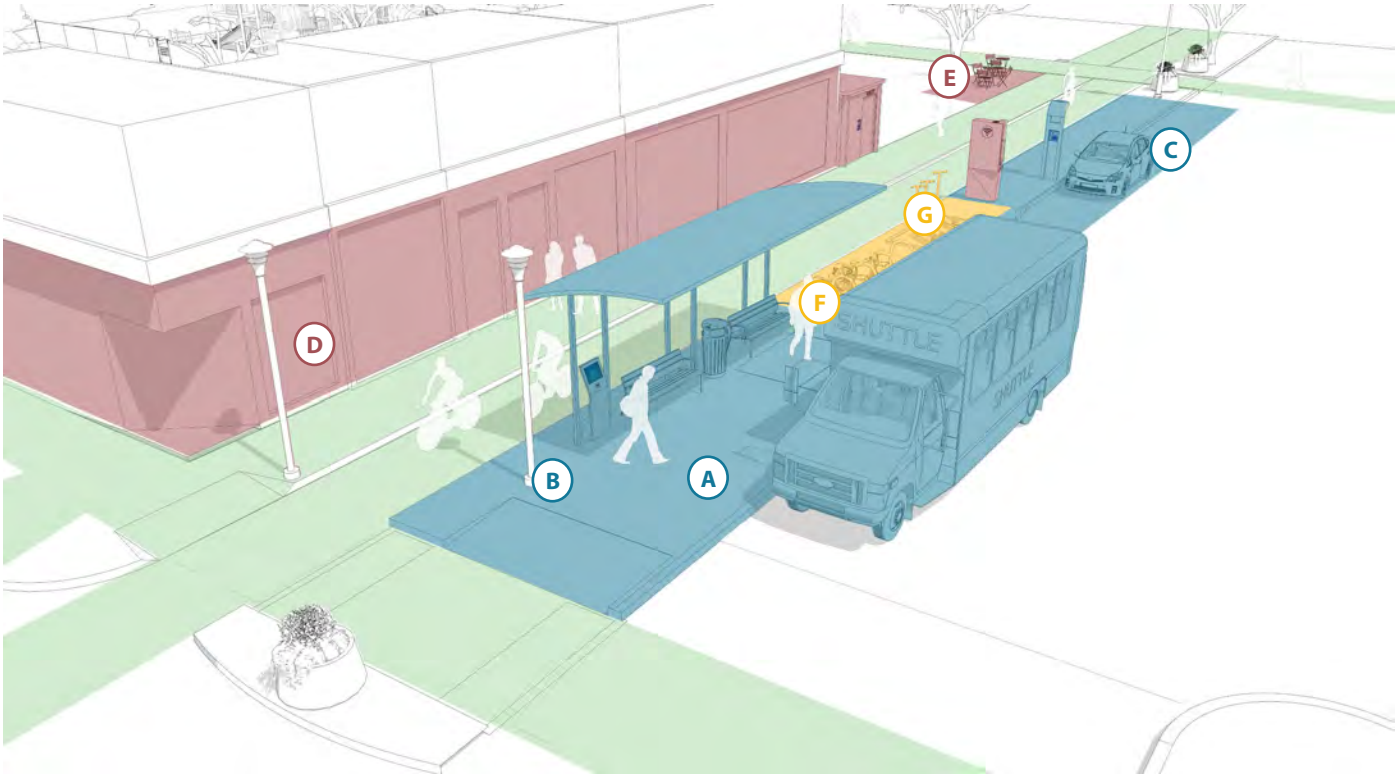
(G) Short term bike parking

(H) Designated micromobility parking

(I) Vehicle parking
- Preferential parking for carshare, carpool, guaranteed ride home
- Dynamic parking pricing for single-occupancy vehicles
- Electric vehicle charging stations

Priority Areas

- Comfortable and continuous walkways
- Comfortable and continuous bikeways
- Safe and frequent road crossings for people walking and biking



3. Micro Mobility Hub

The Micro Mobility Hub demonstrates how new technology can make it more convenient to pair shuttle or microtransit services with active transportation modes. It includes all of the features to support micro-mobility services plus campus shuttle services and accommodates vehicle pick-up/drop-off.

Typical Application:

- Trailheads
- Where an off-street trail intersects an on-street bikeway or pedestrian route
- Along collectors and arterials with low frequency bus service or no service
- At neighborhood centers with low frequency bus service or no service

Potential Design Features:

Transit & Trip Making Services

A Shuttle boarding platform

B Trip planning information that is accessible to all and ticket kiosks to facilitate pre-boarding payment

C Passenger pick-up and drop-off

Amenities

D Retail space for businesses that support trip-chaining, such as bike shops, grocery/convenience stores, or coffee shops

E Features that enhance sense of place

Parking & Charging Services

F Short term bike parking

G Designated micromobility parking

Priority Areas

- Comfortable and continuous walkways
- Comfortable and continuous bikeways
- Safe and frequent road crossings for people walking and biking

Qualitative Analysis

Following the quantitative analysis and development of the mobility hub typology, the qualitative analysis examines additional critical factors of potential mobility hub sites.

For each of the eight (8) potential sites, the project team identified the appropriate type of mobility hub for the location, the existing transit service available at the location, and the relative demand measured in the quantitative analysis. With these identifiers in mind, the project team examined each site based on the following considerations for viability and near-term readiness

- **Feasibility:** The level to which the site is able to accommodate the programming needs and circulation required to allow a mobility hub to function. This category also addresses the level to which existing site uses or buildings can be incorporated into the mobility hub, relocated, or removed.

- **Future Compatibility:** The level to which developing a mobility hub at that site would leverage or complement planned transportation investments at or near the site.

- **Transit Opportunities:** The level to which the site could accommodate an increase in transit service or operations.

- **Land Use and Urban Form:** The level to which the surrounding area currently offers, or is expected to offer in the future, complementary activities and amenities.

For each of the four categories, weighting is applied to ensure that categories with more questions (more point allocations) are not by default given more value. The weighting values serve to normalize the scoring based on the desired weighting by category (15% Feasibility, 25% Future Compatibility, 35% Transit Opportunities, 25% Land Use and Urban Form).

The qualitative analysis is one of several tools used to prioritize mobility hub site opportunities and is intended to be considered in tandem with the GIS suitability analysis, the results of a study area survey, and input from stakeholders.

Mobility hub sites were scored and adjusted through an iterative process by the Planning Team and the Steering Committee. A final group scoring process using an online survey tool resulted in narrowing the final candidate sites down to the following locations:

- South Campus
- Stadium
- Union
- 200 South
- Health Sciences
- Research Park

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QUALITATITIVE FACTORS	0–3 (LOW TO HIGH)	NOTES
FEASIBILITY	**15%**	
Existing Land Use: How readily can the site's existing programming and land uses be removed, relocated, or integrated with a future mobility hub?		3 - Indicates existing uses can be easily replaced or integrated into mobility hub program; 0 - Indicates there are critical existing uses that cannot presently be relocated or integrated with a mobility hub
Circulation: Is there adequate circulation to this site for all modes?		3 - Indicates there is a high degree of circulation for all modes; 0 - indicates there are major circulation limitations for multiple modes
Engineering: What level of engineering constraints, such as utilities or topography, exist on the site?		3 - Indicates the site is relatively free from constraints; indicates numerous, severe, or expensive engineering constraints
FUTURE COMPATIBILITY	**25%**	
Does development of the site as a mobility hub align with the 2008 Campus Master Plan?		3 - Indicates there is no conflict and specific recommendations that favor the site; 2 indicates there is no conflict but no related supportive recommendations; 1 indicates a minor conflict; 0 - indicates a major conflict For sites not included in Campus Plan study area, highest score is applied
Does development of the site as a mobility hub align with other regional plans		3 - Indicates high level of alignment with regional plans; 0 - indicates low level of alignment or conflict with regional plans
TRANSIT OPPORTUNITIES	**35%**	
How readily could the site be improved to support transit operations, service enhancements, or end of line infrastructure?		3 - Indicates simple or minimal modifications required, 0 - indicates complex and expensive modifications required
LAND USE AND URBAN FORM	**25%**	
Is there existing or the potential for mixed-use development (transit-oriented development) or redevelopment in conjunction with this site?		3 - Indicates significant existing or planned multi-use development nearby, 0 - indicates little potential for nearby mixed-use development
Is the site a priority location for placemaking investment such as a gateway or other community gathering space?		3 - Indicates major gateways or other locations with existing or planned placemaking and urban design investment, 0 - indicates locations that are not priorities for placemaking and urban design
Are there existing dining, retail, or other daily services present near the site that would help serve a future mobility hub?		3 - Indicates significant supply of nearby dining, retail or daily services; 0 - complete lack of nearby dining, retail, or daily services
Would this site help support the transportation needs of local neighborhoods?		3 - Indicates good connections and proximity to nearby neighborhoods; 0 - limited connections or proximity to nearby neighborhoods

06

PREFERRED LOCATIONS

"I think those are good locations and that people would be happy to have a place to lock their bikes, buy food, and have comfortable seating while they can see real-time travel information."

- MOBILITY HUB SURVEY PARTICIPANT

Introduction

This chapter identifies the preferred mobility hub locations that were selected during the quantitative and qualitative analysis phase of the study. These sites cover critical nodes that intersect with the campus, existing public transportation routes, and key destinations in the study area. This chapter also displays the results of the qualitative analysis that was completed by the stakeholder group and project team for the preferred locations.

Preferred Locations

Each potential mobility hub site outlined in this study went through the same quantitative and qualitative analysis addressed in the previous chapter. The results of the qualitative analysis for the eight potential mobility hubs is shown below:

QUALITATITIVE ANALYSIS RESULTS

POTENTIAL LOCATION	SCORE
South Campus	75.47
Stadium	73.38
Union	73.80
200 South	72.54
Health Sciences Campus	70.88
Research Park Campus	67.55
Veteran Affairs Medical Center	45.03
Watsatch Drive	31.69

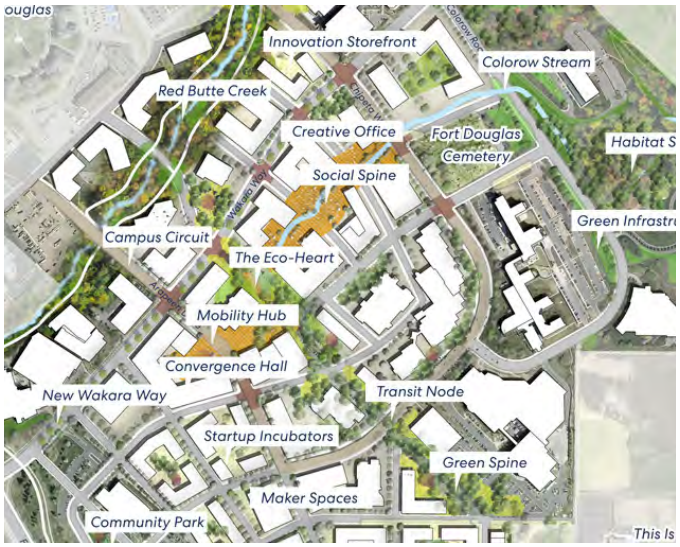
After the analysis was complete four scenarios were developed with the top performing mobility hub locations. These scenarios were assigned four locations each which distributed the potential mobility hubs in a way to best serve the needs of Salt Lake City, UTA, University Main Campus, University Heath Science Campus, University Research Park Campus, and the Veteran Affairs Medical Center.

The scenarios are as follows:

- **Scenario A:** Union, South Campus, Health Sciences, Research Park
- **Scenario B:** Union, Stadium, Health Sciences, Research Park
- **Scenario C:** 200 S., South Campus, Health Sciences, Research Park
- **Scenario D:** 200 S., Stadium, Health Sciences, Research Park

Scenario C was selected as it best covered the varying topographic regions of the study area, was in close proximity to key destinations, served end of line and through route needs for UTA and Campus Shuttles, and minimized overlap between potential locations. The map on the following page shows the preferred scenario with the potential footprint, proximity to public transportation and infrastructure, and 1/4 mile walkshed of the 200 South, South Campus, and Health Sciences mobility hub locations. These locations are meant to collectively fulfill the current and projected needs of the region in connection with University of Utah Main Campus, University of Utah Health Science Campus, and the George E. Wahlen Department of Veterans Affairs Medical Center.

The evaluation of the Research Park Mobility Hub location and program elements will be further addressed by the Research Park Master Plan. The quantitative and qualitative analysis in this study is only intended to give guidance on the general placement and programming of the future Research Park Mobility Hub. Final conceptual plans, program elements, and the preferred location will be addressed in that study.



realestate.utah.edu

Mobility Hub Scenario C

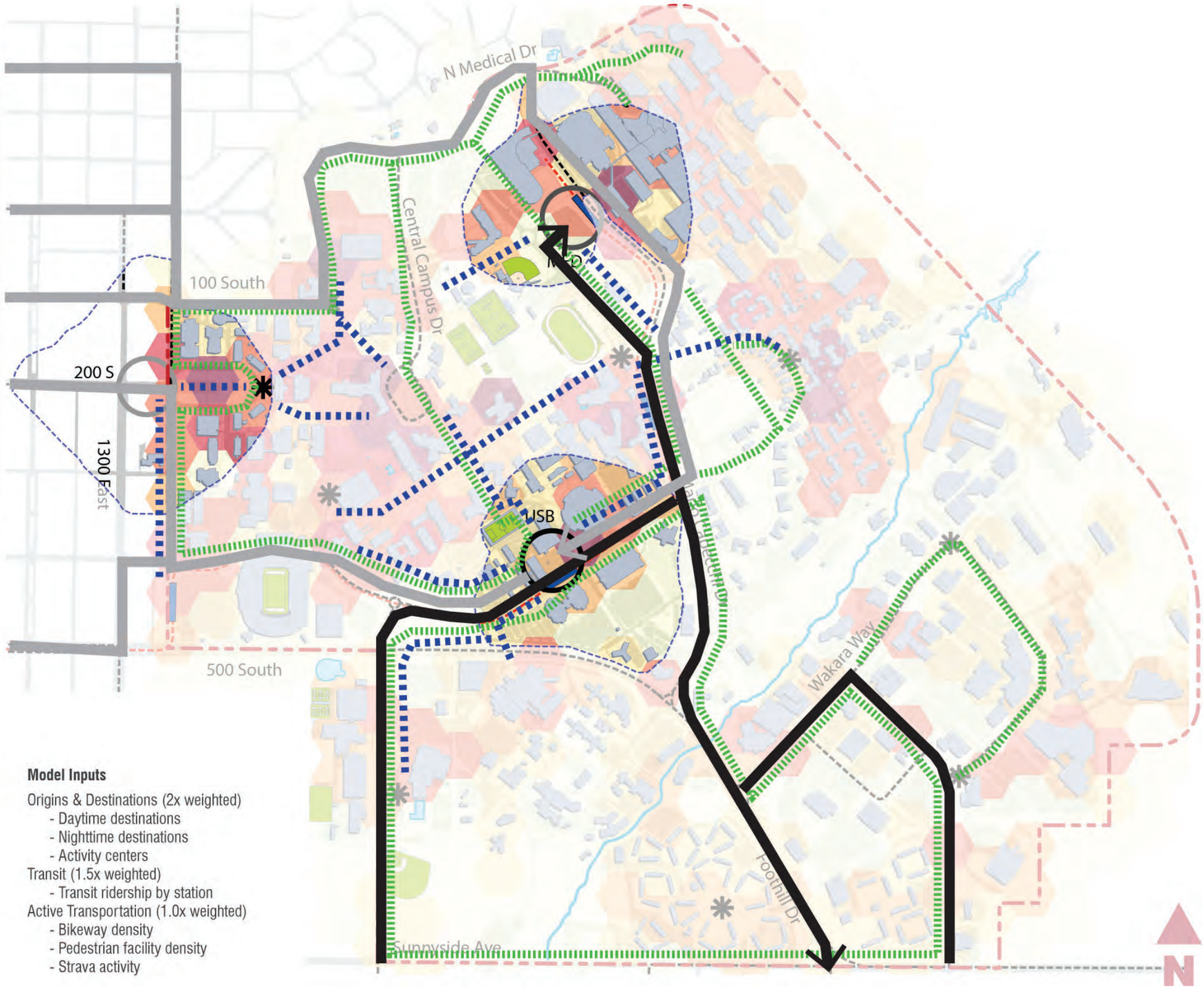
North / South Bus
East/ West Bus
Bike / Micromobility
Campus Shuttle

- Qual. Hub Score (Cumulative): 208.8 (2nd)
- O+D Score within Walkshed: 278

- North / South Bus Routes EOL at Medical
- East / West Routes EOL at USB

Potential Hub Summary

USB.	80,200 sf	1.8 ac
200 S	42,448 sf	0.9 ac
UNION	161,692 sf	3.7 ac
STADIUM	129,200 sf	3.0 ac
MED.	47,126 sf	1.1 ac



Model Inputs

Origins & Destinations (2x weighted)
- Daytime destinations
- Nighttime destinations
- Activity centers

Transit (1.5x weighted)
- Transit ridership by station

Active Transportation (1.0x weighted)
- Bikeway density
- Pedestrian facility density
- Strava activity

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SOUTH CAMPUS QUALITATIVE ANALYSIS		
IDENTIFIERS	**ANSWER**	**NOTES**
What mobility hub type is suited for the location?	Large	Could start with a small hub and phase in more improvements over time as buildings on site reach the end of their lifecycle
What transit service is currently available to the site?	TRAX; Bus	
What is the corresponding "heat map" result for the site? (Level 6- highest, Level 1- lowest)	Level 3	Adjacent to Level 6 near the Huntsman Center
QUALITATIVE FACTORS	**0–3 (LOW TO HIGH)**	**NOTES**
Feasibility	**15% (1.67x multiplier)**	
Existing Land Use: How readily could the site's existing programming and land uses be removed, relocated, or integrated with a future mobility hub? (3- Easily replaced or integrated into mobility hub program, 0- Critical existing uses that cannot presently be relocated or integrate with a mobility hub)	1.50	Yes, redevelopment of the motor pool buildings, and others would be required. Phased improvements may be possible
Is there adequate circulation to this site for all modes? (3- High degree of circulation for all modes, 0- Limited circulation for most modes)	2.00	Yes, no left turns allowed across TRAX from S. Campus Drive
Engineering: What level of engineering constraints, such as utilities or topography, exist on the site? (3-Relatively free from constraints, 0-Numerous, severe, or expensive engineering constraints)	3.00	Few engineering constraints, left turns from eastbound South Campus Drive currently restricted.
Feasibility Sub Score	**10.86**	
Future Compatibility	**25% (4.17x multiplier)**	
Does development of the site as a mobility hub align with the 2008 Campus Master Plan?	3.00	Yes, project aligns with the vision for South Campus Walk
Does development of the site as a mobility hub align with other regional plans?	3.00	Identified as "Planned Transit Center" on SLC Transit Master Plan
Future Compatibility Sub Score	**25.02**	
Transit Opportunities	**35% (11.67x multiplier)**	
How readily could the site be improved to support transit opertaions, service enhancements, or end of line infrastructure? (3- Simple or minimal modifications reqd. , 0 - Complex and expensive modifications reqd.)	2.00	Yes,there could be room with potential redevelopment efforts; site is UTA's preferred location
Transit Opportunities Sub Score	**23.34**	
Land Use + Urban Form	**25% (2.5x multiplier)**	
Is there existing or the potential for mixed use development (transit-oriented development) or redevelopment in conjunction with this site?	2.50	Yes, along with development of South campus walk
Is the site a priority location for placemaking investment such as a gateway or other community gathering space?	3.00	Yes, campus gateway for TRAX and planned South Campus Walk
Are there existing dining, retail, or other daily services present near the site that would help serve a future mobility hub?	1.00	Limited options currently
Would this site help support the transportation needs of local neighborhoods?	0.00	Not adjacent to any neighborhoods
Land Use + Urban Form Sub Score	**16.25**	
TOTAL SCORE	**75.47**	**TIER 1**

200 SOUTH QUALITATIVE ANALYSIS		
IDENTIFIERS	**ANSWER**	**NOTES**
What mobility hub type is suited for the location?	Small	Inline mobility hub required to function within the ROW
What transit service is currently available to the site?	TRAX; Bus	
What is the corresponding "heat map" result for the site? (Level 6- highest, Level 1- lowest)	Level 5	
QUALITATIVE FACTORS	**0–3 (LOW TO HIGH)**	**NOTES**
Feasibility	**15% (1.67x multiplier)**	
Existing Land Use: How readily could the site's existing programming and land uses be removed, relocated, or integrated with a future mobility hub? (3- Easily replaced or integrated into mobility hub program, 0- Critical existing uses that cannot presently be relocated or integrate with a mobility hub)	2.00	Development of the site would likely require removal of on-street parking
Is there adequate circulation to this site for all modes? (3- High degree of circulation for all modes, 0- Limited circulation for most modes)	2.50	Good circulation to the site for all modes
Engineering: What level of engineering constraints, such as utilities or topography, exist on the site? (3-Relatively free from constraints, 0-Numerous, severe, or expensive engineering constraints)	1.00	Slope and ADA access limitations along 200 S
Feasibility Sub Score	**9.19**	
Future Compatibility	**25% (4.17x multiplier)**	
Does development of the site as a mobility hub align with the 2008 Campus Master Plan?	2.50	Does not conflict but no transportation program is mentioned
Does development of the site as a mobility hub align with other regional plans?	2.50	Aligns with SLC's plans to convert 200 S into a "Transit Mall"
Future Compatibility Sub Score	**20.85**	
Transit Opportunities	**35% (11.67x multiplier)**	
How readily could the site be improved to support transit opertaions, service enhancements, or end of line infrastructure? (3- Simple or minimal modifications reqd. , 0 - Complex and expensive modifications reqd.)	1.50	Grade is challenging, difficult to achieve ADA
Transit Opportunities Sub Score	**17.51**	
Land Use + Urban Form	**25% (2.5x multiplier)**	
Is there existing or the potential for mixed use development (transit-oriented development) or redevelopment in conjunction with this site?	2.50	Yes, private sector already exists
Is the site a priority location for placemaking investment such as a gateway or other community gathering space?	2.50	Yes, campus gateway and adjacent to President's Circle
Are there existing dining, retail, or other daily services present near the site that would help serve a future mobility hub?	2.50	Yes
Would this site help support the transportation needs of local neighborhoods?	2.50	Good support of surrounding neighborhood
Land Use + Urban Form Sub Score	**25.00**	
TOTAL SCORE	**72.54**	**TIER 1**

HEALTH SCIENCES CAMPUS QUALITATIVE ANALYSIS		
IDENTIFIERS	**ANSWER**	**NOTES**
What mobility hub type is suited for the location?	Large	
What transit service is currently available to the site?	TRAX; Bus	
What is the corresponding "heat map" result for the site? (Level 6- highest, Level 1- lowest)	Level 1	Site falls squarely within level 5 but is adjacent to Level 6
QUALITATIVE FACTORS	**0–3 (LOW TO HIGH)**	**NOTES**
Feasibility	**15% (1.67x multiplier)**	
Existing Land Use: How readily could the site's existing programming and land uses be removed, relocated, or integrated with a future mobility hub? (3- Easily replaced or integrated into mobility hub program, 0- Critical existing uses that cannot presently be relocated or integrate with a mobility hub)	2.50	Site currently undeveloped; potential to coordinate with new Health Sciences Office Buildings
Is there adequate circulation to this site for all modes? (3- High degree of circulation for all modes, 0- Limited circulation for most modes)	2.00	Access to and from the mobility hub would likely involve elevators to navigate grades
Engineering: What level of engineering constraints, such as utilities or topography, exist on the site? (3-Relatively free from constraints, 0-Numerous, severe, or expensive engineering constraints)	2.00	Mobility hub would need to be tucked under Health Sciences Office Building with elevators to Mario Capecchi or pedestrian bridge
Feasibility Sub Score	**10.86**	
Future Compatibility	**25% (4.17x multiplier)**	
Does development of the site as a mobility hub align with the 2008 Campus Master Plan?	2.50	Does not conflict but no transportation program is mentioned
Does development of the site as a mobility hub align with other regional plans?	3.00	Yes, inclusion of mobility hubs is recommended at high ridership stations
Future Compatibility Sub Score	**22.94**	
Transit Opportunities	**35% (11.67x multiplier)**	
How readily could the site be improved to support transit opertaions, service enhancements, or end of line infrastructure? (3- Simple or minimal modifications reqd. , 0 - Complex and expensive modifications reqd.)	2.00	Limited potential if circulation can be coordinated with new Health Sciences office buildings
Transit Opportunities Sub Score	**23.34**	
Land Use + Urban Form	**25% (2.5x multiplier)**	
Is there existing or the potential for mixed use development (transit-oriented development) or redevelopment in conjunction with this site?	1.50	Area identified for development but mostly single use (medical). However, this area could be programmed with the Health Sciences office building campus
Is the site a priority location for placemaking investment such as a gateway or other community gathering space?	2.50	Yes, campus gateway for TRAX
Are there existing dining, retail, or other daily services present near the site that would help serve a future mobility hub?	1.00	Some options nearby on Health Sciences campus
Would this site help support the transportation needs of local neighborhoods?	0.50	Limited support for Federal Heights residents
Land Use + Urban Form Sub Score	**13.75**	
TOTAL SCORE	**70.88**	**TIER 2**

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07

CONCEPT DESIGN

"I think this [Campus Mobility Hub] is a great idea! It would be nice if it was offered 24/7. I think that this would be a great step in making campus safer."

- MOBILITY HUB SURVEY PARTICIPANT

Introduction

This chapter addresses the process of the conceptual designs for each of the preferred locations and is broken into four subsections. The first subsection contains the concept design considerations used during this phase of the project. The following sections give an overview of each site with the prescribed program elements. These sections also contain the final concept plans, three perspective views, precedent images, and key iterations and phases for the concept.

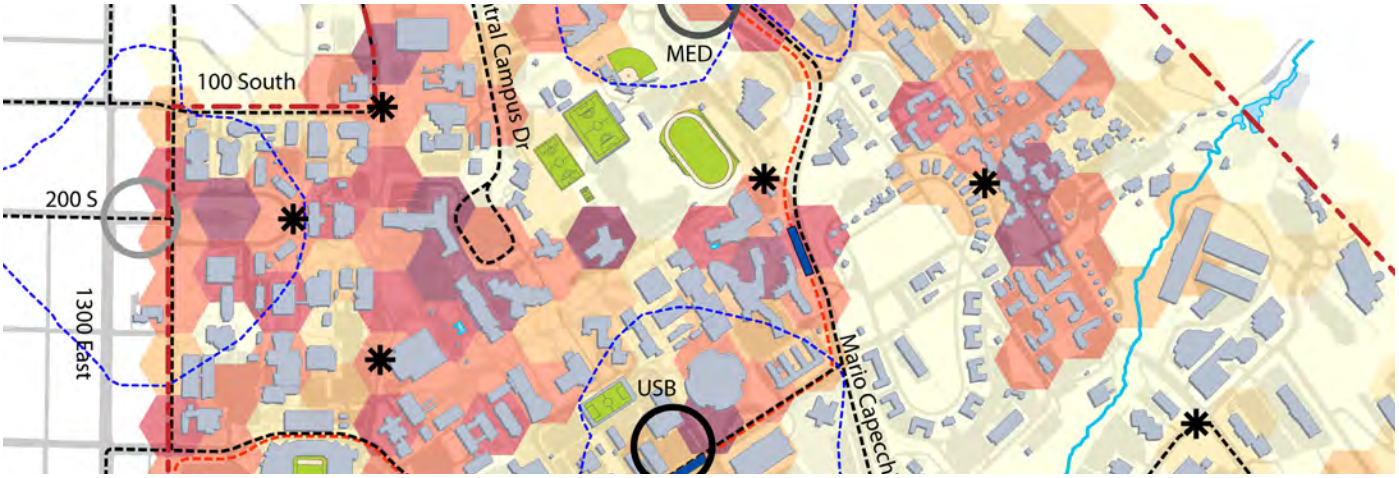
Concept Design Considerations

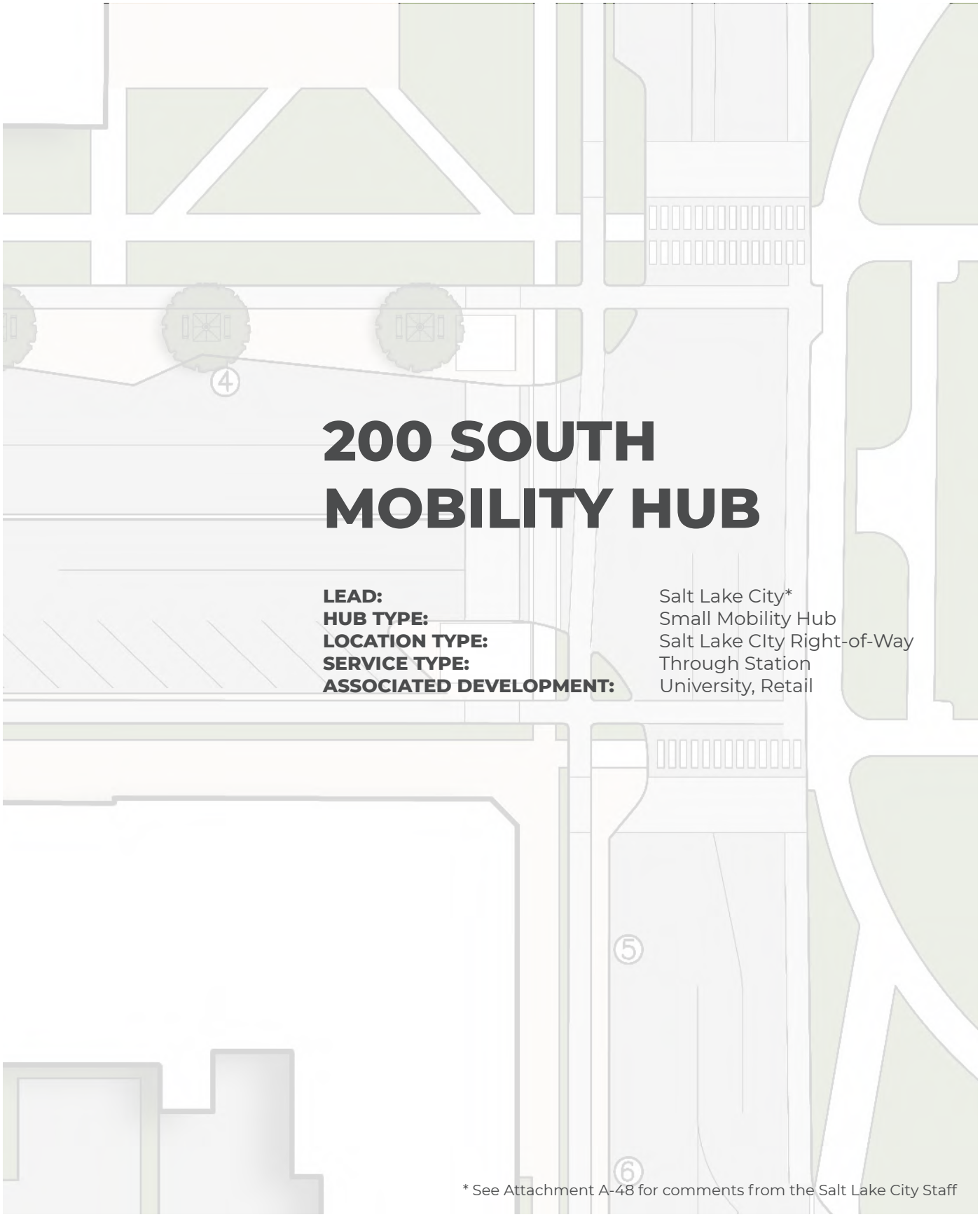
Before developing the concept plans for the mobility hub sites each location was categorized by:

- Available area
- End of line capability
- Hub type classification
- Walkshed
- Non-motorized modes of transportation access
- Motorized modes of transportation access
- Proximity to fixed public transit lines
- Existing and future land uses
- Topography
- Surrounding infrastructure
- Master Plans
- General feasibility
- Proximity to destinations
- Needed network improvements
- Likelihood to promote mode shift
- Existing and future capability of the sites to meet existing and projected demand needs both individually and cumulatively
- And stakeholder feedback.

Once the initial mobility hub's categorization was complete, program elements were established for each site based on mobility hub best practices and emerging trends and the 2015 UTA First/Last Mile Strategies Study. These program elements are intented to encourage mode shift through expanded multimodal transportation opportunities, seamless transfers, increased connectivity, integrated technology, pedestrian priority, wayfinding signage, placemaking, and heightened safety and security measures. Timing also played a critical role in the development of these sites making it necessary to model them to better understand future conditions and any essential phasing.

Initial concept designs were created and illustrative graphics developed to help stakeholder groups better visualize the sites and give appropriate feedback. Each site had several iterations and every new iteration underwent a vetting process which included internal and stakeholder review. This vetting process helped catch inconsistencies in the plan with preliminary considerations and general best practices. The results from this process can be seen on the following pages.





200 SOUTH MOBILITY HUB

LEAD:	Salt Lake City*
HUB TYPE:	Small Mobility Hub
LOCATION TYPE:	Salt Lake CIty Right-of-Way
SERVICE TYPE:	Through Station
ASSOCIATED DEVELOPMENT:	University, Retail

* See Attachment A-48 for comments from the Salt Lake City Staff

Introduction

The 200 South Mobility Hub occupies the full right-of-way of 200 South between 1300 East and University Street. This hub is adjacent to the University of Utah's historic President's Circle and is intended to create an enhanced pedestrian environment with safety improvements and supportive multimodal opportunities. The hub's proximity to current retail development, the University, and existing public transit routes, makes it a great location for a mobility hub. The concept plan's design for this hub is consistent with all University, City, and Regional Plans.

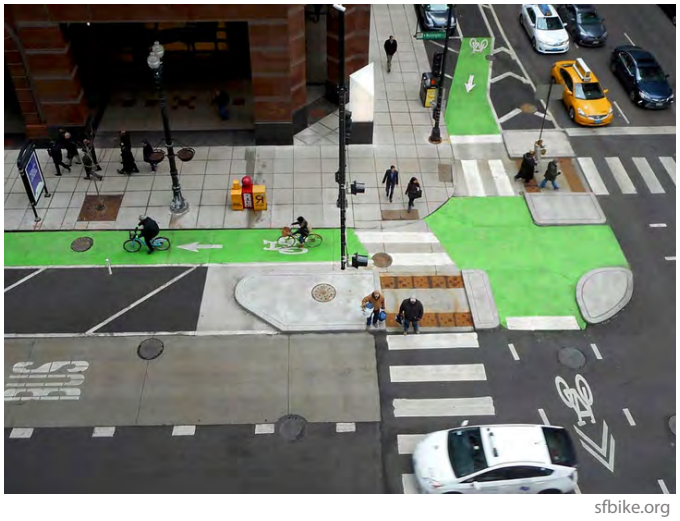
Concept Plan Elements

The pedestrian and program elements incorporated into the 200 South Mobility Hub site are as follows:

- Protected Bike Lanes
- Curb Extensions & Bulb-outs
- Raised Intersection
- Pedestrian Scale Design Elements
- Seating
- Bike / Scooter Share Stations
- Pavement Reduction
- Increased Plaza Space
- Outdoor Dining Next to Retail
- Seven Bus/Shuttle Stops
- Pedestrian Shelters
- Additional Bike Paths
- Replaced Parking
- Flashing Beacons at Unsignalized Crossings
- Stop Signs
- Wayfinding Signage
- Real Time Transit Info
- Additional Landscaping
- Archway at 200 South and University Avenue

altaplanning.com

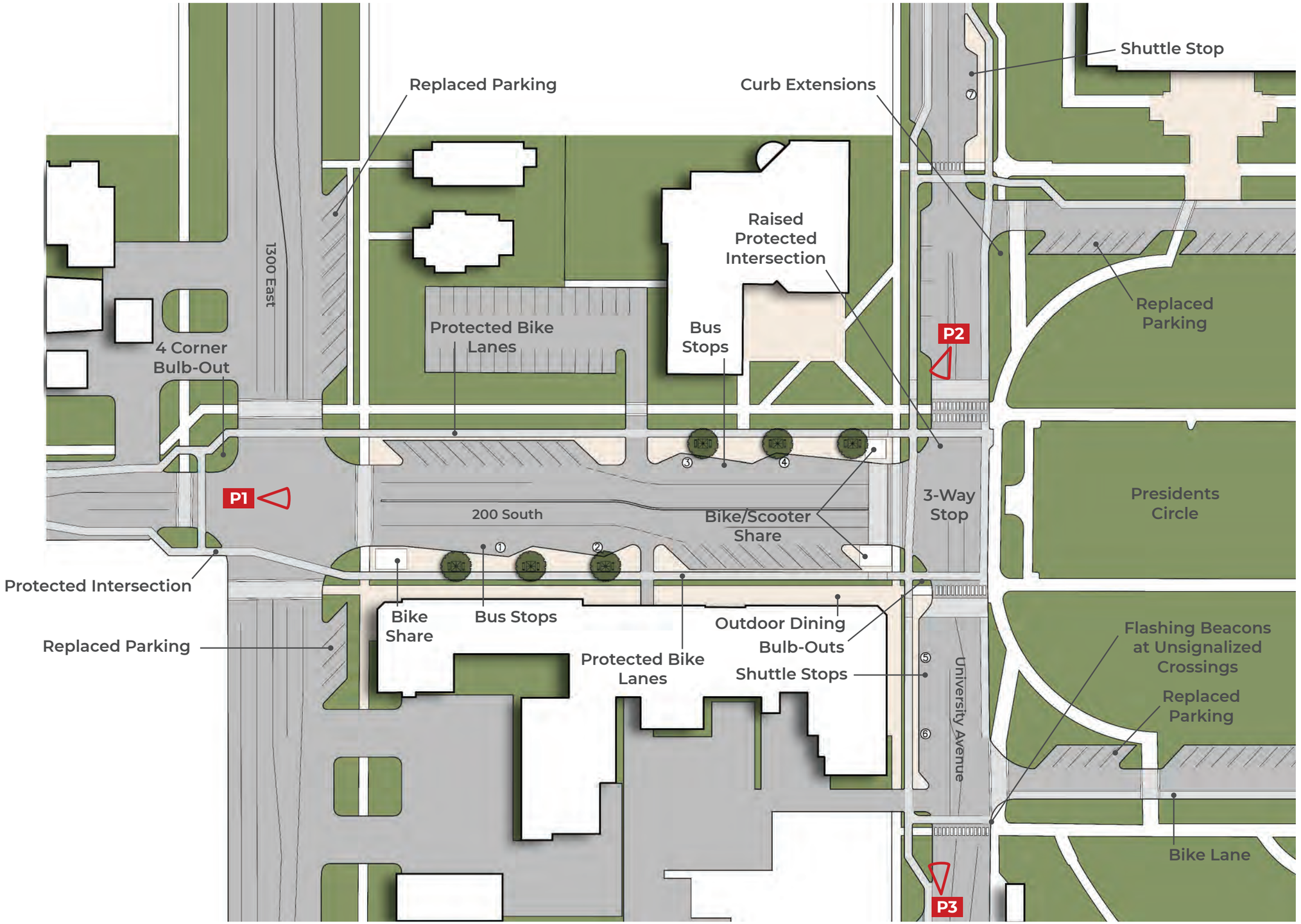
sltrib.com



sfbike.org

bostonbackbay.com

200 South Final Concept Plan



200 South

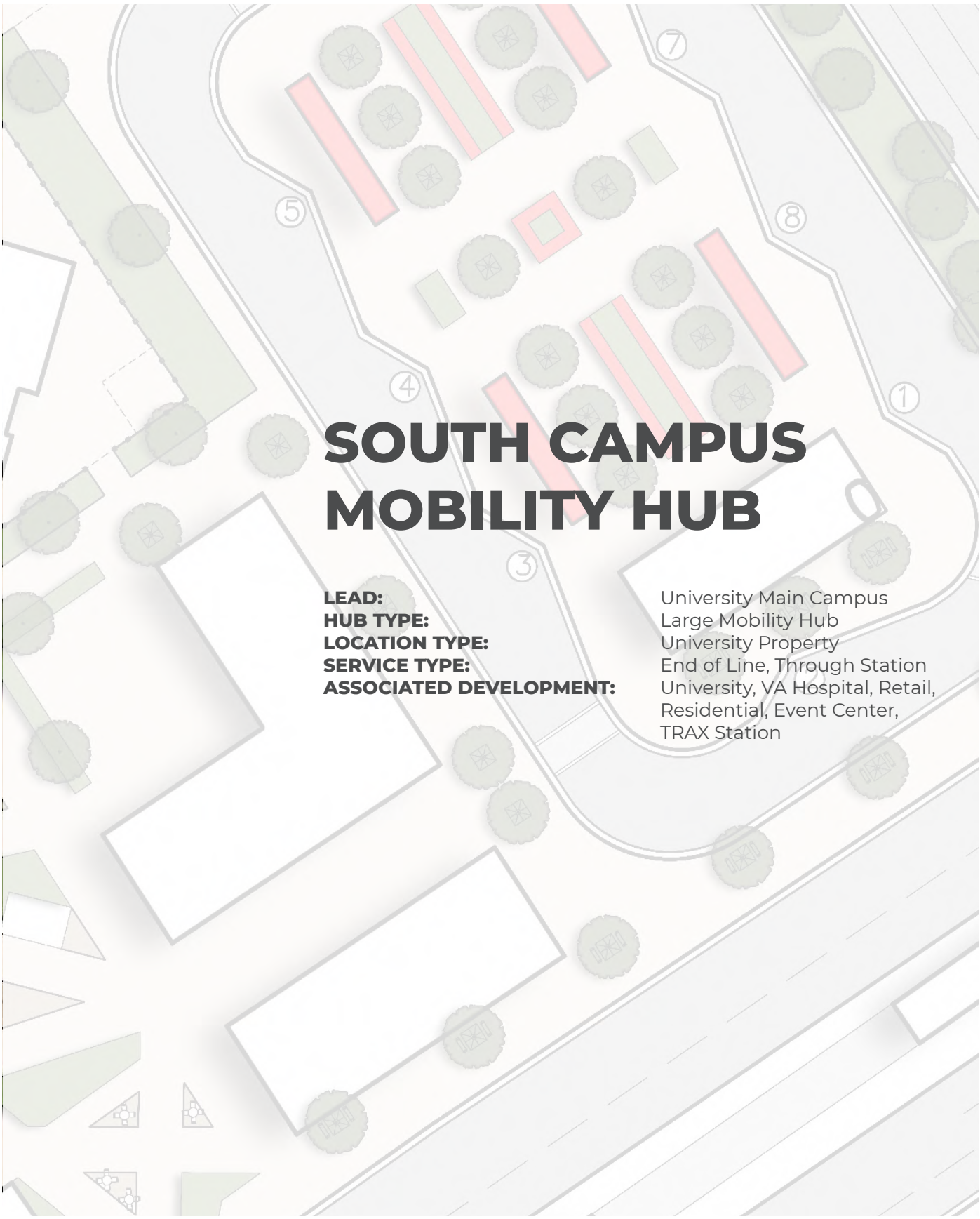
P1 LOOKING EAST TOWARDS PRESIDENTS CIRCLE

200 South

LOOKING SOUTHWEST TOWARDS 200 S. **P2**

200 South

P3 LOOKING NORTH TOWARDS 200 S.



SOUTH CAMPUS MOBILITY HUB

LEAD:	University Main Campus
HUB TYPE:	Large Mobility Hub
LOCATION TYPE:	University Property
SERVICE TYPE:	End of Line, Through Station
ASSOCIATED DEVELOPMENT:	University, VA Hospital, Retail, Residential, Event Center, TRAX Station

Introduction

The South Campus Mobility Hub occupies a portion of the block containing the Turpin University Services Building (USB), and is bound by South Campus Drive and Campus Center Drive. This hub is adjacent to the Huntsman Center, South Campus TRAX Station, The Institute Building, and is in close proximity to the Veterans Affairs Medical Center. It will be developed in two phases to allow continued use of the USB in Phase one. Phase two will contain a range of retail services and dining options and have end of line services for UTA Buses and Campus Shuttles. The design incorporates the South Campus Walk concept by adding residential units, urban plaza space, retail shops, bike storage and a mid-block crossing from the TRAX station.

Concept Plan Elements

The pedestrian and program elements integrated into this mobility hub are as follows:

- Mid-Block Crossing on South Campus Dr
- Gateway Features & Wayfinding Signage
- Expanded Multi-Use Paths
- Urban Plazas & Various Themed Seating Areas
- Pedestrian Shelters with Charging Capabilities
- Pedestrian Scale Design & Placemaking Elements
- Dedicated Rideshare Location
- Bikeshare, & Scooter Share Stations
- Dedicated Bike Lanes
- Bike Shops, Parking, & Storage
- Dining and Retail Development
- Ten Bus/Shuttle Stops including an Electric Bus Charging Station
- Real Time Transit Info
- Addition of Left Turn Pocket on South Campus Dr
- Addition of Parking Garage with Connecting Pedestrian Bridge to Huntsman Center
- Adapted Network Design for Event Traffic
- Bus Layover Facility & Public Restrooms

qbp.com

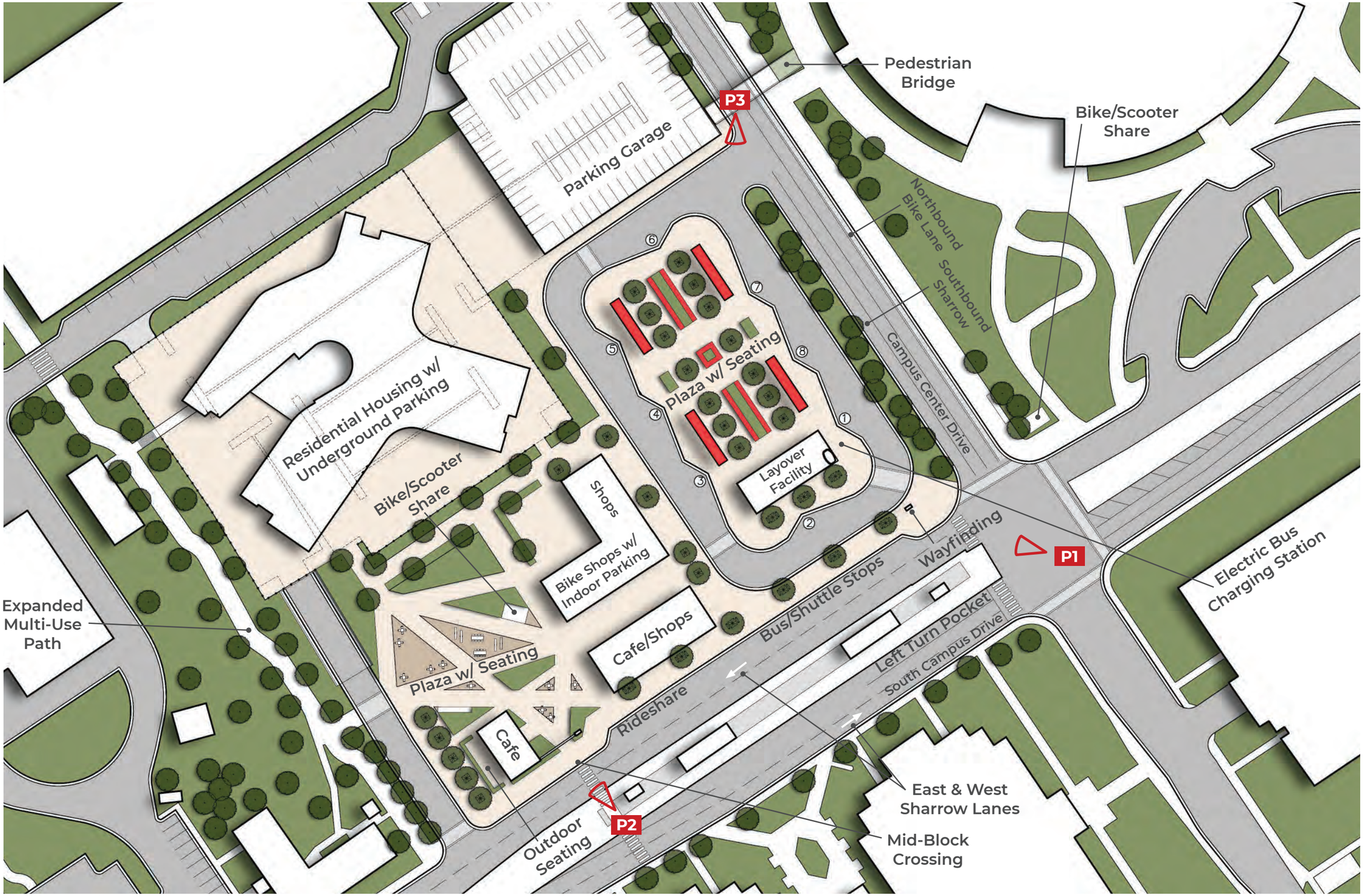
shopthegateway.com

rentquo.com

prospect.org

altaplanning.com

South Campus Final Concept Plan – Phase 2



South Campus

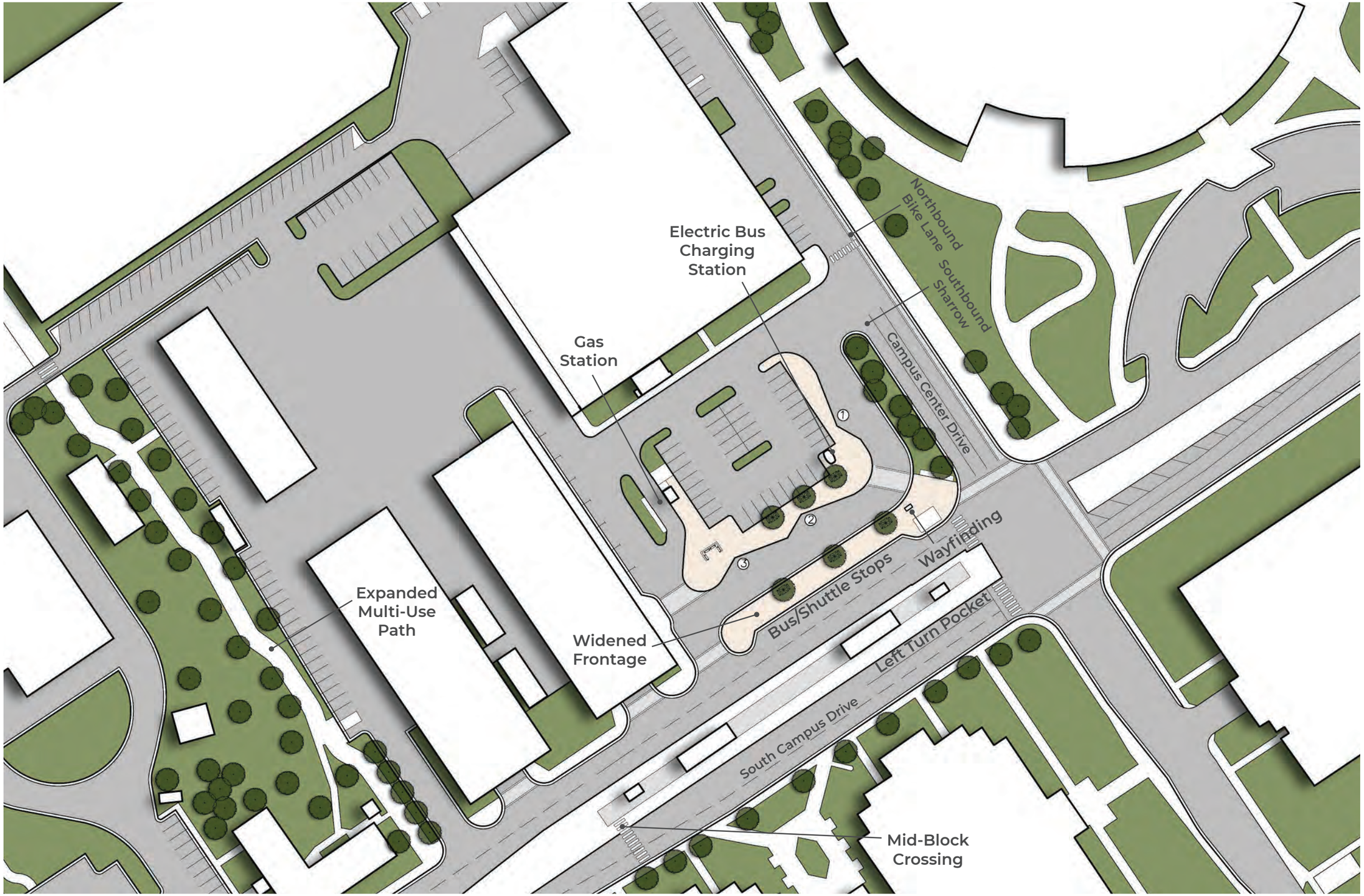
P1 LOOKING NORTHWEST TOWARD CAMPUS

LOOKING NORTHEAST TOWARDS THE JON M. HUNTSMAN CENTER P2

South Campus

P3 LOOKING SOUTHWEST TOWARD THE SOUTH CAMPUS TRAX STATION

South Campus Final Concept Plan – Phase 1



South Campus Iterative Concept Plan – Phase 2

HEALTH SCIENCES MOBILITY HUB

LEAD:	University Health Sciences
HUB TYPE:	Large Mobility Hub
LOCATION TYPE:	University Property
SERVICE TYPE:	End of Line
ASSOCIATED DEVELOPMENT:	University, University Medical Center, TRAX Station

Introduction

The Health Sciences Mobility Hub will be located just South of the future Helix building in the north east corner of the existing parking lot. This hub will be part of the Health Sciences Campus and is adjacent to the Medical Center TRAX Station. It will preserve the existing electrical facility, ADA path and grove of trees on its south east corner as well as allow full loading access to the future Helix building. A cafe and pedestrian crossing will be part of that future building, and the mobility hub will be developed in a way to integrate those services. The Health Sciences Mobility Hub will contain end of line services for UTA Buses and Campus Shuttles. The design incorporates the concepts for all existing master plans.

Concept Plan Elements

The pedestrian and program elements integrated into this mobility hub are as follows:

- Wayfinding Signage & Pedestrian Shelters
- Expanded Multi-Use Path
- Urban Plazas & Themed Seating Areas
- Pedestrian Scale Design & Placemaking Elements
- Dedicated Rideshare Location
- Bikeshare & Scooter Share Stations
- Bike Parking, Storage, & Stairway Runnels
- Pedestrian Bridge
- Eight Bus/Shuttle Stops
- Preservation of Existing ADA Path, Tree Grove, & Electrical Facility Needs
- Real Time Transit Info
- Bus Layover Facility & Public Restrooms

phillymag.como

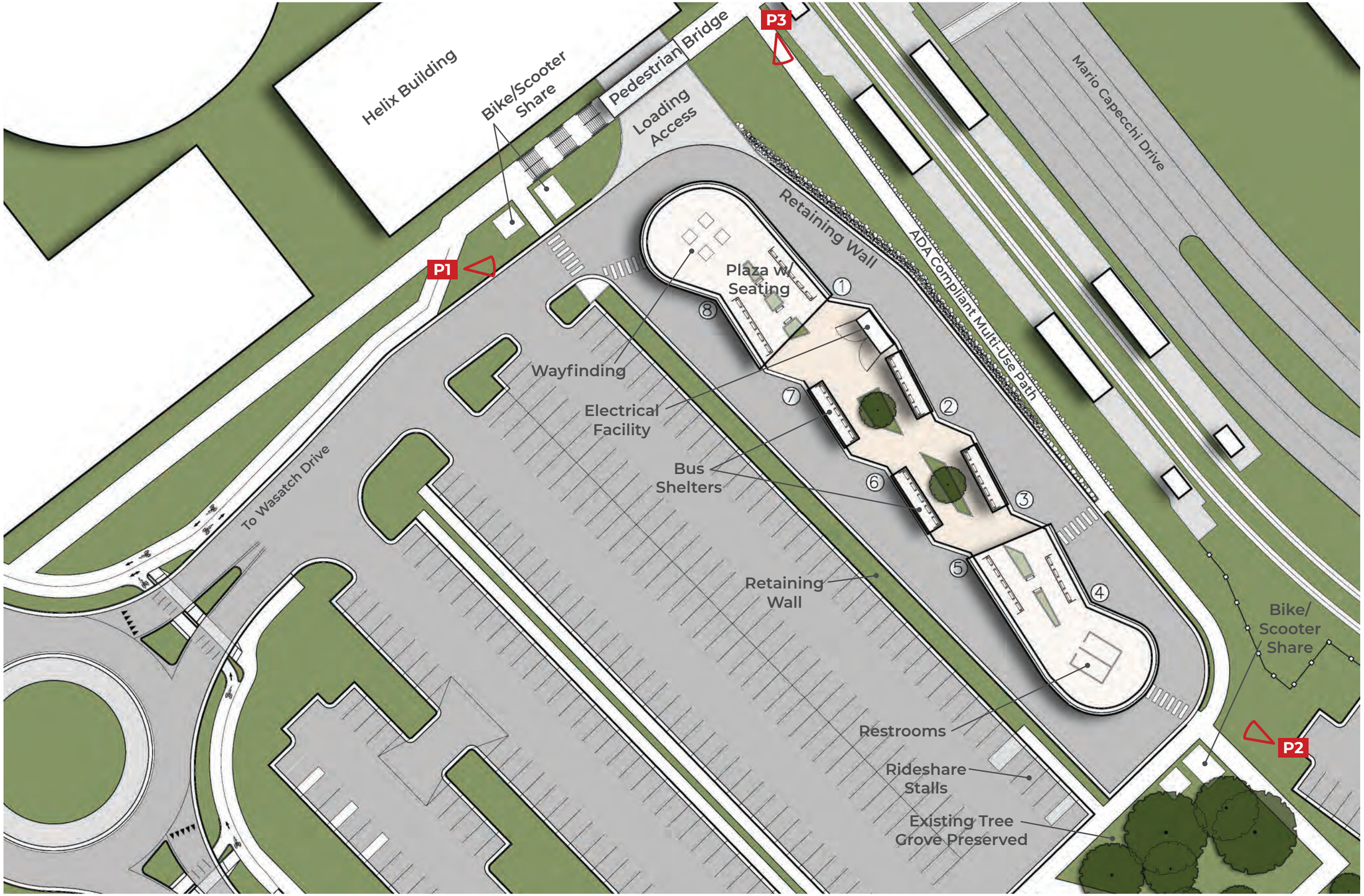
swagroup.com

archdaily.com

drivenxdesign.com

dewitt-associates.com

Health Sciences Campus Final Concept Plan



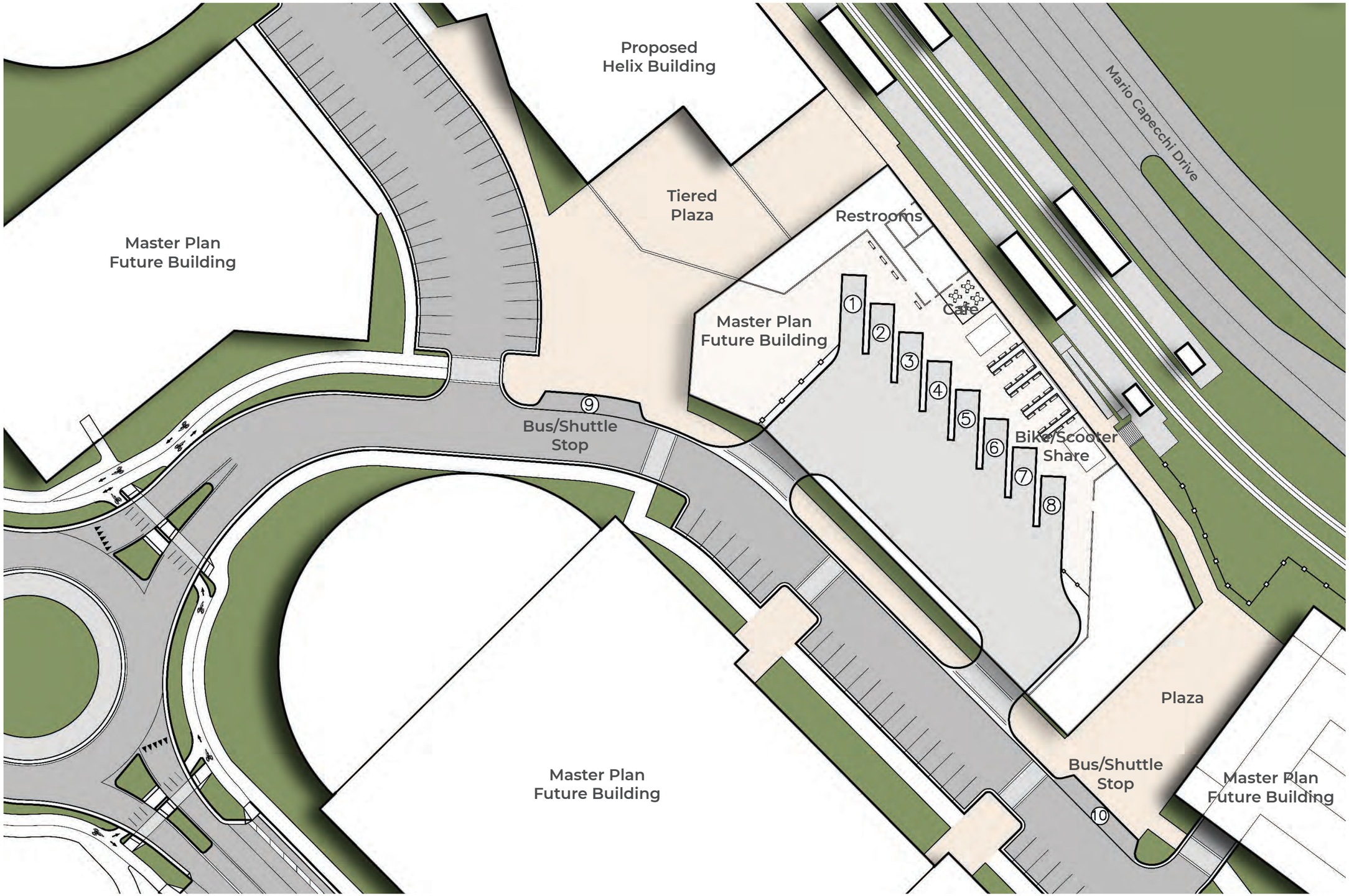
P1 LOOKING SOUTHEAST TOWARDS THE UNIVERSITY MEDICAL CENTER TRAX STATION

LOOKING NORTH TOWARDS THE PRIMARY CHILDRENS OUTPATIENT SERVICES P2

Health Sciences Campus

P3 LOOKING SOUTHWEST TOWARDS CAMPUS

Health Sciences Campus Iterative Concept Plan



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08

FUNDING & SCHEDULE

"Having a comfortable place to sit and read or relax between modes of transportation would make such a big difference and would encourage more people to drive less often."

- MOBILITY HUB SURVEY PARTICIPANT

Introduction

This chapter details the market analysis and schedule for the study. The market analysis specifically addresses office, retail, and residential uses as accessories to mobility hub development and covers the costs for development and general funding avenues. The chapter concludes with the project schedule and detailed agendas.

Market Analysis

Key Highlights for Office Use

- Market remains fairly healthy for office, particularly in more established locations with strong connections and visibility characteristics
- Rent premiums exist in urban markets (similar to the University of Utah) for covered parking. Current rent levels do not justify covered parking costs without a subsidy
- Required rates of return for office in the University of Utah area — 18 – 22%
- Current achievable rents and required rates of return suggest some feasibility. Increased feasibility for preleased or partial preleased buildings
- Minimal incentive to build speculative product at present in the Salt Lake market, including the University of Utah submarket
- Presence of mass transit options has shown a 3–5% value increase over competitive, non-served sites

Key Highlights for Residential Use

- Strong absorption in current market
- Covered parking is not entirely financially feasible (profit margin is too slim to attract development in most cases)
- In the surrounding University of Utah submarket, some rent premiums are evident for covered parking for stacked rentals
- Current value/cost relationship shows adequate profit for good quality, mid-rise residential development
- Nominal rent premiums for properties within 1/4 mile of mass transit options

Key Highlights for Retail Use

- Significant concern about retail going forward with pending high vacancies and notable trend changes in shopping patterns
- Nearly all communities are overbuilt on a per capita basis
- University areas are not immune to market-wide retail weakness
- Rents do not currently justify costs — gap exists between value and costs for small-scale retail additions to the mobility hub area
- Required profit (as compared to total costs) needs to be near 20 percent or greater. Current cost/value analysis shows near or below 15 percent.

buildipedia.com

www.marriott.com

Retail Conditions in Salt Lake — 2019/2020 (Pre-COVID-19):

- Doing well — Grocery stores, automobile services, eateries, "experience" stores, convenience stores
- Faring poorly — Clothing stores, toy stores, jewelry stores, department stores, anything struggling with competing with online shopping

What are Retailers Doing to Adjust? (Pre-COVID-19):

- Concept stores — Opportunities for customers to have experiences that are not replicated online
- Distribution stores — Stores which allow for drop-off deliveries from online services — results in quicker shipping times and reduced costs
- Eateries are adapting to Uber Eats and other delivery services — ultimately leading to reduced table space and a greater need for pick-up capacities

Retailers want the following:

- Strong traffic counts — multiple points of access
- Growing population counts in 0.5, 1.0, 3.0-mile radii, or, in student-scenarios, consistent presence of students year round
- Daytime populations — typically requires an office presence or major educational facility
- Destination locations — customer draws (parks, stadiums, entertainment options, college, etc.)
- Retailers are looking more closely at which demographics are more likely to online shop, and are looking for areas which support traditional retail activity

University of Utah Area Retail

- Most neighborhoods and communities are built to 20–30 square feet of retail space per capita
  - o Developers and brokers indicate that the market should be closer to 15 square feet per capita. This is due to:
    - Changing retail shopping trends (online, delivery, etc.)
    - Persistent vacancy rates near or in excess of 10%
    - Big box woes
- If eateries can stay open, their use trends suggest healthy demand for future years, particularly for well-accessed locations
- Significant need to focus on retail at key nodes, allowing for re-purposing of underperforming retail at secondary sites

Highest and Best Use

The reasonably probable and legal use of vacant land or an improved property that is physically possible, appropriately supported, financially feasible, and that results in the highest value

The Four Criteria that Highest and Best Use Must Consider are:

Office

The highest and best use analysis for office construction considers current market activity, including achievable rents, vacancy rates, operating expenses, construction and land costs, and required rates of return and profit allowances. Rental rates and construction costs are influenced by amount of available parking, type of parking (covered or surface), exposure and visibility of the structure, proximity to transportation connections, and desirability of immediate surroundings.

The scenario shown on the following page highlights office development of a mid-rise building of 75,000 square feet with surface parking. The required rate of return range is noted currently from roughly 17-22 percent. The proposed scenario notes a possible range of 10-18 percent, indicating that near-term development could be possible, although the anticipated range is at or below the market standard. If the market improves, or construction costs decline, office construction will become more feasible.

Financial incentives could also be considered to encourage office development. This may include a Community Redevelopment Area, a Public Infrastructure District, reduced impact fees, partial pre-leasing of the building by the City or University (to offset risk). Furthermore, risk is partially mitigated (and thereby returns increased) if pre-leasing activity results in a minimal stabilization period for an office property.

ASSUMPTIONS (STRUCTURED PARKING)	
VALUATION	
Building Size	75,000
Annual Rent Per SF	$23.00 ($24.00)
Expense Reimbursements	$2.00
Stabilized Vacancy	5%
Management Expense	3%
Reserve Expense	1%
CAPITALIZATION RATES	
6.5%	
7%	
7.5%	
8%	
COSTS	
Direct Costs - SF	$135.00
Indirect Costs - SF	$34.00
Land Per SF	$22.00
Parking Per Stall	$3,500 ($18,000)
Parking Ratio	5.5
Floor-Area Ratio	0.35 (1)

wework.com

OFFICE - SURFACE PARKING CONSIDERATIONS				
GROSS REVENUE	**BUILDING SIZE**	**RENT PER YEAR (SF)**	**RENT TYPE**	**ANNUAL INCOME**
Rental Income	75,000	$23.00	NNN	$1,725,000
Expense Reimbursements		$23.00		$150,000
Potential Gross Income				$1,875,000
		STABILIZED VACANCY RATE		**ANNUAL INCOME**
Less Stabilized Vacancy		5%		($93,750)
Effective Gross Income				$1,781,250
OPERATING EXPENSES		**% OF EGI**	**$ / SF**	**ANNUAL INCOME**
Management		3%		($53,438)
Reserves		1%		($17,813)
CAM Charges			$2.00	($150,000)
Total Operating Expenses				($221,250)
Net Operating Income				$1,560,000
CAPITALIZATION RATE				**POTENTIAL VALUE**
6.5%				$25,052,308
7.0%				$23,262,857
7.5%				$21,712,000
8.0%				$20,355,000
CONSTRUCTION COSTS	**PER SF**	**TOTAL SIZE**		**TOTAL COSTS**
Direct Costs	$135.00	75,000		$10,125,000
Indirect Costs	$34.00	75,000		$2,550,000
Indirects as % of Direct	25%			
	PER STALL	**PARKING RATIO**	**NEEDED SPACES**	**PARKING COSTS**
Parking Cost	$3,500	5.5	413	$1,443,750
	PER SF	**TOTAL LAND/ACRES**	**TOTAL LAND/SF**	**LAND COSTS**
Land Cost	$22.00	4.92	214,286	$4,714,286
			LAND & CONSTRUCTION COSTS	$18,833,036
			Per SF/Bldg	**$251.11**

VALUATION METRICS				
Capitalization Rate	Potential Value	Potential Crisis	Spread	Profit % of Costs
6.5%	$24,000,000	$18,833,036	$5,166,964	27%
7%	$22,285,714	$18,833,086	$3,452,679	18%
7.5%	$20,800,000	$18,833,086	$1,966,964	10%
8%	$19,500,000	$18,833,036	$666,964	4%

OFFICE - STRUCTURED PARKING CONSIDERATIONS

GROSS REVENUE	BUILDING SIZE	RENT PER YEAR (SF)	RENT TYPE	ANNUAL INCOME
Rental Income	75,000	$24.00	NNN	$1,800,000
Expense Reimbursements		$24.00		$150,000
Potential Gross Income				$1,950,000
		STABILIZED VACANCY RATE		ANNUAL INCOME
Less Stabilized Vacancy		5%		($97,500)
Effective Gross Income				$1,852,500
OPERATING EXPENSES		% OF EGI	$ / SF	ANNUAL INCOME
Management		3%		($55,575)
Reserves		1%		($18,525)
CAM Charges			$2.00	($150,000)
Total Operating Expenses				($224,100
Net Operating Income				$1,628,400
CAPITALIZATION RATE				POTENTIAL VALUE
6.5%				$25,052,308
7.0%				$23,262,857
7.5%				$21,712,000
8.0%				$20,355,00
CONSTRUCTION COSTS	PER SF	TOTAL SIZE		TOTAL COSTS
Direct Costs	$135.00	75,000		$10,125,000
Indirect Costs	$34.00	75,000		$2,550,000
Indirects as % of Direct	25%			
	PER STALL	PARKING RATIO	NEEDED SPACES	PARKING COSTS
Parking Cost	$18,000	5.5	413	$7,425,000
	PER SF	TOTAL LAND/ACRES	TOTAL LAND/SF	LAND COSTS
Land Cost	$22.00	4.92	214,286	$4,714,286
			LAND & CONSTRUCTION COSTS	$21,750,000
			Per SF/Bldg	**$290.00**

VALUATION METRICS				
Capitalization Rate	Potential Value	Potential Crisis	Spread	Profit % of Costs
6.5%	$25,052,308	$21,750,000	$3,302,308	15%
7%	$23,262,857	$21,750,000	$1,512,857	7%
7.5%	$21,712,000	$21,750,000	-$38,000	0%
8%	$20,355,000	$21,750,000	-$1,395,000	-6%

Retail

The highest and best use analysis for retail construction considers current market activity (2Q 2020), including achievable rents, vacancy rates, operating expenses, construction and land costs, and required rates of return and profit allowances. Rental rates and construction costs are influenced by the amount of available parking, exposure and visibility of the structure, proximity to transportation connections, desirability of immediate surroundings, and demographics of the surrounding area (population densities, traffic counts, incomes, etc.).

The scenario shown on the following page highlights retail development of a small building of 5,000 square feet with surface parking. The required rate of return range is noted currently from roughly 18-25 percent. The proposed scenario notes a possible range of 7-15 percent, indicating that near-term development is unlikely for notable retail use. If the market improves, or construction costs decline, retail construction may become more feasible. Presently, most investors are somewhat pessimistic about retail market conditions going forward. As noted previously, retail is generally overbuilt and changing consumer trends are exacerbating the excess space in the market. Key retail locations should continue to thrive, while secondary locations with reduced visibility and exposure may suffer for an extended period. Highest and best use conclusions do not suggest much retail, if any, for most sites.

Financial incentives could also be considered to encourage retail development and help to partially bridge the gap between value and costs. This may include a Community Redevelopment Area, a Public Infrastructure District, and reduced impact fees.

ASSUMPTIONS (STRUCTURED PARKING)	
VALUATION	
Building Size	5,000
Annual Rent Per SF	$19.00 ($18.50)
Expense Reimbursements	$2.00
Stabilized Vacancy	5%
Management Expense	3%
Reserve Expense	1%
CAPITALIZATION RATES	
6.5%	
7%	
7.5%	
8%	
COSTS	
Direct Costs - SF	$101.00
Indirect Costs - SF	$30.00
Land Per SF	$18.00
Parking Per Stall	$3,500 ($18,000)
Parking Ratio	3.0 (2.0)
Floor-Area Ratio	0.25 (0.5)

bdcnetwork.com

RETAIL - SURFACE PARKING CONSIDERATIONS

GROSS REVENUE	BUILDING SIZE	RENT PER YEAR (SF)	RENT TYPE	ANNUAL INCOME
Rental Income	5,000	$19.00	NNN	$95,000
Expense Reimbursements				$10,000
Potential Gross Income				$105,000
		STABILIZED VACANCY RATE		ANNUAL INCOME
Less Stabilized Vacancy		5%		($5,250)
Effective Gross Income				$99,750
OPERATING EXPENSES		% OF EGI	$ / SF	ANNUAL INCOME
Management		3%		($2,993)
Reserves		1%		($998)
CAM Charges			$2.00	($10,000)
Total Operating Expenses				($13,990))
Net Operating Income				$85,760
CAPITALIZATION RATE				POTENTIAL VALUE
6.5%				$1,319,385
7.0%				$1,225,143
7.5%				$1,143,467
8.0%				$1,072,000
CONSTRUCTION COSTS	PER SF	TOTAL SIZE		TOTAL COSTS
Direct Costs	$101.00	5,000		$505,000
Indirect Costs	$30.00	5,000		$150,000
Indirects as % of Direct	30%			
	PER STALL	PARKING RATIO	NEEDED SPACES	PARKING COSTS
Parking Cost	$3,500	5.0	15	$52,500
	PER SF	TOTAL LAND/ACRES	TOTAL LAND/SF	LAND COSTS
Land Cost	$18.00	.46	20,000	$360,000
			LAND & CONSTRUCTION COSTS	$1,067,500
			Per SF/Bldg	**$213.50**

VALUATION METRICS				
Capitalization Rate	Potential Value	Potential Crisis	Spread	Profit % of Costs
6.5%	$1,319,385	$1,067,500	$251,885	24%
7%	$1,225,143	$1,067,500	$157,643	15%
7.5%	$1,143,467	$1,067,500	$75,967	7%
8%	$1,072,000	$1,067,500	$4,500	0%

RETAIL - STRUCTURED PARKING CONSIDERATIONS				
GROSS REVENUE	**BUILDING SIZE**	**RENT PER YEAR (SF)**	**RENT TYPE**	**ANNUAL INCOME**
Rental Income	5,000	$18.50	NNN	$92,500
Expense Reimbursements				$10,000
Potential Gross Income				$102,500
		STABILIZED VACANCY RATE		**ANNUAL INCOME**
Less Stabilized Vacancy		5%		($5,125)
Effective Gross Income				$97,375
OPERATING EXPENSES		**% OF EGI**	**$ / SF**	**ANNUAL INCOME**
Management		3%		($2,921)
Reserves		1%		($974)
CAM Charges			$2.00	($10,000)
Total Operating Expenses				($13,895)
Net Operating Income				$83,480
CAPITALIZATION RATE				**POTENTIAL VALUE**
6.5%				$1,284,308
7.0%				$1,192,571
7.5%				$1,113,067
8.0%				$1,043,500
CONSTRUCTION COSTS	**PER SF**	**TOTAL SIZE**		**TOTAL COSTS**
Direct Costs	$101.00	5,000		$505,000
Indirect Costs	$30.00	5,000		$150,000
Indirects as % of Direct	30%			
	PER STALL	**PARKING RATIO**	**NEEDED SPACES**	**PARKING COSTS**
Parking Cost	$18,00	5.0	10	$180,000
	PER SF	**TOTAL LAND/ACRES**	**TOTAL LAND/SF**	**LAND COSTS**
Land Cost	$18.00	.23	10,000	$180,000
			LAND & CONSTRUCTION COSTS	$1,015,000
			Per SF/Bldg	**$203.00**
VALUATION METRICS				
Capitalization Rate	Potential Value	Potential Crisis	Spread	Profit % of Costs
6.5%	$1,284,308	$1,015,000	$269,308	27%
7%	$1,192,571	$1,015,000	$177,571	17%
7.5%	$1,113,067	$1,015,000	$98,067	10%
8%	$1,043,500	$1,015,000	$28,500	3%

Residential

The highest and best use analysis for residential construction considers current market activity, including achievable rents, vacancy rates, operating expenses, construction and land costs, and required rates of return and profit allowances. Rental rates and construction costs are influenced by quality and design of the residences, the type of parking (covered or surface), provided amenities, proximity to support services and transportation connections, and desirability of immediate surroundings.

The scenario shown on the following page highlights residential development of a mid-rise building of 100 units with surface parking. The required rate of return range for residential product in the present market (2Q 2020) is noted from roughly 15-20 percent. The proposed scenario, as shown on the next page, notes a possible range of 12-21 percent, indicating that near-term development is likely. The residential market has remained healthy in key markets.

Financial incentives are likely not needed to further encourage residential development. If covered parking is to be pursued, or specific design standards that notably increase costs, then gaps may exist in value that do not permit for near-term construction. Consequently, economic development tools could be utilized for specific residential development needs.

ASSUMPTIONS (BELOW GRADE PARKING)	
VALUATION	
Total Units	100
Average Unit Size	900
Average Rent Per Month/SF	$1.55 ($1.60)
Other Income per Unit/Month	$35.00
Stabilized Vacancy	5%
CAPITALIZATION (CAP) RATES	
5.5%	
6%	
6.5%	
7%	
SIZE	
Gross Building Size	103,500
Number of Building Stories	4 (6)
Required Parking Per Unit	1.0
COSTS	
Direct Costs	$104 ($120)
Indirect Costs	$32 ($33)
Cost Per Parking Space	$3,500 ($24,000)
Land Costs Per SF	$22.00

abacusarchitects.com

MULTI-FAMILY - SURFACE PARKING CONSIDERATIONS

	# OF UNITS	AVERAGE SIZE	RENT PER UNIT/MONTH	ANNUAL INCOME
Estimated Market Rent	100	900 SF	$1,395	$1,674,000
Other Income (Fees, etc.)				$42,000
Potential Gross Income		Total (90,000 SF)		$1,716,000
		% of PGI		ANNUAL INCOME
Less Stabilized Vacancy		5%		($85,800)
Effective Gross Income				$1,630,000
OPERATING EXPENSES		% OF EGI	PER UNIT/YEAR	ANNUAL INCOME
Management		3%		($48,906)
Reserves		1%		($16,302)
Utilities			$1,020	($102,000)
Maintenance & Repair			$1,020	($120,000)
Admin			$450	($45,000)
Property Taxes			$908	($90,750)
Insurance			$480	($48,000)
Total Expenses				($470,958)
Net Operating Income (NOI)			Total ($4,710)	$1,159,242

CAP RATE	VALUE	PER UNIT	PER SF	VALUE SPREAD W/ COSTS/UNIT	VALUE SPREAD W/ COST/SF	PROFIT %
5.5%	$21,077,127	$210,771	$234	$51,616	$57	32.4%
6%	$19,320,700	$193,207	$215	$34,052	$38	21.4%
6.5%	$17,834,492	$178,345	$198	$19,190	$21	12.1%
7%	$16,560,600	$165,606	$184	$6,451	$7	4.1%

BUILDING SIZE (GROSS)	FOOTPRINT	REQUIRED PARKING/ UNIT	TOTAL SPACES NEEDED	SF/SPACE	TOTAL PARKING AREA	SITE AREA NEEDED
103,500	25,875	1.00	100	330	33,000	1.55

CONSTRUCTION COSTS	PER SF	TOTAL COSTS
Direct Costs - Bldg	$104	$10,764,000
Indirect Costs	$32	$3,312,000
Indirects as % of Direct	31%	

	PER STALL	PARKING COSTS	PER SF LAND	LAND COSTS	LAND & CONSTRUCTION COSTS
Cost	$3,500	$350,000	$22.00	$1,489,538	$15,915,538

	PER UNIT	PER SF	TOTAL COSTS + PROFIT
Cost + Profit	$159,155	$176.84	$15,915,538

MULTI-FAMILY - BELOW GRADE PARKING CONSIDERATIONS

	# OF UNITS	AVERAGE SIZE	RENT PER UNIT/MONTH	ANNUAL INCOME
Estimated Market Rent	100	900 SF	$1,440	$1,728,000
Other Income (Fees, etc.)				$42,000
Potential Gross Income		Total (90,000 SF)		$1,770,000
		% of PGI		ANNUAL INCOME
Less Stabilized Vacancy		5%		($88,500)
Effective Gross Income				$1,681,500
OPERATING EXPENSES		% OF EGI	PER UNIT/YEAR	ANNUAL INCOME
Management		3%		($50,445)
Reserves		1%		($16,815)
Utilities			$1,020	($102,000)
Maintenance & Repair			$1,020	($120,000)
Admin			$450	($45,000)
Property Taxes			$908	($90,750)
Insurance			$480	($48,000)
Total Expenses				($473,010)
Net Operating Income (NOI)			Total ($4,730)	$1,208,490

CAP RATE	VALUE	PER UNIT	PER SF	VALUE SPREAD W/ COSTS/UNIT	VALUE SPREAD W/ COST/SF	PROFIT %
5.5%	$21,972,545	$219,725	$244	$32,627	$36	17.4%
6%	$20,141,500	$201,415	$224	$14,316	$16	7.7%
6.5%	$18,592,154	$185,922	$207	-$1,177	-$1	-0.6%
7%	$17,264,143	$172,641	$192	-$14,457	-$16	-7.7%

BUILDING SIZE (GROSS)	FOOTPRINT	REQUIRED PARKING/ UNIT	TOTAL SPACES NEEDED	SF/SPACE	TOTAL PARKING AREA	SITE AREA NEEDED
103,500	17,250	1.00	100	330	33,000	0.5

CONSTRUCTION COSTS	PER SF			TOTAL COSTS
Direct Costs - Bldg	$120			$12,420,000
Indirect Costs	$33			$3,415,500
Indirects as % of Direct	28%			

	PER STALL	PARKING COSTS	PER SF LAND	LAND COSTS	LAND & CONSTRUCTION COSTS
Cost	$24,000	$2,400,000	$22.00	$474,375	$18,709,875

	PER UNIT	PER SF		TOTAL COSTS + PROFIT
Cost + Profit	$187,099	$207.89		$18,709,875

Highest and Best Use Conclusion

The study area has few limitations for physical and legal possibilities. Financially feasibility considers which possible uses would generate a profit, while the maximally productive use finalizes that use which creates the greatest return to the land.

As shown on accompanying spreadsheets, office, retail, and residential use are all financially feasible in that anticipated value exceeds proposed costs. However, profit margins are limited in some scenarios such that development would not be pursued.

Changes in layout, design, construction quality, parking amenities, etc., could be pursued to increase profitability.

The following table shows currently required rates of return for various property types, as compared to returns associated with proposed development in the study area.

USE TYPE	REQUIRED PROFIT RANGE (UNIVERSITY SUBMARKET)	ANTICIPATED RANGE IN STUDY AE (ACTUAL CONSTRUCTION)	LIKELY TO BE PURSUED IN NEAR TERM?
Office	17-22	10-18%	Possible
Residential (Multi-Family)	15-20	12-21%	Yes
Retail	18-25	7-15%	Unlikely

Site Specific Uses & Costs

Health Sciences Mobility Hub Concept Plan

- **Proposed Use** – This site will primarily include surface parking with landscaping, bathroom facilities, and minimal other improvements.

- **Likely Costs** – Surface parking lot costs will likely be near $3,500 per space. This is inclusive of all hard and soft costs and considers a site relatively graded and ready for near-term construction. It additionally includes costs for some surrounding landscaping and hardscape improvements. Bathrooms and rest facilities will range significantly dependent upon buildout and finishes, but will likely be in excess of $150,000

- **Funding** – Funding could be pursued through traditional financing means, or, through grants available for transportation related improvements. Additional information regarding grants is presented in following pages.

200 South Mobility Hub Concept Plan

- **Proposed Use** – This site will include some intersection changes and minimal landscape and hardscape improvements for the bulb-outs, curb extensions, and bus and shuttle stop areas.

- **Likely Costs** – Costs are likely to be relatively minimal for this study area.

- **Funding** – Funding could be pursued through traditional financing means, or, through grants available for transportation related improvements. Additional information regarding grants is presented in the following pages.

South Campus Mobility Hub Concept Plan

- **Proposed Use** – The site may contain a variety of landscape and hardscape improvements, as well a potential of 14,000 square feet of commercial space and roughly 135 residential units in a stacked-flat design with above grade parking.

- **Likely Costs** – Construction costs of **retail space** will be highly dependent upon intended use and the requirements of that user type (i.e., restaurant space, gym, etc.). Additionally, costs will increase with smaller suite spaces versus larger areas, but the market will better respond to flexibility of suite sizes. Most suites should be below 3,000 square feet to be competitive in the current market. Direct and indirect costs should sum to close to $130 a square foot for standard retail space with a warm shell buildout. Additional costs will include parking at $3,500 per space, land costs, and a required development profit to undertake the risk of development and stabilization. Overall, costs for retail space at south campus site are estimated at between $200 and $225 per square foot.

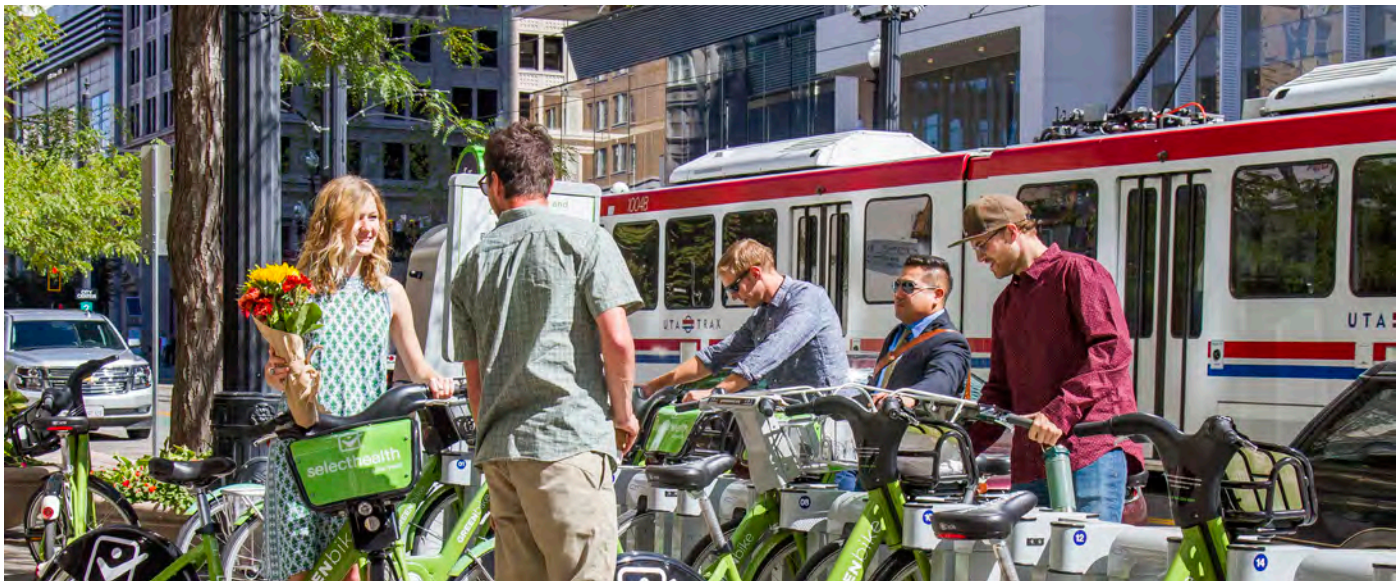
Construction costs of **apartments** will also consider the level of amenities and the desirability of interior finishes. For this analysis, a good quality and condition apartment complex was assumed, commensurate with newer product available in the local and regional market. Assumed rents (as shown previously) consider a desirable buildout with typical apartment amenities. Total costs, including direct and indirect costs, land, and parking, will likely be near $175 per square foot. This does not include a necessary profit to pursue development. The residential assumed cost is notably lower than retail, due primarily to the d ecreased overall parking needs for apartments in comparison to retail. As a result of lower costs of construction and superior market conditions, apartment construction is more feasible than retail in the present market.

- **Funding** – The apartment and retail spreadsheets presented previously show that the continued demand for residential makes it more feasible for funding and investment. Retail reveals a gap between costs and value that would require incentives or changes in market conditions in order to achieve market interest in development. Regarding incentives, Salt Lake City could pursue the creation of a Community Redevelopment Area (CRA), which would allow for tax increment financing. However, consider the make-up of the surrounding area, it is likely not a priority neighborhood for the Salt Lake City Redevelopment Agency.

A potential tool for funding the South Campus site is a Public Infrastructure District (PID). This recently created economic development tool is intended to allow for construction of uses that would otherwise not occur due to onerous initial infrastructure costs. An owner of the property is allowed to form a new taxing entity (the PID), and can bond based on the future tax revenue of the project. This structure permits a relative "offset" to some initial costs, thereby resulting in development that may not otherwise have been feasible. Considering the proposed infrastructure of the south campus site, a PID could be a valuable funding tool to result in a multi-use site.

- **Covered Parking** – Surface spaces are estimated to cost roughly $3,500 per stall, inclusive of all driveways, connector aisles, and with consideration for supporting landscaping. Covered parking costs are largely dependent upon the structure, soil conditions, and other considerations such as height, ground water tables, etc. A below-grade parking structure with upper (above-grade) level uses will typically run roughly $24,000 per space. If more than two-levels are to be constructed below grade, costs would increase. More expensive costs would be associated with a below grade parking structure if upper level building construction requires multiple elevator points and ventilation equipment. For a separate, above-grade, parking structure of two-stories, costs are currently noted at roughly $18,000 per space. This assumes no upper level construction, but rather just a two-story, stand-alone parking structure.

attheu.utah.edu



skouttravel.com

HUB LOCATION	COST ESTIMATE
200 South	$150,000
South Campus	$22,200,000
Health Sciences	$180,000

Implementation Schedule

Due to the various sizes and complexities of the proposed mobility hubs, the implementation of each hub will be done individually as funding becomes available and related projects are implemented. In addition to the previously outlined funding opportunities, it's recommended the development of the 200 South Mobility Hub and the Health Sciences Mobility Hub be in conjunction with proposed projects and planning documents.

The 200 South Mobility Hub should be planned and implemented with Salt Lake City's 200 South transportation improvements. The Health Sciences Mobility Hub should be developed in conjunction with the proposed 'Helix' building on the north end of the site. The first phase of the South Campus Mobility Hub could be developed in the short term,1-5 years as the improvement cost are relatively small.

The proposed construction with the second phase of the South Campus Mobility Hub is not overly significant in size or cost. We anticipate the largest hurdle to development of the site would be relocation of the services currently housed at this location. Once funding for those moves are secured, the development could occur in just a few years.

The office component would likely need to be 50-60 percent preleased (roughly 40,000 square feet) to be of interest to lenders in the current market, we suggest about a 6-12-month marketing/exposure period for that property until some vertical construction begins to take place. Construction of a mid-rise office with separate, structured parking could be done in 12-18 months.

The retail is notably small, and once there are identified tenants (bike shop, café, etc.), construction could begin in the next six months. Total buildout-out would likely be near a year, and that would include individual interior finishes and stabilization. While the lending market for retail is going to be tenuous at best for the next while, it's less than a $1.5 million investment and won't cause much heartache with lenders. Consequently, the retail could move quickly.

We anticipate the multi-family will have strong lending support due to the product type and the specific location. It's a moderate-size investment, particularly with the below-grade parking. The multi-family could be funded in a few months (assuming that architectural and engineering was completed), with construction likely in excess of 12 months. Absorption for a 100-unit apartment complex at the South Campus location could realistically be done in six months, with a fair amount of initial, pent-up demand evidenced in the first month or two of leasing.

Securing transportation grants will require a study and some additional work, but this could realistically be done within the year. Funding from a CRA would take some time considering the process necessary with Salt Lake City and each of the taxing entities. Setting up a Public Infrastructure

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District could feasibly be done by the end of this year. That option would allow for relatively "quick" access to funding from issuing bonds.

It should be noted that the South Campus Mobility Hub is critical to the mobility network within the study area and should be considered a very high priority.

Grants

TIGER Grants (now BUILD Grants)

TIGER Grants, which were previously well known as Transportation Investment Generating Economic Recovery grants, have now been renamed to BUILD grants. BUILD stands for "Better Utilizing Investments to Leverage Development." BUILD grants have been funded by roughly $8.0 billion by the Department of Transportation (DOT) to invest in projects that "have a significant local or regional impact."

The eligibility requirements of BUILD allow project sponsors at the State and local levels to obtain funding for multi-modal, multi-jurisdictional projects that are more difficult to support through traditional DOT programs. BUILD can provide capital funding directly to any public entity, including municipalities, counties, port authorities, tribal governments, MPOs, or others in contrast to traditional Federal programs which provide funding to very specific groups of applicants (mostly State DOTs and transit agencies). This flexibility allows BUILD and its traditional partners at the State and local levels to work directly with a host of entities that own, operate, and maintain much of the transportation infrastructure, but otherwise cannot turn to the Federal government for support.

The BUILD program enables DOT to use a rigorous merit-based process to select projects with exceptional benefits, explore ways to deliver projects faster and save on construction costs, and make needed investments in America's infrastructure. For the study area, a cost-benefit analysis would be required, showing the financial impacts of providing increased and improved transportation connections versus the costs of construction.

STBG

The Surface Transportation Block Grant program (STBG) provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.

The Surface Transportation Program (STP) is one of the main sources of flexible funding available for transit or highway purposes. STP provides the greatest flexibility in the use of funds. These funds may be used (as capital funding) for public transportation capital improvements, car and vanpool projects, fringe and corridor parking

facilities, bicycle and pedestrian facilities, and intercity or intracity bus terminals and bus facilities. As funding for planning, these funds can be used for surface transportation planning activities, wetland mitigation, transit research and development, and environmental analysis. Other eligible projects under STP include transit safety improvements and most transportation control measures.

TRZ

Transportation Reinvestment Zones (TRZ) are a tax-increment financing tool approved by the Utah State Legislature in the past few years. Their intent is to promote transit-oriented development and to help fund transportation-related projects through the capture of property tax increases associated with transportation improvements. The structure of a TRZ is very similar to that of a Community Redevelopment Area (CRA), and necessitates participation from the area taxing entities.

TTIF

The Transit Transportation Investment Fund (TTIF) is a potential funding vehicle for transportation capacity projects. Local governments and districts may nominate projects for consideration of prioritization of select projects. The projects required a 40% match from the local nominating entity, and have the following eligibility requirements:

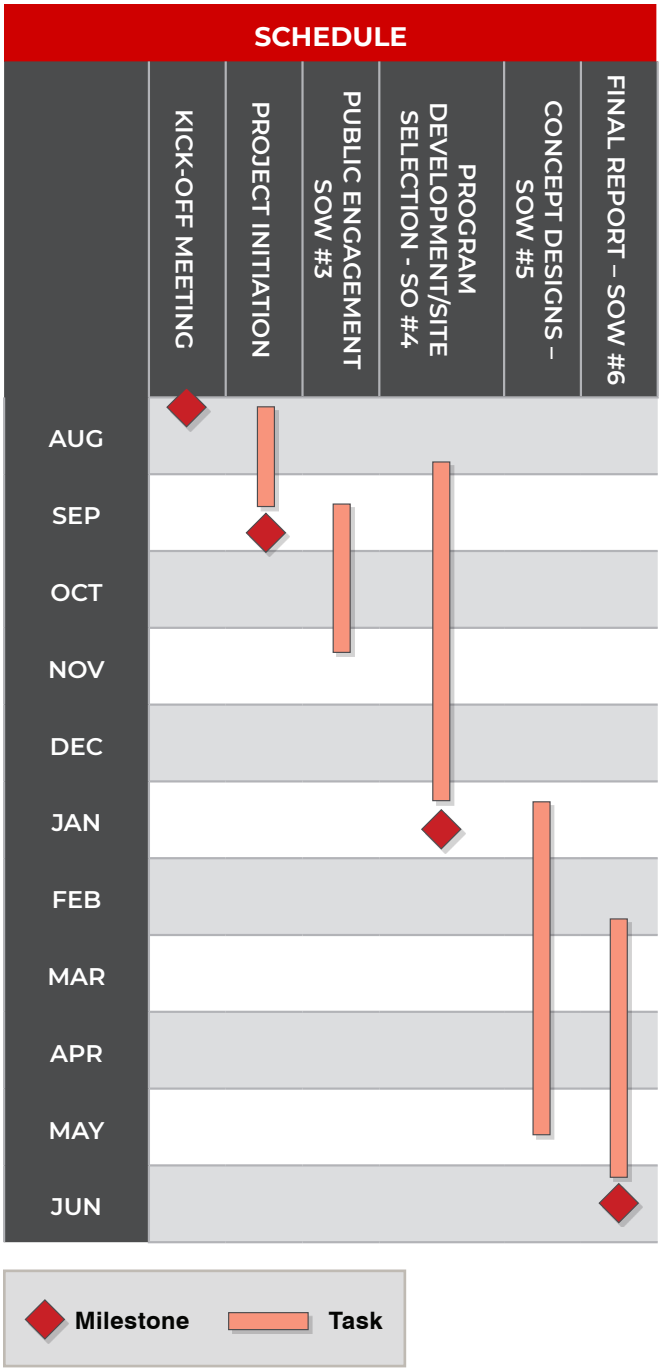
- Public transit project that adds capacity to a public transit system within the state
- Ongoing funding plan for maintenance and operations of the project
- If the project would provide new fixed-guideway public transit service, the project mush be identified in Phase I of the appropriate Regional Transportation Plan or Long Range Plan
- Pedestrian or non-motorized transportation projects that provide connection to a public transit system

CMAQ/STP/TAP

The Congestion Mitigation and Air Quality (CMAQ) program, Surface Transportation Program (STP), and Transportation Alternatives Program (TAP) are administered by the Wasatch Front Regional Council and include roughly $35 million annually in federal transportation funding for local communities. CMAQ provides funding for transportation projects that improve air quality; STP is a programs for funding federal-aid highways and bridges, transit capital improvements and projects, and active transportation projects; and, TAP provides funding for the planning and construction of bicycle and pedestrian facilities.

thestar.com

Project Schedule



Meeting Agendas

August 6, 2019 - Kick-off Meeting

1. Design Team
   a. Psomas
   b. ALTA
   c. CRSA
   d. Zions Bank Public Finance

2. The Stakeholder Team
   a. University of Utah
   b. Utah Transit Authority
   c. Salt Lake City
   d. Utah Department of Transportation
   e. Veterans Affairs Hospital
   f. Wasatch Front Regional Council

3. Project Schedule

4. Management Plan
   a. Project Phases
      i. Data Gathering
      ii. Best Practices/Emerging Trends
      iii. Public Engagement
      iv. Program Development and Site Analysis
      v. Concept Design
      vi. Final Deliverables
   b. Scope of Work

5. Existing and Needed Data
   a. Existing Data
   b. Other Stakeholder Data
   c. Gaps

6. Expert Panel

7. ISI Envision

8. Approach
   a. Public Engagement
   b. Location Exploration
   c. Stakeholder Meetings

August 29, 2019 - Technical Stakeholder Meeting

September 16, 2019 - Existing Conditions Report

September 26, 2019 - Technical Stakeholder Meeting

October 21, 2019 - Stakeholder Meeting #3

1. Introductions (5 min.)

2. Project Schedule/Status (5 min. - Psomas)

3. Outreach and Engagement (10 min. - Psomas/ALTA)
   a. Website
   b. Survey Responses
   c. Boothing Opportunities

4. Mobility Hub Case Studies - Status Update/ Overview (15 min. - ALTA)
   a. Selected case studies - who they are; what we are finding
   b. Visualizing types of mobility hub - examples and images

5. Expert Panel Part #1 - Mobility Hub Partnerships & Implementation (60 min. - ALTA/Psomas)
   a. University of Denver, Chad King (10 min. summary)
   b. Psomas, Augie Chang (10 min. summary)
   c. Facilitated Q&A (35 min.)

6. Next Steps/ACTION Items (5 min.)

October 31, 2019 - Technical Stakeholder Meeting

November 18, 2019 - Public Involvement Report Meeting

1. Pubic Involvement Findings (ALTA)
   a. Survey and Pop-Up Event Results
   b. Initial Findings
   c. Proposed and Additional Analytics

2. Rich Eisenhauer, PBOT – Case Study Report

3. Draft Mobility Hub Types (ALTA)

4. Upcoming Analysis
   a. Multimodal Connectivity Network, Transportation, and Future Demand Analysis (ALTA)
      i. WFRC – Regional Travel Demand Model
      ii. UTA – Service Choices
   b. Site Programing

5. Next Steps – Site Selection
   a. Design Team Review
      i. Existing data
      ii. Survey data
   b. Site Selection Process
      i. Potential Programming Limitations
      ii. Opportunities and Constraints Screening
      iii. Intercampus and Adjacent Neighborhood Connectivity Assessment

cptdb.ca

iv. Complementary Uses
v. Evaluation Criteria
vi. Costs

c. Potential Sites (5-6) – January 21st
i. Visioning and Programing
ii. Stakeholder Feedback

d. Recommended Sites (2-3) – February 17th
i. Concept Renderings
ii. Stakeholder Feedback

e. Final Deliverable – March 16th
i. Mobility Hub Plan
ii. Proposed Schedule
iii. Budget

6. No meeting December 16th

November 28, 2019 - Technical Stakeholder Meeting

January 21, 2020 - Mobility Hub Potential Sites

1. Quantitative Analysis Findings (ALTA and Psomas)
   a. Individual Heat Maps
   b. Composite Map
   c. 8 Potential Hub Sites
      i. Micro Sites

2. Preliminary Qualitative Analysis (ALTA)
   a. Preliminary Spatial Analysis (Psomas)

3. Upcoming Analysis
   a. Finalize Qualitative Analysis
      i. Selection of final 2-3 Hub sites
      ii. Finalize these sites with the Key Stakeholder Team on January 30
   b. Site Programing

4. Next Steps – Final Site Selection
   a. Site Selection Process
      i. Potential Programming Limitations
      ii. Opportunities and Constraints Screening
      iii. Intercampus and Adjacent Neighborhood Connectivity Assessment
      iv. Complementary Uses
      v. Evaluation Criteria
      vi. Costs/Funding
   b. OHSU Aerial Tram Terminal Case Study (Optional) - February 18th
   c. Recommended Sites (2-3) - March 16th
      i. Concept Programming
      ii. Stakeholder Feedback
      iii. Public Involvement Pop-up Event
   d. Final Deliverable - April 20th
      i. Mobility Hub Plan
      ii. Proposed Schedule
      iii. Budget
      iv. Funding

January 30, 2020 - Technical Stakeholder Meeting

February 17, 2020 - Mobility Hub Sites

1. Updated Quantitative Analysis (ALTA and Psomas)
   a. Updated Composite Map
   b. Updated Memo
   c. Updated Spreadsheet (Kahoot Pole)

2. Tier 1 Sites (ALTA)

3. Preliminary Tier 1 Site Programming Discussion (Psomas)
   a. USB (South Campus)
   b. 200 South
   c. Union

4. Next Steps – Final Site Selection (Psomas)
   a. Site Selection Process
      i. Potential Programming Limitations
      ii. Opportunities and Constraints Screening
      iii. Intercampus and Adjacent Neighborhood Connectivity Assessment
      iv. Complementary Uses
      v. Evaluation Criteria
      vi. Costs/Funding
   b. Recommended Sites Preliminary Deliverable - March 16th
      i. Concept Renderings
      ii. Stakeholder Feedback
      iii. Public Involvement Pop-up Event
   c. Final Deliverable - April 20th
      i. Mobility Hub Plan
      ii. Proposed Schedule
      iii. Budget
      iv. Funding
5. 4:30 - 5:00 PM - Optional OHSU Aerial Tram Terminal Case Study
   a. Brett Dodson, Director of Tram, Transportation, & Parking for Oregon Health Sciences University, will provide

a brief overview of the current operations at and management of the mobility hub site that serves OHSU in Portland, OR. The hub is a partnership of OHSU, City of Portland, and TriMet with support from a privately contracted operator. Committee members are encouraged to participate in a Q&A session with Brett. To view the mobility hub site, click here.

February 27, 2020 - Technical Stakeholder Meeting

March 16, 2020 - Mobility Hub Scenarios

1. Project Status - Hub Scenarios (John Close)
   a. University of Utah direction and Stakeholder Coordination
   b. Small - Medium - Large

2. Walkshed discussion (ALTA)

3. Scenario Presentation (ALTA and Psomas)
   a. Health Sciences - Union - USB (South Campus)
   b. Health Sciences - Union - Stadium
   c. Health Sciences - 200 S - USB (South Campus)
   d. Health Sciences - 200 S - Stadium

4. Final Sites Selection (Stakeholders)

5. Next Steps - Final Hub Sites (Psomas)
   a. Site Selection Process Finalization
      i. Potential Programming Limitations
      ii. Opportunities and Constraints Screening
      iii. Intercampus and Adjacent Neighborhood Connectivity Assessment
      iv. Complementary Uses
      v. Evaluation Criteria
      vi. Costs/Funding
   b. Sites Preliminary Deliverable - April 20th
      i. Concept Renderings
      ii. Stakeholder Feedback
      iii. Public Involvement Pop-up Event
   c. Final Deliverable - May 18th
      i. Mobility Hub Plan
      ii. Proposed Schedule
      iii. Budget
      iv. Funding

March 26, 2020 - Key Stakeholder Meeting

1. Project Status - Hub Programming Input (ALTA and Psomas)
   a. Sites Preliminary Deliverable - April 20th
      i. Concept Renderings
      ii. Stakeholder Feedback
      iii. Public Involvement Pop-up Event
   d. Final Deliverable - May 18th
      i. Mobility Hub Plan
      ii. Proposed Schedule
      iii. Budget
      iv. Funding

April 20, 2020 - Key Stakeholder Meeting

1. Preliminary Survey Results and Programming Recommendations (ALTA)

2. Initial Project Layout Review (Psomas)
   a. 200 S
   b. USB (South Campus)
      i. Preliminary
      ii. Final
   c. Health Sciences
      i. Preliminary
      ii. Final

3. Next Steps - Final Hub Sites (Psomas)
   a. Final Deliverable - May 18th
      ii. Final Survey Results
      iii. Mobility Hub Plans
      iv. Proposed Schedule
      v. Budgets
      vi. Funding
      vii. Final Report

April 30, 2020 - Technical Stakeholder Meeting

May 18, 2020 - Final Deliverable Meeting

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A
APPENDIX

"This needs to happen; it'll make it easier to get to the U."

- MOBILITY HUB SURVEY PARTICIPANT

VA U.S. Department of Veterans Affairs

WASATCH FRONT REGIONAL COUNCIL

Attachment A:
Data Gathering Research Matrix

University of Utah - Data Gathering Research Matrix						
Campus Master Plan						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
The University of Utah Camps Master Plan - Implementation	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-7-Implementation.pdf	Promote transportation emand by new roadways for shuttle services, enhance bike and pedestrian connections, and addition on-campus housing.		2
				Construction on "Business Loop" structure and potentially adjacent to Henry Eyring Building. According to @THEU, construction began May 31, 2016 and will include 2 new roundabouts on roadway. See reference to "Business Loop Closure " (May 31, 2016) in file located: Other Documents\Business Loop Closure		2
				Under Implement TDM (Transportation Demand Management) for implementation priorities, it lists to pursue negotiation with UTA to reconfigure South Campus TRAX Station to increase pedestrian safety and realign North Campus Dr.		3
				Lists of improvements for capitol development projects (Phases 1-3).		4 to 11
The University of Utah Campus Master Plan - Executive Summary	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-B-Cover-TOC.pdf	**Development is concentrated around existing TRAX nodes Medical Center (academic, research, and clinical functions), Fort Douglas (Student Life Center and on-campus housing), South Campus (retail and administrative functions), and Stadium (mix-use development with housing and retail).**	Map of 4 TRAX stations on campus	XII
					Map of Interconnected network of pedestrian connections	XIII
				New student life facilities and new student housing goals.	Map for both new student life facilities and student housing	XIV
				New shuttle infrastructure and establish sustainable utility infrastructure.	Map for both shuttle and utility infrastructures	XV
The University of Utah Camps Master Plan - Plan Elements	The University of Utah	Sep-08	Campus Master Plan\2008 - (UofU) CMP 5 - Plan Elements.pdf		Map of campuses on UoU	5
				Includes academics, residential, athletic, health, and mixed-use areas.	Map of Land Uses on UoU campus	9
				Research Park will expand to include East Village.		10
				Existing Conditions of Pedestrian Circulation - includes preferred pedestrian paths from TRAX stations.		28
				Want South Campus TRAX connection for pedestrians. Includes HPER Mall, Interdisplinary Corridor, Central Campus, and Research Park existing and proposed connection conditions.		30
					Map of Primary Pedestrian Path on campus	31
				Existing Conditions of bicycle connections and plans for future routes and lanes.		32
					Map of existing and proposed bicycle paths on campus	33

University of Utah - Data Gathering Research Matrix						
Campus Master Plan						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
				Commuter services are working with UTA to have bicycle lockers at TRAX stations. Want lockers to be located at Main Campus, Research Park, and Health Services Center. Services should include lockers, clothes lockers, bike repair, goods for purchase, and bike rental.		34
				Roadway systems for vehicular circulation.		35, 38, 39
					Map of vehicular paths on campus	36
				Traffic conditions on campus. Main vehicular access roads are 100 South, N Campus Dr., 1300 East, Guardsman, Foothill Dr., and S Campus Dr.		40
				Enhance Shuttle services by creating new roadway improvements on Central Campus Dr, HPER Mall, and New Federal Way. See page 42 for further details of these improvements.		42
					Map of shuttle locations	43
				Parking is in high demand. Most demand in Main Campus and Health Science Campus.	Map of parking utilization	46
					Map of parking lots on campus	50
					Map of parking structures	51
				Transit data and routes. Inclues service and transit routes and ridership.	Tables for UTA bus routes, TRAX, and campus shuttle	52 to 55
				Transit plan includes shuttle services for Ozone route and Black route for connections with Health Services Center and Research Park.		56
					Map of shuttle routes	57
				3 locations identified for mobility hubs: Research Park, Student Life Center near Main campus, and Health Sciences Center.		60
				Potential vanpool programs for employees.		62
				Implement more parking in Research Park area.		63
				Implement viable link between Medical TRAX station to University Hospital.		68
					Map of proposed public/clinical pedestrian connection from Medical TRAX station to University Hospital. New building with bridge connection to University Hospital	69
				Slow vehicular traffic on Mario Capecchi Dr. to create more pedestrian friendly travel. Interdisciplinary Corridor will extend across Mario Capecchi Dr. to continue path to Medical Center.		70
				Improve Research Park connection to Health Sciences Center.		72
				Proposed projects at Research Park.		74
				Proposed Projects on campus.		74 to 101

University of Utah - Data Gathering Research Matrix						
Campus Master Plan						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
					Figure and map of Sustainable Campus Strategies	106 to 107
The University of Utah Camps Master Plan - Discovery	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-3-Discovery.pdf	**Topography has a large impact on transportation. The steepest region on campus is the Health Services Center. Most students prefer the South Campus TRAX station due to higher elevation and leave campus at Stadium TRAX station, which is located downhill.**	2008	14
				Campus organization was based off terrain. Main Campus is west-east grid and Health Services Center and Fort Douglas are oriented 34 degree difference.	Campus Organization Map	15
The University of Utah Campus Master Plan - Growth-Projection	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-4-Growth-Projection.pdf	Includes growth of faculty and students as well as projected space on campus.		
The University of Utah - Transformative Projects	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-6-Transformative-Projects.pdf	Includes transformative projects on campus that are mainly within Main Campus perimeters.	Map of proposed construction	3
				New School of Medicine building will be located adjacent to Medical Center TRAX station and provide a front door to the Health Services Center. Access to TRAX will be along Interdisciplinary Corridor.		4
					Images of front entrance and site layout of Health Services Center	5 to 9
				Master Plan guidelines for new Ambulatory Care Complex (ACC).	Includes images	8 to 13
				Master Plan guidelines for Interdisciplinary Quad.	Includes images	14 to 19
				Master Plan guidelines for Engineering Mall expansion.	Includes images	20 to 23
				Master Plan for new Central Playing Fields for multi-rec use.	Includes images	24 to 29
				Master Plan for HPER Mall renovation due to new multi-modal connections in area.	Includes images	30 to 35
				Master Plan for new Student Life Center, located at eastern end of HPER Mall.	Includes images	36 to 39
				Master Plan to transform South Campus TRAX station - provide access for pedestrians and main campus.	Includes images	40 to 43
				Master Plan for South Campus Housing at corner of Mario Capecchi Dr. and South Campus Dr. to reinforce importance of major campus gateway.	Includes images	44 to 47
				Master Plan for the Stadium TRAX Link to upgrade pedestrian connection to Marriott Library.	Includes images	48 to 51
				Master Plan for Universe Project which student apartments and retail in what is currently Lot 1.	Includes images	52 to 55
				Master Plan for Marriott Library Plaza for infill classrooms to create a more intimate and human-scaled environment.	Includes images	56 to 59

University of Utah - Data Gathering Research Matrix						
Campus Master Plan						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
				Master Plan for Science Yard to transform into a core connection space.	Includes images	60 to 65
				Master Plan for new Business Incubator.	Includes images	66 to 67
The University of Utah Campus Master Plan - Appendix A	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-9-Appendix-A.pdf	**Description of all transportation available on campus.**		17 to 19
The University of Utah Campus Master Plan - Vision Plan Map		2010	Campus Master Plan\Vision-Plan-Map-2010.pdf	Map of UoU property lines, existing facilities, construction sites, heritage preserved sites, and proposed sites.		
The University of Utah Campus Master Plan - Addendum 3_Discovery Green Hill	The University of Utah	8-Jul-19	Campus Master Plan\2008-CMP-Addendum-3_Discovery-GREEN-HILL-2019-r1.pdf	Green Hill designated for 'outdoor green space'.	Map of Green Hill location (North Campus Dr.)	
The University of Utah Campus Master Plan - Introduction	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-1-Introduction.pdf	Overview of campus plan.	Includes campus maps from 1900-1984	
The University of Utah Campus Master Plan - The Vision	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-2-The-Vision.pdf	Vision for the campus.		
The University of Utah Campus Master Plan - Addendum	The University of Utah	Sep-08	Campus Master Plan\Campus-Master-Plan-Addendum.pdf	Updates from 2008 MP for campus projects from 2008-2011	Maps of campus projects and images for new developments.	
The University of Utah Campus Master Plan - Table of Contents	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-A-Cover-TOC.pdf	Table of contents for master plan document.		
The University of Utah Campus Master Plan - Acknowledgements	The University of Utah	Sep-08	Campus Master Plan\2008-U-ofU-CMP-8-Acknowledgements.pdf	Acknowledgements for Steering Committee, Planning Group, Consultants, Credits, and Historic Data.		

University of Utah - Data Gathering Research Matrix						
Design Team						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
ADA Report - Optimized Signature Copy 6-19-12	Psomas	19-Jun-12	Design Team\ADA Report - Optimized Signature Copy 6-19-12.pdf	Existing conditions and recommendations for ADA on campus.		
				ADA primary path of travel	Campus map primary ADA path travel	pg. 67 (pdf)
Foothills Trail System Plan	Alta Planning and Design	Dec-18	Design Team\FoothillsTrailSystemPlan.pdf	University of Utah Campus Master Plan (2008). Recommendations related to study include connection to Foothills Trails on East Campus next to Huntsman Cancer Institute, Proposed 2 buildings along N Campus Dr (Huntsman Cancer Institutes Phase III and Medical Research Labs) w/ access path between buildings, Medical Dr. E proposed to improve safe walking environment, and current/predicted shuttle routes accessing Medical Dr.	Drawing of vision for Interdisciplinary corridor connecting to Health Sciences Center to College of Engineering and Science.	14
				University of Utah Bicycle Master Plan (2011). Recommendations is shared bike lane on Medical Dr. and Wakara Way connected to Foothill Trails, Bonneville Shoreline Trail (BST) Signage to install wayfinding signage on south side of Dry Creek to encourage JCC access road, and proposed trailheads behind Huntsman Cancer Hospital, Parking lot SE of Huntsman Cancer Hospital, and Parking lot NW of Red Butte Canyon Rd.		
				In vicinity of UoU and This Is The Place Heritage Park, the parking near trail systems are designated for other users.		18
					Existing Trail System	pg. 19 (pdf)
					Existing Terrain	pg. 20 (pdf)
					Existing Demand of trails	pg. 24 (pdf)
				Projected Demand - improvements to parking areas, better connectivity to transit, and more trail opportunities.		25
				UoU owns land adjacent to University Medical Center, Research Park, and Natural History Museum (total of 486 acres). Can relocate or close trails as necessary.		27
					Map of property ownership (486 acres). **Trail Accesses within UoU ownership: Shoreline Ridge Access Point, Red Butte Canyon Rd Access Point, NHMU Access Point, Peach Grove Trail Access Point, and Colorow Rd Trail Access.**	pg. 28 (pdf)
					Map of proposed trail networks	pg. 47 (pdf)
					Proposed Trail Network - South Sub Area; also shows area of This Is The Place and Bonneville Shoreline Trail (BST)	pg. 56 (pdf)
					Proposed Access Improvements (includes trails, shared use paths, and bike lanes.	pg. 62 (pdf)
Salt Lake City Pedestrian & Bicycle Master Plan	Alta Planning and Design	Dec-15	Design Team\SLC_PBMPCompleteDocument(Dec2015)Clickable.pdf	Walking environment of City is high priority. City has established prioritized crossing processes. Recommends the National Association of City Transportation Officials' Urban Street Design Guide.	Proposed Downtown Mid-Block Walkways Network	ES-3

University of Utah - Data Gathering Research Matrix						
Design Team						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
				Low-Stress Bikeway Network (i.e. multi-use path, protected bike lane)	Examples of paths	ES-4
				City Council passes a Complete Streets Ordinance (2010) - requires all projects consideration of bicyclists and peds.		5
				North Temple is reconstructed as a multi-modal corridor (TRAX light rail, bike lanes, wide sidewalks).		5
				Downtown bike sharing system, GREENbike. Downtown also has a protected bike lane on Broadway 300 South.		5
				SLC - walking and bicycling innovation (green shared lanes, pavement management systems, countdown timers, orange crossing flags, "LOOK" pavement messages.	See pages 44-46 for pictures	10
				Regent Street/100 South walkway offers more pedestrian-friendly elements. See page for other locations.		14
				5 locations for high bicycle usage: 800 E/800, 200S/Main, Sunnyside/Arapeen, Sunnyside/Guardsman, and Parley's Crossing (provide access to UoU).		15
				Many City Planning Documents influenced by SLC Pedestrian & Bicycle Master Plan. See page for list.		16
				Plan Salt Lake - Master Plan for city vision for next 25 yrs. Incorporates SLC Ped. & Bike Master Plan. See also City's Transportation Master Plan.		17
				Sugar House Circulation and Streetscape Amenities plan incorporated into Pedestrian and Bicycle Master Plan.		17
				Downtown In Motion Master Plan (2008) - multi-modal plan for downtown.		17
				Design Guides: National Association of City Transportation Officials' Urban Design Guide, Urban Bikeway Design Guide, Mid-Block Walkway Design Guide (Transit Design Guide in the works).		36
				Pedestrian Recommendations - sidewalk, intersections, subsections.		41
				Multi-use paths - Jordan River Parkway Trail, Legacy Parkway Trail, Liberty Park Path, 9-Line Trail, and Parley's Trail.		42
				Neighborhood Byways - ex. Long Beach (CA)	Picture of neighborhood byway in Long Beach	42
				Sidewalks, landscaping, & lighting - pedestrian lighting (14-18' max pole height).	Picture of sidewalk landscaping and separation from traffic	43
				Intersections - double ladder crosswalks for school zones and midblocks.	Picture of double ladder crosswalks and crossing flags	44
				SLC Median Refuge Islands	Picture of Median refuge island	45
				Transit Stop Amenities - shelters and benches	Picture of transit stop at Ogden Intermodal Center	45
				SLC HAWK signals	Picture of flashing yellow ball crossing, LED flashing, and HAWK signal on 100S	49
					Mid-Block Walkways Map of Downtown Community	51

University of Utah - Data Gathering Research Matrix						
Design Team						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
					Multi-Use Trails, Neighborhood Byways, & Enhanced Ped. Crossing Map	Fig. 5-2, pg. 55 (pdf)
					Neighborhood Business Node	Fig. 5-3, pg. 57 (pdf)
					Strip Mall Retrofit	Fig. 5-4, pg. 59 (pdf)
					Protected Bike Lane Streetscape	Fig. 5-6, pg. (pdf)
					Conceptual Design for Improving Neighborhood Connections Across Arterial Street	Fig. 5-7, pg. 65 (pdf)
					Conceptual Design for Improvements to a Neighborhood Commercial Area	Fig. 5-8, pg. 67 (pdf)
					Bicycling Network Existing Conditions Map	Fig. 6-3, pg. 75 (pdf)
					Bicycling Network Existing Conditions Map + Recommendations Map(s)	Fig. 6-4, 6-5, 6-6 ; pg. 77,79,81,83 (pdf)
				Bicycle Parking & Other End-of-Trip Facilities - bike racks, seasonally-installed bicycle corrals that converts on-street motor vehicle parking to 10 bike spaces (April-November), bike racks and lockers, and bike share.	Picture of bike corral	99
					Picture of inexpensive protected bike lane and expensive protected bike lane	123
Transformative-Master-Plan-2016	Horrocks Engineers	13-Oct-16	Design Team\Transformative-Master-Plan-2016.pdf	Transformative projects locations, description, and costs.		vi to viii
				Public Recommendations for transit on Main Campus for certain locations.		3-3 to 3-5
				Public Recommendations for transit on Research Park for certain locations.		3-5 to 3-6
				Public Recommendations to Health Services Center for certain locations.		3-6 to 3-7
				Parking recommendations for Main Campus, Health Services Center, and Research Park are identified.		3-8 to 3-10
					Map of major roadway network on campus	pg. 54 (pdf)
					Map of existing intersection controls	pg. 62 (pdf)
					Figure 4-6 shows Medical Dr. North conceptual layout	4-18
				Recommended projects to achieve universities goals.	Map of recommended areas of improvements.	pg. 83 (pdf)
				Potential Mobility Hubs on campus identified in 4 locations.	Map of potential locations for mobility hubs.	pg. 148 (pdf)
				Potential hub locations at the Stadium TRAX station and Student Life Center station.	Map of potential transportation Hub locations	pg. 173 (pdf)
University of Utah Bicycle Master Plan	Alta Planning and Design and Psomas	2011	Design Team\UniversityOfUtah-BicycleMasterPlan.pdf	Existing long-term bicycle lockers.	Includes images of lockers.	29
					Map of secured bike parking	30
					Map of desired bicycle routes on campus.	52
					Map of recommended bike path types throughout campus	70
				Recommended bicycle stations at the proposed Engineering Mall, Health Sciences Campus, and Research Park.	Picture of bicycle station in Long Beach	77
				Bicycle Facility Design Guide.	Includes images	A-1 to A-30

University of Utah - Data Gathering Research Matrix						
Design Team						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
				Proposed Projects on campus.	Includes images	B-1 to B-12
				Street Plan Model	Includes images	C-1 to C-5
UTA Bus Routes - U of U Campus	University of Utah	24-Jan-19	Design Team\UTA Bus Routes - U of U Campus.pdf	Future Routing and Service Enhancements for Business Loop, Hub, Medical Center, and Hospital Loop.	**Map of current UTA bus routing**	
UTA First/Last Mile Strategies Study	Fehr & Peers and Nelson/Nygaard	Apr-15	Design Team\UTAFirst_LastMileFINALCOMP1.pdf	UoU rated medium for walk access for TRAX Stations.	Figure 2-1 Walk Access for TRAX Stations	2-2
				Accessible bicycle lockers in a highly-visible location which can be rented for appropriate lengths of time.		2-4
				Public survey for amenity includes separated bike paths, onboard bike racks, on-road bike facilities, bike lockers and racks, bike share stations, improved crosswalks, roadway lighting, ped-oriented signage, ADA access measures, better waiting areas, station area lighting, station area wayfinding, on-site staffing at stations, UTA shuttles, campus-based shuttles, carpools, car-sharing programs. UTA shuttles are most preferred.		2-5
				Examples of pedestrian tools.		3-2 to 3-7
				Examples of bicycle tools.		3-8 to 3-10
				Examples of transportation demand management tools.		3-11
				Examples of transit access information and tools.		3-12 to 3-14
				Examples of auto access tools.		3-15 to 3-16
				UTA provides GREENbike share program, on-board bike accommodations, enterprise car share program, UDOT TravelWise Travel demand management program, shuttles, active transportation, ride matching services, and wayfinding.		3-17 to 3-19
					Figure 3-3 Summary of First/Last Mile Strategies Reported by Peer Agencies and UTA	3-20
					Figure 3-7 Downtown MetroRail Station Adjacent Car2Go Parking Spaces	3-26
				UoU stations: Stadium, University South Campus, Fort Douglas, and University Medical Center. Figure 4-1 provides other stations and their characteristics.	Figure 4-1 Station Typologies and Characteristics	4-3
					Figure 4-2 TRAX Station Typologies	4-4
				High priority - bicycle network improvements and bike sharing.	Figure 5-3 Recommended Strategies for Institutional Typology	5-4

University of Utah - Data Gathering Research Matrix						
Other Master Plans						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
University of Utah Southwest Precinct Plan	VCBO Architecture	Jun-12	Other Master Plans\Southwest-Campus-Precinct-Plan-2012.pdf	**Recommended Transit Hub at northeast corner of S Campus Dr. and University Street.**		pg. 10 (pdf)
					Image of Gateway Hub on S Campus Dr. and University Street	pg. 24 (pdf)
University of Utah Student Housing Master Plan Final Report	Brailsford & Dunlavey	Apr-12	Other Master Plans\Student-Housing-Master-Plan-2012.pdf	Includes surveys and master plan concepts for student housing.		

University of Utah - Data Gathering Research Matrix						
Salt Lake City						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
Salt Lake City Transit Master Plan	SLC Division of Transportation	2017	SLC\Transit Master Plan.pdf	Percent of transit riders for University of Utah is 18.4%	Map of SLC Percent of Transit Riders	11
				Transit system amenities: services, information and legibility, ped and bike access, on-demand services, high-quality stations, flexible fare programs, coorsdinated land use, and education.		12 to 13 & 22 to 23
				Provides 20-yr vision for Frequent Transit Network (FTN) for SLC.		14
				Ineffictive centralized hub; not good for local trips. Use grid for modal placement.		14
					FTN map for SLC	15
				"By 2040, 73% of people projected to live and/or work in SLC will be within a quarter-mile walking distance of the FTN".		
				Transit corridors listed for capital improvements.		18
				Developing layover facilities on Universit of Utah campus to expand services		20
				Elements of high quality bus corridors		21
					Table that lists goals for SLC Master Plan	Introduction 1-3
				Foothill Drive - enhanced service on regional access corridors. Connecting Research Park, VA Hospital, and Foothill Cultural District		Transit Service 2-11
				FTN Implementation Case Studies: Houston Metro		Transit Service 2-13
				to/from the University. Proposed transit hub location (Route 2 along 200 S and 700 E)		Transit Service 2-17
				UoU Research Park for first-last mile services. Destinations in Foothill Cultural District for shuttles and circulation to City.		Transit Service 2-20
					First-Last Mile Zones	Transit Service 2-21
				First-Last Mil Strategy Factors		Transit Service 2-24
				Case studies for fixed-route shuttle, on-demand shuttle, and on-demand ride services.		Transit Service 2-25 to 2-32
				New transit hubs in vicinity of 200 S and 700 E and on UoU campus		Transit Service 2-33
				Transit Modes: Red Line TRAX light rail (South Jordan - Downtown - University of Utah) recommend frequent services level of 15 min or better		Capital 3-3
				200 S: key east-west corridor for bus service between downtown and university		Capital 3-10
				400 S: east-west bus corridor connecting Redwood Road and university		Capital 3-10
				Foothill Drive: important regional and local transit corridor serving University, Research Park, Foothill Cultural District, and Medical Center. Recommended as Enhanced Bus corridor (with treatments to optimize transit level). Include transit, bicycle, and pedestrian supportive elements.		Capital 3-11
				Downtown Streetcar connecting to University of Utah		Capital 3-12

University of Utah - Data Gathering Research Matrix						
Salt Lake City						
				Foothill Drive Implementation Strategy: Corridor #12		Capital 3-14
				Treatments for Foothill Drive Corridor #12: TSP, Queue Jumps, Dedicated Lane, reversible or contra flow, and stop consolidation.		Capital 3-23
				Transit Pedestrian access characteristics.		Access to transit 4-2
					Examples of transit ped characteristics	Access to transit 4-3
					Examples of bicycle access characteristics	Access to transit 4-4
				Mobility hub definition. 2 Transit centers recommended to support FTN transfers (East Downtown, vicinity of 200 S and 700 E, and UoU).		Land Use & Placemaking 6-10
				Planned transit center in Campus Center Drive	**Map of Facilities**	Land Use & Placemaking 6-12
				Continuous route on N. Temples Street connecting downtown and UoU		Implementation & Funding 7-2

University of Utah - Data Gathering Research Matrix						
UOFU						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
Campus Parking and Transportation & Research Park Mobility Master Plan	Horrocks Engineers	13-Oct-16	UOFU\Commuter Services\Campus Parking & Transportation Master Plan 101316.pdf	Transformative projects locations, description, and costs.		vi to viii
				Public Recommendations for transit on Main Campus for certain locations.		3-3 to 3-5
				Public Recommendations for transit on Research Park for certain locations.		3-5 to 3-6
				Public Recommendations to Health Services Center for certain locations.		3-6 to 3-7
				Parking recommendations for Main Campus, Health Services Center, and Research Park are identified.		3-8 to 3-10
					Map of major roadway network on campus	pg. 54 (pdf)
					Map of existing intersection controls	pg. 62 (pdf)
					Figure 4-6 shows Medical Dr. North conceptual layout	4-18
				Recommended projects to achieve universities goals.	Map of recommended areas of improvements.	pg. 83 (pdf)
				Potential Mobility Hubs on campus identified in 4 locations.	**Map of potential locations for mobility hubs.**	pg. 148 (pdf)
				Potential hub locations at the Stadium TRAX station and Student Life Center station.	Map of potential transportation Hub locations	pg. 173 (pdf)
2017.FINAL.Combined.CSurvey.Report	Sustainability Office, University of Utah	2017	UOFU\Sustainability-AT\2017 U Commuter Survey.Raw Data and Report\2017.FINAL.Combined.CSurvey.Report.pdf	Most popular destinations are North and South Campus.		2
					Campus destination map percentages	8
				Primary from most used to least are: walk/run, drive alone in car, shuttle, and bike.	Figure 10 shows primary modes of transportation on campus	9
					Figure 16 provides different uses of transportation and their relation to other modes of transportation	14
University of Utah Bicycle Parking Utilization Study	Sustainability Office, University of Utah	20-Sep-18	UOFU\Sustainability-AT\Bicycle Census.GIS\2018.Bicycle Parking Utilization Study.FINAL.pdf	Bicycle parking census to determine utilization of bicycle parking on UoU campus (only 11 outdoor bicycle parking). Major findings: 36% of bike parking spaces are utilized, 1/3 of racks have abandoned locks, 8% have abandoned bicycles, 10 racks blocked due to construction, 56 bikes parked illegally, inverted U-racks have highest utilization.		3, 4
				Bicycle racks used primarily by housing (Sector 4) and Northern side of campus (Sector 6).		9
					Bike sections map	11
					Map of high utilization areas	18
				E-bikes are not commonly used and fairly spread out over campus (slightly more concentrated by engineering and medical center).	E-bike map count	9, 21
Comment.Letter to SLC council on Transit MP	Sustainability Office, University of Utah	3-Oct-17	UOFU\Sustainability-AT\Comment Letters.on Transit.Transportation\Comment.Letter to SLC council on Transit MP.pdf	**Letter of support from Chief Sustainability Officer to develop new transit facilities to serve the University, Research Park, and VA community.**		
				Major changes on campus include: rebuilding School of Medicine and other Health Services Buildings east of Mario Capecchi Dr., new student housing project near Marriott Honors Community, and major update of the MP of Research Park to increase density and services in the area.		

University of Utah - Data Gathering Research Matrix						
UOFU						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
				Multi-modal hub to serve campus and VA, a smaller transit hub near Research Park is required, most likely located near intersection of Foothill and Wakara. These 2 hubs will not be effective without major change to Foothill Dr. (improve traffic and include HOV lanes on Foothill).		
WFRC RTP Comment Letter 030819	University of Utah		UOFU\Sustainability-AT\Comment Letters.on Transit.Transportation\WFRC RTP Comment Letter 030819.pdf	University of Utah comments on draft RTP: transportation investments along Foothill Corridor, multi-modal travel support, alignments for routes and hub locations, EOL for BRT routes, and regional bikeway routes.		
Active Transportation Survey	University of Utah	Dec-18	UOFU\Sustainability-AT\Student Research\2018.Fall.Staff Barriers to AT Survey - Final Report (1).pdf	Commuters voiced the need for better bike paths in Research Park area as well as on the intersection of Foothill and Sunnyside.		12
Sustainable Campus Transportation Planning		2016	UOFU\Sustainability-AT\Student Research\SustainableCampusTransportFinal.pdf	Case studies from University of Washington at Seattle, University of Colorado at Boulder, and Stanford University. Results are applied to the University of Utah and suggestions are: least cost planning, restructure parking system, improve active transportation, more on-campus housing, and transit service expansions.		41
2010 Climate Action Plan	Sustainability Office, University of Utah	2010	UOFU\Sustainability-AT\2010 Climate Action Plan.pdf	Goal is to reduce emission production by making the campus accessible by walking, biking, transit, and carpooling to eliminate single person driving.		34
What Affects Millennials' Mobility? Part II Report	National Center for Sustainable Transportation	Mar-17	UOFU\Sustainability-AT\2017-UCDavis-ITS.MillenialBehavior..pdf	Research report of what affects millennials mobility. Includes public surveys.		
Foothill Drive Implementation Strategy	University of Utah, Parametrix, V-I-A Consulting, and Alta Planning + Design	May-17	UOFU\Sustainability-AT\Foothill-Drive-DRAFT-STUDY.pdf	This study includes a summary of consensus, project process, and a recommendations.	Map of Foothill Dr. Corridor	1
				Based on 2008 study.	Image of lane configuration and transit service	6
					Images of 6 corridor scenarios	12
					Images of roadway cross-section evaluations	14
					Image of preferred scenario	22 to 25
					Image of proposed South Sunnyside Ave intersection	27
				Recommendations for Mario Capecchi Dr, Wakara Way, and Sunnyside Ave.		28
					Image of Foothill Dr. and Wakara Way Plan	29
				2 bus stop recommendations for Foothill Dr.		30
				Transit concept to include circular running of Wakara Transportation Center throughout Research Park and reconfigured Bench route to better connect Foothill corridors.	Map of potential Foothill corridor transit	31
				Wakara Transportation Mall should serve Research Park and other destinations. Includes amenities that should be used.	Image of potential layout	32
				Long term recommended tunnel connection for the University and Research Park to connect with Foothill Dr.		39
				Action plan of preferred Foothill Corridor Scenario.		40

University of Utah - Data Gathering Research Matrix						
UOFU						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
Mobility hubs: A Reader's Guide	LADOT	2016	UOFU\Sustainability-AT\MobilityHubsReadersGuide.pdf	Los Angeles Department of Transportation Design Guide		
				Designated spaces for private ride share.	Picture of Schofield Railway Station - Sydney	18
Reducing Parking University of Maryland	University of Maryland		UOFU\Sustainability-AT\Reducing Parking and TDM.UCMARYLAND.pdf	University of Maryland - getting parking cash out of programs.		
Literature Review: Environemtnal, Health, & Economic Benefits of Active Transportation	Urban Design 4 Health, Inc.	Jan-17	UOFU\Sustainability-AT\Task_3-1_Lit_Rev_FINAL_v2_011717_submitted.pdf	Includes economic considerations, environment (active transportation and emissions), and health benefits.		
UCR Mobility Hub Feasibility study	Moore Ruble Yudell architects & planners	29-Jan-16	UOFU\Sustainability-AT\UCR.Hub Feasibility study.pdf	Bus/shuttle use only (could help with Research Park).	Image of Mobility Hub	9
					Mobility Hub conceptual plan and circulations	30
					Operational characteristics of vehicular access and circulation	44
					Pedestrian and bike circulation	45
UNLV Multimodal Transportation Hub FeasibilityStudy	Wilbur Smith Associates	Jun-09	UOFU\Sustainability-AT\UNLV.TransitHub.FeasibilityStudy.pdf	UNLV multi-modal hub feasibility study. Includes purpose and need, development and evaluations, implementaation plans, detailed stop by stop ridership, public outreach, traffic and circulation analysis, and capitol cost estimates.		
Utah Travel Study	RSG Inc.	Jan-13	UOFU\Sustainability-AT\UtahTravelStudy.WFRC_FinalReport_130228.pdf	Travel study for Utah. Includes data for travel, college diary, bike and pedestrian survey, attidue survey, Dixie Sun Transit, and residentail survey.		
Executive Summary Final 6-7-19	University of Utah, Talisman Civil Consulting, and Arch|Nexus	7-Jun-19	UOFU\U Health\Executive Summary Final 6-7-19.pdf	Patient Parking and Traffic Circulation Study for the University of Utah Health Science Campus. Identifies main points of improvement areas and provides recommendation for parkig structure and North Medical Drive redesign.	Illistration for North Medical Dr. design	8
University of Utah Patient Parking Study	Fehr & Peers	Jun-19	UOFU\U Health\UUHealth Patient Parking Report 6-7-19 reduced.pdf	Univeristy of Utah Patient Parking Study. Includes data, parkign analysis, traffic analysis, and a master plan for circulation enhancements and transit/shuttle services.	Transit hub at Univeristy Medical Center	39
2018 RSS Survey Information: Transportation-related items		2018	UOFU\Commuter Services\2018 RSS Survey Information_Transportation including 2017.pdf	Data of vehicles on campus, how often they're used, and satisfaction with shuttle services.		
RP Employee Commuter Survey			UOFU\REA\RP Employee Commuter Survey.xls	Research Park commuters excel data (ex. affiliation, average commute time, arrival and departure time, destinations)		

University of Utah - Data Gathering Research Matrix						
UTA						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
Final Report - 2015 Onboard Origin - Destination Study	RSG	23-Jun-16	UTA\UTA OD 2015 Final Report (sent 6-23-16).pdf	Provides data of average weekday ridership and destinations.		
UTA Five-Years Mobility Plan	UTA Service Planning	2019-2023	UTA\20190703 5YrPlan PreFinal.docx	UTA route performance		17 to 20
				New transit hub located near University Hospital		35
					Route proposal maps for SLC and UoU for August 2019	36 to 41
				List of Route changes		45 to 49
				List of Route updates		50 to 52
				Mobility hubs at transit stations include DRT, TNCs, bikeshares, scooter shares, and carshares.		78
				SLC and UoU projcets (includes bicycle and pedestrian improvements)		81 to 87

University of Utah - Data Gathering Research Matrix						
VA						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
VA Salt Lake City Health Care System Stats		2018	VA\VA Salt Lake City Health Care System Stats.docx	VA Health Care System data on patients and faculty.		

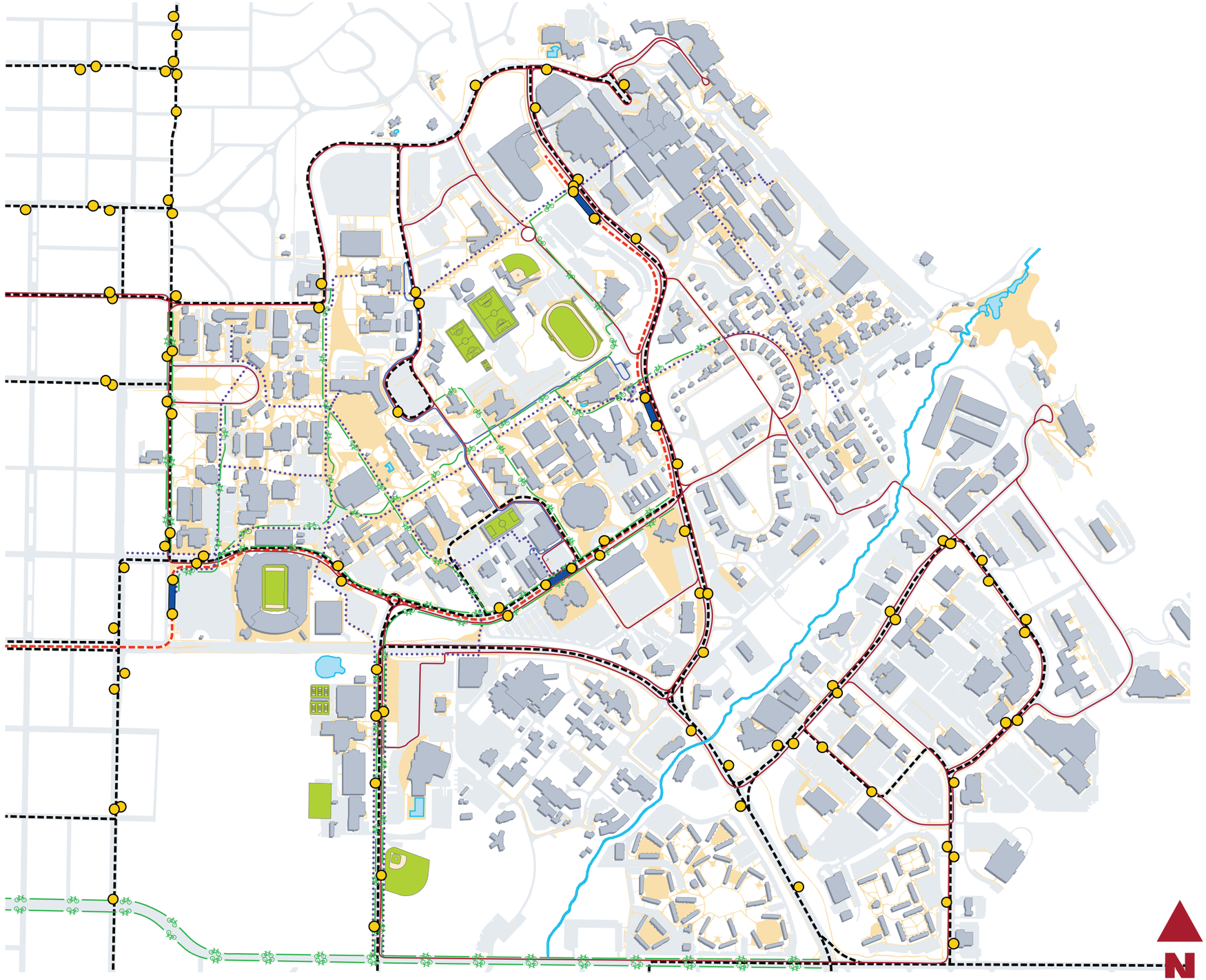
University of Utah - Data Gathering Research Matrix						
WFRC						
Document	**Agency**	**Date**	**File Location**	**Content Summary**	**Report Images/Graphics**	**Page Numbers**
Regional Transportation Plan	Wasatch Front Regional Council	23-May-19	WFRC\RTP_2019_2050_ADOPTED.pdf	Scenarios of improvements to make within the Wasatch Region.	Includes map of proposed project phases	

Attachment B:
University of Utah Main Campuses Map

Mobility Hub Mode Map

Legend

- UTA TRAX Red Line
- UTA Bus
- University of Utah Shuttle
- Autonomous Vehicles
- Prominent Bike Paths
- Prominent Pedestrian Paths
- Pedestrian Space / Sidewalks
- UTA TRAX Stations
- UTA Bus Stops



Attachment C:
University of Utah Proposed Projects Map

LEGEND:

- Health Sciences Campus
- Main Campus
- Fort Douglas
- Research Campus
- VA Campus
- Potential Mobility Hub Sites
- Proposed Underground Tunnel
- Potential Pedestrian Bridge
- Proposed Campus Walkway
- TRAX Station — TRAX Stations

Proposed Transit Hub near University Hospital.
Reference:
Utah Five-year Mobility Plan (2019-2023), page 35.

One location identified for Mobility Hub - Student Life Center
Reference:
The University of Utah Campus Master Plan 2008, page 60.

Grass field.

Interdisciplinary Quad.
Reference:
The University of Utah Campus Master Plan 2008, pages 14-19.

Rehabilitation Center.
Reference:
The University of Utah Campus Master Plan 2008, pages 8-13, 66-70.

New soccer/lacrosse stadium and practice fields.

Ambulatory Care Complex.

Surface parking lot.

Medical Center TRAX Station

School of Medical Replacement.

Proposed Transit Center.
Reference:
Transit Master Plan, pages 6-12.

Fort Douglas TRAX Station

Proposed South Campus Walk.
Reference:
The University of Utah Campus Master Plan 2008, page 40.

South Campus TRAX Station (Most used TRAX Station)

Proposed Stadium TRAX Apartments.
Reference:
The University of Utah Campus Master Plan 2008

Smaller Multi-modal Hub Recommended.
Reference:
The University of Utah Letter to SLC Council

Proposed Wakara Transportation Mall.
Reference:
Foothill Drive Implementation Strategy, page 32.

Stadium TRAX Station

Grass Field.

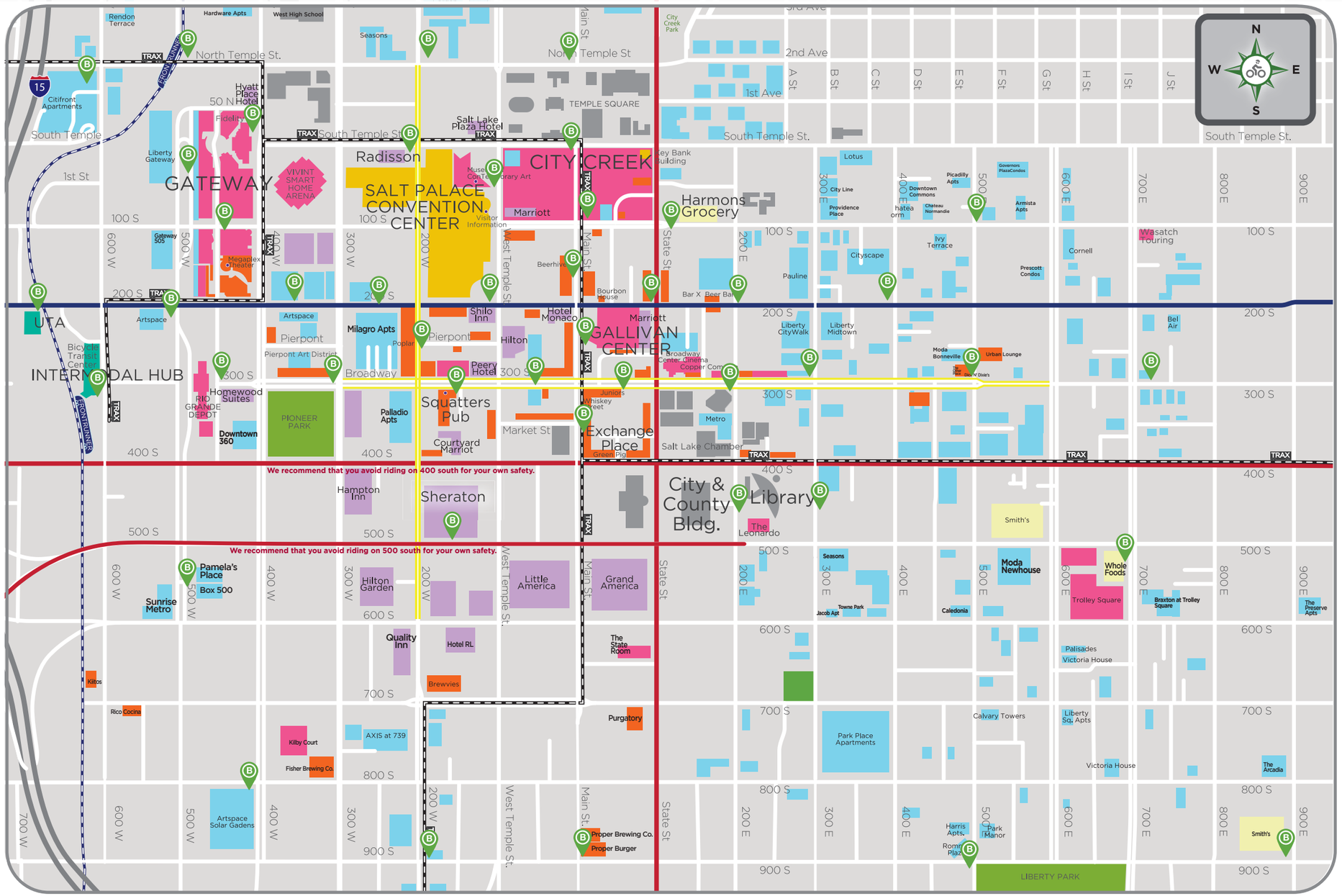
Boy Scouts of America: Foothill Scout Shop.

The Church of Jesus Christ of Latter-day Saints.

Proposed Underground Tunnel
Reference:
Foothill Drive Implementation Strategy, page 39.

N

Attachment D:
Existing GREENbike Stations Map



To The University of Utah Campus*

*Note: There are no GREENBike Stations on campus

Attachment E:
University of Utah Existing & Proposed Bikeway Facilities (2011 - 2014)

Legend

Existing and Proposed Bikeways

- Existing Bikeways
- Proposed SLC Bikeways
- ★ Existing Bonneville Shoreline Trailheads

Recommended Bikeways - Short-Term

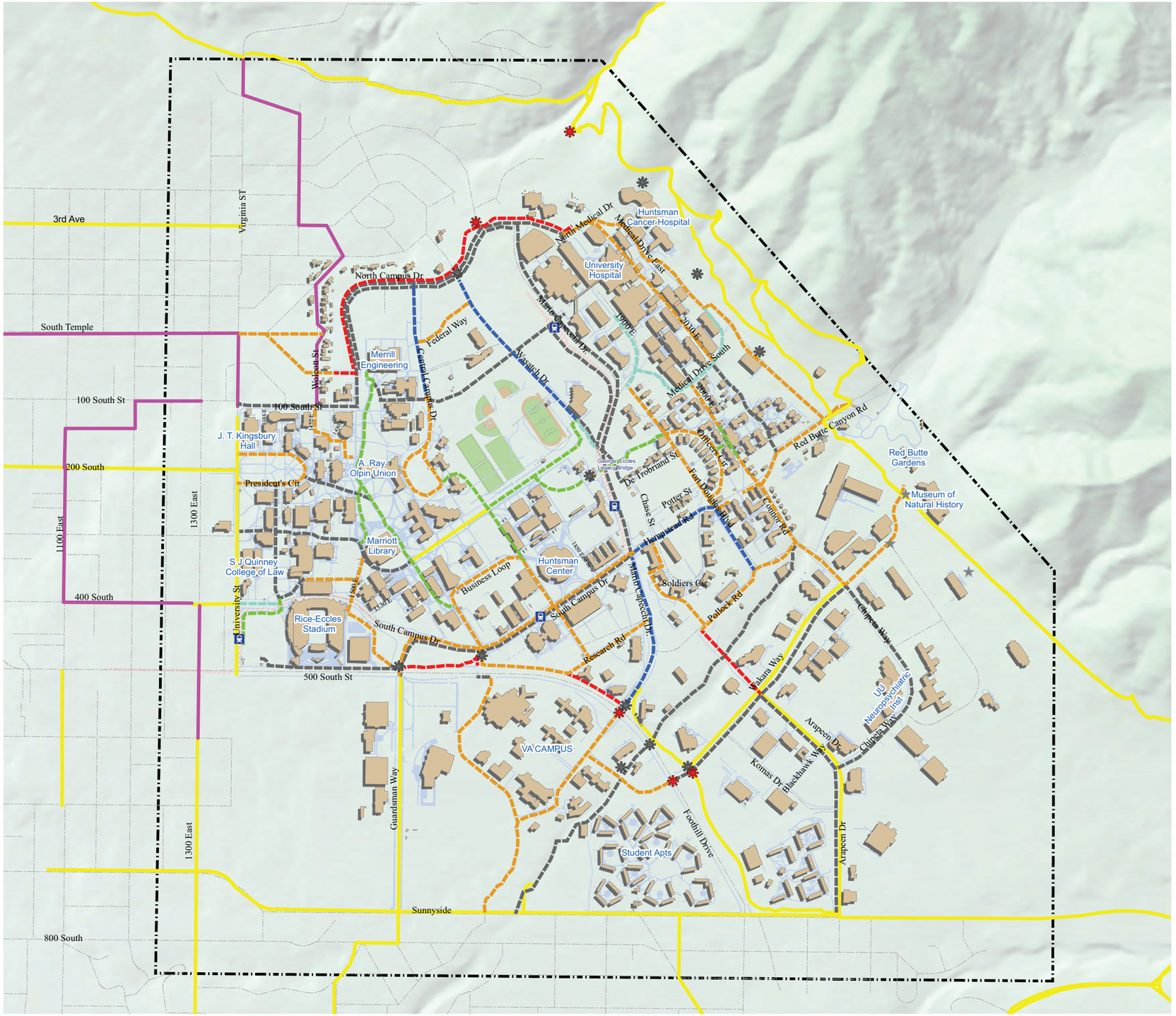
- Shared Lane
- Bike Lane
- Bike/Shared Lane Combo
- Bike Path
- Shared Use Path

Recommended Bikeways - Medium/Long-Term

- Medium/Long-term Bikeways

Recommended Spot Improvements

- ✱ Short-Term
- ✱ Medium/Long-term



Attachment F:
University of Utah Existing & Proposed Bikeway Facilities (2015 - 2020)

Legend

Existing and Proposed Bikeways

- Existing Bikeways
- Proposed SLC Bikeways
- ★ Existing Bonneville Shoreline Trailhead

Recommended Bikeways - Medium-Term

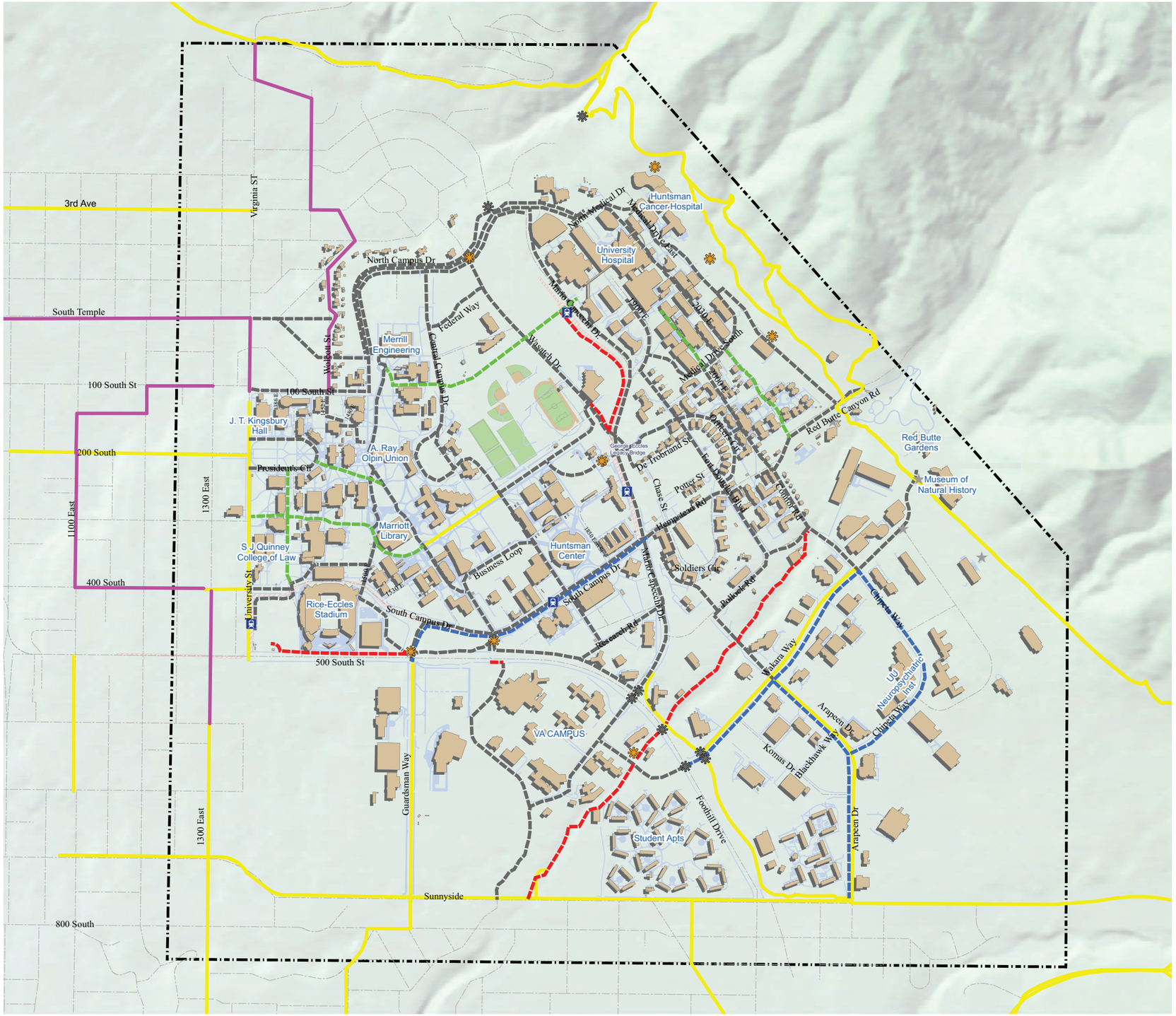
- Bike Lane
- Bike Path
- Shared Use Path

Recommended Bikeways - Short/Long-Term

- Short/Long-term Bikeways

Recommended Spot Improvements

- Medium-Term
- Short/Long term



Attachment G:
University of Utah Existing & Proposed Bikeway Facilities (after 2020)

Legend

Existing and Proposed Bikeways

- Existing Bikeways
- Proposed SLC Bikeways
- Existing Bonneville Shoreline Trailheads

Recommended Bikeways - Long-Term

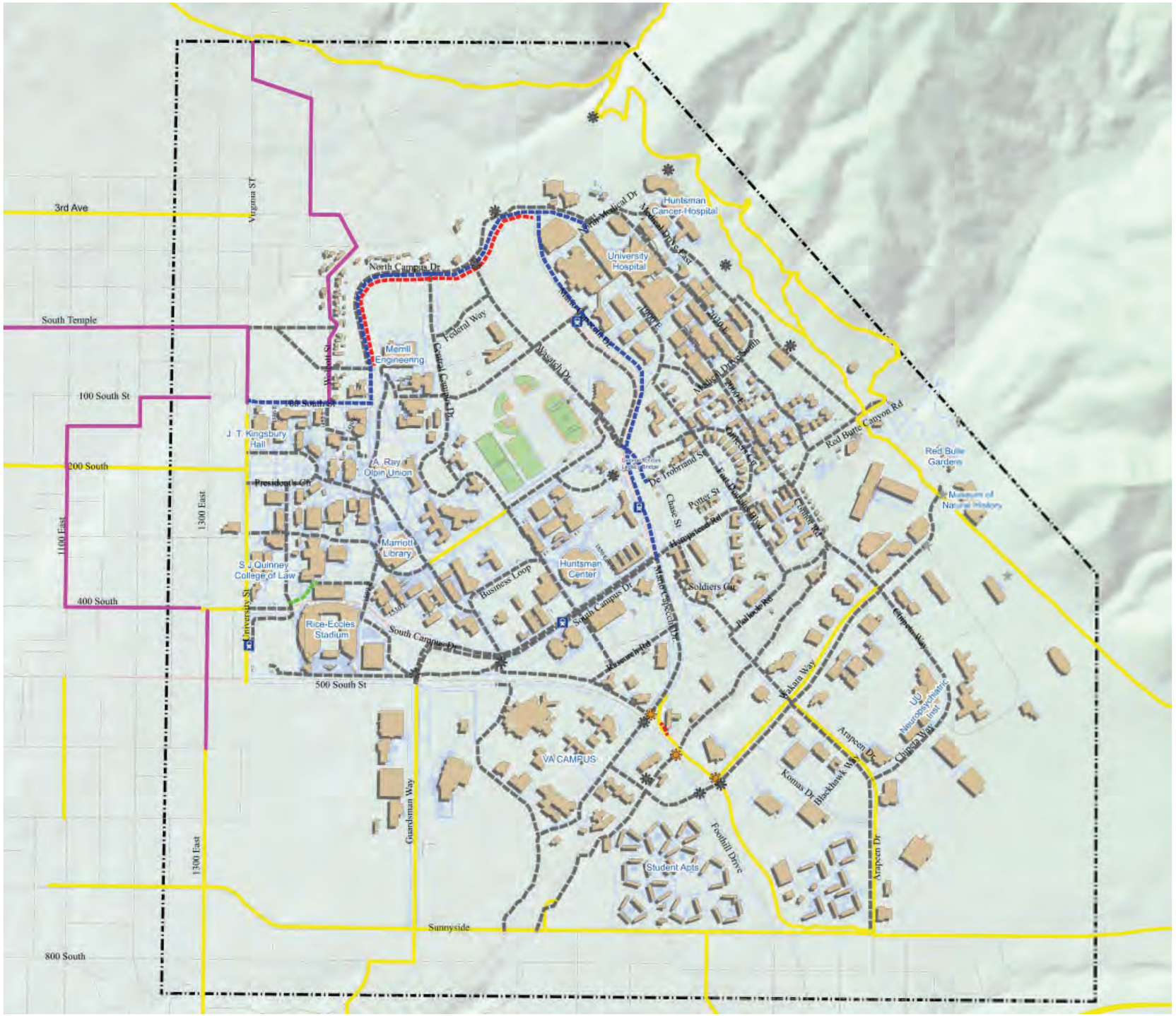
- Bike Lane
- Bike Path
- Shared Use Path

Recommended Bikeways - Short/Medium-Term

- Short/Medium-term Bikeways

Recommended Spot Improvements

- Long-Term
- Short / Medium-Term



Attachment H:
University of Utah Proposed Bicycle Network (0 - 10 Years)

Recommended Bikeways

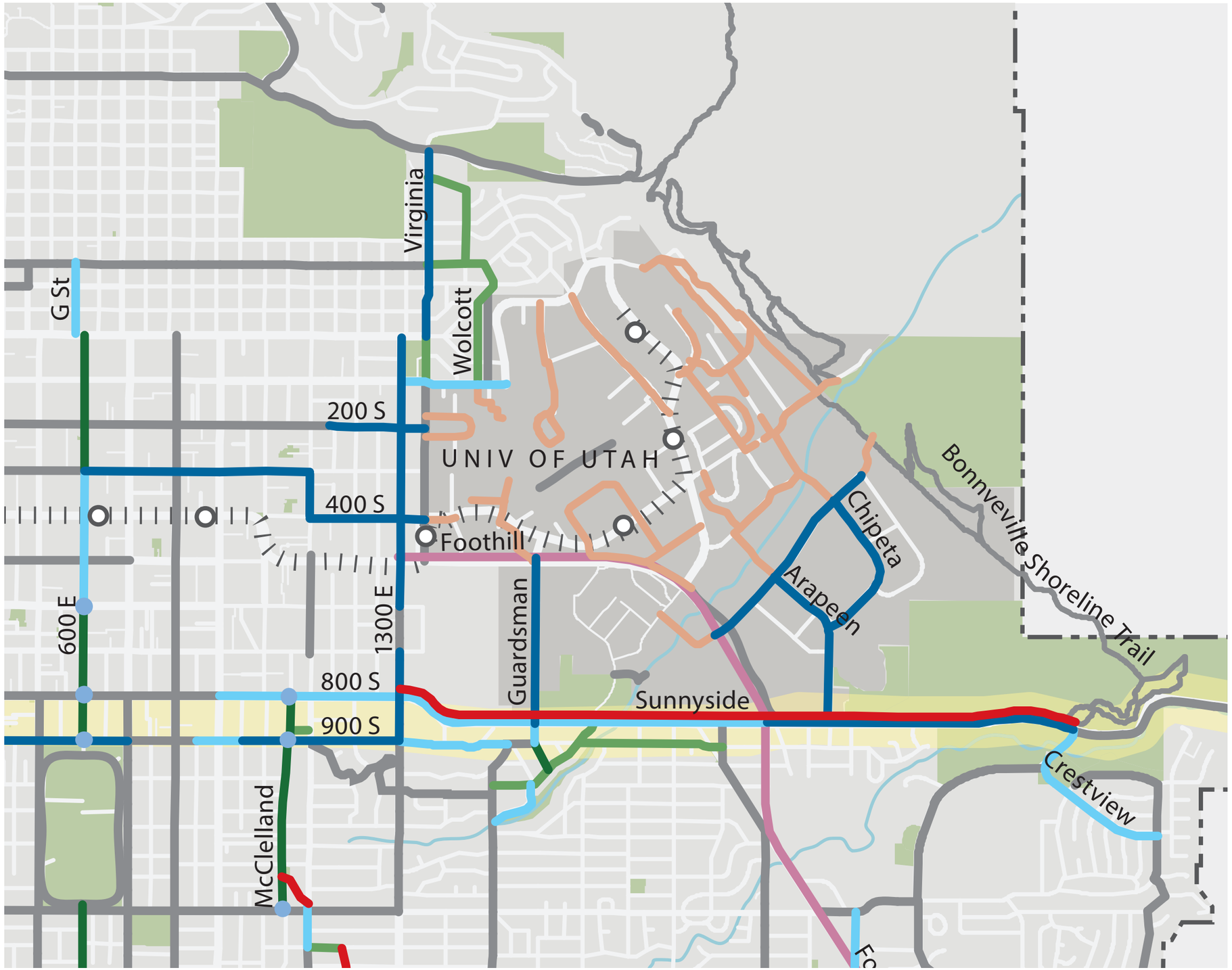
- Multi-Use Paths
- Buffered or Protected Bike Lanes
- Bike Lanes
- Neighborhood Byways
- Neighborhood Byways Crossings & Improvements
- Shared Roadways*
- Bikeways Proposed in Univ. of Utah Bicycle Master Plan
- Requires Further Study
- Transvalley Corridor**

Existing Bikeways

- All Existing Bikeways
- Natural Surface Trails (Bonneville Shoreline)

Existing Transit Facilities

- TRAX/Streetcar/FrontRunner Stop
- TRAX/Streetcar/FrontRunner Line



Attachment I:
University of Utah Proposed Bicycle Network (10 - 20 Years)

Recommended Bikeways

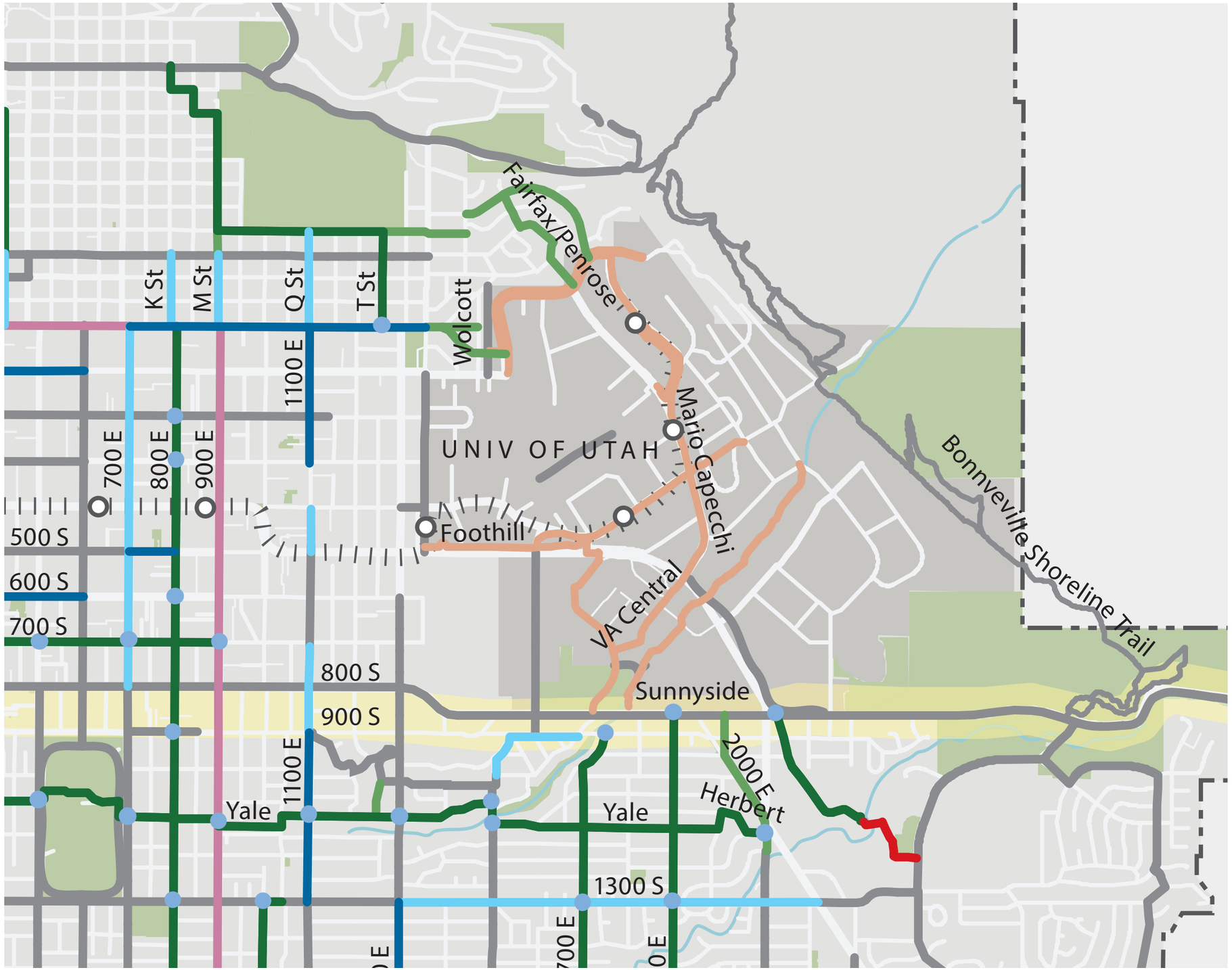
- Multi-Use Paths
- Buffered or Protected Bike Lanes
- Bike Lanes
- Neighborhood Byways
- Neighborhood Byways Crossings & Improvements
- Shared Roadways*
- Bikeways Proposed in Univ. of Utah Bicycle Master Plan
- Requires Further Study
- Transvalley Corridor**

Existing Bikeways

- All Existing Bikeways
- Natural Surface Trails (Bonneville Shoreline)

Existing Transit Facilities

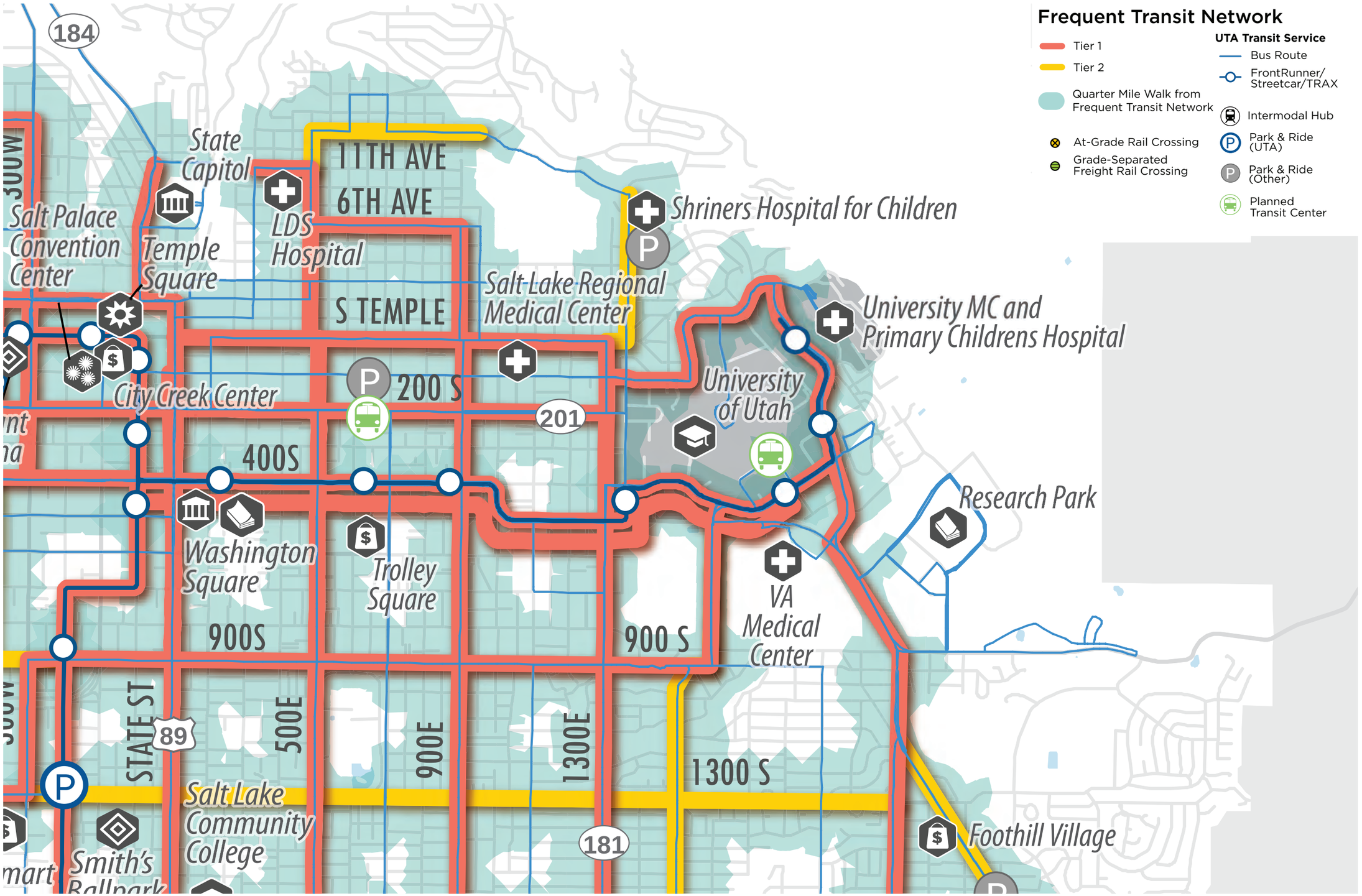
- TRAX/Streetcar/FrontRunner Stop
- TRAX/Streetcar/FrontRunner Line



Attachment J:
First/Last Mile Strategy Prioritization Figure

Candidate Projects	Effective in adding ridership	Improves Safety	Used by peers	Costliness	Stakeholder Support	Ease of Implemen-tation	Score	Overall Ranking
Crosswalk Improvements	2	2	1	3	3	3	**14**	**1**
HAWK Beacons/Ped Signals	3	3	1	2	3	2	**14**	**1**
Bike Lanes	3	2	1	3	3	2	**14**	**1**
On-site Wayfinding/Signage	3	1	1	3	3	3	**14**	**1**
Protected Bike Lanes	3	3	1	2	3	1	**13**	**5**
Wayfinding to Station	2	1	1	3	3	3	**13**	**5**
Sidewalks	2	3	1	1	3	2	**12**	**7**
Access Connections	2	3	1	2	3	1	**12**	**7**
ADA Access Improvements	1	2	1	3	2	3	**12**	**7**
Ped Signage Improvements	2	2	1	3	1	3	**12**	**7**
Bike Sharing	2	2	1	1	3	3	**12**	**7**
Bus Stop Enhancements	1	2	1	2	3	2	**11**	**12**
Car Sharing	2	1	1	2	2	3	**11**	**12**
Bike Paths	3	3	1	2	1	1	**11**	**12**
Bike Racks	2	1	1	3	1	3	**11**	**12**

Attachment K:
Salt Lake City Proposed Frequent Transit Network Map


184
State Capitol
11TH AVE
6TH AVE
LDS Hospital
Shriners Hospital for Children
Salt Palace Convention Center
Temple Square
S TEMPLE
Salt Lake Regional Medical Center
University MC and Primary Childrens Hospital
City Creek Center
200 S
201
University of Utah
400S
Research Park
Washington Square
Trolley Square
900S
900 S
VA Medical Center
STATE ST
89
500E
900E
1300E
1300 S
Salt Lake Community College
181
Foothill Village
Smith's Ballpark
Frequent Transit Network
Tier 1
Tier 2
Quarter Mile Walk from Frequent Transit Network
At-Grade Rail Crossing
Grade-Separated Freight Rail Crossing
UTA Transit Service
Bus Route
FrontRunner/ Streetcar/TRAX
Intermodal Hub
Park & Ride (UTA)
Park & Ride (Other)
Planned Transit Center

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University of Utah Mobility Hub Study

Mobility hubs offer a range of choices to get you where you need to go and make it easier to transfer from one form of travel (like walking or carpooling) to another (like taking the bus or riding a bicycle). The goal of a mobility hub is to provide convenient and comfortable transistions between all transporation modes.

We would love your input to determine where the mobility hub(s) should be located, what it should include, and how to make it convenient and inviting for people moving to and through the area.

When answering the questions, note that the study area includes the combined campuses of the University of Utah, Research Park, Health Sciences, and the VA Medical Center in Salt Lake City. This survey will only take about 5 minutes to complete and is essential to creating a mobility hub that meets your needs!

THE UNIVERSITY OF UTAH®

Thank you for your participation. Please provide your contact info below to enter a drawing to win gift cards to the Campus Store.

Name: _____

Email Address: _____

Would you like to receive project updates?

○ Yes ○ No

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1 **Which of the following statements describe your primary relationship with the study area?**

- ○ I am a student at the University of Utah
- ○ I work within the study area
- ○ I travel to the study area to attend special events or visit cultural attractions
- ○ I travel to the study area for doctor's appointments or other medical visits
- ○ I am a resident of Salt Lake City and my trips often take me through the University of Utah campus, Research Park, Health Sciences, or the VA Medical Center
- ○ Other (please specify): _____

1a **If you selected "I work within the study area," where do you work:**

- ○ On the main University of Utah campus (faculty or staff)
- ○ At the Health Sciences Campus (Primary Children's Hospital, UHealth, Huntsman Cancer Institute, Moran Eye Center
- ○ At the VA Hospital
- ○ Within Research Park
- ○ Other (please specify): _____
- ○ Not applicable

1b **If you selected "I travel to the study area for doctor's appointments or other medical visits" in Question #1, where do you typically visit:**

- ○ The VA Medical Center
- ○ The Health Sciences Campus (Primary Children's Hospital, UHealth, Huntsman Cancer Institute, Moran Eye Center
- ○ Other (please specify): _____
- ○ Not applicable

2 **What is your home ZIP code?**

_____

3 **Where do you spend the majority of your time within the study area?** *(Choose all that apply.)*

- ○ A - North Campus
- ○ B - South Campus
- ○ C - Fort Douglas
- ○ D - Health Sciences
- ○ E - Research Park
- ○ F - Student Apartments
- ○ G - The VA Medical Center
- ○ H - I do not spend much time in the study area

4 **How do you currently travel to and from the study area during a typical week?** *(Choose all that apply.)*

- ○ I walk or run
- ○ I drive by myself with children under 16
- ○ I drive by myself without children under 16
- ○ I carpool/vanpool
- ○ I ride public transportation, such as bus or lightrail
- ○ I ride campus shuttles
- ○ I drive a motorcyle or moped
- ○ I use ride hailing services, such as Uber or Lyft
- ○ I use a bicycle
- ○ I use an e-bike
- ○ I use a shared scooter (Bird, Lime, etc.)
- ○ I use another personal mobility device (including skateboard, electric skateboard, personal electric scooters, hoverboard, segway, unicycle, or other)
- ○ Other (please specify): _____

5 **Once you have arrived at the study area, how do you travel between buildings, classes, or appointments during a typical week?** *(Choose all that apply.)*

- ◯ I walk or run
- ◯ I drive by myself with children under 16
- ◯ I drive by myself without children under 16
- ◯ I carpool/vanpool
- ◯ I ride public transportation, such as bus or lightrail
- ◯ I ride campus shuttles
- ◯ I drive a motorcyle or moped
- ◯ I use ride hailing services, such as Uber or Lyft
- ◯ I use a bicycle
- ◯ I use an e-bike
- ◯ I use a shared scooter (Bird, Lime, etc.)
- ◯ I use another personal mobility device (including skateboard, electric skateboard, personal electric scooters, hoverboard, segway, unicycle, or other)
- ◯ Other (please specify): _____

6 **How important is it for each of the following travel options to be located near your destination?** *(Choose one answer per row.)*

	STRONGLY AGREE		NEUTRAL		STRONGLY DISAGREE	
Light rail	5	4	3	2	1	NOT SURE OR N/A
Bus	5	4	3	2	1	NOT SURE OR N/A
Bike share	5	4	3	2	1	NOT SURE OR N/A
Electric scooter share	5	4	3	2	1	NOT SURE OR N/A
Ride hail pick-up/drop-off zones, for services such as Uber or Lyft	5	4	3	2	1	NOT SURE OR N/A
Parking spaces reserved for car share vehicles that can be rented with an app	5	4	3	2	1	NOT SURE OR N/A
Parking space for private cars, including carpool and electric vehicle spaces	5	4	3	2	1	NOT SURE OR N/A

7 **Please indicate which of the following services you are currently a member or user of:**

- ◯ Greenbike Bike Share
- ◯ Electric Scooter Share, such as Bird or Lime
- ◯ Ride Hailing services, such as Uber or Lyft
- ◯ Car share services that can be rented with an app
- ◯ UTA Vanpool
- ◯ None
- ◯ Other mobility services (please specify): _____

8 **How often do you use ride hailing services (such as Uber or Lyft) to travel to or from the study area? Please select the best fitting answer.**

- ◯ Almost every day
- ◯ At least once or twice a week
- ◯ At least once or twice a month
- ◯ At least once every few months
- ◯ Once a year
- ◯ I have never used ride hailing to travel to or from the study area

8a **If you have used ride hailing services to travel to or from the study area, where do you typically get dropped off?** *(Choose all that apply.)*

- ◯ A - North Campus
- ◯ B - South Campus
- ◯ C - Fort Douglas
- ◯ D - Health Sciences
- ◯ E - Research Park
- ◯ F - Student Apartments
- ◯ G - The VA Medical Center
- ◯ H - Not applicable.

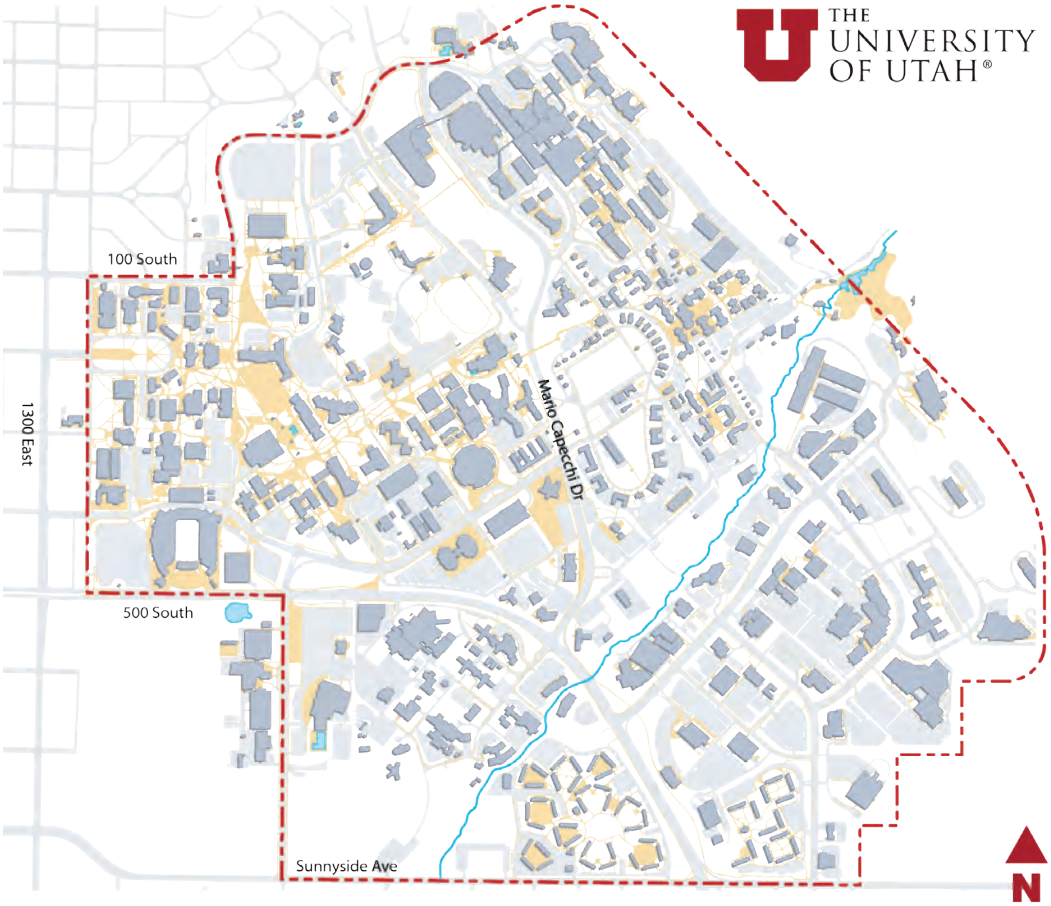
8b **When using ride hailing services, what building or destination is closest to your drop-off location?**

_____

9 **One goal of a mobility hub is to make travel to and from the study area more convenient and inviting. Which of the following amenities would you use if they were incorporated into a future mobility hub within the study area?** *(Choose all that apply.)*

- ◯ Showers and storage lockers for active commuters
- ◯ Community meeting rooms
- ◯ Secure bicycle parking areas
- ◯ Package pick-up options, such as Amazon Lockers
- ◯ Childcare
- ◯ Food carts, coffee shops, or other dining options
- ◯ Dry-cleaning, banking, pharmacy, or other retail services
- ◯ Grocery or farmers market
- ◯ Comfortable, climate-controlled, and social seating areas
- ◯ Charging options for electric vehicles, including cars and e-bikes
- ◯ An "ambassador" who staffs the site to provide travel and routing assistance
- ◯ Other (please specify): _____

WHAT ELSE WOULD MAKE YOUR COMMUTE EASIER?



IS THERE ANYTHING ELSE YOU WOULD LIKE TO TELL THE PLANNING TEAM? WRITE IT ON A STICKY NOTE AND PLACE IT HERE!

WANT A BETTER WAY TO GET TO CAMPUS?

Tell us what would make your trip to the University of Utah, UHealth, Research Park, and VA Medical Center easier.

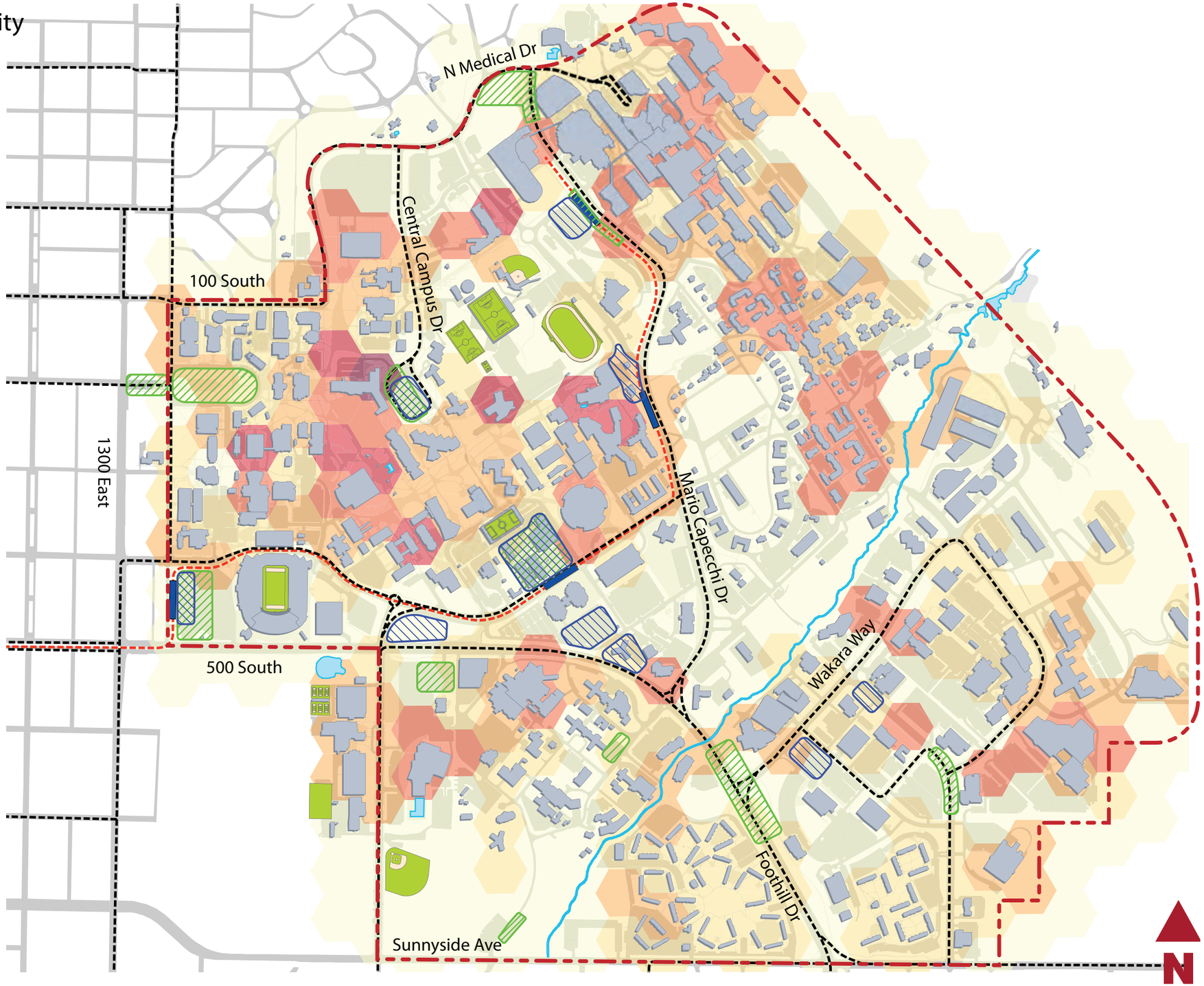
Mobility hubs are locations that integrate **multiple modes of transportation**, such as **walking, bikes, scooters, personal vehicles, buses, and light rail**, and make it easier for people to switch from one mode of transportation (like walking or biking) to another (like taking the bus or an Uber/Lyft). They also can be **a place for eating, socializing, and hanging out**. We need your input to help the University of Utah design and develop a mobility hub on campus!

WHAT DO YOU WANT IN YOUR MOBILITY HUB?

Origins & Destinations Suitability

Legend

- Higher Demand
- Lower Demand
- Stakeholder/Design Team Sites
- Existing Conditions Report Locations
- Light Rail Line
- Light Rail Stations
- Bus Routes



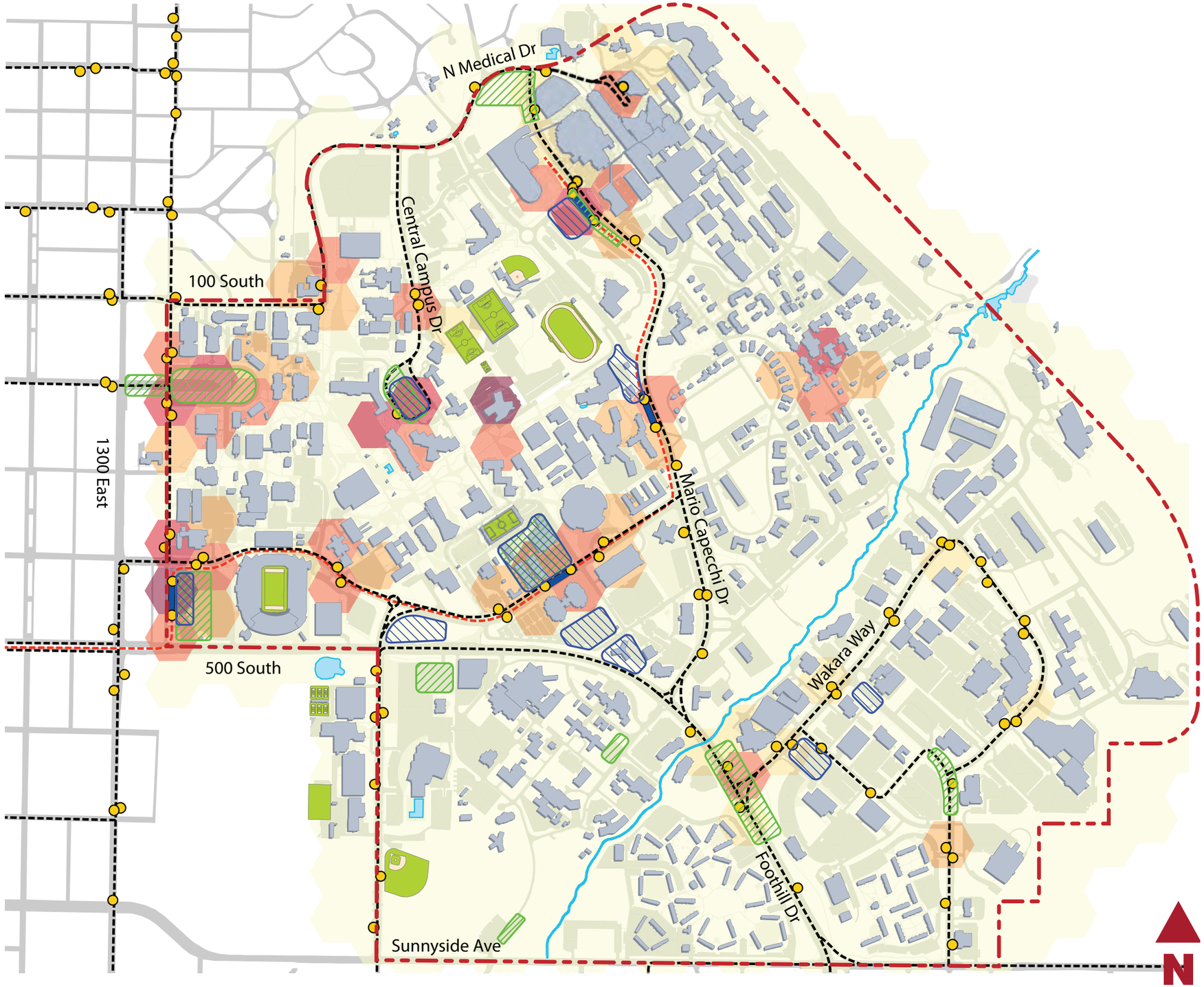
Model Inputs

Origins & Destinations (2x weighted)
- Daytime destinations
- Nighttime destinations
- Activity centers

Transit Suitability

Legend

- Higher Demand
- Lower Demand
- Stakeholder/Design Team Sites
- Existing Conditions Report Locations
- Light Rail Line
- Light Rail Stations
- Bus Routes
- Bus Stops



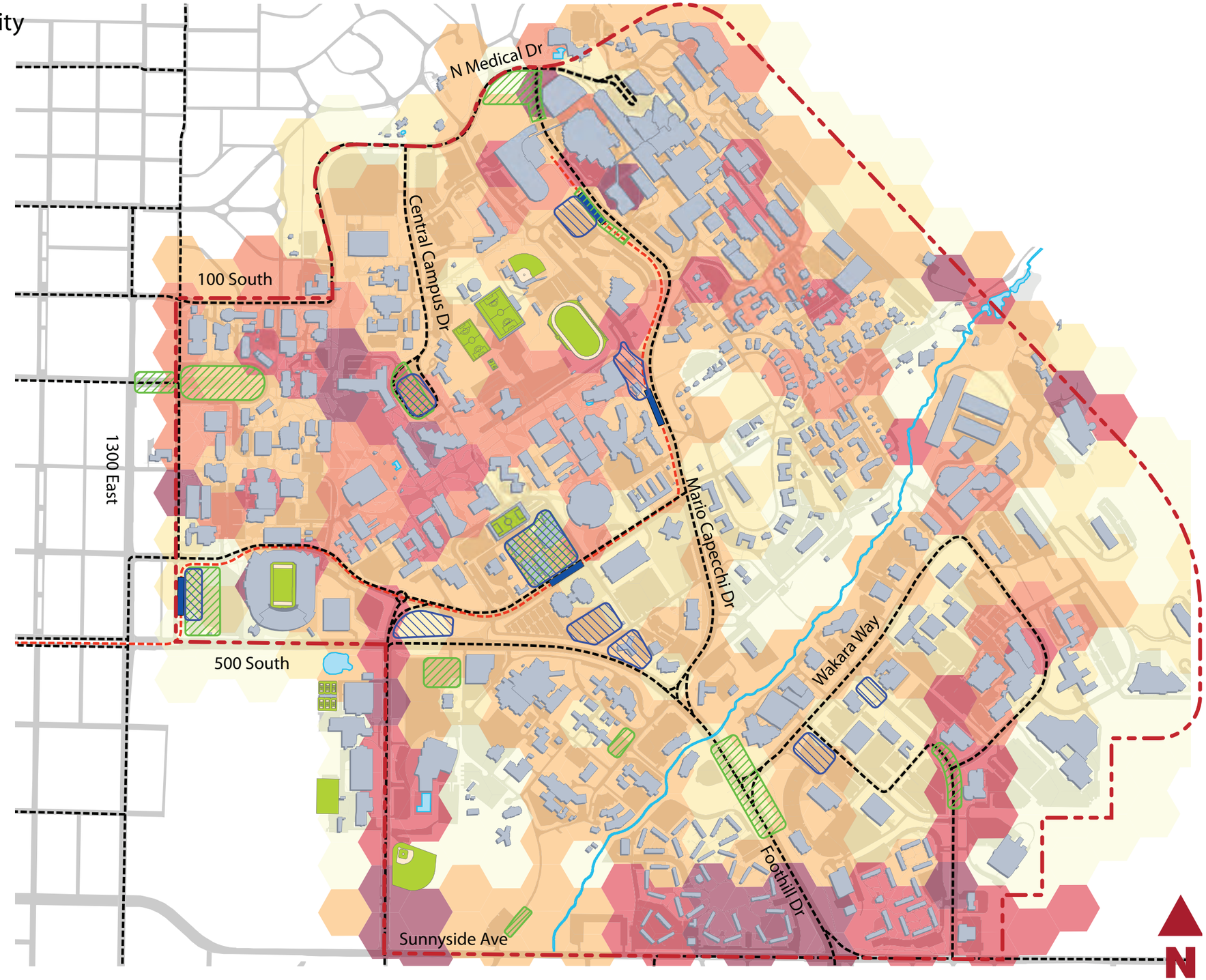
Model Inputs

Transit (1.5x weighted)
- Transit ridership by station

Active Transportation Suitability

Legend

- Higher Demand
- Lower Demand
- Stakeholder/Design Team Sites
- Existing Conditions Report Locations
- Light Rail Line
- Light Rail Stations
- Bus Routes



Model Inputs

Active Transportation (1.0x weighted)
- Bikeway density
- Pedestrian facility density
- Strava activity

200 South Iterative Concept - Salt Lake City Staff Comments