MOBILITY HUBS

WHAT IS A MOBILITY HUB?
A basic definition for a mobility hub is an "intersection" of transit, pedestrians, bicyclists and shared mobility options. It is a safe, convenient, and attractive place where the city interacts with its transit or mobility system.

MOBILITY HUBS TYPOLOGIES

Neighborhood Hubs
Smaller, ancillary hubs which are generally in lower-density residential areas and include basic hub elements such as transit stops, shelters and possible bike-share accommodations. This type of hub may not directly plug into all network services but could be designed to be expanded over time.

Regional Hubs
Regional Hubs are larger in footprint, connect to a regional transit service and are supported by a more concentrated or mixed land use environment. They have additional elements including car-share spaces, charging stations, longer drop-off zones, and public spaces. This type of hub encompasses many (if not all) network services.

WHAT ELEMENTS SHOULD BE INCLUDED?
Mobility hubs come in all shapes and sizes. Each hub is uniquely sized, programmed and designed for the location and community it serves. Hub locations should be highly visible and central to surrounding uses in order to create a high-quality user experience.

MOBILITY HUBS RECOMMENDED ELEMENTS

Transit Stop or Rail Service
Bike-Share System
Wayfinding
Carshare Service & Parking
Ride-Share Drop Off
EV Charging Stations
Secure Bike Parking
Shelter/Seating/Light
Emergency Phone/USB
Retail
Public Space
Pedestrian Connection
## BIKE MOBILITY SYSTEMS

### Distributed Bike Share
#### Kiosk
Bikes are secure and rented out from automatic docking stations.

#### Tech-on Bike
The unlocking and rental technology is located on the bike itself and rentals are through your smartphone. These systems utilize docking stations or designated bike racks.

### Docking Station System
Several cities operate this type of system, including the City of Fort Collins.

### Dockless System
Limebike is currently working with a variety of cities to establish the first programs. Bluegogo is currently operating in San Francisco and in several cities throughout China.

### Hybrid
Spin just launched. Austin, TX. was selected for the launch. Golden Bike Library expands this summer to a hybrid system, with hourly on-site rentals and automated kiosk locations.
**MOBILITY HUBS NETWORK ELEMENTS**

### WAYFINDING
A wayfinding strategy for Mobility Hubs helps users move through the network. It indicates the direction and distance to and from a Mobility Hub. It can also provide alternative routes, highlight points of interest and even serve as public art, lighting and landscaping.

Walk Philadelphia Wayfinding Strategy

**Walk Your City** helps communities, plan, make, and install quick wayfinding strategies to boost walkability. They approach wayfinding by creating signs that show distance, in minutes to everyday amenities.

**CARSHARING**
Car share parking should be located in a visible and convenient location to provide users with greater mobility options.

**RIDESOURCING**
Ridesourcing pick up and drop off zones can help complement the mobility options. Additionally, Lyft is launching Lyft Shuttle in San Francisco and Chicago, where the service runs on fixed routes during certain hours.

### MICROTRANSIT
Microtransit is commonly referred to as a privately operated transit system. Most service types operate along selected routes or within service zones. Some of the current microtransit providers include: Chariot, Via, and Lyft Shuttle.

**Call-n-Ride**
- On Demand Service with reservations (2 hrs to 2 weeks).
- Flex route service with scheduled stops.
- RTD Service area

**Chariot**
- Accessible by smartphone
- 14-passenger chariots (vans)
- Customers can crowdsourced future routes
- Currently operates in San Francisco and Austin.

**Olli**
- Electric vehicle accessible by smartphone
- Self driving or human operated
- Fits up to 12 people

**Lyft Shuttle**
Lyft is launching Lyft Shuttle in San Francisco and Chicago, where the service runs on fixed routes during certain hours.
UNIVERSITY STATION STRATEGY

- Existing University Station layout

- Consolidated entry/exit to RTD garage creates opportunity for public plaza.
UNIVERSITY STATION RECOMMENDATIONS

**A. Bicycle facility improvements at Franklin & Buchtel**
Bicycle facility improvements at Franklin/Buchtel intersection. New pavement markings and signage help transition from existing bicycle facilities at Franklin to a new cycle track along Buchtel.

**B. Pedestrian bridge over I-25**
A bridge connecting neighborhoods north of the station increases visibility, access, and activity. Evaluation requires a related parking study north of I-25.

**C. Redesigned intersection with roundabout at High and Buchtel**
This redesigned intersection and roundabout enables RTD curbside bus service and turnaround and allows for flexible special event operations.

**D. Transit plaza at University Station**
Removing vehicle access to the RTD garage from High St and consolidating access points to the east creates opportunity for a large public plaza.

**E. Mid-block pedestrian ‘Z’ crossing near DU Ritchie Center**
A new staggered crosswalk creates a safe refuge, allowing pedestrians to face oncoming traffic before making a decision at the mid-block crossing.

**F. Redesigned intersection at University and Buchtel**
Pedestrian and bicycle oriented intersection removes high speed right turns, shortens crossing distances, and features exclusive bicycle signal phasing.

**G. Redesigned intersection at University and Asbury**
Pedestrian and bicycle oriented intersection features enhanced pedestrian crossing features.

**H. Redesigned intersection at University and Evans**
Design emphasizes pedestrian safety and mobility enhancements near heart of DU campus.

**I. Enhanced pedestrian crossing at Clayton**
Enhanced pedestrian crossing creates better access to Historic Buchtel Trail and accompanying open space.

**O. 2-way cycle track along Buchtel, Franklin to I-25**
A ‘bicycle super highway’ connecting University and Colorado stations provides safe and attractive access to light rail and nearby bicycle facilities.
COLORADO STATION STRATEGY

INTERSECTION/ENTRYWAY IMPROVEMENTS

INTERSECTION IMPROVEMENTS (REDUCED CROSSING DISTANCE)

CYCLE TRACK

PARTIALLY COVERED TRACKS

PLAZA & MOBILITY HUB

POTENTIAL FUTURE DEVELOPMENT

POTENTIAL FUTURE DEVELOPMENT

COLORADO CENTER MAIN STREET

NEIGHBORHOOD CONNECTOR

BELLAIRE AS COMPLETE STREET

INTERSECTION IMPROVEMENTS PEDESTRIAN CROSSING

MICRO TRANSIT SERVICE AREA

COLORADO CENTER EXISTING - Birch Street over RTD tracks. Bellaire stops at Evans.

COLORADO CENTER FUTURE - Bellaire over RTD tracks and connects to Main Street. Bus Operations moves South of Colorado Drive. Redesign provides opportunity for future development.
COLORADO STATION RECOMMENDATIONS

K. Redesigned intersection at Monroe
   Traffic signalized intersection and smaller crossing distances improves pedestrian and bicycle experience and creates new crossing of Buchtel

L. Redesigned intersection at Colorado / Buchtel
   Pedestrian and bicycle oriented intersection removes high speed right turns, shortens crossing distances, and features exclusive bicycle signal phasing

M. Redesigned access to Colorado Center and auto-oriented wayfinding
   Creating additional access into Colorado Center can reduce vehicle congestion along Colorado Center Drive and Evans Ave

N. Redesigned intersection at Colorado / Evans
   Design features an improved pedestrian experience and significant safety enhancements for crossings of Colorado Blvd and Evans Ave

O. 2-way cycle track along Buchtel, Franklin to I-25
   A ‘bicycle super highway’ connecting University and Colorado stations provides safe and attractive access to light rail and nearby bicycle facilities

Q. New Bellaire complete street
   Bellaire continues through existing RTD parking lot, aligning the street grid and providing direct neighborhood access to Colorado Center Main Street

R. New pedestrian crossing of Evans
   Improvements to the pedestrian environment at and across Evans increases opportunities to reach Colorado Station safely and efficiently
PROPOSED CROSS SECTIONS AT BUCHTEL

SECTION A - BUCHTEL BLVD. LOOKING EAST - EAST OF FRANKLIN STREET

SECTION B - BUCHTEL BLVD. LOOKING EAST - EAST OF HIGH STREET

SECTION C - BUCHTEL BLVD. LOOKING EAST - NEAR RITCHIE CENTER

SECTION D - BUCHTEL BLVD. LOOKING EAST - EAST OF ST. PAUL STREET

SECTION E - BUCHTEL BLVD. LOOKING EAST - EAST OF COLORADO BLVD.
PUBLIC OUTREACH

COMMUNITY CONVERSATIONS

DU Sustainability Council
DU Graduate Student Council
University Park RNO
University Hills North RNO
Denver Police District #3 Citizens’ Advisory Board
DU Good Neighbors
Bonnie Brae RNO
Rosedale-Harvard Gulch General Membership
University Neighbors RNO
Virginia Village RNO
Wash Park East Neighborhood RNO
Cory-Merrill General Membership
East Evans Business Association

COMMUNITY INPUT

@ UNIVERSITY STATION

- Improve pedestrian crossing of University/Buchtel
- Consider moving LRT station east toward (or above) University Blvd
- Improve bicycle access and increase bicycle routes/facilities throughout the University area
- Make Buchtel a “bikeway” linking both stations
- Improve pedestrian crossings of Buchtel, improve pedestrian crossing of High Street and Buchtel; increase pedestrian space and way-finding at the station
- Create a “gateway” to campus near the station
- Increase the number of uses near the station: housing, retail, restaurants
- Redevelop the parking structure at the station – but don’t lose number of spaces!

@ COLORADO STATION

- Link RTD Station to uses south of Evans
- Link RTD station to Colorado Center development
- Improve pedestrian safety at Buchtel/Colorado Blvd.
- Enhance pedestrian environment along Colorado Center Drive; increase utilization of bike/ped bridge
- Connect neighborhoods to the east of I-25 via bike/ped bridge
- Rethink RTD parking lot for redevelopment opportunities – but keep the parking!

STATION POP-UP EVENTS

University and Colorado Stations

STAKEHOLDER GROUP WORKSHOPS

PUBLIC MEETINGS
**PROJECT RECOMMENDATIONS**

- **Bicycle facility improvements at Franklin / Buchtel intersection**
  - New pavement markings and signage help transition from existing bicycle facilities at Franklin to a new cycle track along Buchtel.

- **Pedestrian bridge over I-25**
  - A bridge connecting neighborhoods north of the station increases visibility, access, and activity. Evaluation requires a related parking study north of I-25.

- **Redesigned intersection with roundabout at High / Buchtel**
  - This redesigned intersection and roundabout enables RTD curbside bus service and turnaround and allows for flexible special event operations.

- **Transit plaza at University Station**
  - Removing vehicle access to the RTD garage from High St and consolidating access points to the east creates opportunity for a large public plaza.

- **Mid-block pedestrian ‘Z’ crossing near DU Ritchie Center**
  - A new staggered crosswalk creates a safe refuge, allowing pedestrians to face oncoming traffic before making a decision at the mid-block crossing.

- **Redesigned intersection at University / Buchtel**
  - Pedestrian and bicycle oriented intersection removes high speed right turns, shortens crossing distances, and features exclusive bicycle signal phasing.

- **Redesigned intersection at University / Asbury**
  - Pedestrian and bicycle oriented intersection features enhanced pedestrian crossing features.

- **Redesigned intersection at University / Evans**
  - Design emphasizes pedestrian safety and mobility enhancements near heart of DU campus.

- **Enhanced pedestrian crossing at Clayton**
  - Enhanced pedestrian crossing creates better access to Historic Buchtel Trail and accompanying open space.

- **Pedestrian and bicycle improvements at St. Paul / Steele**
  - Narrowing of Buchtel and exclusive pedestrian and bicycle phases improve safety and emphasize multi-modal connections.

- **Redesigned intersection at Monroe**
  - Traffic signalized intersection and smaller crossing distances improves pedestrian and bicycle experience and creates new crossing of Buchtel.

- **Redesigned intersection at Colorado / Buchtel**
  - Pedestrian and bicycle oriented intersection removes high speed right turns, shortens crossing distances, and features exclusive bicycle signal phasing.

- **Redesigned access to Colorado Center and auto-oriented wayfinding**
  - Creating additional access into Colorado Center can reduce vehicle congestion along Colorado Center Drive and Evans Ave.

- **Redesigned intersection at Colorado / Evans**
  - Design features an improved pedestrian experience and significant safety enhancements for crossings of Colorado Blvd and Evans Ave.

- **2-way cycle track along Buchtel, Franklin to I-25**
  - A ‘bicycle super highway’ connecting University and Colorado stations provides safe and attractive access to light rail and nearby bicycle facilities.

- **Pedestrian improvements along Asbury**
  - A key neighborhood connector, an improved Asbury includes complete sidewalks and other amenities to enhance connectivity.

- **New Bellaire complete street**
  - Bellaire continues through existing RTD parking lot, aligning the street grid and providing direct neighborhood access to Colorado Center Main Street.

- **New pedestrian crossing of Evans**
  - Improvements to the pedestrian environment at and across Evans increases opportunities to reach Colorado Station safely and efficiently.
UNIVERSITY & EVANS INTERSECTION OPTIONS

**Design Strategies**
The compact intersection design narrows existing curb to curb widths to 56 feet on all approaches, eliminating dedicated right turn lanes. This strategy reduces pedestrian crossing distances.

**Operational Strategies**
In this design, traffic signal phasing could be modified to include a pedestrian lead phase. This operational strategy gives pedestrians a head start (typically 3 - 7 seconds) crossing the road.

**Design Strategies**
The controlled intersection design creates an additional right turn lane, allowing for a signal phase strategy that includes protected right turns.

**Operational Strategies**
In this design, traffic signal phasing could be modified to include a pedestrian protected right turn. This operational strategy protects pedestrians by limiting the number of pedestrian and vehicle conflicts.

**Design Strategies**
A pedestrian overpass removes all conflicts by separating pedestrians and vehicles. Escalators and an elevator system provides the most space efficiencies. These bridges are most often installed in high-frequency pedestrian environments near major intersections.

**Design Strategies**
Tunneling both University Ave and Evans Ave would drastically alter the landscape for DU and the surrounding neighborhoods. Smaller, local roads would sit atop a new tunnel system, allowing full access to local businesses in a 'main street' environment. Heavy traffic passing this intersection would be forced underground.

A conceptual alignment (left) illustrates this massive project. Magenta lines indicate where vehicles would begin entering the tunnel. Cyan lines indicate the at-grade roadway sections.

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**UNIVERSITY & EVANS INTERSECTION OPTIONS**

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**Compact Intersection**

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**Controlled Intersection**

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**Pedestrian Overpass**

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**Tunneling**
In this design, traffic signal phasing could be modified to include a pedestrian protected right turns. This operational strategy protects pedestrians by limiting the number of pedestrian and vehicle conflicts.

The design reduces crossing distances for pedestrians by narrowing the intersection as much as possible while still accommodating the heavy traffic volumes in these corridors.

Operational Strategies
In this design, traffic signal phasing could be modified to include a pedestrian protected right turns. This operational strategy protects pedestrians by limiting the number of pedestrian and vehicle conflicts.
At both University Ave and Colorado Blvd, signal operations include dedicated pedestrian and bike phasing. This strategy gives cyclists a dedicated signal to obey and helps to alert vehicles. Pedestrians and cyclists cross together during this phase (Phase 4).
FUTURE IMPLEMENTATION CONSIDERATIONS

A. Conflict Mitigation

Each stop sign controlled intersection and alley that the cycle track crosses will need to be evaluated for conflict mitigation and potential access control measures to ensure safe and efficient operation of the transportation system.

B. Funding

No specific funding for these projects has been identified and secured at this time. Future implementation will depend on identifying adequate funding sources.

C. Right of Way (ROW) Impacts

Although the concept designs presented are not anticipated to have any ROW impacts, future final design and construction activities may identify the need for permanent ROW acquisition or temporary easements for construction purposes.

D. Transportation Operations

The concept designs have been evaluated for traffic operational characteristics and impacts at a high level. Future final design activities will require more detailed transportation system evaluations that could result in modifications to the recommended concepts.

E. Maintenance of Facilities

The maintenance of the recommendations may require special equipment and additional costs that are not currently budgeted. A maintenance program and budget will need to be developed and agreed upon prior to final design and construction.
LAND USE

Residential. The study area encompasses several well-established, single-family neighborhoods, including Cory-Merrill, Virginia Village, University, University Park, and University Hills. Some higher density residential, serving students, seniors, and market-rate tenants, are located near the light rail stations and along University Blvd. and Colorado Blvd.

Pictures on the left represent general character of the neighborhood residential.

Block Structure and Buildings. The area generally follows a grid pattern, ideal for walkable neighborhoods and connectivity. This pattern is disrupted by the super blocks that make up the University of Denver and by a breakdown in the grid east of Colorado Blvd.

The building footprints, shown to the right, illustrate the built urban environment of the neighborhood and the consistency of parcel development.

Commercial Corridors. Near Colorado Station, retail uses tend to be auto-oriented, higher density, and set-back from the street. Colorado Center is currently being redeveloped to add more retail, entertainment, and offices to the area.

Businesses near the University of Denver are generally smaller scale. Bars, restaurants and retail line University Blvd and parts of Evans Ave. Some residential towers feature ground floor retail, restaurants and patio seating.

Current Land Use. The land use map of the entire area illustrates that the primary uses are residential, institutional and commercial.