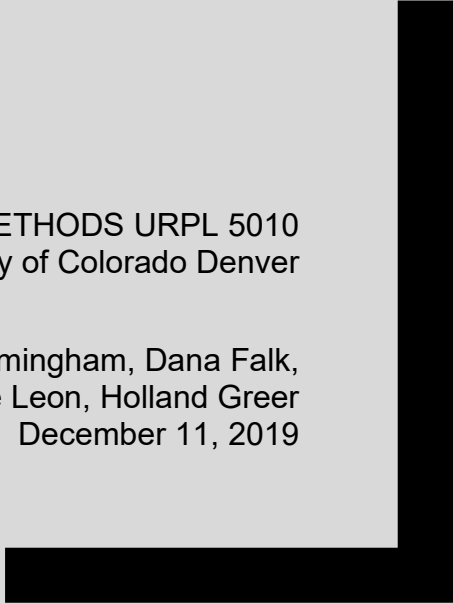# FEDERAL BOULEVARD BUS STOP ASSESSMENT

Study Area: Highland & Jefferson Park
Client: City and County of Denver & WalkDenver

PLANNING METHODS URPL 5010
University of Colorado Denver

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Manuel Garza De Leon, Holland Greer
December 11, 2019

CHAPTER 1: PROJECT CONTEXT

Introduction

Overview

The City and County of Denver (Denver) has dedicated resources to strategically implement Denver Moves: Transit, a plan designed "to…identify transit- supportive strategies and actions to meet Denver's mobility needs." (Denver Moves: Transit Plan Executive Summary, ES-2) in 2019. This plan was born out of a growing demand for greater urban transit solutions for an estimated growth of "189,000 more people…projected by 2040" (ES-1).

Implementation of the plan is through a public-private partnership between government agencies, private firms and non-profit organizations. One of the critical first steps in implementation is to gain an understanding of the current state of transportation stops throughout Denver. The Planning Methods 001 class at the University of Colorado Denver (CU Denver), Urban and Regional Planning department will assist in capturing data regarding the current state of the 9.25 mile stretch of bus stops on Federal Boulevard (Blvd). Data captured includes bus stop condition, amenities, accessibility, and rider perspective. Capturing this data will be in partnership with a non-profit agency, WalkDenver.

Students in the Planning Methods 001 (Methods) class will deliver a formal report inventorying the current conditions of the assigned segment of Federal Blvd bus stops, as well as rider's perspectives. The audience for this report includes Denver's Public Works, Denver Public Health and Environment, and a private consulting firm, Felsburg, Holt & Ullevig.

Team Members

The Methods class has been divided into six teams accountable for specific sections of the identified Federal Blvd corridor. This chapter examines study area five and has been developed by Neysa Bermingham, Dana Falk, Manuel Garza De Leon and Holland Greer.

Course Information

The Methods class is a graduate-level class guiding students to share urban planning information through proper data representation and storytelling. The class is design with experiential, reading and lecture components to provide students with experience in understanding and manipulating reliable data, and delivering analytical conclusions.

Study Area Boundaries

The study area is northwest of downtown Denver and includes a majority of the Highland and Jefferson Park statistical neighborhoods. The area is framed by Empower Field at Mile High to the south, West 38th Avenue to the north, and Federal Blvd to the west. The eastern edge contains Elitch Gardens to the south, before jogging northwest up Speer Blvd, continuing northeast along Interstate 25 until turning north on 16th Street and continuing up North Tejon Street to West 38th Avenue. See Maps 1 and 2 below for study area boundaries.

Map 1: Study Area Regional Location

Legend:
- Study Area
- Federal Blvd
- Interstates
- Denver Neighborhoods

Miles
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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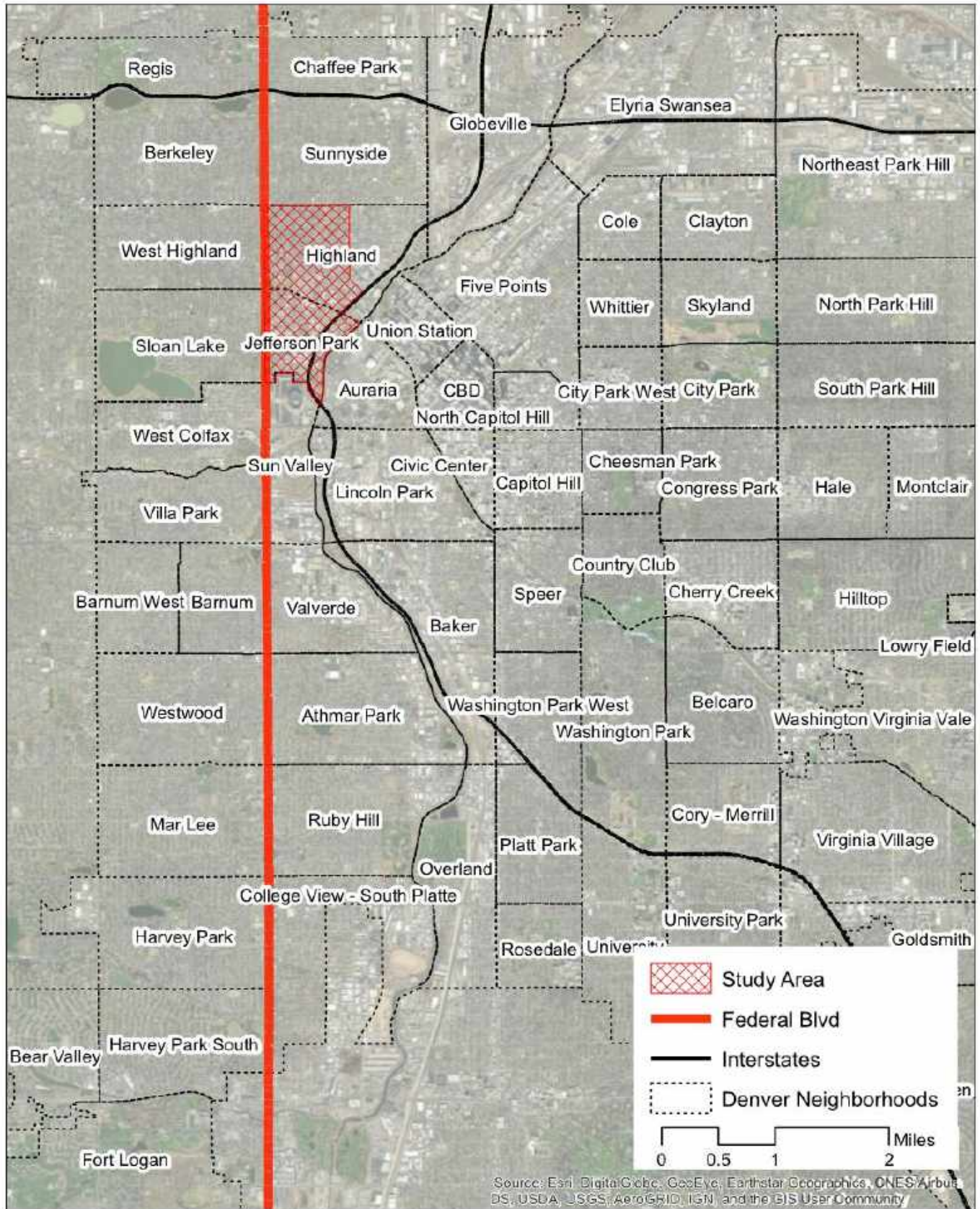
Federal Blvd Bus Stop Inventory - Group 5   Highland & Jefferson Park   URPL 5010 Planning Methods

Federal Blvd Bus Stop Inventory - Group 5   Highland & Jefferson Park   UCD URPL 5010 Planning Methods

Project Summary

Chapter One includes three specific tasks. First, each team is accountable to learn about their assigned study area's land use, local demographics, vehicular and active transportation systems and gaps, and the overall urban fabric and design. In Chapter Two, teams will collect local data via site visits at bus stops. Data will include bus stop amenities, condition of amenities and concrete within close access, physical surroundings, and qualitative information from bus stop users to understand personal experiences. For Chapter Three, teams will use the data gathered from the first and second tasks to gain information, analyze patterns and develop summary recommendations for bus stop gaps, strengths, and improvements.

Methodologies explored consist of researching quantitative and qualitative information, including data captured from relevant data sources, people's stories shared and team member observations. Data was sourced from the United States (U.S.) Census American Community Survey (ACS) 2013-2017 5 year survey regarding population and housing for Denver overall, as well as the study area block groups. Global Information Systems (GIS) data was retrieved from Denver, Regional Transportation Department, Colorado Department of Transportation, and Google Earth. People's stories and team member observations were captured by photo and written documentation while conducting site visits to calculate patterns and outlier observations. In addition, photo imagery from Google Maps Street View was used to view a different perspective of the neighborhood. The data was analyzed to cultivate inferences, questions and conclusions.

Reporting elements include charts, tables, graphics and narrative to document, summarize, analyze and conclude a deeper understanding of the study area, and specifically, the bus stops' conditions along the northwest corner of Federal Blvd. Charts and tables include a population and housing comparison between the study area and Denver overall to understand resident demographics. Photographs document visual evidence of study area characteristics.

Demographic Profile

Overview

The demographic profile compares the study area's population age distribution, housing units by tenure, means of transportation to work, and household income datasets against Denver overall. The data is sourced from the ACS 2013-2017 5 year survey. The specific datasets used in the study area include U.S. Census block groups 80310004021-80310004026, as well as 80310006001 and 80310006002. Map 3 below is a visual representation of the U.S. Census block groups in the study area and their connection to Federal Blvd.

Federal Blvd Bus Stop Inventory - Group 5

Highland & Jefferson Park

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Age Distribution

Denver and the study area's age distribution dataset shows the numerical value and the percentage of residents' ages by categories: 14 and younger, 25-34, 35-44, 45-54, 55-64, and 65 and older. Table 1 below shows population by age distribution values and percent of total.

Table 1: Age Distribution

	Age Distribution			
	Count		Percent	
Age	Study Area	Denver	Study Area	Denver
14 and Younger	782	120,090	9%	18%
15 – 24	518	75,249	6%	11%
25 – 34	3,386	151,865	40%	22%
35 – 44	1,632	106,244	19%	16%
45 – 54	947	79,006	11%	12%
55 – 64	351	70,054	4%	10%
65 and Older	806	75,959	10%	11%
Total	8,422	678,467	100%	100%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, B01001

The study area has a high concentration of 25-44 years old residents, and low percentages of both 14 and younger residents and 65 and older residents. Forty percent of the study area's residents are estimated to be 25-34 years old, which is almost double the percent of 25-34 year olds in Denver overall. In contrast, 9% of residents are 14 and younger in the study area, compared to 18% of 14 year olds and younger are residents of Denver overall. The lower percentage of people below the age of 14 and older than 55 found in the study area could indicate fewer resources for children and older adults. Table 1 and Chart 1 show the distribution of age for study are five and Denver overall.

Chart 1: Age Distribution
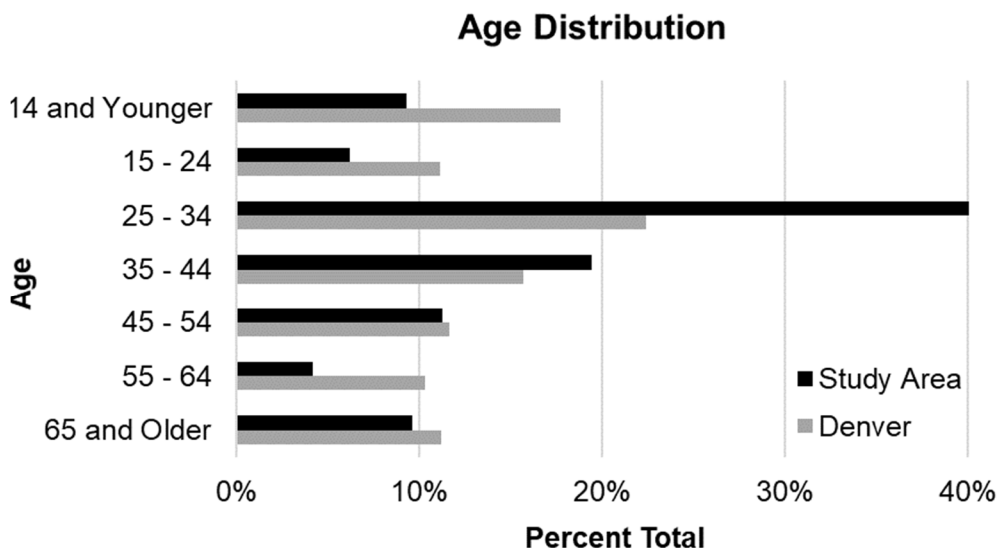
Age Distribution

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, B01001

Differences in the age distribution show Denver overall is more evenly distributed by age categories, when compared to the study area. The greatest percentage point difference in the data found that the study area is home to a 17 percentage point greater of residents in the 25-34 age range when compared to Denver. In addition, Denver overall has a larger percentage of residents 24 and younger, and 55 and older than study area five. One similarity to highlight is that the study area and Denver overall appear to have almost equal percentage points of residents in the 45-54 age range.

Housing Units by Tenure

Denver and the study area's housing unit by tenure dataset shows residential owner and renter occupancy rates. Table 2 and Chart 2 below represent the total population in occupied housing units by tenure.

Table 2: Housing Units by Tenure

	Housing Units by Tenure			
	Count		Percent	
Tenure	Study Area	Denver	Study Area	Denver
Owner Occupied	3,272	351,332	39%	53%
Renter Occupied	5,091	312,181	61%	47%
Total	8,363	663,513	100%	100%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, B25008

Chart 2: Housing Distribution by Tenure
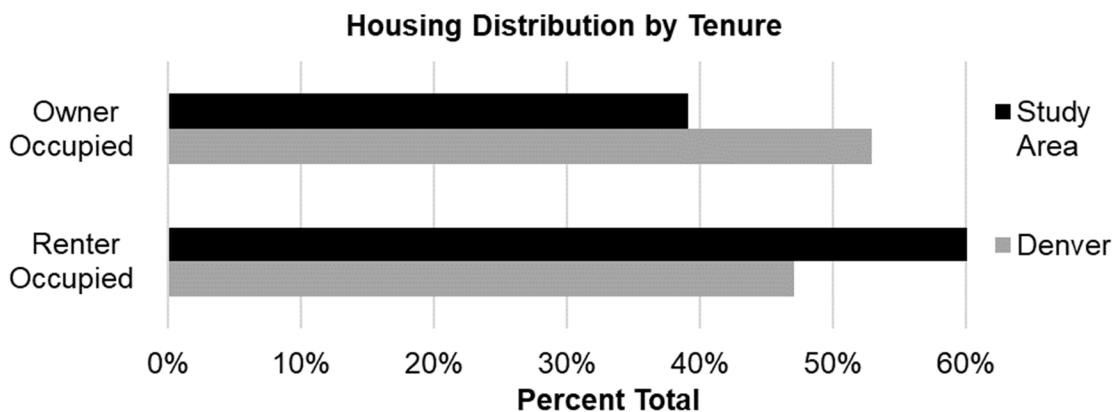
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, B25008

Property ownership data comparison between Denver and the study area housing units are noteworthy, with 61% renter occupied housing in the study area compared to 47% renter occupied in Denver overall. An inference could be made that renter occupied housing may be more transitional than owner occupied housing. Therefore, the study area's populations may be more likely to be mobile in the event of a change in the economy. In addition, a majority renter population, combined with the income level, could indicate a high cost of living within the study area or unaffordable housing. A high rental occupancy rate could also indicate a preference for the rental lifestyle of limited accountability to care for a home.

Means of Transportation to Work

Denver and the study area's Means of Transportation to Work datasets shows numerical values and percent of residents' choices of transportation to work. The means of transportation to work percentage points are very similar for residents of Denver overall and the study area. Close to 70% of the study area and overall Denver residents' commute to work is by driving alone in a car. There is a two percentage point difference between the study area and Denver for those who use Other means of transportation to work. An inference that the study area location in relation to the greater downtown area makes a bicycle or scooter commute shorter in duration, and therefore, potentially more attractive to residents. Table 3 and Chart 3 below represent the transportation to work means in values, percent and comparisons.

Table 3: Means of Transportation

Means of Transportation to Work

	Count		Percent	
Means	**Study Area**	**Denver**	**Study Area**	**Denver**
Drove Alone	3,945	256,782	69%	70%
Carpooled	324	29,730	6%	8%
Public transporation	395	24,960	7%	7%
Bicycle	153	8,081	3%	2%
Walked	286	16,133	5%	4%
Other means	181	3,865	3%	1%
Worked at home	429	27,869	8%	8%
Total	**5,713**	**367,420**	**100%**	**100%**

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, B08301

Chart 3: Means of Transportation
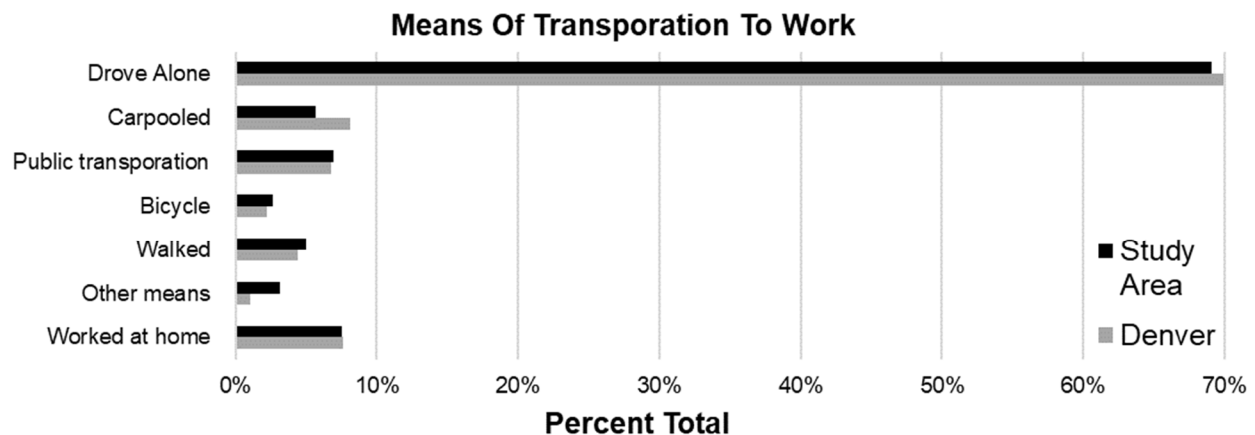
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, B08301

Household Income

Denver and the study area's household income datasets show the numerical volume and percentages of annual income amount per household. The study area in west Denver has historically been a predominately Hispanic, low-income corridor. Over the past decade or more, parts of the study area have quickly gentrified, while other parts have seen little change. This change in the study area is depicted in household income data. Household income is polarized in the study area, with 40% making under $49,999 annually, almost 40% making over $100,000 annually and the remaining approximately 20% making between $50,000 and $100,000. Denver overall has 10 percentage points fewer residents who make over $100,000, therefore the study area has a higher concentration of higher income residents than Denver overall. This finding could be due to a concentration of dual income couples, or stronger single earners residing within the study area. The lower income ranges could indicate a greater volume of service industry career residents, or possibly residents living off an hourly wage. Table 4 and Chart 4 below represent household income values, percent and a comparison chart.

Table 4: Household Income

Household Income (in the past 12 months)

	Count		Percent	
Income	Study Area	Denver	Study Area	Denver
Under $25,000	1,016	58,278	22%	20%
$25,000 – $49,999	844	62,344	18%	22%
$50,000 – $74,999	577	49,101	12%	17%
$75,000 – $99,999	473	35,093	10%	12%
$100,000 – $149,999	899	40,290	19%	14%
Over $149,999	884	42,156	19%	15%
Total	**4,693**	**287,262**	**100%**	**100%**

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, B19001

Chart 4: Household Income (past 12 months)
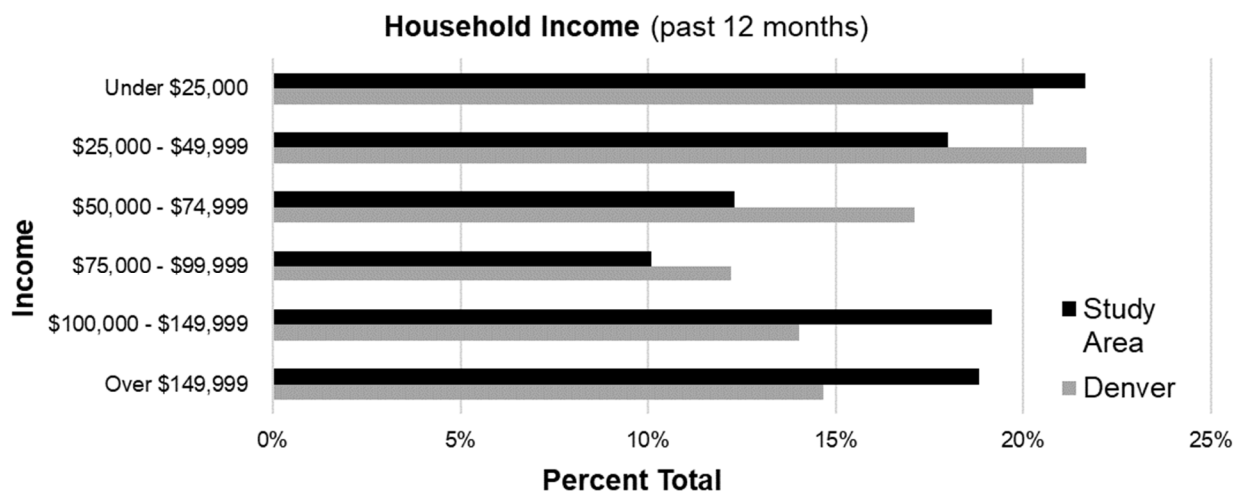
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, B19001

Demographic Findings

Notable highlights from the study area reveal a higher concentration of 25-34 aged residents, heavy car use dependency as a means of transportation to work, a higher volume of both high income and low income but fewer in the middle income range, and a large population of renter-occupied homes, as compared to Denver overall. The study area's polarized income ranges could create consumer demand for both high end housing, as well as affordable housing. The data could, in addition, indicate that residents either prefer the lifestyle freedom that comes with both having a vehicle and renting provides, or that housing ownership and public transportation dependency may be perceived inaccessible or undesirable in the study area.

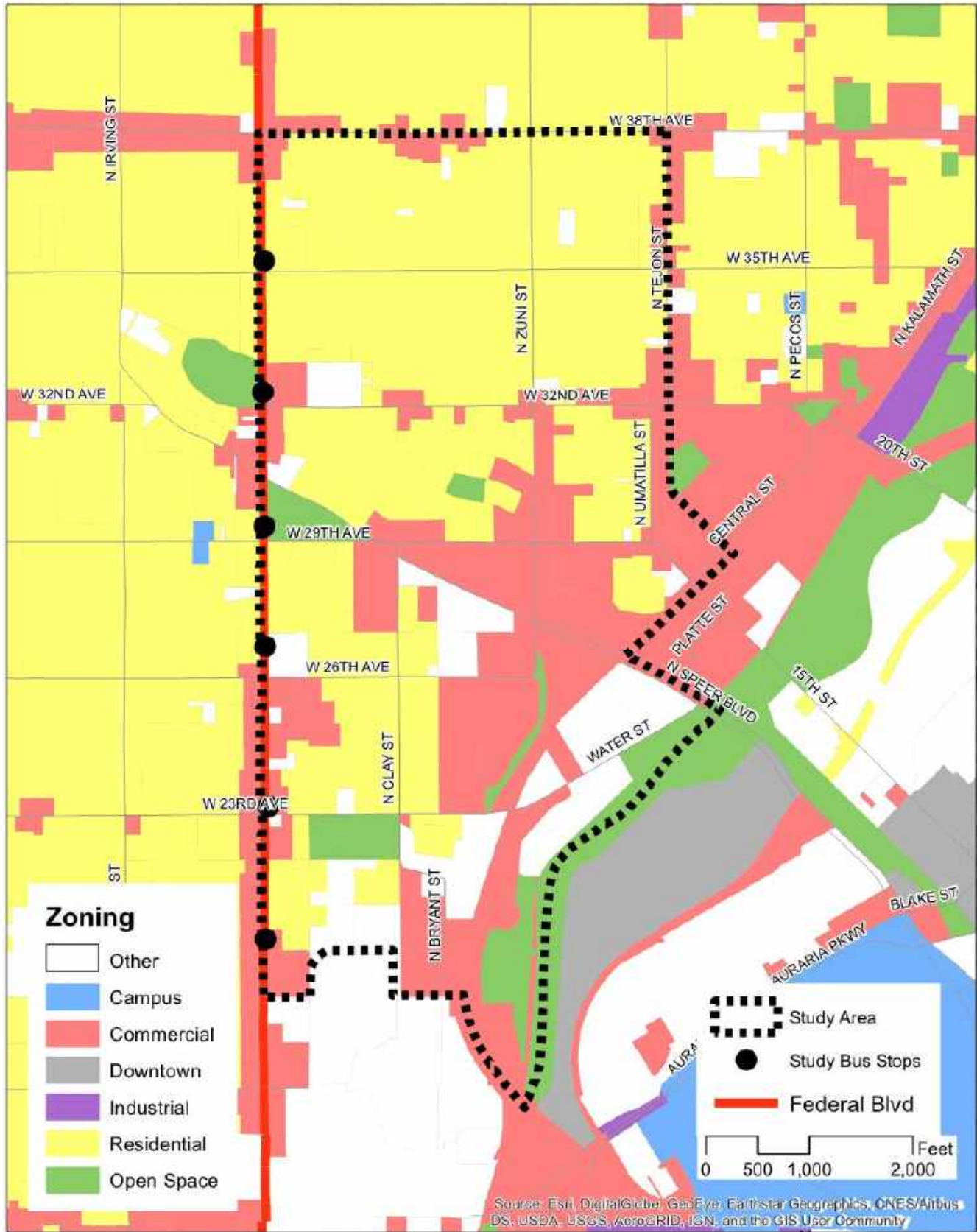## Land Use, Transportation, and Urban Fabric

Overview

The study area's land use, transportation, and urban fabric represent a typical urban neighborhood. Land use includes residential, commercial, community, industrial, and public spaces. There are various modes of transportation mobility within the study area. Finally, urban fabric provides qualitative features of the built and natural environments.

Land Use

Current land use illustrates the diverse range of residential, commercial and open space present in the study area, with higher commercial concentration closer to the central downtown commercial district of Denver. There are a few small parks scattered throughout the heart of the study area, but on the southeast portions of the study area there are numerous narrow parks framing the South Platte River. There are minimal industrial spaces located in the study area but some can be found a few miles to the north, east and west. The study area's residents have access to various education centers, ranging from elementary to high school, and assorted vocational centers. The main roadways and access routes of the study area feature a much higher density of mixed-use commercial business spaces that include offices, retail, trendy restaurants, breweries, schools, churches, and lodging. The concentration of commercial spaces decreases significantly the further away from downtown that is traveled, collectively shifting more to residential land use patterns. Although the study area has a wide array of businesses, locations that serve everyday needs such as grocery stores and health care services are limited. Due to the upcoming development of the Empower Field at Mile High district, the study area's land uses could continue its development evolution in the near future. Land use zoning detail can be seen in Map 4 below.

Map 4: Zoning

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Transportation

The study area has a wide array of transportation options for residents. Interstate 25 runs along the southern border of the study area and has three exit/on ramps at 23rd Avenue, Speer Boulevard, and 20th Avenue. In addition, 23rd Avenue, Speer Boulevard, and 20th Avenue and 15th Street all act as main routes to cross into the central downtown business area. Although Park Avenue is just outside of the study area, it serves as a lifeline to downtown for the area as well. In addition, Photo 1 below shows the stand alone pedestrian Highland Bridge allowing for safe pedestrian traffic between the study area and downtown Denver.

Photo 1: Highland Bridge at Interstate 25 and 15th Street, looking North

Public transportation options are plentiful in the study area. The study area's close proximity to Union Station, Pepsi Center, and Empower Field at Mile High allows quick access to multiple Denver light rail stations. Bus service stops for the study area are every third block north-south and every ninth block east-west. Roads with bus service include: 26th Avenue, 29th Avenue, 32nd Avenue, 38th Avenue, Federal Blvd, Tejon Street, and Navajo Street.

Active transportation in the study area is inviting, although hilly, with tree covered and mostly complete sidewalks that allow for easy pedestrian movement from place to place. The study area includes dedicated bicycle lanes, though primarily focused near connections to downtown and not to other parts of the study area. These bicycle lanes are located from 23rd Avenue to Empower Field at Mile High, 29th Avenue to the 15th Street bridge, and Tejon Street to Central Street to the 20th Street bridge. There are various bicycle stations for maintenance-related emergencies located along those bicycle paths in the study area as well.

Bicycle traffic lanes are represented in Map 5 below, along with bus stop locations and bus routes within the study area. The study's focus on Federal Blvd bus stops are represented visually in bolded circles along a red line to highlight the importance of those locations in the study area.

Federal Blvd Bus Stop Inventory - Group 5   Highland & Jefferson Park   UCD URPL 5010 Planning Methods

Urban Fabric

     The urban fabric of the study area depicts an urban neighborhood set upon a hill overlooking the greater downtown area of Denver. There are alleyways for residents or business owners to access the rear side of a building, garages or carports, and trash and delivery trucks. Colorful mural paintings were observed on the sides of homes down various alleyways, next to contractor's container dumpsters for large waste.

     The team observed a mix of historical and modern buildings set just a few feet back from sidewalks, and mostly complete sidewalks amongst city linear blocks. There is a pattern of small commercial areas scattered throughout the study area with a central feel for residents who live within a five-block walking radius. The commercial areas have locally owned restaurants, clothing stores, marijuana shops, beauty salons, office spaces, churches and more. They appear to attract both local residents as well as visitors wanting to enjoy the amenities offered, services provided or expertly crafted cuisine. There is greater commercial presence along the main access streets such as Speer Blvd and Federal Blvd. Highlighted along the tall tree lined primarily residential streets are tall, multi-family structures standing between three and six floors high with modern, clean lines, and rooftop decks. Integrated amongst the commercial buildings and modern buildings are historic hand-crafted homes and buildings preserved by the Landmark Preservation Commission built in the late 1800s and early 1900s with artistically designed columns, wood and stone detail to decorate siding and window frames. Photo 2 below is a Landmark Preservation Commission preserved church in the study area repurposed as the now Denver Dream Center.

Photo 2: The Denver Dream Center. West 30th Avenue, looking North

     Active transportation and green space access bring unique aspects to each neighborhood. Overall, the study area has well maintained sidewalks, but limited park space, with the exception of Jefferson Park, as seen in Photo 3 below.

Photo 3: Jefferson Park. West 23rd Avenue at Clay Street, looking East

Conclusion

Team Highland & Jefferson Park learned about study area five regarding the urban fabric and design, including land use, local demographics, vehicular and active transportation systems and more. Observations indicate the study area primarily attracts young adults who live in rental housing and value trendy cuisine and locally crafted beer. The neighborhoods' structural and natural environments include mature trees, a mix of historic and modern residential and commercial buildings, complete sidewalks, bike paths, and close proximity to public transportation and the downtown business district.

The socioeconomic diversity was extreme when compared to Denver overall. Most residents brought in an annual income of $49,999 or below, or $100,000 or above. This is a typical income pattern for communities with tourism as a major commerce. This could represent service industry or hourly wage workers serving the study area's trendy cuisine culture, as well as corporate management level employees working in downtown Denver.

Transportation patterns are dependent on the time and day. The team observed an increase in pedestrian, scootering and bicycling activity along primarily residential streets during evening and weekends. In contrast, car traffic was heavy during weekday rush hour commute times showing the car commuting dependency found in the ACS 2013-2017 5-year survey data.

CHAPTER 2: SITE ASSESSMENT

Introduction

Chapter Two includes three specific tasks: study area windshield and walking surveys, bus stop amenity data collection and conditions assessment, and intercept interviews. Windshield and walking surveys were conducted to gain a general understanding of the study area and collect observations through photographs and notes. Federal Blvd bus stop conditions were documented through notes and photographs. The bus stop rating was completed using WalkDenver's bus stop assessment tool, available here. Data about the bus stop amenities include documentation of the amenities present, condition of sidewalk concrete within close access, and physical surroundings. Qualitative intercept interviews of bus stop users were collected to understand rider perspective and experiences.

Team Highland & Jefferson Park executed Chapter Two by utilizing team members' strengths and separated into two sub-groups of two students each. Both teams were accountable for capturing windshield and walking survey data. Field Team, Holland Greer and Manuel Garza, performed the field work to capture bus stop assessments and intercept interviews. Paper Team, Neysa Bermingham and Dana Falk, completed the back-end synthesis, analysis and narrative work to create the chapter deliverable.

Windshield and Walking Survey

Both sub-groups conducted windshield and walking surveys, documenting their visits with notes and photos. The path taken by the Field Team on October 11th is shown in Photo 4.

The windshield and walking surveys conducted provided a broader understanding of the character diversity of the study area, beyond the demographic research in Chapter One. The study area sits atop a hill overlooking the central business district of Denver, and contains a gentle slope rising from the Platt River at the southwest boundary of the study area. There are two parks throughout the study area, Viking Park and Jefferson Park. Study area five has a strong tree canopy throughout the residential areas. Federal Blvd has relatively consistent greenery along

Photo 4: Field Team Windshield Survey Route, Oct 11, 2019

most of the study area, with a few noted gaps in Chapter Three. In general, there are central median trees and street trees along the sides. See Photo 5 below for an example of median and side street trees along Federal Blvd.

Photo 5: Street trees, Federal Blvd and 29th

There is a notable Hispanic/Latino population in the study area, with multiple bilingual signs (English & Spanish), as shown in Photo 6 below. Additionally, there were both English language only and Spanish language only signs along Federal Blvd.

Photo 6: Restaurant with bilingual signs, Federal and 23rd

There is a diversity of building character, as well as language, in the study area. In the southern portion of the study area (Jefferson Park neighborhood), there was mostly residential housing. A mixture of residential, commercial and community spaces were present in the north end (Highland neighborhood). There is an assortment of building architectural styles and dates

of construction next to each other and sidewalks tended to be detached from the street in the residential areas, as shown below in Photo 7: Study area architectural styles, Eliot and 21.

Photo 7: Study area architectural styles, Eliot and 21st Street

Execution and Safety Plan

To prepare for field activity, an Execution and Safety Plan was developed and submitted prior to field work. The plan was implemented as close to the proposal when possible. Minor changes in practice included the dates of field work, introductory statement, post-interview comments, and the introduction of individualized ice breakers per rider approached. The Execution and Safety Plan is accessible here.

Bus Stop Condition Assessment Site Investigation

The Field team completed the six bus stop condition assessments for study area five by capturing photos, observation notes, capturing amenities present and compiling ratings through WalkDenver web collection form. Bus stop conditions were captured in two ways: an amenities inventory, and category ratings.

Results and Analysis

The amenities inventory was captured with a Yes/No categorical response. Amenities counted were a secured bench, a shelter, a secured trash bin, complete sidewalk access within close proximity and that the stop would pass the American with Disabilities Act (ADA) access requirements. Bus stop assessment data is located in the Appendix. See the following page for Map 6, representing the amenities inventory by bus stop.

Map 6: Federal Blvd Bus Stop Amenities

Federal Blvd Bus Stop Inventory (Group 5)

BERKELEY

SUNNYSIDE

W 38TH AVE

N IRVING ST

13716

WEST HIGHLAND

W 32ND AVE

13715

N ZUNI ST

HIGHLAND
W 32ND AVE

N TEJON ST

W 35TH

N UMATILLA ST

13713

W 29TH AVE

CENTRAL ST

13711

W 26TH AVE

N CLAY ST

W ST

SPEER BLVD

SLOAN LAKE

W 23RD AVE

13708

N IRVING ST

JEFFERSON P.

WATER ST

13706

RYANT ST

AURARIA

W 17TH AVE

SUN VALLEY

AURARIA PKWY

7TH ST

WEST COLFAX

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Shelter

Bench

Trash Can

ADA

Sidewalk

● ████ Study Bus Stops

▪▪▪▪ Study Area

━━━ Federal Blvd

I-25

Feet
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Highland & Jefferson Park

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All bus stops in the study area have a minimum rating of three 'Yes' responses regarding stop amenity inventory. The three amenities counted at all stops are a secured bench, ADA access, and sidewalk. The greatest count in missing structures for stops was a shelter. The lack of a shelter may become more important as colder temperatures increase, and riders are seeking shelter from the snow or cold temperatures. It is important to note that stops 13715 and 13711 had all structural amenities. See Table 5 below for all responses by bus stop amenity.

Table 5: Bus Stop Amenities

Amenity	13716	13715	13713	13711	13708	13706
Shelter	No	Yes	No	Yes	No	No
Secured bench	Yes	Yes	Yes	Yes	Yes	Yes
Secured trash can	Yes	Yes	No	Yes	Yes	Yes
ADA access	Yes	Yes	Yes	Yes	Yes	Yes
Sidewalk	Yes	Yes	Yes	Yes	Yes	Yes

Photographic evidence was captured for the bus stop condition assessment. See Table 6 below for photos and an overall bus stop rating score based on the count of amenities.

Table 6: Bus Stop Assessment Amenities Inventory Table: Ratings and Photos

Bus Stop # Cross Street	Overall Rating	Bus Stop # Cross Street	Overall Rating
13706 W 20th Ave	*4*	**13708** W 23rd Ave	*4*

13711 W 26th Ave *5*

13713 W 29th Ave *3*

13715 W 32nd Ave *4*

13716 W 35th Ave *4*

A category ratings scale was based on a five point scale; zero being the lowest and five being the highest. The assessment is available here. Bus stops categorical ratings were based on prescribed categories, including pedestrian connectivity, accessibility for people with disabilities, cleanliness, physical condition, safety and an overall rating score. In general, bus stops in study area five rated well for all categories. The overall category rating for all stops had a majority count of four, with two stops rated five and one stop rated three. The safety category was the highest rated category on all stops, with an average rating of 4.5. The physical conditions, cleanliness and pedestrian connectivity categories were also fairly high, averaging 3.8, 4.0 and 4.2 respectively. The data shows opportunity for improvement to make all stops accessible for people with disabilities, with the lowest average rating of 3.7 and the highest count of a rating value of three. All bus stop ratings are located below in Table 7 below.

Rating Categories	13716	13715	13713	13711	13708	13706	Average
Overall	4	5	3	5	4	4	4.2
Safety	4	4	5	5	4	5	4.5
Physical Condition	4	4	4	3	4	4	3.8
Cleanliness	4	4	4	4	4	4	4
Accessibility for people with disabilities	3	3	4	3	5	4	3.7
Pedestrian connectivity	3	4	5	3	5	5	4.2

Intercept Interviews

On Friday, October 11th and Sunday, October 20th rider interviews were conducted for north-bound bus stops along Federal Blvd in the study area. Riders were approached based on accessibility to the bus stops, representative of diversity selection and interviewer's perspective of rider's expression of interest such as eye contact, engagement in an ice breaker conversation and willingness to stand within close proximity to interviewer. The intent was to gather interview responses with both convenience and broad representative of the transit users. See Photo 8 below for a Field Team member after attempting to conduct a rider interview.

Photo 8: Photo of Holland Greer at Bus Stop

Interview questions, provided by WalkDenver, sought to understand a transit rider's demographics, patterns of engagement in riding the bus and perspective of the bus riding experience. The interview questions and responses are included in the Appendix.

The Field Team was unable to interview riders at all bus stops located in the study area. See Chart 5 below for interviews by bus stops. Most interviews, 75%, came from bus stop 13711 at Federal Blvd and W 27th Ave. According to Ken Schroeppel, a Professor of Urban and

Regional Planning and Department Director for Urban Design at the University of Colorado Denver, the average daily ridership at that particular bus stop is the highest of the six Federal Blvd stops in the study area (208 people, compared to 94 people).

Chart 5: Count of Interviews at Study Area Bus Stops

Count of Interviews by Bus Stop
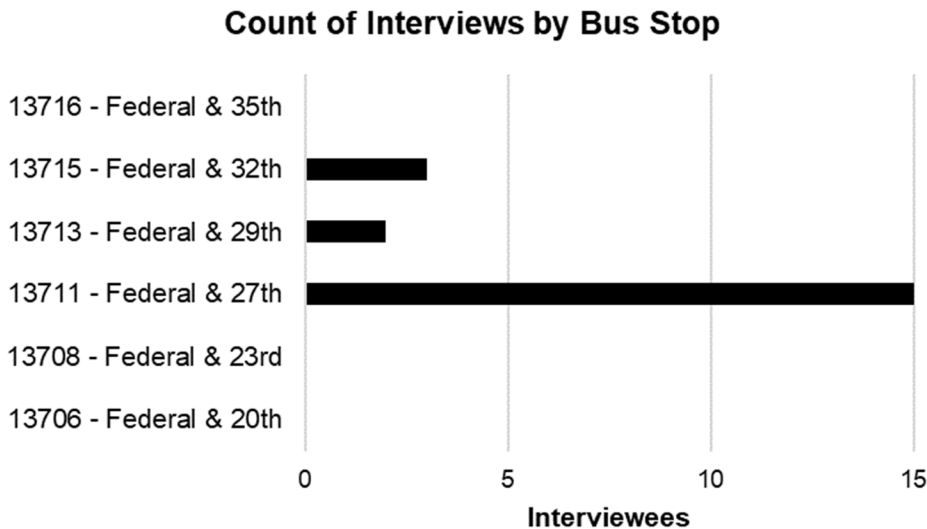
Data provided from intercept interviews shows a broader view of the interviewees transit patterns. Of the 20 people interviewed, 16 were taking transit because it is the only means available to them (80%). See Chart 6 below for all available options and number of interviewees per each category.

Chart 6: Why Interviewees Used Transit

Why Interviewees Used Transit (Day of Interview)
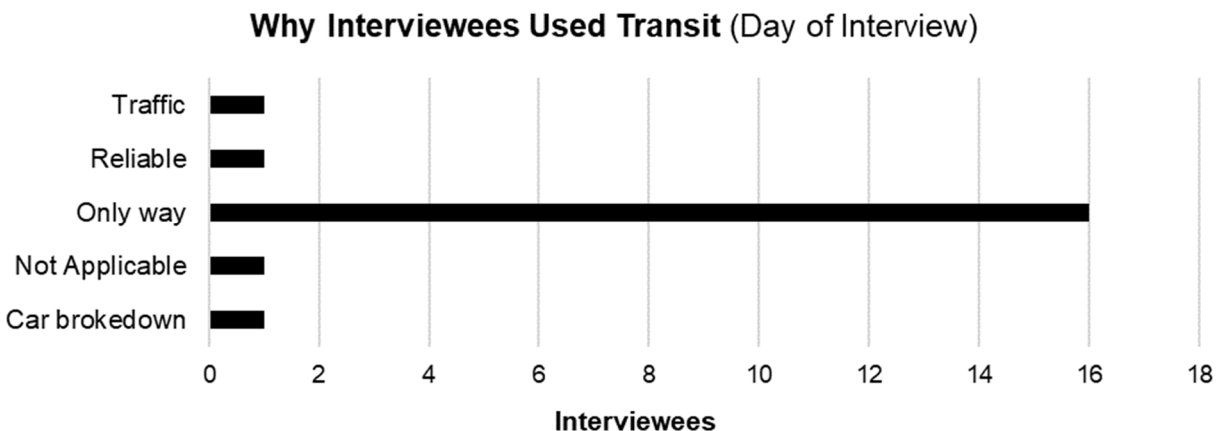
Interviewees arrived at the bus stop through a variety of means. The most common means of arrival were a bus transfer, or walking. The most comment means of arrival at bus stops verified the high number of responses of the bus being the only means of transit from the prior question. Chart 7 below details responses to the means of travel to the bus stop where the interview took place.

How Interviewees Arrived at Bus Stop (Day of Interview)
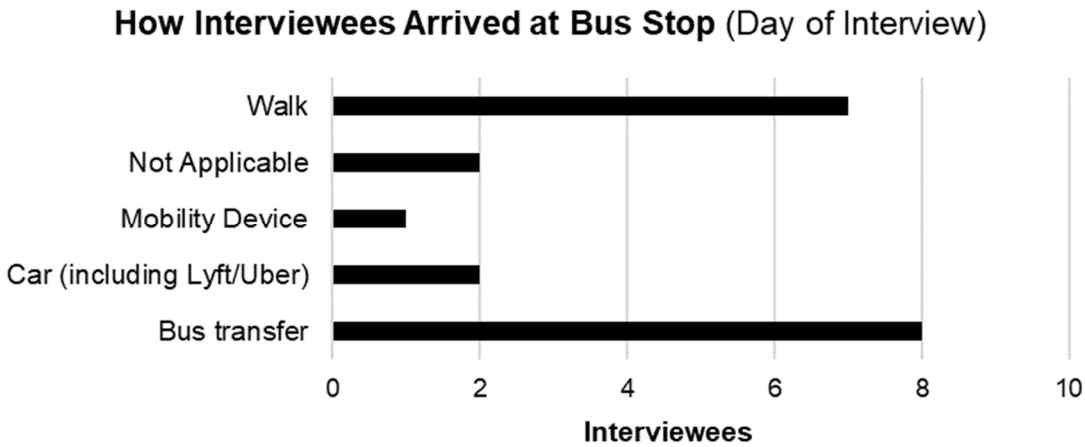
The high number of people who arrived by walking to the bus stop shows a relevant perspective to the question of trade off preferences for bus stops. Only three riders expressed a preference for a longer walk to a nicer bus stop; the remaining bus stop riders expressed preferences for a shorter walk traded for fewer amenities and more bus riding time (excluding two not applicable responses). See Chart 8 below.

Chart 8: Trade-offs Preferred by Interviewee, by Bus Stop

Trade-off Preferred by Interviewee, by Bus Stop
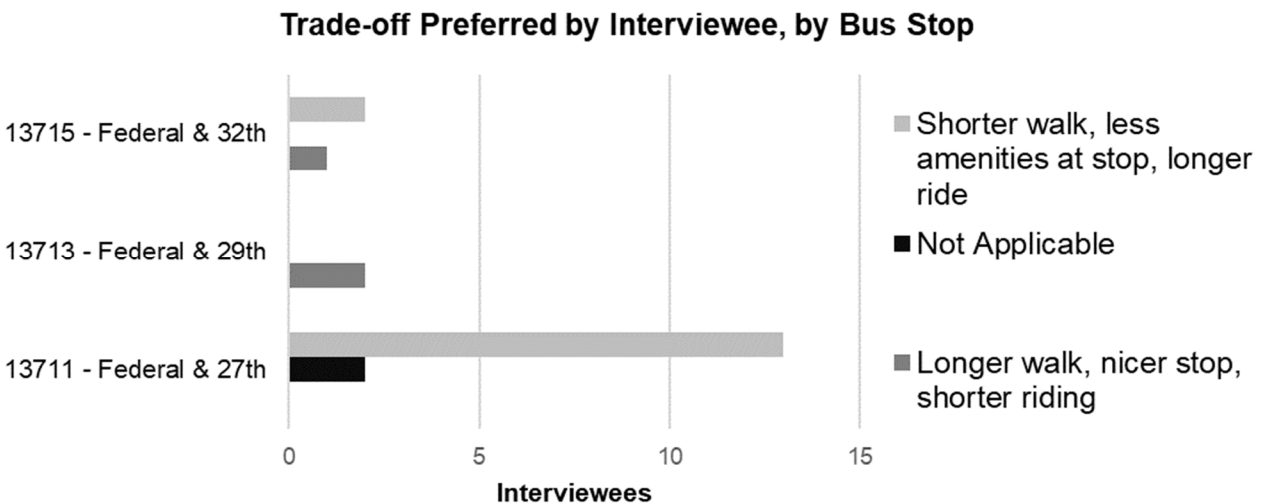
The interview responses for the question of safety correlated to the Field Teams safety categorical rating. The majority of riders felt safe at their bus stop primarily because there were other people around. Only one response at bus stop number 13715 was 'No' to the question of feeling safe. See Chart 9 below for all safety responses.

Chart 9: Bus Stop Safety Ratings

| | Safety Ratings by Interviews | | | |
| | 13711 | 13713 | 13715 | |
Safety Rating	Federal & 27th	Federal & 29th	Federal & 32th	Total %
Yes	13	2	1	80%
Sometimes			1	5%
Just normal	1			5%
No			1	5%
Not Applicable	1			5%
# Responses	15	2	3	100%

Demographics

The Field Team aimed to interview a broad cross-section of the population, including a diversity of ages, genders, preferred languages and races/ethnicities. A majority of interviewees identified as Hispanic/Latino (55%). In addition, 36% of all interviewees were between the ages of 30-39 years old. See Table 5 below for a breakout of all interviewees by age and self-described race/ethnicity.

Table 5: Interviewee Ages and Races/Ethnicities

| | RACE/ETHNICITY AND AGES OF INTERVIEWEES | | | | | | | | |
| | | | | Age | | | | | |
Race/Ethnicity	0-19	20-29	30-39	40-49	50-59	60-69	None Given	Total	Total %
Black.African	1		1		1	1		4	20%
Caucasian	1							1	5%
Hispanic / Latino			4	2	3	1	1	11	55%
Hispanic /Latino & Caucasian	1							1	5%
None Given		1	1				1	3	15%
Total	3	1	6	2	4	2	2	20	
Total %	15%	5%	30%	10%	20%	10%	10%		

Team Learnings

Throughout the process of completing Chapter 2: Site Assessment, Team Highland & Jefferson Park implemented a few new approaches and strategies based on learned experience. Field Team noticed human traffic at the bus stops had different patterns on Friday and Sunday, therefore they were able to adjust their approach on the second day of interviews.

Successful interview requests typically began with an ice breaker making a connection, such as expressing a mutual passion for the Broncos team with a rider wearing clothing with the Broncos emblem. Prior to an ice breaker on the second day in the field, the Field Team would first show the University of Colorado Denver badge to create a sense of credibility. This appeared to reduce a sense of fear or disinterest in participating in interviews, because people engaged in ice breakers more readily on that day.

Methodology Critique

The methodology provided by WalkDenver was overall a good approach. However, Team Highland & Jefferson Park did notice opportunities for improvement.

One opportunity was the bus stop assessment tool provided by WalkDenver did not standardize the overall bus stop amenity inventory as well as account for condition. Each

amenity was given a Yes/No response, but the inventory rating category did not rank amenities by priority or provide an overall rating as a result of total responses. As a result, Team Highland & Jefferson Park used each element (shelter, secured bench, secured trash can, ADA access, sidewalk) to equal a point in the amenity inventory, as noted in Table 5. Therefore, a bus stop with a secured bench and trash can would receive a number two rating. In addition, a stop with a shelter and ADA access would also receive a number two rating. The ambiguity of what an overall rating of two, in these examples, underscores the importance of standardizing the rating categories across a single category and prioritizing amenities in the ranking scale. In addition, this would account for the consideration of multiple field personnel conducting this assessment. There also lacked a structure for capturing amenities that were failing, and therefore did not account for amenity improvement opportunities in this bus stop assessment.

An additional opportunity in WalkDenver's methodology was regarding the demographic questions. They failed to capture other relevant, but important demographic categories. The missing demographic categories were an obstacle in two intercept interviews in study area five. One participant was legally blind and, as a result, was not given the option of completing the responses privately. In addition, an interviewee in study area five was hearing impaired, and therefore was unable to engage in conversation with our interviewer, since sign language was not a language the interviewer had prepared for. In addition, one question initially deterred an interviewee from participation. A demographic question that created a sense of distrust to begin the interview was the question of race/ethnicity. The interviewee expressed sarcasm and a sense of being asked too many times about his race/ethnicity when responding to the question. In other terms, he exhibited signs of being over-surveyed with the question of his race/ethnicity.

CHAPTER 3: GAPS AND RECOMMENDATIONS

Introduction

Chapter Three uses the data gathered from study area five to analyze patterns and develop summary recommendations for Federal Blvd bus stop gaps and improvement opportunities. The information in Chapter One and Chapter Two provided data points related to the broader neighborhood infrastructure and rider and team member perception of transit stop gaps and strengths. This data was analyzed to extrapolate opportunities and weakness of study area's bus stops.

A broader look at Federal Blvd bus stops indicates the bus stops are generally in good condition and provide either all or many amenities provided by the Regional Transport District (RTD) for riders waiting at bus stops. Gaps related to the bus stops include minimal amenity and infrastructure improvements, safety and environment enhancements, and broader recommendations for community engagement and linguistic inclusivity. Recommendations for improvement address the specific gaps noted. Recommendations are based on team member research and consultation with multiple respected and published materials including Blueprint Denver, Denver Moves: Transit Plan, the 2017 Federal Boulevard Corridor Plan, *Human Transit* by Jarrett Walker, and the American Public Transit Association Standards for Development Program 2012 Recommended Practice paper. The published materials make specific bus stop recommendations using local and global examples. Related recommendations for study area five are noted in this chapter.

The local published materials represent the voice of local transit experts, the customer and broader community involvement. *Human Transit* by Jarrett Walker represents the voice of an expert. The American Public Transit Association (APTA) Standards for Development Program published 2012 Recommended Practice paper for the Design of On-street Transit Stops and Access from Surrounding Areas was drafted with input from transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups.

Gaps

Chapter Two highlighted Federal Blvd bus stop amenity gaps in study area five. The physical infrastructure gaps, infrastructure deficiencies and pedestrian experience opportunities for improvement are noted in Table 6 below.

Table 6: Identified Gaps at Study Area Bus Stops

Gap	13716	13715	13713	13711	13708	13706
Existing Transit/Pedestrian Infrastructure Gaps:						
Incomplete sidewalks along the path to bus stop					x	
Distance of bus stop bench to street edge too short	x				x	x
Parking lot entrance from bus stop bench too close					x	
Bench and planters spaced too close together					x	
Inadequate seating for high volume of ridership		x		x		
Missing Transit/Pedestrian Infrastructure Gaps:						
Missing shelters	x		x		x	x
Missing trash can			x			
Long distance to cross walk				x		
Missing route information sign	x		x	x	x	x
Transit-Rider/Pedestrian Experience Gaps:						
Poor lighting	x	x	x			
Lack of shade					x	x
Heavy traffic close to the bus bench	x				x	x
Broken sidewalk concrete					x	
No barrier between bench and parking spaces					x	
Missed opportunity for youth engagement		x				

Existing Transit / Pedestrian Infrastructure Gaps

Existing gaps in infrastructure primarily relate to safety and accessibility concerns. Study area five gaps are mostly caused by dated bus stop infrastructure. Uneven sidewalks, broken and uneven concrete in the waiting area, and maintaining a safe distance for waiting between the stop bench and the busy street are gaps noted.

Federal Blvd is a heavily used street, with a high volume of vehicles traveling at relatively high speeds for a neighborhood area. Two bus stops in the study area have existing infrastructure gaps including uneven and broken concrete in the pedestrian path paving, creating a tripping hazard and concern for wheelchair accessibility. At three bus stops, the transit-riders infrastructure is placed uncomfortably close to Federal Blvd. See Photo 9 and Photo 10 below.

Photo 9: Uneven pavement surface (13708)

Photo 10: Close proximity to vehicles (13706)

Photo 11: Trash cans and planters too close to bus access (13708)

Photo 12: Not enough seating space (13716)

Accessibility to a bus stop boarding area is hindered at bus stop 13708 because the placement of the benches, planters, and trash cans create a barrier for riders waiting behind bus stop amenities. See Photo 11 above for photographic evidence.

A comparison of bus stop waiting amenities is relevant due to the diversity of count of riders boarding at each stop. Bus stops 113711 and 13715 both have over 50 average daily riders boarding which represents the highest volume of ridership for the study area bus stops. As a result, the study team notes that two bus stops should each have two benches for adequate seating at high volume times. See Photo 12 above. At minimum, bus stop 13715 needs one bench, which is not present.

Missing Transit / Pedestrian Infrastructure Gaps

Missing physical infrastructure elements in study area five are minimal when compared to Federal Blvd bus stops overall. Bus stops service one side of Federal Blvd (north-bound traffic), but transit-riders need access to both sides to safely board the bus. In the study area, all bus stops are approximately a quarter of a mile apart from one another. This spacing is noted to be idle by Jarrett Walker in the book *Human Transit*, except "when transit is running on busy streets," (63). Two of Federal Blvd bus stops in the study area are considered heavy use,

therefore fit under Walker's category of "busy streets", and one of the heavy use bus stops sits 250 feet from a crosswalk. This distance caused a great amount of observed jaywalking. See Photo 13 below.

Shelters, secured trash cans and missing signage are three noted missing amenities at various the study area's bus stops. All three of these missing physical elements provide a better experience for riders but are less likely to be connected to a feeling of safety.

Transit / Pedestrian Experience Gaps

Rider experience is important to provide a sense of desire for those who have the privilege of choice, as well as for those dependent on public transportation. Experiential gaps noted in study area five reflect study team member observations and transit rider perspectives.

Photo 13: The closest marked crosswalk is about 250 feet away (13711)

Photo 14: Not a street-lamp in sight (13715)

Adequate lighting for travelers commuting before and after the sun is up is necessary for safety as well as comfort. Three of the study are bus stops were deemed to have poor lighting. The 2017 Federal Boulevard Corridor Report noted that "…the installation of pedestrian lighting along Federal can go a long way to achieving the atmosphere of a safe Denver parkway along this segment of the corridor" (72). See Photo 14 above.

The context of a Denver bus stop is not typically taken into account in bus stop amenities and design. The Denver Moves: Transit Plan action and strategy number 2.2 included the improvement of 'public realm elements' for the purpose of "contribut[ing] to environmental, economic, and social benefits." (3-7). In the study area, one of the bus stops is near a large, public high school. This bus stop is not utilizing the great opportunity to increase community engagement and provide social benefits for students, staff and teachers.

Route and informational signs were noted deficiencies for the study area bus stops. This is a broader theme for Denver area bus stops. This is shown through 40% of residents who responded to the Build Your Own Transit System survey, which informed the Denver Moves: Transit Plan, noting the need for "improved transit legibility (e.g., better maps, wayfinding, and trip planners)" (2-10).

A visual summary of high level bus stop gaps is found on the following page, in Map 7.

Map 7: Gaps, Summary of Study Area Bus Stops
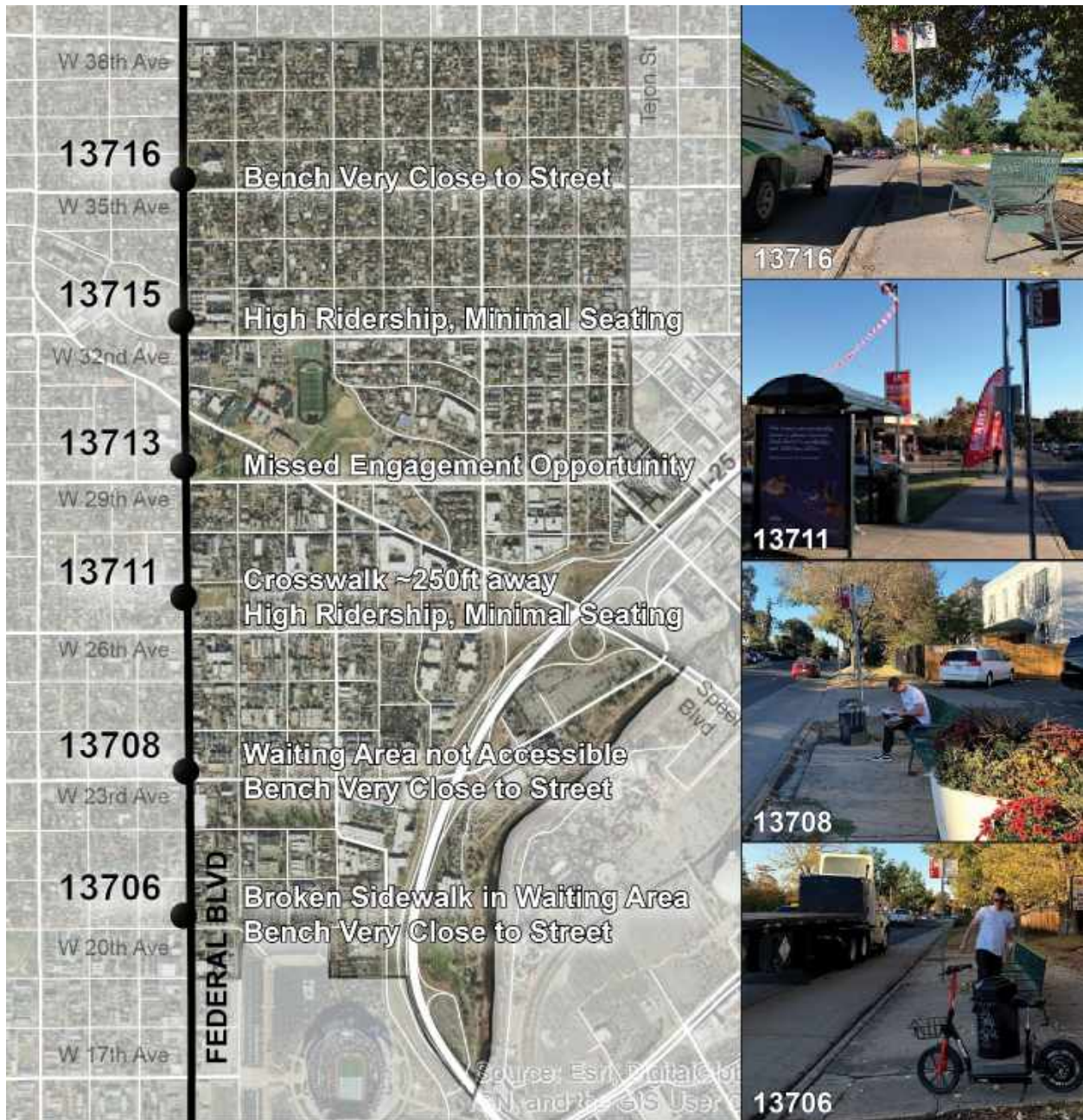
Recommendations

Gaps found in the study area highlight opportunities for bus stop improvements that range from the micro to macro scale of impact. Blueprint Denver provides recommendations across a broad view of the study area such as the importance of having quality, multimodal options to increase equity and access to opportunity. This includes the condition of pavement, ease of accessibility, amenities present, visibility and language inclusive signage and lighting. Equity goals described in Blueprint Denver include decreasing single-occupancy vehicle trips and increasing the number of trips through walking, biking and mass transit (68). A summary of bus stop improvements can be found in Map 8 on the following page.

Map 8: Recommendations, Summary of Study Area Bus Stops

Micro

Recommendations at the micro level begin with infrastructure improvements. Regulations around public transportation stops should support adequate spacing distances, safety measures and regular bus stop assessments by RTD staff. Many improvements for bus stop rider experience noted in the study team data collection were also noted as themes in the Denver Moves: Transit Plan. An example noted in the report is "real-time travel information,… lighting, safe crossings, and pedestrian connections [are] the five most desired improvements for transit stops and stations" for almost 500 people who responded to the Preliminary Recommendations survey (2-11).

The distance between a bus stop structural amenity (such as bench, shelter) and waiting space and other infrastructure for tire based usage (cars, bikes), including the driving street, a driveway or vehicle right of way and bike path should provide adequate spacing for safe seating on benches and/or walking around amenities.

In addition to improvements in distance of street to structure, all crosswalks should be within 90 feet of any bus stop for ease of access for pedestrians. In the study area, bus passengers were repeatedly crossing busy streets unsafely due to the lack of a close crosswalk. According to the APTA recommendations paper, "forcing pedestrians to detour to a major intersection to cross a street can greatly increase trip time and thus discourage pedestrian activity [and] encourage jaywalking" (13). Walker recommends to "adjust stop locations so that people can cross the street safely at every stop" (Walker, 63). The 2017 Federal Boulevard Corridor Report suggests that "midblock crossings allow for safe crossings along the Boulevard that connect important destinations but don't necessarily align with the street network" (Federal Boulevard Corridor Report, 31). As a result, safety at bus stops within the study area can be improved with relocations or placement of additional crosswalks on this busy transit corridor.

Better integration of landscaping materials would enhance a rider's experience. The ATPA states "street trees increase the desirability of pedestrian activity by providing shade" (17). In the interest of increasing rider's overall experience as well as promote multimodal transportation, as recommended by Blueprint Denver, more streets trees would be an important addition. Street trees also introduce visual friction and are a traffic calming method.

Denver Moves: Transit references the importance of shelters and amenities. "Transit stop and station amenities can enhance comfort and improve the overall rider experience…stops without shelters or other amenities can discourage people from using transit, especially during inclement weather (1-5). RTD considers bus stops with more than 50 average daily riders boarding to warrant a bench, with additional criteria such as adjacency of connecting routes, available space, and context in their evaluation (Smith, 19Nov19).

Broken concrete pads, unevenly settled or poured concrete pads, or incomplete sidewalks cause pedestrians to experience unnecessary safety concerns. Individuals who live with sight impairment, are bound by wheelchairs for mobility or have a smaller range of leg motion are more likely to experience trips, falls and accidents from uneven and broken concrete in walking or standing areas by bus stops. The study team recommends regular site assessments of all bus stops to determine any safety risks from concrete movement.

Macro

Improvements that relate to many of Denver bus stops are considered on the macro scale. These include lighting, signage, language inclusivity, and opportunities for local community engagement.

A high priority improvement item based on study team research is all bus stop need English and non-English language and impairment inclusive signage. Signage should include specific route information, contact information for route and destination navigation, contact information to report amenity and infrastructure repairs, and who to contact for safety concerns. See Photo 15 below for a TransLink bus stop sign in Vancouver, Canada that provides route information to riders. Brail and verbal messages are needed at all stops for hearing and/or sight impaired riders. Language inclusivity for specific neighborhood needs, such as Spanish in Highland & Jefferson Park stops, are recommended to be installed.

At minimum, all bus stops shall have appropriate lighting inside shelters, street lights above the loading pads, and two street light on either side of the bus stop waiting area for pedestrian walking safety. Should addition funds be available for safety lighting to be added, the APTA recommends "lighting no greater than 12 ft in height should be provided to distinguish the pedestrian network. Street lighting is not necessarily adequate for sidewalks, and off-street paths need their own lighting fixtures." (APTA, 13). See Photo 16 below for an example from Phoeniz, Arizona.

Photo 15: Informative Bus Stop Sign, Vancouver TransLink

Photo 16: Pedestrian-scale light along path in Phoenix, Arizona

Photo 17: Bus Stop Social Benefits, Library Integration

Photo 18: Bus Stop Social Benefits, Environmental Education

As stated under the Gaps section, Denver Moves: Transit highlighted the need for improvement of 'public realm elements' for the purpose of "…social benefits." (3-7). All neighborhoods in Denver should be evaluated for community engagement opportunities at the stop level, therefore this is considered a macro improvement opportunity.

Find ways to build awareness and educate riders and those who pass by with fun facts, thought provoking statements or problems to solve for all age categories. Examples include integrating sidewalk games including hopscotch, painted animal prints, or environmental public service messages. Photo 18 above is from an Auckland, New Zealand public awareness campaign about litter in the city. They used the side of the bus stop to encourage use of the trash bins inside the shelters and promote awareness of the environmental impact of littering.

In addition, consider a partnership with nearby schools or community centers. In the study area, bus stop 13713 is located adjacent to a large Denver high school. Engaging the staff, teachers and students is a great opportunity to increase social benefits of public transit. Consider providing "advertising" space inside shelters to display youth artwork. Consider a partnership with Denver Public Library to install a local library inside a shelter at this stop. See Photo 17 above is an Isreali bus stop with a bookshelf attached to bus shelter side wall, which supports literacy integration.

Conclusion

In Denver, "young adults are driving less and show a clear preference for options to bike, walk, and take transit… and the number of older adults is growing as baby boomers reach retirement and desire to age in place. The impacts from growth as well as the changes in travel behavior are two of the important reasons why providing frequent, reliable, and connected transit is important in Denver" (Denver Moves: Transit, 1-3). In an effort to meet the growing demand, the City and County of Denver plans to improve the rider experience, frequency and convenience of public transportation and strengthen coordination with RTD.

The Methods Class at the University of Colorado Denver partnered with WalkDenver to complete bus stop assessment for Denver's portion of Federal Blvd to enhance Denver transit improvement plans. Study area five, which represents the Highland and Jefferson Park neighborhoods of Denver, showed overall good bus stop conditions and rider experiences. Minimal adjustments need to be made to provide a safer, more supportive, and encourage a engaged, positive and memorable experience for transit riders in study area five.

WORKS CITED

Beyond DC. "Bus stop sign, Vancouver." Flickr, Flickr, 29 October 2011,
https://www.flickr.com/photos/beyonddc/6839812259. Accessed 26 November 2019.

"Bus Stop Books: Israel's Newest Public Library." Israeli Innovation and Beyond, 01 December
2011, https://jccotp4israel.wordpress.com/2011/12/01/bus-stop-books-israels-newest-public-
library/. Accessed 22 November 2019.

Community Planning and Development. Blueprint Denver: A blueprint for an inclusive city
(2019). City and County of Denver, April 2019, https://www.denvergov.org/media/denvergov
/cpd/blueprintdenver/Blueprint_Denver.pdf, Accessed 25 September 2019.

Community Planning and Development. Denver Moves: Transit Plan (2019). City and County of
Denver, January 2019, https://www.denvergov.org/content/dam/denvergov/Portals
/Denveright/documents/transit/Denver-Moves-Transit-Plan-2019.pdf, Accessed 25
September 2019.

Community Planning and Development. Statistical Neighborhoods [Shapefile]. City and County
of Denver, 09 December 2018, https://www.denvergov.org/opendata/dataset/city-and-
county-of-denver-statistical-neighborhoods, Accessed 15 September 2019.

Data Access and Dissemination Systems (DADS). "HOUSEHOLD INCOME IN THE PAST 12
MONTHS" American FactFinder - Results, United States Bureau, 5 Oct. 2018,
https://factfinder.census.gov/bkmk/table/1.0/en/ACS/17_5YR/B19001/1400000US08031000
402|1400000US08031000600, Accessed 25 September 2019.

Data Access and Dissemination Systems (DADS). "MEANS OF TRANSPORTATION TO
WORK." American FactFinder - Results, United States Bureau, 5 Oct. 2018,
https://factfinder.census.gov/bkmk/table/1.0/en/ACS/17_5YR/B08301/1400000US08031000
402|1400000US08031000600, Accessed 25 September 2019.

Data Access and Dissemination Systems (DADS). "SEX BY AGE." American FactFinder -
Results, United States Bureau, 5 Oct. 2018, https://factfinder.census.gov/bkmk/table/1.0/en
/ACS/17_5YR/B01001/1400000US08031000402|1400000US08031000600, Accessed 25
September 2019.

Data Access and Dissemination Systems (DADS). "TOTAL POPULATION IN OCCUPIED
HOUSING UNITS BY TENURE" American FactFinder - Results, United States Bureau, 5
Oct. 2018, https://factfinder.census.gov/bkmk/table/1.0/en/ACS/17_5YR/B25008
/1400000US08031000402|1400000US08031000600, Accessed 25 September 2019.

Department of Finance / Assessment Division / GIS Section. Parcels [Shapefile]. City and
County of Denver, 14 September 2019, https://www.denvergov.org/opendata/dataset/city-
and-county-of-denver-parcels, Accessed 15 September 2019.

McLeod, Duncan. "Heart of the City Litter in Auckland." Inspiration Room, 20 September 2008,
http://theinspirationroom.com/daily/2008/heart-of-the-city-litter-in-auckland/. Accessed 22
November 2019.

Online Transportation Information System. Highways [Shapefile]. Colorado Department of
Transportation, http://dtdapps.coloradodot.info/staticdata/Downloads/StateGeoData
/highways.zip, Accessed 15 September 2019.

Public Works. Federal Boulevard Corridor Plan: Opportunities and implementation report. City
and County of Denver, 03 March 2017, https://www.denvergov.org/content/dam
/denvergov/Portals/705/documents/projects/federal-corridor/federal-corridor-report-
march2017.pdf, Accessed 22 November 2019.

Public Works – Traffic Engineering Services (PWTES). Denver Bicycle Facilities [Shapefile].
City and County of Denver, 16 December 2018, https://www.denvergov.org/opendata
/dataset/city-and-county-of-denver-denver-bicycle-facilities, Accessed 15 September 2019.

Regional Transportation District. "Facilities Map." Home, Regional Transportation District,
https://www.rtd-denver.com/app/facilities?view=map, Accessed 25 September 2019.

RTDGIS. Active Bus Stops [Shapefile]. Regional Transportation District, 11 September 2019,
gis-rtd-denver.opendata.arcgis.com/datasets/e0d10c153c1f40f4af45fb81c9a5b905,
Accessed 15 September 2019.

RTDGIS. Bus Routes [Shapefile]. Regional Transportation District, 24 September 2019,
http://gis- rtd- denver.opendata.arcgis.com/datasets/e0d10c153c1f40f4af45fb81c9a5b905,
Accessed 25 September 2019.

Schroeppel, Ken. "BusStops_Federal_Base_Data." URPL 5010 Planning Methods, Planning
Department, College of Architecture and Planning, University of Colorado, Denver. 19
August 2019. Spreadsheet.

Smith, Steven. Personal interview, 19 November 2019.

Sustainability and Urban Design Program. "Design of On-street Transit Stops and Access from
Surrounding Areas." American Public Transportation Association, March 2012,
https://www.apta.com/wp-content/uploads/Standards_Documents/APTA-SUDS-UD-RP-005-
12.pdf, Accessed 22 November 2019.

Technology Services / Enterprise Data Management. Street Routes [Shapefile]. City and County
of Denver, 01 November 2018, https://www.denvergov.org/opendata/dataset/city-and-
county-of-denver-street-routes, Accessed 15 September 2019.

Technology Services / GIS Data. Census Block Groups (2010) [Shapefile]. City and County of
Denver, 01 November 2018, https://www.denvergov.org/opendata/dataset/city-and-county-
of-denver-census-block-groups-2010, Accessed 15 September 2019.

Walker, Jarrett. *Human Transit: How clearer thinking about public transit can enrich our
communities and our lives*. Washington D.C., Island Press, 2012.

APPENDIX

Bus Stop Assessment

Interview Questions

Interview Responses

Bus Stop Assessment

Bus Stop ID	How would you rate the bus stop overall?	How would you rate the safety of the bus stop?	What, if anything, makes the bus stop feel unsafe?	How would you rate the physical condition of the bus stop (state of good repair)?	How would you rate the cleanliness of the bus stop?	How would you rate the accessibility of the bus stop to people with disabilities?
13716	4	4	Lighting/visibility	4	4	3
13715	4	4	Lighting/visibility	4	4	3
13713	3	5	Lighting/visibility	4	4	4
13711	5	5	Traffic, Poor access to/from the stop (e.g., no sidewalks)	3	4	3
13708	4	4	Traffic	4	4	5
13706	4	5	Traffic	4	4	4

Bus Stop Assessment

Bus Stop ID	How would you rate pedestrian connectivity to the bus stop (e.g., sidewalks)?	What amenities are present at the bus stop?	If public art is present at the bus stop, please describe it	How close is the nearest marked crosswalk to the bus stop?	Any other observations?	What amenities are present at the bus stop?2
13716	3	Concrete pad	NA	Close enough that some people will use it, but other people may not go that far	NA	Bench, Trash can, Shade trees
13715	4	Concrete pad	NA	Very close, most people will use it	NA	Trash can, Standard shelter, Shade trees, Route information/schedule
13713	5	Concrete pad	NA	Very close, most people will use it	NA	Bench, Shade trees
13711	3	Concrete pad	NA	So far away, most people won't go that far to use it	NA	Bench, Trash can, Standard shelter, Lighting
13708	5	Concrete pad	NA	Very close, most people will use it	NA	Bench, Trash can
13706	5	Concrete pad	NA	Very close, most people will use it		Bench, Trash can

Interview Questions

Opening (icebreaker):

Why are you taking transit today?

Current Transit Habits:

How often do you take transit to get somewhere in a typical week?: At least once per day 2 - 5 times per week? Once per week? Less than once per week?

Why did you choose transit today versus another mode of transportation?

How did you get to this bus stop today?: Walk? Mobility Device? Bike? Bus transfer? Scooter? Car (including Lyft/Uber)?

Where are you going today? (destination/location)

How far are you going today on transit? (distance)

Transit/Bus Stop Issues:

How would you rate this bus stop on a scale from 1- 5? (1 = terrible, 5 = great)

What would make this bus stop better?: Shelter? Route maps and Schedules? Public art? Heating? Security cameras? Real time arrival Information? Bike racks? Wifi? Better lighting? Benches/seating? Trash cans? More space to wait? Other?

Would you rather have: 1. A longer walk to a nicer stop and less time riding? 2. A shorter walk to a stop with less amenities and more time riding?

Do you feel safe at this bus stop? Why or why not?

Demographics:

What is your age?

What is your race or ethnicity?

What gender do you most identify with?

Do you live in the neighborhood? (Y / N)

Do you work in the neighborhood? (Y / N)

What is the nearest intersection to where you live?

Do you own a car? (Y / N)

Interview Responses

ID #	Bus ID	Interview language	1) Why are you taking transit today?	2) How often do you take transit to get somewhere in a typical week?	3) Why did you choose transit today versus another mode of transportation?	4) How did you get to this bus stop today?	5) Where are you going today? (destination/	6) How far are you going today on transit? (distance)	7) How would you rate this bus stop on a scale from 1-5?	8) What would make this bus stop better?
1	13713 - Federal & 29th	English	Only Way	At least once per day	Only way	Bus transfer	Friends house	3-5 Miles	4	Shelter, Route maps/schedules, Heating, Better lighting
2	13713 - Federal & 29th	English	Only Way	At least once per day	Only way	Bus transfer	Friends house	3-5 Miles	4	Shelter, Route maps/schedules, Heating, Better lighting
3	13711 - Federal & 27th	English	Only Way	At least once per day	Only way	Walk	Federal & 44th	Less than 1 Miles	1 (Terrible)	Route maps/schedules, Heating, Real time arrival information, Wifi
4	13715 - Federal & 32th	English	Only Way	2-5 times per week	Only way	Not Applicable	Not Applicable	5- 10 Miles	5 (Great)	Route maps/schedules
5	13711 - Federal & 27th	English	Only Way	2-5 times per week	Only way	Walk	Federal & 80th	5- 10 Miles	5 (Great)	Heating, Real time arrival information, Wifi, Benches/seating
6	13715 - Federal & 32th	English	Car brokedown	2-5 times per week	Car brokedown	Walk	Home	More than 20 Miles	3	Route maps/schedules, Benches/seating, Trash cans
7	13711 - Federal & 27th	English	Only Way	At least once per day	Only way	Bus transfer	King Soopers	Less than 1 Miles	4	Public art, Security cameras, Real time arrival information, Better lighting, More space to wait
8	13711 - Federal & 27th	English	Only way	At least once per day	Only way	Not Applicable	See friends	5- 10 Miles	2	Shelter, Route maps/schedules, Heating, Benches/seating
9	13711 - Federal & 27th	English	Only Way	At least once per day	Only way	Bus transfer	King Soopers	Less than 1 Miles	3	Public art, Better lighting, More space to wait
10	13711 - Federal & 27th	English	Only Way	At least once per day	Only way	Bus transfer	Visit someone	10-12 Miles	3	Cleaner
11	13711 - Federal & 27th	English	Only Way	At least once per day	Only way	Walk	Downtown	1-3 Miles	5 (Great)	Heating, Smoke only area
12	13711 - Federal & 27th	English	Only way	At least once per day	Only way	Walk	See friends	10-12 Miles	1 (Terrible)	Shelter, Route maps/schedules, Heating, Benches/seating
13	13711 - Federal & 27th	Spanish	Avoid traffic	2-5 times per week	Traffic	Car (including Lyft/Uber)	Home	3-5 miles	5 (Great)	Route maps/schedules, Public art, Heating, Real time arrival information, Bike racks, Wifi, More space to wait, More seating spaces
14	13711 - Federal & 27th	English	License	At least once per day	Reliable	Bus transfer	King Soopers	Less than 1 Miles	2	Route maps/schedules, Heating, No loitering
15	13711 - Federal & 27th	Spanish	Only way	At least once per day	Only way	Walk	Home	3-5 Miles	5 (Great)	Security cameras, Better lighting
16	13711 - Federal & 27th	English	Only Way	2-5 times per week	Only way	Mobility Device	Autozone	3-5 Miles	5 (Great)	Shelter, Route map/schedules
17	13711 - Federal & 27th	English	Get to work	At least once per day	Not Applicable	Car (including Lyft/Uber)	Home	5- 10 Miles	3	Shelter, Route maps/schedules, Display arrival time
18	13715 - Federal & 32th	English	Only Way	At least once per day	Only way	Bus transfer	Store	Less than 1 Miles	5 (Great)	More space to wait
19	13711 - Federal & 27th	Spanish	Only way	At least once per day	Only way	Bus transfer	Home	Less than 1 Miles	5 (Great)	Not Applicable
20	13711 - Federal & 27th	English	Only way	At least once per day	Only way	Walk	Home	3-5 Miles	3	Heating, Better lighting

Interview Responses

ID #	9) Would you rather have:	10 A) Do you feel safe at this bus stop?	10 B) Why?	11) What is your age?	12) What is your race or ethnicity?	13) What gender do you most identify with?	14) Do you live in the neighborhood?	15) Do you work in the neighborhood?	16) What is the nearest intersection to where you live?	17) Do you own a car?	Notes / comments
1	Longer walk, nicer stop, shorter riding	Yes	People around	0-19	Caucasian	Male	Yes	No	Federal & 44th	No	Was with #12
2	Longer walk, nicer stop, shorter riding	Yes	People around	0-19	Hispanic / Latino & Caucasian	Male	Yes	Yes	Federal & 44th	Yes	Getting off bus
3	Shorter walk, less amenities at stop, longer ride	Yes	People around	0-19	Black / African	Male	Yes	No	Federal & 26th	No	
4	Longer walk, nicer stop, shorter riding	No	Never too sure	20-29	Prefer not to answer	Male	Yes	No	Federal & 32th	No	Like orange bus stops (downtown)
5	Shorter walk, less amenities at stop, longer ride	Yes	People around	30-39	Hispanic / Latino	Both	Yes	Yes	Federal & 26th	No	
6	Shorter walk, less amenities at stop, longer ride	Yes	Shelter	30-39	Prefer not to answer	Female	Yes	No	Not Applicable	No	Hesitant
7	Shorter walk, less amenities at stop, longer ride	Yes	Nice neighborhood	30-39	Black / African	Male	Yes	Yes	Federal & 17th	No	
8	Shorter walk, less amenities at stop, longer ride	Yes	People around	30-39	Hispanic / Latino	Male	Yes	No	Not Applicable	No	
9	Shorter walk, less amenities at stop, longer ride	Yes	Not Applicable	30-39	Hispanic / Latino	Female	Yes	No	Federal & 17th	No	Was with #15
10	Shorter walk, less amenities at stop, longer ride	Yes	People around	30-39	Hispanic / Latino	Male	No	No	Federal & Yale	No	
11	Shorter walk, less amenities at stop, longer ride	Yes	People around	40-49	Hispanic / Latino	Male	Yes	No	Lakewood	No	Have someone when there is bad weather (in case of emergencies)
12	Shorter walk, less amenities at stop, longer ride	Yes	People around	40-49	Hispanic / Latino	Male	Yes	Yes	Not Applicable	No	
13	Shorter walk, less amenities at stop, longer ride	Yes	People around	50-59	Hispanic / Latino	Male	No	Yes	Federal & 55	Yes	Spanish interview
14	Shorter walk, less amenities at stop, longer ride	Yes	Far off st	50-59	Black / African	Male	Yes	No	Federal & 26th	Yes	
15	Not relevant	Yes	People around	50-59	Hispanic / Latino	Male	No	Yes	Colfax & Kendall	No	Spanish interview
16	Shorter walk, less amenities at stop, longer ride	Just normal	Average	50-59	Hispanic / Latino	Male	No	No	Sheridan & 28th	No	Deaf
17	Shorter walk, less amenities at stop, longer ride	Yes	Not Applicable	60-69	Black / African	Male	Yes	Yes	Federal & 26th	No	CU Jacket
18	Shorter walk, less amenities at stop, longer ride	Sometimes	People noisy loud	60-69	Hispanic / Latino	Male	No	No	Federal & Colorado	No	Blind
19	Not Applicable	Not Applicable	Not Applicable	None Givern	Hispanic / Latino	Female	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Bus arrived after Q7). Spanish interview
20	Shorter walk, less amenities at stop, longer ride	Yes	People around	None Given	Not Applicable	Female	No	Yes	Lipan & 35th	No	