

To: Maggie Derk and Laurel Priest, City of Vancouver

From: Derek Abe and Amelia Adams, Alta Planning + Design

Date: February 16, 2024

Re: Vancouver Upper Main Street Safety & Mobility Project: Existing Conditions Memorandum

Introduction

This Existing Conditions Memorandum assembles available data necessary to understand the current operations and conditions of Upper Main Street (from Fourth Plain Boulevard to just south of NE 63rd Street / Minnehaha Street) for all transportation user groups. This information provides a basis for determining potential treatments for the corridor that can be made in conjunction with planned 2025 paving work and in coordination with the upcoming Hwy 99 Bus Rapid Transit (BRT) project. This memo also provides a pre-project baseline for comparison and evaluation of the safety and mobility project impacts. The data examined includes:

- Pedestrian Level of Traffic Stress (P-LTS)
- Bicycle Level of Traffic Stress (B-LTS)
- Transit ridership data
- Roadway conditions, vehicle volumes and speeds
- History of collisions
- Demographics
- Improvement opportunities and constraints

Existing Conditions

Overview

The Vancouver Upper Main Street Safety and Mobility Project corridor is a 1.7-mile-long segment of the north-south Main Street corridor stretching from Fourth Plain Boulevard to the Vancouver city limits (just south of NE 61st Street). This corridor serves as a critical connection for people traveling north-south between the Minnehaha neighborhood and Downtown Vancouver. Main Street serves automobile, freight, transit, and pedestrian trips, and some segments also feature bicycle facilities.

The corridor connects the neighborhoods of Hough, Arnada, Carter Park, Shumway, Lincoln, Northwest and West Minnehaha. The parcels located directly along the corridor are a mixture of commercial and residential land uses, while the neighborhoods adjacent to the corridor are majority single family detached residential. Main Street has been identified as an urban corridor in the 2011- 2030 Comprehensive Plan, and as a commercial spine in The Westside Mobility Strategy. The City has outlined the following designations for Upper Main Street:

- **Primary Pedestrian Corridor:** High levels of walking or rolling are expected ([2024 Vancouver Transportation System Plan](#)).
- **Enhanced Transit Corridor:** The City will focus on supporting access to transit and transit priority ([2024 Vancouver Transportation System Plan](#)).

- **Protected Mobility Lane:** Mobility lanes with physical protection is recommended for Main Street from 39th Street to the northern city limits ([2024 Vancouver Transportation System Plan](#)).
- **Urban Corridor:** These areas are community focal points and contain a mixture of employment, housing, and cultural opportunities (Vancouver Comprehensive Plan 2011-2023).
- Recommendation to implement a road diet to manage diversion traffic, operational and safety issues on Upper Main Street (Westside Mobility Strategy 2016)

Two upcoming projects are scheduled to impact Upper Main Street in the coming years (see Figure 1), including:

- **Paving Project:** In 2025, The City plans to repave Upper Main Street from 39th Street to Hazel Dell Avenue and between the northbound I-5 off ramp to the northern city limits.
- **Bus Rapid Transit (BRT):** C-TRAN is planning to open a BRT line along this stretch of Main Street in 2027, which will include four proposed stops within the project area.

Figure 1: Upper Main Street Project Area



Corridor Segmentation

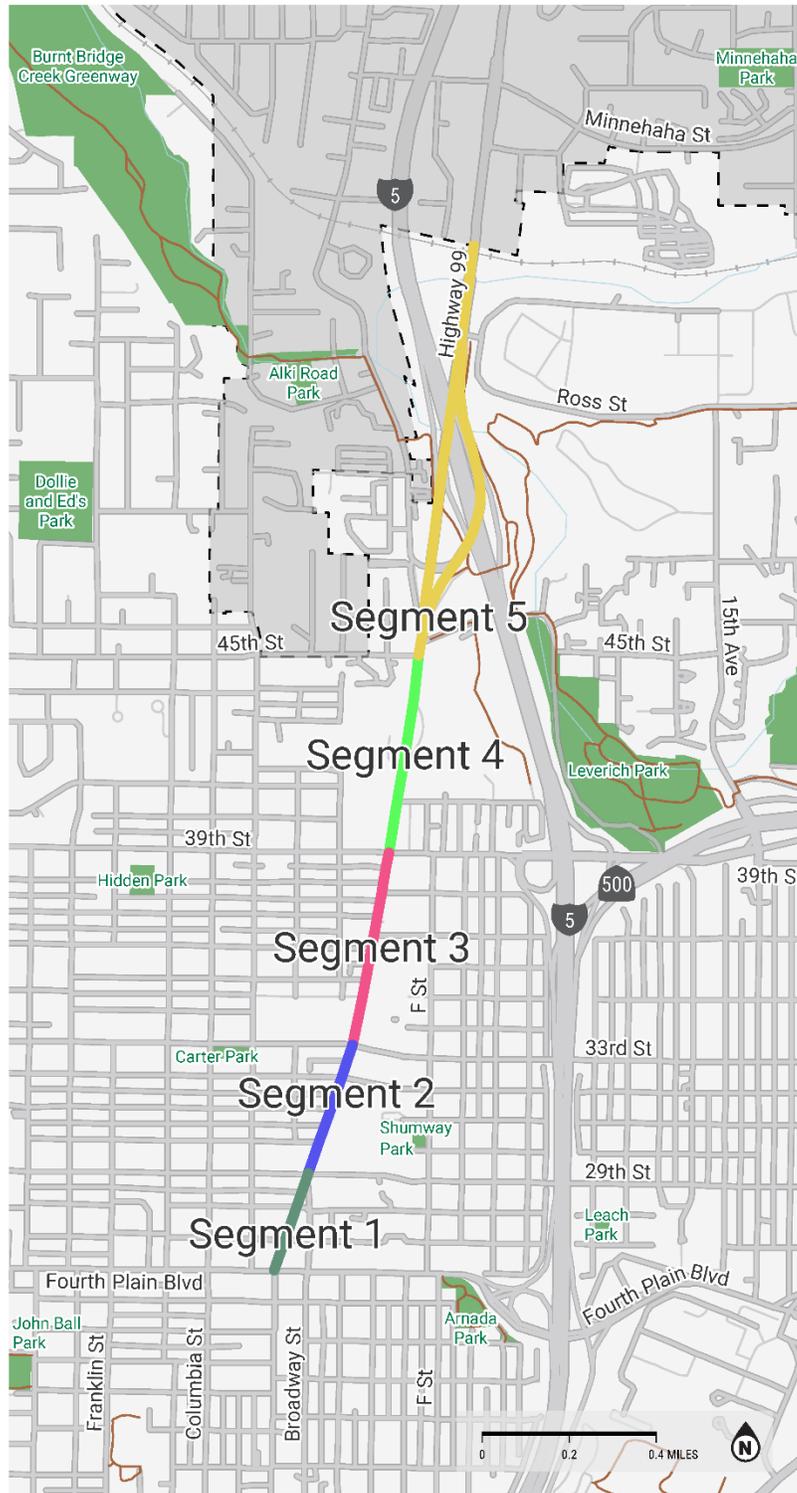
To better understand varying conditions along the Upper Main Street corridor, the project team divided the corridor into five segments, shown in Figure 2. These segments were proposed based on several factors, including roadway width and composition, vehicle speeds, and adjacent land use and character. As the project advances to the recommendations stage, these segments will likely receive different recommendations according to their contexts. The segments are as follows, from south to north:

- **Segment 1: Fourth Plain Boulevard to 29th Street**
 - This portion of Upper Main Street connects to Downtown Vancouver across Fourth Plain Boulevard. This segment also features a traffic pattern where Main Street breaks the grid pattern of Downtown Vancouver and goes diagonal from southwest to northeast. At the northern end of this segment, the intersection of Broadway Street with Main Street features a unique geometry with a traffic island at the center of the intersection. The census tracts immediately adjacent to Main Street feature low-density commercial land uses, while the areas in the surrounding neighborhood generally feature low-density residential. This area feels like a continuation of the character and feel of Downtown Vancouver.
- **Segment 2: 29th Street to 33rd Street**
 - This portion of Upper Main Street is characterized by residential neighborhoods to the west and the Vancouver School of Arts and Academics to the east. This area feels like a transition between higher-density Downtown Vancouver and the less dense neighborhoods, such as Shumway.
- **Segment 3: 33rd Street to 39th Street**
 - This portion of Upper Main Street features low density commercial on both sides of the roadway. In general, these businesses have large parking lots with multiple driveways onto Main Street. The side streets perpendicular to Main Street in this area are often offset, creating irregular, three-way intersections.
- **Segment 4: 39th Street to 45th Street**
 - This portion of Upper Main Street features a considerable slope between 40th Street to 45th Street, where the intersection of Main Street and 45th Street is at a much lower elevation than the southern end of this segment near the intersection of Main Street and 39th Street. This area features larger land parcels than areas to the south with community and public uses such as the First Presbyterian Church and the Washington State Department of Transportation office. This area also features a natural area and park at Kiggins Bowl, which provides a transition between this area and I-5 to the north.
- **Segment 5: 45th Street to City Limits (just south of NE 63rd Street / Minnehaha Street)**
 - This portion of Upper Main Street is characterized by the interchange of Main Street with I-5. North of the interchange, Main Street passes under a railroad and continues to the Vancouver city limits where the roadway becomes NE Highway 99. Beyond the city limits, Highway 99 passes through commercial and residential areas of unincorporated Clark County. This segment serves as transition between the City of Vancouver and those communities.

Figure 2: Project segments

PROJECT SEGMENTS

CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND
MOBILITY PROJECT



BACKGROUND
 — Trail
 — Railroad
 ■ Park
 - - - Vancouver City Limits



Pedestrian Network

People walking in Vancouver use Upper Main Street to travel throughout the adjacent neighborhoods, to recreate, to access bus stops along Main Street, among other reasons. The City's TSP has designated Main Street as a Primary Pedestrian Corridor. This designation means the corridor serves as a significant north-south thoroughfare for people walking and rolling in North Vancouver. Other nearby roadways that intersect with Upper Main Street have been designated as Pedestrian Corridors including Fourth Plain Boulevard, 33rd Street, and 39th Street. In addition, Columbia Street serves as a Tier 2 pedestrian corridor, meaning that it serves pedestrian travel needs to a lesser extent. To cross Main Street, there are numerous marked crossings, some of which are signalized. Existing crossing locations along Upper Main Street are at the intersections of Fourth Plain Boulevard, 29th Street, 33rd Street, 37th Street, 39th Street, 40th Street, the entrance of First Presbyterian Church, 45th Street, the Discovery Trail, and NE Ross Street. According to the [Pedestrian Crossing Policy](#), desired spacing of marked and enhanced crosswalks along Upper Main Street should be approximately every three blocks or 800 feet. Locations that exceed this crosswalk spacing standard include Main Street between: 29th and 33rd, 33rd and 37th, 45th to Discovery Trail, and Discovery Trail to NE Ross Street. See Figure 3 for a map of the pedestrian network.

Figure 3: Pedestrian Network

PEDESTRIAN NETWORK

CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND
MOBILITY PROJECT

PEDESTRIAN NETWORK

Existing Facilities

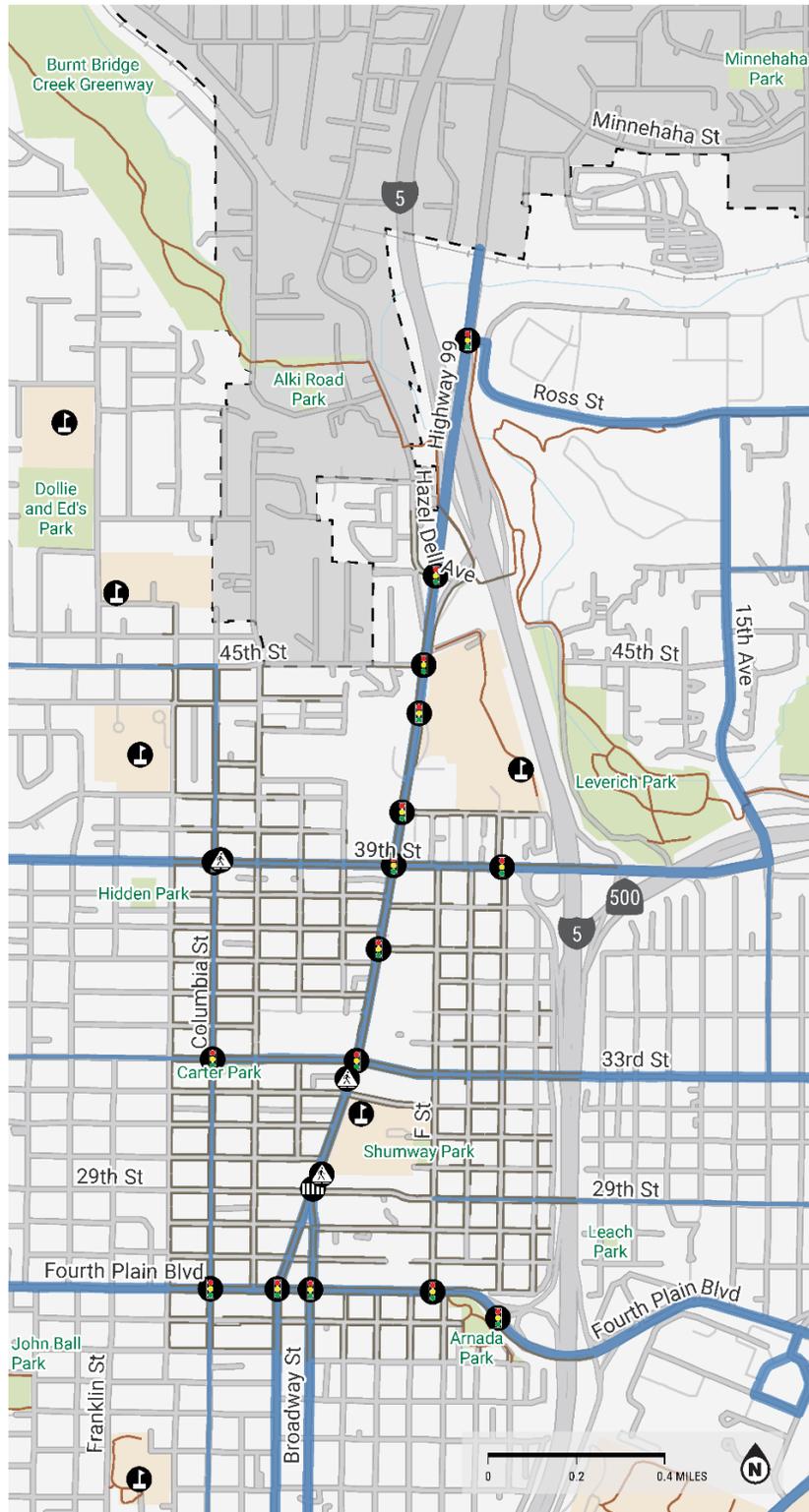
- School Crossing
- Traffic Signal
- Crosswalk
- Sidewalk

Planning and Projects

- Pedestrian Corridor
- Pedestrian Corridor (Tier 2)

BACKGROUND

- School
- Trail
- Railroad
- Park
- Vancouver City Limits



Pedestrian Level of Traffic Stress (P-LTS)

Pedestrian level of traffic stress (P-LTS) is an analysis performed to demonstrate how a person who is traveling on foot or using an assistive device along a roadway segment may perceive the experience. P-LTS can be used to determine the comfort and safety of pedestrian facilities that are adjacent to vehicle traffic. The Washington State Department of Transportation (WSDOT) offered guidance¹ used to assess the P-LTS of the corridor, which assessed the:

- Posted speed limit of the roadway
- Annual Average Daily Traffic (AADT)
- Number of vehicle travel lanes
- Sidewalk width

Methodology

Figure 4 Figure 4. Key findings from the analysis include the following:

- The majority of sidewalks along Main Street were found to be less than 6 feet (72 inches) wide.
- The P-LTS score along the project area generally improves as one travels south because the number of vehicle travel lanes reduce from four to two in the southern portion of the corridor.
- Main Street between 29th Street and the driveway exit of Historic Covington House has P-LTS score of three due to a four-lane roadway cross section with traffic volumes over 10,000 and sidewalks averaging under six feet wide.
- Main Street between 31st Street and 29th Street has an adjusted P-LTS score of three rather than two to reflect the width of the southbound through lane as being nearly equal to two travel lanes.
- While Upper Main Street is listed by the City as a pedestrian corridor, the majority of the corridor is rated with a P-LTS score higher than two, except for the section south of 29th Street, and the section between 45th Street and Hazel Dell Ave, which scored lower (better) due to less vehicle travel lanes and wider sidewalks respectively.

¹ Washington State Department of Transportation, "Designing for Level of Traffic Stress, Bulletin #2022-01." November 1, 2022, <https://wsdot.wa.gov/sites/default/files/2022-06/DesignBulletin2022-01.pdf>

Figure 4: Pedestrian Level of Traffic Stress (P-LTS)

PEDESTRIAN LEVEL OF TRAFFIC STRESS

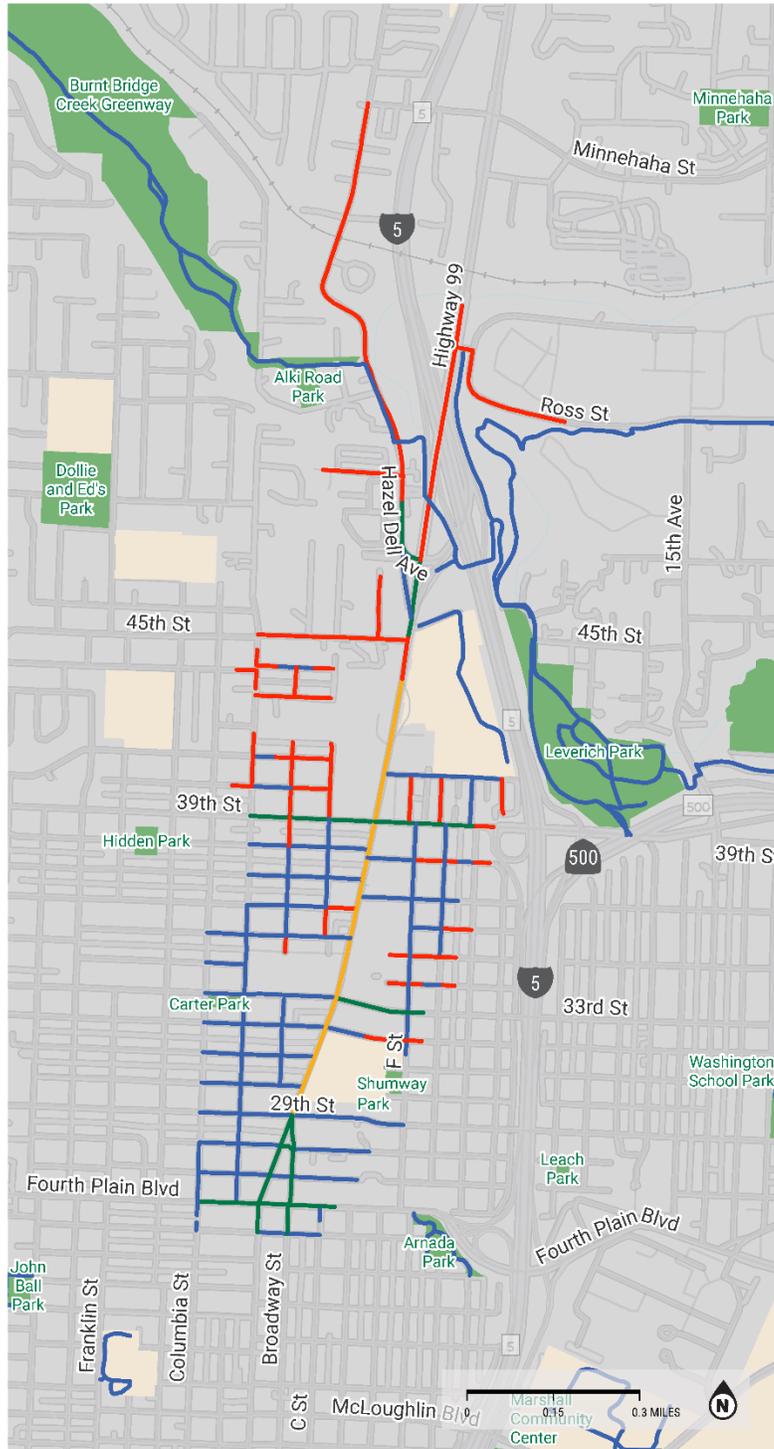
CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND
MOBILITY PROJECT

LEVEL OF TRAFFIC STRESS

- 1 (Blue line)
- 2 (Green line)
- 3 (Yellow line)
- 4 (Red line)

BACKGROUND

- Railroad
- Park



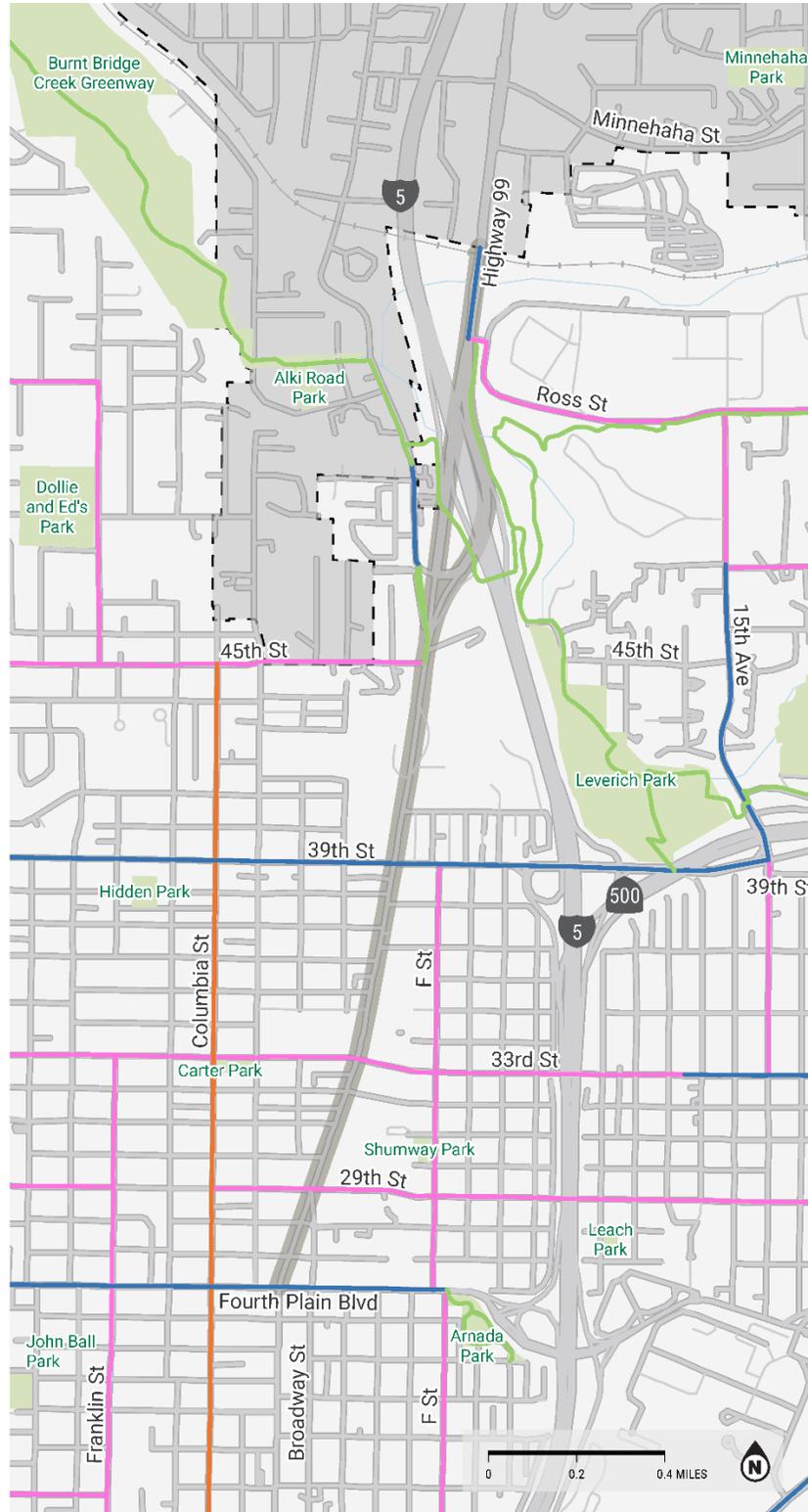
Bicycle and Small Mobility Network

Most of the Upper Main corridor lacks bicycle and small mobility facilities, except for a mobility lane along the most northern section between Ross Street and the city limits (see Figure 5Figure 5). The Vancouver TSP recommends protected mobility facilities on Main Street between 39th Street and the discovery trail (see Figure 6). This future facility would connect Upper Main Street to existing and recommended facilities on 39th Street and help provide access to other bike and small mobility connections.

Figure 5: Existing bicycle and small mobility network

EXISTING BICYCLE AND SMALL MOBILITY NETWORK

CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND
MOBILITY PROJECT



- EXISTING FACILITIES**
- Multi-Use Path
 - Unpaved
 - Paved
 - Mobility Lanes
 - Mobility Lane
 - Protected
 - Buffered
 - Other Facility
 - Shared Roadway
- BACKGROUND**
- Upper Main St Study Corridor
 - Railroad
 - Park
 - Vancouver City Limits



Figure 6: Planned bicycle and small mobility network (Vancouver TSP)

PLANNED BICYCLE AND SMALL MOBILITY NETWORK

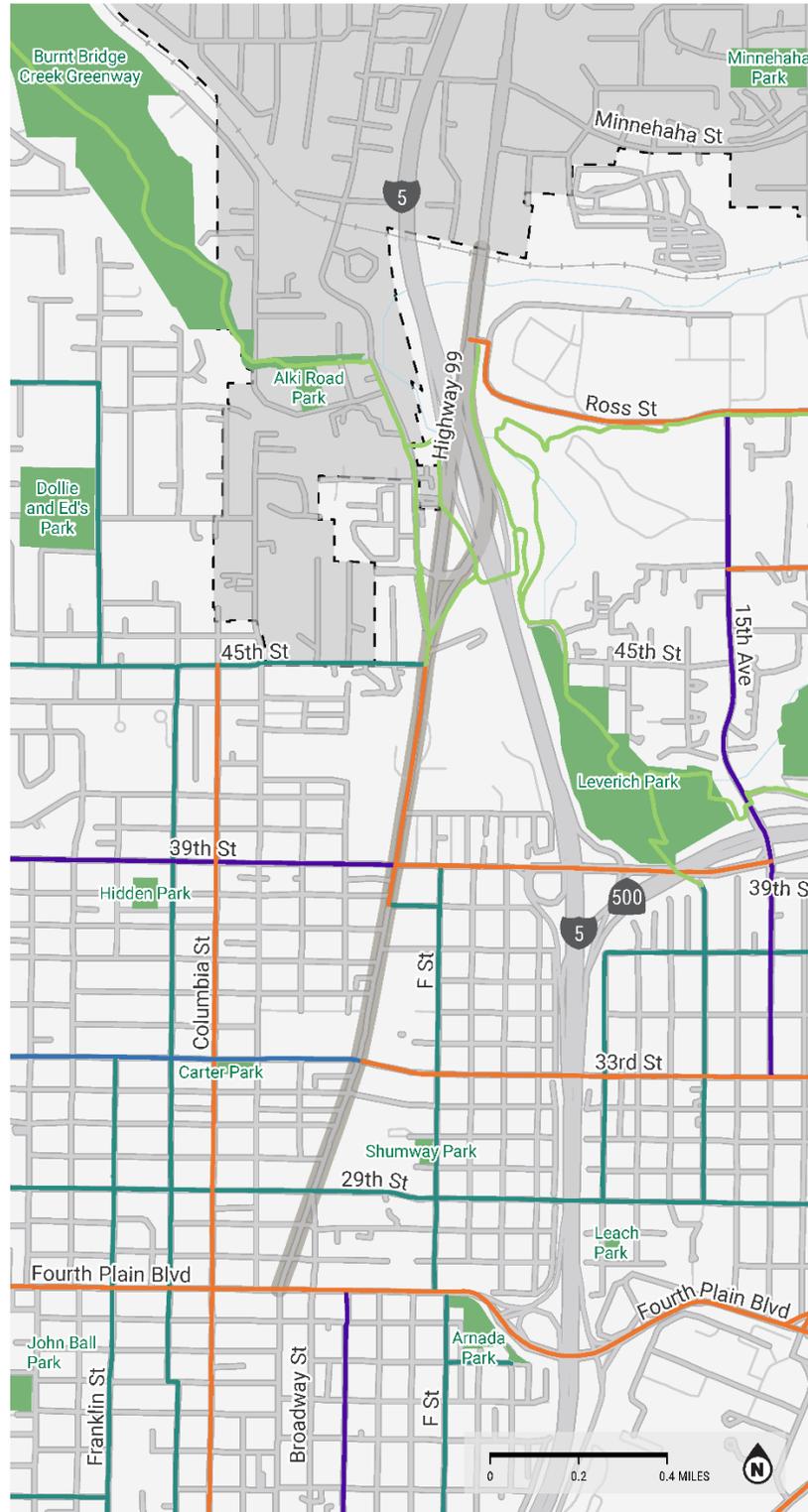
CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND
MOBILITY PROJECT

PLANNED FACILITY

- Multi-Use Path
- Unpaved
- Paved
- Mobility Lane
- Mobility Lane
- Protected
- Buffered
- Other Facility
- Neighborhood Greenway

BACKGROUND

- Upper Main Street Study Corridor
- Railroad
- Park
- Vancouver City Limits



Bicycle Level of Traffic Stress (B-LTS)

Like the Pedestrian Level of Traffic Stress analysis, the Bicycle Level of Traffic Stress (B-LTS) is performed to approximate how a person traveling by bike or small mobility device (such as an e-scooter or skateboard) along a roadway segment may perceive the experience. This provides a useful starting point for understanding how roadway conditions contribute to a person’s likelihood to ride. In Vancouver, traditional bike lanes are called ‘mobility lanes’ in recognition of the range of small mobility types and users, but B-LTS is still the nomenclature for assessing the safety and comfort of these facilities.

Methodology

WSDOT² methods specify the following inputs for B-LTS:

- Posted speed limit of the roadway
- Annual Average Daily Traffic (AADT)
- Number of vehicle travel lanes
- Cross section characteristics such as presence and/or quality of bicycle facility

The three B-LTS cross section categories used to score facilities are:

- Mixed traffic (no marked mobility lane, with or without shoulder)
- Mobility lane without separation from traffic (paint stripe or buffer less than two feet wide)
- Mobility lane with separation from traffic (buffer two feet wide or greater)

WSDOT B-LTS scores are measured on a scale of one to four. A higher (3 or 4) B-LTS score suggests a less comfortable experience for a person traveling by bicycle or small mobility device on the roadway segment.

Findings

Results of the B-LTS analysis are shown in Figure 7. Key findings from the analysis include:

- As illustrated in Figure 7, All segments of Upper Main Street are either B-LTS three or B-LTS four, meaning that most people will likely not feel comfortable riding along it.
- Key cross streets and segment extents have that LTS scores of two, include Fourth Plain Boulevard, 29th Street, 33rd Street (west of Main Street), 39th Street, and 45th Street. The only major route across Upper Main with an LTS score of one is the Burnt Bridge Creek Trail undercrossing north of 45th Street.
- F Street, a parallel bike route described as a “shared roadway” in the Transportation System Plan (TSP), has a B-LTS of one, and Columbia Street, which has protected bike and small mobility lanes along most of its length, has a B-LTS of two. Given their lower B-LTS scores, Columbia Street and F Street serve as more comfortable bike and small mobility routes to Main Street.

² Washington State Department of Transportation, "Designing for Level of Traffic Stress, Bulletin #2022-01." November 1, 2022, <https://wsdot.wa.gov/sites/default/files/2022-06/DesignBulletin2022-01.pdf>

Figure 7: Bicycle and small mobility Level of Traffic Stress (LTS)

BICYCLE AND SMALL MOBILITY LEVEL OF TRAFFIC STRESS

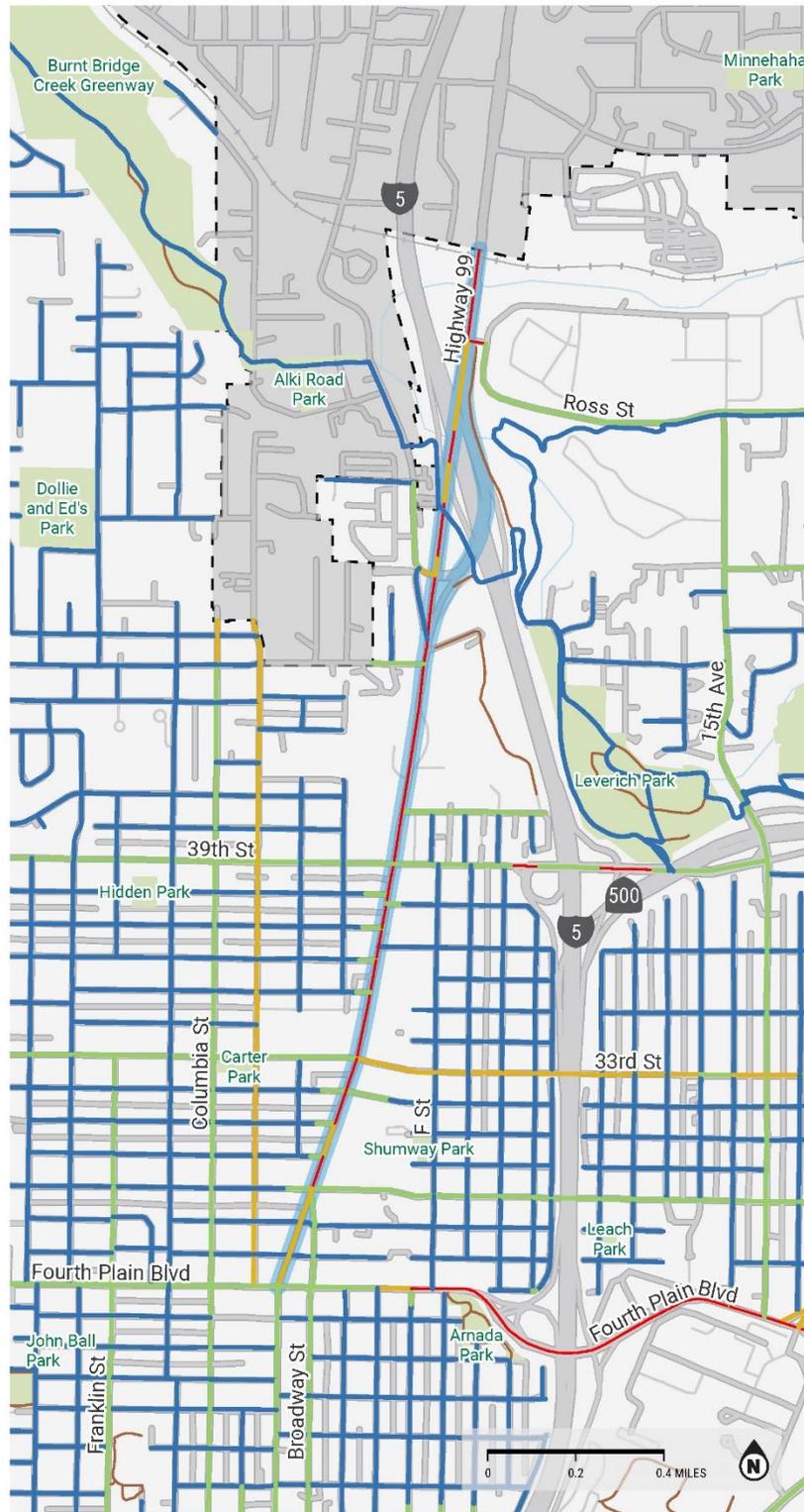
CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND
MOBILITY PROJECT

LEVEL OF TRAFFIC STRESS
Bicycle Level of Traffic Stress (LTS)

- 1
- 2
- 3
- 4

BACKGROUND

- Upper Main St Study Corridor
- Trail
- Railroad
- Park
- Vancouver City Limits



Transit Service and Ridership

There are currently three C-TRAN fixed-route bus lines that provide service within the vicinity of the Main Street corridor, as shown in Figure 8:

- #6 Fruit Valley / Grand
- #31 Hazel Dell
- #71 Highway 99

Line #31 Hazel Dell and #71 Highway 99 both provide north-south service on Main Street along the extent of the study corridor while the #6 Fruit Valley / Grand line provides east-west service on Fourth Plain Boulevard at the south end of the Main Street corridor. The northbound Line #31 and #71 diverge south of the I-5 interchange, where line #31 travels west and line #71 continues along Main Street.

Table 1 shows the average daily boardings (getting on) and alightings (getting off) for each stop within the study area. Based on this data:

- The two most heavily utilized transit stops along this corridor are located at the southern end of the Upper Main Street corridor. The westbound stop located at Fourth Plain Boulevard and Washington Street and the southbound stop located at Broadway Street and 25th Street have the largest numbers boardings and alightings on the list.
- The stop near the Safeway at Main Street and 38th Street and the stop at Main Street (3400 block) are two other popular stops along Main Street.

Planned Service Improvements

In March 2023, the C-TRAN Board of Directors approved plans to upgrade Line #71 on Main Street and Highway 99 to bus rapid transit (BRT).³ Bus Rapid Transit uses features such as larger buses, transit signal priority, seamless fare payments, and level boarding platforms to move passengers more efficiently and reliably. This new service is scheduled to begin service in 2027 and will connect the Vancouver Waterfront to the Salmon Creek Park & Ride as well as Washington State University Vancouver.

³ C-TRAN, “Growing the vine,” 2023. https://www.catchthevine.com/images/Factsheet/Highway99/C-Tran_Hwy99_Fact%20Sheet_v10-reduced.pdf.

Table 1: Average Weekday Boardings & Alightings by C-TRAN stop and route for the Upper Main Street Study Area (Spring 2023)

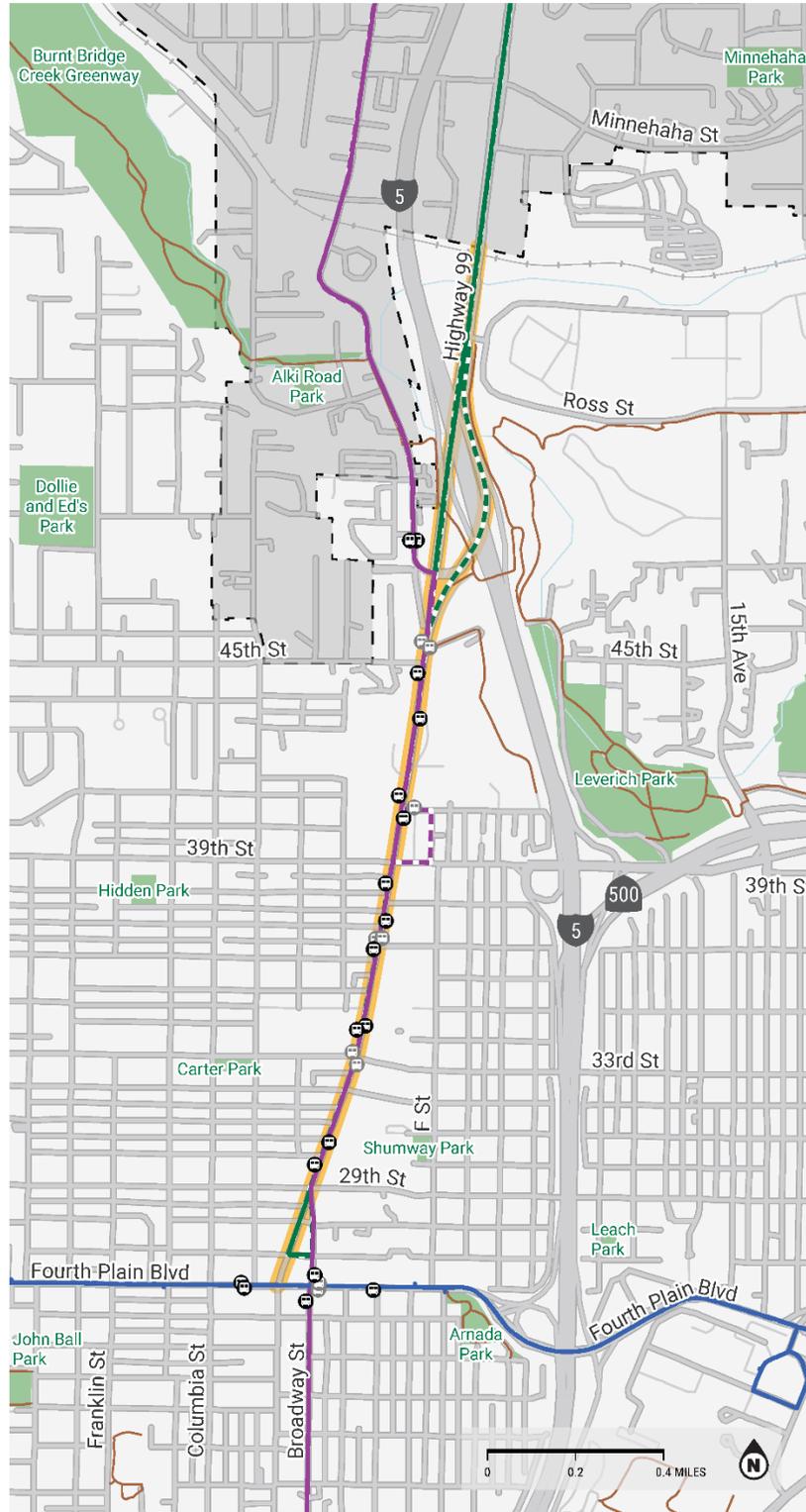
Stop	Ridership Data		C-TRAN Service Line		
	Boardings	Alightings	#6 Fruit Valley / Grand	#31 Hazel Dell	#71 Highway 99
Broadway & 25th St SB	16.6	19.7		X	X
Main St & 30th St SB	4.7	1.8		X	X
Main & 36th St SB	11.1	4.1		X	X
Main & 30th St NB	2.4	3.2		X	X
Main & 38th St NB	10.2	9.9		X	X
Main & 33rd St NB	4.1	5.3		X	X
Main & 39th St SB	5.4	7.5		X	X
Main & 45th St SB	5	2.4		X	X
Main St 3400 Block SB	12.1	10.5		X	X
Broadway & Fourth Plain NB	5.1	4.2		X	X
Main & 40th St NB	2.8	2.4		X	X
Main & 40th St SB	2.9	3		X	X
Main & 45th St NB	3.3	3.3		X	X
Hazel Dell Ave 4900 Block NB	4.2	5.8		X	
Hazel Dell Ave 4900 Block SB	10.1	3.3		X	
Fourth Plain & Washington WB	19.9	8.5	X		
Fourth Plain & D St EB	2.1	2	X		
Fourth Plain & Washington St EB	6.8	28.4	X		

Figure 8: Public transit network

PUBLIC TRANSIT NETWORK

CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND
MOBILITY PROJECT

- TRANSIT**
- Bus Stops
- Existing
 - Planned
- Bus Routes
- Existing
- Fruit Valley / Grand
 - Hazel Dell
 - Highway 99
- Planned
- Fruit Valley / Grand
 - Hazel Dell
 - Highway 99 BRT
- BACKGROUND**
- Upper Main St Study Corridor
 - Trail
 - Railroad
 - Park
 - Vancouver City Limits



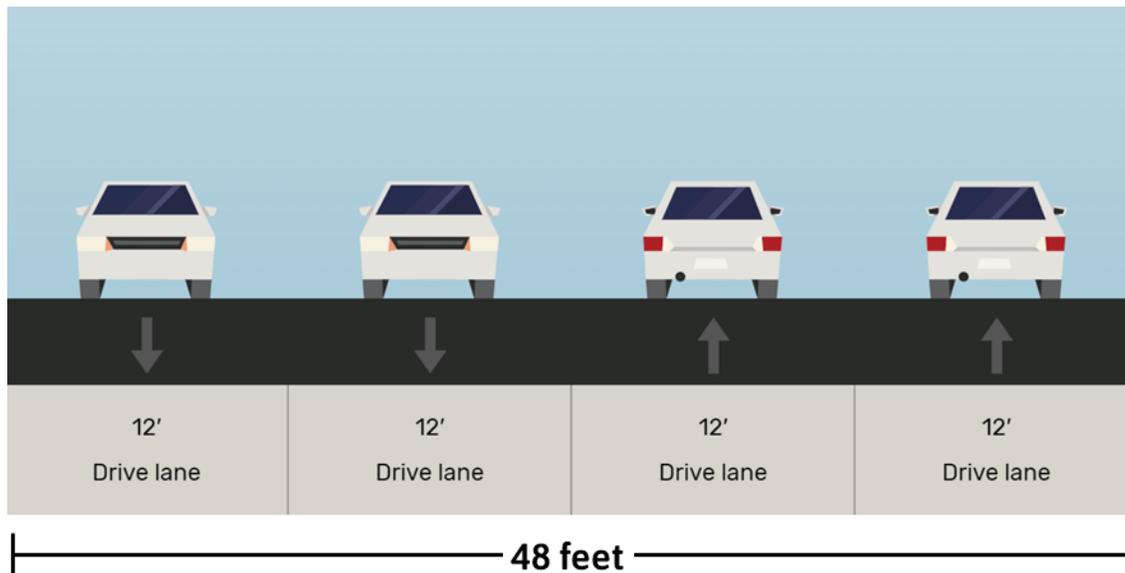
Current Roadway Conditions

The number of vehicle travel lanes along the Upper Main Street corridor vary from three to five lanes.

- Segment 1 (Fourth Plain Boulevard to 29th Street): One lane in each direction and a left turn lane, three lanes total
- Segments 2 and 3 (29th Street to 39th Street): Two lanes in each direction, four lanes total
- Segment 4 (39th Street to 45th Street): Two lanes in each direction and a two-way left turn lane, five lanes total
- Segment 5 (45th Street to 68th Street): Two northbound lanes and one-to-two southbound lanes, with a two-way left turn lane in the southern part of Segment 5. Overall cross section transitions from three lanes to five lanes (north to south).

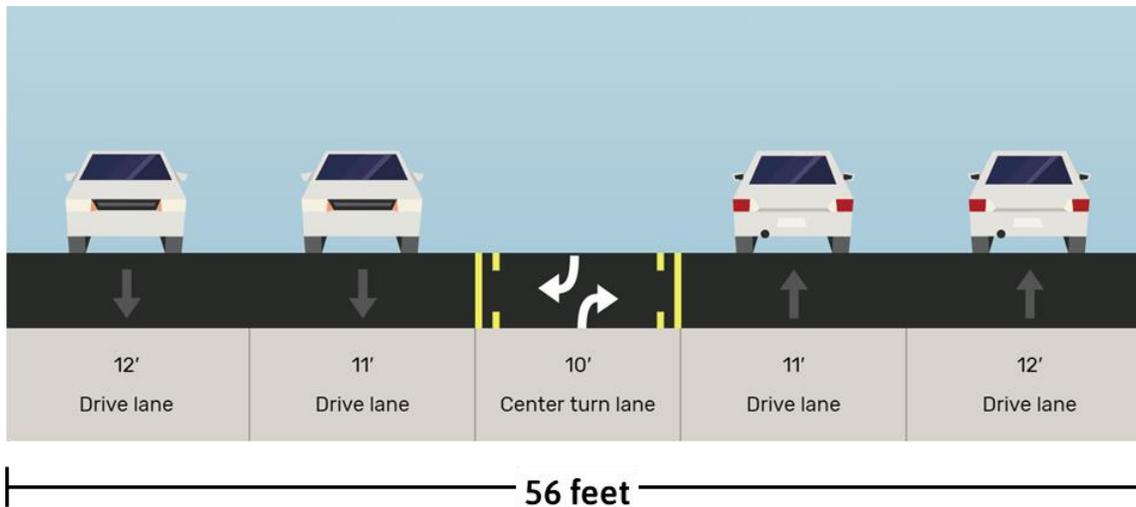
Typical lane widths range between nine and ten feet wide, but in some locations, such as north of 45th, those lanes can exceed 12 feet. Where this is the case, drivers may feel more comfortable driving at faster speeds, which has a negative impact on safety and comfort for people walking, biking, and rolling. Where the travel lane is nine feet wide, larger vehicles such as buses and freight trucks can have difficulty maneuvering. Each nine-to-ten-foot travel lane provides capacity for approximately 1,500 people per hour.

Figure 9: Main Street Segments 2 & 3 Cross Section (29th Street-39th Street).⁴



⁴ Nelson Nygaard, “Existing and Future Conditions: C-Tran Hwy 99 BRT.” October 27, 2022.

Figure 10: Main Street Segment 4 Cross Section (39th Street to 45th Street).⁵



Traffic Speeds and Volumes

The posted speed limit along most of the corridor is 30 miles per hour except:

- North of NE Ross Street the speed limit is 40 miles per hour; and
- Between E 29th Street and E 32nd Street during arrival and dismissal when school zone signs are flashing the speed limit is 20 miles per hour.

Methods

A traffic analysis of the corridor was performed in 2023 by DKS Associates as an early phase of the Vancouver Upper Main Street Corridor Study for several intersections. DKS documented the development, calibration, and results of the existing year 2022 weekday AM and PM peak period VISSIM microsimulation models for the project.⁶ The model used the following data sources:

- Roadway geometry data obtained from aerial imagery and Google Street View.
- Traffic control data obtained from aerial imagery and Google Street View, the City of Vancouver, and WSDOT.
- Traffic count data collected on Thursday, November 17th.
- Travel time and speed data streamed over a typical weekday using Google Maps API.
- Field data which included pictures and video taken in June 2022.
- Transit data collected from C-TRAN website.

⁵ Ibid.

⁶ DKS Associates “Existing Conditions and Calibration Memorandum” *Vancouver Upper Main Street Corridor – Existing Conditions and Calibration*. 2023.

Findings

The analysis yielded the following Measures of Effectiveness (MOE): Level of Service (LOS), Delay, and Volume-to-Capacity ratios for each study intersection. The following table reports the targets and results of the evaluation.

Table 2: Results of Main Street VISSIM Microsimulation Models

Segment	Intersection	Target LOS or v/c Ratio	Reported AM Peak LOS or v/c Ratio	Reported PM Peak LOS or v/c Ratio
Segment 1: Fourth Plain to 29 th	Broadway Street & E Fourth Plain Boulevard	LOS-D	LOS-B	LOS-B
	Main Street & 29 th Street	v/c > 0.95		LOS-C, v/c 0.38
Segment 2: 29 th to 33 rd	Main Street & 33 rd Street	LOS-D	LOS-B	LOS-C
Segment 3: 33 rd to 39 th	Main Street & 39 th Street	LOS-D	LOS-D	LOS-C
Segment 4: 39 th to 45 th	Main Street & 40 th Street	LOS-D		LOS-A
Segment 5: 45 th to City Limits	Main Street & 45 th Street	LOS-D		LOS-B
	Main Street & Hazel Dell Avenue	LOS-D		LOS-A

Key Results

Based on level of service (LOS) as a standard of evaluation, each of these intersections along the corridor are meeting capacity for vehicular traffic. The intersection of Main Street and 29th Street did not meet the standard set for volume to capacity ratio. Intersections throughout the corridor have generally favorable operations with no areas over capacity and queue lengths not showing long spillbacks. However, both the travel demand model and observations in the field report a moderate to high (LOS D/E) delay for southbound left turns at the intersection of Main Street and SE 39th Street. Typical conditions do not reflect occasional incidents on I-5 that spur vehicle diversion onto Main Street resulting in higher levels of delay on the corridor.

Collision History

The history of reported collisions within the project corridor can provide insight on where improvements can be made that reduce the chance of errors. For the purposes of this analysis, the project team analyzed data on collisions between 2018 and 2022 within 200 ft of the project corridor. This data was provided by WSDOT via the City of Vancouver.

When drawing conclusions from this crash data, it is important to note that this data does not account for near-misses or crashes that may have occurred since outside of this analysis period. Local knowledge of past incidents, as well as reports of perceived discomfort or danger, are an essential understanding existing transportation issues along the Upper Main Street corridor.

Pedestrian and Bicycle Collisions

People walking, rolling, and biking are particularly susceptible to injuries and fatalities while traveling on facilities that they share with motor vehicles. Given this vulnerability, understanding where injuries and fatalities have occurred involving these categories of travelers can inform where safety countermeasures might be needed to improve the safety.

Between 2018 and 2022, there were three injury collisions⁷ along the Upper Main Street corridor that involved vehicles striking people biking, walking, and rolling along the study corridor. Two of these crashes involved pedestrians, and one involved a bicyclist. Figure 11 maps these collisions, while **Error! Reference source not found.** provides additional details about each crash.

As shown in Figure 11, within the study area, the areas where collisions tend to take place involving people walking, rolling, and biking are often where Main Street intersects with another major roadway, such as 45th Street, 39th Street, 29th Street, and Fourth Plain Boulevard.

Outside of this analysis period, in 2017⁸, one person was killed as the result of traffic collisions along the corridor while walking at the intersection of Main Street and E 37th Street. The incident report described the collision type as a “vehicle going straight hit[ting a] pedestrian.”⁹ The person was crossing the intersection where the Main Street intersects with the driveway to the Safeway parking lot. There is no marked crosswalk in this location. The roadway was dry, and the vehicle was described as a “pickup, panel truck or vanette under 10,000 lbs” and did not have any mechanical defects. The driver was not under the influence of alcohol and did not suffer any injuries. This event occurred in the evening between 7 and 10 pm. There is a sign on the east side of the roadway directing pedestrians to use the crosswalk one block to the south of the location where this incident occurred.

⁷ Injury collisions include only collisions where an injury was reported.

⁸ Note that this incident does not appear in Figure 11 or in **Error! Reference source not found.** as it occurred before 2018.

⁹ City of Vancouver, “Collision Dashboard,” Accessed 01/09/2024.

<https://experience.arcgis.com/experience/9d0363af1b7a418b9395373c97bcd9c4/page/Page/>

Table 3 - Upper Main Street Pedestrian- and Bicycle-involved Injury Collisions 2018-2022 within 200 ft of project corridor

Year	Ped/ Bike Involved	Location	Description of Action	Factors Involved	Conditions	Injury Reported
2018	Bicyclist	Main St near 39 th St	Bicyclist struck moving vehicle (not at intersection)	distracted driver involved; alcohol involved	Daylight, dry road	Suspected Minor Injury
2022	Pedestrian	45 th St and Main St	Vehicle entering intersection at angle	distracted driver involved	Daylight, dry road	Suspected Minor Injury
2022	Pedestrian	Main St near 29 th St	Vehicle backing up out of driveway hit pedestrian		Daylight, dry road	Suspected Minor Injury

Vehicle-Only Collisions

In addition to collisions involving people walking, rolling, and biking, there have also been numerous collisions between vehicles in the Upper Main study area (see Figure 12). While these crashes did not involve people walking, rolling, and biking, they may indicate areas of potential danger for all road users. Three incidents resulted in severe injuries to those involved in 2018, 2020, and 2022. These crashes resulted from reported improper turns or merges, rear-ending, and reckless driving.

Areas of considerable vehicle collision density in the project study corridor include:

- The intersection of 39th Street and Main Street
- The intersection of 33rd Street and Main Street
- The intersection of Fourth Plain Boulevard and Main Street

Figure 11: Collisions between motorists and people walking, rolling, and biking (2018-2022)

COLLISIONS BETWEEN MOTORISTS AND PEOPLE WALKING AND BIKING 2018-2022

CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND MOBILITY PROJECT

BICYCLE AND PEDESTRIAN INVOLVED COLLISIONS

Walking

- Fatal
- Serious Injury
- Minor Injury

Biking

- Serious Injury
- Minor Injury

Collision Density

- Sparse
- Dense

BACKGROUND

- Upper Main St Study Corridor
- Railroad
- Trail
- Park
- Vancouver City Limits

This map displays roadway collision data from Washington State Department of Transportation collected between 2018 and 2022. Note that this data relies on reporting from local agencies and that not all incidents are reported.

Source: Washington State Department of Transportation, 2023.

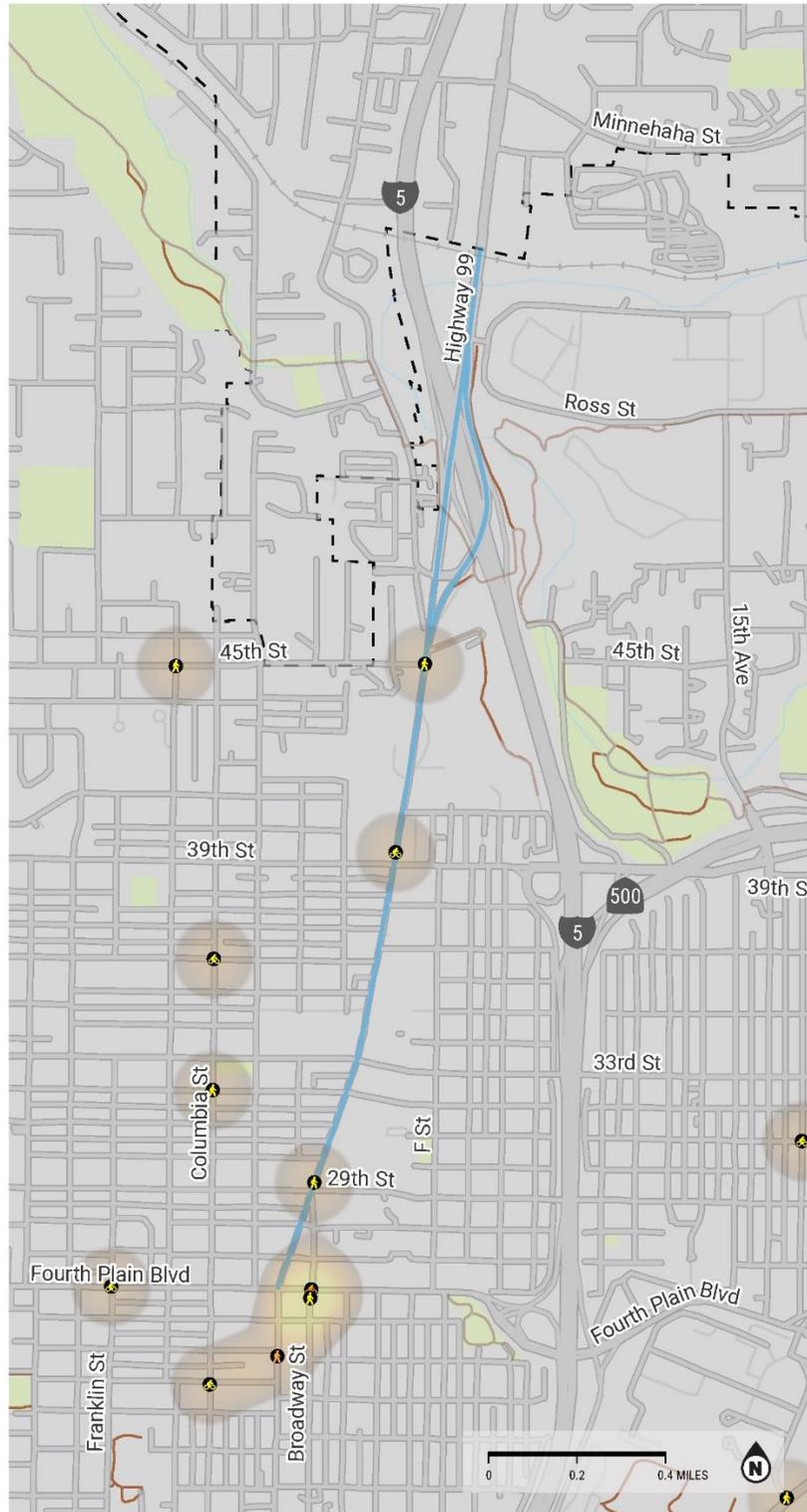


Figure 12: Collisions involving vehicles (2018-2022)

COLLISIONS ONLY INVOLVING VEHICLES 2018-2022

CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND
MOBILITY PROJECT

VEHICLE COLLISIONS

Vehicle Collisions

- Fatal
- Minor Injury
- Serious Injury

Collision Density

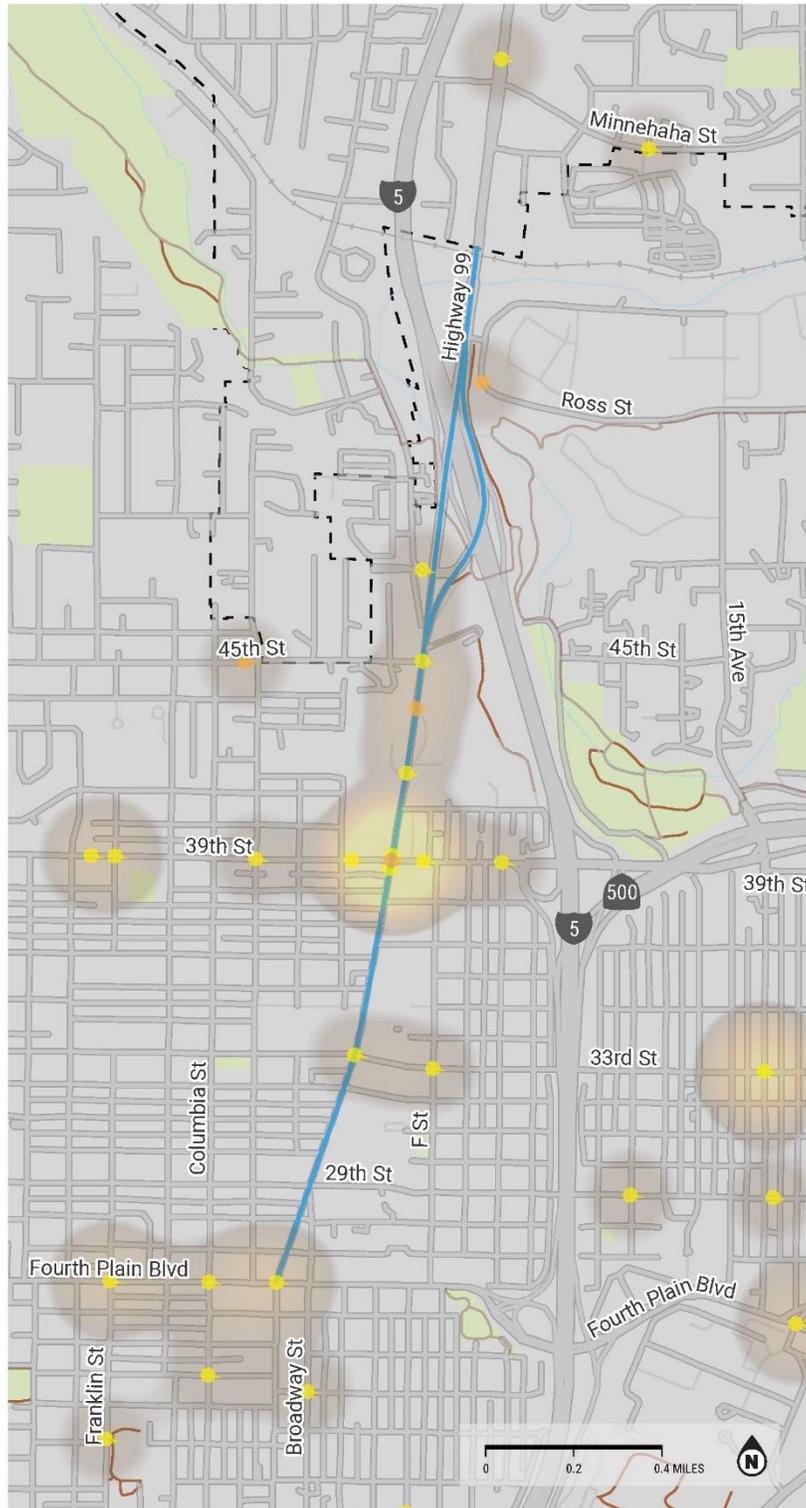
- Sparse
- Dense

BACKGROUND

- Upper Main St Study Corridor
- Railroad
- Trail
- Park
- Vancouver City Limits

This map displays roadway collision data from Washington State Department of Transportation collected between 2018 and 2022. The vehicle collision data displayed includes collisions that occurred on facilities owned by the City of Vancouver. Note that this data relies on reporting from local agencies and that not all incidents are reported.

Source: Washington State Department of Transportation



Demographic and Geographic Characteristics

The City of Vancouver's Equity Index provides a snapshot of equity need based on demographics and equity metrics in the areas along the corridor (represented in Figure 13). The index incorporates the following variables:

- People of color (non-white and/or Hispanic/Latinx)
- Educational Attainment less than a bachelor's degree (people over 25)
- Renters
- Median Family Income
- People 65 and over
- Households with children

The Equity Index shows the areas of highest equity need in the census tracts that comprise the Rose Village neighborhood to the east of I-5, followed by the Hough neighborhood south of Fourth Plain Boulevard, and West Minnehaha area to the northeast. While few parts of these areas reside immediately on or along the Upper Main corridor study area, the corridor still functions as a vital transportation connection for people traveling to and from these areas, and beyond, particularly for people who do not have access to an automobile and must rely on other transportation facilities that are not currently safe or comfortable.

Other Equity Considerations

- Recently established Safe Stay Village 4— at 45th and Main Street at Kiggins Bowl brings residents that may use transit and active transportation to get around. The closest transit stations to the Stay Safe Village are located on either side of Main Street between 45th Street and the entrance of First Presbyterian Church. Residents of this community may also use the nearby Burnt Bridge Creek and Discovery Trails. The City will enforce a public camping ban within 1,000 feet of the Stay Safe Community.¹⁰
- I-5 traffic diversion can adversely impact the neighborhoods adjacent to the corridor, including congestion and other undesirable driving behavior.

¹⁰ City of Vancouver, "Neighborhood Letter and Community Resource Guide," November 3, 2023. <https://www.cityofvancouver.us/wp-content/uploads/2023/12/SSC4-Neighborhood-Letter-and-Community-Resource-Guide-FINAL.pdf>

Figure 13: City of Vancouver Equity Index

**CITY OF VANCOUVER
EQUITY INDEX SCORE**

CITY OF VANCOUVER
UPPER MAIN STREET
SAFETY AND
MOBILITY PROJECT

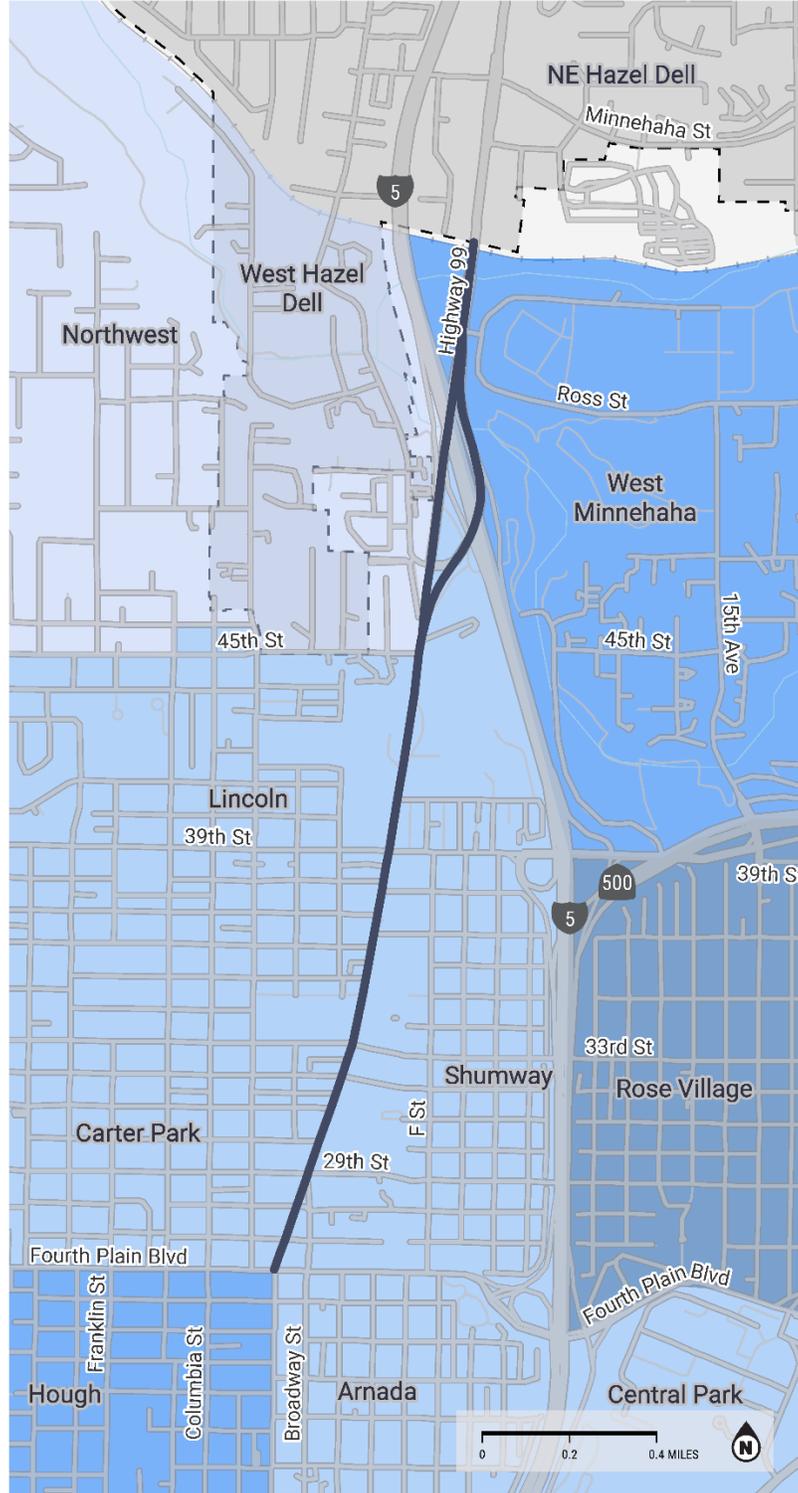
EQUITY PROFILE

- Highest
- High
- Average
- Low
- Lowest

BACKGROUND

- Railroad
- Vancouver City Limits

Source: City of Vancouver Equity Index 2020.



Opportunities and Constraints

The Upper Main Street corridor is a critical connection in Vancouver’s transportation system. It is utilized by many different types of travelers, for different trip purposes, along a range of frontage and land use contexts. Through examination of the existing conditions of the roadway, it is apparent that improvements are needed for Upper Main Street to prepare the corridor for additional growth in Vancouver and facilitate the implementation of BRT. While there are many constraints observed as part of the analysis, there are also several opportunities, including application of the City’s Pedestrian Crossing Policy, which establishes the need for marked crosswalks at least every 800 feet along pedestrian corridors.¹¹

Segment	Opportunities	Constraints
Segment 1: Fourth Plain to 29 th	<ul style="list-style-type: none"> This segment is closest to Lower Main Street / Broadway Street, where multimodal improvements have already been implemented. Bicycle and pedestrian improvements along this section could connect to the facilities on Main Street and Broadway Street, contributing to an integrated pedestrian and bicycle network. There are no signal-controlled pedestrian crossings between Fourth Plain Boulevard and 33rd Street. There are pedestrian activated flashing yellow lights at the marked crossing located at 29th Street. Vehicles may not always stop for pedestrians at the marked crosswalks located at the intersections without beacons with flashing yellow lights or signals, such as Main Street with 27th Street. 	<ul style="list-style-type: none"> The triangle configuration between 28th and 29th Street introduces many operational challenges and improvements should be considered as a part of this project (and/or HWY 99/Main Street BRT). The three-way intersection between Main Street, E 28th Street, and Broadway Street can be difficult for pedestrians to navigate. Pedestrians must look for vehicles coming from multiple directions. There is limited right-of-way in this area to make improvements. C-TRAN bus service currently travels along Broadway Street south of 29th Street, which requires the buses to turn off Main Street onto Broadway Street.
Segment 2: 29 th to 33 rd	<ul style="list-style-type: none"> Students walking and biking to Vancouver School of Arts and Academics do not have a designated pedestrian crossing to cross Main Street. People using transit do not have a designated crossing at Main Street and E 30th Street to access the bus stops. A new marked crossing between 29th St and 33rd Streets to align with City Pedestrian Crossing Policy. 	<ul style="list-style-type: none"> There are currently utility poles located in the middle of the east sidewalk adjacent to Vancouver School of Arts and Academics. These poles impair visibility and impose challenges for people walking, rolling on the sidewalk. Expanding the right of way on this section of the roadway may require the removal of trees on the property of Vancouver School of Arts and Academics and/or relocation of utility poles on the eastern side of the roadway.

¹¹ Pedestrian Crossing Policy. <https://www.beheardvancouver.org/3933/widgets/23216/documents/46663>

Segment	Opportunities	Constraints
Segment 3: 33 rd to 39 th	<ul style="list-style-type: none"> The improvement of pedestrian facilities along Main Street could connect people to essential businesses in this area, such as Safeway. This could include upgrading driveways and side street intersections with Main Street from unmarked crosswalks to marked crosswalks. This segment could include bike facility improvements that include wayfinding to parallel north-south bike routes on F Street and Columbia Street. A new marked crossing along between 33rd and 37th streets to align with the Pedestrian Crossing Policy. 	<ul style="list-style-type: none"> The sidewalk adjacent to the office building property located at the northeast side of Main Street and 33rd Street is built along a retaining wall, limiting the opportunity to expand eastward or add a transit stop in this location. This segment has a considerable number of businesses with large driveways, which may make a bicycle or pedestrian facility difficult to implement or potentially uncomfortable for users. The lack of a center turn lane at the intersections of E 37th Street and E 38th Street may result in backups in the travel lanes when vehicles are waiting for gaps in oncoming traffic to make left turns. Sidewalks along this segment are narrow and pedestrians walk very close to the vehicle travel lanes, which can be uncomfortable.
Segment 4: 39 th to 45 th	<ul style="list-style-type: none"> This segment has a considerably large right-of-way and few driveways entering Main Street. Potential bicycle facilities on Main Street can connect to an existing bicycle lane on E 39th Street and the Burnt Bridge Creek and Discovery Trails, establishing a strong connection to other parts of Vancouver. 	<ul style="list-style-type: none"> The northbound route along Main Street between 39th Street and 45th Street is a downhill slope with a considerable grade, which may not be easy for people walking (especially with a mobility device) or traveling by bicycle. Sidewalks along this segment are narrow and pedestrians walk very close to the vehicle travel lanes, which can be uncomfortable. There is currently no east sidewalk between the signalized crossing adjacent to Kiggins Bowl and the one at 45th Street. Currently pedestrians and bicyclists are expected to use the crossings to transfer to the west sidewalk.
Segment 5: 45 th to City Limits	<ul style="list-style-type: none"> This route could provide a connection to the Burnt Bridge Creek Trail and Kiggins Bowl Park. There is a pedestrian bridge across I-5, which could connect to future north-south facilities on Main Street. There is considerable space in existing roadway shoulders on Main Street in both directions in this segment. 	<ul style="list-style-type: none"> The existing connections to off-street paths, Hazel Dell, and the pedestrian crossing of I-5 are currently poorly signed and hard to locate. Travel lanes that enter or exit I-5 may have vehicles traveling at higher speeds and may not be best suited for bicycle and pedestrian facilities. Vehicles travel along this segment at high speeds, and wide lanes contribute to a sense that the area is vehicle focused.
Summary Findings	<ul style="list-style-type: none"> This route could better connect to existing and planned active transportation corridors, and planned Hwy 99 BRT stops. 	<ul style="list-style-type: none"> Driveway access can be a conflict point between pedestrians and bicyclists with vehicles.

Segment	Opportunities	Constraints
	<ul style="list-style-type: none"> • There are many important destinations along the corridor that would be beneficial for people to access safely by all modes. • Existing transit routes (and improvements to these routes) will create multi-modal connections (e.g., walk then take transit, bike ride then take transit). • A small amount of sidewalk infill could create a continuous pedestrian experience for the corridor. • The large width of the roadway in the northern section of the corridor makes a more substantial reconfiguration of the roadway possible as needed to address connectivity or safety issues. • Improved wayfinding can help direct people walking, rolling and/or biking to existing facilities on nearby streets. 	<ul style="list-style-type: none"> • Potential for conflict between buses and pedestrians or bicyclists should be considered and mitigated wherever possible. Right-of-way is narrow in some locations, limiting the options for roadway reconfiguration. • Existing development, limited ROW and steep terrain limit the expansion of the bike/pedestrian facilities.