Transportation Commission Special Meeting

Bike Bellevue
December 14, 2023

City of Bellevue:
Franz Loewenherz - 425-452-4077
Jay Backman, PE - 425-452-5361
Kevin McDonald, AICP - 425-452-4558
Nick Bleich, AICP, PE, TE - 425-452-6056
Ming-Bang Shyu, PhD, PTP - 425-452-6015
Hu Dong, PE - 425-452-4067

Fehr & Peers:
Chris Breiland, PE

Transportation

Agenda

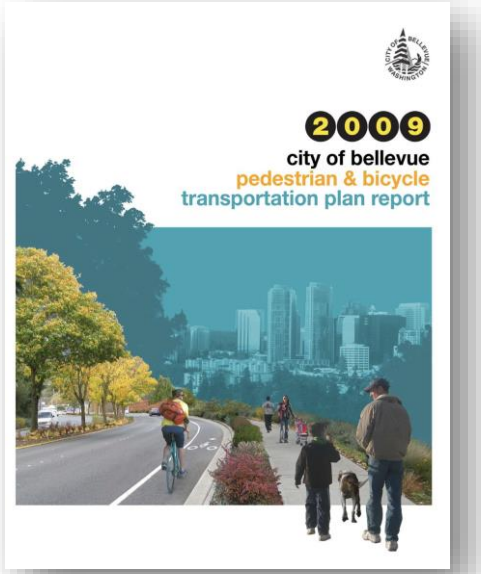
- Welcome and meeting purpose
- Bike Bellevue background
- Mobility Implementation Plan overview
- Modelling overview
- Responses to Transportation Commission questions

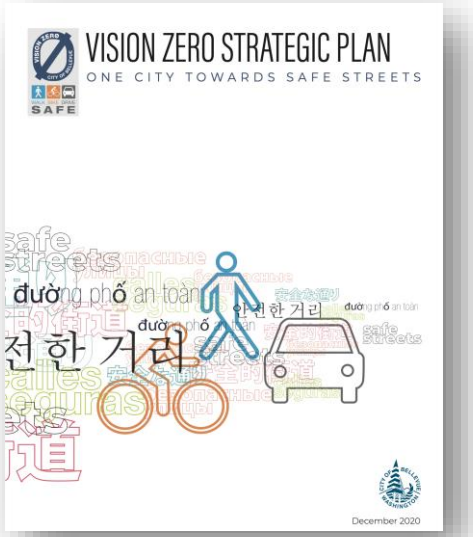
Welcome and Meeting Purpose

1. Transportation Commission will arrive at a deeper understanding of:
   - Background on previous bike planning and implementation,
   - performance metrics adopted in the Mobility Implementation Plan,
   - how modelling works and is used.
2. Staff will then respond to technical questions from the Transportation Commission.
3. There will NOT be an opportunity for public comments and questions at this Special Meeting.

Bike Bellevue Background

- Confluence of several Transportation Department efforts since 2009
- Next step in Bellevue's active mode and safety implementation
- Consistent with Mobility Implementation Plan





BELLEVUE
PEDESTRIAN
& BICYCLE
IMPLEMENTATION INITIATIVE

Bike Bellevue Background

CIP (PW-W/B-85) description: *"Growth Corridor High Comfort Bicycle Network Implementation" (AKA: Bike Bellevue)*

- $4.5 million in 2023-29 CIP.
- Design and implement rapid-build bicycle projects on existing streets in the Downtown, Wilburton, and BelRed neighborhoods.
- Establish grid of safe and comfortable connections to key destinations for people of all ages and abilities.

Note: CIP (PW-W/B-85) represents 1.4% of the Transportation Department's 2023-29 CIP budget ($320M).

Bike Bellevue Principles

Safety

Reduce the frequency and severity of crashes and minimize conflicts between roadway users through bikeway design.

Connectivity

Implement a connected network of bicycle lanes that facilitate access to major destinations.

Comfort

Design bicycle lanes that maximize separation between motor vehicles and people bicycling on streets with higher speed limits and more vehicle traffic.

Evaluation

Use a data informed approach to evaluate impacts to all modes of travel and design the program to maximize the mobility of all modes.

Coordination

Coordinate transportation and land use efforts underway in Bellevue to ensure equity and sustainability outcomes are aligned.

Partnerships

Identify partnership opportunities to advance the implementation of bicycle projects.

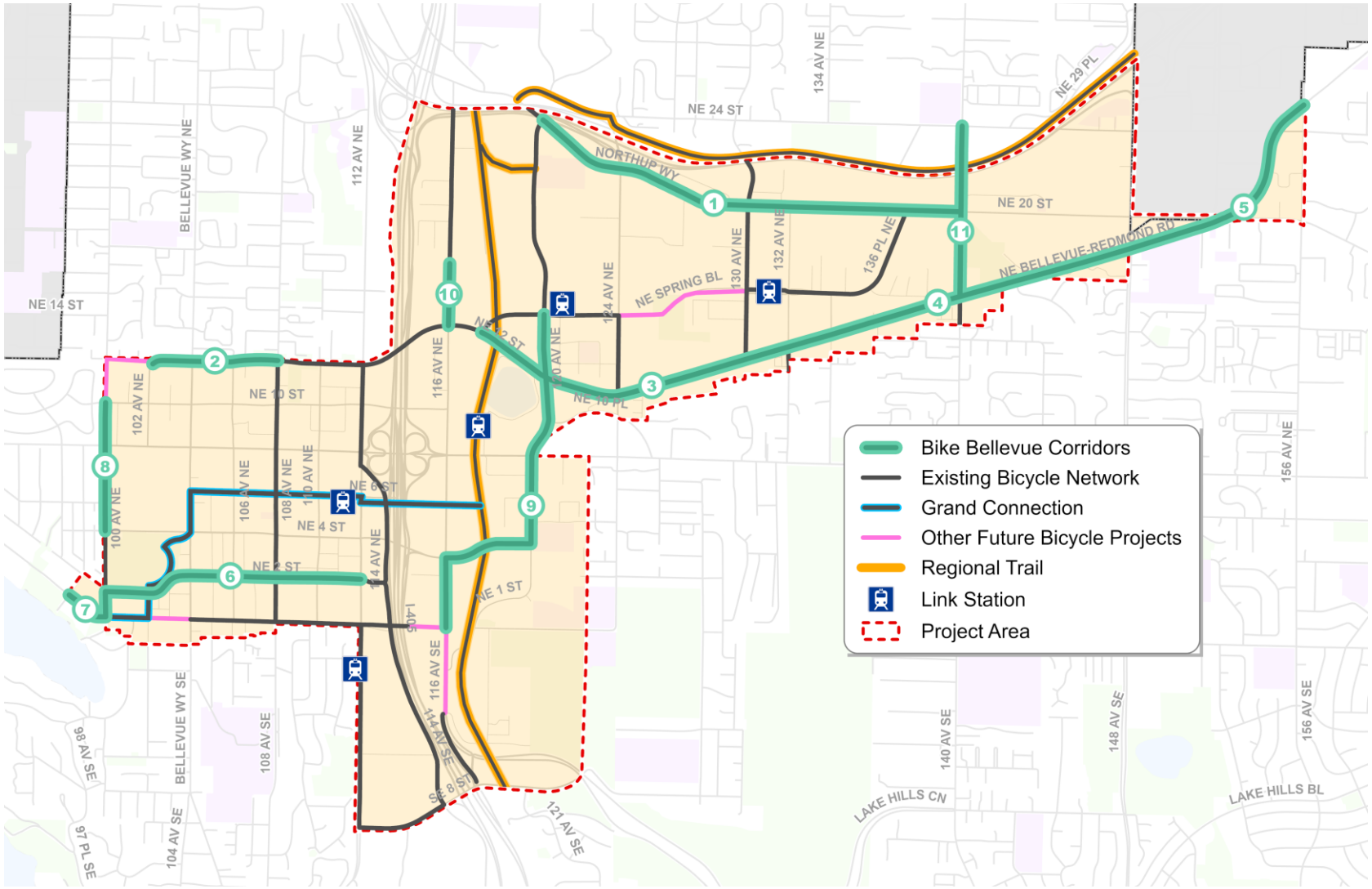
Engagement

Engage community stakeholders in setting the priorities for Bike Bellevue investments.

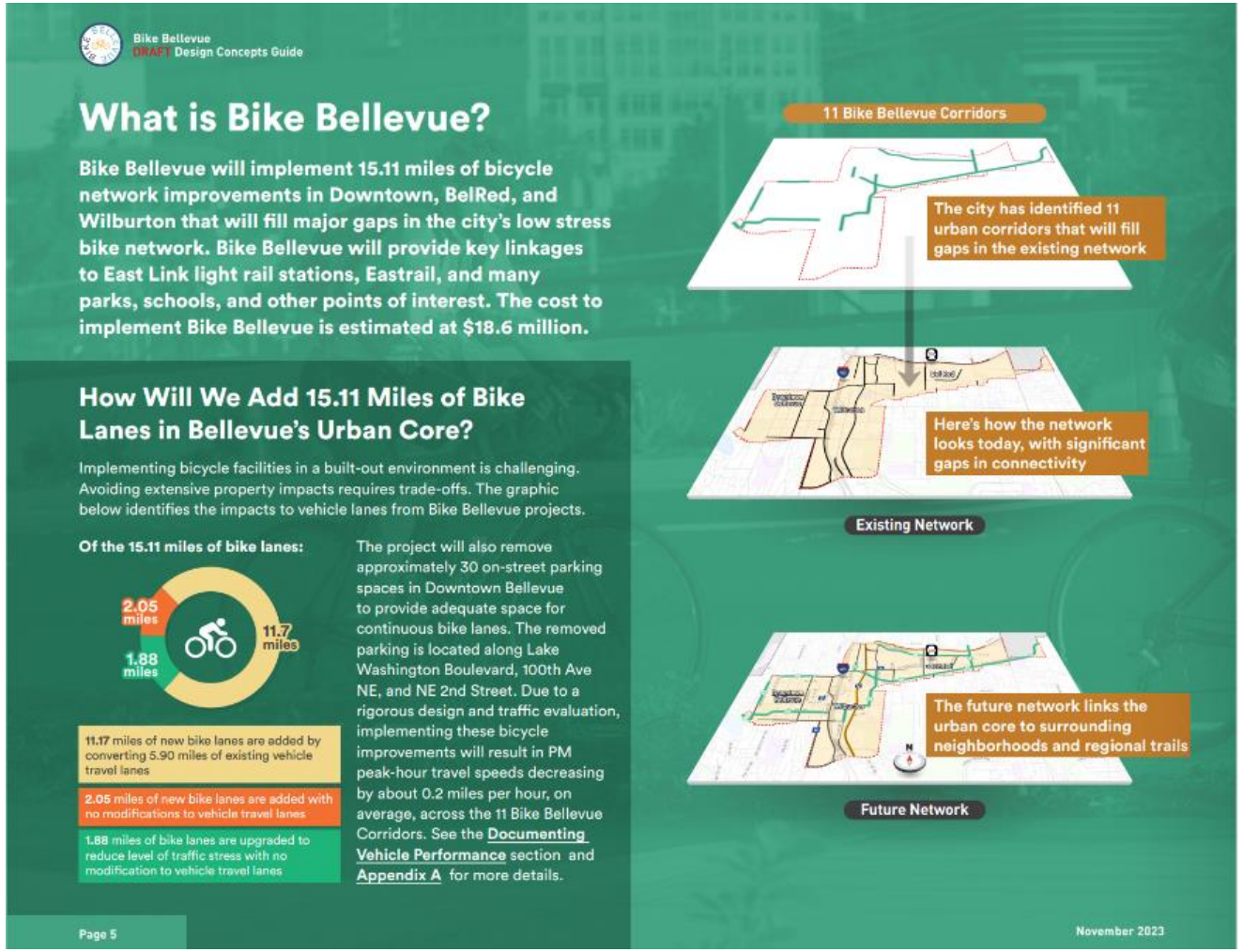
Equity

Promote equity and inclusion in the development and delivery of bicycle projects. Consistent with the city's Diversity Advantage Plan, Bike Bellevue will center equity, access, inclusion, and opportunity in project delivery.

DRAFT Project Area Map



DRAFT Design Concepts Guide



DRAFT Design Concepts Guide, November 2023

2044 Bellevue Comprehensive Plan

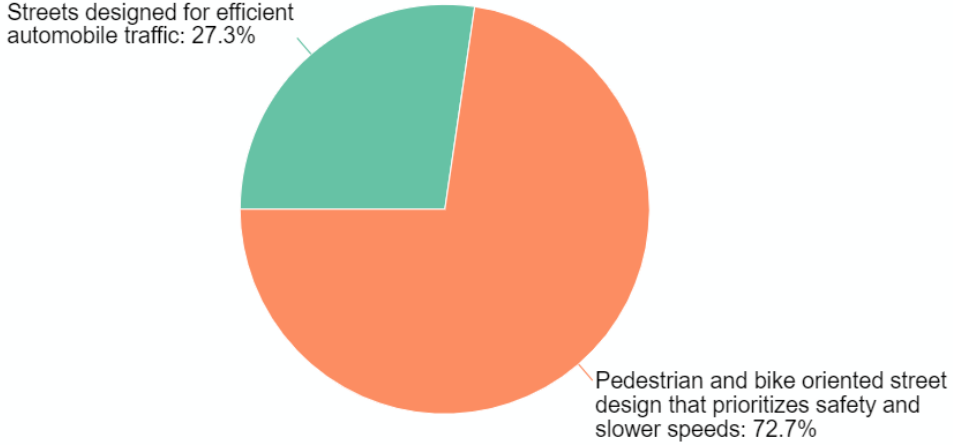
[Comprehensive Plan Update Survey | Displayr] derived from a statistically significant sample size of Bellevue residents-only. The image in the link shows that "Nearly three quarters of respondents prefer street design that is oriented towards bikes and pedestrians, and prioritizes safety and slow speeds. About a quarter of respondents prefer street design oriented towards efficient automobile traffic."

BELLEVUE 2044 COMPREHENSIVE PLAN
Building A Livable City for All

Primary Street Design

Nearly three quarters of respondents prefer street design that is oriented towards bikes and pedestrians, and prioritizes safety and slow speeds.
About a quarter of respondents prefer street design oriented towards efficient automobile traffic.

Preferred Street Design



Study questions or want more info?
Contact Katherine Ness at
knesse@bellevuewa.gov

City of Bellevue - Comprehensive Plan Survey

ReconMR Reconnaissance Market Research

Dashboard questions or want your own?
Contact Nathan Wiggin at
Nathan.Wiggin@ReconMR.com

MIP Overview

- Goals
- Layered Network
- Performance Metrics
- Performance Management Areas
- Performance Targets

Kevin McDonald, AICP

Bellevue Transportation Department

Mobility Implementation Plan Goals

- **Safety:** Eliminate serious injuries and fatalities from crashes (Vision Zero)
- **Equity:** Design and prioritize projects to address equitable access
- **Growth:** Support growth and accommodate multimodal travel
- **Access/Mobility:** Complete the transportation network to provide access

The Layered Network

Land Use

- Intensity and mix of uses

Pedestrian

- Along arterials
- Across arterials

Bicycle

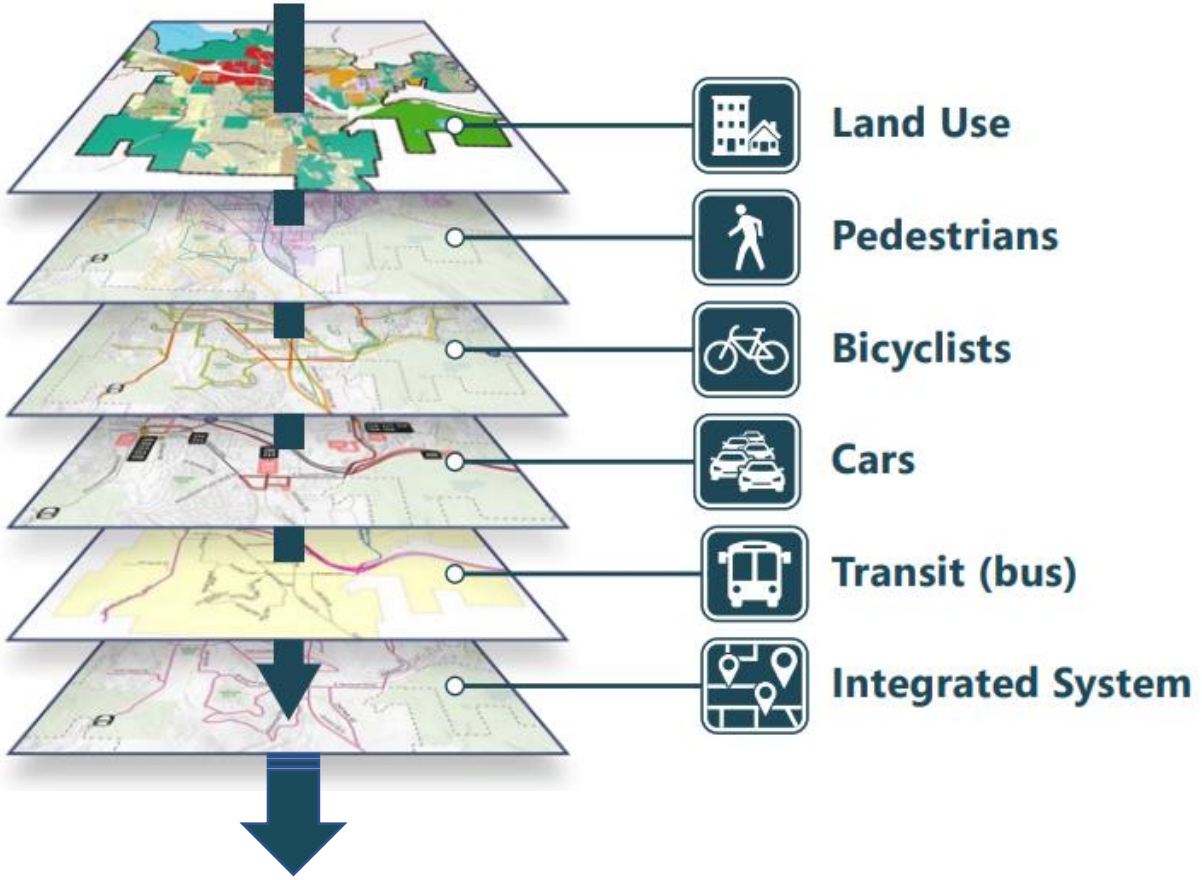
- Arterial Network corridors

Vehicle

- Primary Vehicle Corridors
- System Intersections

Transit

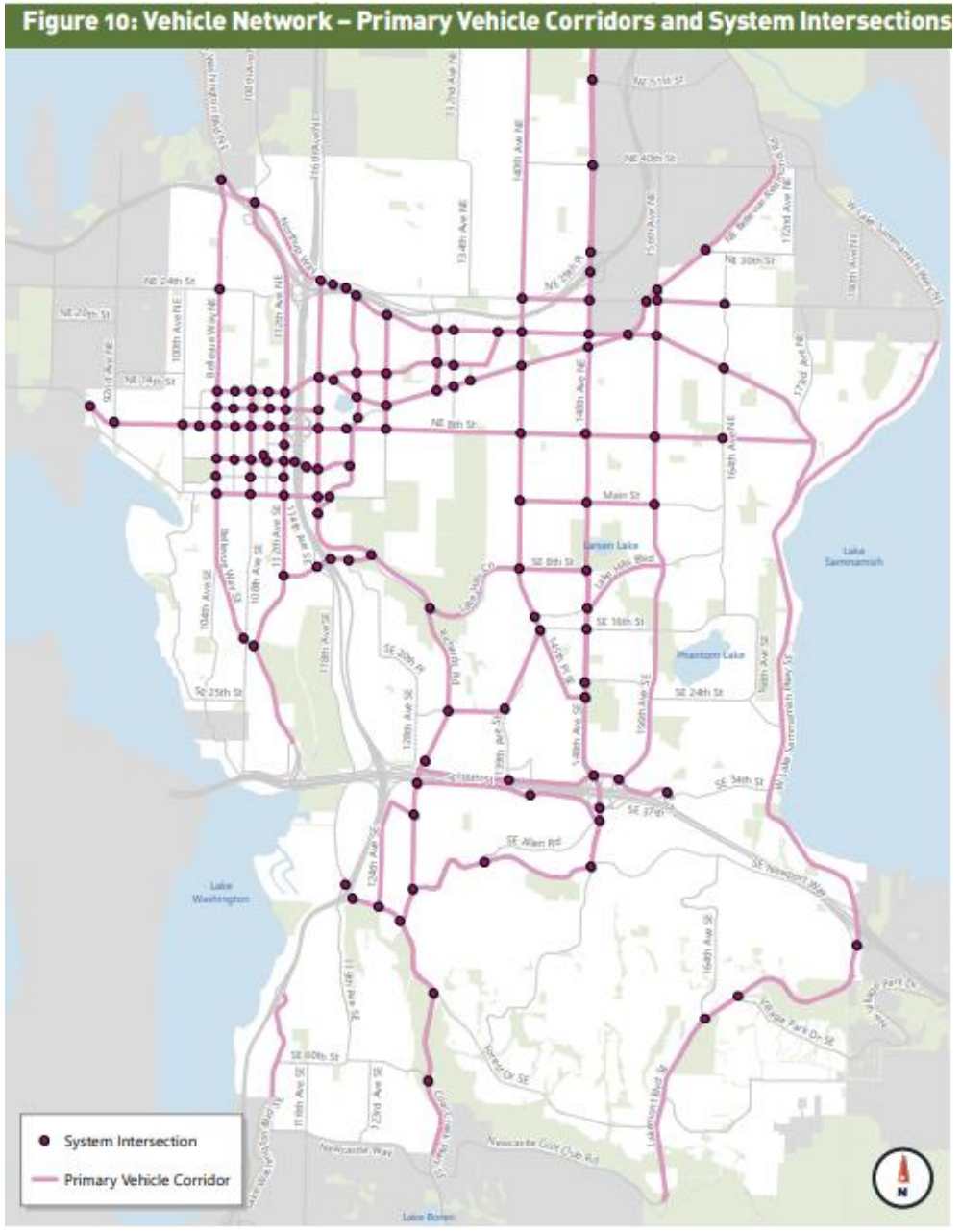
- Frequent Transit Network
- Transit stops



Integrated System

Bicycle Layer

Vehicle Layer



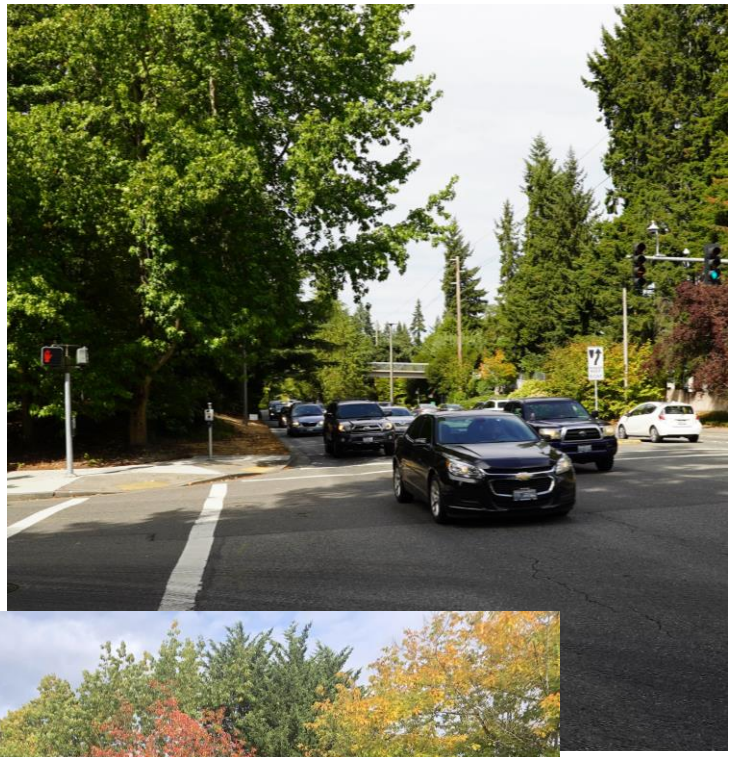
Performance Metrics

Bicycle Network (Arterials)

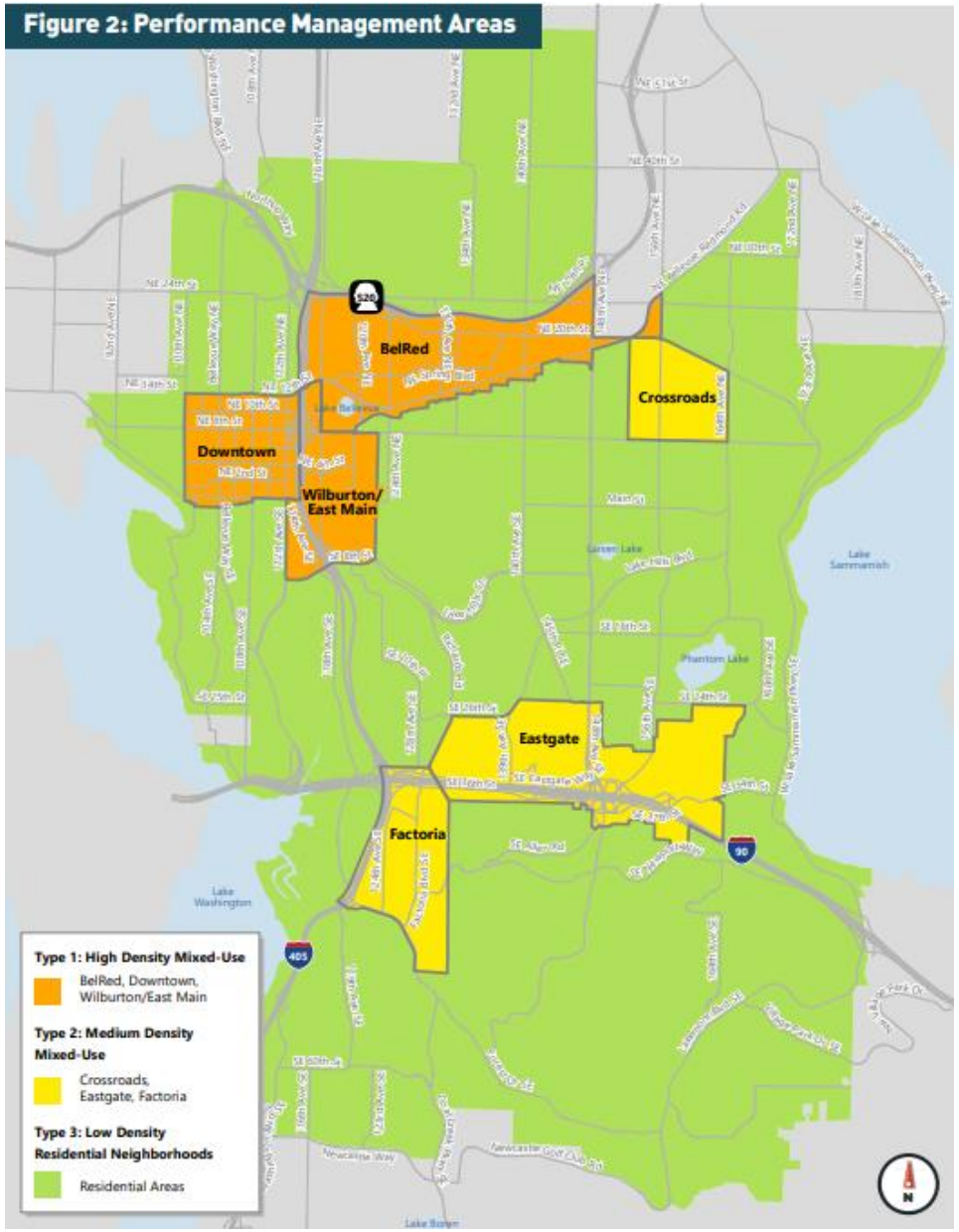
- Level of Traffic Stress (LTS)

Vehicle Network

- Travel Speed on Primary Vehicle Corridors
- V/C Ratio at System Intersections



Performance Management Areas



Mode	Performance Target	
Vehicle	Type 1 PMA High Density Mixed-Use	• 1.0 V/C ratio at System Intersections • ≥0.5 Typical Urban Travel Speed for Primary Vehicle Corridors
	Type 2 PMA Medium Density Mixed-Use	• 0.90 V/C ratio at System Intersections • ≥0.75 Typical Urban Travel Speed for Primary Vehicle Corridors
	Type 3 PMA Residential	• 0.85 V/C ratio at System Intersections • ≥0.9 Typical Urban Travel Speed for Primary Vehicle Corridors

Performance Target
Bicycle Network

Mode	Performance Target
Bicycle	Bicycle network facilities (corridors and intersections) meet the intended LTS

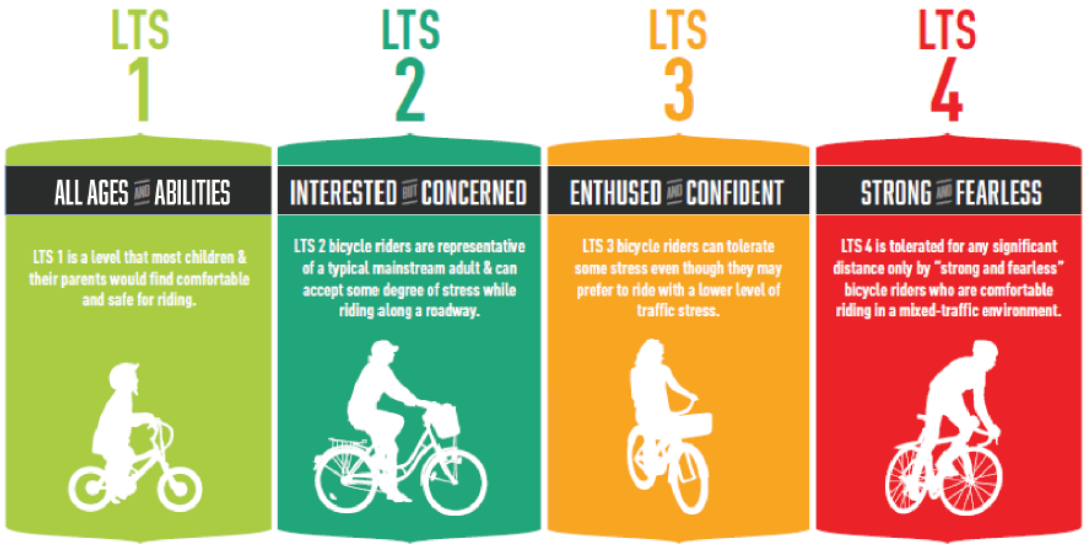
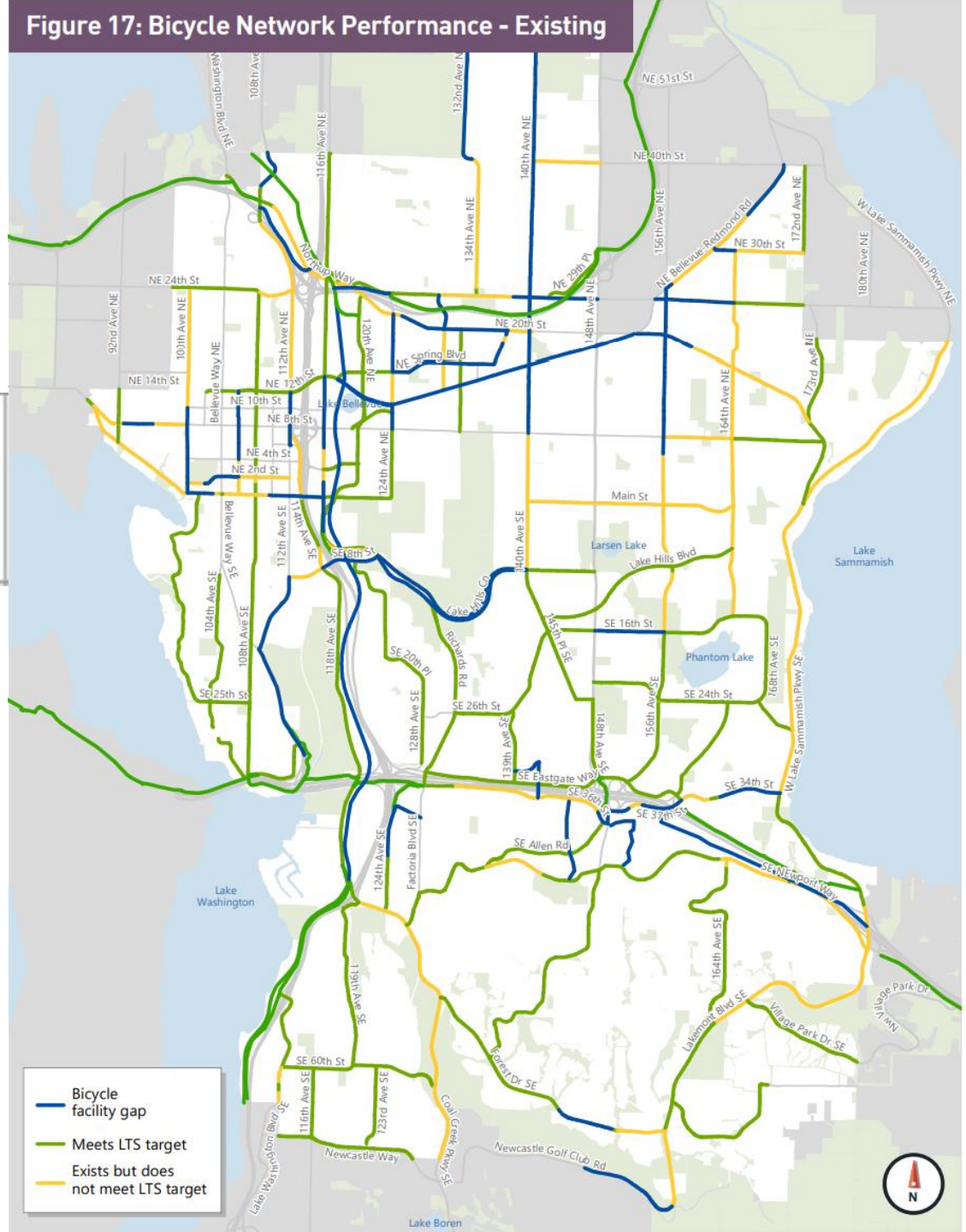


Figure 17: Bicycle Network Performance - Existing



Modelling and Analysis Team

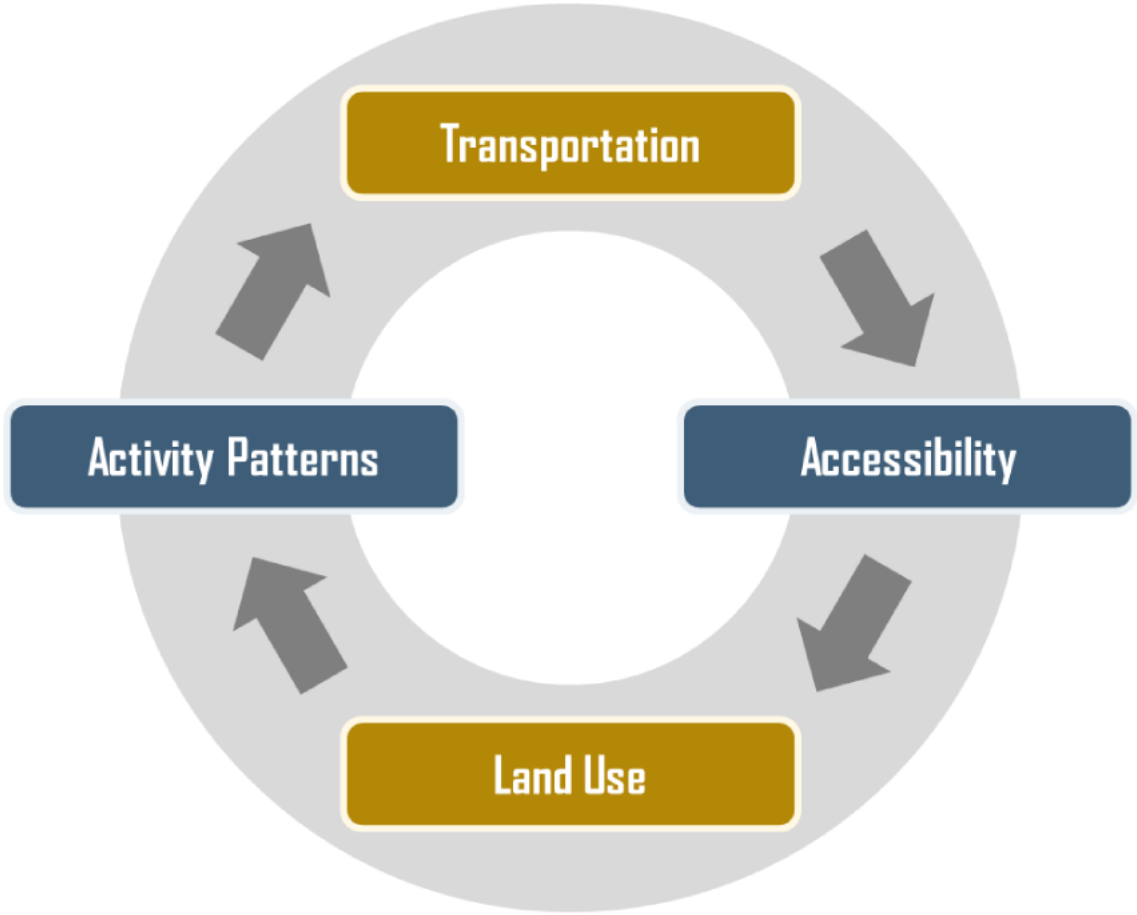
- Nick Bleich, AICP, PE, TE – Senior Transportation System Analyst
  - 10 years of professional experience, 1 year with COB

- Shuming Yan, PE – Transportation Forecasting Manager
  - 27 years of professional experience, 9 years with COB
- Hu Dong, PE – Senior Transportation Engineer
  - 18 years of professional experience, 15 years with COB
- Ming-Bang Shyu, PhD, PTP – Senior Transportation System Analyst
  - 25 years of professional experience, 5 years with COB

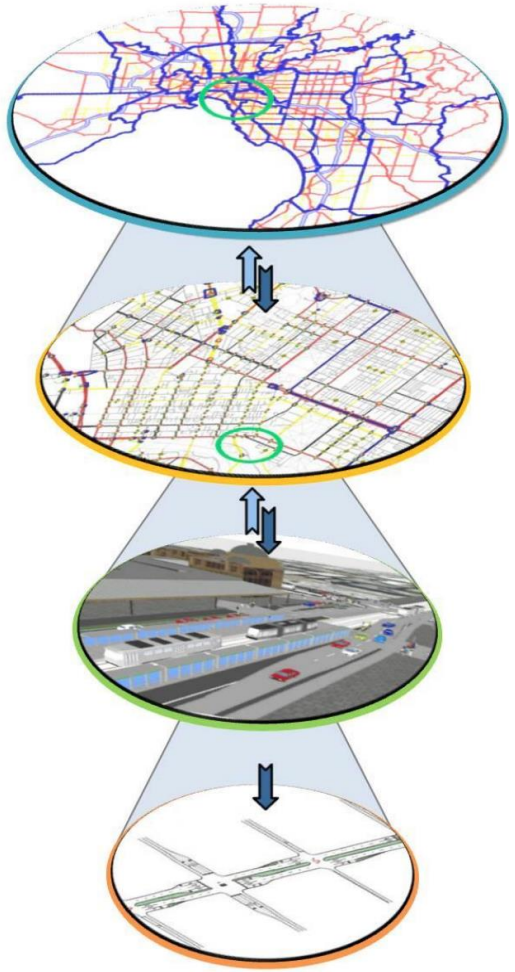
- 75+ years of combined professional experience

Understanding Transportation Demand

- What activities to people want to participate in?
- Where are these activities?
- When are these activities?
- What travel mode is used?
- What route is used?



Transportation Models used in Bellevue



Type of Model	Characteristics	Representative Software	Project Uses
Macroscopic	Activity or Trip Based Travel Demand Model	**EMME** (CUBE, TransCAD, VISUM)	Review Policy Changes Long-Range Planning Test Improvements
Mesoscopic	Dynamic Traffic Assignment Model	**DYNAMEQ** (TransModeler)	Area Planning Traffic Redistribution Test Improvements
Microsimulation	Vehicle-to-Vehicle Interactions	**SimTraffic** (VISSIM)	Detailed Network Operational Studies Test Improvements
Intersection	Utilizes standard traffic engineering equations and principles	**Synchro**, **HCS** (SIDRA)	Test Improvements Optimize Existing Conditions

Supplemental Model Resources

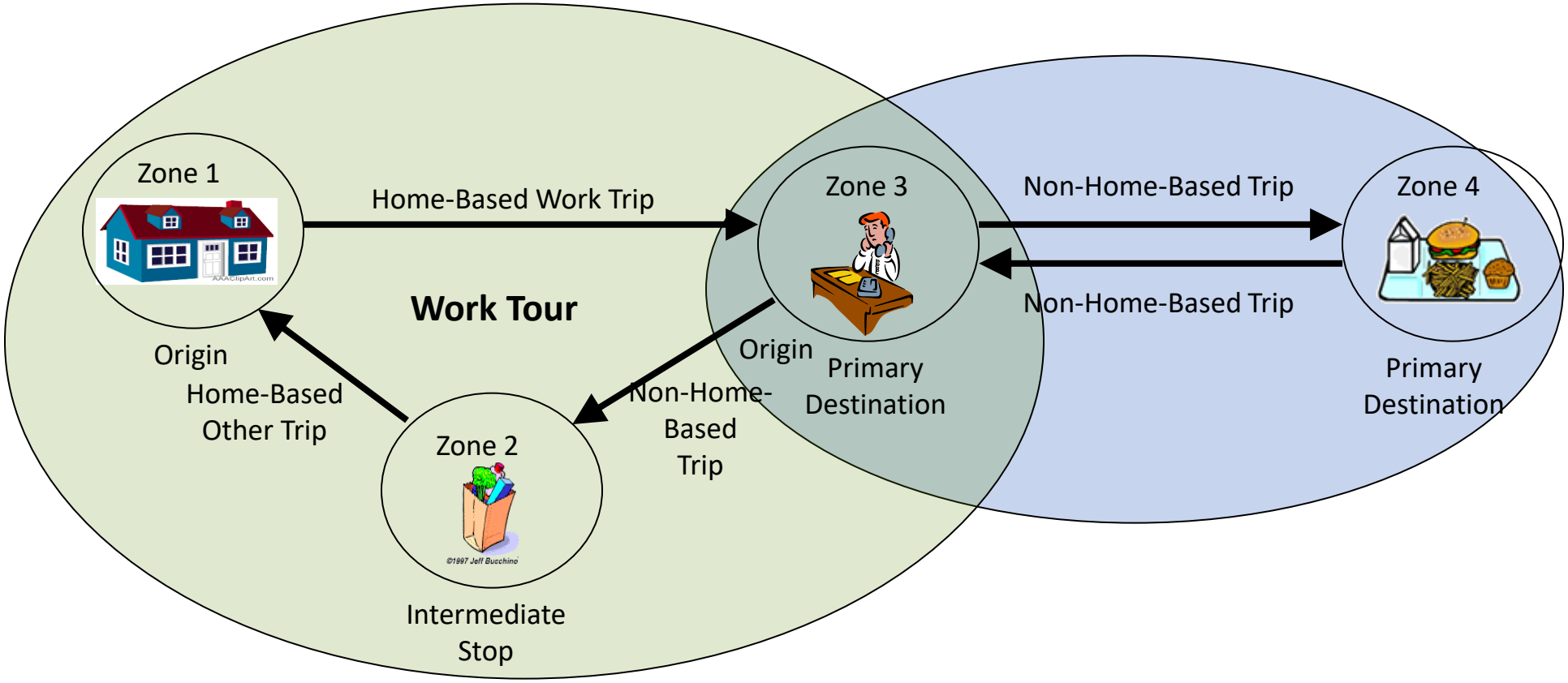
- Dynamic Traffic Assignment
- ICLEI
- MOVES Model
- HEAT Tool

What is BKRCast?

BKRCast is an activity-based travel demand model

- Developed from PSRC's SoundCast model
- Peer reviewed using funding provided by FHWA
- Calibrated using regional travel surveys and traffic counts

What is a tour? What about trips?



BKRCast Inputs

- Population
  - Developed from US Census & local data sources
- Land Use Information
  - Number of jobs by parcel in nine categories
  - Number of households by parcel in two categories
- Transportation Networks
  - Auto, transit, and non-motorized networks
- Operating Assumptions
  - Tolls, parking, fuel, transit fares, etc.

What can we do with BKRCast outputs?

- Estimate mode share
- Approximate annual VMT
- Calculate Intersection V/C ratios
- Determine Corridor Travel Times
- Identify unique travel characteristics
- Isolate trips based on household or person demographics

Questions & Responses

1. Transportation Commission prepared 48 questions for staff.
2. Staff will respond to as many of these technical questions in the time available for this Special Meeting.
3. The slides making up the question/response portion of the meeting will be available on the Bike Bellevue project webpage.

Commission Question #1

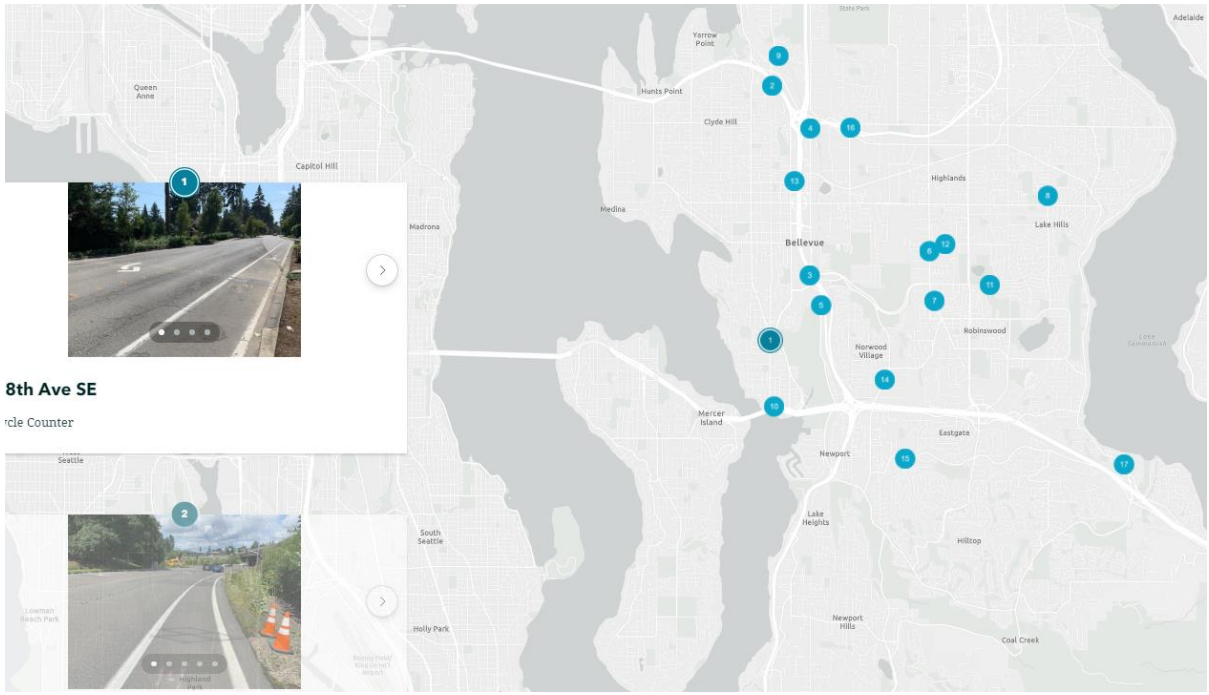
When was the last time a true bike count was done by the city to reflect how many bike trips were being taken?

Staff Response #1

Bellevue's Transportation Department measures walking and bicycling traffic across the city continuously from 17 permanent count locations.

This data provides insights into where, when, and how many people walk and bike in Bellevue and how that changes over time.

The first permanent bike counters were installed in 2015 on the I-90 Trail and SR-520 Trail. Another counter was installed on the Eastrail in 2018, and more than a dozen additional counters were installed in bike lanes in 2019.



The Pedestrian and Bicycle Count Dashboard is publicly available at: [Pedestrian & Bicycle Count Report (arcgis.com)]

Commission Question #2

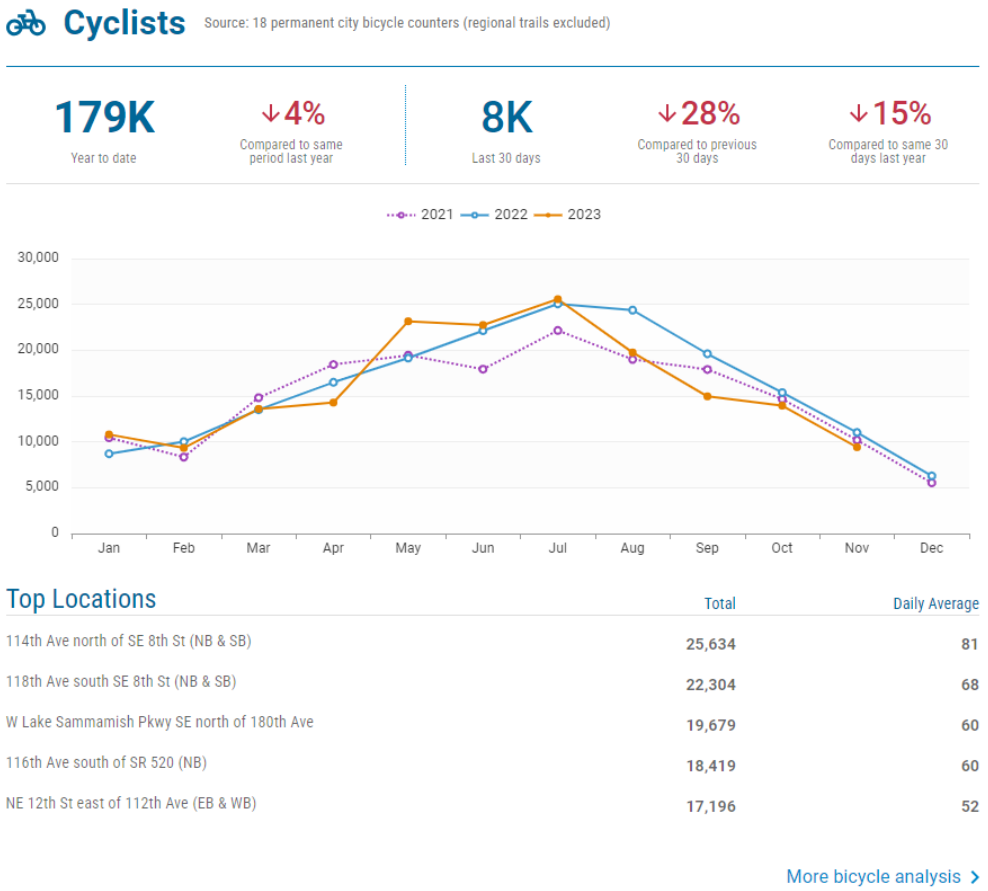
Has the city done any year-round studies of bike ridership to see how it fluctuates with different seasons?

Staff Response #2

The city's permanent bicycle counters automatically upload data to online data platforms.

[Bellevue | Data Analysis (strataresearch.io)](strataresearch.io) displays year-round bike counts.

These counters provide the city with data to understand bicycle count fluctuations that may be influenced by season, construction activity, events, infrastructure improvements, etc.



Clip taken from [Bellevue | Data Analysis (strataresearch.io)](strataresearch.io) on 12/8/2023

Commission Questions #3

What percentage of all travelers in Bellevue choose to ride a bike to work on a daily basis?

Staff Response #3

Mode Share for Non-WFH Commuters	Lives in Bellevue (Works anywhere)			Works in Bellevue (Lives anywhere)		
	Estimate	*Margin of Error*		Estimate	*Margin of Error*	
		Low	*High*		*Low*	*High*
Drove Alone	67.6%	*70.0%*	*65.5%*	76.9%	*78.5%*	*75.5%*
Carpooled	12.0%	*11.3%*	*12.5%*	11.2%	*11.0%*	*11.5%*
Public Transit	10.4%	*10.0%*	*10.8%*	6.6%	*6.1%*	*7.0%*
Walk	7.0%	*6.6%*	*7.3%*	3.3%	*3.0%*	*3.6%*
Bike	0.7%	*0.5%*	*0.8%*	0.5%	*0.4%*	*0.7%*
Other	2.4%	*1.6%*	*3.0%*	1.4%	*1.0%*	*1.8%*

Data source: 2022 American Community Survey 5-year Estimates: Tables B08301 & B08601

Commission Question #4

What happened to the corridors/ plans that were proposed in the 2016 bike plan? Why are we not building on that plan?

Staff Response #4

Bike Bellevue includes corridors beyond those in the 2016 BRIP citywide project list to address the Mobility Implementation Plan LTS performance target gaps; a notable example being Bel-Red Road.

The 2016 Bicycle Rapid Implementation Program (BRIP) includes recommendations for citywide investments in Bellevue's bicycling infrastructure. Following approval of the BRIP, staff has been implementing projects (see progress report) identified in this citywide plan (including Downtown Bikeway Projects).

Although major capital projects and levy-supported projects are implementing bikeways in Bellevue's Downtown, Wilburton and BelRed neighborhoods significant gaps in the network remain that limit access to and the utility of these investments. In 2022, Council approved $4.5 million for CIP PW-W/B-85 in the 2023-2029 Capital Investment Program to plan and implement rapid-build bicycle infrastructure in the Downtown, Wilburton and BelRed neighborhoods.

Commission Question #5

What major stakeholders in the Bellevue business community have you personally reached out to?

Staff Response #5

The following represents the formal presentations by staff to businesses and business organizations.

- Bellevue Commuter Trip Reduction/Employee Transportation Coordinator Networking Meeting (October 25, 2023): Presentation
- Bellevue Chamber of Commerce PLUSH Committee (October 24, 2023): Presentation
- Bellevue Chamber Transportation Committee (September 27, 2023): Presentation
- Bellevue Downtown Association Transportation Committee (September 20, 2023): Presentation
- Bellevue Chamber of Commerce Transportation Committee (April 6, 2023): Presentation

Additional presentations to the Bellevue Chamber of Commerce and Bellevue Downtown Association are scheduled for February 2024.

Additionally, the city:

- Sent mailers to **27,230** homes and businesses in the project area.
- Emailed **74** businesses to reach **52,000** employees through the CTR listserv; and **4,310** people on COB transportation listservs
- Shared posters with **30** libraries, community centers, coffee/tea shops, and outdoor/recreational shops
- Provided information through the *Choose Your Way* Bellevue newsletter and website, *Neighborhood News*, and *It's Your City*
- Distributed flyers to businesses in Spring District (and Farmers Market), BelRed, and Wilburton neighborhoods in May and again in December.

Commission Question #6

How has the city notified Bellevue businesses and Bellevue residents specifically about the plan to take out 6 miles of vehicle lanes and turn them into bike lanes?

Staff Response #6

- The DRAFT Design Concepts Guide, November 2023 (pg. 5) includes that an estimated 5.9 miles of motor vehicle travel lanes will be repurposed for this project.

- The project webpage specifies that 5.9 miles of motor vehicle travel lanes will be repurposed to implement the 15.11 miles of bike lanes (see FAQ).

- Bike Bellevue mailers, posters, flyers, and social media posts are brief and do not delve into project impact details – positive or negative.
  - Instead, these communications direct the public to where they can find more information (project webpage, Konveio site when it was open).

Commission Question #7

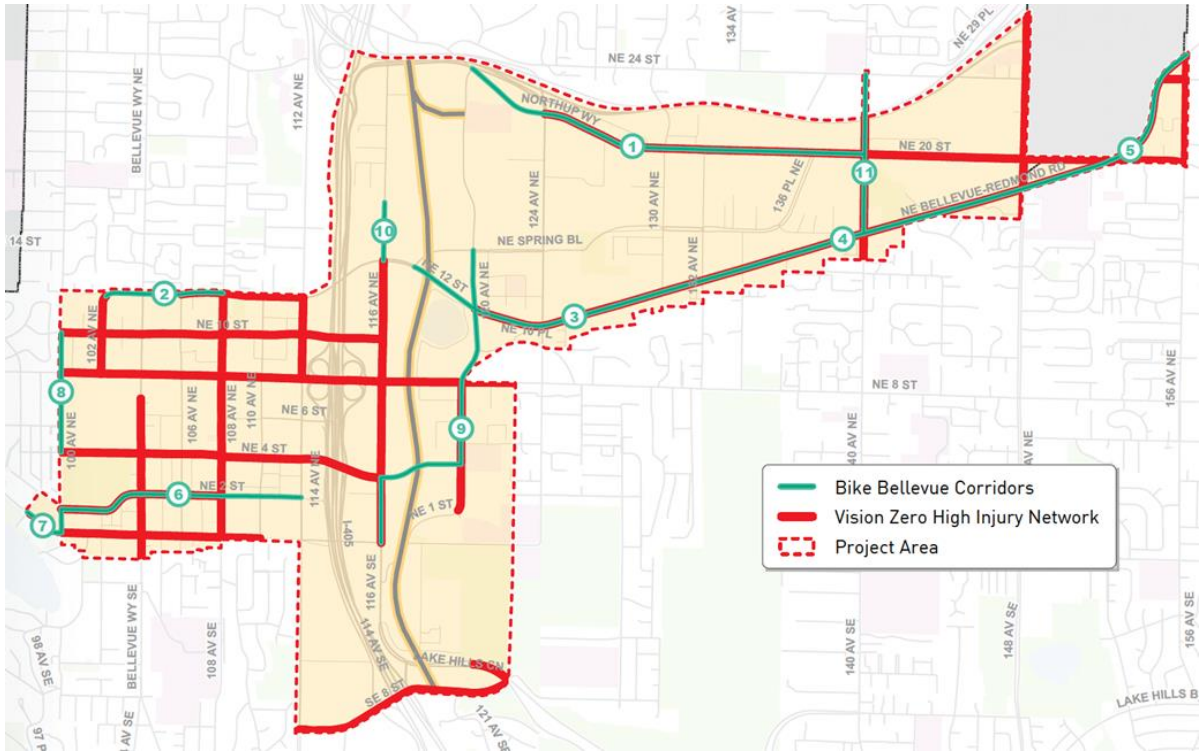
Why are you looking at taking car lanes away from corridors that parallel each other?

Staff Response #7

The proposed Bike Bellevue corridors are part of the city's identified bicycle network. As such, some Bike Bellevue corridors do parallel each other as they are part of a larger bicycle network.

The Bike Bellevue concepts have tried to limit reducing the number of vehicle lanes when possible. However, because Bike Bellevue is a rapid-build effort, the concepts are constrained to the existing roadway width. In order to meet Level of Traffic Stress (LTS) metrics defined in the Mobility Implementation Plan (MIP) for these identified bike network corridors, some vehicle lane width was reallocated to provide designated bicycle facilities along said corridors. Traffic modeling was conducted following city standards for all corridors, including corridors in which the number of vehicle lanes was reduced in the build scenario. This approach is consistent with the layered performance target gap evaluation presented in the MIP and the results of each of these performance metrics has been included in the Bike Bellevue (DRAFT) Design Guide.

Each corridor has been identified as an opportunity to improve safety, level of traffic stress (LTS), and access for cyclists present today and anticipated in the future.



City of Bellevue High Injury Network (HIN) within Bike Bellevue area

Commission Question #8

Why are you looking at taking cars lanes away from Northup & 20th when the 520 trail runs right next to it?

Staff Response #8

The 520 multi-purpose trail is a regional trail that provides regional access for non-motorized users and is largely separated from local Bellevue streets, businesses, and residences.

Adding bicycle lanes along Northup Way will improve connectivity of bicycle infrastructure on Bellevue streets, allowing cyclists to safely access home, jobs, areas of play, and local businesses within the city.

Commission Question #9

What are the alternatives to building more bike infrastructure without taking away vehicle travel lanes?

Staff Response #9

The city is working with developers as well planning capital improvement projects to install fully separated bicycle facilities behind the roadway curb at locations across Bellevue. However, development projects only provide short segments of frontage improvements, not full corridors; and larger capital projects that include considerable paving, utilities, and landscaping require more funding and have longer lead times for planning, design, engineering, and construction.

The 2009 Pedestrian and Bicycle Transportation Plan acknowledged the need for near and mid-term implementation of north-south and east-west cross-city bicycle routes, defining 5 and 10-year goals yet to be completed. Rapid-build techniques like re-channelization of existing roadway space is needed to meet these types of near and mid-term goals.

Bike Bellevue aims leverage rapid-build solutions to meet city goals of providing a safe, connected network of bicycle facilities until larger projects take place that can put bike facilities behind the curb.

Commission Question #10

What about Spring Blvd? That was built as a great roadway with bikes lanes on the side. Why not focus on extending that on through as the principal East/ West route?

Staff Response #10

Projects like Spring Boulevard require large budgets and long lead times for planning, design, engineering, and construction. Portions of Spring Blvd have been constructed, however remaining segments are still in early stages of design and do not yet have construction funding. These future segments will ultimately provide a multi-modal east-west corridor through Spring District in years to come, but without funding there is no estimated completion date of the remaining segments.

In the meantime, quick-build solutions like Bike Bellevue are cost effective ways to provide safe bicycle infrastructure while other corridor projects are still in the works. Additionally, projects like Bike Bellevue expand the benefit of large investments like Spring Blvd by increasing the range at which Bellevue residents and visitors can get to the facilities on Spring Blvd safely via bicycle. Network projects like Bike Bellevue allow us to look beyond just one corridor and consider network-wide gaps and needs. Bike Bellevue looks to connect existing and future bicycle infrastructure to provide a network of safe and diverse mode choices.

[NE Spring Boulevard | City of Bellevue (bellevuewa.gov)]

Commission Question #11

What about poor weather conditions in our area and the impact that has on the desire to ride a bike?

Staff Response #11

Seasonality can certainly impact how people travel and mode choice, but this is a large umbrella under which more nuanced evaluation is needed to understand seasonal trends. For one, weather, including temperature and precipitation, has seasonal trends that have shown correlating trends with bicycle counts. Cyclists may be choosing other mode options on colder and wetter days, reducing average cyclist counts in winter months. However, other factors of seasonality may also be contributing to this trend. For example, reduced visibility with fewer daylight hours may be making cyclists not feel as seen or confident on the roadway. Infrastructure improvements such as improved lighting and separated, buffered bicycle facilities may mitigate those inhibitors. Additionally, research has shown that seasonality impacts recreational facilities more than utilitarian ones [Modeling Seasonal and Weather Impacts on Cycling Count].

Commission Question #12

Is staff considering maintenance in Bike Bellevue?

Staff Response #12

Yes, project staff members are coordinating and receiving feedback from our streets maintenance crew on the Bike Bellevue design concepts. All new bicycle infrastructure will be accounted for in future maintenance budget requests. We will calculate the annual maintenance expense for these corridors and incorporate it into future budget asks as each corridor works its way through final design.

Commission Question #13

Is staff considering Fire Department operations in Bike Bellevue?

Staff Response #13

Yes, project staff members have met with Fire and will maintain coordination as Bike Bellevue design concepts are refined. Staff will ensure the design concepts meet fire code and address concerns the Fire Department raises during review.

Commission Question #14

BKRCast model

Does it assume no Eastrail in both Build and No Build scenarios? Is Eastrail in the TFP2033 network?

Staff Response #14

- No, Eastrail is complete between 118th Ave SE & the northern City Limits in the TFP 2033, in the No Build, and Build networks.

The No Build future year model network is based on the 2033 TFP network with the addition of a pedestrian Grand Connection between Eastrail and the Downtown Link Light Rail Station, the Spring Boulevard extension between 124th Ave NE and 130th Ave NE, and the SR 520 eastbound half-interchange at 124th Ave NE. The No Build model includes Sound Transit and King County Metro transit capacity projects programmed to be implemented prior to 2035. The Build future year model network is based on the No Build network with the addition of the eleven Bike Bellevue corridors.

Commission Question #15

BKRCast model

How did it compute mode share in build vs. no-build?

Staff Response #15

- Mode share is calculated independently between the No Build and Build models
- Mode share is derived from the Tours output from BKRCast

Mode share is the percentage of travel events that are taken by each mode of transportation: walking, bicycling, single-occupancy vehicle, high-occupancy vehicle, and transit/school bus. For the Bike Bellevue concept assessment, the mode share is presented by tours that originate or have a destination in the project area or Bellevue for both all purposes and work purpose.

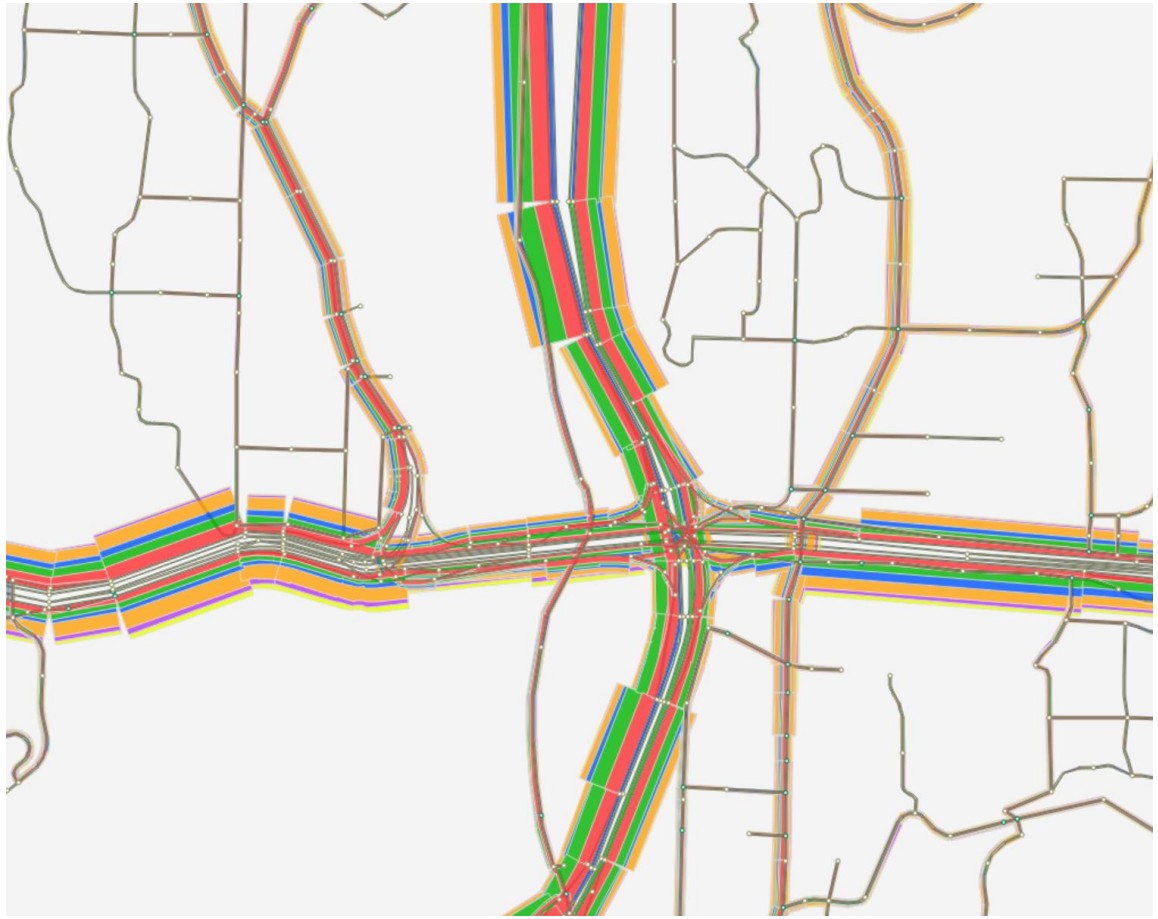
Commission Question #16

BKRCast model

Does it provide route/corridor data per mode?

Staff Response #16

- Yes, BKRCast outputs routing information for 21 vehicle classes
  - Vehicle
  - Bike
  - Toll vs No Toll
  - Income Level
  - SOV vs HOV
  - Truck Size
- Accounts for walk trips but does not route them



Example of the six SOV vehicle classes tracked in BKRCast

Commission Question #17

BKRCast model

Which alternative does this assume from the Comp Plan Update 2023 DEIS?

Staff Response #17

- The updated Bike Bellevue future analysis will be based on the constrained 2044 Preferred Land Use scenario
  - Currently under development for publication in early 2024
- Initial analysis based on best available published future land use scenario, 2033 TFP
  - Original project timelines didn’t allow for overlapping analyses

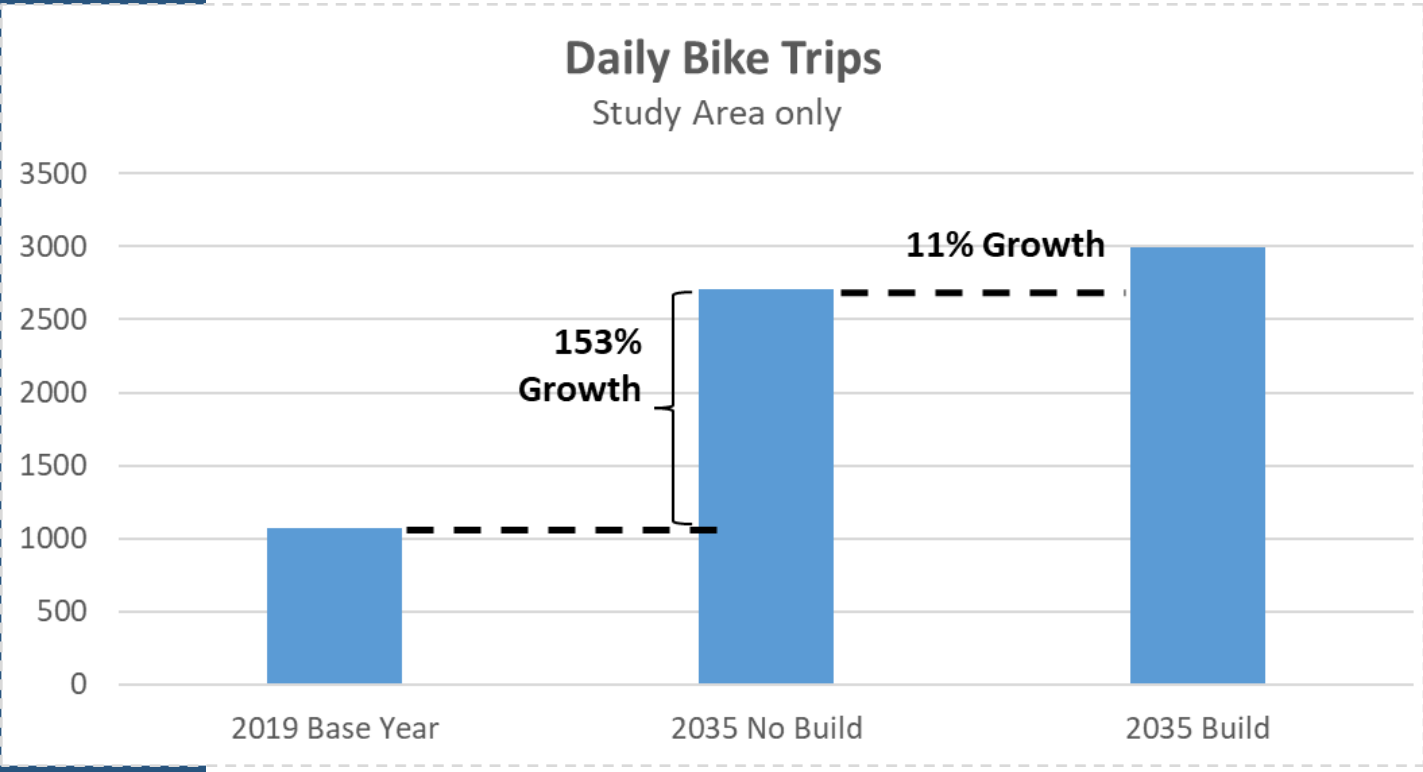
Commission Question #18

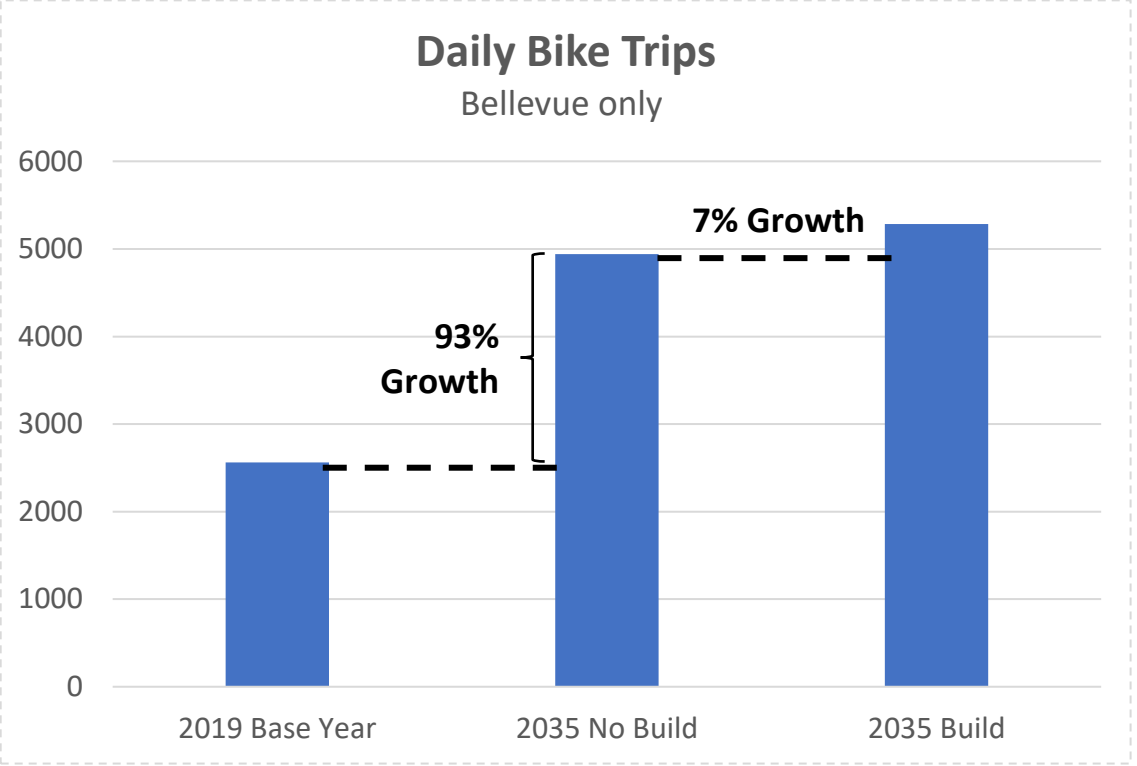
BKRCast model

Why are there no changes in Project Area Bike Work Tours between Build and No Build?

Staff Response #18

- The land use scenario is the same for both No Build and Build models and this is the largest factor in mode shift





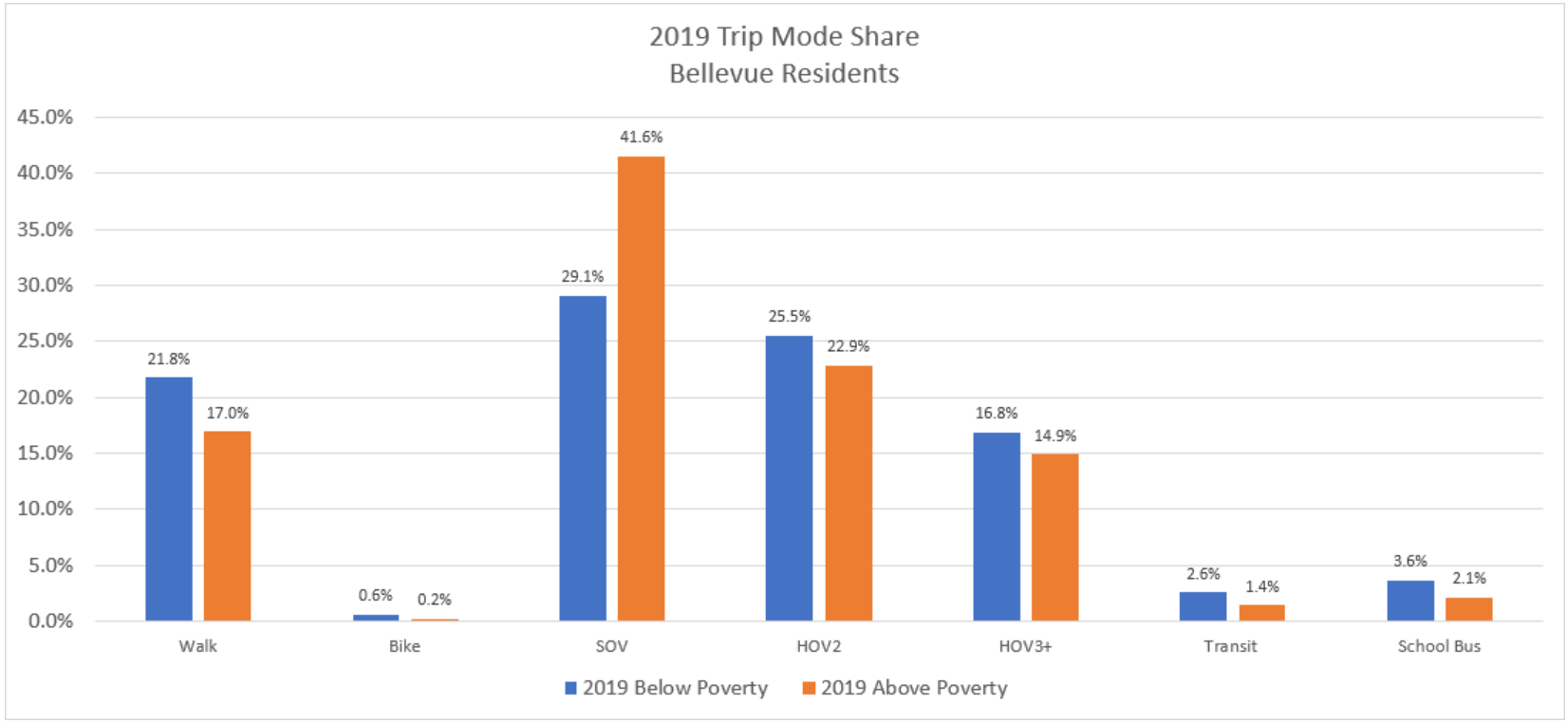
Commission Question #19

Equity / Enhancing Equitable Access

What are the separate walk vs. bike statistics? Separate this where "Active Transportation" or "Non Motorized" are stated.

Staff Response #19

People with lower-incomes are 28% more likely to walk and 210% more likely to bicycle than people with higher incomes. This supplements the data shown in Appendix C, page 148 of the DRAFT Design Concepts Guide, November 2023.



Commission Question #20

Equity / Enhancing Equitable Access

Why did we select those particular equity indicators? Why not include low income families?

Staff Response #20

The body of the DRAFT Design Concepts Guide (pages 11 and 12) provide data and maps on low-income households.

The additional metrics in the Appendix are provided for context and completeness based on best practices identified in our literature review. See page 12 and Appendix B.

Figure 9. Low Income Population in the Bike Bellevue Project Area Based on US Census Bureau Data (2019-2023)

Commission Question #21

Alta Accessibility Report

Add "Baseline + Eastrail" scenario to compare Build vs No Build scenarios. Why was this excluded? Are we assuming Eastrail is built out if and only if Bike Bellevue is built out?

Staff Response #21

The sequencing of Baseline + Bike Bellevue was chosen to isolate the benefits of Bike Bellevue to the immediate project area. Adding Eastrail shows how Bike Bellevue and Eastrail can combine for more access gains. The analysis did not intend to imply that Eastrail is dependent on Bike Bellevue. See Appendix B, page 2 of the Alta memo.

Table 1. Accessibility Analysis Scenario Network Settings

Scenario	Network Notes	LTS Conditions
Baseline	OSM-based network, all existing Eastrail segments included	Current LTS values for all network segments
Bike Bellevue Only	OSM-based network, all existing Eastrail segments included	Future LTS values for all Bike Bellevue Projects, current LTS values everywhere else
Bike Bellevue + Eastrail	OSM-based network, existing and proposed Eastrail segments included	Future LTS values for all Bike Bellevue projects, current LTS values everywhere else

Commission Question #22

Alta Accessibility Report

Job accessibility is increased, but how do we calculate actual usage? Can people afford housing 20 minutes bike distance to their work?

Staff Response #22

This report was focused on increases in access, which is a measure of the ability for the transportation network to connect origins and destinations. Estimated actual usage was calculated using BKRCast and the ICLEI methodology and is presented in other parts of the document (see Appendix C – pages 115 and 153 of the combined DRAFT Design Concepts Guide and Appendices).

Low-income households were identified and analyzed as part of the analysis (see Figure 9 on page 12)

Project Areas	Low-Stress Job Access Gain	Low-Stress Lower-Income Job Access Gain	Low-Stress School Access Gain	Low Stress Transit Stop Access Gain
	Average Increase Each Resident Sees in Number of Jobs Accessible	Average Increase Each Resident Sees in Number of Lower-Income Jobs Accessible	Average Increase Each School Sees in the Number of Low-Income Residents with Access to the School	Average Increase Each Transit Stop Sees in the Number of Low-Income Residents with Access to the Stop
Bike Bellevue	670 jobs (+24%)	106 jobs (+30%)	313 people (+33%)	72 people (+71%)
City of Bellevue	120 jobs (+8%)	19 jobs (+8%)	70 people (+3%)	16 people (+3%)
Beyond Bellevue	25 jobs (+3%)	4 jobs (+3%)	32 people (+1%)	4 people (+0.5%)

Commission Question #23

Alta Accessibility Report

Why is 200% of federal poverty line used here (vs. 100% fed poverty line)? Separate walking and biking stats (they are often stated together).

Staff Response #24

This analysis was prepared prior to the other equity analyses and uses the definition of poverty adopted many Washington State assistance programs. General trends are the same if you use 100 or 200% of the poverty line when evaluating increased access to low-income households.

Figure 9. Low Income Population in the Bike Bellevue Project Area Based on US Census Bureau Data (2019-2023)

Commission Question #24

Economic Impact from Physical Activity and Crash Risk study (F&P) - ICLEI

What % of buildings provide secure parking, repair, rentals, and proper changing facilities (Level A)?

Staff Response #24

The ICLEI Model is used by the Community Development Department to support the Environmental Stewardship Plan. Collaboration between the Transportation Modeling team and Community Development identified ICLEI as a tool to use for Bike Bellevue.

ICLEI provides a general description of the land use and bicycling environment (Levels A-C) that that are related to specific elasticities. Level A includes a general description of downtown areas that include a basic level of bicycle supportive infrastructure. Exact percentages of buildings that have bicycle amenities are not provided. See Appendix C, page 151 of the combined DRAFT Design Concepts Guide and Appendix document for detailed descriptions of the ICLEI Levels).

When reviewing new projects in the Bike Bellevue study area, Development Services works with developers to build bicycle amenities such as showers, lockers, and secure parking facilities.

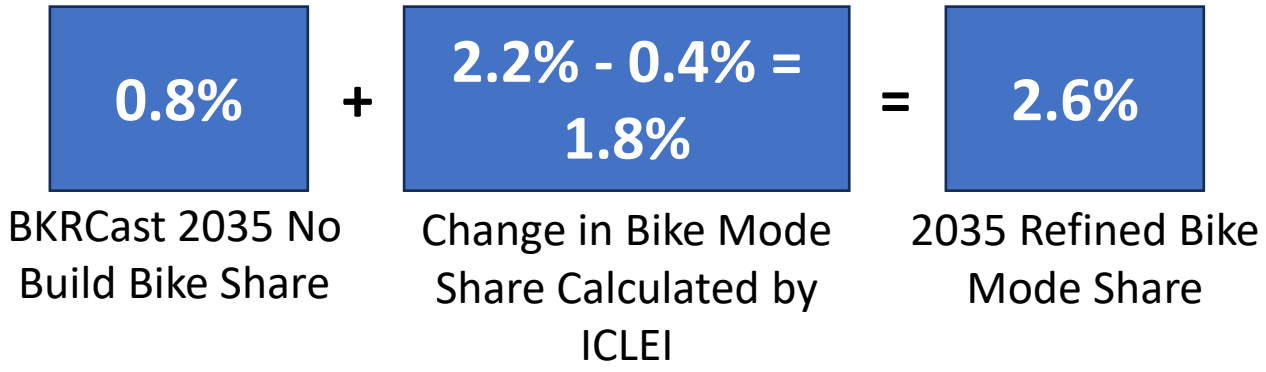
Commission Question #25

Economic Impact from Physical Activity and Crash Risk study (F&P) - ICLEI

Why is: 0.8% + (2.2%-0.4%) = 2.6% bike mode share a valid calculation? 2.2% is from Level A; 0.4% is from No Amenities (All arear population density). BKRCast models 0.86%, an increase of 0.06%.

Staff Response #25

Per Appendix C, page 115 of the combined DRAFT Design Concepts Guide and Appendix document, the 2035 forecast No Build bike mode share for all trip purposes is 0.8%. To forecast future bike mode share using the ICLEI elasticity for Level A communities, the change in mode share between No Amenities and Level A is applied to the No Build BKRCast Data.



Commission Question #26

Economic Impact from Physical Activity and Crash Risk study (F&P) - ICLEI

Why was the default of 0% used for re-assigned active trips? Where was trip reassignment done in ICLEI? In BKRCast Bike tours increased by 210 but walk decreased by 122 (in project area). But this data was not used in the HEAT tool (2.6% bike share mode was used from ICLEI).

Staff Response #26

This comment pertains to the HEAT model that was used to calculate potential health benefits of more bicycling (see Appendix A, page 57 of the combined Concept Guide and Appendix document).

The HEAT model has an option to “re-assign” vehicle trips to active mode trips. This was not applied since we directly input the change in mode share into the HEAT model using output from the BKRCast and ICLEI models. The change in the people walking was not used in the HEAT analysis because we did not calculate any safety or personal health changes related to changes in pedestrian travel.

Commission Question #27

Economic Impact from Physical Activity and Crash Risk study (F&P) - ICLEI

Take up time for active travel demand was left at 1. Does this imply the entire network is available in 2022?

Staff Response #27

No, there was no presumption that Bike Bellevue was complete by 2022. The DRAFT Design Concepts Guide summarizes sustainability and health benefits at a 2035 horizon and a 20-year cumulative benefit based on the 2035 calculation.

Sustainability

Improving bike facilities encourages more people to ride. City modeling indicates that Bike Bellevue improvements and increased land use density will result in bicycle mode share increasing from 0.8% today to 2.6-4.3% by 2035 (Appendix E). These modeling results support a city survey, that found that 62% of respondents indicated they would ride a bicycle more often if streets had safe and comfortable bike lanes. **When built out in 2035, Bike Bellevue will:**

- Facilitate 825,000[a] to 4 million[b] bike trips a year
- Reduce GHG emissions by between 1,100[a] - 4,000[b] metric tons per year; equivalent of eliminating the annual GHG emissions of 240[a] - 890[b] cars
- Reduce VMT between 1.2 million[a] and 10.8 million[b] miles per year
- Support Bellevue's Environmental Stewardship goals of reducing total GHG emissions and per capita VMT by 50% over the next 10 years

Over the 20-year project lifetime, between 31,000[a] and 115,000[b] metric tons of GHG emissions are eliminated, equivalent to eliminating the annual emissions of:

- 6,900[a] and 25,700[b] cars
- or 3,900[a] or 14,600[b] homes
- or Burning 3.5[a] million to 12.9[b] million gallons of gasoline
- or Planting between 37,000[a] and 137,500[b] acres of new forest

a. BKRCast Bike Bellevue 2035 Build Model (Appendix E)
b. ICLEI International Local Government GHG Emissions Analysis Protocol (IEAP) Level B (Appendix B)

Commission Question #28

Economic Impact from Physical Activity and Crash Risk study (F&P) - ICLEI

Why was ICLEI Level B also calculated and presented?

Staff Response #28

As noted in Appendix C, page 152 of the combined Concept Guide and Appendix document, with Bike Bellevue, the Bike Bellevue project area is forecast to have a high population density (17,800 persons per square mile) and 8 miles of bicycle lane per square mile. This level of bike infrastructure is substantially more extensive than the Level A definition but lacks the extensive external network and traffic calming defined for Level C. Therefore, Level B was selected since there is the potential for additional mode shift beyond what is predicted by Level A.

Staff Response #29

Economic Impact from Physical Activity and Crash Risk study (F&P) - ICLEI

ICLEI's model assumes the cost of gasoline has a significant impact on bike mode share. Does this apply to Bellevue, considering recreational use and EVs?

Staff Response #29

No, fuel prices are not a consideration. ICLEI's model for estimating bicycle mode shift is only influenced by land use context and the level of cycling infrastructure.

Commission Question #30

GHG Emission Reduction

How do EVs and WA policy through 2035 change these numbers? It says it takes EVs into account -- how?

Staff Response #30

The GHG emissions factors presented in Appendix C, pages 149 and 150 of the combined Concept Guide and Appendix document were provided by PSRC. PSRC incorporates the expected vehicle fleet mix of EVs and internal combustion vehicles, inclusive of Washington State policies, into the calculations.

Table 2: GHG Emission Factors in Grams CO2 Equivalent per Mile

Speed Bins	2018	2030	2040	2019 Interpolated	2035 Interpolated
(0.0, 2.5]	2089	1597	1442	2048	1520
(2.5, 7.5]	1160	885	799	1137	842
(7.5, 12.5]	698	531	479	684	505
(12.5, 17.5]	550	418	377	539	398
(17.5, 22.5]	456	348	314	447	331

[1] US Environmental Protection Agency, *MOVES and Mobile Source Emissions Research.* https://www.epa.gov/moves

Commission Question #31

GHG Emission Reduction

Which is more accurate, ICLEI or BKRCast?

Staff Response #31

Based on the research of communities that have substantially built out their bicycle infrastructure (presented in Appendix C, page 151 of the combined Concept Guide and Appendix document), BKRCast may have the tendency to underestimate the potential for mode shift due to fine-grained improvements to the bicycle network. However, it is worth noting that BKRCast is a state-of-the-art travel model based on localized data.

Acknowledging that there are limitations associated with both models, we present the range of bike mode share potentials since both models have merit and can be validated against different types of data.

Commission Question #32

Modeling Analysis Summary

2019 Citywide households is stated as 70,980. U.S. Census Bureau QuickFacts: Bellevue city, Washington states 59,800 for 2017-2021 (2.48 people/household). Why the difference?

Staff Response #32

- The 70,980 households represents Bellevue and the Sphere of Influence
  - City of Bellevue: 59,556 households
  - Bellevue Fringe: 11,414 households
- The Draft Concept Guide will be updated to reflect this information

Commission Question #33

Modeling Analysis Summary

In Mode Share for both Project Area and Citywide, Bike is listed as 0% in 2019 and 1% in 2035 Build and No Build. Can you go to two significant digits, or is the within the error band?

Staff Response #33

Yes, staff can provide two significant digits.

- The 2019 Project Area mode share for bike is 0.4%
- The 2019 Citywide mode share for bike is 0.4%

Commission Question #34

Modeling Analysis Summary

Why do some corridors improve in speed and V/C going from No Build to Build?

Staff Response #34

The utility of a specific corridor changes when the roadway capacity changes

- A route that has an abundance of capacity will attract drivers from the surrounding area
- These drivers are capitalizing on the available space to make longer trips
- When the capacity is reduced / constrained, the long trip drivers search for the next best route and local drivers continue to use the route
- The resulting shift of traffic results in a slight increase in travel speed and reduction in V/C

Commission Question #35

If the .2 mph reduction in travel speed is an average of all the proposed corridors. What is the average reduction per direction specifically for the corridors where you are looking to remove a car lane?

Staff Response #35

Staff are updating the future year analysis and will incorporate your feedback in the updated presentation of the results.

Commission Question #36

If the overwhelming majority of people that work in Bellevue do not live in Bellevue, does that hold true for people that choose to bike to work?

Staff Response #36

No, if you live in Bellevue the mode share for bike is 0.7% and if you work in Bellevue the mode share is 0.5%.

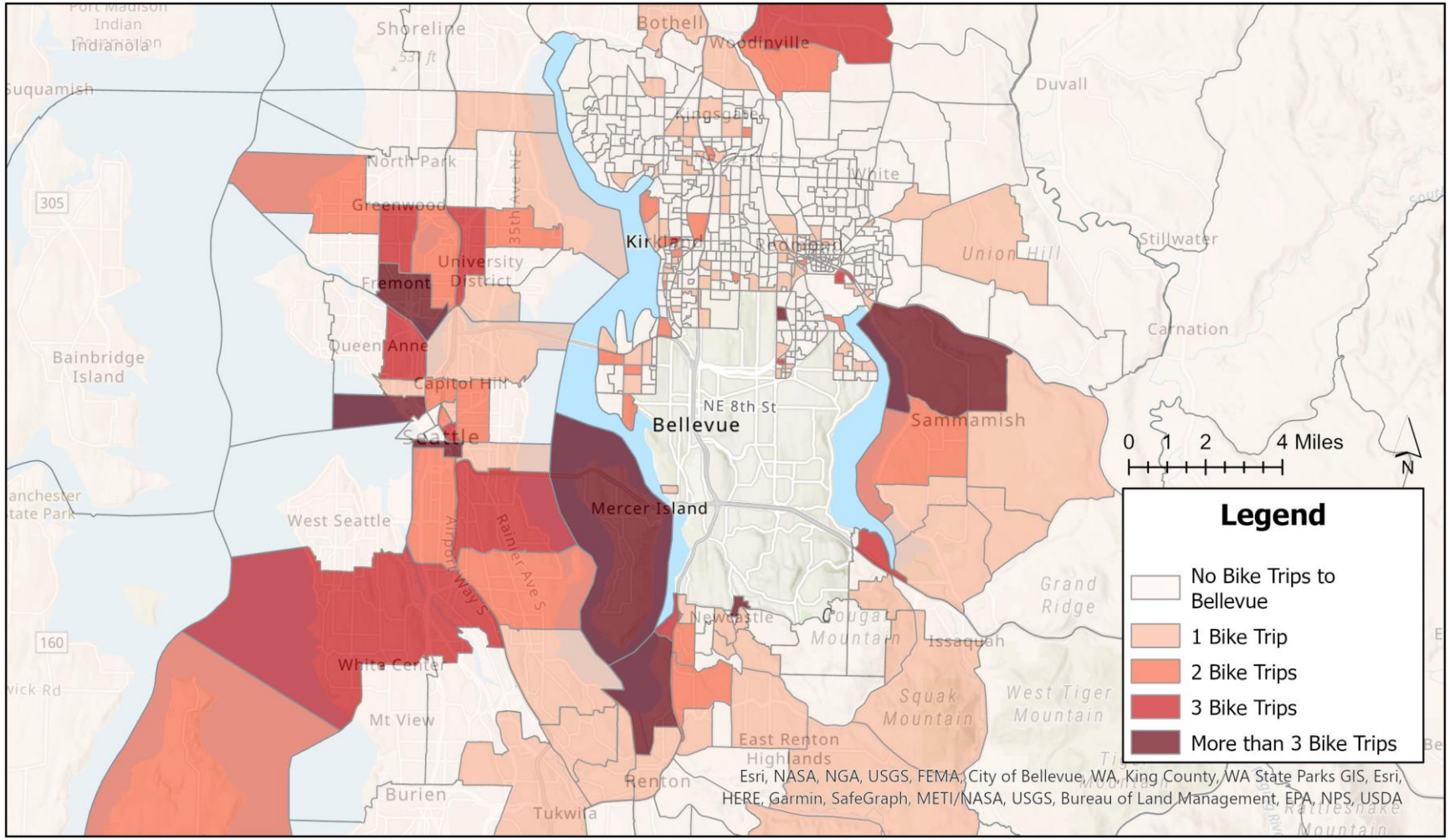
Mode Share for Non-WFH Commuters	Lives in Bellevue (Works anywhere)			Works in Bellevue (Lives anywhere)		
	Estimate	*Margin of Error*		Estimate	*Margin of Error*	
		Low	*High*		*Low*	*High*
Drove Alone	67.6%	*70.0%*	*65.5%*	76.9%	*78.5%*	*75.5%*
Carpooled	12.0%	*11.3%*	*12.5%*	11.2%	*11.0%*	*11.5%*
Public Transit	10.4%	*10.0%*	*10.8%*	6.6%	*6.1%*	*7.0%*
Walk	7.0%	*6.6%*	*7.3%*	3.3%	*3.0%*	*3.6%*
Bike	0.7%	*0.5%*	*0.8%*	0.5%	*0.4%*	*0.7%*
Other	2.4%	*1.6%*	*3.0%*	1.4%	*1.0%*	*1.8%*

Data source: 2022 American Community Survey 5-year Estimates: Tables B08301 & B08601

Commission Question #37

Where are the bicycle commuters mainly coming in from?

Staff Response #37



2035 Build Distribution of Bike Trips to Bellevue during the AM Peak Period (6 am to 9 am)

Commission Question #38

Of the 33,000 new residents coming in by 2035, what percentage of them will want to commute by car?

Staff Response #38

Mode share is dependent on many factors:

- Housing/Job Ratio
- Housing/Job Density
- Vehicle ownership
- Transit Accessibility
- etc.

The changing landscape of Bellevue will likely result in fewer trips by car and more transit, walking, and biking trips.

Commission Questions #39

What percentage of all travelers in Bellevue choose to travel by Car/ Carpool/ Transit or Company Shuttle (essentially anything that requires a vehicle lane)?

Staff Response #39

Mode Share for Non-WFH Commuters	Lives in Bellevue (Works anywhere)			Works in Bellevue (Lives anywhere)		
	Estimate	*Margin of Error*		Estimate	*Margin of Error*	
		Low	*High*		*Low*	*High*
Drove Alone	67.6%	*70.0%*	*65.5%*	76.9%	*78.5%*	*75.5%*
Carpooled	12.0%	*11.3%*	*12.5%*	11.2%	*11.0%*	*11.5%*
Public Transit	10.4%	*10.0%*	*10.8%*	6.6%	*6.1%*	*7.0%*
Walk	7.0%	*6.6%*	*7.3%*	3.3%	*3.0%*	*3.6%*
Bike	0.7%	*0.5%*	*0.8%*	0.5%	*0.4%*	*0.7%*
Other	2.4%	*1.6%*	*3.0%*	1.4%	*1.0%*	*1.8%*

Data source: 2022 American Community Survey 5-year Estimates: Tables B08301 & B08601

Commission Question #40

BKRCast model

How does BKRCast calculate net 88 Walk/Bike tours in the project area vs. ICLEI's 2.6%?

Staff Response #40

BKRCast

- The increase in bike tours within the project area from No Build to Build represents a 7.5% percent change.
- BKRCast is developed using historic travel surveys and counts and doesn't include systemic changes to travel behavior or disruptive technologies

ICLEI

- Per Appendix C, page 115 of the combined Concept Guide and Appendix document, the 2035 forecast No Build bike mode share for all trip purposes is 0.8%. To forecast future bike mode share using the ICLEI elasticity for Level A communities, the change in mode share between No Amenities and Level A is applied to the No Build BKRCast Data.
- Approach is known as the "difference method" and is a standard for forecasting travel behavior.

Commission Question #41

BKRCast model

Alta Accessibility Model (Replica Places) indicates 1627 trips that end in project areas (2022). BKRCast indicates 1068 in study area (2019). Is the difference expected?

Staff Response #41

Yes, the difference between the Replica Places Model and BKRCast is to be expected.

- The Replica Places Model was developed to be the first nationwide activity-based model and utilizes aggregate data skimmed from connected devices and counts to calibrate and validate the model at a regional, state, and national level
- BKRCast is hyper localized and has been calibrated and validated for the local conditions in Bellevue using travel surveys and local counts
- They are different tools for different purposes

Commission Question #42

BKRCast model

Why does the SR520 trail drop from 682 (No Build) to 496 (Build) in Bike Daily Volumes?

Staff Response #42

Cyclists who previously utilized a less direct route to access more comfortable bicycle facilities can take a more direct route, thus reducing the volume on the trail, with the implementation of Bike Bellevue.

Commission Question #43

BKRCast model

Why do Project Area Walk Tours drop by 123 comparing No Build to Build?

Staff Response #43

The reduction in walk tours is within the expected variability of the model, the percent change from No Build to Build for walk tours in the project area is -0.17%.

Commission Question #44

Dynameq DTA model

How do you consider network resiliency for all modes? What if there is a localized failure?

Staff Response #44

In a demand model, for each origin-destination (OD) pair, all used routes have equal and lowest travel time (generalized cost). Similarly, in a DTA model, For each OD pair and departure time, all used routes have equal and lowest experienced travel time (generalized cost).

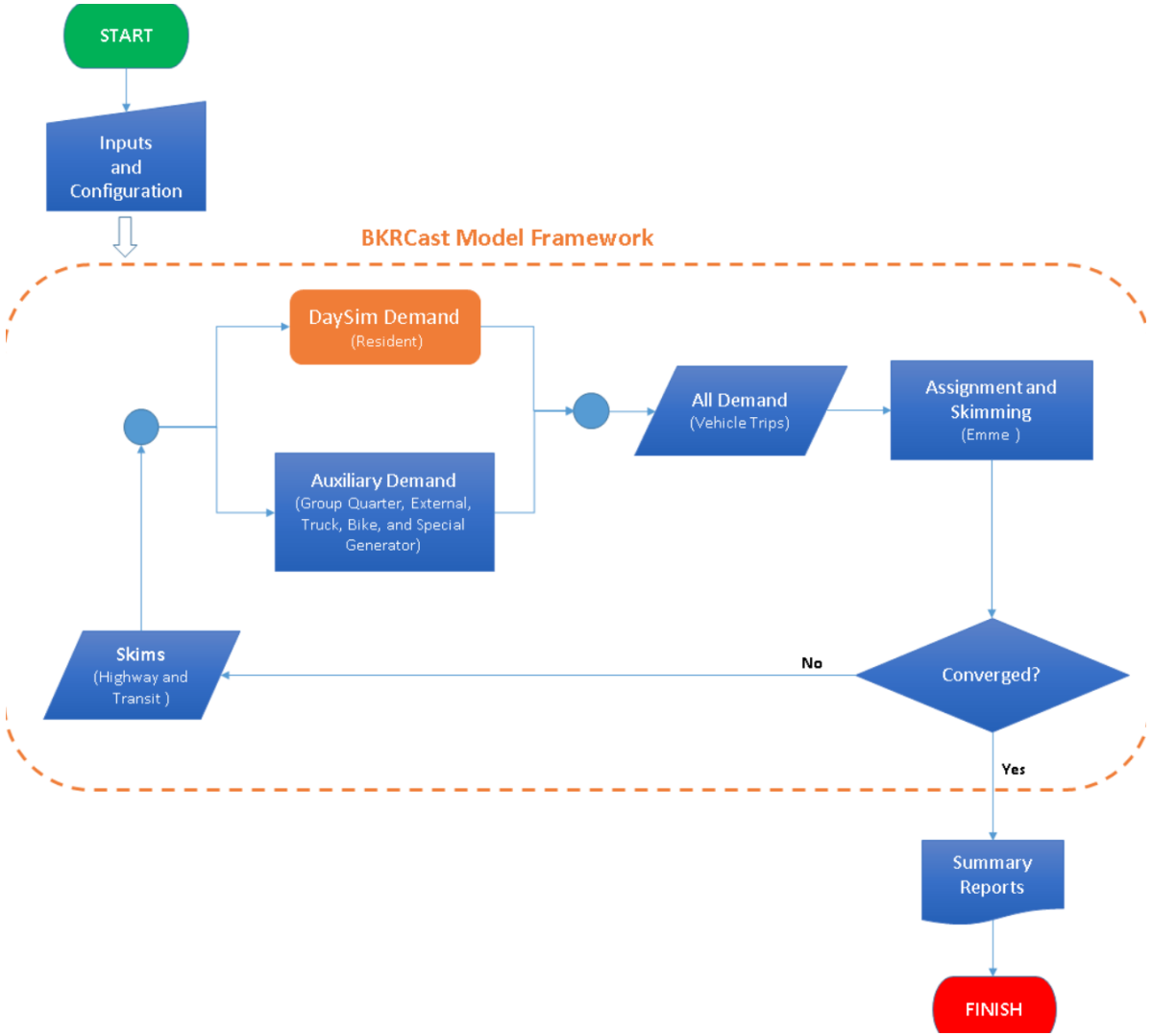
In other words, in a Dynameq DTA model, unlike a static travel demand model, the route which has the shortest travel time for a OD pair could be different for different time periods. The experienced travel time is calculated and updated for each given time period for assigning the trips in the following time period.

Commission Question #45

BKRCast model

What is the error band for the Build/No-Build calculations? What is the level of convergence?

Staff Response #45



STOP_THRESHOLD = 0.005
max_iter = 50
best_relative_gap = 0.01
relative_gap = .0001
normalized_gap = 0.01

Commission Question #46

BKRCast model

How do we describe/quantify the # trips and impact to the transportation area outside the project area?

Staff Response #46

The Bike Bellevue analysis included 57 system intersections, 45 of which are within the project area, a Type 1 Performance Management Area (PMA), one intersection is in the Crossroads, Type 2 PMA, and the rest are in the residential Type 3 PMA.

The intersections outside of the project area were selected to capture trips outside of the project area.

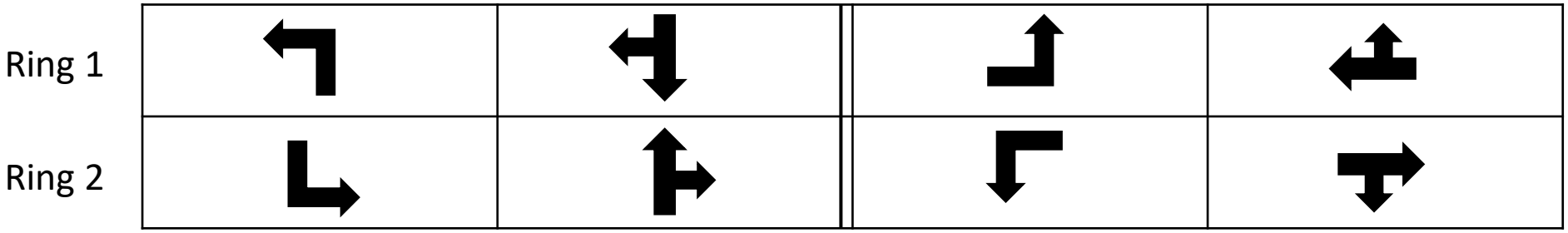
Commission Question #47

Dynameq DTA Model

What is the "Crit Vol" in Intersection V/C Ratio? Is it the lane/direction that has the highest volume (e.g., eastbound with right turn)? Is this the same as the "Critical Lane"? Is it the same lane/direction in base year, Build and No Build?

Staff Response #47

Critical volume is the volume of critical movement/lane group at a given signal timing phase that would require the most green time.



For Barrier 1, Critical Vol = Max (NBL + SBTh/R, SBL + NBTh/R)
For Barrier 2, Critical Vol = Max (EBL + WBTh/R, WBL + EBTh/R)

No, it is not the highest volume lane/direction; it is the maximum volume on either side of the barrier.

No, if the lane configuration and or the signal phase changes due to a project, the volumes on critical movements or lanes would be different.

Commission Question #48

Dynameq DTA Model

Why do some V/C ratios in downtown get better going from No Build to Build (especially where a travel lane is removed)? What happened to the No Build trips?

Staff Response #48

In a demand model, for each OD pair, all used routes have equal and lowest travel time (generalized cost). Similarly, in a DTA model, For each OD pair and departure time, all used routes have equal and lowest experienced travel time (generalized cost).

When a vehicular travel lane is removed on a corridor, it would be implied that the route is less attractive as the capacity is less for autos vehicles, especially there are capacity improvements proposed on the parallel streets or nearby routes, which still have capacity and would provide equal and lowest travel time.

Project Information

- **Project Webpage**
  https://BellevueWA.gov/bike-bellevue

- **Franz Loewenherz**
  Floewenherz@bellevuewa.gov or 425-452-4077