

City of
Bellevue



Transportation Commission Study Session

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TO: Chair Bishop and Members of the Transportation Commission

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SUBJECT: 108th Avenue Northeast Demonstration Bikeway Assessment Framework

DIRECTION REQUESTED

Action (Endorsement)

Discussion

Information

At the April 12, 2018 Transportation Commission meeting, staff seeks Commission endorsement of the 108th Avenue Northeast Demonstration Bikeway Assessment Framework.

Note: Multiple hyperlinks are included in this memo, requiring extensive Commission consideration. It will not be possible to review these materials in depth in the 45 minutes allotted to this topic at the April 12 meeting. Staff offers to meet with Commissioners to review materials and answer questions in advance of the April 12 meeting.

Background

Guided by the City Council's Pedestrian and Bicycle Implementation Initiative (PBII) [Program Principles](#) and [Scope of Work](#), the Transportation Commission and staff are working with community stakeholders to advance the projects and programs identified in the [2009 Pedestrian and Bicycle Transportation Plan](#). At its January 11, 2018 meeting, the Transportation Commission reaffirmed the 2009 Plan directive to implement a high comfort priority bicycle route through Downtown Bellevue.

Voting five in favor and two opposed, the Transportation Commission recommended proceeding with implementation of a downtown demonstration bikeway project on 108th Avenue Northeast, from Main Street to Northeast 12th Street (see [Commission Transmittal Letter to the City Council](#)). In its deliberations on the bikeway project the Transportation Commission indicated that the project should:

- collect data to make necessary adjustments and ultimately for assessing performance and next steps;
- minimize impacts to travel times, on street parking, and access to property;
- support existing and anticipated near-term bicycle projects leading to/from downtown;
- incorporate effective outreach before and during the implementation;
- ensure a safe and comfortable place for people walking, bicycling, taking transit, and driving vehicles; and,
- coordinate with transit and ride share services to support frequent and reliable operations.

The Transportation Commission recommended staff commence work on:

- design and permitting with a target implementation date of May 2018 (corresponds with Bike Everywhere Month);
- developing a scope of work to assess outcomes for all street users, including people bicycling, walking, driving, using transit, and transporting goods, based on data and community engagement; and,
- coordinating with private and non-profit organizations to support the launch and test period of the downtown demonstration bikeway project with education and encouragement activities.

At its February 5, 2018 meeting, the City Council voiced support for the demonstration bikeway project as a north-south priority bicycle corridor in the 2009 Pedestrian and Bicycle Transportation Plan that provides connections to regional bicycle routes. Councilmembers concurred with the Transportation Commission that a before-and-after study should be conducted to assess outcomes for all street users, including people bicycling, walking, driving, using transit, and transporting goods, based on data and community engagement. If outcomes are favorable, City Council could approve more permanent upgrades in the future, including more robust bike lane separation, traffic signal modifications, durable pavement markings, and other changes to curbs and the streetscape. This demonstration project could also help guide other Downtown bicycle improvements.

The Bellevue staff approach to the 108th Avenue Northeast Demonstration Bikeway Assessment Framework is informed by feedback from the Bellevue Downtown Association (BDA) [Position Statement, Conditions, and Recommendations for the Demonstration Bikeway](#) which states that: “The Demonstration Bikeway should be measured objectively through a systematic method of collecting data. Community feedback should also be routinely collected throughout the operation. The two approaches will be used for making necessary adjustments and ultimately for assessing performance.” The BDA specifically referenced the following key considerations.

1. **Ensure safety for all.** Consistent with the City of Bellevue’s Vision Zero initiative, the Demonstration Bikeway corridor needs to be designed as a safe and comfortable place for people walking, bicycling, taking transit, and driving motor vehicles. An educational outreach program should be incorporated to promote safe bicycling practices and information about the new corridor.
2. **Acknowledge change will occur to the right-of-way.** Minimize impacts to travel times, on street parking, and access to property.
3. **Coordinate with transit and ride share services.** The Demonstration Bikeway should not disrupt regular bus operations and rider experience. The City must have cooperation from transit agencies and ride share programs.
4. **Network connectivity is a high priority.** The Demonstration Bike Lanes should connect to the existing network of bike lanes.
5. **Support existing initiatives, plans, and projects.** The Demonstration Bike Lanes should support the Pedestrian and Bike Implementation Initiative and the 2009 Pedestrian Bicycle Transportation Plan by maximizing the return on investment of existing and anticipated near-term projects.
6. **Performance should inform next steps.** The examined results and evaluated community feedback will determine whether to refine or remove the Demonstration Bike Lanes.

In developing its 108th Avenue Northeast Demonstration Bikeway Assessment Framework, Bellevue staff also considered feedback from Commissioners Bishop and Woosley. As indicated in their [January 31 letter to Mayor Chelminiak and Councilmembers](#), Commissioners Bishop and Woosley suggested that the evaluation criteria might include:

- a. Changes in travel delay in Downtown, on a wide range of streets.
- b. Changes in traffic volume on a range of streets.
- c. Changes in the Vehicle LOS at specific intersections and Arterial Corridors
- d. The number of bicycle trips attracted to 108th Ave. NE.
- e. Changes in the number of bicycle trips attracted to Downtown.
- f. The traffic safety experience in Downtown in terms of reported collisions.
- g. The impacts on on-street parking.
- h. The impacts on current and projected bus stops along 108th Ave. NE.
- i. The potential for managed curb space for bus stops and passenger and freight load zones for increased ACES (e.g. Microsoft Connector, Uber/Lyft type services) demand for passenger load zones.
- j. Impacts on ingress and egress at adjacent buildings.
- k. Impacts on the benefit/cost of the future N.E. 10th Street off ramp from I-405.

Additionally, staff explored how the following North American cities undertook assessments of new bicycle facilities: Washington, D.C. ([Bicycle Facility Evaluation](#)); Saskatoon, Canada ([Downtown Protected Bike Lane Demonstration Project](#)); Charlotte, North Carolina ([The Plaza Separated Bicycle Lane Demonstration Project](#)); Toronto, Canada ([Bloor Street West Bike Lane Pilot Project Evaluation](#)); New York, New York ([Protected Bike Lanes](#)); Calgary, Canada ([Centre City Cycle Track Pilot](#)); Hamilton, Ontario ([Cannon Street Bi-Directional Cycle Track Pilot Project](#)); Baltimore, Maryland ([Roland Avenue Cycle Track Evaluation](#)); and, Chicago, Illinois ([Kinzie Street Protected Bike Lane](#)).

Finally, Bellevue staff considered insights from multiple guidance documents including: Portland State University’s [Evaluating Protected Bike Lanes in the U.S.](#) that presents finding from research evaluating U.S. protected bicycle lanes in terms of their use, perception, benefits, and impacts; the Federal Highway Administration’s (FHWA) [Traffic Monitoring Guide](#), in particular Chapter 4 which addresses non-motorized traffic; the FHWA’s [Separated Bike Lane Planning and Design Guide](#) in particular Appendix D: Project Evaluation Checklist; and, the National Highway Cooperative Research Program’s [Guidebook on Pedestrian and Bicycle Volume Data Collection](#) which offers suggestions on selecting appropriate counting methods and technologies, and provides examples of how organizations have used non-motorized count data to better fulfill their missions.

108th Avenue Northeast Demonstration Bikeway Assessment Framework

Based on the community feedback received and a review of best practices for evaluating bicycle lane projects, Bellevue staff will employ a wide range of methods to assess outcomes in safety, efficiency, and livability. This section articulates the performance indicators, count methods, and technologies staff will employ in the 108th Avenue Northeast Demonstration Bikeway Assessment Framework.

- 1. Safety:** In its [Position Statement, Conditions, and Recommendations for the Demonstration Bikeway](#) the BDA asserts: “Consistent with the City of Bellevue’s Vision Zero initiative, the Demonstration Bikeway corridor needs to be designed as a safe and comfortable place for people walking, bicycling, taking transit, and driving motor vehicles.” The assessment framework will use data and community engagement to document if safety for people bicycling, walking, and driving is impacted by the demonstration bikeway.
 - **Collisions** – Collision data (from police reports) separated into individual modes (i.e., people driving, biking, and walking) and severity (i.e., fatalities, injuries, and property damage only) is one method to explore the safety impacts of a project. To the extent feasible, staff will attempt to “adjust” bicycle collision data to more directly account for increased volume of bicyclists using the facility and/or use FHWA’s [crash rate calculation](#) to compare *before* and *after* data.
 - **Perceptions of Safety** – It can be difficult to use collision data as a post-construction evaluation metric since crashes are infrequent and it takes time – typically five years – to see effects of any changes for before-after studies. Consequently, collision data will be combined with results of an online questionnaire to better understand changed perceptions of safety for people driving, walking, and bicycling along the corridor. This approach is consistent with guidance found in Portland State University’s [Evaluating Protected Bike Lanes in the U.S.](#) Perceptions of safety *after* installation will be compared to results from question 27 on the [Bikeway On-Line Questionnaire](#) (Nov. 2017 – Jan. 2018) that asked people *before* installation whether they feel that 108th Avenue Northeast provides a safe and comfortable street for people bicycling.
 - **Traffic Conflicts and Interactions** – A staff intern will dedicate 60 hours to observe video footage *after* project implementation to determine the following behaviors of people walking, bicycling, and driving at key locations: sidewalk interactions (e.g., observations of people riding bicycles on the sidewalk); curbside interactions (e.g., transit boarding and alighting interactions at the temporary bus island platform installed south of

Northeast 2nd Street); and, roadway interactions (e.g., instances where a person driving a motor vehicle or riding a bicycle was forced to make an emergency change of direction or emergency change of speed to avoid a collision). The purpose for the video review of traffic conflicts and interactions is to determine how well the various users of the corridor understands the design intent of the project and if/how potential conflicts arise; as such, no *before* data will be collected for this performance indicator. This approach is consistent with an assessment completed in Washington, D.C. ([Bicycle Facility Evaluation](#)).

2. **Efficiency:** In its [Position Statement, Conditions, and Recommendations for the Demonstration Bikeway](#) the BDA recognizes that although “change will occur to the right-of-way” to accommodate the movement of people riding bicycles that efforts should be made to “minimize impacts to travel times” and “not disrupt regular bus operations and rider experience.” In implementing the demonstration bikeway project the City of Bellevue seeks a balance between providing connectivity within the bicycle network and maintaining efficient roadway circulation. The assessment framework will document if vehicular travel is impacted by the demonstration bikeway, and if so, by how much.
- **Motor Vehicle Travel Time** – Bluetooth travel-time detection units were purchased and will be mounted at Main Street, Northeast 4th Street, Northeast 6th Street, and Northeast 12th Street. These Bluetooth units match unique MAC (Media Access Control) addresses associated with Bluetooth-enabled electronic devices to determine travel time between roadway segments. Analysis of motor vehicle travel times will be completed both *before* and *after* installation of the demonstration project.
 - **Bus Delay** – King County Metro’s on-board systems (OBS) data – for both *before* and *after* implementation conditions – will be leveraged to assess whether delay impacts are observed on buses making key movements along 108th Avenue Northeast (i.e., NBLT @ NE 8th Street, EBLT @ NE 4th Street, SB @ Main Street, and all movements @ NE 6th Street). Additionally, Bellevue and Metro staff will invite coach operators to participate in a questionnaire to better understand if transit operations are impacted by the demonstration bikeway facility.
 - **Automobile Delay** – Automobile delay is expressed as the average amount of delay experienced by each driver traveling through an intersection. Delay is measured in seconds per vehicle and is also used to determine automobile level-of-service (LOS). To arrive at this calculation for *before* and *after* conditions at intersections along 108th Avenue Northeast, staff will leverage turning movement volume data (see Facility Use section) to calculate delay experienced by drivers during morning (7:00 AM – 9:00 AM) and afternoon peak hours (4:30 PM to 6:30 PM) using [Synchro analysis software](#).
 - **Network Assessment**– Bellevue’s adaptive traffic system (SCATS) relies on in-ground loop detectors for traffic data acquisition and traffic control purposes. SCATS calculates values for degree of saturation (DS) – defined as the ratio of the effectively used green time to the total available green time on the approach. A DS value of 100% infers congestion at that approach. Bellevue staff will compare the amount of time above a DS value of 100% at four intersections on 108th Avenue Northeast and at four intersections on 106th Avenue Northeast based on *before* and *after* conditions.

3. **Livability.** In its [Position Statement, Conditions, and Recommendations for the Demonstration Bikeway](#) the BDA asserts: “The Demonstration Bike Lanes should support the Pedestrian and Bike Implementation Initiative and the 2009 Pedestrian Bicycle Transportation Plan by maximizing the return on investment of existing and anticipated near-term projects.” BDA’s recommendations are consistent with Bellevue’s [Comprehensive Plan](#), which aims to realize “a comprehensive multimodal transportation system to serve all members of the community” (Transportation Element Goal). The plan notes that “mobility in Bellevue means providing people with an assortment of mobility options that help people get where they need to go,” and that this “contributes to a quality of life that Bellevue residents expect, and that attracts employers and businesses” (Transportation Element Introduction).

- **Facility Use** – The assessment framework aims to document if corridor usage (by people bicycling and driving) is impacted by the demonstration bikeway facility, and if so, by how much. *Before* and *after* traffic volume data (both bicycle and motor vehicle turning movement counts) will be collected during the morning (7:00 AM – 9:00 AM) and afternoon peak hours (4:30 PM to 6:30 PM) for a typical mid-week day (Tuesday, Wednesday, or Thursday). For a historic perspective, turning movement counts will be compared to counts collected in the previous two years where available. Staff is augmenting these limited duration counts with two thermal bike counting units installed at Northeast 4th Street that produce 24/7 continuous counts (these units are being validated by manual counts). These integrated thermal traffic sensors are anticipated to provide counts of bicyclists both inside and outside the designated bicycle facilities for *before* and *after* conditions. It is also anticipated that the GPS-enabled bike share bicycles permitted to operate in Bellevue will provide *before* and *after* origin-destination trip level data that can help the City understand whether people preferred riding on the demonstration bikeway through Downtown. Finally, staff will leverage its video analytics partnership with Microsoft (see [ITE Journal Article](#)) to generate continuous automobile turning movement counts (and potentially bicycle and pedestrian counts) at the Main Street, NE 4th Street, and NE 8th Street intersections where 360 HD cameras are in place.
- **User Satisfaction** – Some performance indicators – like user satisfaction – require a more nuanced approach to gathering useful data on who is using the 108th Avenue Northeast Demonstration Bikeway and if there is ongoing support for the project. Staff will administer a post-construction online questionnaire using [SurveyMonkey](#) to better understand if user satisfaction is impacted by the demonstration bikeway facility, and if so, by how much. An assessment of user satisfaction will be based on how much a person walking, bicycling, taking transit, and driving a motor vehicle ‘liked’ the experience travelling on the demonstration corridor. The questionnaire will also ask respondents about how the demonstration project influenced their frequency of use and route choice and if they support the demonstration project and have input on project adjustments (i.e., design modifications). User satisfaction *after* installation will be compared to results from question 29 on the [Bikeway On-Line Questionnaire](#) (Nov. 2017 – Jan. 2018) that asked people *before* installation whether they thought they would bike in Downtown Bellevue more often because of the 108th Avenue Northeast demonstration bikeway project. Staff will employ multiple methods of promoting the online questionnaire including: a press release, social media, and vis-à-vis postcards

distributed at various locations along the corridor. Finally, staff will make itself available to organizations interested in receiving a briefing(s) on the assessment results so that these organizations can arrive at a formal statement on any impacts they might have experienced and whether they regard the project as supportive of Downtown Bellevue's economic vitality and quality of life.

- Bicycle Level of Service – The assessment framework will leverage Bellevue's Multi-Modal Level of Service (MMLOS) assessment indicators; in particular the Bicycle Level of Service (BLOS) metric to determine if the demonstration corridor is a more appealing environment for cyclists in the "interested but concerned" group. The BLOS metric accounts for factors like vehicle speed and volume to arrive at a determination of whether the amount of separation provided by a bicycle facility provides a comfortable user experience for less experienced bicyclists. Bellevue staff will use BLOS mapping to assess *before* and *after* conditions resulting from the demonstration bikeway.
- TNC and Freight Delivery – During staff observations of video footage for traffic conflicts and interactions (see Safety) there will be documentation of instances where pick-up/drop-off activities occur in bike lanes or create queue blockage. Additionally, Bellevue Police will be invited to offer insights on observed compliance issues (e.g., incidences of vehicles blocking the bikeway). Finally, Bellevue staff will solicit input from Transportation Network Company (TNC) and freight delivery company representatives to gain feedback on their experience accessing properties along the demonstration bicycle corridor. The purpose for the TNC and freight delivery review is to determine how well the various users of the corridor understands the design intent of the project and if/how potential conflicts arise; as such, no *before* data will be collected for this performance indicator.

At its April 12 meeting, staff will provide the Transportation Commission with an overview on the 108th Avenue Northeast Demonstration Bikeway Assessment Framework. Equipment purchases and data collection has already commenced for some elements of the assessment framework to ensure that before data is compiled in advance of project implementation. The data collection period informing the evaluation will last through December 2018. Staff will provide the Transportation Commission a final evaluation report and briefing in Q1 2019.