bikewinnipeg

MORE PEOPLE BIKING
MORE OFTEN

Bicycle Level of Service Measures in OurWinnipeg Corridor Evaluations

Context of the Corridor Evaluations

When we present well defined measures as aids in decision making processes, it's important that the measures we present follow agreed upon methodologies for their calculation. In its reporting of Bicycle Level of Service (BLOS), the Corridor Evaluations have failed to do that.

Bicycle Level of Service is a well-defined measure of cyclist comfort calculated from such roadway properties as lane width, presence of parking, volume of traffic and the number of laneways. It is a qualitative measure used to measure the level of comfort a person experiences when riding along a particular segment of roadway.

In stark contrast to this, the BLOS measurement presented in the Corridor Evaluations measures the length of cycling facilities within each of the city's census tracts and then ranks the census tracts into quartiles based on the length of existing cycling facilities per square km of area in the census tract. This measure is then combined with an equity score based on demographic data for the census tract to produce the BLOS measure used in the Corridor Evaluations.

This obviously differs considerably from the well-defined methodology for calculating Bicycle Level of Service. As a measure of qualitative experience, it is completely meaningless. It provides no value to the evaluation of any corridor that bisects the census tract measured, and lumps demographic data in with what is supposed to be a measure of comfort.

We recommend that the BLOS measure be removed from the evaluations or replaced with a better quality measure, that any decisions based on this measure get revisited, and the efficacy of other measures and methodologies within the corridor evaluations be reassessed.

We recommend that People for Bikes Bicycle Network Analysis Tool be used in any future measures aimed at quantifying network connectivity and general neighbourhood bikeability.

Bicycle Level of Service as defined in Corridor Evaluations

The Corridor Evaluations state that Bicycle Level of Service has been calculated as follows:

BICYCLE LEVEL OF SERVICE	Road density, road connectivity, topography, permeability, and population/employment density, comprising a Bicycle Level of Service score	Bicycle Level of Service scores derived from Map 2.9 of the Pedestrian and Cycling Strategies

Pg. 1

Bicycle Level of Service as defined in the Pedestrian and Cycling Strategies

The Pedestrian and Cycling Strategies define the Bicycle Level of Service presented in Map 2.9 as follows:

"D. LEVEL OF SERVICE ANALYSIS

One way to compare the amount of facilities in different neighbourhoods is to take a simple measurement of bikeway-kilometres and divide this result by the area of the Census Tract (bicycle facility-km per km^2), which resulted in a measure of the "level of bicycle service" shown in **Map 2.9**. This analysis identified Census Tracts in the lowest quartile (bottom 25 percent) that can be considered to be low coverage (low service) areas. Census Tracts with low coverage are outlined in yellow, while Census Tracts that have both low coverage and score highest in the equity analysis are outlined in red.

The combination of low bicycle network coverage and a high equity score indicates a vulnerable community with limited access to safe bicycle facilities. This is a strong justification to connect these areas into the Winnipeg bicycle network with future infrastructure improvements."

Pg. 90 – Pedestrian and Cycling Strategies

Actual Definition of Bicycle Level of Service

Several measures of Bicycle Level of Service (BLOS) have been developed over the years, and are well defined in such papers as BICYCLE LEVEL OF SERVICE: Applied Model, which was used in the Highway Capacity Manual. As stated in that document, it's used as a "method of evaluating the bicycling conditions of shared roadway environments" and "reflects the effect on bicycling suitability or "compatibility" due to factors such as roadway width, bike lane widths and striping combinations, traffic volume, pavement surface conditions, motor vehicles speed and type, and on-street parking."

In general, BLOS is data intensive, and as the text above suggests, it relates to specific road segments (versus areas or networks) and is aimed at the experience of people biking on shared roadways. It might not be the best measure for the Corridor Evaluations developed for the Complete Communities study, which are presumably attempting to determine the relative bikeability of corridors as a way to match the Complete Communities goal of improving transportation options and shifting people into more sustainable modes of transportation.

Some Sample Bicycle Level of Service Measures using an Online Calculator

Developed by Sprinkle Consulting, BLOS is in the Highway Capacity Manual. Ride Illinois developed this calculator for the published BLOS formula for roadway segments. Their calculator has been used to measure Bicycle Level of Service for a number of roadway segments that fall within the Corridor Evaluations and compared to the BLOS measure given for the corridor in that document.

Portage Avenue (between Erin and Wall)

Through lanes per direction: (Default = 1)	**3**
Width of outside lane, to outside stripe, in ft: (Default = 12)	**11**
Paved shoulder, bike lane, OR marked parking area - outside lane stripe to pavement edge, in ft: (Def=0)	**0**
Bi-directional Traffic Volume in ADT: (Default = 4000)	**60000**
Posted speed limit in mph: (Default = 30)	**36.6**
Percentage of heavy vehicles: (Default = 2)	**3**
FHWA's pavement condition rating: (5 = Best, 1 = Worst; Default = 4)	**3**
Percentage of road segment with occupied on-street parking: (Default = 0)	**12**
Bicycle Level of Service Score	**5.3**
Bicycle Level of Service Grade	**E (4.51-5.50)**
BLOS Level of Compatibility	**Very Low**

BLOS Scale

Score	**< 1.50**	**1.51 – 2.50**	**2.51 – 3.50**	**3.51 – 4,50**	**4.51 – 5.50**	**>5.50**
Grade	**A**	**B**	**C**	**D**	**E**	**F**

BLOS Rating: ★☆☆☆☆☆☆☆☆☆

Corridors Evaluation Rating: ★★★★★★★★☆☆

Main Street (between Mountain and Inkster)

Through lanes per direction: (Default = 1)	**3**
Width of outside lane, to outside stripe, in ft: (Default = 12)	**11.6**
Paved shoulder, bike lane, OR marked parking area - outside lane stripe to pavement edge, in ft: (Def=0)	**0**
Bi-directional Traffic Volume in ADT: (Default = 4000)	**41600**
Posted speed limit in mph: (Default = 30)	**36.6**
Percentage of heavy vehicles: (Default = 2)	**3**
FHWA's pavement condition rating: (5 = Best, 1 = Worst; Default = 4)	**3**
Percentage of road segment with occupied on-street parking: (Default = 0)	**12**
Bicycle Level of Service Score	**5.05**
Bicycle Level of Service Grade	**E (4.51-5.50)**
BLOS Level of Compatibility	**Very Low**

BLOS Rating: ★☆☆☆☆☆☆☆☆☆

Corridors Evaluation Rating: ★★★★★★★☆☆☆

Regent Avenue (between Panet and Plessis)

Through lanes per direction: (Default = 1)	**3**
Width of outside lane, to outside stripe, in ft: (Default = 12)	**13.1**
Paved shoulder, bike lane, OR marked parking area - outside lane stripe to pavement edge, in ft: (Def=0)	**0**
Bi-directional Traffic Volume in ADT: (Default = 4000)	**44900**
Posted speed limit in mph: (Default = 30)	**36.6**
Percentage of heavy vehicles: (Default = 2)	**3**
FHWA's pavement condition rating: (5 = Best, 1 = Worst; Default = 4)	**3**
Percentage of road segment with occupied on-street parking: (Default = 0)	**0**
Bicycle Level of Service Score	**4.71**
Bicycle Level of Service Grade	**E (4.51-5.50)**
BLOS Level of Compatibility	**Very Low**

BLOS Rating: ★★☆☆☆☆☆☆☆☆

Corridors Evaluation Rating: ★★★★★★☆☆☆☆

Selkirk Ave (between Main and McGregor)

Through lanes per direction: (Default = 1)	**1**
Width of outside lane, to outside stripe, in ft: (Default = 12)	**13.1**
Paved shoulder, bike lane, OR marked parking area - outside lane stripe to pavement edge, in ft: (Def=0)	**10.7**
Bi-directional Traffic Volume in ADT: (Default = 4000)	**13200**
Posted speed limit in mph: (Default = 30)	**30**
Percentage of heavy vehicles: (Default = 2)	**2**
FHWA's pavement condition rating: (5 = Best, 1 = Worst; Default = 4)	**4**
Percentage of road segment with occupied on-street parking: (Default = 0)	**75**
Bicycle Level of Service Score	**3.3**
Bicycle Level of Service Grade	**C (2.51-3.50)**
BLOS Level of Compatibility	**Moderately High**

4m (13.1 ft) parking lane and 3.25m (10.7 ft) travel lane

BLOS Rating: ★★★★★★☆☆☆☆

Corridors Evaluation Rating: ★★★★★★★★☆☆

Why the Corridor Evaluations Definition of Bicycle Level of Service is Meaningless

While an area study of bikeability may have meaning when considering residential growth, as these evaluations are meant to aid, the definition for Bicycle Level of Service actually used has no relation to the level of service someone on a bicycle might actually expect in the neighbourhoods being analyzed. The definition used in these evaluations is simply a very rough relative measure of an area's bikeability in comparison to other areas of the city combined with socio-economic measures for the neighbourhood, not an actual measure of bikeability that can be used to express a level of stress or connectivity that in turn might help approximate people's use of bikes within the neighbourhood.

To the point, the chosen measure for Bicycle Level of Service (BLOS) in this analysis would score a 1km stretch of off road path through forest the same as a 1km stretch of sharrow on a 4 lane, 60km/hr truck route with AADT of 40,000 vehicles per day. Similarly, the BLOS measure used in these analyses treats every intersection the same. So an uncontrolled crossing of that 4 lane, 60km/hr truck route with AADT of 40,000 vehicles per day arterial is treated the same as a 4 way stop at the intersection of two local streets. This particular BLOS measurement is of no value in any attempt to try and model traffic. In short, this is a misleading measurement and should not be part of any decision making process.

If applied to any corridors where development is being considered, the bicycle level of service measure defined in these analyses provides zero value as they fail completely to measure the quality of experience for anyone biking to destinations along the corridor, and has no value in any attempt to model traffic or determine costs to meet goals within OurWinnipeg.

Bikeability as a Measure to Help Predict Traffic and Mode

How many people will choose to bike to their destinations depends on more than just a person's ability to reach a destination comfortably, which real BLOS measures try to capture. If you want to predict the number of people that might use their bikes to reach destinations, you also need to think about the availability of destinations within a reasonable range for the mode of transportation being considered. Density of development and the diversity of destinations play a central role in where people will travel to and from, and the modes of transportation that they will choose to reach their destinations.

This ability to reach everyday destinations has been termed "access to opportunity". The Why and How of Measuring Access to Opportunity defined **access to opportunity** as a measure of "how well the transportation network and land use patterns within a community are enabling all members of the community to reach jobs and other resources and services, such as education, healthcare, healthy food, and recreation centers." …

"Measuring access to opportunity means evaluating the ease with which people can reach jobs in their communities, businesses can attract customers, and both can reach the other services they need to thrive. Multimodal transportation networks play a vital role in connecting people and businesses to resources and providing safe, affordable access to employment, education, and other daily needs." (pg.

4, The Why and How of Measuring Access to Opportunity, Governor's Institute on Community Design, January 2017).

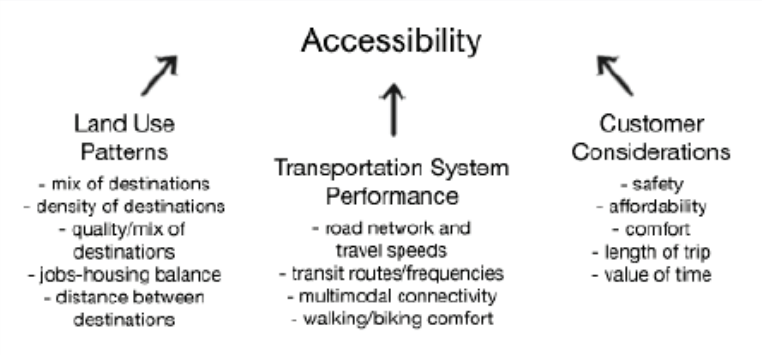


Figure 1. Some of the key variables, each with different data sources that contribute to how we measure accessibility. Projects that call for increased access to achieve community goals like economic development, equity, or connectivity, can be measured by a combination of these example variables. Some variables are controlled by transportation agencies, while they actively influence others. It is important to understand how multiple factors contribute to accessibility.

Pg. 2, The Why and How of Measuring Access to Opportunity, Governor's Institute on Community Design, January 2017.

Complete Communities and the Transportation Master Plan clearly place the relationship between land use and transportation as the number one priority. Policy must be crafted to encourage both density of development and diversity of use, especially where connectivity and access can be provided. Under the axiom that you cannot change what you do not measure, policies that promote the integration of land use and transportation need to be backed up with measurements that tell us how well land use and transportation are fitting together to provide all people with an ability to get where they need to go.

A very good tool to help measure access to opportunity for people on bikes is the Bicycle Network Analysis Tool developed by People for Bikes. The Bicycle Analysis tool uses fairly simple, available measures of the transportation network to assess the reach of a city's low stress bike network and combines that with knowledge of land use and the location of various types of destination to derive a measure of the degree to which people can comfortably bike to the places they want to go.

The Bicycle Network Analysis Tool's level of stress measures have been selected to match up against well-defined groupings of prospective cyclists based on their toleration for traffic stress.

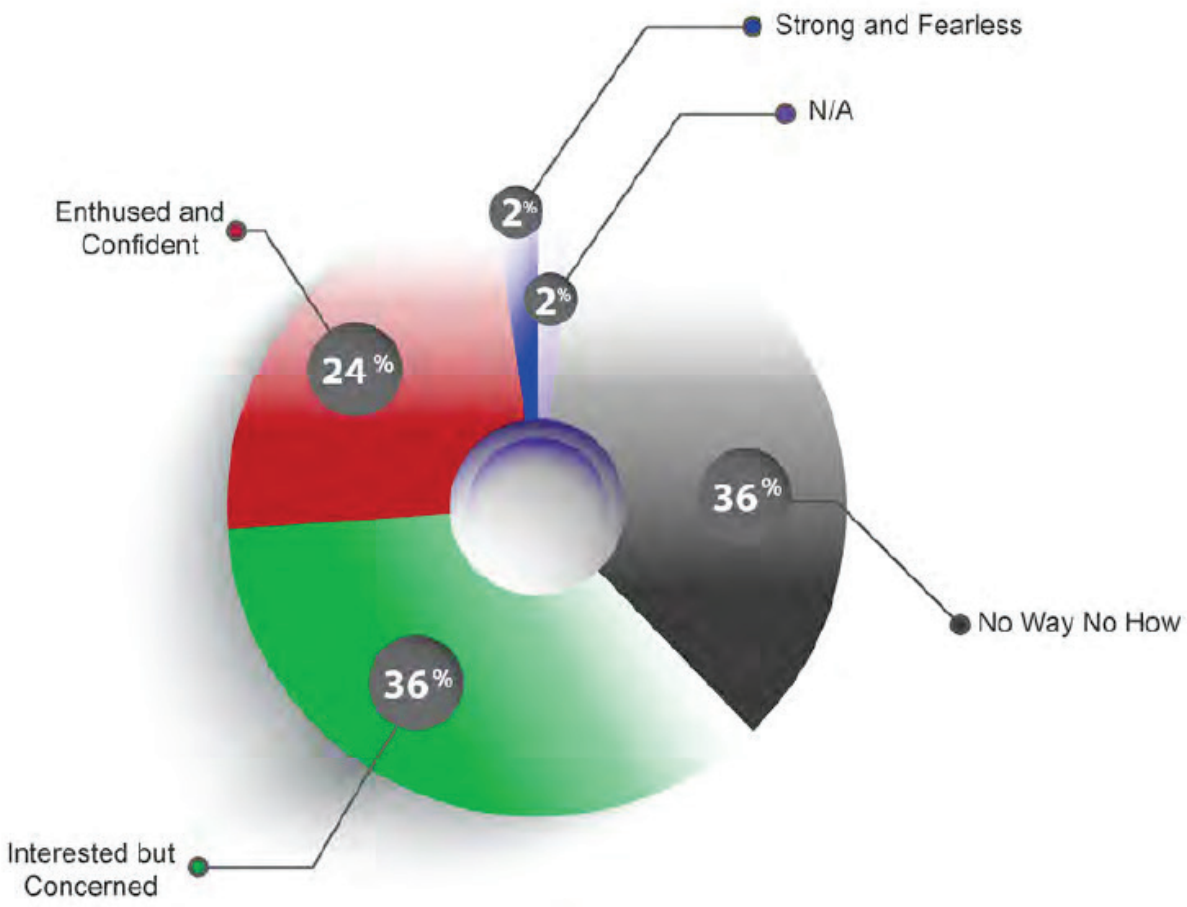
Level of Traffic Stress (LTS) is a rating given to a road segment or crossing indicating the traffic stress it imposes on bicyclists. Levels of traffic stress range from 1 to 4 as follow:

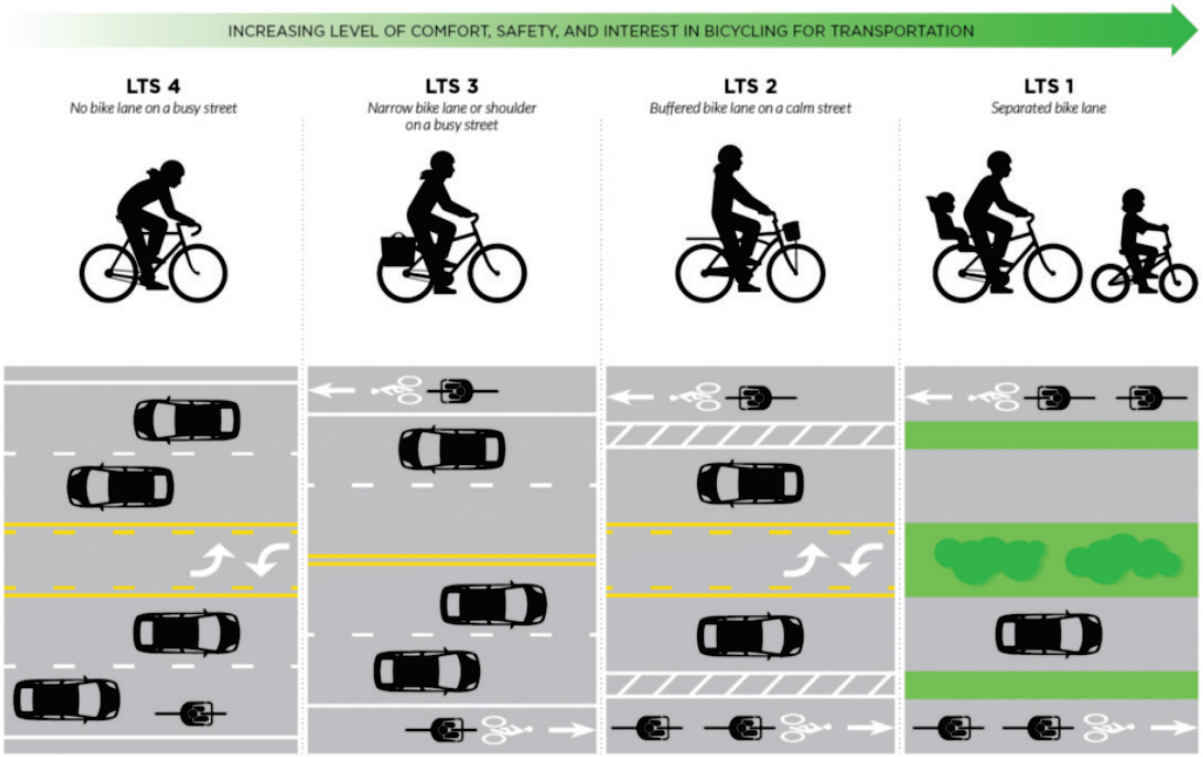
- LTS 1: Strong separation from all except low speed, low volume traffic. Simple crossings. Suitable for children.
- LTS 2: Except in low speed / low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic except at formal crossings. Physical

separation from higher speed and multilane traffic. Crossings that are easy for an adult to negotiate. Corresponds to design criteria for Dutch bicycle route facilities. A level of traffic stress that most adults can tolerate, particularly those sometimes classified as "interested but concerned."

- LTS 3: Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. A level of traffic stress acceptable to those classified as "enthused and confident."
- LTS 4: Involves interaction with higher speed traffic or close proximity to high speed traffic. A level of stress acceptable only to those classified as "strong and fearless."

Figure 2.3:
Types of Cyclists in Winnipeg





Example LTS graphic created for public consumption for our project in Bend, OR.

Since bikeability depends on not only the ability to ride along a networks individual segments, but also on the availability of shops, services, workplaces, and other destinations within a reasonable cycling distance, it gives a much better measure of peoples likelihood to choose cycling over other means of transportation.

The Bicycle Network Analysis Tool combines measures traffic stress level along road and pathway segments and through intersections, and combines those measures with information on destinations and their desirability to come up with an overall measure of access to destinations that is converted into a bike score.

This is the measure that makes most sense if the goal of calculating the measure is to help determine people's availability of transportation options or to develop estimates on what modes people will choose for their daily transportation needs.