



Level of Bicycle Compatibility and Connectivity Analysis

Background: To support NJTPA’s goals of improving safe and efficient access for all modes of travel, NJTPA is identifying the level of bicycle compatibility associated with the road network to guide efforts at creating a regional bicycle network.

Goal: Develop a map of the bicycle network in the NJTPA region that categorizes roads by their suitability for bicycling. The network will include off-road bike paths. Future development will include an analysis of bicycle connectivity in the region.

Performance Metric: Based on research of other similar analyses (referenced later), the NJTPA will incorporate a “Level of Bicycle Compatibility” analysis (LBC) for the road network. The LBC will be broken down into four levels:

- LBC 1: Little to no stress. Suitable for almost all cyclists including children.
- LBC 2: Little traffic stress. Suitable for most adult cyclists, but demanding more attention than might be expected from children.
- LBC 3: Moderate traffic stress. Comfortable for those who already confidently ride bicycles.
- LBC 4: High traffic stress. Likely suitable for very skilled bicyclists.
- NOTE: Roads which exclude bikes (e.g., Highways) were categorized as LBC 5

Data Sources:

- NJDOT Straight Line Diagrams (SLD)
- Open Street Map (Crowd Sourced Database)
- NJDOT Bike Path Data (multiple sources)
- County Data

Defining LBC: Based on findings from research, roads were categorized with an LBC using the following criteria:

- LBC 1: all bike paths
- LBC 1: Protected bike lanes along roads ≤ 30 mph (NOTE: we are unable to identify protected bike lanes in the region so these will be handled on an exceptions basis)
- LBC 2: Protected bike lanes along roads > 30 mph.
- LBC 4: Speed limit ≥ 40 mph
- LBC 4: ≥ 6 lanes
- LBC 4: ≥ 4 lanes no shoulder, speed limit ≥ 35 mph
- LBC 4: all ramps
- All interstates, freeways and toll routes are coded 5 for non-accessible to bikes
- Truck Adjustment: Adjustments were made for a high level of truck volume.
 - If daily truck volume was over 200, the level of service was changed to LBC 4.

# of Lanes	Speed	Bike Lane or Shoulder 0-6 ft (or Parking Lane < 14 ft)	Bike Lane or Shoulder 6+ ft	Parking Lane Y 14+ ft
≤ 3	25	2	1	2
≤ 3	30	3	2	2
≤ 3	35	3	3	3
4-5 lanes	25	3	2	2
4-5 lanes	30	4	2	2
4-5 lanes	35	4	3	3

- If daily truck volume was between 100 and 200 and the LBC was previously 1 or 2, it was changed to LBC 3.
- All principal arterials are coded with at least an LBC 3 if they don't have a bike lane.
- All roads with a pavement width of less than 30 feet and no bike lane are coded at least an LBC 3.

NOTE: We started an exceptions list where the data was known to be incorrect or where there are issues related to how the NJDOT SLD reports the data.

Criteria considered but excluded from this first version of the bicycle LBC:

- Increase LBC for high crash areas: Difficult to standardize definition of a “high crash area.” Might be better handled as an exception initially.
- Increase LBC for high road volume: Lack of volume data for local and county roads.
- Adjust LBC based on land use type: Difficult to define how to adjust based on urban, suburban, rural or commercial land use characteristics. Might be explored in the future.
- Adjust LBC due to intersection configuration: Lack of data related to intersection configurations (e.g., shoulder width drop-offs). Might be factored into the exceptions list.
- Increase LBC for steep grade: Defining the steepness where bicycling becomes more difficult still needs to be examined. Potential future enhancement.
- Increase LBC due to buses: Bus routes are unavailable in a format that can be easily linear referenced to the NJDOT network. Potential future enhancement.

Data Quality Issues

- Bike Lanes: There is no official database of bike lanes so crowd-sourced (Open Street Map) data was used.
- NJDOT SLD Issues: There were occasionally missing data (e.g., missing speed limits) of which some were addressed as exceptions.
- NJDOT SLD Format: The manner in which some portions of the network were reported on the SLD created difficulties (e.g., roads shown with a dual carriageway rather than a single line).

Because of the data issues and the difficulties with defining the correct LBC under every circumstance, these LBC designations are considered to be a work-in-progress. We will continue to update the designations as data improves and criteria are refined.

References:

See the accompanying project description from the NJTPA for further discussion and analysis of the data.

- Mineta Transportation Institute on Low-Stress Bicycling and Network Connectivity (<https://transweb.sjsu.edu/sites/default/files/1005-low-stress-bicycling-network-connectivity.pdf>)
- DVRPC bicycle stress and connectivity analysis (<https://www.dvrpc.org/transportation/bicyclepedestrian/Bicycle/>).

Link to ArcGIS Viewer (shows LBC designations of all roads and bike paths):

<http://njtpa.maps.arcgis.com/apps/View/index.html?appid=1c0d4e47c8a34556bb3e26c65d654f79>

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