ESTIMATED USERS: PEDESTRIANS AND BICYCLISTS

For the H-GAC Call for Projects applications, the methodology for estimated daily users for pedestrians and bicyclists are explained below. Shared use paths are considered to have both types of users, while sidewalk improvements only have estimated pedestrian users, and bike lane improvements only have estimated bicycle users. In the cases where sidewalks and bike lanes are proposed, both users are counted.

Pedestrian Users

The corridors with proposed new or significantly improved infrastructure do not currently support pedestrian activity in existing conditions, as verified by field observations. For sidewalk and other improvements that improve the walkability of an area, there is a presumed increase in pedestrian usage. The Houston-Galveston Area Council (H-GAC) assumes that back of the curb improvements will result in 26% of internal trips being converted from automobile to pedestrian trips. Additionally, an average one-way walking trip length is 0.50 mile (one-way)[1] which is an input into the H-GAC Call for Projects spreadsheets.

This methodology uses updated 2018, 2025 and 2045 Daily OD Vehicle trip tables released by H-GAC in September 2018. All Traffic Analysis Zones (TAZs) that are adjacent to the improvement are assumed to have a 26% conversion from daily vehicle trips to pedestrian trips between those TAZs. The pedestrian trips are divided by two: it is assumed that each user takes a round-trip. The spreadsheets require the number of estimated daily users in the project open year: this is derived through using the growth rate between the selected TAZs in the 2018 and 2025 trip tables.

Equation 1 Pedestrian – Estimated Daily Users

Estimated Daily Users = INT * 26% / 2

INT = Daily automobile trips between TAZs
26% = Trip conversion factor
2 = trips per user

Bicycle Users

This methodology explains how the number of daily users on a new bicycle facility is calculated, based upon measuring and forecasting the demand. Guidelines for Analysis of Investments in Bicycle Facilities, a National Cooperative Highway Research Program report hereafter referred to as the NCHRP report, indicates that people are more likely to ride a bike if they live within 2,400 meters or ~1.5 miles of a bicycle facility.[2] The likelihood to ride a bicycle increases the closer people live to the facility; therefore, existing and induced demands are calculated using 800-, 1,600- and 2,400-meter buffers around the length of the proposed facility. The steps below outline the inputs needed to calculate the demand for bicycling:

Step 1: Establish the number of residents within each distinct buffer using 2012-2016 American Community Survey (ACS) block group level data.

[1] This figure is based upon the methodology used in the 2013-2016 H-GAC TIP Call for Projects, which assumes ½ mile as the walking distance for the intra-TAZ trips.

[2] Transportation Research Board. (2006). *NCHRP Report 552: Guidelines for Analysis of Investments in Bicycle Facilities.* Washington, D.C.: Transportation Research Board.

Step 2: Establish the existing bicycle mode share for the region (C) based on the U.S. Census Journey to Work share. For the Houston-Galveston Area Council (HGAC) region, the bicycle commute share is 0.3%.

Step 3: Establish the "all biking" mode share, comprised of both recreational and commuting users by assuming 1.5C + 0.3%.[3]

Step 4: Establish the recreational mode share of bicycles by assuming (1.5C + 0.3%) – C.

Step 5: Establish percentage of adults in buffer areas and the average percentage of adult commuters in buffer areas, through using 2012-2016 ACS block group level data. In Harris County, 63% of adults are considered commuters: total workers who do not work at home divided by the total population over 16 years old.

Next, estimate the existing bicyclists in each buffer area, through calculating the number of adults that commute via bicycle and the adults and children who are recreational bicycle users.

Step 6: Calculate the Daily Existing Bicycle Commuters in each buffer (adults only)

Equation 2 Existing Bicycle Commuters

Existing Bicycle Commuters = Number of residents in each buffer * existing bike mode share (C) * % of adults * % of commuters

Step 7: Calculate the Total Existing Recreational Bicyclists in each buffer

Equation 3 Adult Recreational Bicyclists

Adult Recreational Bicyclists = Number of adults * recreational mode share

Equation 4 Child Recreational Bicyclists

Child Recreational Bicyclists = Number of children * 5%[4]

The number of children in each buffer is assumed to be those who are over the age of 16, as calculated from the 2012-2016 ACS. The share of children who ride a bicycle on a given day is 5%, as cited in the NCHRP report from the 2001 National Household Travel Survey (NHTS).

Step 8: Calculate the Total Existing Bicyclists for both children and adults in each buffer

Equation 5 Total Bicyclists

Total Bicyclists = Existing Bicycle Commuters + Existing Recreational Bicyclists

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[3] The NCHRP Report found that over large geographic areas such as metropolitan areas or states, the number of adults in the United States that ride a bicycle "could range roughly between about 0.3% and 2.5%. Over smaller areas such as specific parts of metropolitan areas, the range could go as high as 15%." Researchers conclude that a 'most likely' value for the MSA level, that also describes the United States as a whole would be 0.3% plus 1.5 times the commute share.

[4] Krizek, K. J., Poindexter, G., Barnes, G., & Mogush, P. (2005, August 1). *Translating Demand and Benefits Research into Guidelines.* Retrieved from Ped Bike Info: http://www.pedbikeinfo.org/bikecost/docs/Guidelines.pdf, 1.

Next, estimate the future bicyclists in each buffer area, through calculating the number of new adults that commute via bicycle and the adults and children who will become new recreational bicycle users, using the facility.

Step 9: Calculate the Daily New Bicycle Commuters in each buffer (adults only)

Equation 6 New Daily Bicycle Commuters

New Daily Bicycle Commuters = Existing Bicycle Commuters * L[5]

Where $L_{800m}=0.51$
$L_{1600m}=0.44$
$L_{2400m}=0.15$

Step 10: Calculate the Daily New Recreational Bicyclists in each buffer

Equation 7 New Recreational Bicyclists

New Recreational Bicyclists = Existing Recreational Bicyclists * L

Where $L_{800m}=0.51$
$L_{1600m}=0.44$
$L_{2400m}=0.15$

Step 11: Calculate the Daily Total New Bicyclists in each buffer

Equation 8 Total New Bicyclists

Total New Daily Bicyclists = New Bicycle Commuters + New Recreational Bicyclists

The calculations are made for each of the three buffer areas and summed up for each metric to be used in the analysis as the figure for number of new daily users.

The demand is calculated based on existing demographic data. The number of bicyclists is expected to change each year, depending on the area's population forecasts. To determine population growth over the planning horizon, the compound annual growth rate is calculated from the H-GAC latest growth forecasts, for the TAZs within 1.5 miles of the improvement. The household population from 2020 to 2040, as published by the 2017 H-GAC Regional Growth Forecast, is used for the growth rate calculation. The H-GAC Call for Projects spreadsheets require the number of estimated daily users in the project open year; this number is filled in based on the extrapolated number, derived from growth rate derived from the TAZ forecasts. The average one-way trip length is estimated as 3 miles for the H-GAC Call for Projects spreadsheets, as per FTA guidance.[6]

[5] Ibid., 2.
[6] Final Policy Statement on the Eligibility of Pedestrian and Bicycle Improvements Under Federal Transit Law. 2011. Accessed September 2018. https://www.federalregister.gov/documents/2011/08/19/2011-21273/final-policy-statement-on-the-eligibility-of-pedestrian-and-bicycle-improvements-under-federal