DVRPC Bicycle LTS and Connectivity Analysis: Webmap User Guide

Introduction

Level of Traffic Stress (LTS) is a road classification scheme based on the comfort of bicyclists in the traffic stream. DVRPC's LTS assignment is based on the number of lanes, effective vehicle speed, and presence/type of bicycle facility. The table below outlines the characteristics of each LTS level.

LTS	Comfortable Enough For (Cyclist Type)	Characteristics
1 ●	Everyone	• Relaxing • Suitable for children
2 ●	Interested, but Concerned	• Suitable for most adults • Present little traffic stress
3 ●	Enthused and Confident	• Moderate traffic stress • Comfortable for those already riding bikes in American cities
4 ●	Strong and Fearless	• High traffic stress • Multi-lane, fast moving traffic

Sources: Mekuria, M., Furth, P. and Nixon, H. "Low-stress bicycling and network connectivity", Mineta Transportation Institute, No. Report 11-19, 2012.; Geller, R. "Four Types of Cyclists," Portland Bureau of Transportation, Portland, OR, 2006. www.portlandoregon.gov/transportation/article/264746. Accessed Aug, 11, 2016.

Connectivity Analysis was conducted to determine which segments provided the greatest number of connections throughout the region, from every census block to every other census block. The results of this analysis were categorized to assist in the prioritization of bicycle infrastructure improvements. Regional priorities consist of roads that are currently LTS 3. If made more comfortable for cycling (LTS 1 or 2), these roads could enable the most (top 10%) new low-stress connections between Census blocks in their county, compared to other LTS 3 road segments.

This user guide describes the layers included in the LTS webmap and provides helpful tips on using the functionality available in the map interface. Additional information about LTS, connectivity analysis, and the methodology behind the results displayed in the map can be found in the documentation.

The layers and corresponding tables displayed in this map are available for download via DVRPC's Open Data portal.

DVRPC will continue to refine this approach and our tools - if you have any ideas, questions, or comments, please contact Sarah Moran at smoran@dvrpc.org.

Layers

Layer	Description	Attributes	Source
Regional Priorities (Suburban)	Highlights the LTS 3 road segments in the PA suburban counties that would enable the greatest number of new connections (top 10 % from each county) between Census blocks if improvements were made to reduce the stress level to LTS 1 or 2. In some cases, only one direction of a certain road segment made it into the top 10%. Road segments are shown as divided to allow users to see which side of the road made it into the top 10% and is considered a regional priority. Attributes show existing roadway conditions. If the segment has the potential to connect low-stress islands, the number of islands and specific island numbers are identified.	Link Total Connected Islands Number of Islands Connected Sum Length of Islands Number of Lanes Speed Bike Facility County Link LTS	DVRPC
Suburban LTS 3 Connections	Shows all LTS 3 roads in the PA suburban counties. The "Top [x] Percent" attributes show whether the segment is in the top [x] percent in the county. The percentages are based on the number of connections between Census blocks that would be enabled if LTS was reduced to 1 or 2 along the segments. A value of "1" in the percent attribute means the segment falls in that percentage, while a value of "0" means that it does not.	Link Total Number of Lanes Speed Bike Facility County Top 10 Percent Top 20 Percent Top 30 Percent Top 40 Percent Top 50 Percent Link LTS	DVRPC
Suburban Connectivity Analysis	Shows the results of the connectivity analysis in the PA suburban counties, upon which the Regional Priorities and LTS 3 Connections layers are based. The roads shown include segments of LTS 1, 2 and 3. The thicker the purple line, the more connections are made between Census blocks using that road segment.	Link Total Number of Lanes Speed Bike Facility Length Link LTS	DVRPC
DRAFT Regional Priorities (Philadelphia)	Highlights the LTS 3 road segments in Philadelphia that would enable the most new connections (top 10 % from each county) between Census blocks if improvements were made to reduce the stress level to LTS 1 or 2. In some cases, only one direction of a certain road segment made it into the top 10%. Road segments are shown as divided to allow users to see which side of the road made it into the top 10% and is considered a regional priority. Attributes show existing roadway conditions. If the segment has the potential to connect low-stress islands, the number of islands and specific island numbers are identified. *The connectivity analysis focused on PA suburban counties. Philadelphia results are preliminary.*	Link Total Connected Islands Number of Islands Connected Sum Length of Islands Number of Lanes Speed Bike Facility County Link LTS	DVRPC

LAYERS (CONTINUED)

LAYER	DESCRIPTION	ATTRIBUTES	SOURCE
DRAFT Philadelphia LTS 3 Connections	Shows all LTS 3 roads in Philadelphia. "Top [x] Percent" attributes show if the segment is in the top [x] percent in the city. The percentages are based on the number of connections between Census blocks that would be enabled if LTS was reduced to 1 or 2 along these segments. A value of "1" in the percent attribute means the segment falls in that percentage, while a value of "0" means that it does not. *The connectivity analysis focused on PA suburban counties. Philadelphia results are preliminary.*	Link Total Number of Lanes Speed Bike Facility County Top 10 Percent Top 20 Percent Top 30 Percent Top 40 Percent Top 50 Percent Link LTS	DVRPC
DRAFT Philadelphia Connectivity Analysis	Shows the results of the connectivity analysis in Philadelphia, upon which the Regional Priorities and LTS 3 Connections layers are based. The roads shown include segments of LTS 1, 2 and 3. The thicker the purple line, the more connections are made between Census blocks using that road segment. *The connectivity analysis focused on PA suburban counties. Philadelphia results are preliminary.*	Link Total Number of Lanes Speed Bike Facility Length Link LTS	DVRPC
LTS 1 & 2 Islands	Shows groups of low-stress (LTS 1 and 2) roads that are connected. Segments that are part of an "island" are shown in the same color. Most bicyclists should be able to navigate within islands comfortably. However, reaching a destination on another island would present an uncomfortable level of stress. Islands are numbered for reference.	Link Total Cost Island ID	DVRPC
Existing Condition LTS	Shows assigned level of traffic stress based on number of lanes, effective speed, and presence/type of bicycle facility.	Number of Lanes Speed Bike Facility Link LTS One Way Street	DVRPC
Paved Shoulders on PennDOT Roads	Shows the location of paved shoulders along PennDOT owned road segments. Two overlapping lines are shown if paved shoulders exist in both directions.	Shoulder Side Pavement Width	PennDOT

Map Functionality

This section outlines the functionality available in the webmap.

Location Search

The search bar, located at the top right, allows users to type the name of a town or other location. Press enter or click the magnifying glass to center the map and zoom to the location of interest.

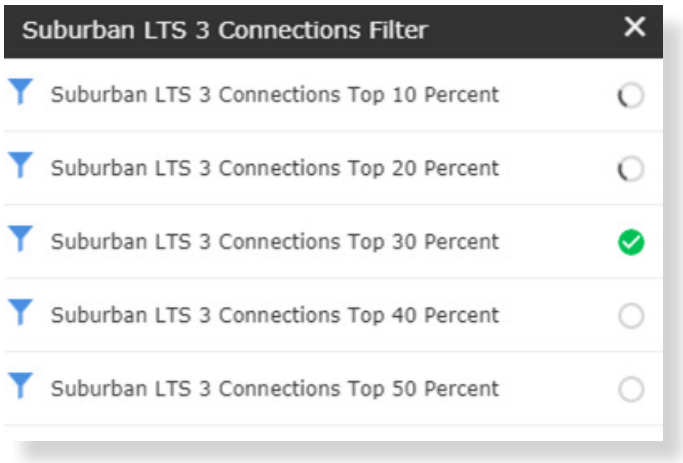
Zoom

Similar to using the scroll wheel on the mouse, the plus/minus signs will zoom in or out on the current center point.

The home button will reset the zoom level to the default regional extent.

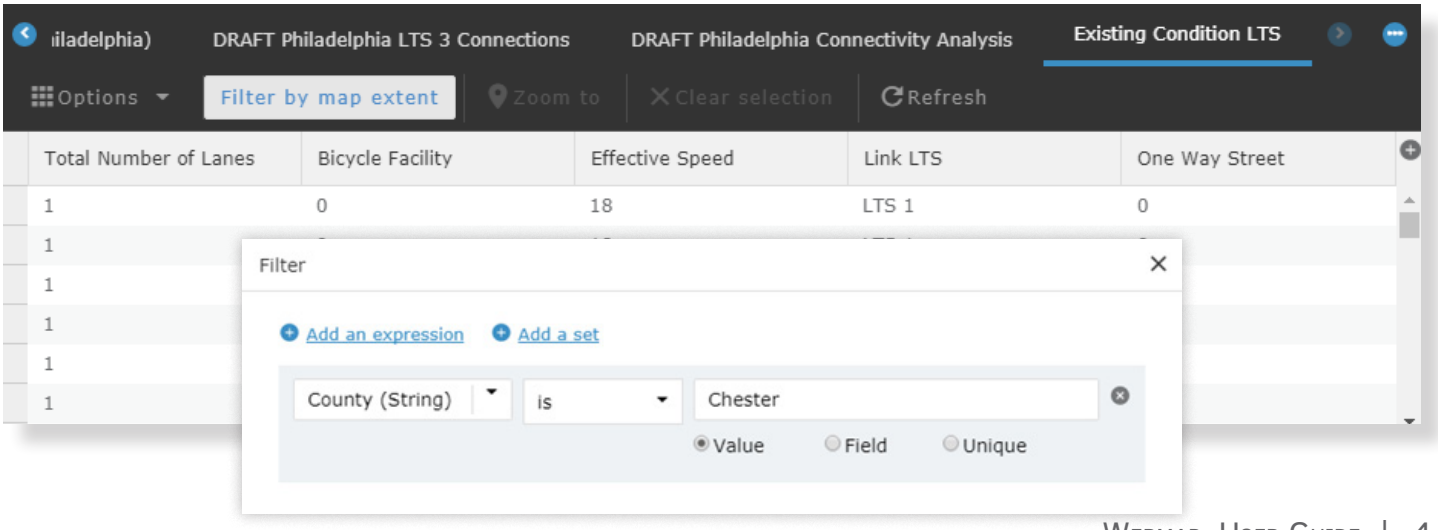
Pre-set Filters

Two pre-set filters are available in the top right to control which segments of the Suburban LTS 3 Connections or DRAFT Philadelphia LTS 3 Connections layers are displayed. Click on the filter to display only those segments that fall within the given percentage. Segments that are included in the top 10 percent are the same as those in the Regional Priorities layer. Percentage groups are nested, so those that fall in the top 10 percent are also in all other percentage groups.



View Attribute Table

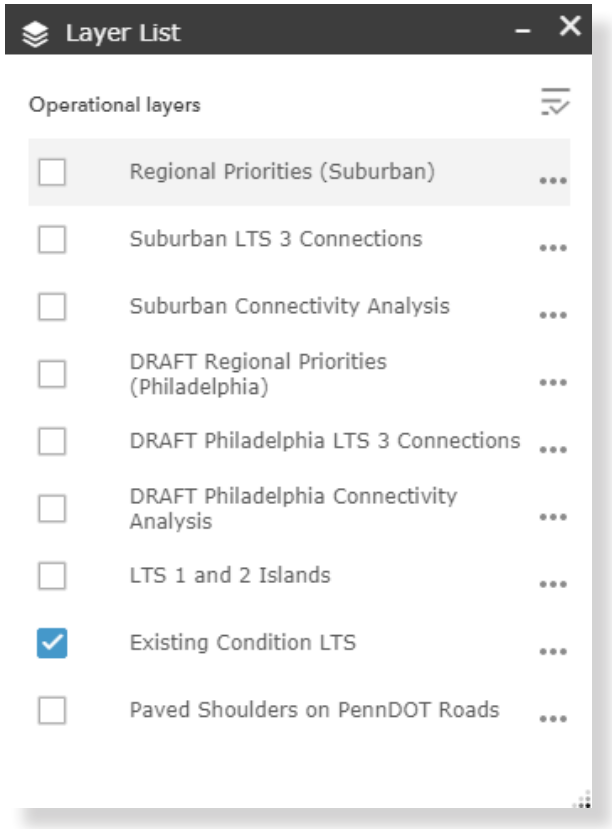
The table button at the top right opens the attribute table. Attribute tables for different layers are shown in tabs. By default, the table is filtered to show records only for those features displayed in the current map extent. Users can also creae custom filters under “Options.” Performance is better at smaller geographies. Users can select a row in the table and click “Zoom To” to center the map on the selected feature. Under “Options”, users can export the attribute table to a .CSV file.



Map Functionality

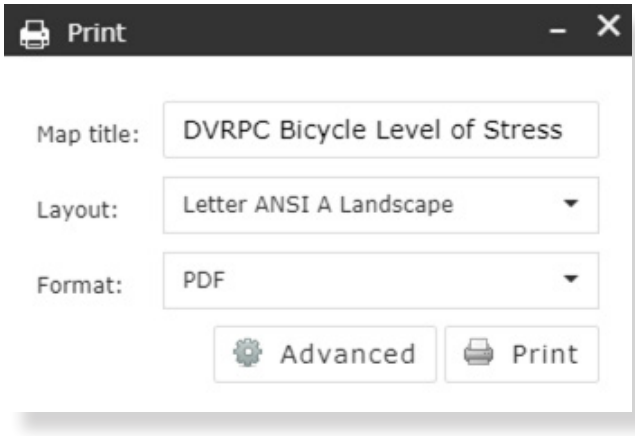
Layer List

The left-most blue button at the bottom opens the Layer List. Click the checkbox to turn a layer on or off. The Layer List window, as well as the other pop-up windows, can be resized and moved if desired.



Print (Export)

The green print button at the bottom opens the print window. Here, users can set the map title, size and orientation before exporting the map in a variety of different file formats, including PDG and JPG.

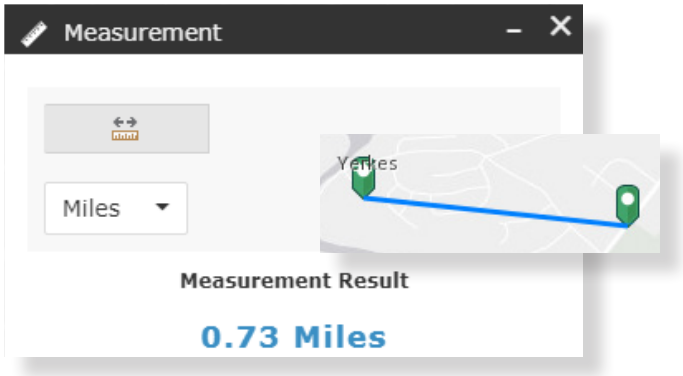


About

The brown button at the bottom opens the About window. The About window shows the same description that was included in the initial pop-up window when the map was first launched. The About window contains links to this User Guide, Documentation, and the DVRPC's Open Data Portal, where users can download the layers included in the webmap.

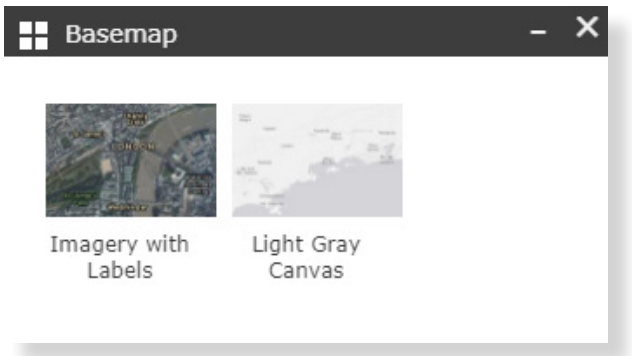
Measure

The orange ruler button at the bottom opens the measurement window. Select the desired units and click the ruler. Click on the map to select a start and double-click to select the end point. The resulting distance from start to end will be displayed. Continue clicking to measure a multi-segment line.



Change Basemap

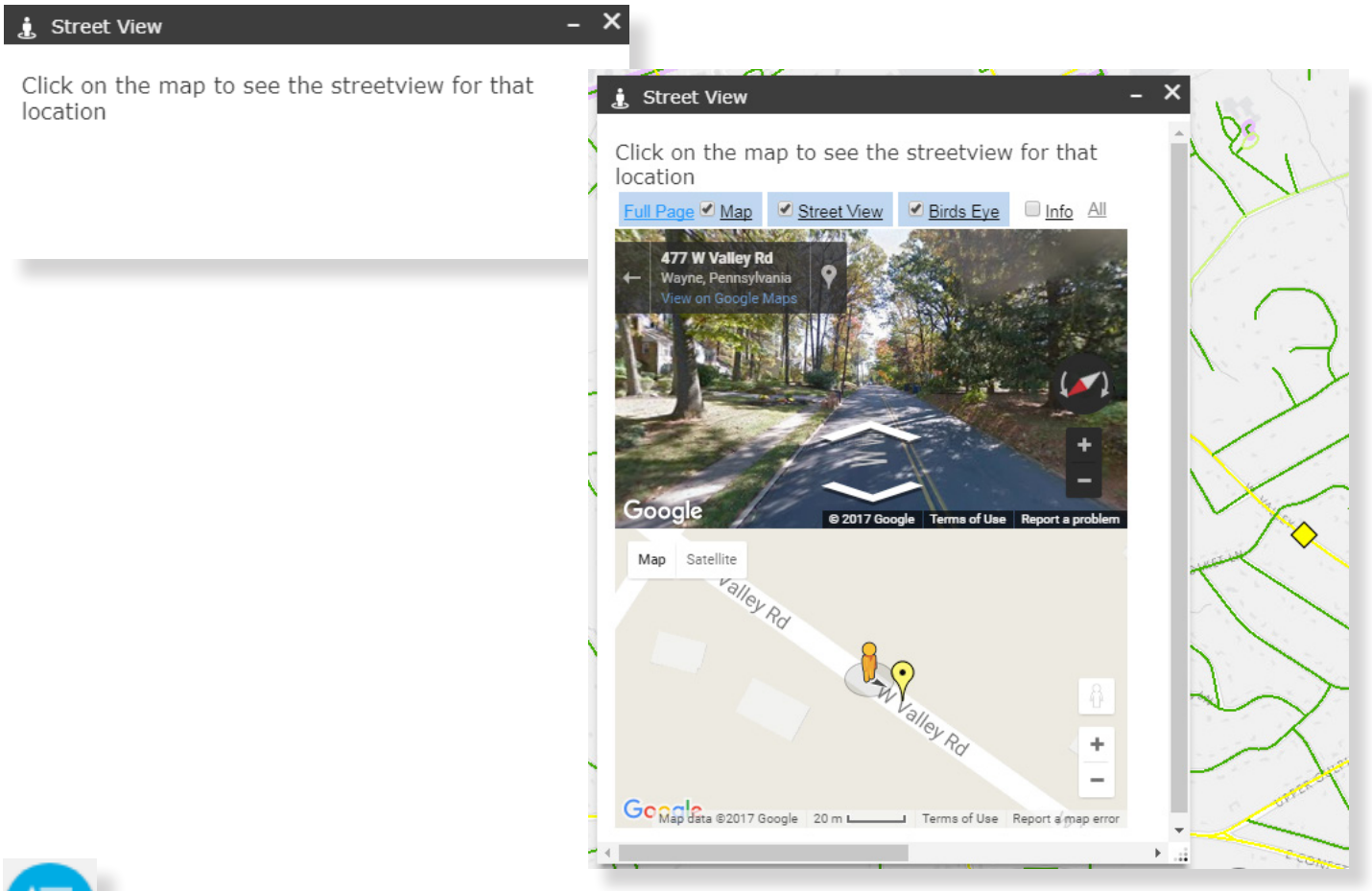
The light blue button at the bottom opens the Basemap Gallery. Users can change the background map by selecting one of the available map layers in the gallery.



Map Functionality

Street View

The gray button at the bottom opens the Street View Tool. When first opened, the Street View window prompts the user to click on the map to see the Google Street View for a specific location. Once the user selects a location on the map, the Street View window populates with the familiar Google Street View interface and Google basemap. Check-boxes are available at the top to toggle individual elements in the window. Checking the “Info” check-box will display the latitude and longitude of the basemap point and the street view location.



Legend

The bright blue button at the bottom right opens the Legend window. The legend shows key information for the layers that are currently displayed (turned on via the Layer List). The legend is displayed by default, but can be minimized or closed at any time.