TRAIL USER PROJECTIONS

ALBANY-HUDSON ELECTRIC TRAIL

JUNE 12, 2018

EMPIRE STATE TRAIL

NEW YORK STATE OF OPPORTUNITY.

Hudson River Valley Greenway

alta PLANNING + DESIGN

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TRAIL USER PROJECTIONS

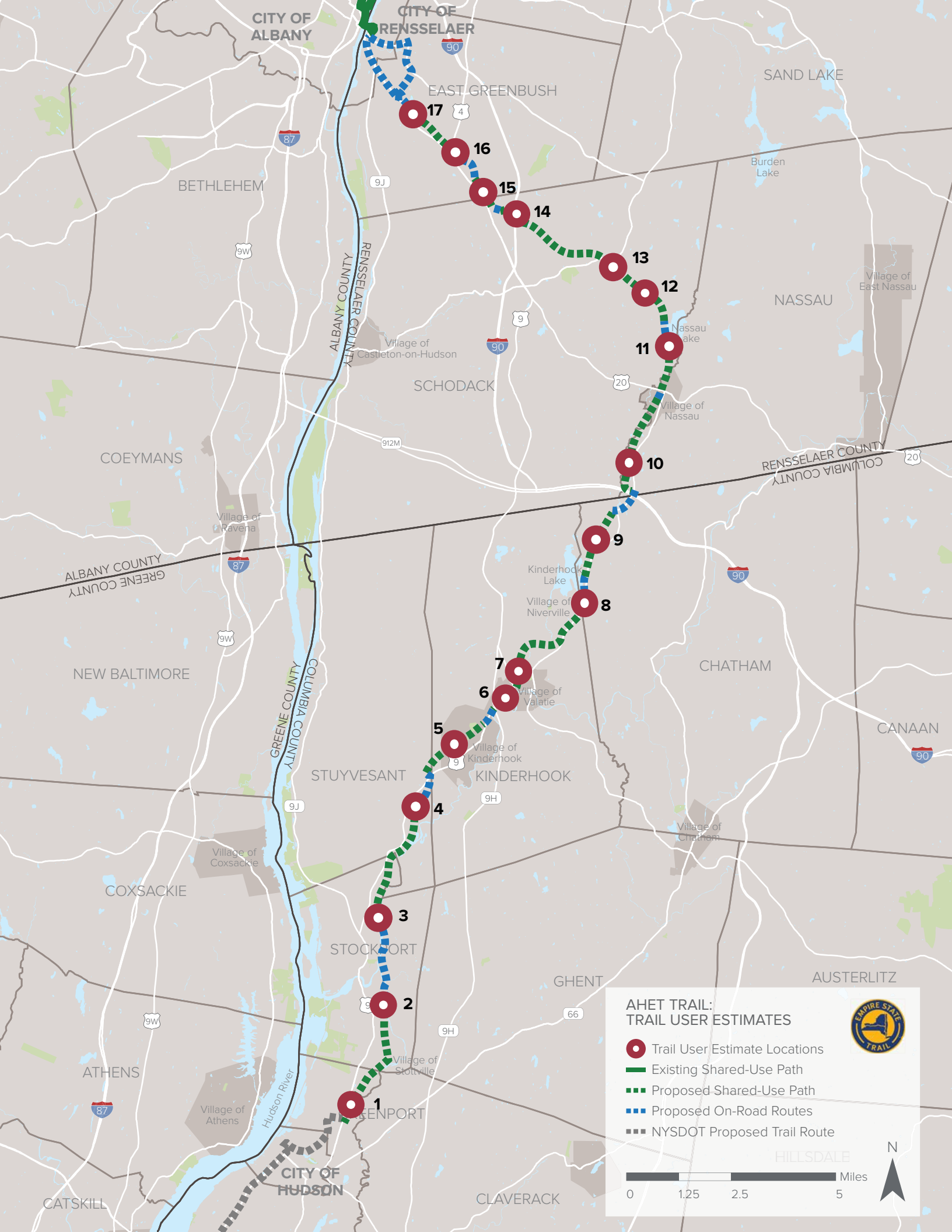
The Hudson River Valley Greenway is developing the Albany-Hudson Electric Trail (AHET), which will be a new 35-mile rail-trail from the City of Rensselaer to the City of Hudson, in Rensselaer and Columbia Counties. Detailed information about the trail is available on the project website at www.AHETtrail.org. This Report provides a projection of the number of walkers, runners, and bicyclists that will visit the trail annually at seventeen (17) specific locations along the trail, along with a "trail-wide" visitor projection for the entire 35-mile route. Since the Albany-Hudson Electric Trail will be a new facility, no existing trail user information exists. Therefore, this report analyzes trail use data compiled at more than 50 other rail-trail and Canalway trail locations in New York State - extrapolating to create an estimate for the AHET Trail.

Trail users for the entire 35-mile Albany-Hudson Electric (AHET) Trail are projected to be approximately 490,000 users annually. Trail users at individual points along the Albany-Hudson Electric Trail are expected to range between 30,000 to 132,000 annually. The peak season for trail use is expected to be the Summer season between the months of June, July, and August with peak trail use occurring around noon over the weekends. It is anticipated that trail use will be noticeably lower during weekdays and the off-peak seasons. Peak seasonal trail user estimates are predicted on average to be approximately 200 trail users per day. Trail users are expected to be highest within East Greenbush and lowest between North Chatham and Nassau. Annual trail user estimates have been developed for 17 points along the AHET Trail, which are shown in the AHET Trail User Estimates map on page 4 and within table 1 on page 3.

The annual user projections in this report apply to off-road sections of the trail, which will be a ten to twelve foot wide path. At various locations along the 35 miles where physical constraints preclude creation of an off-road trail, sections of the AHET route will be designated on the shoulders of public roadways. While this report does not provide trail use estimates for on-road sections of the AHET route, it is anticipated that usage will be much lower for on-road sections. The majority of on-road use will be from experienced bicyclists comfortable riding on road shoulders, traveling on roads that connect off-road sections (most pedestrians will use off-road sections).

Table 1: AHET Trail User Estimate Summary Table

#	ANNUAL TRAIL USER ESTIMATES	BICYCLISTS (35%)	PEDESTRIANS (65%)	WINTER AVERAGE DAILY (DEC., JAN., FEB.)	SPRING AVERAGE DAILY (MAR., APR., MAY)	SUMMER AVERAGE DAILY (JUNE, JULY, AUG.)	FALL AVERAGE DAILY (SEPT. , OCT., NOV.)
17	132397	46339	86058	131	422	568	335
16	79677	27887	51790	79	254	342	202
15	68548	23992	44556	68	219	294	173
14	63447	22207	41241	63	202	272	160
13	40015	14005	26010	40	128	172	101
12	38648	13527	25121	38	123	166	98
11	33131	11596	21535	33	106	142	84
10	36062	12622	23440	36	115	155	91
9	35096	12284	22812	35	112	151	89
8	33731	11806	21925	33	108	142	85
7	40336	14118	26219	40	129	173	102
6	40336	14118	26219	40	129	173	102
5	42059	14721	27338	42	134	180	106
4	35119	12292	22827	35	112	151	89
3	31092	10882	20210	31	99	133	79
2	34336	12018	22319	34	110	147	87
1	49947	17481	32465	49	159	214	126


CITY OF ALBANY
CITY OF RENSSELAER
EAST GREENBUSH
SAND LAKE
BETHLEHEM
Burden Lake
NASSAU
Village of East Nassau
Nassau Lake
Village of Castleton-on-Hudson
SCHODACK
Village of Nassau
COEYMANS
Village of Ravena
ALBANY COUNTY
GREENE COUNTY
RENSSELAER COUNTY
COLUMBIA COUNTY
Kinderhook Lake
Village of Niverville
NEW BALTIMORE
CHATHAM
Village of Valatie
CANAAN
STUYVESANT
KINDERHOOK
Village of Kinderhook
Village of Chatham
Village of Coxsackie
COXSACKIE
STOCKPORT
GHENT
AUSTERLITZ
ATHENS
Village of Athens
Hudson River
Village of Stottville
GREENPORT
HILLSDALE
CITY OF HUDSON
CATSKILL
CLAVERACK
1
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14
15
16
17
AHET TRAIL:
TRAIL USER ESTIMATES
Trail User Estimate Locations
Existing Shared-Use Path
Proposed Shared-Use Path
Proposed On-Road Routes
NYSDOT Proposed Trail Route
Miles
0
1.25
2.5
5
N

METHODOLOGY

Trail user estimates are typically conducted on existing trails or for extensions of existing trails. These estimates are based on trail user counts conducted using volunteers during peak hours or days, or by using automated trail counters. To project the number of trail users for the AHET Trail, a proposed trail, a methodology was developed to correlate existing trail counts elsewhere in New York State to the proposed trail.

Data from 54 annual trail user count locations across New York State were collected and mapped. These trail user counts were conducted by Parks and Trails New York (PTNY) during 2016 and 2017.[1] These counts served as the primary basis for the AHET Trail user projection.

To correlate these existing points to the proposed trail, population density was used. Research has shown that there is a correlation between trail users and surrounding population density.[2][3] Population density has also been used as a method to adjust trail counts to evaluate other trail characteristics, such as trail surface types.

Population densities of variable radii have been used to project or support trail user counts, typically ranging from 1 to 3 miles. Given the length and scope of the AHET Trail, Erie Canalway Trail, and Empire State Trail in general, and lack of other long distance shared use paths as alternatives in both the existing and projected count locations, a larger 3 mile radius was used. Population density for a 3-mile radius around each of these count locations was calculated by using population data from block groups within this radius and dividing it by the total area. To more accurately represent the density surrounding the AHET Trail, trail counts were limited to locations with a population density with less than 1000 people per square mile. The count conducted near the Walkway Over the Hudson, a destination and significant generator, was also excluded. The resulting trendline equation was used to generate annual trail user estimates at locations along the Albany-Hudson Electric Trail. The scatterplot and trendline are shown in Figure 1 on page 6.

Adjustment factors developed through the National Bicycle and Pedestrian Documentation Project were used to develop peak monthly, daily, and hourly estimates for each of these points.[4] To develop the trail user estimate for the entire Albany-Hudson Electric Trail, it was assumed that all user trips will start and end at the same location, creating an out-and-back user trip. It was assumed that the average pedestrian trip would be a round trip of 4 miles in length and that the average bicycling trip would be a round trip of 10 miles in length. A mode share of 65% pedestrians and 35% bicyclists was also assumed, based on trail user data collected by PTNY since 2005. Using these assumptions, each of the point estimates was adjusted to reflect an accurate distribution of pedestrians and bicyclists over the length of the trail to not discount or double count users at any one location.

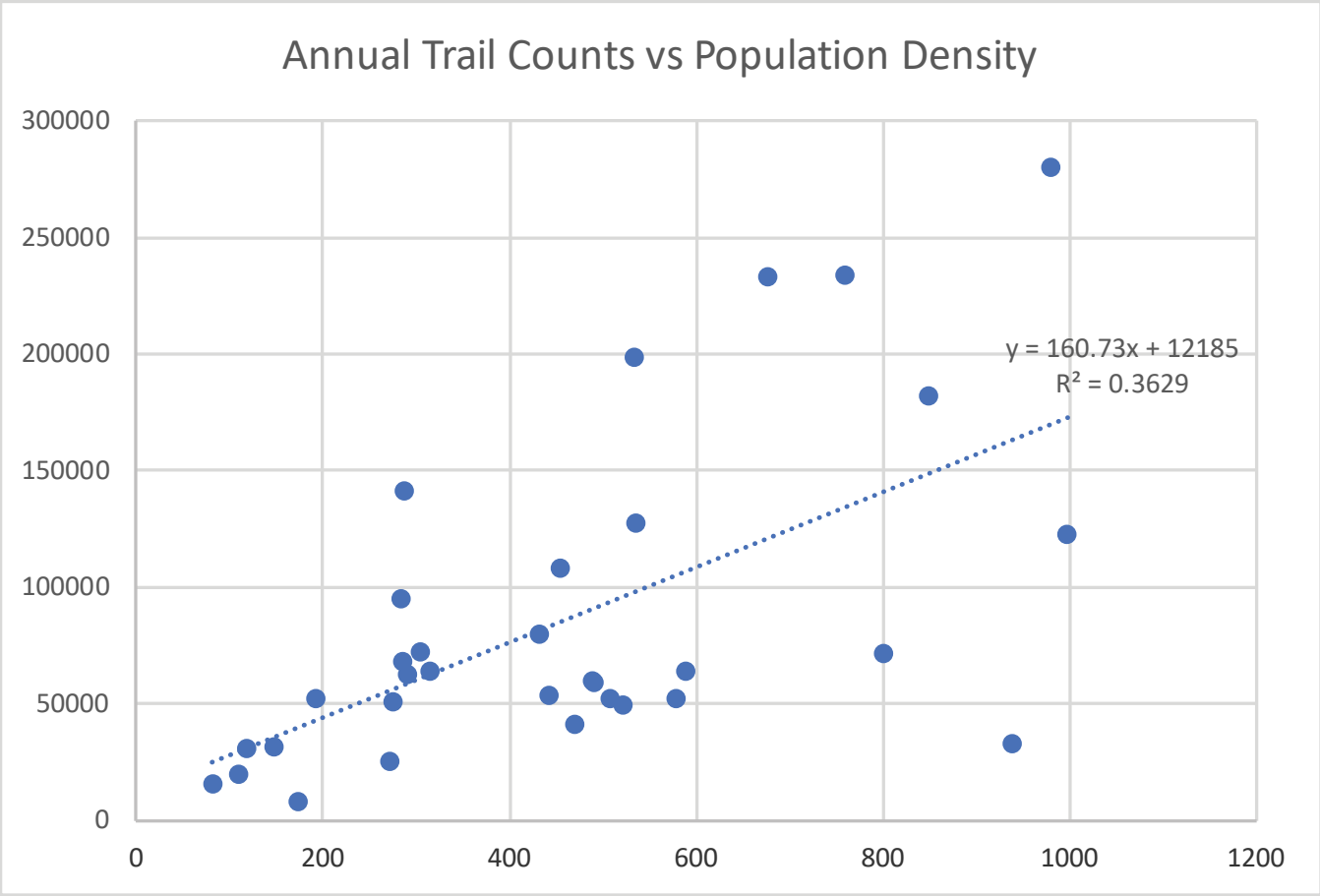
1 https://www.ptny.org/publications/annual-reports

2 Seamless Travel: Measuring Bicycle and Pedestrian Activity in San Diego County and its Relationship to Land Use, Transportation,Safety, and Facility Type; http://www.path.berkeley.edu/sites/default/files/publications/PRR-2010-12.pdf

3 Trail Characteristics as Correlates of Urban Trail Use; Kim D. Reynolds, PhD; Jennifer Wolch, PhD; Jason Byrne, BA; Chih-Ping Chou, PhD; Guanjun Feng, PhD; Susan Weaver, MA, MPl; Michael Jerrett, PhD; https://activelivingresearch.org/sites/default/files/Reynolds_0.pdf

4 http://bikepeddocumentation.org/

Figure 1: Graph of Trail User Count Locations Used to Estimate AHET Trail User Projections



DETAILED METHODOLOGY

POPULATION DENSITY

Population densities within a three mile radius of each existing trail count locations were calculated using the following steps:

1. Map 54 existing trail count locations conducted by Parks and Trails New York (PTNY) across Upstate New York. These trail counts were taken from Tables 16 and 17 of the 2017 Who's on the Trail report and the 2016 Capital District Multi-Use Trail User Counts interactive map, both of which were produced by PTNY.
2. Input the population and area of all block groups within 3 miles of each existing count location. Select and extract all block groups that fall within a 3-mile radius of each existing count location. Join ACS 2016 5-Year Estimate Total Population data to all block groups (POP). Calculate area of each block group (SQMI).
3. Determine the population density for each individual existing count location. Select all block groups that are within 3 miles of each individual count location. Take the sum of the population (POP_SUM) and sum of the area (SQMI_SUM). Use these values to determine the unique population densities (POPDEN_PER_SQMI) associated with each individual existing count location by dividing the sum of the population by the sum of the area (POPDEN_PER_SQMI = [POP_SUM] / [SQMI_SUM]).

Population densities within a three mile radius of locations along the AHET Trail were calculated using the following steps:

1. Map 17 sample points along proposed off-road shared-use path along the AHET Trail. Due to the 3-mile radius used throughout the analysis, for off-road segments longer than 2 miles, sample points were placed at either end of the line segments and, for segments shorter than 2 miles, sample points were placed in the middle of the line segment. This resulted in 17 sample points along the route.
2. Input the population and area of all block groups within 3 miles of each existing count location. Select and extract all block groups that fall within a 3-mile radius of each existing count location. Join ACS 2016 5-Year Estimate Total Population data to all block groups (POP). Calculate area of each block group (SQMI).
3. Determine the population density for each individual AHET Trail sample count estimate location. Select all block groups that are within 3 miles of each individual sample count estimate location. Take the sum of the population (POP_SUM) and sum of the area (SQMI_SUM). Use these values to determine the unique population densities (POPDEN_PER_SQMI) associated with each individual sample count estimate location by dividing the sum of the population by the sum of the area (POPDEN_PER_SQMI = [POP_SUM] / [SQMI_SUM]).

POPULATION DENSITY AND TRAIL USER PROJECTIONS

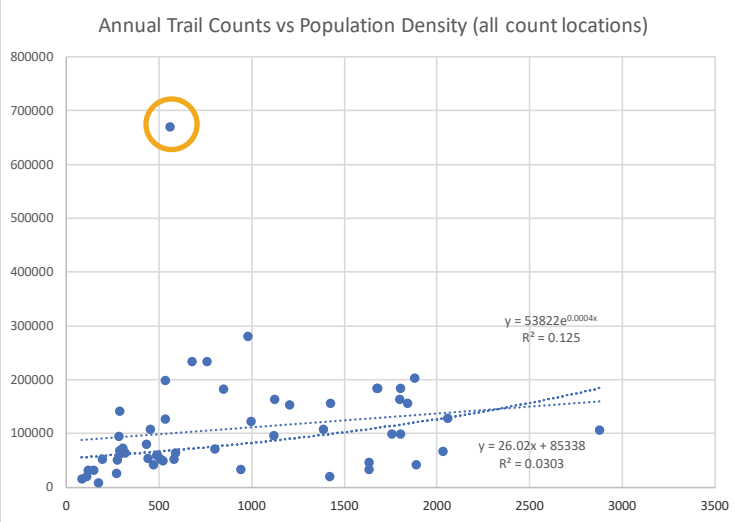
Each of the 54 annual trail counts and the corresponding population densities were plotted. As shown on the graph to the right, the count taken near the Walkway Over the Hudson, with 670,000 users, is an outlier. To further refine the correlation between the existing trail count locations and the character of the proposed AHET Trail, the count locations were reduced to those with a corresponding population density of less than 1000 people per square mile. There are no points along the proposed AHET Trail that exceed that density. The graph and trendline used to develop trail user estimates at each of the 17 points along the AHET Trail is shown on page 6. This same methodolgy is commonly used in transportation engineering for trip and parking generation estimates.

Population densities at each of the 17 points along the AHET Trail were then entered into the equation (y = 160.73x + 12185; where x is population density and y is annual trail users). The resulting annual trail user estimates are shown in Table 1, column 2.

DETAILED TRAIL USER ESTIMATES

To more fully understand the projected AHET Trail user quanities, the annual trail user estimate was adjusted to provide trail user projections during several peak periods. Using trail user counts taken over multiple years and across the country, the National Bicycle and Pedestrian Documentation Project has developed adjustment factors that are widely used and accepted.[1] These same factors were

Figure 2: Graph of All Trail User Count Locations



used here to develop the trail user estimates. While NBPD adjustment factors for peak month in Long Winter/Short Summer climate conditions is 14% of annual users in August, counts collected by PTNY in New York State over the last few years show a peak month factor of approximately 16%. For the peak month of August, 16% was used to estimate AHET Trail users. The other tables used from NBPD are included in References in this report.

Peak Month: Annual Trail Estimate * 16%

OVERALL AHET TRAIL USER PROJECTION

It is common for annual trail user estimates to be created by adding annual counts or annual count estimates at irregular intervals along a trail together. The fault with this common methodology is that the estimates will either duplicate trail users if count

1 National Bicycle and Pedestrian Documentation Project Count Adjustment Factors (March 2009); http://bikepeddocumentation.org/application/files/6114/6671/7593/NBPD_Adjustment_Factors.pdf

locations are too close together or leave out trail users if count locations are too far apart.

To more accurately project the total number of trail users along the AHET Trail, each point location for annual user projections was adjusted to account for the likely distance a trail user will be using the AHET Trail. In order to accomplish this, trail users needed to be divided into bicyclists and pedestrians, since the average distance is different for these user groups. Data collected by PTNY and others along the Erie Canalway Trail since 2005 have shown variability in the mode share between these two groups but on average, this split is typically 65% pedestrians/joggers and 35% bicyclists. This mode share split was used for the AHET Trail.

In additon to this mode split, it was also assumed that the average round trip for a pedestrian would be 4 miles long (2 miles out and 2 miles back) and the average round trip for a bicyclist would be 10 miles long (5 miles out and 5 miles back). Lastly, it was also assumed that on-road sections of the Albany-Hudson Electric Trail would not generate any new users. These on-road portions are likely to have trail users as they travel between or to/from off-road portions of the trail, but are unlikely to generate users that are not already counted as part of the off-road estimates.

Each of the 17 annual user projections developed along the Albany-Hudson Electric Trail were divided into bicyclists and pedestrian projects, then adjusted for distance of off-road trail on either side of that point. Table 2 summarizes the annual estimates, distances, and calculations utilized to estimate the annual trail user estimates for the AHET Trail.

Annual Bicyclists: Annual Trail User Projection * 35%

Adjusted Bicyclists: Annual Bicyclists * (Off-Road Distance South / 5) + Annual Bicyclists * (Off-Road Distance North / 5)

Annual Pedestrians: Annual Trail User Projection * 65%

Adjusted Pedestrians: Annual Pedestrians * (Off-Road Distance South / 2) + Annual Pedestrians * (Off-Road Distance North / 2)

Table 2: Overall AHET Trail User Projection Summary Table

#	ANNUAL TRAIL USER PROJECTION	OFF-ROAD DISTANCE SOUTH	OFF-ROAD DISTANCE NORTH	ANNUAL BICYCLISTS AT POINT	ADJUSTED BICYCLISTS	ANNUAL PEDESTRIANS AT POINT	ADJUSTED PEDESTRIANS
17	132397	0.81	0.17	46339	9083	86058	42169
16	79677	0.56	0.81	27887	7656	51790	35544
15	68548	0.30	0.56	23992	4152	44556	19276
14	63447	1.42	0.30	22207	7670	41241	35609
13	40015	0.51	1.42	14005	5423	26010	25179
12	38648	0.64	0.51	13527	3118	25121	14477
11	33131	1.49	0.64	11596	4952	21535	22990
10	36062	0.33	1.49	12622	4614	23440	21424
9	35096	0.64	0.33	12284	2381	22812	11056
8	33731	1.30	0.64	11806	4566	21925	21201
7	40336	0.38	1.30	14118	4747	26219	22037
6	40336	0.62	0.38	14118	2834	26219	13159
5	42059	1.04	0.62	14721	4885	27338	22680
4	35119	1.48	1.04	12292	6202	22827	28794
3	31092	0.25	1.48	10882	3770	20210	17502
2	34336	1.46	0.25	12018	4107	22319	19070
1	49947	0.60	1.46	17481	7218	32465	33511
Total Annual Trail Users by Mode:					87377		405677
				Total Annual Trail Users:			493053

REFERENCE TABLES FROM NATIONAL BICYCLE AND PEDSTRIAN DOCUMENTATION PROJECT

NBPD Count Adjustment Factors (March 2009)

Table 1

Hourly Adjustment Factors

Multi-use paths and pedestrian entertainment areas by season

	April - September 6am - 9pm					October - March 6am - 9pm				
	---- PATH------		-----PED-----			---- PATH------		-----PED-----		
	wkdy	wkend	wkdy	wkend		wkdy	wkend	wkdy	wkend	
0600	2%	1%	1%	1%	0600	2%	0%	1%	0%	
0700	4%	3%	2%	1%	0700	4%	2%	2%	1%	
0800	7%	6%	4%	3%	0800	6%	6%	3%	2%	
0900	9%	9%	5%	3%	0900	7%	10%	5%	4%	
1000	9%	9%	6%	5%	1000	9%	10%	6%	5%	
1100	9%	11%	7%	6%	1100	9%	11%	8%	8%	
1200	8%	10%	9%	7%	1200	9%	11%	9%	10%	
1300	7%	9%	9%	7%	1300	9%	10%	10%	13%	
1400	7%	8%	8%	9%	1400	9%	10%	9%	11%	
1500	7%	8%	8%	9%	1500	8%	10%	8%	8%	
1600	7%	7%	7%	9%	1600	8%	8%	7%	7%	
1700	7%	6%	7%	8%	1700	7%	5%	6%	6%	
1800	7%	5%	7%	8%	1800	6%	3%	7%	6%	
1900	5%	4%	7%	8%	1900	4%	2%	7%	6%	
2000	4%	3%	7%	8%	2000	2%	1%	6%	6%	
2100	2%	2%	6%	8%	2100	2%	1%	5%	5%	

Table 2

Daily Adjustment Factors

Note: Holidays use weekend rates.

MON	14%
TUES	13%
WED	12%
THURS	12%
FRI	14%
SAT	18%
SUN	18%