

# The Statewide Impacts of the September 11<sup>th</sup> National Memorial Trail in Pennsylvania

The ROI of Active Transportation Investments

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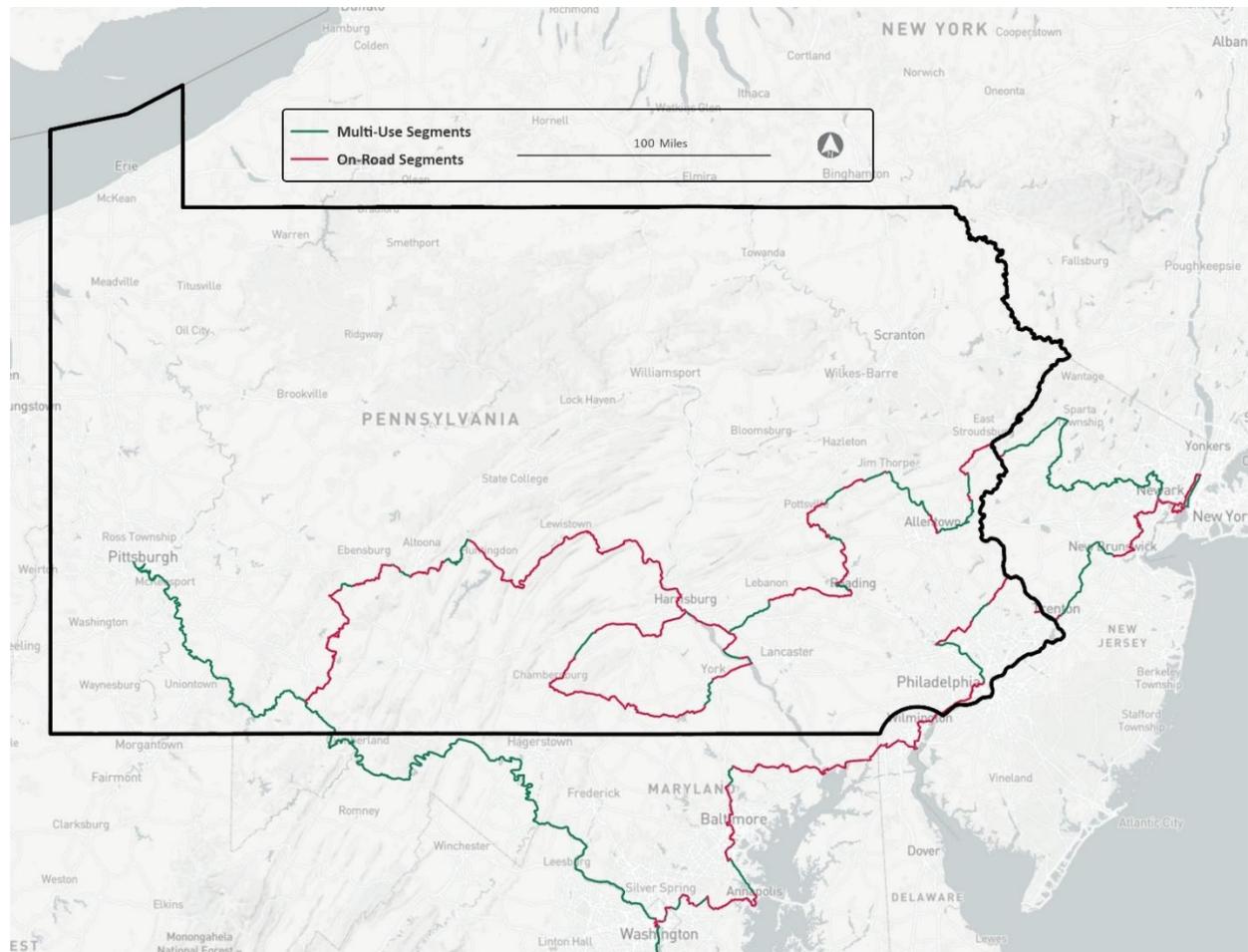
Submitted to the September 11<sup>th</sup> National Memorial Trail Alliance



## Executive Summary

The September 11<sup>th</sup> National Memorial Trail is a 1,500-mile multi-state network that connects the three sites of the tragic event in our country’s history, from the Flight 93 Memorial outside Pittsburgh to the Pentagon in Arlington to the World Trade Center Memorial in Manhattan. The commemorative corridor integrates existing trail systems, such as the Great Allegheny Passage, Circuit Trails, and East Coast Greenway, and consists of both multi-use and on-road sections. Within Pennsylvania, the Trail connects 515 miles of existing multi-use trail corridors to 615 miles of on-road segments. Missioned to advance the network to both honor the legacy of lives lost and to provide greater access to recreation and its many benefits, the September 11<sup>th</sup> National Memorial Trail Alliance has focused its current efforts on the full alignment of the current on-road segments across the state.

Figure ES.1: Map of the September 11<sup>th</sup> National Memorial Trail



Source: September 11<sup>th</sup> National Memorial Trail; ESI (2025); ArcGIS (2025)

As an economic development tool, trails serve multiple purposes, which means that the return on investment of a network can be viewed through a number of perspectives:

- As an indicator of local reinvestment in a place, trails can serve as a catalyst for additional economic and community development projects.
- As part of a region’s green infrastructure, trail building – when done in harmony with nature – can include the creation of a green buffer and tree cover that contribute to sustainable and resilient ecosystems.
- As a mode of active recreation for residents and out-of-town visitors, trails also often serve as a way to encourage “local tourism” as well as attract visitors to spend more time in the region, in turn spending at businesses located nearby.
- Finally, trails are a critical social infrastructure that support mental and physical health.

### Capital Investment

The continued development of the September 11<sup>th</sup> National Memorial Trail network within Pennsylvania will represent a significant boost to the local and state economies through the upfront capital investment. Taken together, the Commonwealth’s historic and future investment of an estimated \$1.3 billion in the network will generate direct construction activity in the region, employing construction workers and professional service providers (e.g. architects, engineers, and environmental services firms) through the project development period. Upon completion, the fully developed 1,130-mile network’s direct expenditures are projected to generate approximately \$2.5 billion in total economic impact, supporting 12,000 jobs with \$936.9 million in earnings in the Pennsylvania economy.<sup>1</sup>

Figure ES.2 Potential Aggregate One-time Economic Impact from Construction of the September 11<sup>th</sup> National Memorial Trail in Pennsylvania

<b>Impact Type</b>	<b>Total Network</b>	<b>Per Mile</b>
<b>Economic</b>		
Total Impact (\$M)	\$2,472.5	\$2.2
Employment Supported (FTE)	12,000	10
Employee Compensation (\$M)	\$936.9	\$0.8
<b>Fiscal</b>		
Aggregated: Income, Sales, Business (\$M)	\$45.7	\$0.04

Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)

### User Spending Due to Trail Development

Above and beyond impacts generated by the development of the trail network, the local spending by trail users will generate additional economic benefits for the businesses located near the network. Residents and visitors who access the region’s trails often spend money on both goods and services

<sup>1</sup> All monetary inputs and resulting impacts are represented in 2025 dollars.

related to active recreational activity during their trips. Much of this spending is happening at retailers in immediate proximity of the trails.

It is estimated that the fully built-out network will host over eight million visitors on an annual basis, with users making purchases on two broad categories of consumer items, commonly referred to in recreational studies as ‘hard’ and ‘soft’ goods. Taken together, an estimated \$1.2 billion of annual spending at retailers doing business in Pennsylvania will result in \$2.0 billion in total economic impact supporting 19,600 jobs with \$618.5 million in earnings for the state’s economy.<sup>2</sup>

Figure ES.3 Potential Annual Economic Impact from User Spending on the September 11<sup>th</sup> National Memorial Trail in Pennsylvania

<b>Impact Type</b>	<b>Total Network</b>	<b>Per Mile</b>
<b>Economic</b>		
Total Impact (\$M)	\$2,040.8	\$1.8
Employment Supported (FTE)	19,600	20
Employee Compensation (\$M)	\$618.5	\$0.5
<b>Fiscal</b>		
Aggregated: Income, Sales, Business (\$M)	\$37.2	\$0.03

Source: IMPLAN (2023), Econsult Solutions, Inc. (2025)

## Public Health

The September 11<sup>th</sup> National Memorial Trail supports healthy lifestyles for people in surrounding communities by providing an easily accessible and low-cost option for residents to recreate and engage in physical activity. Physically active people typically enjoy a variety of health benefits, including lower incidence of cardiovascular diseases, diabetes, depression, certain cancers, and obesity compared to their sedentary counterparts.

It is estimated that 467,300 working age adults reside within a half mile of the network, 77,900 of whom will noticeably improve their activity level to Center for Disease Control standards. These effects are expected to deliver \$102.6 million in annual healthcare cost savings statewide.

Figure ES.4: Estimated Value of Healthcare Savings from Active Trail Users in Pennsylvania

	<b>Working Age Adults</b>	<b>Estimated Regular Trail Users</b>	<b>Users Meeting Activity Req. Due to Trails</b>
<b>Total Network</b>	<b>467,300</b>	<b>165,700</b>	<b>77,900</b>
	<b>Lower Bound</b>	<b>Mean</b>	<b>Upper Bound</b>
Average Annual Savings per Active Individual	\$748	\$1,318	\$1,888
Annual Savings - Full Network (\$M)	\$58.2	\$102.6	\$147.0
Per Mile of Full Network	\$51,500	\$90,800	\$130,000

Source: Carlson et al. (2013); Götschia and Lohb (2017); CDC (2018); ESRI (2025); Econsult Solutions, Inc.(2025)

<sup>2</sup> All monetary inputs and resulting impacts are represented in 2025 dollars.

## Additional Benefits

Trails and other recreational amenities provide many benefits on both an individual and societal level, some of which cannot be quantified or valued in terms. While more difficult to measure, it is necessary to describe the positive impacts of trails on a geography's overall transportation network, property values, and environmental landscape. The proposed network expansion will offer additional transit mode choices and increase property values for many Pennsylvanians. More generally, further development will establish useful resources and attractive features as shared spaces while also supporting a sustainable environment.

# Table of Contents

1.	Introduction .....	8
1.1.	Purpose of Report .....	8
1.2.	About the September 11 <sup>th</sup> National Memorial Trail Alliance .....	8
1.3.	Trail Networks as a Driver of Regional Benefits .....	11
1.4.	Organization of Report.....	11
2.	Impacts from Capital Investments Made to Complete the Trail Network .....	12
2.1.	Methodology.....	12
2.2.	The September 11 <sup>th</sup> National Memorial Trail’s Existing and Future Network.....	13
2.3.	Economic Impact of the September 11 <sup>th</sup> National Memorial Trail .....	15
2.4.	Completion of the September 11 <sup>th</sup> National Memorial Trail Will Support a Diversity of Jobs in the State .....	15
2.5.	Potential Tax Impacts from the Completion of the September 11 <sup>th</sup> National Memorial Trail ...	16
3.	Economic Impacts Associated with Trail Users.....	18
3.1.	Trail Use Estimation Approach.....	18
3.2.	User Spending Estimation .....	19
3.3.	How Trails Contribute to Positive Public Health Outcomes .....	22
3.4.	Potential Public Health Value of the Total Network.....	24
3.5.	Transportation and Safety Impacts.....	25
4.	Other Benefits of Active Transportation Networks .....	28
4.1.	Potential Environmental Services Impact Benefits of Trails and Open Space .....	28
4.2.	Residential Property Value Impacts .....	30
5.	Case Studies .....	32
5.1.	Case Study 1: The Schuylkill River Trail to Delaware and Lehigh Heritage Trail and the City of Pottsville, Schuylkill County .....	34
5.2.	Case Study 2: The Susquehanna River Route and the Borough of Lewistown, Mifflin County ..	40
5.3.	Case Study 3: Route 311 from Chambersburg to Shippensburg and Chambersburg, Franklin County .....	46
6.	Appendix .....	52

6.1. Technical Details ..... 52

6.2. Input-Output Methodology ..... 56

6.3. About Econsult Solutions, Inc. .... 59

# 1. Introduction

## 1.1. Purpose of Report

Multi-use trails provide valuable economic, environmental, and public health benefits to the communities they serve. These valuable impacts are often understated or overlooked when considering investment in trail systems within communities. The purpose of this study is to quantify the economic and fiscal impacts of

the September 11<sup>th</sup> National Memorial Trail’s 1,130 miles within Pennsylvania, while also highlighting societal benefits. The report calculates the impacts of the historical development of the trail’s existing network as well as an estimation of the economic and fiscal impacts of future alignments. This analysis aims to help stakeholders understand the estimated value created by completing the network, including opportunities arising for the community, workers, and local businesses.

Alignment of the 600-plus miles of on-road trailway will bring economic benefit to the state, and, in particular the 27 counties through which the interconnected route travels. Additionally, usage of the trails by residents and visitors will add invaluable benefits and economic activity to the area on an ongoing, annual basis, in the form of spending on goods and services associated with outdoor recreation. The completed network will also expand walking, biking, and other active transportation options for the region and improve connectivity to the public transportation system and other destinations and encourage active lifestyles and healthy usage of leisure time.

## 1.2. About the September 11<sup>th</sup> National Memorial Trail Alliance

The September 11<sup>th</sup> National Memorial Trail Alliance (“the Alliance”) is a nonprofit organization dedicated to honoring the lives lost and the heroes remembered on September 11, 2001, through the creation and stewardship of the September 11<sup>th</sup> National Memorial Trail. This 1,500-mile commemorative corridor links the three sites of the September 11<sup>th</sup> events – the World Trade Center in New York City, the Pentagon in Arlington, Virginia, and the Flight 93 National Memorial in Shanksville, Pennsylvania.<sup>3</sup> Working with federal, state, and local partners, as well as trail and community organizations, the Alliance advances the development of this interconnected network, which integrates existing greenways, rail trails, and roadways.

Beyond commemoration, the Alliance fosters tourism, supports local economies, and encourages healthy lifestyles. It serves as both a living memorial and a resource for recreation and reflection. Through partnerships and investments in trail infrastructure, the organization is working to complete a

### Funding Acknowledgement

Funding assistance has been provided by the Department of Conservation and Natural Resources Bureau of Recreation and Conservation Environment Stewardship Fund.

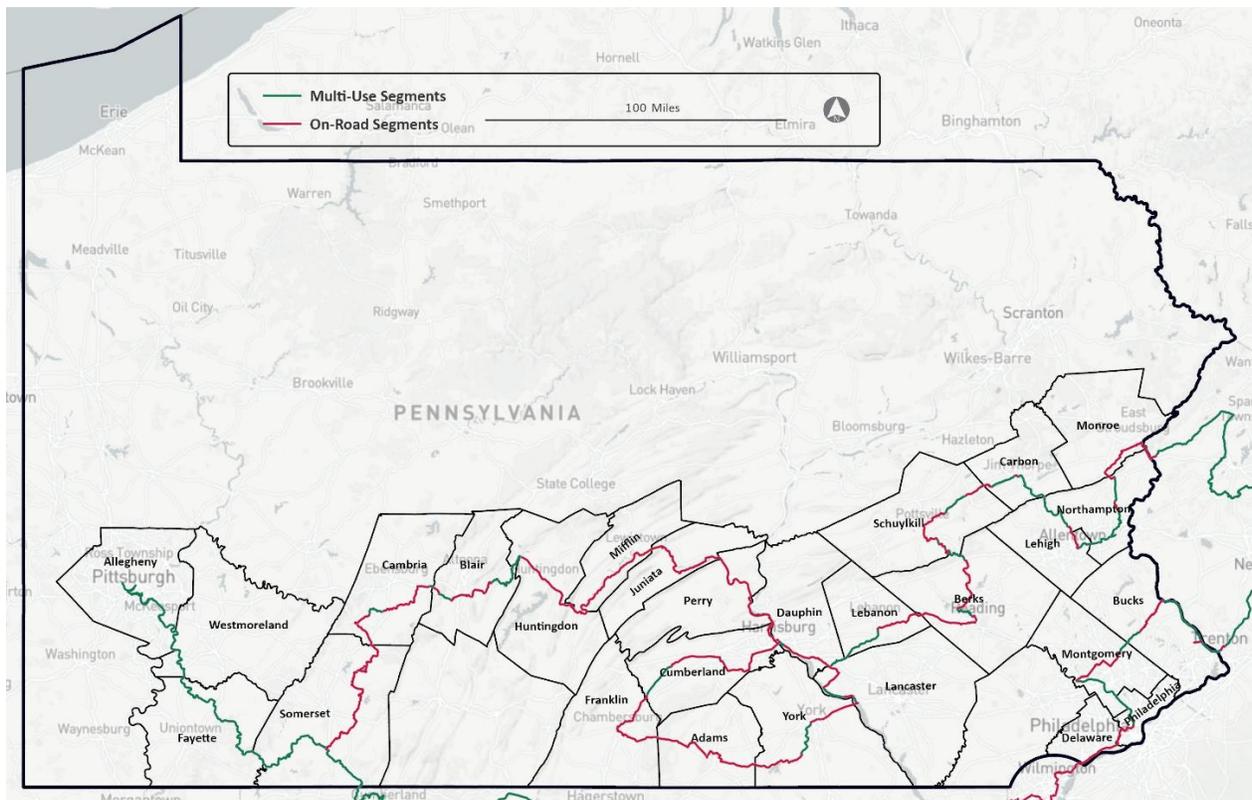


<sup>3</sup> “Remember, discover, connect with the 9/11 Trail, 9/11 Trail”. <https://www.September11thtrail.org/about.html>.

fully connected network that strengthens communities and preserves the legacy of the September 11<sup>th</sup> tragedy. The Commonwealth of Pennsylvania’s Department of Transportation (PENNDOT) and Department of Conservation and Natural Resources (DCNR) are partnering with the Alliance to ensure the trail is fully marked ahead of next year’s 25<sup>th</sup> anniversary of September 11<sup>th</sup>. Nearly 750 new signs are being installed statewide as part of this effort, underscoring Pennsylvania’s commitment to preserving the memory of the tragedy while enhancing connectivity for residents and visitors.<sup>4</sup> This initiative is intended to bring greater accessibility and visibility to current and potential trail users.

In Pennsylvania, the Trail connects 27 counties, from the Flight 93 Memorial site in Somerset County eastward to the state border with New Jersey in Northampton County. At present, the in-state network boasts 515 miles of multi-use trail corridors and another 615 miles proposed along future alignments. Additionally, the network weaves together established routes like the Great Allegheny Passage and Schuylkill River Trail with on-road connections that are still being developed. This report’s analysis focuses on the economic and societal impacts of the Trail’s existing and proposed Pennsylvania network.

Figure 1.1: Map of the September 11<sup>th</sup> National Memorial Trail in Pennsylvania



Source: September 11<sup>th</sup> National Memorial Trail; ArcGIS (2025); Econsult Solutions, Inc. (2025)

<sup>4</sup> Commonwealth of Pennsylvania. “Shapiro Administration Working to Establish 9/11 National Memorial Trail Across Pennsylvania Ahead of 25th Anniversary of September 11th Next Year, Commonwealth of Pennsylvania, September 10, 2025”. <https://www.pa.gov/governor/newsroom/2025-press-releases/shapiro-admin--working-to-establish-9-11-national-memorial-trail>.

The network passes through 27 of the State’s 67 counties, as far north as the Monroe County border with New Jersey and crossing over the Somerset County border with Maryland.

Figure 1.2: Pennsylvania’s September 11<sup>th</sup> National Memorial Trail by Status of Segments

	<b>Existing Mileage</b>	<b>Planned Mileage</b>	<b>Total Mileage</b>
<b>County</b>	<b>515.4</b>	<b>615.4</b>	<b>1,130.8</b>
<b>Adams</b>	-	11.1	<b>11.1</b>
<b>Allegheny</b>	48.7	-	<b>48.7</b>
<b>Berks</b>	13.0	49.0	<b>62.0</b>
<b>Blair</b>	20.8	23.0	<b>43.7</b>
<b>Bucks</b>	83.8	23.9	<b>107.7</b>
<b>Cambria</b>	8.8	36.6	<b>45.4</b>
<b>Carbon</b>	24.6	2.0	<b>26.6</b>
<b>Cumberland</b>	13.1	46.0	<b>59.0</b>
<b>Dauphin</b>	7.2	18.3	<b>25.5</b>
<b>Delaware</b>	-	30.1	<b>30.1</b>
<b>Fayette</b>	65.0	-	<b>65.0</b>
<b>Franklin</b>	0.9	32.9	<b>33.8</b>
<b>Huntingdon</b>	7.5	32.3	<b>39.8</b>
<b>Juniata</b>	-	25.9	<b>25.9</b>
<b>Lancaster</b>	20.5	3.2	<b>23.7</b>
<b>Lebanon</b>	16.2	17.1	<b>33.3</b>
<b>Lehigh</b>	23.9	1.9	<b>25.8</b>
<b>Mifflin</b>	-	32.3	<b>32.3</b>
<b>Monroe</b>	-	22.5	<b>22.5</b>
<b>Montgomery</b>	19.2	21.4	<b>40.6</b>
<b>Northampton</b>	38.1	20.4	<b>58.5</b>
<b>Perry</b>	-	32.3	<b>32.3</b>
<b>Philadelphia</b>	15.3	45.1	<b>60.4</b>
<b>Schuylkill</b>	15.8	30.3	<b>46.1</b>
<b>Somerset</b>	53.4	46.7	<b>100.2</b>
<b>Westmoreland</b>	16.2	-	<b>16.2</b>
<b>York</b>	3.3	11.1	<b>14.4</b>

Source: September 11<sup>th</sup> National Memorial Trail; ArcGIS (2025); Econsult Solutions, Inc. (2025)

### 1.3. Trail Networks as a Driver of Regional Benefits

Research and practice show that recreational trails are essential infrastructure which improve the economic vitality of communities. These networks create safe and easy access to a community's natural assets and connect destinations throughout a region. When developed as a network, they support healthy living, provide affordable transportation, and improve the quality of life for residents who live nearby. In addition to providing benefits to residents, investments in greenways and trails increase the attractiveness of a community for businesses and out-of-town visitors. As an economic development tool, trails serve multiple purposes, which means that the return on investment of a network can be viewed through a number of perspectives:

- As an indicator of local reinvestment in a place, trails can serve as a catalyst for additional economic and community development projects.
- As part of a region's green infrastructure, trail building – when done in harmony with nature – can include the creation of a green buffer and tree cover that contribute to sustainable and resilient ecosystems.
- As a mode of active recreation for residents and out-of-town visitors, trails also often serve as a way to encourage “local tourism” as well as attract visitors to spend more time in the region, in turn spending at businesses located nearby.
- Finally, trails are a critical social infrastructure that support mental and physical health.

### 1.4. Organization of Report

This report analyzes the potential economic, fiscal, and public health impacts of the September 11<sup>th</sup> National Memorial Trail within Pennsylvania, and is organized as follows:

- **Section 2: Impacts from Capital Investments of the Existing Network and Potential Alignments:** estimating the upfront impacts of historic and future trail construction as a series of one-time events;
- **Section 3: Impacts Associated with Trail Users:** quantifying the impacts of potential spending generated from trail users, and other benefits associated with increased access to trails;
- **Section 4: Other Societal Benefits from Trails Expansion:** measuring additional positive effects attributed to the continued build out of the network;
- **Section 5: Case Studies:** providing a snapshot of the quantifiable impacts and societal benefits of proposed trail alignments, with a profile of the downtown commercial center of a nearby municipality for each trail development; and
- **Appendix:** providing additional analytical results at more granular level than is presented in the main body of the report.

## 2. Impacts from Capital Investments Made to Complete the Trail Network

Historically, upfront capital investments made to convert trail segments from on-road to multi-use have benefited the local and state economies in a number of ways. The economic impacts included in this analysis are twofold, as over 500 miles of existing trail have already delivered one-time economic benefits through construction activity while approximately 600 miles present the opportunity for similar future positive impacts.

As build-out of the September 11<sup>th</sup> National Memorial Trail progresses across the Pennsylvania, direct construction activity will continue to stimulate local economies and the state as a whole. Primarily, direct construction activity of the network employs construction workers and professional service providers, such as architects, engineers, and environmental services firms, through the project development period. Those workers, in turn, spend a portion of their salaries and wages, both locally and statewide. The construction activity also catalyzes the procurement of a wide range of goods and services, helping to sustain business and drive new economic opportunities for local and regional vendors.

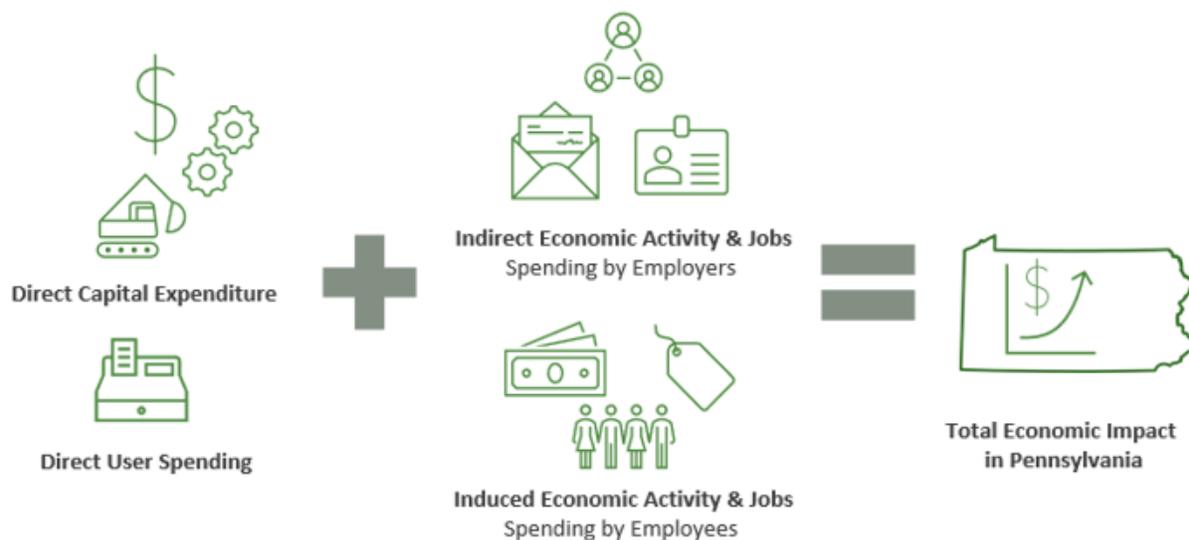
### 2.1. Methodology

The impact of this direct investment in the construction of the trails does not end with the initial investment, but is recirculated and multiplied through the economy in two ways:

- First, a portion of that direct spending, which goes to the purchase of goods and services, gets circulated back into an economy when those goods and services are purchased from local vendors. This is the “indirect effect,” and reflects the fact that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, a portion of that direct spending, which goes to labor income, gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This is the “induced effect,” and reflects the fact that some of those goods and services will be purchased from local vendors, further stimulating the local economy.

More details on IMPLAN, the input-output modeling framework that ESI uses can be found in the appendix.

Figure 2.1: Economic Impact Methodology



Source: Econsult Solutions, Inc. (2025)

By determining linkages across industries, input-output models estimate both the magnitude and composition of spillover impacts to all industries associated with a dollar spent in any one industry. Thus, the total economic impact for the expansion of the September 11<sup>th</sup> National Memorial Trail is the sum of the direct construction investment plus the indirect and induced effects generated by that direct investment.<sup>5</sup>

## 2.2. The September 11<sup>th</sup> National Memorial Trail’s Existing and Future Network

Significant investment has been made to the trail network within Pennsylvania to date, but a substantial amount of work is still required to realize its full potential. Currently, the Pennsylvania network consists of over 615 miles of on-road trail available (54 percent of its portion of the September 11<sup>th</sup> National Memorial Trail) to be converted for the full range of multi-use benefits. Full build out of an interconnected network of exclusively multi-use segments will enable communities and residents to maximize benefits from this amenity.

ESI conducted comprehensive research of publicly available data sources to determine a conservative set of assumptions for the per-mile cost of multi-use trail development. Key sources provided the following estimates of trail development costs per mile:

- Circuit Trails (Greater Philadelphia Region): \$2.5 million<sup>6</sup>

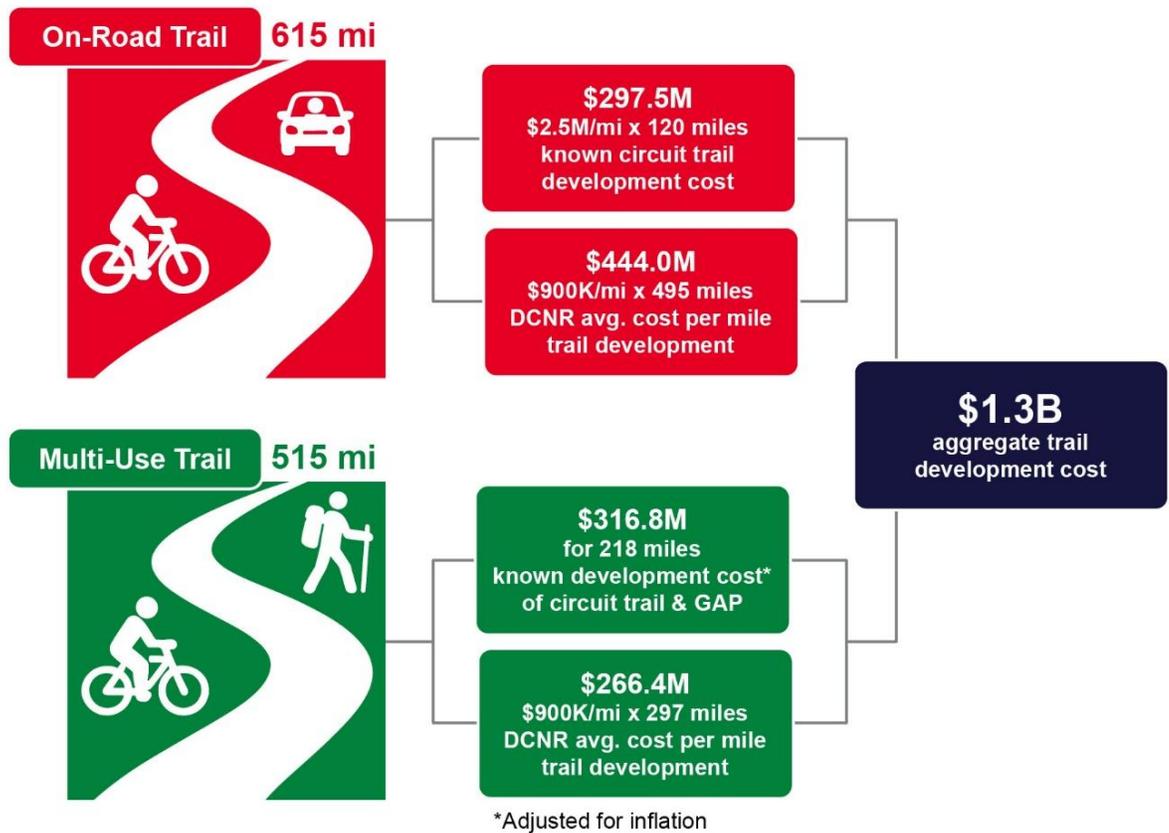
<sup>5</sup> All monetary inputs and resulting impacts are represented in 2025 dollars.

<sup>6</sup> Circuit Trails. “Annual Reports: 2012 – 2022.” <https://circuittrails.org/resource-library/#circuit-trails-annual-reports>.

- Great Allegheny Passage (Greater Pittsburgh Region): \$1.0 million<sup>7</sup>
- Statewide: \$897,000<sup>8</sup>

Historically, approximately \$583.2 million has been invested in the network’s development statewide, delivering more than 500 miles of multi-use trail to the benefit of Pennsylvanians and its visitors. As is shown in Figure 2.2, ESI estimates a total cost of approximately \$1.3 billion for full build out of the statewide network.

Figure 2.2: Projected Development Cost of the September 11<sup>th</sup> National Memorial Trail Network within Pennsylvania



Source: Circuit Trails (2023); Great Allegheny Passage (2020); DCNR (2025); Econsult Solutions, Inc. (2025)

<sup>7</sup> Rails to Trails Conservancy. “How the Great Allegheny Passage Transformed a Region”. 2020. <https://www.railstotrails.org/trailblog/how-the-great-allegheny-passage-transformed-a-region/#:~:text=Completing%20a%20Great%20Regional%20Asset,of%20the%20House%20Transportation%20Committee>.

<sup>8</sup> Pennsylvania Department of Conservation and Natural Resources, “Land and Water Trail Segment Strategic Plan 2025-2029”. <https://weconservepa.org/blog/dcnr-land-and-water-trail-network-plan-2025/>.

### 2.3. Economic Impact of the September 11<sup>th</sup> National Memorial Trail

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On average, each mile of additional trail in Pennsylvania supports:  
**10 jobs** during construction  
**\$2.3 million** in economic output

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Direct expenditures attributed to the proposed trail network of the September 11<sup>th</sup> National Memorial Trail are estimated to total approximately \$741 million. These direct expenditures are projected to generate an estimated \$1.4 billion in total economic impact to the Commonwealth, supporting 6,700 full-time equivalent jobs and \$524 million in total earnings (see Figure 2.3).<sup>9</sup> Taken together, completed and proposed impacts

of trail development will deliver \$2.5 billion in total economic impact to the Commonwealth.

Figure 2.3: One-Time Aggregate Economic Impact from Construction of the September 11<sup>th</sup> National Memorial Trail in Pennsylvania

Impact Type	Completed Network	Proposed Network	Total Network
Direct Output (\$M)	\$583.6	\$741.5	\$1,325.0
Indirect and Induced Output (\$M)	\$505.4	\$642.1	\$1,147.5
<b>Total Impact (\$M)</b>	<b>\$1,089.0</b>	<b>\$1,383.6</b>	<b>\$2,472.5</b>
<b>Employment Supported (FTE)</b>	<b>5,300</b>	<b>6,700</b>	<b>12,000</b>
<b>Employee Compensation (\$M)</b>	<b>\$412.7</b>	<b>\$524.3</b>	<b>\$936.9</b>

Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)

### 2.4. Completion of the September 11<sup>th</sup> National Memorial Trail Will Support a Diversity of Jobs in the State

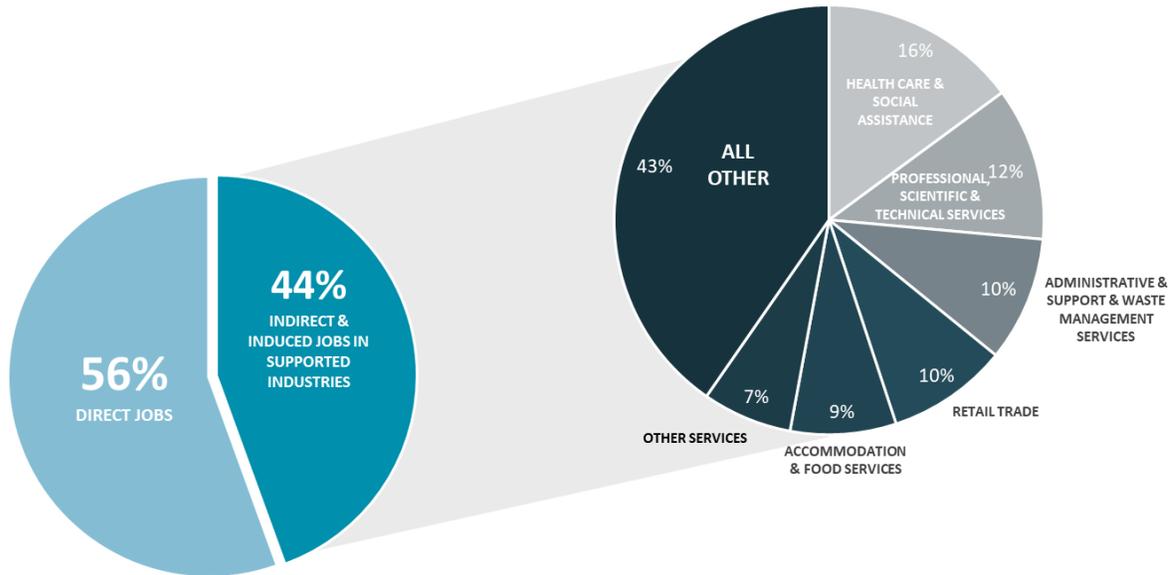
Capital investment in the Trail network will support jobs in many industries beyond the building trades and engineering. Direct employment in construction of the trails will account for approximately 56 percent of all jobs supported. However, 44 percent of the jobs supported are indirect and induced jobs, including healthcare and social services, professional and technical services, administrative services, retail sector, accommodation and food services, and other non-government services. The industry distribution of all employment generated by the proposed construction of the trail system within Pennsylvania is shown in Figure 2.4.

These indirect and induced jobs are supported through the spillover spending that occurs from the upfront construction of the trail network. For example, the retail industry is supported when a general contractor purchases materials from a local building supply store. Additionally, the accommodation and food service sector is supported when construction workers spend their earnings having lunch at a restaurant.

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<sup>9</sup> IMPLAN generates job estimates based on the term “job-years”, or how many jobs will be supported each year. For instance, if a construction project takes two years, and IMPLAN estimates there are 100 employees, or more correctly “job-years” supported, over two years, that represents 50 annual jobs. Additionally, these can be a mix of a full and part-time employment. Consequently, job creation could feature more part-time jobs than full-time jobs. To account for this, IMPLAN has a multiplier to covert annual jobs to full-time equivalent jobs.

Figure 2.4: Industry Distribution of Employment Generated from Construction of the Trail Network



Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)

## 2.5. Potential Tax Impacts from the Completion of the September 11<sup>th</sup> National Memorial Trail

The cumulative capital investment also generates tax revenue impacts in the respective localities during the period of construction. To estimate these increases, ESI created a tax revenue impact model to translate total economic impacts into their commensurate tax revenue gains. This analysis estimates the potential increases in income, sales, and business tax revenues to the Commonwealth in 2025 dollars due to spending on constructing the remaining trail segments within the state.

The direct construction activity of the 615 miles of the proposed network, as well as its indirect and induced economic impacts, is estimated to generate approximately \$25.5 million to the state over the construction period (see Figure 2.5). **Tax revenue generated from planned trail construction is approximately \$41,500 per mile for the Commonwealth of Pennsylvania.** These tax revenue impacts, represented in 2025 dollars, do not account for an average three percent rise in costs that can be assumed for each year into the future. Furthermore, the one-time construction period does not include any subsequent operation and maintenance of the trail network after it has been built.

To estimate these tax revenue impacts, ESI has created a custom fiscal impact model to translate total economic impacts into their commensurate tax revenue gains. Output from the IMPLAN model determines its impact on the relevant tax types and tax bases associated with the jurisdictions in which revenue impacts reside. These include income, sales, and business taxes at the state level, which are modeled in this report. The resulting property tax gains from the trail development are later discussed in Section 4 of this report.

Figure 2.5: Potential State Tax Revenue from Construction of the September 11<sup>th</sup> National Memorial Trail<sup>10</sup>

<b>Tax Type</b>	<b>Completed Network</b>	<b>Proposed Network</b>	<b>Total Network</b>
Income (\$M)	\$8.0	\$10.1	\$18.1
Sales (\$M)	\$8.9	\$11.3	\$20.2
Business (\$M)	\$3.3	\$4.1	\$7.4
<b>Total Tax Revenue (\$M)</b>	<b>\$20.1</b>	<b>\$25.5</b>	<b>\$45.7</b>
<b>Tax Revenue Per Mile of Planned Trails</b>	<b>\$39,000</b>	<b>\$41,500</b>	<b>\$40,400</b>

*Source: PA CAFR (2022); IMPLAN (2023); Econsult Solutions, Inc. (2025)*

<sup>10</sup> Totals may not sum due to rounding.

### 3. Economic Impacts Associated with Trail Users

Above and beyond impacts generated by the development of the September 11<sup>th</sup> National Memorial Trail, ESI quantified impacts related to the purchases made by the network's users.

- The local spending by trail users will generate additional economic benefits for the businesses located near the trail. Residents and visitors who access the region's trails often spend money on both goods and services related to active recreational activity during their trips. Much of this spending is happening at retailers in immediate proximity of a segment of the trail network.
- The network supports healthy lifestyles for people in surrounding communities by providing an easily accessible and low-cost option for residents to recreate and engage in physical activity. Physically active people typically enjoy a variety of health benefits, including lower incidence of cardiovascular diseases, diabetes, depression, certain cancers, and obesity compared to their sedentary counterparts. Additionally, physically active individuals tend to achieve higher rates of productivity at work. This section estimates health-related cost savings associated with the network's physically active trail users.

Consistent with methodology and terminology employed for related studies of trails, greenways, and related outdoor recreational amenities, ESI's includes two categorical spending components in its estimation of trail usage economic impacts. ESI performed comprehensive research to leverage the most current survey data available for prominent subnetworks located on the statewide network. These subnetworks, or groupings of trail segments, include the following:

- Circuit Trails
- Cumberland Valley Rail Trail
- Delaware and Lehigh Heritage Trail
- Great Allegheny Passage
- York Heritage Trail

Additionally, relevant survey data from the DCNR's recently published Outdoor Recreation Study was applied to calculations of the model's assumptions.

#### 3.1. Trail Use Estimation Approach

Annual user counts for both multi-use and on-road trail segments were derived from a combination of official count data and modeled estimates. For segments where official annual counts were available, reported figures were used directly. These were paired with segment mileage to calculate annual use rates per mile. For segments lacking direct data, average per-mile usage rates were applied, with adjustments made for geographic similarity to known segments. A statewide average was then calculated, excluding outliers such as very high-volume urban trail segments to avoid overestimation. Segment-level counts were then aggregated to estimate annual usage for the existing network, the

proposed network, and the completed trail system. As such, the existing trail network had an estimated annual trail use count of nearly 4.0 million, while the proposed trail network is estimated at 4.1 million, for a total of 8.1 million total annual uses upon completion of the trail.

### 3.2. User Spending Estimation

In order to quantify the local spending by users of the trail, a spending profile was developed based on user count estimates and survey data from comparable Pennsylvania and regional trail systems. An estimate of spending by trail users on “soft” goods such as beverages, snacks, and meals is established on a per-visit basis and an estimate of spending on “hard” goods such as bicycles and exercise clothing and accessories is developed on an annual basis. It is estimated, based on survey data, that trail users spend approximately \$30 on “soft” goods when they choose to purchase these types of goods as part of a visit to a trail. It is estimated that frequent trail users spend \$464 on “hard” goods each year such as bikes, bike accessories, and exercise clothing and equipment.<sup>11</sup>

These direct expenditures by trail users support local businesses and generate spillover effects in the local and regional economy. Industry standard input-output modeling software IMPLAN is used to model the economic impacts of this direct user spending. Fiscal modeling is undertaken to estimate the additional tax revenues to jurisdictions associated with this economic activity.

#### Estimated Annual Spending by Trail Users

“Hard” goods expenditures were estimated by applying the proportion of frequent users (defined as those who use the trail two or more times per week) to the total annual trail use count. Survey data from multiple sources, including DCNR’s Outdoor Recreation User Survey, York County Heritage Trail’s Survey, Cumberland Valley Rail Trail’s Feasibility Study, and the Circuit Trails’ Survey, indicate that approximately 35% of users fall into this frequent-user category. The number of frequent users was then multiplied by \$464 – the average annual per-user spending on “hard” goods, adjusted for inflation. This methodology yielded estimated annual “hard” goods spending of \$654.3 million for the existing network, \$676.1 million for the proposed network, and \$1.3 billion upon completion.

Figure 3.1: Estimated Direct Spending on “Hard” Goods

Category	Completed Network	Proposed Network	Total Network
Annual Trail Use Count	3,982,000	4,114,000	8,096,000
Share of Frequent (2+ times a week) Trail Users	35%	35%	35%
Count of Regular (2x Week) Trail Users	1,412,000	1,458,000	2,870,000
Average Amount Spent on "Hard" Goods	\$464	\$464	\$464
<b>Estimated Total Direct Spending on "Hard" Goods (\$M)</b>	<b>\$654.3</b>	<b>\$676.1</b>	<b>\$1,330.4</b>

Source: Circuit Trails (2017); York County Heritage Trail (2022); Cumberland Valley Rail Trail Feasibility Study (2023); DCNR Outdoor Recreation Survey (2024); Econsult Solutions, Inc. (2025)

<sup>11</sup> All monetary inputs and resulting impacts are represented in 2025 dollars.

To estimate annual spending on “soft” goods (e.g. beverages, snacks, etc.), the annual number of trail visits was multiplied by the proportion of users who reported purchasing soft goods during their last visit. This share (38%) was derived from survey data across the comparable trail systems referenced above. That number was then multiplied by the average per-visit “soft” goods expenditure which, after adjusted for inflation, was estimated at \$30 per visit. Using this approach, annual “soft” goods spending was estimated at \$45.1 million for the existing network, \$46.6 million for the proposed network, and \$91.7 million upon completion.

Figure 3.2: Estimated Direct Spending on “Soft” Goods

Category	Completed Network	Proposed Network	Total Network
Annual Trail Use Count	3,982,000	4,114,000	8,096,000
Share that Purchased "Soft" Goods During Last Trail Visit	38%	38%	38%
Est. Number of "Soft" Goods Spending Visits	1,521,000	1,572,000	3,093,000
Average Amount Spent on "Soft" Goods	\$30	\$30	\$30
<b>Estimated Total Direct Spending on "Soft" Goods (\$M)</b>	<b>\$45.1</b>	<b>\$46.6</b>	<b>\$91.7</b>

*Source: Circuit Trails (2017); York County Heritage Trail (2022); Cumberland Valley Rail Trail Feasibility Study (2023); DCNR Outdoor Recreation Survey (2024); Econsult Solutions, Inc. (2025)*

Combining soft and hard goods, direct annual trail user spending is estimated at \$699.4 million on the existing network, \$722.7 million on the proposed network, and \$1.4 billion upon full completion. To ensure that only spending retained in the regional economy is modeled, the analysis conservatively applies a retail margin – that is, the difference between the retailer’s purchase price and the final sales price – thereby excluding spending that occur outside the local area. As the impacts for this analysis are modeled at the state geographical level, a 15 percent reduction is applied to the total estimated amount of user spending in order to account for purchasing from retailers located outside of the Pennsylvania economy.<sup>12</sup>

Based on this adjustment, the total modeled trail user spending was \$594.5 million for the existing network, \$614.3 million for the proposed network, and \$1.2 billion upon completion of the entire trail network (see Figure 3.3). These modeled totals serve as the inputs for the input-output modeling analysis to estimate the broader economic impacts of the September 11th National Memorial Trail.

<sup>12</sup> See Appendix Figure A.3 for the steps taken to calculate the retail margin for ‘hard’ and ‘soft’ goods.

Figure 3.3: Potential Annual Local Spending by Trail Users (\$M)

	Completed Network (\$M)	Proposed Network (\$M)	Total Network (\$M)
Trail User Spending on "Soft" Goods	\$45.1	\$46.6	\$91.7
Trail User Spending on "Hard" Goods	\$654.3	\$676.1	\$1,330.4
Total Trail User Spending	\$699.4	\$722.7	\$1,422.1
<i>Amount of Spending Outside of Region</i>	<i>-\$104.9</i>	<i>-\$108.4</i>	<i>-\$213.3</i>
<b>Total Modeled Trail User Spending</b>	<b>\$594.5</b>	<b>\$614.3</b>	<b>\$1,208.8</b>

Source: Econsult Solutions, Inc. (2025)

### Potential Annual Economic Impact from Trail User Spending

Input-output modeling is undertaken to estimate the statewide economic impacts associated with annual trail user spending on the completed trail. The modeled direct expenditures, adjusted to include only local retail margins, are projected to generate approximately \$2.0 billion in total annual economic impact statewide, supporting nearly 19,600 full-time equivalent jobs and more than \$618.5 million in annual employee compensation. On a per mile basis for the fully built out network, trail user spending would deliver the following annual economic impacts to the Commonwealth:

- \$1.8 million in total economic impact
- \$500,000 in employee compensation

Figure 3.4: Potential Annual Economic Impact from Local Spending by Trail Users

Impact Type	Completed Network		Proposed Network		Total Network	
	PA	per mile	PA	per mile	PA	per mile
Direct Output (\$M)	\$594.5	\$0.5	\$614.3	\$0.5	\$1,208.8	\$1.1
Indirect and Induced Output (\$M)	\$409.2	\$0.4	\$422.8	\$0.4	\$832.0	\$0.7
<b>Total Impact (\$M)</b>	<b>\$1,003.7</b>	<b>\$0.9</b>	<b>\$1,037.1</b>	<b>\$0.9</b>	<b>\$2,040.8</b>	<b>\$1.8</b>
<b>Employment Supported (FTE)</b>	<b>9,600</b>	<b>10</b>	<b>10,000</b>	<b>10</b>	<b>19,600</b>	<b>20</b>
<b>Employee Compensation (\$M)</b>	<b>\$304.2</b>	<b>\$0.3</b>	<b>\$314.3</b>	<b>\$0.3</b>	<b>\$618.5</b>	<b>\$0.5</b>

Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)

### Potential Annual Tax Impact from Spending by Trail Users

On an annual basis, the total economic associated with trail user spending activity – including direct, indirect, and induced impacts – produces ongoing increases in various tax bases. To estimate these increases, ESI created a tax revenue impact model to translate total economic impacts into their commensurate tax revenue gains. This analysis estimates the potential increases in income, sales and business tax revenues to the Commonwealth of Pennsylvania attributable to user spending across the trail network.

In total, the completed Trail network could generate approximately \$37.2 million annually in state tax revenues, comprised of \$11.6 million from income taxes, \$18.8 million from sales taxes, and \$6.9 million from business taxes. On a per-mile basis, this equates to roughly \$32,900 in tax revenues per mile of trail each year, reflecting the sustained fiscal benefits that trail use contributes to the Commonwealth.

Figure 3.5: Potential Fiscal Impact Generated from Economic Impact from Trail User Spending

Tax Type	Completed Network	Proposed Network	Total Network
Income (\$M)	\$5.7	\$5.9	\$11.6
Sales (\$M)	\$9.2	\$9.6	\$18.8
Business (\$M)	\$3.4	\$3.5	\$6.9
<b>Total Tax Revenue (\$M)</b>	<b>\$18.3</b>	<b>\$18.9</b>	<b>\$37.2</b>
<b>Tax Revenue Per Mile of Trail</b>	<b>\$35,500</b>	<b>\$30,800</b>	<b>\$32,900</b>

Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)

### 3.3. How Trails Contribute to Positive Public Health Outcomes

According to the 2018 *Physical Activity Guidelines for Americans*, individuals who engaged in at least 150 minutes of moderate to strenuous physical activity each week are considered to be physically active.<sup>13</sup> In order to quantify the health benefits for trail users, this section will measure the impacts of frequent trail users who are healthy and active because of the presence of the September 11th National Memorial Trail within the state of Pennsylvania. ESI utilized data from the U.S. Census regarding working age adults with access to the trail network as well as survey data and research from the *Journal of Transport and Health* to estimate frequent trail users and active adults. Measures from the CDC’s report *Inadequate Physical Activity and Health Care Expenditures in the United States* were used to quantify the estimated value of an active lifestyle.<sup>14</sup> These statistics were used as the basis for estimating the potential savings in the form of health care expenditures that are avoided as a result of increased physical activity on the trail network.

Additionally, the health benefits achieved by physically active individuals are associated with benefits in terms of workplace productivity and employee retention. Physically active workers tend to have lower rates of absenteeism (employees missing work) and presenteeism (employees less productive while at work) than their physically inactive counterparts.<sup>15</sup> Lost productive work hours due to absenteeism and presenteeism represent direct costs associated with physical inactivity.

<sup>13</sup> Centers for Disease Control and Prevention (2023), *Physical Activity Basics*. [https://www.cdc.gov/physical-activity-basics/guidelines/adults.html?CDC\\_AAref\\_Val=https://www.cdc.gov/physicalactivity/basics/adults/index.htm](https://www.cdc.gov/physical-activity-basics/guidelines/adults.html?CDC_AAref_Val=https://www.cdc.gov/physicalactivity/basics/adults/index.htm).

<sup>14</sup> Carlson et al. (2013), *Inadequate Physical Activity and Health Care Expenditures in the United States*.

<https://www.cdc.gov/nccdphp/dnpao/docs/carlson-physical-activity-and-healthcare-expenditures-final-508tagged.pdf>.

<sup>15</sup> Chenoweth and Leutzinger (2006), *The Economic Cost of Physical Inactivity and Excess Weight in American Adults*. <https://pubmed.ncbi.nlm.nih.gov/28834464/>.

## Estimated Active Users of the September 11<sup>th</sup> National Memorial Trail Upon Completion

It is estimated that the completion of the full September 11<sup>th</sup> National Memorial Trail in Pennsylvania will support approximately 77,900 active residents in the region (see Figure 3.6). The following steps were taken to arrive at this count:

- First, ESI estimated the number of local residents who are or will be frequent (two or more times a week) trail users. This estimate combines data on trail usage with working-age population data from ESRI Business Analyst, which draws on U.S. Census data, to identify adults living within walking or biking distance of a trail segment across the Pennsylvania counties covered by the network. Separate estimates were developed for the existing network, proposed additions, and the full network upon completion.
- Next, the number of frequent trail users who meet recommended physical activity levels established by the CDC due to trail usage were calculated. Research on the physical activity levels of trail users from Götschia and Lohb (2017) was used to estimate the number of frequent trail users who are considered active and are indeed experiencing the health benefits associated with their healthy habits.<sup>16</sup>
- Finally, ESI applied a reduction to this estimate based on the proportion of users who would be considered active even without access to the trail.<sup>17</sup> This approach yields a more conservative estimate that accounts only for users that can attribute their increased activity and associated health benefits to the presence of the trails in their community.

Figure 3.6: Estimated Number of Trail Users Located within Walking/Biking Distance and Meeting Physical Activity<sup>18</sup>

	<b>Working Age Adults</b>	<b>Estimated Regular Trail Users</b>	<b>Users Meeting Activity Req. Due to Trails</b>
Existing Trail Network	197,500	70,000	32,900
Proposed Trail Network	269,800	95,700	45,000
<b>Total – Upon Completion</b>	<b>467,300</b>	<b>165,700</b>	<b>77,900</b>

Source: Götschia and Lohb (2017); CDC (2018); ESRI (2025); Econsult Solutions, Inc.(2025)

The existing trail network supports an estimated 32,900 multi-county residents to meet recommended levels of physical activity. It is estimated that the completed network will support nearly 78,000 active residents and each mile of trail will support approximately 70 physically active users on average.

<sup>16</sup> Götschia and Lohb (2017), *Advancing Project-Scale Health Impact Modeling for Active Transportation: A User Survey and Health Impact Calculation of 14 US Trails*. <https://www.sciencedirect.com/science/article/pii/S2214140516303255>.

<sup>17</sup> Proportions are drawn from Götschia and Lohb (2017), *Advancing Project-Scale Health Impact*.

<sup>18</sup> Note that columns may not sum due to rounding.

### 3.4. Potential Public Health Value of the Total Network

Residents who achieve physically active lifestyles due to the completed September 11th National Memorial Trail yield a range of personal health benefits as well as broader public health benefits in Pennsylvania. Physically active lifestyles are linked to positive health outcomes including reduced risk of chronic diseases, improved mental health, and reduced prevalence of rheumatic conditions and injury.<sup>19</sup> These positive individual outcomes yield public health value by reducing strain on the health system and lowering overall health care expenditures.

The economic value of these health benefits can be quantified as the healthcare costs avoided by physically active trail users. ESI developed lower bound, mean, and upper bound estimates of potential health care expenditure reductions. These estimates were developed by applying potential healthcare expenditure savings per active individual from the CDC study to the number of active trail users supported by the Trail.<sup>20</sup> As such, it is estimated that physically active users of the existing trail network could achieve annual healthcare cost savings between \$24.6 million and \$62.1 million. Completion of the full network could increase annual savings between \$58.2 million and \$147 million in healthcare cost savings. **On average, each mile of the completed network is estimated to support between \$51,500 and \$130,000 in annual healthcare cost savings.**

Figure 3.7: Estimated Value of Healthcare Savings from Active Trail Users in Pennsylvania

	Lower Bound	Mean	Upper Bound
Average Annual Savings per Active Individual	\$748	\$1,318	\$1,888
Annual Savings - Existing Trail Network (\$M)	\$24.6	\$43.4	\$62.1
Annual Savings - Proposed Trail Network (\$M)	\$33.6	\$59.3	\$84.9
<b>Annual Savings - Total Network Upon Completion (\$M)</b>	<b>\$58.2</b>	<b>\$102.6</b>	<b>\$147.0</b>
<b>Per Mile of Completed Trail Network</b>	<b>\$51,500</b>	<b>\$90,800</b>	<b>\$130,000</b>

Source: Carlson et al. (2013); Götschia and Lohb (2017); ESRI (2025); Econsult Solutions, Inc. (2025)

#### Additional Benefits: How Trail Networks Influence Employee Wellness and Retention

Increasingly, people choose where to live based on quality-of-life features such as access to trails, parks, and outdoor activities as well as job availability, school district performance, and other key elements. A 2019 Headwaters Economics study found that communities with well-developed trail networks not only retain residents but also draw businesses that value employee well-being.<sup>21</sup> In addition to compensation and other employee benefits, local trail investments can help contribute to a community’s overall attractiveness for current and potential workers.

<sup>19</sup> Centers for Disease Control and Prevention (2023), *Physical Activity Basics*. [https://www.cdc.gov/physical-activity-basics/guidelines/adults.html?CDC\\_AAref\\_Val=https://www.cdc.gov/physicalactivity/basics/adults/index.htm](https://www.cdc.gov/physical-activity-basics/guidelines/adults.html?CDC_AAref_Val=https://www.cdc.gov/physicalactivity/basics/adults/index.htm).

<sup>20</sup> Carlson et al. (2013), *Inadequate Physical Activity and Health Care Expenditures in the United States*. <https://www.cdc.gov/nccdphp/dnpao/docs/carlson-physical-activity-and-healthcare-expenditures-final-508tagged.pdf>.

<sup>21</sup> Headwaters Economics, “Recreation Counties Attracting New Residents and Higher Incomes,” January 2019, <https://headwaterseconomics.org/wp-content/uploads/recreation-counties-attract-report.pdf>.

Employer survey data from *Wellhub*, an app-based health benefit offered by some employers, demonstrates that physical activity is a central driver of corporate wellness program success. Companies that incorporate active elements such as walking or exercise challenges report 47 percent major productivity growth, 40 percent lower turnover, and up to 35 percent reductions in healthcare costs.<sup>22</sup> Benefits such as access to trail amenities in particular can play a part in employee retention, since employees want benefits personalized to their needs. By aligning workplace wellness with regional trail access, communities can strengthen employee health, enhance retention, and capture the economic returns of a more productive and stable workforce.

### 3.5. Transportation and Safety Impacts

The September 11<sup>th</sup> National Memorial Trail network increases mobility options for people that live and work across the state, providing a safe, extensive network for non-motorized transportation that is connected and routed through major destinations. The proposed network expansion, and increased trail accessibility and usage resulting from segment conversions and network build out, provides crucial support for the region’s transportation system (for example easing traffic, reducing Vehicle Miles Traveled (VMT), and increasing safety for users).

Many studies have shown that a robust network of pedestrian and bicycle trails encourage more sustainable travel mode choices among residents by creating traffic-separated pathways that are safe, comfortable, and convenient.<sup>23</sup> This “mode shift” means residents may choose to shift from driving a single-occupancy vehicle to biking, walking, or taking public transportation.

#### Existing Mobility and Transportation Conditions

The existing trail network within Pennsylvania is a critical component of the region’s transportation system, alongside public transit, highways, and roads. In the Philadelphia and Pittsburgh metropolitan areas, as well as other densely populated communities across the state, trails work as a transportation corridor for commuters to employment centers and help reduce the region’s overall reliance on personal vehicles and the increasing popularity of ride-share companies. Below, Figure 3.8 displays the typical commuting pattern of the working age population across the 27 Pennsylvania counties that the trail runs through. As shown, the majority (68%) of commuters drive to work alone. Approximately four percent of commuters in this set of counties currently bike or walk to work.<sup>24</sup> With the delivery of 1,130 miles of interconnected multi-use trails, it can be expected that the share of commuters by non-vehicular modes would increase from its current four percent share.

Transportation is a significant source of carbon emissions in the U.S. (contributing approximately 28 percent of all U.S. greenhouse gas emissions) and light-duty vehicles like cars represent more than half

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<sup>22</sup> Wellhub, “Return on Wellbeing 2024,” 2024, [https://assets-cdn.wellhub.com/docs/Lead-Magnets/US/ROW24/US\\_ROW\\_REPORT\\_167eed42d9.pdf?\\_gl=1\\*55ft9u\\*\\_gcl\\_au\\*MTU3OTYxOTMyOS4xNzU4OTEwMjE1LjE2NjgzMDQ2MzAuMjc1ODkxMDI0NS4xNzU4OTEwMzA3&ajs\\_aid=7ce082b8-3b8d-49ec-b6eb-9fb9a4e0fc06&\\_eventn\\_id=7ce082b8-3b8d-49ec-b6eb-9fb9a4e0fc06&\\_hstc=238227295.4be2a152116779d53dfec57eccce803.1758910216538.1758910216538.1758910216538.1&\\_hssc=238227295.2.1758910216538&u](https://assets-cdn.wellhub.com/docs/Lead-Magnets/US/ROW24/US_ROW_REPORT_167eed42d9.pdf?_gl=1*55ft9u*_gcl_au*MTU3OTYxOTMyOS4xNzU4OTEwMjE1LjE2NjgzMDQ2MzAuMjc1ODkxMDI0NS4xNzU4OTEwMzA3&ajs_aid=7ce082b8-3b8d-49ec-b6eb-9fb9a4e0fc06&_eventn_id=7ce082b8-3b8d-49ec-b6eb-9fb9a4e0fc06&_hstc=238227295.4be2a152116779d53dfec57eccce803.1758910216538.1758910216538.1758910216538.1&_hssc=238227295.2.1758910216538&u).

<sup>23</sup> *Active Transportation Transforms America*, Rails to Trails Conservancy, 2023.

<sup>24</sup> Note that this data from the American Community Survey is representative of commute-to-work trips for the employed population and does not represent the mode split for all trips in the region. Trips for household errands, childcare, trips to school, etc. are not captured in this data.

of that transportation sector.<sup>25</sup> To encourage residents to shift their transportation preferences to sustainable modes where possible, a region needs to actively invest in infrastructure that enables residents to safely choose these modes.

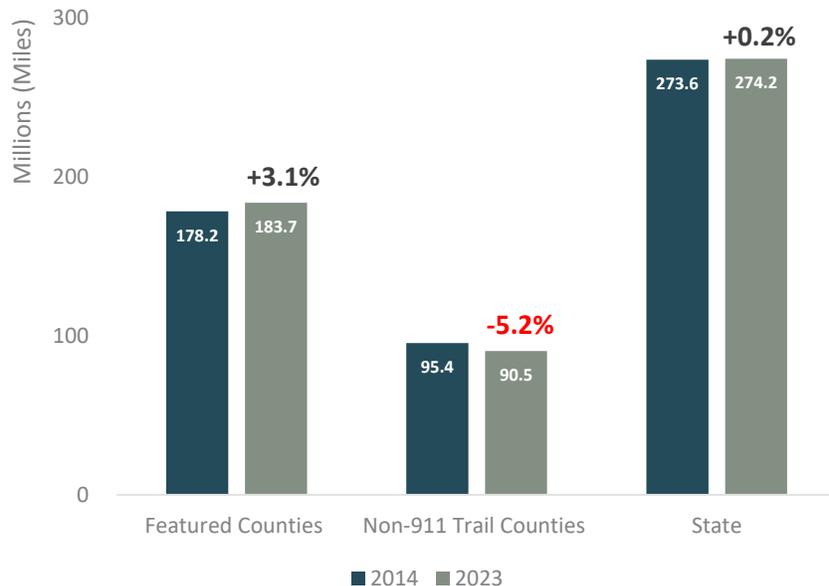
Figure 3.8: Distribution of Commuters across 27 Pennsylvania Counties that Host the Trail

	<b>Mode Split</b>
Drove alone	68%
Carpooled	7%
Public transportation (excl. taxicab)	5%
Taxicab, Motorcycle, or Other	1%
Bicycle	1%
Walked	3%
Worked at home	15%

Source: U.S. Census American Community Survey (2023)

Pennsylvania has seen overall slight growth in daily VMT since 2014, increasing from approximately 273.6 million to 274.2 million miles. However, over the same ten-year period, the 27 counties through which the Trail passes have seen a three percent increase, while other counties have seen a decrease of approximately five percent.

Figure 3.9: Increased Daily Vehicle Miles Traveled in Pennsylvania Counties, 2014-2023



Source: Pennsylvania Department of Transportation (2023)

<sup>25</sup> US Environmental Protection Agency, *Fast Facts on Transportation Greenhouse Gas Emissions*. <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>.

Based on assumptions developed by the Environmental Protection Agency (EPA) on average gallons of gas used per mile, the 2023 daily VMT estimates for counties that host the September 11<sup>th</sup> National Memorial Trail within Pennsylvania generated over 72,100 metric tons of CO<sup>2</sup> emissions a day.<sup>26</sup> To put this quantity of emissions into context, 72,100 metric tons CO<sub>2</sub> is equivalent to the emissions from burning 80 million pounds of coal, 21 wind turbines running for a whole year, or the carbon sequestered each year by 72,300 acres of woodlands.<sup>27</sup>

### Safety Implications of Trail Networks

In addition to reducing congestion and dependence on car travel, well-designed trail systems enhance safety for both pedestrians and cyclists. By separating users from motor vehicle traffic, trails significantly lower the risk of collisions that could lead to severe injuries or fatalities. Across the state, there were over 1,200 fatalities from vehicular accidents in 2023 alone.<sup>28</sup> Beyond the trauma and loss associated with crashes for those involved and their loved ones, crashes come at significant financial costs in terms of medical expenses, emergency services costs, lost quality of life, and other costs.

Trail development presents a community's residents an additional option for reaching the range of regular destinations, from workplaces to shopping centers. Nationally, the majority of trips are within a 20-minute bike, while over 25 percent of trips are within a 20-minute walk.<sup>29</sup> Specifically, initiatives set in motion and investments made will encourage shifts in transit mode choice by individuals may result in lighter traffic, which in turn, will decrease the frequency and severity of vehicular accidents and their related personal and societal costs.

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<sup>26</sup> The EPA emissions calculator estimates an average of 22.8 miles per gallon for a typical vehicle. <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>.

<sup>27</sup> US Environmental Protection Agency (2021), *Greenhouse Gas Equivalencies Calculator*. <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

<sup>28</sup> PENNDOT, "Pennsylvania Crash Facts and Statistics", [https://www.pa.gov/content/dam/copapwp-pagov/en/pennndot/documents/travelinpa/safety/documents/2023\\_cfb\\_linked.pdf](https://www.pa.gov/content/dam/copapwp-pagov/en/pennndot/documents/travelinpa/safety/documents/2023_cfb_linked.pdf).

<sup>29</sup> Rails to Trails Conservancy, "The Case for Increased Federal Investment in Bicycling and Walking". 2023.

## 4. Other Benefits of Active Transportation Networks

Trails provide a vast range of benefits to individuals and society as a whole, some of which cannot be fully captured in terms of money invested or dollars saved. As part of the recreational assets within a geography, multi-use trails contribute to society in immeasurable ways, such as enhancing shared spaces with attractive features and landscaping while also supporting sustainability initiatives. Additionally, the community benefits when these impacts translate into increased property values for both privately held and communal assets.

### 4.1. Potential Environmental Services Impact Benefits of Trails and Open Space

Trails and the open spaces around them provide critical ecosystem services, including air pollution removal, water quality and supply improvement, wildlife habitat preservation, and carbon storage. The extent of these benefits depends on the surrounding landscape. For example, tree cover is especially important for carbon sequestration and air purification, while wetlands and riparian forests play a major role in flood control, protection of the natural waterways, and filtration of this critical resource. By maintaining and expanding trail corridors, communities safeguard these ecosystems and ecological assets, in addition to generating the aforementioned economic and fiscal benefits.

#### Air Pollution Removal

Air quality is a persistent challenge in many urban and suburban regions, with pollutants contributing to respiratory illnesses such as asthma, damaging infrastructure and vegetation, and fueling smog and climate change. Trails can mitigate these impacts in two ways: first, by promoting walking and biking and modes of transportation, thereby reducing emissions (as discussed in Section 3); and second, by preserving and expanding tree canopy, which naturally filters pollutants through respiration and deposition processes. In fact, a 2024 study found that urban trees not only filter harmful air pollutants but also absorb carbon dioxide from the atmosphere, leading to clearer air and better health outcomes for nearby communities.<sup>30</sup> Together, these mechanisms improve environmental quality and community health while reducing associated costs.

#### Water Supply

Natural landscapes act as a living water infrastructure, storing precipitation, recharging aquifers, and maintaining stream and reservoir levels. The soil of undeveloped land stores water and replenishes streams, reservoirs, and aquifers. This natural system provides continuous productive land covers for water provision. The larger the land cover, the greater the benefits derived. Without such systems, municipalities would face increased reliance on costly water imports or advanced treatment. Trails help protect these critical ecosystems by discouraging development pressure along corridors and preserving streamside and upland habitats that enhance resilience against flooding and water shortage.

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<sup>30</sup> Moreno, Roberto, Nery, André, Zamora, Ricardo, Lora, Angel, and Galán, Carmen, "Contribution of urban trees to carbon sequestration and reduction of air pollutants in Lima, Peru" Science Direct, June 2024, <https://www.sciencedirect.com/science/article/pii/S221204162400024X>.

## Water Quality

Forests, wetlands, and riparian zones act as natural buffers, protecting water supplies from the impacts of human activity. Vegetation in these areas filters pollutants such as pathogens, excess nutrients, metals, and sediments before they reach rivers and groundwater. Without these natural systems, communities would face higher costs for engineered solutions like groundwater filtration and advanced water treatment.

Trail development near streams and wetlands can affect water quality, but the extent of that impact depends heavily on design choices. When trails are constructed with conservation practices – such as minimizing soil disturbance, maintaining vegetated buffers, and restoring adjacent habitats – they can provide recreation while preserving the ecosystems that safeguard clean water. According to the Rails-to-Trails Conservancy, trails built in environmentally sensitive areas can reduce their impacts when designed with porous materials and careful measures to limit soil disturbance during construction.<sup>31</sup> Recent research confirms that when trails are carefully designed – using sustainable surfaces, minimizing soil disturbance, and preserving buffer vegetation – they do not significantly degrade water quality.<sup>32</sup>

Trail development and riparian conservation can be mutually reinforcing when projects are designed with ecological sensitivity in mind. In Pennsylvania, recent studies are directly testing the effectiveness of riparian buffers in reducing farm-related runoff and improving local ecosystems, providing recreational value, healthier water quality, and scenic benefits.<sup>33</sup> For example, Penn State researchers working in Mahantango and Halfmoon Creeks – which are in close proximity to segments of the Trail – are evaluating how buffer width, vegetation type, and land use context influence reductions in nutrients and sediments, demonstrating that buffers can provide measurable improvements to water quality when properly established and maintained.<sup>34</sup> This project is expected to be completed in 2025.

## Flood Mitigation

Natural landscapes function as buffers that protect people and property from destructive storm events. The absorptive capacity of forests, wetlands, and other open spaces reduces flood risk by capturing and holding stormwater. Without this natural service, Pennsylvania residents and local governments would face significant costs to safeguard the built environment through engineered solutions such as dams, levees, or reservoirs.

## Wildlife Habitat

The trail network also supports rich habitats for plants and animals. Intact forests and wetlands shelter species valued for both ecological functions and aesthetic enjoyment. Unlike other ecosystem services that reflect avoided costs, the value of wildlife habitat is typically measured by how much people are

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<sup>31</sup> *Rails to Trails Conservancy*, “Developing Trails in Sensitive Areas,” <https://www.railstotrails.org/build-trails/trail-building-toolbox/planning/developing-trails-in-sensitive-areas/>.

<sup>32</sup> Callau, Aitor À., Erdozain Maitane, Fariás-Torbidoni, Estela Inés, and de-Miguel, Sergio, National Library of Medicine, “Linking Forest Planning and Recreational Trail Design: A GIS Approach for Enhancing the Social Use of Forests,” June 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC12259729/>.

<sup>33</sup> Jones, Abigail M., PennFuture, “Riparian Buffers: a Natural, Inexpensive, and Crucial Way to Protect and Improve Water Quality,” October 2023, <https://www.pennfuture.org/Blog-Item-Riparian-Buffers-a-Natural-Inexpensive-and-Crucial-Way-to-Protect-and-Improve-Water-Quality>.

<sup>34</sup> Pennsylvania State University, “Do Riparian Buffers Work?,” April 2024, <https://agsci.psu.edu/magazine/articles/2024/spring/do-riparian-buffers-work>.

willing to pay to ensure its preservation. To maintain a conservative estimate, the figures in this section rely on minimum willingness-to-pay values documented in the research literature.<sup>35</sup>

## Carbon Sequestration and Storage

Trees help mitigate climate change by removing carbon dioxide from the atmosphere and storing it in their biomass, both above and below ground. Carbon storage represents the total stock of carbon held in existing trees. If released, this carbon would contribute to atmospheric greenhouse gases, leading to detrimental effects, such as reduced agricultural productivity, negative health impacts, and property damages. Importantly, this value is not annual. The storage of carbon in trees represents a one-time benefit representing the carbon that -is stored until the tree dies.

As trees grow, they also provide annual carbon uptake, pulling additional carbon dioxide from the air through new growth. This process is ongoing and is measured each year, accounting for natural releases from tree death and decay. The avoided damages from this annual removal represent measurable economic savings for communities along the Trail. For example, Philadelphia’s urban forest – comprised of about 2.9 million trees in 2016 – covers roughly 20 percent of the city, stores around 702,000 tons of carbon, removes approximately 27,000 tons of carbon annually, and filters out about 513 tons of air pollutants each year (valued at \$19 million). Moreover, it reduces residential energy costs by \$6.9 million annually, indicating the significant economic benefits of environmental investment in the region.<sup>36</sup>

## 4.2. Residential Property Value Impacts

Alongside the protection of green spaces, waterways, and other amenities found across the natural landscape, the development of multi-use trail networks benefits society and, in particular, property-owners. Trails are associated with positive impacts on property values proximate to them. Basic real estate economics demonstrate that when positive attributes are added to a community, demand for that place increases. Within a half mile of the statewide trail network, approximately 345,000 housing units could potentially benefit from the realization of a fully built-out September 11<sup>th</sup> National Memorial Trail. This section draws on existing academic literature and scholarly research to explain this societal benefit. A wide body of research has examined how proximity to parks, trails, and conserved natural areas can enhance home values, generating both individual homeowner benefits and broader public revenue gains.

### Measuring Property Value Premiums Associated with Trails

Multiple studies have attempted to quantify this premium, and while results vary by geography, open space type, and methodology, there is broad consensus that the effect is both measurable and significant. A 2019 review of 33 U.S. studies found that property values generally increase with proximity to parks — particularly passive parks — with estimated premiums of eight to ten percent for homes adjacent to such spaces. The review also noted that larger parks generate broader value impacts,

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<sup>35</sup> Costanza, Wilson, Tory, Voinov, Liu, and D’Agostino (2006), *The Value of New Jersey’s Ecosystem Services and Natural Capital*. New Jersey Department of Environmental Protection, Division of Science, Research, and Technology.

<sup>36</sup> Nowak, David J., Bodine, Allison R., Hoehn, Robert, et al, “The Urban Forest of Philadelphia,” United States Department of Agriculture, November 2016, [https://www.fs.usda.gov/nrs/pubs/rb/rb\\_nrs106.pdf](https://www.fs.usda.gov/nrs/pubs/rb/rb_nrs106.pdf).

premiums tend to be higher for multifamily or small lot homes, and permanently protected lands yield greater value than developable ones.<sup>37</sup>

In 2025, ESI did an additional review of studies across the country that examined how proximity to open space, trails, and green infrastructure affects property values. While the specific impact varies by location, size, and type of open space, the research consistently finds a positive relationship. The table below summarizes findings from a range of studies, providing estimated property value premiums associated with nearby green amenities.

Figure 4.1: Estimated Impact of Open Space on Property Values

Source	Estimated Property Value Impact
<i>A Dynamic Approach to Estimating Hedonic Prices for Environmental Goods: An Application to Open Space Purchase</i> (Riddel, 2001)	3.8%
<i>Influence of Trees and Landscaping on Rental Rates at Office Buildings</i> (Laverne & Winson-Geideman, 2003)	7.0%
<i>The Economic Impact of the Catawba Regional Trail</i> (Campbell & Monroe, 2004)	4.0%
<i>The Determinants of Neighborhood Transformations in Philadelphia, Identification and Analysis: The New Kensington Pilot Study</i> (Wachter, 2005)	30.0%
<i>The Potential Economic Impacts of the Proposed Carolina Thread Trail</i> (Econsult Corporation, 2007)	4.0%
<i>City Trees and Property Values</i> (Wolf, 2007)	5.0%
<i>The Potential Economic, Environmental, Health, and Quality of Life Benefits of a Fully Connected Waterfront Greenway in Philadelphia</i> (Econsult Corporation, 2010)	6.0%
<i>Quantifying the Economic Value of Protected Open Space in Southeastern Pennsylvania</i> (Econsult Corporation, 2010)	3.8%
<i>Valuing the Conversion of Urban Green Space</i> (Econsult Corporation, 2010)	7.2%
<i>Ecusta Rail-to-Trail Economic Impact Analysis</i> (Econsult Corporation, 2011)	4.0%
<i>New York City Property Values: What Is the Impact of Green Roofs on Rental Pricing?</i> (Ichihara & Cohen, 2011)	16.0%
<i>The Green Edge: How Commercial Property Investment in Green Infrastructure Creates Value</i> (Clements, Juliana & Davis, 2013)	3.5%
<i>The Economic Impact of Green City, Clean Waters: The First Five Years</i> (Econsult Solutions, Inc., 2016)	12.1%
<i>The Economic Impact of Open Space in Chester County</i> (Econsult Solutions, Inc., 2019)	3.6%

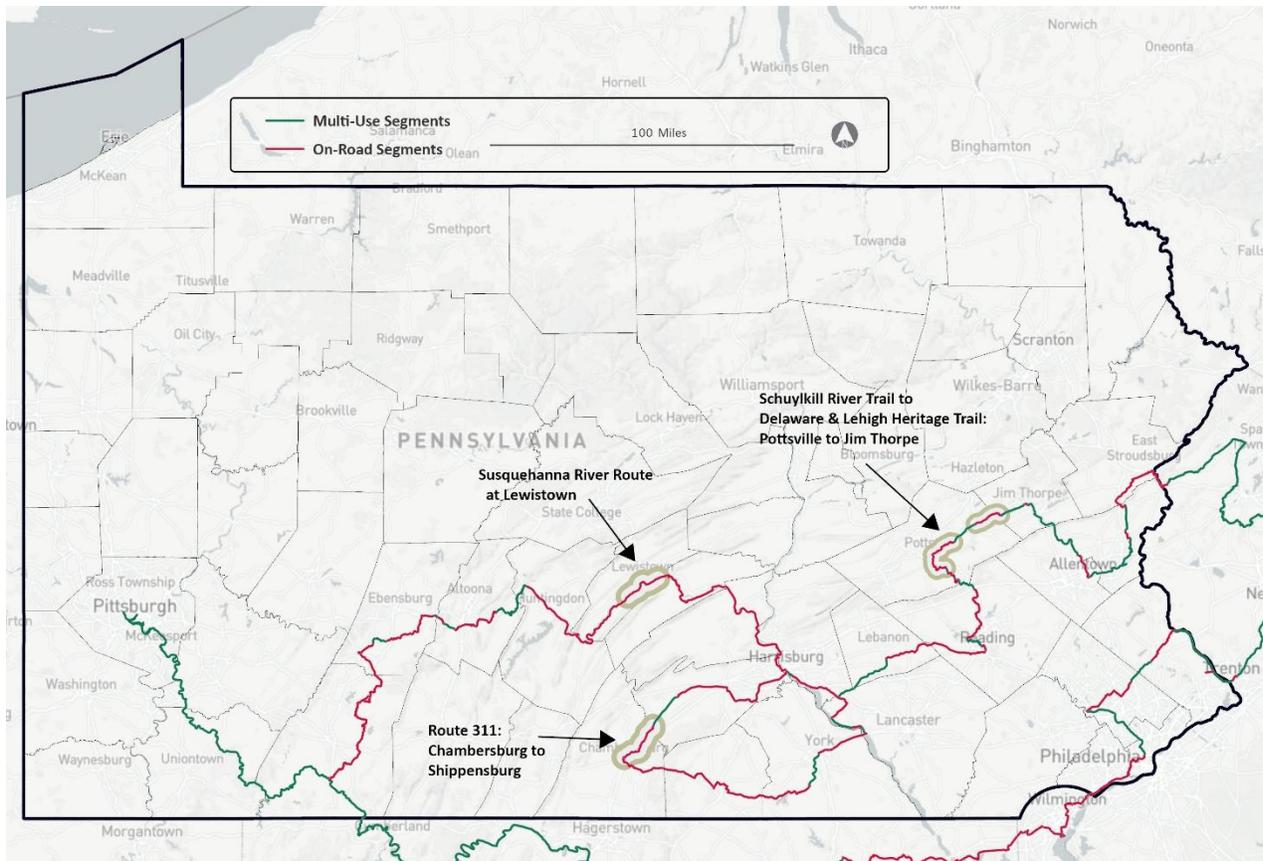
Source: Econsult Solutions, Inc. (2025)

<sup>37</sup> Crompton, J., Nicholls, S. "Impact on Property Values of Distance to Parks and Open Spaces: An Update of U.S. Studies in the New Millenium". *Journal of Leisure Research*. 2020. <https://www.tandfonline.com/doi/full/10.1080/00222216.2019.1637704>.

## 5. Case Studies

Trails serve as more than recreational amenities; they act as extensions of transportation networks, catalysts for local spending, and magnets for residents and visitors. Communities across the state benefit from investment in these public assets in several ways, most notably when a network's trails connect directly into their downtowns. By developing trails in close proximity to commercial corridors, municipalities can sustain small businesses and strengthen community identity. The conversion of on-road segments into fully established multi-use trails enhances accessibility, public health, and traffic safety. Overall, well-established trail networks foster improved quality of life and healthier communities, while also attracting new visitors and strengthening small businesses.

Figure 5.1: Proposed Developments as Part of the Statewide Trail Network



Source: September 11<sup>th</sup> National Memorial Trail; ArcGIS (2025); Econsult Solutions, Inc. (2025)

In this section, three on-road segments, ranging from 15 to 30 miles in length, are profiled as holding potential for alignment to multi-use railway. These selections possess established features and certain capacity to benefit both users of the enhanced trail network and the businesses of the neighboring main streets and downtown districts. The demographics of the municipalities that host a portion of these proposed developments, and, in turn, are well-positioned to both cater to and benefit from increased

trail usage, are highlighted in Figure 5.2 below. The proposed multi-use linkage of the Schuylkill River Trail and Delaware and Lehigh Heritage Trail runs along Pottsville’s main commercial corridor. While it is separated from Lewistown by the Juniata River, the conversion of the proposed stretch of the Susquehanna River Route could increase visitors to the area with close access to the borough’s business district. Third, build-out of the Route 311 Trail from Chambersburg to Shippensburg starts at the north end of downtown Chambersburg, and its well-established commercial downtown. The metrics shown below provide demographic context for the populations that are positioned to benefit from further trail development.

Figure 5.2: Demographics of Municipalities Featured as Proposed Trail Town Developments

	<b>Pottsville</b>	<b>Lewistown</b>	<b>Chambersburg</b>
Population	13,400	8,500	22,100
Number of Housing Units	6,800	4,500	10,100
Median Household Income	\$53,500	\$40,200	\$56,200
Median Home Value	\$97,700	\$98,600	\$196,200
Share of Adults with a Bachelor’s Degree	22%	11%	27%
Average Commute Time (Minutes)	24	21	19

*Source: U.S. Census American Community Survey (2023)*

## 5.1. Case Study 1: The Schuylkill River Trail to Delaware and Lehigh Heritage Trail and the City of Pottsville, Schuylkill County

Pottsville, situated on the outskirts of the Poconos region and its vibrant tourism economy, is well positioned to attract future users of a trail alignment project. The city is one of the denser hubs in Schuylkill County, with more than 3,200 people per square mile.<sup>38</sup> Within the Pennsylvania segments of the proposed September 11<sup>th</sup> National Memorial Trail, the planned Schuylkill River Trail (SRT) to Delaware & Lehigh (D&L) Canal Trail Connector and the Switchback Railroad Trail would create greater accessibility to Pottsville and its historic downtown core.

The development of nearby on-road trails would also deliver meaningful economic benefits. With a median household income of \$53,500 and an 18 percent poverty rate, a well-designed multi-use trail represents an affordable recreation asset, while also creating a platform for attracting outside visitors who can generate spending in local shops, restaurants, and services. Moreover, the County's Chamber of Commerce lists more than 230 businesses as active members.<sup>39</sup> **By converting existing on-road trail segments into safe, attractive, and environmentally friendly multi-use paths, Pottsville can enhance quality of life for residents and visitors to the area, while bolstering commercial activity in its downtown district.**

### Economic and Fiscal Impacts Associated with Trail Segment Alignment in Schuylkill County

Connecting the to the D&L and completing the Switchback Railroad Trail would generate economic and fiscal impacts for the State. More importantly, it would stimulate economy at a local level and present Pottsville an opportunity to share in the positive effects of trail tourism with its neighboring municipality of Jim Thrope.

- It is estimated that capital investment will produce nearly \$34.3 million in total economic output and support roughly 170 FTE job-years.
- After this segment's conversion, annual user spending will generate an estimated \$60.9 million in total economic output and support nearly \$18.5 million in employee compensation annually.
- Additionally, the enhanced trailway will be accessible to approximately 11,500 working age adults and deliver an estimated \$2.5 million in avoided health cost savings on a yearly basis.

### MURAL ARTS

Alongside the iconic Yuengling Brewery, downtown Pottsville hosts a vibrant arts and culture scene with iconic public murals supported by the Schuylkill County Historical Society, Rediscover Pottsville, and the Pottsville Area Development Corporation. The Schuylkill County Council for the Arts, housed in the historic Yuengling Mansion, offers exhibits, classes, and performances, while events like the Block of Art Festival and the upcoming Pottsville Film Festival showcase local talent.

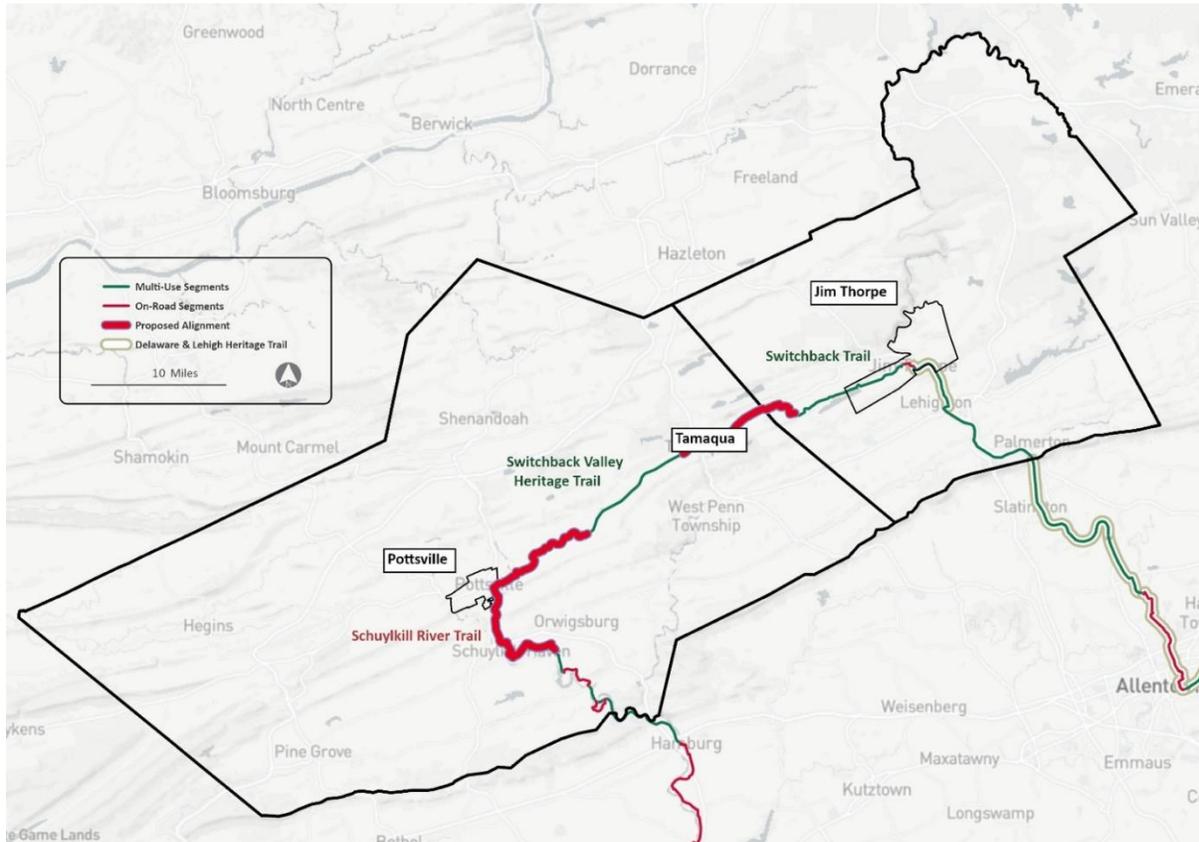
*Source: Schuylkill County Council for the Arts, Pottsville Area Development Corporation, Rediscover Pottsville, Block of Art (2025)*

<sup>38</sup> [Pottsville, PA - Profile data - Census Reporter](#)

<sup>39</sup> [Directory Growth Zone - Schuylkill Chamber of Commerce](#)

The proposed alignment that connects Pottsville to Jim Thorpe via the existing Switchback Trail, travels through several municipalities within Schuylkill and Carbon Counties, including Port Carbon, Blythe, Ryan, and Rush.

Figure 5.3: Proposed Multi-use Trail Alignment: Schuylkill River Trail and Delaware and Lehigh Heritage Trail



Source: ArcGIS (2025); Econsult Solutions, Inc. (2025)

### Potential Impacts from Capital Expenditure

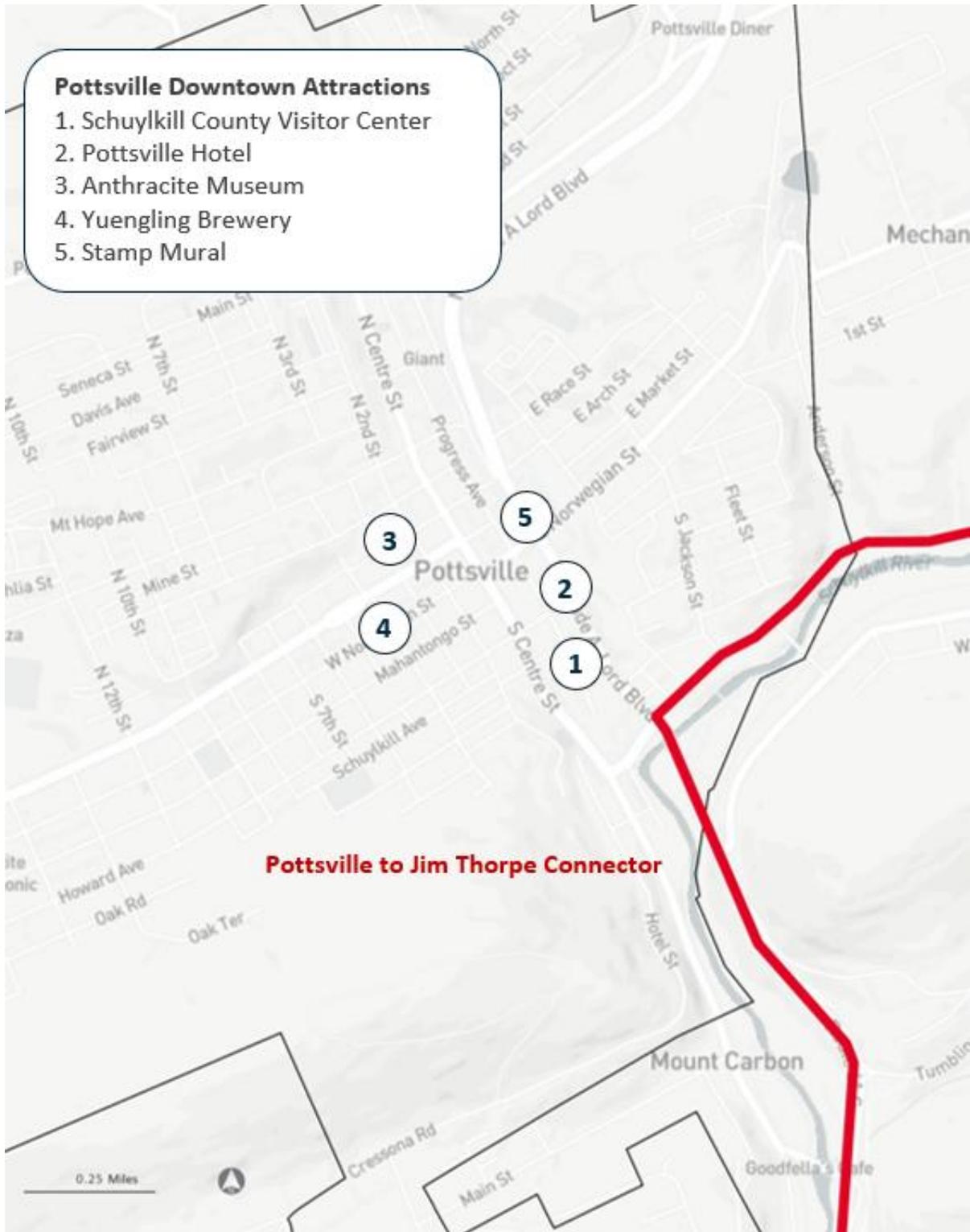
Direct expenditures made during the construction period of this trail alignment are estimated to support 170 FTE job-years with \$11.4 million in compensation, in addition to \$34.3 in total economic output.

Figure 5.4: Estimated Economic Impacts Associated with Capital Investments of the SRT to D&L Segments

Impact Type	Pennsylvania
Direct Output (\$M)	\$18.9
Indirect and Induced Output (\$M)	\$15.4
<b>Total Impact (\$M)</b>	<b>\$34.3</b>
<b>Employment Supported (FTE)</b>	<b>170</b>
<b>Employee Compensation (\$M)</b>	<b>\$11.4</b>

Source: IMPLAN (2023), Econsult Solutions, Inc. (2025)

Figure 5.5: Proposed Multi-use Trail Alignment and the Pottsville Commercial Corridor



Source: ArcGIS (2025); Econsult Solutions, Inc. (2025)

### Potential Impacts from Increased User Spending

Recreational usage of this trail connection would benefit the local economy in terms of increased visitor spending on consumable and durable goods. It is estimated that 158,000 people will visit this segment each year, spending \$36.1 million at local businesses.

Figure 5.6: Potential Annual Local Spending by Trail Users (\$M)

	(\$M)
Trail User Spending on "Soft" Goods	\$2.7
Trail User Spending on "Hard" Goods	\$39.7
Total Trail User Spending	\$42.4
<i>Amount of Spending Outside of Region</i>	<i>-\$6.4</i>
<b>Total Modeled Trail User Spending</b>	<b>\$36.1</b>

*Source: Econsult Solutions, Inc. (2025)*

This multi-use trail is estimated to deliver \$60.9 in total economic impact, 590 FTE jobs, and \$18.5 million in employee compensation to the Commonwealth each year.

Figure 5.7: Estimated Economic Impacts from User Spending Associated with the Development of the SRT to D&L Segment

Impact Type	Pennsylvania
Direct Output (\$M)	\$36.1
Indirect and Induced Output (\$M)	\$24.8
<b>Total Impact (\$M)</b>	<b>\$60.9</b>
<b>Employment Supported (FTE)</b>	<b>590</b>
<b>Employee Compensation (\$M)</b>	<b>\$18.5</b>

*Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)*

### Potential Fiscal Impacts

Capital expenditures during the construction period and the ongoing user spending will generate revenue for the Commonwealth in the form of personal income, sales, and business taxes.

Figure 5.8: Estimated Tax Revenue Impacts from the Development of the SRT to D&L Trail Segments<sup>40</sup>

<b>Tax Type</b>	<b>Capital Expenditure</b>	<b>User Spending</b>
Income	\$356,000	\$345,000
Sales	\$398,000	\$561,000
Business	\$146,000	\$206,000
<b>Total</b>	<b>\$900,000</b>	<b>\$1,112,000</b>

Source: Econsult Solutions, Inc. (2025)

### Public Health Benefits

While the multi-use trail will be open to all Schuylkill and Carbon County residents and visitors, it will provide most benefit to those to whom it is most easily accessible. Of the nearly 11,500 working age adults living within a half-mile distance to this segment, it is expected that about 1,900 will achieve the recommended level of physical activity due to trail-based exercise, such as walking and cycling. It is estimated that this will translate into \$2.5 million in avoided medical expenses.

Figure 5.9: Estimated Value of Healthcare Savings from Active Trail Users

	<b>Working Age Adults</b>	<b>Estimated Regular Trail Users</b>	<b>Users Meeting Activity Req. Due to Trails</b>
	11,500	4,100	1,900
<b>Cost Savings Calculation</b>			
	<b>Lower Bound</b>	<b>Mean</b>	<b>Upper Bound</b>
Average Annual Savings per Active Individual	\$748	\$1,318	\$1,888
<b>Annual Savings - Total Network Upon Completion (\$M)</b>	<b>\$1.4</b>	<b>\$2.5</b>	<b>\$3.6</b>
<b>Per Mile of Completed Trail Network</b>	<b>\$45,700</b>	<b>\$80,500</b>	<b>\$115,300</b>

Source: Götschia and Lohb (2017); CDC (2018); ESRI (2025); Econsult Solutions, Inc. (2025)

<sup>40</sup> Note that tax revenue generated by capital expenditures is a one-time event, while the revenue driven by User spending is an annual event.

### Safety and Transportation Impacts

The overwhelming majority of Schuylkill County residents drive or carpool as their primary means of getting to work. Moreover, less than two percent bike or walk to work. The build-out of this trail route connection would present a non-motorized transit mode to some share of the county’s workforce.

Figure 5.10: Distribution of Commuters in Schuylkill County<sup>41</sup>

<b>Mode Split</b>	<b>Schuylkill</b>
Drove alone	79%
Carpooled	11%
Public transportation (excl. taxicab)	0%
Taxicab, Motorcycle, or Other	3%
Bicycle	0%
Walked	1%
Worked at home	6%

*Source: U.S. Census American Community Survey (2023)*

### Environmental Benefits

In addition to the specific benefits quantified in the above sections, the development of trails networks adds considerable societal value across the Commonwealth. Within Schuylkill County, the conversion of this connecting route would enhance the natural landscape and improve air quality while also reducing pollution and roadway congestion.

### Property Value Premium

As detailed for the state as a whole in Section 4, trails and other recreational assets are associated with higher property values. There are approximately 6,400 housing units within half mile of this 19-mile segment, with each owner positioned to benefit from a premium associated with trail development.

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<sup>41</sup> Values in table are rounded to the nearest whole percentage and do not reflect value of 0.3 percent (public trans) and 0.1 percent (biking).

## 5.2. Case Study 2: The Susquehanna River Route and the Borough of Lewistown, Mifflin County

Situated along the Susquehanna River Route, the historic Borough of Lewistown presents a compelling case for the Trail Town development model. At present, multi-use trailway is found almost exclusively in the easternmost and westernmost reaches of the Pennsylvania network, with extensive stretches of on-road segments fulfilling the critical role of connecting those more densely populated regions. Full development of the selected 15-mile subsegment of the 129-mile Susquehanna River Route would increase trail access and usage while also bolstering business opportunity and economic output. By connecting downtown Lewistown to nearby communities, local parks, and scenic areas like Victory Park and the Juniata Riverfront Greenway, this project would fill a major gap in the central portion of Pennsylvania’s trail system and establish Lewistown as a regional destination for cyclists and trail users.

Demographically, Lewistown reflects the general characteristics of municipalities across the rural core of the Commonwealth’s southcentral region. Across its two-square area, the municipality is home to 8,500 residents with a median household income of \$40,200. The trail’s development would provide residents with a low-cost, high-value recreation amenity while also attracting visitors who could support local businesses.

The borough stands apart from many of its peers with a well-established downtown district. Supported by a well-established revitalization organization, Downtown Lewistown, Inc. (DLI) as well as the Juniata River Valley Tourism Bureau, and offering a varied mix of shops and restaurants, the borough’s commercial corridor is well-positioned to attract business from the increased recreational visitor volume to the area.

### Economic and Fiscal Impacts Associated with Trail Segment Alignment in Mifflin County

Conversion of this on-road segment will not only bring a sizable stretch of multi-use trail to residents of Lewistown and its neighboring municipalities but will also usher economic benefits into the State economy.

- The costs of construction are estimated to deliver \$24.8 million in total economic output while supporting approximately 120 FTE job-years.
- Each year, spending from users of this multi-use trailway will generate more than \$29.3 million in total economic output and support over \$8.9 million in employee compensation.
- Additionally, the enhanced trailway will be accessible to approximately 1,000 working age adults and deliver an estimated \$300,000 in annual medical cost savings.

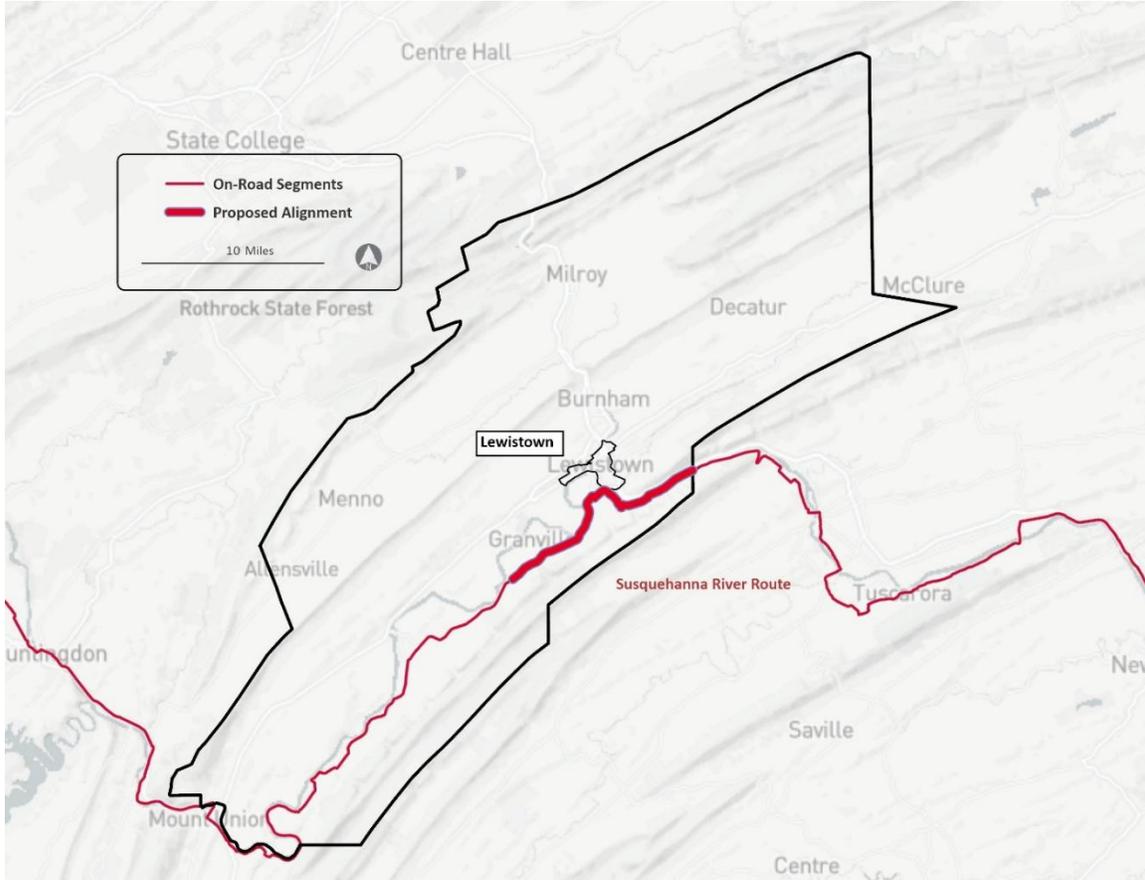
### MAIN STREET MATTERS

In July 2025 the Commonwealth’s Department of Community and Economic Development (DCED) added the borough to its Main Street Matters program. As an official designee, Downtown Lewistown, Inc. will activate its strategic plan to strengthen partnerships, attract investment, and drive planned development projects.

*Source: PA DCED (2025)*

Following along the path of the Juniata River, this potential alignment runs through Granville and Derry while also being near Highland Park and Juniata Terrace.

Figure 5.11: Proposed Multi-use Trail Alignment: Susquehanna River Route, Borough of Lewistown



Source: ArcGIS (2025); Econsult Solutions, Inc. (2025)

#### Potential Impacts from Capital Expenditure

The direct investment of \$13.6 million into this trail alignment is expected to produce considerable impacts for Pennsylvania’s economy, including \$24.8 million in total economic output and approximately 120 FTE job-years with \$8.2 in employee compensation.

Figure 5.12: Estimated Economic Impacts Associated with Capital Investments of the Susquehanna River Route Segment

Impact Type	Pennsylvania
Direct Output (\$M)	\$13.6
Indirect and Induced Output (\$M)	\$11.1
<b>Total Impact (\$M)</b>	<b>\$24.8</b>
<b>Employment Supported (FTE)</b>	<b>120</b>
<b>Employee Compensation (\$M)</b>	<b>\$8.2</b>

Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)



### Potential Impacts from Increased User Spending

In need of both soft and hard goods, trail users will stimulate local businesses. It is estimated that 116,300 people will visit this multi-use trail annually, triggering \$17.4 million in local spending.

Figure 5.14: Potential Annual Local Spending by Trail Users (\$M)

	(\$M)
Trail User Spending on "Soft" Goods	\$1.3
Trail User Spending on "Hard" Goods	\$19.1
Total Trail User Spending	\$20.4
<i>Amount of Spending Outside of Region</i>	<i>-\$3.1</i>
<b>Total Modeled Trail User Spending</b>	<b>\$17.4</b>

*Source: Econsult Solutions, Inc. (2025)*

Once converted from on-road to multi-use, this segment of the Susquehanna River Route is estimated to provide \$29.3 million in total economic impact to the state, support 280 FTE jobs, and \$8.9 million in employee earnings and benefits.

Figure 5.15: Estimated Economic Impacts from User Spending Associated with the Development of Susquehanna River Route Segment

Impact Type	Pennsylvania
Direct Output (\$M)	\$17.4
Indirect and Induced Output (\$M)	\$12.0
<b>Total Impact (\$M)</b>	<b>\$29.3</b>
<b>Employment Supported (FTE)</b>	<b>280</b>
<b>Employee Compensation (\$M)</b>	<b>\$8.9</b>

*Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)*

### Potential Fiscal Impacts

Both construction period activity and annual trail usage will collect tax revenues for the State, with the capital dollars invested in the conversion of the segment to multi-use garnering \$470,000 in total and trail users accounting for \$270,000 on a yearly basis.

Figure 5.16: Estimated Tax Revenue Impacts from the Development of the Susquehanna River Route Segment<sup>42</sup>

<b>Tax Type</b>	<b>Capital Expenditure</b>	<b>User Spending</b>
Income	\$186,000	\$166,000
Sales	\$208,000	\$270,000
Business	\$76,000	\$99,000
<b>Total</b>	<b>\$470,000</b>	<b>\$535,000</b>

Source: Econsult Solutions, Inc. (2025)

### Public Health Benefits

The delivery of this 15-mile multi-use trail will improve health outcomes for those living in the area by increasing accessibility to recreational activity. It is estimated that approximately 200 Mifflin County residents would meet CDC guidelines for physical activity due to the addition of this public amenity, leading to about \$200,000 in annual healthcare cost savings.

Figure 5.17: Estimated Value of Healthcare Savings from Active Trail Users

	<b>Working Age Adults</b>	<b>Estimated Regular Trail Users</b>	<b>Users Meeting Activity Req. Due to Trails</b>
	1,000	300	200
<b>Cost Savings Calculation</b>			
	<b>Lower Bound</b>	<b>Mean</b>	<b>Upper Bound</b>
Average Annual Savings per Active Individual	\$748	\$1,318	\$1,888
<b>Annual Savings - Total Network Upon Completion (\$M)</b>	\$0.1	\$0.2	\$0.3
<b>Per Mile of Completed Trail Network</b>	\$7,900	\$13,800	\$19,800

Source: Götschia and Lohb (2017); CDC (2018); ESRI (2025); Econsult Solutions, Inc. (2025)

<sup>42</sup> Note that tax revenue generated by Capital expenditures is a one-time event, while the revenue driven by User spending is an annual event.

### Safety and Transportation Impacts

As is the case in rural counties across the state, personal vehicles are the dominant mode of transportation for Mifflin County residents. If developed, this stretch of the Susquehanna River Route would serve as a viable commuting route for a share of the population. The delivery of a multi-use trailway could increase the combined share of walkers and bikers above its current low rate.

Figure 5.18: Distribution of Commuters in Mifflin County<sup>43</sup>

<b>Mode Split</b>	<b>Mifflin County</b>
Drove alone	80%
Carpooled	12%
Public transportation (excl. taxicab)	0%
Taxicab, Motorcycle, or Other	2%
Bicycle	0%
Walked	1%
Worked at home	6%

*Source: U.S. Census American Community Survey (2023)*

### Environmental Benefits

As just one of its many positive environmental impacts, multi-use trails protect the local water supply and the wildlife that it supports. Running along the Juniata River, this proposed development would serve the populations beyond those in immediate proximity; it would also benefit populations living downstream of the trail.

### Property Value Premium

It is estimated that 800 housing units are located within a half-mile buffer of this trailway. This segment's alignment would deliver a premium on each of these properties, serving to the benefit of their owners. As median home values in Mifflin County are below \$100,000, and median household income is only slightly above \$40,000, even marginal increases in asset values will be impactful.

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<sup>43</sup> Values in table are rounded to the nearest whole percentage and do not reflect value of 0.2 percent for public transportation and 0.1 percent for biking.

### 5.3. Case Study 3: Route 311 from Chambersburg to Shippensburg and Chambersburg, Franklin County

The Cumberland Valley, and in particular the Town of Chambersburg which is located in the heart of Franklin County, offers a compelling case for trail development. The 19-mile Route 11 Corridor segment is well-positioned to be aligned with the Cumberland Valley Rail Trail, to which it is connected.

With over 3,200 residents per square mile and a median household income of \$56,200, Chambersburg is more densely populated and wealthier than the vast majority of municipalities in its particular region of the State.

Chambersburg's business district, which features nearly 70 businesses, is well-equipped to capture the benefit of the heightened trail-based activity. In addition to an attractive retail mix, Chambersburg's concentrated shopping and dining area features many popular events and festivals that draw sizable crowds of locals and visitors alike.

#### Economic and Fiscal Impacts Associated with Trail Segment Alignment in Franklin County

Full build-out of the nearly 20-mile on-road segment from Chambersburg to Shippensburg would deliver a range of benefits to the local community and state economy.

- Capital investments are estimated to deliver nearly \$30.6 million in total economic output while supporting approximately 150 FTE job-years.
- Following alignment, it is estimated that recreational user spending attributed to this segment would generate more than \$36.5 million in total economic output and support roughly \$11.0 million in employee compensation.
- Additionally, the enhanced trailway will be accessible to more than 9,700 working age adults and deliver an estimated \$3.1 million in annual medical cost savings.

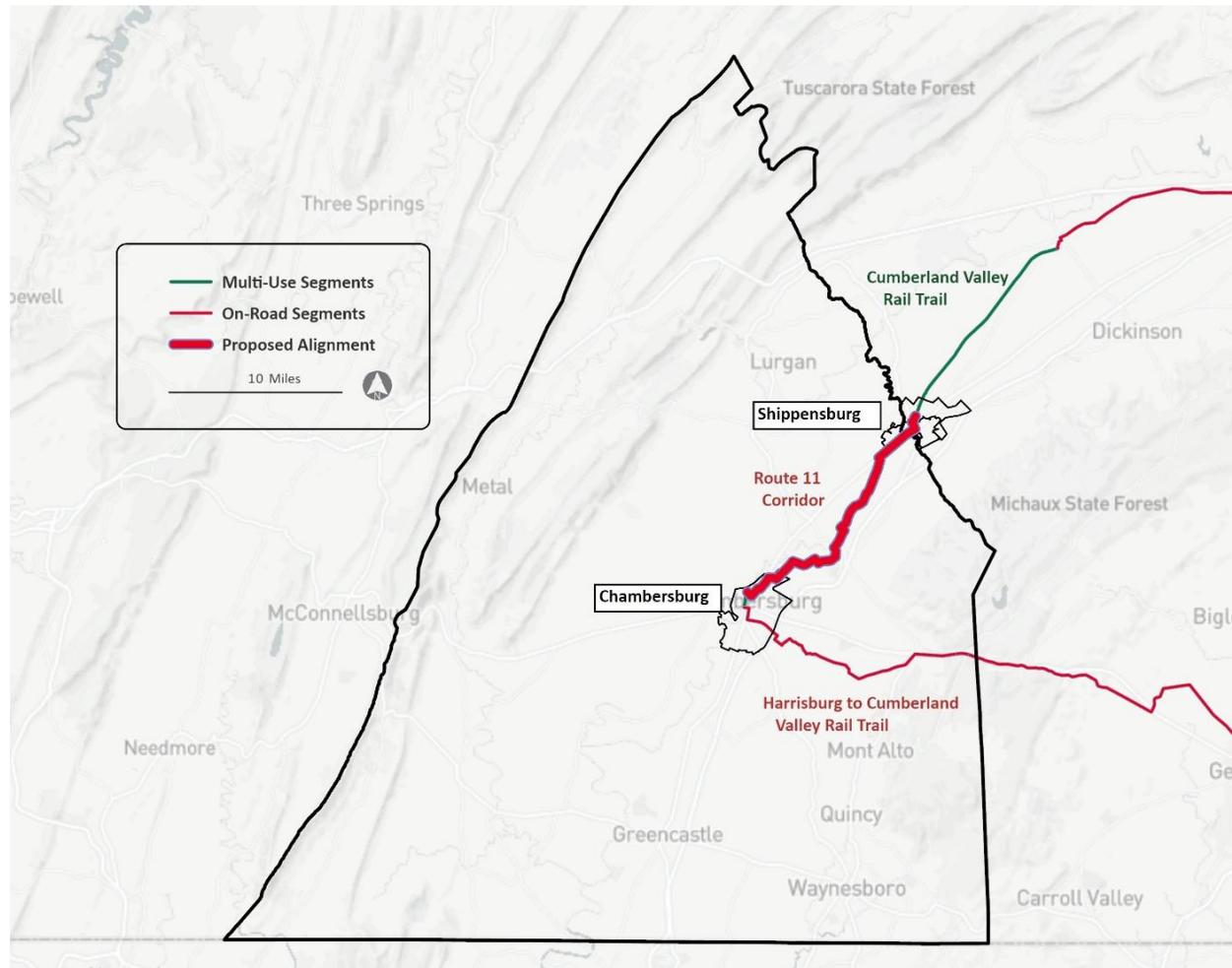
En route to connecting its two endpoints of Chambersburg and Shippensburg, this proposed alignment cuts through Green and Southampton.

#### LIVE MUSIC SERIES

Many retailers and restaurants located in Chambersburg's downtown are aligned to the preferences of the typical trail enthusiast. This makes the weekend live music series, which runs throughout the calendar year, a potentially popular draw for many bikers and hikers of the completed Chambersburg to Shippensburg segment. This will benefit the host brewery of the series, and neighboring retailers and restaurants as well as the commercial district overall.

*Source: Downtown Chambersburg Inc. (2025)*

Figure 5.19: Proposed Multi-use Trail Alignment: Route 311 – Chambersburg to Shippensburg



Source: ArcGIS (2025); Econsult Solutions, Inc. (2025)

### Potential Impacts from Capital Expenditure

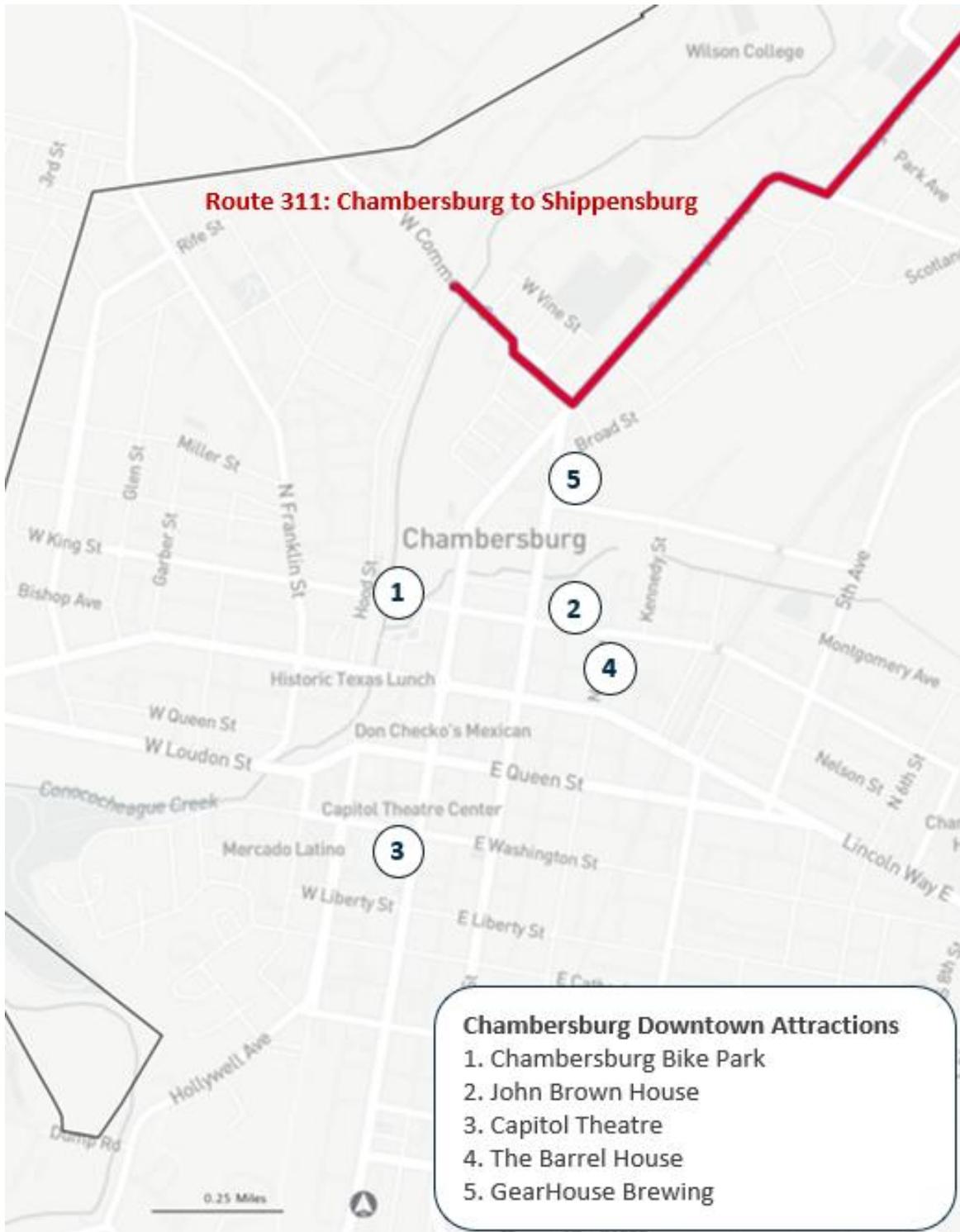
The capital expenditures associated with the conversion of this segment from on-road to multi-use is estimated to result in \$30.7 million in total economic impact for the state, while also supporting 150 FTE job-years earning \$10.2 million in wages, salaries, and benefits.

Figure 5.20: Estimated Economic Impacts Associated with Capital Investments of the Chambersburg to Shippensburg Segment

Impact Type	Pennsylvania
Direct Output (\$M)	\$16.9
Indirect and Induced Output (\$M)	\$13.8
<b>Total Impact (\$M)</b>	<b>\$30.7</b>
<b>Employment Supported (FTE)</b>	<b>150</b>
<b>Employee Compensation (\$M)</b>	<b>\$10.2</b>

Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)

Figure 5.21: Proposed Multi-use Trail Alignment and the Chambersburg Commercial Corridor



Source: ArcGIS (2025); Econsult Solutions, Inc. (2025)

### Potential Impacts from Increased User Spending

Businesses within the region will supply a sizable share of the goods that users of this trail route. With an estimated 144,600 people using the trail per year, the local economy can expect approximately \$21.6 million in sales of soft and hard goods.

Figure 5.22: Potential Annual Local Spending by Trail Users (\$M)

	(\$M)
Trail User Spending on "Soft" Goods	\$1.6
Trail User Spending on "Hard" Goods	\$23.8
Total Trail User Spending	\$25.4
<i>Amount of Spending Outside of Region</i>	<i>-\$3.8</i>
<b>Total Modeled Trail User Spending</b>	<b>\$21.6</b>

*Source: Econsult Solutions, Inc. (2025)*

On an annual basis, the fully developed trail segment running from Chambersburg to Shippensburg is estimated to provide \$36.5 million in total economic impact to state, support 350 FTE jobs, and \$11.0 million in employee compensation.

Figure 5.23: Estimated Economic Impacts from User Spending Associated with the Development of the Chambersburg to Shippensburg Segment

Impact Type	Pennsylvania
Direct Output (\$M)	\$21.6
Indirect and Induced Output (\$M)	\$14.9
<b>Total Impact (\$M)</b>	<b>\$36.5</b>
<b>Employment Supported (FTE)</b>	<b>350</b>
<b>Employee Compensation (\$M)</b>	<b>\$11.0</b>

*Source: IMPLAN (2023); Econsult Solutions, Inc. (2025)*

### Potential Fiscal Impacts

The capital expenditures accrued during the development of the Chambersburg to Shippensburg segment will generate \$581,000 in one-time revenues while user spending related to the trail’s usage will add \$336,000 to Pennsylvania’s annual tax base.

Figure 5.24: Tax Revenue Impacts<sup>44</sup>

<b>Tax Type</b>	<b>Capital Expenditure</b>	<b>User Spending</b>
Income	\$230,000	\$206,000
Sales	\$257,000	\$336,000
Business	\$94,000	\$123,000
<b>Total</b>	<b>\$581,000</b>	<b>\$665,000</b>

Source: Econsult Solutions, Inc. (2025)

### Public Health Benefits

The proposed alignment will benefit residents countywide but will improve health outcomes of the population living within a one-mile distance most significantly. It can be expected that the presence of an 18-mile multi-use trail would allow approximately 1,600 adults to reach an adequate level of physical activity, translating to an annual health cost savings of \$3.1 million.

Figure 5.25: Estimated Value of Healthcare Savings from Active Trail Users

	<b>Working Age Adults</b>	<b>Estimated Regular Trail Users</b>	<b>Users Meeting Activity Req. Due to Trails</b>
	9,700	3,400	1,600
<b>Cost Savings Calculation</b>			
	<b>Lower Bound</b>	<b>Mean</b>	<b>Upper Bound</b>
Average Annual Savings per Active Individual (\$)	\$748	\$1,318	\$1,888
<b>Annual Savings - Total Network Upon Completion (\$M)</b>	\$1.2	\$2.1	\$3.1
<b>Per Mile of Completed Trail Network</b>	\$64,500	\$113,700	\$162,800

Source: Götschia and Lohb (2017); CDC (2018); ESRI (2025); Econsult Solutions, Inc. (2025)

<sup>44</sup> Note that tax revenue generated by Capital expenditures is a one-time event, while the revenue driven by User spending is an annual event.

### Safety and Transportation Impacts

The establishment of multi-use trails increases access to cycling and walking as an alternative to the reliance on a personal vehicle for transportation needs, providing a range of benefits to the individual and a reduction of the costs and safety issues associated with high traffic volumes. In Franklin County, where 92 percent of residents rely on vehicular transportation for commuting purposes, the proposed development would make alternative transit modes more available and accessible.

Figure 5.26: Distribution of Commuters in Franklin County<sup>45</sup>

<b>Mode Split</b>	<b>Franklin County</b>
Drove alone	79%
Carpooled	8%
Public transportation (excl. taxicab)	5%
Taxicab, Motorcycle, or Other	0%
Bicycle	0%
Walked	3%
Worked at home	9%

*Source: U.S. Census American Community Survey (2023)*

### Environmental Benefits

Trail development will also enhance the livability of the surrounding environment, with noticeable improvements to the natural landscape as well as overall improvements to air quality and water supply. These benefits reach all residents of the region, with those living in close proximity receiving the most benefit.

### Property Value Premium

Of Franklin County's 67,400 housing units, about 6,900 are situated within half-mile of this trail segment. The proposed development would increase the value of a primary asset for a sizable group, as 76 percent of occupied housing units are owner-occupied.

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<sup>45</sup> Values in table are rounded to the nearest whole percentage and do not reflect value of 0.2 percent for both biking and public transportation.

## 6. Appendix

### 6.1. Technical Details

Figure A.1: Multi-use Segments of the Pennsylvania Network

Segment	Status
Cumberland Valley Rail Trail	Multi-use
Capital Area Greenbelt - South Harrisburg	Multi-use
Conewago Recreation Trail	Multi-use
Lebanon Valley Rail-Trail	Multi-use
Great Allegheny Passage from Garrett to MD State Line	Multi-use
Great Allegheny Passage from Pittsburgh to Garrett PA	Multi-use
Lower Trail	Multi-use
Plainfield Township Trail	Multi-use
D & L Trail - Lehigh Canal South - Laurys Station to Coplay	Multi-use
D & L Trail - Lehigh Canal South - Appalchian Trail to Lockport	Multi-use
D & L Trail - Lehigh Canal South - Allentown to Easton	Multi-use
Plainfield-Palmer Township Trail to Bushkill Creek and D & L Trail at Easton	Multi-use
D & L Trail - Northampton Canal Park to Walnutport	Multi-use
Switchback Railroad Trail	Multi-use
Schuylkill River Trail - Schuylkill Valley Heritage Trail	Multi-use
Schuylkill River Trail - John Bartram Trail	Multi-use
Union Canal Trail	Multi-use
Capital Area Greenbelt - North Harrisburg	Multi-use
Allegheny Portage Railroad & Incline Trail	Multi-use
Path of the Flood Trail	Multi-use
6 to 10 Trail	Multi-use
Schuylkill River Trail - Thun Trail	Multi-use
Northwest River Trail - Chickies Rock County Park	Multi-use
Northwest River Trail	Multi-use
Schuylkill River Trail - Philadelphia to Valley Forge 1	Multi-use
Schuylkill River Trail - Philadelphia to Valley Forge 2	Multi-use
Schuylkill River Trail - Philadelphia to Valley Forge 3	Multi-use
202 Parkway Trail	Multi-use
Chambersburg Rail-Trail	Multi-use
Northwest Lancaster River Trail - Columbia	Multi-use
D & L Trail - Delaware Canal Towpath	Multi-use
Lehigh to Bowmantown	Multi-use
York County Heritage Rail Trail	Multi-use

Source: September 11<sup>th</sup> National Memorial Trail

Figure A.2: On-road Segments of the Pennsylvania Network

<b>Segment</b>	<b>Status</b>
Cumberland Valley Rail Trail	On-road
Capital Area Greenbelt - South Harrisburg	On-road
Conewago Recreation Trail	On-road
Lebanon Valley Rail-Trail	On-road
Great Allegheny Passage from Garrett to MD State Line	On-road
Great Allegheny Passage from Pittsburgh to Garrett PA	On-road
Lower Trail	On-road
Plainfield Township Trail	On-road
D & L Trail - Lehigh Canal South - Laurys Station to Coplay	On-road
D & L Trail - Lehigh Canal South - Appalachian Trail to Lockport	On-road
D & L Trail - Lehigh Canal South - Allentown to Easton	On-road
Plainfield-Palmer Township Trail to Bushkill Creek and D & L Trail at Easton	On-road
D & L Trail - Northampton Canal Park to Walnutport	On-road
Switchback Railroad Trail	On-road
Schuylkill River Trail - Schuylkill Valley Heritage Trail	On-road
Schuylkill River Trail - John Bartram Trail	On-road
Union Canal Trail	On-road
Capital Area Greenbelt - North Harrisburg	On-road
Allegheny Portage Railroad & Incline Trail	On-road
Path of the Flood Trail	On-road
6 to 10 Trail	On-road
Schuylkill River Trail - Thun Trail	On-road
Northwest River Trail - Chickies Rock County Park	On-road
Northwest River Trail	On-road
Schuylkill River Trail - Philadelphia to Valley Forge 1	On-road
Schuylkill River Trail - Philadelphia to Valley Forge 2	On-road
Schuylkill River Trail - Philadelphia to Valley Forge 3	On-road
202 Parkway Trail	On-road
Chambersburg Rail-Trail	On-road
Northwest Lancaster River Trail - Columbia	On-road
D & L Trail - Delaware Canal Towpath	On-road
Lehigh to Bowmantown	On-road
York County Heritage Rail Trail	On-road
Harrisburg to Cumberland Valley Rail Trail	On-road
Capital Area Greenbelt to Conewago Recreation Trail - BicyclePA Route J1	On-road
Lebanon Valley Rail-Trail to Schuylkill River Trail	On-road
Shanksville to Great Allegheny Passage at Garrett PA	On-road
Portland to Delaware Water Gap on East Coast Bicycle Trail - BicyclePA Route V	On-road
Susquehanna River Rte 322 to Lower Trail	On-road
D & L Trail - Delaware Canal Towpath to Garden of Reflection	On-road
Paulinskill Valley Trail to PA State Line at Portland	On-road

<b>Segment</b>	<b>Status</b>
BicyclePA Route V to Plainfield Township Trail	On-road
BicyclePA Route V	On-road
D & L Trail - Allentown Trailhead to Coplay	On-road
Switchback Railroad Trail to Schuylkill Valley Heritage Trail	On-road
Schuylkill Valley Heritage Trail to Schuylkill River Trail - Bartram Trail	On-road
Schuylkill River Trail - John Bartram Trail - Auburn to Tunnel Road	On-road
Schuylkill River Trail - John Bartram Trail - Hamburg to Union Canal Trail	On-road
Union Canal Trail to Schuylkill River Trail - Thun Trail	On-road
Path of the Flood Trail to Summit	On-road
Lower Trail to 6 to 10 Trail	On-road
Johnstown to Staple Bend Road	On-road
Flight 93 On-Road North Route	On-road
Plainfield-Palmer Township Trail to Bushkill Creek and D & L Trail at Easton	On-road
Capital Area Greenbelt to Highspire Reservoir Park Trail - BicyclePA Route J1	On-road
Northwest River Trail - Marietta	On-road
Lower Trail trailhead to Holidaysburg	On-road
Summit to Lower Trail (6 to 10 Trail)	On-road
Valley Forge - Doylestown - D&L Trail	On-road
Chambersburg to Shippensburg Rte 11 Corridor	On-road
BicyclePA Route S to Caledonia SP	On-road
BicyclePA Route S	On-road
Caledonia SP to Chambersburg	On-road
Hanover Junction to Gettysburg	On-road
BicyclePA Route S	On-road
Jim Thorpe to D&L	On-road
East Coast Greenway	On-road
Schuylkill River Trail Detour at Auburn	On-road
Hooversville to Hillsboro	On-road
York to Gettysburg	On-road
Gettysburg NMP	On-road

*Source: September 11<sup>th</sup> National Memorial Trail*

Figure A.3: Calculation for Retail Margin

	Completed Network (\$M)	Proposed Network (\$M)	Total Network (\$M)
Trail User Spending on "Soft" Goods	\$45	\$47	\$92
Trail User Spending on "Hard" Goods	\$654	\$676	\$1,330
Total Trail User Spending	\$699	\$723	\$1,422
<i>Amount of Spending Outside of Region</i>	<i>-\$105</i>	<i>-\$108</i>	<i>-\$213</i>
<b>Total Modeled Trail User Spending</b>	<b>\$595</b>	<b>\$614</b>	<b>\$1,209</b>

Source: Econsult Solutions, Inc. (2025)

The formulas detailed below show the step-by-step process for the calculated \$1,209,000,000 in User Spend used as the input value in the economic impact model.

Soft Goods

$$\text{User Spending on Soft Goods} - (15\% \times \text{User Spending on Soft Goods}) = \text{Modeled Soft Goods Spend}$$

$$\rightarrow \$92,000,000 - \$14,000,000 = \mathbf{\$78,000,000}$$

Hard Goods

$$\text{User Spending on Hard Goods} - (15\% \times \text{User Spending on Hard Goods}) = \text{Modeled Hard Goods Spend}$$

$$\rightarrow \$1,330,000,000 - \$199,000,000 = \mathbf{\$1,131,000,000}$$

Total Modeled User Spend

$$\text{Retail Margin of User Spend on Soft Goods} + \text{Retail Margin of User Spend on Hard Goods} = \text{Total Modeled User Spend}$$

$$\rightarrow \$78,000,000 + \$1,131,000,000 = \mathbf{\$1,209,000,000}$$

## 6.2. Input-Output Methodology

In an inter-connected economy, every direct dollar spent generates two spillover impacts:

- First, some amount of the proportion of that expenditure that goes to the purchase of goods and services gets circulated back into an economy when those goods and services are purchased from local vendors. This represents what is known as the **indirect effect** and reflects the fact that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, some amount of the proportion of that expenditure that goes to labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This represents what is known as the **induced effect** and reflects the fact that some of those goods and services will be purchased from local vendors, further stimulating the economy.

To model the impacts resulting from the direct expenditures of MA Eds and Meds, ESI developed a customized economic impact model using IMPLAN's input/output modeling system. Utilizing an industry standard approach, IMPLAN's input/output modeling system allows users to assess the economic and job creation impacts of industry-based events and public policy changes within a county or its surrounding area. IMPLAN has developed a social accounting matrix (SAM) that accounts for the flow of commodities through economics. From this matrix, IMPLAN also determines the regional purchase coefficient (RPC), or the proportion of local supply that satisfies local demand. These values not only establish the types of goods and services supported by an industry or institution, but also the high level at which they are acquired locally. This assessment determines the multiplier basis for the local and regional models created in the IMPLAN modeling system. IMPLAN takes these multipliers and divides them into 546 industry categories in accordance with the North American Industrial Classification System (NAICS) codes.

### Explanation of Multipliers<sup>46</sup>

The use and application of multipliers are intuitive. Multipliers, in their most basic form, are the result of an algebraic analysis expressing how two inputs are interconnected in the production of an output. The result of the equation generates a multiplier that is broken down into direct, indirect, and induced effects. In a generalized example: if the multiplier for good X to good Y is 3, then the direct effect of good X on Y is 1, with indirect and induced effects of 2. Essentially, every unit of good X supports 2 units of good Y.

When implemented on a large complex scale, such as that of the US economy or any subsection of it, multiplier effects across industries can be complicated. However, the same general concept comes into play. Each industry has largely different and varied inputs into other industries. The quantity of the output is largely decided by the scale and efficiency of the industries involved. As a result, the sum of those inputs equates to an output product plus a value added/component. By arranging these inputs

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<sup>46</sup> Lahr, Michael. "Input-Output Analysis: Technical Description and Application." Rutgers University Edward J. Bloustein School of Planning and Public Policy.

and outputs by industry in a matrix and performing some algebra to find the Leontief inverse matrix, each industry's effect on final demand can be estimated. Additionally, the direct, indirect, and induced effects can also be determined. Direct effects include direct purchases for production, indirect effects include expenses during production, and induced effects concern the expenditures of employees directly involved with production. Using building construction as an example, the direct effects would include materials, brick, steel, and mortar; the indirect effects would involve the steel fabrication and concrete mixing; and the induced effects would consider purchases by construction workers using their wages. While impacts vary in size, each industry has rippling effects throughout the economy. By using an input-output model, these effects can be more accurately quantified and explained.

IMPLAN is one of several popular choices for regional input-output modeling. Each system has its own nuances in establishing proper location coefficients. IMPLAN uses a location quotient to determine its regional purchase coefficient (RPC). This represents the proportion of demand for a good that is filled locally; this assessment helps determine the multiplier for the localized region. Additionally, IMPLAN also accounts for inter-institutional transfers (e.g., firms to households, households to the government, etc.) through its social account matrix (SAM) multipliers. IMPLAN takes the multipliers and divides them into industry categories in accordance with the North American Industrial Classification System (NAICS) codes, allowing a comprehensive breakdown of a region's multipliers by industry to be shown.

Despite the usefulness of input/output modeling, there are some shortcomings to the system. Notably, input-output models ignore economies of scale. Input-output models assume that costs and inputs remain proportionate through different levels of production. Further, multipliers are not generally updated on a timely basis; most multipliers are prone to be outdated with the current economy. If the multipliers are sourced from a year of a recession economy, the multipliers may not accurately represent the flows from an economic boom period. Additionally, multipliers may not capture sudden legal or technological changes which may improve or decrease efficiency in the production process.

## Glossary of Terms for Input/Output Models

**Multiplier Effect**– the notion that initial outlays have a ripple effect on a local economy, to the extent that direct output leads to indirect and induced output.

**Economic Impacts**– total expenditures, employment, and labor income generated.

**Tax Revenue Impacts**– local and/or state tax revenues generated.

**Direct Output**– initial outlays usually associated with the project or activity being modeled; examples: one-time upfront construction and related expenditures associated with a new or renovated facility, annual expenditures associated with ongoing facility maintenance and/or operating activity.

**Direct Employment**– the number of annual jobs associated with direct output (including full- and part-time employment)

**Direct Labor Income**– the salaries and wages earned by employees, contractors, and proprietors as part of the direct output.

**Indirect Output**– indirect and induced outlays resulting from the direct output; examples: vendors increasing production to meet new demand associated with the direct output, workers spending direct labor income on various purchases within the local economy.

**Indirect/Induced Employment**– the number of annual jobs associated with indirect/induced output (including full- and part-time employment)

**Indirect Labor Income**– the salaries and wages earned by employees, contractors, and proprietors as part of the indirect output.

**Total Output**– the sum of direct output and indirect output.

**Total Employment**– the sum of direct employment and indirect employment.

**Total Labor income**– the sum of direct labor income and indirect labor income.

*Source: Econsult Solutions, Inc. (2025)*

### 6.3. About Econsult Solutions, Inc.

This report was produced by Econsult Solutions, Inc. (ESI), providing businesses and public policy makers with consulting and thought leadership services in urban economics, real estate, transportation, public infrastructure, economic development, public policy and finance, strategic planning, as well as expert witness services for litigation support.

ESI combines robust quantitative analysis with trusted expert insights to create sustainable solutions. The firm works collaboratively with its clients, and draws in expertise, when necessary, from our network of experts and partners across industries, regions, and management practices. Based in Philadelphia, the firm supports clients nationwide.

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