MEMORANDUM

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To: Tim Maloney (Hoosier Environmental Council)

From: Kyle James (Alta Planning + Design)

CC: Wade Walker (Alta Planning + Design)

Date: May 2016

Re: Mounds Greenway Economic, Health, and Environmental Benefits Analysis

Introduction

Constructing the Mounds Greenway will connect the East Central Indiana communities of Blackford County, Delaware County, Henry County, Jay County, and Madison County, providing residents and visitors a fun, healthy way to experience the culture and natural beauty of the region. **Envisioned as a quality of life amenity and planned as a tool for land conservation, sustainable economic growth, and the creation of new opportunities for outdoor recreation, the Greenway will extend over 17 miles, linking city centers, schools, and universities through a system of parks along the White River and helping create a 149-mile continuous trail network across East Central Indiana.**

The full build-out of the Mounds Greenway will impact a variety of health, environmental, tourism, property value, and transportation factors that directly affect the lives of East Central Indiana residents and visitors. Quantifying these factors and understanding the magnitude of their impact on the region enables a more informed discussion on whether and how best to invest in the trail network.

Study Area

While the construction of the Mounds Greenway will benefit all residents of and visitors to the region by closing a large gap between the popular White River Trail and the Cardinal Greenway, a review of trail users within Indiana found that the most frequent users of a trail generally live in close proximity of the trail.[1] **Because of this, the bicycling study area of this analysis was limited to those living within a 3-mile buffer (a conservative estimate of the average distance an able-bodied person can travel by bicycle in 15 minutes)[2] and the walking study area was limited to a 0.5-mile buffer (a conservative estimate of the average distance an able-bodied person can travel by foot in 10 minutes)[3] of the greenway.** This means that residents of Anderson, Chesterfield, Daleville, Yorktown, and Muncie will have the most convenient access and will gain the most from the greenway's completion, but it's important to note that the greenway will provide an amenity for the entire region and that the creation of a regional network, while difficult to model, greatly expands access to trail and park facilities among all East Central Indiana residents. **Figure 1** shows a map of the study area around the proposed Mounds Greenway alignment, and **Figure 2** shows the total and employed population within the two buffer areas. **Appendix A** provides additional socio-demographic data of residents living within the two buffer areas.

Figure 1: Study Area

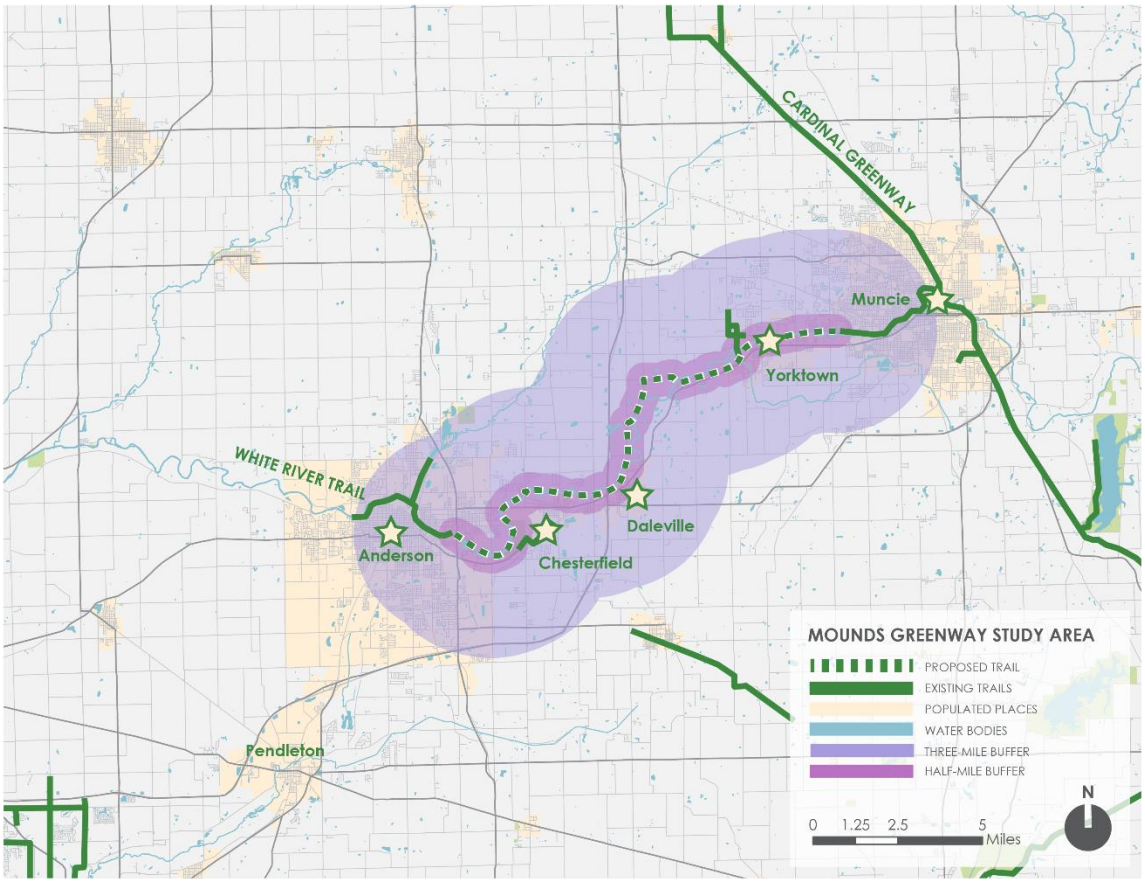
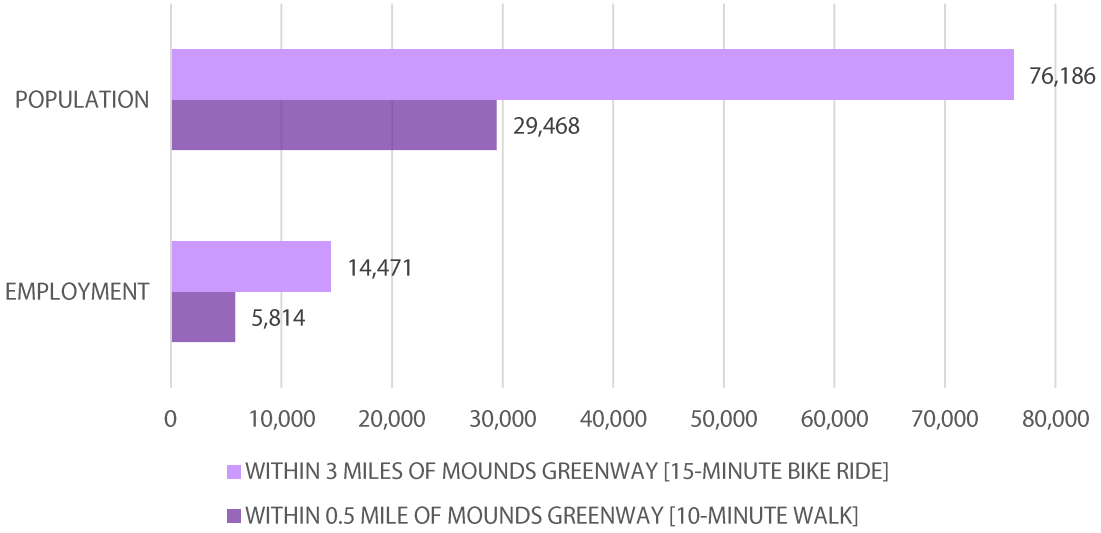


Figure 2: Total and Employed Population



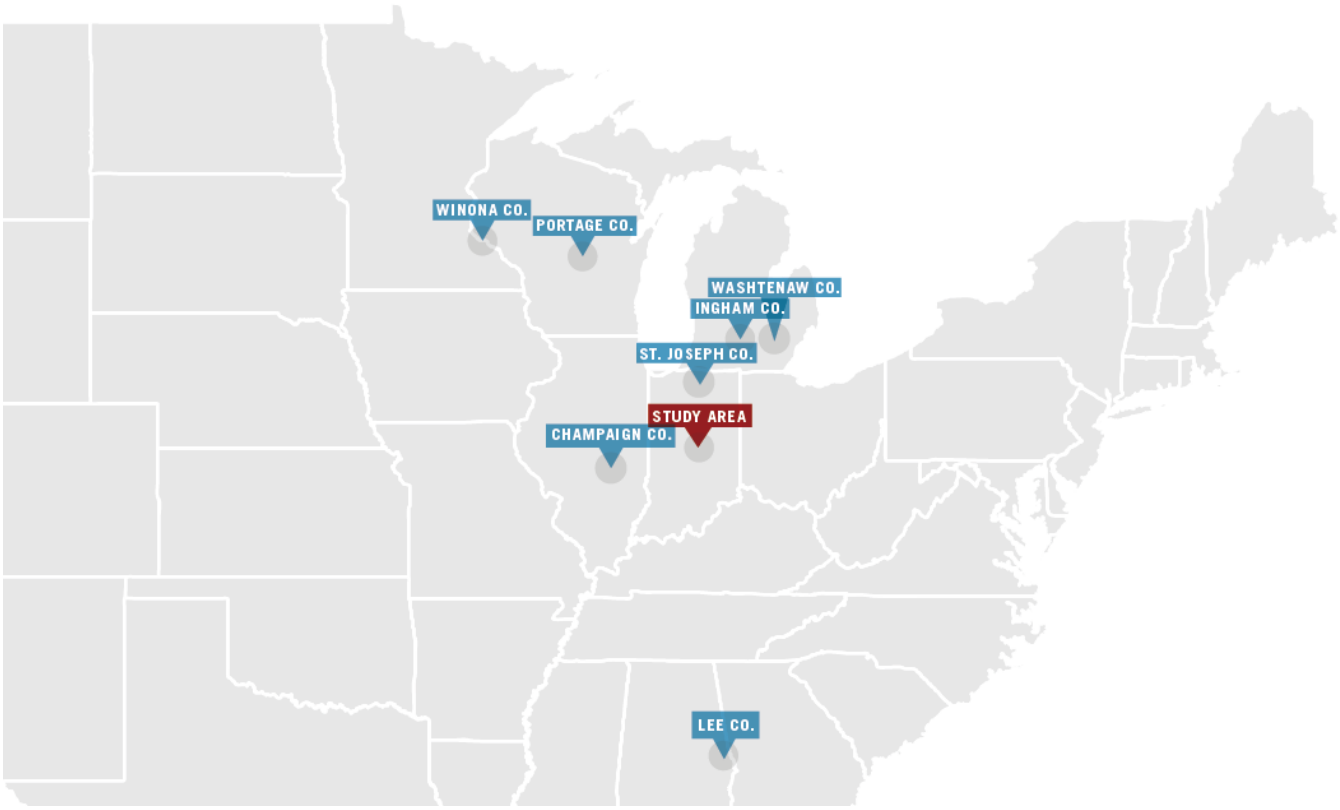
Methods

The benefits analysis uses a standard methodology for calculating health, environmental, economic, and transportation-related benefits. All **projections are based on the most recent five-year estimates from the American Community Survey** (ACS), which are then **extrapolated through the use of various multipliers** derived from national studies and quantified in terms of monetary value, where appropriate. The estimated monetary values are then **calibrated to baseline values and compared to bicycle and walk mode commute mode shares of peer counties**.

SELECTING PEER COUNTIES

In order to estimate potential future increases in bicycling and walking that may result from the implementation of the Mounds Greenway within Delaware County (IN) and Madison County (IN),[a] the travel patterns in seven peer counties shown in **Figure 3** were examined: Lee County (AL), Champaign County (IL), St. Joseph County (IN), Ingham County (MI), Washtenaw County (MI), Winona County (MN), and Portage County (WI). These seven peer counties were selected based on similarities in the design of their roadway networks, regional proximity and proximity to universities, climates, terrain, population size and demographics, and the presence of bicycle and pedestrian infrastructure similar to the proposed infrastructure in East Central Indiana (See **Table 1**).

Figure 3: Peer Counties



[a] The two counties within East Central Indiana through which the proposed segment of the Mounds Greenway will be built.

Table 1: Peer County Comparison

Locations	Climate[4]	Population[5]	College Population[6]	Local Colleges & Universities	Population Density[7]	Percent Minority Population[8]	Bicycle Friendly Community Award[9]	Walk Friendly Community Award[10]
East Central Indiana[11]	*Dfa*	248,129	27,686	Anderson University, Ball State University, & Ivy Tech	446/sq. mi.[12]	11%[13]	None	None
Lee County (AL)	*Cfa*	147,790	28,673	Auburn University & Southern Union State	231/sq. mi.	29%	Bronze[14]	None
Champaign County (IL)	*Dfa*	204,214	50,034	Parkland College & University of Illinois at Urbana-Champaign	202/sq. mi.	26%	Gold[15]/ Bronze[16]	None
St. Joseph County (IN)	*Dfa*	266,916	25,927	Bethel College, Indiana University – South Bend, & Norte Dame University	583/sq. mi.	19%	Bronze[17]	None
Ingham County (MI)	*Dfa/ Dfb*	282,562	57,587	Lansing Community College & Michigan State University	505/sq. mi.	23%	Bronze[18]	Honorable Mention[19]
Washtenaw County (MI)	*Dfa*	351,454	67,045	Eastern Michigan University, University of Michigan, & Washtenaw Community College	488/sq. mi.	25%	Silver[20]	Gold[21]
Winona County (MN)	*Dfa*	51,285	8,780	Minnesota State College, Saint Mary's University of Minnesota, & Winona State University	82/sq. mi.	6%	Bronze[22]	None
Portage County (WI)	*Dfb*	70,337	10,323	University of Wisconsin – Stevens Point	87/sq. mi.	5%	Bronze[23]	None

After the identification of peer counties based on general characteristics, the existing bicycle and walk commute data from each county was examined. Compared to the selected peer counties, East Central Indiana is tied for the lowest bicycle commute mode share (0.6 percent), according to 2010-2014 ACS data.

Table 2 shows the existing bicycle commute mode shares for East Central Indiana and its seven peer counties, as well as the range of forecasted bicycle commute mode shares for the study area. These low, mid, and high ranges provide the basis for planning-level bicycling demand estimates of the study area, with the estimated increase in bicycling-related benefits derived from the difference between the existing bicycle commute mode share and each of the three values within the forecasted future bicycle commute mode share range. This process is replicated for the planning-level walk demand estimates.

Table 2: Existing and Forecasted Bicycle Commute Mode Share

Cities	Employed Population	Existing Bicycle Commute Trips per Day	Existing Bicycle Commute Mode Share	Forecasted Future Bicycle Commute Mode Share		
				Low[24]	Mid[25]	High[26]
East Central Indiana[27]	102,882	601	0.6%	1.0%	1.7%	1.9%
Lee County (AL)	66,091	384	0.6%			
Champaign County (IL)	99,633	2,622	2.6%			
St. Joseph County (IN)	119,789	811	0.7%			
Ingham County (MI)	127,756	2,506	2.0%			
Washtenaw County (MI)	169,545	3,048	1.8%			
Winona County (MN)	27,495	352	1.3%			
Portage County (WI)	35,069	594	1.7%			

If the bicycle commute mode share within the study area increased to the 25th percentile of its seven peer counties, there would be a 67 percent increase in the number of bicycle commuters (0.6 percent to 1.0 percent). If the study area increased its bicycle commute mode share to the 50th percentile of its seven peer counties, there would be a 183 percent increase in the number of bicycle commuters (0.6 percent to 1.7 percent). If the study area increased its bicycle commute mode share to the 75th percentile of its seven peer counties, there would be a 217 percent increase in the number of bicycle commuters (0.6 percent to 1.9 percent).

Table 3 shows the existing walk commute mode share for East Central Indiana and its seven peer counties, as well as the range of forecasted walk commute mode shares for the study area. Compared to its peer counties, East Central Indiana has the third lowest walk commute mode share (3.8 percent), according to 2010-2014 ACS data. If the study area increased its walk commute mode share to the 25th percentile of its seven peer counties, there would be a 16 percent increase in the number of walk commuters (3.8 percent to 4.4 percent). If the walk commute mode share within the study area increased to the 50th percentile of its seven peer counties, there would be a 45 percent increase in the number of walking commuters (3.8 percent to 5.5 percent). If the study area increased its walk commute mode share to the 75th percentile of its seven peer counties, there would be a 78 percent increase in the number of walking commuters (3.8 percent to 6.7 percent).

Table 3: Existing and Forecasted Commute Walk Mode Share

Cities	Employed Population	Existing Walk Commute Trips per Day	Existing Walk Commute Mode Share	Forecasted Future Walk Commute Mode Share		
				Low[28]	Mid[29]	High[30]
East Central Indiana[31]	102,882	3,872	3.8%	4.4%	5.5%	6.7%
Lee County (AL)	66,091	1,590	2.4%			
Champaign County (IL)	99,633	8,155	8.2%			
St. Joseph County (IN)	119,789	4,118	3.4%			
Ingham County (MI)	127,756	6,978	5.5%			
Washtenaw County (MI)	169,545	10,656	6.3%			
Winona County (MN)	27,495	1,933	7.0%			
Portage County (WI)	35,069	1,590	5.4%			

MULTIPLIERS

Multipliers were developed through an analysis of the relationship between two or more model inputs, such as the number of vehicle-miles traveled and the cost of road maintenance. The model used for this study includes more than 50 multipliers in order to extrapolate annual trip rates, trip distance, vehicle trips replaced, emission rates, physical activity rates, and other externalities linked to increases in bicycling and walking trips and decreases in motor vehicle trips.

LIMITATIONS

The primary purpose of the analysis is to enable a more informed discussion on whether and how best to invest in a greenway network in East Central Indiana. Even with extensive primary and secondary research incorporated into the benefits analysis model, it is impossible to accurately predict the *exact* impacts of various factors. Accordingly, all estimated benefit values are rounded and should be considered order of magnitude estimates, rather than exact amounts. Additionally, many of the studies off which the multipliers are based focus on urban areas rather than suburban or rural areas like East Central Indiana. In some cases, this may result in the overestimation of benefits.

Health and Environmental Benefits

Constructing a well-designed, connected greenway network across East Central Indiana will encourage a shift from energy-intensive modes of transportation such as cars and trucks to active modes of transportation such as bicycling and walking. While many of the active living-related benefits of a greenway network– such as improved educational growth, connection to nature, and sense of place – can be difficult to quantify, a growing body of literature links parks and trails to increased physical activity, decreased healthcare costs, and improved air quality.[32] In addition, studies show that increased physical activity helps seniors stay mentally fit,[33] reduces the risk of coronary heart disease, decreases the amount of insulin needed by people with Type I diabetes,[34] and helps manage weight gain[35] – an important point given Indiana has the seventh highest adult obesity rate in the nation.[36]

HEALTH CALCULATIONS

The benefits analysis evaluated and quantified an estimated increase in bicycling and walking trips, an estimated increase in hours of physical activity, and annual savings resulting from reduced healthcare costs. The primary inputs into the health component of the benefits model were derived from ACS journey to work data (2010-2014),[37] National Household Travel Survey data (2009),[38] and historic Safe Routes to School data from schools across the United States[39] (See **Table 4**). Existing bicycle and walk commute data was multiplied by national trip purpose ratios to generate mode share data that includes all trip purposes. This balanced mode share data was indexed against the mode share data of East Central Indiana's seven peer counties, and multiplied by various health factors.

Table 4: Health Multipliers

	Bike	Walk
Commute Trip Mode Share[40]	See **Table 2**	See **Table 3**
College Trip Mode Share[41]	1.7%	6.8%
K-12 Mode Share[42]	1.0%	13.4%
Utilitarian/Social/Recreation Trip Multiplier[43]	1.6%	4.3%
Commute/Utilitarian Vehicle Trip Replacement[44]	89.6%	90.8%
College Vehicle Trip Replacement[45]	81.5%	86.0%
K-12 Vehicle Trip Replacement[46]	42.6%	48.6%
Commute Trip Distance (miles)[47]	3.5	0.7
College Trip Distance (miles)[48]	2.1	0.5
K-12 Trip Distance (miles)[49]	0.8	0.4
Utilitarian Trip Distance (miles)[50]	1.9	0.7
Social/Recreational Trip Distance (miles)[51]	2.2	0.8
Physical Inactivity Rate[52]	27.4%	
Healthcare Cost Savings per Newly Active Person[53]	$1,437	

The completed Mounds Greenway will dramatically shape the ability of residents in East Central Indiana to get out and live more active, healthier lifestyles. The proposed greenway alignment will help to generate between 759,000 and 2,748,000 more bicycling and walking trips, spur 80,000 to 287,000 new hours of physical activity, and encourage 600 to 2,200 more people to meet the Centers for Disease Control and Prevention's recommended hours of physical activity. This boost to wellness will help save between $112,000 and $390,000 in regional healthcare expenses per year. **Table 5** summarizes the annual health benefits for the study area.

Table 5: Annual Health Benefits

	Baseline	Low Estimate		Mid Estimate		High Estimate	
	Total	Total	Difference	Total	Difference	Total	Difference
Annual Bicycle Trips	267,000	812,000	545,000	1,799,000	1,532,000	2,056,000	1,789,000
Annual Walk Trips	604,000	818,000	214,000	1,167,000	563,000	1,564,000	960,000
Annual Miles Bicycled	555,000	1,167,000	612,000	2,276,000	1,721,000	2,565,000	2,010,000
Annual Miles Walked	394,000	451,000	57,000	545,000	151,000	651,000	257,000
Annual Vehicle Miles Traveled Reduced	427,000	974,000	547,000	1,953,000	1,526,000	2,304,000	1,877,000
Annual Hours of Physical Activity	187,000	267,000	80,000	410,000	223,000	474,000	287,000
People Getting Enough Exercise[54]	1,400	2,000	600	3,100	1,700	3,600	2,200
Exercise Need Met through Biking/Walking	7.5%	9.2%	1.6%	12.0%	4.4%	14.1%	6.6%
Annual Healthcare Cost Savings from Bicycling and Walking	$102,000	$214,000	$112,000	$411,000	$309,000	$492,000	$390,000

ENVIRONMENTAL CALCULATIONS

Using the estimate of vehicle miles traveled (VMT) reductions calculated in the health benefits component of the analysis, changes in hydrocarbon, particulate matter, nitrous oxides, carbon monoxide, and carbon dioxide were analyzed (see **Table 6**). The replacement of motor vehicle trips with active transportation trips may result in 1,829,000 to 6,081,000 fewer pounds of CO_2 emissions per year and between 17,000 and 61,000 fewer pounds of other vehicle emissions. Additionally, the preservation of pervious green space along the White River will help reduce the cost of stormwater treatment and mitigation by roughly $299,000 per year compared to if the land were developed and $8,050,000 in annual avoided flood damage (see **Table 7**). These additional environmental benefits will help East Central Indiana save between $318,000 and $362,000 per year (see **Table 8**). Other potential ecological services associated with the greenway such as water regulation, carbon sequestration, carbon storage, and waste treatment exist, but the quantifiable value of these services are negligible on the overall impact of the project. It should also be noted the use of trails can potentially have negative ecological impacts such as trampling, soil compaction, erosion, noise and motion disturbance, pollution, nutrient loading, and the introduction of non-native invasive plant species.[55] These costs and any opportunity costs that exist with conserving land should be weighed against the environmental benefits summarized below and any additional cultural and conservation benefits resulting from the construction of the Mounds Greenway.

Table 6: Emissions Multipliers

	Hydrocarbons	Particulate Matter	Nitrous Oxides	Carbon Monoxide	Carbon Dioxide
Reduced Emissions[56]	0.00300 lb/VMT	0.00002 lb/VMT	0.00209 lb/VMT	0.02734 lb/VMT	0.81351 lb/VMT
Reduced Emission Costs[57]	$1,700/ton	$168,000/ton	$4,000/ton	N/A	$36/ton

Table 7: Stormwater Multiplier

	Mounds Greenway
Acres[58]	2,300
Annual Stormwater Cost Savings per Acre[59]	$130
Annual Avoided Flood Damage per Acre[60]	$3,500

Table 8: Annual Environmental Benefits

	Baseline	Low Estimate		Mid Estimate		High Estimate	
	Total	Total	Difference	Total	Difference	Total	Difference
CO_2 Emissions Diverted (lbs)	1,041,000	2,870,000	1,829,000	6,176,000	5,135,000	7,122,000	6,081,000
Other Vehicle Emissions Diverted (lbs)[61]	14,000	31,000	17,000	63,000	49,000	75,000	61,000
CO_2 and Other Vehicle Emissions Diverted	$14,000	$33,000	$19,000	$65,000	$51,000	$77,000	$63,000
Stormwater and Flood Savings	N/A	$8,349,000	$8,349,000	$8,349,000	$8,349,000	$8,349,000	$8,349,000
Total Environmental Cost Savings	**$14,000**	**$8,382,000**	**$8,368,000**	**$8,414,000**	**$8,400,000**	**$8,426,000**	**$8,412,000**

Economic Benefits

While it is difficult to accurately forecast the change in tourism spending resulting from the construction of the Mounds Greenway, an analysis of similar trails shows that the region can anticipate roughly $3,000,000 in direct tourism spending per year. Similar large-scale bicycle and pedestrian projects such as the Big Four Bridge in Jeffersonville, IN, have shown a penchant for rallying community pride and spurring new businesses. The Indiana Economic Digest reports that new businesses popped up around the Big Four Bridge after it opened in May 2014, and the owners of nearby businesses believe that the walking and bicycling amenity is helping drive customer traffic.[62] Like the views of the Ohio River that attracts visitors to the Big Four Bridge, the proposed alignment for the Mounds Greenway would offer access to the White River, Rangeline Nature Preserve, and numerous other local parks and schools. One of the biggest attractions along the proposed route is Mounds State Park, which Indiana's Department of Natural Resources reports attracts over 400,000 visitors per year.[63] With existing recreation-oriented businesses in the area such as Canoe Country, a livery located in Daleville that estimates it attracted 20,000 visitors to the area in 2015, the region is prepared to capitalize on any increase in visitors looking for outdoor recreation.[64]

The same amenities that will draw tourists to the area, also appeal to residents looking to buy homes or open businesses. Property value studies of similar trail systems show that nearby property owners can expect a minimum one-time increase of 3.5 percent in the value of their properties after the Mounds Greenway is completed, resulting in an estimated collective property value increase of $32,791,000 for homes and businesses directly adjacent to the proposed trail.

TOURISM CALCULATIONS

The primary inputs into the tourism component of the benefits analysis model are domestic tourism data from local economic studies and visitor data from comparable trails in the United States (see **Table 9**). Based on data from similar trail projects, an **estimate of 3,700 non-resident visits to the Mounds Greenway per mile per year** was assumed. With a proposed greenway alignment of over 17 miles that will connect to an additional 131 miles of trails, the Mounds Greenway could experience an estimated 62,000 non-resident visits per year. Assuming visitors spend $45 per day and the maintain an average visitor trip length of 1.1 days, East Central Indiana could experience an **estimated $3,000,000 in increased tourism spending per year**. Based on the existing number of jobs supported by tourism-related spending in East Central Indiana, the Mounds Greenway is estimated to directly and indirectly support an additional 31 jobs in the leisure and hospitality industry (see **Table 10**).

Table 9: Estimated Number of Non-Resident Users

Trails	State	Length (Mile)	Estimated Non-Resident Users per Year	Estimated Non-Resident Users per Mile per Year
Swamp Rabbit Trail[65]	South Carolina	20	125,000	6,250
American Tobacco Trail[66]	North Carolina	23	150,000	6,500
Little Miami Scenic Trail[67]	Ohio	77	150,000	1,900
Catawba Regional Greenway[68]	North Carolina	150	62,000	400
The Great Allegheny Trail[69]	Maryland - Pennsylvania	141	500,000	3,500
Average		82	237,000[70]	3,700
Mounds Greenway	Indiana	17	62,000	3,700

Table 10: Annual Tourism Benefits

	Mounds Greenway
Estimated Number of Non-Resident Visits per Mile Per Year	3,700
Estimated Number of Non-Resident Visits per Year	62,000
Estimated Average Direct Spending per Visitor	$45 per day[71]
Average Length of Trip	1.1 days[72]
Estimated Increase in Direct Tourism-related Spending per Year	$3,000,000[73]
Estimated Increase in Tourism-related Earnings Impact per Year	$636,000[74]
Jobs to Spending Ratio (Direct/Indirect)	1:0.00001307[75] / 1:0.00000357[76]
Estimated Number of Non-Construction Jobs Supported by an Increase in Tourism Spending (Direct/Indirect)	23 / 8

PROPERTY VALUE CALCULATIONS

East Central Indiana faces an aging and declining population, which could significantly impact the workforce in coming years as well as require services to support those who choose to age in place. The region's population has been in decline from its peak of just over 390,000 people in 1980 to under 360,000 people today. Anderson, the county seat of Madison County, shrunk by 3,700 people since the turn of the century - the largest decline among East Central Indiana cities. The median age of residents in the region has increased at a faster rate than the state as a whole, with the number of senior citizens growing by 11 percent from 2000 to 2013 compared to 7 percent across Indiana. The growth in older residents is mirrored by a decline in school-age and young adult populations. The number of residents under 18 decreased by 9 percent between 2000 and 2013, and despite the large number of college-aged residents attending one of the region's universities, East Central Indiana has had difficulty in retaining young adults with only 23 percent of the population comprised of residents between the ages of 25 and 44 compared to 26 and 27 percent for the state and country, respectively.[77]

For the residents that remained in the region between 2000 and 2013, per capita income grew at a slower rate than the state as a whole (14 percent compared to 21 percent), and the percent of working families living below the poverty line amounted to 10 percent of the population compared to 7 percent across the state. Additionally, the region lags behind the state by roughly 10 percent in the number of new businesses as a percent of all businesses. ADVANCE, a collaborative effort of community leaders that aims to increase economic opportunities within East Central Indiana, writes that the confounding issues of aging population, inability to retain college graduates, and slow growth of the economy lead stakeholders in their regional development planning process to feel "disappointed by the 'headline' version of the region's recent past or current progress. They felt a more positive story could help enthuse difference-makers to get involved and drive meaningful initiatives forward."[78]

Construction of the Mounds Greenway would provide a regional amenity that could attract and retain young adults, while providing older residents with limited transportation options greater access to stores, community centers, and recreation opportunities. A 2013 study conducted by the U.S. Public Interest Research Group found that Millennials were leading the charge of reduced rates of driving with people between the ages of 16 and 34 driving 23 percent less than they did at the turn of the century.[79] The American Public Transportation Association surveyed 1,000 people in cities considered attractive to Millennials and found that young adults consider transportation choice (driving, transit, bike, or walk) an important factor when deciding where to live.[80] A 2014 study by the American Planning Association found that two-thirds of people believe that investing in transportation choice and walkability were important ways to strengthen the local economy and attract Millennials and Baby Boomers, including those living in suburbs.[81]

Transportation for America's report *Aging in Place, Stuck without Options* found that seniors show a strong preference for communities that support walking, with 51 percent of senior citizens agreeing that it was extremely or very important to be able to walk easily in their community. The report also found that while walking accounts for the second largest share of total trips by older adults (8.8 percent), the perception of poor sidewalks, the absence of resting places, and the presence of dangerous intersections all create barriers to walking. From 2000 to 2007, senior citizens accounted for 22 percent of pedestrian fatalities in the U.S. while representing only 13 percent of the total population.[82] Trails provide safe walking environments for senior citizens, children, and families, while presenting Millennials with additional transportation options to get to school, work, shopping, and other activities. Amenities like the Mounds Greenway may encourage young adults to stay in the region and may allow senior citizens to age in place.

The primary inputs into the property value component of the analysis are tax parcel data and estimated property value impacts from trail studies around the country. Using tax parcel data provided by Madison County (IN) and Delaware County (IN), the number of parcels within one-half mile of the proposed greenway were isolated (See **Figure 4**),[83] and the assessed property value of those parcels was totaled. The most conservative estimate of property value increase associated with locating near a trail system from the literature review was used in this analysis (3.5 percent) because most of the reviewed studies concentrated on urbanized areas which may overestimate changes in property value within suburban and rural areas.[84] Applying this value to properties within one-half mile of the proposed greenway, property values are estimated to increase by $32,791,000 (See **Table 11**).

Figure 4: Properties within 0.5 Miles of the Mounds Greenway

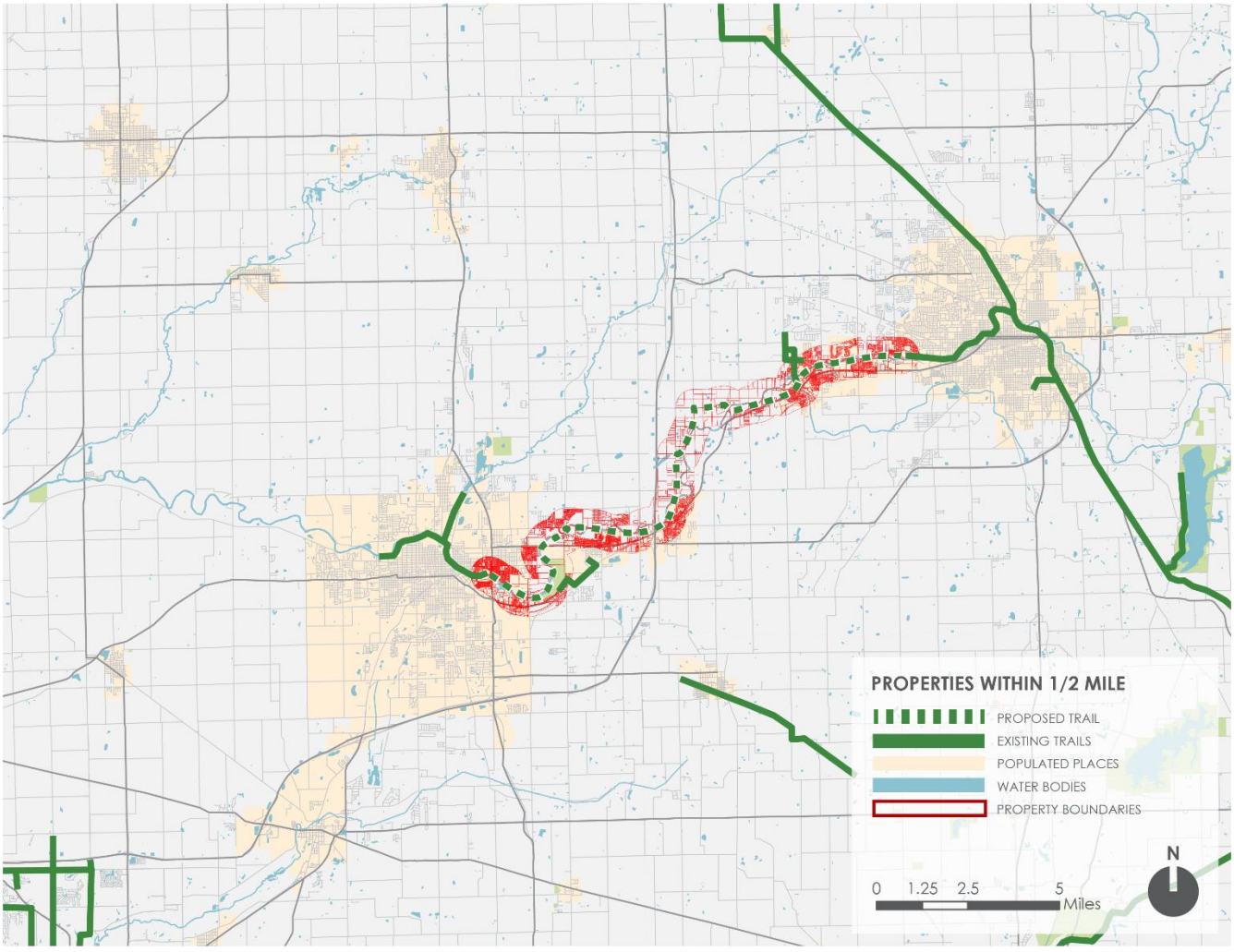


Table 11: Estimated Property Value Increase

	Main Alignment
Number of Parcels	8,232
Estimated Assessed Property Value	$936,896,000
Estimated Change in Property Value	+ 3.5%
Estimated Increase in Property Value	$32,791,000

CONSTRUCTION CALCULATIONS

The construction of a continuous 10 foot multi-use path along the proposed 17-mile alignment could cost between $3,000,000 and $8,000,000, depending on variations in design and property acquisition according to planning-level cost estimates from the Hoosier Environmental Council. This one-time influx in construction spending would circulate through the regional economy and could induce between $2,699,000 and $7,196,000 in indirect spending, leading to between 50 and 140 direct and indirect temporary jobs (See **Table 12**).

Table 12: Direct and Indirect Construction Spending

	Baseline	Low Estimate		Mid Estimate		High Estimate	
	Total	Total	Difference	Total	Difference	Total	Difference
Direct Construction Cost Estimate[85]	$0	$3,000,000	$3,000,000	$5,500,000	$5,500,000	$8,000,000	$8,000,000
Indirect Construction Spending[86]	$0	$2,699,000	$2,699,000	$4,947,000	$4,947,000	$7,196,000	$7,196,000
Direct Jobs from Construction Spending[87]	0	50	50	90	90	140	140
Total Construction Spending	$0	$5,699,000	$5,699,000	$10,447,000	$10,447,000	$15,196,000	$15,196,000

Transportation Benefits

The most readily-identifiable benefits of the Mounds Greenway or any large trail project derive from their use as a transportation corridor. While no money changes hands, real savings can be estimated from the reduced costs associated with congestion, vehicle crashes, road maintenance, and household vehicle operations.

TRANSPORTATION CALCULATIONS

Using the same annual VMT reduction estimates highlighted in the health and environmental components of the analysis, transportation-related cost savings were calculated by multiplying VMT reduced by established multipliers for traffic congestion, vehicle collisions, road maintenance, and vehicle operating costs. In total, an annual transportation cost savings between $706,000 and $2,423,000 is estimated (See **Table 13**).

Table 13: Annual Transportation Benefits

	Baseline	Low Estimate		Mid Estimate		High Estimate	
	Total	Total	Difference	Total	Difference	Total	Difference
Annual VMT Reduced	427,000	974,000	547,000	1,953,000	1,526,000	2,304,000	1,877,000
Reduced Traffic Congestion Costs[88]	$29,000	$68,000	$39,000	$137,000	$108,000	$161,000	$132,000
Reduced Vehicle Collision Costs[89]	$213,000	$487,000	$274,000	$977,000	$764,000	$1,153,000	$940,000
Reduced Road Maintenance Costs[90]	$64,000	$146,000	$82,000	$293,000	$229,000	$346,000	$282,000
Household Vehicle Cost Savings[91]	$244,000	$555,000	$311,000	$1,113,000	$869,000	$1,313,000	$1,069,000
Total Vehicle Cost Savings	$550,000	$1,256,000	$706,000	$2,520,000	$1,970,000	$2,973,000	$2,423,000

Total Benefits

Table 14 summarizes the health, environmental, tourism, and transportation benefits estimated to result from the construction of the Mounds Greenway. In total, the greenway is expected to produce between $12,186,000 million and $14,225,000 in additional benefits per year. The benefits are presented within a range to highlight the uncertainty inherent in high-level benefits analyses, and residents should expect these benefits to take a few years after construction to be fully realized. **Table 15** summarizes the indirect or non-reoccurring benefits associated with construction of the trail network. Construction of the trail network is expected to result in the creation of 91 to 181 permanent and temporary jobs and increase combined property values within 0.5 mile of the trail by $32.8 million.

Table 14: Total Annual Benefits

	Baseline	Low Estimate		Mid Estimate		High Estimate	
	Total	Total	Difference	Total	Difference	Total	Difference
Health	$102,000	$214,000	$112,000	$411,000	$309,000	$492,000	$390,000
Environmental	$14,000	$8,382,000	$8,368,000	$8,414,000	$8,400,000	$8,426,000	$8,412,000
Tourism[92]	$272,000,000	$275,000,000	$3,000,000	$275,000,000	$3,000,000	$275,000,000	$3,000,000
Transportation	$550,000	$1,256,000	$706,000	$2,520,000	$1,970,000	$2,973,000	$2,423,000
Total Benefits	$272,666,000	$284,852,000	$12,186,000	$286,345,000	$13,679,000	$286,891,000	$14,225,000

Table 15: Total Indirect or Non-Reoccuring Benefits

	Baseline	Low Estimate		Mid Estimate		High Estimate	
	Total	Total	Difference	Total	Difference	Total	Difference
Direct and Indirect Jobs	0	81	81	121	121	171	171
Direct and Indirect Constructing Spending	$0	$5,699,000	$5,699,000	$10,447,000	$10,447,000	$15,196,000	$15,196,000
Property Value	$0	$32,791,000	$32,791,000	$32,791,000	$32,791,000	$32,791,000	$32,791,000

Conclusion

The full build-out of the Mounds Greenway could have a dramatic impact on the quality of life of East Central Indiana residents and visitors. The state as a whole is ranked among the bottom half in the country in health issues such as adult and childhood obesity, diabetes, and hypertension, and since the turn of the century, the region has experienced steady population decline and limited economic growth. By quantifying the potential health, environmental, tourism, property value, and transportation impact of the greenway, a more informed discussion about how best to encourage healthy lifestyles, attract families to the region, and promote economic growth can take place. These benefits should be weighed against the estimated costs of the greenway and should be considered alongside the harder to quantify benefits such as mental health, sense of place, community cohesion, and access to nature. Next steps in the planning process include engaging local residents, developing multiple design alternatives, and evaluating the feasibility of constructing the Mounds Greenway.

Appendix A

- *Table 16: Age and Gender (ACS, 2010-2014)*
- *Table 17: Self-identified Race of Individuals (ACS, 2010-2014)*
- *Table 18: Commute Mode Share of Employed Individuals, 16 years or older (ACS, 2010-2014)*
- *Table 19: Average Travel Time of Commute Trips - All Modes (ACS, 2010-2014)*
- *Table 20: Average Travel Time of Commute Trips - Bus or Trolley Bus (ACS, 2010-2014)*
- *Table 21: Average Travel Time of Commute Trips - Walked (ACS, 2010-2014)*
- *Table 22: Average Travel Time of Commute Trips - Taxicab, Motorcycle, Bicycle, or Other Means (ACS, 2010-2014)*
- *Table 23: Time Leaving Home to go to Work (ACS, 2010-2014)*
- *Table 24: Household Size (ACS, 2010-2014)*
- *Table 25: Educational Attainment for the Population 25 Years and Older (ACS, 2010-2014)*
- *Table 26: Income and Equity (ACS, 2010-2014)*

Table 16: Age and Gender (ACS, 2010-2014)

	Within 0.5 Mile of Greenway				Within 3 Miles of Greenway			
Age	**Male**		**Female**		**Male**		**Female**	
Under 5	487	3.4%	373	5.1%	2,525	3.3%	2,422	3.2%
5 to 9	464	3.2%	510	6.9%	2,168	2.8%	2,515	3.3%
10 to 14	491	3.4%	425	5.8%	2,614	3.4%	2,420	3.2%
15 to 19	519	3.6%	491	6.7%	2,695	3.5%	2,705	3.6%
20 to 24	279	1.9%	465	6.3%	1,635	2.1%	2,173	2.9%
25 to 29	533	3.7%	411	5.6%	2,638	3.5%	2,337	3.1%
30 to 34	624	4.3%	493	6.7%	2,411	3.2%	2,447	3.2%
35 to 39	432	3.0%	397	5.4%	2,154	2.8%	2,154	2.8%
40 to 44	342	2.4%	472	6.4%	1,991	2.6%	2,451	3.2%
45 to 49	453	3.1%	446	6.0%	2,390	3.1%	2,593	3.4%
50 to 54	444	3.1%	548	7.4%	2,491	3.3%	2,621	3.4%
55 to 59	530	3.7%	534	7.2%	2,502	3.3%	2,813	3.7%
60 to 64	434	3.0%	480	6.5%	2,499	3.3%	2,758	3.6%
65 to 69	394	2.7%	350	4.7%	1,792	2.4%	2,165	2.8%
70 to 74	308	2.1%	333	4.5%	1,664	2.2%	1,784	2.3%
75 to 79	167	1.2%	238	3.2%	956	1.3%	1,387	1.8%
80 to 84	123	0.9%	239	3.2%	594	0.8%	1,152	1.5%
Over 84	72	0.5%	170	2.3%	470	0.6%	1,099	1.4%
Subtotal	7,095	49.0%	7,376	100.0%	36,191	47.5%	39,996	52.5%
Total	14,471 (100.0%)				76,186 (100.0%)			

Table 17: Self-identified Race of Individuals (ACS, 2010-2014)

Race	Within 0.5 Mile of Greenway		Within 3 Miles of Greenway	
White, alone	11,102	76.7%	53,176	69.8%
Black or African American, alone	2,692	18.6%	19,829	26.0%
American Indian or Alaska Native, alone	38	0.3%	200	0.3%
Asian, alone	182	1.3%	787	1.0%
Hawaiian Native or other Pacific Islander, alone	0	0.0%	9	0.0%
Some other race	265	1.8%	1,053	1.4%
Two or more races	192	1.3%	1,133	1.5%
Total	14,471	100.0%	76,186	100.0%

Table 18: Commute Mode Share of Employed Individuals, 16 years or older (ACS, 2010-2014)

Mode Choice	Commuters within 0.5 Mile of Greenway		Commuters within 3 Miles of Greenway	
Drive Alone	4,733	81.4%	24,923	84.6%
Carpool	712	12.3%	2,847	9.7%
Transit	7	0.1%	170	0.6%
Taxi	0	0.0%	7	0.0%
Motorcycle	16	0.3%	127	0.4%
Bicycle	5	0.1%	57	0.2%
Walk	106	1.8%	438	1.5%
Other	26	0.4%	213	0.7%
Worked at Home	208	3.6%	686	2.3%
Employed Population	5,814	100.0%	29,468	100.0%

Table 19: Average Travel Time of Commute Trips - All Modes (ACS, 2010-2014)

Travel Time	Commuters within 0.5 Mile of Greenway		Commuters within 3 Miles of Greenway	
Less than 10 minutes	943	16.8%	4,986	17.3%
10 to 14 minutes	994	17.7%	5,742	19.9%
15 to 19 minutes	1,136	20.3%	5,681	19.7%
20 to 24 minutes	604	10.8%	4,005	13.9%
25 to 29 minutes	303	5.4%	1,771	6.2%
30 to 34 minutes	725	12.9%	2,968	10.3%
35 to 44 minutes	327	5.8%	1,038	3.6%
45 to 59 minutes	319	5.7%	1,221	4.2%
60 or more minutes	256	4.6%	1,370	4.8%
Total	5,606	100.0%	28,782	100.0%

Table 20: Average Travel Time of Commute Trips - Bus or Trolley Bus (ACS, 2010-2014)

Travel Time	Commuters within 0.5 Mile of Greenway		Commuters within 3 Miles of Greenway	
Less than 10 minutes	0	0.0%	0.0	0.0%
10 to 14 minutes	0	0.0%	0.0	0.0%
15 to 19 minutes	0	0.0%	34	23.4%
20 to 24 minutes	0	0.0%	3	1.7%
25 to 29 minutes	0	0.0%	10	6.7%
30 to 34 minutes	0	0.1%	53	36.4%
35 to 44 minutes	1	33.3%	4	2.8%
45 to 59 minutes	0	0.0%	3	2.0%
60 or more minutes	2	66.7%	40	27.0%
Total	3	100.0%	147	100.0%

Table 21: Average Travel Time of Commute Trips - Walked (ACS, 2010-2014)

Travel Time	Commuters within 0.5 Mile of Greenway		Commuters within 3 Miles of Greenway	
Less than 10 minutes	81	75.8%	288	65.7%
10 to 14 minutes	7	6.3%	36	8.2%
15 to 19 minutes	0	0.0%	38	8.6%
20 to 24 minutes	11	10.7%	52	11.8%
25 to 29 minutes	0	0.0%	0	0.0%
30 to 34 minutes	4	3.5%	15	3.5%
35 to 44 minutes	4	3.7%	8	1.8%
45 to 59 minutes	0	0.0%	0	0.0%
60 or more minutes	0	0.0%	1	0.3%
Total	106	100.0%	438	100.0%

Table 22: Average Travel Time of Commute Trips - Taxicab, Motorcycle, Bicycle, or Other Means (ACS, 2010-2014)

Travel Time	Commuters within 0.5 Mile of Greenway		Commuters within 3 Miles of Greenway	
Less than 10 minutes	14	30.9%	172	42.7%
10 to 14 minutes	27	57.9%	87	21.6%
15 to 19 minutes	5	10.5%	32	8.0%
20 to 24 minutes	0	0.0%	16	4.0%
25 to 29 minutes	0	0.2%	7	1.8%
30 to 34 minutes	0	0.2%	34	8.4%
35 to 44 minutes	0	0.0%	4	0.9%
45 to 59 minutes	0	0.0%	9	2.3%
60 or more minutes	0	0.3%	42	10.4%
Total	47	100.0%	404	100.0%

Table 23: Time Leaving Home to go to Work (ACS, 2010-2014)

Time Leaving Home to go to Work	Commuters within 0.5 Mile of Greenway		Commuters within 3 Miles of Greenway	
12:00 a.m. to 4:59 a.m.	278	5.0%	1,783	6.2%
5:00 a.m. to 5:29 a.m.	229	4.1%	1,468	5.1%
5:30 a.m. to 5:59 a.m.	387	6.9%	2,143	7.4%
6:00 a.m. to 6:29 a.m.	442	7.9%	2,331	8.1%
6:30 a.m. to 6:59 a.m.	584	10.4%	3,095	10.8%
7:00 a.m. to 7:29 a.m.	803	14.3%	3,552	12.3%
7:30 a.m. to 7:59 a.m.	996	17.8%	4,449	15.5%
8:00 a.m. to 8:29 a.m.	439	7.8%	2,109	7.3%
8:30 a.m. to 8:59 a.m.	166	3.0%	1,289	4.5%
9:00 a.m. to 9:59 a.m.	288	5.1%	1,458	5.1%
10:00 a.m. to 10:59 a.m.	177	3.2%	718	2.5%
11:00 a.m. to 11:59 a.m.	35	0.6%	280	1.0%
12:00 p.m. to 3:59 p.m.	439	7.8%	1,904	6.6%
4:00 p.m. to 11:59 p.m.	342	6.1%	2,203	7.7%
Total	5,606	100.0%	28,782	100.0%

Table 24: Household Size (ACS, 2010-2014)

Household Size	Within 0.5 Mile of Greenway		Within 3 Miles of Greenway	
1 person	1,769	31.3%	9,931	32.3%
2 people	1,872	33.1%	10,251	33.4%
3 people	967	17.1%	4,931	16.1%
4 people	564	10.0%	3,296	10.7%
5 people	335	5.9%	1,365	4.4%
6 people	68	1.2%	579	1.9%
7 or more people	83	1.5%	358	1.2%
Total	5,658	100.0%	30,711	100.0%

Table 25: Educational Attainment for the Population 25 Years and Older (ACS, 2010-2014)

Highest Grade Level	Within 0.5 Mile of Greenway		Within 3 Miles of Greenway	
No Formal Education	157	1.6%	779	1.5%
Nursery	0	0.0%	0	0.0%
Kindergarten	12	0.1%	4	0.0%
1st Grade	10	0.1%	25	0.0%
2nd Grade	8	0.1%	41	0.1%
3rd Grade	34	0.3%	94	0.2%
4th Grade	23	0.2%	83	0.2%
5th Grade	72	0.7%	296	0.6%
6th Grade	169	1.7%	638	1.2%
7th Grade	76	0.8%	641	1.2%
8th Grade	163	1.6%	1,066	2.0%
9th Grade	191	1.9%	1,135	2.2%
10th Grade	316	3.2%	1,931	3.7%
11th Grade	267	2.7%	1,594	3.0%
12th Grade	217	2.2%	1,161	2.2%
High School Diploma	2,508	25.2%	13,286	25.4%
GED or Equivalent	470	4.7%	2,800	5.4%
Some College	2,114	21.2%	12,046	23.0%
Associate's Degree	797	8.0%	3,791	7.2%
Bachelor's Degree	1,534	15.4%	6,634	12.7%
Master's Degree	508	5.1%	2,770	5.3%
Professional Degree	199	2.0%	842	1.6%
Doctorate	123	1.2%	654	1.3%
Total	9,967	100.0%	52,313	100.0%

Table 26: Income and Equity (ACS, 2010-2014)

Income/Equity Measure	Within 0.5 Mile of Greenway	Within 3 Miles of Greenway
Individuals below poverty level	998 (17.6%)	6,429 (20.9%)
Median Household Income	$42,056	$40,132
GINI Index[a]	0.44	0.44
Households Receiving Food Stamps/SNAP in the past 12 months	725 (12.8%)	5,607 (18.3%)
Unemployed	796 (6.9%)	4,408 (7.3%)
Not in Labor Force	4,849 (41.9%)	25,901 (42.7%)
Moved to Region from outside of Region[b]	90 (0.1%)	557 (0.8%)
Vacant Properties[c]	670 (11.8%)	5,083 (16.6%)
Households with No Vehicle Available	313 (5.5%)	2,251 (7.3%)
Median Gross Rent as a Percent of Household Incomed	28.4%	30.9%
Median Mortgages that are Equal to or Greater than 25 percent of Household Income[e]	989 (23.6%)	4,685 (43.7%)
Residents without US Citizenship	750 (5.2%)	2,156 (2.8%)

[a] Weighted average by population

[b] (number of households that lived in a different house outside of the study metropolitan or micropolitan statistical area one year ago + number of households that lived in a different house outside of the United States one year ago) / (number of households)

[c] Excluding properties that are designed for seasonal, recreational, or occasional use and properties designed for migrant workers

[d] Weighted average of renter occupied households within Delaware County and Madison County

[e] Excluding "Housing units with a mortgage: Not computed"

Notes and Sources

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[9] "Current Bicycle Friendly Communities 2015." The League of American Bicyclists. <http://www.bikeleague.org/sites/default/files/BFC_Master_Spring_2015.pdf>
[10] FHWA, UNC – Highway Safety Research Center, and FedEx (2015), <http://www.bikeleague.org/sites/default/files/BFC_Master_Spring_2015.pdf>
[11] Delaware County (IN) and Madison County (IN)
[12] Average population density of Delaware County, IN (300.1 people per square mile), and Madison County, IN (291.3 people per square mile). US Census, Quick Facts (2010), <http://www.census.gov/quickfacts/table>
[13] Weighted average of population that does not identify as white for Delaware County, IN (10.8%) and Madison County, IN (11.3%). US Census, Quick Facts (2010), <http://www.census.gov/quickfacts/table>
[14] The City of Auburn within Lee County, AL, received a bronze-level Bicycle Friendly Community Award for 2015
[15] The City of Urbana within Champaign County, IL received a gold-level Bicycle Friendly Community Award for 2015
[16] The City of Champaign within Champaign County, IL received a bronze-level Bicycle Friendly Community Award for 2015
[17] The City of South Bend within St. Joseph County, IN, received a bronze-level Bicycle Friendly Community Award for 2015
[18] The City of Lansing within Ingham County, MI, received a bronze-level Bicycle Friendly Community Award for 2015
[19] The City of Lansing within Ingham County, MI, received an honorable mention as a Walk Friendly Community in 2015
[20] The City of Ann Arbor within Washtenaw County, MI, received a silver-level Bicycle Friendly Community Award for 2015.
[21] The City of Ann Arbor within Washtenaw County, MI, received a gold-level Walk Friendly Community Award for 2015.
[22] The City of Winona within Winona County, MN, received a bronze-level Bicycle Friendly Community Award for 2015
[23] The City of Stevens Point within Portage County, WI, received a bronze-level Bicycle Friendly Community Award for 2015
[24] The low estimate for future bike commute mode share is the difference between East Central Indiana's existing bike commute mode share and the 25th percentile bike mode split of the seven selected peer counties
[25] The mid estimate for future bike commute mode share is the difference between East Central Indiana's existing bike commute mode share and the 50th percentile bike mode split of the seven selected peer counties
[26] The high estimate for future bike commute mode share is the difference between East Central Indiana's existing bike commute mode share and the 75th percentile bike mode share of the seven selected peer counties
[27] Delaware County (IN) and Madison County (IN)
[28] The low estimate for future walk commute mode share is the difference between East Central Indiana's existing walk commute mode share and the 50th percentile walk mode share of the seven selected peer counties
[29] The mid estimate for future walk commute mode share is the difference between East Central Indiana's existing walk commute mode share and the 50th percentile walk mode share of the seven selected peer counties
[30] The high estimate for future walk commute mode share is the difference between East Central Indiana's existing walk commute mode share and the 75th percentile walk mode share of the seven selected peer counties
[31] Delaware County (IN) and Madison County (IN)
[32] <http://atfiles.org/files/pdf/BenefitsPA2002.pdf; http://safety.fhwa.dot.gov/ped_bike/docs/case15.pdf>
[33] <http://www.americantrails.org/resources/benefits/VAcognitive.html>
[34] <http://atfiles.org/files/pdf/AHShealthben.pdf>
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[36] "The State of Obesity: Better Policies for a Healthier America" (2015). <http://stateofobesity.org/files/stateofobesity2015.pdf>
[37] "When to use 1-year, 3-year, or 5-year estimates." *US Census Bureau.* <http://www.census.gov/acs/www/guidance_for_data_users/estimates/>
[38] <http://nhts.ornl.gov/>
[39] <http://saferoutesinfo.org/sites/default/files/resources/NHTS_school_travel_report_2011_0.pdf>
[40] ACS (2010-2014), assumes 251 work days per year

[41] <http://nhts.ornl.gov/>, assumes 150 days of class per year
[42] <http://saferoutesinfo.org/sites/default/files/resources/NHTS_school_travel_report_2011_0.pdf>, assumes 180 days of class per year
[43] <http://nhts.ornl.gov/>, assumes 365 days per year
[44] ACS (2010-2014)
[45] <http://nhts.ornl.gov/>
[46] <http://saferoutesinfo.org/sites/default/files/resources/NHTS_school_travel_report_2011_0.pdf
[47] <http://nhts.ornl.gov/>
[48] <http://nhts.ornl.gov/>
[49] <http://saferoutesinfo.org/sites/default/files/resources/NHTS_school_travel_report_2011_0.pdf
[50] <http://nhts.ornl.gov/>
[51] <http://nhts.ornl.gov/>
[52] <http://www.cdc.gov/brfss/annual_data/annual_2010.htm>
[53] Carlson, et al. (2014). "Inadequate Physical Activity and Health Care Expenditures in the United States". <http://www.cdc.gov/nccdphp/dnpao/docs/carlson-physical-activity-and-healthcare-expenditures-final-508tagged.pdf>
[54] The Centers for Disease Control and Prevention recommend 150 minutes of moderate intensity aerobic activity (i.e., brisk walking) for adults every week. <http://www.cdc.gov/physicalactivity/basics/adults/>
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[56] Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks (EPA report 420-F-05-022).
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[59] ($804,187 in savings due to park runoff reduction / 6,200 acres) < http://cloud.tpl.org/pubs/ccpe-denver-park-value-report.pdf>
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[64] Canoe County visitor data provided by Robbie Mixell, president of Canoe Country. While not estimated in this report, a 2012 study by the Center for Agricultural and Rural Development found that tourism-related spending around river-based recreational activities, such as canoeing and kayaking, was, on average, in line with tourism-related spending around bicycle and pedestrian activities ($46). It is possible that increased access to the White River will provide additional opportunities for visitors to engage in river-based recreational activities, and thus increase the total amount of tourism-related spending resulting from the construction of the Mounds Greenway. <http://www.card.iastate.edu/environment/items/economic_impacts_of_river_trail_recreation.pdf>
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[69] http://www.atatrail.org/docs/GAPeconomicImpactStudy200809.pdf
[70] Weighted average, rounded to nearest thousandth.
[71] ($130 million in direct expenditures by tourists) / (2.64 million tourists) / (an average of 1.1 days per visit), Certec, Inc. "Economic Impact of the Muncie/Delaware County Tourism and Travel Industry – 2000 and 2008" (2009). <http://muncieactionplan.org/wp-content/uploads/2012/01/Economic-Impact-of-the-Muncie-Delaware-County-Tourism-and-Travel-Industry-2000-and-2008.pdf>
[72] (3 million participant days) / (2.64 million visitors), Certec, Inc. "Economic Impact of the Muncie/Delaware County Tourism and Travel Industry – 2000 and 2008" (2009). <http://muncieactionplan.org/wp-content/uploads/2012/01/Economic-Impact-of-the-Muncie-Delaware-County-Tourism-and-Travel-Industry-2000-and-2008.pdf>
[73] (visitors per year) x (average spending per day) x (average length per visit) = estimated increase in tourism spending per year , rounded
[74] (increase in tourism spending per year) * ($0.212 in wages generated per every $1.00 spent by visitors), Certec, Inc. "Economic Impact of the Muncie/Delaware County Tourism and Travel Industry – 2000 and 2008" (2009). <http://muncieactionplan.org/wp-content/uploads/2012/01/Economic-Impact-of-the-Muncie-Delaware-County-Tourism-and-Travel-Industry-2000-and-2008.pdf>

[75] (2,422 direct tourism jobs) * (increase in tourism spending per year) / ($186.9 million contributed to the economy via the tourism and travel industry), Certec, Inc. "Economic Impact of the Muncie/Delaware County Tourism and Travel Industry – 2000 and 2008" (2009). <http://muncieactionplan.org/wp-content/uploads/2012/01/Economic-Impact-of-the-Muncie-Delaware-County-Tourism-and-Travel-Industry-2000-and-2008.pdf>

[76] (615 indirect tourism jobs) * (increase in tourism spending per year) / ($186.9 million contributed to the economy via the tourism and travel industry), Certec, Inc. "Economic Impact of the Muncie/Delaware County Tourism and Travel Industry – 2000 and 2008" (2009). <http://muncieactionplan.org/wp-content/uploads/2012/01/Economic-Impact-of-the-Muncie-Delaware-County-Tourism-and-Travel-Industry-2000-and-2008.pdf>

[77] East Central Indiana Regional Development Plan (2015). ADVANCE. <http://advance-eci.org/wp-content/uploads/2015/09/ADV_RegionalDevelopmentPlan_ONLINE.pdf?189db0>

[78] Ibid.

[79] "A New Way to Go: The Transportation Apps and Vehicle-Sharing Tools that are Giving More Americans the Freedom to Drive Less" (2013). U.S. PIRG <http://uspirg.org/sites/pirg/files/reports/A%20New%20Way%20to%20Go%20vUS1.pdf?

[80] "Millennials & Mobility: Understanding the Millennial Mindset" (2013). American Public Transportation Association. < http://www.apta.com/resources/reportsandpublications/Documents/APTA-Millennials-and-Mobility.pdf>

[81] "Investing in Place" (2014). American Planning Association. <https://www.planning.org/policy/polls/investing/pdf/pollinvestingreport.pdf>

[82] "Aging in Place, Stuck without Options." Transportation for America. <http://t4america.org/docs/SeniorsMobilityCrisis.pdf>

[83] Analysis excludes properties labeled as "other industrial structure", "light manufacturing and assembly", "light, heat, or power company", "livestock other than dairy and poultry", and "commercial warehouse" because there was not sufficient evidence in the literature review to comment on the impact of trails on these land uses.

[84] Racca, D. and A. Dhanju. "Property Value/Desirability Effects of Bike Paths Adjacent to Residential Areas." (2006). Delaware Center for Transportation, The State of Delaware Department of Transportation. <https://www.railstotrails.org/resourcehandler.ashx?id=4482>; Webel, S. "Trail Effects on Neighborhoods: Home Value, Safety, Quality of Life." National Trails Training Partnership. http://www.americantrails.org/resources/adjacent/sumadjacent.html; "Economic Values of Greenways, Trails, and River Protection. "National Trails Training Partnership. <http://www.americantrails.org/resources/economics/NPSeconStudy.html>

[85] Construction cost estimates are planning level estimates for a continuous 10 foot asphalt or concrete multi-use path and are based on HEC estimates of $200,000 to $600,000 per mile of greenway plus an estimated $9,479,000 to $20,144,000 for land acquisition.

[86] Applying a final-demand multiplier of 0.8995 (BEA RIMS II multiplier) indicates that an increase in final demand of $1 million in direct construction spending would lead to $899,500 in indirect spending.

[87] Estimates for Bloomington, Indiana. Garrett-Peltier, Heidi. "Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts." 2011. Policitcal Economy Research Institute. <http://www.peri.umass.edu/fileadmin/pdf/published_study/PERI_ABikes_June2011.pdf>

[88] Crashes vs. Congestion: What's the Cost to Society? AAA, 2011. Figure 3, pg 13. http://www.camsys.com/pubs/2011_AAA_CrashvCongUpd.pdf

[89] Average Annual Miles per Driver by Age Group. Last modified: September 26, 2014. FHWA. https://www.fhwa.dot.gov/ohim/onh00/bar8.htm; Using Figure ES.3 "Cost of Crashes and Congestion per Vehicle Mile Traveled" ratios from 2008 report and adjusting to 2011 values. http://www.camsys.com/pubs/AAA.pdf

[90] Kitamura, R., Zhao, H., and Gubby, A. R. Development of a Pavement Maintenance Cost Allocation Model. Institute of Transportation Studies – University of California, Davis. http://pubs.its.ucdavis.edu/publication_detail.php?id=19

[91] AAA, 2014. Your Driving Costs: How much are you really paying to drive? http://publicaffairsresources.aaa.biz/wp-content/uploads/2014/05/Your-Driving-Costs-2014.pdf

[92] ($142 million in tourism spending per year in Madison County) + ($130 million in tourism spending per year in Delaware County), "Madison County Measures Tourism Impact" (2015). <http://www.insideindianabusiness.com/story/29823764/madison-county-measures-tourism-impact>, Certec, Inc. "Economic Impact of the Muncie/Delaware County Tourism and Travel Industry – 2000 and 2008" (2009). <http://muncieactionplan.org/wp-content/uploads/2012/01/Economic-Impact-of-the-Muncie-Delaware-County-Tourism-and-Travel-Industry-2000-and-2008.pdf>