MORPC Rapid Speed Transportation Initiative

Draft Existing Conditions Report

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MORPC
MID-OHIO REGIONAL PLANNING COMMISSION

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1.0 Introduction

This document provides a description of the environmental, cultural, and socio-economic resources along the Rapid Speed Transportation Initiative (RSTI) Passenger Rail project corridor between Lima, OH and Pittsburgh, PA.

An examination of the existing conditions within the corridor is required as part of the National Environmental Policy Act (NEPA) to help identify resources in the area that might be impacted by a project.

NEPA is required for all projects that utilize federal funding or require federal approvals (such as water permits). The sections that follow cover:

1. Socio-economic Conditions
2. Previous Rail Planning Studies
3. Transportation Facilities and Existing Service Levels
4. Environmental Resources

1.1. Rapid Speed Transportation Initiative (RSTI)

MORPC's overall Rapid Speed Transportation Initiative (RSTI) includes two projects: a hyperloop feasibility study, and an examination of conventional (steel wheel on steel rail) passenger rail service (this Project). MORPC's overall goal for RSTI is to enhance the transportation options and opportunities available to the residents of the central Ohio region, as well as all residents of the corridor.

The RSTI projects, summarized below, are both currently in the planning/feasibility phase, and have not yet moved into the environmental phase. This current phase will provide a foundation for initiating future environmental work, which will follow the federal NEPA process, where the costs, benefits, and environmental impacts of a reasonable set of project alternatives are assessed, and public input is utilized to select a preferred alternative.

Two separate planning/feasibility studies are being carried out for RSTI – one for passenger rail, and one for hyperloop – because of the very different characteristics of the two technologies.[1]

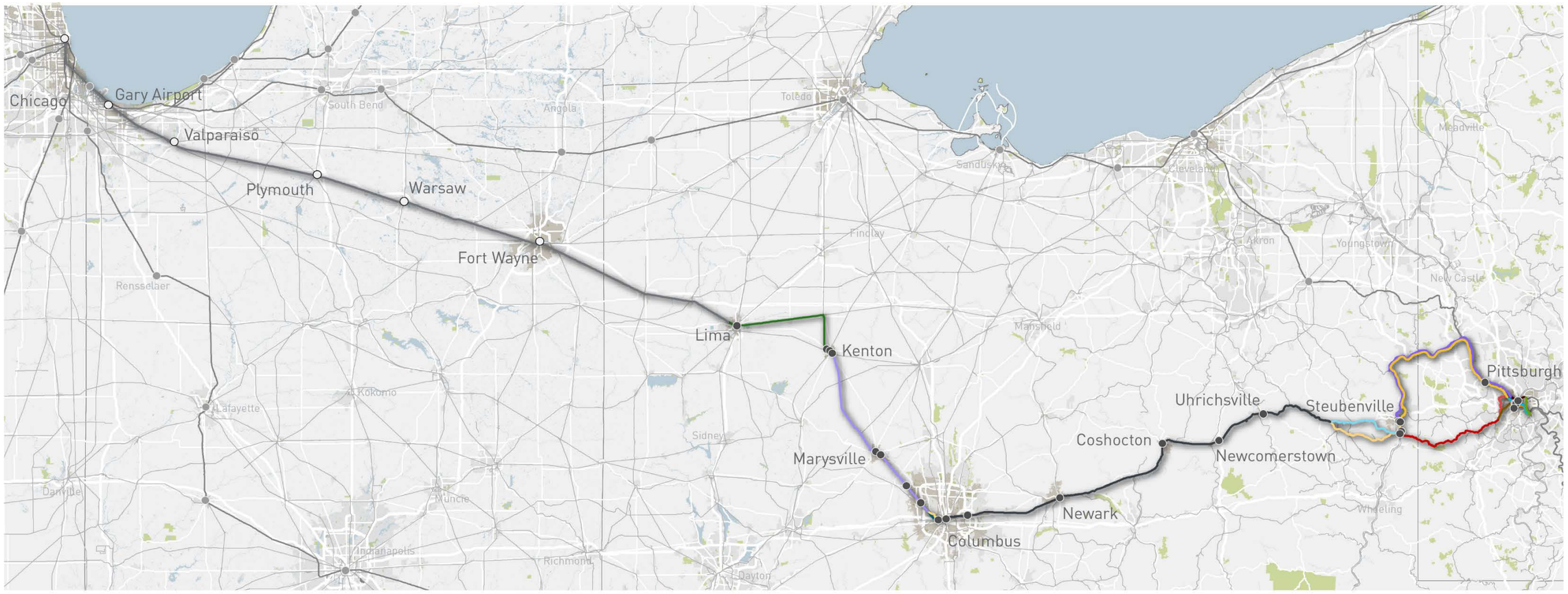
RSTI Passenger Rail Project

The RSTI Passenger Rail project is examining a passenger rail corridor between Lima and Pittsburgh with stops in Kenton, Marysville, and Columbus, Ohio, as well as other potential station locations along the corridor. This would be a continuation of planning studies currently underway that are examining a Chicago to Lima corridor as part of a larger Chicago to Pittsburgh corridor. Figure 1 identifies the RSTI project corridor, including potential route alignments and possible station locations for future analysis and consideration. RSTI is specifically examining the corridor between Lima, OH, and Pittsburgh, and will incorporate the findings of the two studies west of Lima, listed below:

[1] These differences are covered in Section 1.1.2 of the Goals and Objectives document.

- The Northern Indiana Passenger Rail Corridor Project, examining alternatives for using existing freight rail corridors for passenger service between Tolleston, IN (near Gary, IN) and Lima. This study is described in section 3.8.
- The “South of the Lake” study between Chicago and Tolleston, which will look at the best way to get into the busy Chicago region from Indiana. This study is described in section 3.4.

Figure 1: RSTI Passenger Rail Project Corridor

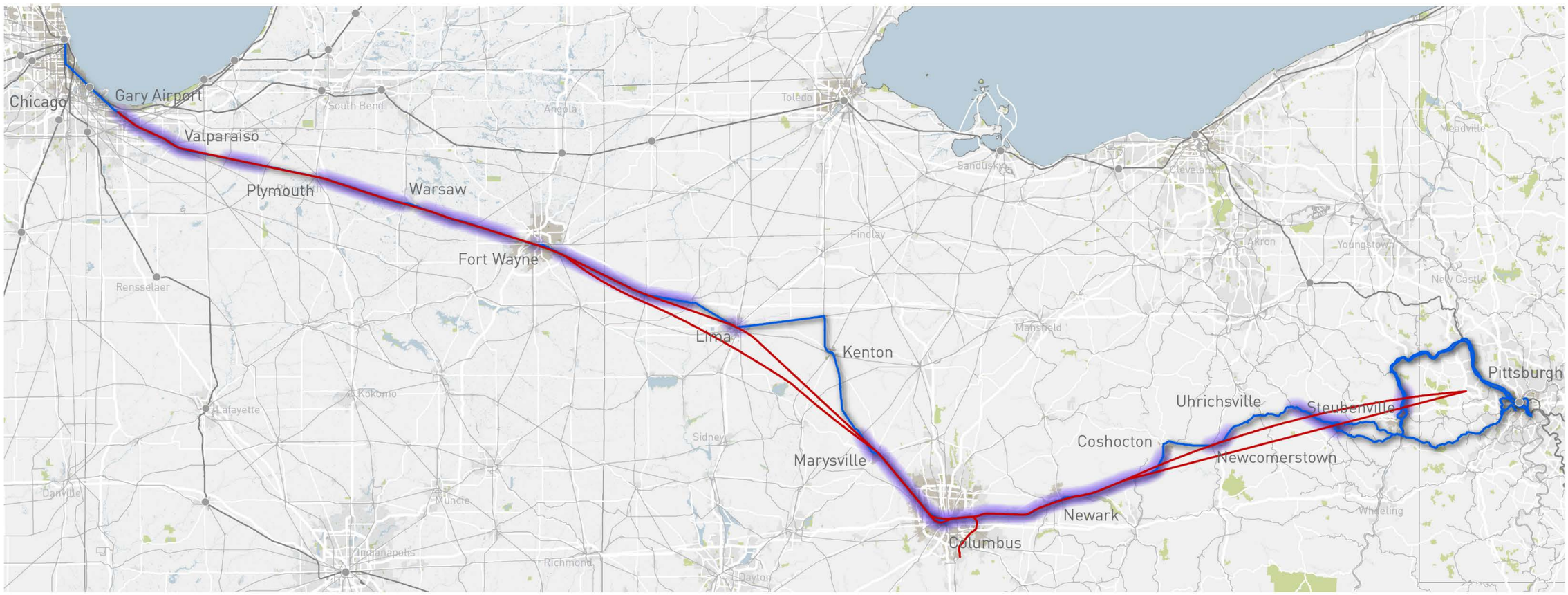


RSTI Hyperloop Project

The RSTI Hyperloop Feasibility Study is also looking at a corridor between Chicago and Pittsburgh, traveling through Fort Wayne IN and Columbus. Figure 2 shows this corridor, highlighting areas where the hyperloop and passenger rail corridors overlap.

Hyperloop is a new mode of transportation that moves freight and people quickly and safely. Passengers or cargo are loaded into a Hyperloop pod vehicle and accelerate gradually via electric propulsion through a low-pressure tube. The pod quickly lifts above the track using magnetic levitation and glides at airline speeds for long distances. Hyperloop systems will be built on columns or tunneled below ground. The technology is under development currently; eventual cruising speeds are potentially anticipated to exceed 500 mph. Because of the high speeds, the curvature requirements call for a very straight alignment – changes in vertical or horizontal alignment would necessitate a reduction in speed to ensure passenger comfort.

Figure 2: RSTI Hyperloop Corridor, Showing Areas of Overlap



Chicago - Pittsburgh Rail/Hyperloop Corridors

- Chicago - Pittsburgh Alternative Rail Corridor Segments
- Chicago - Pittsburgh Alternative Hyperloop Corridor Segments
- Chicago - Pittsburgh Rail/Hyperloop Shared Corridor Segments

Shared rail and hyperloop segments were created using a 50 meter tolerance. Locations are approximate.

Other Map Features

- Other rail lines
- Amtrak routes & stations
- Interstate highway
- US highway
- State road
- Parks
- Rivers, streams, and waterbodies
- Census designated urbanized areas (UZA)
- Census places (incorporated areas)

2.0 Socio-economic Conditions

2.1. Population

Continuing population growth is expected to increase travel demand in the corridor, worsening congestion on existing transportation facilities, and increasing the demand for non-auto travel options. As Table 1 shows, each of the three largest metropolitan areas along the corridor is expected to grow over the next two decades, adding a total of over 2.6 million residents. Smaller cities in the corridor are expected to be stable, grow slowly, or even shrink over the coming decades. Overall, population in the major corridor markets is expected to grow from 13.9 million in 2015 to 16.5 million in 2040.

The Chicago region, already the largest population center in the corridor, will add the largest number of new residents, with the Columbus (Central Ohio) region showing the highest percentage growth rates of the three major metropolitan areas in the corridor.

Table 1: 2015-2040 Population of Key Corridor Cities

Metro Region	Population		Growth 2015-2040	
	2015	2040	Persons	Percentage
Chicago Metro	8,524,670	10,249,300	1,724,630	20.2%
Fort Wayne/Allen County, IN	370,226	408,694	38,468	10.4%
Lima/Allen County, Ohio	106,240	102,892	-3,348	-3.2%
Central Ohio	2,301,465	2,856,072	554,607	24.1%
Pittsburgh Metro	2,572,995	2,911,667	338,672	13.2%
Total	**13,875,596**	**16,528,625**	**2,653,029**	**19.1%**

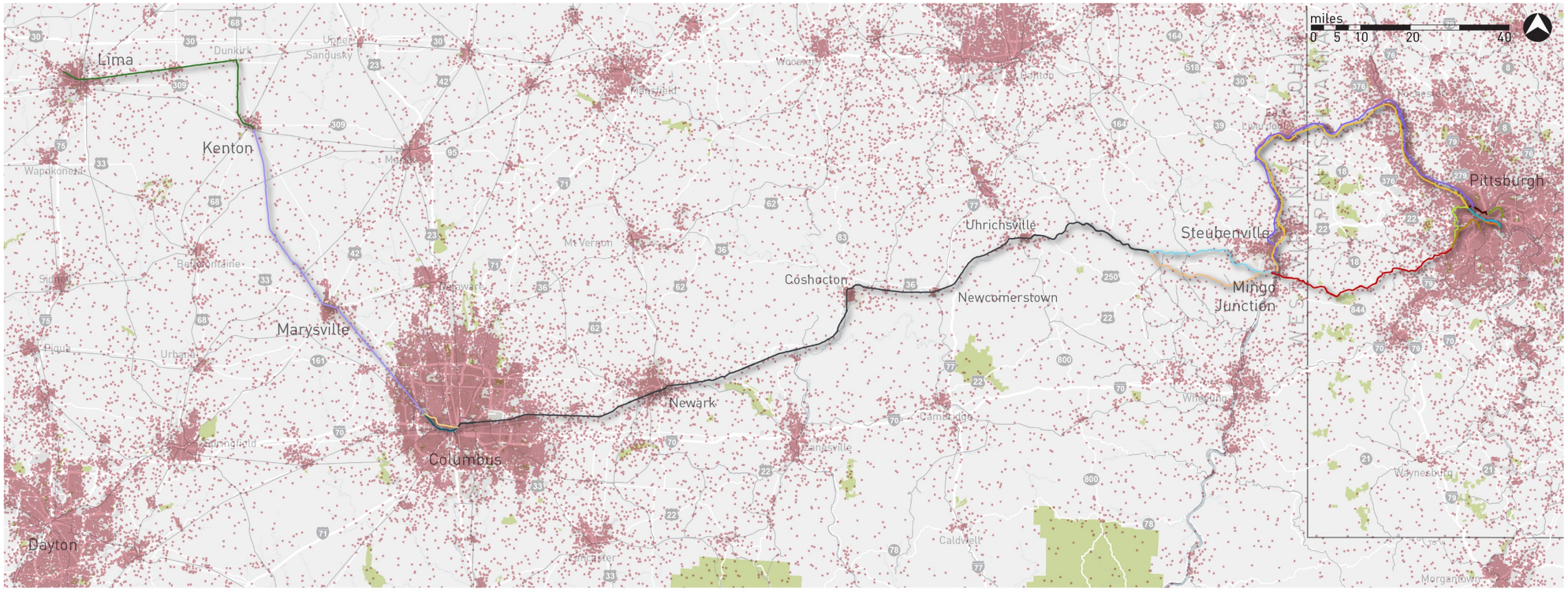
Source: Current (as of late 2018) population projections from the Chicago, Fort Wayne, Columbus, and Pittsburgh MPOs2, and the Lima-Allen County 2040 Long Range Transportation Plan Update. Central Ohio 2015 data is imputed from 2010 and 2018 estimates.

More specifically, the Lima to Columbus to Pittsburgh portion of the corridor, the focus of this report, features the two populous metropolitan areas of Columbus and Pittsburgh. Other notable population concentrations include Lima and Marysville west of Columbus and Newark and Steubenville east of Columbus. The highest density areas in 2015 are in and around Columbus and Pittsburgh, which are also the fastest-growing, and therefore also the highest density areas in 2040.

Figure 3 shows population densities along the corridor.

[2] The Metropolitan Planning Organizations (MPOs) used for these data sources are: Chicago Metropolitan Agency for Planning (CMAP), Mid-Ohio Regional Planning Commission (MORPC), Lima-Allen County Regional Planning Commission (LACRPC), Northeastern Indiana Regional Coordinating Council (NIRCC), and Southwestern Pennsylvania Commission (SPC).

Figure 3: RSTI Corridor Population, 2015



2.2. Employment

Along with population, employment growth is expected in the corridor, which will also increase travel demand in the corridor, adding to congestion on existing transportation facilities, and increasing the demand for non-auto travel options. As Table 2 shows, the economies of each of the three major metropolitan areas along the corridor are expected to grow over the next two decades, adding a total of one million jobs. The number of jobs in smaller cities are expected to be stable, grow slowly, or even shrink over the coming decades. Overall, employment in the corridor is expected to grow from 7.1 million in 2015 to 8.2 million in 2040.

Similar to the population trends described above, the Chicago region, currently the largest employment center in the corridor, will add the largest number of new jobs, with the Central Ohio region showing the highest percentage growth rates of the three major metropolitan areas in the corridor.

Table 2: 2015-2040 Employment in Key Corridor Cities

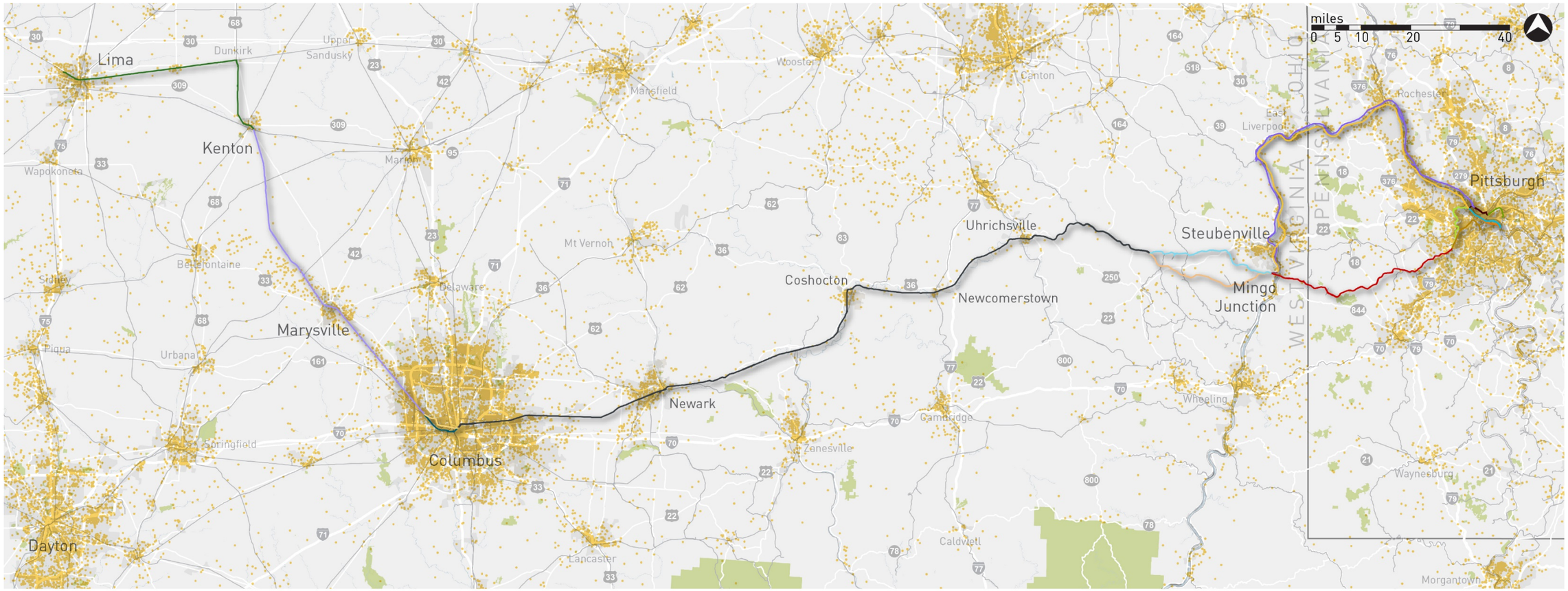
Metro Region	Employment		Growth 2015-2040	
	2015	2040	Jobs	Percentage
Chicago Metro	4,085,553	4,710,024	624,471	15.3%
Fort Wayne/Allen County, IN	194,564	236,670	42,106	21.6%
Lima/Allen County, Ohio	64,978	73,022	8,044	12.4%
Central Ohio	1,196,303	1,394,823	198,520	16.6%
Pittsburgh Metro	1,597,589	1,797,150	199,561	12.5%
Total	**7,138,987**	**8,211,689**	**1,072,702**	**15.0%**

Source: Current (as of late 2018) employment projections from the Chicago, Fort Wayne, Columbus, and Pittsburgh MPOs, and the Lima-Allen County 2040 Long Range Transportation Plan Update. Central Ohio 2018 data is used in place of unavailable 2015 data, and Lima data from 2016 is also used.

More specifically, the Lima to Columbus to Pittsburgh portion of the corridor, the focus of this report, features two significant employment areas of Columbus and Pittsburgh. Other notable employment concentrations include Lima and Marysville west of Columbus and Newark and Steubenville east of Columbus. The highest employment density areas in 2015 are in and around Columbus and Pittsburgh, which are also the fastest-growing, and therefore also the highest density areas in 2040.

Figure 4 shows employment densities along the corridor.

Figure 4: RSTI Corridor Employment, 2015



Employment Density

- 1 dot = 100 jobs

Alternative Rail Segments & Stations

- Lima to Dunkirk to Kenton
- Kenton to Marysville to Columbus
- Columbus - North
- Columbus - South
- Columbus to Mingo Junction
- Mingo Junction - North
- Mingo Junction - South
- Mingo Junction to Pittsburgh - North A
- Mingo Junction to Pittsburgh - North B
- Mingo Junction to Pittsburgh - South
- Pittsburgh - Downtown
- Pittsburgh - Downtown to Carnegie Mellon
- Pittsburgh - Ohio River West Lower
- Pittsburgh - Ohio River West Upper
- Kirwan Heights to Dawn
- Kirwan Heights to Ohio Connecting Bridge

Other Map Features

- Other rail lines
- Interstate highway
- US highway
- State road
- Parks
- Rivers, streams, and waterbodies
- Census designated urbanized areas (UZA)
- Census places (incorporated areas)

2.3. Socio-Economic Conditions

Current socio-economic conditions vary along the corridor, with the major markets of Chicago, Columbus, Fort Wayne, and Pittsburgh featuring the highest median household incomes. These are also the same station areas that are expected to see the largest population growth. Median household incomes of major station cities along the corridor are below the national average of $55,322 when considering households within the city proper.

The presence of lower median income communities on the corridor presents an opportunity for intercity rail to connect these markets to stronger economic areas such as Columbus and Pittsburgh. Additionally, several portions of the corridor are proximate to aging populations and minority populations that are currently underserved by alternative transportation modes. Detailed socio-economic conditions for the corridor can be seen in Appendix C.

Table 3: 2012-2016 Median Household Income

City	Median Income (2012-2016)
Chicago, IL	$50,434
Columbus, OH	$47,156
Pittsburgh, PA	$42,450
Lima, OH	$30,953
Fort Wayne, IN	$44,449
United States	$55,322

Source: US Census Bureau, 2012-2016 ACS

2.4. Travel Demand

Travel demand on the corridor is largely expected to derive from travel between the major metropolitan regions on the corridor. The Ohio Statewide Traffic Forecasting Model provides auto and airline trips for 2015 and 2040 between Chicago, Columbus, and Pittsburgh and is used as the primary source for travel demand.

The Chicago to Columbus origin-destination pair has the highest existing travel demand, followed by Columbus to Pittsburgh and Chicago to Pittsburgh. Automobile travel is the dominant mode between Columbus and Pittsburgh as no commercial air service is available between these markets. Air travel is the largest mode share between Chicago and Columbus and Chicago and Pittsburgh.

Table 4 and Table 5 show estimated 2015 and 2040 passenger flows between the major origin-destination pairs on the corridor.

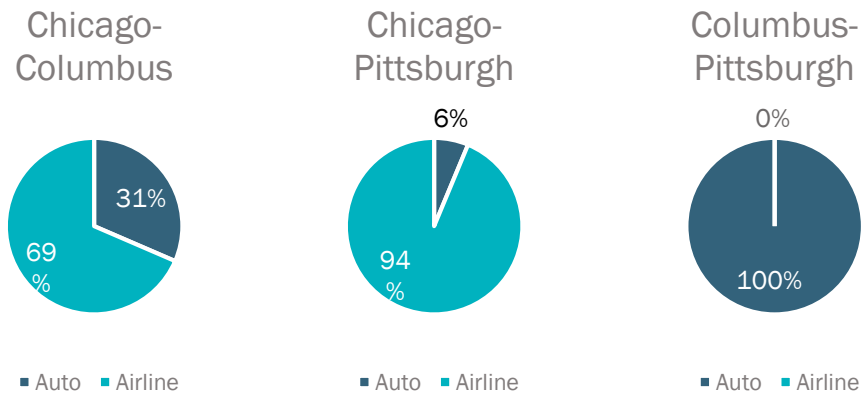
Additional information on existing transportation services and facilities on the corridor are discussed in Section 4.0 Existing Transportation Facilities.

Table 4: 2015 Passenger Flows By Mode for Sample Trips

Origin/Destination Pairing	Auto	Airline	Total
Chicago-Columbus	190,562	414,750	605,312
Chicago-Pittsburgh	26,597	396,600	423,197
Columbus- Pittsburgh	479,973	0	479,973
Total	697,132	811,350	1,508,482

Source: Auto: Ohio Statewide Traffic Forecasting Model; Airline: Airline Origin and Destination Survey

Figure 5. 2015 Mode Split for Major Cities on Project Corridor



Source: Auto: Ohio Statewide Traffic Forecasting Model; Airline: Airline Origin and Destination Survey

Estimated 2040 travel demand reflects similar passenger flows between the major metropolitan regions with growth on all origin-destination pairs. The Chicago-Columbus origin-destination pair is estimated to see the largest growth in travel demand, increasing nearly 26% to roughly 761,180 annual passenger trips. The Chicago-Pittsburgh origin-destination pair is estimated to grow by nearly 23% to approximately 519,263 annual trips and the Columbus-Pittsburgh origin-destination pair is estimated to grow by approximately 20% to 577,407 annual trips.

Origin-destination growth is estimated to be consistent across modes between 2015 and 2040.

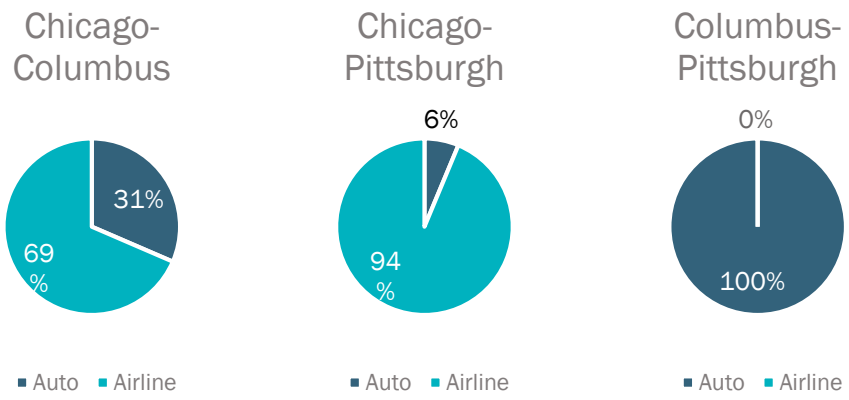
Table 5 and Figure 6 show the estimated 2040 passenger flows between major origin-destination pairs on the corridor. Figure 7 shows growth in passenger flows between major origin-destination pairs on the corridor.

Table 5: 2040 Passenger Flows By Mode for Sample Trips

Origin/Destination Pairing	Auto	Airline	Total
Chicago-Columbus	239,632	521,548	761,180
Chicago-Pittsburgh	32,635	486,628	519,263
Columbus- Pittsburgh	577,407	0	577,407
Total	849,674	1,008,176	1,857,850

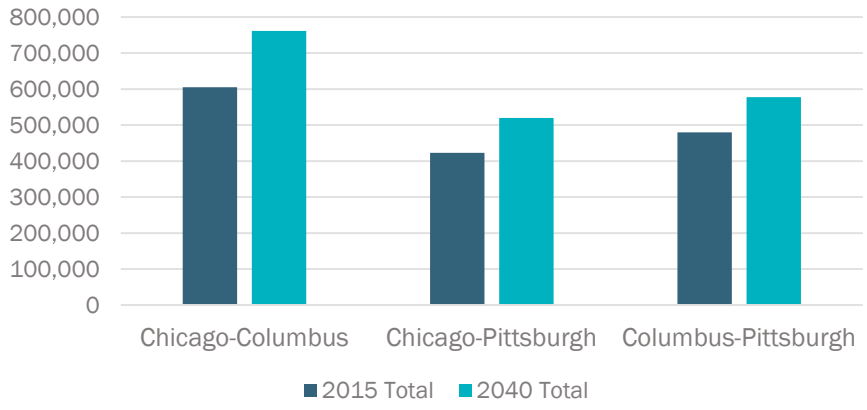
Source: Auto: Ohio Statewide Traffic Forecasting Model; Airline: applied an average growth rate on the 2015 flows based on the population growths specified in the latest MPO plans for the three cities.

Figure 6. 2040 Mode Split for Major Cities on Project Corridor



Source: Auto: Ohio Statewide Traffic Forecasting Model; Airline: applied an average growth rate on the 2015 flows based on the population growths specified in the latest MPO plans for the three cities.

Figure 7. 2015 and 2040 Passenger Flows for Sample Trips

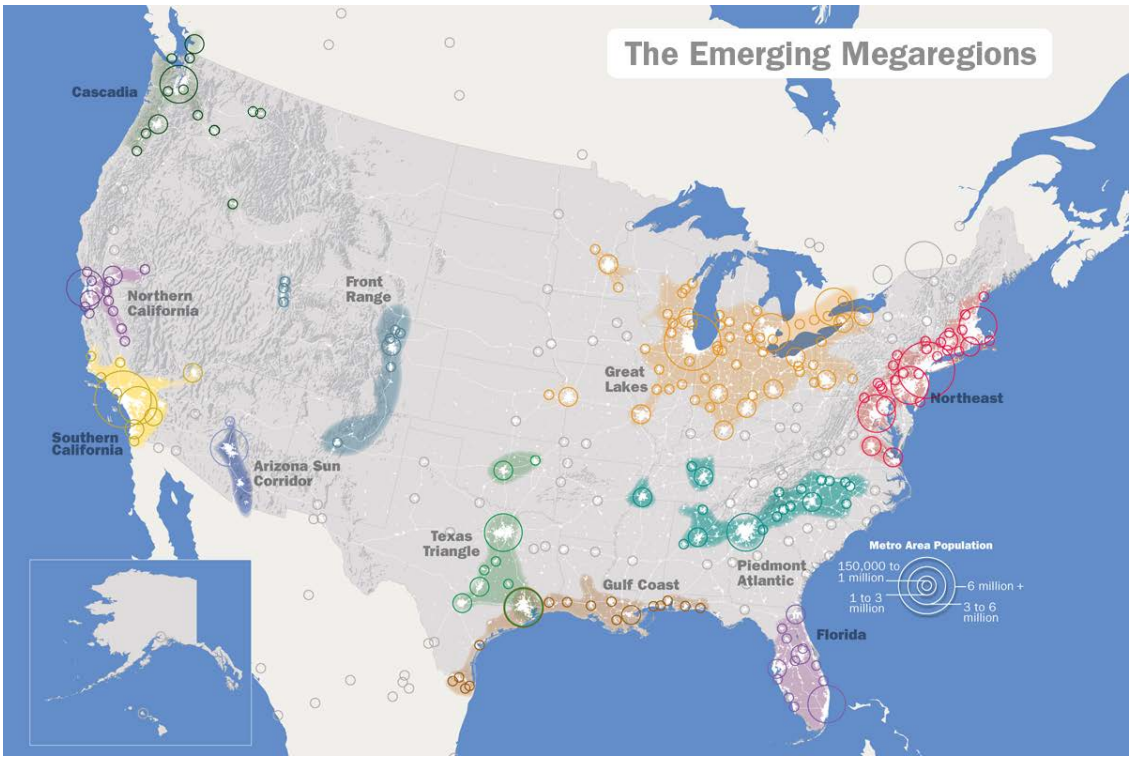


Source: Auto: Ohio Statewide Traffic Forecasting Model; Airline: applied an average growth rate on the 2015 flows based on the population growths specified in the latest MPO plans for the three cities.

2.5. Corridor Economy

As shown in Figure 8, the Chicago-Columbus-Pittsburgh corridor runs through the center of the eastern Great Lakes Mega Region, linking the largest employment center in the region (metro Chicago) to two growing employment centers (Columbus and Pittsburgh). The term "mega-region" or "megapolitan region" is used to describe economic regions composed of multiple metropolitan areas that are economically inter-dependent. As noted in the Goals & Objectives document, providing fast, reliable, accessible transportation between large and small cities in this region makes both business and personal travel more efficient, which in turn enhances economic competitiveness for businesses and quality of life for residents. Intercity transportation improvements thus leverage the competitiveness not only of metro areas within the corridor, but the megaregion as a whole in attracting business and talent.

Figure 8: Map of U.S. Megaregions



Source: Regional Plan Association

Easy movement of people and goods are essential to a vibrant economy. This has been true since ancient times when great cities arose around rivers and coastal ports, and more recently as canals, then railroads, and then interstates often had a strong effect in attracting or accelerating development around stations and highway exits. Fast and reliable movement of people remains critical today, particularly with so many globally-connected businesses.

Access between cities is also important for quality of life, making it easier for individuals to reach healthcare, education, and other opportunities throughout their region. A robust transportation system will become increasingly important to support growth in the major cities along the corridor (see Table 1 and Table 2). For smaller cities along the corridor inter-city mobility may be even more critical to ensure that their residents and businesses have multiple options (including reliable

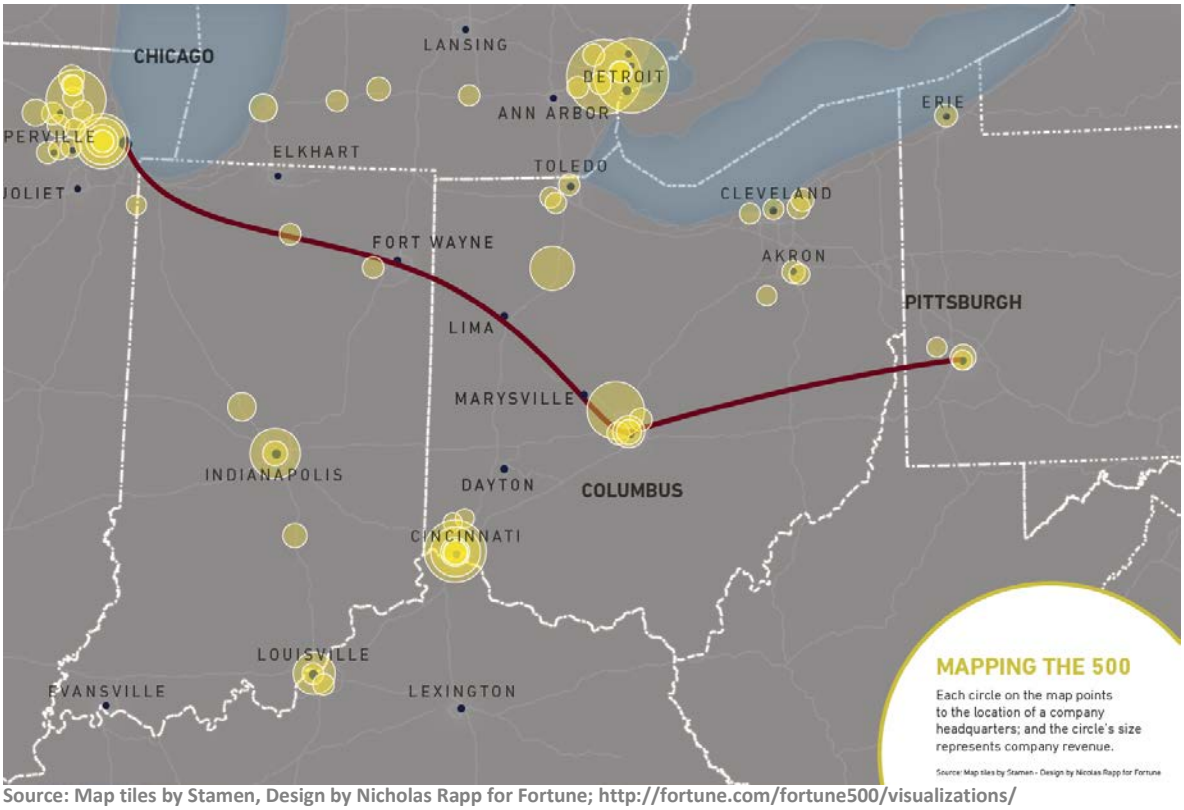
passenger rail service) to access the business and other opportunities in the growing metro areas of the corridor.

As represented in Appendix C, many portions of the corridor provide access to aging, minority, and low-income populations – populations that are often underserved and/or overlooked. Similarly, many of these areas do not have alternatives to automobile travel. The connectivity and access provided by intercity rail facilitates economic and socio-economic opportunities for corridor-adjacent communities.

Figure 9below demonstrates the importance of this region to the national economy by mapping the Fortune 500 companies located along the corridor. Appendix A lists these companies by city.

Appendix B lists the top 20 employers for the Chicago, Fort Wayne, Lima, Central Ohio, and Pittsburgh regions.

Figure 9: Major Company Headquarters in the RSTI Passenger Rail Corridor



Source: Map tiles by Stamen, Design by Nicholas Rapp for Fortune; http://fortune.com/fortune500/visualizations/

3.0 Previous Rail Planning Studies

As noted in the Goals and Objectives document, prior passenger rail planning studies provide the basis for the RSTI passenger rail project, particularly the planning work done to develop passenger rail along the Chicago-Fort Wayne-Lima corridor. State and regional rail planning efforts are also important. This section first discusses state rail plans, which are federally required. Following that is a description of two multi-state regional rail studies done for the Midwest. Following this are

descriptions of the planning studies done for individual corridor and station projects along the entire Chicago-Columbus-Pittsburgh corridor. Some of the studies are predecessor studies to the RSTI project, others show passenger rail routes that could connect to a future RSTI.

Two of the studies are particularly important to RSTI, as they are part of the RSTI Passenger Rail Study. As described below, results from these two studies will be used to determine the alignment, stations, and operating characteristics of the RSTI corridor west of Lima. These two studies are:

- The "South of the Lake" study (Section 3.4)
- The Northern Indiana Passenger Rail Corridor Project (Section 3.7)

3.1. State Rail Plans

Ohio State Rail Plan

The current Ohio State Rail Plan (SRP) was recently completed in 2018. Ohio has over 5,000 miles of active rail lines, ranking it fourth in the nation. The Ohio SRP notes that there are three long-distance (over 750 miles) Amtrak routes in the state. These routes do not receive state subsidies, as long distance Amtrak routes do not require state support. In addition to the RSTI Passenger Rail study, the SRP notes other studies underway to improve passenger rail services or stations:

- Toledo-Detroit Passenger Rail Feasibility Study (described below)
- Great Lakes Hyperloop Feasibility Study (examining a Chicago-to-Cleveland route)
- Station improvements to:
    - Cincinnati Union Terminal (work underway)
    - Cleveland (study)
    - Elyria Station (study to move Amtrak service from the existing station to a restored New York Central station)
    - Oxford (study to look at a new station stop on Amtrak's Cardinal route, which currently stops in Cincinnati, and runs through the city of Oxford, 40 miles to the north)
    - Sandusky (improvements to Sandusky station recently completed)
    - Toledo (station improvements underway)

West Virginia State Rail Plan

The most recent SRP publicly available for West Virginia is from 2013. Passenger rail initiatives are focused on improving existing rail service, which includes MARC commuter rail and existing Amtrak service along the Cardinal route. MARC links eastern West Virginia to Washington DC and Baltimore MD, and the SRP does not call for any extensions of the service.

The SRP discusses a problem with the Cardinal service, which still exists today, which is that it runs only three days a week, leading to some inefficiencies, as well as decreasing ridership. The Cardinal does not serve areas close to the RSTI Passenger Rail Corridor.

Pennsylvania State Rail Plan

The most recent Pennsylvania State Rail Plan was completed in 2015 and relates to the *PA On-Track Long Range Transportation Plan.* Passenger rail is heavily concentrated in the southeastern portion of the state with SEPTA commuter rail and Amtrak's Northeast Corridor running from Washington DC to Boston, serving the Philadelphia area. Amtrak also owns the Keystone Corridor running between Philadelphia and Harrisburg with 26 trains each weekday. Amtrak's *Pennsylvanian* also travels from New York, NY to Pittsburgh with one daily round trip, and Amtrak's *Lake Shore Limited*, and *Capitol Limited* provide once daily service to Erie and Pittsburgh. Fifteen tourist railroads operate in Pennsylvania.

PennDOT's long-term goals for passenger rail are to maintain and develop the state's rail network with stable and predictable funding and strong public support. PennDOT supports the maintenance of current levels, frequencies, capacities, and ridership on SEPTA's existing commuter rail service and on Amtrak's Pennsylvanian and Keystone routes. PennDOT is in frequent communication with Amtrak and SEPTA to identify potential frequency increases and/or expansions of service, with specific operating and capital investment objectives for passenger rail service set by the respective agencies. There are several unfunded passenger rail projects listed in the plan within western Pennsylvania including:

- Pittsburgh Rail Connection, Lawrenceville to Hazelwood
- Pittsburgh-Morgantown Commuter Rail
- Pittsburgh Grand Central Multimodal Transportation Hub
- Butler County to Pittsburgh North Shore Commuter Rail
- Keystone West High Speed Rail Study
- Rockwood, PA Amtrak Station Proposal

3.2. Multi-State Midwest Rail Planning Studies

Midwest Regional Rail Initiative (MWRRI)/Midwest Regional Rail System (MWRRS)

In 1996, nine Midwest states[3] including three from the RSTI corridor (Illinois, Indiana, and Ohio), in partnership with the Federal Railroad Administration (FRA), initiated the Midwest Regional Rail Initiative (MWRRI), a cooperative, multi-agency initiative to develop a 21st century passenger rail system in the Midwest centered on Chicago. In 2000, the MWRRI developed an initial series of service concepts into the Midwest Regional Rail System (MWRRS) in order to establish a coordinated regional network for expanding Midwest intercity passenger rail. Planning for the MWRRS addressed a wide range of issues including infrastructure and operational requirements, market demand, financing alternatives, institutional arrangements, and system-wide costs and benefits. Planning for the MWRRS also reconfirmed a central role for states in expanding and enhancing intercity passenger rail service that would be consistent with market demand and each state's financial capacity.

The MWRRI recommendations included:

- Operation of a hub and spoke passenger rail system centered on Chicago

[3] The nine states were Indiana, Illinois, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.

- Use of 3,000 miles of existing rail right-of-way to connect rural and urban areas
- Track and signal improvements and introduction of modern trains operating at speeds up to 110 mph to substantially reduce travel times
- Provision of multi-modal connections to improve system access
- Improvement in frequency, reliability, speed, and on-time performance

Figure 10: Proposed Midwest Regional Rail System



Source: Midwest Regional Rail Initiative, Midwest Regional Rail System, 2000.

In 2004, planning led by the MWRRI updated the estimates of MWRRS capital costs as well as ridership, revenue, and operating costs. The 2004 MWRRS update refined routes, travel times, and operating speeds in specific corridors so as to minimize capital costs while maximizing ridership and revenues. Ridership and revenue projections assumed construction of the entire MWRRS, but proposed a 10-year phasing schedule for individual corridor segments. While the 2000 MWRRS identified a need for long-term joint planning and coordination with the freight and commuter railroads, the 2004 update further assessed freight rail capacity and needs related to expanding passenger rail service in shared corridors.

In 2006, a 12-state passenger rail system was proposed by MWRRI, shown in Figure 10. In this system, Chicago serves as the hub around which the Midwest service is based. The Chicago-Fort Wayne corridor was proposed in MWRRI with service continuing to Toledo and Cleveland.

In 2009, FRA's High Speed Intercity Passenger Rail Program (HSIPR) provided an opportunity to implement a number of the state supported corridors that are identified in the MWRRS. Eight Midwestern states and the City of Chicago entered into a Memorandum of Understanding in July 2009 for the purpose of coordinating individual applications to the FRA for funding established by the American Recovery and Reinvestment Act of 2009 (ARRA) to develop the Chicago Hub/Midwest High-Speed Rail Corridor.

Some elements envisioned under the MWRRI have been completed, such as upgrades to the rail corridor between Chicago and St. Louis, and the upgrade of a line between Porter, IN and Kalamazoo, MI.

More recently, the FRA initiated a new planning effort to provide an update to the Midwest Regional Rail Initiative. This effort, the Midwest Regional Rail Plan (MWRRP) is described below.

Midwest Regional Rail Planning Study (MWRRP)

The FRA is leading the development of a 12-state study to determine the potential for a high-performance, multi-state intercity passenger rail network in the Midwest. The study builds on current rail planning efforts within the states of Illinois, Missouri, Iowa, Michigan, Wisconsin, Ohio, Nebraska, Kansas, South Dakota, North Dakota, Indiana, and Minnesota and examines opportunities for a fully integrated passenger rail network linking communities throughout the region. The MWRRP's goal is to provide a rigorous analytical, policy, and governance structure to establish a 40-year framework incorporating regional priorities, outlining investment needs, identifying additional studies, and developing an implementation strategy to advance projects in a network context.

The study is the third in the FRA's national rail planning effort and follows the studies in the Southwest and Southeast regions of the US. The analysis efforts for the study are based on the use of the CONceptual NEtwork Connections Tool (CONNECT), which provides order-of-magnitude ridership, revenue, and cost estimates. The CONNECT analysis resulted in a high-level prioritization of Midwest rail corridors.

The final draft Midwest network should be available in 2019 (www.midwestrailplan.org). Together, the network corridors are expected to attract an estimated 43 to 54 million annual linked trips at full build out in 2055. Assuming the full network vision is implemented, the study's estimated annual corridor ridership in the year 2055 for the Chicago-to-Columbus corridor is 1.9 million.

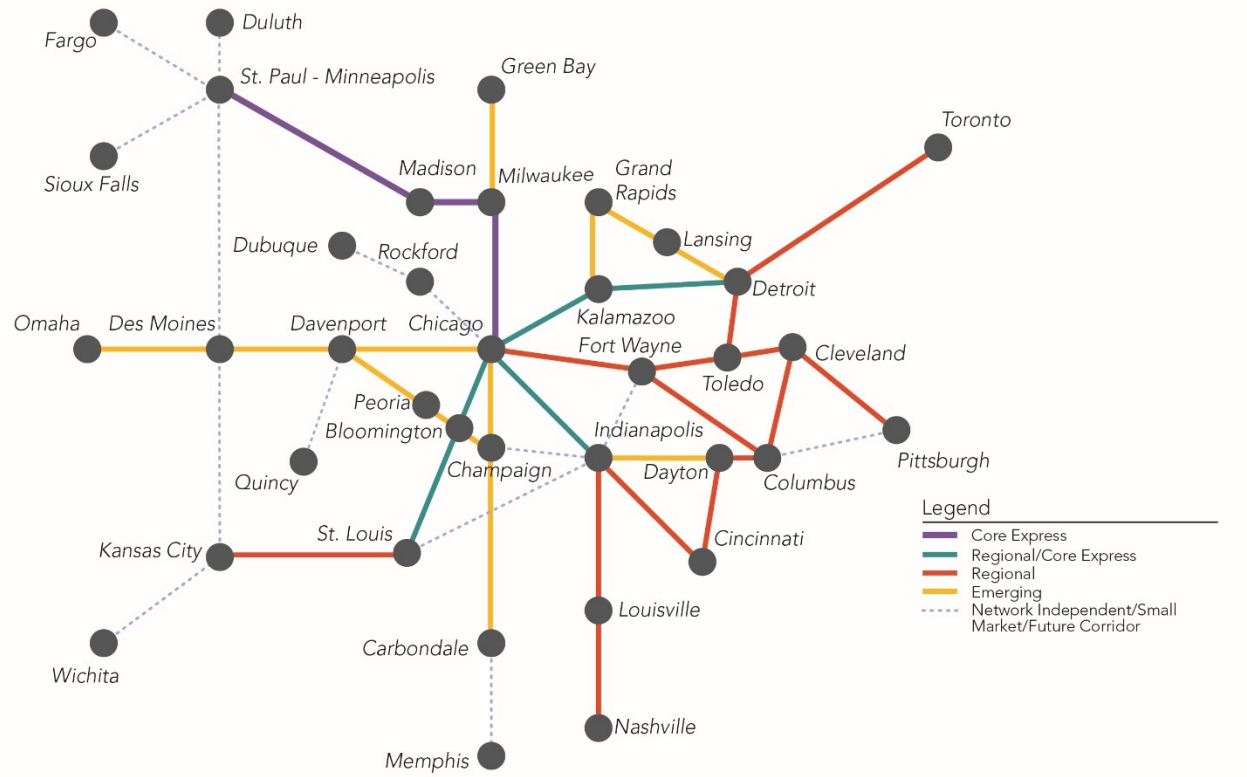
The tiers of service are as follows:

- Core Express: over 125 mph on dedicated tracks (i.e., tracks would not be shared with freight trains)
- Regional: 90-125 mph service on dedicated and shared tracks
- Emerging: up to 90 mph on shared tracks
- Independent/Small Market/Future: corridors of local and/or regional significance

An initial draft FRA Midwest Regional Rail Plan Network from 2018 is shown below in Figure 11. Service between Chicago and Columbus is represented as a Regional Service with speeds up to 125 mph and frequent service on dedicated and shared tracks. Service between Columbus and

Pittsburgh is shown as Network Independent, meaning it was not included as part of the CONNECT analysis. However, the corridor exhibited regional significance and was identified as a future corridor that could be advanced by other stakeholders independent of FRA's efforts, such as a state or MPO.

Figure 11: FRA Regional Rail Plan Network (DRAFT)



Source: Federal Railroad Administration, Draft Midwest Regional Rail Plan Study, 2018.

3.3. Chicago Terminal Area Service Development Plan

Working in cooperation with Chicago DOT and Metra, the Illinois Department of Transportation (IDOT) received an FRA grant to supplement ongoing passenger and freight rail studies. This plan will provide recommendations for the optimal configuration of passenger and freight rail infrastructure supporting Metra commuter rail services and intercity passenger service in the Chicago Terminal Area, including existing long-distance Amtrak service as well as planned Midwest passenger rail initiatives. The project's study area is represented in Figure 12.

The effort will result in a Service Development Plan (SDP), following FRA's prescribed structure. The SDP is focused on the goal of providing a more modally balanced transportation system in the Midwest with environmentally beneficial, reliable, and convenient travel options centered on a Chicago hub. The project will define the priorities for future investment in rail infrastructure in the Chicago area, demonstrating the operational feasibility, financial feasibility, and benefits of improved passenger rail service through the Chicago Terminal Area. The project will also examine tradeoffs associated with intercity passenger rail travel time and reliability, freight and transit enhancement opportunities and operational impacts, network redundancy, degree of public corridor ownership, economic development, and lifecycle cost.

The SDP is part of the Passenger Rail Corridor Investment Plan (PRCIP) for the Chicago-Detroit/Pontiac Corridor, focusing on the Chicago end of the corridor. This portion of the corridor terminating and originating in Chicago is complex with an interdependency on several other passenger and freight services, including the Chicago to St. Louis, Chicago to Quincy, and the Metra Services into LaSalle Street and Chicago Union Station (CUS). The SDP encompasses segments of Metra's 12 commuter rail lines and more than a dozen existing and proposed Amtrak services.

The SDP will result in a coordinated operating plan and infrastructure investment program for trains that operate between CUS and these corridors. The preferred option will maintain or enhance existing and planned Amtrak, Metra, and freight operations that utilize connecting corridors, including eliminating the need for time-consuming reverse operations for Amtrak's Illini/Saluki and City of New Orleans trains.

The project will follow FRA's newly developed approach to pre-NEPA planning, wherein a certain amount of service planning, environmental analysis, alternatives analysis, and public involvement are undertaken prior to beginning the formal NEPA process, with the goal of initiating NEPA with a solid preliminary purpose and need and a well-defined range of reasonable alternatives.

Figure 12: Chicago Terminal Planning Study Corridors



Analysis from the 2014 Chicago Terminal Planning Study Committee

3.4. Chicago-to-Detroit/Pontiac Passenger Rail Corridor Program/ "South of the Lake" Alternatives Analysis

Michigan DOT is leading a multi-state effort in cooperation with Illinois DOT and Indiana DOT to complete a Corridor Investment Plan (CIP) for the Chicago-Detroit/Pontiac corridor that includes completion of an Environmental Impact Statement (EIS) and Service Development Plan (SDP). Enhancements to improve speeds in the corridor up to 110 mph have been completed for the segment between Porter, IN and Kalamazoo, MI while current efforts are focused on improvements in the Kalamazoo to Dearborn, MI segment as well as addressing rail congestion between Porter, IN, and Chicago that is causing train delays within Michigan.

In September 2014, MDOT released a Draft Tier I EIS for the Chicago-Detroit/Pontiac Corridor. The goal of the project is to expand service in the corridor and reduce delays.

Today there are three daily round trips in the corridor. With the improvements proposed in the EIS, service will be expanded to six daily round trips in 2025. By 2035, there will be ten round trips between Chicago and Detroit and seven between Detroit and Pontiac.

The project involves upgrading track along much of the route to handle 110 mph service and introducing new, high-performance trains capable of traveling at 125 mph. There will also be work to unclog congestion resulting from freight train conflicts, as well as station improvements throughout the corridor. In addition to improving reliability, these improvements will shave nearly two hours off the journey (on express trains), from 5h 38m today to 3h 46m in 2035.

MDOT has settled on a route between Porter, IN and Detroit/Pontiac. Now they are determining which route to choose between Chicago and Porter, the stretch of highly congested tracks known as the South-of-the-Lake Route.

The route represented by the light green line (below), has been recommended by the Midwest High Speed Rail Association (MHSRA) because it will bypass drawbridges that frequently delay service and would prevent service expansion in the future.

The RSTI and NIPRA passenger rail projects are relying on the findings of the South of the Lake study and other future efforts to identify the best alignment between Tolleston, IN (near Gary IN) and Chicago's Union Station.

Figure 13: Selected Reasonable Route Alternatives for the Chicago-to-Detroit/Pontiac and "South of the Lake" Study



Source: Chicago-Detroit/Pontiac Passenger Rail Corridor Program Tier I DRAFT Environmental Statement, September 2014

3.5. Other Chicago Passenger Rail Planning and Improvement Projects

Many passenger and freight rail lines are centered on Chicago, which provides important connections throughout the Midwest and beyond. A number of studies, including those listed below,

are underway to improve existing passenger service and implement new service heading west and south of Chicago. While these studies won't directly impact the RSTI passenger rail project, the expansion and improvement of service beyond Chicago – if implemented – will enhance the connectivity of a future Chicago-to-Pittsburgh service, increasing ridership by providing new destinations in the regional rail network.

- The Chicago to St. Louis corridor improvement program – a $1.6 billion investment in upgrading track, signal systems, stations, and equipment with the goal of increasing passenger rail speeds up to 110 mph, improving passenger and freight rail performance, and improving safety in this 284-mile corridor.
- Chicago to Dubuque – a plan to restore intercity passenger rail service from Chicago to Rockford using Metra (commuter rail) and Union Pacific tracks, with future plans to extend service to Dubuque, Iowa.
- Chicago to Quad Cities and Iowa City – a plan to re-introduce passenger rail service between Chicago and Iowa, with a goal of achieving 60 to 79 mph service.

3.6. Chicago Region Environmental and Transportation Efficiency Program (CREATE)

With numerous routes from across North America converging in Chicago, rail congestion in the area has historically been a problem. By bringing public and private interests together to agree on priorities, CREATE has been successful in attracting federal, state, local, and private funding to implement projects that provide benefits for passenger rail, commuter rail, and freight rail. The benefits of reducing congestion in the Chicago region have ripple effects throughout the nation, as much of the freight rail traveling across the continent moves through Chicago. Amtrak also has nine multi-state routes that converge in Chicago.

CREATE was developed by a public-private partnership between the Illinois Department of Transportation, City of Chicago, Metra and the freight railroads. The program is composed of a total of 71 separate projects, totaling over $3 billion, of which 46 are eliminating rail junctions (locations where railroads cross over each other), and the remainder are eliminating highway-rail grade crossings. As of 2018, nearly half of these projects have been completed or are under construction, with more underway (in design or undergoing the environmental review process).[4]

As an example, in 2014 CREATE sponsored the $126 million Englewood Flyover Project in Chicago which grade-separated two of the most heavily traversed passenger and freight corridors in the Midwest. CREATE improvements in the 75th Street corridor are currently underway; these will increase capacity and benefit passenger rail.

3.7. Northern Indiana/Ohio Passenger Rail Corridor Feasibility Study and Business Plan

The Northern Indiana Passenger Rail Association (NIPRA) built on the MWRRI's plan to return passenger rail service to Fort Wayne by testing the feasibility of providing service to Columbus

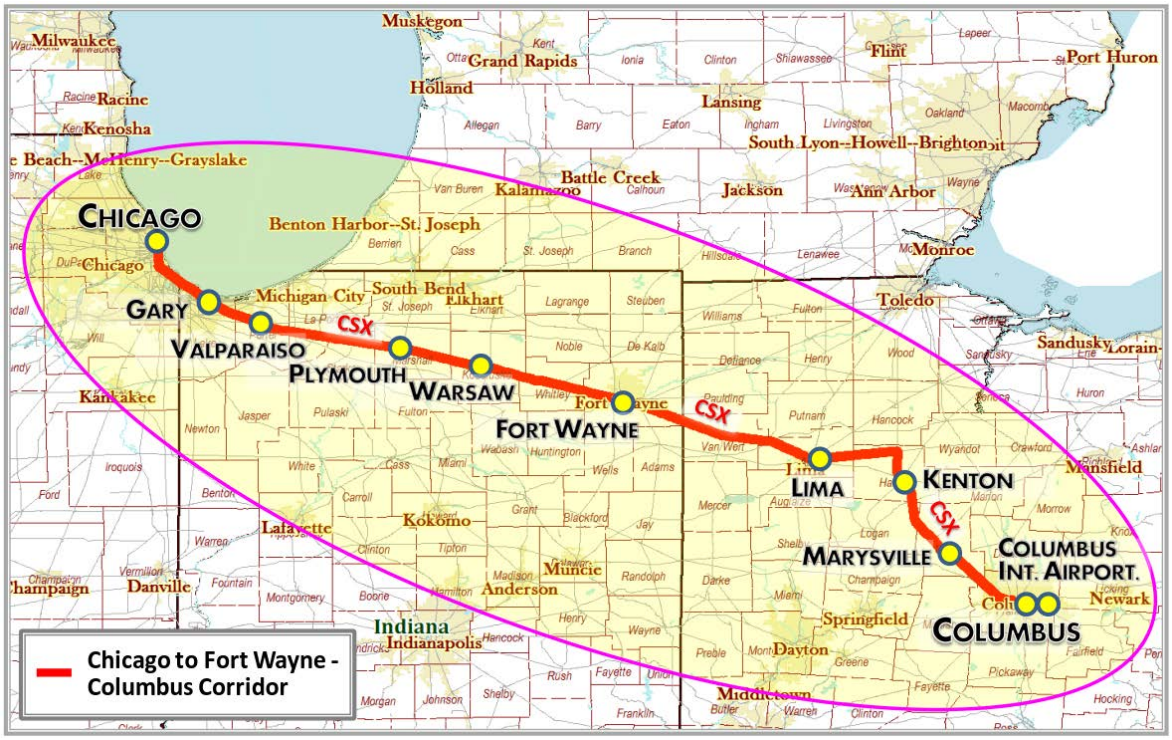
[4] Source: Wikipedia, downloaded November 2018: "As of November 2017, a total of 29 had been fully completed, 5 were under construction, four are in final design, and another 13 are in the preliminary design and environmental review process."

instead of Toledo and Cleveland. In 2013, NIPRA commissioned a study (carried out by the TEMS consulting company) to assess the feasibility of a Chicago-Fort Wayne-Lima-Columbus Corridor with 110 mph or 130 mph service (Figure 14). This is a predecessor study to RSTI.

This Study, reflecting the latest direction from the FRA for High-Speed Rail planning, included:

- A comprehensive market analysis
- Identification of engineering needs
- Development of a likely operating plan
- An estimate of the likely financial and economic returns from the project

Figure 14: 2013 TEMS Feasibility Study Corridor



Source: Northern Indiana Passenger Rail Association Feasibility Study, 2013.

The study revealed that positive financial and economic outcomes can be achieved on this corridor and the development of the route would result in benefits for system users and the communities linked by the system, including shorter travel times, reduced highway congestion, fewer vehicle emissions, lower travel costs, and localized benefits, such as station-area development potential.

3.8. Northern Indiana Passenger Rail Corridor Project

Known as the NIPRA Study, this project followed up on the findings of the 2013 TEMS study. Supported by a Memorandum of Agreement between Indiana DOT and the mayors from nine towns located along the route, FRA recognized the route for passenger service and in 2016 granted approval to proceed with an Environmental Assessment (EA). With the discontinuance of the Ohio Hub study (described below), NIPRA and the cities of Fort Wayne and Lima realized that the Chicago-Fort Wayne-Lima corridor could still move forward as a segment of independent utility regardless of

potential future passenger rail linkages in Ohio and beyond. Currently, NIPRA and the cities of Fort Wayne and Lima are continuing to take steps to implement service along the Chicago-Fort Wayne-Lima corridor.

Passenger service being explored by the NIPRA study in the Chicago-Ft. Wayne-Lima corridor is proposed to utilize existing railroad tracks, re-establish historical train stations, and potentially operate under a partnership model that includes a cost-share program among state and local governments, as well as potential private partners. The current alternatives under study in this effort include passenger rail speeds of 79 mph and 110 mph, utilizing existing freight rail corridors.

Information on preliminary costs and likely benefits have been presented to the public and stakeholders to help select a specific route and service alternative for further study and detailed environmental analysis. **The results of this work will be the basis for the segment of the RSTI passenger rail project between Tolleston and Lima.**

Because most of the infrastructure work would be within a pre-existing rail right-of-way, a full Tier I EIS is not necessary. The alignment of the proposed passenger service would be on railroads owned by CSX, with a current operator of Chicago, Fort Wayne & Eastern (CFER). The project sponsors will therefore need to reach an agreement with CSX to implement the project.

The proposed Chicago-Fort Wayne-Lima Corridor, shown in Figure 15, is approximately 200 miles long.

Figure 15: Chicago-Fort Wayne-Lima Corridor Location



Source: Northern Indiana Passenger Rail Corridor Project, 2018.

3.9. Ohio Hub Study

The Ohio Hub study is a predecessor to RSTI, as two of the segments it examined (Columbus-Lima-Ft. Wayne-Chicago, and Columbus-Pittsburgh), are in the RSTI study.

The Ohio Hub passenger rail system was developed in 2004 as an eastern complement to the system proposed by MWRRI (Section 3.2 above).

It originally consisted of a "Cleveland Hub" network with four interconnecting 110 mph diesel-powered passenger rail lines. In 2007 this concept was expanded by the addition of three Columbus-

centered routes to Pittsburgh, Toledo/Detroit, and Fort Wayne/Chicago. As a result, the name of the system was changed from "Cleveland Hub" to "Ohio Hub" reflecting the expanded statewide and multiple-hub focus of the proposed corridor system.

The Ohio Hub Study was a cooperative effort led by the State of Ohio that included neighboring states, Amtrak, and Via Rail (the national passenger rail system in Canada). The Ohio Hub network as envisioned in 2007 is shown in Figure 16.

The goal of the study was to determine, at a conceptual level, the financial and economic feasibility of developing a passenger rail system serving seven intercity travel corridors (listed below), and to assess economic and environmental benefits.

- Cleveland-Columbus-Dayton-Cincinnati
- Cleveland-Toledo-Detroit
- Cleveland-Pittsburgh
- Cleveland-Buffalo-Niagara Falls-Toronto
- Columbus-Pittsburgh
- Columbus-Toledo-Detroit
- Columbus-Lima-Ft Wayne-Chicago

Figure 16: Proposed Ohio Hub Rail System



Source: Ohio Hub Study, 2007.

The Ohio Hub study funded the initial feasibility-level assessment of the passenger rail route connecting Columbus to Fort Wayne, but the scope of that assessment did not extend west of Fort Wayne. The study identified a passenger rail network of 860 miles serving 32 stations, connecting four states and southern Ontario. The State of Ohio discontinued the Ohio Hub study in 2010 and federal funding for the project was withdrawn.

3.10. Ohio 3C Study

An environmental study was initiated by the Ohio Department of Transportation (ODOT) for the Cincinnati-Columbus-Cleveland (3C) corridor, which proposed connecting the three largest cities in Ohio with passenger rail. The intention of the study was to initiate conventional intercity passenger

rail service, and then later upgrade the route to provide faster service. Initially, trains would operate at peak speeds of 79 miles per hour, although practical limitations of the route would limit the initial schedule to an average of 39 miles per hour.

A preferred corridor was recommended that also served Dayton (Figure 17). The State of Ohio discontinued this study in 2010 in concert with the Ohio Hub Study.

Figure 17: 3C Corridor Preferred Alternative, 2010



Source: 3C Quick Start Passenger Rail Environmental Assessment, October 2010.

3.11. Pittsburgh-Altoona Study

The Pennsylvania Department of Transportation (PennDOT) is investigating the potential to provide enhanced passenger rail service between Pittsburgh and Altoona on Norfolk Southern's Pittsburgh Line. This rail corridor currently has passenger rail service via Amtrak's one daily round trip *Pennsylvania*n between Pittsburgh and New York City. As noted for the west-of-Chicago studies discussed in Section 3.5, this study won't directly impact the RSTI passenger rail project, but the expansion and improvement of passenger or commuter rail service beyond the limits of the RSTI passenger rail project – if implemented – will enhance the connectivity of a Chicago-Pittsburgh service, increasing ridership by providing additional destinations in the regional rail network.

4.0 Existing Transportation Facilities

The project corridor is currently served by auto, bus, and air travel. These existing modes have various challenges with reliability, cost, and accessibility. With the proper infrastructure in place to support it, rail can offer a reliable, safe, and convenient long-distance travel choice.

Private auto and bus travel is subject to slowdowns from weather, crashes, and daily commuter congestion, and air travel is also susceptible to weather-related delays and other occurrences beyond the control of transportation operators. Fixed-guideway modes like intercity passenger rail are able to perform in a variety of weather conditions. And particularly where passenger rail has dedicated tracks not shared with freight traffic, passenger rail is less vulnerable to delay than highway-based modes, including delays caused by accidents.

Further, the distances between many of the corridor cities are too short to develop an air market, yet too long to efficiently drive on a regular basis – an ideal market gap for passenger rail to fill.

4.1. Highway Travel

Similar to the United States as a whole, private auto travel is the dominant mode choice for trips in the region.[5] Auto trips are convenient – for most auto owners, there is no wait time, and no need to pre-schedule at trip as there is, for example, with air travel. Speeds are slower than air travel, but cars can take you directly from your origin to your final destination – no need for security procedures, check-in, or "last mile" transfers (such as finding a taxi to get from an airport to downtown, or renting a car to get to a suburban destination).

However there are also problems with private auto travel:

- Not everyone owns a car
- Not everyone is able to drive (whether because of income limitations, physical limitations, or age)
- It is not as safe (per passenger mile) as air, rail, or bus modes (see Section 4.5)
- Congestion causes predictable peak hour delays, particularly in urban areas
- Weather delays occur
- Crashes and other factors cause unpredictable delays

Travel Time, Congestion, and Reliability

East of Columbus there is a direct interstate route from Columbus to Pittsburgh, along I-70. West of Columbus, there is no direct route, forcing drivers to choose between an indirect interstate route through Indianapolis, and a direct route using lower-quality, lower-speed, less safe highways (see Figure 1).

Congestion and lack of travel time reliability are also a factor, primarily during rush hours in congested central business districts. Information from the Chicago, Columbus, and Pittsburgh MPOs is shown below. In Figure 18, the lack of travel time reliability for auto trips, which increases closest

[5] Source: USDOT, Bureau of Transportation Statistics. Retrieved May 2019. https://www.bts.gov/statistical-products/surveys/national-household-travel-survey-daily-travel-quick-facts

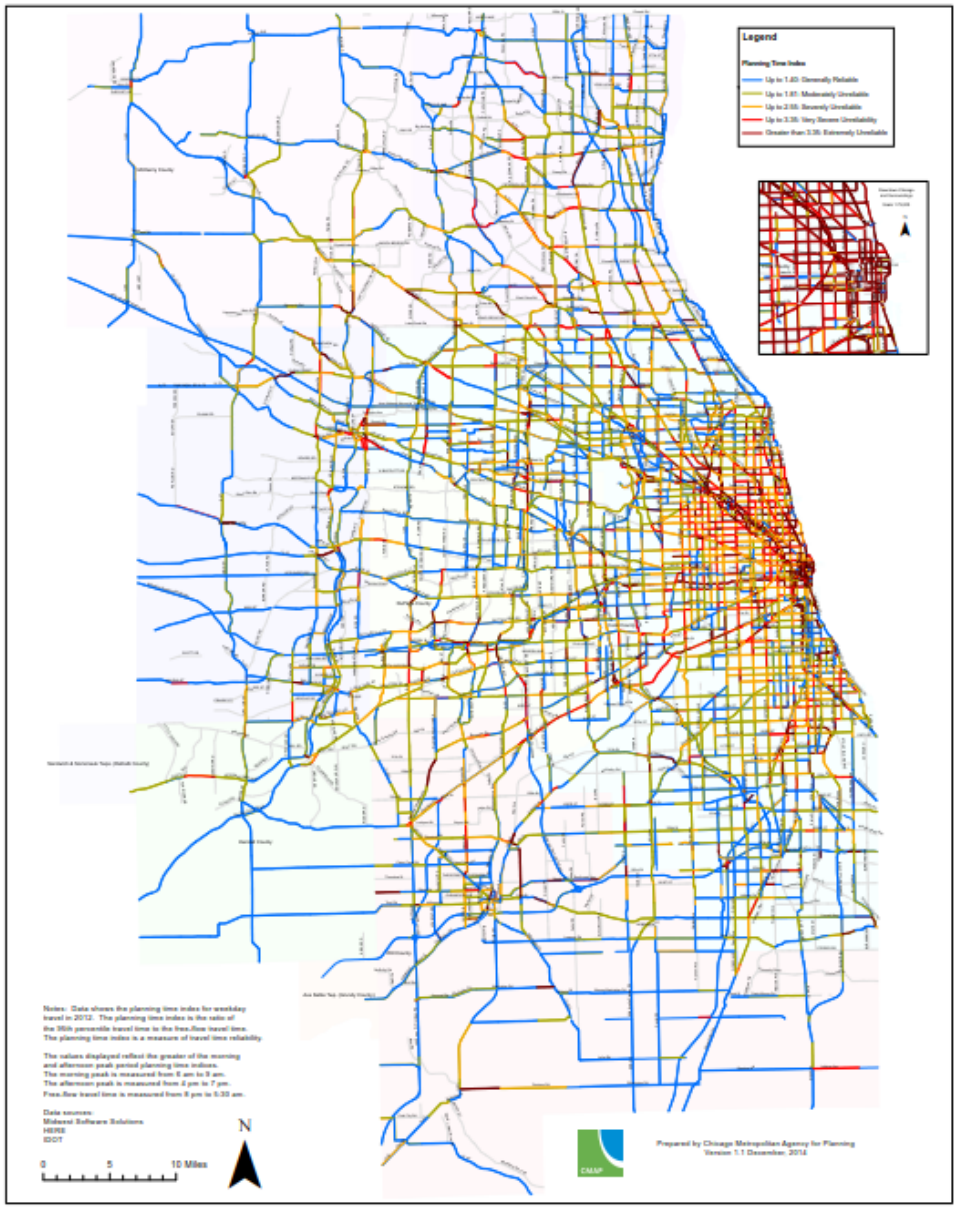
to downtown Chicago, is shown. Similarly, Figure 19 shows the increased congestion near downtown Columbus.

Figure 20 shows data from the Pittsburgh MPO, indicating predictable delay in terms of daily totals and per-person totals. Overall, VMT and vehicle trips are estimated to increase between 2015 and 2040 causing an increase in trip times and a significant increase in average daily delay time by over 100%.

On a corridor level, off-peak and peak travel times between Pittsburgh and Chicago can vary by more than one hour depending upon the time of day. The variation in travel time is largely influenced by the time of day travel takes place in the large metropolitan areas along the corridor and the direction of travel. Table 7 shows the shortest and longest travel times between select city pairs on the corridor.

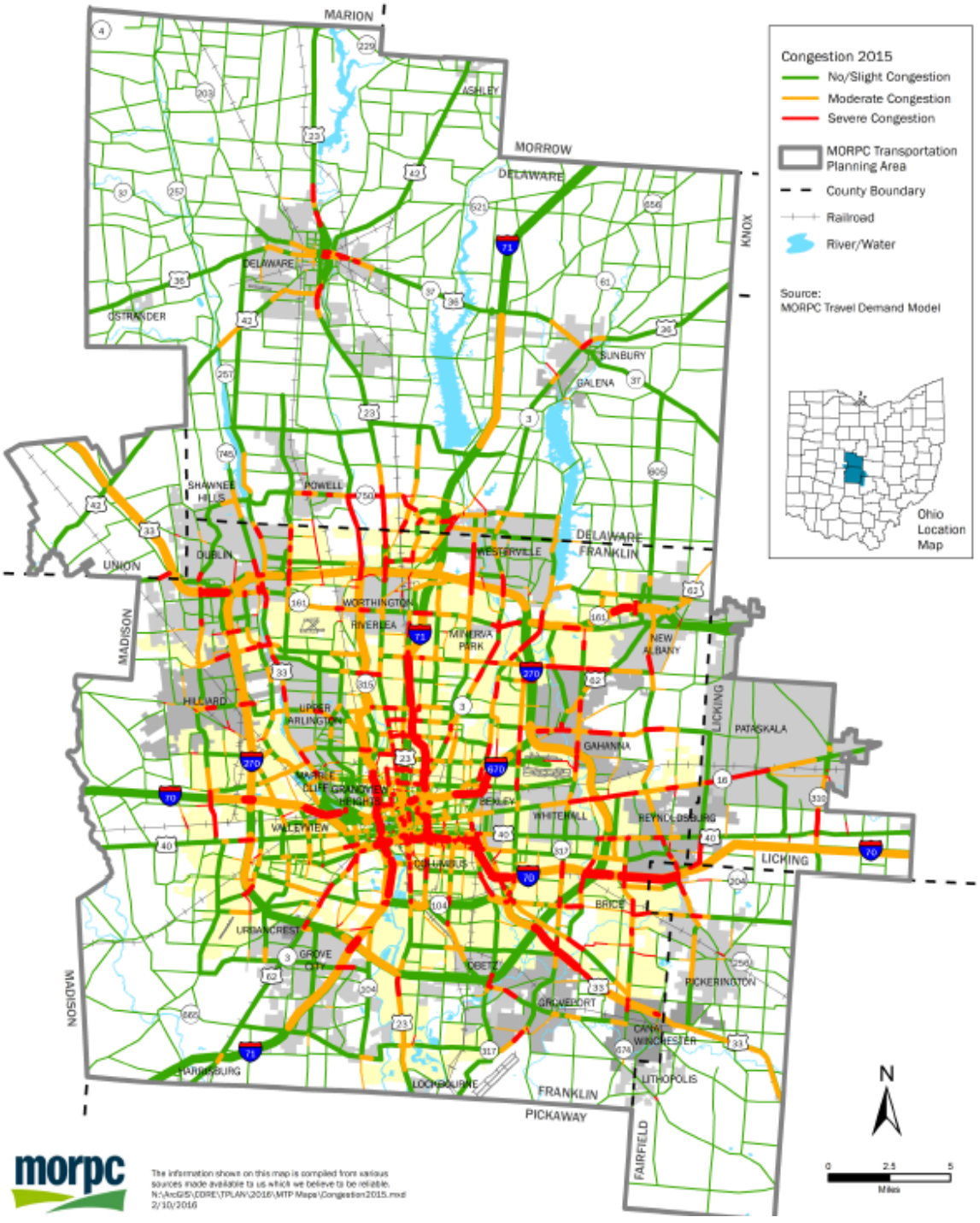
NOTE: MORPC requested to add updated/additional graphics depicting travel time, congestion, and reliability as available.

Figure 18: Travel Time Reliability, Chicago Region, 2012



Source: Chicago Metropolitan Agency for Planning (CMAP), December 2014. https://www.cmap.illinois.gov/documents/10180/349301/HighwayTravelTimeReliability_ChicagoRegion_2012.pdf/7334e26f-c258-4e4f-9af7-8a928441970e

Figure 19: Columbus Level of Congestion, 2015



Source: MORPC 2016-2040 Columbus Area Metropolitan Transportation Plan, Adopted June 2016. http://www.morpc.org/wp-content/uploads/2017/12/060216FINAL-MTP-REPORT-merged.pdf

Figure 20: Pittsburgh Travel Delay (2015 vs. 2040)

Changes in Key Variables
Long Range Plan Tests

Variable	Existing (2015)	No-Build (2040)	Transp. Plan (2040)	Percent Change Existing to No-Build	Percent Change Existing to Plan	Percent Change No-Build to Plan
Transit Person Trips (per day)	166,369	178,795	178,789	7.47%	7.47%	0.00%
Highway Vehicle Trips (per day)	6,377,141	7,296,857	7,296,127	14.42%	14.41%	-0.01%
Highway VMT (per day)	63,589,361	71,527,257	71,679,787	12.48%	12.72%	0.21%
Trip Time (Person Hours per day)	1,742,157	1,990,851	1,985,965	14.28%	13.99%	-0.25%
Delay (Person Hours per day)	73,602	147,947	138,892	101.01%	88.71%	-6.12%
Delay per Person Trip (Minutes)	0.55	0.97	0.91	76.18%	65.40%	-6.12%
Avg Trip Travel Time (Minutes)	13.33	13.34	13.30	0.04%	-0.21%	-0.25%
Avg Trip Length (Miles)	9.97	9.80	9.82	-1.69%	-1.48%	0.22%

SPC May 2015

Source: Mapping the Future: The Southwestern PA Plan, Adopted June 2015/Amended June 2016, SPC https://www.spcregion.org/pdf/lrpdraft/mtf/MTF_All.pdf

4.2. Bus Travel

Intercity bus service is provided by Greyhound between Chicago and Pittsburgh. Two direct Chicago to Pittsburgh roundtrips are currently offered via Cleveland. Additional intercity bus service is provided on the western segment of the corridor between Chicago and Columbus and the eastern segment of the corridor between Columbus and Pittsburgh. Each of these segments features four roundtrips per day two of which provide timed connections in Columbus for through travel.

While several frequencies are available for passengers traveling between Chicago and Columbus and those traveling between Columbus and Pittsburgh, direct intercity bus service between Chicago and Pittsburgh is time consuming and departure times are limited. Additionally, there are no direct intercity bus services between Chicago and Pittsburgh operating via Columbus.

Table 6 shows bus travel times compared to auto travel times.

Table 6: Comparison of Auto and Bus Travel Times

Trip	Intercity Bus Travel Time (trip duration in hours & minutes)	Auto Travel Time (shortest route, without traffic)	Peak Auto Travel Time (shortest route, with traffic)	Added Time Required for Bus Travel (in hours & minutes)
Chicago-Columbus	7h 50min to 8h 55min (7 trips daily)	5h 35min	6h 40 min	2h 15min (minimum)
Chicago-Pittsburgh	9h 50min to 12h 30min (4 trips daily)	7h 13min	8h 20 mins	2h 37min (minimum)
Fort Wayne to Pittsburgh	11h 45min (1 trip daily)	5h 08min	6h 20 mins	6h 37min
Chicago-Lima	5h 55min (1 trip daily)	4h 05min	5h 10 mins	1h 50min
Lima-Columbus	1 trip daily is 1h 55min 1 trip daily is 4h 10min (SB) or 3h 25min (NB)	1h 37min	2h 10 mins	1h 48min (minimum)
Columbus-Pittsburgh	3h 25min to 7h 10min (5 trips daily)	2h 55min	3h 50 mins	0h 30min (minimum)

Source: Greyhound online reservation system for scheduled service, 11/6/2018. Google Maps Directions, 5/29/2019.

Further information related to intercity bus service on the corridor is discussed in the Goals and Objectives document.

4.3. Air Travel

Commercial air service currently exists between the select markets of Chicago (MDW & ORD), Fort Wayne (FWA), Columbus (CMH), and Pittsburgh (PIT). However, current air service is limited, as only Chicago features direct flights to all air markets on the corridor. Fort Wayne, Columbus, and Pittsburgh only have direct scheduled commercial flights to/from Chicago.

A recent one-day survey of the lowest price air tickets between the three largest cities in this corridor showed that air travel can be cost-competitive with single-occupant auto travel, particularly over longer distances (see Table 7). Although if two or more people are traveling, auto travel is typically the lower cost option.

Table 7: 2015 Lowest-Cost Flights Compared to Auto Travel Costs

From	To	Roundtrip Air Cost (lowest fare)	Miles by car (one-way)	Comparable Auto Trip (round trip)
Chicago (ORD)	Pittsburgh (PIT)	$229	460	$534
Chicago (ORD)	Columbus (CMH)	$203	324	$376
Columbus (CMH	Pittsburgh (PIT)	$227	185	$215

Source: Flight cost data was collected on Travelocity on November 30,2018 for December 13, 2018 departure and December 20, 2018 return. Lowest priced tickets were selected.

Auto trip costs use the 2019 Internal Revenue Service rate for business travel of 58 cents per mile.

Costs of tolls (for auto trips) and non-fare air travel costs (airport parking, rental car at destination, luggage fees) are not included.

4.4. Rail Facilities

Passenger Rail

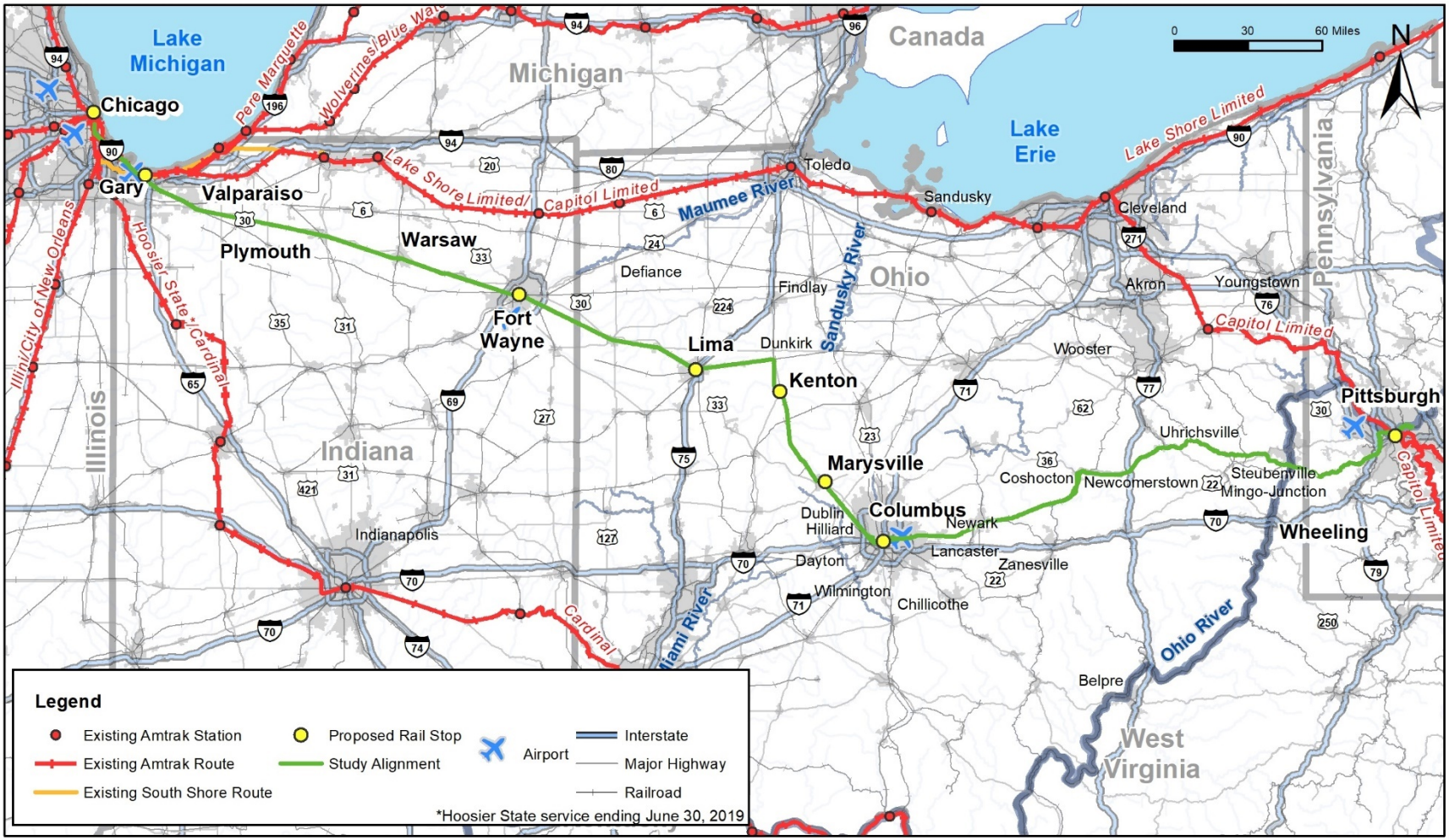
There is currently no intercity passenger rail service along the project corridor from Pittsburgh to Chicago. There is commuter rail service on the South Shore Line (NICTD) between Chicago and Gary, heading further east along Lake Michigan, north of the Project corridor (visible in Figure 21). Of cities on the project corridor, only Chicago and Pittsburgh currently have intercity passenger rail service via service on other routes. Other corridor cities, including Warsaw IN, Fort Wayne, Lima, Marysville, and Columbus, do not have any passenger rail service.

Passenger rail stations exist at both ends of the corridor: with Chicago's Union Station and Pittsburgh Union Station. Old passenger rail stations have been preserved (or simply exist) and could potentially be available for use in other cities in the corridor as well.

In Lima, OH, the historic rail station has been preserved and is on the National Register of Historic Places.[6] Lima currently houses its Utility Department in the station building, but has indicated municipal desire to reopen the station to passenger rail services. On the Panhandle route in Ohio, the historic Pennsylvania Railroad station building in Newark, OH, has been preserved and is being reused as office space. It is unknown whether there would be an option to reactivate it for passenger rail service. In Coshocton, OH, also on the Panhandle Route, a historic passenger rail station from the Pennsylvania Railroad exists on the northeast corner of Walnut Street and 5th Street. It is unknown whether this building is in active use nor whether it would be available to reuse for passenger rail service.

[6] National Archives Catalog, Ohio SP Lima Pennsylvania Railroad Passenger Depot, https://catalog.archives.gov/id/71986608

Figure 21: Amtrak Routes in RSTI States



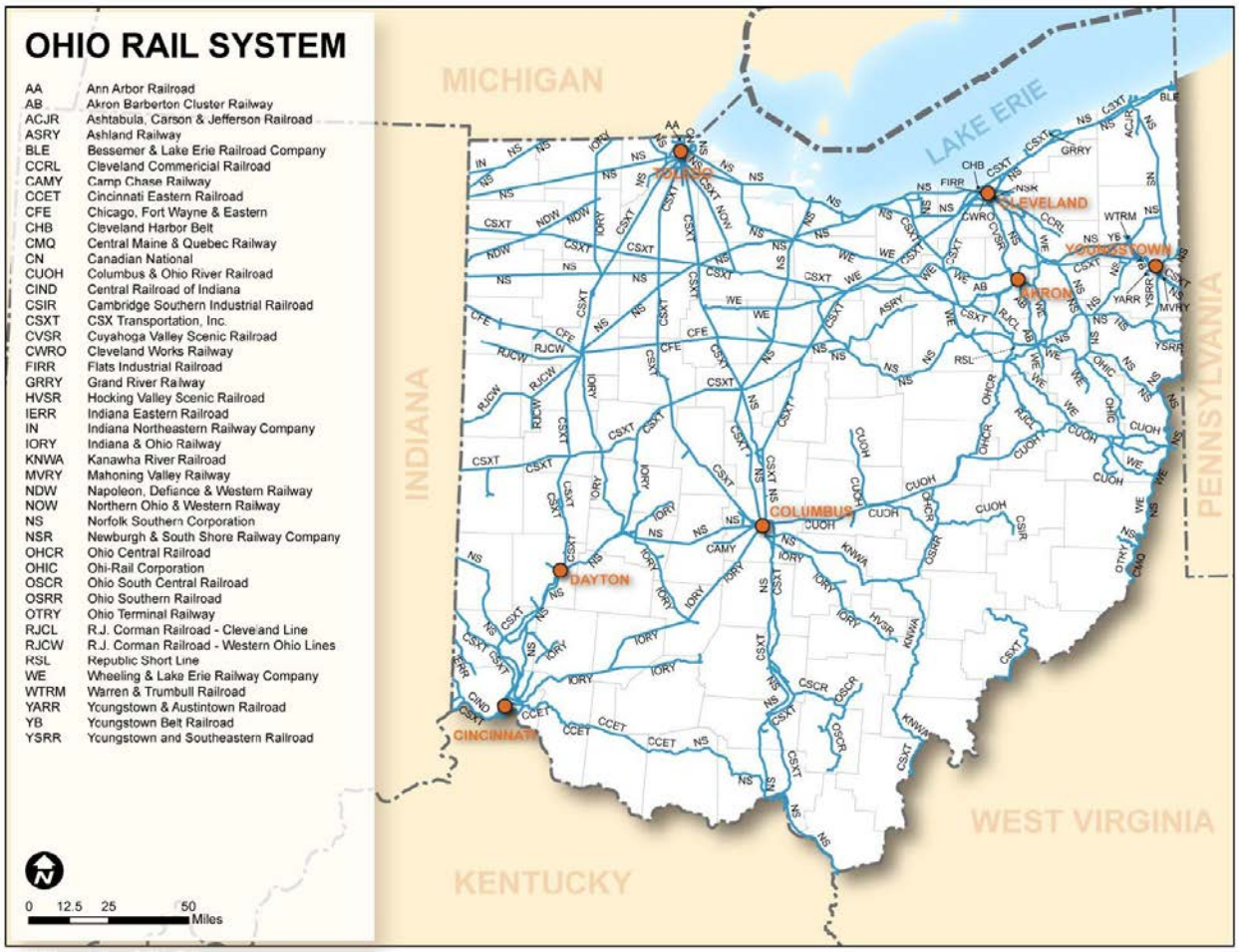
Source: WSP

Freight Rail

Freight Rail in Ohio

The identification of corridor alignment alternatives considers both active and abandoned rail corridors. In Ohio, there are 4,589 miles of active rail lines owned by freight railroads. The State of Ohio owns 210 miles of active railroad. The State owns the Panhandle line which goes from Columbus to Mingo Junction and is operated by Columbus & Ohio River Railroad (CUOH). Both Norfolk Southern (NS) and CSX Transportation (CSX) own and operate lines through Columbus. West of Columbus, the project corridor aligns with CSX owned and operated right-of-way to Dunkirk. West of Dunkirk to Lima, the right-of-way is owned by CSX and operated by Chicago, Fort Wayne & Eastern Railroad (CFER). The different rail lines and their operators are shown in Figure 22.

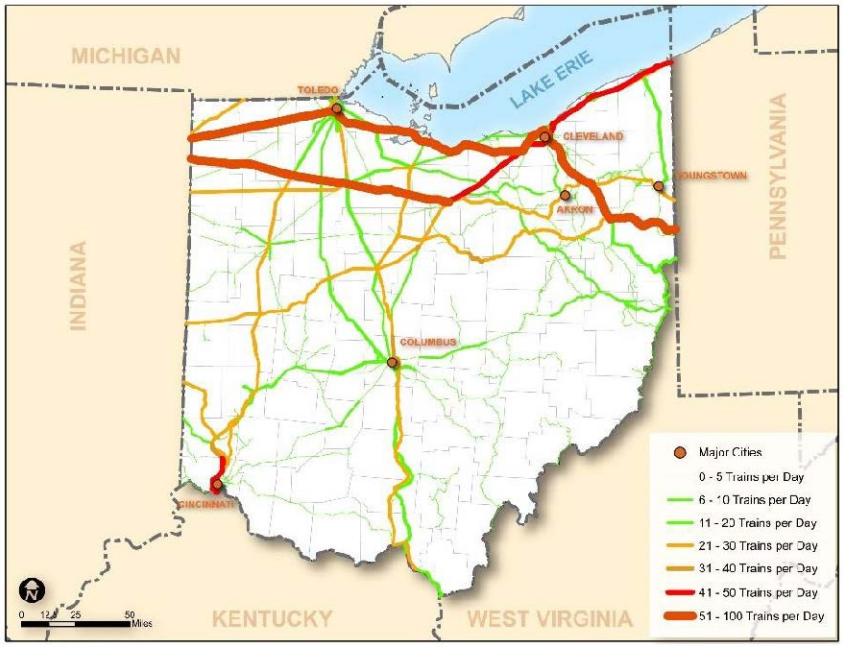
Figure 22. Ohio Rail Network by Operator



Source: Ohio State Rail Plan, January 2019, pg 2-3.

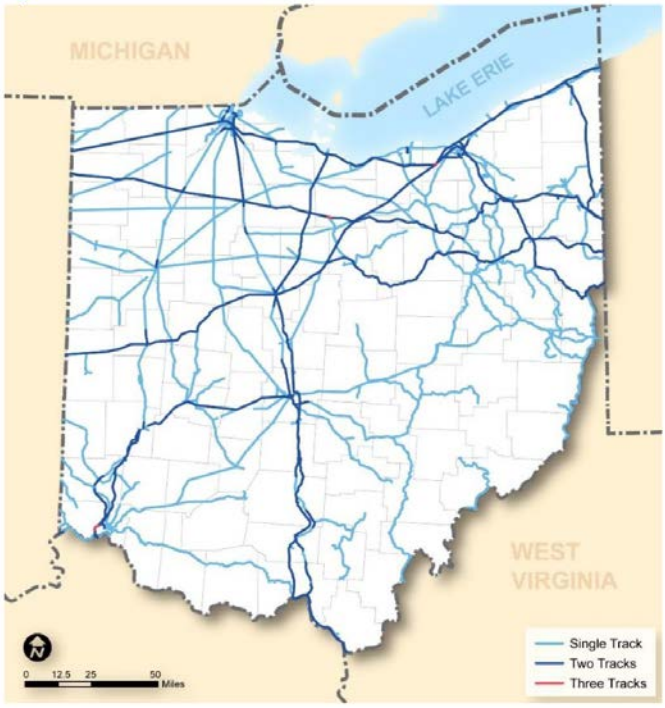
The highest daily freight train volumes are on east-west corridors in the northern portion of the state. Most of the rail lines on the project corridor have fewer than 20 daily trains (see Figure 23). Most of the active rail lines in Ohio are single track, with the exception of a few heavily used freight routes. Figure 24 shows that the project corridor consists primarily of single track rail lines.

Figure 23. Trains Per Day of Ohio Rail Lines



Source: Ohio State Rail Plan, January 2019, pg 2-5.

Figure 24. Number of Tracks of Rail Lines in Ohio

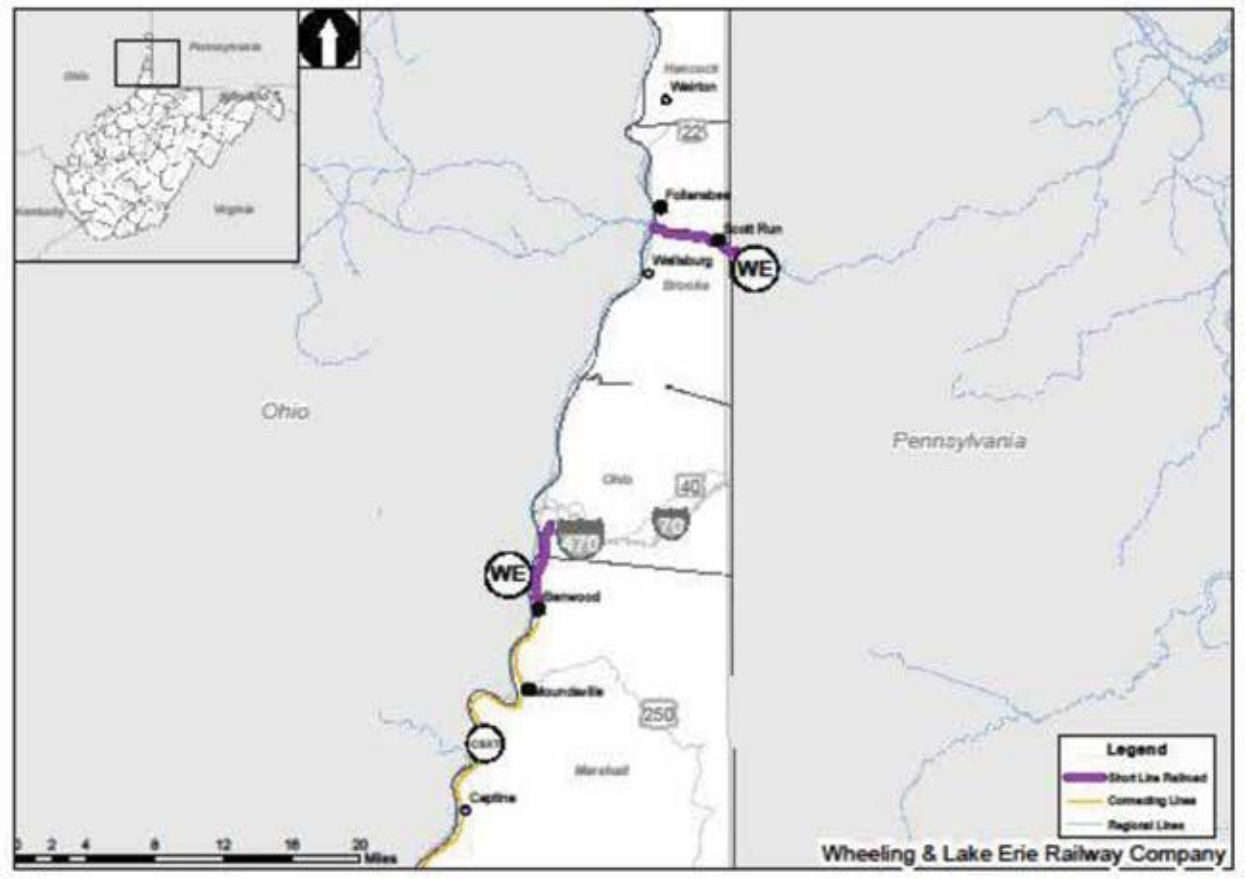


Source: Ohio State Rail Plan, January 2019, pg 2-6.

Freight Rail in West Virginia

The Wheeling & Lake Erie Railway Company (WE) owns and operates about 4.5 miles of railroad that traverses the small section of the project corridor which is in West Virginia (see Figure 25). This segment connects Mingo Junction, OH, to Jefferson, PA via West Virginia. This is on WE's Rook Subdivision. The Rook Subdivision is a single track railroad with no sidings and no signal system. There are 20 trains per week on this segment and the maximum speed is 30 mph (as of 2013).

Figure 25. Wheeling & Lake Erie Railway Company in West Virginia



Source: West Virginia State Rail Plan, December 2013, pg A1-1.

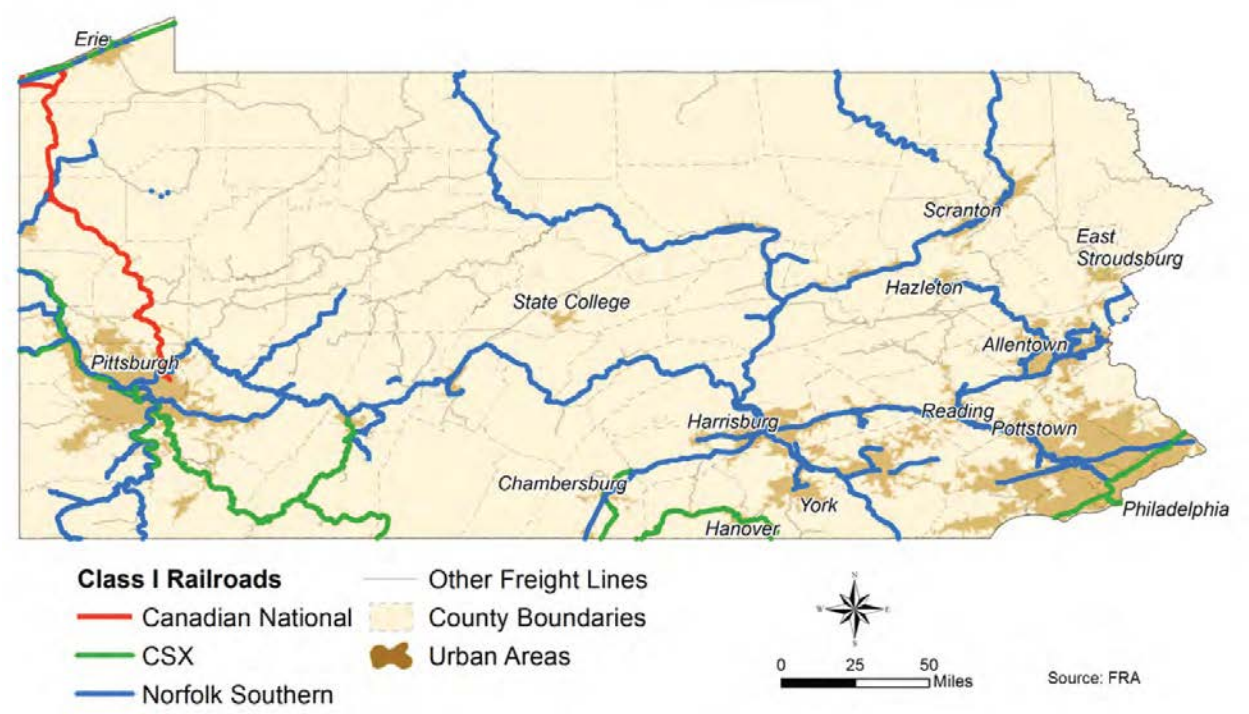
Freight Rail in Pennsylvania

The project corridor under consideration in Pennsylvania consists of either NS or CSX rail lines (see Figure 26 for Class I railroads) or Wheeling & Lake Erie (WLE) rail lines (see Figure 27 for Class II railroads). In the Pittsburgh area, NS operates the Mainline Corridor from Pittsburgh to Harrisburg and onto Philadelphia. The Mainline also provides access to markets to the west, including Chicago. CSX operates through Pittsburgh on the Southwest Corridor, which connects Maryland through Pittsburgh to Ohio (see

Figure 28). CSX has an intermodal terminal in Pittsburgh on the corridor.

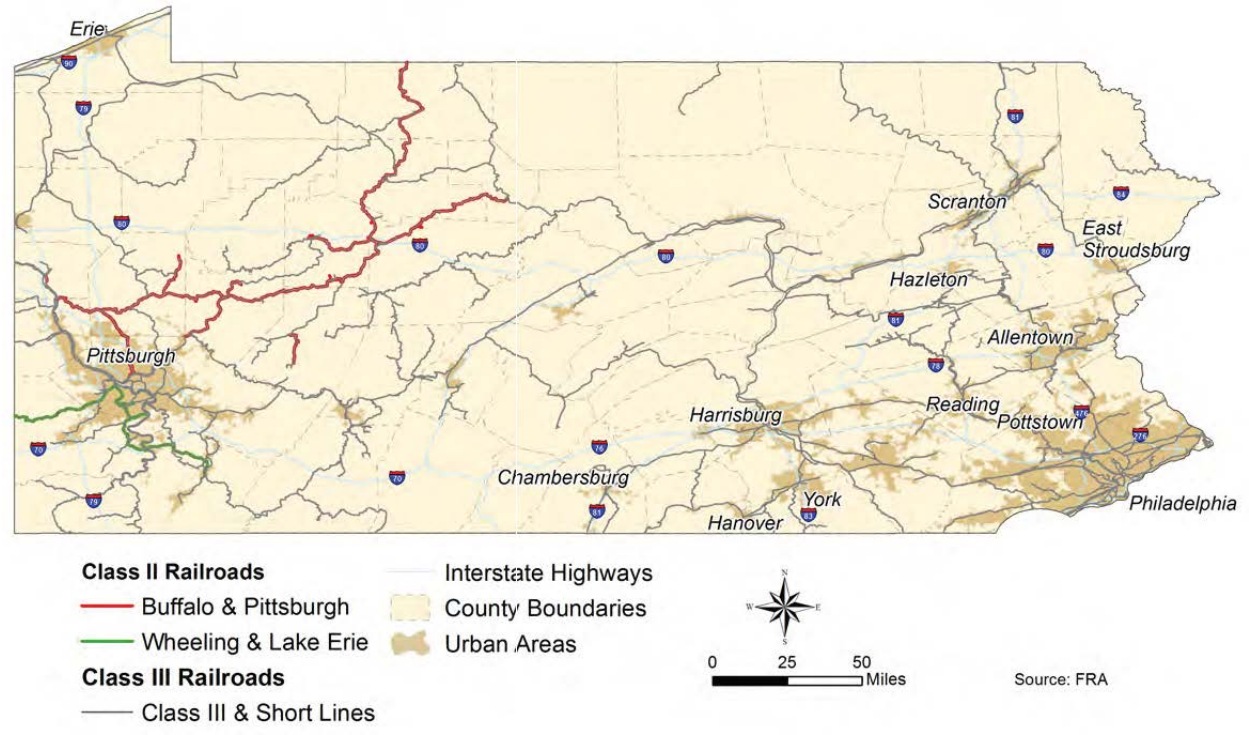
The CSX, NS, and WLE all carry significant freight tonnage, particularly CSX and NS. Figure 29 shows inbound rail tonnage on the corridors, which illustrates the relative activity of freight around the Pittsburgh area. [Note: Figure 29 shows only inbound rail tonnage. Outbound and through tonnage are not reflected.]

Figure 26. Pennsylvania's Freight Rail Network – Class I Railroads



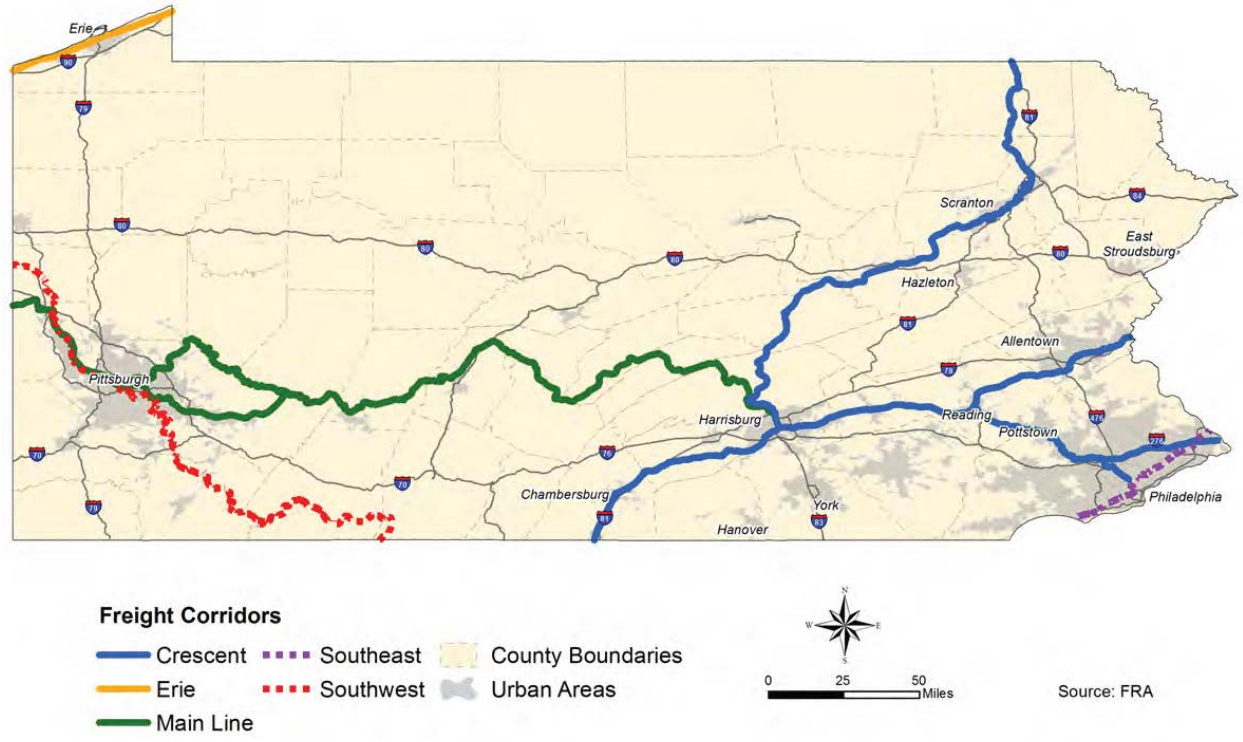
Source: Pennsylvania State Rail Plan, December 2016, p. 2-38.

Figure 27. Pennsylvania's Freight Rail Network – Class II Railroads



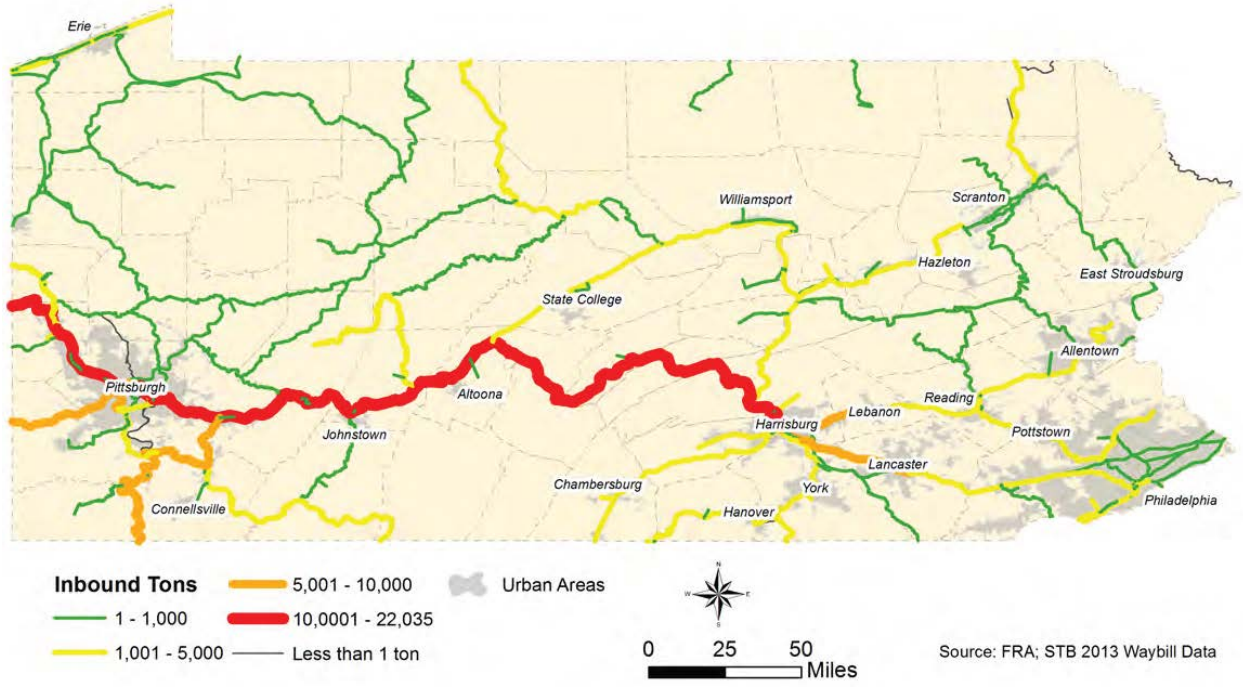
Source: Pennsylvania State Rail Plan, December 2016, p. 2-47.

Figure 28. Major Freight Corridors in Pennsylvania



Source: Pennsylvania State Rail Plan, December 2016, p. 2-45.

Figure 29. Inbound Rail Traffic Flows by Rail Tonnage



Source: Pennsylvania State Rail Plan, December 2016, p. 2-58.

4.5. Safety

As shown in Table 8, traveling by car is the least safe of the major modes of intercity passenger transportation, and is by far the most common mode of travel. Measured in terms of fatalities per passenger-miles carried, the highway fatality rate is nearly 17 times higher than the rail fatality rate. Air travel has the lowest fatality rate.

Highway travel comprises the vast majority of trips within the corridor, and has the capacity to serve much of the travel demand in the corridor. However, with the highest fatality rate, travelers are choosing a less safe mode of transportation. In some cases this is because of the service provided – auto is a very convenient mode for many corridor residents – but it is also because in many cases there is limited or no other choice.

Table 8. US Fatality Rates by Mode (2000-2009)

Mode	Fatalities	Passenger Miles (Billions)	Fatalities per Billion Passenger Miles
Auto (driver or passenger)	301,399	41,403	7.28
Commuter Rail and Amtrak	70	163	0.43
Bus (bus holding more than ten passengers, transit, inter-city, school or charter)	304	2,806	0.11
Air (passenger on commercial aviation)	474	7,290	0.07

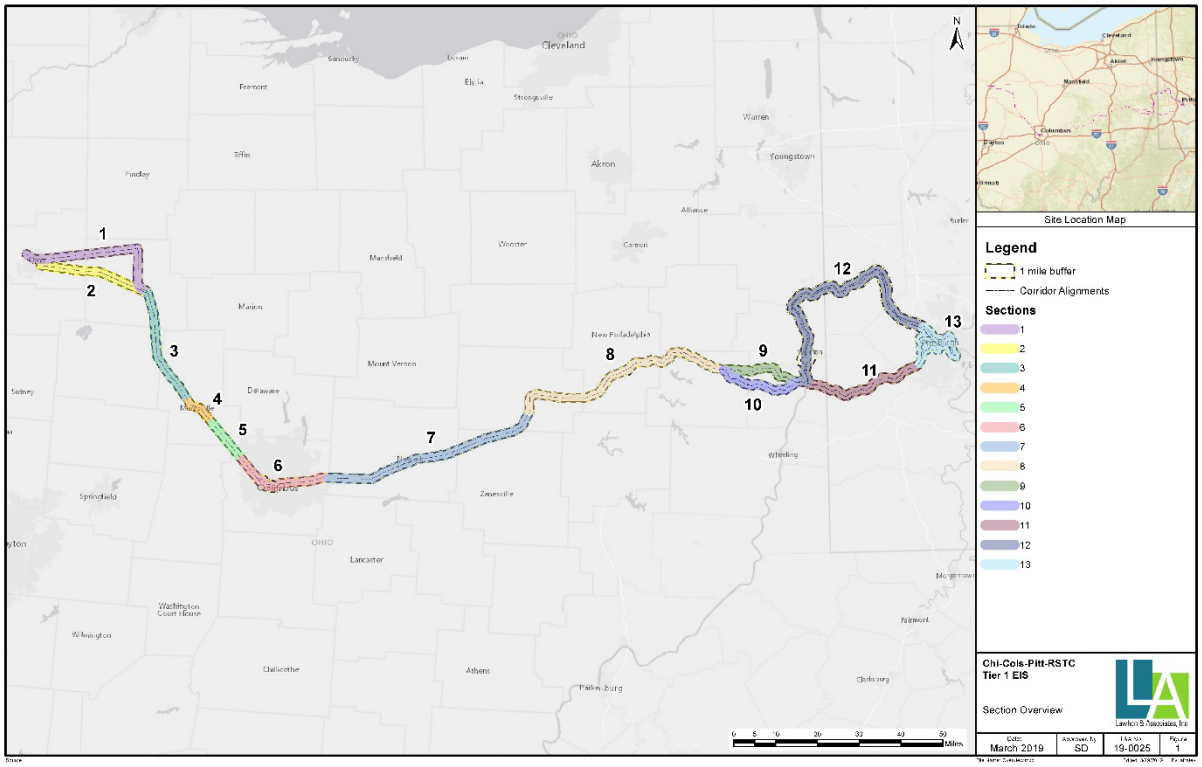
Source: Savage, Ian, Northwestern University, Comparing the Fatality Risks in United States Transportation Across Modes and Over Time, Supplemental Data Appendix, published in Research in Transportation Economics: The Economics of Transportation safety, volume 43(1) pages 9-22, 2013.

5.0 Environmental

Methodology

The proposed corridor was evaluated for the presence of social, economic and environmental resources. Based upon the limited design detail available at this stage, it is unknown where impacts may occur outside of existing rail right-of-way. Therefore, resources were mapped within one mile of the proposed corridor. The corridor was divided into 13 sections for analysis, as shown in Figure 30. Each resource category was then evaluated for potentially impacted resources, utilizing varying distances from the proposed corridor based upon the nature of the resource and the potential reach of the effects. For example, Environmental Justice populations were evaluated within one mile, potential noise sensitive areas within 500-ft, ecological resources within 300-ft, and vibration issues within 60-ft. A summary is provided below for each resource category.

Figure 30: Corridor Environmental Analysis Sections



Source: WSP

5.1. Community Resources

Environmental Justice and Underserved Populations

The methodology for conducting the review and evaluation of Environmental Justice and other traditionally underserved populations is in accordance with federal regulations and guidelines, including Title VI of the Civil Rights Act of 1964, Executive Order 12898, U.S. DOT Order 5610.2, Executive Order 13166, and the Age Discrimination Act of 1975.

Executive Order 12898, "Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations," requires each federal agency to "make achieving environmental

justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Executive Order 13166 on LEP calls for all agencies to ensure that their federally conducted programs and activities are meaningfully accessible to LEP individuals. The U.S. Department of Transportation (U.S. DOT) defines LEP persons as individuals with a primary or home language other than English who must, due to limited fluency in English, communicate in that primary or home language if the individuals are to have an equal opportunity to participate effectively in or benefit from any aid, service, or benefit provided by the transportation provider or other U.S. DOT recipient. The Age Discrimination Act of 1975 prohibits discrimination on the basis of age in programs and activities receiving federal financial assistance.

The project team collected demographic data from the U.S. Census Bureau 2017 American Community Survey (ACS) 5-Year Estimates for all census tracts within or intersecting a one mile buffer of the alignment options. This information is shown on *Socioeconomic Figures 1-22*. This census tract level data was then compared to the statewide averages to identify the census tracts where the percentage of the population that is considered low-income[7], minority[8], limited English proficient[9], and/or over age 65[10] is greater than the respective statewide average. For the purpose of this analysis, low-income is defined as a family whose income is less than two times the federal poverty level. Minority is defined as any person that identifies as Hispanic or Latino and/or identifies as any race other than white alone. A limited English speaking household is defined by the U.S. Census Bureau as one in which no household member over the age of 14 either speaks English only or speaks English "very well." Table 9 provides information about the percentage of the population that is considered low-income, minority, limited English proficient, and/or is over age 65 by state.

Table 9: Low-Income, Minority, LEP, and Aging Populations

State	Low-Income	Minority	Limited English Proficient	Over Age 65
Ohio	25.8%	20.4%	1.4%	15.9%
Pennsylvania	22.7 %	22.7%	2.4%	17.1%
West Virginia	31.8%	7.7%	0.4%	18.3%

Table 10 provides a qualitative summary of underserved populations living near the preliminary RSTI alignment within each section of the corridor. The analysis is based on a comparison of the census tract level data to statewide averages for each of the socioeconomic indicators.

Table 10: Underserved Corridor Populations

Section	Underserved Populations
1	• Low-income populations are concentrated in the cities of Lima and Kenton, OH. • Minority populations are concentrated in the City of Lima, OH. • Limited-English proficient populations are present on the west and south sides of the City of Lima, OH. • There are many census tracts with higher than average percentages of people over age 65 throughout this section, in both urban and rural areas.

[7] 2017 ACS 5-Year Estimates: Table B17026
[8] 2017 ACS 5-Year Estimates: Table DP05
[9] 2017 ACS 5-Year Estimates: Table S1602
[10] 2017 ACS 5-Year Estimates: Table DP05

Section	Underserved Populations
2	• There are many census tracts with higher than average percentages of low-income families throughout this section, in both urban and rural areas. • Minority populations are concentrated in the City of Lima, OH. • Limited-English proficient populations are present on the west and south sides of the City of Lima, OH. • There are many census tracts with higher than average percentages of people over age 65 throughout this section, in both urban and rural areas.
3	• There is one census tract in this section just west of Marysville, OH with a higher than average percentage of low-income families.
4	• There is a concentration of both low-income families and individuals over age 65 on the east side of Marysville, OH. • There is a census tract with a higher than average percentage of Limited English proficient households between Marysville and Dublin, OH.
5	• There are several census tracts with higher than average percentages minority populations between Dublin and Hilliard, OH. • There are several census tracts with higher than average percentages of Limited English proficient households between Marysville and Dublin, OH and throughout northwest Franklin County, OH. • There are a couple of census tracts with higher than average percentages of the population over age 65 to the north and west of Hilliard, OH.
6	• There are higher than average percentages of low-income, minority, and limited-English proficient populations in a majority of the census tracts along the rail corridor throughout the City of Columbus, OH. • There are a few census tracts along the rail corridor in the Columbus, OH area that have higher than average percentages of people over age 65
7	• There is a census tract on the east side of Pataskala with a higher than average percentage of the population over age 65. • There are concentrations of low-income families and people over age 65 in and around Newark, OH. • There is a census tract on the north side of Newark, OH with a higher than average limited-English proficient population. • There are several census tracts in the rural areas between Newark, OH and Coshocton, OH that have higher than average percentages of low-income families and people over age 65.
8	• There are concentrations of low-income families and people over age 65 in and around Coshocton, OH. • There is a census tract on the east side of Coshocton, OH with a higher than average limited-English proficient population. • There are several census tracts in the rural areas between Coshocton, OH and Jewett, OH that have higher than average percentages of low-income families and people over age 65. • There is a census tract around Jewett, OH with a higher than average percentage of limited-English proficient households.
9	• There are several census tracts in the rural areas between Jewett, OH and Mingo Junction, OH that have higher than average percentages of low-income families and people over age 65.
10	• There are several census tracts in the rural areas between Jewett, OH and Mingo Junction, OH that have higher than average percentages of low-income families and people over age 65.
11	• The percentage of the population over age 65 is greater than the respective statewide averages for a majority of the census tracts in this section.
12	• There are some concentrations of low-income families in the census tracts around Steubenville and Wellsville, OH and Bridgewater and Rochester, PA.

Section	Underserved Populations
	• There are several census tracts with a higher than average percentage of minority population around Steubenville and Wellsville, OH and Rochester and Ambridge, PA. • There are several census tracts with a higher than average percentages of limited-English proficient households around Steubenville, OH, Newell, WV, and Bridgewater and Coraoplis, PA. • The percentage of the population over age 65 is greater than the respective statewide averages for almost all of the census tracts in this section.
13	• There are higher than average percentages of low-income, minority, and limited-English proficient populations in a majority of the census tracts along the rail corridor throughout the City of Pittsburgh, PA.

Noise and Vibration

The initial noise and vibration assessment for this project uses the Federal Railroad Administration's (FRA) 2012 *High Speed Ground Transportation Noise and Vibration Impact Assessment* guidance document. The document provides procedures for the assessment of potential noise and vibration impacts resulting from proposed high-speed ground transportation projects.

Noise Evaluation

This section contains procedures for an initial evaluation of potential noise impacts from a high-speed train project. The goal of this initial noise evaluation is to identify any land use within the project corridor that would not be compatible with and would be greatly affected by the potential noise of a high-speed rail system. This type of land use would include lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Sensitive land uses could include outdoor music and performance venues, memorial areas, and possibly cemeteries where quiet is necessary to allow prayer or other reflectance.

This red flag survey is generally based on the FRA screening procedure for noise. The screening procedure is appropriate for very early phases of a project when the alternatives are still at a conceptual stage. Noise from high-speed trains passing near noise-sensitive receptors is the focus of the screening procedure. Other ancillary project noise sources, such as electrical sub-stations, roadway traffic near passenger stations, and maintenance facilities are not considered at this stage of planning due to a lack of detail on the design and placement of these types of noise sources.

The screening procedure is based on the type of technology and the type of area the alignment is passing through. The screening procedure identifies areas where impacts are likely to occur, but it does not attempt to predict noise exposure at specific receptors or to estimate the mitigation requirements. For this project, the screening distance is 500 feet measured from the centerline of the rail corridor. The distances were developed using typical noise emissions of high-speed trains. The 500 feet distance is a conservative distance given to steel-wheeled project type located within an existing railroad corridor. The area defined by the screening distance is sufficiently large to encompass all potential red flag land uses and has been designed to overstate any potential impact.

All sections of the project corridor were scanned using Google Earth to identify any red flag land uses located within approximately 500 feet of the railroad centerline. No red flag noise sensitive land uses were identified within the rail corridors. However, numerous noise sensitive land uses are situated within 500 feet of the railroad sections. Most numerous are residential dwelling units particularly in the many urban areas through which the RSTI would travel. In addition to residential

land use, other noise sensitive land uses include schools, places of worship, public parks and recreation areas.

Table 11 is not a comprehensive list of all noise sensitive land uses within 500 feet of the railroad corridor, but highlights some of the most sensitive receptors that are located immediately adjacent to the preliminary RSTI alignment. The noise sensitive land uses are listed by section. The areas identified as noise sensitive land uses may require additional investigation and potentially some form of noise abatement. There is some overlap between the identified noise sensitive land uses and other red flag land uses identified in the community resources analysis. For example, many parks and trails are identified throughout the corridor and would be both noise sensitive land uses and Section 4(f) resources.

Table 11: Noise Sensitive Land Use near the Corridor

Section	Noise Sensitive Land Use	Land Use Type
1	Ohio Northern University Recreation Facilities (Ada, OH)	Recreation Area
	Ada Medical and Diagnostic Center (Ada, OH)	Medical
	Hardin County Medical Wellness Center (Kenton, OH)	Medical
	CE Wharton Memorial Park (Kenton, OH)	Park
4	New Life Family Center (Marysville, OH)	Place of Worship
	McCarthy Park (Marysville, OH)	Park
5	Darree Fields Park (Dublin, OH)	Park
6	Hilliard Davidson High School (Hilliard, OH)	School
	Life Community Church (Hilliard, OH)	Place of Worship
	McKinley Field Park (Grandview Heights, OH)	Park
	Lifestyles Community Pavilion (Columbus, OH)	Outdoor Music Venue
	St. Margaret of Cortona (Columbus, OH)	Place of Worship
	McFerson Commons Park (Columbus, OH)	Park
	I-670 Bikeway (Columbus, OH)	Trail
7	Heath Community Park (Newark, OH)	Park
	T.J. Evans Panhandle Recreational Trail (Newark, OH)	Trail
	Frew Park (Frazeysburg, OH)	Park
	Frazeysburg Elementary School (Frazeysburg, OH)	School
8	East Elementary (Newcomerstown, OH)	School
	Hecks Grove Park (Uhrichsville, OH)	Park
	Dennison Railroad Depot Museum (Uhrichsville, OH)	Museum
10	Fernwood State Forest (New Alexandria, OH)	Park
11	Brooke High School (Rockdale, WV)	School
	State Game Lands 303 (Avella, PA)	Hunting Area
	Cross Creek County Park (between Avella and Rea, PA)	Park
	Mount Pleasant Township Park (Hickory, PA)	Park
	Chartiers Valley School District (Carnegie, PA)	School
12	Cornerstone Church (Toronto, OH)	Place of Worship
	Riverside Presbyterian Church (Wellsville, OH)	Place of Worship
	Westgate Middle School (East Liverpool, OH)	School
	Bridgewater Crossing (Bridgewater, PA)	Park
	Park Road Park (Ambridge, PA)	Park
	Edward C. Henli Park (Leetsdale, PA)	Park
	Morrow Pontefract Park (Leetsdale, PA)	Park
	Kennedy Marina (Congo, WV)	Marina
	Shouse Park (Glenwillard, PA)	Park
13	West End-Elliott Overlook Park (Pittsburgh, PA)	Park
	Manchester Park (Pittsburgh, PA)	Park
	Scott Township Municipal Park (Scott Township, PA)	Park
	Thornburg Conservation Area (Pittsburgh, PA)	Park
	McGonigle Park (Pittsburgh, PA)	Park
	Sheraden Park (Pittsburgh, PA)	Park
	Allegheny Commons Park West (Pittsburgh, PA)	Park
	National Aviary (Pittsburgh, PA)	Museum
	Frank Curto Park (Pittsburgh, PA)	Park
	Art Park (Pittsburgh, PA)	Park
	Heinz College (Pittsburgh, PA)	School
	Phipps Conservatory (Pittsburgh, PA)	Museum
13	Schenley Park (Pittsburgh, PA)	Park
	Junction Hollow Trail (Pittsburgh, PA)	Trail

Section	Noise Sensitive Land Use	Land Use Type
	Great Allegheny Passage/Three Rivers Heritage Trail(Pittsburgh, PA)	Trail
	Southside Riverfront Park (Pittsburgh, PA)	Park
	Point of View Park (Pittsburgh, PA)	Trail

Vibration Evaluation

Similar to noise screening, the FRA uses a table of distances to determine whether vibration-sensitive land uses are located close enough to the proposed high-speed train system for impact from ground borne vibration to be possible. The vibration screening method is intended to be applied early in a project's development before many details on the system have been defined. It allows a quick check to identify whether and where impacts from ground borne vibration may occur. Vibration impacts due to high speed rail projects are not a common occurrence. Land uses would have to be located immediately adjacent to or directly above a rail line. Land uses that may be sensitive to ground-borne vibration could include high-tech manufacturing facilities, universities, or other research facilities and hospitals. The screening procedure does not require any specific knowledge about the vibration characteristics of the system or the geology of the area. A screening distance of 60 feet is used for steel-wheel/steel rail high speed train systems traveling at 100 mph. All segments of the project corridor were scanned using Google Earth to identify any red flag land use located within approximately 60 feet of the railroad centerline. No red flag vibration-sensitive land uses were identified within the rail corridor or within the 60 foot screening distance.

Cultural Resources

Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effect of their undertakings on historic properties. Cultural resources include historic and archaeological resources that are listed or are eligible for listing on the National Register of Historic Places (NRHP). Sites listed on the NRHP are also subject to Section 4(f) of the U.S. Department of Transportation Act.

The Ohio State Historic Preservation Office (SHPO), Pennsylvania Cultural Resources Geographic Information System, and the West Virginia State Preservation Office provided information about resources that are currently listed or eligible for listing on the NRHP. The Ohio Genealogical Society (OGS) provided information on the location of cemeteries in Ohio. Resources were mapped within one mile of proposed corridor, shown on *Community Resources Figures 1-85*. Areas that were previously surveyed for cultural resources are also shown on the mapping. Table 12 below summarizes cultural resources within 500 feet of the rail alignment by corridor section, including places that are listed on or eligible for listing on the National Register of Historic Places (NRHP) and cemeteries.

Table 12: Cultural Resources near the Corridor

Section	Cultural Resources Within 500 Feet of Rail Alignment
1	• 3 NRHP-listed sites and 2 cemeteries in Lima (OH) • 1 NRHP-listed resource in Ada (OH) • 1 cemetery just southeast of Dunkirk (OH)
2	• 3 three NRHP-eligible sites in Lima (OH) • 1 cemetery just southeast of Lima (OH)
3	• 2 cemeteries between Kenton (OH) and Marysville (OH)

Section	Cultural Resources Within 500 Feet of Rail Alignment
4	• 2 cemeteries in Marysville (OH)
5	• 1 NRHP-listed resource in Washington Township in Franklin County (OH)
6	• 6 NRHP-listed resources and 2 cemeteries in Columbus (OH)
7	• 1 NRHP-eligible resource on the west side of Pataskala (OH) • 5 NRHP-eligible resources on the east side of Pataskala (OH) • 1 cemetery between Pataskala (OH) and Newark (OH) • 1 NRHP-eligible resource, 1 NRHP-listed resource, and 1 cemetery in Newark (OH) • 2 NRHP-eligible resources between Marne (OH) and Frazeysburg (OH)
8	• 1 NRHP-listed resource and 1 cemetery in Coshocton (OH) • 2 cemeteries between West Lafayette (OH) and Newcomerstown (OH) • 2 cemeteries in Newcomerstown (OH) • 3-NRHP listed resources in Uhrichsville (OH)
9	• 1 cemetery just west of Mingo Junction (OH)
10	• 1 cemetery in Hopedale (OH)
11	• None
12	• 1 NRHP-listed resource just west of Mingo Junction (OH) • 2 NRHP-listed resources in Mingo Junction (OH) • 1 NRHP-listed resource and 2 cemeteries north of Steubenville (OH) • 1 NRHP-listed resource in Toronto (OH) • 1 NRHP-listed resource and 1 cemetery in Wellsville (OH) • 2 NRHP-listed resources, 1 NRHP-eligible resource, and 1 cemetery in East Liverpool (OH) • 1 NRHP-listed resource at the Ohio/Pennsylvania border
13	• tbd

Section 4(f) and Other Community Resources

Section 4(f) of the Department of Transportation Act (49 USC 303) prevents the FTA from approving the use of land from a publicly-owned park, recreational area, wildlife and waterfowl refuge, or historical site of national, state, or local significance unless there is no feasible and prudent alternative and the action has undergone all possible planning to minimize harm to the resource. Some examples of Section 4(f) properties include historic buildings, archaeological sites, historic districts, school playgrounds, trails, and parks. Information about the location of parks was obtained from Esri Online (sourcing National Park Service and Tom Tom data) as well as desktop research using Google Earth to scan all sections of the project corridor to identify any potential Section 4(f) land uses located within 500 feet of the railroad centerline. Historical resources within 500 feet of the rail alignment were summarized in the previous section. Section 4(f) may also potentially be applicable to the other community resources summarized by corridor section in Table 13 below.

Table 13: Potential Section 4(f) Resources near the Corridor

Section	Potential Section 4(f) Resources Within 500 Feet of Rail Alignment (Not Including Cultural Resources)
1	• Schoonover Park (Lima, OH) • CE Wharton Memorial Park (Kenton, OH)

Section	Potential Section 4(f) Resources Within 500 Feet of Rail Alignment (Not Including Cultural Resources)
2	• Lincoln Park (Lima, OH) • Harrod Veteran's Memorial Park (Harrod, OH)
3	• Wood Longbrake Memorial Park (Raymond, OH)
4	• Millcreek Park (Marysville, OH) • Swartzkopf Park (Marysville, OH) • McCarthy Park (Marysville, OH) • American Legion Park (Marysville, OH)
5	• Darree Fields Park (Dublin, OH)
6	• McKinley Field Park (Grandview, OH) • Wyman Woods Park (Grandview, OH) • McFerson Commons Park (Columbus, OH) • I-670 Bikeway (Columbus, OH) • Saunders Park (Columbus, OH) • Avalon Park (Columbus, OH) • Cassady Park (Columbus, OH) • Nelson Park (Columbus, OH) • Whitehall Community Park (Columbus, OH)
7	• William V. Karr Park (Pataskala, OH) • Infirmary Mound Park (Granville, OH) • Heath Community Park (Newark, OH) • Wells Park (Newark, OH) • T.J. Evans Panhandle Recreational Trail (Newark, OH) • The Virtues Golf Club (between Hanover and Frazeysburg, OH) • Frew Park (Frazeysburg, OH) • Frazeysburg Pool (Frazeysburg, OH) • Frazeysburg Elementary School Playground (Frazeysburg, OH) • Monroe Basin State Wildlife Area (between Frazeysburg and Coshocton, OH)
8	• East Elementary Playground (Newcomerstown, OH) • Hecks Grove Park (Gnadenhutten, OH) • McCluskey Park (Uhrichsville, OH) • Conotton Creek Trail (between Bowerston and Scio, OH) • Scio Soccer Field (Scio, OH)
9	• None
10	• Friendship Park (north of Smithfield, OH) • Fernwood State Forest (west of New Alexandria, OH)
11	• Cross Creek County Park (between Avella and Rea, PA) • Mount Pleasant Township Park/Hickory Park (Hickory, PA) • Cecil Park (east of Venice, PA)
12	• Broadhead Park (Vanport, PA) • Belleview Municipal Park (Steubenville, OH) • Bridgewater Crossing (Bridgewater, PA) • Rochester Riverfront Park (Rochester, PA) • Park Road Park (Ambridge, PA) • Edward C. Henli Park (Leetsdale, PA) • Morrow Pontefract Park (Leetsdale, PA) • Shouse Park (Glenwillard, PA) • Emsworth Community Park in Dixmom (PA)
13	• Scott Township Municipal Park (Scott Township, PA)

Section	Potential Section 4(f) Resources Within 500 Feet of Rail Alignment (Not Including Cultural Resources)
	• Manchester Park (Pittsburgh, PA) • West End-Elliott Overlook Park (Pittsburgh, PA) • West Park (Pittsburgh, PA) • Grandview Overlook Park (Pittsburgh, PA) • Thornburg Conservation Area (Pittsburgh, PA) • McGonigle Park (Pittsburgh, PA) • Sheraden Park (Pittsburgh, PA) • Allegheny Commons Park West (Pittsburgh, PA) • Cliffside Parklet (Pittsburgh, PA) • Frank Curto Park (Pittsburgh, PA) • West Penn Park (Pittsburgh, PA) • Bloomfield Playground (Pittsburgh, PA) • Ormsby Playground (Pittsburgh, PA) • Four Mile Run Playground (Pittsburgh, PA) • Schenley Park (Pittsburgh, PA) • Bud Hammer Playground (Pittsburgh, PA) • Lewis Playground (Pittsburgh, PA) • Arlington Heights Playground (Pittsburgh, PA) • Junction Hollow Trail (Pittsburgh, PA) • Great Allegheny Passage/Three Rivers Heritage Trail (Pittsburgh, PA) • Southside Riverfront Park (Pittsburgh, PA) • Steel Valley Trail (Pittsburgh, PA) • Point of View Park (Pittsburgh, PA)

5.2. Regulated Materials

The project reviewed data from the ODOT Regulated Properties Search (ORPS)[11], the West Virginia Department of Environmental Protection GIS Viewer 2.1[12], and the Pennsylvania Department of Environmental Protections eMapPA[13]. All regulated material locations are shown on the environmental resources map and should be taken into consideration; however, landfills and superfund sites are generally of the greatest concern. Table 14 below shows a count of the number of landfills and/or superfund sites by corridor section. Any work within 300 feet of a landfill requires a permit. If the 300 foot landfill buffer was within the environmental study area (300 foot buffer of corridor), it was counted and noted as a concern. A buffer was not added to the superfund sites. The Ohio database has two landfill categories: historic or abandoned and active. The historic landfill is not differentiated from the abandoned landfill on the exhibits; they are both shown as the same symbol. No landfills or superfund sites are located within the environmental study area in West Virginia. The Pennsylvania database has two categories of landfills: landfill and abandoned landfill. All landfills within the environmental study area in Pennsylvania were counted, regardless of category.

[11] https://gis3.dot.state.oh.us/rmr/
[12] https://dep.wv.gov/Pages/default.aspx
[13] http://www.depgis.state.pa.us/emappa/

Table 14: Regulated Materials near the Corridor

Section	Regulated Materials
1	• Historic or Abandoned Landfills - 2 • Superfund sites - 1
2	• Historic or Abandoned Landfills - 3 • Superfund sites - 1
3	• Historic or Abandoned Landfills - 0 • Superfund sites - 0
4	• Landfills- 0 • Superfund sites -1
5	• Historic or Abandoned Landfills -3 • Superfund sites - 0
6	• Historic or Abandoned Landfills - 11 • Active Landfills - 1 • Superfund sites - 0
7	• Historic or Abandoned Landfills - 4 • Active Landfills - 1 • Superfund sites - 0
8	• Historic or Abandoned Landfills - 11 • Active Landfills - 0 • Superfund sites - 2
9	• Historic or Abandoned Landfills - 0 • Active Landfills - 0 • Superfund sites - 0
10	• Historic or Abandoned Landfills - 0 • Active Landfills - 0 • Superfund sites - 0
11	• Historic or Abandoned Landfills - 2 • Active Landfills - 0 • Superfund sites - 0 • Abandoned Landfills - 1
12	• Historic or Abandoned Landfills - 5 • Active Landfills - 0 • Superfund sites - 2 • Abandoned Landfills - 4 • Penn Landfill - 1
13	• Historic or Abandoned Landfills - 0 • Active Landfills - 0 • Superfund sites - 0 • Abandoned Landfills - 0

5.3. Ecological Resources

Water Resources

The project team reviewed a variety of materials and data sources to identify water resources in along the preliminary rail corridor. Regulatory and guidance documents reviewed included Chapter

93 of the Pennsylvania Code[14] and the Ohio EPA Antidegradation Regulations[15]. In addition to these regulatory documents, the project team collected data from the National Wild and Scenic Rivers System Map[16], the US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI)[17], the US Geological Survey (USGS) National Hydrography Dataset (NHD)[18], and the Pennsylvania Spatial Data Access[19] to identify streams and wetlands within 300 feet of the preliminary project corridor alignment. In Ohio, high quality streams have the following designations: Outstanding State Waters (OSW) and Superior High Quality Waters (SHQW). In PA, high quality streams are designated as High Quality Waters (HQ). West Virginia high quality streams are designated as Tier 3 streams. No Tier 3 streams are located within the 300 foot study area. Table 15 provides information about notable wetlands and high quality streams by corridor section. Please note that NWI wetlands and NHD streams are not listed on the table, but are shown on the ecological maps.

Table 15: Notable Water Resources near the Corridor

Section	Notable and/or High Quality Water Resources
1	• No notable wetlands
2	• No notable wetlands
3	• No notable wetlands
4	• No notable wetlands
5	• No special wetlands
6	• No special wetlands • Superior High Quality Waters (SHQW): o Scioto River o Big Walnut Creek
7	• Superior High Quality Waters (SHQW): Muskingum River • Outstanding State Waters (OSW): o Wakatomika Creek o Rocky Fork
8	• No Special wetlands
9	• No Special wetlands
10	• No Special wetlands
11	• No special wetlands • Special waters o OH - none o WV - none o PA - High Quality Waters (HQ) ▪ South Fork Cross Creek ▪ Cross Creek
12	• Special waters o OH - none

[14] https://www.pacode.com/secure/data/025/chapter93/chap93toc.html
[15] https://www.epa.state.oh.us/portals/35/rules/01-05.pdf
[16] https://www.rivers.gov/index.php
[17] https://www.fws.gov/wetlands/
[18] https://www.usgs.gov/core-science-systems/ngp/national-hydrography
[19] http://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=1098

Section	Notable and/or High Quality Water Resources
	○ WV - none ○ PA - ▪ High Quality Waters (HQ)- Little Sewickley Creek ▪ National Scenic River- Little Beaver Creek • No special wetlands
13	• Special waters ○ OH - none ○ WV - none ○ PA - none • No special wetlands

State and Federally-Listed Threatened and Endangered (T&E) Species

The Endangered Species Act of 1973 (ESA) provides protections for species that are listed by the federal government as threatened, endangered, or proposed for such listing. The ESA prohibits non-permitted take of species listed and proposed for listing under this law; "take" is defined in ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such activity. The USFWS has administrative authority for enforcement of the ESA relative to non-marine species; the National Marine Fisheries Service (NMFS) has enforcement authority relative to marine and anadromous species. The Migratory Bird Treaty Act of 1918, as amended, extends federal protection to migratory bird species; among other activities, non-regulated "take" of migratory birds is prohibited under this Act in a manner similar to the ESA prohibition of "take" of threatened and endangered species. Specific habitats for threatened and endangered species may be designated as "critical habitat" under the ESA. Federal agencies are required to ensure that actions authorized, funded, or carried out by the agency are not likely to result in the destruction or adverse modification of critical habitats.

Ohio and Pennsylvania also maintain state lists of threatened and endangered species. Ohio Revised Code 1531.25 allows the chief of the Ohio Department of Natural Resources (ODNR) Division of Wildlife to adopt rules that restrict the taking or possession of species threatened with statewide extinction. In Pennsylvania, protections for state-listed threatened and endangered species are provided in the Pennsylvania Fish and Boat Code (30 Pa.C.S.§ §102,2502,2504, and 2506), the Game and Wildlife Code (34 Pa.C.S. .§ §102,925,2164-67, and 2924), the Wild Resource Conservation Act (32 P.S. .§ §5301-5314), and the Conservation of Pennsylvania Native Wild Plans (17 Pa. Code § 45.1-91). West Virginia does not have state-listed species.

Specific locations of species and/or habitat were not evaluated at this level of detail and are not shown on the mapping. The potential for impacts to state- and federally-listed Threatened and Endangered Species were evaluated for Sections 1-13 by noting the species that may occur within each county[20] in Table 16 below. This does not include Federally-listed mussel species, which are addressed in a separate section below.

[20] Data sources: Pennsylvania Natural Heritage Program (PNHP): Pennsylvania Conservation Explorer (https://conservationexplorer.dcnr.pa.gov/); Pennsylvania Natural Heritage Program (PNHP) (http://www.naturalheritage.state.pa.us/Species.aspx) Pennsylvania Natural Heritage Program (PNHP): Pennsylvania Conservation Explorer (https://conservationexplorer.dcnr.pa.gov/) Pennsylvania Natural

Table 16: State and Federal Listed T&E Species near the Corridor

Section	State and Federal Listed T&E Species by County*
1	• Allen County, OH: Indiana bat, Northern long-eared bat, upland sandpiper • Hardin County, OH: Indiana bat, Northern long-eared bat, Eastern massasauga, Copperbelly water snake, Upland sandpiper, Northern harrier
2	• Allen County, OH: Indiana bat, Northern long-eared bat, Upland sandpiper • Hardin County, OH: Indiana bat, Northern long-eared bat, Eastern massasauga, Copperbelly water snake, Upland sandpiper, Northern harrier
3	• Union County, OH: Indiana bat, Northern long-eared bat, King rail, Northern harrier, Loggerhead shrike, Scioto madtom • Hardin County, OH: Indiana bat, Northern long-eared bat, Eastern massasauga, Copperbelly water snake, Upland sandpiper, Northern harrier • Logan County, OH: Indiana bat, Northern long-eared bat, Eastern massasauga, Spotted turtle
4	• Union County, OH: Indiana bat, Northern long-eared bat, King rail, Northern harrier, Loggerhead shrike, Scioto madtom
5	• Union County, OH: Indiana bat, Northern long-eared bat, King rail, Northern harrier, Loggerhead shrike • Madison County, OH: Indiana bat, Northern long-eared bat, Upland sandpiper, King rail, Northern harrier, Scioto madtom • Franklin County, OH: Indiana bat, Northern long-eared bat, Upland sandpiper, Scioto madtom
6	• Franklin County, OH: Indiana bat, Northern long-eared bat, Upland sandpiper, Scioto madtom
	•
7	• Licking County, OH: Indiana bat, Northern long-eared bat, Eastern massasauga • Muskingum County, OH: Indiana bat, Northern long-eared bat, Eastern hellbender, Eastern spadefoot, Northern harrier • Coshocton County, OH: Indiana bat, Northern long-eared bat, Eastern hellbender, Eastern spadefoot, Northern harrier
8	• Coshocton County, OH: Indiana bat, Northern long-eared bat, Eastern hellbender, Eastern spadefoot, Northern harrier • Tuscarawas County, OH: Indiana bat, Northern long-eared bat, Eastern hellbender, Eastern spadefoot, Northern harrier • Harrison County, OH: Indiana bat, Northern long-eared bat, Upland sandpiper
9	• Harrison County, OH: Indiana bat, Northern long-eared bat, Upland sandpiper • Jefferson County, OH: Indiana bat, Northern long-eared bat, Eastern hellbender
10	• Harrison County, OH: Indiana bat, Northern long-eared bat, Upland sandpiper • Jefferson County, OH: Indiana bat, Northern long-eared bat, Eastern hellbender

Heritage Program (PNHP) (http://www.naturalheritage.state.pa.us/Species.aspx); USFWS: Endangered Species https://www.fws.gov/endangered/; ODOT technical guidance: ODOT:TG-ECO-04-16 ; http://www.dot.state.oh.us/Divisions/Planning/Environment/Ecological_Resources_Permits/Ecology/Documents/TechnicalGuidance/State%20Listed%20Species%20Technical%20Guidance.pdf).

Section	State and Federal Listed T&E Species by County*
11	• Jefferson County, OH: Indiana bat, Northern long-eared bat, Eastern hellbender • Washington County, PA: Indiana Bat, Eastern Sand Darter, River Shiner, Ghost Shiner, Sheepnose Mussel, Rabbitsfoot, Pistolgrip Mussel, Round Hickorynut, Bog Goldenrod, Stalked Bulrush, Tennessee Pondweed, Northern Water-milfoil, Oblique Milkvine, American Gromwell, Purple Rocket, Bicknell's Hoary Rockrose, Harbinger-of-spring, Wild Bleeding-hearts, Tall Larkspur, Northern Small Yellow Lady's-slipper, Blue False-indigo, Vase-vine Leather-flower, Cattail Sedge • Allegheny County, PA: Short-eared Owl, Northern Harrier, Peregrine Falcon, Migrant Loggerhead Shrike, Eastern Massasauga, Northern Cricket Frog, Kirtland's Snake, Lake Sturgeon, Longnose Sucker, Gravel Chub, Eastern Sand Darter, Warmouth, River Shiner, Ghost Shiner, Southern Redbelly Dace, Snuffbox, Sheepnose Mussel, Rabbitsfoot, Round Hickorynut, Pistolgrip Mussel, Limestone Petunia, Gray-headed Prairie Coneflower, Common Hop-tree, Common Shooting-star, Tennessee Pondweed, Balsam Poplar, Purple-fringeless Orchid, Passion-flower, False Gromwell, Northern Water-milfoil, Spotted Bee-balm, Oblique Milkvine, Large-flowered Marshallia, American Gromwell, Torrey's Rush, Forked Rush, Crested Dwarf Iris, Purple Rocket, Bicknell's Hoary Rockrose, Cluster Fescue, Tall Larkspur, Four-angled Spike-rush, Harbinger-of-spring, Southern Small Yellow Lady's-slipper, Vase-vine Leather-flower, Cattail Sedge, Carey's Sedge, Wild Hyacinth, Blue False-indigo, Northern Water-plantain, Scarlet Ammannia, Eastern Blue-eyed Grass
12	• Jefferson County, OH: Indiana bat, Northern long-eared bat, Eastern hellbender • Columbiana County, OH: Indiana bat, Northern long-eared bat, Eastern hellbender, Eastern massasauga, American bittern • Beaver County, PA: Beaver: Long-eared Owl, Peregrine Falcon, Migrant Loggerhead Shrike, North American Least Shrew, Indiana Bat, Bigmouth Buffalo, Warmouth, Longear Sunfish, Ghost Shiner, Southern Redbelly Dace, Snuffbox, Sheepnose Mussel, Clubshell, Rabbitsfoot, Pistolgrip Mussel, Bog Goldenrod, Stalked Bulrush, Tennessee Pondweed, Northern Water-milfoil, Oblique Milkvine, American Gromwell, Purple Rocket, Bicknell's Hoary Rockrose, Harbinger-of-spring, Wild Bleeding-hearts, Tall Larkspur, Northern Small Yellow Lady's-slipper, Blue False-indigo, Vase-vine Leather-flower, Cattail Sedge • Allegheny County, PA: Short-eared Owl, Northern Harrier, Peregrine Falcon, Migrant Loggerhead Shrike, Eastern Massasauga, Northern Cricket Frog, Kirtland's Snake, Lake Sturgeon, Longnose Sucker, Gravel Chub, Eastern Sand Darter, Warmouth, River Shiner, Ghost Shiner, Southern Redbelly Dace, Snuffbox, Sheepnose Mussel, Rabbitsfoot, Round Hickorynut, Pistolgrip Mussel, Limestone Petunia, Gray-headed Prairie Coneflower, Common Hop-tree, Common Shooting-star, Tennessee Pondweed, Balsam Poplar, Purple-fringeless Orchid, Passion-flower, False Gromwell, Northern Water-milfoil, Spotted Bee-balm, Oblique Milkvine, Large-flowered Marshallia, American Gromwell, Torrey's Rush, Forked Rush, Crested Dwarf Iris, Purple Rocket, Bicknell's Hoary Rockrose, Cluster Fescue, Tall Larkspur, Four-angled Spike-rush, Harbinger-of-spring, Southern Small Yellow Lady's-slipper, Vase-vine Leather-flower, Cattail Sedge, Carey's Sedge, Wild Hyacinth, Blue False-indigo, Northern Water-plantain, Scarlet Ammannia, Eastern Blue-eyed Grass
13	• Allegheny County, PA: Short-eared Owl, Northern Harrier, Peregrine Falcon, Migrant Loggerhead Shrike, Eastern Massasauga, Northern Cricket Frog, Kirtland's Snake, Lake Sturgeon, Longnose Sucker, Gravel Chub, Eastern Sand Darter, Warmouth, River Shiner, Ghost Shiner, Southern Redbelly Dace, Snuffbox, Sheepnose Mussel, Rabbitsfoot, Round Hickorynut, Pistolgrip Mussel, Limestone Petunia, Gray-headed Prairie Coneflower, Common Hop-tree, Common Shooting-star, Tennessee Pondweed, Balsam Poplar, Purple-fringeless Orchid, Passion-flower, False Gromwell, Northern Water-milfoil, Spotted Bee-balm, Oblique Milkvine, Large-flowered Marshallia, American Gromwell, Torrey's Rush, Forked Rush, Crested Dwarf Iris, Purple Rocket, Bicknell's Hoary Rockrose, Cluster Fescue, Tall Larkspur, Four-angled Spike-rush, Harbinger-of-spring, Southern Small Yellow Lady's-slipper, Vase-vine Leather-flower, Cattail Sedge, Carey's

Section	State and Federal Listed T&E Species by County*
	Sedge, Wild Hyacinth, Blue False-indigo, Northern Water-plantain, Scarlet Ammannia, Eastern Blue-eyed Grass

**West Virginia does not have state-listed T&E species.*

Listed Mussel Streams

Ohio and West Virginia have both developed protocols to provide standards for the process of identify and documenting the potential presence or absence of federally listed mussel species (FLS). The project team reviewed by the 2018 Ohio Mussel Survey Protocol[21] and the 2018 West Virginia Mussel Survey Protocols[22]. In Ohio and West Virginia, streams that are considered likely to have habitat for FLS are classified into four groups: Group 1 (Small to mid-sized streams, FLS not expected; Group 2 (Small to mid-sized streams, FLS expected); Group 3 (Large Rivers, FLS not expected); and Group 4 (Large Rivers, FLS expected). Pennsylvania does not have a mussel protocol, but does have a state list of mussel streams[23]. Table 17 below notes Group 2 or 4 streams within the environmental study area in Ohio and West Virginia. Numerous unlisted, Group 1 and Group 3 crossings which may affect state-listed species are possible with the proposed corridor and are not included below.

Table 17: Federally-Listed Mussel Streams near the Corridor

Section	Federally-Listed Mussel Streams within Study Area
1	• None
2	• None
3	• Group 2 Stream- Mill Creek (Union County, Ohio)
4	• Group 2 Stream- Mill Creek (Union County, Ohio)
5	• None
6	• Group 4 Stream – Scioto River (Franklin County, Ohio)
7	• Group 4 Stream – Muskingum River (Coshocton County, Ohio)
8	• Group 4 Stream – Muskingum River (Coshocton County, Ohio)
9	• None
10	• None
11	• None
12	• Federally Listed Mussel Stream – Ohio River (PA)
13	• Federally listed Mussel Stream – Ohio River (PA)

[21] https://wildlife.ohiodnr.gov/portals/wildlife/pdfs/licenses%20&%20permits/OH%20Mussel%20Survey%20Protocol.pdf

[22] https://www.fws.gov/westvirginiafieldoffice/PDF/2018WVMusselSurveyProtocols.pdf

[23] https://pa.fisheries.org/wp-content/uploads/2018/02/Mussel-ID-workshop-field-guide-2-9-18.pdf

5.4. Air Quality

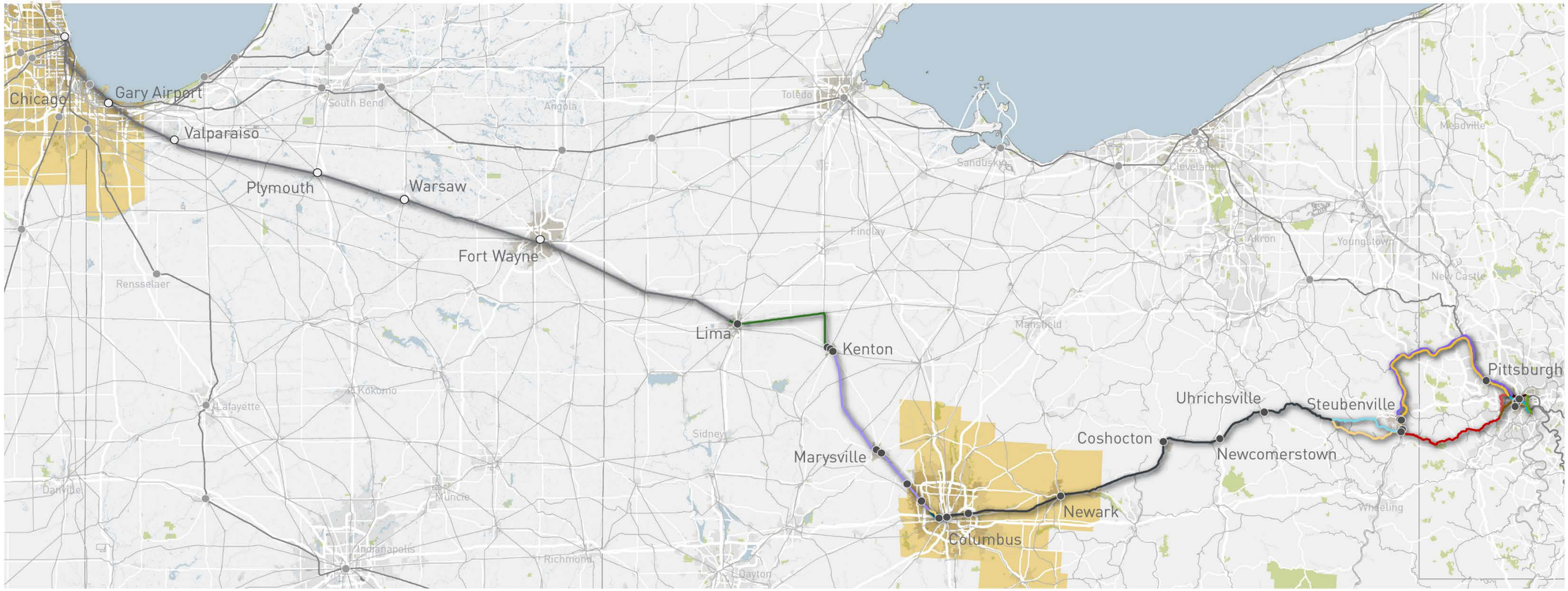
The Chicago to Pittsburgh corridor directly serves four counties which are designated National Ambient Air Quality Standards (NAAQS) 8-hour ozone nonattainment zones – Cook County, IL, Lake County, IN, Franklin County, OH, and Licking County, OH. These are areas where ground-level ozone, caused when pollutants from cars, power plants, refineries, and other sources chemically react with sunlight, exceeds the maximum allowed measurement for ozone as determined by NAAQS posing human health risks and harmful environmental effects.[24] In addition to the four counties directly served by the corridor, two additional 8-hour ozone nonattainment counties lie within 10 miles of the corridor – Delaware County, OH and Fairfield County, OH. See Figure 31 for a map of corridor nonattainment areas.[25]

In addition to 8-hour ozone nonattainment areas, Alleghany County, PA (Pittsburgh) is a designated NAAQS nonattainment area for particulate matter (PM-2.5, 2012 standards) and sulfur dioxide (2010 standards). Particulate matter is typically caused by complex chemical reactions involving sulfur dioxide and nitrogen oxides, both of which are pollutants from power plants, industries, and automobiles.[26] Sulfur dioxide is typically caused by the burning of fossil fuels by power plants and other industrial facilities.[27] Similar to ozone pollution, both particulate matter and sulfur dioxide pollution are harmful to the human respiratory system and the environment.

As discussed in the RSTI Goals and Objectives Report, passenger rail offers an energy-efficient solution to intercity travel and has lower emissions than other modes. Thus, rail would be expected to have less of an air quality impact than other modes.

[24] Environmental Protection Agency. Ground-level Ozone Pollution. https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#effects
[25] Environmental Protection Agency. Green Book, Current Nonattainment Counties for All Criteria Pollutants. https://www3.epa.gov/airquality/greenbook/ancl.html
[26] Environmental Protection Agency. Particulate Matter Pollution. https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#PM
[27] Environmental Protection Agency. Sulfur Dioxide Pollution. https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#what%20is%20so2

Figure 31: Corridor Ozone Nonattainment Areas



Corridor Nonattainment Areas

- 8-Hour Ozone (2015) National Ambient Air Quality Standards (NAAQS) Nonattainment Counties

Lima - Pittsburgh Alternative Rail Segments & Stations

- Potential station locations
- Lima to Dunkirk to Kenton
- Kenton to Marysville to Columbus
- Columbus - North
- Columbus - South
- Columbus to Mingo Junction
- Mingo Junction - North
- Mingo Junction - South
- Mingo Junction to Pittsburgh - North A
- Mingo Junction to Pittsburgh - South
- Pittsburgh - Downtown
- Pittsburgh - Downtown to Carnegie Mellon
- Pittsburgh - Ohio River West Lower
- Pittsburgh - Ohio River West Upper
- Kirwan Heights to Dawn
- Kirwan Heights to Ohio Connecting Bridge

Chicago - Lima Rail Corridor

- Chicago - Lima Rail Corridor and stations

Other Map Features

- Other rail lines
- Amtrak routes & stations
- Interstate highway
- US highway
- State road
- Parks
- Rivers, streams, and waterbodies
- Census designated urbanized areas (UZA)
- Census places (incorporated areas)

5.5. Future Environmental Considerations

This report and the complementary Goals and Objectives Report and Route Alternatives Analysis Report outline preliminary rail alignments and station locations based on initial public outreach and feedback. Pending continued interest and support for the RSTI Passenger Rail corridor, detailed analysis and public input will be required as part of future planning efforts to confirm route alignments, station locations, and formally advance the NEPA process.

Defined route alternatives and station locations will affect various environmental resources, however not all of the elements discussed previously will be affected. Environmental resources will also be affected by specific planning and engineering decisions that may alter right-of-way (ROW) and adjacent resources. Infrastructure and facility decisions such as adjusting rail alignments with tight curve radii, and the location and size of station footprints will have varying environmental resource impacts that are to be determined in future efforts.

Other future considerations that are not included in the Environmental Section include facilities and infrastructure that are above and beyond the basic provision of RSTI Passenger Rail. Additional facilities such as station parking structures or passenger separated ROW would have development and traffic impacts extending beyond the corridor area which would require sufficient environmental planning, analysis, and outreach.

5.6. Next Steps

The release of this report is aligned with outreach involving corridor stakeholders and members of the public in which additional comments regarding corridor alignments and stations will be received for future planning efforts. Collectively, this Existing Conditions Report, the Goals and Objectives Report, and the Route Alternatives Report are documents that allow the project to advance into the NEPA planning process pending future interest and support.

Additional project elements that are not included in prepared documents to-date that further prepare the RSTI Passenger Rail Initiative for NEPA include a Service Alternatives Report, Infrastructure Investment Report, and additional Public Involvement. The completion of these efforts are recommended next steps to advance the project.

Appendix A

List of Fortune 500 Headquarters in Corridor Cities

Source: Midwest Connect Hyperloop Proposal Appendix, October 28, 2016.

Chicago, IL Region

Company Name	Rank	City
Boeing	24	Chicago, IL
Archer Daniels Midland	41	Chicago, IL
Walgreen Boots Alliance	19	Deerfield, IL
Jnited Continental Holdings, Inc.	80	Chicago, IL
The Allstate Corporation	81	Northbrook, IL
Mondelez International, Inc.	94	Deerfield, IL
Sears Holdings Corporation	111	Hoffman Estates, IL
McDonald's Corporation	109	Oak Brook, IL
Exelon Corporation	95	Chicago, IL
US Foods, Inc.	122	Rosemont, IL
Abbott Laboratories	138	Abbott Park, IL
AbbVie Inc.	123	North Chicago, IL
Kraft Heinz	153	Northfield, IL
Baxter International Inc.	286	Deerfield, IL
Illinois Tool Works Inc.	211	Glenview, IL
CDW Corporation	220	Vernon Hills, IL
R.R. Donnelley & Sons Company	255	Chicago, IL
lavistar International Corporation	281	Lisle, IL
W.W. Grainger, Inc.	285	Lake Forest, IL
Discover Financial Services	283	Riverwoods, IL
Motorola Solutions, Inc.	451	Schaumburg, IL
LKQ Corporation	369	Chicago, IL
Anixter International Inc.	391	Glenview, IN
Packaging Corp of America	446	Lake Forest, IL

Chicago, IL Region Cont.

Company Name	Rank	City
Ingredion Incorporated	456	Westchester, IL
Old Republic International Corp.	442	Chicago, IL
Jones Lang LaSalle	436	Chicago, IL
Essendant	477	Deerfield, IL
Univar	315	Downers Grove, IL
Telephone & Data Systems	496	Chicago, IL

Source: Forbes 2016

Fortune 500 Company Headquarters by Region

Columbus, OH Region

Company Name	Rank	City
Cardinal Health	21	Dublin, OH
Nationwide Mutual Insurance	69	Columbus, OH
American Electric Power	165	Columbus, OH
L Brands Inc.	234	Columbus, OH
Big Lots	495	Columbus, OH

Pittsburgh, PA Region

Company Name	Rank	City
Dick's Sporting Goods	365	Coraopolis, PA
PPG Industries	182	Pittsburgh, PA
United States Steel	244	Pittsburgh, PA
WESCO International	357	Pittsburgh, PA
PNC Financial	171	Pittsburgh, PA
Kraft Heinz	153	Pittsburgh, PA

Lima, OH Region

Company Name	Rank	City
Marathon Petroleum	42	Findlay, OH

Fort Wayne, IN Region

Company Name	Rank	City
Zimmer Biomet Holdings	431	Warsaw, IN
Steel Dynamics	356	Ft. Wayne, IN

Appendix B

Top 20 Employers in Chicago, Fort Wayne, Lima, Columbus, and Pittsburgh

Source: Midwest Connect Hyperloop Proposal Appendix, October 28, 2016.

Top 20 Largest Employers by Region

Chicago, IL Region

Employer	Sector	FTE
US Government	Government	42,887
Chicago Public Schools	Education	37,406
City of Chicago	Government	30,276
Cook County	Government	21,795
Advocate Healthcare	Health Care	18,308
University of Chicago	Education	16,197
Northwestern Memorial Healthcare	Health Care	15,317
State of Illinois	Government	15,136
JP Morgan Chase	Financial Activities	14,158
United Continental Holdings	Aviation	14,000
Health Care Service Corp	Health Care	13,006
Walgreens Boots Alliance Inc.	Retail Trade	13.006
Presence Health	Health Care	10,500
Abbott Laboratories	Health Care	10,000
Northwestern University	Education	9,708
Jewel-Osco	Retail Trade	9,660
Chicago Transit Authority	Government	9,510
University of Illinois at Chicago	Education	9,212
American Airlines Group Inc.	Aviation	8,900
Rush University Medical Center	Health Care	8,273

Source: Crain's List 2016

Top 20 Largest Employers by Region

Fort Wayne, IN Region

Employer	Sector	FTE
Parkview Health Systems	Health Care	4,710
Lutheran Health Network	Health Care	4,301
Fort Wayne Community Schools	Education	4,230
General Motors	Manufacturing	3,909
Lincoln Financial Group	Insurance/Health Care	1,970
City of Fort Wayne	Government	1,814
Allen County Government	Government	1,605
BFGoodrich	Rubber Tire Manufacturing	1,580
IPFW	Education	1,255
BAE Systems Platform Solutions	Technology	1,150
Frontier Communications Corp.	Telecommunications	1,150
Raytheon Systems Co.	Technology	950
Harris Corporation	Telecommunications	888
Sweetwater Sound	Technology	850
Steel Dynamics Inc.	Manufacturing	825
Norfolk Southern Corp	Logistics	784
Northwest Allen County Schools	Education	742
Benchmark Human Services	Health Care	683
Vera Bradley	Retail Trade	630
Edy's Grand Ice Cream	Retail Trade	542

Source: Greater Fort Wayne Economic Development 2016

Top 20 Largest Employers by Region

Lima, OH Region

Employer	Sector	FTE
St. Rita's Medical Center	Health Care	3,000
Lima Building Trades Council	Manufacturing	1,470
Lima Memorial Health System	Health Care	910
Metokote Corporation	Manufacturing	800
Ford Motor Company	Manufacturing	650
Dana Corporation	Manufacturing	621
DTR Industries, Inc.	Manufacturing	611
SpartanNash	Retail Trade	550
University of Northwestern Ohio	Education	530
Plumbers & Pipefitters Local Union 776	Manufacturing	500
Wal-Mart	Retail Trade	450
Husky Lima Refinery	Manufacturing	420
Rudolph Foods Company	Retail Trade	400
Joint Systems Manufacturing	Manufacturing	400
ılfred Nickels Bakery Of Ohio Inc.	Retail Trade	300
Correctional Behavioral Solutions Of Ohio, Inc.	Government	300
Lakeview Farms, Inc.	Retail Trade	300
Oakwood Correctional Facility	Government	292
Procter & Gamble Manufacturing Company	Manufacturing	250
Accubuilt	Manufacturing	230

Source: Allen Economic Development Group 2016

Top 20 Largest Employers by Region

Columbus, OH Region

Employer	Sector	FTE
The Ohio State University	Education	29685
State of Ohio	Government	22030
JP Morgan Chase	Financial Activities	16975
Ohio Health	Health Care	16000
Nationwide Insurance	Financial Activities	11235
United States Government	Government	10800
City of Columbus	Government	8653
Columbus Public Schools	Education	8611
Mt. Carmel Health Systems	Health Care	8448
Honda of America	Manufacturing	7400
Franklin County	Government	6048
Nationwide Children's Hospital	Health Care	5762
Kroger	Retail Trade	5417
Limited Brands	Retail Trade	5200
Huntington Bancshares	Financial Activities	4170
Cardinal Health	Health Care	4030
Medco Health	Health Care	3831
American Electric Power	Utilities	3527
Battelle	Professional Services	2,618
Southwestern City Schools	Education	2500

Source: City of Columbus Economic Development 2016

Top 20 Largest Employers by Region

Pittsburgh, PA Region

Employer	Sector	FTE
UPMC	Health Care	43,000
Highmark Health	Health Care	22,000
US Government	Government	17,347
Commonwealth of Pennsylvania	Government	12,822
University of Pittsburgh	Education	12,386
Giant Eagle	Retail Trade	10,742
BNY Mellon Corp	Financial Activities	7,000
Allegheny County	Government	6,750
Wal-Mart	Retail Trade	6,200
Eat'n Park Hospitality Group	Retail Trade	5,614
Westinghouse Electric Co.	Chemicals/Technology	5,600
United States Steel Corp	Manufacturing	5,121
Carnegie Mellon University	Education	4,663
Excela Health	Health Care	4,658
Pittsburg Public Schools	Education	3,899
Verizon Communications	Telecommunications	3,300
City of Pittsburgh	Government	3,082
Heritage Valley Health System	Health Care	3,055
Fed Ex	Logistics	3,000
Allegheny Technologies	Manufacturing	2,900

Source: Pittsburgh Business Times 2016

Appendix C

Corridor Socioeconomic Condition Maps