Indiana Department of Transportation

BIL COMPLIANT

# INDIANA MULTIMODAL FREIGHT AND MOBILITY PLAN

May 2023

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## 1.1 Purpose of The Plan

The Fixing America's Surface Transportation (FAST) Act has guided federal funding for transportation through its active period from December 4, 2015 to September 30, 2021. The FAST Act established many "firsts" for freight planning that states need to consider as part of their long-range freight planning. To receive formula funds for freight transportation projects, state freight plans must meet requirements established by the FAST Act and align with National Highway Freight Program (NHFP) goals and National Multimodal Freight Policy (NMFP) goals. The Indiana Department of Transportation (INDOT) 2018 Multimodal Freight Plan [1] was a FAST Act-compliant document.

The Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL), was signed into law on November 15, 2021. The BIL increases the frequency of updating state freight plans from every five years to every four years. While many of the components of freight planning under FAST Act are carried forward as part of BIL, certain new content requirements have been established by BIL for state freight plans.

The new Indiana Multimodal Freight and Mobility Plan represents an update to 2018 Indiana Multimodal Freight Plan. It is a BIL-compliant document. INDOT expects to use the new plan to develop and prioritize strategies and projects to address statewide major freight issues and needs and guide transportation investment decisions. The new plan also coordinates with INDOT's existing plans to ensure consistency and meet the two major freight planning needs identified by INDOT:

- Promote using preferred freight corridors; and
- Improve multimodal linkages.

## 1.2 Stakeholder Engagement

The development of the new plan was undertaken by INDOT in partnership with freight stakeholders throughout the state. Extensive efforts have been made to engage freight stakeholders to ensure the new plan meets the state and industry's needs for long-range freight planning.

A three-level hierarchy of target stakeholders was established at the beginning of the study to provide guidance and input throughout the planning process. **Table 1.1** summarizes the target stakeholders, roles, and engagement activities. Details of stakeholder engagement are described in corresponding chapters of this report.

[1] Indiana DOT, Indiana Multimodal Freight Plan Update, 2018.

## Table 1.1 – Target Stakeholders and Engagement

| TARGET STAKEHOLDERS | POLICY & GOALS | ISSUES & NEEDS | STRATEGIES & ACTIONS | FINDINGS & REPORT |
|---|---|---|---|---|
| | **Time:** Jan & Feb 2022<br>**Purpose:** Get consensus on INDOT's freight plan goals<br>**Means:** Online survey | **Time:** Mar & Apr 2022<br>**Purpose:** Collect input on freight issues, needs, and improvement ideas<br>**Means:** Map-based online survey | **Time:** June 2022<br>**Purpose:** Develop weights for the rating system to support project prioritization<br>**Means:** Online survey | **Time:** Nov 2022<br>**Purpose:** Solicit comments on major findings and recommendations<br>**Means:** Email coordination |
| **Project Team**<br>• FHWA<br>• INDOT Central Office<br>• Conexus [1]<br>• Consultant | ✓ | ✓ | ✓ | ✓ |
| **Planning Partners**<br>• INDOT Districts<br>• MPOs<br>• RPOs<br>• Ports of Indiana | ✓ | ✓ | ✓ | ✓ |
| **Freight/Logistics Industry**<br>• Industry Representatives<br>• IMTA (Indiana Motor Truck Association) | | ✓ | ✓ | |

[1] The State Freight Advisory Committee has been engaged through Conexus.

## 1.3 Plan Structure

The new plan describes Indiana's freight transportation system, its role in the state's economy, INDOT's freight planning goals and objectives, current and future trends, issues and needs, recommended improvement strategies, and project prioritization. This plan also includes a fiscally constrained Investment Plan that discusses INDOT's current freight priority projects and the use of National Highway Freight Program (NHFP) funds.

The remainder of the new Indiana Multimodal Freight and Mobility Plan is organized by the following chapters.

- **Chapter 2 – Freight Policy** describes the development of freight plan goals as well as objectives and discusses the plan's compliance with federal freight planning requirements.
- **Chapter 3 – Freight Assets and Demands** provides an overview of the importance of freight industries and goods movement to the state of Indiana, including trends that may affect goods movement in the future. It also describes Indiana's multimodal freight infrastructure, including the establishment of INDOT's Preferred Freight Corridors and key facilities for multimodal linkages.
- **Chapter 4 – Freight Issues and Needs** identifies freight system performance measures and describes the condition and performance of Indiana's freight system based on comprehensive technical analysis and stakeholder inputs.
- **Chapter 5 – Strategies and Recommendations** overviews the development of strategies for highway and other modes to address freight system needs. It also describes a prioritization process for highway freight projects.
- **Chapter 6 – Investment Plan** focuses on describing how INDOT uses NHFP funds for its current freight priorities. The Investment Plan, along with other freight priority projects identified by a data-driven approach through the study, will guide INDOT's investment on the state's priorities for freight planning.

The report also includes appendices which provide detailed information of activities and results that were completed as part of the plan.

## 2.1 Federal Freight Planning Guidance

The Fixing America's Surface Transportation (FAST) Act, a five-year surface transportation bill, passed on December 4, 2015. Building upon the Moving Ahead for Progress in the 21st Century Act (MAP-21), the FAST Act established the National Highway Freight Program (NHFP) that includes $6.3 billion in formula funding to improve the designated National Highway Freight Network (NHFN). The FAST Act also established national multimodal freight policy and goals. To achieve the goals, the U.S. Department of Transportation (U.S. DOT) published a National Freight Strategic Plan (NFSP) in September 2020, which assesses the condition and performance of the nation's freight system and provides forecasts and improvement strategies. The U.S. DOT is also developing a National Multimodal Freight Network (NMFN), which includes key multimodal facilities (e.g., public ports, waterways, railroads) in addition to the NHFN.

To receive NHFP funds for freight projects, states are required to have FAST Act compliant freight plans that address the 10 content requirements listed in the FAST Act. In addition, state freight plans need to include the following components:

- A fiscally constrained, prioritized project investment plan
- A bottleneck analysis
- Identification of critical urban and rural freight corridors
- Identification of multimodal freight facilities and corridors

Originally scheduled to expire in 2020, the FAST Act funding was extended for federal fiscal year 2021 through the Continuing Appropriations Act (2021) and Other Extensions Act, Public Law (Pub. L.) 116-159. The Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL), was signed into law on November 15, 2021. The BIL makes certain changes to federal freight planning guidance. It increases the frequency of freight planning from every five years to every four years. In addition to carrying forward the 10 content requirements under the FAST Act, the BIL adds seven additional content requirements for state freight plans. **Table 2.1** summarizes the legislative content requirements listed in FAST Act and BIL and how these requirements are met or addressed in INDOT's new Freight Plan.

## Table 2.1 – Coverage of FAST Act/BIL Requirements in INDOT Freight Plan

| LEGISLATION | CONTENT REQUIREMENTS | INDOT FREIGHT PLAN |
|---|---|---|
| FAST Act & BIL | 1. An identification of significant freight system trends, needs, and issues with respect to the state. | • Chapter 3 contains freight system trends by mode for Indiana.<br>• Chapter 4 highlights multimodal freight system needs and issues. |
| FAST Act & BIL | 2. A description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the state. | • Chapter 2 describes federal freight planning policies and how they are addressed by the plan.<br>• Chapter 4 highlights a performance measure matrix that INDOT uses to track and improve the system.<br>• Chapter 5 outlines an Improvement Concept Toolbox that INDOT uses to guide freight-related improvements for highway and freight strategies for other modes. |
| FAST Act & BIL | 3. When applicable, a listing of: | |
| | (A) Multimodal critical rural freight facilities and corridors designated within the state under section 70103 of title 49 (NMFN). | • Chapter 3 describes Indiana's multimodal freight systems and facilities. A Preferred Freight Corridor Network is also established for Indiana. |
| | (B) Critical rural and urban freight corridors designated within the state under section 167 of title 23 (NHFP). | • INDOT has not chosen to designate Critical Rural Freight Corridors (CRFC) or Critical Urban Freight Corridors (CUFC).<br>• Chapter 3 describes the establishment of a Preferred Freight Corridor Network that considers the candidate CRFC and CUFC previously proposed by INDOT. |
| FAST Act & BIL | 4. A description of how the plan will improve the ability of the state to meet the national multimodal freight policy goals described in 70101(b) of title 49, and the national highway freight program goals described in section 167 of title 23. | • Chapter 2 highlights the crosswalk between national freight goals and INDOT's goals. INDOT's approach is consistent with, and will support, federal goals. |
| FAST Act & BIL | 5. A description of how innovative technologies and operational strategies, including freight intelligent transportation system, that improve the safety and efficiency of the freight movement, were considered. | • Chapter 3 includes a discussion of emerging trends that are likely to affect the freight system such as connected and autonomous vehicle (CAV).<br>• Chapter 5 describes freight operations/ITS strategies, as part of the Improvement Concept Toolbox. These strategies are in INDOT's toolkit to improve safety and efficiency of the freight movement. |
| FAST Act & BIL | 6. In the case of roadways on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of the roadways, a description of improvements that may be required to reduce or impede the deterioration. | • Chapter 4 identifies roadway pavement and bridge issues and needs in terms of infrastructure condition.<br>• Chapter 5 outlines an Improvement Concept Toolbox that includes pavement replacement, as part of roadway improvement strategies.<br>• Chapter 5 describes a rating system for project prioritization, which accounts for pavement and bridge condition. |

| LEGISLATION | CONTENT REQUIREMENTS | INDOT FREIGHT PLAN |
|---|---|---|
| FAST Act & BIL | 7. An inventory of facilities with freight mobility issues, such as bottlenecks, within the state, and for those facilities that are state owned or operated, a description of the strategies the state is employing to address the freight mobility issues. | • Chapter 4 identifies freight bottlenecks in terms of capacity constraints and travel time reliability.<br>• Chapter 5 outlines an Improvement Concept Toolbox that includes various strategies to address freight mobility issues. Chapter 5 also recommends projects to address freight mobility issues.<br>• Appendix D provides a list of mobility bottlenecks and proposed improvement projects. |
| FAST Act & BIL | 8. Consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay. | • Chapter 5 describes a rating system for project prioritization, which accounts for delays caused by freight movements.<br>• Chapter 5 outlines an Improvement Concept Toolbox that includes various strategies to mitigate congestion or delay. These strategies are used to recommend freight improvement projects. |
| FAST Act & BIL | 9. A freight investment plan that, subject to 49 U.S.C. 70202(c), includes a list of priority projects and describes how funds made available to carry out 23 U.S.C. 167 would be invested and matched | • Chapter 6 includes INDOT's current freight priority projects along with allocated NHFP funds.<br>• Appendix D provides a list of additional freight priority projects to support INDOT's future planning and programming activities. |
| BIL | 10. The most recent commercial motor vehicle parking facilities assessment conducted by the state under 49 U.S.C. 70202(f) – As part of the development or updating, as applicable, of a State freight plan under this section, each State that receives funding under section 167 of title 23, in consultation with relevant State motor carrier safety personnel, shall conduct an assessment of:<br>(1) the capability of the State, together with the private sector in the State, to provide adequate parking facilities and rest facilities for commercial motor vehicles engaged in interstate transportation:<br>(2) the volume of commercial motor vehicle traffic in the State; and<br>(3) whether there exist any areas within the State with a shortage of adequate commercial motor vehicle parking facilities, including an analysis (economic or otherwise, as the State determines to be appropriate) of the underlying causes of such a shortage. | • Chapter 3 provides existing and future truck volumes on state-owned roadways.<br>• Chapter 4 includes an assessment of current truck parking capacity (in both public and private sectors), utilization, shortages, and needs.<br>• Chapter 4 describes INDOT's truck parking expansion plans. |

| LEGISLATION | CONTENT REQUIREMENTS | INDOT FREIGHT PLAN |
|---|---|---|
| BIL | 11. The most recent supply chain cargo flows in the state, expressed by mode of transportation. | • Chapter 3 illustrates multimodal commodity flows and the change between base year (2022) and future year (2045) by tonnage and value.<br>• Chapter 3 highlights top industry commodity flows for Indiana. |
| BIL | 12. An inventory of commercial ports in the state. | • Chapter 3 describes major commercial ports in Indiana. |
| BIL | 13. If applicable, consideration of the findings or recommendations made by any multi-state freight compact to which the state is a party under 49 U.S.C. 70204. | • Indiana is currently not a party of any multi-state freight compact. |
| BIL | 14. The impacts of e-commerce on freight infrastructure in the state. | • Chapter 3 includes a discussion of the impacts of e-commerce on Indiana's freight system. |
| BIL | 15. Considerations of military freight. | • Chapter 3 describes the establishment of a Preferred Freight Corridor Network that considers the Strategic Highway Network (STRAHNET).<br>• Chapter 3 describes the Strategic Rail Corridor Network (STRACNET) in Indiana. |
| BIL | 16. Strategies and goals to decrease: | |
| | (A) The severity of impacts of extreme weather and natural disasters on freight mobility. | • Chapter 4 discusses INDOT Strategic Plan and Transportation Asset Management Plan goals to improve sustainable transportation options, address the impact of freight on environment, and manage resilience risks (Section 4.2.1.4).<br>• Chapter 4 includes a discussion of INDOT's effort to address the impacts of extreme weather and natural disasters (e.g., winter weather, hydraulics and seismic demands) through the Winter Operations Dashboard (Section 4.2.1.4), improved pavement and bridge design with resiliency considerations (Section 4.2.2.2), and an interactive trucker's information page (Section 4.2.2.2). |
| | (B) The impacts of freight movement on local air pollution. | • Chapter 4 discusses INDOT's missions and goals to improve sustainable transportation options and alleviate the impact on the environment (Section 4.2.4).<br>• Chapter 4 describes INDOT's air quality conformity analysis process, tools, Transportation Performance Management (TPM) goals and existing air quality conditions, CMAQ program, Carbon Reduction Strategy, Electric Vehicle Infrastructure Deployment Plan to address the impacts of freight movement on air quality (Section 4.2.4).<br>• Chapter 5 describes a project rating system that considers emission cost savings and recommends freight projects for mobility improvement which will reduce air pollution (Section 5.3.1). |

| LEGISLATION | CONTENT REQUIREMENTS | INDOT FREIGHT PLAN |
|---|---|---|
| | (C) The impacts of freight movement on flooding and stormwater runoff. | • Chapter 4 discusses INDOT Strategic Plan and Transportation Asset Management Plan goals to improve sustainable transportation options, address the impact of freight on environment, and manage resilience risks (Section 4.2.1.4).<br>• Chapter 4 includes a discussion of INDOT's effort to address the impacts of flooding and stormwater runoff through bridge/roadway projects development (Section 4.2.1.4) and pavement/bridge design with resiliency considerations (Section 4.2.2.2). |
| | (D) The impacts of freight movement on wildlife habitat loss | • Chapter 5 includes a discussion of INDOT's strategies to address the impacts of freight movements on environment and wildlife habitat loss through its project development process (Section 5.3.2). |
| FAST Act & BIL | 17. Consultation with the state freight advisory committee, if applicable. | • Chapter 1 outlines the stakeholder engagement efforts, which includes consultation with the state freight advisory committee.<br>• Appendices A, B and C include collected data from multiple stakeholder surveys that the state freight advisory committee participated in. |

## 2.2 National and State Freight Goals

### 2.2.1 National Freight Goals

According to federal freight planning guidance, state freight plans should align with national freight policy goals described in National Highway Freight Program (NHFP), [23 U.S.C. 167 (a), (b)], and National Multimodal Freight Policy (NMFP), [49 U.S.C. 70101 (b)]. Major national freight policy goals include:

- Identify and invest infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, eliminate bottlenecks, reduce the cost of freight transportation, improve reliability, and increase productivity;
- Improve the safety, security, efficiency, and resilience of freight transportation;
- Improve the state of good repair of freight transportation system;
- Use innovation and advanced technology to improve safety, efficiency, and reliability of freight transportation system;
- Improve economic efficiency and productivity of freight transportation system;
- Support multi-state corridor planning and address freight connectivity;
- Improve the short- and long-distance movement of goods that travel across and between rural areas, population centers, and ports, airports, and gateways; and
- Reduce environmental impacts of freight movement on freight transportation system.

### 2.2.2 INDOT Freight Goals and Objectives

INDOT has identified two major goals that are the most important to the public and freight/logistics industry in the state:

- Goal #1 – **Promote using preferred freight corridors** to improve statewide mobility, reliability, safety, system preservation, economic vitality, air quality, and innovative technology implementation.

- **Goal #2 – Improve multimodal linkages** to cost effectively alleviate bottlenecks and barriers to freight transfers across modes.

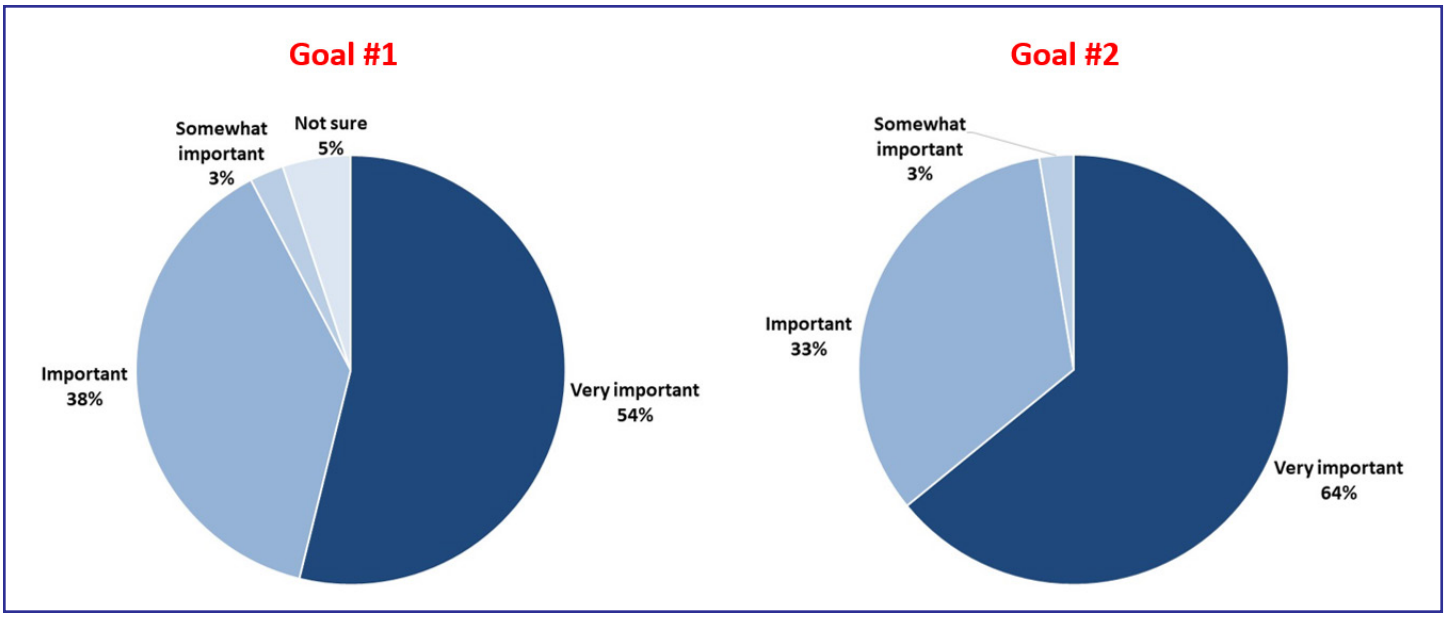
INDOT is pursuing the two major freight planning goals based upon its 2019 Strategic Plan[2], which guides the fundamental aspects of INDOT's strategies to evolve by accommodating the unprecedented increase in the advancement of new technology and the major shifts in demographic and economic profiles of Indiana. In the 2019 Strategic Plan, INDOT refined its mission statement to:

> *"Collaboratively plan, build, and maintain safe and innovative transportation infrastructure that enhances quality of life, drives economic growth, and accommodates new modes of transport."*

INDOT developed strategic priorities and launched several major initiatives to fully realize its mission. Since the transportation network is one of Indiana's most critical and valuable assets and the freight/logistics is a key driven power of the state's economy, the 2019 Strategic Plan includes strategic priorities that enhance end-to-end freight journeys and connectivity across all modes of transportation and initiatives that increase capacity on major corridors. Therefore, INDOT's freight planning goals comply with and support the agency's mission and strategic priorities to enhance Indiana's position as a leader in freight and logistics for economic competitiveness and quality of life.

An important step in developing INDOT freight goals was to reach consensus among the public and private stakeholders. INDOT conducted an online survey in January/February 2022 to share draft freight goals with the Project Team and Planning Partners and solicit their feedback. **Figure 2.1** summarizes the survey results. Details of the survey are included in **Appendix A.**

## Figure 2.1 – Summary of INDOT Freight Goals Survey




[2] Indiana DOT, 2019 Strategic Plan, https://www.in.gov/indot/files/INDOTStrategicPlan.pdf

INDOT's freight goals were strongly supported by stakeholders, with 92% and 97% of total 39 responses voting "Very Important" or "Important" for Goal #1 and Goal #2 respectively. In addition, three themes emerged from the survey:

1. A desire to communicate the relative priorities of the goals.
2. A desire to prioritize system preservation.
3. A request to clarify the term "promote" in Goal #1.

INDOT addressed the first two items through the development of performance measures (see **Section 4.1**) and the project rating system (see **Section 5.3**). INDOT addressed the third item through the establishment of the Preferred Freight Corridors (see **Chapter 3**), the identification of issues and needs (see **Chapter 4**), as well as improvement developments (see **Chapter 5**) with a focus on the Preferred Freight Corridors.

INDOT also developed a set of objectives that articulate the two major freight goals. These objectives provided specific guidance to identify freight issues and needs and develop improvement strategies during the freight plan development. INDOT's freight planning objectives are listed below.

- Mobility and Connectivity:
  - Improve freight network capacity to meet demands.
  - Reduce bottlenecks on freight network.
  - Enhance connections and linkages across all modes.

- Safety and Security:
  - Reduce crashes, injuries, and fatalities for all modes.
  - Improve safety of at-grade railroad crossings.
  - Provide adequate truck parking spaces.
  - Reduce system vulnerability due to natural disasters and emergencies.

- Infrastructure Preservation:
  - Maintain highway transportation assets in good condition.
  - Continue coordination with modal partners (rail, water, rail) for maintenance and improvement of their transportation assets.

- Economic Vitality:
  - Provide efficient access to freight generators and intermodal facilities.
  - Increase efficiency and reliability of freight system.
  - Promote regional economic benefit from freight industries.

- Environmental Stewardship
  - Reduce air quality emissions related to building, maintaining, and operating the State's freight transportation system.
  - Avoid or mitigate impacts of freight transportation on built and natural environment.

- Innovation and Technology
  - Harness technology and innovation to develop more effective transportation solutions to support all Indiana's freight planning objectives where applicable.

A requirement for state freight plan is to include a description of how the plan will meet national freight policy goals. **Table 2.2** shows how INDOT freight goals and objectives relate to the national goals described in National Highway Freight Program (NHFP) and National Multimodal Freight Policy (NMFP). INDOT freight goals and objectives are consistent with and support national freight policy goals.

## Table 2.2 – National Freight Policy Goals and INDOT Freight Goals/Objectives

| NATIONAL FREIGHT GOALS<br><br>National Highway Freight Program (NHFP)<br><br>National Multimodal Freight Policy (NMFP) | INDOT FREIGHT GOALS & OBJECTIVES | | | | | |
|---|---|---|---|---|---|---|
| | Goal #1 – Promote using preferred freight corridors to improve statewide mobility, reliability, safety, system preservation, economic vitality, air quality, and innovative technology implementation.<br>Goal #2 - Improve multimodal linkages to cost effectively alleviate bottlenecks and barriers to freight transfers across modes. | | | | | |
| | • Mobility and Connectivity:<br>○ Improve freight network capacity to meet demands.<br>○ Reduce bottlenecks on freight network.<br>○ Enhance connections and linkages across all modes. | • Safety and Security:<br>○ Reduce crashes, injuries, and fatalities for all modes.<br>○ Improve safety of at-grade railroad crossings.<br>○ Provide adequate truck parking spaces.<br>○ Reduce system vulnerability due to natural disasters and emergencies. | • Infrastructure Preservation:<br>○ Maintain highway transportation assets in good condition.<br>○ Continue coordination with modal partners (rail, water, rail) for maintenance and improvement of their transportation assets. | • Economic Vitality:<br>○ Provide efficient access to freight generators and intermodal facilities.<br>○ Increase efficiency and reliability of freight system.<br>○ Promote regional economic benefit from freight industries. | • Environmental Stewardship:<br>○ Reduce air quality emissions related to building, maintaining, and operating the State's freight transportation system.<br>○ Avoid or mitigate impacts of freight transportation on built and natural environment. | • Innovation and Technology:<br>○ Harness technology and innovation to develop more effective transportation solutions to support all Indiana's freight planning objectives where applicable. |
| • Identify and invest infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, eliminate bottlenecks, reduce the cost of freight transportation, improve reliability, and increase productivity | ✓ | | | ✓ | | |
| • Improve the safety, security, efficiency, and resilience of freight transportation | | ✓ | | | ✓ | |
| • Improve the state of good repair of freight transportation system | | | ✓ | | | |
| • Use innovation and advanced technology to improve safety, efficiency, and reliability of freight transportation system | | | | | | ✓ |

| NATIONAL FREIGHT GOALS<br><br>National Highway Freight Program (NHFP)<br><br>National Multimodal Freight Policy (NMFP) | INDOT FREIGHT GOALS & OBJECTIVES<br>Goal #1 – Promote using preferred freight corridors to improve statewide mobility, reliability, safety, system preservation, economic vitality, air quality, and innovative technology implementation.<br>Goal #2 - Improve multimodal linkages to cost effectively alleviate bottlenecks and barriers to freight transfers across modes. | | | | | |
|---|---|---|---|---|---|---|
| | • Mobility and Connectivity:<br>○ Improve freight network capacity to meet demands.<br>○ Reduce bottlenecks on freight network.<br>○ Enhance connections and linkages across all modes. | • Safety and Security:<br>○ Reduce crashes, injuries, and fatalities for all modes.<br>○ Improve safety of at-grade railroad crossings.<br>○ Provide adequate truck parking spaces.<br>○ Reduce system vulnerability due to natural disasters and emergencies. | • Infrastructure Preservation:<br>○ Maintain highway transportation assets in good condition.<br>○ Continue coordination with modal partners (rail, water, rail) for maintenance and improvement of their transportation assets. | • Economic Vitality:<br>○ Provide efficient access to freight generators and intermodal facilities.<br>○ Increase efficiency and reliability of freight system.<br>○ Promote regional economic benefit from freight industries. | • Environmental Stewardship:<br>○ Reduce air quality emissions related to building, maintaining, and operating the State's freight transportation system.<br>○ Avoid or mitigate impacts of freight transportation on built and natural environment. | • Innovation and Technology:<br>○ Harness technology and innovation to develop more effective transportation solutions to support all Indiana's freight planning objectives where applicable. |
| • Improve economic efficiency and productivity of freight transportation system | | | | ✓ | | |
| • Support multi-state corridor planning and address freight connectivity | ✓ | | | | | |
| • Improve the short- and long-distance movement of goods that travel across and between rural areas, population centers, and ports, airports, and gateways | ✓ | | | | | |
| • Reduce environmental impacts of freight movement on freight transportation system | | | | | ✓ | |

## 3.1 The Importance of Freight to Indiana

According to U.S. Census, Indiana's poulation was 6.8 million in 2021. The state's population is estimated to grow to 7.8 million in 2045 at an annual growth rate of 0.57%, according to the current Indiana Statewide Travel Demand Model (ISTDM8, 2020 – see detailed description in **Section 4.1**).[3] Increased population can create congestion and capacity issues, especially in urban areas. In Indiana, the urban population is expected to increase at an annual growth rate of 0.24% through 2045, which is slower than the suburban and rural population growth at an annual growth rate of 1.12% and 0.54% respectively (ISTDM8, 2020). This may lead to longer movements for passengers and goods, from non-urban to urban areas.

Indiana's jobs expect to grow from 3.6 million in 2015 to 4.7 million in 2045, at a faster annual growth rate of 0.89% than population (ISTDM8, 2020). **Table 3.1** shows the state's employment by major sectors in 2015 and 2045. In 2015, there were 1.45 million freight-related employments (i.e., agriculture and construction, industrial, and retail), accounting for 41% of total employment in the state. While a slight employment decrease is estimated for several freight-related sectors (i.e., utilities, manufacturing, wholesale trade, transportation and warehousing) through 2045, the overall freight-related employments still expect to have steady growth over the next 20 years, with 1.63 million jobs in 2045, more than one third (35%) of the state's total employments.

Indiana's economy is diverse and is driven by business services, as well as freight- or trade-related industries such as agriculture, mining, construction, manufacturing, wholesale and retail trade, etc. 49% of the Gross State Product (GSP) of Indiana is dependent on freight-related industries. **Figure 3.1** details the percentage contribuion, by North American Industry Classification System (NAICS) industry sector, to Indiana's GSP.

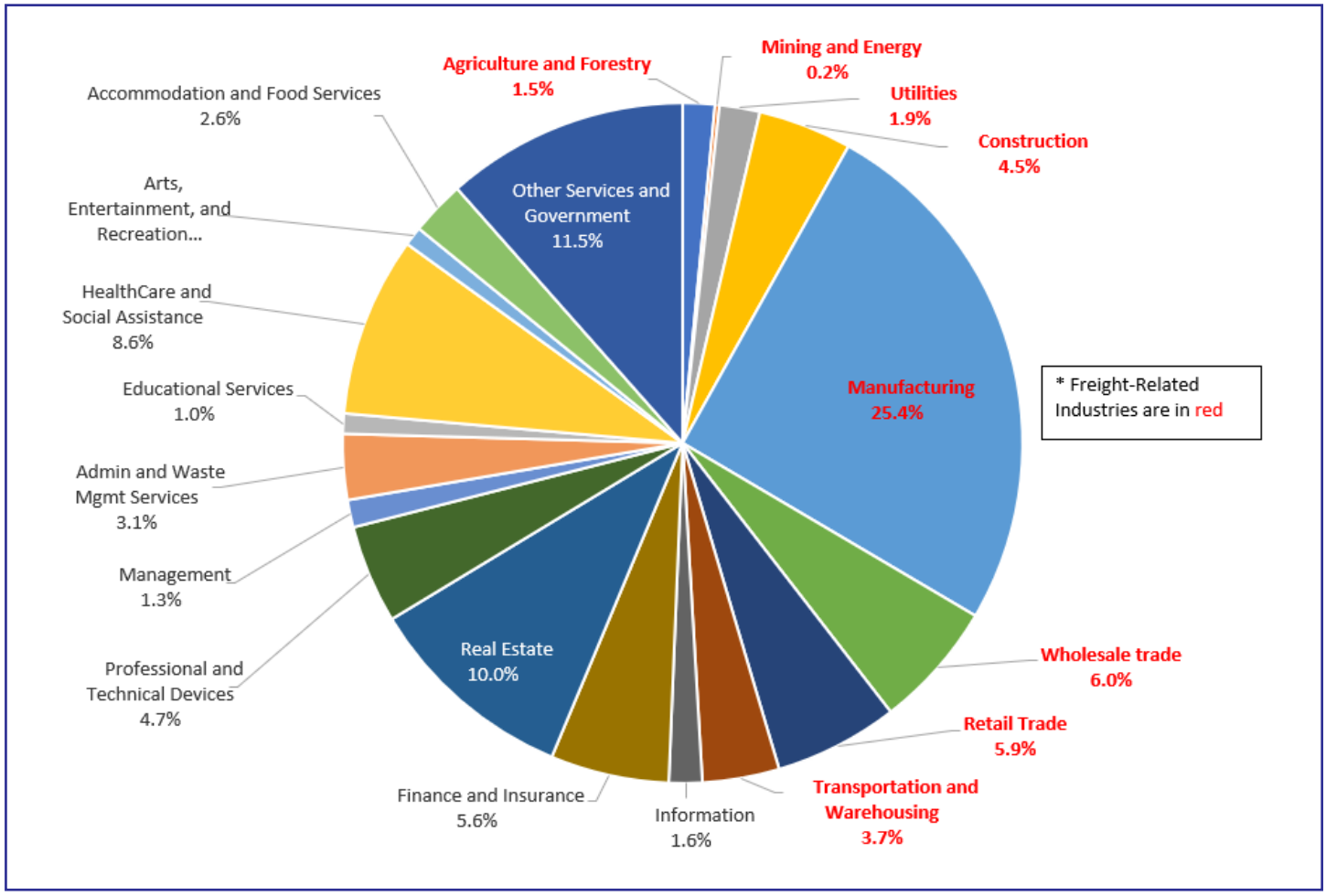
[3]INDOT, Indiana Statewide Travel Demand Model Version 8 (ISTDM8), 2020.

## Table 3.1 – Indiana Employment and Growth

| EMPLOYMENT TYPE | EMPLOYMENT CATEGORY | NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODES | 2015 | | 2045 | |
|---|---|---|---|---|---|---|
| | | | EMPLOYMENT | PERCENT | EMPLOYMENT | PERCENT |
| Freight Related | Agriculture & Construction | 11 - Agriculture, Forestry, Fishing & Hunting | 225,728 | 6% | 300,458 | 6% |
| | | 21 - Mining | | | | |
| | | 23 Construction | | | | |
| | Industrial | 22 - Utilities | 780,449 | 22% | 779,507 | 17% |
| | | 31-33 - Manufacturing | | | | |
| | | 42 - Wholesale Trade | | | | |
| | | 48-49 - Transportation & Warehousing | | | | |
| | Retail | 44-45 - Retail Trade | 449,527 | 13% | 554,331 | 12% |
| Non-Freight Related | Food & Lodging | 72 - Accommodation & Food Services | 290,173 | 8% | 370,366 | 8% |
| | Professional Services | 51 - Information | 1,249,040 | 35% | 1,803,927 | 38% |
| | | 52 - Finance & Insurance | | | | |
| | | 53 - Real Estate & Rental & Leasing | | | | |
| | | 54 - Professional, Scientific & Technical Services | | | | |
| | | 55 - Management of Companies & Enterprises | | | | |
| | | 61 - Education Services | | | | |
| | | 62 - Health Care & Social Assistance | | | | |
| | Government | 92 - Public Administration | 185,061 | 5% | 285,848 | 6% |
| | Other Services | 56 - Administrative & Support & Waste Management & Remediation Services | 410,549 | 11% | 591,732 | 13% |
| | | 71 - Arts, Entertainment & Recreation | | | | |
| | | 81 - Other Services | | | | |
| **Total** | | | **3,590,527** | **100%** | **4,686,212** | **100%** |

Source: ISTDM8, 2020

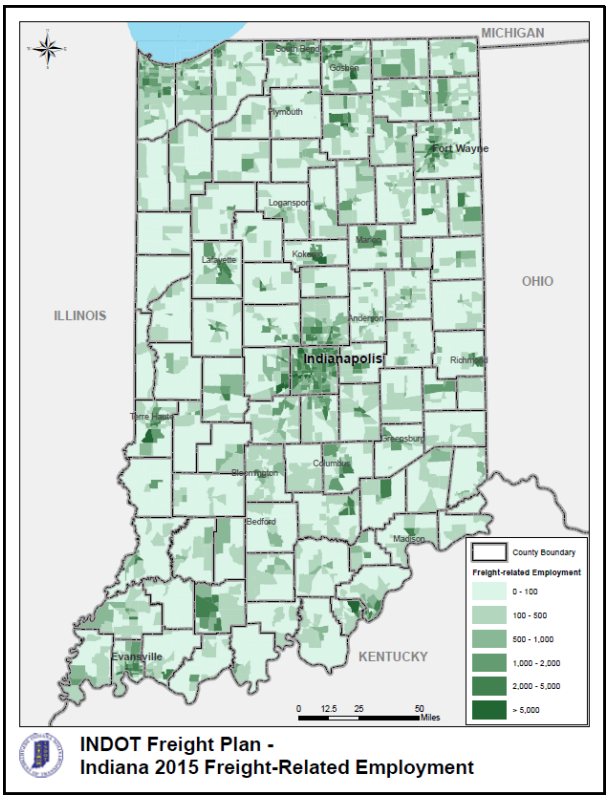
## Figure 3.1 – Indiana's GSP by Industry Sectors

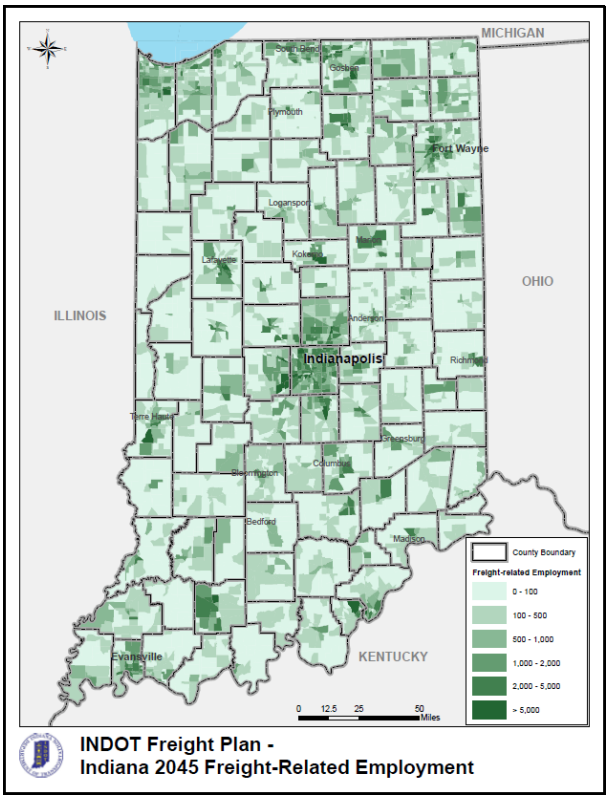


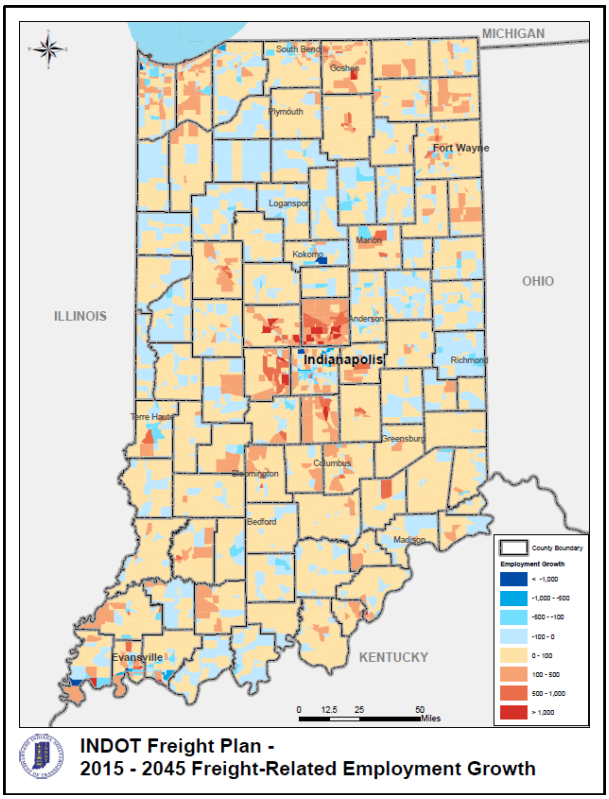

Source: U.S. Bureau of Economic Analysis, 2021

**Figure 3.2** illustrates the geographic distribution of freight-related employments and anticipated growth in Indiana, from 2015 to 2045. Most freight-related job clusters concentrate on urban and suburban areas. There is a trend that the freight-related jobs expand to suburban areas surrouding major cities, such as Indianapolis, South Bend, Fort Wayne, Evansville, northwestern Indiana, Lafayette, Kokomo, Terre Haute, Bloomington, Columbus, and southern Indiana near Louisville, Kentucky. Therefore, Indiana's freight transportation system would need to adapt to continuing demographic and freight changes.

## Figure 3.2 – Freight-Related Employment and Growth in Indiana (2015-2045)




Source: ISTDM, 2020

## 3.2 Freight Assets

This section briefly describes Indiana's multimodal freight infrastructures by major modes, including highways, railroads, waterways, and airports. To support INDOT's freight planning goals, the new freight plan has established statewide Preferred Freight Corridors (PFC) and identified major intermodal facilities, under INDOT's guidance.

### 3.2.1 Highway

INDOT maintains 11,169 miles of roadways (Interstates, U.S. Highways, and state roads) and 5,747 bridges.[4] The state-owned highway system is the backbone for goods movement in Indiana and provides first- and last-mile connectivity to all industries. In 2015, approximately 5.2% of total daily trips carried by the state-owned highway system are made by trucks. However, the vehicle miles traveled (VMT) by trucks account for 20.2% of the total VMT on the state-owned highway system (ISTDM8, 2020), because freight trucks usually have longer intrastate/interstate trips for moving and delivering goods. Due to the nature of logistics, trucks typically use designated highway networks to transport goods from point to point, for safety, efficiency, and reliability reasons.

As described in **Chapter 2**, one of INDOT's freight planning goals is to *"promote using preferred freight corridors to improve statewide mobility, reliability, safety, system preservation, economic vitality, air quality, and innovative technology implementation."* Therefore, the establishment of a PFC network is critical to achieve this goal.

The Project Team made extensive efforts to establish the statewide PFC. The following factors were considered and incorporated during the process.

- **National Highway Freight Network (NHFN)[5].** Per the FAST Act, FHWA established the NHFN to strategically direct federal resources and policies toward improved performance of highway portions of the U.S. freight transportation system. The NHFN includes the following subsystems of roadways:

  - **Primary Highway Freight System (PHFS).** This is a network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data. The network consists of 41,518 centerline miles, including 37,436 centerline miles of Interstate and 4,082 centerline miles of non-Interstate roads.
    - There are 971.26 miles of PHFS in Indiana. They are all included in the Preferred Freight Corridors.
    - FHWA designates a list of PHFS Intermodal Connectors for Indiana. They are all included in the Preferred Freight Corridors.

  - **Other Interstate portions not on the PHFS (Non-PHFS Interstate).** These highways consist of the remaining portion of Interstate roads not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. These portions amount to an estimated 9,709 centerline miles of Interstate, nationwide, and will fluctuate with additions and deletions to the Interstate Highway System.
    - There are approximately 370 miles of Non-PHFS Interstate in Indiana, including the new I-69 from Evansville to Indianapolis with the last piece (Section 6 – from Martinsville to Indianapolis) to be completed soon. All Non-PHFS Interstate are included in the Preferred Freight Corridors.

  - **Critical Urban Freight Corridors (CUFCs) and Critical Rural Freight Corridors (CRFCs).** These are public roads in or not in urbanized areas which provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal freight facilities. Nationwide, there are 5,044 centerline miles designated as CRFCs, and 2,387 centerline miles designated as CUFCs.
    - INDOT has not chosen to designate CRFCs or CUFCs to date. However, initial planning efforts were made to identify candidate CRFCs and CUFCs, as part of INDOT's 2018 Freight Plan. These candidate corridors were reviewed and examined during the development of the new freight plan. Many of candidate CRFCs and CUFCs

[4] Indiana DOT, *Long-Range Transportation Plan – 2018-2045 Transportation Needs Report,* June 2019.

[5] FHWA, *National Highway Freight Network Map and Tables for Indiana*, https://ops.fhwa.dot.gov/Freight/infrastructure/ismt/state_maps/states/indiana.htm

are included in the Preferred Freight Corridors, while some of them are not included based on justifications, due to relatively low truck volumes or less connectivity functions of freight movements using latest data.

- **National Highway System (NHS).** NHS consists of roadways important to the nation's economy, defense, and mobility. It includes Interstate, Other Principal Arterials, Strategic Highway Network (STRAHNET), Major Strategic Highway Connectors, and Intermodal Connectors.
    - All NHS routes that carry 1,200 or more daily trucks are included in the Preferred Freight Corridors to recognize their important role of moving goods. The threshold of 1,200 daily truck flows was established using the rule of thumb of the equivalent at least one truck per minute in each direction, during peak hour.
    - FHWA designates a list of NHS Intermodal Connectors for Indiana. They are all included in the Preferred Freight Corridors.
    - The STRAHNET is critical to the Department of Defense's (DoD's) domestic operations. The STRAHNET is a 62,791-mile system of roads deemed necessary for emergency mobilization and peacetime movement of heavy armor, fuel, ammunition, repair parts, food, and other commodities to support U.S., military operations. Indiana NHS includes two STRAHNET connectors (US 231 from Spencer to Crane Naval Depot, and US 31 to/near Camp Atterbury).[6] These connectors are also included in the Preferred Freight Corridors.
- **INDOT's Extra Heavy-Duty Highways (XHDH)[7].** This system was established by the Indiana General Assembly in Indiana Code (IC) 9-20-5[8], with the intent to allow trucks in the Michigan Train configuration to travel from Michigan to the steel mills in northern Indiana and back. Most are in the northwest part of the state, though there is also a mill connected to XHDH in Allen County. This system was established before FHWA recognized in 2012 Indiana's grandfathered rights to permit overweight divisible loads on the interstates, and as such are all on US and State Highways. Rules for the special weight permits that are required for overweight travel on the XHDH system are in Indiana Administrative Code, 105 IAC 10-2. Requirements for all permitted overweight vehicles are in 105 IAC 10-3, though INDOT is exercising engineering judgement to allow higher axle weights for non-divisible loads.
- **Other state-owned roads that do not meet the above criteria but provide improved freight connectivity to the network and major freight generators:**
    - US 421 connecting Greensburg with Madison
    - SR 46 from Bloomington to Columbus
    - SR 3 from Greensburg to Muncie
    - New US 41 Bypass in Terre Haute
    - New US 50 Bypass in North Vernon
    - Some road sections that generally carry more than 1,000 daily trucks and fill gaps.

**Table 3.2** summarizes the PFC and **Figure 3.3** illustrates the PFC network. The PFC is a 3,694-mile system of major truck corridors in Indiana. It accounts for one third of the total centerline miles of all state-owned roads and carries more than three quarters (76%) of total truck VMT in the state (ISTDM8, 2020). The PFC network was proposed by the Project Team and then finalized by engaging Indiana MPOs, RPOs, and Freight Advisory Committee through Indiana MPO Council Meetings, INDOT's Regional Planning Coordination Meetings, and State Freight Working Group Meetings.

[6] FHWA, *National Highway System: Indiana*, 2021. https://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps/indiana/in_indiana.pdf

[7] Indiana DOT, *Indiana Extra Heavy-Duty Highways,* https://www.in.gov/indot/doing-business-with-indot/files/Hvydty.pdf

[8] Indiana Code (IC) 9-20-5, https://iga.in.gov/legislative/laws/2022/ic/titles/009#9-20-5

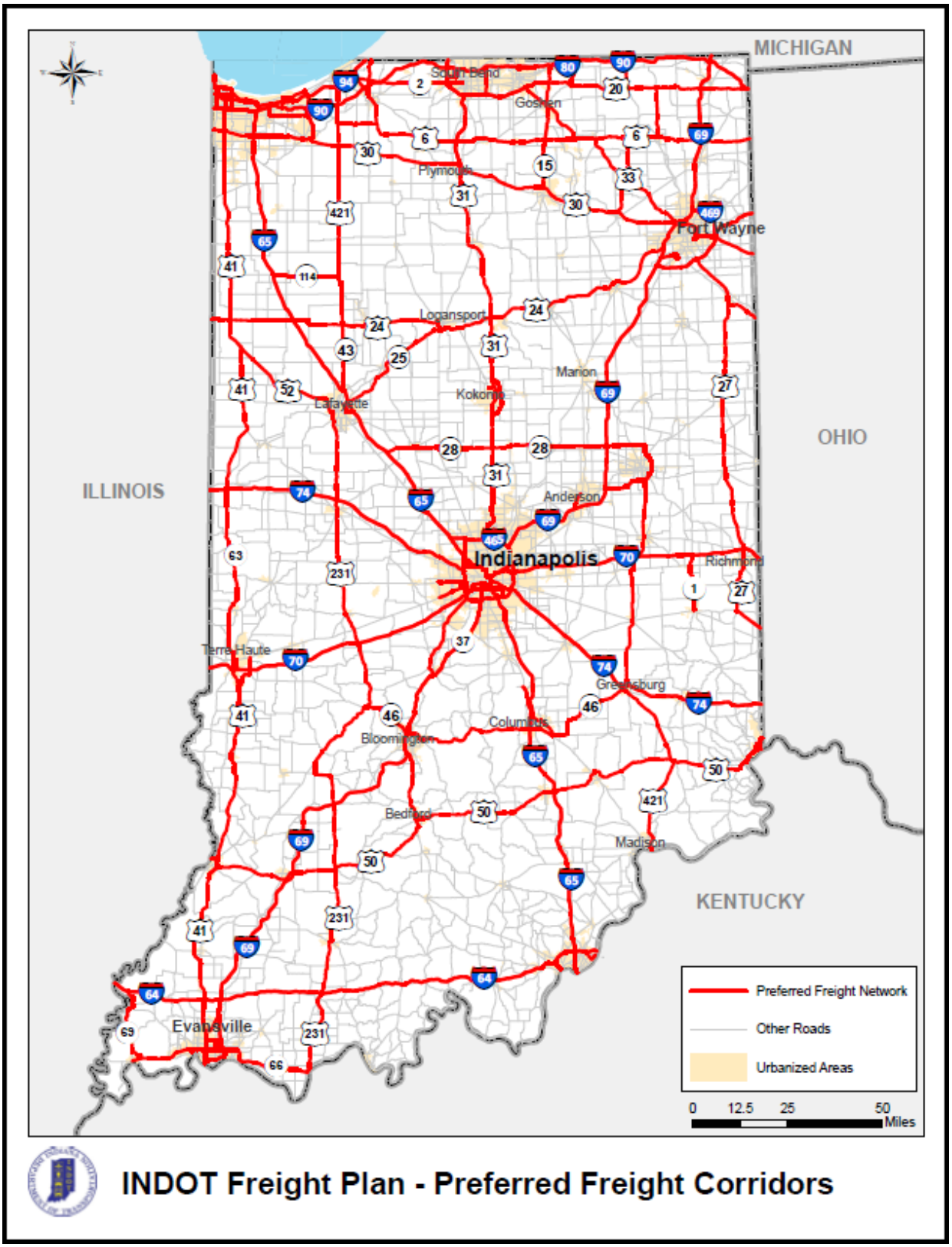
## Table 3.2 – Preferred Freight Corridors (PFC) in Indiana

| FACILITY CATEGORY | CENTERLINE MILES | PERCENT |
|---|---|---|
| **Preferred Freight Corridors (PFC)** | **3,694** | **33%** |
| PHFS | 971 | 9% |
| Non-PHFS Interstate | 370 | 3% |
| Other State-Owned Roads | 2,353 | 21% |
| **Non-PFC State-Owned Roads** | **7,475** | **67%** |
| **All State-Owned Roads** | **11,169** | **100%** |

Note: Non-PHFS Interstate includes I-69 from Evansville to Indianapolis.

The established PFC identifies the key roadway facilities that impact Indiana's freight truck movements the most. Due to the heavier truck flows, the PFC experiences more freight-related issues than other roads, regarding safety, mobility, reliability, system preservation, economic and environmental impacts. Properly addressing the PFC's needs will promote the use of the identified major freight corridors by trucks, and efficiently improve Indiana's statewide freight transportation system. In the freight plan development, the PFC is a focus of analysis to identify freight-related issues and needs towards the development of strategies and recommendations.

## Figure 3.3 – Preferred Freight Corridors (PFC) in Indiana



### 3.2.2 Railroad

Railroads play a significant role in Indiana's economy. Given their importance, INDOT conducts a comprehensive statewide rail planning effort every four years. The result of this effort is the *Indiana State Rail Plan*. INDOT completed the latest *Indiana State Rail Plan* in November 2021.[9] The plan provides a detailed assessment of Indiana's railroad assets, usage, trends, forecasts, and potential improvements. Following is a summary of the railroad assets in Indiana. For more detailed information, refer to the *Indiana State Rail Plan.*

Indiana's rail network consists of 4,870 active route miles, as shown in **Figure 3.4**. The network is used primarily for freight movement, with freight railroad companies owning more than 96% of the network. The remaining portion is owned by Amtrak in northwest Indiana, the Northern Indiana Commuter Transportation District (NICTD) in northern Indiana, and smaller tourist/excursion railroads throughout the state.

The U.S. Surface Transportation Board classifies freight railroads based on operating revenue.[10] Following is a breakdown of Indiana's freight railroads:

- Class 1 railroads have annual operating revenue over $900 million. About 65% of Indiana's freight railroads fall into this class.
- Class 2 railroads are regional railroads with annual operating revenue between $900 million and $40.4 million. About 5% of Indiana's freight railroads fall into this class.
- Class 3 railroads are short line railroads with operating revenue less than $40.4 million. About 31% of Indiana's freight railroads fall into this class.

Given its position as the Crossroads of America, Indiana's rail network is extensive compared to many other states. For example, in 2019 Indiana ranked:[11]

- 4th in the U.S. in terms of number of railroads;
- 9th in terms of rail miles;
- 9th in terms of freight rail employment; and
- 7th in terms of average wages and benefits per employee.

The U.S. Bureau of Transportation Statistics (BTS) tracks data on significant U.S. intermodal facilities in its Intermodal Transportation Database. In keeping with the approach of focusing on major freight facilities, INDOT used the BTS database to identify major rail to flatcar/container on flatcar facilities. These facilities support the movement of freight between roads and railroads. Indiana has two of these facilities in the BTS database, both of which are located in the Indianapolis metropolitan area.[12] These two facilities are described below and shown in **Figure 3.4.**

- The eastern most facility – CN/Indiana Rail Road Company Intermodal Terminal in Indianapolis
- The western most facility – CSX Intermodal Terminal in Avon

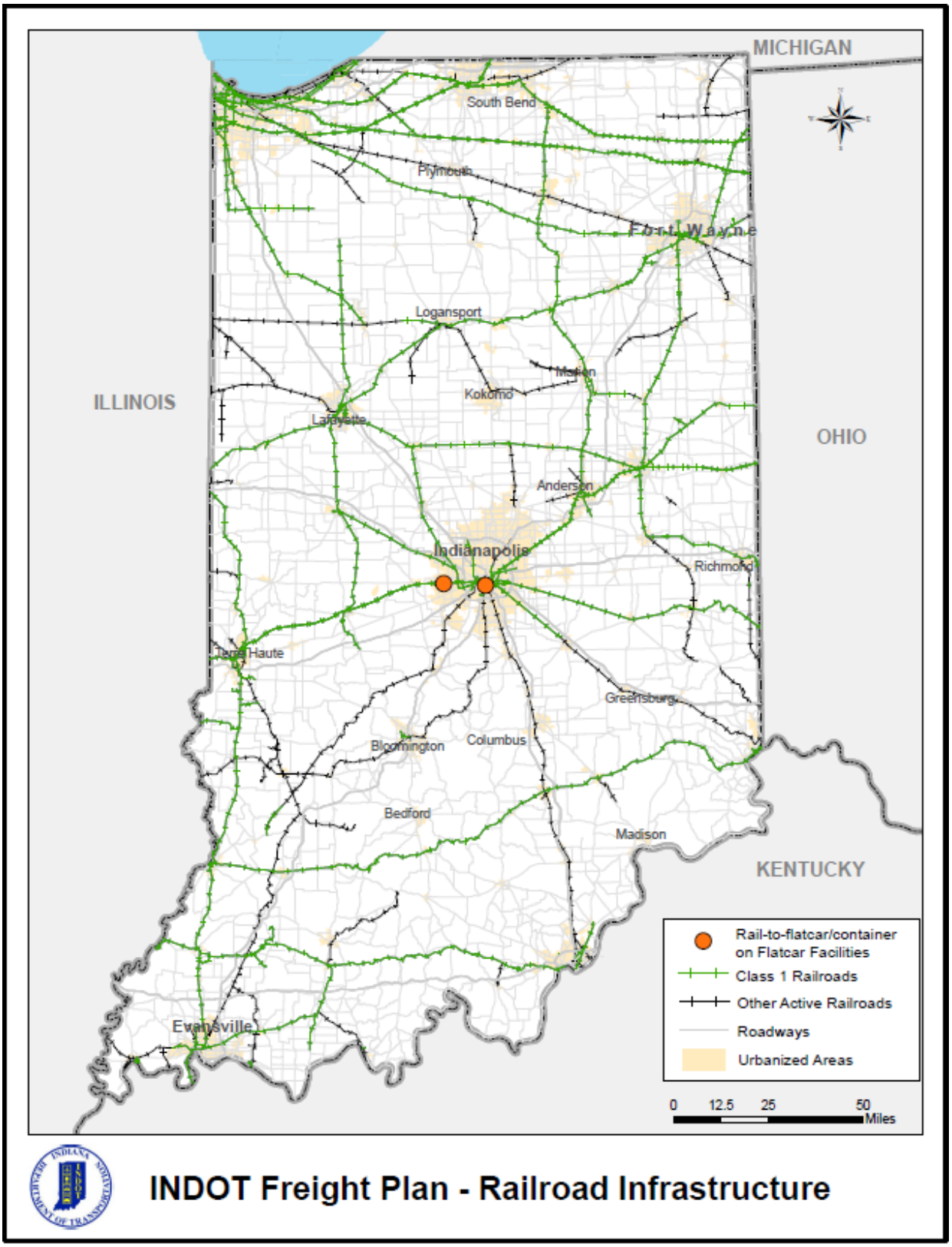
[9] Indiana DOT, *Indiana State Rail Plan,* November 2021.

[10] U.S. Surface Transportation Board, *Surface Transportation Board Adopts Final Rule Amending Thresholds from Classifying Rail Carriers,* April 5, 2022.
https://www.stb.gov/news-communications/latest-news/pr-21-16/

[11] Association of American Railroads, State Rankings 2019, published February 2021.
https://www.aar.org/wp-content/uploads/2021/02/AAR-State-Rankings-2019.pdf

[12] Bureau of Transportation Statistics, Intermodal Freight Facilities Rial TOFO/COFC.
https://data-usdot.opendata.arcgis.com/datasets/intermodal-freight-facilities-rail-tofc-cofc/explore

## Figure 3.4 – Railroad Infrastructures in Indiana



In conjunction with the Federal Railroad Administration (FRA), the U.S. Department of Defense (DoD) has established the Strategic Rail Corridor Network (STRACNET) to ensure minimum rail needs are met and coordinated for defense deployment.[13] The STRACNET is a network of rail lines which provides the U.S. military access, continuity, and emergency capabilities for defense purposes. A portion of the STRACNET passes through Indiana (see **Figure 3.5**). In addition to the STRACNET, associated defense connector lines are rail connections that link remote military facilities to STRACNET and are likely to be restricted to lower operating speeds.

Indiana boosts the 4th largest National Guard contingent. The U.S. military depends on the Indiana freight system to move cargo to support the installations and deploy personnel and equipment for national defense. The state's military installations serve as major freight generators, consumer markets, and need connectivity to the freight transportation system. Diverse and complex supply chains are necessary to efficiently and reliably provide logistics support to the military sites in Indiana, including:

- Camp Atterbury (CAIN) – near Edinburgh, Indiana. It is the state's largest military site. The Atterbury Rail Deployment Facility possesses services and equipment to facilitate rapid deployment activities. It includes a 20,000-square-foot vehicle deployment processing facility, weigh-in-motion scale house, rail operations building, and loading, marshaling, and staging areas. CAIN is served by the Louisville and Indiana Railroad.

- Crane Naval Surface Warfare Center – near Crane, Indiana. It is the third largest naval installation in the world. Crane possesses over 90 miles of active rail lines to support its mission and is served by the Indiana Railroad.

- Grissom Joint Air Reserve Base – near Bunker Hill, Indiana. It hosts an Air Force Reserve refueling wing.

- Muscatatuck Urban Training Center – near Butlerville, Indiana. It is the Army's largest and most technologically advanced urban training facility.

- Several rail-served industries that support the DoD, such as Rolls Royce (aircraft engines) based in Indianapolis and BWX Technologies (naval engine components) based in Mount Vernon.

[13] Military Surface Deployment and Distribution Command Transportation Engineering Agency. Strategic Rail Corridor Network (STRACNET) and Defense Connector Lines, October 2018. https://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/RND%20Publications/STRACNET%202018_Reduced.pdf

## Figure 3.5 – Strategic Rail Corridor Network (STRACNET) in Indiana


Source: Indiana State Rail Plan (2021)

### 3.2.3 Waterway

Indiana's ports provide Hoosiers with access to two of the most important domestic and international trade routes in the world:

- They provide access to the Atlantic Ocean via Lake Michigan.
- They provide access to the Gulf of Mexico via the Ohio River.

The ports also serve as a vital component of Indiana's intermodal network. For example, trucks can access 2/3 of the U.S. within a one-day drive from an Indiana port.[14]

INDOT's freight planning efforts focus on Principal Ports, as identified by the US Army Corp of Engineers. Principal Ports are the top 150 ports in the U.S. based on waterborne tonnage. In 2019, the Army Corp identified five Principal Ports in Indiana, as shown in **Figure 3.6**.[15]

- Indiana Harbor and Ship Canal (#43 in the U.S. based on tonnage) – Located in East Chicago, this facility connects the Grand Calumet River to Lake Michigan and primarily serves the steel industry. It is maintained by the Chicago District of the U.S. Army Corp.

- Port of Indiana – Mount Vernon (#51) – Located on the Ohio River about 15 miles west of Evansville, this facility serves the energy, agricultural, and construction industries. Mount Vernon is one of the largest inland ports in the U.S. It sees more than 3,600 barges, 40,000 railcars, and 200,000 truck each year.[11] The port is served by 5 Class I railroads, and I-69 in Evansville is the nearest limited access highway.

- Port of Indiana – Burns Harbor (#55) – Located on Lake Michigan about 18 nautical miles from Chicago, this facility primarily serves the steel, steel manufacturing, agricultural, and construction industries. Burns Harbor is served by 4 railroads, including one Class I, and has direct access to I-94 via SR 249.

- Port of Gary (#63) – This private port is located on Lake Michigan about 15 nautical miles east of Chicago. The Port of Gary primarily serves the steel and construction industries.

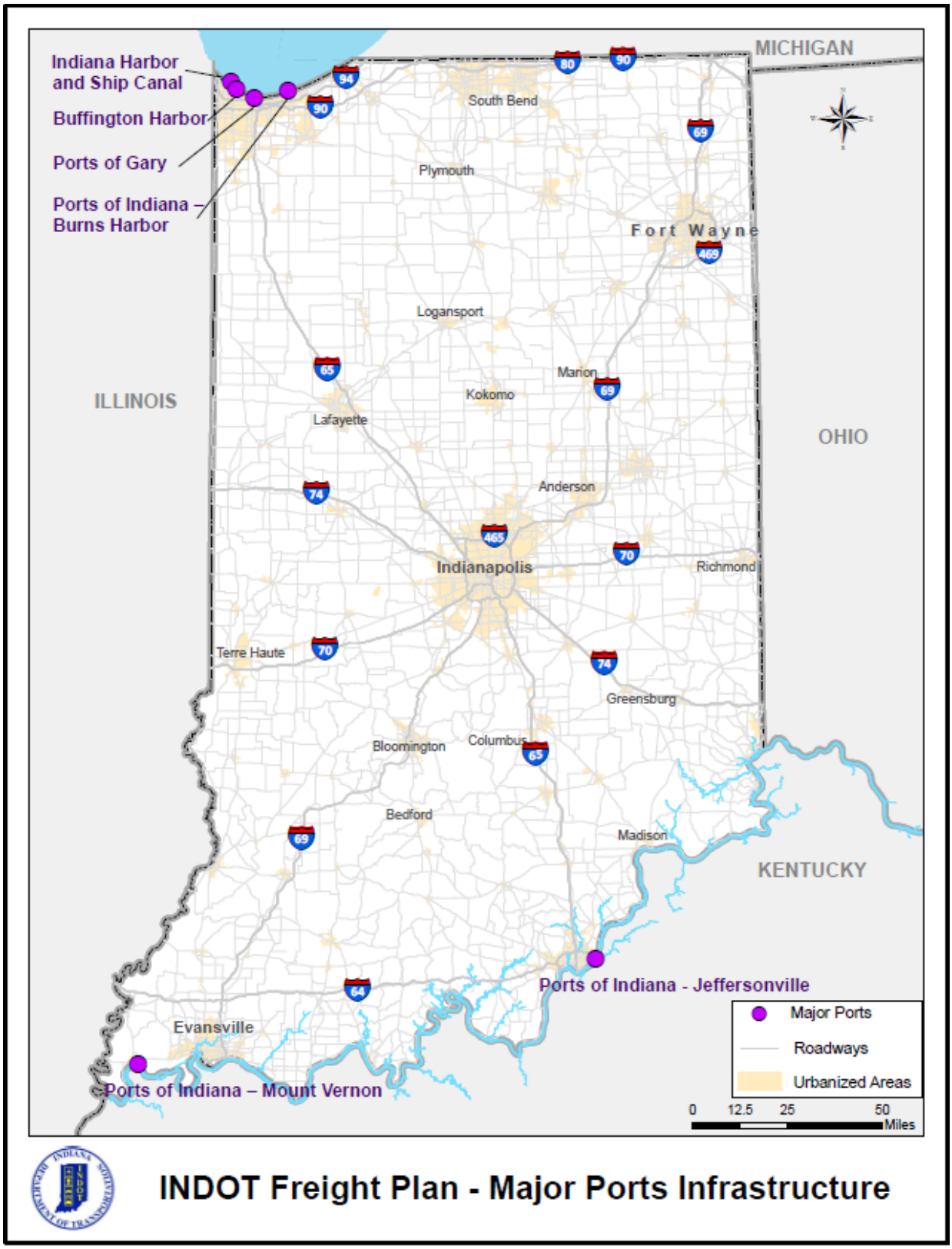
- Buffington Harbor (#134) – This private harbor is located on Lake Michigan about 14 nautical miles east of Chicago. The harbor serves the steel industry and houses two gaming boats.

In 2020, Army Corp combined the 4 ports along Lake Michigan into a single district for reporting purposes. The combination is referred to as the Northern Indiana Maritime District. This district ranked #28 in the Army Corp's 2020 list of Principal Ports.[16]

In addition to the Principal Ports, Indiana has over 80 water facilities operating along the state's 365 miles of shore along the Ohio River. These facilities are a combination of ports, terminals, casinos, marinas, and shipbuilders.[17] Port of Indiana – Jeffersonville (see **Figure 3.6**), located on the Ohio River near Louisville, is also identified as a major port in the state, as it handles over 2 million tons of cargo a year, primarily serving the advanced manufacturing and logistics industries.[14]

[14] Ports of Indiana website. https://www.portsofindiana.com/
[15] U.S. Army Corps of Engineers, CY 2019 Waterborne Tonnage by State. https://usace.contentdm.oclc.org/digital/collection/p16021coll2/id/6753
[16] U.S. Army Corps of Engineers, CY 2020 Waterborne Tonnage by State. https://usace.contentdm.oclc.org/digital/collection/p16021coll2/id/7447
[17] Letter from the Ports of Indiana to the U.S. Army Corp of Engineers RE USACE Statistics Port Polygon Project, August 27, 2020.

## Figure 3.6 – Major Ports in Indiana



### 3.2.4 Air Cargo

The 2022 State Aviation System Plan provides a comprehensive assessment of Indiana's airports. The report addresses inventory, demand, and performance and needs for these facilities.[18] As with waterway facilities, Indiana's freight planning efforts focus on major air cargo facilities. The Federal Aviation Administration (FAA) defines cargo airports as "airports that, in addition to any other air transportation services that may be available, are served by aircraft providing air transportation of only cargo with a total annual landed weight of more than 100 million pounds."[19]

In 2021, four Indiana airports met this threshold, as shown in **Figure 3.7**:

- Indianapolis International Airport (ranked #8 in the U.S., landed weight = 7,160,133,175 lbs)
- Fort Wayne International Airport (ranked #100, landed weight = 191,439,593 lbs)
- Gary/Chicago International Airport (ranked #119, landed weight = 114, 206, 394 lbs)
- South Bend International Airport (ranked #123, landed weight = 103,206,492 lbs)

The Gary/Chicago International Airport was a new addition to this list in 2021. Its growth in freight cargo was due primarily to UPS beginning service operations at the facility in November 2020.[20]

The U.S. BTS tracks significant air-to-truck facilities that serve the top 60 freight airports in the U.S., in its Intermodal Transportation Database. INDOT identified seven major air-to-truck facilities in the BTS database, all of which are located on the southwest side of Indianapolis and serve the Indianapolis International Airport (see **Figure 3.7**).[21] The following service providers operate at these facilities:

- Alaska Airlines Cargo
- American Airlines Cargo
- Cargolux Airlines International SA
- Delta Air Lines Cargo
- Southwest Cargo
- United Airlines Cargo
- Quantem Aviation Services
- Air General
- FedEx
- DHL Global Forwarding
- United States Postal Service

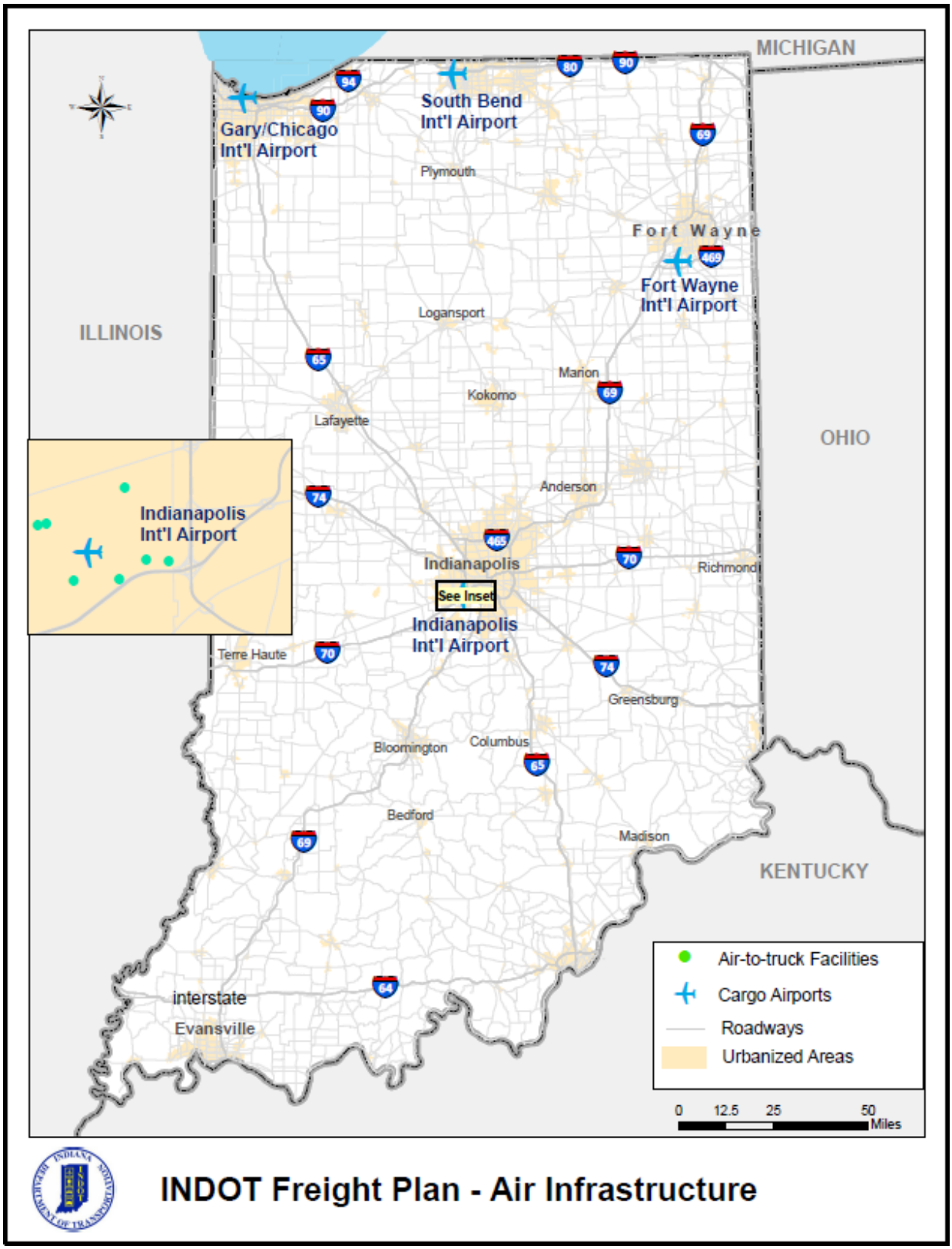
[18] INDOT, 2022 Indiana State Aviation System Plan, September 2022

[19] Federal Aviation Administration, Airport Categories. https://www.faa.gov/airports/planning_capacity/categories

[20] UPS, UPS to Launch Air Service from Gary/Chicago International Airport, May 13, 2020. https://about.ups.com/sg/en/newsroom/press-releases/customer-first/ups-to-launch-air-service-from-gary-chicago-international-airport.html

[21] Bureau of Transportation Statistics, Intermodal Facilities Air-to-Truck. https://hub.arcgis.com/datasets/fedmaps::intermodal-freight-facilities-air-to-truck/explore

## Figure 3.7 – Major Air Infrastructures in Indiana



### 3.2.5 Key Freight Facilities for Multimodal Linkages

Indiana's freight system is multimodal. For supply chains to work efficiently, it is critical to ensure seamless connections between modal components, including the highway system, intermodal hubs and connections to ports/airports. As described in **Chapter 2**, one of INDOT's freight planning goals is to "improve multimodal linkages to cost effectively alleviate bottlenecks and barriers to freight transfers across modes."

Stakeholder feedback throughout the plan development indicated a desire to improve connections between highway and non-highway modes towards increased logistics capabilities. A key to efficient multimodal linkages is the enhanced first- and last-mile connectivity at or near where freight transfers occur across modes. **Sections 3.2.2** through **3.2.4** have identified major rail, water, and air freight assets, as well as significant intermodal facilities between them and highways. In addition, the designated NHS and PHFS intermodal connectors covers highway access to many of Indiana's rail, port, and cargo airport facilities. Based on the Project Team's consensus, a 5-mile buffer was established surrounding the following key multimodal facilities:

- Major rail to flatcar/container on flatcar facilities (see **Section 3.2.2**)
- Major ports (see **Section 3.2.3**)
- Major cargo airports and air-to-truck facilities (see **Section 3.2.4)**
- NHS intermodal connectors
- PHFS intermodal connectors

These multimodal/intermodal facilities, along with highway links within the 5-mile buffer, are considered as key freight facilities that impact multimodal linkages in Indiana, as shown in **Figure 3.8.** It is noted that the highway connectors, especially those on the PFC, provide primary first- and last-mile connections to other modes, in addition to supporting many of Indiana's key industries.

## Figure 3.8 – Key Freight Facilities for Multimodal Linkages in Indiana

## 3.3 Freight Demands

This section describes Indiana's freight movements and demands by major mode (highway, rail, water, and air), which have primary impacts on the needs of the state's freight system. The analysis was based on FHWA's Freight Analysis Framework Version 5 (FAF5)[22] and the current Indiana Statewide Travel Demand Model (ISTDM8, 2020).

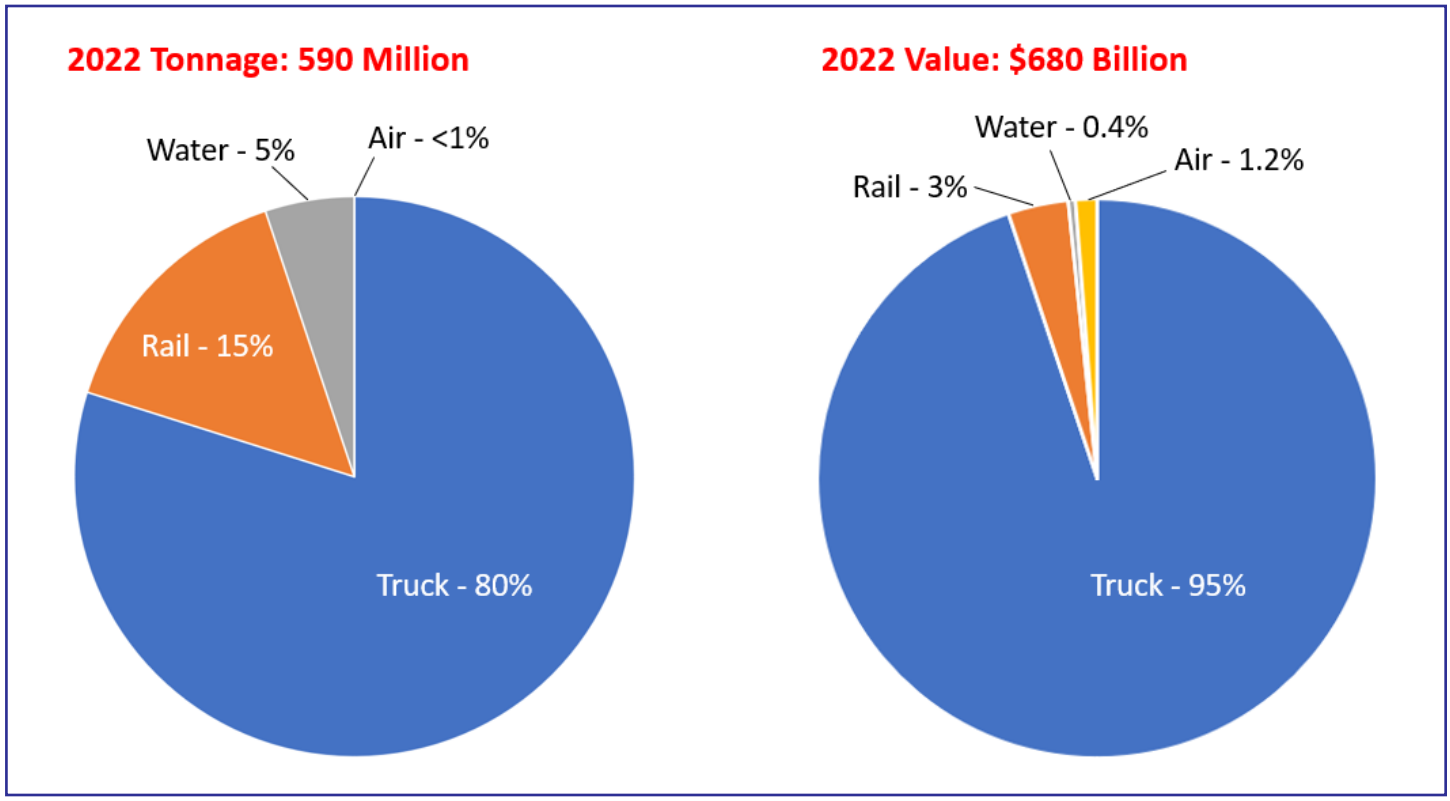
### 3.3.1 Overview of Indiana Freight Movements

#### *3.3.1.1 Freight Movements by Mode*

**Figure 3.9** and **Figure 3.10** show Indiana's freight commodities by mode, in 2022 and 2045, respectively. Trucks dominate the freight movements in Indiana. In 2022, 590 million tons and $680 billion of freight are estimated to move through Indiana's transportation system. Trucks carry 80% of all freight tonnages and 95% of all freight values to, from, within and through Indiana. Rail is the second largest mode to carry commodities in the state, by accounting for 15% of total tonnages and 3% of total values in 2022. Water carries 5% of total tonnages and 0.4% of total values. Air has an almost negligible effect on the overall state tonnages, however, it represents 1.2% of overall value. This is because air cargo is typically comprised of higher unit cost goods.

By 2045, Indiana's freight commodities are estimated to grow to 760 million tons and $1.09 trillion, with an increase of 28% and 61% respectively. While the mode share is expected to remain similar through 2045, trucks will have an even larger share according to forecasts, by carrying 86% of total tonnages and 96% of total values. Remaining the second largest mode by 2045, rail has a decreased share of commodity shipment by tonnage (10%) and the same share of total commodity value (3%). Goods carried by water and air continue being a small share of total freight in Indiana through 2045.

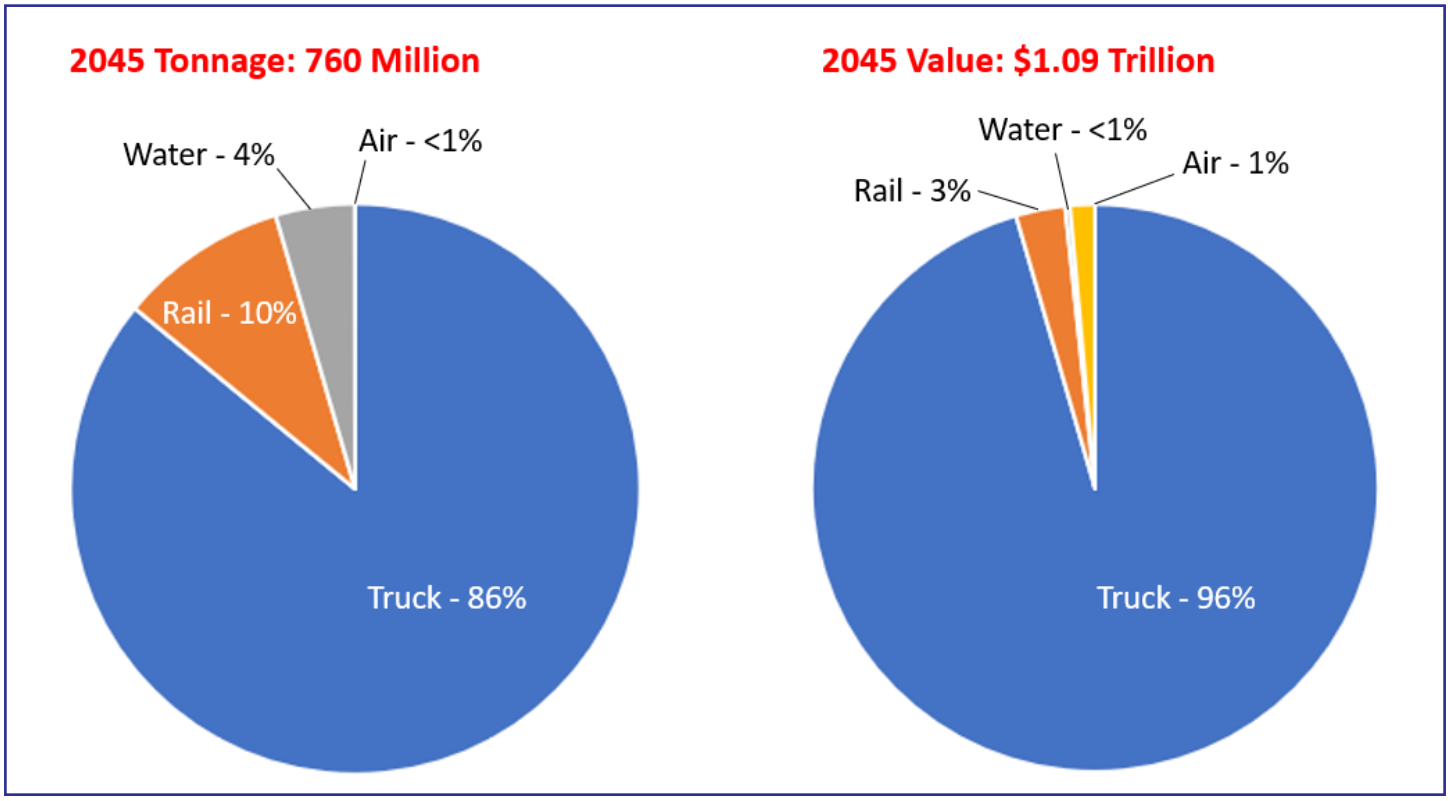
**Figure 3.9 – Mode Share in 2022**




Note: value is by 2017 dollars.

[22] FHWA, Freight Analysis Framework Version 5 (FAF5), https://faf.ornl.gov/faf5/dtt_total.aspx

## Figure 3.10 – Mode Share in 2045




Note: value is by 2017 dollars.

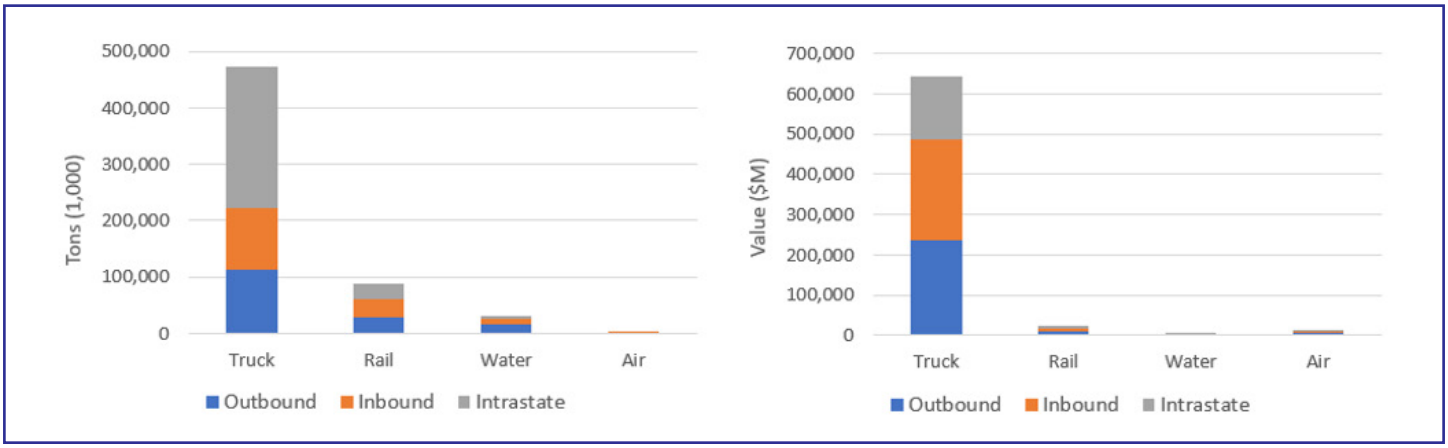
### *3.3.1.2 Freight Movements by Direction*

**Table 3.3** and **Figure 3.11** show the tonnage and value of commodities by mode and direction (inbound, outbound, and within Indiana). Approximately 53% of total truck freight tonnages move within the state, which represent approximately 25% of total truck shipment value. As a comparison, lower percentage of internal commodity movements are observed for rail, water, and air. It confirms the non-highway modes usually carry longer-distance commodities.

## Table 3.3 – Freight Movements by Mode and Direction (2022)

| DIRECTION | TRUCK | RAIL | WATER | AIR |
|---|---|---|---|---|
| **Tonnage (1,000 tons)** | | | | |
| Outbound | 112,783 | 28,281 | 15,611 | 36 |
| Inbound | 108,678 | 32,077 | 10,844 | 27 |
| Intrastate | 252,604 | 28,530 | 4,020 | 0 |
| Total | 474,066 | 88,889 | 30,475 | 63 |
| **Value ($M)** | | | | |
| Outbound | 237,449 | 11,012 | 1,922 | 4,604 |
| Inbound | 247,410 | 6,784 | 533 | 3,860 |
| Intrastate | 158,778 | 5,866 | 355 | 1 |
| Total | 643,637 | 23,663 | 2,810 | 8,465 |

## Figure 3.11 – Freight Movements by Mode and Direction (2022)

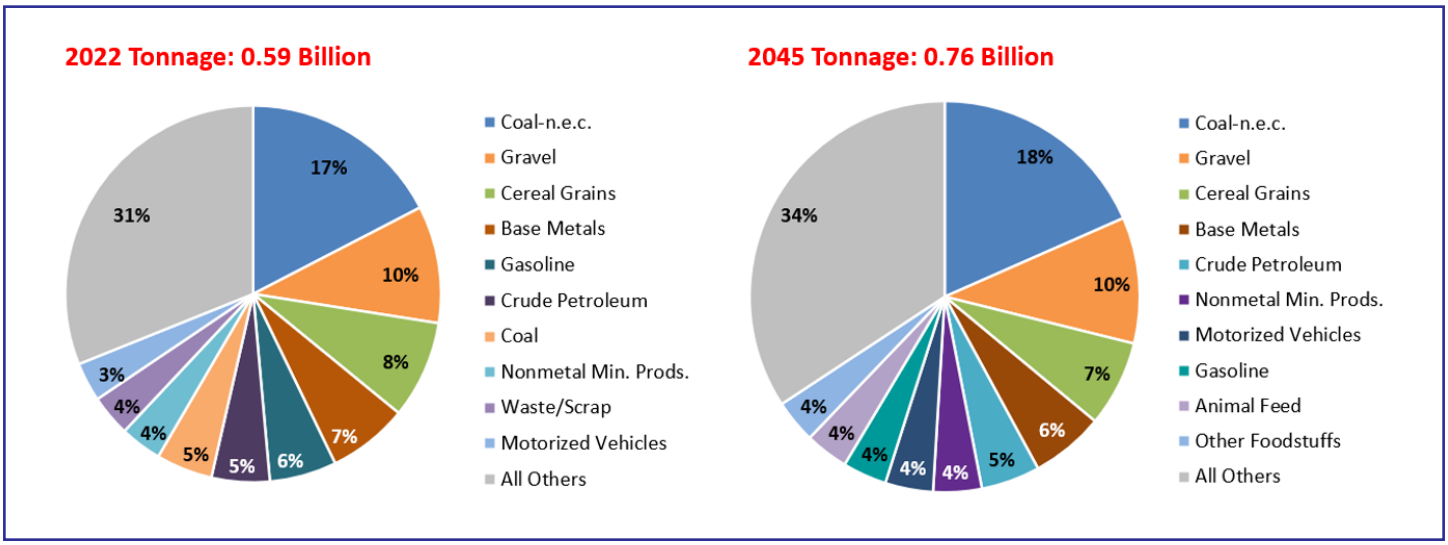



Note: value is by 2017 dollars.

### *3.3.1.3 Major Freight Commodities*

FHWA's FAF5 includes 42 commodity types (see **Appendix E** for details). At the statewide level, Coal-n.e.c., Gravel, Cereal Grains, and Base Metals are the largest commodities representing 42% of total tonnage in 2022, as displayed in **Figure 3.12**. They will continue to be the top four commodities with the same share (42%) through 2045. Gasoline, Crude Petroleum, Nonmetal Mineral Products, and Motorized Vehicles are other top commodities in Indiana, in terms of tonnage. It is noted that Coal and Waste/Scrap are among the top 10 commodities in 2022, and will be replaced by Animal Feed and Other Foodstuffs, according to forecasts.

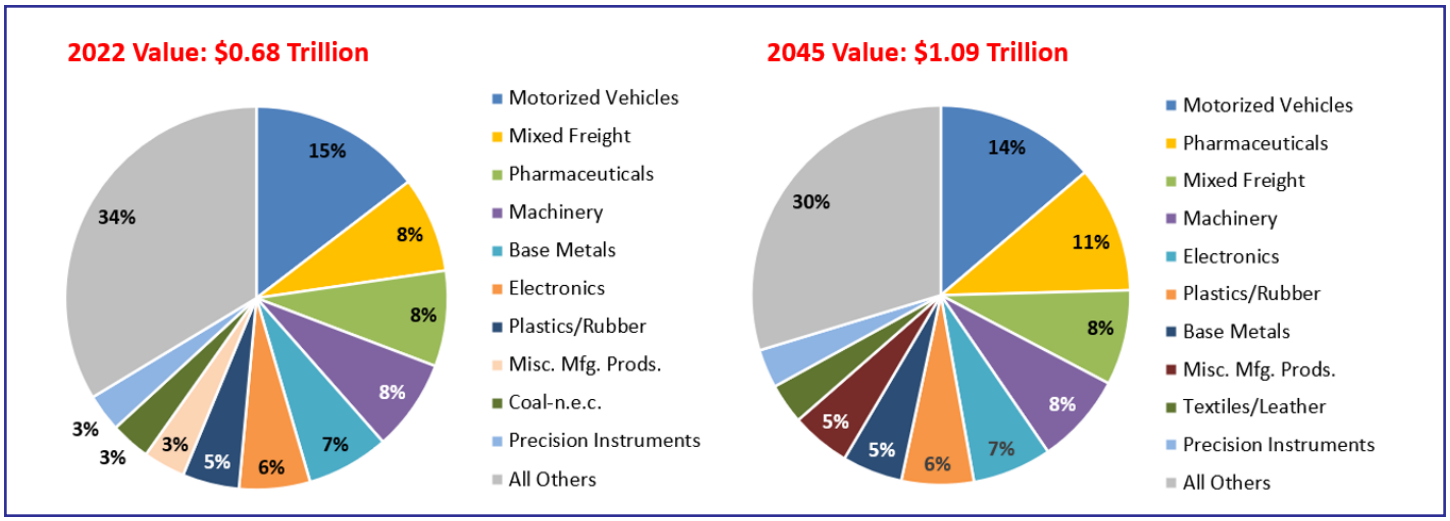
## Figure 3.12 – Major Freight Commodities by Tonnage




Note: Coal-n.e.c. refers to coal and petroleum products not elsewhere classified, including natural gas.

By value, the list of major commodities changes greatly. As **Figure 3.13** shows, Motorized Vehicles, Mixed Freight, Pharmaceuticals, and Machinery are the top four major commodities, representing 39% of total value in 2022 and 41% of total value in 2045. Other top 10 high-value commodities in 2022 include Base Metals, Electronics, Plastics/Rubber, Miscellaneous Manufacturing products, Coal-n.e.c., and Precision Instruments, among which Coal-n.e.c. is estimated to be replaced by Textiles/Leather by 2045.

## Figure 3.13 – Major Freight Commodities by Value




Note: value is by 2017 dollars.

### 3.3.2 Freight Demand - Highway

Highway is the dominant component of Indiana's freight system in terms of amount of infrastructure, tonnage shipped, and value shipped. Trucks carry 0.47 billion tons in 2022, which will increase by 38% to 0.65 billion tons in 2045. By value, trucks carry $0.64 trillion commodities in 2022 and they are estimated to increase by 62% to $1.04 trillion through 2045. The top highway commodities (by 2022 tonnage) are listed below, along with corresponding shares:

- Gravel (15%)
- Cereal Grains (11%)
- Base Metals (9%)
- Nonmetal Mineral Products (6%)
- Motorized Vehicles (6%)
- Waste/Scrap (5%)

**Figure 3.14** and **Figure 3.15** compare daily truck flow forecasts between 2015 and 2045, based on the Indiana Statewide Travel Demand Model (ISTDM8, 2020 – see detailed description in **Section 4.1**). Overall, the state-owned roadways will experience increased truck traffic over the next 20 years, especially in urban/suburban areas. In addition, the Preferred Freight Corridors (PFC) expect to carry heavier truck flows, including all interstates as well as major arterial corridors (e.g., US 30, US 31, US 24). Several arterial corridors (e.g., US 231 south of Lafayette) tend to have decreased truck traffic through 2045. This is primarily due to the land use changes that impact truck movements estimated by ISTDM8. It is also noted that I-69 from Evansville to Indianapolis was only partially constructed in 2015. However, upon its anticipated completion of construction soon, I-69 will become a major freight corridor in southwestern Indiana by carrying a significant amount of freight trucks through 2045.

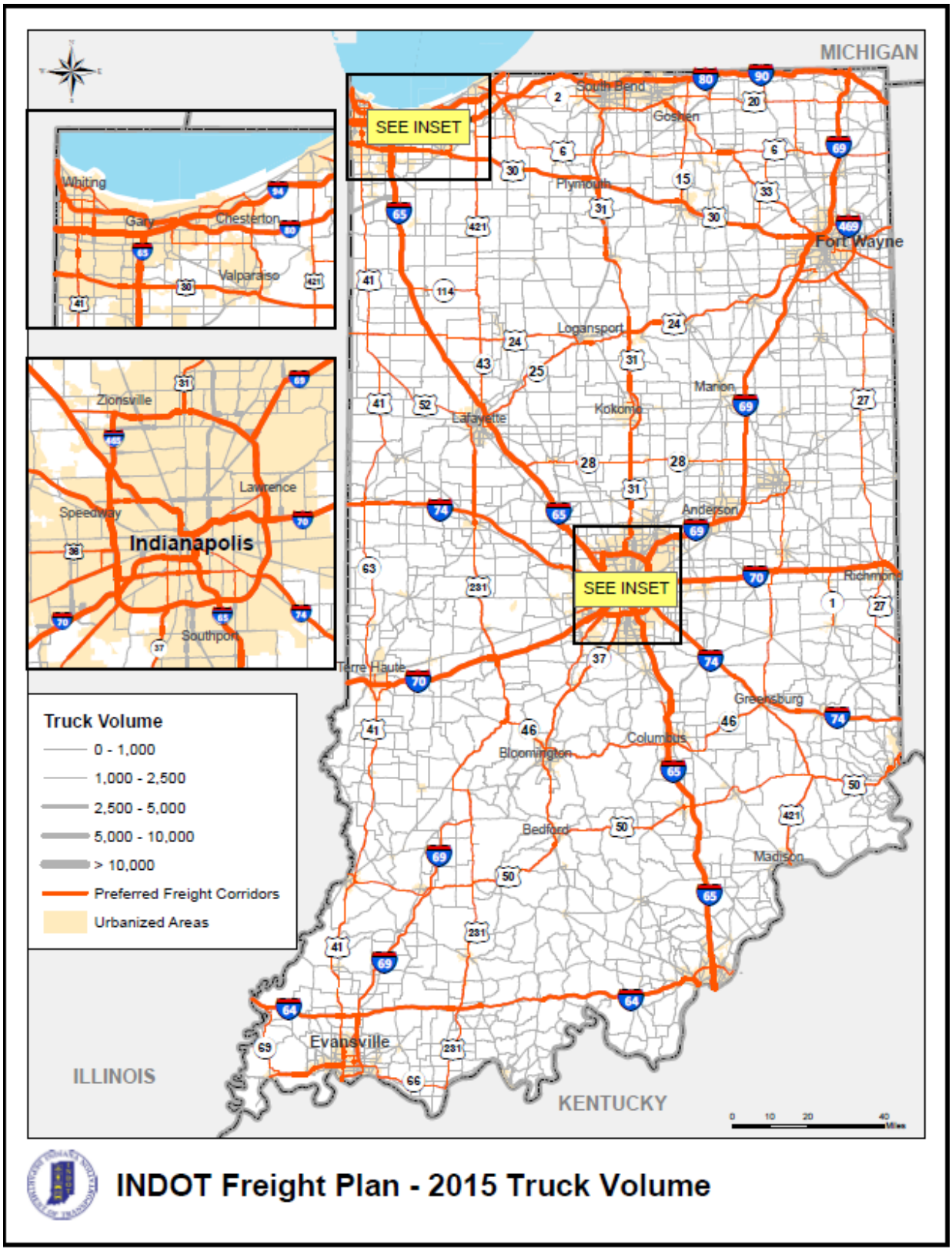
**Table 3.4** summarizes truck VMTs estimated by ISTDM8. The daily truck VMTs on all state-owned roads grow from 21.2 million in 2015 to 29.3 million in 2045, representing an annual growth rate of 1.09%. The PFC carry more than three quarters of total statewide truck VMTs (76% in 2015, 78% in 2045) and have a faster growth than other roads. This confirms the importance of PFC in freight truck movements.

## Table 3.4 – Daily Truck VMT in 2015 and 2045

| ROAD CATEGORY | 2015 DAILY TRUCK VMT (MILLION) | | 2045 DAILY TRUCK VMT (MILLION) | | ANNUAL GROWTH RATE |
|---|---|---|---|---|---|
| Preferred Freight Corridors | 16.1 | 76% | 22.9 | 78% | 1.18% |
| Other State-Owned Roads | 5.1 | 24% | 6.4 | 22% | 0.76% |
| All State-Owned Roads | 21.2 | 100% | 29.3 | 100% | 1.09% |

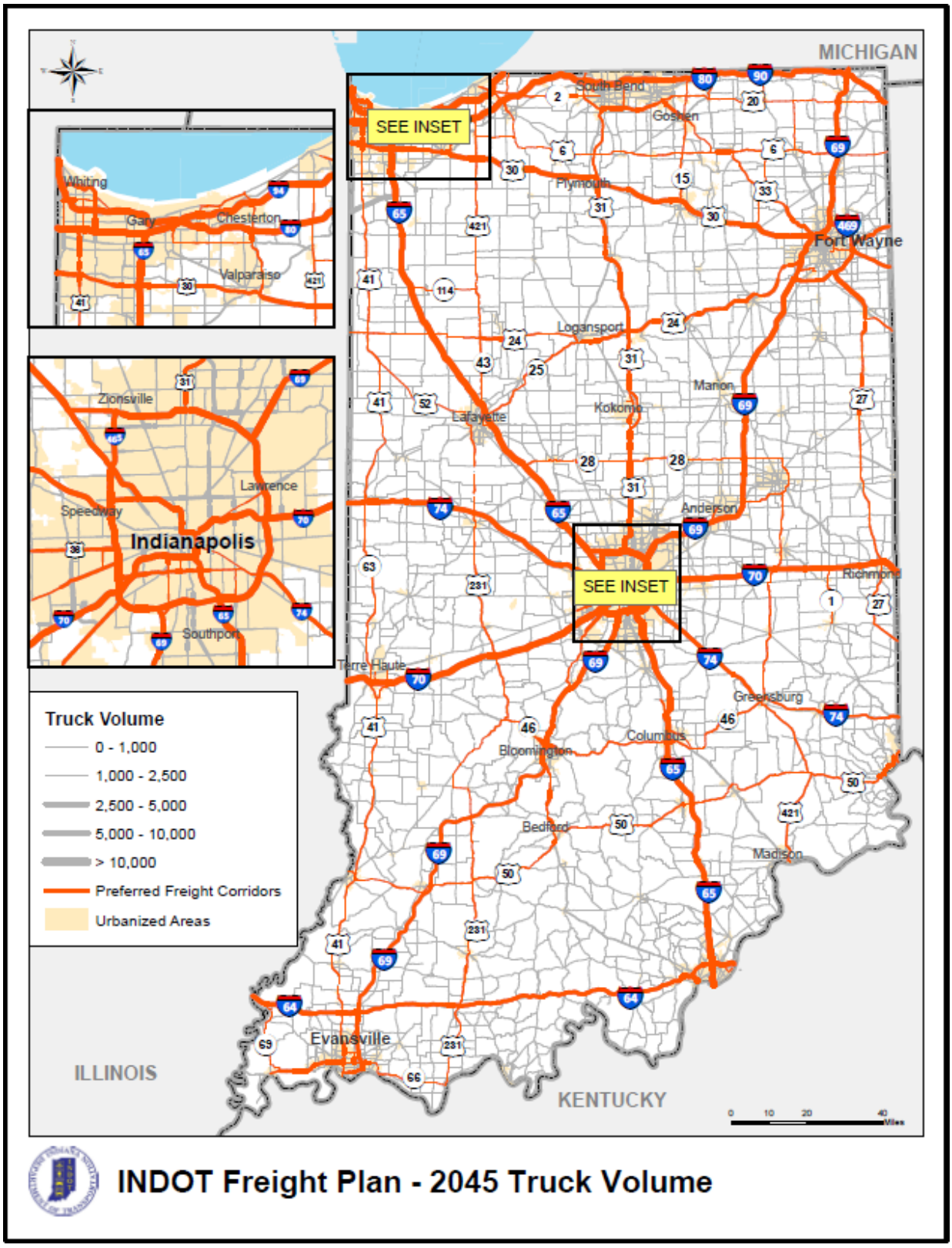
Source: ISTDM8, 2020

## Figure 3.14 – 2015 Truck Volume




Source: ISTDM8, 2020

## Figure 3.15 – 2045 Truck Volume




Source: ISTDM8, 2020

### 3.3.3 Freight Demand - Railroad

Indiana's railroads currently carry 15% of the state's freight by weight and 3% by value. The difference between these two values is due to the amount of coal that the railroads carry. Coal, which is relatively inexpensive compared to other types of freight, accounts for almost half of Indiana's railroad shipments by weight. The top rail commodities are listed below, along with corresponding shares (by 2022 tonnage):

- Coal (43%)
- Cereal Grains (15%)
- Base Metals (11%)
- Coal-n.e.c. (4%)
- Fertilizers (4%)
- Other Agricultural Products (3%)
- Waste/Scrap (3%)

The value of freight rail shipments in Indiana is expected to increase by 30% by 2045. However, the weight of the shipments is expected to decrease by 18%. This decrease is due primarily to a projected 70% decrease in coal shipments.

### 3.3.4 Freight Demand - Waterway

Indiana's waterways currently carry 5% of the state's freight by weight and 0.4% by value. The top water commodities are listed below, along with corresponding shares (by 2022 tonnage):

- Gravel (55%)
- Cereal Grains (13%)
- Other Agricultural Products (8%)
- Coal (5%)
- Nonmetallic Minerals (5%)
- Coal-n.e.c. (4%)
- Metallic Ores (4%)

The value of freight water shipments in Indiana is expected to increase by 8% by 2045. The weight of the shipments is expected to increase by 12%.

### 3.3.5 Freight Demand - Air Cargo

Indiana's airports currently carry less than 1% of the state's freight by weight and 1.2% by value. The top air commodities are listed below, along with corresponding shares (by 2022 tonnage):

- Electronics (21%)
- Precision Instruments (12%)
- Motorized Vehicles (11%)
- Machinery (11%)
- Plastics/Rubber (7%)
- Pharmaceuticals (6%)
- Base Metals (5%)

The value of freight air shipments in Indiana is expected to increase by 82% by 2045. The weight of the shipments is expected to increase by 77%. These increases are projected to occur consistently across the top air commodities listed above. While these increases would be significant for the individual facilities, air shipments in 2045 are projected to represent less than 1% of the state's freight shipments by weight and 1.4% by value.

## 3.4 Other Freight Trends

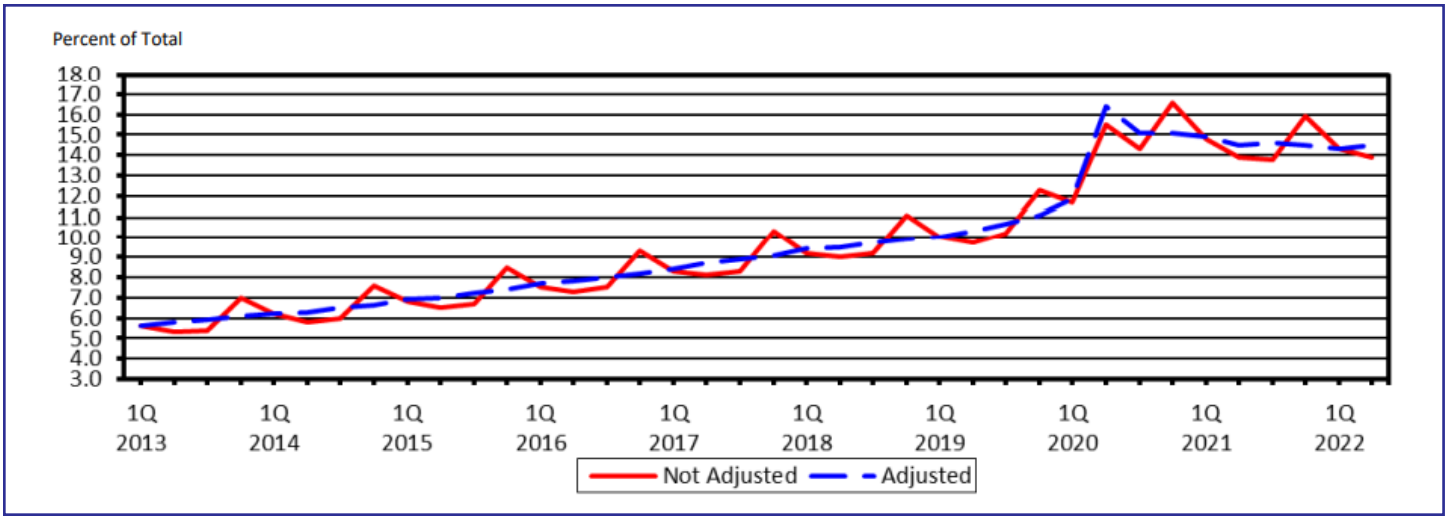
This section addresses a few emerging and noticeable trends that are likely to impact the freight transportation system and the logistics industry in Indiana.

### 3.4.1 E-Commerce

E-commerce (electronic commerce) refers to the activity of electronically buying or selling of products on online services or over the internet. The e-commerce industry has grown exponentially in the past 10 years, especially since the pandemic. According to U.S. Census Bureau, the nationwide retail e-commerce sales have increased from approximately 5.5% to

14.5% of total retail sales since 2013, as shown in **Figure 3.16.**[23] For the second quarter of 2022, the U.S. retail e-commerce sales (adjusted for seasonal variation, but not for price changes) was $257.3 billion, representing an increase of 6.8% from the second quarter of 2021.

## Figure 3.16 – Estimated Quarterly U.S. Retail E-Commerce Sales as A Percent of Total Quarterly Retail Sales: 1st Quarter 2013 – 2nd Quarter 2022




The massive surge in e-commerce has disrupted the global supply chain and transformed freight infrastructure networks. The growth in home deliveries is one of the most significant impacts of e-commerce as more consumers are switching to online purchases. This change has an impact on urban freight transportation, with more trucks moving through and to residential areas instead of shops. This change will also impact destinations of freight trucks, because more warehouses/distribution centers have been and/or will be built in support of faster dispatch and delivery of goods towards homes. As a result, the freight sector has been changing their fleet composition to be more suitable for short and more frequent last-mile logistics. For example, the following is a list of existing and planned Amazon fulfillment centers and sortation centers in Indiana [24]:

- #DIN1 – 5850 West 80th Street, Indianapolis (Marion County)
- #DIN3 – 5545 Chet Waggoner Court, South Bend (Joseph County)
- #IND1 – 4255 Anson Boulevard, Whitestown (Boone County)
- #IND2/IND3 – 715 Airtech Parkway, Plainfield (Hendricks County)
- #IND4/IND8 – 710 South Girls School Road, Indianapolis (Marion County)
- #IND5 – 800 South Perry Road, Plainfield (Hendricks County)
- #IND7 – 9101 Orly Drive, Indianapolis (Marion County)
- #IND9 – 2140 Stacie's Way, Greenwood (Johnson County)
- #PIN1 – 6161 Decatur Boulevard, Indianapolis (Marion County)
- #SDF8 – 900 Patrol Road, Jeffersonville (Clark County)
- #XUSE – 5100 South Indianapolis Road, Whitestown (Bonne County)
- Elkhart (opening 2023)
- Fort Wayne (opening 2022)
- Franklin (opening 2022)
- Lanesville (opening 2022)

[23] U.S. Census Bureau of the Department of Commerce, Quarterly Retail E-commerce Sales – 2nd Quarter 2022, https://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf

[24] Wikipedia, https://en.wikipedia.org/wiki/List_of_Amazon_locations
Tinuiti, https://tinuiti.com/blog/amazon/amazon-fulfillment-centers-map/

The changes of the freight sector's fleet composition demand a safer and more reliable roadway network surrounding airports, warehouses/distribution centers, homes, and in between. Currently, no first-/last-mile issues related to the fulfillment/distribution centers are known or reported by INDOT and the State Freight Advisory Committee. However, a well-maintained and efficient system of intermodal facilities and roadway connectors plays an important role to meet the needs of the growing e-commerce. INDOT has identified key facilities in support of multimodal linkages and first-/last-mile services (see **Section 3.2.5**) and it is INDOT's goal to improve these facilities.

While e-commerce requires an integrated and efficient freight system of all modes, air freight plays a more important role in the rapid growth of e-commerce operations because air cargo is the most reliable way of moving freight. Moving goods by air has become more imperative for faster delivery of the parcels. A critical tenant of e-commerce is faster delivery of goods, which increases the demand for air freight. In Indiana, e-commerce is likely to be one of the driving powers for the anticipated significant growth of air cargo in future. A major challenge in the air freight sector is usually the lack of cargo capacity. However, Indiana has excess air shipping capacity and generally the ability to expand its airports (INDOT Freight Plan, 2018). This means Indiana airports have the potential to meet the increased air cargo demands in foreseeable future.

### 3.4.2 Connected and Autonomous Vehicles (CAV)

Connected and Autonomous Vehicle (CAV) technology offers the possibility of fundamentally changing transportation. Equipping automotive vehicles of all types with new technology will likely reduce crashes, energy consumption, pollution, and the cost of congestion. This technology is most easily conceptualized using a six-level continuum suggested by the National Highway Traffic Safety Administration (NHTSA), with different benefits of the technology realized at different levels of automation:[25]

- **Level 0 –** Momentary driver assistance
- **Level 1 –** Driver assistance
- **Level 2 –** Additional assistance
- **Level 3 –** Conditional automation
- **Level 4 –** High automation
- **Level 5 –** Full automation

No one knows the full scope of the changes to come. However, the auto and technology industries are moving at an aggressive pace to provide the consumer autonomous vehicles. Recent research suggests that it will be at least 2045 before half of new vehicles are autonomous, and 2060 before half of the vehicle fleet is autonomous. Because of the high labor costs and predictable routes, long-haul freight trucks are particularly appropriate for autonomous operation, so self-driving trucks may become common in the 2030s and 2040s.[26]

INDOT is recently in a partnership with Ohio Department of Transportation (ODOT) to promote the adoption and integration of truck automation technologies into daily operations by freight carriers that deliver products along the I-70 corridor across Indiana and Ohio, under the Advanced Transportation and Congestion Management Technology Deployment (ATCMTD) grand awarded by FHWA.[27] The goal of this study is to facilitate and provide host fleets and truck automation vendors an opportunity to deploy technology in revenue service on Indiana and Ohio interstate system routes. Through this effort, INDOT also hopes to better understand how roadway assets, such as signs and stripping, effect truck automation.

[25] National Highway Traffic Safety Administration (NHTSA), Automated Vehicles for Safety, https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety

[26] Victoria Transport Policy Institute, Autonomous Vehicle Implementation Predictions: Implications for Transport Planning, 2022. https://www.vtpi.org/avip.pdf

[27] FHWA, U.S. Department of Transportation Awards $4.4 Million to Ohio's I-70 Truck Automation Corridor, 2020. https://highways.dot.gov/newsroom/us-department-transportation-awards-44-million-ohios-i-70-truck-automation-corridor

### 3.4.3 Truck Driver and Workforce Shortage

The American Trucking Association estimates a nationwide shortfall of 80,000 truck drivers in 2022 and 160,000 by 2030.[28] The shortfall is attributed to high demand, a retiring workforce and a lack of new drivers coming into the industry. The pandemic is making it increasingly difficult for the trucking industry to find and retain qualified drivers.

The lack of truck drivers not only reduces truck fleet capacity, but also spreads pressure across other associated modes such as the air and rail industries. In Indiana, the freight industry has made an effort to fill truck driver shortages. Conexus Indiana and its partners are launching a new program: commercial truck-driver training that students can pay for using federal student loans. The program was developed with a grant awarded from Indiana Department of Workforce. In addition, the aforementioned effort on implementing full automation of trucking could cause massive disruptions in the labor forces associated with the industry, or potentially serve as a solution to the truck driver shortage.

[28] Forbes, Foreign Immigration Could Relieve U.S. Truck Shortage, 2022. https://www.forbes.com/sites/andyjsemotiuk/2022/08/31/foreign-immigration-could-relieve-us-trucker-shortage/?sh=713de0e61839

This chapter describes freight-related issues and needs in Indiana. A performance measure matrix was established to aid in achieving INDOT's freight planning goals and objectives. The performance measures guide the process of analyzing existing and future conditions of Indiana's freight system and identifying issues and needs, with a focus on the Preferred Freight Corridors (PFC) and key facilities in support of multimodal linkages for highway mode. Extensive stakeholder outreach efforts were also made to identify multimodal freight issues and needs, in addition to analysis using INDOT data and planning tools.

## 4.1 Performance Measures

A performance-based freight planning process allows INDOT to not only track how its existing freight assets are performing and changing but also guide the evaluation of potential investments towards achieving its goals and objectives. Based on discussions with the Project Team and coordination with other stakeholders, INDOT established measurable highway-focused performance measures to best meet its freight planning goals and objectives, as **Table 4.1** shows.

### Table 4.1 – Indiana Freight Performance Measures

| CATEGORY | PERFORMANCE MEASURES | |
|---|---|---|
| | Goal #1 - Promote using preferred freight corridors to improve statewide mobility, reliability, safety, system preservation, economic vitality, air quality, and innovative technology implementation. | Goal #2 - Improve multimodal linkages to cost effectively alleviate bottlenecks and barriers to freight transfers across modes. |
| **Demand** | • Commodity flow by mode (tonnage & value)<br>• Daily truck volume | |
| **Mobility & Reliability** | • Bottlenecks with Level of Service (LOS) E or F<br>• Truck hour delays<br>• % of unreliable roadway length | • Within 5 Miles of Intermodal Facilities:<br>  ○ Truck hour delays<br>  ○ % of unreliable roadway length |
| **Infrastructure** | • % of pavement with "Poor" condition<br>• Number of bridges with "Poor" condition | • Within 5 Miles of Intermodal Facilities:<br>  ○ % of pavement with "Poor" condition<br>  ○ Number of bridges with "Poor" condition<br>  ○ Number of weight restricted bridges |
| **Safety** | • Number of truck-involved total crashes<br>• Number of truck-involved incapacitating injury crashes<br>• Number of truck-involved fatal crashes<br>• Number of railroad at-grade crossings | • Within 5 Miles of Intermodal Facilities:<br>  ○ Number of truck-involved total crashes<br>  ○ Number of truck-involved incapacitating injury crashes<br>  ○ Number of truck-involved fatal crashes<br>  ○ Number of railroad at-grade crossings |
| **Economy** | • New jobs<br>• Benefit/cost (B/C) ratio | |
| **Environment** | • Total emission reductions<br>• Truck $CO_2$ emission per mile | |

INDOT's freight performance measure matrix covers five core aspects that have the greatest impact on the state's freight system, especially on the Preferred Freight Corridors and key facilities of multimodal linkages:

- **Demand** measures existing and future freight flows carried by Indiana's freight system. Freight demand serves as the foundation to understand and identify the most important freight assets. Fast-growing freight volumes result in congestions and unreliable travel times, cause safety issues, and impact the condition of freight infrastructures. It is a major factor causing freight issues and needs. Two types of freight demands are considered in the plan.

  - Commodity flow by tonnage and value for all modes in Indiana, based on FHWA FAF data. This provides a high-level understanding of statewide commodity movements. Details of the analysis can be found in **Section 3.3.1.**
  - Daily truck volume. This forecasts link-level freight truck daily flows on all state-owned roadway facilities, using the Indiana Statewide Travel Demand Model (ISTDM).

    ISTDM is a statewide planning-level traffic forecasting tool developed, updated, and maintained by INDOT. It covers the entire state of Indiana and parts of adjacent states. The model was recently updated to a new version (ISTDM8) in 2020. ISTDM8 is a daily model with a 2015 Base Year and a 2045 Future Year, and includes the following major components:

    - **Traffic analysis zones (TAZ)** (see **Figure 4.1**). 2015 zonal socioeconomic data was developed based on U.S. census and available employment data. 2045 zonal data was projected using combined sources including Woods & Poole forecasts, growth estimated by the previous version of ISTDM, and additional adjustments.

    - **Roadway network** (see **Figure 4.1**). The 2015 Base Year network is based on INDOT's Roadway Inventory GIS files that were used for Highway Performance Monitoring System (HPMS) reporting. 2045 Future Year network incorporates the existing and committed (E+C) major capacity improvement projects for roadways identified by INDOT. **Appendix F** includes a list of these E+C projects.

    - **Speed/capacity calculator.** It estimates free-flow speeds and capacities for roadway links based on key attributes (e.g., functional class, area type, and access control type).

    - **Trip generation.** This estimates trip productions and attractions by trip purpose in each TAZ, using relevant zonal socioeconomic data.

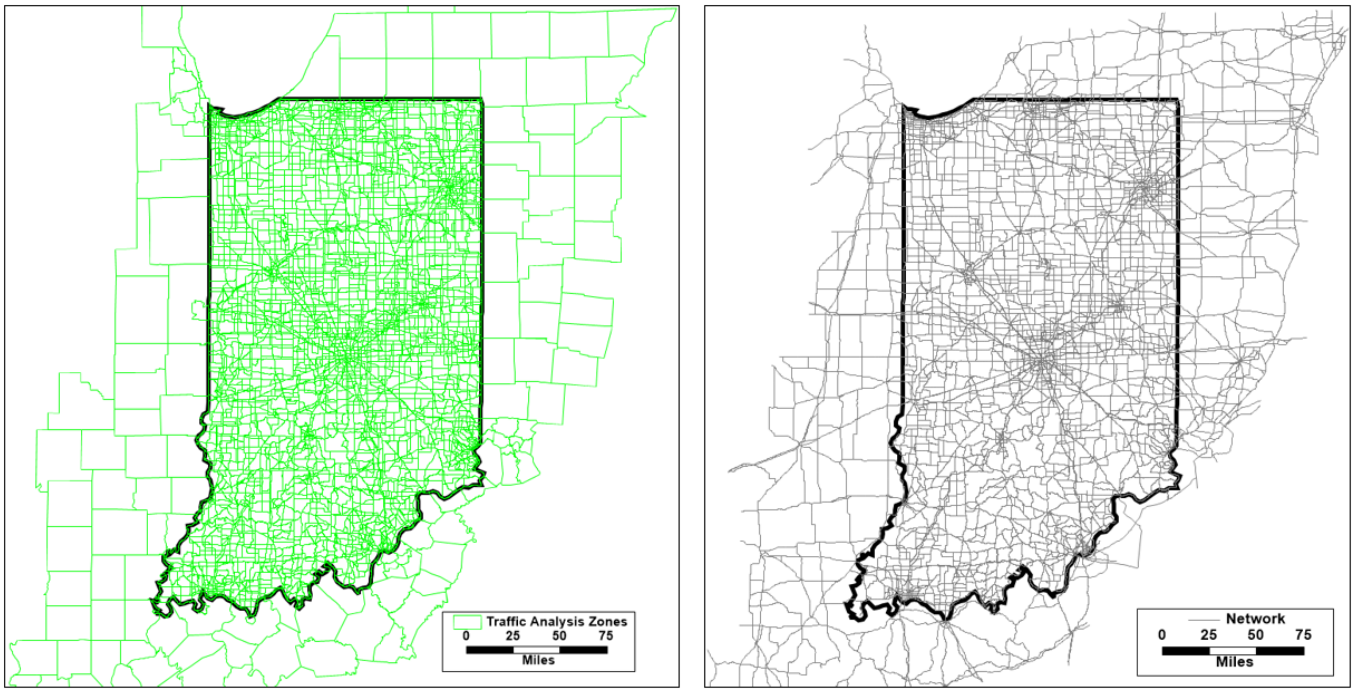
    - **Trip distribution.** This distributes trips between zones by trip purpose, using gravity models.

    - **Mode choice.** This predicts mode split between auto and transit for the long trip purpose, and auto occupancy. The transit mode accounts for the South Shore intercity commuter rail in northern Indiana.

    - **Truck model.** This includes both freight and non-freight trucks. The freight truck model utilized TranSearch commodity flow data for Indiana, while the non-freight truck model uses methods from the Quick Response Freight Manual.

    - **Traffic assignment.** This uses a multi-modal multi-class assignment approach for traffic assignment, with daily truck trips and auto trips loaded to the network at the same time.

## Figure 4.1 – ISTDM8 TAZ and Network




- **Mobility and reliability** are indicators of the system efficiency and accountability. They are used to identify system bottlenecks and delays due to capacity constraints as well as unreliable locations in terms of travel time.

  - Bottlenecks with Level of Service (LOS) E or F. LOS is a commonly used measure for traffic condition, using letters A through F, with A being the best and F being the worst. LOS E and F represent unstable or breakdown flow with low speed and major backups, which identify bottlenecks due to insufficient capacity. An unacceptable LOS (E or F) was determined using the volume/capacity (v/c) ratio estimated by ISTDM8 and a threshold of v/c of 0.85 or greater at a planning level.
  - Truck hour delay. This measures the level of congestion for truck flows through the roadway system. For each roadway link in ISTDM8 network, truck hour delay was calculated as the link truck volume multiplied by the delay (i.e., the difference between free-flow time and congested time) from ISTDM8.
  - Percent of unreliable roadway length. Unreliable roadway segments were derived based on the Truck Travel Time Reliability Index (TTTR), the only one freight-specific performance measure identified by federal freight planning policy (i.e., FAST Act). TTTR is a ratio of congested truck travel times (95th percentile) to normal truck travel time times (50th percentile) on a roadway segment at five different times of day. TTTR values were provided by INDOT using the National Performance Management Research Dataset (NPMRDS). As the FAST Act did not establish a TTTR threshold for unreliable truck travel time, a TTTR value of 1.5 or greater was used to identify unreliable truck travel times in the plan.
  - The truck hour delay and percent of unreliable roadway length were also reported for a 5-mile buffer of identified intermodal facilities, in support of INDOT's freight planning goals.

- **Infrastructure** evaluates pavement and bridge physical conditions to inform system maintenance and preservation programs.

  - Percent of pavements with poor condition. This was derived using INDOT's pavement data and reported by Preferred Freight Corridors and a 5-mile buffer of identified intermodal facilities.
  - Number of bridges with poor condition. This was based on INDOT's bridge data and reported by Preferred Freight Corridors and a 5-mile buffer of identified intermodal facilities.

- Number of weight restricted bridges. Based on INDOT's bridge data, this information was particularly prepared for a 5-mile buffer of identified intermodal facilities to inform potential impact on bridges during first-/last-mile freight movements which may occur on local facilities with lower standard.

- **Safety** is at the forefront of planning and investment decision making. Safety-related measures were developed to improve safety of the freight transportation system in Indiana.

  - Number of truck-involved total, incapacitating injury, and fatal crashes. These statistics were summarized using statewide crash data extracted by INDOT from the Automated Reporting Information Exchange System (ARIES).
  - Number of railroad at-grade crossings. The railroad at-grade crossings are potential safety concerns for all vehicles, including trucks. The information was derived using INDOT's railroad GIS layer.
  - The number of truck-involved crashes and the number of railroad at-grade crossings were also reported for a 5-mile buffer of identified intermodal facilities, in support of INDOT's freight planning goals.

- **Economy** is among the key factors that drive INDOT's investment decision on major transportation projects. The following two representative measures are considered by INDOT when evaluating economic benefits of freight-related projects.

  - New jobs. This represents the average annual jobs that are anticipated to create by a new transportation project through the planning horizon. This information was estimated using ISTDM8 modeling and INDOT's economic analysis tools.
  - Benefit/cost (B/C) ratio. B/C ratio is a common criteria to evaluate the financial effectiveness of transportation projects. This information was estimated using ISTDM8 modeling, INDOT's economic analysis tools, and planning-level cost estimation.

- **Environment** is closely related to the quality of life and impacts sustainable development. The following air quality emission factors that are measurable using available data are considered by INDOT when evaluating environmental impact of freight-related projects.

  - Total emission reductions. This was based on INDOT's air quality analysis of total emission reductions for most applicable criteria pollutants, through the Air Quality Improvement Program (CMAQ) funded projects.
  - Truck $CO_2$ emissions per mile. This was based on FHWA Mobility Trends Tool to estimate the total amount of $CO_2$ emitted by truck per mile measured in metric tons.

**Chapter 3** describes freight demands for all modes and provides more details of truck demands on Indiana's highway system. **Section 4.2.4** discusses the air quality conformity procedure, analysis tools, performance measures and targets in Indiana. **Chapter 5** includes details of economic benefits for proposed freight projects, as part of the development of strategies and recommendations. Therefore, this chapter focuses on identifying freight issues and needs related to mobility and reliability, infrastructure, and safety based on the established performance measures described in **Table 4.1.**

## 4.2 Issues and Needs – Highway

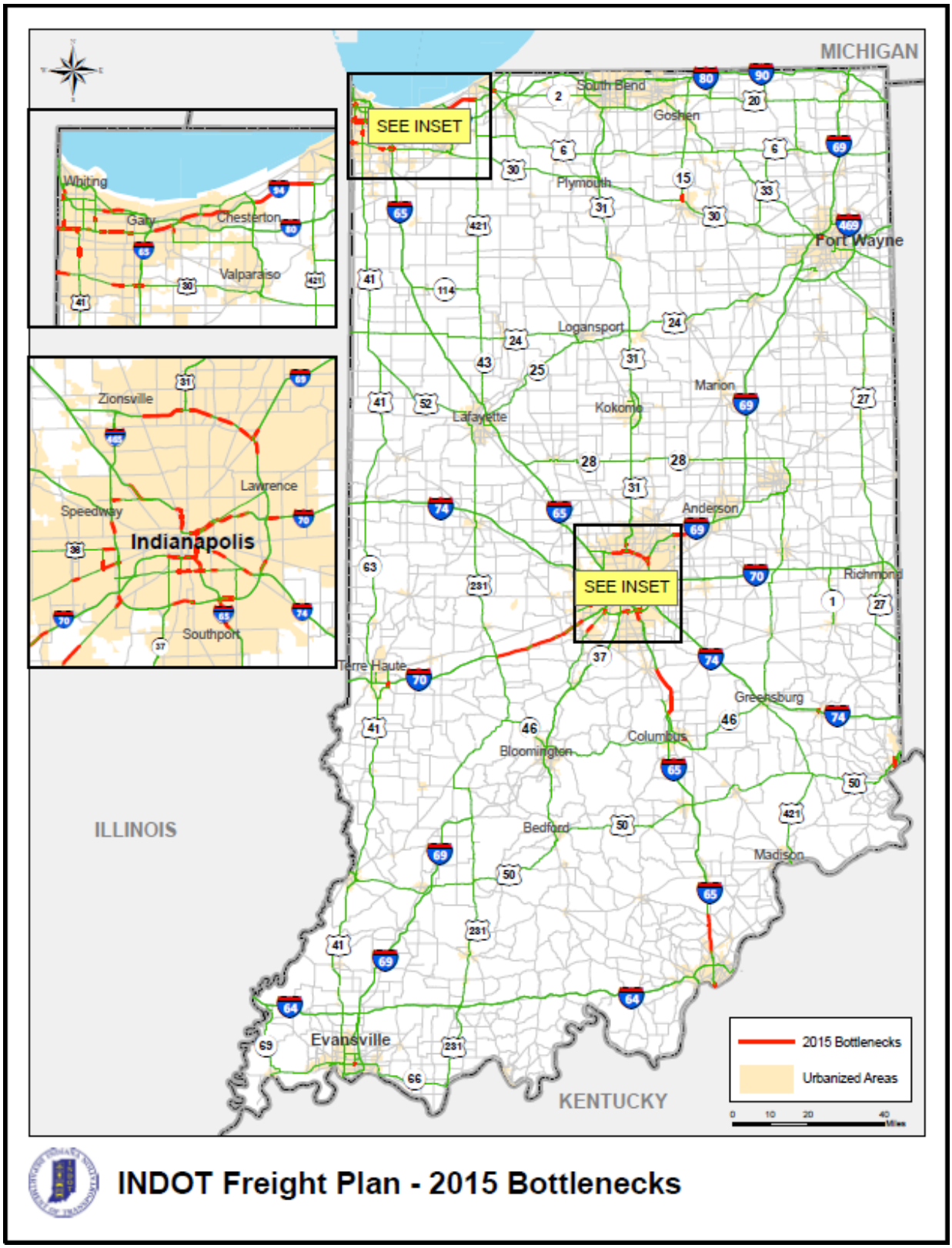
### 4.2.1 Mobility and Reliability

Highway freight bottlenecks are locations with constraints that cause a significant impact on freight mobility or reliability. This plan considers all truck bottlenecks identified using INDOT's data and tools.

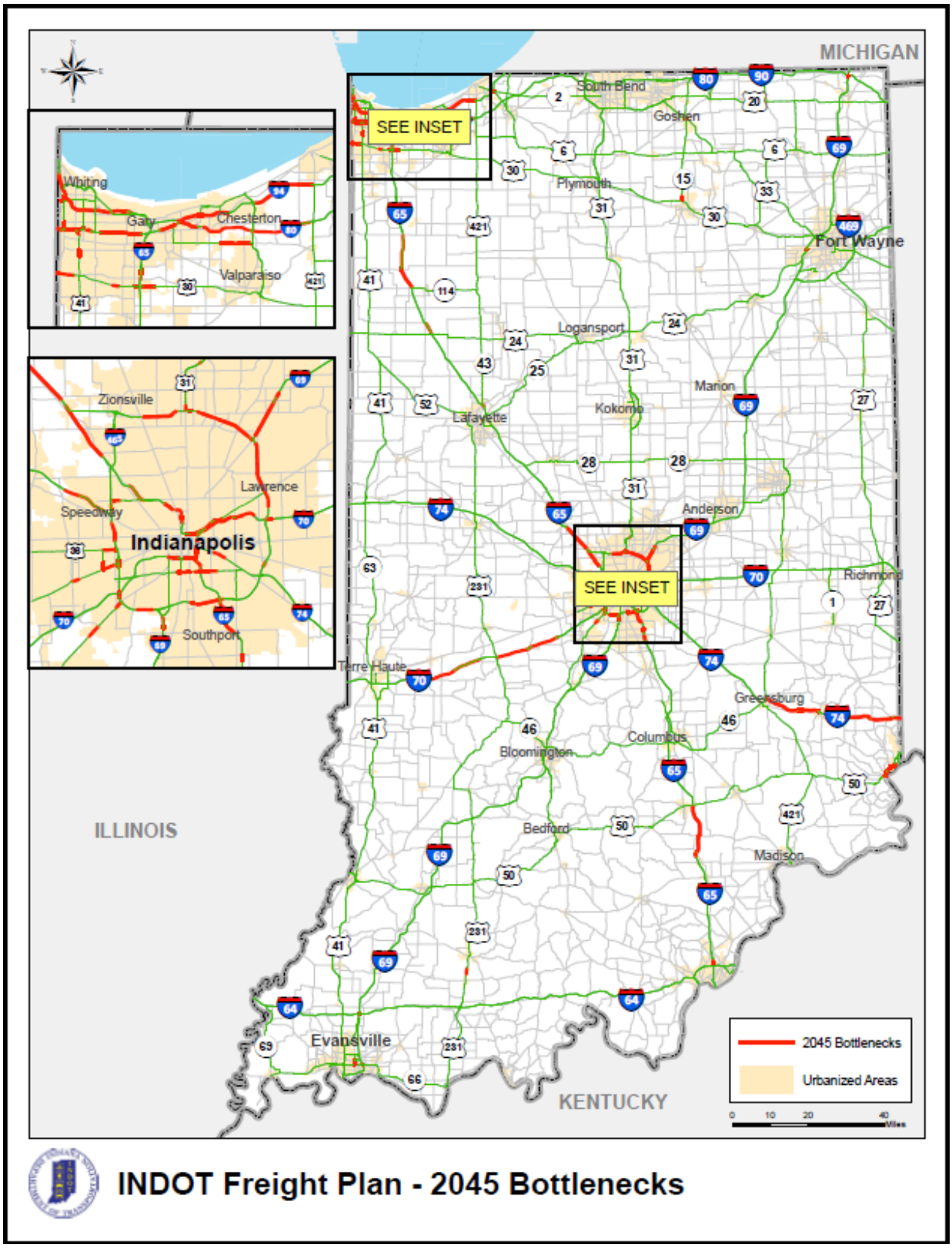
#### *4.2.1.1 Capacity-Constraint Bottlenecks*

**Figure 4.2** and **Figure 4.3** show capacity-constraint bottlenecks on the Preferred Freight Corridors in 2015 and 2045 respectively, according to ISTDM8.

## Figure 4.2 – 2015 Truck Bottlenecks (Capacity Constraints)



## Figure 4.3 – 2045 Truck Bottlenecks (Capacity Constraints)



It is noted that the 2045 estimates from ISTDM8 account for INDOT's existing and committed (E+C) projects for major roadway capacity improvements. Therefore, some bottlenecks observed in 2015 no longer exist in 2045. As expected, many of the bottlenecks are observed on I-465, I-65, I-70, I-80/I-90 (northwestern Indiana), and I-94 (northwestern Indiana) and expand over time, as they are major truck corridors carrying large volume of commodities in the state. I-74 is anticipated to experience congestion between Greensburg and the Indiana/Ohio state border by 2045, while it maintains an acceptable traffic condition in 2015. Indianapolis and northwestern Indiana are the two urban areas that have the most congested freight highway networks. Isolated bottlenecks are also observed in other urban/suburban areas such as Fort Wayne, Lafayette, Evansville, Jeffersonville/Clarksville, Warsaw, and southeastern Indiana near Cincinnati, Ohio.

Truck hour delay measures the congestion of freight network at corridor, regional, or systemwide levels, which are primarily caused by bottlenecks. **Table 4.2** summarizes daily truck hour delays in existing and future conditions. The Preferred Freight Corridors have 42,728 truck hour delays in 2015 and the delay almost doubles (83,700) through 2045, representing more than 80% of total truck hour delays in the statewide highway network. When looking into the proximity of intermodal facilities, those Preferred Freight Corridor segments that are within 5-mile buffer of intermodal facilities account for over 18% of statewide total truck delays, although they are only 2% of state-owned roads in length. The delays incurred through the long-distance and first-/last-mile truck movements impact the efficiency of freight transportation system, increase logistics costs, and worsen environmental impacts due to more vehicle emissions. A common way to reduce highway congestion due to capacity constraints is to improve roadway capacity.

It is noted that **Table 4.2** only shows analysis results for roadway categories of interest in the study (i.e., PFCs and 5-mile buffer). Numbers in the last row of the table are not the sum of other rows, because non-PFCs and the roadways outside of the 5-mile buffer are not included.

## Table 4.2 – Daily Truck Hour Delay

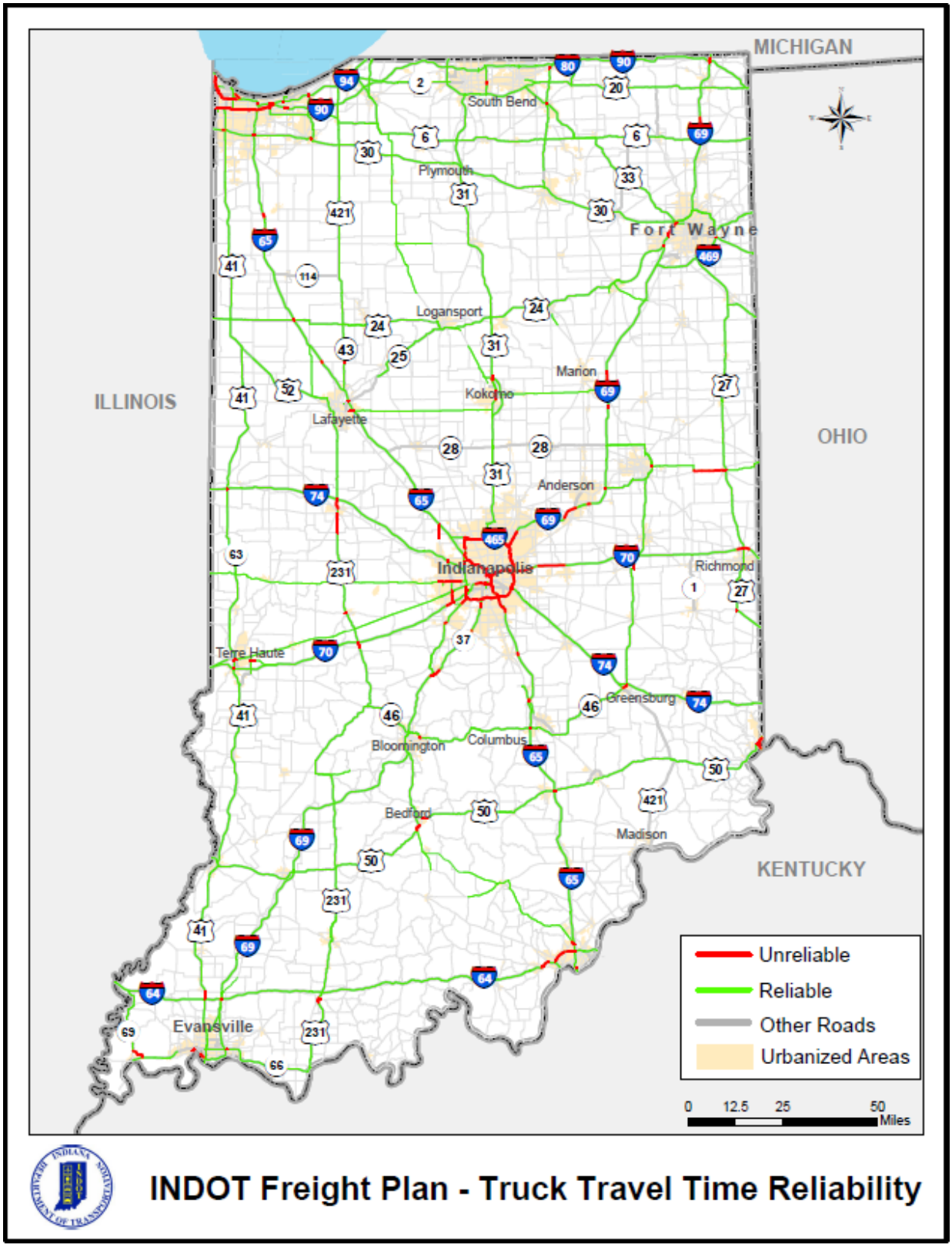
| ROAD CATEGORY | 2015 TRUCK HOUR DELAY | | 2045 TRUCK HOUR DELAY | |
|---|---|---|---|---|
| Preferred Freight Corridors | 42,728 | 82% | 83,700 | 80% |
| All State-owned Roads within 5-mile Buffer of Intermodal Facilities | 13,200 | 25% | 24,119 | 23% |
| Preferred Freight Corridors within 5-mile Buffer of Intermodal Facilities | 9,586 | 18% | 19,555 | 19% |
| All State-owned Roads | 52,275 | 100% | 104,141 | 100% |

Source: ISTDM8, 2020

### *4.2.1.2 Unreliable Truck Travel Time Location*

Travel time reliability represents the variability of operation speeds, which could be caused by incidents, weather, maintenance or short-term construction on roadway facilities, in addition to capacity constraints. Unreliable truck travel time is a key performance measure to identify locations with freight mobility and reliability issues. As described in **Section 4.1**, unreliable truck travel time locations are determined based on the Truck Travel Time Reliability Index (TTTR), which is a ratio of congested truck travel times (95th percentile) to normal truck travel time times (50th percentile) on a roadway segment at five different times of day, according to federal freight planning policy (i.e., FAST Act). In this plan, TTTR values derived from INDOT's 2019 NPMRDS data were used instead of 2020 data, to avoid impacts due to the pandemic. Unreliable truck travel time was determined if TTTR is greater than 1.5. It is noted that INDOT's 2019 TTTR values were only available for interstates during the plan development. To have a better coverage of the Preferred Freight Corridors, INDOT's 2019 Level of Travel Time Reliability (LOTTR) values were used as a proxy for TTTR on non-interstate roads where data is available. LOTTR is a ratio of congested travel times (80th percentile) to normal travel times (50th percentile) for all vehicles on a roadway segment at four different times of day. For non-interstate roads, truck travel time was assumed unreliable if LOTTR is greater than 1.5. **Figure 4.4** shows unreliable truck travel time locations.

## Figure 4.4 – Truck Travel Time Reliability




Source: INDOT's 2019 TTTR and LOTTR data.

Unreliable truck travel times exist on interstate and major arterials in Indianapolis (e.g., I-465, I-65, I-69, I-70, US 36, SR 37, and SR 67) and northwestern Indiana (e.g., I-90 and I-94). Many of these unreliable locations overlap with capacity-constrained bottlenecks. In addition, isolated locations with unreliable truck travel times spread throughout the state, especially near interchanges and intersections, which are likely caused by traffic operational issues (e.g., poorly designed intersections or signal timings, incidents due to deficient geometry design, work zones, and short-term constructions, etc.), instead of capacity constraints.

As **Table 4.3** shows, 4.5% of the Preferred Freight Corridors in length have unreliable truck travel time issues. This percentage significantly increases to 16.8% when focusing on the 5-mile buffer of intermodal facilities. The analysis indicates that noticeable unreliability issues exist surrounding intermodal access for the first-/last-mile freight movements and multimodal linkages, likely due to deficient connectivity of local freight network, traffic operational delays (e.g., at signalized intersections), roadway geometric deficiencies, etc. A reliable freight network is particularly important for freight trucks to operate on a just-in-time schedule as part of the modern supply chain.

## Table 4.3 – Truck Travel Time Reliability

| ROAD CATEGORY | PERCENT OF UNRELIABLE LENGTH |
|---|---|
| Preferred Freight Corridors | 4.5% |
| Preferred Freight Corridors within 5-Mile Buffer of Intermodal Facilities | 16.8% |

Note: Preferred Freight Corridor links with unavailable LOTTR/TTTR data were not included in analysis

### *4.2.1.3 Truck Parking Needs*

Truck parking is a national challenge. Truck parking is critical to safety and mobility of truck movements throughout Indiana. Truck drivers need parking availability to get the rest they need, as required by Federal Hours of Service (HOS) regulations. Truck parking is also important as drivers wait for pick-up and delivery appointments (known as staging) or avoid congestion. Inadequate truck parking leads to economic and social costs for truck drivers and the public. While the number of truck parking spaces in the U.S. has risen 6 percent in recent years, it is still not enough.[29]

The BIL requirement for truck parking includes an assessment of:

- Capacity of the State, with the private sector, to provide adequate parking;
- Volume of commercial motor vehicle traffic in the State; and
- Whether there exist any areas within the State with a shortage of parking facilities, including an analysis (economic or otherwise) of the underlying causes of such a shortage.

According to an available national truck parking survey [30], Indiana is among the states with the highest numbers of public, private, and total truck parking facilities/spaces on National Highway System (NHS) roadways. Indiana's truck parking spaces per vehicle-mile traveled (VMT) and mileage on NHS also rank high in the nation. **Table 4.4** summarizes these key truck parking indicators used to analyze truck parking shortages and needs in Indiana. While Indiana had a high level of truck parking, the state still reported shortages at private truck stops, according to the survey. INDOT's capability to build additional truck parking is limited by various factors, such as land availability, zoning restrictions, cost of building new parking facilities and maintenance of the facilities. Addressing these issues requires the coordination and collaboration between government agencies, private business, and other stakeholders to develop solutions that work for everyone involved.

[29] FHWA, Truck Parking Development Handbook, September 2022. https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/docs/Truck_Parking_Development_Handbook.pdf

[30] FHWA, Jason's Law Truck Parking Survey Results and Comparative Analysis, August 2015. https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/jasons_law/truckparkingsurvey/jasons_law.pdf

## Table 4.4 – Truck Parking Indicators in Indiana

| TYPE | NUMBER OF TRUCK PARKING FACILITIES | TRUCK SPACES | | |
|---|---|---|---|---|
| | | Number | Per 100 Thousand Daily Truck VMT on NHS | Per 100 Miles of NHS |
| Public | 40 | 2,070 | 20.3 | 43.1 |
| Private | 186 | 11,810 | 116.0 | 245.9 |
| Total | 206 | 13,880 | 136.3 | 289.0 |

Source: FHWA, Jason's Law Truck Parking Survey Results and Comparative Analysis (2015)

INDOT is striving to provide adequate parking for interstate truck movement by continuing its efforts to address increasing truck parking demand and locate the greatest truck parking needs in the state. INDOT conducted assessments of the availability of truck parking in the state using publicly available tools and input from industry stakeholders. As a result, INDOT determined there is a shortage of truck parking and proposed strategies to address the issue.

The efforts include a recently developed Rest Area and Truck Parking Plan [31]. Indiana has truck parking spaces located at rest areas, welcome centers, and alternative service locations (e.g., private truck stops) around the state to improve safety and efficiency of the trucking industry. INDOT currently operates 28 rest areas and welcome center properties across the state (see **Figure 4.5)**. The INDOT Rest Area and Truck Parking Plan has an overall objective of determining the need of future capital investments for expanded truck parking spaces, by considering the following five major criteria:

1. **Distance between INDOT facilities and locations of private sector travel break opportunities.** INDOT has utilized a standard of approximately 100 miles between travel break opportunities. The majority of the travel break opportunities are in the form of INDOT rest areas and welcome centers; however, in some cases there is a clear opportunity for the private sector to serve the traveling public for these breaks.

2. **Number of truck parking spaces available.** Ensuring the truck industry has ample locations for their mandated rest breaks is a critical safety component of Indiana's rest area and welcome center network. Based on the current truck parking availability at INDOT facilities, a standard of how many spaces should be considered when constructing or reconfiguring locations was proposed:

   - New rest area locations should seek to provide no less than 75 truck parking spaces.
   - New welcome center locations should seek to provide 80-150 truck parking spaces based on demand and current capacity rates.

   In determining these recommended number of truck parking spaces, each property was reviewed for current occupancy rates during peak truck parking hours as well as the proximity to other private sector truck parking opportunities.

3. **Overall usage and truck parking capacity rates.** When identifying the needs of truck parking facilities, INDOT reviewed the Annual Average Daily Traffic (AADT) counts on ramps near INDOT facilities and compared them with the location considerations. The volume of trucks on Indiana's network can be found in **Figures 3.14** and **3.15**. INDOT also evaluated truck parking occupancy rates using visual count data collected from INDOT's Truck Parking Information Management System (TPIMS). **Table 4.5** shows truck parking occupancy rates at INDOT facilities for the peak weekday overnight hours (between 10pm and 7:59am). The analysis provided INDOT with a clearer understanding of the locations with high truck parking demands and the potential shortage of adequate parking facilities.

[31] INDOT, Rest Area and Truck Parking Plan (Draft), 2019.

## Table 4.5 – Average Peak Truck Parking Occupancy Rate

| REST AREA AND WELCOME CENTERS | AVERAGE PERCENT AT CAPACITY DURING PEAK HOURS (BETWEEN 10:00PM AND 7:59AM) |
|---|---|
| Wolcott NB (I-65, Mile Marker 195) | 100% |
| Lebanon NB (I-65, Mile Marker 148) | 100% |
| Plainfield EB (I-70, Mile Marker 64) | 100% |
| Taylorsville SB (I-65 Mile Marker 74) | 100% |
| Clear Creek Welcome Center (I-70, Mile Marker 2) | 100% |
| Kankakee NB (I-65, Mile Marker 231) | 100% |
| Henryville Welcome Center (I-65, Mile Marker 22) | 100% |
| Kankakee SB (I-65, Mile Marker 231) | 98% |
| Lebanon SB (I-65, Mile Marker 148) | 95% |
| Plainfield WB (I-70, Mile Marker 64) | 93% |
| Greenfield WB (I-70, Mile Marker 107) | 91% |
| Greenfield EB (I-70, Mile Marker 107) | 90% |
| Centerville Welcome Center (I-70, Mile Marker 143) | 90% |
| Taylorsville NB (I-65, Mile Marker 72) | 81% |
| Lizton EB (I-74, Mile Marker 57) | 65% |
| Lizton WB (I-74, Mile Marker 57) | 64% |
| Auburn NB (I-69, Mile Marker 325) | 64% |

4. **Priority of Welcome Center Facilities.** In recent years, INDOT has strategically chosen to focus on the renovation and investment of welcome center properties, because they are seen as gateways to Indiana for the traveling public and provide an opportunity to make a positive first impression to visitors. INDOT's new standard of welcome center seeks to provide design elements that match the region in which it is located. It is expected that these buildings and properties will be larger and provide a higher standard of design features.

5. **Location of private sector travel break opportunities**. It is INDOT's goal to supplement private sector truck parking opportunities with public sector facilities where demand is needed. Available private sector travel break facilities were considered in analysis using criteria described above, in support of promoting truck parking capacity at INDOT facilities. For example, switching an existing rest area into truck-parking-only facility can only be possible if there are sufficient private sector travel break opportunities readily available in the nearby area; the lower end of the truck parking standard for welcome centers could be selected if it is within the proximity of private sector truck parking facilities.

In addition to the five criteria mentioned above, the Rest Area and Truck Parking Plan gave special attention to safety considerations. There are the greatest number of commercial truck crashes in northwestern Indiana and around the Indianapolis metropolitan area. The majority of the recommended transitions from existing rest area properties to truck-only facilities will take place surrounding northwestern Indiana as well as the Indianapolis area. Most of the locations selected have shown maximum capacity rates during peak overnight hours. Additionally, this transition provides added safety benefit in these areas.

INDOT's Rest Area and Truck Parking Plan calls for an overall net increase of 1,122 truck parking spaces across the state (an increase of 80% from 1,402 to 2,524), as **Table 4.6** shows. Separate from this plan are the rest areas and travel plazas located along the Indiana Toll Road (I-80 and I-90 in northern Indiana), which are managed separately by a different organization and adhere to different requirements.

## Table 4.6 – INDOT's Current and Proposed Truck Parking Spaces on Interstates

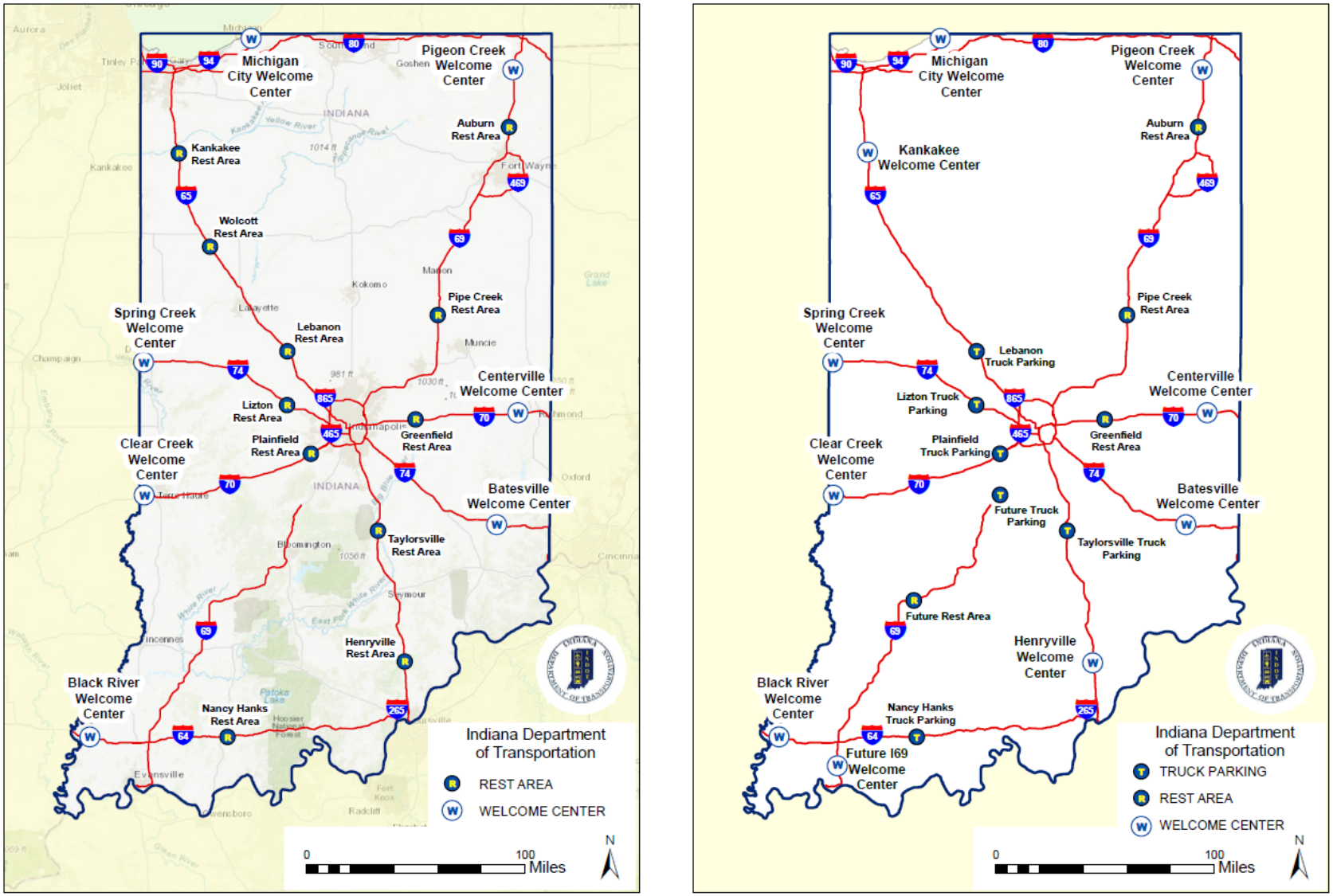
| INTERSTATE CORRIDOR | CURRENT SPACES | PROPOSED SPACES | NET INCREASE OF SPACES |
|---|---|---|---|
| I-64 | 43 | 155 | 112 |
| I-65 | 376 | 635 | 259 |
| I-69 | 255 | 643 | 388 |
| I-70 | 557 | 736 | 179 |
| I-74 | 145 | 255 | 110 |
| I-94 | 26 | 100 | 74 |
| **Total** | **1,402** | **2,524** | **1,122** |

These strategically positioned increases of truck parking capacity are intended to optimize tax-payer investment while increasing safety and mobility to the traveling public. The overall recommendation from the Rest Area and Truck Parking Plan is summarized below and illustrated in **Figure 4.5**:

- Five complete property closures
- Nine transitions to truck-parking-only facilities
- Two new truck-parking-only facilities
- Nine welcome center renovations
- One new welcome center
- Five facilities to remain in operation without capital investment

In addition, INDOT launched a Truck Parking Information Management System (TPIMS) in 2019. TPIMS aggregates real-time data of truck parking availability and communicates it to drivers. This new technology optimizes the utilization of truck parking resources and improves safety as well as mobility of truck movements in Indiana. INDOT's TPIMS project development included a Stakeholder Engagement Workshop in April of 2016. Attendees from trucking companies and drivers provided feedback on the proposed project and input on the overall truck parking challenges and needs in Indiana. The input helped INDOT in determining which rest areas to use TPIMS. **Section 5.1.3.2** provides details of TPIMS.

## Figure 4.5 – INDOT's Rest Area and Welcome Center Portfolio: Existing (Left) and Proposed (Right)




Source: INDOT, Rest Area and Truck Parking Plan (Draft), 2019

#### *4.2.1.4 Impacts of Extreme Weather, National Disasters, and Flooding on Freight Mobility*

INDOT recognizes that extreme weather and natural disasters events have the potential to impact the reliability of the transportation network. INDOT has been dedicated to improving their resiliency and ability to quickly recover from these events. INDOT is also focused on reducing the impact of highway network that carries freight on flooding and stormwater runoff.

As described in **Section 2.2.2**, INDOT developed its 2019 Strategic Plan to adapt to the unprecedented increase in the breadth and level of impact that new technologies have brought to transportation and ongoing shifts in demographics throughout the state. INDOT's plan is to "Enhance Sustainability, Resiliency, Access and Innovation in Our Transportation Network." The 2019 Strategic Plan defines INDOT's service objectives (i.e., strategic priorities) and launches a variety of major initiatives to help deliver the agency's service objectives and fully realize its mission. These objectives and corresponding major initiatives are summarized below:

- **Safety –** "Ensure road safety for motorists, contractors, and INDOT personnel."
  - Strategic Highway Safety Plan
  - Work Zone Safety Measures
  - Local Trax Rail Overpass Program

- **Mobility -** "Enhance end-to-end customer and freight journeys across all modes of transportation."
  - Americans with Disabilities Act (ADA) Compliance
  - Para-Transit Expansion
  - Connectivity Planning Initiative

- **Customer Service –** "Ensure local engagement, timeliness of service, and quality of responses."
  - INDOT4U Customer Service Initiative
  - Emergency Response
  - Enhanced Applications (INDOT Mobile & Next Level Construction Map)

- **Economic Competitiveness –** "Enhance economic outcomes for Indiana."
  - Next Level Roads
  - Added Travel Lanes
  - Next Level Connections

- **Asset Sustainability -** "Enhance ability to management and maintain assets throughout their life cycle."
  - Strategic Asset Management Plan (SAMP)
  - INDOT Road & Bridge Conditions

- **Organization & Workforce –** "Provide employees with tools, training, and information to succeed."
  - Business System Integration
  - Workforce Diversity Initiative
  - Launching Careers for Students and New Graduates
  - Integrating New Employees
  - Employee Investment

- **Innovation & Technology –** "Harness technology and innovation to develop more effective transportation solutions."
  - Autonomous, Electric and Connected Vehicles
  - Intelligent Transportation Systems (Connected Roadways and Signals)
  - Innovative Funding Mechanisms
  - Electronic Construction Management
  - Joint Transportation Research Program (JRTP)

INDOT's 2019 Strategic Plan objectives and major initiatives encompass the freight planning goals and objectives identified by this plan. In particular, INDOT's strategic priorities of mobility and asset sustainability demonstrate its attention to reduce the impacts of extreme weather, natural disasters, flooding, and stormwater runoff events. The 2019 Strategic Plan also indicates INDOT has a goal of "improving sustainable transportation options and alleviating the impact we have on the environment."

INDOT's 2022 Transportation Asset Management Plan (TAMP)[32] reiterates the goals to address weather impacts on freight mobility and the impacts of freight on the environment. INDOT adopted the National Performance Goals that consider various dimensions, including safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery delays. The 2022 TAMP goals strongly support the key aspects and performance measures of freight planning that are focused by this plan. The TAMP outlines strategies to achieve INDOT's goals and supports the State Freight Plan. According to the statement of strategies in the TAMP, INDOT recognizes that "weather events, congestion and traffic incidents are the main contributors to system unreliability on our transportation system". INDOT's Mobility Asset team monitors travel time using NPMRDS data and has developed a Major Expansion Priority List to improve system reliability. INDOT also designed strategies to support existing environmental, project development, and Statewide Transportation Improvement Program (STIP) processes that protect the natural environment. INDOT considers extreme weather and the resiliency of its transportation network as part of risk identification. Two of the major weather and resilience risks are changes in extreme temperatures and increased risk of flooding, both of which may impact freight movements.

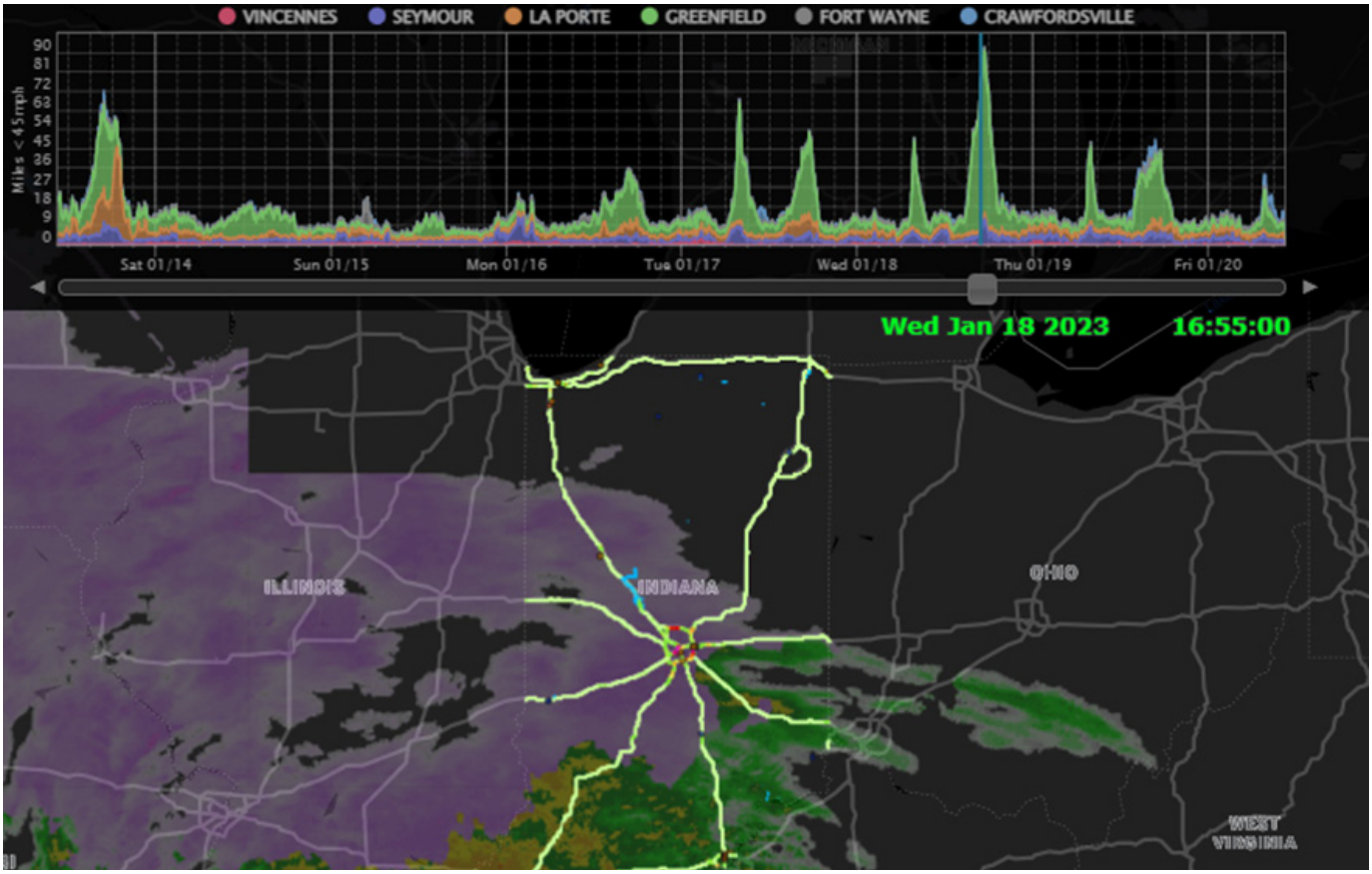
It is important to note that INDOT has made extra efforts to decrease the impacts of freight movement on flooding and stormwater runoff to address mobility and reliability issues on the state highway system, in addition to developing and investing in normal projects. Since about 2019, INDOT's Mobility Asset Team (MAT) has asked for Mobility call projects to address recurrent flooding and/or high water road closures on the state highway system, and sought funding for the projects in order to increase system reliability, reduce user delay, and improve safety for users and residents (e.g. motorists not attempting to drive through flooded roadways, and emergency response units not having to take alternate routes to get to a destination blocked by a flooded road). INDOT has about five projects of this sort that have been funded (or provisionally funded) that are currently in development. While most of the projects are lower-cost small structure replacements, one project involves a bridge replacement and roadway grade raise for a significant length, which probably will cost more than $10M if construction funding is approved. Most of these projects are on lower-volume state roads in less-populated areas of the state, where flooding or stormwater occurs more frequently. However, these projects definitely benefit all users being affected, including freight carriers, businesses, and consumers, in terms of decreased delay and travel distance, improved reliability and safety. INDOT Corridor Development and the MAT will continue to seek out projects of this type in the ongoing effort to improve the efficiency, safety, reliability, and robustness of the state highway system by defining, vetting, and seeking funding for infrastructure projects that benefit all users.

INDOT strives to reduce impacts of winter weather events on freight movement. Through the Joint Transportation Research Program (JRTP), INDOT Maintenance Operations and Purdue University have worked together to develop innovative tools to manage the effects of winter weather events and reduce the impact on freight mobility. INDOT has developed a set of Winter Operations Dashboards (see **Figure 4.6**) that characterizing the real time impact of precipitation and pavement surface temperature on mobility during winter storms. The dashboards enable INDOT Maintenance Operations to better tracking fleet activity through a winter storm, helping in resource allocation and scheduling and forecasting resource needs. INDOT also uses the data for performance measures that track the recovery from an event and travel delay during the event. The result is a reduction in the length of time travelers experience delays due to the weather impacts.

INDOT makes real-time operational adjustments to its snowplow deployments in response to network shutdowns seen on the Winter Operations Dashboards. INDOT has equipped snowplows with a variety of Mobile Road Weather Information Sensors (MARWIS) which can provide a host of analytical data characterizing on-the-ground conditions during periods of wintry precipitation. Traffic speeds combined with road conditions and precipitation data from weather stations provide a uniquely detailed look at the progression of a winter event. The combination of information including traffic speeds, MARWIS and North American Land Data Assimilation System (NLDAS) data results in a real-time, winter operation dashboards characterizing the impact of precipitation and pavement surface temperature on mobility. The use of the winter operations dashboards results in more efficient response to winter weather and reduces the overall travel delays for all users.

[32] INDOT, *Transportation Asset Management Plan (2022)*, https://www.in.gov/indot/files/2022-TAMP.pdf

**Figure 4.6 – INDOT Winter Operations Dashboard**



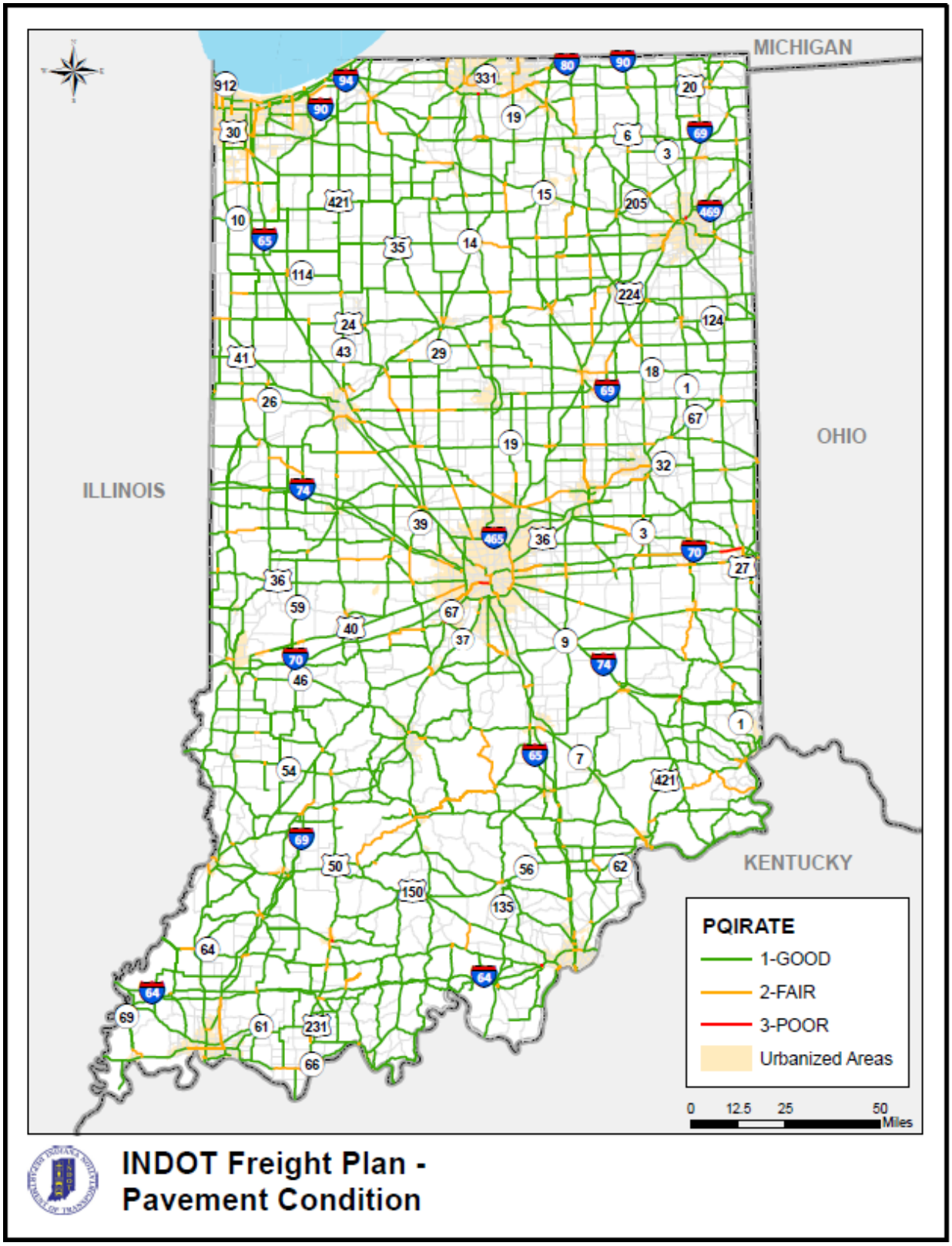

## 4.2.2 Infrastructure

### *4.2.2.1 Pavement*

INDOT's Pavement Asset Team develops its pavement investment targets by considering the performance targets for each road category. To measure roadway performance, pavement conditions are evaluated based on condition factors including International Roughness Index (IRI), faulting, rutting, and cracking. In addition to the individual elements of pavement condition, INDOT has established pavement quality indices derived from each condition factor. For each measure of condition, threshold values are selected for an index ranging from 0-100. This is accomplished by setting a threshold value of 70 between good and fair and 30 between fair and poor. Lastly, these individual indices are, in turn, rolled up into an overall pavement quality index (PQI). PQI sets the condition rates/level of service as a function of the road category, which includes interstates, freeways and principal arterials, and remaining roads, to help normalize pavement condition across the various road categories and leads to more relevant qualitative definitions of good, fair, and poor. Thus, PQI values and their respective categorical definitions (good, fair, and poor) are variable and generally permit lower values of condition as one moves from higher priority to lower priority roadways.

The analysis of pavement condition was based on the PQI value and rating provided by INDOT for a 4-year period from 2017 to 2020. It is important to note that INDOT performs approximately 400-800 miles a year of construction in each of the four years represented in the data. Pavement data might not be available at some locations in current/recent years due to road closure, construction, bridge closure, deviation of lane during collection, etc. Therefore, pavement conditions of state-owned roads were identified primarily using 2020 data, with a supplement of older data for some locations where 2020 data is not available. It is also noted that I-80 and I-90 (Indiana Toll Road) was not included in the dataset from INDOT, so they were not included in the analysis. **Figure 4.7** shows pavement conditions on state-owned roads in Indiana.

## Figure 4.7 – Pavement Condition (2020)



In Indiana, the state-owned roadway system has an overall good or fair pavement condition. Details of roadway pavement conditions can be found in INDOT's current Transportation Asset Management Plan (2022).

**Table 4.7** compares pavement conditions between Preferred Freight Corridors and all state-owned roads, and within the 5-mile buffer of intermodal facilities. Higher percent poor pavements are observed on the Preferred Freight Corridors and within the 5-mile buffer of intermodal facilities, compared to the average of all state-owned roads. It is also noted that 63% (in length) of all poor pavements are located on the Preferred Freight Corridors and 14% (in length) are near intermodal facilities. The maintenance of good or fair pavement conditions is important to freight truck movements, as they carry heavier loads than passenger vehicles and thus have more impacts on sustainability of pavements.

## Table 4.7 – Pavement Condition (2020)

| ROAD CATEGORY | PERCENT OF POOR PAVEMENT |
|---|---|
| Preferred Freight Corridors | 0.29% |
| All State-owned Roads within 5-Mile Buffer of Intermodal Facilities | 0.58% |
| Preferred Freight Corridors within 5-Mile Buffer of Intermodal Facilities | 0.58% |
| All State-owned Roads | 0.14% |

### *4.2.2.2 Bridge*

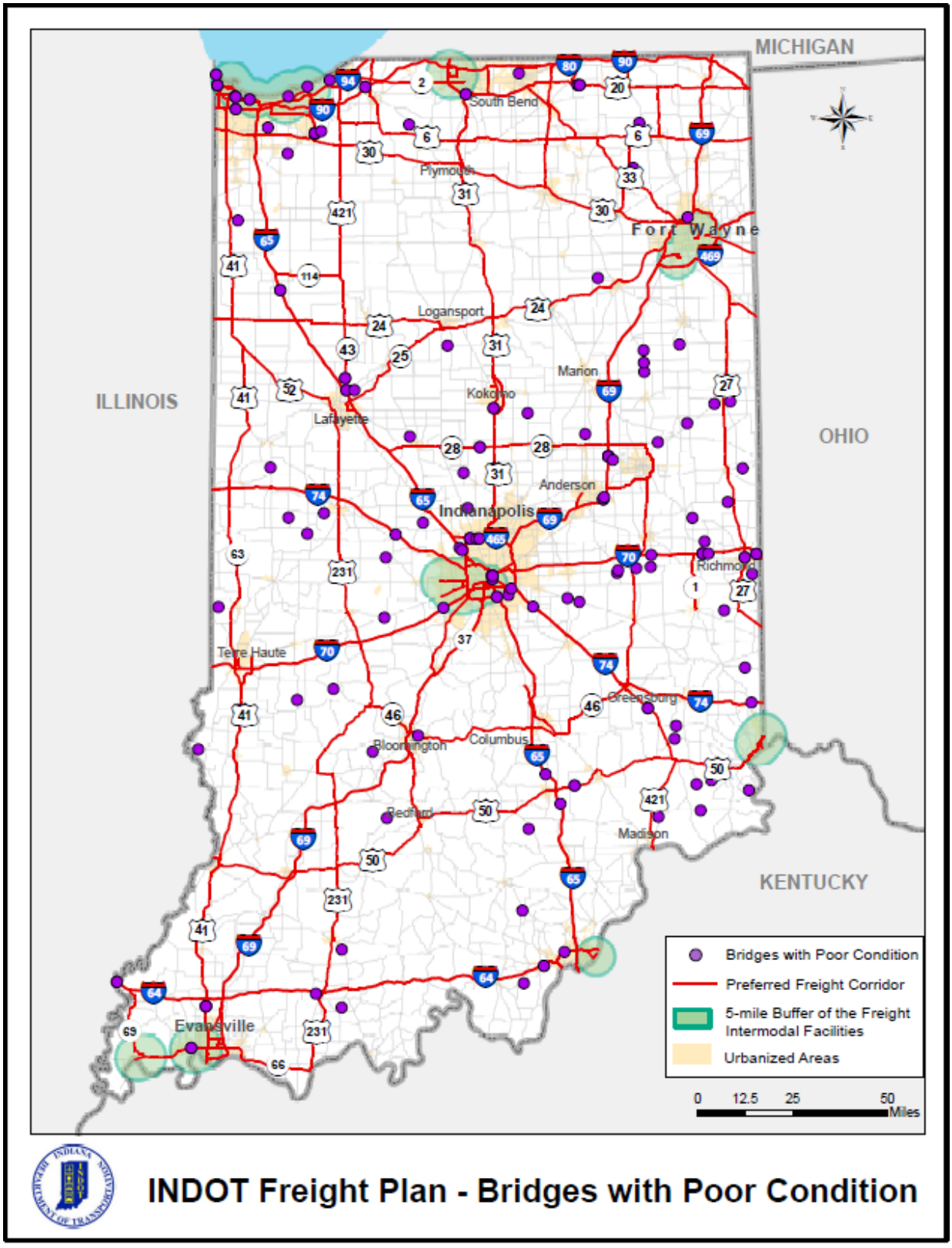
#### Bridge Condition

INDOT's Bridge Asset Team updates the bridge condition (Good, Fair, Poor) on a quarterly basis based on FHWA's method using deck, superstructure and substructure conditions. Bridges with a rating of four or below are considered to be in poor condition. Among all 5,747 state-owned bridges, there are 133 bridges in poor condition, with 41 on the Preferred Freight Corridors, 19 near intermodal facilities, and 9 on the Preferred Freight Corridor and near intermodal facilities simultaneously, according to INDOT's bridge data in 2022. **Table 4.8** summarizes the bridges in poor condition by category of interest and **Figure 4.8** shows their locations.

## Table 4.8 – Bridges in Poor Condition (2022)

| BRIDGE LOCATION | NUMBER OF POOR BRIDGES |
|---|---|
| On Preferred Freight Corridors | 41 |
| On All State-owned Roads within 5-Mile Buffer of Intermodal Facilities | 19 |
| On Preferred Freight Corridors within 5-Mile Buffer of Intermodal Facilities | 9 |
| On All State-owned Bridges | 133 |

## Figure 4.8 – Bridges in Poor Condition (2022)



### Overweight (OW) / Oversize (OS) Restrictions

It is not uncommon for overweight (OW) and oversize (OS) trucks (see **Figure 4.9**) to move through the highway network, as they support several specific industries in Indiana and provide necessary connections for commodities to, from, and through the state. There are size and weight restrictions on the state's highway network to manage safety risk and infrastructure deterioration.

## Figure 4.9 – Example Overweight Trucks (Left) and Oversize Trucks (Right)


Bridges with weight restrictions were identified using INDOT bridge data, if the NBI_041 attribute (i.e., Structure Open, Posted, or Closed to Traffic) has a value of "P" (Posted for load (may include other restrictions such as temporary bridges which are load posted) or "R" (Posted for other load-capacity restriction (speed, number of vehicles on bridge, etc.), according to FHWA guidelines.[33] As **Table 4.9** shows, 27 state-owned bridges have weight restrictions and five of them are within the 5-mile buffer of intermodal facilities. There is no bridge restriction along the Preferred Freight Corridors.

## Table 4.9 – Bridges with Weight Restrictions (2022)

| BRIDGE LOCATION | NUMBER OF BRIDGES WITH WEIGHT RESTRICTIONS |
|---|---|
| On Preferred Freight Corridors | 0 |
| On All State-owned Roads within 5-Mile Buffer of Intermodal Facilities | 5 |
| On Preferred Freight Corridors within 5-Mile Buffer of Intermodal Facilities | 0 |
| On All State-owned Bridges | 27 |

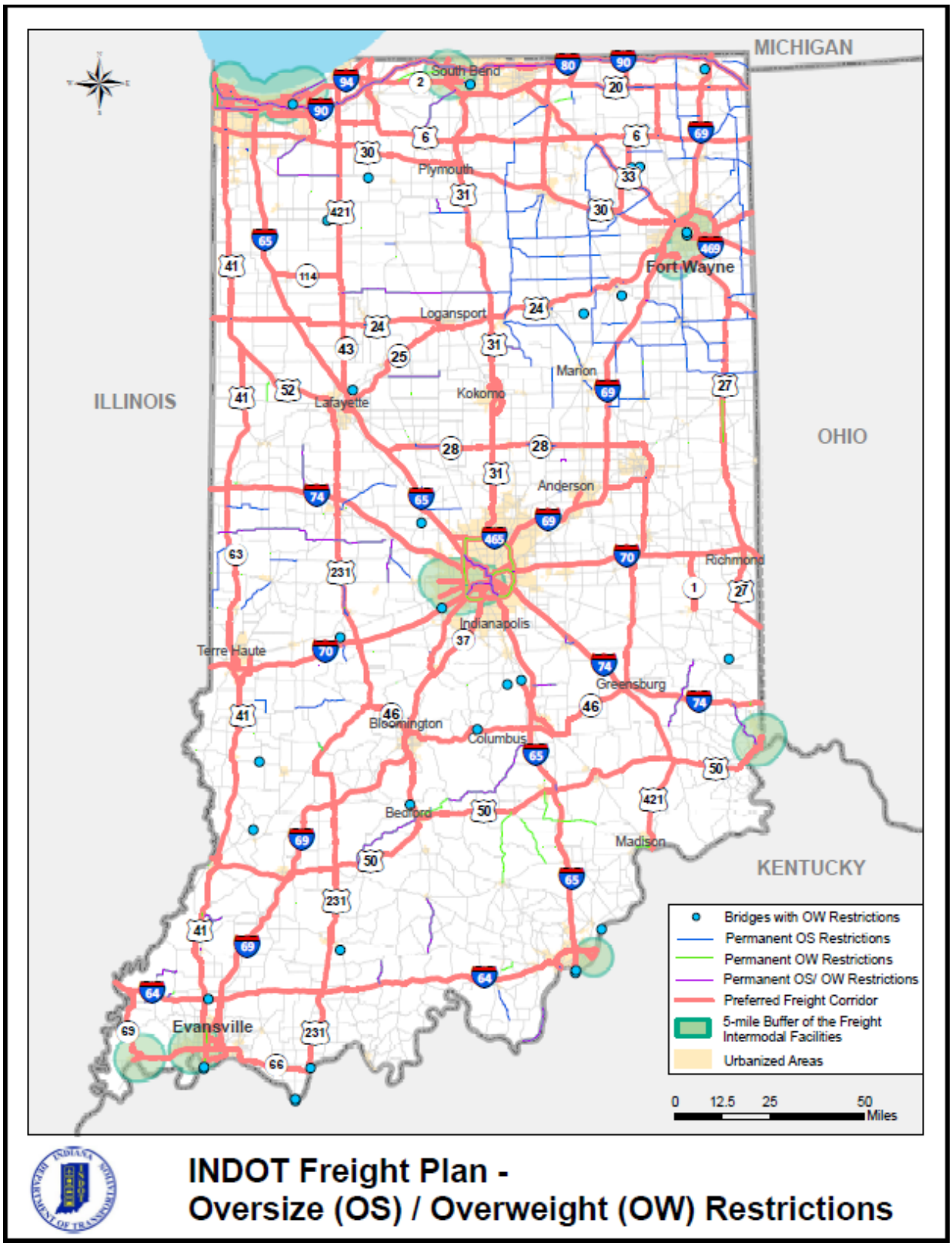
Roadways with weight and size restrictions also impact truck movements, as OW/OS freight may be specifically permitted or prohibited on certain routes. Roadways with permanent restrictions, along with bridges with weight restrictions, are shown in **Figure 4.10**. While certain restrictions exist on I-465, I-65 and I-70 (within I-465), I-80/I-90 (Indiana Toll Road), Borman Expressway/I-94, and several arterial segments, they do not cause detours of regular fright movements on the Preferred Freight Corridors.

It is noted that INDOT has developed and maintained an interactive trucker's information page through its CARs program to distribute real-time information regarding weight and size restrictions, construction/work zones, weather alters, and flooding zones, etc., to support safe, efficient, and reliable truck movements throughout the state.[34]

[33] FHWA, Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges. https://www.fhwa.dot.gov/bridge/mtguide.pdf

[34] INDOT, CARs Program. https://511in.org/@-83.27637,40.03112,6?show=truckersReports

## Figure 4.10 – Facilities with Overweight (OW)/Oversize (OS) Restrictions (2022)



### Bridge Under-Clearance

This plan also reviewed bridge vertical under-clearance that may impact the Preferred Freight Corridors, based on INDOT's bridge data in 2022. Bridges with low vertical under-clearance are potential safety concerns and choke points for truck movements, due to larger size of freight vehicles. According to INDOT's Design Manual, a general clearance threshold of 14'-6'' was used in this planning-level screening analysis. **Figure 4.11** shows bridges that cross over the Preferred Freight Corridors and have a low vertical under-clearance.

While the plan focuses on issues and needs on the Preferred Freight Corridors, a few bridges with low-clearance issues that impact local freight infrastructures were also identified based on stakeholder inputs through an online survey during the plan development (see details in **Section 4.4**). These bridges are:

- US 31 bridges over Edison Road and Fillmore Road in South Bend
- US 20 bridge over Lake George Canal in northwestern Indiana

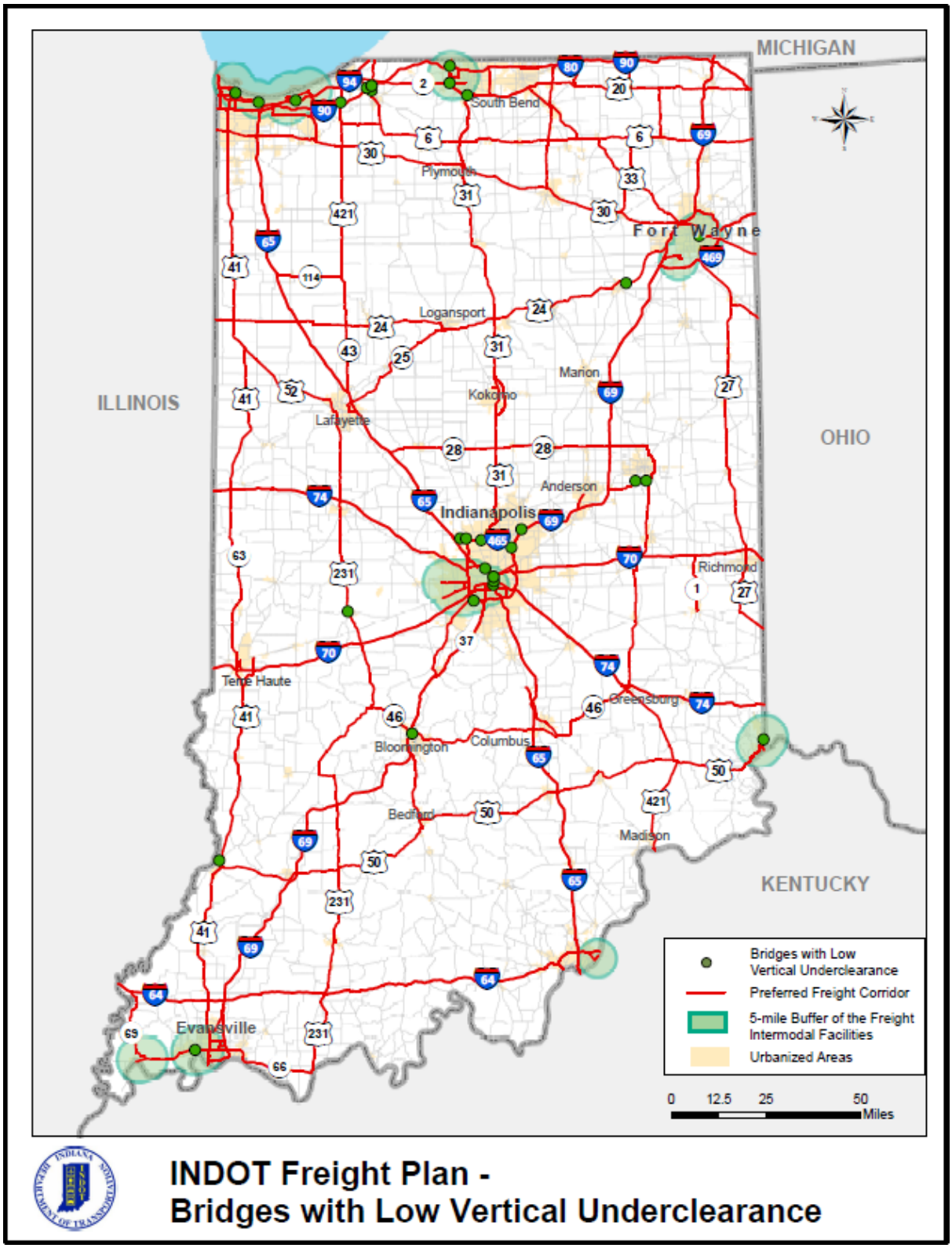
### Resiliency Consideration of Structures

INDOT considers extreme weather and the resiliency of its transportation network while developing its plan to meet asset management goals. According to INDOT's 2022 Transportation Asset Management Plan(TAMP), two of the major weather and resilience risks are changes in extreme temperatures and increased risk of flooding, both of which may require changes in treatments and increased investments in preservation and rehabilitation. To address these risks during life-cycle planning, INDOT uses its pavement and bridge modeling systems to consider the impact of more substantial treatments in a resiliency scenario that require greater funding. This scenario includes the need for upsizing culverts to meet current design standards, cleaning or expanding ditches, and increasing the waterway openings for bridges to accommodate higher levels of flooding to meet current design standards. To support freight safety and mobility, INDOT's Bridge Design Team has been making additional efforts to address the impacts of extreme weather, natural disasters, and flooding, including:

- Review existing design policy and guidance related to hydraulics and seismic demands; and,
- Evaluate methods for incorporating the Preferred Freight Corridors into design criteria selection process.

It is also noted that large culverts (with a span of 48 inches or more) are a new addition to INDOT's TAMP (2022). Large culverts and other hydraulic infrastructure play an important role in effectively managing water flows throughout the state and support the reduced impacts of the highway network on stormwater runoff. The TAMP includes large culverts in all of its analysis (life cycle cost planning, risk management, and financial planning).

## Figure 4.11 – Bridges with Low Vertical Under-Clearance and Over Preferred Freight Corridors (2022)



## 4.2.3 Safety

### *4.2.3.1 Truck-Involved Crash*

INDOT provided 2018, 2019, and 2021 truck-involved crash data extracted from the Automated Reporting Information Exchange System (ARIES). 2021 data was used to avoid the disruption to normal travel patterns diagnosed in 2020 data due to the pandemic. **Figure 4.12** shows the 3-year totals of truck-involved crashes by severity type, including fatal, incapacitating injury, non-incapacitating injury, and property damage only (PDO). **Table 4.10** compares the 3-year crashes by severity type, between state-owned roads, Preferred Freight Corridors, and within 5-mile buffer of intermodal facilities. The Preferred Freight Corridors have 16,309 crashes (53% of state total), 1,374 incapacitating injury crashes (66% of state total), and 178 fatal crashes (66% of state total), which are related to truck movements. For the proximity of intermodal facilities (5-mile buffer), the Preferred Freight Corridors have 4,535 crashes (15% of state total), 354 incapacitating injury crashes (17% of state total), and 31 fatal crashes (12% of state total).

**Table 4.10 – Truck Involved Crashes**

| ROAD CATEGORY | TOTAL CRASHES | | INCAPACITATING INJURY CRASHES | | FATAL CRASHES | |
|---|---|---|---|---|---|---|
| Preferred Freight Corridors | 16,309 | 53% | 1,374 | 66% | 178 | 66% |
| All State-owned Roads within 5-Mile Buffer of Intermodal Facilities | 7,648 | 25% | 474 | 23% | 42 | 16% |
| Preferred Freight Corridors within 5-Mile Buffer of Intermodal Facilities | 4,535 | 15% | 354 | 17% | 31 | 12% |
| All State-owned Roads | 30,515 | 100% | 2,094 | 100% | 268 | 100% |

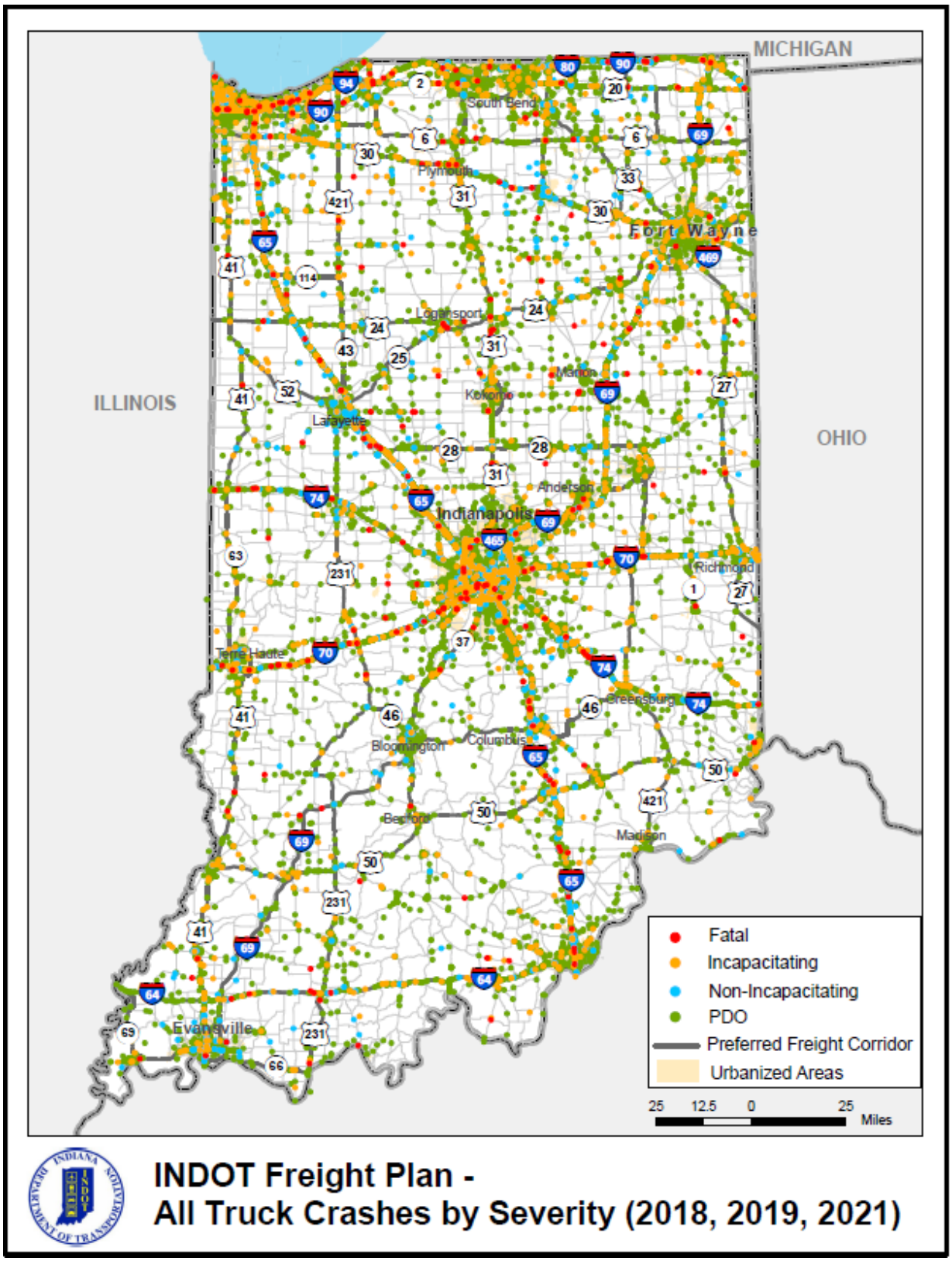
Source: ARIES crash data through INDOT (2018, 2019, 2021)

**Figures 4.13, 4.14** and **4.15** highlight frequent truck-involved crash locations on the Preferred Freight Corridors, by severity type (total, incapacitating injury, and fatal). In particular, the following locations are noticeable hot spots for truck-involved fatal crashes:

- I-65 near Taylorsville, Seymour, and Louisville
- I-70 east of Terre Haute and southwest of Indianapolis
- I-70 near SR 3 and near SR 109
- I-70 east of Eagle Creek in Indianapolis
- I-74 north of Waldron
- I-80/I-90 (Indiana Toll Road) east of N 475 E in LaGrange County
- I-94 between Indiana/Illinois state line and SR 912
- I-94 between I-90 and SR 149
- I-465 between US 31 and Keystone Parkway
- I-465 near SR 67/Kentucky Avenue
- US 30 near Plymouth
- US 31 near US 24

In the plan development, truck crash rates were also calculated at bottlenecks as part of the project prioritization process. Details can be found in **Chapter 5.**

## Figure 4.12 – Truck-Involved Crashes by Severity Type




Source: ARIES crash data through INDOT (2018, 2019, 2021)

## Figure 4.13 – Heat Map of Truck-Involved Total Crashes on Preferred Freight Corridors

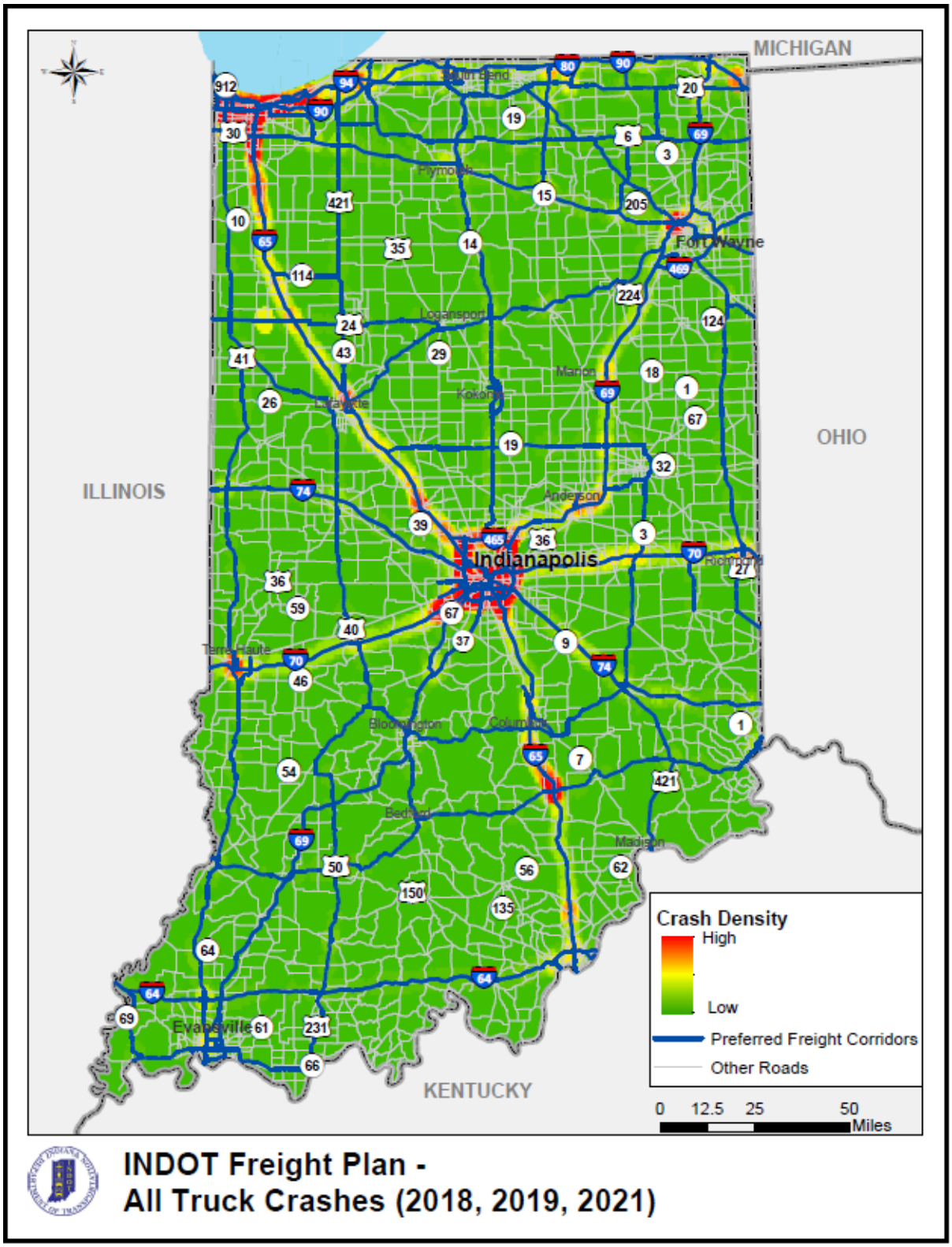
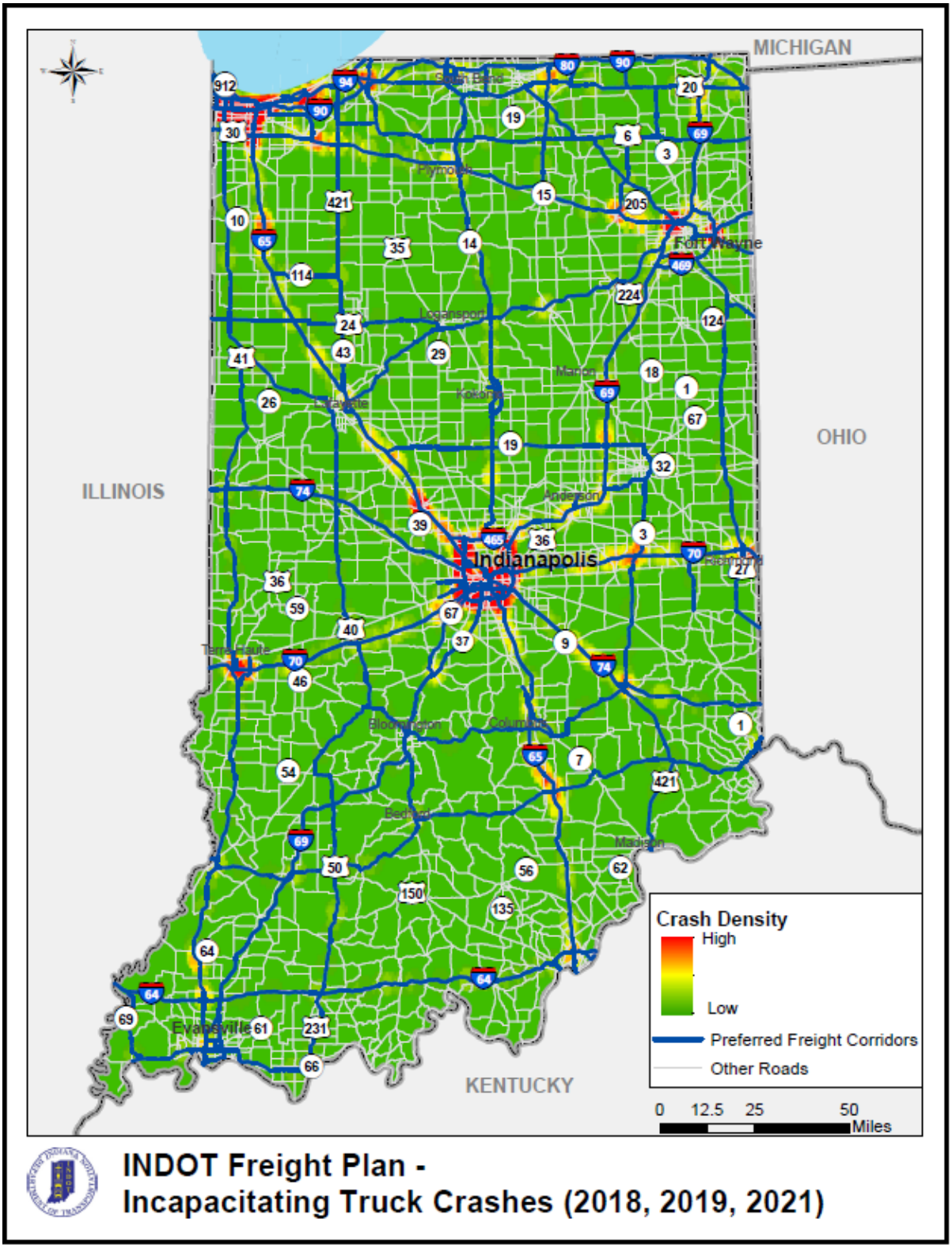
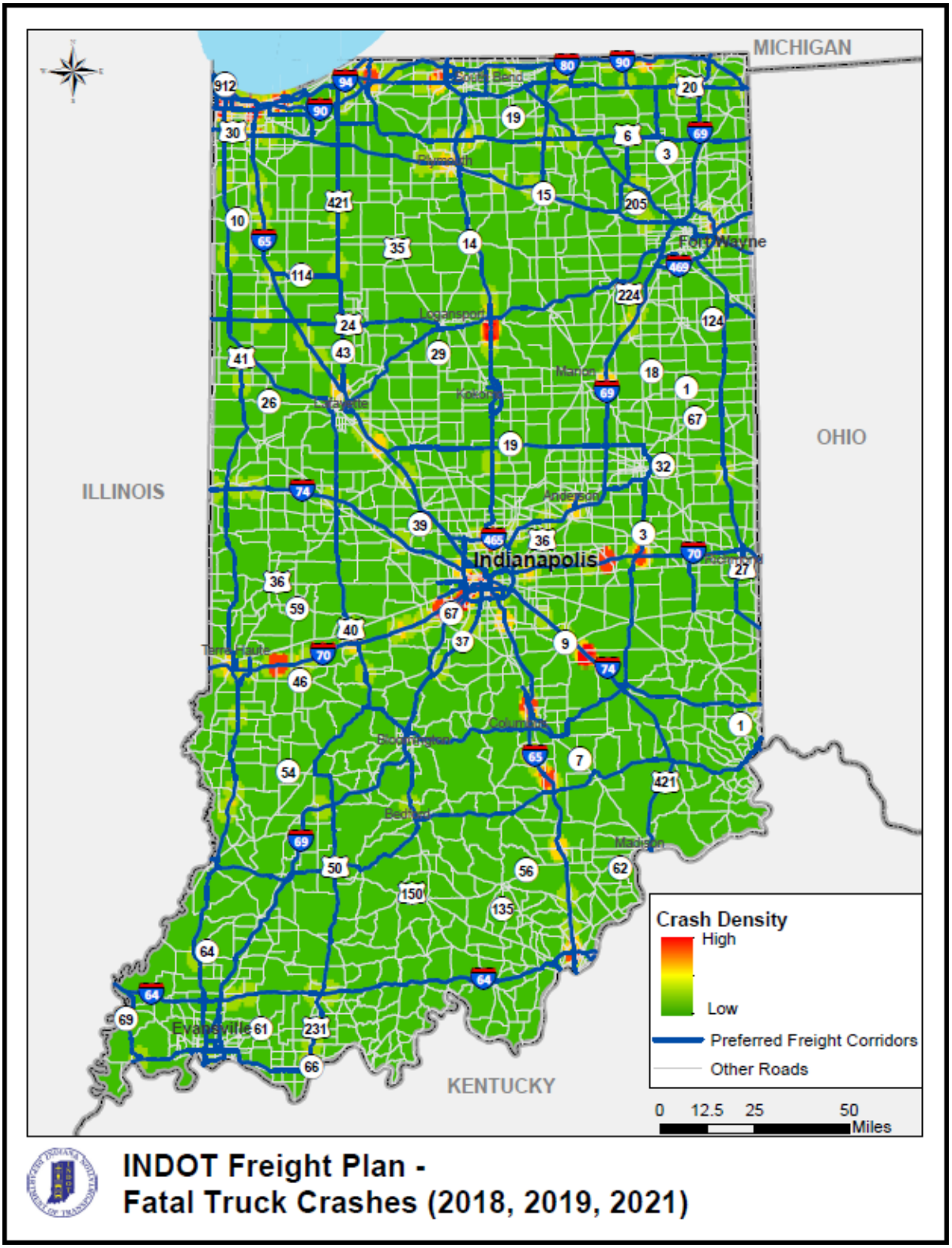


**Figure 4.14 – Heat Map of Truck-Involved Incapacitating Injury Crashes on Preferred Freight Corridors**



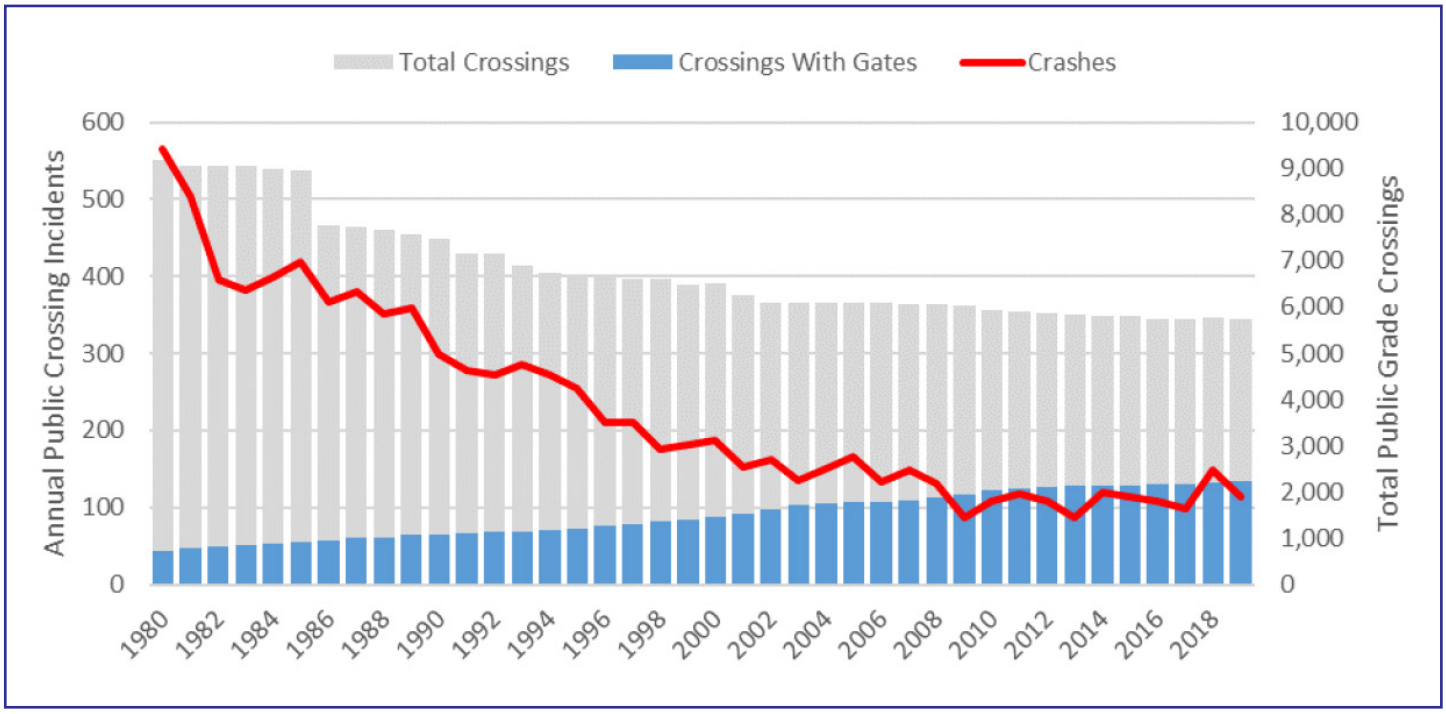
## Figure 4.15 – Heat Map of Truck-Involved Fatal Crashes on Preferred Freight Corridors



#### *4.2.3.2 Railroad At-Grade Crossings*

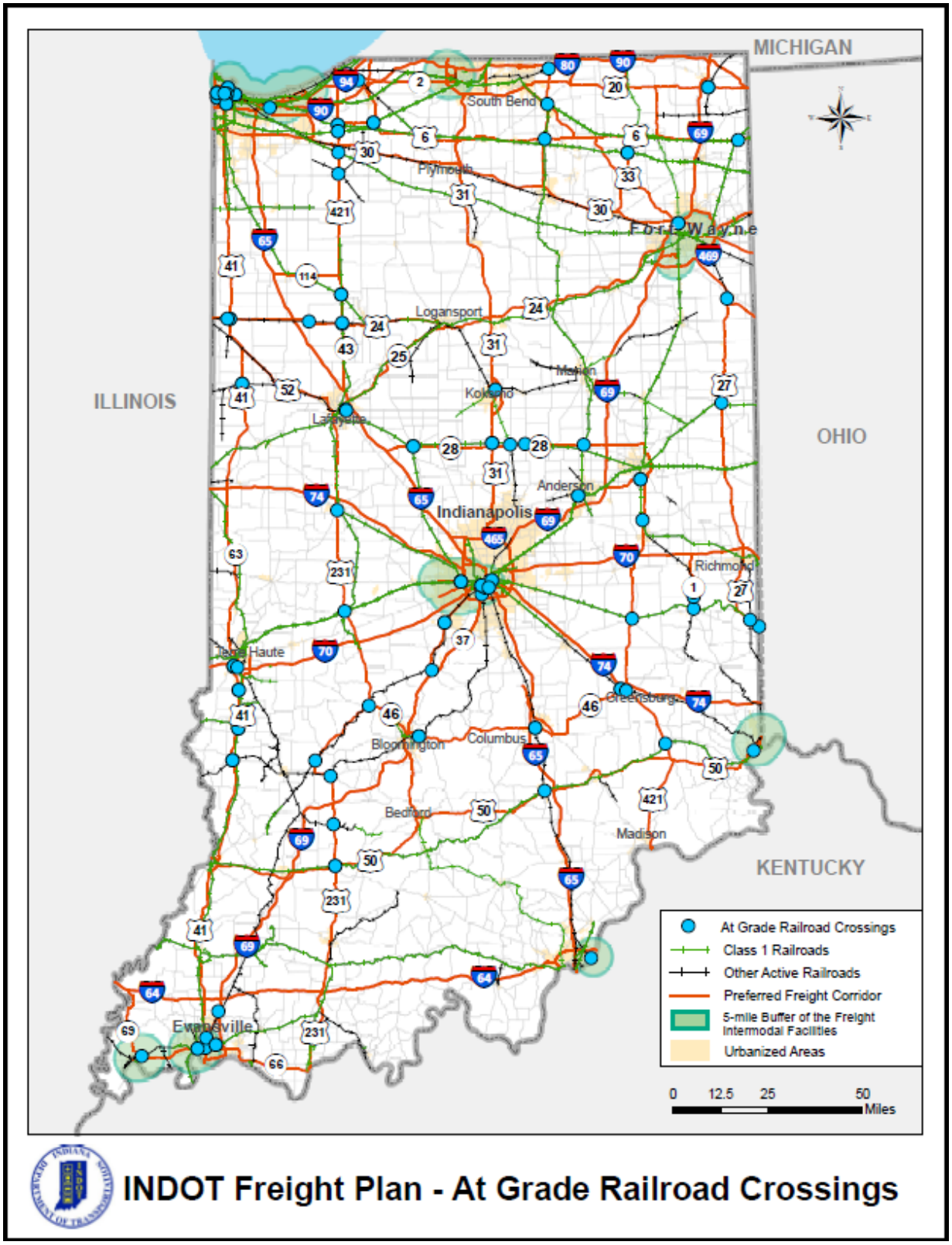
As of 2020, Indiana has 5,541 public highway-rail crossings (5th in the nation). As **Figure 4.16** shows, incidents associated with railroad at-grade crossings have significantly dropped in the past decades throughout the state, due to the significant efforts made by INDOT (see details in **Section 4.3**). However, railroad at-grade crossings are still a potential safety concern for all road users, including trucks. There are 130 railroad at-grade crossings with the Preferred Freight Corridors, with 41 of them within the 5-mile buffer of the identified key intermodal facilities (see **Figure 4.17**). The railroad at-grade crossing is one of the factors considered for freight improvement project development and prioritization. Details can be found in **Chapter 5.**

**Figure 4.16 – Incidents at Railroad At-Grade Crossings**




Source: Indiana State Rail Plan (2021)

## Figure 4.17 – Railroad At-Grade Crossings with Preferred Freight Corridors



## 4.2.4 Air Quality

INDOT is committed to improving sustainable transportation options and alleviating the impact on the environment. As described in **Section 4.2.1.4**, INDOT's 2019 Strategic Plan establishes comprehensive objectives that guide the agency's activities to plan, build, and maintain Indiana's transportation network, including the development of the State Freight Plan. The 2019 Strategic Plan includes a goal of "improving sustainable transportation options and alleviating the impact we have on the environment." Among various initiatives in the 2019 Strategic Plan, the Connectivity Planning strategy aims at improving public health and fitness and reducing harmful emissions, while enhancing job growth, reducing crashes, and reducing demand on roadways. INDOT's 2022 Transportation Asset Management Plan (TAMP) develops strategies to achieve the adopted National Performance Goals and support the State Freight Plan. The 2022 TAMP improves freight movement and economic vitality while protecting and enhancing the natural environment. It includes a goal for the use of Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds on projects and programs that help meet the requirement of the Clean Air Act. CMAQ funds may be used for a transportation project or program intended to help an area meet the National Ambient Air Quality Standards, or to maintain adherence to the National Ambient Air Quality Standards.

INDOT strategies to decrease the impacts of freight movement on air quality include various programs, plans, and tools.

### *4.2.4.1 Air Quality Conformity and Analysis Tools*

The Clean Air Act requires that areas which exceed the air quality limits must develop a plan to reduce emissions and decrease pollutant levels. This plan, known as a State Implementation Plan (SIP), includes an emission budget which limits the quantity of pollutants that can be emitted. All projects that may impact air quality have to undergo analysis by INDOT or a Metropolitan Planning Organization (MPO) to ensure that they conform to the regional plan. All INDOT's non-exempt projects in air quality non-attainment/maintenance areas must undergo conformity analysis to ensure that they will not exceed the relevant emission budget.

INDOT has developed an Air Quality Post-Processor (AQPP) to support the activities of air quality conformity analysis. This AQPP tool applies emission rates developed in the Motor Vehicle Emissions Simulator (MOVES) to key output data (e.g., traffic volumes, travel distance and times) produced by the travel demand models used in Indiana. The AQPP provides greater ease and precision in assessing the air quality benefits achieved by improvements to the transportation system. INDOT has used this tool to effectively estimate emissions and assess air quality impacts in project development.

INDOT uses various tools for economic benefit analysis in support of project development. These tools, such as the Major Corridor Investment Benefit Analysis System (MCIBAS) and Transportation Economic Development Impact System (TREDIS), calculate pollutant emissions, monetize these outputs, and estimate a total environmental emission cost for transportation projects and plans. In this freight plan, the MCIBAS tool was used for economic impact analysis as part of project scoring and ranking. The economic benefit accounts for emission cost savings of each proposed freight project (see **Section 5.3** for details).

The FHWA Freight Mobility Trends Tool is also in INDOT's toolbox to support the state's freight mobility and air quality analysis. This tool is an active dashboard that presents national freight statistics and identifies freight highway bottlenecks on the Interstate System, NHS, NHFN, and STRAHNET.[35] **Table 4.11** shows selected mobility and air quality performance measures on interstates in Indiana, which are extracted from the FHWA Freight Mobility Trends Tool at state level. The tool can also be used to generate similar performance measures by functional class, urban areas, MPOs, freight bottlenecks, and major corridors, etc.

[35] FHWA, Freight Mobility Trends Tool. https://ops.fhwa.dot.gov/freight/freight_analysis/mobility_trends/index.htm

## Table 4.11 – Selected Freight Performance Measures on Interstates in Indiana

| FREIGHT MOBILITY INDICATOR | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| Delay (Truck Hours) | 12,210,966 | 13,773,314 | 12,991,522 | 8,790,903 | 11,628,519 |
| Delay/Mile (Truck Hours) | 1,332 | 1,505 | 1,502 | 1,168 | 1,512 |
| Truck Reliability Index (TRI) | 1.13 | 1.12 | 1.14 | 1.09 | 1.12 |
| Truck $CO_2$ Emissions/Mile (Metric Tons of $CO_2$) | 975 | 1,077 | 932 | 865 | 840 |

Source: FHWA Freight Mobility Trends Tool

### *4.2.4.2 Congestion Mitigation and Air Quality Improvement (CMAQ) Program*

CMAQ is a federal program that funds projects that reduce congestion and air pollution. It is administered by INDOT under supervision of FHWA. The CMQA funding may not be used for added capacity work, but it may be used for eligible work types that are part of a larger added capacity project. CMAQ funding applications should describe potential air quality emission reduction in kilograms per day, which is anticipated from the proposed project. INDOT prepares an annual report to FHWA that details the projects that had CMAQ funds obligated to them as well as their expected air quality impacts.

In addition, INDOT established 2- and 4-year targets of State On-Road Mobile Source Emissions Reductions performance measure, to comply with the FHWA Transportation Performance Management (TPM) process and goals. The targets represent the anticipated condition/performance at the mid-point and end of the 4-year performance period. INDOT has formed a CMAQ performance measure task group to coordinate efforts between INDOT and the MPOs in setting the INDOT CMAQ targets. The task group included three representatives from INDOT's Technical Planning and Programming, a representative from the Indianapolis and Northwestern Indiana MPOs (the two larger MPOs with over one million in population subject to the rule), two representative members from the Indiana MPO Council (Fort Wayne and Evansville). A representative from the Indiana Division of the FHWA also participated in the task group to provide guidance.

**Table 4.12** shows INDOT's air quality performance measures and targets of total emission reductions for 2018-2022 TPM reporting period. INDOT has met or exceeded the 2-year targets and is on track to meet or exceed the 4-year targets for most applicable criteria pollutants (e.g., PM2.5, PM10, NOx, and CO), through the CMAQ funded projects. INDOT will be reviewing and confirming the methodology used to calculate VOC (volatile organic compounds) reductions relative to project eligibility and will be concentrating more efforts on CMAQ project selection to select projects that have a greater impact on overall VOC reductions.

## Table 4.12 – INDOT Air Quality Performance Measures and Targets for TPM Reporting (2018-2022)

| TPM AIR QUALITY PERFORMANCE MEASURES | BASELINE | 2-YEAR CONDITION/ PERFORMANCE | 2-YEAR TARGET | 4-YEAR CONDITION/ PERFORMANCE | 4-YEAR TARGET |
|---|---|---|---|---|---|
| Total Emission Reductions: PM2.5 | 179.165 | N/A | 20.000 | N/A | 30.000 |
| Total Emission Reductions: NOx | 4576.370 | 2737.320 | 1600.000 | 3373.765 | 2200.000 |
| Total Emission Reductions: VOC | 2641.020 | 277.013 | 1600.000 | 863.370 | 2600.000 |
| Total Emission Reductions: PM10 | 4.068 | 168.042 | 0.300 | 168.058 | 0.500 |
| Total Emission Reductions: CO | 13939.400 | 2245.090 | 200.000 | 2668.037 | 400.000 |

Source: FHWA

**Table 4.13** shows INDOT's air quality performance measure targets of total emission reductions for 2022-2026 TPM reporting period. INDOT continues its efforts to decrease the impacts of freight movement on air quality and meet the TPA goals using various programs, plans, and tools.

## Table 4.13 – INDOT Air Quality Performance Measure Targets for TPM Reporting (2022-2026)

| TPM AIR QUALITY PERFORMANCE MEASURES | BASELINE | 2-YEAR TARGET | 4-YEAR TARGET |
|---|---|---|---|
| Total Emission Reductions: PM2.5 | N/A | 3.000 | 4.000 |
| Total Emission Reductions: NOx | 3373.765 | 690.000 | 725.000 |
| Total Emission Reductions: VOC | 863.370 | 590.000 | 600.000 |
| Total Emission Reductions: PM10 | 168.058 | 0.020 | 0.030 |
| Total Emission Reductions: CO | N/A | 330.000 | 520.000 |

Source: FHWA

### *4.2.4.3 Carbon Reduction Strategy*

INDOT has developed a draft carbon reduction strategy (CRS)[36] to support efforts to reduce carbon dioxide (CO2) emissions from the transportation sector in Indiana and in alignment with federal requirements and guidelines established in BIL and other federal policies. INDOT and its MPO partners have identified five categories of activities that can support carbon reduction and detailed projects and strategies within each category:

- Alternative Fuels/Energy Efficiency: Strategies that support electric or alternative fuel vehicle adoption or improve overall energy efficiency and lower carbon fuel sources for the transportation network.
- Active Modes: Strategies that encourage active transportation such as walking, biking, and transit.
- Transportation Demand Management: Strategies that reduce demand for travel on roadways by incentivizing reduced trip making and higher occupancy modes of travel.
- Technology Solutions: Strategies that deploy advanced technology solutions for roadway operations and communications and improve traffic flow.
- Other: Projects or programs that can demonstrate a reduction of carbon emissions when implemented.

INDOT will implement the CRS through four specific actions:

- Develop carbon reduction performance measure and targets.
- Identify early opportunities for carbon reduction within the current statewide transportation improvement program.
- Identify new opportunities for carbon reduction in each project and strategy category.
- Integrate carbon reduction into the transportation planning process.

It is worthy to note that the Indiana Electric Vehicle Infrastructure Deployment Plan [37] was recently approved by FHWA. The plan approval clears the way for INDOT to work with private and public partners to begin investing nearly $100 million over the next five years to bolster the availability of fast, reliable electric vehicle (EV) charging infrastructure across the state. The emergence of EVs is among those technological innovations that can reduce fuel consumption, emissions, and vehicle operating costs.

[36] INDOT, Carbon Reduction Strategy (Draft), December 2022. https://www.in.gov/indot/files/Final-Draft-Carbon-Reduction-Strategy-December2022v1.pdf

[37] INDOT, Indiana Electric Vehicle Infrastructure Deployment Plan, July 2022. https://www.in.gov/indot/files/INDOT-EV-Deployment-Plan_DRAFT_7-29-22.pdf?utm_medium=email&utm_source=govdelivery

## 4.3 Issues and Needs – Other Modes

As part of its freight planning process, INDOT compiled information regarding issues and needs for the railroad, water, and air modes via an on-line survey that was distributed to the Project Team and Planning Partners (see details in **Section 4.4**), discussions with stakeholders throughout the planning process, and a review of previous planning documents, including:

- INDOT's 2018 Freight Plan
- INDOT's 2017 Rail Plan and 2021 Rail Plan
- 2022 Indiana State Aviation System Plan
- MPO planning studies

Specific issues and needs for railroad, waterway and air assets are managed outside of INDOT by facility owners and operators. INDOT supports these efforts in several ways. For example, INDOT's 2021 Rail Plan and 2022 Aviation System Plan provide a comprehensive statewide assessment of issues and needs for these modes. In addition, INDOT also has a direct role in the following areas:

- **Intermodal access.** INDOT evaluates potential enhancements to the roads that provide access to rail, water, and air facilities. INDOT addressed this issue during the freight planning process by identifying key facilities for multimodal linkages (see **Section 3.2.5**), having them as one of the focused areas for issues and needs analysis (see **Section 4.2**), and incorporating them into the roadway strategy development (see **Chapter 5**).

- **Rail condition.** INDOT administers Indiana's Industrial Rail Service Fund. The purpose of this fund, which was legislatively created in 1982, is to fund rehabilitation efforts along Indiana's smaller railroads. Port Authorities and Class II and III freight railroads compete for funding via an annual grant process. The maximum grant size is $250,000. Example projects funded through this effort in FY 2022 include installing new switches; replacing rail, ties, and ballast; and bridge work.[38]

- **Railroad crossing safety.** INDOT manages railroad crossing safety needs through its Railway Highway Crossing Program (referred to as the Section 130 Program). This program, which is coordinated with Indiana's Highway Rail Crossing Safety Action Plan and Strategic Highway Safety Plan, funds warning device upgrades on state and local highways. INDOT uses a data driven approach to assess all public at-grade crossings and prioritize improvements. As a result of this program and other related efforts, rail crossing collisions have steadily declined over the past 20 years.[39]

Given all of the existing efforts described above, the primary multimodal issue identified by INDOT during the freight planning process (and the area in which INDOT can make the largest impact on Indiana's railroad, waterway, and air facilities) is coordination. For example, there is a need to better understand:

- How INDOT can continue to support economic growth;
- How INDOT can continue to support multimodal freight movement, access, and connections; and,
- How facility improvements made by modal owners and operators may impact INDOT facilities.

## 4.4 Stakeholder Inputs

During the development of this plan, INDOT used an innovative map-based online survey tool to collect location-specific comments from the Project Team, Planning Partners, and the state's freight/logistics industry, regarding freight-related issues, needs, and improvements.

[38] INDOT Industrial Rail Service Grant website. https://www.in.gov/indot/multimodal/multimodal-landing-page-fake/railroad/industrial-rail-service-grant/

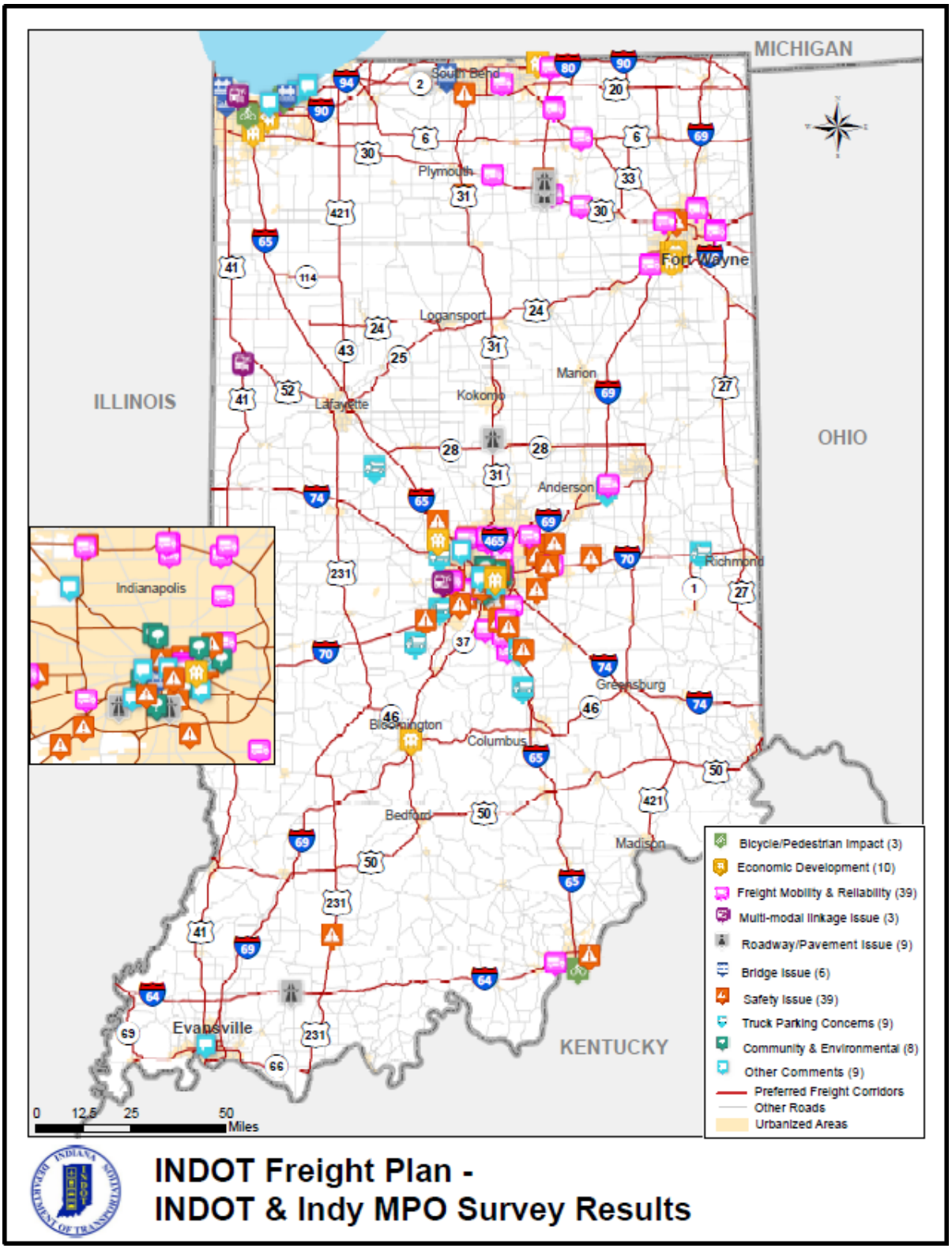
[39] INDOT Rail-Highway Crossing Program (Section 130) website. https://www.in.gov/indot/safety/traffic-safety/rail-highway-crossing-program-section-130/

The survey was open for stakeholders from March 4 to April 15, 2022. The survey collected a total of 56 comments throughout the state, which include 33 comments for the Preferred Freight Corridors and 23 comments for other roadway and facilities. Details of the INDOT's freight planning survey can be found in **Appendix B**. INDOT made additional efforts to coordinate with the Indianapolis Metropolitan Planning Organization (IMPO) regarding a similar on-line survey that was completed earlier as part of IMPO's Regional Freight Plan Update. IMPO's survey was open from October 20 to November 29, 2021 and collected 79 comments from stakeholders in the central Indiana region. A combined total of 135 comments collected from the INDOT's freight planning survey and IMPO's survey were used during the plan development, especially in support of identifying issues/needs and developing improvement strategies for the Preferred Freight Corridors. **Figure 4.18** shows a map of the combined survey data. Safety and mobility/reliability stand out in the map much more than other freight-related issues or concerns.

The Project Team also reviewed existing and recent freight plans and studies from MPOs in Indiana, with a focus on capacity-constrained bottlenecks and unreliable travel time locations for the Preferred Freight Corridors. In addition, the Project Team reviewed an Indiana Commodity Movement Study recently conducted by Conexus, which identified statewide top freight bottlenecks.

All the stakeholder inputs described above were incorporated into a process of identifying freight project locations and recommending improvement strategies as part of this plan, with necessary justifications based on INDOT's data and tools. **Chapter 5** provides details of this process.

## Figure 4.18 – Combined Data from INDOT's Freight Planning and Indianapolis MPO Surveys



This chapter recommends strategies to address Indiana's freight system issues and needs by all modes, directed by the established freight performance measures, existing and future conditions. The strategies include traditional capacity improvements and emerging freight operation solutions, with a focus on the freight highway system. Specific highway improvement projects were recommended for freight bottlenecks identified by INDOT data and planning tools as well as stakeholder inputs. These highway projects were also prioritized using a data-driven approach and serve as a practical guidance to support INDOT's resource investment to respond to the changing conditions.

## 5.1 Freight Strategies for Highway

### 5.1.1 Improvement Strategy Toolbox

INDOT developed a list of general improvement categories and strategies to meet the state's freight highway system needs at a high planning level, as **Table 5.1** shows. This toolbox was based on INDOT's highway improvement concepts through previous statewide corridor planning studies with necessary adjustments to meet the freight planning needs.

The toolbox includes a variety of traditional capacity improvement strategies to address existing and anticipated safety, mobility, reliability and infrastructure issues. These strategies include added travel lanes (ATL), roadway upgrade, interchange and grade separation projects, as well as major intersection improvements to benefit all roadway users, including trucks. The toolbox also includes freight operation strategies to address issues and needs in a more cost-effective manner, using ITS and emerging technologies (see details in **Section 5.1.3**). INDOT also provided an estimated range of construction costs for each strategy (in 2022 dollars). The detail of the cost estimates was on a high level such as "typical cost per mile", "typical cost per interchange/intersection", or "typical cost per rest area", etc. It is noted that the ATL project costs account for pavement condition by considering pavement patching/overlay or replacement. Construction costs were estimated for recommended freight projects and incorporated in the project prioritization process.

It is important to note that the improvement strategies noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the future project development process.

The Improvement Strategy Toolbox focuses on the freight highway system, due to its dominant role of the freight system in Indiana. Strategies for other modes (rail, waterway, and air) are summarized in **Section 5.2.**

## Table 5.1 – Freight Improvement Strategy Toolbox

| IMPROVEMENTS CATEGORIES | UNIT | UNIT COST |
|---|---|---|
| Added Travel Lanes Major (Divided Road) - Rural Areas<br>4 lanes to 6 lanes for Interstate / State Roads | | |
| New pavement (2 lanes) & Existing Pavement Patching and Overlay (4 lanes) | Per Mile | $12-16 M |
| New pavement (2 lanes) & Existing Pavement Replacement (4 lanes) | Per Mile | $18-25 M |
| Added Travel Lanes Major (Divided Road) - Typical Urban Areas (Light Residential or Commercial)<br>4 lanes to 6 lanes for Interstate / State Roads | | |
| New pavement (2 lanes) & Existing Pavement Patching and Overlay (4 lanes) | Per Mile | $25-30 M |
| New pavement (2 lanes) & Existing Pavement Replacement (4 lanes) | Per Mile | $30-40 M |
| Added Travel Lanes Major (Divided Road) - High Density Urban Areas (CBD) | | |
| 4 lanes to 6 lanes for Interstate / State Roads | Per Mile | $60-80 M |
| Added Travel Lanes Minor (Undivided Road) | | |
| 2 lanes to 4 or 5 lanes (full replacement) | Per Mile | $10-15 M |
| Roadway Upgrade | | |
| Expressway Upgrade to Freeway | Per Mile | $15-20 M |
| Arterial Upgrade to Expressway | Per Mile | $8-12 M |
| Interchange / Grade Separation | | |
| New System Interchange | Per Interchange | $40-200 M |
| New Service Interchange - Rural | Per Interchange | $20-30 M |
| New Service Interchange - Urban | Per Interchange | $30-50 M |
| Interchange Modification | Per Interchange | $10-20 M |
| Grade Separation Only (under or overpass) | Per Grade Separation | $6-12 M |
| New Auxiliary Lane (continuous between interchanges) | Per Lane & Per Mile | $8-10 M |
| New Collector-Distributor Road (mainly in urban areas) | Per Lane & Per Mile | $10-20 M |
| Major Intersection Improvement | | |
| >= 4 lanes in both directions | Per Intersection | $5-10 M |
| < 4 lanes in both directions | Per Intersection | $3-8 M |
| Freight Operations & ITS | | |
| Virtual Weigh-in-Motion (VWIM) Station | Per Location & Per Lane | $450 K |
| Truck Parking Information Management System | Per Rest Area | $330 K |
| Ramp Metering | Per Ramp | $170 K |
| Variable Speed Limit Signs | Per Mile | $330 K |

Note: unit cost is in 2022 dollars.

### 5.1.2 Traditional Highway Improvement Projects

INDOT desired to provide practical guidance in support of its investment decisions for statewide freight planning. Therefore, this plan recommended practical projects that focus on addressing freight bottlenecks on the Preferred Freight Corridors, using traditional capacity improvement options from the toolbox described above, where appropriate. It is assumed that any improvement based on freight mobility and/or reliability needs will be constructed to current INDOT standards and will include necessary safety and infrastructure (i.e., pavement and bridge) improvements. Other spot safety and infrastructure improvements could be warranted for those locations, but they are not included in this study. However, INDOT and its Planning Partners will use information of these spot issues and non-statewide significant needs in support of future planning activities and project developments.

In total, 188 freight projects (see **Figure 5.1**) were recommended to address all bottlenecks on the Preferred Freight Corridors, by considering the following factors:

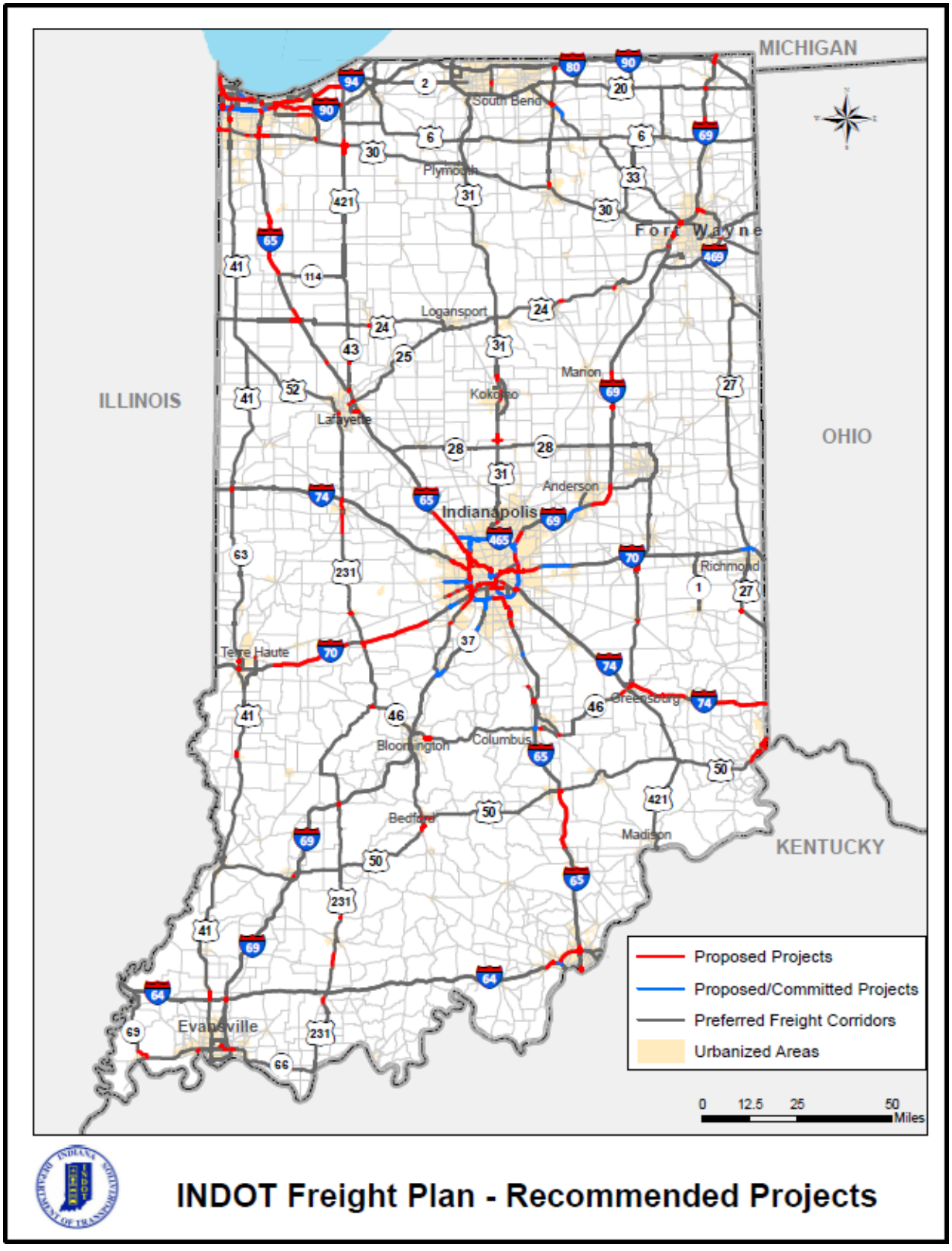
- Capacity-constraint bottlenecks (in 2045)
- Unreliable truck travel time
- Top 20 statewide freight bottlenecks identified by Conexus' Indiana Commodity Movement Study (2021)
- Stakeholder inputs from INDOT's freight planning survey, IMPO's Regional Freight Plan survey, and MPO's existing and recent freight plans, with professional justifications using INDOT's data and tools.

It is noted that there are 30 projects that coincide with INDOT's recent, or existing and committed (E+C) projects. These projects will be constructed under INDOT's existing programs. Under INDOT's guidance, these projects were only recognized instead of being included in analysis, to avoid conflicts with INDOT's current plans or programs. Therefore, 158 freight projects advanced to the prioritization process, as described in **Section 5.3**.

In addition, the following assumptions were made during the process of recommending improvement projects:

- System interchange modification is considered as an independent project.
- New service interchange construction or service interchange modification is combined with freeway added travel lane (ATL) project, if they are connected.
- Improvement ideas from the INDOT's freight planning survey were considered with necessary professional judgment.
- For short and deficient arterial segments with major intersections(s), the intersection improvements (e.g., adding turn lanes) were recommended instead of ATL.
- Right-of-way (ROW) analysis is not included, due to the nature of this high-level statewide planning effort. Detailed ROW analysis is expected to be part of future project development.

## Figure 5.1 – Recommended Freight Highway Project Locations



## 5.1.3 Operations Strategies

As part of its freight planning process, INDOT has identified operations strategies that have the potential to improve freight mobility and safety on Indiana's highways, as shown in Table 5.1. This section describes details of these strategies:

- Virtual weigh-in-motion (VWIM)
- Truck parking information management system (TPIMS)
- Ramp metering
- Variable speed limits

INDOT has experience with each of these strategies. INDOT has deployed TPIMS at several rest areas and has plans to expand the network. For the other strategies, INDOT is developing and evaluating initial deployments. Future implementation is contingent on the findings and results of these projects.

### *5.1.3.1 Virtual Weigh-in-Motion (VWIM)*

This strategy uses sensors and cameras to capture truck weight information as vehicles travel full speed down a highway. It benefits freight mobility and safety by enabling trucks to be weighed without stopping. Indiana has implemented 8 pilot VWIM sites and has plans for two more. **Figure 5.2** shows an example of a VWIM currently in operation on I-94 in northwestern Indiana. In the figure, a truck is traveling over a scale embedded in the pavement, and the hardware running the equipment can be seen on the poles along the side of the road.

**Figure 5.2 – Virtual Weigh-in-Motion Site on I-94** [40]

INDOT is currently evaluating the business case for a comprehensive statewide weigh-in-motion program. Future implementation is contingent on the findings from the pilot program and the resulting business case.

### *5.1.3.2 Truck Parking Information Management System*

Truck parking is a common issue nationwide. Truck drivers needs parking spaces to comply with federal hours of operation regulations for rest and avoiding congestion. In coordination with other Midwest state DOT's, INDOT launched a Truck Parking Information Management System (TPIMS) in 2019. This technology provides truck drivers with real-time information regarding the availability of parking at Indiana's rest areas (see example in **Figure 5.3**). This strategy improves truck safety and mobility by providing drivers with a convenient and safe place to rest. It is estimated that driver fatigue is a factor in 30-40% of semi-truck accidents and that over 80% of truck drivers frequently took more than 30 minutes to find parking according to a recent study.[41] INDOT's TPIMS addresses these issues directly. INDOT operates several TPIMS sites across the state and has plans to expand the network, as shown in **Figure 5.4**.[42]

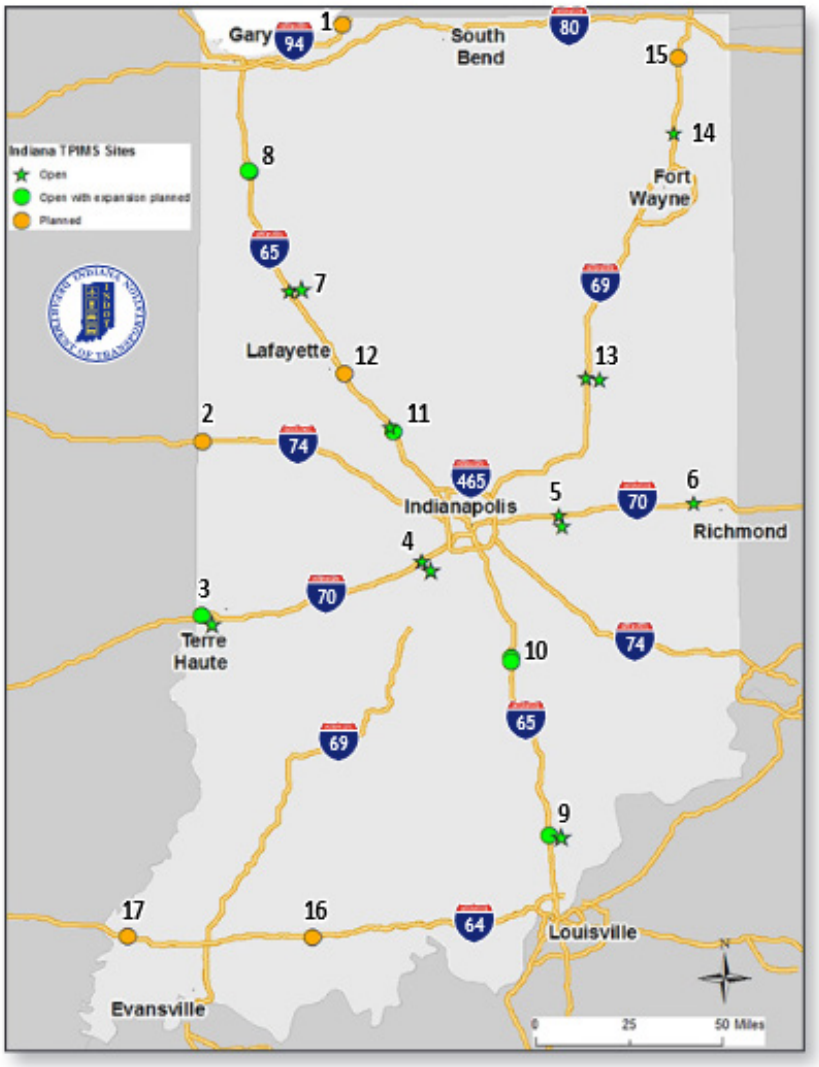
[40] INDOT and Purdue University Joint Transportation Research Program, *Implementation of Weigh-in-Motion Data Quality Control and Realtime Dashboard Development,* November 2018.

[41] INDOT Bulletin, Trucks Park Here System Debuts Making Indiana Interstates Safer, January 2019. https://content.govdelivery.com/accounts/INDOT/bulletins/225e6a7

[42] INDOT webpage, https://www.in.gov/indot/files/New-TPIMS-sites-on-State-Map-Shading.pdf

**Figure 5.3 – Example Truck Parking Information Sign**


**Figure 5.4 – INDOT TPIMS Sites (Location and Mile Marker)**



#### *5.1.3.3 Ramp Metering and Variable Speed Limits*

Ramp metering is a strategy to manage the rate of traffic that merges onto a highway. A traffic light is placed on an on-ramp and traffic must stop when the light is red (see example in **Figure 5.5**).

**Figure 5.5 – Example Ramp Meter**


Varying speed limits is a strategy to manage the flow of traffic through a segment of a highway (see example in **Figure 5.6**). Decreasing speed limits during highly congested periods and/or periods of bad weather can reduce the frequency and severity of accidents and improve mobility.

**Figure 5.6 – Example Variable Speed Limit Sign**


## 5.2 Freight Strategies for Other Modes

As described in **Section 4.3** of the report, INDOT's strategies for the rail, waterway, and air modes focus on strengthening coordination with INDOT's planning partners and industry stakeholders. INDOT will continue working with the following entities to 1) identify opportunities to support economic growth, 2) identify opportunities to support multimodal freight movement, access, and connections; and 3) understand the roadway impacts of future modal facility improvements:

- Indiana's Metropolitan Planning Organizations (MPO)
- The Indiana Economic Development Corporation (IEDC)
- The Ports of Indiana
- Indiana's four major freight airports (Indianapolis, Fort Wayne, South Bend, Gary/Chicago)
- Local economic development agencies
- Conexus Indiana (a network of public-sector leaders in advanced manufacturing and logistics)

## 5.3 Project Prioritization

In this plan, the project prioritization process focused on the 158 freight highway projects identified in **Section 5.1.2**. A data-driven approach was used for project scoring, based on a project rating system as well as performance measures of the freight projects.

### 5.3.1 Project Rating System

This plan developed a performance-based decision-making process (rating system) to support project prioritization. The rating system generally echoes the performance measures (mobility and reliability, infrastructure, safety, and economic benefit) that were established (see **Section 4.1**) and could be analyzed using readily available data in this high-level planning study. The rating system includes more details of each measure as needed to support a quantitative analysis. It is noted that the freight demand was determined to be a component of the mobility and reliability measure in the rating system. An on-line survey was also conducted to gather input from the Project Team, Planning Partners, and the freight/logistics industry on the importance of each of the four performance measures. The survey was live from June 10 through June 27, 2022. Detailed data gathered from the survey are shown in **Appendix C**. The project rating system was developed using rounding weights derived from survey results.

The rating system was used to determine which freight projects have greater needs for improvement and investment. Performance measures and their weights are listed in **Table 5.2**. Each performance is generally assigned a value ranging from 1 to 5 points, with the latter indicating the highest need or deficiency for the corresponding performance measure. The mobility/reliability, infrastructure, safety, and economic benefit scores are combined to create a total score that ranges from 0 to 100, for INDOT's freight planning goal of promoting using the Preferred Freight Corridors (Goal #1). In addition, a bonus factor was developed to account for extra benefits of a freight project if it is within a 5-mile buffer of intermodal facilities in support of INDOT's another freight planning goal of improving multimodal linkages (Goal #2). A value of 0.85 was derived for the bonus factor, based on the same on-line stakeholder survey described above. Therefore, the total possible score ranges from 0 to 185 points, by considering both of INDOT's major freight planning goals. A higher score indicates greater needs of improvement for the project and greater statewide benefits expected from the improvement.

**Table 5.2 – Project Rating System**

| PERFORMANCE MEASURES | GOAL #1 – PROMOTE USING PREFERRED FREIGHT CORRIDORS | | | GOAL #2 – IMPROVE MULTIMODAL LINKAGES | MAX. POSSIBLE WEIGHTED SCORE (TOTAL) |
|---|---|---|---|---|---|
| | SCORE RANGE | SCORE WEIGHT | MAX. POSSIBLE WEIGHTED SCORE | WITHIN 5 MILES OF INTERMODAL FACILITIES (BONUS FACTOR = 0.85) | |
| Mobility & Reliability | 1 - 5 | 4 | 20 | 17 | 37 |
| Infrastructure | 0 - 5 | 6 | 30 | 25.5 | 55.5 |
| Safety | 1 - 5 | 6 | 30 | 25.5 | 55.5 |
| Economic Benefit | 1 - 5 | 4 | 20 | 17 | 37 |
| | | | **Sum = 100** | **Sum = 85** | **Sum = 185** |

Each of the four performance indices was derived from unique sub-factors and associated weights, based on the Project Team's discussion and the survey results as mentioned above. For each performance index, a detailed description of the sub-factors and weights are provided below:

- **Mobility & Reliability**
  - **Daily Truck volume (30%).** This was calculated as the project-level average daily truck demand in the future year 2045, using ISTDM8 data. For a consistent and reasonable comparison to other types of improvements, interchange and intersection projects used the total entering truck flow for calculation. This factor has a score ranging from 1 to 5 points. Scores were assigned based on 0-20th, 20th- 40th, 40th-60th, 60th-80th, and 80th-100th percentiles of calculated values.

- **Truck VHT delay (40%).** This forecasts the level of congestion at a project location in the future year 2045. Link-level truck hour delay was calculated as the link freight volume multiplied by the delay (i.e., the difference between free-flow time and congested time) from a 2045 model run of ISTDM8. The total delay of a project is a sum of all link-level delays in the project. This factor has a score ranging from 1 to 5 points. Scores were assigned based on 0-20th, 20th- 40th, 40th-60th, 60th-80th, and 80th-100th percentiles of calculated values.

- **Percent Length with unreliable truck travel time (30%).** This measures the overall truck travel time reliability at a project location. Unreliable links were determined by INDOT's 2019 TTTR (for interstate links) and LOTTR (for non-interstate links, due to unreliable TTTR data) values greater than 1.5 (see details in **Section 4.2.1.2**). A higher percentage of unreliable project length indicates the existing mobility has higher variability of operation speeds and is more likely to benefit from the recommended improvements. This factor has a score ranging from 1 to 5 points. Scores were assigned based on calculated percent values (i.e., 0-20%, 20-40%, 40-60%, 60-80%, and 80-100%).

- **Infrastructure**

  - **Pavement (50%).** This factor was assigned a value of 5, if any segment of the project has poor pavement condition. Otherwise, it was assigned a value of 0.

  - **Bridge (50%).** This factor was assigned a value of 5, if the project carries a bridge that is in poor condition. Otherwise, it was assigned a value of 0.

- **Safety**

  - **Truck crash rate (60%).** Truck crash rates were firstly calculated by fatal, injury, and PDO respectively at each project location, using 3-year truck crash data (2018, 2019, and 2021) and 2019 daily traffic volumes. **Section 4.2.3.1** of the report includes details of crash data. Based on discussion with INDOT Safety Office, it was determined to use a compound truck crash rate to measure an integrated pattern of crashes at each project location, using the following equation:

    *Truck crash rate = 541.7 x Fatal crash rate + 11.2 x Injury crash rate + 1.0 x PDO crash rate*

    The coefficients were derived from the crash costs by crash severity as part of the Equivalent Property Damage Only (EPDO) method recommended by FHWA.[43] This factor has a score ranging from 1 to 5 points. Scores were assigned based on 0-20th, 20$^{th}$- 40$^{th}$, 40$^{th}$-60$^{th}$, 60$^{th}$-80$^{th}$, and 80$^{th}$-100$^{th}$ percentiles of calculated values.

  - **Railroad at-grade crossing (40%).** This factor was assigned a value of 5, if the project has a railroad at-grade crossing. Otherwise, it was assigned a value of 0.

- **Economic Benefit**

  - **New jobs (40%).** This forecasts the annual average new jobs created by an improvement project through 2045. For each project location, the ISTDM8 was used to generate 2015 and 2045 "No Build" and "Build" model data. The model data was then entered into INDOT's Major Corridor Investment Benefit Analysis System (MCIBAS) for economic benefit analysis, including the estimated new jobs. This factor has a score ranging from 1 to 5 points. Scores were assigned based on 0-20$^{th}$, 20$^{th}$- 40$^{th}$, 40$^{th}$-60$^{th}$, 60$^{th}$-80$^{th}$, and 80$^{th}$-100$^{th}$ percentiles of estimated new jobs.

  - **B/C ratio (60%).** This evaluates the effectiveness of recommended projects to improve the state's freight system, by accounting for user and economic benefits including travel time savings, vehicle operation cost savings, emission cost savings, etc. Project construction cost was estimated at a planning level, using the middle point average

[43] FHWA, Improving Safety on Rural Local and Tribal Road – Safety Toolkit. https://safety.fhwa.dot.gov/local_rural/training/fhwasa14072/sec4.cfm

of INDOT's cost range listed in **Table 5.1**. It is also noted that the costs of several system interchange projects were adjusted by INDOT for more accurate estimates, due to the relatively wide cost range originally provided by INDOT. The B/C ratio was estimated using the same analysis procedure and modeling tools as the new jobs factor described above. It has a score ranging from 1 to 5 points. Scores were assigned based on 0-20$^{th}$, 20$^{th}$- 40$^{th}$, 40$^{th}$-60$^{th}$, 60$^{th}$-80$^{th}$, and 80$^{th}$-100$^{th}$ percentiles of estimated values.

### 5.3.2 Project Scoring and Ranking

The project scores and rankings were determined by combining the mobility/reliability, infrastructure, safety, and economic benefits on 185-point scales with allocated weights (mobility/reliability – 20%, infrastructure – 30%, safety – 30%, and economic benefit – 20%) and the bonus factor (for additional values in support of multimodal linkages) outlined in **Section 5.3.1.**

**Appendix D** includes detailed project scores, rankings, and cost estimates for all 158 freight projects that participated in project prioritization. It also lists the 30 freight projects that coincide with INDOT's recent or E+C projects and were not included in project prioritization as part of this plan.

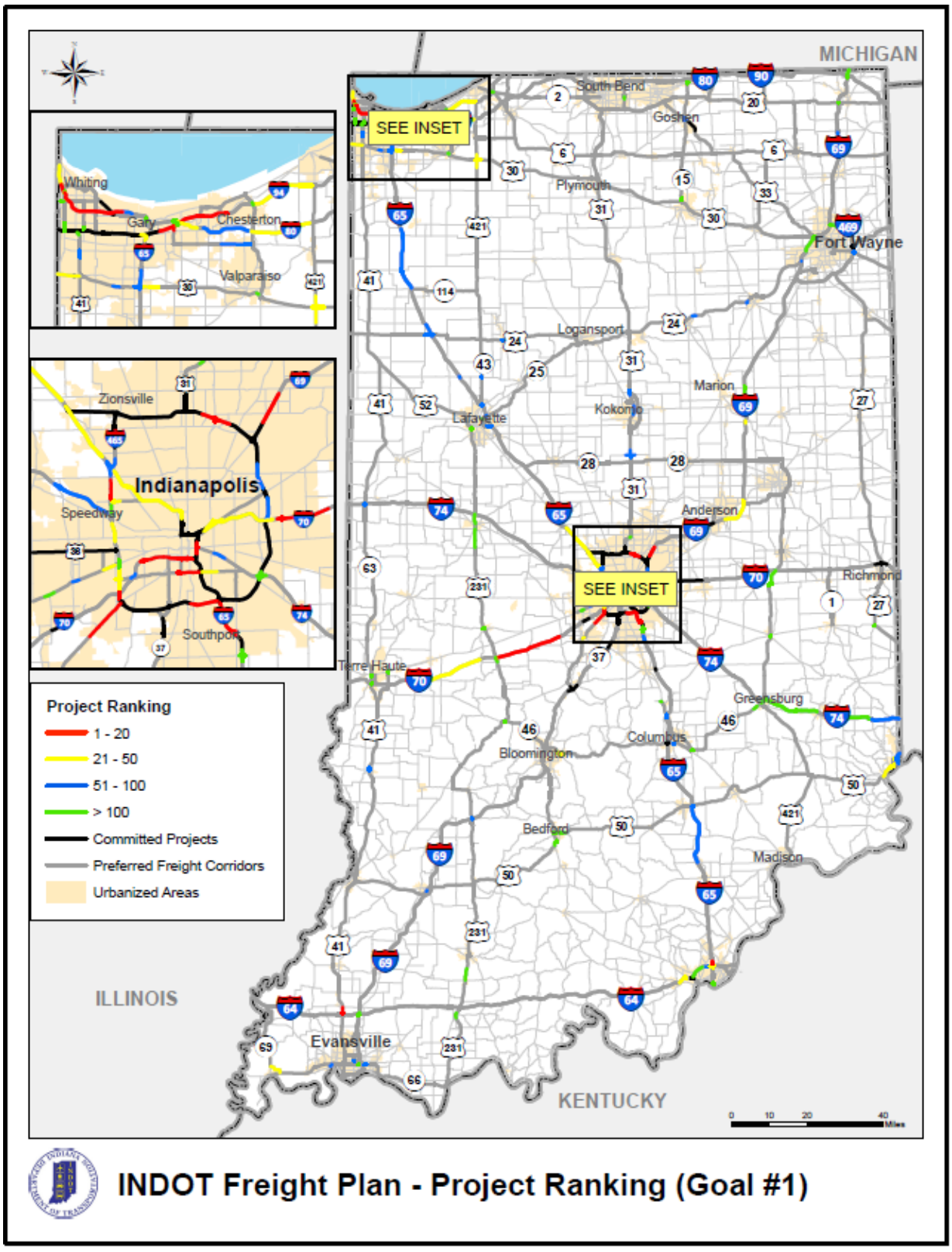
**Figure 5.7** shows project rankings in support of INDOT's freight planning Goal #1 (i.e., promote using preferred freight corridors), and **Figure 5.8** show project rankings in support of both of INDOT's freight planning goals (i.e., including Goal #2 – improve multimodal linkages). The two figures also illustrate how project rankings shift when incorporating the extra points for improving multimodal linkages (Goal #2). Major findings are:

- For Goal #1 ranking:
  - Among top 20 projects, 16 are on interstates.
  - Among top 50 projects, 34 are on interstates.
- For overall ranking (Goal #1 and Goal #2):
  - Among top 20 projects, all of them are within the 5-mile buffer of key intermodal facilities (with 15 on interstate PFC and 5 on non-interstate PFC).
  - Among top 50 projects, 30 are within the 5-mile buffer of key intermodal facilities and on interstate PFC; 17 are within the 5-mile buffer of key intermodal facilities and on non-interstate PFC; 3 are outside of the 5-mile buffer of key intermodal facilities and on interstate PFC.
- Many of the top projects concentrate on congested urban and suburban areas, especially in Indianapolis metropolitan area and northwestern Indiana. More top projects shift to these two areas when taking into account Goal #2.

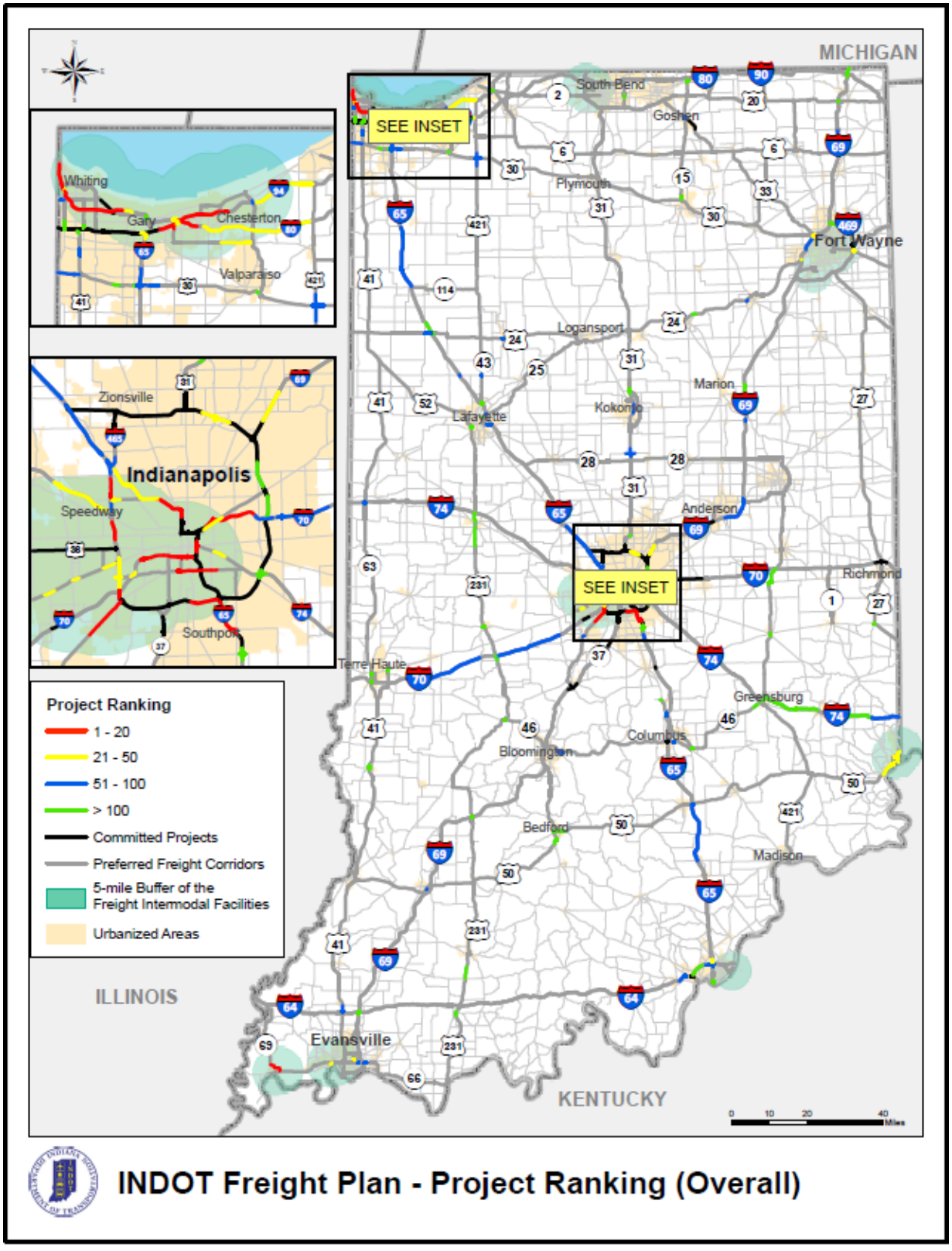
The prioritized projects provide a deep understanding of the greatest needs by the statewide freight highway system and recommend a practical strategy to guide INDOT's future investment of freight improvement projects in terms of statewide significance.

It is noted that INDOT has also developed strategies to reduce the impacts of freight movements on environment and wildlife habitat loss through its project development process. Freight movement does not have a direct impact on wildlife habitat. The loss of habitat is the result of development of new terrain roadways or expansion of existing travel lanes used by all modes of vehicular transportation. Avoidance and mitigation of impacts is required by federal and state law. Unavoidable impacts above thresholds are mitigated through purchase of credits or through permittee responsible mitigation. INDOT's permittee responsible mitigation for large new terrain projects has provided new wildlife habitat through conversion of previously farmed land. INDOT will continue to implement protections for wildlife habitat that are associated with its obligation to avoid, minimize, and mitigate impacts under state and federal law, including the federal Endangered Species Act and the federal Clean Water Act.

## Figure 5.7 – Project Rankings (Goal #1)



## Figure 5.8 – Project Rankings (Overall – Goal #1 and #2)



## 6.1 Status of 2018 Freight Investment Plan

Indiana's 2018 Multimodal Freight Plan described how INDOT planned to allocate National Highway Freight Program (NHFP) funds to three major projects that would improve freight mobility on Indiana's Primary Highway Freight System (PHFS). Status of these projects is summarized below:

- I-65 bridge over the Wabash River – This project included replacing and widening a bridge deck on I-65 over the Wabash River in Lafayette, IN. This project was completed in 2022.
- I-65 Southeast Added Travel Lanes – This project includes an added travel lane in both directions on I-65 over approximately 14 miles between US 50 and State Road 58 near Seymour, IN. This project is expected to be completed in 2023.
- Clear Path 465 – This project includes added travel lanes on the northeastern portion of I-465, a modified I-465 and I-69 interchange, and the reconstruction of portions of I-69 in Indianapolis. Construction began in 2022. This project is included in the current Freight Investment Plan, as discussed in th**e Section 6.2.**

## 6.2 Current Freight Investment Plan

This section provides INDOT's Freight Investment Plan, which includes a list of current priority projects and illustrates how INDOT plans to allocate NHFP funds. INDOT anticipates $169,190,316 in NHFP funds will be available from Federal fiscal year (FY) 2022 through 2026. **Table 6.1** shows a breakdown of these funds by Federal fiscal year, which runs from October 1 to September 30.

**Table 6.1 – INDOT NHFP Funds by Federal Fiscal Year**

| FEDERAL FISCAL YEAR | NHFP FUNDS |
|---|---|
| 2022 | $33,045,246 |
| 2023 | $33,032,028 |
| 2024 | $33,692,669 |
| 2025 | $34,366,521 |
| 2026 | $35,053,852 |
| **Total** | **$169,190,316** |

INDOT has allocated all of these NHFP funds to two priority projects, both of which will have significant freight safety and mobility benefits.

- **Clear Path 465 –** This project includes added travel lanes on the northeastern portion of I-465, a modified I-465 and I-69 interchange, and the reconstruction of portions of I-69 in northeast side of Indianapolis.
- **I-70 Added Travel Lanes (ATL) –** This project includes an added travel lane in both directions of I-70 from the Ohio state line to SR 1, interchange modifications at US 40 and US 35, and bridge, pavement, and drainage rehabilitation and reconstruction work. While this portion of I-70 was not identified as a truck bottleneck due to capacity constraint, it does exhibit unreliable truck travel time as shown in **Figure 4.4.** In addition, the widening of I-70 to a minimum of six lanes from the Illinois State Line to the Ohio State Line was identified in the 2018 State Freight Plan as a necessary project for which funding had not been identified. That widening has long been an agency goal, with the stretch of interstate between Indianapolis and the Ohio State Line as particularly important due to the strong freight connection between Indianapolis and Columbus, OH.

Both of the projects are identified as statewide significant freight projects and coincide with INDOT's existing and committed (E+C) projects described in **Chapter 5** of the plan.

**Table 6.2** illustrates how INDOT plans to allocate the NHFP funds to the Clear Path 465 and I-70 ATL projects and to leverage these funds with additional Federal and state funds. This fiscally constrained Investment Plan is organized by state fiscal year, which runs from July 1 through June 30. Since the state fiscal year does not align with the Federal FY, the plan also provides a breakdown of NHFP funding by Federal FY.

INDOT's Investment Plan contains two scenarios because Indiana has applied for a Federal grant for the I-70 ATL project. **Table 6.2** shows INDOT's funding plan for I-70 with and without this grant.

The Clear Path 465 and I-70 ATL projects, which are being supported by INDOT's NHFP funds, represent INDOT's current freight priorities. **Chapter 5** of the plan identifies other statewide significant freight projects and prioritized 158 projects to address freight issues and needs of statewide significance, using a detailed and data-driven approach. The analysis results of those freight projects, along with the freight investment plan, will be a practical guidance to support INDOT's future planning and programming activities. **Appendix D** includes detailed information of the identified statewide significant freight projects and prioritization results.

## Table 6.2 – INDOT Freight Investment Plan

| | State FY22 | State FY23 | State FY24 | State FY25 | State FY26 | Total |
|---|---|---|---|---|---|---|
| **Clear Path 465** | | | | | | |
| Federal Freight Funds | | | | | | |
| Federal FY21 | $17,391,394 | | | | | $17,391,394 |
| Federal FY22 | $7,941,497 | $25,103,749 | | | | $33,045,246 |
| Federal FY23 | | $33,032,028 | | | | $33,032,028 |
| Subtotal | $25,332,891 | $58,135,777 | | | | $83,468,668 |
| Federal Grant Funds | | $70,000,000 | | | | $70,000,000 |
| Other Federal Funds | $3,210,163 | $17,350,937 | | | | $20,561,100 |
| State Funds | $39,134,502 | $201,072,938 | | | | $240,207,440 |
| Total | $67,677,556 | $346,559,652 | | | | $414,237,208 |
| **I-70 ATL (If Federal Grant Awarded)** | | | | | | |
| Federal Freight Funds | | | | | | |
| Federal FY24 | | | $17,699,867 | $15,992,802 | | $33,692,669 |
| Federal FY25 | | | | $34,366,521 | | $34,366,521 |
| Federal FY26 | | | | | $35,053,852 | $35,053,852 |
| Subtotal | | | $17,699,867 | $50,359,323 | $35,053,852 | $103,113,042 |
| Federal Grant Funds | | | $123,715,099 | | | $123,715,099 |
| Other Federal Funds | | | | $75,586,825 | | $75,586,825 |
| State Funds | | | $60,606,414 | $69,000,000 | | $129,606,414 |
| Total | | | $202,021,380 | $194,946,148 | $35,053,852 | $432,021,380 |
| **I-70 ATL (If Federal Not Grant Awarded)** | | | | | | |
| Federal Freight Funds | | | | | | |
| Federal FY24 | | | $33,692,669 | | | $33,692,669 |
| Federal FY25 | | | | $34,366,521 | | $34,366,521 |
| Federal FY26 | | | | | $35,053,852 | $35,053,852 |
| Subtotal | | | $33,692,669 | $34,366,521 | $35,053,852 | $103,113,042 |
| Federal Grant Funds | | | | | | $0 |
| Other Federal Funds | | | $107,093,346 | $164,356,148 | | $271,449,494 |
| State Funds | | | $26,868,844 | $30,590,000 | | $57,458,844 |
| Total | | | $167,654,859 | $229,312,669 | $35,053,852 | $432,021,380 |

Note: NHFP funds are highlighted in light blue.

Indiana
Department of
Transportation