Appendix A: Major New Program & 5-Year Construction Program

5-Year Construction Program, Project List Placeholder

The INDOT Major Moves Program can be accessed at the following weblink: http://www.in.gov/indot/7039.htm.

Please note: The Major Moves Program is constantly being monitored and revised according to need.

Appendix B: Highway Needs Analysis

Overview

The statewide transportation planning process provides for the identification of highway needs through a comprehensive process. This process uses past planning studies, current planning programs, and quantitative analysis from the various system planning tools.

Existing Projects

The first step in the statewide needs analysis process was to identify expansion projects which were already under development or have already been documented as a need by a previously-conducted transportation planning and/or programming study. The primary sources for this process were the State Project Management System (SPMS), INDOT's Major Moves, Major New Program, and the MPO Long Range Transportation Plans.

State Project Management System

The State Project Management System (SPMS) is a database containing every project under development by INDOT. Each project has a production schedule which provides a timetable of the development activities required to complete the project. These required activities include: (1) Preliminary Engineering, (2) Environmental Assessment, (3) Design, (4) Land Acquisition and (5) Construction. Expansion projects (interchange modifications, new interchanges, added travel lanes and new road construction) require a minimum of eight to ten years to implement. Projects programmed in SPMS have generally originated from either the INDOT Districts and/or Central Office planning and programming activities. Potential projects are identified through the Annual Program Development Process (Annual PDP) which includes annual meetings with the Districts, Regional Planning Organizations (RPOs) and Metropolitan Planning Organizations (MPOs). The projects programmed for development in the next four years provide the basis for the Indiana Statewide Transportation Improvement Program (INSTIP). The INSTIP is presented for review by transportation stakeholders and the public at a series of INDOT District Meetings. At these meetings, information is also provided on projects which are to be implemented beyond the four-year span of the INSTIP.

MPO Long Range Transportation Plans

The fourteen Indiana Metropolitan Planning Organizations (MPOs) provide comprehensive transportation needs analysis in the state's major urban centers. Each MPO is required to develop a twenty year transportation plan which identifies needs on both state and local roadway systems. The MPOs also carry out a multi-modal planning process that identifies potential rail, transit, freight, bicycle, and pedestrian improvements.

Statewide Technical Needs Analysis

An effective statewide transportation planning process depends upon the ability to conduct quantitative analysis to measure system performance and the impact of potential improvements. The Statewide Long-Range Multimodal Transportation Plan recommended that INDOT develop a comprehensive set of planning tools that will allow for system-level analysis of the state transportation network. These tools will include a geographic transportation information system, multi-modal travel demand forecasting capabilities, and methodologies to identify the economic impact of transportation investments. Technical planning tools developed to address this recommendation include:

- TransCAD-based Statewide Travel Demand Model
- Major Corridor Investment Benefit Analysis System (MCIBAS)
  - Corridor Travel Demand Analysis
  - Benefit/Cost Analysis Framework

- User Benefit Analysis (NET_BC)
- Economic Impact Modules (Business Attraction, Business Expansion, Tourism)
- REMI Economic Simulation Model

- State Highway Economic Requirements System (HERS_ST)
- INDOT Management Systems (Coordination with pavement, bridge, public transportation, intermodal, congestion, and safety management systems).

These planning tools provided the basis for INDOT's needs analysis. The key elements of the system planning tools and their relationship to the travel demand model are shown in **Figure A-1**. The Statewide Travel Demand Model is used to produce forecasts of future traffic in order to identify future capacity deficiencies. In addition, its future travel demand growth rates provided the primary input into the HERS_ST model used to identify added capacity improvements. At each decision point in the process, the output of these planning tools was reviewed by experienced transportation planners and project development engineers from each of INDOT's six districts and fourteen MPOs. This continuing review by local experts tempered the output with engineering and planning judgment.

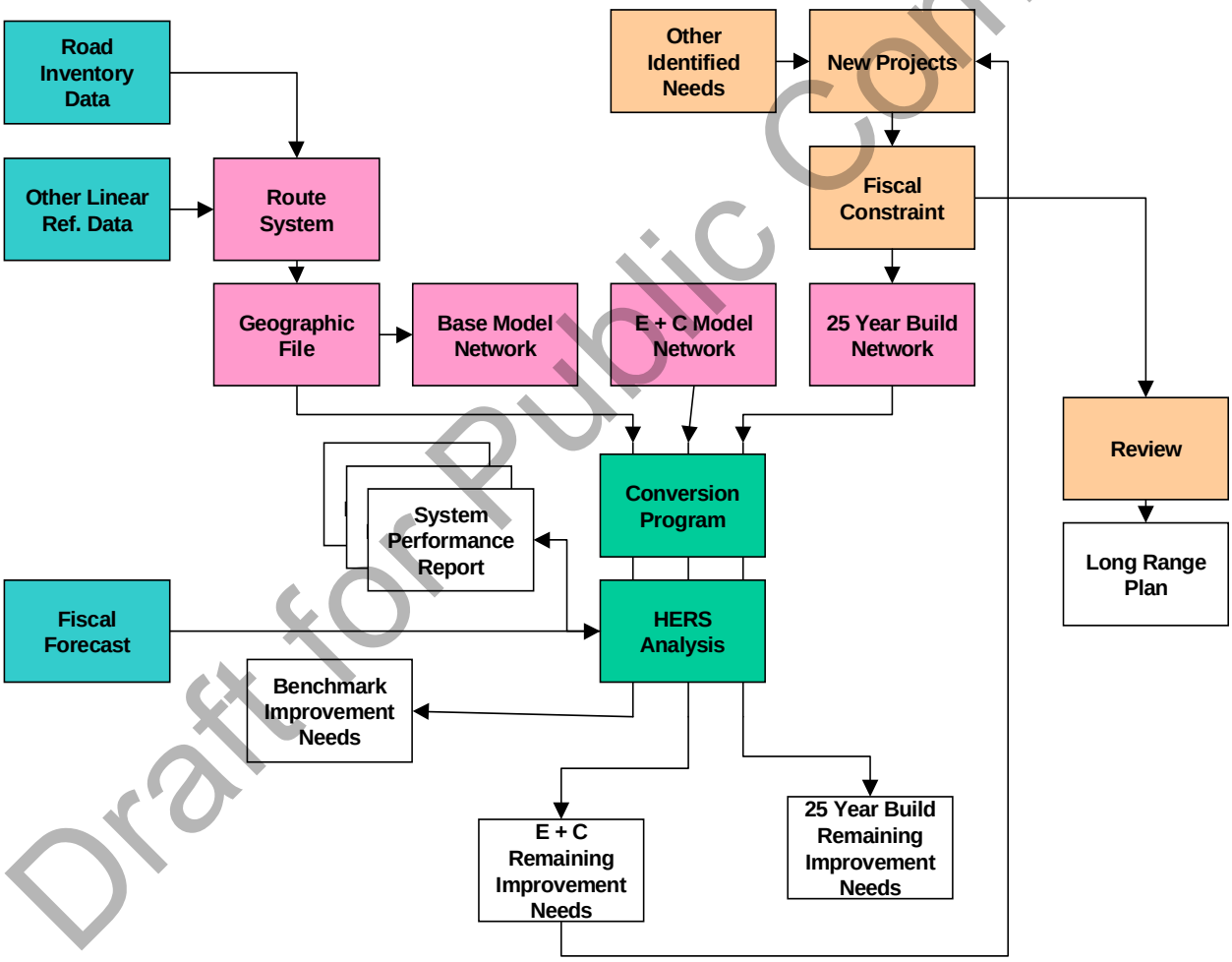

FIGURE B- 1, PLANNING TOOL RELATIONSHIPS

Roadway

The roadway data used in the statewide transportation planning process is obtained from the Road Inventory database maintained by IINDOT's Office of Technical Services. This database provides the comprehensive inventory of roadway physical features and traffic count information needed for the development of the system planning tools. The use of the TransCAD-based routing system allowed the creation of electronic databases through the process of dynamic segmentation.

Highway Capacity

The capacity of a roadway to carry traffic provides one of the basic inputs for the identification of needed highway improvements such as added travel lanes and new roadway construction. The highway carrying capacities were developed using the procedures of the Highway Capacity Manual.

Indiana Statewide Travel Demand Model (ISTDM)

Model Overview

Statewide models are designed to provide the analytical framework for assessing system performance, conducting project-level analysis, and providing the spatial framework for many of the management systems. Indiana's Statewide Travel Demand Model (ISTDM) provides the cornerstone for system planning tools and coordination with the INDOT Congestion and Safety Management Systems. The Statewide Travel Demand Model was developed using TransCAD which integrates Geographic Information System (GIS) and transportation-modeling applications.

Model Development

INDOT's first TransCAD-based GIS ISTDM was developed in the mid 1990's as part of the Major Corridor Investment-Benefit Analysis System (1998) for use as a systems-level planning tool to provide statewide and corridor estimates of current and future year travel demand. The model has since evolved and served as the catalyst for various statewide planning studies including the Interstate Interchange Planning Study (2000), and the I-69 Evansville to Indianapolis Tier 1 EIS (2001). For the 2004 ISTDM upgrade, enhancements were incorporated into the I-69 ISTDM model such as expanding the model's planning year horizon from 2025 to 2030 and adding significant detail to the model's input data files such as adding 3,876 additional traffic analysis zones, including major local roads to increase the network by 7,000 additional links, and the incorporation of traffic signal data in the network. These changes are illustrated in **Figures A-2, A-3**, and **A-4**. The ISTDM was updated again in 2010. Summarized below are some of the major refinements incorporated in the ISTDM model update:

- **Freight Model Incorporation**. The commodity-flow freight model was incorporated into the ISTDM software. In the late 90s, Dr. William Black, professor of Geography at Indiana University, developed a truck model based on geographic commodity flow data. This model directly forecasts freight flows by trucks, rail, and water for the entire US as a function of employment and population. Previously, the truck model ran separately and the results were added to the auto model. Having the freight model run with the auto model makes the model more sensitive to network and socio-economic scenario differences.
- **Intersection Analysis.** Intersection delays play a role in travel time and in travel routes. The intersection delay factors were improved to more accurately portray the delays and delays were created for intersections not coded as signals but containing stop signs or other traffic control devices.
- **2006 Base Year.** The base year was updated from 2000 to 2006. This requires updating the model with the best available socio-economic data from 2006 such as employment and population, along with the best available 2006 traffic counts. The traffic counts are used to calibration and validate model results.
- **Future year Projections:** New future year (2020 & 2035) projections of socio-economic data were developed based on public and private data providers, collaboration with MPOs, historic trends, and available land capacity. Due to the sluggish economy, 3 growth scenarios were provided. Along with the

best available growth projection which we called the “medium” growth scenario, “low” and “high” scenarios were developed.

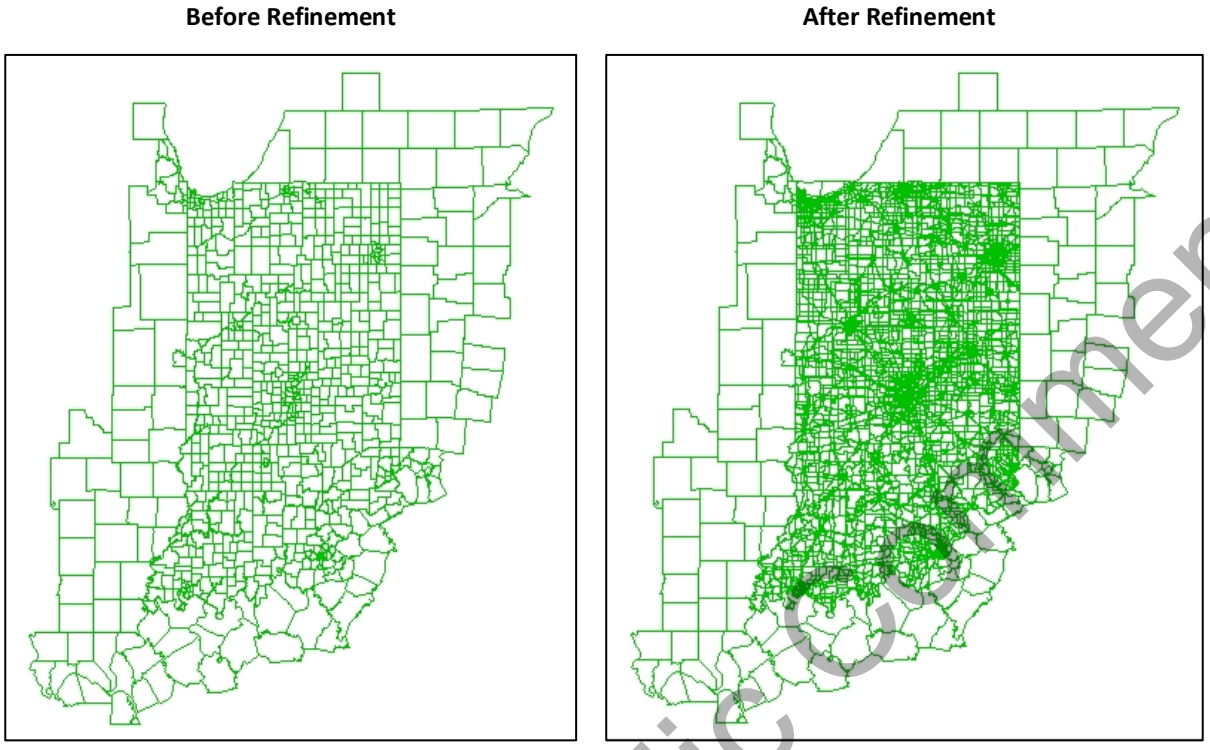

FIGURE B- 2: ISTDM TRAFFIC ANALYSIS ZONE (TAZ) REFINEMENTS

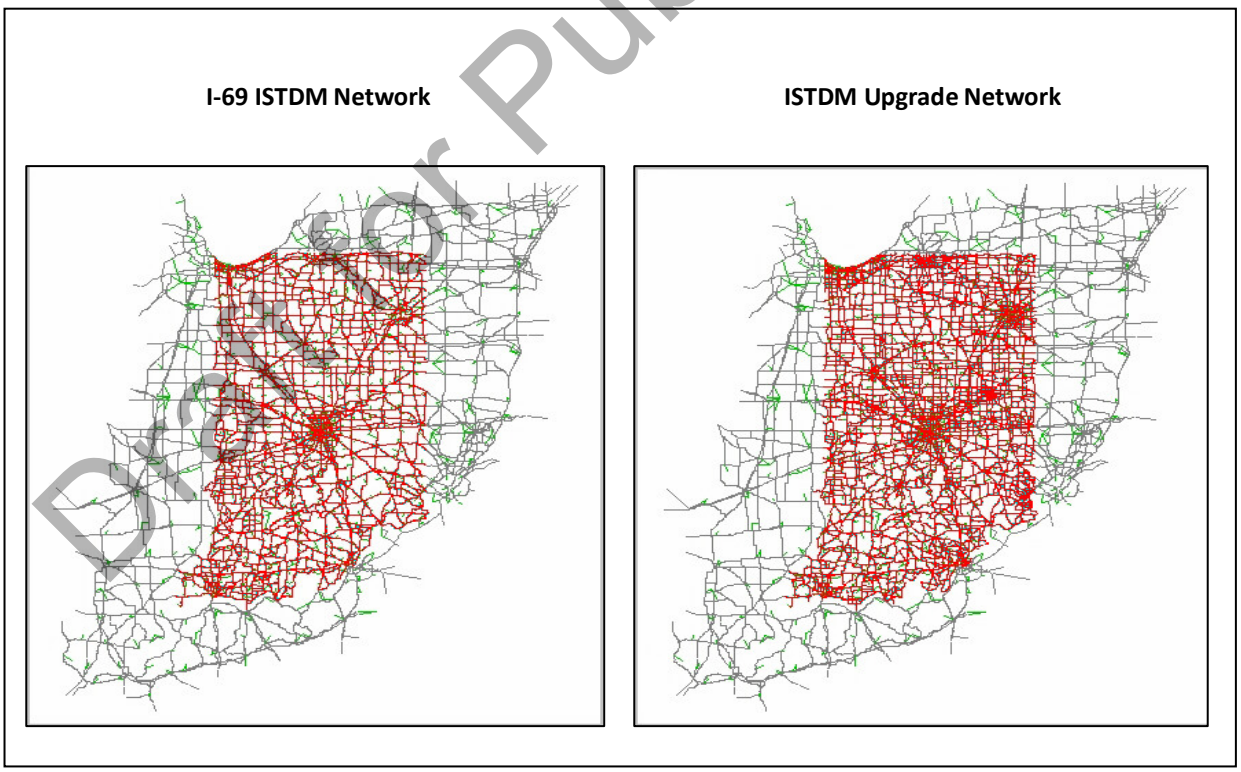

FIGURE B- 3: ISTDM ROAD NETWORK REFINEMENT

Long Range Plan Project Evaluation

One of the primary uses for the ISTDM is to evaluate projects considered for inclusion or already listed in INDOT's Long Range Transportation Plan. Project evaluation provides vital input regarding the feasibility and performance of potential improvement.

To facilitate ISTDM project evaluations, two network outputs are necessary: a future year "No-Build" Network and a future year "Build" Network. The no-build network, also known as the "do-nothing" network, consists of the roadway network as it exists today, plus INDOT projects identified as "committed". The no-build network provides information of how the roadway network will perform if future year ttraffic volumes are assigned.

The build network is similar to the no-build network but incorporates proposed improvements identified in the 10-year construction program. Build networks provide systems-level statistics of how the roadway will perform with implemented improvements active. When both networks are compared, decisions are made regarding need for the project.

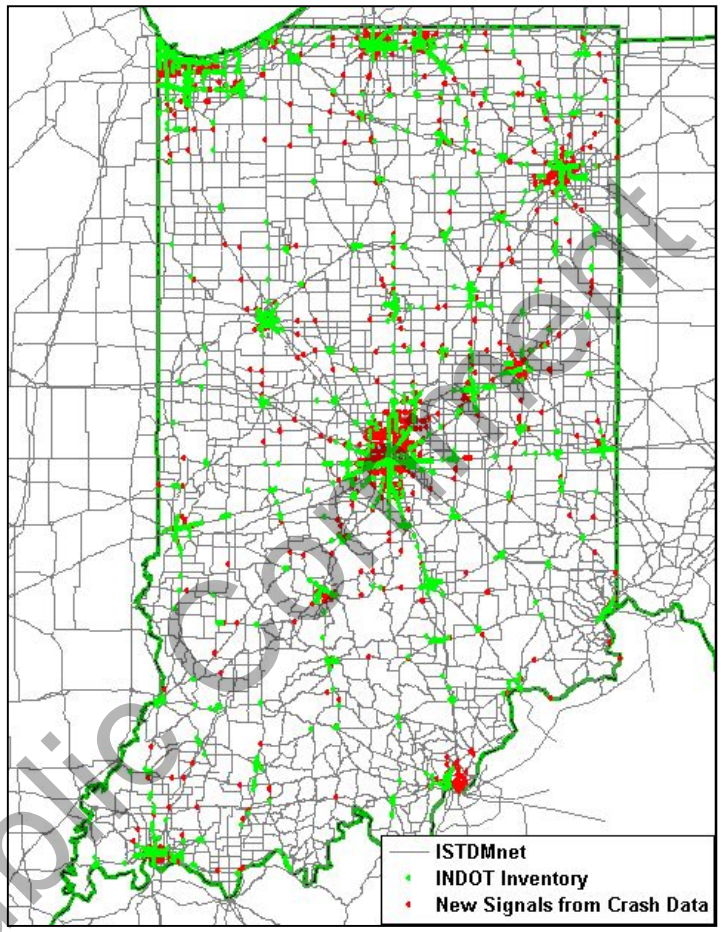

FIGURE B- 4: ISTDM TRAFFIC SIGNAL REFINEMENTS

For the 2035 plan update, maps of each build and no-build network were presented to various planning organizations and INDOT District Office staff for their review, analysis and comments. **Figure A-5**, shows sample network analysis maps presented to the various organizations. Note: the model networks are displayed by Levels of Service (LOS) classifications from LOS "A" (free-flowing, no congestion) to LOS "F" (Severe congestion).

Travel Forecast and Systems-Level Performance

Traffic growth rates from the ISTDM are used to forecast future volumes on specific highway links. The ISTDM develops future year traffic volumes based upon forecasted socio-economic growth. Over the 2010 to 2035 time period, statewide population is forecasted to increase 20%, statewide employment is forecasted to increase 18%; however, travel demand is estimated to increase much more rapidly at 52%.

INDOT's standard for acceptable levels of congestion are no worse than LOS C in rural areas and no worse than LOS D in urban areas. In the year 2000, there were 409 miles of state jurisdictional roadway (or 3.6% of the state jurisdictional network) with unacceptable levels of congestion. In 2035, assuming no new roadway improvements, there will be 1,503 miles of roadway (13.4% of the network) with unacceptable levels of congestion. However, construction of the projects currently in the long range plan reduces this number to 1,011 miles (8.8% of the network).

While the miles of roadway with poor levels of service increase, albeit much less, despite the build-out of the long range plan, another measure of system performance, average system speed (total vehicle miles of travel divided by total vehicle hours of travel) improves over the base year, increasing from 48.4 mph in 2000 to 49.9 mph in 2035.

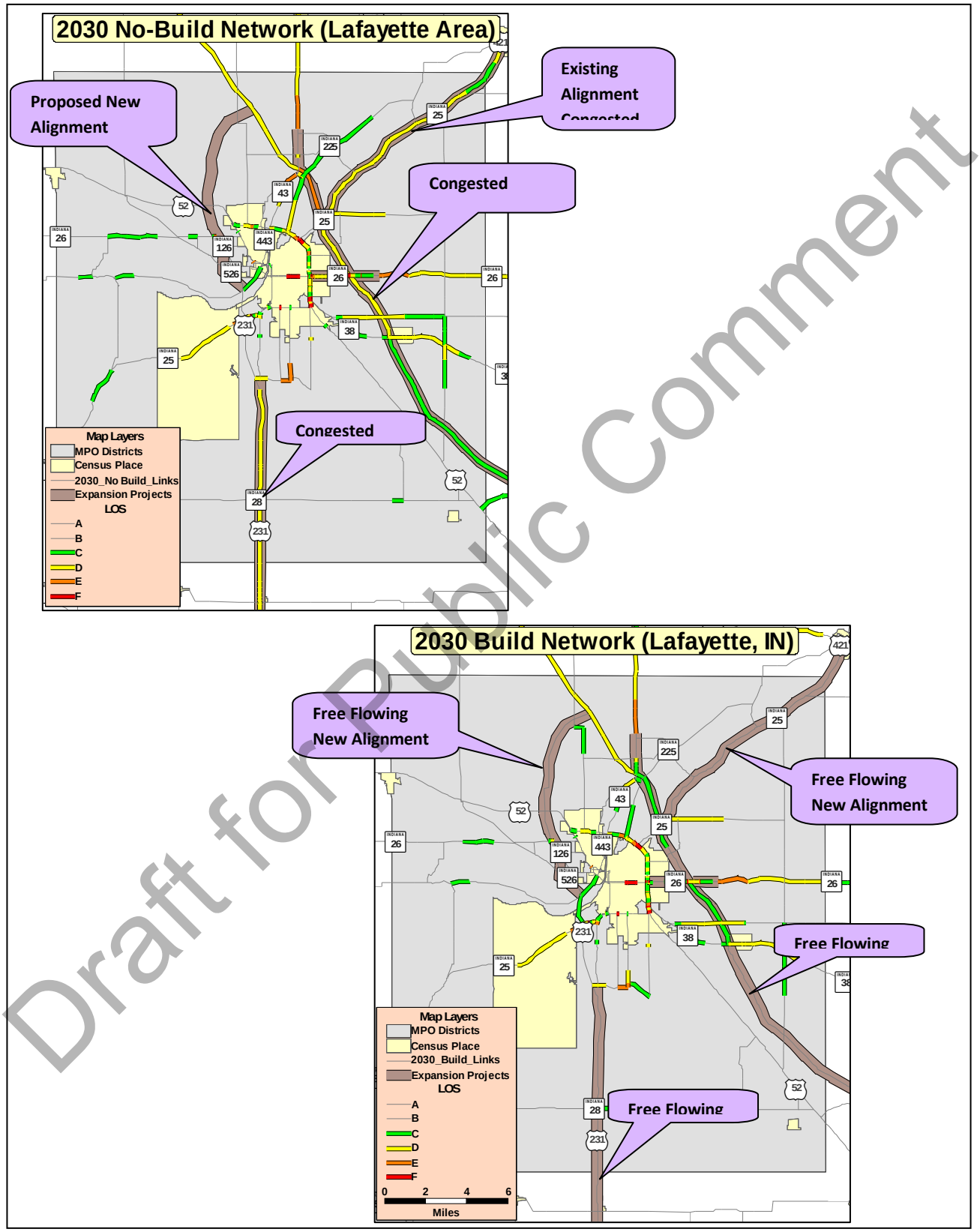

FIGURE B- 5: MODEL OUTPUT MAPS

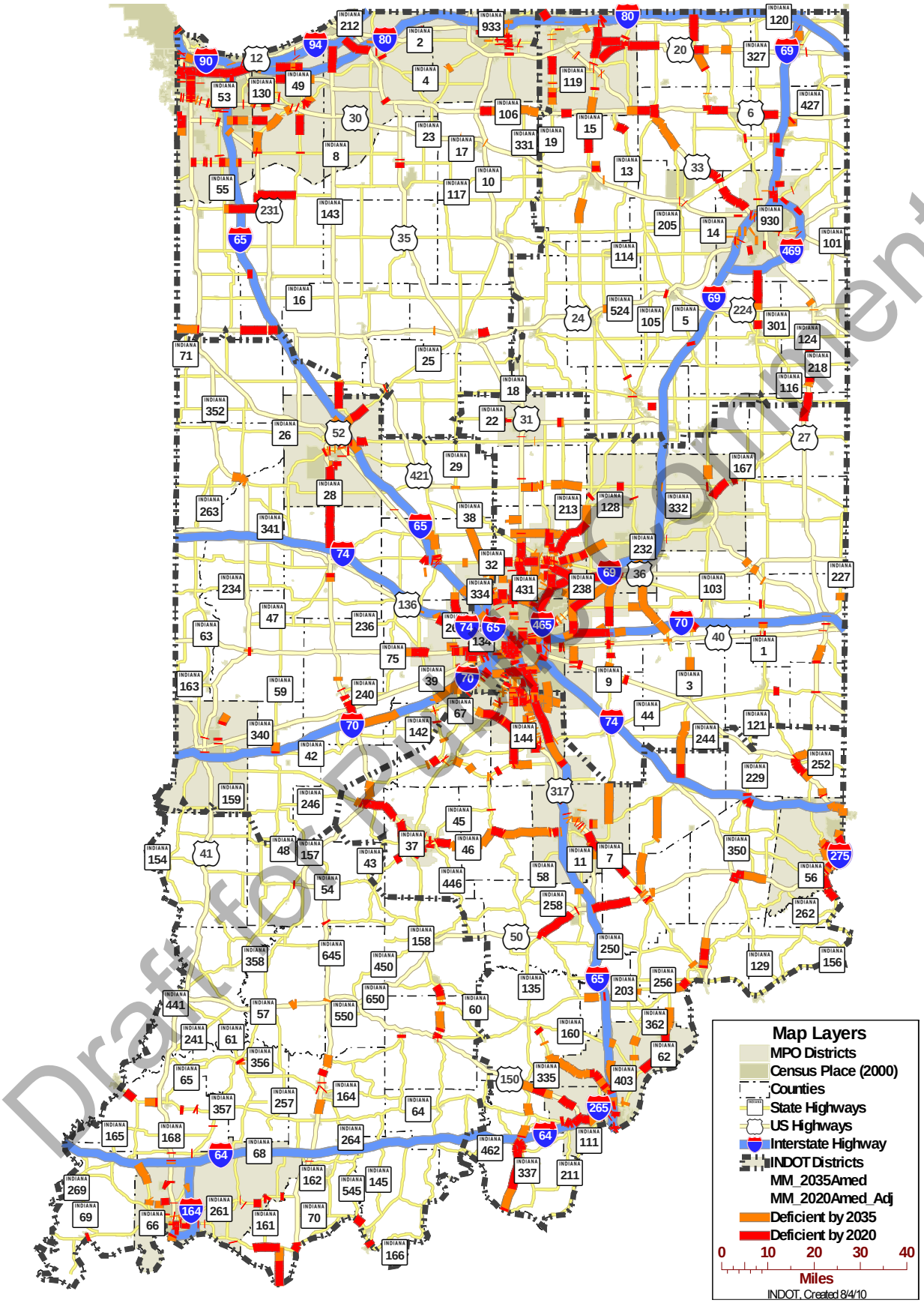

FIGURE B- 6 - 2020 AND 2035 CAPACITY NEEDS WITH MAJOR MOVES, MAJOR NEW PROGRAM ACTIVE

HERS_ST Model

One of the tools developed for statewide transportation planning is the Highway Economic Requirements System- State Version (HERS_ST). HERS_ST is a long-range planning tool for the analysis of highway system investments. HERS_ST was developed from the Highway Economic Requirements System created by the Federal Highway Administration (FHWA) for national highway investment analysis. The FHWA model is used in conjunction with the national Highway Performance Monitoring System to prepare a biennial report to Congress on the state of the nation's highways. Initially, INDOT modified the national model for specific application to its analytical need. This effort resulted in HERS_ST_IN. The major modifications for HERS_ST_IN focused the analysis on added capacity projects, incorporated INDOT's Road Inventory database to provide a 100% sample of our state highway network, and used a geographic information system (GIS) to map output.

Due to the interest in HERS expressed by INDOT and other state DOTs, FHWA developed a state version of this model called HERS_ST which wasn't as capable as INDOT''s customized version. Over time, the various features of HERS_ST_IN were gradually incorporated into subsequent versions of HERS_ST, until it no longer made sense to have a customized version. INDOT currently uses HERS_ST to conduct its highway investment analysis.

HERS_ST identifies needed improvements by forecasting highway capacity deficiencies for the 2010 to 2035 planning period. HERS_ST evaluated these forecasted highway deficiencies using a cost/benefit economic analysis approach to identify the need for an added capacity project and the most appropriate time period to implement it. HERS_ST identifies a potential project, calculates the estimated cost of the improvement, compares that to the project benefits (travel time savings, lower accidents costs, and reductions in vehicle operating expenses), and assigns the improvement to one of five funding periods on the basis of a cost/benefit ratio.

HERS_ST provides a statewide highway analysis tool, which allows the testing of a wide range of "what if" scenarios. The analysis can evaluate the system performance impacts of using different levels of benefit/cost ratios to select highway investments, the use of different capacity levels to identify deficiencies, and the use of alternative levels of investments. The HERS_ST analysis is limited to the evaluation of the existing highway system. The analysis of new highway links, such as new inter-city highways providing new connections need to be evaluated through other system planning tools such as NET_BC.

Indiana Interchange Study

A major element in the development of an efficient statewide system of transportation is the provision of interchanges which safely operate at an acceptable level of service. INDOT ensures this by periodically updating the INDOT Interchange Study. The first study was conducted in 1990 by MTA. It was updated in 2002 by Parsons-Brinckerhoff, and again in 2007.

This study complements the strategies laid out in the Long Range Transportation Plan by evaluating improvement needs for interchange areas and identifying a prioritization for improvement of interchanges based on a relative comparison of deficiencies or need for improvement. This study was based upon a fiscally unconstrained needs analysis, and therefore serves as an input into needs identification phase of the statewide planning process. Recommendations from this study will be integrated into the statewide plan set of recommended improvements based upon the evaluation of interchange needs relative to other improvement needs and anticipated financial resources.

The 2002 study developed improvement recommendations and priorities for the nearly 250 existing interchanges on the Interstate System, plus evaluated the feasibility and need for 11 new interchange locations. The recommendations of this interchange study provide the foundation for the interchange improvement program in terms of interchange modifications and new interchange development. All Interstate interchanges are evaluated with the exception of the Indiana Toll Road interchanges, which are analyzed in a separate INDOT process. The interchange study evaluated the potential interchange improvement needs by studying the following factors: (1) accident frequency and severity, (2) future traffic volumes and

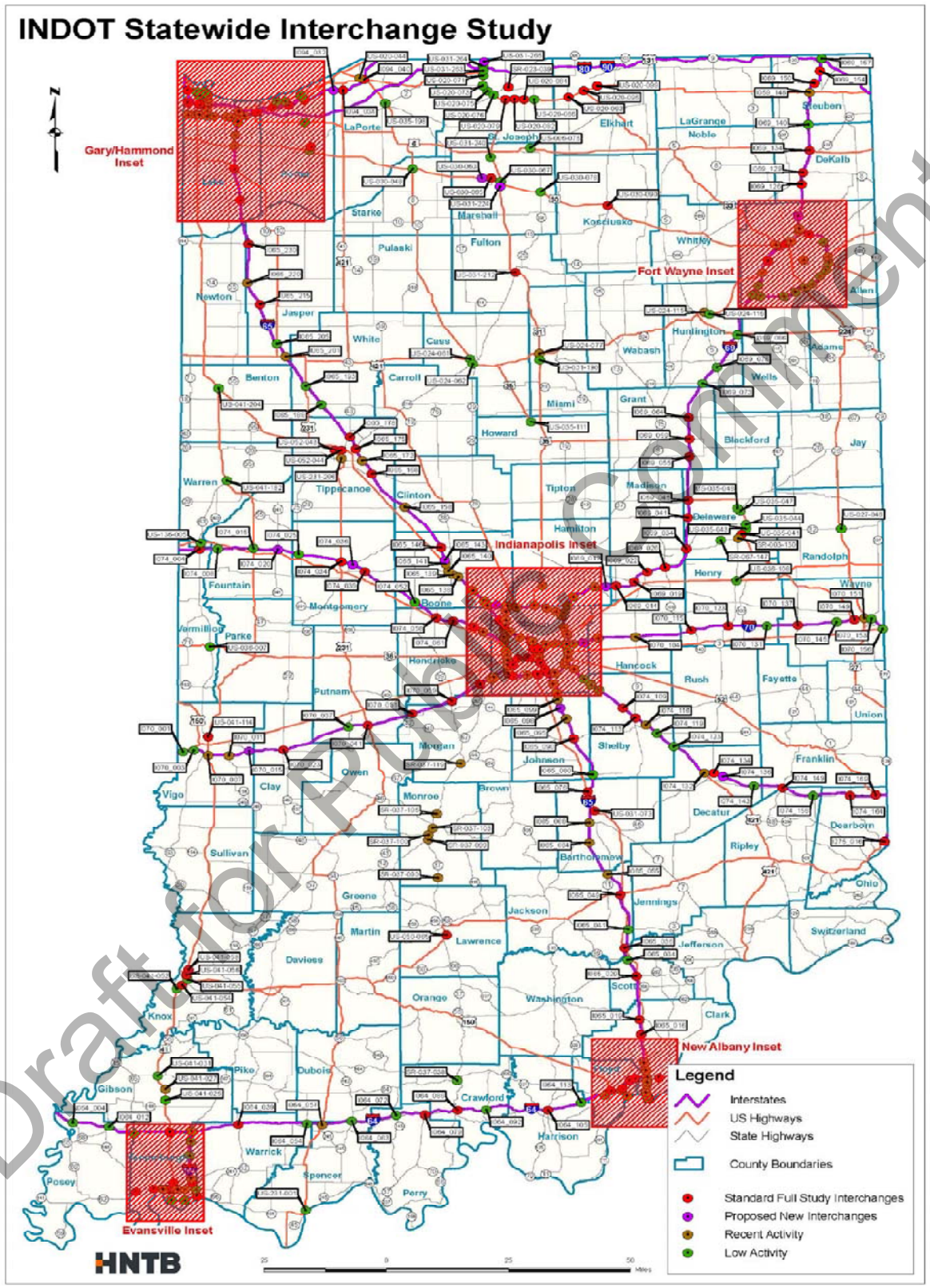

FIGURE B- 7 - INTERCHANGE STUDY MAP

interchange level of service (congestion), (3) geometric deficiencies and, (4) pavement and bridge conditions. Interchanges which had active improvement projects underway were included only in the inventory phase of the study. Interchanges in rural areas with no significant new development received limited study. The majority of study resources were directed towards interchanges located in areas with rapidly increasing development pressure and higher traffic volumes. The final report included a list of improvements and associated estimated costs per interchange. The report's recommendations drove our interchange modification and new interchange construction program for the next four years.

The 2007 study not only looked at existing and proposed interstate interchanges, but interchanges on non-interstate highways as well. The primary differences between this update and the 2002 study are:

1. Inclusion of non-Interstate interchanges, raising the total number of interchanges considered to 353 total existing interchanges (251 Interstate and 102 Non-Interstate) and 15 potential new interchange locations. See **Figure B-7**.

2. The 1990 study published its findings in a set of 250 three-ring notebooks. The 2002 study resulted in a set of 12 Compact Disks for distribution. This study provides for distribution of the study via a Web-based GIS Viewer at http://dotmaps.indot.in.gov/apps/InterchangeStudy.

Summary

The statewide transportation planning process provides for the identification of highway needs through a comprehensive process, which includes identifying existing projects, conducting technical needs analysis with tools such as the ISTDM and HERS_ST, utilizing system s evaluation efforts such as the Interchange Study, and consulting with the MPOs. By assembling these elements, a listing of the state's transportation needs is developed. After creating this list, the next task is to prioritize the projects in a data-driven, quantifiable manner which will allow INDOT to select the best projects to implement consistent with the available funding.

Appendix C: System Definitions

Overview

The state highway system definition process attempts to identify the importance of the various components of the road network in terms of the movement of people and goods. The various elements of the highway system are evaluated in terms of their statewide significance based on levels of passenger or freight travel. A major focus is the enhancement of connectivity between major activity centers in order to support the state's economy. Highway corridors were evaluated on the basis of:

- Accessibility measures between major urban area concentrations;
- Designation as a Principal Arterial under FHWA's Functional Classification System;
- Designation as part of the National Highway System;
- High volumes of commercial traffic and commodity movements;
- High volumes of passenger vehicle traffic.

A highway's classification clarifies its role in the state system, aids in the identification of future improvements, and guides INDOT in determining the appropriate level of capital investment. The system definition also aids INDOT in setting priorities, and allocating resources among various corridors. This ensures that highway investments achieve system-performance goals in a cost-effective manner.

Planning-Level Corridor Hierarchy

Many of the traditional systems used to categorize roads are discussed in the "Other Classification Schemes" section of this chapter. These schemes provide important information regarding Indiana's highway system. The development of INDOT's Long Range Plan included analyzing this information to develop a mobility corridor hierarchy scheme for statewide planning purposes. This new hierarchy has three levels:

1) Statewide Mobility Corridors

These corridors are the top-end of the highway system, and are meant provide mobility across the state. They provide safe, high-speed connections for long-distance trips between the metropolitan areas of Indiana, and those of the surrounding states. They serve as the freight arteries of the state, and thus, vital for economic development. INDOT has as a strategic goal to directly connect metropolitan areas of 25,000 in population or greater. **See Figure C-1.**

2) Regional Corridors

These corridors are the middle tier of the highway system, and are meant to provide mobility within regions of the state. They provide safe, high-speed connections for medium-distance trips between smaller cities and towns.

3) Sub-Regional Corridors

These corridors make up the remainder of highway system. They are the bottom level of the system, and are used for safe, lower speed, short-distances trips. They provide access between local land uses and the rest of the state network.

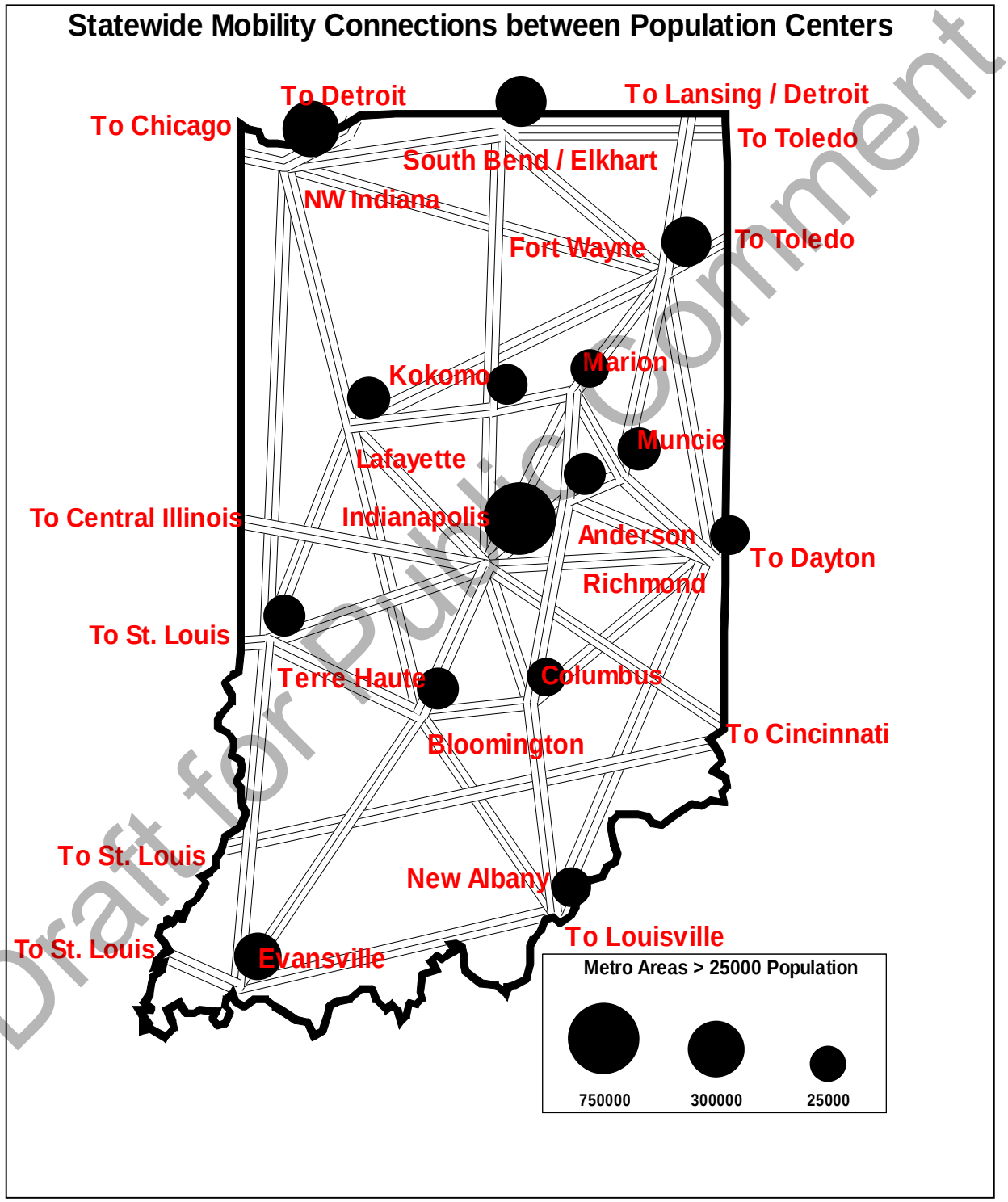

FIGURE C- 1: MOBILITY CORRIDOR CONNECTORS

CHARACTERISTICS OF PLANNING CORRIDORS

The basics of how these corridors will look and operate as well as how INDOT will use these designations to guide future investment are defined here:

Statewide Mobility Corridors

Statewide Mobility Corridors serve as the connection between major metropolitan areas of Indiana and neighboring states, provide macro-level accessibility to cities and regions around the state, and play a vital role in the economic development of the state.

The Statewide Mobility Corridor System consists of the Indiana portion of the Interstate Highway System, plus most other routes included in the Principal Arterial System. Other route segments considered essential to providing reasonably structured highway mobility corridors include US-24 Fort-to-Port, US-31 from Indianapolis to South Bend, SR-25 Hoosier Heartland, and the US 231 connection from Spencer to Lafayette. Two new routes are being developed. The Illiana Expressway in Northwest Indiana is being studied, and portions of the I-69 Extension in Southwest Indiana are under construction. The Mobility Corridor System is shown in **Figure A-2**.

Characteristics:

- Upper level design standards
- High speed
- Free flowing conditions
- Serves long distance trips
- Large through volumes of traffic
- Heavy commercial vehicle flows
- Carry longer distance commuter traffic
- Generally multi-lane, divided
- Full access control desirable, no less than partial access control
- Railroad and highway grade separations desirable
- Desirable to by-pass congested areas
- No non-motorized vehicle/pedestrian interaction
- Major river crossing

Regional Corridors

Regional Corridors serve as a connection to smaller cities and regions, feed traffic to the Statewide Mobility Corridors, and provide for regional accessibility. These corridors are shown in **Figure B-2**.

Characteristics:

- Mid-level design standards
- High to moderate speed
- Free-flow to the extent practicable in rural areas
- Serves medium distance trips
- Carry medium distance commuter traffic
- Moderate through volumes of traffic
- Moderate commercial vehicle flows
- Potential for heavy local traffic volumes
- Typically, at grade intersections with highways and railroads, with consideration for railroad separation
- High-level two-lane or multi-lane
- Partial access control desirable
- Conventionally routed through cities and towns
- Moderate interaction with non-motorized vehicles and pedestrians

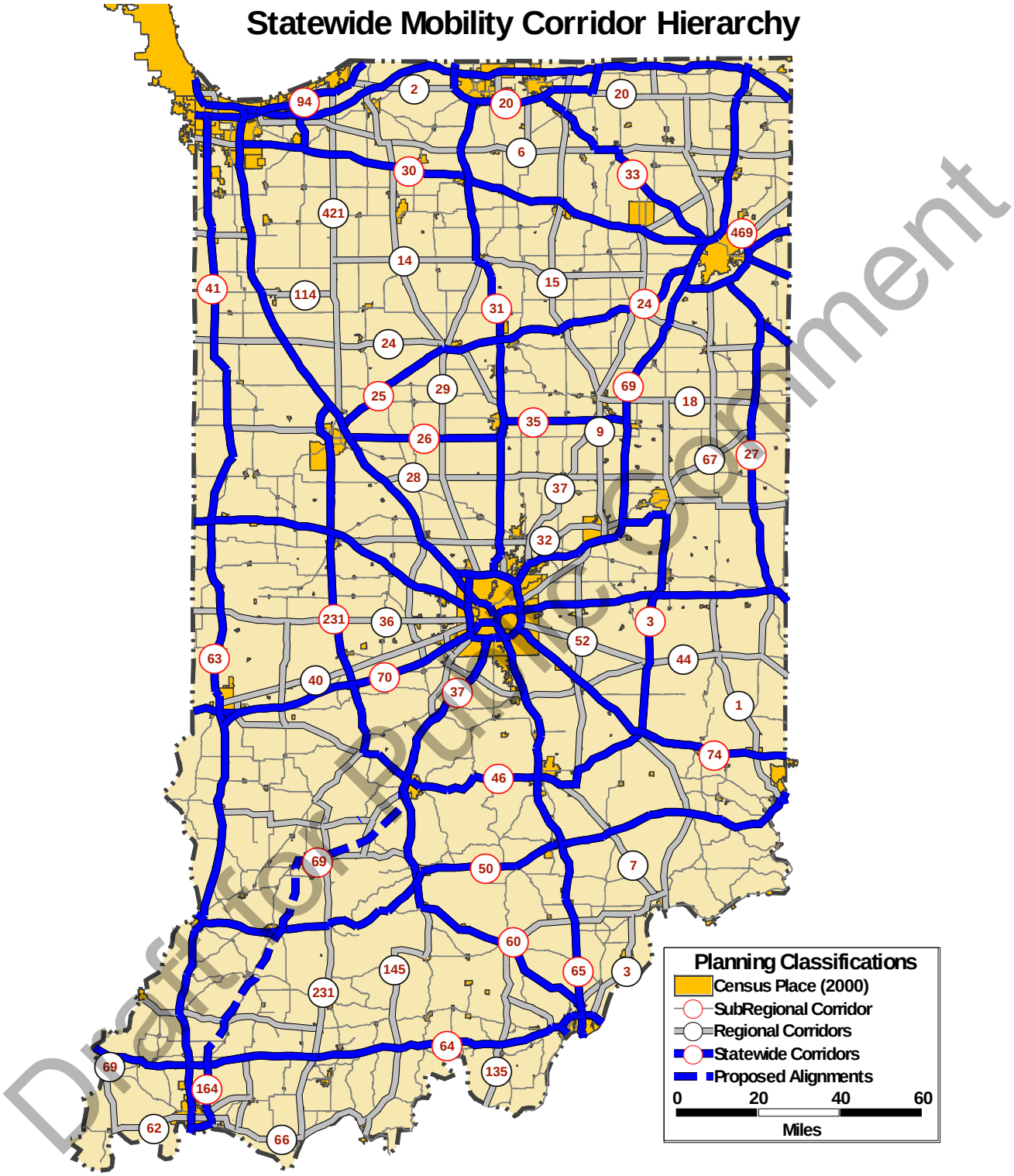

FIGURE C- 2: CORRIDOR HIERARCHY SYSTEM

Sub-Regional Corridors

Sub-Regional Corridors serve intra- and inter-county short-distance trips, provide access to local residences and businesses, and connect rural areas and small towns. These corridors are shown in **Figure C-2**.

Characteristics:

- Lower-level design standards
- Moderate to low speed
- At-grade intersections with highways and railroads
- Minimal access control
- Short distance trips
- Low through traffic volumes
- Moderate local traffic volumes
- Typically two-lane with multi-lane exceptions
- Frequent interaction with non-motorized vehicles and pedestrians
- Routed through cities and towns

Functional Classification System

The functional classification concept is one of the most important determining factors in highway design. In this concept, highways are grouped by the character of service they provide. The basic principle involved in classifying highways is that roads serve two distinct functions: mobility (moving traffic), and providing access to land. Although most roads serve both functions, the degree that one function predominates over the other determines the highway's classification. Thus, arterial roads serve primarily a mobility role while local roads primarily provide access to land. Between arterial and local roads are the collector roads, which maintain a relatively equal balance between traffic service and land access.

In the functional classification scheme, the overall objective is that the highway system, when viewed in its entirety, will yield an optimum balance between its access and mobility purposes. If this objective is achieved, the benefits to the traveling public will be maximized.

There are many other reasons for functionally classifying roads. Functional classification has often been used to assign jurisdictional responsibility to highways. Functional classification has also been used in fiscal planning, establishing needs, and setting design standards.

Jurisdictional responsibility usually follows functional classification. Indiana, like many other states, has assigned the responsibility for the highest levels (arterials and most major collectors) to INDOT, while local governments generally have been given the responsibility for the lower level roads falling into minor collector and local road systems.

For fiscal planning, the underlying concept is that the funding source should be related to the road's function. Roads that function primarily as mobility corridors are financed by vehicle use taxes supported by federal funding (fuel tax, registration fees, etc.), while roads that provide access to land alone are not federally supported and are financed by property taxes and general revenue.

Highway deficiencies in terms of design standards are also related to functional classification. What may be considered a deficient on a higher level road may be considered acceptable on a lower level road. For instance, since the main purpose of local roads are to provide access to property and not to move traffic, conditions contributing to lower speeds such as high densities of driveways can be tolerated. By the same token, higher level roads (arterials) provide minimal or non-direct property access in order to facilitate the flow of traffic.

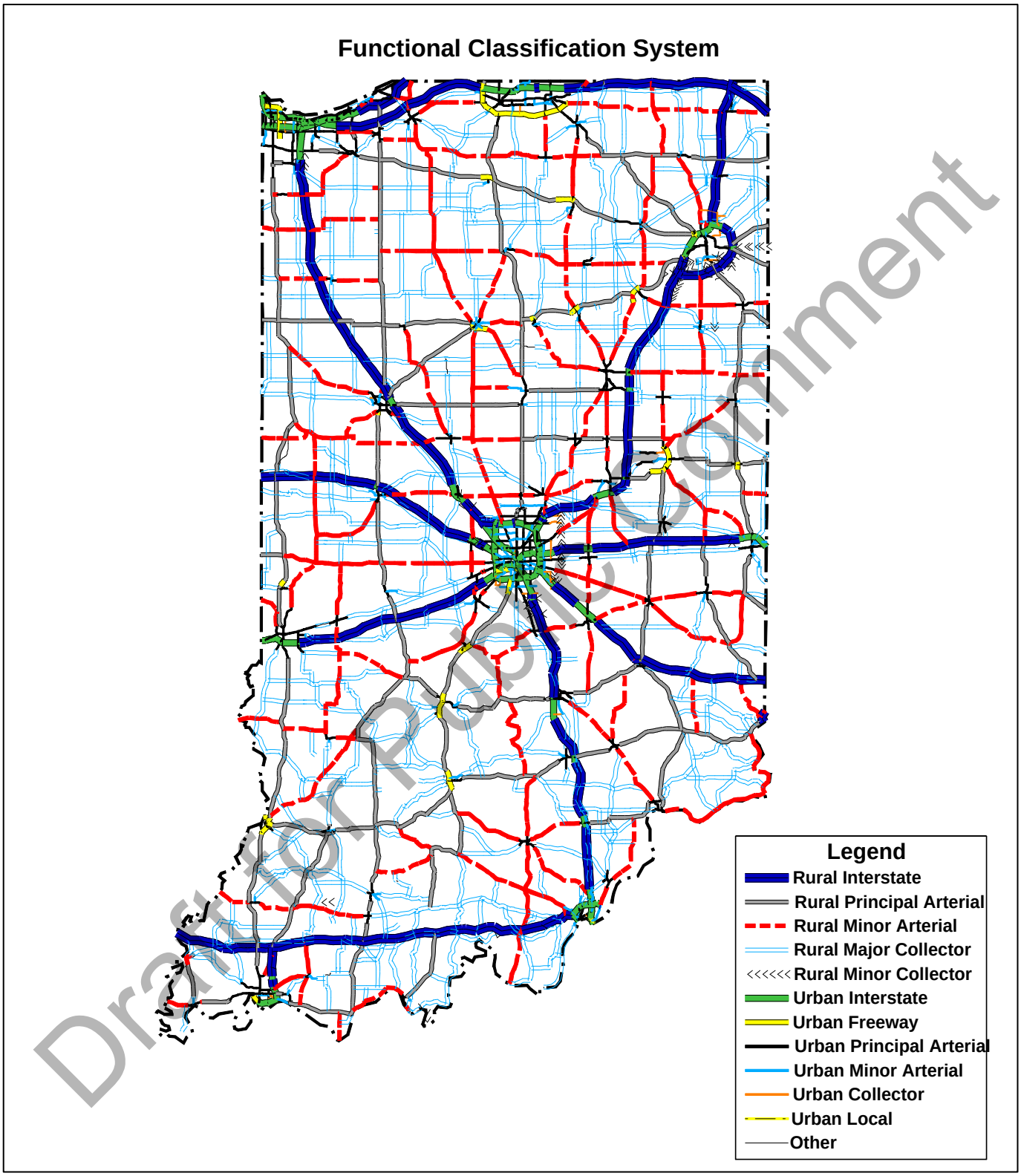

FIGURE C- 3: FUNCTIONAL CLASSIFICATION SYSTEM

The functional classification system currently in existence in Indiana, as proposed and supported by both INDOT and FHWA, was created by analyzing population centers and traffic generators within the state as well as those in proximity to the state's borders. They were then ranked by size. The largest ones were connected together by a continuous interconnected system of roads. Stub connections were avoided wherever possible except where unusual geographic or traffic flow conditions dictated.

Other factors including trip length, spacing, degree of access control and coordination with neighboring states were analyzed. Average trip length was also considered an important factor in classifying roads. Roads with longer average trip lengths were usually assigned to higher classifications.

Spacing was also a major consideration. In urban areas, the spacing of arterials was decreased as the population density increased. Parallel roads in the same corridor usually were provided different classifications. Those roads with higher design usually were considered to function as principal arterials while the others were deemed more appropriate to serve localized traffic and provide a needed degree of land access.

Coordination with adjacent states was always an important element in this process. Roads serving major traffic generators in adjacent states should always be provided with a functional classification designation similar to ours as the routes cross the State lines. A map depicting all functionally classified roads in Indiana is shown in **Figure C-3**.

National Highway System

National Highway System (NHS) is a system of roadways determined to have the greatest national importance to transportation, commerce, and defense in the United States. It consists of the Interstate Highway System, logical additions to the Interstate System, selected other principal arterials, and other facilities which meet the requirement of one of the subsystems of the NHS. The NHS represents approximately 4% to 5% of the total public road mileage in the United States. Therefore, the total Indiana mileage is somewhat restricted in terms of actual highway segments assigned to the National Highway System. Specifically, the National Highway System was intended to contain the following subsystems:

- Interstate - - The current Interstate System retains its separate identity within the NHS along with specific provisions to add mileage to the existing Interstate subsystem.
- Other Principal Arterials - - These include highways in rural and urban areas which provide access between an arterial route and a major port, airport, public transportation facility or other inter-modal transportation facility.
- Strategic Highway Network - - A network of highways which are important to the United States' strategic defense policy and which provide military access, continuity and emergency capabilities for national security purposes.
- Major Strategic Highway Network Connectors - - Highways which provide access between major military installations and the Strategic Highway Network.

Although the National Highway System as defined above is comprised of principal arterials, all of the designated Indiana principal arterial routes are not necessarily on the system. The portion of the Indiana's principal arterial mileage included in the system was limited by caps established nationwide for the NHS.

The original exercises to determine the extent of the various state NHS mileages and route segments assumed that the rural portion of the system should not exceed 4%, while the urban portion should not exceed 10% of the existing principal arterial system back then. As expected, some states had systems much leaner than the average while others had systems that were much more extensive. In order to maintain some sense of balance among the States, principal arterial system reclassification was undertaken with maximum rural area road targets of 4% and maximum urban area road targets of 10%.

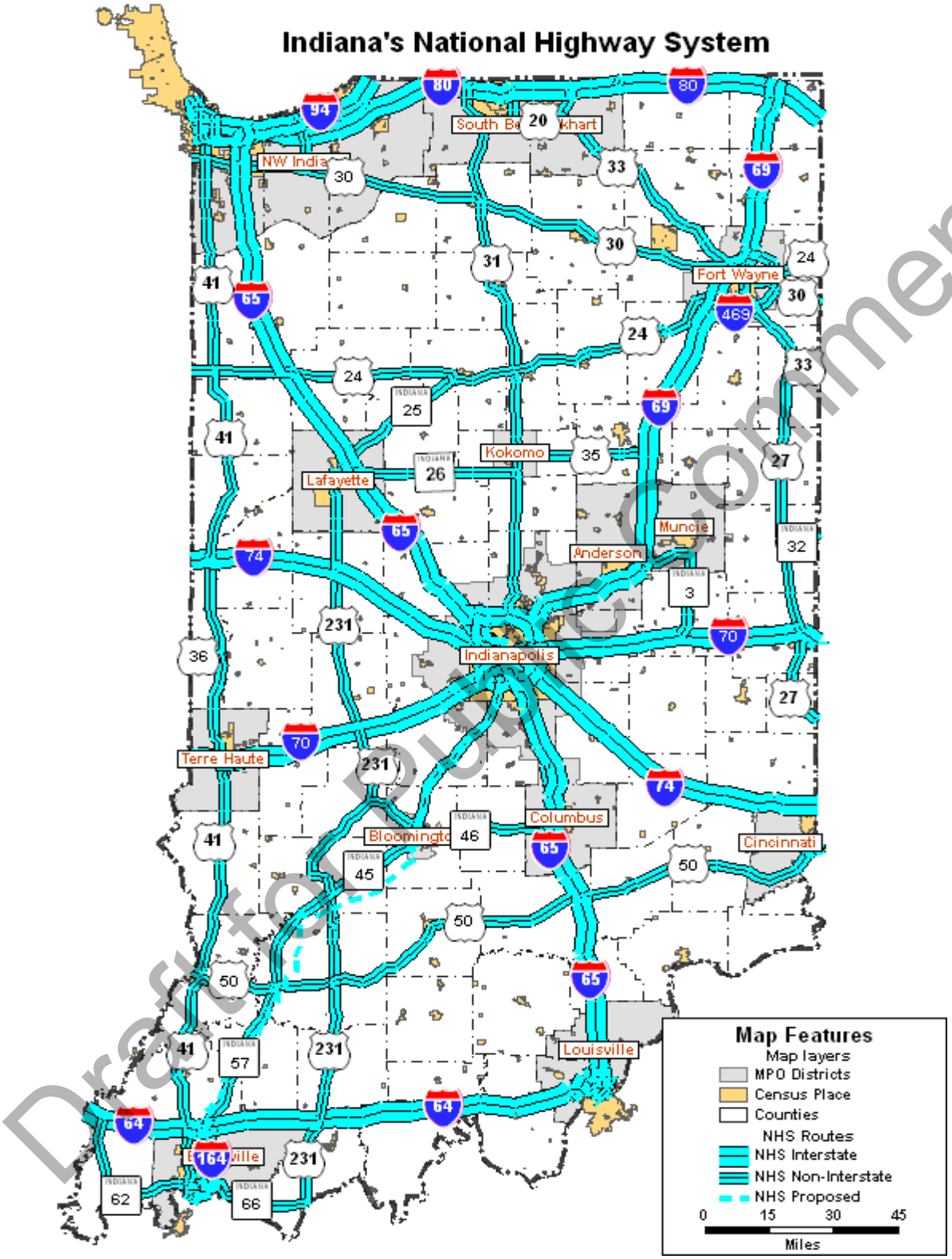

FIGURE C- 4: NATIONAL HIGHWAY SYSTEM

This resulted in a nationwide principal arterial system larger than anticipated since states with lean principal arterial networks used the reclassification as an opportunity to increase their mileage to the maximum limit. This gave them a much more extensive system than other states, and resulted in road density (area divided by road mileage) varying considerably from one state to another. A state with a dense system of roads (common in the Midwest and the Great Plains) which included the full 4% of its rural roads as principal arterials had a larger system than a state with a lean road system (common in mountainous, desert and wetland areas).

Another factor that influenced the arterial classification of roads involved traffic density (VMT divided by road miles). Areas with higher traffic density required a higher percentage of their roads to provide for traffic service. By considering road density and traffic density combined, a much more equitable balance between the states was achieved, and resulted in systems that were the same for similar states. Ultimately, states with lean systems added some minor arterials to their system. Indiana was not one of these states and still has some arterial roads that are not on the National Highway System. The NHS is shown in **Figure C-4**. Not all segments of this system are on the state highway system.

Intermodal Connecting Links

These are highways that connect NHS routes to inter-modal transportation facilities. These facilities can be ports, international border crossings, airports, public transportation & transit centers, interstate bus terminals, and rail yards.

Commerce Corridors

In 1991, the Indiana General Assembly passed legislation that directed INDOT to establish "commerce corridors" in the state. These corridors were defined as a part of a recognized system of highways that: (1) directly facilitates intrastate, interstate, or international commerce and travel, (2) enhances economic vitality and international competitiveness, or (3) provides service to all parts of Indiana and the United States. Indiana's Commerce Corridors are depicted in **Figure C-5.**

National Truck Network

The Surface Transportation Assistance Act of 1982 (STAA) created a national network of highways designated for use by large trucks as defined by federal width and length limits. The objective of the act was to facilitate freight movement by promoting uniform highway standards throughout the nation to accommadate legal truck sizes and weights. The national weight standard for trucks is 80,000 pounds. The National Truck Network includes almost all of the Interstate Highway System and other, specified non-Interstate highways which have been built to handle large trucks. In addition, the Act required that "reasonable access" be provided for commercial vehicles from the National Truck Network to terminals; and to facilities for food, fuel, repair, and rest; and, for household goods carriers, to points of loading and unloading. Under Indiana State Statutes, all principal arterials are available to commercial vehicles of legal dimensions subject to local restrictions. In addition, the State has enacted legislation that stipulates that all public roads are legally available to these commercial vehicles subject to local restrictions.

STRAHNET

The Strategic Highway Corridor Network (STRAHNET) is a system of highways, including the Dwight D. Eisenhower System of Interstate and Defense Highways, identified as strategically important to the defense of the United States. The system was identified by the Military Traffic Management Command Transportation Engineering Agency. The purpose of this national system is:

- In peacetime, to maintain the readiness of our fighting forces, to assist in the maintenance of a credible deterrent posture, and to enable the rapid mobilization of military forces during increased tension;
- In wartime, to gather and deploy personnel and equipment as needed; and;
- To support industrial mobilization.

This military road network uses the Interstate System in Indiana and, since the Interstate System does not go directly to the military bases, a connector system is required. The NHS includes the STRAHNET system and its Primary Connectors to Priority One and Two military installations in response to a federal requirement that these routes be included. Those portions of the National Highway System designated as STRAHNET and its Primary Connectors are depicted in **Figure C-6.**

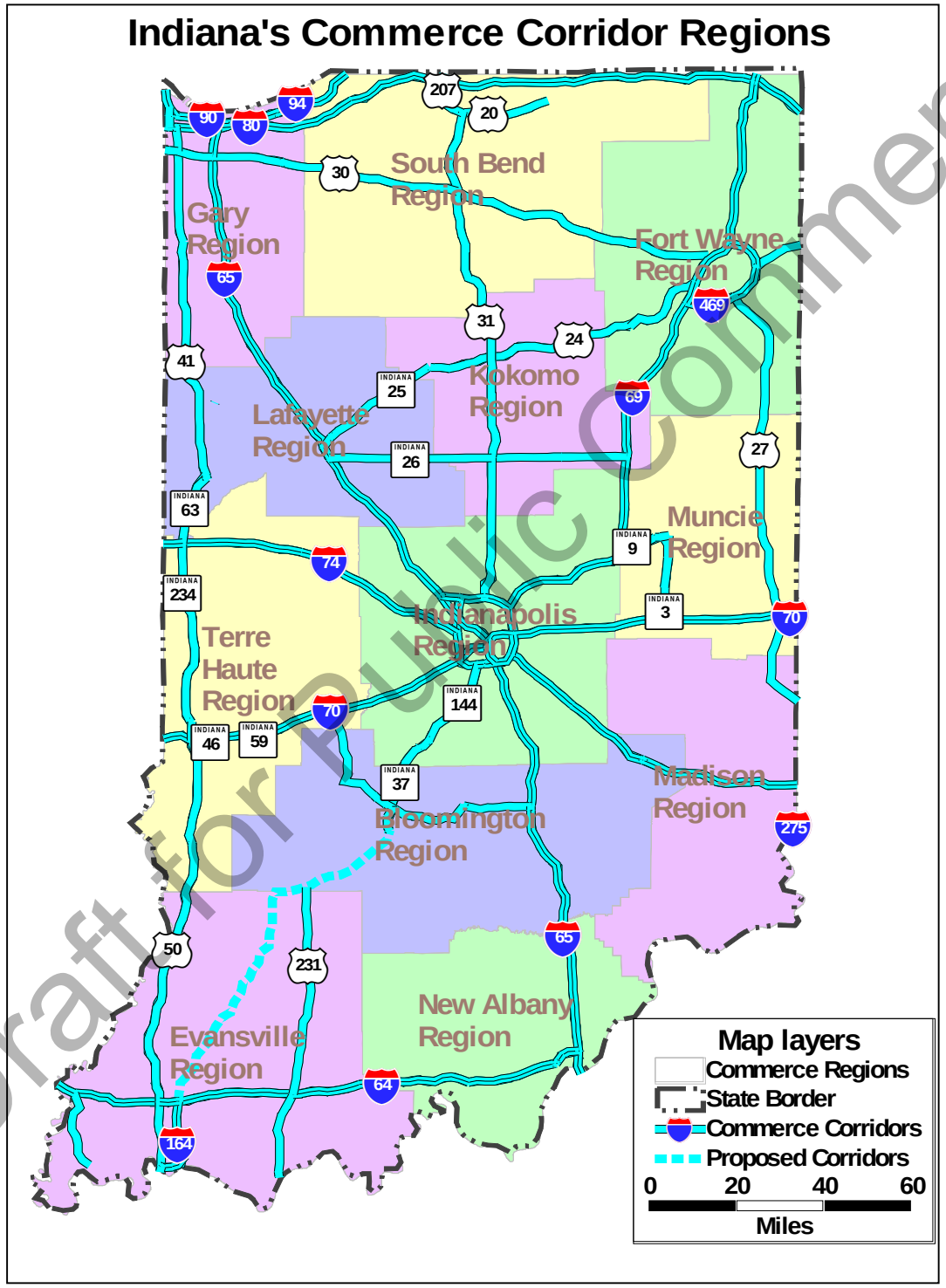

FIGURE C- 5: COMMERCE CONNECTORS

Heavy Duty and Extra Heavy Highway Network

INDOT has been authorized to designate certain highways as Heavy Duty or Extra Heavy Duty. This designation sets maximum weights for vehicles that may be operated on those highways. However, this designation is limited to those highways that have been constructed and maintained in such condition that the intended use will not materially decrease the useful life of that facility. The Heavy Duty Highway Network consists of all state-jurisdictional highways, and allows for the operation of trucks with a maximum gross vehicle weight of 80,000 pounds.

The Indiana General Assembly has specifically identified segments of the following state roads: US 6, US 12, US 20, US 30, US 31, US 35, US 41, SR 2, SR 3, SR 9, SR 23, SR 39, SR 149, SR 249, SR 312 and SR 912 as Extra Heavy Duty Highways. With some exceptions, the maximum gross vehicle weight limits for this network is 134,000 pounds. The Extra Heavy Duty Highway Network is depicted in **Figure C-7.**

National Scenic Byways

The National Scenic Byways Program recognizes highways that provide access to outstanding examples of our nation's beauty, culture, and recreational experiences, and display the diverse regional characteristics of our nation. These highways, nominated by the states and federal land management agencies, are designated by the U.S. Secretary of Transportation to provide a map for people from all over the world to explore America's treasured open roads.

Currently, Indiana has three highways designated as National Scenic Byways. The Historic National Road, US 40 from the Illinois State Line to the Ohio State Line. The Ohio River Scenic Byway includes portions of SR 62, US 41, I-64, SR 66, SR 56, and SR 156 from the Illinois State Line to the Ohio State Line. The Indiana Historic Pathways includes US-50 from the Illinois State Line to the Ohio State Line, and US-150 from Shoals to Clarksville. Indiana's National Scenic Byways are shown in **Figure C-8.**

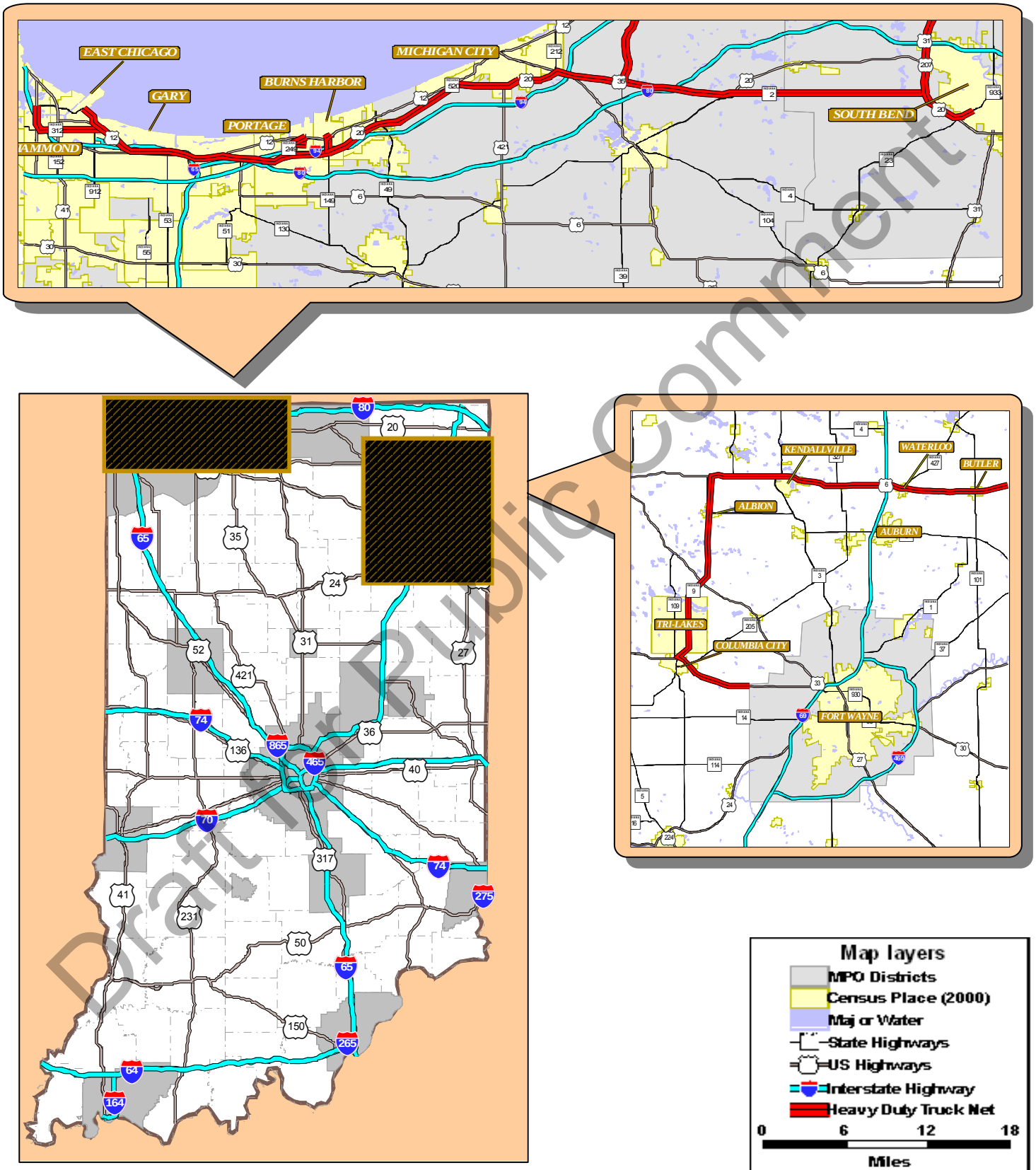

FIGURE C- 6: HEAVY DUTY TRUCK NETWORK

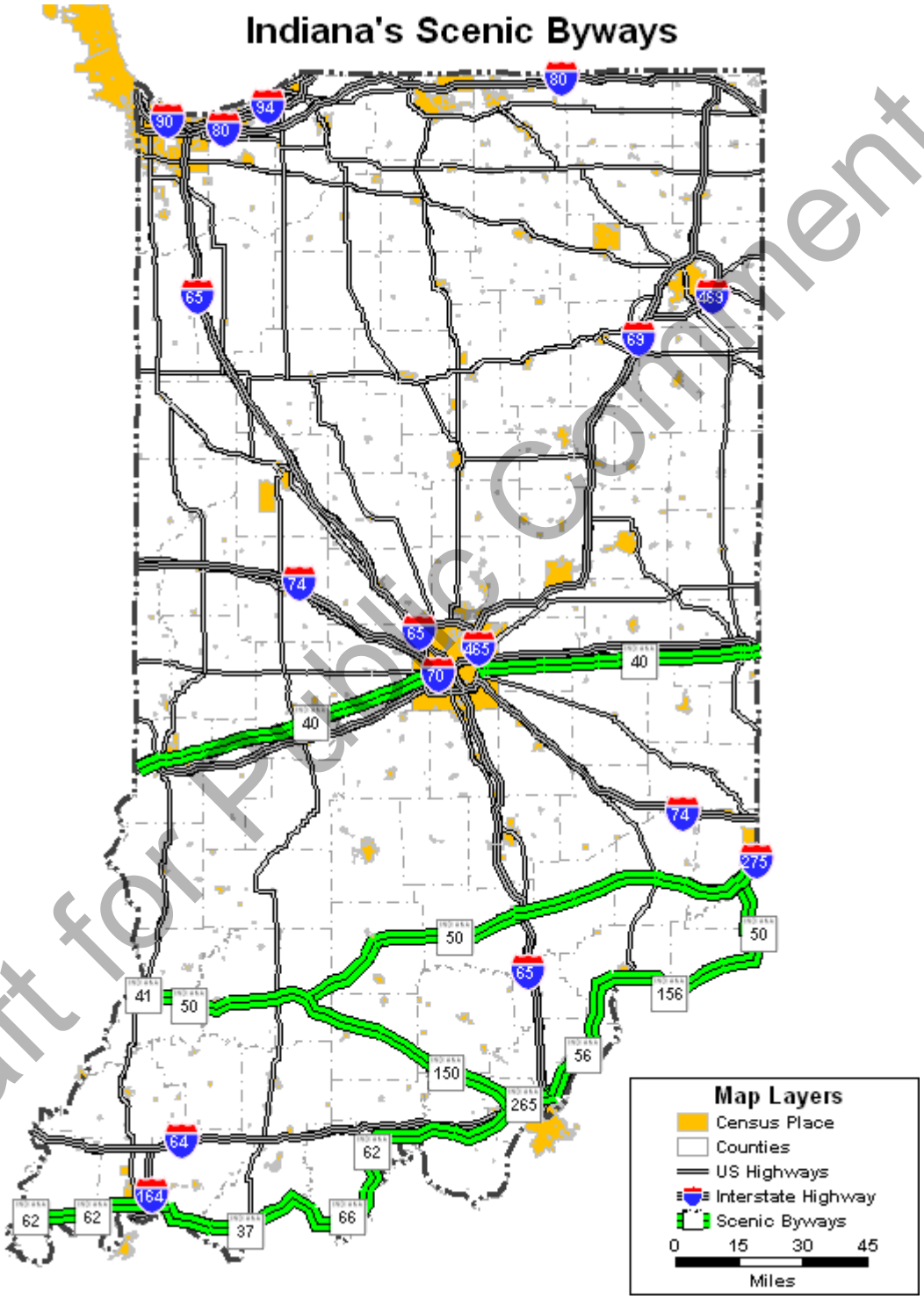

FIGURE C- 7: SCENIC BYWAYS

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Appendix D: The Planning Process

Overview

This chapter provides an outline of the procedures followed in the development of the INDOT 2035 Long Range Transportation Plan. The Indiana Department of Transportation (INDOT) has established guidelines for its planning process both internally, and through its planning partnership with the Metropolitan Planning Organizations (MPOs). These processes are described in detail in the following text.

The responsibility for the production of a long range plan for INDOT lies with the Long Range Transportation Planning Section of Integrated Transportation Planning. This effort relies on data, expertise, and input from a wide range of people within INDOT, Federal Highway Administration (FHWA), MPOs, and others. The core function of the Long Range Transportation Planning Section is to identify and strategically address Indiana's long-term transportation needs. Elements within this function include conducting corridor studies, coordinating the state and metropolitan long range plans, and ultimately, producing an INDOT long range plan. Production of a long range plan is a continuous, cooperative, and comprehensive activity.

All state and local transportation planning is subject to FHWA planning regulations. The most recent set of regulations is derived from the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Public Law 109-69. The INDOT long range planning process is consistent with SAFETEA-LU. The values and goals embedded in Section 135(c) of the Federal planning regulations are expressed through the identification of Statewide Planning Factors. These planning factors are listed below.

- Support economic vitality of the United States, the States and metropolitan areas, and non-metropolitan areas, especially by enabling global competitiveness, productivity and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;
- Increase accessibility and mobility options available to people and for freight;
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

INDOT also follows the National Environmental Policy Act (NEPA) in the development of Indiana's transportation planning process. NEPA sets a vision for how the government should work to incorporate

information on the environmental impact of any Federally funded action is available to public officials and citizens before decisions are made and before actions are taken. Under NEPA, INDOT includes in its planning process environmental, social, as well as economic and technical considerations.

Development of INDOT's Long Range Plan is a continuous process, never truly "completed." The task of updating the Long Range Plan began at the time it was published. Periodically it becomes necessary to provide a formal record of progress and outline a refined long range vision. This document is the latest update of the ever evolving state transportation plan. Other updates will certainly follow over ensuing years.

This planning process is constantly looking for and receiving comments and input from citizens, elected officials and transportation professionals for the next Plan Update. INDOT's Long Range Transportation Planning staff has the responsibility to maintain and update the Long Range Plan. This requires the staff to monitor current transportation conditions and forecast future needs of the State. Useful methods employed by planning staff to understand the needs and concerns of the public and the technical demands of the state's transportation network include public outreach through the INDOT website and public meetings, participation with the INDOT Asset Management teams, corridor studies and the employment of technical planning tools.

Long Range Plan Development Process

The overall statewide transportation planning process is outlined in the following flowchart. The process consists of eight steps, starting with the outreach for public and key transportation stakeholder involvement and ending with the short range programming of specific transportation improvements within the INDOT production schedule. The organization of this transportation plan document reflects the flow of activities outlined in **Figure D-1.**

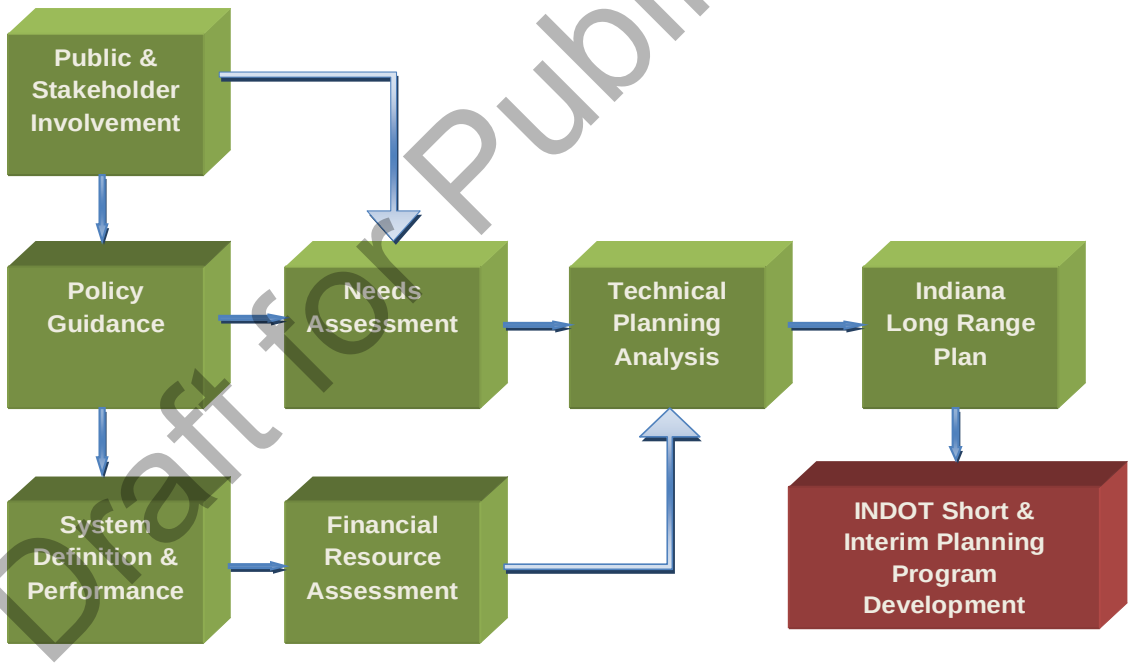

FIGURE D- 1: PLAN DEVELOPMENT PROCESS

Technical Planning Tool Development

In order to develop a statewide long range transportation plan based upon the quantifying of system needs and the prioritization of potential transportation improvements, it was necessary to develop a series of technical planning tools. The Statewide Long Range Multimodal Transportation Plan stated, "INDOT will develop a comprehensive set of planning tools that will allow for system-level analysis of the state transportation system. These tools will include a geographic transportation information system, multimodal travel demand forecasting capabilities, and methodologies to identify the economic impact of transportation investments." Following the adoption of the statewide transportation plan, work began on the development of a comprehensive set of statewide and corridor level planning tools. Technical planning tools developed since then include:

- TransCAD based Statewide Travel Demand Model and Geographic Information System
- Major Corridor Investment Benefit Analysis System (MCIBAS)
- Corridor Travel Demand Analysis
- Benefit/Cost Analysis Framework
- User Benefit Analysis---(NET_BC)
- Economic Impact Modules (Business Attraction, Business Expansion, Tourism)
- REMI Economic Simulation Model
- Highway Economic Requirements System
- INDOT Management Systems (Coordination with pavement, bridge, public transportation, intermodal, congestion and safety management systems)
- Asset Management

The development of the transportation planning tools was initiated in the Intermodal Management System Project. This project provided for the development of a statewide geographic information system (GIS) which could display several modal transportation networks (e.g. highway and rail systems) plus a variety of transportation hubs and intermodal transfer facilities (e.g. airports, inter-city train and bus stations, rail/truck terminals, port facilities). The TransCAD GIS incorporated a routing system that allows the display of highway attribute information (number of lanes, functional classification, and average daily traffic, etc.) from the INDOT highway inventory file. This connection provided for the development of a statewide travel demand model. The Intermodal Management System incorporated a TransCAD based commodity flow model developed by Indiana University for the analysis of statewide freight movements.

Major Corridor Investment Benefit Analysis System (MCIBAS)

The Major Corridor Investment Benefit Analysis System (MCIBAS) provided for the development of an economic analysis tool linked to the statewide travel demand model. The MCIBAS project included the analysis of three Commerce Corridors identified for additional study in the 1995 Statewide Plan. These were:

- US 31 from Indianapolis to South Bend
- The Southwest Indiana Highway from Evansville to Bloomington
- SR 26 / US 35 from I-65 (Lafayette) to I-69

The MCIBAS process uses the statewide travel demand model to measure the direct impacts of a major highway system improvement on existing and future traffic volumes, speeds, and distances. The travel demand model estimates the impacts on the performance of the transportation system in terms of aggregate measures such as vehicle miles of travel and vehicle hours of travel. The travel demand model output is converted into a user benefit/cost analysis of the feasibility of the major corridor improvement by the NET_BC post-processor program. This program converts the travel demand impacts by estimating the dollar value of travel time, travel cost, and safety benefits (reduced accident cost). Estimates of project costs are included to allow the estimation of traditional user benefit/cost.

In addition to the traditional user based benefit/cost analysis process, the statewide plan also recognized the need to account for other, external forms of benefit in terms of the economic development impacts a proposed highway improvement generates due to increasing transportation accessibility. To account for these impacts, the MCIBAS process provides for the economic impact analysis of the economic benefits. These impacts are:

- The expansion of existing businesses in the corridor study area resulting from the improved transportation system (increased accessibility for a larger market area and increased speeds, lowering the cost of delivering goods and services).
- The attraction of new business into the study area due to the higher transportation accessibility and lower business costs derived from an improved transportation system.
- The attraction of increased tourism business due to increased market area and higher accessibility.

The REMI Economic Forecasting and Simulation Model uses the direct economic benefits estimated by the three economic assessments listed above and forecasts the total (direct and secondary) employment, business output, income, and population changes due to the transportation improvements.

The benefit/cost analysis evaluation estimates the net present value of the project. The analysis takes the total disposable income changes forecast by the REMI model, in addition to the total cost and non-business (personal time and safety) benefit data and calculates the benefit/cost ratios for the potential transportation improvements.

Highway Economic Requirements System

The Highway Economics Requirement System is a highway investment/performance computer model that considers engineering and economic concepts and principles in determining the impact of alternative highway investment levels and program structures on highway condition, performance, and user impacts. The statewide analysis for added travel lanes and the relative priority for the additional capacity projects are estimated by the needs analysis program, the HERS. This needs analysis program was developed by the Federal Highway Administration for national analysis using Highway Performance Monitoring System (HPMS) sample data. The HERS program uses a total system analysis which is allowed by the TransCAD GIS and linked to the INDOT road inventory database. In addition, future travel demand forecasts are obtained from the statewide travel demand model for estimating travel growth. The HERS model provides an identification of needed added travel lane projects by economic analysis using a system-wide benefit/cost analysis procedure. Projects are prioritized into improvement phases based upon the forecasted growth of traffic (2010 to 2035) and the resulting benefits generated from implementing potential roadway widening projects. HERS incorporates a project cost estimating routine based upon number of added travel lanes and roadway functional classification.

Coordination with INDOT Management Systems

The development of the TransCAD Geographic Information System and the routing system allows the display of highway attribute information (number of lanes, functional classification, and average daily traffic, etc.) from the INDOT highway inventory file, and provides the basic analysis tool for the INDOT congestion and safety management systems. Common analysis procedures, such as the measurement of highway capacity, are coordinated between the statewide planning and congestion management systems to ensure compatibility. Proposed highway improvements for added travel lanes are evaluated with the proposed pavement rehabilitation projects from the pavement management system to identify opportunities to construct widening improvements at the same time traffic is disrupted by pavement projects.

Asset Management

The concept and the application of Asset Management principles is a relatively new practice that is beginning to be used by many State Departments of Transportation; the process is intended to provide a solid foundation to optimize the performance and cost effectiveness of transportation facilities. This is true for the Indiana Department of Transportation which has recently taken steps to develop and implement a new Asset Management/Capital Program Management process for project selection, ranking and capital program portfolio development. Asset Management is defined by The American Association of State and Highway Officials (AASHTO), as a strategic and systematic process of operating, maintaining, upgrading and expanding physical assets effectively throughout their life-cycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision making based upon quality information and well defined objectives.

In general, Asset Management implementation asks five key questions:

1. What is the current state of the agency's assets?
2. What is level of service/performance will the agency set for the assets?
3. Which assets are critical to sustained performance?
4. What are the best investment strategies for operations, maintenance and capital improvements?
5. What is the best long-term funding strategy to meet the desired future levels of service/performance?

The five core principles of Asset Management are:*

1. **Policy-driven**—Resource allocation decisions are based on a well-defined set of policy goals and objectives.
2. **Performance-based**—Policy objectives are translated into system performance measures that are used for both day-to-day and strategic management.
3. **Analysis of Options and Tradeoffs**—Decisions on how to allocate funds within and across different types of investments (e.g., preventive maintenance versus rehabilitation, pavements versus bridges) are based on an analysis of how different allocations will impact achievement of relevant policy objectives.
4. **Decisions Based on Quality Information**—The merits of different options with respect to an agency's policy goals are evaluated using credible and current data.
5. **Monitoring Provides Clear Accountability and Feedback**—Performance results are monitored and reported for both impacts and effectiveness.

*Adapted from NCHRP Report 551, *Performance Measures and Targets for Transportation Asset Management, Vol. I, Research Report*, 2006, p. ii

The INDOT Asset Management/Capital Program Management process is intended to deliver with reliability and sustainability, a program with maximum value for its customers/citizens. It consists of nine asset management teams:

1. Mobility/Capacity Asset Team
2. Roadway/Pavement Asset Team

3. Bridge Asset Management Team
4. Safety Asset Management Team
5. Other Asset/Statewide Programs Management Team
6. Local Program Asset Management Team
7. Multi-modal Asset Management Team
8. Maintenance Asset Management Team
9. Building Asset and Fleet Management Team

The Asset Management Teams have defined clear and appropriate performance measures to support this new management process. The purpose of which is to aid and support the capacity to make rational, well informed decisions regarding the transportation system's future performance. Each asset management team developed its own set of business rules and the related project scoring factors to be used in the ranking of projects. The scoring factors are intended to capture those attributes that are specific to each team's assets. In general, the goal was to develop a system of 4-8 scoring factors with weights which favor equally between the project need and the solution. Each team is responsible for scoring its current set of projects and the new, proposed projects related to the asset.

The overall vision for the Asset Management/Capital Program Management Process is that all state "Capital" type projects (Roadway, Bridge, Traffic Safety, Mobility, Statewide) would be under one process at the same time. The other core areas will have independent selection process based on what best fits their development / budget cycles (TBD). The other core Asset Management areas Multi-Modal, Maintenance, Buildings and Fleet Management) will have their own independent selection process based on what best fits their development / budget cycles.

The project scores for the five Capital Asset Management Teams (Roadway, Bridge, Traffic Safety, Mobility, Statewide) are then forwarded to the Capital Program Management Team, an oversight committee for review. A statistical analysis is then performed to align all the asset groups into one common scale. Once asset performance goals are determined, each asset manager in Planning will provide a recommendation of a expenditure target per fiscal year based on the asset current performance. Targets will be fiscally constrained. Once targets are established, selecting the highest value projects within each asset class will be the responsibility of the asset team based on the approved business rules.

TEA-21 Statewide Planning Factors

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) required states to develop and periodically update statewide transportation plans. These requirements have been continued to the current Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) as signed into law on August 10, 2005. [23 USC 135(c)] prescribes a series of factors that each state's planning process should consider as well as the identification of basic plan components. This section outlines these factors and provides a discussion of how they are being considered in the Indiana statewide transportation planning process.

1. *Support the economic vitality of the United States, the States, and metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency.*

The INDOT statewide transportation planning process supports the expansion and development of the state's economy. The statewide transportation planning process has developed the Major Corridor Investment Benefit Analysis System

(MCIBAS). The MCIBAS project included the analysis of three Commerce Corridors identified for additional study in the 1995 Statewide Plan. These were: (1) US 31 from Indianapolis to South Bend, (2) The Southwest Indiana Highway from Evansville to Bloomington, and (3) SR 26/US 35 from I-65 (Lafayette) to I-69. The MCIBAS process uses the statewide travel demand model to measure the direct impacts of a major highway system improvement on existing and future traffic volumes, speeds, and distances. In addition to the traditional user based benefit/cost analysis process, the 1995 Statewide Plan also recognized the need to account for other forms of benefit in terms of the economic development impacts a proposed highway improvement generates due to increasing transportation accessibility. To account for these impacts, the MCIBAS process provides for the economic impact analysis of the economic benefits. These impacts are: (1) The expansion of existing businesses in the corridor study area resulting from the improved transportation system (increased accessibility for a larger market area and increased speeds, lowering the cost of delivering goods and services), (2) The attraction of new businesses into the study area due to the higher transportation accessibility and lower business costs derived from an improved transportation system, and (3) The attraction of increased tourism business due to increased market area and higher accessibility. The REMI Economic Forecasting and Simulation Model uses the direct economic benefits estimated by the three economic assessments listed above and forecasts the total (direct and secondary) employment, business output, income, and population changes due to the transportation improvements.

2. Increase the safety of the transportation system for motorized and non-motorized users.

In 2006 Indiana developed the Strategic Highway Safety Plan (SHSP), a comprehensive approach to reducing traffic crash injuries and deaths through coordinated engineering, education, enforcement, and emergency response. Partners in developing the plan included eight state agencies, federal transportation agencies, and traffic safety advocacy groups.

The entire document can be found at: http://www.in.gov/indot/files/shsp.pdf.

Highway infrastructure projects are identified in Indiana's Highway Safety Improvement Program (HSIP). Population of the safety program of infrastructure projects by the INDOT Office of Roadway Safety and Mobility (ORSM) began with a screening of existing projects using safety criteria of INDOT's schedule of State system projects. Projects were excluded if they had a cost over $5-million or if development had completed the "ready for contracts" stage. The projects were then scored upon nine criteria:

a. Safety, based upon nominal safety calculations using a minimum of 3 years of crash history;
b. Congestion, based upon a basic load/carry highway capacity calculation;
c. Standards, based upon compliance with current INDOT design standards;
d. Value, based upon cost effectiveness review by engineering staff;
e. Road Class, based upon route system classification;
f. INDOT district preference, based upon engineering judgment;
g. Public interest, based upon support from State or local elected officials and the public;
h. System coordination, based upon the projects relation to other projects;
i. Project development stage, based upon how close to completion the project is in development.

This analysis established INDOT's first HSIP, providing an initial schedule of highway safety improvement projects for hazard correction or prevention for funding under 23 U.S.C. § 148. The schedule of projects is to be updated annually, with every new candidate project receiving screening, evaluation, and analysis before inclusion in the schedule. For candidate projects proposed after the approval of the SHSP, the ninth criteria will be changed to "Strategic priority, based upon if a project specifically addresses or contributes to a SHSP emphasis area strategy."

Fundamental to the long-term success of the SHSP, the core disciplines of the 4Es need the support of three additional Es, Exemplary Leaders, Effective Laws, and Evaluation. To that end, each strategy development team will report quarterly to their respective discipline team leader with a summary of the activities and progress in carrying out the strategy. The discipline team leaders and working group champion will prepare a progress report for the executive Safety Leadership Team twice a year with an evaluation and update on strategies.

3. Increase the security of the transportation system for motorized and non-motorized users.

In 2005 the Indiana Department of Homeland Security (IDHS) was created by consolidating the state's emergency management and homeland security efforts into one department. In early 2006 the IDHS released Indiana Strategy for Homeland Security, a document outlining efforts to assess, plan, implement, evaluate, and refine strategies to address potential threats to our security. The Indiana Department of Transportation is a stakeholder and planning partner in this effort and continues to work with IDHS in the Vision, Mission, and Strategies outlined in the 2006 report. A complete copy of the document is available on the IDHS website at http://www.in.gov/dhs/strategic_plan.pdf. The Indiana Strategy for Homeland Security has the following strategic goals:

- Teamwork – Enhance coordination between homeland security partners and integrate all disciplines.
- Planning and Risk Analysis – Develop requirements-based and capabilities-based, statewide, and comprehensive plans to address natural and man-made hazards.
- Protect – Reduce the risk to Indiana's critical infrastructure.
- Outreach and Engagement – Engage and educate the public and media on homeland security issues.
- Training and Exercise – Establish world-class training and exercise facilities, curriculum and networks.
- Response – Promote and optimize coordination of disaster responses.
- Medical – Establish an effective disaster medical capability.
- Economic Security – Promote economic security through partnerships and the development of homeland security innovations.

Security is also addressed in each of the transportation modes, as described in Chapter 4, Multimodal Coordination.

4. Increase the accessibility and mobility options available to people and freight.

The statewide planning process considers the long range needs of the state transportation system in terms of increasing the accessibility and mobility options available to people and for freight. The policy planning elements making up the Statewide Plan identify the development of modal and intermodal strategies to increase mobility options for people and freight movements. The Intermodal Management System provides for the development of a multimodal transportation system. The efficient movement of commercial vehicles is an underlying consideration in the normal selection and development process for highway transportation improvements. Project design data in the form of the amount and composition of truck traffic is typically considered in the project development process. In addition to these typical procedures that enhance commercial vehicle movement, INDOT has conducted research studies on the identification of commodity flows typically carried by commercial vehicles. The Commodity Flow Model Study conducted by the Indiana University Transportation Research Study has assigned the volume of specific commodity movements to a statewide network of highway facilities. Commercial vehicle flows were obtained by applying a model which allocates commodity flows by weight into number of commercial vehicles. The resulting commercial vehicle trips are then used in the statewide travel demand model to estimate truck trips. This information was used to refine the statewide mobility corridor network.

5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.

The overall social, economic and environmental effects of transportation investment decisions are considered by the Indiana Department of Transportation in accordance with the National Environmental Policy Act (NEPA) guidelines. INDOT in cooperation with FHWA has developed an Environmental Streamlining Procedure which provides for planning studies at the corridor level to be conducted as environmental assessments under the NEPA process. It is anticipated that the environmental streamlining process will reduce a project's development time by avoiding potential duplication of planning studies being redone under NEPA procedures. Planning tools currently under development by INDOT, coupled with

management systems information, will provide an opportunity to measure the effects of investment decisions on a larger scale for long range multimodal systems planning and development programs. INDOT will also continue to work closely with the Indiana Department of Environmental Management, the Indiana Department of Natural Resources and other government agencies in the development of long range transportation plans and projects.

6. *Enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight.*

The statewide transportation planning process explicitly considers the connectivity between metropolitan planning areas both within the state and in adjacent states. The connectivity between metropolitan planning areas is a central element of the highway classification effort for the state mobility corridors and builds upon the functional system reclassification work and identification of routes for the National Highway System. Multimodal planning connectivity between metropolitan planning areas has been addressed in the modal transportation system plans and in the Indiana Department of Transportation's Intermodal Management System. The identification of major intermodal facilities of both national and statewide significance was conducted in conjunction with the identification of intermodal connector routes. This effort provided Indiana's component for the development of the NHS Intermodal connectors.

7. *Promote efficient system management and operation.*

INDOT is continuing the development of management programs intended to maximize the efficient use of the existing transportation system. The major elements in these four systems analysis and planning work are:

a. Pavement Management System;
b. Bridge Management System;
c. Congestion Management System;
d. Safety Management System.

The four management systems supported by INDOT's Office of Systems Analysis and Planning identifies projects and programs to increase the efficient use of existing transportation facilities. Highway projects, transit projects and associated programs are programmed for implementation in the Indiana Statewide Transportation Improvement Program.

8. *Emphasize the preservation of the existing transportation system.*

INDOT places a high priority on the preservation of its existing transportation system as demonstrated by the investment of resources in preservation activities. System preservation strategies will be developed, implemented and evaluated through the: (1) Pavement Management System, (2) Bridge Management System, (3) Congestion Management System and (4) Safety Management System. A high priority has been placed on the coordination of preservation improvements with expansion improvements to minimize the delay to the traveling public.

In addition, INDOT considers the transportation needs of non-metropolitan areas (areas outside of Metropolitan Planning Organization planning boundaries) through a process that includes consultation with local elected officials with jurisdiction over transportation. The Indiana Department of Transportation is responsible for transportation planning outside of the state's Metropolitan Planning Areas according to Federal regulations. The INDOT District Offices have the lead role for conducting transportation planning in rural areas. This process includes frequent contacts and consultation with local officials. To facilitate the state's partnership process, a series of district public involvement meetings are held annually to ensure full participation of local elected officials, interest groups, and the general public in the project and development process.

Metropolitan Planning Organization (MPO) Planning

Metropolitan Planning Organizations (MPOs) play a vital role in the planning and development of transportation projects and services throughout the urbanized areas of Indiana. Together with the INDOT District Offices, they serve as primary sources of local input and as fundamental cooperating partners in the multimodal planning and program implementation process.

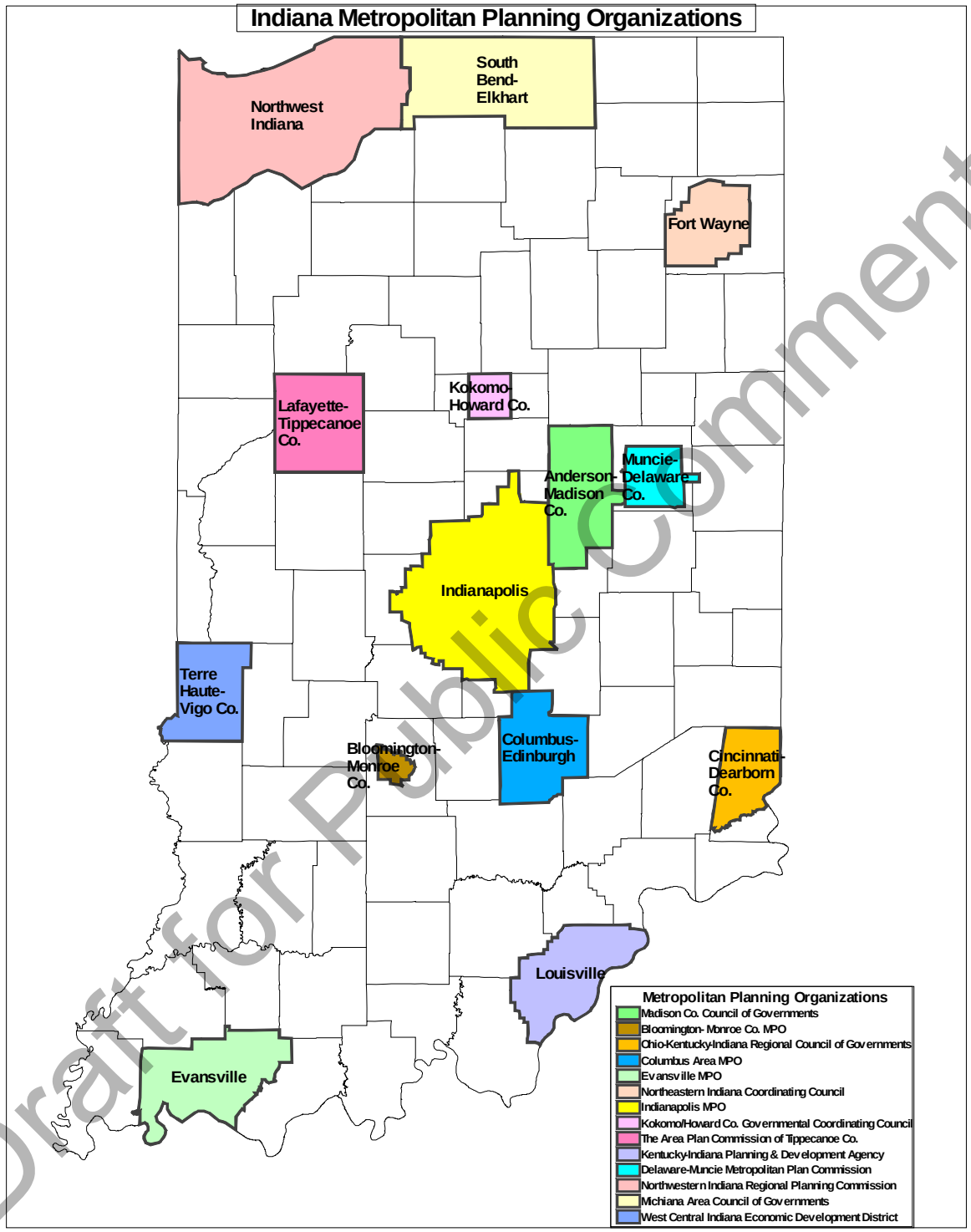

FIGURE D- 2: METROPOLITAN PLANNING ORGANIZATIONS

Indiana's Metropolitan Planning Organizations have jurisdictional responsibility for transportation planning in fourteen urbanized areas. Urbanized areas are defined by the U.S. Bureau of the Census as centers with populations equal to or greater than 50,000 people. By virtue of their function as major economic centers of the state, a great deal of Indiana's transportation activity occurs in and around these urbanized areas.

Anderson Urbanized Area

The Anderson metropolitan planning area (MPA) encompasses all of Madison County and includes the Town of Daleville in Delaware County. The Madison County Council of Governments (MCCOG) is the designated Metropolitan Planning Organization for transportation planning in the urbanized area. The organization is governed by the twelve-member Madison County Council of Governments Policy Committee that acts as the official MPO and represents the Cities of Anderson, Elwood and Alexandria, and the Town of Pendleton. The MPO Technical Advisory Committee makes recommendations to the Policy Committee and provides the necessary technical input to shape policies into practical actions. MCCOG formally adopted its current 2030 transportation plan in 2005.

Bloomington Urbanized Area

The City of Bloomington Planning Department initiated an area-wide Long Range Transportation and Land Use Study in 1978 in anticipation of the fact that the population of the Bloomington Urbanized Area would exceed 50,000 persons with the 1980 Census. The Bloomington Area Transportation Study (BATS) was formed to coordinate the study, and in 1982 became the designated Metropolitan Planning Organization. This process culminated in June 1984 with the completion of the Year 2000 Staging Program, and Policy Committee adoption of the collective study products as the area's long range transportation plan. The metropolitan planning area covers central Monroe County. BATS formally adopted its 2030 transportation plan in 2005.

Columbus Urbanized Area

One of Indiana's newest metropolitan areas resulting from the 2000 census, the Columbus Area Metropolitan Planning Organization (CAMPO) was designated in 2004. It encompasses all of Bartholomew County and the Town of Edinburgh in Johnson County. CAMPO formally adopted its 2030 transportation plan in 2005.

Evansville Urbanized Area

The Evansville Metropolitan Planning Organization (EMPO) was created in October 1969 as the Evansville Urban Transportation Study (EUTS), the planning agency responsible for conducting the 3-C planning process within the Evansville urbanized area. Until its dissolution in 1985, EUTS had been associated with the Southwest Indiana Kentucky Regional Council of Governments (SWIKRCOG). After SWIKRCOG dissolved, EUTS continued on as an independent transportation planning agency and was designated as the MPO for the Evansville urbanized area in 1986. On April 6, 2006, EUTS formally changed its name to the Evansville Metropolitan Planning Organization (EMPO) and the organization became an independent, stand-alone agency. The EMPO Metropolitan Planning Area consists of

Henderson County, in Kentucky; Vanderburgh, Warrick and a small section of eastern Posey Counties in Indiana. The EMPO updated twenty-five year Long Range Transportation Plan which extends the planning horizon out to the year 2030 was formally adopted by its Policy Committee in December of 2003. EMPO intends to update its plan to a 2035 planning horizon and meet the requirements of the new SAFETEA-LU by June 30, 2007.

Vanderburgh County and a small portion of Warrick County had been formerly designated as a "marginal" non-attainment area under the EPA's 1-hour ozone standard and have since been re-designated as an "attainment" area subject to the 1-hour ozone maintenance requirements. Effective June 15, 2005, The EPA established new, 8-hour standards, effectively replacing the former 1-hour ozone standard. Vanderburgh and Warrick Counties had originally been designated by the EPA as non-attainment areas under that new 8-hour ozone standard but that designation has since been upgraded to a maintenance area for the 8-hour ozone standard.

Vanderburgh, Warrick, and Dubois Counties, and certain identified townships within Gibson, Spencer, and Pike Counties were designated as non-attainment by the EPA for the PM 2.5 (particulate matter) standard. The term "donut area" refers to an area surrounding an urbanized area. While the area remains rural, its proximity to the non-attaining urban area warrants its inclusion into the non-attainment areas. EMPO has published a draft conformity finding for its 2035 Long Range Plan update and in consultation and coordination with INDOT, for the donut counties and townships adjacent to the EMPO metropolitan planning area.

Fort Wayne Urbanized Area

The Fort Wayne metropolitan planning area occupies nearly all of western and central Allen County. The Northeastern Indiana Regional Coordinating Council (NIRCC) is the designated Metropolitan Planning Organization for transportation planning in the cities of Fort Wayne and New Haven, the towns of Grabill and Huntertown, and much of unincorporated Allen County. NIRCC is also designated to perform general purpose regional planning for Adams, Allen, DeKalb and Wells counties. The Urban Transportation Advisory Board (UTAB) was established to advise NIRCC on matters of policy and to act as the urbanized area Policy Committee. The Transportation Technical Committee and Transit Planning Committee make recommendations to the UTAB and provide the necessary technical input required to shape policies into practical actions. NIRCC formally adopted its 2030 transportation plan in 2005.

Indianapolis Urbanized Area

The Department of Metropolitan Development, Division of Planning of the City of Indianapolis is the designated Metropolitan Planning Organization for the Indianapolis urbanized area. Their area includes Marion County and the urbanized portions of Boone, Hamilton, Hancock, Hendricks, Johnson, and Morgan counties. The MPO serves the cities of Beech Grove, Carmel, Greenwood, Indianapolis, Lawrence, and Southport. It also serves the towns of Avon, Brownsburg, Cumberland, Fishers, New Whiteland, Plainfield, Speedway, Westfield, Whiteland and Zionsville. The Metropolitan Development Commission serves as the policy body of the MPO. The Indianapolis Regional Transportation Council (IRTC) acts as the advisory forum to the MPO.

The Indianapolis area was designated as a "marginal" ozone non-attainment area by the U.S. Environmental Protection Agency (EPA). The area has been redesignated as being in attainment for ozone and received official approval of that request in December 1994 and as such, is currently a

maintenance area for ozone. The product of the Indianapolis long range transportation plan update is the regional transportation plan. The Indianapolis 2030 plan update was formally adopted by the Indianapolis Metropolitan Development Commission (MDC) on June 1, 2005.

Kokomo-Howard County Urbanized Area

The Kokomo-Howard County Governmental Coordinating Council (KHCGCC) was established in 1981 and designated the Metropolitan Planning Organization for the Kokomo Urbanized Area in March 1982. The planning area covers central Howard County. Kokomo has met air quality requirements set forth by the U.S. Environmental Protection Agency. In 2005, KHCGCC formally adopted a revised transportation plan that extends to the year 2030.

Lafayette Urbanized Area

The Tippecanoe County Area Plan Commission (TCAPC) is the designated Metropolitan Planning Organization for the cities of Lafayette and West Lafayette, the towns of Battle Ground and Dayton, and the majority of Tippecanoe County. The Area Plan Commission conducts a wide range of transportation planning studies for Tippecanoe County including the long range transportation plan, corridor studies, traffic studies, transportation systems management, and the Transportation Improvement Program. The TCAPC completed and adopted its 2030 Long Range Transportation Plan in 2006.

Louisville Urbanized Area

The Kentuckiana Regional Planning and Development Agency (KIPDA) is the designated Metropolitan Planning Organization for the Louisville urbanized area. The metropolitan planning area covers the bi-state Louisville area, including Clark and Floyd counties in Indiana. The KIPDA long range transportation plan, known as Regional Mobility, is intended to serve as a tool for planning and implementing a transportation system which responds to the mobility needs of the community, produces proactive programs, enhances the quality of life of the area, and demonstrates compliance with the federal regulations and mandates under which this plan was developed. Regional Mobility was published and adopted in the fall of 1993. Clark and Floyd counties have been designated as a “moderate” ozone non-attainment area by the U.S. Environmental Protection Agency. KIPDA adopted a 2030 transportation plan in 2005.

Muncie Urbanized Area

The Muncie metropolitan planning area is located in central Delaware County. The Delaware-Muncie Metropolitan Plan Commission (DMMPC) is the designated Metropolitan Planning Organization for transportation planning in the area. The Administrative Committee, whose membership includes decision-makers from the City of Muncie, the towns of Selma and Yorktown, and Delaware County, formulates local transportation policies as the Policy Committee. The Technical Advisory Committee makes recommendations to the Administrative Committee and provides the necessary technical input to shape policies into practical actions. DMMPC formally adopted its 2030 transportation plan in 2005.

Northwest Indiana Urbanized Area

The Northwestern Indiana Regional Planning Commission (NIRPC) is one of two MPOs serving the Chicago urbanized area. The other is the Chicago Area Transportation Study (CATS). In 1966, the Lake-Porter County Regional Transportation and Planning Commission was formed for the purpose of

conducting a regional transportation planning process in the two counties in response to a new federal initiative. Its creation was the result of 1965 State enabling legislation that allowed for the formation of such Commissions. The State Legislation was amended in 1971 to provide for expansion of the Commission into other counties, and in 1973 to expand the membership. The name was changed to the Northwestern Indiana Regional Planning Commission (NIRPC) in 1973 and Metropolitan Planning Organization designation was received in 1975. LaPorte County was formally added into the MPO planning boundary in 1994. NIRPC also staffs the Little Calumet River Basin Development Commission, the Kankakee River Basin Commission and the Marina Development Commission. The NIRPC urbanized area has been designated as a "severe" ozone non-attainment area by the U.S. Environmental Protection Agency. NIRPC has a 2030 transportation plan that was adopted in 2005.

Ohio Kentucky Indiana Regional Council of Governments (OKI)

The Ohio-Kentucky-Indiana Regional Council of Governments (OKI) makes up the Cincinnati metropolitan area which encompasses eight counties within the tri-state region. Dearborn County, Indiana, and its cities of Lawrenceburg, Aurora and Greendale are included OKI's metropolitan planning area. The OKI 2030 Long Range Transportation Plan was adopted in 2004.

South Bend and Elkhart Urbanized Areas

The Michiana Area Council of Governments (MACOG) and the Southwestern Michigan Commission (SMC) are the regional agencies conducting transportation planning activities in the Michiana area. MACOG is the designated Metropolitan Planning Organization responsible for the Indiana portion of the South Bend and Elkhart Urbanized Areas while the SMC provides technical and planning assistance to the Michigan portion of the South Bend Urbanized Area. A Bi-State Coordination committee serves to unify the planning efforts of the MACOG and the SMC. MACOG serves as the office of record for the Bi-State organization. The area was designated as a "marginal" ozone non-attainment area by the U.S. Environmental Protection Agency (EPA). The area has since been redesignated as in attainment for ozone and as such, is currently a maintenance area for ozone. MACOG has a 2030 transportation plan which was adopted in 2005.

Terre Haute Urbanized Area

The West Central Indiana Economic Development District (WCIEDD) is the Metropolitan Planning Organization for the metropolitan planning area covering Vigo County. The WCIEDD is also responsible for economic development and senior citizen programs in Clay, Parke, Putnam, Sullivan, Vermillion and Vigo Counties. The WCIEDD conducts a wide range of transportation planning studies for the urbanized area and Vigo County including a long range transportation plan, corridor studies, traffic studies, transit planning, transportation systems management development, and the Transportation Improvement Program. WCIEDD formally adopted its 2030 transportation plan in 2005.

Small Urban and Rural Planning Program

In 2001, the Indiana Department of Transportation initiated the Small Urban and Rural Transportation Planning Program to serve the transportation planning needs of small urban and rural areas of the state. The program provided transportation planning funds in the form of a matching grant to regional planning organizations (RPOs) and MPOs that also represent small urban and rural areas of the state. Nine agencies, five RPOs and four MPOs, were awarded grants under this program in 2001. By 2004, the program had grown to eleven agencies, seven RPOs and four MPOs.

Regional Planning Organizations

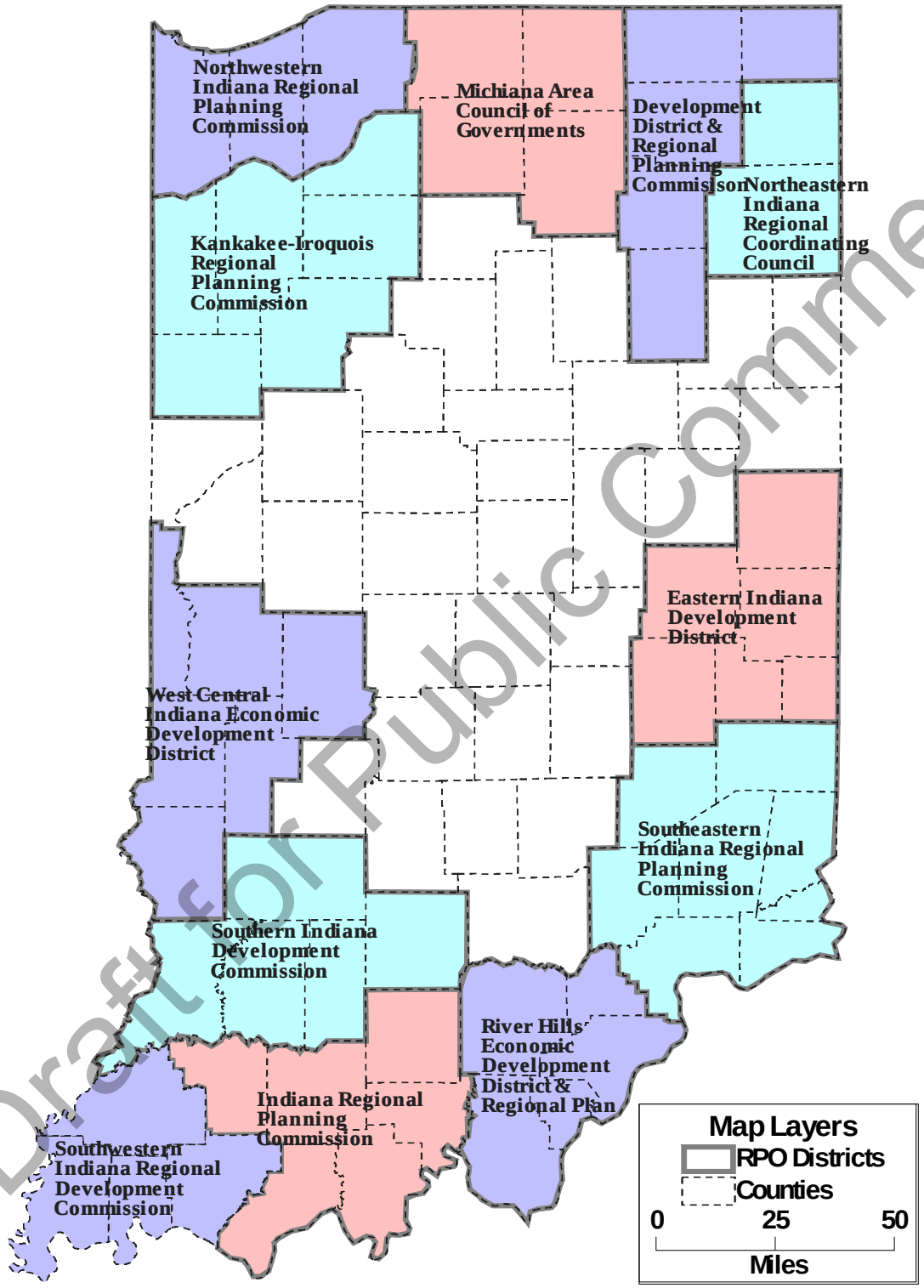

FIGURE D- 3: REGIONAL PLANNING ORGANIZATIONS

In 2005, the RPO program was re-engineered to improve accountability and effectiveness. Each agency would have a uniform basic work program. This program would consist of collecting HPMS sample data including traffic counts, implementing a regional traffic counting program on non-state jurisdictional roadways, creating a railroad crossing inventory, and providing planning support to INDOT Central and District Offices. Agencies would also be able to perform other eligible planning activities in order to provide planning support to local communities.

Kankakee-Iroquois Regional Planning Commission

The Kankakee-Iroquois Regional Planning Commission serves Benton, Jasper, Newton, Pulaski, Starke and White Counties.

Michiana Area Council of Governments

The Michiana Area Council of Governments (MACOG) is an MPO that serves Elkhart, Marshall, Kosciusko and St. Joseph Counties. In addition to the basic work program, MACOG will develop a travel-demand model for Kosciusko County, assist local officials in coordinating with INDOT, and update the state functional classification system in Marshall and Kosciusko Counties.

Northeastern Indiana Regional Coordinating Council

The Northeastern Indiana Regional Coordinating Council (NIRCC) is an MPO that also serves Adams, Allen, DeKalb and Wells Counties. In addition to the basic work program, NIRCC will update the DeKalb County Transportation Plan and maintain the regional bicycle and pedestrian plan.

Southeastern Indiana Regional Planning Commission

The Southeastern Indiana Regional Planning Commission (SIRPC) serves Dearborn, Decatur, Franklin, Jefferson, Jennings, Ohio, Ripley and Switzerland Counties.

Southern Indiana Development Commission

The Southern Indiana Development Commission (SIDC) serves Daviess, Greene, Knox, Lawrence and Martin Counties. Additionally, SIDC will also provide traffic counting support to local communities upon request

River Hills Economic Development District and Regional Planning Commission

The River Hills Economic Development District and Regional Planning Commission serves Harrison, Scott and Washington Counties. Clark and Floyd Counties are in the district but they are served by the Louisville, Kentucky MPO. Additionally, River Hills will also provide traffic counting support to local communities upon request

Indiana 15 Regional Planning Commission

The Indiana 15 Regional Planning Commission serves Crawford, Dubois, Orange, Perry, Pike and Spencer Counties. In addition to the basic work program, Indiana 15 will develop a county-wide road map for Perry County

Evansville Metropolitan Planning Organization

The Evansville Metropolitan Planning Organization (EMPO) is the MPO for the Evansville Urbanized Area. It also provides services to Gibson, Posey, Vanderburgh and Warrick Counties. Additionally, EMPO will provide planning support to local officials upon request.

Region 3A Development District and Regional Planning Commission

The Region 3A Development District and Regional Planning Commission represents Huntington, LaGrange, Noble, Steuben and Whitley Counties. In addition to the basic work program, Region 3A will conduct bike/pedestrian planning, perform a regional transportation needs assessment, and conduct corridor studies on SR-8, SR-14, and US-33.

Eastern Indiana Development Commission

The Eastern Indiana Development District (EIDD) serves Fayette, Franklin, Rush, Union and Wayne Counties.

West Central Indiana Economic Development District

The West Central Indiana Economic Development District (WCIEDD) in addition to being the MPO for Terre Haute also serves Clay, Parke, Putnam, Sullivan, Vermillion, and Vigo Counties.

Madison County Council of Governments

The Madison County Council of Governments (MCCOG) is the MPO which serves the Anderson Metropolitan Area including the cities of Alexandria and Elwood and the town of Pendleton.

Planning Unit Geographic Boundaries

Figure D-2 displays the regional boundaries for Indiana's MPOs and active Regional Planning Organizations are shown in **Figure D-3**. At present, six regions in the State have inactive Regional Planning Commissions. The three Indiana counties surrounding the Evansville Metropolitan Planning Organization's (EMPO's) urbanized area, while a part of an active Regional Planning Commission, currently receive some rural transportation planning services from EUTS under the Small Urban and Rural Planning Program.

Summary

The production of a statewide long range plan involves much data, expertise, and input from a wide range of people within the Department of Transportation and the Federal Highway Administration. In addition, the PDP provides a set of procedures for project development in the INDOT state highway jurisdictional system, MPO's provide local input for planning in urban areas, and district field offices play a critical role in identifying transportation needs within their areas. Moreover, several technical planning tools are vital to the development of the Long Range Plan. The Indiana Department of Transportation's Long Range Transportation Planning Section coordinates this effort which is a continuous, cooperative, and comprehensive activity.

Appendix E: Corridor Studies

Overview

The statewide transportation plan provides an integrated planning process starting with an outreach program for public and transportation stakeholder involvement and the development of policy guidance. These activities flow into the systems-level planning activities which provide for the evaluation of system performance, the identification of deficiencies and needs, and the sizing of potential improvement concepts relative to the assessment of financial resources and plan development objectives. The key element in making the transition from the systems-level planning activities to the project development/programming process is the corridor planning process. This chapter outlines the corridor planning studies undertaken and anticipated to be conducted by INDOT as part of the statewide plan development process.

Major Corridor Studies

In 1991, the Indiana General Assembly passed legislation that directed INDOT to establish "commerce corridors" in the state. These corridors were defined as, "…that part of a recognized system of highways that: (1) directly facilitates intrastate, interstate, or international commerce and travel; (2) enhances economic vitality and international competitiveness; or (3) provides service to all parts of Indiana and the United States."

This effort resulted in three major corridor studies: US 31 from Indianapolis to South Bend, SR 26/US 35 from Lafayette to Fort Wayne, and the Southwest Indiana Highway from Evansville to Indianapolis.

The Commerce Corridor Concept was incorporated into the Statewide Mobility Corridor System during a previous plan update.

US 31 – INDIANAPOLIS TO SOUTH BEND

The US 31 study was completed in 1998 to evaluate the costs and benefits, including the economic development impacts, associated with an improved inter-city highway facility. The US 31 corridor extends from I-465 at Indianapolis to US 20 at South Bend, a distance of 122 miles. US 31 is a four-lane divided highway with varying degrees of access control depending on the roadway location. Concentrations of traffic signals and access points reduce the carrying capacity of the roadway in Hamilton County and in Kokomo in Howard County. Traffic forecasts projected an increase in vehicle miles of travel carried by US 31 by 60% by the year 2020 with average speed dropping by 9% if no improvements are made.

US 31 Tolling Feasibility Study

The Indiana General Assembly mandated the Indiana Transportation Finance Authority to conduct a study of the need for and feasibility of constructing a new toll road from Indianapolis to South Bend. The study was completed in 1999 and it concluded that anticipated toll revenues would not be sufficient to pay the costs of the project.

US 31 Improvement Concept

The economic evaluation found the freeway upgrade would increase the market area for businesses along the US 31 corridor and improve travel conditions thereby lowering the cost of transportation. The overall US 31 freeway upgrade project was found to have discounted benefits of $2.9 billion and costs of $0.9 billion resulting in a net benefit of $2.0 billion. Three segments were identified for more detailed Environmental Studies. These segments were Hamilton County, Kokomo/Howard County, and Plymouth to South Bend. The individual Major Investment Studies and environmental phase have been completed and each section has entered the construction phase of development.

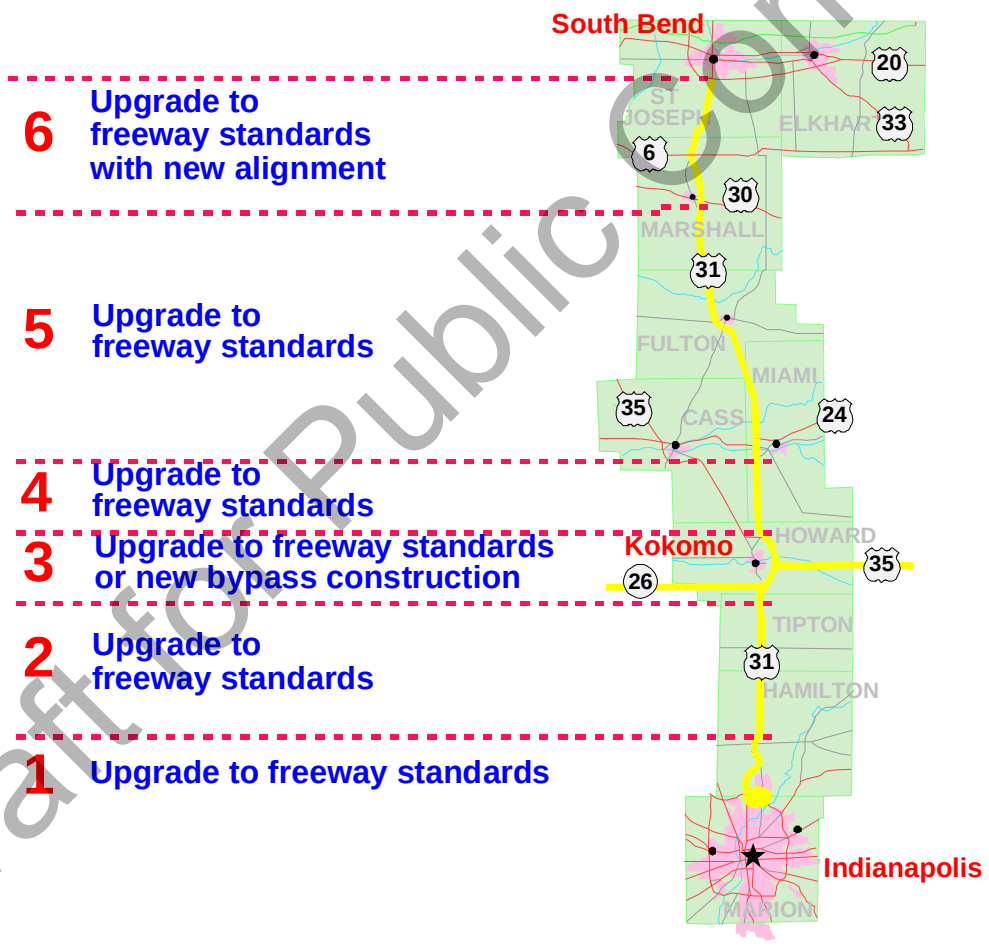

FIGURE E- 1:US 31 CORRIDOR IMPROVEMENT

US 31 Hamilton County Environmental Impact Statement (EIS)

The EIS for the US 31 corridor from Interstate 465 to SR 38 in Southern Hamilton County in the Carmel and Westfield areas is nearing completion. The Draft EIS was published in June 2003. The Final EIS was completed in 2008. Construction will begin by 2011.

US 31 Kokomo/Howard County Environmental Impact Statement (EIS)

This US 31 EIS in the Kokomo / Howard County area began in early 2002. The Draft EIS was published in early 2005. The FEIS was published in March, 2007. FHWA published a Record of Decision in May 2007. The project construction phase will begin in 2010.

US 31 Plymouth to South Bend Environmental Impact Statement (EIS)

This US 31 study from US 30 at Plymouth to US 20 at South Bend began in late 2001. The Draft EIS was published in February 2004, and named Alternative G-E as the preferred alternative. The FEIS was published in April 2006. FHWA published a Record of Decision in July 2006. Project construction started in 2009.

I-69 – EVANSVILLE TO INDIANAPOLIS

Since the 1940s the Indiana Department of Transportation (INDOT) and its predecessor agencies considered an improved highway between Evansville and Indianapolis. Although the idea wasn't fully developed then, the idea continued to receive attention until the early 1990s. At that time, Congress selected an Evansville to Indianapolis highway as part of a national high priority transportation corridor, designated as Corridor 18 in the Intermodal Surface Transportation Efficiency Act of 1991 (known as ISTEA). By the late 1990s, Congress further determined that Corridor 18 would be a part of a national interstate highway project, I-69, which would improve connections between Canada, Mexico and the United States.

Southwest Indiana Highway – Evansville to Bloomington DEIS

An important element of this study from I-64/164 at Evansville to SR 37 at Bloomington was an analysis of the economic impacts of the proposed improvement. While the traditional user benefits and costs were studied, an additional macroeconomic analysis took place as part of this study. This economic analysis included identification of benefits related to business expansion, business attraction, and tourism generated by the proposed improvement. The analysis indicated that the highway would enhance the attractiveness of Southwest Indiana for businesses looking for new locations, increase business expansions, and make the region more attractive to tourists by improving access to existing tourist attractions. This study was completed in 1996 but was superseded by the I-69 EIS.

I-69 Evansville to Indianapolis EIS Tier I

In late 1999, a Tier 1 Environmental Impact Study (EIS) was initiated for the Evansville to Indianapolis portion of I-69. This EIS looked at a wide range of possible highway corridors to link Evansville and Indianapolis. At the outset of this EIS, the Purpose and Need for I-69 between Evansville and Indianapolis was determined, and was based upon both Federal and State policies, as well as a comprehensive needs analysis using state-of-the-practice technical tools. Nine project goals for I-69 were developed that fall under the following three categories:

- Strengthen the transportation network in Southwest Indiana;
- Support economic development in Southwest Indiana; and,
- Complete the portion of the National I-69 project between Evansville and Indianapolis.

Fourteen route concepts were initially analyzed and nine were eliminated for consideration. The remaining five alternatives underwent additional analysis. In December of 2003, a Final Environmental Impact

Statement (FEIS) for I-69 was issued. The FEIS responded to the comments made on the Draft Environmental Impact Statement (DEIS), and added considerable information to that presented in the DEIS. The FEIS recommended Alternative 3C as the preferred corridor for I-69. The Federal Highway Administration selected Alternative 3C for I-69 in its Record of Decision (ROD) dated March 24, 2004. The ROD paved the way for the initiation of Tier 2 studies for I-69.

After the ROD was issued, INDOT began the current I-69 Evansville to Indianapolis Tier 2 Studies. In a continued effort to include the pubic in the transportation decision-making process, INDOT has divided the approved corridor into six sections, which are between 13 and 29 miles long. The corridor is 2,000 feet wide, and each of the six Tier II section study teams will determine the final alignment of the approximately 350-foot wide highway within the approved corridor.

I-69 Evansville to Indianapolis EIS Tier II

On March 24, 2004, the Federal Highway Administration issued a Record of Decision (ROD) approving a corridor for I-69 between Evansville and Indianapolis for the I-69 Evansville to Indianapolis Tier I Study. This corridor, designated as Alternative 3C in the Tier I Environmental Impact Statement (EIS) for I-69, is generally 2000 feet in width, although it is wider or narrower in some places.

FHWA and INDOT are now preparing six separate Tier II EISs for I-69 between Evansville and Indianapolis. The Tier II EISs will determine the alignment, interchange locations and design characteristics of I-69 within the selected corridor, as well as develop more detailed mitigation measures. Based on the Tier I studies, it is anticipated that the actual right-of-way needed for I-69 will be between 240 and 470 feet wide, as compared with the 2000 foot width for the corridor.

Each of the six Tier II EISs will examine a section of the selected corridor. The Tier II sections range in length from 13 to 29 miles. The termini for the Tier II sections were described in the Tier I EIS and were approved by FHWA in the Tier I ROD. These termini are:

- Section 1 from I-64 (near Evansville) via the SR 57 corridor to SR 64 (near Princeton/Oakland City) ROD was published December 12, 2007.
- Section 2 from SR 64 (near Princeton/Oakland City) via the SR 57 corridor to US 50 (near Washington). Final Environmental Impact Statement was issued February 25, 2010.
- Section 3 from US 50 (near Washington) via the SR 57 corridor and cross country to US 231 (near Crane Naval Surface Warfare Center). ROD was published January, 2010
- Section 4 from US 231 (near Crane Naval Surface Warfare Center) via cross country to the intersection of Victor Pike Road and State Road 37 (south of Bloomington). Draft Final Environmental Impact Statement is expected by fall of 2010 and FEIS by 2011.
- Section 5 from State Road 37 just north of the intersection of Victor Pike Road (south of Bloomington) via State Road 37 to State Road 39 (Martinsville). Study is ongoing.
- Section 6 from State Road 39 (Martinsville) via State Road 37 to I-465 (Indianapolis). Study is ongoing.

A map of the individual sections can be found in **Figure E-2**.

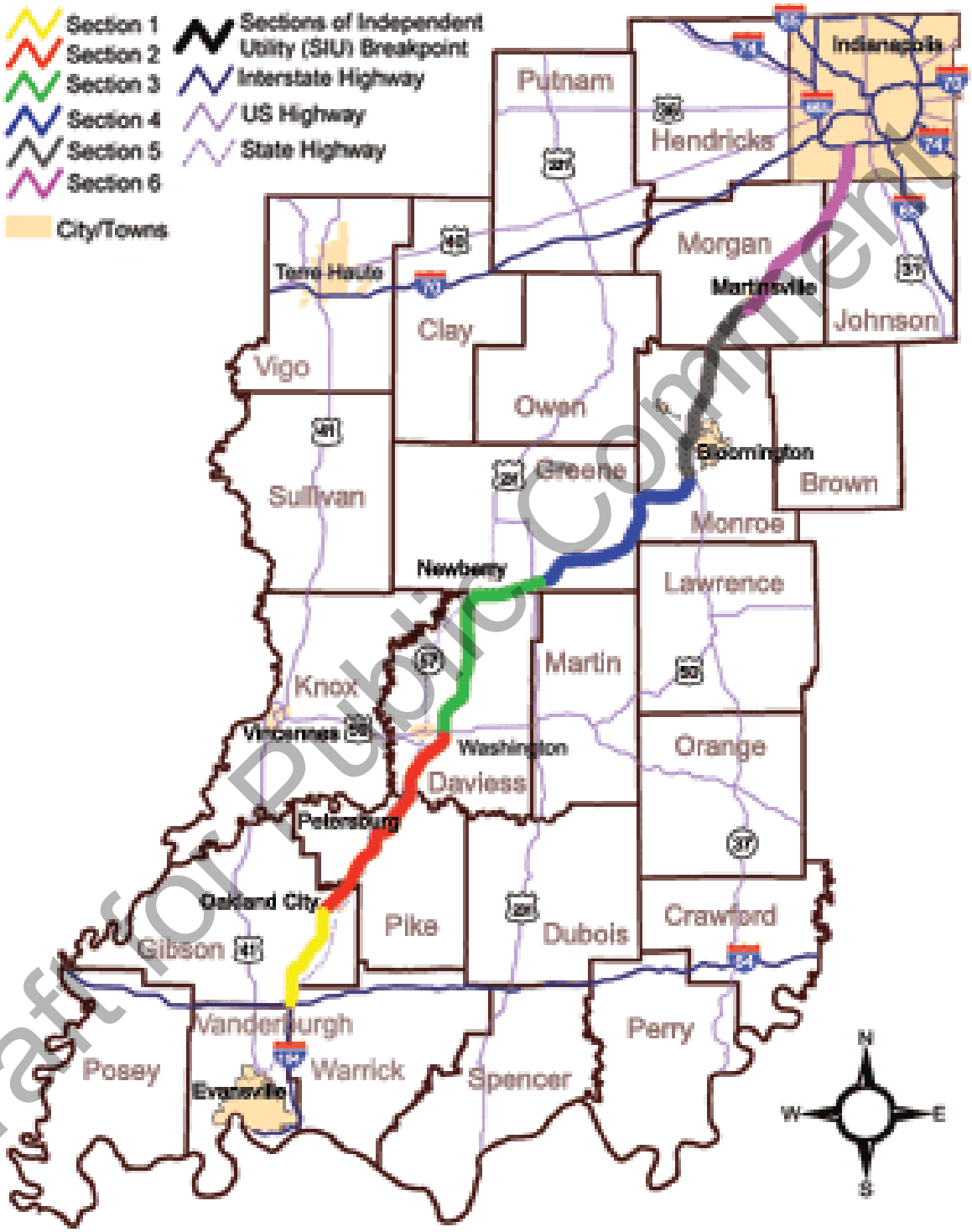

FIGURE E- 2: I-69 TIER SECTIONS

Active Environmental Impact Statements (EIS)

Environmental documentation is required for Federal Actions. INDOT utilizes federal funds for many projects undertaken. A large-scale project that could have a significant impact on the social, natural, and economic environment of an affected area requires the preparation of an Environmental Impact Statement (EIS). This study is conducted after, and builds upon the previously described planning studies that may have been conducted earlier in project development. There are several milestones in the environmental process. The first is the development of a Purpose & Need Statement and the Identification of Preliminary Alternatives. Next, the alternatives are evaluated on the basis of their benefits, costs, and impact to the human and natural environment. Third, a Draft Environmental Impact Statement (DEIS) is published selecting a preferred alternative. Fourth, based upon input from the public and stakeholders, the DEIS is modified and published as the Final Environmental Impact Statement (FEIS). After review and public comment, Federal Highway Administration (FHWA) will publish a Record of Decision (ROD) approving the document and completing the environmental process. INDOT will begin work to implement the preferred alternative. The following EISs are currently underway:

I-69 Evansville / Henderson EIS

I-69 from the Lower Rio Grande Valley in Texas at the United States/Mexico border to the dual termini of Port Huron, Michigan, and Detroit, Michigan, at the United States/Canada border has been designated by Congress as a High Priority Corridor on the National Highway System. Thus, I-69 in Indiana is more than just the potential improvements from Evansville to Indianapolis and the existing roadway from Indianapolis to Michigan. INDOT, the Kentucky Transportation Cabinet, and the Evansville Metropolitan Planning Organization are conducting this EIS which addresses I-69 south of I-64 and across the Ohio River into Kentucky. The Draft EIS was completed in 2004.

US 231 Dubois County EIS

This US 231 EIS from Interstate 64 to north of Jasper in the Huntingburg and Jasper area examined options for improving this corridor in order to reduce congestion and travel time; provided an adequate level of service for forecasted traffic volumes; to enhance safety, support local community mobility needs, and accommodate regional transportation needs. The Draft EIS was published in early 2004.

Completed Environmental Impact Statements (EIS)

Since 2000, INDOT has completed work on many Environmental Impact Statements. Some of the most significant studies have been listed below. The studies' recommendations have been incorporated into the statewide plan.

US 24 Fort Wayne to Toledo, Ohio, EIS

The US 24 EIS from Interstate 469 at Fort Wayne to Interstate 475 at Toledo, Ohio has been completed, The Ohio Department of Transportation was is the lead agency on this EIS. The Draft EIS was approved in 2003. The FEIS for US 24 New Haven to Defiance was completed in 2005; the ROD was issued soon after. Construction of the 4-lane divided highway began in 2008 with the section between Indiana State Road 101 and the Indiana/Ohio state line. The remainder of the project is currently under construction with completion anticipated in 2012.

Indianapolis Northeast ConNECTions FEIS

The Draft EIS was completed in 2001 and the Public Hearing was held on highway and transit corridor improvements in the northeast quadrant of Marion County and Southern Hamilton County. The highway recommendations were advanced into the Final EIS (FEIS) published in 2003. Expanded transit alternatives will undergo further, separate study, including analyzing the need for rail transit outside and in addition to the northeast corridor from downtown Indianapolis to Noblesville. A Record of Decision was published in early 2004.

SR 25 Lafayette to Logansport EIS

The State Road 25 (SR 25) Hoosier Heartland project is nearing the end of the environmental study stage of development. The Draft Environmental Impact Statement (DEIS) was published in August 2002 with three public hearings held along the corridor in October of that year. Public and participating agency comments on the DEIS were addressed in the Final Environmental Impact Statement (FEIS). On January 22, 2003, the late Governor Frank O'Bannon announced Alternative 2 as the preferred alternative for the Hoosier Heartland Highway between Logansport and Lafayette. The recommendation was based on the alternative's ability to meet the project's purpose and need, environmental design considerations, and input received during the public comment period. The FEIS was approved by the Indiana Department of Transportation and Federal Highway Administration on November 10, 2004.

Ohio River Bridges

The Ohio River Bridges Project addresses the long term cross-river transportation needs in the Louisville-Southern Indiana region. A Draft Environmental Impact Statement (DEIS) was published in November 2001 analyzing nine specific bridge locations in one and two-bridge combinations. Public hearings were held in Indiana and Kentucky, and more than 5,000 comments were received on the DEIS.

A Final Environmental Impact Statement (FEIS) was issued in April, 2003. This document identified the preferred alternative, responded to comments on the DEIS, and included a plan to minimize impacts to historic properties and other resources. The commitments are legally binding. They were developed in consultation with community representatives who will stay involved and monitor work to help ensure commitments are fulfilled.

After a detailed analysis that included extensive public outreach and involvement, The Federal Highway Administration (FHWA) authorized the project in September 2003 in a Record of Decision (ROD).

The project is comprised of a new downtown bridge immediately upstream from the Kennedy Bridge (I-65); an east end bridge about eight miles from downtown, connecting the Gene Snyder Freeway (Ky. 841) to the Lee Hamilton Highway (S.R. 265); and a rebuild to the south of the Kennedy Interchange where I-64, I-65 and I-71 converge in downtown Louisville.

US 231 West Lafayette Environmental Document

In 1987, a Draft EIS was completed for a relocation of US 231 from south of Lafayette to northwest of West Lafayette. The Final EIS was completed in 1992. The southern sections crossing the Wabash River and continuing northward on River Road opened to traffic in 2001. The middle segment from River Road to SR 26 is currently being designed. This study is preparing additional environmental documentation for the northern segment from SR 26 to US 52 west and northwest of West Lafayette and Purdue University in order to address concerns that recent residential development may have significantly affected the area, and require that a Supplemental Environmental Impact Study (SEIS) be conducted.

Indiana Streamlined EIS and Corridor/EA Planning Study Procedures

In 2001, INDOT and FHWA released new streamlined procedures for environmental studies to establish a coordinated planning development process. These procedures are intended to address projects being developed under the National Environmental Protection Act (NEPA) which may require preparation of an Environmental Impact Statement (EIS) but begins with the preparation of an Environmental Assessment (EA) as a corridor planning study.

The new procedures were implemented to avoid the duplication of planning and public involvement activities between Major Investment Studies (MIS) and following project development studies conducted under the NEPA requirements. In several corridor planning studies, negative comments were received because controversial alternatives that study participants believed had been eliminated were re-evaluated when the NEPA "decision-making" process was initiated.

Basic Elements:

1. Establish a project coordination team to provide policy guidance to the development of a study.
2. Issue an early coordination letter to resource agencies, notifying them that FHWA is initiating a NEPA decision making process.
3. Establish two key coordinating points with resource agencies.
    i. Purpose and Need and Preliminary Alternatives
    ii. Preliminary Alternative Analysis and Screening
4. At each key coordinating point, an Agency Review Package will be prepared and submitted to the resource agencies to initiate a sixty-day Inter-agency review process. An Interagency Review meeting will be held thirty-days into the review period.
5. Complete DEIS (or EA/Corridor Study). The EA/Corridor Study will conclude that each study does or does not involve significant impacts. The EA/Corridor will identify for each segment of independent utility the purpose and need, and the preliminary alternatives retained for further study.
6. Transition of an EA/Corridor Study to an EIS. If FHWA determines that a project has significant impacts, a decision will be made to move forward with preparation of an EIS. If the project has less significant impacts, it will remain an EA. Initially, more detailed studies will be conducted to prepare a DEIS. A coordination point with resource agencies will be established for review of the Preferred Alternatives and Mitigation. This will involve the preparation of an Agency Review Package and submittal to the resource agencies to initiate a sixty-day Inter-agency review process. An Interagency Review meeting will be held thirty days into the review period.
7. Complete the Final Environmental Impact Statement and Record of Decision.

A detailed description of the Indiana Streamlined EIS and Corridor/EA Procedures is available on the FHWA's Indiana Division website at: *http://www.fhwa.dot.gov/indiv/eisproc.htm*.

Completed Corridor Studies

Since 2000, eleven corridor studies have been completed. The studies' recommendations have been incorporated into the statewide plan as allowed by funding resources.

US 231: I-70 to I-65 Corridor Improvement Study

The US 231 corridor runs about 70 miles from I-70 in Putnam County, through Montgomery County to I-65 in Tippecanoe County. This route provides a north-south two lane principal arterial serving west-central Indiana. In the development of the Indiana portion of the original National Highway System (NHS), US 231 between I-74 and I-70 was evaluated to be included in the system but was eliminated in interests of minimizing system mileage. The 2002 NHS update effort, however, included a reexamination of this US 231 segment, resulting in addition of the segment to the Indiana portion of the NHS. This portion of US 231 has also been designated as a Statewide Mobility Corridor.

INDOT conducted a corridor feasibility study to establish the need to improve US 231 and make recommendations for roadway improvement projects if warranted. Key issues studied included: (1) the connection needs between SR 26 and I-65 in the Lafayette area including the current EIS between SR 26 and US 52, (2) examination of the needs for bypasses of Greencastle and Crawfordsville to address potential through truck and passenger car traffic in congested downtown areas, and (3) analysis of basic improvement plans for upgrading the roadway to four lanes and consider roadway relocation alternatives.

The Study was completed in March, 2003. It recommended a series of improvements to the US-231 Corridor including construction of a bypass of Greencastle and a potential bypass of Crawfordsville when traffic volumes warrant it. The Study identified eleven segments of independent utility requiring additional environmental analysis to refine the Study's recommendations

SR 101 Corridor Improvement Study

The enhancement of transportation in Southeastern Indiana has been a long-term concern of INDOT. In 1991, a joint resolution of the Indiana General Assembly urged the extension of SR 101 through Switzerland County to US 50 to improve north-south travel within the region. Preliminary INDOT studies indicated a new SR 101 extension would not be cost effective.

The INDOT corridor study was intended to identify and evaluate transportation improvements in a north-south corridor between the Markland Dam on the Ohio River in Switzerland County and I-74 in Dearborn and Ripley Counties.

The study was completed in 2003. The study determined that specific locations with significant traffic operational and safety problems in Switzerland and Ohio Counties should be identified and treated with low-cost TSM-type operational improvements. In reviewing the SR 101 Corridor Planning/Environmental Assessment Study and the comments received from the reviewing agencies, transportation stakeholders and the public, it is INDOT's decision not to include a new alignment SR 101 project connecting I-74 and the Markland Dam in the new Long Range Transportation Plan.

SR 62 West Lloyd Expressway Planning Corridor/Environmental Assessment

The SR 62 Lloyd Expressway Corridor Planning Study evaluated the 5.5 mile corridor of the Lloyd Expressway from Eichoff Road (University of Southern Indiana entrance) to Fulton Avenue on the West Side of Evansville. The potential for upgrading the corridor to freeway standards was examined. In December 2002, a decision was made based upon the preliminary findings to upgrade the corridor to a freeway facility. The Fulton Avenue intersection was upgraded to a freeway interchange in 2010. Other improvements are being re-evaluated as to fiscal constraints.

SR 9 Greenfield Corridor Improvement Study

SR 9 in Greenfield experiences significant traffic congestion. The SR 9 study corridor has been initially established from US 52 to SR 234. In the 1998 TEA-21 legislation, a project to "Construct a SR 9 Bypass in

Greenfield" was included as part of the Section 1602 Program for High Priority Demonstration Projects. The INDOT corridor feasibility study was intended to establish the essential need for improvements on SR 9, analyze basic improvement plans, and make recommendations to INDOT for the programming of improvement projects (if warranted). The study conducted an origin-destination traffic study to measure through-traffic patterns.

The study was completed in December, 2005. Based upon the results of the screening and evaluation process, and funding constraints, it was recommended that a series of local road improvements be pursued in lieu of major improvement on the state system

SR 37 Noblesville to Marion Corridor Improvement Study

SR 37 from Noblesville in Hamilton County, through Madison County and the community of Elwood, and connecting with Marion in Grant County was evaluated in a corridor improvement feasibility study. SR 37 is currently a four lane arterial roadway from I-69 to northeast of Noblesville where it becomes a two lane roadway. In 1989, a joint resolution of the Indiana General Assembly urged the widening of SR 37 to four lanes from Noblesville to Marion. INDOT conducted a highway improvement feasibility study in 1990 that found widening the roadway would not be cost effective. Since the early 1990s, the rapid growth of Hamilton County has created additional traffic growth on SR 37 in the greater Indianapolis area. In the 1998 TEA-21 legislation, a feasibility study of SR 37 improvements in Noblesville, Elwood, and Marion was included as part of the Section 1602 Program for High Priority Demonstration Projects.

The study was completed in June 2006. The study identified three segments of independent utility and advanced two alternatives per segment for detailed environmental analysis. In the Transportation Plan, this project was identified as an unfunded need due to fiscal constraints:

1. SR-32 to SR-13(South Junction) -- Reconstruct SR-37 as a four-lane expressway on existing or new alignment with consideration of a bypass of Strawtown.
2. SR-13(South Junction) to CR1300N – Reconstruct SR-37 as a four-lane expressway on existing or new alignment with consideration of a bypass of Elwood.
3. SR-13(South Junction) to CR1300N – Reconstruct SR-37 as a four-lane expressway or an improved 2-lane highway on existing or new alignment.

US 36 Danville Corridor Improvement Study

US 36 is the primary travel corridor connecting central and eastern Hendricks County and West-Central Indiana to Indianapolis. INDOT conducted the US 36 Corridor Improvement Study to:

1. Establish the essential need for improving US 36
2. Develop and analyze basic improvement plans ranging from the upgrade of US 36 on its present alignment to relocation of portions or all of US 36, and
3. Make appropriate recommendations for the programming of projects.

The study was completed in December 2004. The study recommendations to improve the US 36 corridor have been delayed by fiscal constraint.

Central Indiana Suburban Transportation Study

The Central Indiana Suburban Transportation Study considered suburban mobility issues in the greater Indianapolis nine-county metropolitan area. The existing transportation problems and potential future transportation improvements were studied from a system --level perspective, including future demand levels,

interaction with other elements of the regional roadway system (i.e. I-465), relationships to I-69 / National Corridor 18 options, and opportunities to meet localized needs. This study primarily addressed the area from I-465 outward to the nine-county boundary but also considered impacts and benefits to the urban core. This process examined the interrelationship of land use and transportation decisions, the role of public transit and the appropriate hierarchy of key transportation corridors within the nine-county area. An evaluation of ITS features, access control, travel demand management and other programs to increase system efficiency was included in the study. This study also assessed the regional impact of an outer beltway on the local and regional transportation system and on development patterns. The study ensured meaningful public involvement by initially convening a group of regional constituents and then developed smaller task force groups to deal with specific areas and issues. INDOT and the Indianapolis MPO conducted this cooperative study of the central Indiana region. The study was completed in October 2005. The study recommendations are being incorporated into future versions of the INDOT Long Range Transportation Plan.

US-50: Dearborn County Corridor Planning and EA Study

The Indiana Department of Transportation has initiated a study of transportation needs and opportunities in the U.S. 50 corridor in Dearborn, Indiana. The objectives of this study are to assess the feasibility of improvements to the U.S. 50 corridor between Dillsboro and the IN-1/I-275/US-50 junction east of Lawrenceburg as well as other alternatives for improving mobility in eastern Dearborn County. Specifically, the study will:

- Establish the need for improving the US-50 corridor within the study area (including Dillsboro, Aurora, Greendale, and Lawrenceburg);
- Develop and analyze basic improvement alternatives including a comprehensive evaluation of the transportation, economic, and social impacts of these alternatives; and
- Provide project-specific data to be used by INDOT to score and rank improvements for programming purposes

The study was completed in 2007.

Study Report Link: http://www.in.gov/indot/div/projects/us50/dearborn/

US-231/SR-46/SR-67: Spencer Corridor Planning and EA Study

INDOT has begun a corridor planning study of US-231/SR-46/SR-67 in Spencer. The primary focus of this study is the highway between US-231/SR-67 and SR-46 west junction and US-231/SR-67 and SR-46 east junction. The roadway passes directly through the Town of Spencer and is approximately 0.85 miles in length. The general study area includes Washington Township in east-central Owen County. The goal of this study is to identify congestion and freight mobility issues with the purpose of:

- Improving roadway efficiency
- Improving roadway safety
- Meeting current geometric criteria

The study was completed in 2007.

US-50: North Vernon Corridor Planning and EA Study

The US 50 – North Vernon Corridor Planning and Environmental Assessment study is a study with the goal of determining the degree to which transportation needs/improvements that will reduce congestion, improve safety, and improve mobility along US 50 are:

- Establish the need for improving the US-50 corridor within the study area;
- Develop and analyze basic improvement alternatives including a comprehensive evaluation of the transportation, economic, and social impacts of these alternatives; and
- Provide project-specific data to be used by INDOT to score and rank improvements for programming purposes.

The study limits are from I-65 in Jackson County to Butlerville just east of North Vernon in Jennings County. The study was completed in February, 2008. Currently, INDOT is developing a connection between US 50 and SR 7 and SR 3 in the northwestern portion of North Vernon.

Study Report Link: http://www.in.gov/indot/div/projects/us50/northvernon/

Indiana Interchange Study II

Initiated in 2006, the Indiana Interstate Interchange Planning Study identifies a program of interchange modification and new interchange construction projects. The study was completed in 2007 and provided recommendations for freeway interchange improvements.

Interchange Study Report Link: http://dotmaps.indot.in.gov/apps/InterchangeStudy/

US-421: Madison-Milton Bridge Planning Study and Environmental Assessment

In the mid-1990s, KYTC and INDOT undertook a planning study and environmental overview to replace the existing bridge. This study identified a number of potential river crossing location alternatives and assembled information on the environmental constraints existing at that time.

The project recommends replacing the existing truss superstructure with a new, wider superstructure similar in appearance to the existing one. The roadway would be widened to 40 feet, which includes two 12-foot lanes and 8-foot shoulders with a bike lane in each shoulder. A 5-foot wide sidewalk would be cantilevered to the downstream side of the truss. The existing piers would be modified and strengthened to support the new wider superstructure. The Environmental Assessment was completed in December, 2009 and the Finding of no Significant Impact (FONSI) was issued in March 2010. The project received a $20 million Federal Transportation Investment Generating Economic Recovery (TIGER) grant and is anticipated to be completed in 2012.

Study Links: http://www.miltonmadisonbridge.com/project-documents.aspx

http://www.miltonmadisonbridge.com/media/11547/signed%20fonsi%203-15-10.pdf

Illiana Expressway Planning Study and Environmental Assessment

This is a joint study between INDOT and the Illinois Department of Transportation. In late 2006, the states of Indiana and Illinois, through their respective DOTs, entered into a Bistate Agreement that provided a framework for further development of the corridor. This was followed in May 2007 by the passage of SB 105 in Indiana that directed the Indiana Department of Transportation (INDOT) to perform the feasibility study to determine the needs of the corridor, financing options, alternative routes, and impacts.

Study Link: http://www.in.gov/indot/files/FR_INDOT_IllianaExprsswy_06-30-2009.pdf

In 2010, Indiana and Illinois initiated work on a EIS to study the project in more detail

Summary

The key element in making the transition from the system planning activities to the project development/programming process is the corridor planning process. This chapter outlines the corridor planning studies undertaken and anticipated to be conducted by INDOT as part of the statewide plan development process. These studies included the Major Corridor Investment Studies involving commerce corridors, several segments of US 31, the Ohio River, Northwest Indiana, and I-69 in Fort Wayne. Other corridor studies included US 31 from Indianapolis to South Bend, SR 25 from Lafayette to Logansport, Indianapolis Northeast ConNECTions MIS/DEIS, US 231 in Dubois County, and the Interstate Interchange Study.

Appendix F: Air Quality Conformity

Background

OZONE

What is ozone, and why is it bad for us?

Ozone is a colorless gas that can be found in the air we breathe. Each molecule of ozone is composed of three atoms of oxygen, one more than the oxygen molecule we need to breathe to sustain life. The additional oxygen atom makes ozone extremely reactive. Ozone exists naturally in the Earth's upper atmosphere, known as the stratosphere, where it shields the Earth from the sun's ultraviolet rays. However, ozone is also found close to the Earth's surface. This ground-level ozone is a harmful air pollutant.

Where does ground-level ozone come from?

Ground-level ozone is formed by a chemical reaction between volatile organic compounds (VOCs) and oxides of nitrogen in the presence of sunlight. Sources of VOCs and oxides of nitrogen include:

- Automobiles, trucks, and buses;
- Large industry and combustion sources such as utilities;
- Small industry such as gasoline dispensing facilities and print shops;
- Consumer products such as paints and cleaners;
- Off-road engines such as aircraft, locomotives, construction equipment, and lawn and garden equipment.

Ozone concentrations can reach unhealthy levels when the weather is hot and sunny with relatively light winds.

How does ozone affect human health?

Even at relatively low levels, ozone may cause inflammation and irritation of the respiratory tract, particularly during physical activity. The resulting symptoms can include breathing difficulty, coughing, and throat irritation. Breathing ozone can affect lung function and worsen asthma attacks. Ozone can increase the susceptibility of the lungs to infections, allergens, and other air pollutants. Medical studies have shown that ozone damages lung tissue and complete recovery may take several days after exposure has ended.

Who is sensitive to ozone?

Groups that are sensitive to ozone include children and adults who are active outdoors, and people with respiratory disease, such as asthma. Sensitive people who experience effects at lower ozone concentrations are likely to experience more serious effects at higher concentrations.

What is an Ozone Action Day?

An Ozone Action Day may be called by your state or local air quality agency when ozone levels are

forecast to reach unhealthy levels. These programs, often in partnership with local businesses, encourage voluntary actions to reduce emissions of pollutants that contribute to ground-level ozone formation.

CLEAN AIR AND HIGHWAY LEGISLATION

The Clean Air Act Amendments of 1990 (CAAA), Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), Transportation Equity Act for the 21st Century (TEA21), and SAFETEA-LU have combined to alter the environment in which transportation and air quality decisions are made throughout the nation and Indiana. Federal, state, and local decision makers must now respond to a wide range of new regulations, requirements, and processes for transportation system planning and development to provide better management and control of the major pollutants caused by transportation sources.

Transportation services and projects must play a major role in the effort to reduce emissions under the CAAA. In air quality "non-attainment" areas, transportation decisions may be shaped largely by the CAAA requirements, including specific measures to reduce emissions of several pollutants associated with mobile sources. Several pollutants associated with mobile sources include volatile organic compounds (VOC) and nitrogen oxides (NOx) which combine to make Ozone (O^3); carbon monoxide (CO), and particulate matter (PM 2.5).

Given the magnitude of change brought about by these laws, it is important that transportation officials understand several key elements of the new transportation/air quality setting. The new conformity regulations place stronger constraints on transportation plans, programs, and projects, making it imperative that transportation planners work closely with air quality planners. These regulations include the following:

- The State Implementation Plan (SIP) process has a great impact on transportation, both through the establishment of emissions budgets and through the development of control strategies to reduce emissions. SIPs are plans at both the urbanized area and State level that are designed to achieve improved air quality and federally mandated controls and regulations.
- The CAAA has linked transportation to air quality actions--even actions directed at issues not related to mobile sources--since failure to meet the requirements of the act can lead to a cutoff of highway funds.
- Specific requirements in the CAAA are aimed at transportation directly, including measures to reduce emissions through technological improvements. Improvements may include (1) enhanced vehicle inspection and maintenance, (2) reformulated fuels, (3) alternative fuel vehicles, and (4) transportation control measures (TCMs) such as the employee commute option program in certain urbanized areas.
- SAFETEA-LU funding is available to for transportation projects that benefit air quality through the Congestion Mitigation and Air Quality Improvement (CMAQ) Program.
- TEA-21 recognized the relationship between transportation and air quality and emphasized the role of transportation conformity in the planning provisions of the statute. The USEPA and USDOT will continue to implement the conformity rule in accordance with the CAA and encourage State and local transportation and air quality agencies to coordinate their planning activities to achieve both transportation and air quality goals.

The ISTEA, CAAA, TEA 21, and SAFETEA-LU have combined to produce an unprecedented period of change in the transportation community. The acts and associated regulations emphasize the links between transportation policy and air quality concerns through (1) incentives to make investments that promote air

quality and, (2) regulatory restrictions on transportation decisions in areas that fail to meet national ambient air quality standards.

Transportation Air Quality Conformity

Transportation conformity is a process to ensure that Federal funding and approval are given to those transportation activities that are consistent with air quality goals. The conformity regulation requires that all transportation plans and programs in non-attainment or maintenance areas conform to the State's SIP (State Implementation Plan).

It ensures that transportation activities do not worsen air quality or interfere with the purpose of the SIP, which is to attain the NAAQS. Meeting the NAAQS often requires emission reductions from mobile sources. Several types of highway emissions reduction strategies are available (and, in some regions, required) to help regions attain the standards.

In addition, the conformity regulations affect transportation planning in several critical ways. Specifically:

- States and Metropolitan Planning Organizations (MPOs) must show that Transportation Plans and Transportation Improvements Programs result in emissions levels that fall within the "emissions budget" for mobile sources specified in each non-attainment/maintenance SIP.
- Transportation Control Measures (TCMs) contained in the SIP must be included in Transportation Plans and Transportation Improvement Programs.
- Over the 25 Year period of the Transportation Plans, many areas must show reductions in emissions of key pollutants, notably NOx and VOC.

Failure to Meet Transportation Conformity

Failure to meet the conformity requirements can result in the expiration of the Transportation Plan and the Transportation Improvement Program (TIP) and thus halting federal funding for many transportation projects. In addition, transportation may be affected by a state's or urban area's inability to meet any of the CAAA requirements--whether or not the lack of compliance is related to transportation measures. Failure to obtain a required SIP revision approval (even if that SIP revision relates to a non-transportation issue) can result in the loss of federal transportation funds.

In order to address the clean air challenges successfully, it is crucial that transportation officials become involved in air quality early in the planning process. Transportation officials need to be actively involved in the various SIP processes, particularly in the establishment of emissions budgets, which become key constraints on future transportation plans and programs.

In addition, transportation planners need to incorporate a range of current and new players into the decision-making process, including the U. S. Environmental Protection Agency (EPA), the Indiana Department of Environmental Management (IDEM), special interest groups, and the general public. Cooperation between all these groups is essential if Indiana is to comply with ISTEA and CAAA air quality requirements.

Ozone Non-Attainment and Maintenance Areas Classifications

For the pollutant Ozone, Indiana currently has six attainment/maintenance air quality areas, three (3) basic air quality non-attainment areas, one marginal non-attainment area, and one (1) moderate non-attainment area for Ozone. The six (6) Indiana areas originally classified as marginal non-attainment were reclassified to attainment/maintenance in 2005 and 2006. Although these areas are now attainment for ozone, the maintenance designation means they are required to perform the same air quality conformity activities they did as marginal non-attainment areas for the next twenty years

Areas in Indiana fall within one of three (3) classifications; maintenance attainment, Basic non-attainment, marginal non-attainment, or moderate non-attainment. Each non-attainment or maintenance area classification has an associated definition and mandatory transportation provisions. The transportation provisions of the Clean Air Act as amended in 1990 for maintenance and non-attainment area classifications are specified in the various CAAA and subsequent legislation.

8-Hour Ozone Non-Attainment Areas

In July 1997, EPA revised the National Ambient Air Quality Standards (NAAQS) for ozone. EPA is currently phasing out and replacing the existing 1-hour ozone standard with the "new" 8-hour standard to protect against longer exposure periods.

The Threshold value for both the primary and secondary 8-hour standard is 0.08 parts per million (ppm), as measured as maximum daily 8-hour average concentrations. To attain the new ozone NAAQS, the 3-year average of the annual 4th-highest daily maximum 8-hour ozone concentration must be less than or equal to 0.08 ppm.

In the year 2000, EPA formally determined which areas of the country do not meet its new 8-hour ozone standard and designated them as “non-attainment.” In doing so, EPA will use the 3 most recent years of data (e.g., 1997-1999). In the interim, all areas of the country must continue to implement the programs that led to their attaining the 1-hour standard. The map in **Figure F-1** shows areas of Indiana that do not meet the 8-hour standard based on 1994 to 1996 monitored data.

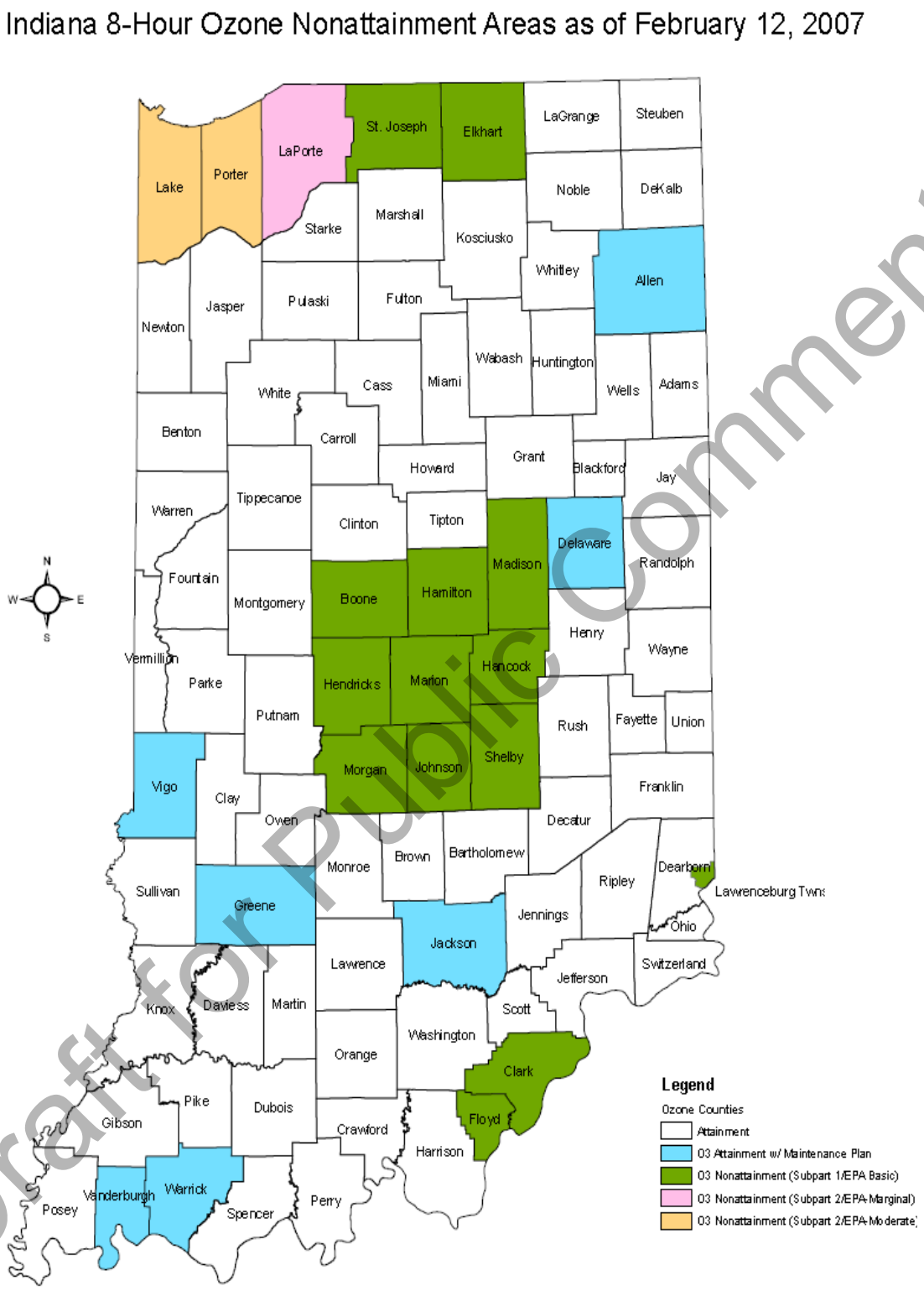

FIGURE F- 1:8-HOUR OZONE AREAS

Fine Particulate Matter

Also called particulate matter, fine particles are one of six criteria pollutants addressed by the Clean Air Act. These pollutants have been identified as being particularly harmful to humans and the environment.

Fine Particle Pollution – PM 10 and PM 2.5

Particle pollution in the air includes a mixture of solids and liquid droplets. Some particles are emitted directly; others are formed in the atmosphere when other pollutants react. Particles come in a wide range of sizes. Those less than 10 micrometers in diameter (PM 10) are so small that they can get into the lungs, potentially causing serious health problems. Ten micrometers is smaller than the width of a single human hair.

- Fine particles (PM2.5). Particles less than 2.5 micrometers in diameter are called "fine" particles. These particles are so small they can be detected only with an electron microscope. Sources of fine particles include all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes.
- Coarse dust particles. Particles between 2.5 and 10 micrometers in diameter are referred to as "coarse." Sources of coarse particles include crushing or grinding operations, and dust stirred up by vehicles traveling on roads.

Figure F-2 shows the non-attainment areas in Indiana for PM 2.5.

Re-Designation Petitions and Maintenance Plans

This section is dedicated to Indiana's Re-designation Petitions and Maintenance Plans for counties that now meet the National Ambient Air Quality Standards (NAAQS). The Indiana Department of Environmental Management (IDEM) has prepared these Re-designation Petitions and Maintenance Plans for U.S. Environmental Protection Agency (USEPA) review and consideration for these counties to be re-designated from non-attainment to attainment, and classified as maintenance under the standards. The list is broken down by non-attainment area and provides additional information to support continued compliance with the standard(s).

- Central Indiana Ozone Non-Attainment Area: Indianapolis, Anderson, and Columbus: Re-designation submitted March 26, 2007.
- Clark and Floyd Counties Ozone Non-Attainment Area: Re-designation submitted July, 2006.
- Evansville Ozone Non-Attainment Area (Vanderburgh and Warrick Counties): Re-designation approved and formally re-designated as an Attainment/Maintenance area by the USEPA effective January 30, 2006.
- Gary/Hammond Sulfur Dioxide (SO2) Non-Attainment Area (Lake County): Re-designation submitted August 12, 2005.
- Lake and Porter Counties Ozone Non-Attainment Area: Re-designation submitted September 12, 2006.

- LaPorte County Ozone Non-Attainment Area: Re-designation submitted May 30, 2006. Linton (Greene County) Ozone Non-Attainment Area: Re-designation approved and formally re-designated as an Attainment/Maintenance area by the USEPA effective December 29, 2005.

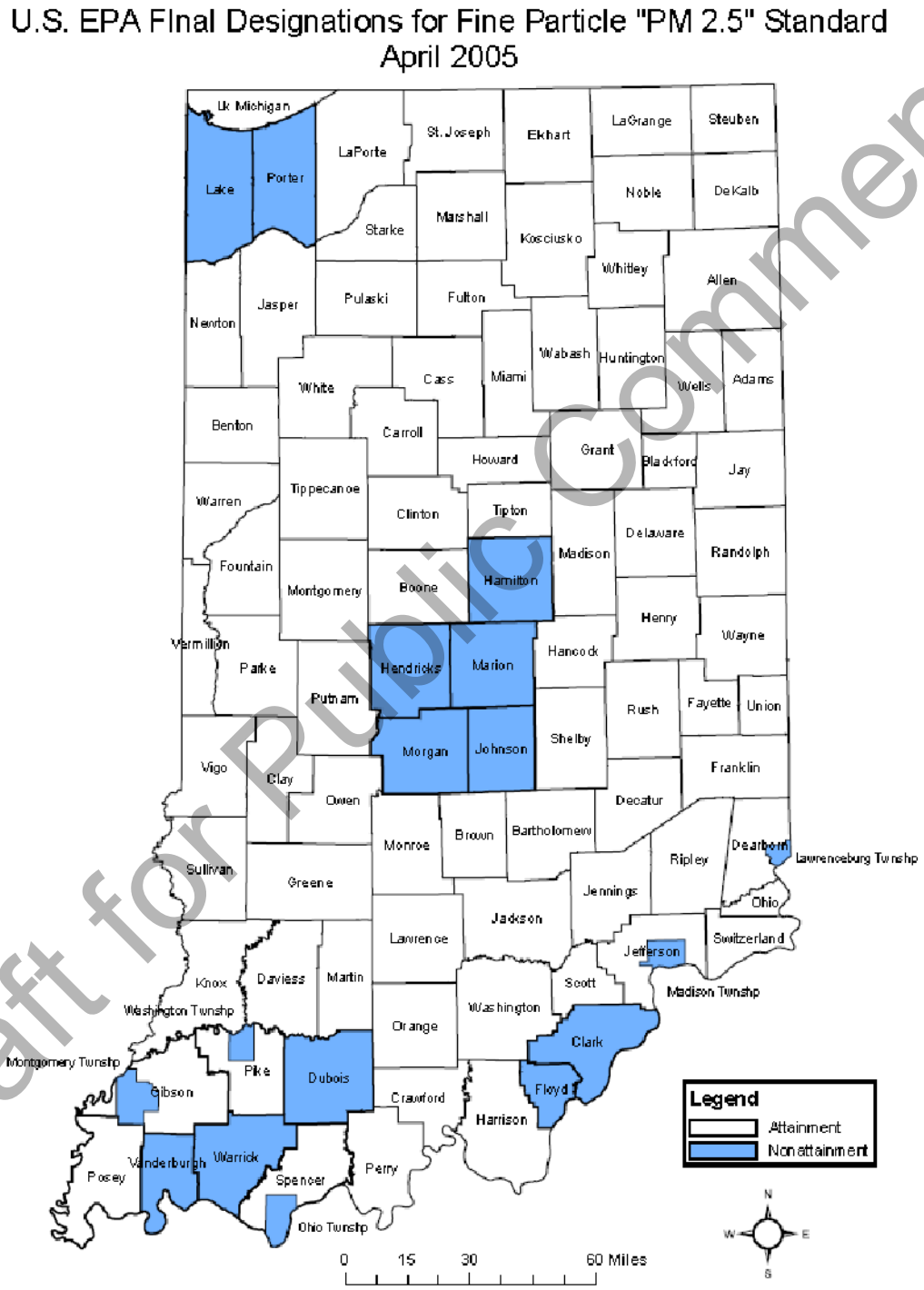

FIGURE F- 2: PM 2.5 AREAS

- Muncie (Delaware County) Ozone Non-Attainment Area: Re-designation approved and formally re-designated as an Attainment/Maintenance area by the USEPA effective January 3, 2006.
- Seymour (Jackson County) Ozone Non-Attainment Area: Re-designation approved and formally re-designated as an Attainment/Maintenance area by the USEPA effective December 29, 2005.
- St. Joseph/Elkhart County Ozone Non-Attainment Area: Re-designation submitted May 30, 2006.
- Terre Haute (Vigo County) Ozone Non-Attainment Area: Re-designation approved and formally re-designated as an Attainment/Maintenance area by the USEPA effective February 6, 2006.
- Fort Wayne (Allen County) Ozone Non-Attainment Area: Re-designation approved and formally re-designated as an Attainment/Maintenance area by the USEPA effective February 12, 2007.

Congestion Mitigation and Air Quality Program

One important element of meeting these new challenges is the Congestion Mitigation and Air Quality Program (CMAQ). Congress allocated money for the CMAQ program to be used to fund Transportation Control Measures (TCMs) or other programs designed to implement an urbanized area's transportation/air quality plan. The CMAQ program was established to assist in achieving attainment. INDOT and the MPOs have been using CMAQ funds to support a wide variety of projects such as the implementation of vehicle inspection/maintenance (I/M) programs, public education programs, transit and congestion reduction projects. Other possible uses include using these funds to support projects that improve intermodal freight distribution activities that are justified by air quality benefits.

CMAQ projects are usually classified in one of several categories noted below:

- Transit improvements;
- Shared ride services;
- Traffic flow improvements;
- Demand management strategies;
- Pedestrian and bicycle programs;
- Vehicle inspection/maintenance (I/M) programs;
- Conversion of public fleets to alternative fuels, and;
- Public education and outreach programs.

Indiana's Policy and Procedures for the CMAQ Improvement Program

INDOT has developed policy and procedures that establishes how the CMAQ Program will be administered in the State of Indiana. It is applicable to projects proposed in non-attainment areas by either the Metropolitan Planning Organizations (MPOs) or the State of Indiana. The Indiana CMAQ policy incorporates many aspects of the joint Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) guidance of October 16, 1992, and April 9, 1993, on the CMAQ program. The federal guidance is included in this policy as an ongoing source of reference. The policy also contains other elements that may be considered unique to Indiana.

Included in this policy are sections relating to: (1) the formula for sub-allocating funds to Indiana's non-attainment areas; (2) eligible projects; (3) project selection criteria, and; (4) the project development and submittal process. It is the intent of this policy that the parties governed by it, INDOT, the Indiana Department of Environmental Management (IDEM) and the MPOs, have equal status and that each will

work in a cooperative spirit with the other toward meeting the objectives of this policy, SAFETEA-LU and the CAAA.

Summary

The Indiana Department of Transportation faces many challenges in successfully meeting the transportation needs of the State of Indiana while simultaneously achieving air quality goals. A multimodal transportation planning process focused on adherence to the air quality provisions of CAAA and SAFETEA-LU will help INDOT meet our responsibility to provide improved mobility, quality of life, and economic vitality for all Indiana citizens.

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Appendix G: Access Management

Overview

In 2006, INDOT developed a formal INDOT Access Management Guide. The guide is intended to be used by transportation officials at both the state and local levels to develop and implement access management techniques in Indiana. It contains specific standards that can be directly applied as well as a modal local access management ordnance that can be used as a template for developing access management standards for a local entity such as a zoning board or county engineer.

What is Access Management?

In short, access management is the process of balancing the competing needs of traffic movement and land access. Over the last several decades, numerous transportation studies and research efforts have demonstrated a fundamental relationship between the level of direct property access permitted along a roadway and the roadway's corresponding operational and safety performance.

The introduction of vehicle conflict points associated with unrestricted vehicular property access has been shown to result in increases in delays, crash rates, and vehicle emissions. However, most roadways must provide some level of vehicular access to abutting properties, in addition to providing a mobility function. The basic principles of access management involve achieving a balance between mobility and access by limiting the number of conflict points, separating the conflict points, and reducing the impediments to through traffic caused by turning and queued vehicles.

The *Access Management Manual*, published in 2003 by the Transportation Research Board of the National Academy of Sciences, is a comprehensive resource that summarizes the results of access management research conducted over the last several decades. The *Access Management Manual* defines access management, and its purpose, as follows:

> *"Access management is the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. It also involves roadway design applications, such as median treatments and auxiliary lanes, and the appropriate spacing of traffic signals. The purpose of access management is to provide vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system."*

As indicated above, roadways serve two primary functions: 1) moving vehicles, and 2) providing direct access to property. The primary objective of access management is to protect the functional integrity of the roadway system by ensuring that each roadway maintains its intended balance between the movement and access functions.

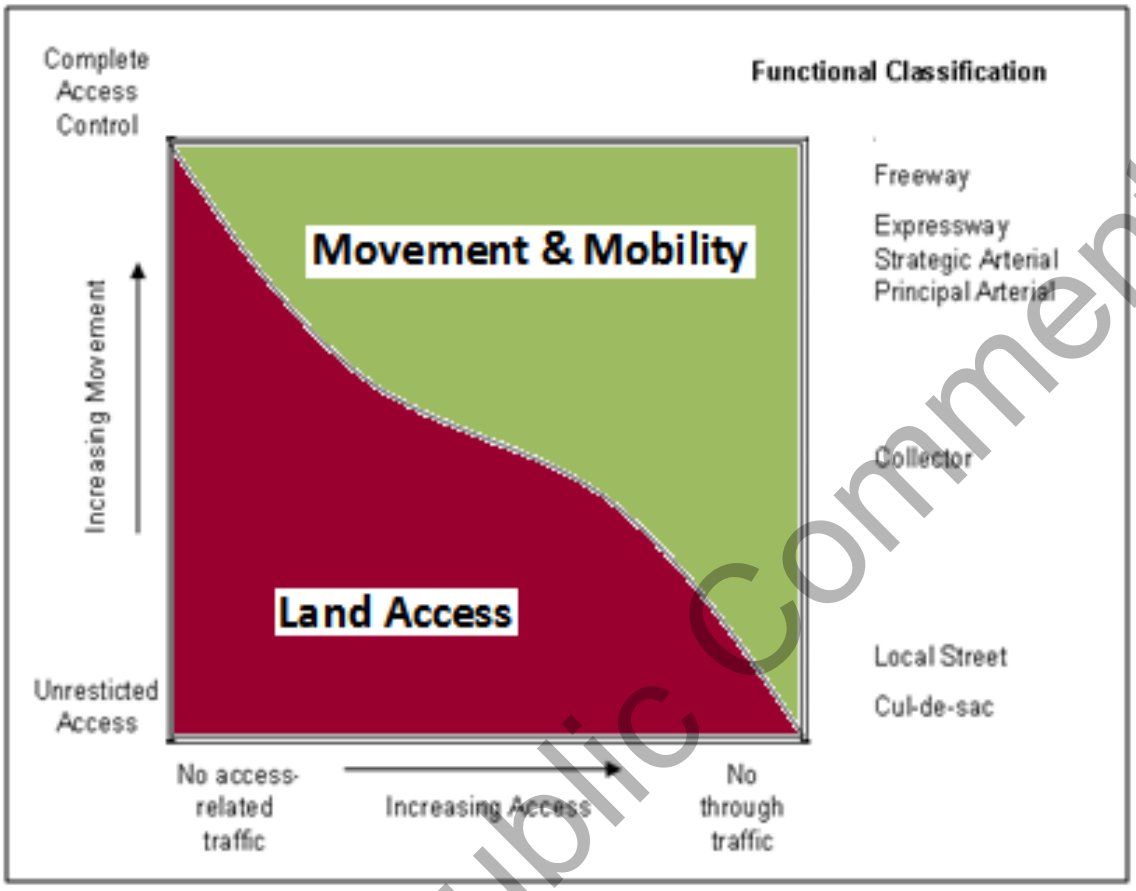

Figure 12-1 illustrates the balance between movement and access functions for roadways of various functional classifications. Higher-order roadways—such as freeways, expressways, and arterials—have a higher degree of access control to preserve their movement function. On the other hand, local streets have less restrictive access control because they are intended primarily to provide access to abutting properties.

Figure 12-1

Access Management Objectives

In order to accommodate access to existing and future development in a safe and efficient manner, INDOT seeks to manage the location, design, and type of property access in order to:

- Reduce traffic congestion;
- Preserve the flow of traffic;
- Improve traffic safety and reduce the frequency of crashes;
- Preserve existing road capacity;
- Support economic growth;
- Improve access to businesses and homes;
- Maintain or improve property values; and
- Preserve the public investment in the transportation infrastructure.

These objectives can be achieved through the application of the following access management techniques described in this Guide:

- Consolidate and limit (where necessary) access along the State highway system;
- Promote a supporting local street system;
- Promote the sharing of site-access to the State highway system; and
- Promote efficient on-site circulation.

The primary goal is to create an interconnected system of State highways that function safely and efficiently for their useful life. Proper application of access management techniques also assures businesses and drivers of safe and convenient access, and taxpayers of more cost-effective use of their money spent on roads. In addition, access management practices quite often result in more attractive corridors.

Benefits of Access Management

This section outlines the benefits of improving access management policy and practices in Indiana. The wide-ranging benefits of access management extend to a host of users and affected parties including:

- Motorists – who face fewer conflicts and decision points, simplifying the driving task and improving safety;
- Cyclists and Pedestrians – who face fewer conflicts with traffic, and are afforded safe refuge locations such as medians;
- Transit riders – who experience reduced delays and travel times, and benefit from an improved walking environment;
- Business persons – who are served by a more efficient transportation system that captures a broader market area, and benefit from stable property values and a predictable and consistent development environment;
- Freight delivery carriers – who experience reduced delays and improved safety, resulting in shorter transportation times and lower delivery costs;
- Government agencies – who benefit from the lower cost of delivering a safe and efficient transportation system; and
- Communities – who benefit from a safer and more attractive transportation system and from reduced disruptions associated with road widening and construction.

Considerable research and experience from other states has demonstrated the traffic safety and operational benefits to the motoring public. Access management benefits focus on the following major areas:

- System preservation benefits
- Economic benefits
- Environmental benefits
- Roadway safety benefits
- Traffic operations benefits
- Aesthetic benefits

Indiana Access Management

Legal Authority in Indiana

> Indiana State law requires the public to obtain permission from the governmental unit having jurisdiction over a street or highway to construct inside of the right-of-way (ROW) line. INDOT has jurisdiction over the State highway system and has established a driveway permit process to be followed by all applicants.

The administrative requirements associated with the driveway access permit application process for all State highways are governed by the promulgated rules of Title 105, Article 7 of the Indiana Administrative Code (IAC): Permits for Highways (Reference 6).

Any business or private party wishing to construct an access driveway onto the State highway right-of-way is required to apply for, and obtain, a permit from INDOT prior to beginning any construction. A permit is also required for any proposed relocation or alteration of an access, approach, or cross-over and is governed by the same regulations and standards as for a new access driveway.

INDOT Access Classification System and Design Criteria

An Access Classification System and Design Criteria are the first steps in developing and implementing the Access Management Program in Indiana.

As stated previously, INDOT's access management program seeks to:

- Reduce traffic congestion;
- Preserve the flow of traffic;
- Improve traffic safety and reduce the frequency of crashes;
- Preserve existing road capacity;
- Support economic growth;
- Improve access to businesses and homes;
- Maintain or improve property values; and
- Preserve the public investment in the transportation infrastructure.

These objectives are accomplished by:

- Establishing appropriate levels of allowable access for each State highway through the implementation of a statewide Access Classification System;
- Managing the driveway permitting process to ensure that new driveways proposed in conjunction with private development are properly located and designed;
- Enforcing identified permit violations;
- Working cooperatively and proactively with other government agencies, property owners, and the public when access and land use decisions affecting State highways must be made;
- Incorporating access management techniques into design plans for new State highways and improvement plans for existing State highways;
- Educating INDOT staff and others regarding INDOT's specific access management-related policies and procedures.

Access Classification System

An Access Classification System is typically used to establish the level of allowable access for roadways of varying levels of importance in the State highway system. In essence, an Access Classification System is a hierarchy of access categories that forms the basis for the application of access management. Each access category sets forth criteria governing the access-related standards and characteristics for corresponding roadways. These access categories ultimately define where access can be allowed between private developments and the roadway system, and where it should be denied or discouraged. They define spacing standards for signalized intersections, and where a driveway should be restricted to right-in/right-out operation. Defining access categories involves consideration of the following factors:

1) Roadway Functional Classification System – As alluded to above, the foundation of an access classification system is the functional classification system (arterial, collector, etc.) that reflects the general purpose of each roadway within the transportation system.
2) Roadway Design Characteristics – In addition, roadway characteristics associated with geometric design (such as the number of lanes, shoulder widths, design speed, and particularly median treatments) should be considered in defining access categories.
3) Degree of Urbanization – Factors (such as intersection frequency, development intensity, traffic volume, and speed conditions) can be used to help define the degree of urbanization, and could be considered in defining access categories.

Typically, direct property access is prohibited from freeways and expressways. Direct property access is also typically denied (or highly restricted) for higher-level arterial class roadways, although access may be provided where no reasonable alternative access is available. Direct property access is often permitted for lower level arterials and collectors, although there may be limitations on the number and location of access points. Direct property access is typically allowed on local roadways and frontage roads, subject to safety considerations (such as maintaining proper sight distances).

Table 12-1 provides an overview of the INDOT Access Classification System. The access classification system uses the Planning Level Corridor Hierarchy as the primary basis for a tiered system of access categories. Because interstate highways and freeways are of the highest level of importance and are fully access-controlled, they represent the highest category within the access classification system. However, spacing criteria for these roadways are already established in other sources such as the INDOT *Roadway Design Manual* and AASHTO's *A Policy on Geometric Design of Highway and Streets* (the "Green Book").

Tiers 1 and 2 of the Access Classification Syst1em include all “Statewide Mobility Corridors” and “Regional Corridors,” respectively, on the INDOT highway system. Tier 3 of the Access Classification System includes all “Local Access Corridors” on the INDOT highway system. However, because Local Access Corridors serve a mobility function and accommodate some through traffic volume, the term “Sub-Regional Corridors” has been used instead for Tier 3 roadways in the Access Classification System.

Statewide Mobility Corridors (Tier 1), Regional Corridors (Tier 2), and Sub-Regional Corridors (Tier 3) are each subdivided into two subcategories (Type “A” and Type “B”) that reflect distinct variations within each of these Tiers. For all three tiers, the Type “A” distinction applies exclusively to multi-lane roadways, and the Type “B” distinction applies exclusively to two-lane roadways. The purpose for this distinction was to reflect the different characteristics associated with two-lane roadways.

In addition, as **Table 12-1** shows, a separate access category for “Special Transportation Areas” (STAs) is included to reflect the special access needs found in environmentally-sensitive areas and along traditional “main streets” (roadways characterized by mixed land uses, pedestrian activity, and a role as a community focal point, etc.). STAs have a range in function between access and mobility, and are intended to incorporate unique context-sensitive design and access management treatments based on the particular needs of the locality and the function of the facility.

Overview of INDOT Access Classification System

Level of Importance / Access Category	Type	Traffic Function	Design Standards
Interstate Highways and Freeways		Accommodates high-speed, high-volume, and long-distance through traffic for interstate, intrastate, or intercity travel. Also can provide a major connection between suburban areas and metropolitan centers.	Multi-lane roadways with full access-control. Access via intechanges only (no direct private access to abutting properties allowed). All roadways are multi-lane and median-controlled/divided. At-grade intersections and access driveways not permitted under any circumstances. Interchange spacing is in accordance with the INDOT *Roadway Design Manual*.
Tier 1: Statewide Mobility Corridor	A	Provides connections to major metropolitan areas within the State and to neighboring states. Provides accessibility to cities and regions around the state. Accommodates high-speed and long-distance trips. Can accommodate heavy commercial vehicle traffic. Includes most rural non-Interstate routes on the Principal Arterial System.	Includes all multi-lane roadways. Access generally occurs only at interchanges or at-grade public street intersections. Some movements at public street intersections may need to be restricted based on existing and projected operating conditions and intersection spacing. Private access to abutting properties is not allowed, unless property has no reasonable alternative access (via joint-use driveways or frontage roads) or opportunity to obtain such access.
	B	Same traffic function as Tier 1, Type A. Generally provides key rural connections between metropolitan areas.	Includes only 2-lane roadways. Access generally only occurs via at-grade public street intersections. Some movements at public street intersections may need to be restricted based on existing and projected operating conditions and intersection spacing. Private access to abutting properties is not allowed, unless property has no reasonable alternative access (via joint-use driveways or frontage roads) or opportunity to obtain such access.
Tier 2: Regional Corridors	A	Provides connections to smaller cities and regions, feeds traffic to the Statewide Mobility Corridors, and provides for regional accessibility. Accommodates moderate to high-speed traffic, medium distance trips, and moderate volumes of through traffic and commercial vehicle traffic. Can accommodate local heavy traffic volumes.	Includes all multi-lane roadways. Generally median-controlled/divided. Public street connections occur at-grade. Private access to abutting properties is allowed. Full movements and signalization are allowed for public steet connections and "commercial major" driveways only. All other private driveways are limited to unsignalized, right-in/right-out (median-controlled) access, with left-turns allowed conditionally subject to INDOT review and approval.
	B	Same traffic function as Tier 2, Type A.	Includes only 2-lane roadways. Public street connections occur at-grade. Private access to abutting properties is allowed. Full movements are allowed at all private driveways, with the exception of access driveways located within 300 feet of an existing (or potential future) signalized intersection which must be right-in/right-out (with left-turn access allowed conditionally subject to INDOT review and approval). Signalization is allowed for public street intersections and "commercial major" driveways only.
Tier 3: Sub-Regional Corridors	A	Typically provides access to local residences and businesses in rural areas and small towns. Accommodates moderate to low speed traffic, short distance trips, and moderate local traffic volumes.	Includes all multi-lane roadways. Public street connections occur at-grade and may be signalized. "Commercial major" driveways may also be signalized. Full movements are allowed at public street intersections and all private access driveways.
	B	Same traffic function as Tier 3, Type A.	Includes only 2-lane roadways. Public street connections occur at-grade and may be signalized. "Commercial major" driveways may also be signalized. Full movements are allowed at public street intersections and all private access driveways.
Special Transportation Areas		STAs could be implemented on roadways of all Tiers, and depend on location. STAs typically apply to roadways aligned through towns or environmentally-sensitive areas. They may range in function (between access and mobility) based on the needs of the community and environmental concerns.	Unique context-sensitive design and special access management treatments are established based on the particular mobility and access needs of the location, in accordance with general guidelines.

TABLE 12-1

A summary of the key differences in spacing guidelines for the three tiers is shown in **Table 12-2**:

Summary of Key Differences in Spacing Guidelines by Tier of Access Classification System

Tier	Ideal Signalized Intersection Spacing Guideline*	Minimum Acceptable Bandwidth for Deviation from Ideal Signalized Intersection Spacing		Functional Area near Signalized Intersections for Right-In/Right-Out Access Only
		Urban	Rural	
1A and 1B	½ mile	45%	50%	400 feet
2A and 2B	½ mile	40%	45%	300 feet
3A and 3B	½ mile	35%	40%	200 feet

* A ¼-mile spacing guideline applies to all State highways with speeds ≤ 40 mph located within a built-up urban area, regardless of tier.

Table 12-2

As shown above, the ideal spacing guideline for signalized intersections on all tiers of the State highway system is ½ mile in most cases. The ½ mile spacing typically accommodates progression speeds ranging between approximately 30 mph and 60 mph, depending on the length of the signal cycle that is selected.

As noted in the table above, for State highways with posted speeds of 40 mph or less that are located in built-up urban areas, a ¼ mile spacing guideline applies. Currently, these conditions would apply to a total of approximately 6.8 miles of the INDOT highway system under Tiers 3A and 3B. The ¼ mile spacing typically accommodates progression speeds ranging between approximately 15 mph and 30 mph, depending on the length of the signal cycle that is selected.

Where the ideal signal spacing guidelines cannot be met, a deviation may be allowed, provided a minimum acceptable bandwidth criterion can be met. As shown above, this minimum acceptable bandwidth criterion varies depending on the tier of the State highway system, and the location of the highway in either an urban or rural area.

Bandwidth measures how large a platoon of vehicles can pass through a series of signals without stopping for a red traffic light. It represents a "window of green" in which motorists traveling along a roadway will encounter a series of green lights as they proceed. For Tier 1 State highways, the minimum bandwidth is defined to be 45-percent in urban areas and 50-percent in rural areas. This means that if a traffic signal has a 100-second cycle length, there is a 45-second band in which a platoon of vehicles will encounter green lights as they travel along a State highway in urban areas, and a 50-second band for rural areas. In addition to minimum bandwidth, the signal spacing for a particular roadway is also a function of the cycle length of the signals and the desired progression speed for that roadway.

In addition, to reduce potential turning conflicts near signalized intersections, direct property access would be restricted to Right-In/Right-Out (RIRO) movements within a specified distance of such intersections. As shown in the table above, this distance would again depend upon which tier of the State highway the access driveway is located.

The spacing guidelines for unsignalized intersections and driveways are based on speed as specified in Table 8.1 of INDOT's *Driveway Permit Manual*, irrespective of tier. The decision-making process with respect to the application of the access spacing guidelines may also consider existing and projected future traffic volumes and the type of environment (built-up, intermediate,

suburban, and rural). In general, greater flexibility is needed for lower speed roadways in built-up areas.

Driveways should not be situated within the longitudinal length of an auxiliary lane from an adjacent intersection along any State highway. It should be noted that auxiliary lane criteria are not defined as part of the access classification system described above. The criteria for various types of auxiliary lanes are defined in the *Roadway Design Manual* and the *Driveway Permit Manual*, based on the roadway cross-section, traffic volume, and speed.

The following **Tables 12-3** through **12-8** provide the following details for Tiers 1, 2 and 3:

- Type of access permitted (at-grade intersection, private driveway);
- Traffic movements allowed (full movements, right-in/right-out only, etc.);
- Traffic control devices permitted (traffic signal, STOP sign);
- Spacing criteria for public intersections and driveways.

TABLE 12-3

Design Criteria for Tier 1: Statewide Mobility Corridors - Type "A" (Multi-Lane Roadways)

		At-Grade Public Street Intersections	Access Driveways[1,2]	
			Commercial Major	All other driveways
Permitted?		Yes	Restricted	Restricted
Traffic movements allowed		Full movements[3]	Full movements[3]	RIRO[4]
Traffic control devices		Traffic signal[5]	Traffic signal[5]	STOP[6]
Spacing criteria	Urban areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[7]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[8]	Ideal signalized spacing = 1/2 mile[8]	
	Rural areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[7]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[9]	Ideal signalized spacing = 1/2 mile[9]	

Notes:

1: Driveways should not be situated within the longitudinal length of an adjacent auxiliary lane.

2: Driveways are allowed if property owner has no reasonable alternative access (or opportunity to obtain such access) and joint-use driveways and frontage roads are infeasible.

3: Some movements may need to be restricted based on intersection spacing, and existing and projected operating conditions. Limited to Right-In/Right-Out movements for driveways within 400-feet of an existing (or potential future) signalized intersection. Left-turn access may be allowed conditionally subject to INDOT review and approval.

4: Right-In/Right-Out (RIRO) driveways are allowed if property owner has no reasonable alternative access (or opportunity to obtain such access) and joint-use driveways and frontage roads are infeasible. Left-turn access may be allowed conditionally subject to INDOT review and approval.

5: Traffic signal installation subject to traffic signal warrant criteria per MUTCD and additional assessment by INDOT, including signal criteria. Where warrants are satisfied, the new approach should be situated opposite an existing 3-leg intersection, if present.

6: STOP control applies to the access driveway and not to the State highway.

7: Except where future development may trigger the need for a signal, in which case the signalized spacing distance is to be applied.

8: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 45%.

9: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 50%.

Design Criteria for Tier 1: Statewide Mobility Corridors - Type "B" (Two-Lane Roadways)

		At-Grade Public Street Intersections	Access Driveways[1,2]	
			Commercial Major	All other driveways
Permitted?		Yes	Restricted	Restricted
Traffic movements allowed		Full movements	Full movements[3]	Full movements[3]
Traffic control devices		Traffic signal[4]	Traffic signal[4]	STOP[5]
Spacing criteria	Urban areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[6]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[7]	Ideal signalized spacing = 1/2 mile[7]	
	Rural areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[6]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[8]	Ideal signalized spacing = 1/2 mile[8]	

Notes:
1: Driveways should not be situated within the longitudinal length of an adjacent auxiliary lane.
2: Driveways are allowed if property owner has no reasonable alternative access (or opportunity to obtain such access) and joint-use driveways and frontage roads are infeasible.
3: Limited to Right-In/Right-Out movements for driveways within 400-feet of an existing (or potential future) signalized intersection. Left-turn access may be allowed conditionally subject to INDOT review and approval.
4: Traffic signal installation subject to traffic signal warrant criteria per MUTCD and additional assessment by INDOT, including signal criteria. Where warrants are satisfied, the new approach should be situated opposite an existing 3-leg intersection, if present.
5: STOP control applies to the access driveway and not to the State highway.
6: Except where future development may trigger the need for a signal, in which case the signalized spacing distance is to be applied.
7: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 45%.
8: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 50%.

TABLE 12- 4

Design Criteria for Tier 2: Regional Corridors - Type "A" (Multi-Lane Roadways)

		At-Grade Public Street Intersections	Access Driveways[1]	
			Commercial Major	All other driveways
Permitted?		Yes	Yes	Yes
Traffic movements allowed		Full movements	Full movements[2]	RIRO[3]
Traffic control devices		Traffic signal[4]	Traffic signal[4]	STOP[5]
Spacing criteria	Urban areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[6]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[7]	Ideal signalized spacing = 1/2 mile[7]	
	Rural areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[6]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[8]	Ideal signalized spacing = 1/2 mile[8]	

Notes:
1: Driveways should not be situated within the longitudinal length of an adjacent auxiliary lane.
2: Limited to Right-In/Right-Out movements for driveways within 300-feet of an existing (or potential future) signalized intersection. Left-turn access may be allowed conditionally subject to INDOT review and approval.
3: Limited to Right-In/Right-Out movements. Left-turn access may be allowed conditionally subject to INDOT review and approval.
4: Traffic signal installation subject to traffic signal warrant criteria per MUTCD and additional assessment by INDOT, including signal criteria. Where warrants are satisfied, the new approach should be situated opposite an existing 3-leg intersection, if present.
5: STOP control applies to the access driveway and not to the State highway.
6: Except where future development may trigger the need for a signal, in which case the signalized spacing distance is to be applied.
7: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 40%.
8: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 45%.

TABLE 12- 5

Design Criteria for Tier 2: Regional Corridors - Type "B" (Two-Lane Roadways)

		At-Grade Public Street Intersections	Access Driveways[1]	
			Commercial Major	All other driveways
Permitted?		Yes	Yes	Yes
Traffic movements allowed		Full movements	Full movements[2]	Full movements[2]
Traffic control devices		Traffic signal[3]	Traffic signal[3]	STOP[4]
Spacing criteria	Urban areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[5]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[6]	Ideal signalized spacing = 1/2 mile[6]	
	Rural areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[5]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[7]	Ideal signalized spacing = 1/2 mile[7]	

Notes:
1: Driveways should not be situated within the longitudinal length of an adjacent auxiliary lane.
2: Limited to Right-In/Right-Out movements for driveways within 300-feet of an existing (or potential future) signalized intersection. Left-turn access may be allowed conditionally subject to INDOT review and approval.
3: Traffic signal installation subject to traffic signal warrant criteria per MUTCD and additional assessment by INDOT, including signal criteria. Where warrants are satisfied, the new approach should be situated opposite an existing 3-leg intersection, if present.
4: STOP control applies to the access driveway and not to the State highway.
5: Except where future development may trigger the need for a signal, in which case the signalized spacing distance is to be applied.
6: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 40%.
7: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 45%.

TABLE 12-6

TABLE 12-7

Design Criteria for Tier 3: Sub-Regional Corridors - Type "A" (Multi-Lane Roadways)

		At-Grade Public Street Intersections	Access Driveways[1]	
			Commercial Major	All other driveways
Permitted?		Yes	Yes	Yes
Traffic movements allowed		Full movements	Full movements[2]	Full movements[2]
Traffic control devices		Traffic signal[3]	Traffic signal[3]	STOP[4]
Spacing criteria	Urban areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[5]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[6] Ideal signalized spacing = 1/4 mile for roadways ≤ 40 mph in built-up urban areas	Ideal signalized spacing = 1/2 mile[6] Ideal signalized spacing = 1/4 mile for roadways ≤ 40 mph in built-up urban areas	
	Rural areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[5]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[7]	Ideal signalized spacing = 1/2 mile[7]	

Notes:
1: Driveways should not be situated within the longitudinal length of an adjacent auxiliary lane.
2: Limited to Right In/Right Out movements for driveways within 200 feet of an existing (or potential future) signalized intersection. Left turn access may be allowed conditionally subject to INDOT review and approval.
3: Traffic signal installation subject to traffic signal warrant criteria per MUTCD and additional assessment by INDOT, including signal criteria. Where warrants are satisfied, the new approach should be situated opposite an existing 3-leg intersection, if present.
4: STOP control applies to the access driveway and not to the State highway.
5: Except where future development may trigger the need for a signal, in which case the signalized spacing distance is to be applied.
6. Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 35%.
7: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 40%.

Design Criteria for Tier 3: Sub-Regional Corridors - Type "B" (Two-Lane Roadways)

		At-Grade Public Street Intersections	Access Driveways[1]	
			Commercial Major	All other driveways
Permitted?		Yes	Yes	Yes
Traffic movements allowed		Full movements	Full movements[2]	Full movements[2]
Traffic control devices		Traffic signal[3]	Traffic signal[3]	STOP[4]
Spacing criteria	Urban areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[5]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[6]	Ideal signalized spacing = 1/2 mile[6]	
		Ideal signalized spacing = 1/4 mile for roadways ≤ 40 mph in built-up urban areas	Ideal signalized spacing = 1/4 mile for roadways ≤ 40 mph in built-up urban areas	
	Rural areas	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*[5]	Unsignalized spacing per Table 8.1 of *Driveway Permit Manual*	Spacing per Table 8.1 of *Driveway Permit Manual*
		Ideal signalized spacing = 1/2 mile[7]	Ideal signalized spacing = 1/2 mile[7]	

Notes:
1: Driveways should not be situated within the longitudinal length of an adjacent auxiliary lane.
2: Limited to Right-In/Right-Out movements for driveways within 200-feet of an existing (or potential future) signalized intersection. Left-turn access may be allowed conditionally subject to INDOT review and approval.
3: Traffic signal installation subject to traffic signal warrant criteria per MUTCD and additional assessment by INDOT, including signal criteria. Where warrants are satisfied, the new approach should be situated opposite an existing 3-leg intersection, if present.
4: STOP control applies to the access driveway and not to the State highway.
5: Except where future development may trigger the need for a signal, in which case the signalized spacing distance is to be applied.
6: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 35%.
7: Where 1/2-mile signalized intersection spacing guideline can not be met, minimum bandwidth must equal 40%.

TABLE 12- 8

Access Management - Retrofit Techniques

Access management improves traffic safety and protects the public's investment in the road system by preserving its functional integrity. Its focus is to minimize disruptions to the through traffic that would reduce the highway's safety and efficiency.

Access management is best implemented by applying criteria based on established traffic engineering and roadway design principles. However, there may be constraints in built-up areas that would limit the application of the access management criteria. This section provides guidance on access management techniques that can be used in situations where it is not possible to achieve the desired access criteria. These are commonly referred to as "retrofit" situations.

The design criteria described in this Guide identify the desired outcome for access connections to the State highway system. However, in areas that are fully developed, it may not be possible to achieve these desired conditions. For example, block widths and mid-block alleys in some urban areas may rule out achieving the spacing standards. Elsewhere, there may be many pre-existing driveways and patterns of land ownership that make it difficult to achieve the desired access location criteria. In these cases, retrofit techniques should be used to the maximum extent feasible to accomplish INDOT's access policy goals.

Inter-Governmental Coordination

The need for coordination between INDOT and local governments with respect to land use and transportation decisions cannot be understated. This section of the Guide addresses the role of local jurisdictions, their relationship to INDOT, and the need for coordinated decision-making with respect to access management.

In Indiana, access management is a prerogative of local government that varies in the level of exercise from no access control requirements, to access management standards that may, on occasion, be more restrictive than INDOT. Under general enabling legislation for municipalities (IC 36-9-2 and 36-9-6), counties (IC 8-17-1 and 8-20) and all levels of government (IC 9-21), local governments may require permits for private access to public roadways.

A secondary means of access management by local jurisdictions is through land use controls (zoning per IC 36-7-4-600 series, subdivisions per IC 36-7-4-700 series and site plan review per IC 36-7-4-1400 series) where requested permission to expand a land use right may trigger a review of roadway access to the subject property. Historically, the relationships between State and local jurisdictions regarding access management have been informal and found to vary widely throughout Indiana.

Although the review and approval of applications for driveway access to abutting State roadways is primarily the responsibility of INDOT, site plan review and approval are the responsibility of local governmental agencies. Although in some cases the permit review and site plan review processes are well-coordinated between INDOT and the local jurisdiction, the more frequent lack of coordination jeopardizes the ability of both agencies to manage access properly, which can have detrimental effects on the operations and safety of the highway system.

Sometimes problems begin with the local agency responsible for local land use planning, zoning, and site plan review. Site plans are approved without the county or municipality requesting an independent review by INDOT. As a result, the number and spacing of driveways, and the placement of buildings and parking areas, essentially become fixed, leaving INDOT with little or no opportunity for recourse.

It is not uncommon for developers and property owners to use this lack of inter-agency coordination to their advantage, pressuring one agency to take action only after approvals have been issued by the other agency. In addition, the INDOT driveway permit process can be avoided by the developer in cases where no direct site-access to a State highway is proposed.

Although much of the traffic associated with the development may use the State highway, INDOT is limited in its ability to require mitigating measures to compensate for this additional traffic.

The conflict between vehicle movement and land access increases as development continues in both urban and rural areas. The challenge is how best to coordinate vehicular access with land development in a way that encourages economic activity while simultaneously preserving mobility and providing adequate property access. The principles of access management, described earlier, address these competing needs.

Land use planning and development review all take place at the local level where the authority resides. A key objective of the transportation process, therefore, is to coordinate transportation and land use. This is especially important for access management and corridor preservation. The actions of local jurisdictions in planning, reviewing, and approving land development can significantly impact the ability of other agencies to implement their transportation plans. A key feature of successful access management is coordination with land use decisions made by local jurisdictions.

Future Activities

In the future INDOT, will initiate various studies and activities that will implement the recommendations arising from the INDOT Access Management Study and included in the new Indiana Access Management Guide.

Implementation and use of the INDOT Access Management Guide will be increased as INDOT addresses the current and projected needs of the Indiana Transportation System.

Given the continual and growing demands on the overall Transportation System, the increasing difficulties in finding ways to adequately solve these demands and needs, and the decreasing availability of funding for transportation solutions of all types, Access Management will play a greater role in the future in INDOT. INDOT will need to rely on the tools and techniques of Access Management to help us find new and innovative ways to address the future travel demand needs of the state.

Much of this chapter is from the Draft INDOT Access Management Guide which can be found in its entirety at http://www.in.gov/dot/div/planning/iams/index.html.

Appendix H: Planning Documents Links

INDOT Planning Studies can be found at: http://www.in.gov/indot/2355.htm .

Appendix I: Public Comments