TECHNICAL ADVISORY COMMITTEE
November 29, 2017
10:00 – 11:30 am
McCloskey Room (#135)

I. Call to Order and Introductions

II. Approval of Minutes*
   a. October 25, 2017

III. Communications from the Chair and Vice-Chair

IV. Reports from Officers and/or Committees
   a. LPA Project Updates

V. Reports from Staff
   a. I-69 Update

VI. Old Business

VII. New Business
   a. FY 2018-2021 Transportation Improvement Amendment*
   b. Draft 2040 Metropolitan Transportation Plan

VIII. Communications from Committee Members *(non-agenda items)*
   a. Topic suggestions for future agendas

IX. Upcoming Meetings
   a. Technical Advisory Committee – January 24, 2018 at 10:00 a.m. (McCloskey Room)
   b. Citizens Advisory Committee – January 24, 2018 at 6:30 p.m. (McCloskey Room)
   c. 2040 MTP Final Public Open House – November 30, 2017 at 6:00 p.m. (Council Chambers)
   d. Policy Committee – December 8, 2017 at 1:30 p.m. (Council Chambers)
   e. Policy Committee – December 15, 2017 at 1:30 p.m. (Council Chambers)

Adjournment

**Action Requested / Public comment prior to vote (limited to five minutes per speaker*).*

Auxiliary aids for people with disabilities are available upon request with adequate notice. Please call 812-349-3429 or e-mail human.rights@bloomington.in.gov.

Section 5

Bi-Weekly Local Agency Coordination Meeting

November 14, 2017

- **Attendance (October 31, 2017)**

Name	Organization
Andrew Cibor	City of Bloomington
Roy Aten	City of Bloomington
Jane Fleig	City of Bloomington
Pat Martin	City of Bloomington
Ben Ayers	Monroe County
Lisa Ridge	Monroe County
Paul Satterly	Monroe County
Jason Rhoades	HNTB
Audrey Myers	RBBCSC
Arnold Caldwell	RBBCSC
James Culbertson	INDOT
LaMar Holliday	INDOT
Sandra Flum	INDOT

- **Schedule Update**
  - Substantial Completion Date: August 2018
- **Construction Update**
  - *Zone 1*
    - 3rd Street
      - Bridge patching is still taking place
      - Bridge work should be completed by Thanksgiving
    - Tapp Road
      - NB traffic in one lane condition
      - Traffic signal has been taken out
      - Ramp system will close down to one lane going SB to tie in ramps
    - Vernal Pike
      - Temporary traffic signal still in place
      - Two weeks until traffic is switched to other side
    - Mainline
      - Paving continues from the south to Tapp Road

- *Zone 2*
  - Traffic shifts
    - Crews trying to finish intermediate pavement on mainline and finish shoulder work
    - SB traffic will move to new SB lanes (Tuesday, 10/31)
    - Excavation work still taking place mainline in Kinser Pike area
    - Two weeks amount of work to be completed on current SB lanes before NB traffic can be shifted onto old SB lanes
    - Access points will vary, traffic will have to use U-Turns
- *Zone 3*
  - On track to return to two lanes in both directions by Thanksgiving
    - Recent weather has delayed some work
  - Earthwork will continue, a lot of work to be completed on NB lane on outside and shoulder area

- **MOT Discussions**
  - Stop ahead and traffic pattern change signs still need to be picked up
  - Road close sign on S. Leonard Springs needs to be picked up
  - Resident request on Maple Leaf Drive: No place for people to turn around, requesting a road closure sign on Maple Leaf Drive and Hickory Leaf Drive
  - Jason Rhoades went over concepts and options of Cota Drive with city and county
  - Edge of pavement is still on INDOT's radar
  - County request: Request for pavement on Shaw Road to fix potholes
  - INDOT's Winter Preparedness
    - Interchanges, ramps, mainline and any restricted roads/access will be maintained by INDOT
    - Any roads without restrictions will be maintained by city or county
    - INDOT will maintain ramp system and roundabouts at Fullerton Pike, county will maintain Fullerton Pike
    - Walsh has O & M trucks and will use smaller vehicles on access roads
  - City concern: Stripping on 17th – there's double stripping on 17th St. on the EB turning lane.

To: BMCMPO Technical Advisory Committee and Citizens Advisory Committee

From: Pat Martin
Senior Transportation Planner

Date: November 8, 2017

Re: FY 2018-2021 Transportation Improvement Program (TIP) Amendments

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The Bloomington Public Transportation Corporation (BPTC) requests two amendments to the FY 2018-2021 TIP. The proposed amendments include:

Replacement of key elements of the HCAV system at the BPTC Grimes Lane Facility (DES# TBD)
This project will fund multi-year capital replacement through an FTA Section 5307 Grant.

BTPC Grimes Lane Facility – HVAC Key Element Replacements (DES# TBD)					
Project Phase	**Fiscal Year**	**Federal Source**	**Federal Funding**	**Local Match**	**Total**
CN	2018	5307	$120,000.00	$30,000	$150,000
CN	2019	5307	24,960	6,240	31,200
CN	2020	5307	25,958	6,490	32,448
CN	2021	5307	26,997	6,749	33,746
Totals			**$197,915**	**$49,479**	**$247,394**

Add one (1) additional BT Access vehicle to the two (2) previously programmed vehicles in the FY 2018-2021 TIP (DES#1500495, 1500496, 1700768, 1700769)
This project will fund the acquisition of three (3) BT Access vehicles through FTA Section 5307/5310 Grants.

SR46/SR45 at SR45/10th Street Statewide Safety Project (DES#1702224)					
Project Phase	**Fiscal Year**	**Federal Source**	**Federal Funding**	**Local Match**	**Total**
CN	2018	5307/5310	$128,800	$36,200	$165,000
CN	2019	5307/5310	104,832	26,208	131,040
CN	2020	5307/5310	109,025	27,256	136,282
CN	2021	5307/5310	113,386	28,347	141,733
Totals			**$465,043**	**$118,011**	**$583,054**

Requested Action
Recommend approval of the proposed FY2018-2021 Transportation Improvement Program amendments to the BMCMPO Policy Committee.

PPM/pm

Transform2040

Metropolitan Transportation Plan

Bloomington/Monroe County MPO

Adopted by the
BMCMPO Policy Committee:
TBD, 2017

Introduction

Transportation is a common thread in the quality of life of the residents of any community. People must move safely and efficiently between their homes, workplaces, shopping opportunities, and recreational activities. For each trip that a person makes, there are options. What mode of travel will be used? Which route will best connect the trip origin with its destination? What are the costs and benefits of the decisions made with regard to each trip?

Transform 2040 seeks to quantify the answers to those questions over a 20 year time horizon. The Plan serves primarily as a means to predict future transportation needs and to illustrate a plan of action to meet those needs. Specifically, it provides a menu of transportation projects to be implemented over the next 20 years that may alleviate projected congestion points, safety hazards, and connectivity limitations.

This document has been designed specifically to fulfill Federal and State transportation planning requirements, and, in doing so, to ensure that the Bloomington/Monroe County Metropolitan Planning Organization maintains its eligibility for Federal transportation funding. The Plan study area includes all of Monroe County to ensure that all communities are represented and that system-wide solutions to transportation issues can be created in a cooperative and coordinated process. In addition, the Plan strives to achieve a multi-modal transportation perspective, including provisions to improve facilities for bicycling, walking, and public transit.

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Acknowledgments

Transform2040 was completed through the efforts of a variety of individuals and groups. Their input, assistance, and persistence is greatly appreciated. Special thanks to all who participated in the public workshops and made the voice of the community heard in this process.

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Consultant

The Corradino Group (*Travel Demand Model*)

1 Executive Summary

Executive Summary

The 2040 Metropolitan Transportation Plan (MTP) constitutes the long-range, multi-modal transportation plan for the Bloomington, Indiana Urbanized Area as required by Federal statutes (23 USC 135, Section 450.300) for the programming of Federal funds for transportation project planning and implementation of ground transportation modes (roadway, transit, bicycle, and pedestrian facilities). The Plan study area included all of Monroe County in order to make it coordinated and comprehensive in its scope. The City of Bloomington, Monroe County, and the Town of Ellettsville participated in a cooperative process through the BMCMPO to develop the Plan. The 2040 Metropolitan Transportation Plan supersedes the 2035 Long Range Transportation Plan adopted by the Metropolitan Planning Organization's Policy Committee in the year 2015. The 2040 Metropolitan Transportation Plan is a "living" document, and complements the ongoing operational and capital improvement programs of the City of Bloomington, Monroe County, and the Town of Ellettsville.

The Governor of the State of Indiana designated the City of Bloomington Plan Commission as the MPO responsible for transportation planning when Bloomington became an Urbanized Area in 1980. The BMCMPO completed the first long range transportation plan in 1984 and has since updated and adopted subsequent plans through a comprehensive, coordinated, and continuous process. The 2040 MTP is a reflection of the BMCMPO's long commitment towards comprehensive, coordinated, and continuous transportation planning.

The 2040 Metropolitan Transportation Plan document consists of four key chapters:

- Chapter 2 outlines the BMCMPO's "Vision and Guiding Principles" that further establish transportation policies for preparing, evaluating and implementing multi-modal transportation improvements;
- Chapter 3 provides an overview and basis for "Future Transportation Needs", which helps to identify transportation needs through the year 2040;
- Chapter 4 estimates the available funding available for transportation investments and demonstrates a "Cost Feasible Plan" by showing the fiscal constraints of the BMCMPO through the year 2040; and
- Chapter 5 details the key policies and strategies of the MTP based upon the information from the three previous chapters.

The 2040 Metropolitan Transportation Plan incorporates all of Monroe County into its study area to improve project coordination on the edge of the expanding urban area. Upon adoption, the 2040 Metropolitan Transportation Plan will:

- Serve as the basis from which to draw transportation projects involving Federal surface transportation funds for the Transportation Improvement Program for the Bloomington Urbanized Area;
- Be incorporated by reference into the Indiana Statewide Long-Range Multi-Modal Transportation Plan when it is updated; and
- Provide guidance of an advisory nature to Monroe County and the Indiana Department of Transportation on projects outside the Urbanized Area boundary.

The 2040 Metropolitan Transportation Plan shall undergo an update at least every five years in order to maintain the minimum 20-year time horizon with more frequent amendments as needed and approved by the BMCMPO Policy Committee.

MTP Development

At a minimum, this plan has been developed to satisfy federal and state planning requirements, and, in doing so, has ensured that the BMCMPO maintains its eligibility to receive federal transportation funding. Details of the federal requirements can be found in Appendix A, but the MTP requirements are also summarized below:

- projected transportation demand of persons and goods
- existing and proposed transportation facilities for all modes
- operational and management strategies to improve the performance of existing transportation facilities to relieve vehicular congestion and maximize the safety and mobility of people and goods
- assessment of capital investment to preserve the existing and projected future infrastructure and provide for multi-modal capacity increases based on regional priorities
- a discussion of types of potential environmental mitigation
- pedestrian walkway and bicycle transportation facilities in accordance with 23 U.S.C. 217(g)
- transportation and transit enhancement activities
- a financial plan that demonstrates how the adopted transportation plan can be implemented

Public Outreach Process

Public and stakeholder outreach has been continuous throughout the development of Transform 2040. Through a variety of stakeholder interviews, the creation of a task force, public workshops, public open houses and interagency consultation and coordination, the BMCMPO has received ample input and thus direction regarding the vision, travel demand model scenarios, public outreach activities, strategies and more. Public notices, press releases, and contact lists were used to notify the public on all of the outreach opportunities listed below. All locations and meetings were accessible and open to the public. The methods for gathering public input are summarized in Appendix C and feedback has been used to help further shape and refine the MTP throughout the development and approval process. Generally, the following are methods used throughout the development of the MTP to both inform the public and gather their feedback.:

- Metropolitan Transportation Plan Task Force (2010 - 2014)
- Individual Stakeholder Interviews (2013)
- Travel Surveys (2013)
- Public Workshops (2013 -2017)
- Presentations to MPO Committees (2010 - 2017)
- Final Public Open House (2017)
- Interagency Consultation and Coordination (2012 -2017)

Technical Assistance

The Corradino Group was retained to provide key tasks to develop the 2040 MTP. The data collection, methodologies, and model development are further detailed in Appendix B, C, and D. Technical assistance focused on the following objectives in developing this MTP:

- Data Collection and Analysis
- Socioeconomic Forecasts
- Transportation Analysis Zones (TAZ)
- Land Use Forecasts
- Travel Demand Model
- Performance Measures

Future Transportation Needs

The determination of future transportation needs involved an extensive and intensive public involvement process with citizens, elected /appointed officials and transportation engineers, managers, planners. Themes that emerged were an projected increase in elderly populations; an increased demand for multi-modal transportation options; environmental air quality and health concerns with the use of fossil fuels, and an increasing interest towards maintenance, operations and preservation of current transportation infrastructure.

The consensus finding was that current needs of the BMCMPO transportation network are in many ways similar to our future needs, especially when examining safety, convenience, mode, and accessibility needs.

Transform 2040 therefore takes a new approach different from prior long-range plans by focusing more to multi-modal performance measures and scenarios rather than specific projects.

Public transit needs include potential service improvements, facility modernization at the Grimes Lane facility, passenger amenities, cost-feasible fleet replacement less dependence on fossil fuels, and pursuit of a Transit Regional Authority. A key challenge for public transportation is continuous future fleet replacement with flat to declining federal assistance.

State highway needs voiced by the public and elected officials center on safety, mobility and connectivity for pedestrian and bicycles along and within selected corridor areas. Safety must follow FHWA performance standards to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

Local road and street needs for Monroe County, the Town of Ellettsville and the City of Bloomington predominantly emphasize safety and east-west connectivity. Safety performance targets must correspond with those established by INDOT or targets determined through the MPO area approved by INDOT.

Active transportation needs identified a demand for separate and/or protected sidepath/multi-use facilities for pedestrians and cyclists along high volume corridors; facilities that address users of all ages and abilities; a review/prioritization of transit stop facilities, and; improved connectivity for the most vulnerable system users.

Financial Forecasts

The Bloomington/Monroe County urbanized area is forecast to receive approximately $79.3 million in Federal Surface Transportation Program (STP), $13.6 million in Highway Safety Improvement Program (HSIP), and $4.5 million in Transportation Alternatives Program (TAP) funds through Fiscal Year 2040 for transportation infrastructure investments.

The sum total of revenue sources from Monroe County and the City of Bloomington Motor Vehicle Highway Account, Wheel Tax, Local Road and Street, Cumulative Bridge Funds, Cumulative Capital Development, Tax Increment Financing, and Alternative Transportation Funds suggest that, given forecast assumptions, the BMCMPO planning area will have over $564 million in local funds available for safety, maintenance, preservation, and added multi-modal transportation system capacity activities for Fiscal Years 2018 through 2040.
The sum total of revenue sources for Bloomington Transit under formula grants, capital investment grants, and locally derived income suggest that, given forecast assumptions, the BMCMPO planning area will have over $210.6 million available for transit service activities for Fiscal Years 2018 through 2040.

The Plan Scenarios

The BMCMPO 2040 Metropolitan Transportation Plan travel demand model (TDM) examined macro-level transportation system network scenarios under an assortment of policy considerations and associated socioeconomic/land use changes.

The scenarios examined with the TDM relied upon guidance from the public Metropolitan Transportation Plan Task Force, general public input, and MPO staff experience as reasonable comparable examples. The travel demand model (TDM) used FHWA/FTA performance measures to further examine all scenarios.

The BMCMPO travel demand model examined a "Do Nothing" Scenario and twelve (12) Travel Demand Model alternative scenarios using Base Year 2013 and forecasting to the Year 2040.

Scenario #12, using an established transportation

policy orientation of projects programmed in the BMCMPO FY 2016-2019 plus a strong focus on urban infill (TIP + Urban Infill), clearly demonstrated the best multi-modal system performance in the Year 2040.

Furthermore, Scenario #12 meets or shall meet FHWA national performance goals for safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and potentially reduced project delivery delays.

Scenario #12 is the recommended Scenario or multi-modal growth and management system policy approach for the BMCMPO 2040 Metropolitan Transportation Plan.

2 Guiding Principles

What is *Transform2040*?

The Metropolitan Transportation Plan (MTP) for the Bloomington Monroe County Metropolitan Planning Organization, *Transform2040,* sets the course for regional transportation investment in the Bloomington Urbanized Area for the next 25 years. It provides a framework for transportation decision-making and project selection that can be used in cooperation by the MPO partners to select and implement the right projects for the future of the region.

Transportation in the Bloomington Urbanized Area has changed significantly within the last ten years. The adoption of the BMCMPO Complete Streets Policy has influenced the selection and design of Federally funded local projects, ensuring that they are welcoming and safe for all modes of travel. The construction of the I-69 highway project, while still in progress, promises to profoundly alter local travel patterns and regional access to key resources. Steady growth in transit ridership and recent national declines in overall driving volumes portend exciting opportunities for the future.

Transform2040 will help the region respond to these challenges and opportunities. The vision, goals, and objectives provided in this chapter will guide MPO decision-makers as they work to build the best possible transportation system for local users. Ultimately, all policy and investment decisions made by the MPO should be consistent with the vision, goals, and objectives set forth in the Plan.

Guiding Principles

Vision

We will build a transportation system that ensures the safe, efficient movement of people, whether by motor vehicle, transit, bicycle or walking; that is directed by relevant locally adopted land use and transportation plans; that is compatible with citizen desires; and that ultimately links our communities to each other, our region, our state, and our nation.

Goals

Mobility & Accessibility

Improve the movement of people through the transportation system as a means to create modal and social equity within the transportation system community

- Select transportation projects that are sensitive to community character and do not induce sprawl development
- Encourage development patterns that are walkable, bikeable, and readily served by public transit
- Encourage infill development to most effectively utilize existing utilities and infrastructure
- Enhance the efficient movement of freight through maintenance, operational and capital investment decisions
- Annually allocate 20% of STP, or its equivalent in future transportation bills, to fund independent non-motorized projects that are not part of a larger roadway project
- Use local Americans with Disabilities Act (ADA) Transition Plans to identify deficiencies and implement projects that ensure promote proper integration of ADA components into the transportation system

Transit

Provide the community with efficient, affordable, frequent and reliable transit services

- Pursue all possible funding opportunities to increase public transit capital and operating investment and to expand, enhance, and increase the use of transit services
- Prioritize projects that will create or improve direct access to transit services
- Use the BMCMPO Coordinated Human Services Transportation Plan to identify and remove gaps in transit services to elderly, disabled and low-income citizens in the region
- Encourage transit projects that increase "choice-riders" who choose to take transit even though they may have other travel options.
- Continue to fund transit projects that maintain or upgrade current facilities
- Encourage the expansion of both geographic coverage and hourly services offered by transit
- Encourage the use of advanced technologies such as electric, CNG and autonomous buses in regular transit services and operations

Community

Ensure that transportation projects maximize the community's quality of life and are compatible with local land use plans and policies

- Involve the public in transportation project selection, scoping, and implementation
- Incorporate context sensitive solutions and best practices into all project designs as set forth in alternative transportation plans, comprehensive plans, subdivision control ordinances and site design review processes
- Pursue all possible funding opportunities to increase trail use and investment

- Plan, design, develop, construct and maintain transportation facilities to minimize adverse impacts on environmentally sensitive areas, public parks and recreation areas, historic structures and neighborhoods
- Incorporate aesthetic elements such as streetscape features into transportation projects such that they are compatible with the abutting area
- Implement public outreach programs that create awareness of the impact that travel mode choices have on the transportation system, the environment, and the community

Safety

Improve the safety of the transportation system for all modes and all users

- Fund non-traditional, non-capacity adding projects that encourage and educate the public about safe driving, biking, walking, and using transit
- Encourage safety and civility among roadway users of all modes
- Analyze the causes of traffic safety hazards and reduce those hazards in a comprehensive, systematic and sustainable way
- Annually evaluate the top 10 crash locations by crash rate and crash severity and implement quick, low-cost improvements while also seeking funding for more comprehensive changes if necessary

Preservation

Directly focus on maintaining existing transportation facilities before building new ones

- Adopt a "fix-it-first" mentality that directs funding and project selection to prioritize maintenance and renewal of existing transportation facilities
- Support projects that maximize the use of existing infrastructure through systematic, systemic and operational best practices
- Evaluate proposed project alternatives that maximize existing transportation facilities for all modes including freight
- Maintain and improve existing infrastructure through projects such as surface treatment, bridge repairs, improved striping paint, sign replacements and drainage improvements
- Create a Transportation Improvement Program that effectively directs spending in compliance with this Metropolitan Transportation Plan

3 Future Transportation Needs

Introduction

We don't always think about it, but transportation plays an incredibly important role in all of our lives. Every day we travel to work, home, school, friends houses and back again on a network of highways, streets, sidewalks, and bridges. Some people choose to travel by car while some choose to walk, ride a bicycle or take a bus. Furthermore, the goods and services we buy and use also rely on transportation. One can easily understand the broad scope that transportation plays within a community and addressing the wide range of mobility needs. When considering the implications of an aging population, the impacts from climate change, and the various economic constraints to pay for transportation improvements, this can further complicate the process for a community to meet its many mobility needs.

Projections predict approximately 173,784 people will call Monroe County their home by the year 2040. This growth can result in new residential neighborhoods, employment centers, and commercial destinations. Ultimately, these projections estimate over 35,000 new people living in Monroe County by 2040, who together with the existing population will have a range of transportation needs to anticipate and plan for.

As part of the development of *Transform 2040*, several transportation themes emerged from the process. These themes help to establish a perspective that can be used towards opportunities and have potential to help meet area needs.

The key themes include:

- Increase in elderly population - account for an increase of the baby boomers and their impact transportation;
- Increasing desire for more transportation options - account for an increase in the number of transportation options available to the community;
- Use of fossil fuels and its impacts on carbon emissions and greenhouse gases - account for impacts and changes that address the impacts travel has on air quality, health, and the environment; and
- Increasing interest towards maintenance, operations and preservation of current transportation infrastructure - account for maintenance and operations as a means to address needs.

Because *Transform 2040* serves as the comprehensive "blueprint" it must satisfy anticipated future transportation and mobility needs of residents within Monroe County. *Transform 2040* achieves this through policy direction by guiding future transportation projects and programs that are expected to be implemented by the year 2040. However, many projects have yet to be fully developed and only the expectation that these general needs will be addressed over time. This Chapter discusses a range of considerations regarding future needs and does not identify specific projects for consideration. Rather, this chapter reviews existing conditions and outlines characteristics of Monroe County that play a key role in transportation and mobility. From this assessment and public feedback, a range of future transportation and mobility needs are summarized. Keeping in mind that these needs must be viewed through the lens of the Guiding Principles detailed in Chapter 2 as future projects begin to take shape in response to these needs. Together the future needs and Guiding Principles can result in an implementable, sustainable plan.

Socioeconomic Forecast

Regional Profile

A majority of the population living within Monroe County is located within the urbanizing area, which includes the Town of Ellettsville, the City of Bloomington, and portions of Monroe County adjacent to these incorporated areas. Stats Indiana has the current population estimate for Monroe County at approximately 143,000. Of this total, approximately 83,000 people live within Bloomington, and 6,400 people within Ellettsville. Coupled with Bloomington's density compared to the rest of Monroe County and the presence of Indiana University students, these two factors have a significant impact on our transport system.

A few national and regional trends do offer an important context to transportation and mobility needs for the BMCMPO. Often these aspects are not directly considered because they may present challenges when planning for future investments. Just as "do nothing" or "no build" are often considerations for future investments, the following trends can offer policy guidance on choices and future investment decisions:

- Typical households spend 20% of household income on transport, where annual automobile owner costs according to American Automobile Association (AAA) is over $8,500;
- Area household poverty rate just under 24%, according to Stats Indiana; and
- Lack of reliable and efficient transportation is a barrier to upward mobility for many households, which can hinder economic growth and stability.

Keeping this in mind, for families in Monroe County earning the median household income of just over $40,000, they would spend around $8,010 annually. Factor in rent/mortgage, utilities, food and basic essentials, there is not much leftover for disposable income, savings, or other needs. Thus the BMCMPO transportation network must strive to provide mobility options that increase reliability of the network and increase mobility access for every household regardless of household income levels.

Monroe County historically has avoided national/state economic cycles of boom and bust conditions. Historic trends demonstrate a relatively stable economy and modest population growth. The estimated population growth is provided in Table 3-1. This trend, about 1% per year in population growth, is expected to continue thanks to large stable employers within the public education and health sectors of the local economy. Monroe County additionally serves as a regional retail and service hub for the surrounding counties, which facilitates sustainable stable economic conditions.

Because economic conditions greatly influence population trends, together they help assess the long-term impacts on the transportation system from their related travel demands. Monroe County's modest growth rates establish daily trip demands based on employment, shopping, school, or pleasure. This in turn factors into the functionality of the whole transportation network, which is projected into the future to help estimate needs.

A simple growth projection of traffic volumes is not a sufficient means to account for future trip generation and network needs. Using more detailed demographic, household, land use, and employment data, projections can better incorporate these attributes which influence household trip generation. For example, the very young and elderly often are dependent upon others for their daily transportation needs and tend to generate fewer daily trips. Conversely, the employed and higher income households tend to generate more daily trips than other cohorts. Using a range of household and employment attributes is beneficial way to project future trip generation and network needs.

Land Use Scenario Development - Forecasts 2040	*Overall Growth Scenario ---> Development Style --->	Low Growth Standard	Low Growth Compact	Low Growth Low Density	Mid-Range Growth Standard	Mid-Range Growth Compact	Mid-Range Growth Low Density	High Growth Standard	High Growth Compact	High Growth Low Density
Control Totals - TAZ Global Assumptions										
	Number of households by scenario	64,431	64,431	64,431	72,952	72,952	72,952	82,552	82,552	82,552
	Total population by scenario	153,209	153,209	153,209	173,784	173,784	173,784	185,234	185,234	185,234
	Total employment by scenario	94,240	94,240	94,240	107,135	107,135	107,135	118,443	118,443	118,443
	School enrollment	15,762	15,762	15,762	17,879	17,879	17,879	19,057	19,057	19,057
	IU enrollment forecast	48,500	48,500	48,500	49,000	49,000	49,000	50,000	50,000	50,000
Employmnet Global Development Assumptions										
	Emp. Growth Existing	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
	Emp. Growth Undeveloped	70.0%	40.0%	80.0%	70.0%	40.0%	80.0%	70.0%	40.0%	80.0%
	Emp. Growth Redevelopment	20.0%	50.0%	10.0%	20.0%	50.0%	10.0%	20.0%	50.0%	10.0%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	New Housing - Low Density	50.0%	10.0%	80.0%	50.0%	10.0%	80.0%	50.0%	10.0%	80.0%
	New Housing - Medium Density	25.0%	50.0%	19.0%	25.0%	50.0%	19.0%	25.0%	50.0%	19.0%
	New Housing - High Density	25.0%	40.0%	1.0%	25.0%	40.0%	1.0%	25.0%	40.0%	1.0%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Residential Global Assumptions										
	Infill Medium Density	10.0%	50.0%	1.0%	10.0%	50.0%	1.0%	10.0%	50.0%	1.0%
	Redevelopment High Density	70.0%	90.0%	30.0%	70.0%	90.0%	30.0%	70.0%	90.0%	30.0%
	Rural SFR Units per acre	0.2	0.1	2	0.2	0.1	2	0.2	0.1	2
	Urban SFR Units per acre	8	12	5	8	12	5	8	12	5
	Max. Rural Growth	0.5%	0.1%	1.0%	0.5%	0.1%	1.0%	0.5%	0.1%	1.0%

Detailed Summary After Applying Assumptions:	Overall Growth Scenario ---> Development Style --->	Low Growth Standard	Low Growth Compact	Low Growth Low Density	Mid-Range Growth Standard	Mid-Range Growth Compact	Mid-Range Growth Low Density	High Growth Standard	High Growth Compact	High Growth Low Density
Total Employment 2040										
	RETAIL	2,443	2,443	2,443	2,777	2,777	2,777	3,070	3,070	3,070
	INDUST	7,228	7,228	7,228	8,217	8,217	8,217	9,084	9,084	9,084
	OFFICE	10,972	10,972	10,972	12,473	12,473	12,473	13,789	13,789	13,789
	SERVICE	73,597	73,597	73,597	83,668	83,668	83,668	92,499	92,499	92,499
	TOTAL_EMP	94,240	94,240	94,240	107,135	107,135	107,135	118,443	118,443	118,443
Net Employment Growth 2010-2040										
	RETAIL	(476)	(476)	(476)	(142)	(142)	(142)	151	151	151
	INDUST	(1,148)	(1,148)	(1,148)	(159)	(159)	(159)	709	709	709
	OFFICE	900	900	900	2,401	2,401	2,401	3,717	3,717	3,717
	SERVICE	15,353	15,353	15,353	25,423	25,423	25,423	34,254	34,254	34,254
	TOTAL_EMP	14,627	14,627	14,627	27,522	27,522	27,522	38,830	38,830	38,830
Employment Growth in Existing Establishments										
	RETAIL	(571)	(571)	(571)	(170)	(170)	(170)	15	15	15
	INDUST	(1,377)	(1,377)	(1,377)	(190)	(190)	(190)	71	71	71
	OFFICE	90	90	90	240	240	240	372	372	372
	SERVICE	1,535	1,535	1,535	2,542	2,542	2,542	3,425	3,425	3,425
	TOTAL_EMP	(323)	(323)	(323)	2,422	2,422	2,422	3,883	3,883	3,883
Employment Growth in Undeveloped Sites										
	RETAIL	74	74	74	22	22	22	106	61	121
	INDUST	179	179	179	25	25	25	496	284	567
	OFFICE	630	360	720	1,681	960	1,921	2,602	1,487	2,974
	SERVICE	10,747	6,141	12,283	17,796	10,169	20,339	23,978	13,702	27,404
	TOTAL_EMP	11,629	6,754	13,255	19,524	11,176	22,306	27,182	15,533	31,066
Employment Growth in Re-developed Sites										
	RETAIL	21	21	21	6	6	6	30	30	30
	INDUST	51	51	51	7	7	7	142	142	142
	OFFICE	180	180	180	480	480	480	743	743	743
	SERVICE	3,071	3,071	3,071	5,085	5,085	5,085	6,851	6,851	6,851
	TOTAL_EMP	3,323	3,323	3,323	5,578	5,578	5,578	7,766	7,766	7,766
Residential Growth - Rural	Total Rural Housing Units	11,273	9,804	13,411	11,273	9,804	13,411	11,273	9,804	13,411
	Net growth in rural	1,806	337	3,944	1,806	337	3,944	1,806	337	3,944
	Rural acres needed	9,028	3,370	1,972	9,028	3,370	1,972	9,028	3,370	1,972
Residential Growth - Urban	Total Urban Units	53,158	54,626	51,020	61,679	63,148	59,541	71,279	72,748	69,141
	Net growth in urban	8,141	9,609	6,003	16,662	18,131	14,524	26,262	27,731	24,124
Residential Growth Distribution	New vacant site low density	4,070	961	4,802	8,331	1,813	11,619	13,131	2,773	19,299
	New vacant site med. density	1,832	2,402	1,129	3,749	4,533	2,732	5,909	6,933	4,538
	New in-fill med. density	204	2,402	11	417	4,533	28	657	6,933	46
	New vacant site high density	611	384	42	1,250	725	102	1,970	1,109	169
	New redeveloped site high density	1,425	3,459	18	2,916	6,527	44	4,596	9,983	72
	Urban acres needed	509	80	960	1,041	151	2,324	1,641	231	3,860

Table 3-1: 2040 socioeconomic household and employment sector data by low, medium, high growth rates with data subsequently allocated into land use development of standard, compact, and low density development styles.

The BMCMPO took into account many important attributes in order to better reflect existing conditions and subsequently project relatively accurate future needs tailored more specifically to Monroe County. Another step to this future projection took into account how and how fast Monroe County would grow over time. A low density, standard, and high density growth pattern was considered in combination with a slow, moderate, and fast growth rate as detailed in Table 3-1. The results of these projections will be detailed more in Chapter 5, but is important to highlight as part of projecting future conditions.

The first step in this projection process used 2013 as the Base Year to establish existing conditions. This also included new projects that already have funding committed through the BMCMPO and would be implemented within a near-term basis. The range of data employment and household characteristics previously discussed plus mode choice, traffic counts, and land use for Monroe County were used to establish base year conditions. Once these conditions were vetted or validated, these data were then used to project future trip generation. This future projection is one aspect used to identify network needs to the year 2040. Public input, fiscal constraints, and federal transportation performance measures are other aspects considered in the MTP. *Transform 2040* takes a new approach than prior plans with a focus directed toward performance measures and scenarios rather than specific projects. More information is available in Appendix D regarding the travel demand model on base year conditions and projections.

Fundamental understanding future transportation system needs is an exercise on the assessment process of existing infrastructure (including programmed improvement projects) the ability to reasonably accommodate future travel demands. In the past, typical approaches tended to identify projects that generally fall under "capacity expansion" actions, such as adding through lanes to existing roadways, constructing new roadways, or adding interchanges in order to accommodate future needs. While this approach can help to determine if any significant capacity deficiencies exist within the network, it is often silent on the role that centralized land use policies play, the role "capacity preservation" can offer, or the role that other performance measures, such as safety provide in addressing future needs. These actions are important to assess as they often cost less and take less time to implement when compared to "capacity expansion" actions and is the primary focus of this Plan. Actions that can accomplish addressing future need include:

- For Commuting & Recreation: the on-going day-to-day operation and maintenance of the existing roadway system and bicycle and pedestrian facilities, the public transportation fixed-route services, the demand-response services for the elderly and handicapped;
- For Capital Replacement: the preservation of roadways through resurfacing and reconstruction based on a pavement management program, the rehabilitation and reconstruction of bridges through a bridge management program, the improvement of transit service facilities and replacement buses through a public transportation capital assets management program; and
- For Safety Improvements & Localized Congestion Relief: low-cost capital improvements for preservation of safety and roadway capacity through intersection signalization, improved signage, pavement marking, and guardrail improvements based on safety, congestion, and access management programs.

Due to the on-going nature of these "capacity preservation" projects, most are not specifically defined in a Metropolitan Transportation Plan partially due to limitations in the ability to forecast the best time to implement relatively small scale improvements.

Capacity preservation projects are often identified in short-term needs planning based on responses to localized development and travel pattern adjustments.

The identification and funding of capacity preservation projects are defined, as appropriate, in the annual operating and capital improvement programs of the Town of Ellettsville, Monroe County, the City of Bloomington, and in the Transportation Improvement Program (TIP) of the Bloomington/Monroe County Planning Organization (MPO).

Future Needs

Anticipated Transportation Needs

The current needs of our transportation network are in many ways similar to our future needs, especially when examining safety, convenience, mode, and accessibility needs. This is fairly easy to equate into future needs when developing specific projects. This could include safety improvements to a location with a high incidence of crashes, a new multi-use trail project connecting a school to a neighborhood, extended transit service times to meet demand, and updating an existing corridor to improving east-west connectivity. In addition to safety, convenience, mode choice, and accessibility needs, "big picture" input from the general public, local agencies, and elected officials indicates overwhelmingly strong preferences towards lower carbon emissions, less dependence on the automobile, and increased mode shares for transit, walking, and bicycle trips. Big picture ideas on the influence of I69, increasing gasoline prices, housing strategies, and the relocation of a major employer, Bloomington Hospital, are also important considerations when anticipating our future needs as these will have a significant impact upon the network.

While some feedback suggested new facilities such as Fullerton Pike, a bypass for Ellettsville, or multi-use trails, these specific types projects in the context of our future may be uncertain when evaluated network-wide. It is important that to remember that future needs are not necessarily just a list of projects, but also include "big picture" or policy level guiding principles such as lowering our greenhouse gas emissions or increasing the mobility of non-motorized trips. Over time, conditions will change and reassessments will be necessary for either the base year or future assumptions. Typically this is achieved through regular updates of the MTP approximately every five years.

Public Transit Needs

Bloomington Public Transportation Corporation (BPTC), Indiana University Campus Bus, and Rural Transit are the three public transportation service providers that operate within Monroe County. The Bloomington Public Transportation Corporation (BPTC), known as Bloomington Transit, provides public transportation services exclusively within the Bloomington corporate limits.

Indiana University Campus Bus primarily serves student transportation needs on the Indiana University campus.

Rural Transit, operated by the Area 10 Agency on Aging, serves demand response transportation needs within the 244,000 population service area covering Monroe, Lawrence, Owen, and Putnam Counties. Ridership demands within this service area are growing with an aging of the population.

Transit has enjoyed extraordinary growth in service and ridership over the past three decades within the City of Bloomington and Monroe County. Growth in ridership and service is expected to continue well into the future albeit at slower rates given market saturation and potential market competition from emerging on-demand ride-sharing technologies. As Bloomington continues to grow, however, it is essential to plan for the provision of expanded public transportation services that offer viable public alternatives to driving. The MTP identifies a number of "big picture" transit service and capital improvements necessary over the next two decades to ensure the provision of mobility options.

In this section, a summary of the following future service and capital needs for the area transit providers:

Service

- Transit service should be provided seven days a week including Sundays on all routes not campus-oriented.
- Transit service should be provided on holidays that are major shopping days such as New Year's Day, Memorial Day, and Independence Day.
- Transit daily service hours should be increased.
- The frequency of transit service should be increased or reduced headway times by route are attained.
- The coverage of transit service areas are

increased to reflect population and employment growth.

- Pursue mobility management strategies for persons with disabilities and the general public (Examples: partnerships with TMCs and risesharing companies).
- Pursue new local funding sources for expanding transit services (Example: Local Option Income Tax as the best likely choice for significantly expanding transit services for Monroe County and the City of Bloomington).
- Employ travel training as a means to encourage and train persons with disabilities who are currently using specialized transit services to use fixed route service.

Facilities, Fleet, and Amenities

- Continue to explore ex-urban Park and Ride lots to help serve residents/commuters living outside the urbanized area.
- Continue transit fleet replacement according to the prescribed duty cycles, including specialized fleet providing service to people with disabilities.
- Continue researching, testing and, when practical, the use of emerging alternative emerging propulsion system technologies (e.g., total electric, CNG and autonomous vehicles) to further operational/capital cost efficiencies, promote the advancement these technologies, and minimize environmental impacts.
- Explore the operational and capital cost implications of emerging driverless vehicle technologies.
- Modernize all elements of the Grimes Lane facility nearing or at the end of productive service life.
- Explore a potential Grimes Lane facility expansion to accommodate fleet growth
- Update passenger amenities as needed at bus stops, downtown facilities, and onboard passenger vehicles the help promote and encourage transit use for persons of all abilities.

Transit Regional Authority

- Pursue legislative efforts to overcome the existing barriers to development of regional transit authorities.
- Maintain consideration of further efficiencies through the development of an overarching regional transit authority for the distribution of Federal funding resources and potential develop policy and decision-making for the provision of services.

State Highway Needs

Indiana's 2013-2035 Future Transportation Needs Report "Keeping Indiana Moving" guides INDOT's needs-based strategic planning approach. The management of INDOT's bridge and highway network system are directed by business models emphasizing a combination of federal/state economic and engineering performance goals to further derive bridge and highway needs.

INDOT facilities within Monroe County include SR 37/I-69, SR 45, SR 46, the SR 45/46 Bypass, SR 48, and SR 446. The functional use of these transportation network facilities fulfill urban and rural, Interstate, arterial, and collector distributive roles. The SR 37/I-69 corridor will evolve after the completion of the Section 5 and Section 6 projects in Calendar Year 2018 and beyond, respectively. The remaining balance of INDOT roadway corridor facilities will additionally evolve to the Year 2040, but at lesser rates dependent upon local, regional, and state economic/population growth needs.

Through an extensive set of BMCMPO public input and involvement opportunities, residents identified a set of state highway system needs within Monroe County. A majority of the citizen identified needs focus on safe and comfortable facilities for pedestrians and bicyclists along State Roads outside of the SR 37/I-69 corridor. These needs emphasize safety, mobility and connectivity fully consistent with current FHWA and INDOT performance measures.

The following section is a summary of future area needs for state highways:

- Sidewalks on both sides of State Road 45 with trees and/or separation from north of University Elementary School to the 45/46 Bypass;
- Dedicated on-street bicycle facilities on State Road 45 from near University Elementary to the 45/46 Bypass, but especially at the curve near Smith Road;
- Improved intersection safety at the SR 46 Bypass/College Mall Road and E. 3rd Street;

- Increased and consistent pedestrian facilities along E. 3rd Street from College Mall Road to State Road 446;
- Completion of SR 45/46 Bypass pedestrian/bicycle facility accommodations "missing link" between Kinser Pike and College Avenue.
- Increased and consistent bicycle facilities along E. 3rd Street from College Mall Road to 446;
- Increased sidewalk connections along State Road 446, especially where there is the opportunity to connect to existing sidewalk networks; and
- "Other" projects that increase comfort and safety for pedestrians and bicyclists along State facilities.

Local Road Needs

Beyond maintenance and preservation, future local road and street needs for Monroe County, the Town of Ellettsville and the City of Bloomington predominantly focus on safety and east-west connectivity. Safety needs include vehicular, pedestrian and bicycle intersection improvements based on crash reports and public comments, and corridor safety improvements (e.g., sidewalks, sidepaths, multiuse-pathways) for pedestrian and bicycle transportation movements. East-west connectivity needs are found along Monroe County's Fullerton Pike/Gordon Pike corridor. Appendix G also includes a listing of local projects.

Active Transportation Needs

The BMCMPO strives to create a walking and bicycling network for all ages and abilities. A car is not accessible to everyone. A third of the U.S. population cannot drive due to age or other factors. And for some, a car is financially out of reach. For many people, walking and bicycling are primary modes of transportation, and designing facilities for only motor vehicles results in excluding many people.

What qualifies as "all ages and abilities," depends on the character of the street. What is appropriate for walking on a low-speed, low-motor vehicle volume street will be different than a high-speed, high-volume corridor. On streets with higher motor vehicle speeds, increased separation is needed for pedestrians and bicyclists, as speed is a factor in both safety and comfort. Separation for pedestrians can include curbs and a tree rows with trees and appropriate plantings. Separation for bicyclists includes infrastructure that physically separates bicyclists from motor vehicle traffic such as curbs or bollards.

The following section is a summary of future area needs for people who walk and/or bicycle:

- The walking and bicycling network must include facilities on high-volume roads as most often, this is where destinations are located;
- Higher-volume roads need to have high-comfort accommodations for all users; for walking this means a sidewalk separated from auto traffic with a tree plot and for bicycling it means a protected bicycle lane;
- Facilities need to address users of all ages and abilities, especially the young, the old, people without personal vehicles, people with disabilities, and people accessing transit;
- Facilities near transit stops should be reviewed and prioritized to improve connections to transit;
- The walking and bicycling network must be connected and not require the most vulnerable users to travel out of their way to access facilities;

4 Financial Forecast

Introduction

Financial resources define the feasibility, timing, and scope of transportation project implementation. This chapter defines reasonable financial forecasts that support the recommended multi-modal transportation needs plan for the Bloomington/Monroe County urbanized area. The resulting fiscally constrained plan of projects is a requirement first set forth in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Successive Federal transportation legislation (TEA-21, SAFETEA-LU, MAP-21 and FAST) continued this requirement and permitted the inclusion of "illustrative" transportation projects for potential implementation if additional funding were to become available during the established twenty (20) year plan period.

Financial resources for federal, state, and local highway transportation projects are typically set aside for three categorical areas:

- Safety and Security - represent the highest multi-modal transportation system priority by protecting people, system users, and infrastructure investments.
- Capacity Preservation - protect existing capital investments which include operation and maintenance and reconstruction (including pavement resurfacing, bridge rehabilitation transit operations, and bicycle/pedestrian facilities) of existing transportation facilities and services and
- Capacity Expansion - major new transportation capital investments and include new roadways and interchanges, additional travel lanes, new transit facilities, and new bicycle/pedestrian facilities such as trails.

Federal Resources

Federal Programs

Current federal funding for highway, transit and railroad facilities is governed by the Fixing America's Surface Transportation (FAST) Act (Pub. L. No. 114-94). The FAST Act authorizes $305 billion over fiscal years 2016 through 2020 and maintains a focus on safety, keeps intact the established structure of the various highway-related programs, continues to streamline project delivery, and provides a dedicated source of federal dollars for freight projects. Major funding programs administered by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) include the:

- **National Highway System (NHS)** for the roughly 163,000 miles of the federally designed National Highway System that includes the Interstate Highway System (about 46,000 miles) and other freeways, expressways and principal arterials of national significance.
- **Interstate Maintenance (lM)** for Interstate Highway System resurfacing, rehabilitation and reconstruction.
- **Surface Transportation Block Grant Program (STBG)** for state and local roadways functionally classified as major collectors and arterials.
- **Highway Bridge Replacement and Rehabilitation Program (HBR)** for state and local bridges.
- **Congestion Mitigation and Air Quality Improvement Program (CMAQ)** for air quality non-attainment areas.
- **Federal Transit Program Formula Grants and Capital Investment Grants.**

Federal Funding Projections

Surface Transportation Block Grant (STBG)

Surface Transportation Block Grant program (STBG) funds represent the primary source of federal support for improvements to urbanized area roadways. The FAST Act converts the long-standing Surface Transportation Program (STP) into the Surface Transportation Block Grant (STBG) program. As noted by the Federal Highway Administration website. "The STBG promotes flexibility in State and local transportation decisions and provides flexible funding to best address State ad local transportation needs."

Urbanized areas with a population of 200,000 or more persons (referred to as Group I areas) have a dedicated funding allocation stipulated by federal statute. Indiana urbanized areas, such as Bloomington, with a population of 50,000 to less than 200,000 persons (referred to as Group II areas) receive funding allocations based on a proportion of statewide population.

Under a sharing agreement for surface transportation programs, the Indiana Department of Transportation (INDOT) retains 75% of the federal funds received by the State of Indiana. The remaining 25% federal fund balances are made available to local jurisdictions, including Metropolitan Planning Organizations.

The Federal STBG fund allocation for the Bloomington urban area in Fiscal Year 2018 was approximately $2.75 million. A conservative, constant and real dollar growth rate of 2.0% has been used to forecast STBG funds available between fiscal years 2018 and 2040. As shown below, the Bloomington urban area is likely to receive a total of $79,347,485 in STBG funds between fiscal years 2018 and 2040 for locally initiated capital roadway system improvements.

Fiscal Years 2018 through 2027 =	$30,133,189
Fiscal Years 2028 through 2040 =	$49,214,296
Total	***$79,347,485***

Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) provides federal funding for eligible safety improvement projects on local roadways. The Bloomington urbanized area received an annual allocation of $470,684 for fiscal year 2018. Using the same 2.0% annual growth rate, the following HSIP resources are predicted for Fiscal Year 2018 through Fiscal Year 2040.

Fiscal Years 2018 through 2027 =	$5,153,858
Fiscal Years 2028 through 2040 =	$8,423,004
Total	***$13,576,862***

Transportation Alternatives Program (TAP)

The Transportation Alternatives Program (TAP) provides federal funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation, and enhanced mobility. The Bloomington urbanized area received an annual allocation of $155,801 for fiscal year 2018. Using the same 2.0% annual growth rate, the following TAP resources are predicted for Fiscal Year 2018 through Fiscal Year 2040.

Fiscal Years 2018 through 2027 =	$1,705,977
Fiscal Years 2028 through 2040 =	$2,788,096
Total	***$4,494,074***

State of Indiana Investments

The Indiana Department of Transportation has one committed major capital project identified for construction in Bloomington and Monroe County between Fiscal Year 2018 and Fiscal Year 2040:

- I-69 Section 5 - the reconstruction of 21 miles of State Road 37 in Monroe and Morgan Counties from That Road to near vicinity of State Road 39. Approximately 16.5 miles of this construction is in Monroe County. The current estimated remaining construction cost of this project is approximately $73,000,000 in the BMCMPO planning area. As of July 31, 2017, INDOT assumed responsibility for project construction which is currently scheduled for an August 2018 substantial completion date.

Indiana's 2013-2035 Future Transportation Needs Report does not identify any further major capital projects to be undertaken within Bloomington and Monroe County during this time period. Instead, the majority of investment is anticipated to focus on system preservation and safety enhancements to existing state roads in the BMCMPO area. As these improvements will be undertaken on an as-needed basis, no firm estimate of future investments in such projects is currently available.

Indiana's *Next Level Roads Plan* announced in 2017 focuses funding in the BMCMPO area on preservation, maintenance and safety investments with a 5-year investment total equaling $13,033,146 from 2018 through 2020.

INDOT's Community Crossing Local Road and Bridge Matching Grant Fund Program provides an additional source of revenue to the BMCMPO area through discretionary awards for systems preservation, maintenance, replacements, reconstruction, and similar activities. No future funding availability is possible given the discretionary nature of this program.

Federal Transit Program Formula Grants and Capital Investment Grants and State Assistance

Federal transit program formula grants and capital investment grants and state assistance are critical to the success of Bloomington Transit and its provision of service to 3.50 million annual customers.

The Federal transit formula operating and capital investment grants for Bloomington Transit totaled approximately $2.17 million in Fiscal Year 2017. A conservative, constant real dollar growth rate of 2.0% has been used to forecast these funds available between 2018 and 2040. As shown below, Bloomington Transit is likely to receive a total of $63,857,056 in formula grants and capital investment grants for Fiscal Year 2018 through Fiscal Year 2040.

Fiscal Years 2018 through 2027 =	$24,240,521
Fiscal Years 2028 through 2040 =	$39,616,535
Total	***$63,857,056***

State transit program assistance to Bloomington Transit totaled approximately $2.51 million in Fiscal Year 2017. A conservative, constant real dollar growth rate of 2.0% has been used to forecast these funds available between 2018 and 2040. As shown below, Bloomington Transit is therefore likely to receive a total of $73,899,433 in formula grants and capital investment grants for Fiscal Year 2018 through Fiscal Year 2040.

Fiscal Years 2018 through 2027 =	$28,052,668
Fiscal Years 2028 through 2040 =	$45,846,765
Total	***$73,899,433***

Local Resources

Primary resources for locally initiated transportation projects include Motor Vehicle Highway Account (MVHA) fund receipts, Local Road and Street Funds (LRS), the Wheel Tax, the Cumulative Bridge Fund, Cumulative Capital Development Funds, alternative transportation funds and, in certain instances, Tax Increment Financing (TIF) District funds.

Motor Vehicle Highway Account (MVHA) & Wheel Tax

MVHA receipts for Monroe County and the City of Bloomington typically exhibit an annual variability, but they are expected to stabilize in future years. MVHA funds must be used for the construction or reconstruction and maintenance of streets and alleys. These funds represent the primary operating and maintenance expenditures for Monroe County and Bloomington between 2018 and 2040. The forecast assumption for the 2040 MTP is that MVHA receipts will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for basic operations and maintenance.

Wheel Tax funds for Monroe County and Bloomington are used for resurfacing and minor roadway rehabilitation projects. The forecast assumption for the 2040 MTP is that Wheel Tax receipts will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the Indiana General Assembly.

Given MVHA and Wheel Tax receipts and under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$108,583,414
Fiscal Years 2028 through 2040 =	$177,458,996
Total	***$286,042,410***

Local Road and Street (LRS) Funds

Local Road and Street account (LRS) funds, including accelerated allocations, are available for capital investment; however, a portion of the funds must be set aside for preservation projects such as resurfacing, intersection/signalization, and safety improvements.

Based on past and present budgets, approximately 80% of the Monroe County funds and approximately 50% of the City of Bloomington funds may be used for major capital investments. These funds represent the primary expenditures that will be used by Monroe County and Bloomington for engineering, land acquisition, construction, resurfacing, restoration, and rehabilitation of roadway facilities. The forecast assumption for the 2040 MTP is that LRS receipts will remain at a constant real dollar growth rates of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the Indiana General Assembly.

Given LRS receipts and under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$14,822,867
Fiscal Years 2028 through 2040 =	$24,225,165
Total	***$39,048,032***

Cumulative Bridge Funds

The Monroe County Cumulative Bridge Fund will continue to be dedicated to bridge preservation for the cost of construction, maintenance, and repair of bridges, approaches, grade separations and county-wide bridge inspections. The forecast assumption for the 2040 MTP is that the Cumulative Bridge Fund will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the Indiana General Assembly.

Given Cumulative Bridge receipts and under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$16,282,453
Fiscal Years 2028 through 2040 =	$26,610,582
Total	***$42,893,035***

Cumulative Capital Development Funds

The forecast assumption for the 2040 Metropolitan Transportation Plan is that the Cumulative Capital Development Fund will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the Indiana General Assembly.

Given Cumulative Capital Development Fund receipts for Monroe County and the City of Bloomington under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$46,554,228
Fiscal Years 2028 through 2040 =	$76,084,055
Total	***$122,638,283***

Tax Increment Financing (TIF) Funds

Tax Increment Financing (TIF) District revenue receipts are occasionally used by Monroe County and the City of Bloomington for capital infrastructure investments including roadway and drainage improvements. Forecasts for these districts are inexact given their direct link to project development, property values, and sunset provisions.

Given current receipts and constant rate trend growth, estimates for the Monroe County Fullerton Pike TIF, the SR46 TIF, and the Westside TIF, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$26,024,960
Fiscal Years 2028 through 2040 =	$42,532,875
Total	***$68,557,835***

Alternative Transportation Funds

The City of Bloomington established Alternative Transportation funding exclusively for pedestrian and bicycle infrastructure maintenance, preservation, and facility expansions more than a decade ago. Funds are allocated through annual municipal budget approvals by the Common Council. The forecast assumption for the 2040 Metropolitan Transportation Plan is that the Alternative Transportation fund allocations will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the City of Bloomington.

Given Alternative Transportation Fund allocations from 2012 through 2017 for the City of Bloomington under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$8,190,645
Fiscal Years 2028 through 2040 =	$13,386,061
Total	***$21,576,706***

Public Transportation Locally Derived Income

Federal transit program formula grants and capital investment grants help to support Bloomington Transit's service. Bloomington Transit is also supported by locally derived income (LDI) consisting of fare revenue, contract/other revenue, and local assistance.

The forecast assumption for the 2040 Metropolitan Transportation Plan is that locally derived income will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes currently prescribed by the needs of Bloomington Transit.

Given locally derived income revenues from 2012 through 2017 for the City of Bloomington under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$30,244,130
Fiscal Years 2028 through 2040 =	$49,428,294
Total	***$79,672,424***

General Obligation Bonds

Monroe County and the City of Bloomington may use General Obligation (GO) bonds for transportation infrastructure investments. The use of this funding mechanism, however, is subject to a variety of unique circumstances. Given a measurable level of uncertainty over their use, no financial forecasts were calculated for the BMCMPO *2040 Metropolitan Transportation Plan*.

Conclusion

The Bloomington/Monroe County urbanized area is forecast to receive approximately $79.3 million in Federal Surface Transportation Block Grant (STBG) program, $13.6 million in Highway Safety Improvement Program (HSIP), and $4.5 million in Transportation Alternatives Program (TAP) funds through Fiscal Year 2040 for transportation infrastructure investments.

The sum total of revenue sources from Monroe County and the City of Bloomington Motor Vehicle Highway Account, Wheel Tax, Local Road and Street, Cumulative Bridge Funds, Cumulative Capital Development, Tax Increment Financing, and Alternative Transportation Funds suggest that, given forecast assumptions, the BMCMPO planning area will have over $564 million in local funds available for safety, maintenance, preservation, and added multi-modal transportation system capacity activities for Fiscal Years 2018 through 2040.

The sum total of revenue sources for Bloomington Transit under formula grants, capital investment grants, and locally derived income suggest that, given forecast assumptions, the BMCMPO planning area will have over $210.6 million available for transit service activities for Fiscal Years 2018 through 2040.

5 The Plan

Introduction

This chapter highlights the fundamental aspects to the MPT, which is used to the guide decision making process for future transportation investment by the BMCMPO. The Guiding Principles, the financial forecast, and the future needs discussed in the previous chapters need to be reflected in future decisions by the BMCMPO. Developing quantifiable metrics to simply use in the decision making process is not the purpose of this MTP and is never the intended purpose of the continuous, comprehensive, and coordinated (3C) planning process. Rather this process must use the MTP to help inform and create a framework in which all members of the BMCMPO can work towards the best solution in the decision making process. Expectations that the MTP must identify, select, or establish a discrete or particular project that is worthy of future investment is misguided. The MTP is not a decision making tool and should not be used make claims that any one project is final and certain for implementation. Project implementation is a long and very thorough process that requires many considerations well beyond the scope of the MTP. Rather, the MTP provides direction for these considerations from the beginning project concept through implementation. A critical milestone for the BMCMPO to utilize this direction is when a project is being considered for the Transportation Improvement Plan (TIP). The MTP can provide direction: during the project concept phase by using the Guiding Principles; during the financial feasibility by considering the financial forecast; and during the technical design by addressing future needs.

Another powerful tool of the MTP to assist in the 3C process is the Travel Demand Model (TDM). Again, this should inform and establish a framework for all BMCMPO members to work towards the best solution. Information on the technical aspects of the TDM are available in Appendix C and D and are not detailed in this chapter. The TDM was developed to project future growth and travel demands (as discussed in Chapter 2) and to apply these to the 2013 base year conditions (existing and committed projects) and then to the year 2040. The TDM also uses multiple growth and development scenarios. This is a unique aspect of this TDM and a new analysis for the BMCMPO. What is important to this analysis is it allows the TDM to consider different rates of growth and allocate the growth into several different development styles as land uses and people are the most significant influences on transportation needs. Finally, another unique aspect and new tool for the BMCMPO is a TDM performance measure analysis. Together these components of the TDM provide results to further guide decision making.

Travel Demand Model

Baseline conditions were used in a Travel Demand computer model (TDM) to give a good understanding on the existing 2013 conditions for Monroe County. This 2013 snapshot in time, often referred to the "base year", and is useful way to measure changes over time. The TDM is used to quantify travel demand based on growth, land uses, and socioeconomic characteristics and allocate trips to transportation network. This is a typical step used to help identify basic future transportation network needs - often locations in the network expected to have high levels of congestion. However, this step often does not include other important network considerations such as political, topographical, and technical feasibility to name a few. Needs derived from public comments, feedback from various agencies, and even land development activities can further help planners formulate a TDM to reasonably reflect transportation needs. This list could include bigger buses to aid in serving busy bus routes, a roundabout for a dangerous intersection, and new road to serve a fledgling business park.

Factors related to financial aspects, political support, and public policy can introduce much more complexity, especially for a TDM. Looking out 25 or more years into the future can make this exercise much more complicated. While the TDM does aid in this process by assessing socioeconomic trends, anticipated land use changes, and some transportation improvements highly anticipated, the future is nevertheless uncertain. What the TDM can achieve is to help us to understand the magnitude of our future needs by considering a range of scenarios. The TDM can also further help us understand possible consequences of scenarios and near-term decisions by using performance measures. Together the TDM can help bring some certainty to an uncertain future and guide decisions based on a preferred course of action or trajectory to meet our future expectations.

Network Scenarios

The TDM examined various transportation system network scenarios to determine the macro-level performance impacts under an assortment of policy considerations. These scenarios provided an understanding of the implications that may result from public policy investments strategies within the transportation network and associated socioeconomic changes, land use changes and other defined parameter conditions. The scenarios examined with the TDM relied upon guidance from the public Metropolitan Transportation Plan Task Force, general public input, and MPO staff. The overall assumption for most scenarios is that general operations and maintenance shall continue at existing necessary baseline levels. Scenarios 2, 3, 4, 6, and 11 did examine aspects of changing operations, maintenance, or some external factor impacting travel demand. General operations and maintenance were accounted for as part of the financial forecast in Chapter 2, but any capital investments were not accounted for within the scenario analysis. Typically, this best evaluated when projects are being considered for the TIP and not a function of this scenario analysis.

The TDM examined a thirteen scenarios. One was a no build or "do nothing" and twelve additional scenarios were examined using the modeled Base Year 2013. The E+C network is included as part of all other scenarios with the exception of Scenario 3 which does not include I69 and is intended only to compare it with the E+C network to better understand local impacts associated with I69. Each scenario is detailed below:

	Scenario Statistics	Scenario									
	Scen #-->	0	1	2	4	5	6	9	10	11	12
	Land Use-->	Base	Mid-Stnd	Mid-Stnd	Mid-Stnd	Mid-Stnd	Mid-Stnd	IURP	Bed Comm.	Mid-Stnd	Infill
Category	**Measure** Net-->	Base	E+C	E+C+BRT	E+C	TIP	TIP+	TIP	TIP	2-Ways	TIP
Demand	Vehicle Miles (VMT)	2,955,625	3,584,415	3,564,909	3,297,662	3,694,826	3,731,774	3,700,595	4,107,402	3,570,078	3,469,918
Demand	Vehicle Hours (VHT)	108,575	152,246	154,597	135,499	152,050	154,939	152,203	166,853	153,584	148,175
Demand	Work Trip - Vehicle Occupancy	1.08	1.08	1.07	1.09	1.08	1.08	1.07	1.07	1.08	1.08
Demand	Person Trips	589,162	690,749	690,748	690,748	690,738	690,738	692,285	702,061	690,744	685,964
Demand	Transit Share	4.49%	5.50%	6.39%	8.14%	5.50%	5.45%	5.51%	5.30%	5.50%	5.67%
Demand	Daily Ridership	27,792	39,892	46,555	59,038	39,895	39,496	40,458	39,056	39,897	40,808
Demand	Transit Trips	26,468	37,992	44,128	56,227	37,995	37,615	38,168	37,196	37,997	38,864
Demand	Transit Person Miles	51,875	60,819	72,535	91,984	60,818	60,210	60,955	61,815	60,819	60,398
Demand	Transit Person Hours	3,435	4,028	4,591	6,092	4,028	3,987	4,023	4,094	4,028	4,000
Demand	Non-Motorized Share	38.3%	37.2%	36.7%	40.9%	37.2%	36.8%	37.2%	34.7%	37.2%	39.0%
Demand	Non-Motorized Trips	225,589	256,619	253,542	282,280	256,617	254,051	257,262	243,832	256,619	267,585
Demand	Non-Motorized Person Miles	278,934	327,028	320,831	359,731	327,024	323,754	327,756	310,732.84	327,026	306,894
Demand	Non-Motorized Person Hours	42,974	50,384	49,435	55,421.94	50,383	49,879	50,496	48,176	50,383	47,287
Efficiency	Vehicle Hours Under Delayed Conditions	5,976	28,416	28,826	25,006	28,379	28,168	28,294	28,002	29,717	28,568
Efficiency	Avg. PM Peak Speed	27.22	23.54	23.06	24.34	24.30	24.09	24.31	24.62	23.25	23.42
Efficiency	Avg. Auto Trip Length	6.78	6.50	6.55	9.36	6.50	6.57	6.51	6.43	6.50	6.24
Efficiency	Lane Miles at LOS E or worse	9.93	65.88	65.91	58.00	65.79	64.48	65.59	64.92	68.89	65.52
Environ	Vehicle Emissions (Daily Tons CO2)	1,418	1,845	1,835	1,697	1,902	1,921	1,905	2,114	1,838	1,786
Safety	Fatal Accidents	12	15	15	14	16	16	16	17	15	15
Safety	Injury Accidents	1,111	1,453	1,461	1,313	1,472	1,494	1,474	1,626	1,457	1,410
Safety	Property Damage Accidents	3,068	4,011	4,034	3,626	4,066	4,126	4,071	4,489	4,023	3,894
Econ	Avg. Daily Roadway User Costs in 2040 ($2013 millions)	$ 2.697	$ 4.830	$ 4.412	$ 5.362	$ 4.405	$ 4.339	$ 4.409	$ 4.739	$ 4.398	$ 4.290
Econ	Daily User Cost per Vehicle Trip (Autos and Trucks)	$ 8.00	$ 12.19	$ 11.22	$ 13.64	$ 11.12	$ 10.95	$ 11.11	$ 11.26	$ 11.10	$ 11.30
Econ	Present Value ($2013 millions) 2013-2040 lifecycle user and safety benefits	n/a	n/a	$ 1,106.67	$ (430.04)	$ 1,019.04	$ 1,042.39	$ 993.90	$ (1,064.14)	$ 1,176.28	$ 1,820.47
Econ	Capacity Added to Meet Standards (Road Lane Miles)	9.93	65.88	65.91	58.00	65.79	64.48	65.59	64.92	68.89	65.52
Econ	Est. Cost to Achieve LOS D ($Million)	$ 7.45	$ 49.41	$ 49.43	$ 43.50	$ 49.34	$ 48.36	$ 49.20	$ 48.69	$ 51.67	$ 49.14

Scenario Statistics	Scenario									
Scen #-->	0	1	2	4	5	6	9	10	11	12
Land Use-->	Base	Mid-Stnd	Mid-Stnd	Mid-Stnd	Mid-Stnd	Mid-Stnd	IURP	Bed Comm.	Mid-Stnd	Infill
Measure Net-->	Base	E+C	E+C+BRT	E+C	TIP	TIP+	TIP	TIP	2-Ways	TIP
Acres with a 5D Score > 0.8	1,208	1,623	1,623	1,623	1,623	1,620	1,682	1,548	1,623	1,794
Population with a 5D Score > 0.8	27,367	32,734	32,734	32,734	32,734	32,555	35,144	29,386	32,734	39,468
Households with a 5D Score > 0.8	6,575	9,516	9,516	9,516	9,516	9,461	10,013	7,397	9,516	10,956
Employment with a 5D Score > 0.8	35,293	52,307	52,307	52,307	52,307	52,183	47,637	47,311	52,307	57,080
Aggregate 5D Score (sum of 600 zones)	318.58	329.46	329.47	329.47	329.53	327.06	329.61	326.83	329.58	333.58
Average 5D Score	0.53	0.55	0.55	0.55	0.55	0.55	0.55	0.54	0.55	0.56
Aggregate Number of HH Autos	93,780	122,578	122,577	122,577	122,561	123,176	122,769	128,522	122,555	116,672
Population	152,952	188,760	188,760	188,760	188,760	188,760	189,464	188,229	188,760	188,759
Households	57,191	75,011	75,011	75,011	75,011	75,011	75,389	75,011	75,011	75,011
Jobs	79,611	107,138	107,138	107,138	107,138	107,138	107,138	107,136	107,138	107,138
Autos per Household	1.64	1.63	1.63	1.63	1.63	1.64	1.63	1.71	1.63	1.56
Pct. Of Acres with a 5D Score > 0.8	0.48%	0.64%	0.64%	0.64%	0.64%	0.64%	0.66%	0.61%	0.64%	0.71%
Pct. Of Population with a 5D Score > 0.8	17.9%	17.3%	17.3%	17.3%	17.3%	17.2%	18.5%	15.6%	17.3%	20.9%
Pct. Of Households with a 5D Score > 0.8	11.50%	12.69%	12.69%	12.69%	12.69%	12.61%	13.28%	10.01%	12.69%	15.11%
Pct. Of Employment with a 5D Score > 0.8	44.33%	48.82%	48.82%	48.82%	48.82%	48.71%	44.46%	44.16%	48.82%	53.28%

Color Coding

Best Performer
Better than Avg.
Average
Worse than Avg.
Worst Performer
n/a

5D/Urban Design Score

Category	*Range*	*Characteristics*
Auto oriented	0.0 to 0.2	Low density, low diversity, no destinations within walking distance, road design favors autos, little or no transit
More auto oriented than avg.	0.2 to 0.4	^
Average for area	0.4 to 0.6	|
More walk oriented than avg.	0.6 to 0.8	v
Walk/Bike/Transit oriented	0.8 to 1.0	High density, mixed land uses, many destinations within walking distance, road design favors walking, good access to transit

Table 5-1: TDM Scenario Results

Scenario 0 - "Do Nothing"

This scenario, also known as the Existing plus Committed Network (E+C), operates under the Base Year 2013 transportation network conditions (roadway configurations, operations of traffic control devices, transit services, and bicycle and pedestrian facilities) and only with the committed transportation projects scheduled for construction (bid awards by FY 2014). The committed projects included:

- I-69 Section 4 – New Major roadway/interchange construction from U.S. 231 near Crane NSWC/NSA to State Road 37 south of Bloomington.
- I-69 Section 5 – Major roadway/interchange construction and roadway conversion of State Route 37 to fully access controlled interstate from Kinser Pike to Victor Pike.
- Fullerton Pike/Gordon Pike/Rhorer Road - Road reconstruction and safety improvements including bituminous pavement, curb, gutter, sidewalk, side path, bridges and drainage appurtenances. This includes turn lanes and the installation of a new traffic signal at the Walnut Street Pike intersection from 475 feet west of the intersection of Old SR 37 and proceeding east to the end point, 200 feet east of Walnut Street Pike.
- Karst Farm Greenway (Phase I) - Preliminary engineering, Right-of-Way and construction of a multi-use trail for non-motorized use, including site amenities (~4.00 miles long) from South of Vernal Pike to Karst Farm Park.
- Karst Farm Greenway (Phase IIa) - Preliminary engineering, Right-of-Way and construction of a multi-use trail for non-motorized use, including site amenities (approximately 1.1 mile length) from Vernal Pike to Woodyard Road.
- Karst Farm Greenway (Phase 3) – Multi-use trail construction with amenities from rail-banked area to Hartstrait Road.
- 17th St. & Arlington Rd. Roundabout – Construction to replacement of "K" intersection with a modern roundabout to serve this intersection of three streets to improve safety and facilitate better traffic flow from the Intersection of Arlington Road, West 17th Street and North Monroe Street.
- 17th St. & Jordan Avenue – Construction to improve vertical geometry and sight distance at the intersection and on approaches from the Intersection of East 17th Street and North Jordan Avenue.
- 17th St. & Jordan Avenue Sidepath – Construction of a new non-motorized side path on 17th Street at Jordan Avenue.
- Old SR 37 & Dunn St. Intersection Improvements – Construction to Improve horizontal and vertical geometry and sight distance at the intersection and on approaches.
- Tapp Rd & Rockport Rd Intersection Improvements - Intersection improvements to correct a skew, improve sight distance & geometry and add bicycle and pedestrian facilities at the intersection of Tapp Rd/Country Club Drive and Rockport Road.
- Black Lumber Trail Spur - Construction of a multi-use trail for non-motorized use from Henderson Street to B-Line Switchyard property (approximately 0.3 mile length).
- Ellettsville Heritage Trail (Phase 1) - Construction of a multi-use trail for non-motorized use, including site amenities along the former rail line from Main St. to Depot Road.
- Ellettsville Heritage Trail (Phase II) - Construction of a multi-use trail bridge for non-motorized use over Jack's Defeat creek.

Scenario #1 - I69 Section 5

This scenario assumes the full construction of I69 Section 5 as committed and the following associated, committed projects benefitting the Bloomington-Monroe County local area including:

- Fullerton Pike Phase I - Construction for the installation of a new traffic signal and turn lanes at the Walnut Street Pike intersection from approximately 500 feet west of South Walnut Street to just east of Walnut Street Pike.
- Karst Farm Trail Phase 2a – Construction from of a multi-use path on publicly owned land connecting Ellettsville, Bloomington, three educational institutions, several large residential areas, several major, employment centers, the Monroe County Airport, and Karst Farm Park.
- Mt. Tabor Road – Roadway reconstruction as an element of I69 Section 5.
- 17th Street/Arlington Road/Monroe Street roundabout – Construction to resolve significant grade and sight distance problems.
- 17th Street and Jordan Avenue - Sidepath construction and reconstruction.
- Old SR 37 and Dunn Street - Improve horizontal and vertical geometry and sight distance at the intersection and approaches. Construction and reconstruction of a multi-use trail.
- The Black Lumber Trail - Construction of a multi-use trail for non-motorized use from Henderson Street to B-Line Switchyard property (approximately 0.3 mile length).

Scenario #2 - Bus Rapid Transit Route #3

This scenario converts and slightly modifies Bloomington Transit's existing Route #3 by converting it into a bus rapid transit route. This route would have 10-minute headways and signal preemption for added time-efficiency. This scenario demonstrates the system impacts associated with a major east-west bus rapid transit route.

Scenario #3 - State Road 37

In this scenario, the only modification to the E+C network is to exclude the I69 Section 5 project and all associated local projects previously noted. This scenario analysis was examined to further understand the impacts associated with the construction of I69 Section 5 beyond the proposed construction/operational corridor as well as a means to identify other local needs outside the I69 Section 5 corridor.

Scenario #4 - Peak Oil

Using a different approach to the scenarios, the impacts of rising gasoline and diesel fuels is considered as part of the mode choice process. The E+C network is not modified, but as fuel prices increase it is expected that trips will be altered or reduced. This scenario helped understand some of the economic and behavioral influences on the transportation system with fuel prices at $5.00 per gallon. Fuel efficiencies as well as alternative fuels and new technologies will play a mitigating factor, but this helps factor a reasonable constraint, i.e., cost, into the mode-choice process for the BMCMPO planning area.

Scenario #5 - Transportation Improvement Program (TIP)

The E+C network is modified under this scenario by the recent approval of the FY 2016-2019 TIP. This scenario provides information on the adopted FY 2016-2019 Transportation Improvement Program projects scheduled for completion well before 2040. The new transportation projects for this scenario are as follows:

- Rogers Road Sidepath construction.
- Winslow Road Sidepath construction.
- 10th Street and Law Lane new road connection construction.
- 17th Street reconstruction.
- Fullerton Pike Phases 1 & 2 construction and modernization.
- South Henderson Sidepath construction, and
- Jackson Creek Trail Extensions construction.

Scenario #6 - TIP + Public Workshop Allocation

This scenario uses the TIP network with the addition of priorities identified by two (2) public workshops. The additional new transportation projects include:

- The construction of a B-Line Trail extension westward to the Karst Farm Trail
- The construction of a Fullerton Pike connection from I69 to Rogers Road (3-lane with sidewalks and sidepath that connects to Clear Creek Trail)
- The construction of a competed Jackson Creek Trail, and
- The implementation of a new Bloomington Transit service route along Tapp/Winslow/Rogers/Country Club from Curry Pike and SR 45 to Sare Road and Rogers Road with 30 minute headways

Results demonstrated by this scenario provided system performance information on the community-based transportation projects previously noted.

Scenario #7 - TIP + MTP 2035 Carryover Projects

This scenario evaluated older local project priorities that had yet to achieve fruition. Some of these projects did not move forward for a variety of reasons, including the fact that some were anticipated as part of private sector developments and their respective public improvements, or simply that local funding and priorities had changed. A detailed description is available in the BMCMPO 2030 Long Range Transportation Plan. Generally speaking, these improvements included completing South Adams Street, connecting East 14th Street to Law Lane, completing Sudbury Drive, connecting Fullerton Pike from I69 to Walnut Street, the modernization of Curry Pike from Constitution Avenue to Tapp Road, the realignment of Weimer Road, and the total completion of the Jackson Creek Trail. System performance information derived from this scenario aided in a reassessment of challenging local project lingering needs previously identified in the 2030 Long Range Transportation Plan.

Scenario #8 - TIP + MTP 2030 Limited Carryover

This scenario is essentially the same as the previous scenario, but it omits the construction of improvements to Weimer Road, 14th Street, Curry Pike, Sudbury Drive, and sections of the Jackson Creek Trail that are not part of the TIP. This analysis will provide information mostly on the new 3-lane connection of Fullerton Pike from I69 to Rogers Road and projects included within the FY 2014-2017 TIP.

Scenario #9 - TIP + IU Research Park

This scenario examined the system impact of Bloomington Hospital's potential relocation to the Indiana University Research Park neighborhood at East 10th Street and SR 45/46 Bypass. Land at the vacated current Bloomington Hospital site located at 2nd Street and Roger Street would then convert to a traditional single family housing neighborhood. This scenario provided a system understanding of the associated changes that would potentially occur with a Bloomington Hospital relocation to the east side of the city.

Scenario #10 - TIP + Sample Road Bedroom Community

This scenario examined the construction of a new I69 Section 5 interchange at Sample Road. This scenario demonstrated the transportation system impacts associated with a conceptual new bedroom community having new access to either Bloomington or Indianapolis. This is because of the improved access to relatively vacant land and the respective location of Sample Road to major destinations. In this scenario, the TDM model allocated a majority of new population growth around this this interchange to demonstrate the maximum impacts for a sprawl-like land use development.

Scenario #11 - TIP + 2-Way Streets

This scenario converts many of the existing local one-way streets back into two-way street corridors for College Avenue, Walnut Street, 3rd Street, and Atwater Avenue. This scenario demonstrated the impacts of one-way streets in Scenario #5 when compared with the results of this scenario (i.e., Rogers Road Sidepath, Winslow Road Sidepath, 10th Street and Law Lane new road connection, 17th Street reconstruction, Fullerton Pike Phases 1 & 2 modernization, South Henderson Sidepath, and Jackson Creek Trail Extensions).

Scenario #12 - TIP + Urban Infill

This scenario allocated to growth to existing housing by minor increases in neighborhood densities with the inclusion of accessory living units, or so-called "granny flats". This scenario eliminated the potential for allocating new population growth with new bedroom communities. This scenario offered an additional examination of impacts on land use policy similar to a relocation of the Bloomington Hospital and a subsequent adaptive reuse/conversion of that land into a traditional single family housing neighborhood.

Performance Measures

The TDM also examined a range of performance measures to further shed insight on outcomes of the thirteen scenarios considered to the year 2040. First, these performance measures were based on federal guidance and the expectation that performance measures will be necessary for future transportation projects using federal resources. While the exact measurements or standards used may further evolve over time, they offer a valuable tool to use for evaluations. The TDM also used another performance measure which further assess the conditions of the built environment and influences on travel. This is the first time the BMCMPO has used performance measures for long-range planning and therefore offers a powerful means to assess long-range outcomes.

The first tier of performance measures use attributes that are based on travel demand, efficiency, environmental, safety, and economic. Respectively they include values such as person trips, travel delay, CO2 emissions, frequency of crashes, and infrastructure costs. A second tier of performance measures use attributes that are based on a land use density score called "5D". This score further assessed the relationship between land uses and transportation. Values for density, diversity, design, destination, and distance to transit were developed for the TDM. Together these measures produce a robust output to consider. Please see Appendix B for more information on the performance measures.

Conclusion

2040 MTP Scenarios Summary

The BMCMPO examined a "Do Nothing" Scenario and twelve additional scenarios using Base Year 2013 conditions and forecasting to the Year 2040. The TDM also used a range of local performance measures (travel demand, efficiency, environmental, safety, economic, and a 5D land use score) to further examine the overall performance of the 13 scenarios. The information in Table 5-1 illustrates the summary results of each scenario by their respective performance. First, the analysis shows that Scenario #0 (Do Nothing), #4 (Peak Oil), and #12 (Urban Infill), respectively out-performed other scenarios using the performance measures.

Coupled with the 5D land use scores, Scenario #12 stands out from all other scenarios. Using an adopted transportation policy orientation of projects programmed in the BMCMPO FY 2016-2019 TIP plus a strong focus on urban infill (TIP + Urban Infill), clearly demonstrated the best multi-modal system performance in the Year 2040. Furthermore, Scenario #12 meets or shall meet all FHWA national performance goals for safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and potentially reduced project delivery delays.

Scenario #12 is the recommended Scenario or multi-modal growth and management system approach for the BMCMPO 2040 Metropolitan Transportation Plan.

A Appendix

Transportation Planning Requirements

Introduction

This Plan has been prepared to comply with the Federal Fixing America's Surface Transportation (FAST) Act and its predecessors. MPOs are required to have a continuous, cooperative and comprehensive planning processes that implement projects, strategies and services that will address the ten core planning factors. Those factors, along with an explanation of how *Transform2040* addresses them, are provided in this Appendix.

Planning Factors

Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency

This Plan supports and builds upon locally adopted land use and development plans, helping to implement the local economic development goals of partner communities. *Transform2040* seeks to provide an efficient network where travel time reliability and on-time delivery services are maintained if not enhanced and productivity is strengthened by improved network circulation. One objective this Plan incorporates is connectivity and ease of movement by persons and goods in and through the area. This is achieved by investments across modes to ensure that multiple travel options are available and bringing balance to the transportation system.

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

Investments in safety are a high priority for *Transform2040*. This is accomplished in the following ways:

- The Plan advocates for system preservation rather than expansion, limiting the addition of lane miles where user conflicts could occur.
- The Plan supports increased investment in bicycle, pedestrian, and transit modes, providing opportunities for safer and more efficient travel by users of those modes.
- The projects contained in the Plan reduce congestion by providing alternative routes to satisfy user needs. With reduced congestion, conflicts are reduced and safety is enhanced.
- The BMCMPO Complete Street Policy compels local planning agencies (LPAs) to consider the needs of all users within a corridor when designing a project.

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

Transform2040 enhances the security of all transportation users in several ways. Increasing roadway connectivity provides redundancy in the system, allowing for multiple routes of ingress and egress and flexibility in planning evacuation routes in emergency situations. Monroe County Emergency Management Administration (EMA) is the lead county agency for security issues and BMCMPO will play a supporting role providing them with assistance as needed.

Bloomington Transit has several security strategies in operation. Access control, surveillance and monitoring on bus as well as office and maintenance facilities are currently employed strategies. Operations include Computer Aided Dispatching and Automatic Vehicle Locater technology.

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

Transform2040 strengthens and creates accessibility on two distinct levels. One focuses on improving the continuity of the road network. The other provides additional connections and improvements between modes of travel. All citizens, travelers and businesses benefit from this dual approach. This Plan reduces travel and delivery time by increasing accessibility through the completion of key new connections and the enhancement of existing corridors. Access to the new I-69 highway greatly increases statewide and national connectivity for local user.

Transform2040 increases bicycle and pedestrian mobility, as well as the safety of transit riders because all proposed road improvements are required to include provisions for these modes. When sidewalks and trails are available it is safer for transit users as well as provides more options for bicyclists and pedestrians.

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.

Transform2040 clearly supports these goals by recommending the implementation of transportation projects that are consistent with adopted local land use plans. It is clear from analysis of the MPO region that local land use decisions have the greatest impact on transportation system performance. It is thus paramount that transportation investments made by the MPO are supportive of best practices in land use planning, including focusing development density in existing urban centers rather than encouraging sprawl development.

The Plan's focus on system preservation over expansion as well as emphasis on investment in non-motorized transportation facilities will certainly support the protection and enhancement of the environment. The Plan is also strongly supportive of further investment in public transit services, which will reduce single-occupant vehicle usage on the roadway network. These types of investments are especially important in offsetting the potential environmental impacts of the new I-69 highway corridor thorough the MPO region.

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

This Plan sets forth a program of goals and projects that support the integration and connectivity of the transportation system. Roadway network improvements focus on enhancing the existing system while providing key new connections, particularly in response to I-69 highway impacts. Investments across modes will expand travel options for community residents.

Transform2040 builds upon the multi-modal plans and programs of previous plans. Transit use, bicycling, and walking play an increased role in the region and this plan makes specific recommendations for both bicycling and walking. BMCMPO works closely with Bloomington Transit to assist it in serving the community, because multi-modal travel promotes energy conservation and improves the quality of life.

Promote efficient system management and operation

The local partners of the MPO have management systems for pavement and traffic, bridge, and transit programs. These allow the jurisdictions to monitor system performance and needs, identify deficiencies, and then target specific projects to address needs. Pavement and traffic management systems allow them to utilize existing transportation facilities more efficiently (e.g. pavement maintenance, signal timing and coordination, sign replacement, pavement marking, and intersection improvements). Additionally Monroe County has a bridge inventory and management system. All jurisdictions are now updating roadway management systems to address Americans with Disabilities Act needs. All use their systems to document and establish priorities.

Bloomington Transit has practiced system management practices that promote safety, mobility and more efficient use of their existing transportation infrastructure. Consistent ridership increases are evidence that their aggressive programs of information management, fleet maintenance and acquisition, marketing, schedule adherence and strategic planning contribute to a system that successfully provides an alternative to the automobile.

The concept of corridor re-use and joint corridor use also make existing transportation facilities more effective. There are very few new corridors or major new construction projects recommended in the *Transform2040*. Most improvements utilize existing corridors or are extensions of existing facilities that provide greater connectivity to the transportation system. The planned inclusion of bicycle and pedestrian facilities, as well as transit accommodations where appropriate, within roadway projects will support shared use of corridors in the region.

Emphasize the preservation of the existing transportation system.

One of the key tenets of the Vision and Goals of *Transform2040* (Chapter 2: Guiding Principles) is the concept of system preservation. The Plan advocates adopting a "fix it first" mentality to ensure that investments in maintaining and improving the existing system are prioritized over those that would expand existing roads or create new corridors where none exist.

Most proposed road improvements in the community are on existing, not new, corridors. Several roads will be reconstructed within existing corridors. Most of the recommended projects follow changes in land use and are for roads that were originally built as rural cross sections that now need to be updated to an urban cross section with sidewalks and bicycle facilities.

Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.

The Monroe County Emergency Management Agency (EMA) is this community's lead for crisis and disaster response. The MPOs local partners are represented on the Local Emergency Planning Committee. The EMA also works closely with Community Organizations Active in Disaster (COAD) for Monroe County as well as District 8 Indiana EMA, a multi-county regional EMA. Additionally, local asset management systems allow for the timely assessment, speedy repair and recovery from unexpected infrastructure damage.

Bloomington and Monroe County have long operated stormwater utilities that manage such infrastructure and provide for its maintenance and enhancement over time. All new or upgraded roadway corridors include stormwater runoff control as a significant priority in their design.

Enhance travel and tourism.

Bloomington and Monroe County have long been recognized as destinations for outdoor recreation, in particular for bicycling. Past and future investments in bicycle infrastructure supported by the MPO will continue to enhance that reputation and draw in visitors for important bicycling events like the Little 500 race and the Hilly Hundred Bike ride. In addition, local investments to provide connectivity with the new I-69 corridor will improve the ability of local residents to access statewide and national destinations and allow greater access for visitors coming from outside the region.

B Appendix

Performance Measures

Introduction

The FAST Act and MAP-21 have new requirements for performance management in transportation planning. National performance goals have been established in 7 key areas and states and MPO are to establish performance targets in support of the national goals. The national performance goals for Federal Highway programs are:

- **Safety** – to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure Condition** – To maintain the highway infrastructure asset system in a state of good repair.
- **Congestion Reduction** – To achieve a significant reduction in congestion on the National Highway System (NHS).
- **System Reliability** – To improve the efficiency of the surface transportation system.
- **Freight Movement and Economic Vitality** – To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Environmental Sustainability** – To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced Project Delivery Delays** – To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

Performance Measures

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) issued new transportation planning rules on the statewide and metropolitan transportation planning processes to reflect the use of a performance based approach to decision-making in support of the national goals. These processes must document in writing how the Metropolitan Planning Organizations (MPOs), Indiana Department of Transportation (INDOT) and providers of public transportation shall jointly agree to cooperatively develop and share information related to transportation performance data, the selection of performance targets, the reporting of performance to be used in tracking progress toward attainment of critical outcomes for the region of the MPO (see 23 CFR 450.306(d)) and the collection of data for the INDOT asset management plan for the National Highway System specified in 23 CFR 450.314(h).

FTA has performance measures for Transit Asset Management, and final regulations are published and currently in effect. FHWA has performance measures and final regulations published for Safety, Bridge and Pavement Conditions, Congestion Reduction and System Reliability, but only the Safety Performance Measure regulation is in effect at this time.

INDOT along with the MPOs and FHWA will continue to collaborate to identify Performance Targets for each Performance Measure. Once Performance Targets are established, the Transportation Improvement Program (TIP) and Statewide Transportation Improvement Program (STIP) will be modified to reflect this information.

For FHWA and FTA to approve any TIP amendments after May 27, 2018, the INDOT, MPOs and Public Transit Operators must reflect this information and describe how projects in the TIP/STIP, to the maximum extent practicable, achieve the Federally required performance targets identified in the Statewide and Metropolitan Transportation Plans, linking investment priorities to these performance targets.

Safety

The INDOT, the MPOs, FHWA, and Indiana Criminal Justice Institute (ICJI) are actively discussing and collaborating on the Safety Performance Measures and Safety Performance Targets. INDOT will submit their Safety Performance Measures by August 31, 2017, and the MPOs will have until February 27, 2018 to follow INDOT's submission to either support the INDOT Safety Targets or set independent targets. The Highway Safety Improvement Program (HSIP) is a primary source of federal funds for qualifying safety improvement projects. HSIP along with other funding sources are used to implement safety improvements with the purpose to reduce roadway crashes, and a corresponding reduction in fatalities and serious injuries on all public roads. The five specific safety performance measures are:

- Number of fatalities;
- Rate of fatalities;
- Number of serious injuries;
- Rate of serious injuries; and
- Number of non-motorized fatalities and non-motorized serious injuries

If FHWA makes effective the rules they have published for assessing pavement and bridge condition for the National Highway Performance Program and performance of the National Highway System (NHS), freight movement on the Interstate System and Congestion Mitigation and Air Quality (CMAQ) improvement program, INDOT and the MPOs will have to establish performance targets for these measures, too.

Pavement and Bridge

The pavement and bridge condition performance measures are applicable to the Interstate and non-Interstate Highways that comprise the National Highway System (NHS). The NHS includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. The measures are focused on the condition of pavement and bridges, including ramps utilized to access the system. There are four measures to assess pavement condition and two measures for assessing bridge condition.

Pavement Performance Measures

- Percentage of pavements of the Interstate System in Good condition
- Percentage of pavements of the Interstate System in Poor condition
- Percentage of pavements of the non-Interstate NHS in Good condition
- Percentage of pavements of the non-interstate NHS in Poor condition

Bridge Performance Measures

- Percentage of NHS bridges classified as in Good condition
- Percentage of NHS bridges classified as in Poor condition

The INDOT, the MPO and FHWA will collectively develop targets for the pavement and bridge performance measures. The National Highway Performance Program is a core Federal-aid highway program that provides financial support to improve the condition and performance of the NHS, and the construction of new NHS facilities. INDOT utilizes these funds for maintenance activities on the NHS.

System Performance

The system performance measures are also applicable to the Interstate and non-Interstate NHS. These performance measures assess system reliability and freight movement, and establish several measures for on-road mobile source emissions consistent with the Congestion Mitigation and Air Quality (CMAQ) Program. There are two measures for assessing reliability, one measure to assess freight movement, and three measures for the CMAQ program.

Reliability Performance Measures

- Percent of the Person-Miles Traveled on the Interstate System That Are Reliable
- Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable

Freight Movement Performance Measure

- Truck Travel Time Reliability (TTTR) Index

CMAQ Measures

- Annual Hours of Peak-Hour Excessive Delay Per Capita Percent of Non-SOV Travel
- Percent Change in Tailpipe CO2 Emissions on the NHS Compared to the Calendar Year 2017 Level
- Total Emissions Reductions

Transit Performance Measures

The Transit Asset Management Final Rule requires transit providers to set performance targets for state of good repair by January 1, 2017. The Federal Transit Administration has since extended that deadline to January 1, 2018. The Planning Rule requires each MPO to establish targets not later than 180 days after the date on which the relevant provider of public transportation establishes its performance targets. BMCMPO will adopt the targets established by Bloomington Transit. Targets will be established in the following categories:

Rolling Stock

- Percent of revenue vehicles that have met or exceeded their useful life benchmark.

Equipment

- Percent of service vehicles that have met or exceeded their useful life benchmark.

Facility

- Percent of facilities rated below 3 on the condition scale.

Vision and Performance Measures

Travel Demand

- Person trips per day
- Daily vehicle trips
- Daily vehicle miles
- Daily vehicle hours
- Daily transit boarding's
- Mode shares

Travel Efficiency

- Vehicle hours of delay
- Accessibility by mode
  - Number of jobs within X minutes
  - Shopping within X minutes
- Transit person hours
- Weighted average transit walk distance
- Weighted average transit headway
- 5D Variables

Economic

- Infrastructure costs
- Monetized System User benefits (time, cost, etc.)
- Potential jobs impacts
- Prosperity index

Safety

- Predicted number of accidents
  - Fatal, Injury, Property Damage

Environmental

- Greenhouse gas emission tonnage
- GHG per trip
- GHG per capita

Urban Design Variables

Elements	Variables	Data Source		Units
Density				
DENS1	Households Densiity	*No. Households from TAZ data*	*TAZ land area in sq.mi*	*households per sq. mi.*
DENS2	Employment Density	*No. of Jobs from TAZ data*	*TAZ land area in sq.mi*	*jobs per sq.mi.*
Diversity				
DIVERS	Jobs/Housing Ratio	*No. of Jobs within 1 mile radius*	*No. Households within 1 mile radius*	*Jobs per household ratio*
Design				
DESGN1	Walkability	*Pct. Of TAZ streets that are walkable*		*miles walkable per total centerline miles*
DESGN2	Average Blockface (miles)	*Centerline miles of road (non-freeway)*	*Number of links (non-freeway)*	*Miles per link*
DESGN3	Street Density	*Centerline miles of road (non-freeway)*	*Land area of TAZ*	*road miles/square mile*
Destinations				
DEST1	Commercial establishments within 10 min walk	*Selection set of commercial parcels*	*Count parcels within 0.1667 mi*	*Number of establishments*
DEST2	Retail jobs within 10 min walk	*No. of Retail jobs from TAZ data*	*Count jobs within 0.1677 mi*	*Number of retail jobs*
Distance to Transit				
DTT1	Street Coverage within 10min. Walk to Transit Stop	*Street miles within a 10 min walk of transit stops*		*Pct. Of Centerline Miles*
DTT2	Access to destinations via transit	*Number of stops within 5 miles via transit*		*Number of stops*

BMCMPO Performance Measures

The BMCMPO developed Performance Measures in line with the plan's vision and goals. The Performance Measures reflect the community's character and goals for the transportation network. The above table illustrates the Performance Measures grouped into five larger categories--Travel Demand, Travel Efficiency, Economic, Safety, and Environmental. Each of the Performance Measures were analyzed as through the Travel Demand Model. A second tier of performance measures were used using a 5D score, which is also shown in the table above.

C Appendix

Methodology

Introduction

This plan was developed by BMCMPO staff with assistance from a consultant. Staff focused on the public input process and plan development while the consultant developed a new travel demand model (TDM) for the MPO. Specific details about the TDM are set forth in Appendix C. The following appendix details the plan development process that was used, with particular focus on public input opportunities.

Transform 2040 Public Workshop - map exercise on needs/issues to help identify specifically where improvements should be made.

Public Outreach Process

Public and stakeholder outreach has been continuous throughout the development of Transform 2040. Through a variety of stakeholder interviews, the creation of a task force, public workshops, public open houses and interagency consultation and coordination, the BMCMPO has received ample input and thus direction regarding the vision, travel demand model scenarios, public outreach activities, strategies and more.

Public notices, press releases, and contact lists were used to notify the public on all of the outreach opportunities listed below. All locations and meetings were accessible and open to the public. The methods for gathering public input has been summarized below and feedback has been used to help further shape and refine the MTP throughout the development and approval process.

MTP Task Force (2010 - 2014)

The Metropolitan Transportation Plan Task Force was created by the Bloomington/Monroe County Metropolitan Planning Organization (BMCMPO) to first help review best practices of other similar sized MPOs, evaluate the current 2030 MTP, and help develop a Request for Proposals (RFP) and a scope of work for to update the 2030 MTP. The RFP process allowed the BMCMPO to select and hire a professional consultant to assist staff with the planning and technical modeling efforts necessary. Its membership was comprised of members from the MPO Policy, Citizen's Advisory, and Technical Advisory Committees. Once a consultant was selected the Task Force continued to provide review and guidance regarding preliminary public outreach efforts, data collection, scenarios, and general information needed to facilitate staff with the update of MTP.

Key Stakeholder Interviews (2013)

BMCMPO staff conducted a series of small group stakeholder interviews to initiate preliminary issues and opportunities. Several group sessions with BMCMPO staff were held to ensure that key transportation stakeholders had an opportunity to express their needs and desires for the future transportation system. Participants were asked to provide insight on the strengths and weaknesses of transportation in the community today and how they thought it could be improved upon in the future. Many businesses, organizations, and agencies were invited to participate in these meetings. Hoosier Energy, Bloomington Hospital, Indiana University (IU) Campus Bus, IU Student Representative, Monroe County Coalition for Access and Mobility, Area 10 Agency on Aging, Monroe County Community School Corporation, Indian Creek Fire Department, Ellettsville Fire Department, Van Buren Fire Department, and the Bloomington Police Department attended. Their feedback is summarized below by topic area.

Local Businesses/Employers and Transit:

- Attendees felt that the new bypass north of Bloomington, as well as, the various roundabouts has improved transportation.
- Weaknesses that were mentioned include 10th street railroad underpass as it relates to transit, congestion on Tapp Road during peak hour, specifically at the Tapp & Rockport Road intersection.
- There is an interest to have transit services on Tapp Road to serve Hoosier Energy and the new hospital location originally proposed for at North Park.
- Pedestrians crossing Rogers at 1st Street is challenging with fast moving traffic. Attendees showed interest in a wider road from State Route 37 to the hospital on 2nd Street.
- Attendees felt that more signals and roundabouts should replace four-way stops and that one-way streets could negatively impact emergency access to the hospital.
- One-way streets and mid-block crossings can have a negative impact on transit services.
- A Woodlawn connection could improve route efficiency and it was suggested to hire a cadet at intersections to direct traffic during peak hours.

Environmental Justice and Accessibility

- Participants felt that the strengths of transportation included a strong transit system. Bloomington Transit (BT) Access covers a large area and transit access is close to residential areas.
- Participants felt that weaknesses included disconnected sidewalks, and a lack of transit services beyond the city limits that could serve Monroe Hospital and Ivy Tech.
- Participants felt that roundabouts can be challenging for the visually impaired and suggested putting a pedestrian signal at every roundabout.
- Visually disabled could be better served with the installation of more audible signals and the use of ramped curb cuts as they are more easily detected.
- Attendees specifically identified Sherwood Oaks and The Stands as places with a large aging demographic and no sidewalks. They felt that this could be a problem in the future where senior residents will no longer be able to drive and won't be able to walk due to lack of sidewalks.
- Attendees felt that if Bloomington Hospital were to move outside the city limits, this could reduce the number of people who are able to access this healthcare provider.
- Walkability of neighborhoods, housing and the B-Line are important for an aging population and their ability to access their daily needs.

Local Schools:

- The Arlington Valley Trail Park could be better served with walking access to Arlington Heights Elementary School.
- W. Gifford Rd. west of Curry Pike could use a sidewalk to get to Highland Park Elementary.
- Students are unable to cross 10th/45 to get to University School. Though there is a sidewalk, crossing is problematic. A sidewalk constructed on both sides of the road could better serve students walking to school.
- Identified the difficulty to get students from The Stands subdivision to Childs Elementary School via walking or biking.
- Jackson Creek Trail has helped with getting kids to school.
- Feels the Fullerton Pike project with regard to Batchelor School will have little impact as long as there is a traffic signal.
- Commented that the bus pull off on Henderson has been effective.

Emergency Responders:

- The bypass helps with ambulatory access to and from IU campus and the additional lanes have helped with traffic flow/congestion
- There are major backups and dangers on Tapp, Country Club, Rockport, westbound Vernal Pike, Fullerton/Rockport, Victor/Oolitic Quarry
- Supportive of Fullerton Pike connection because they feel that there is a need for more direct routes to and from neighborhoods
- Concerned with access impacts and maintenance needs due to I-69 construction through Indian Creek.
- Dislike the size of Moore's Pike/Renwick roundabout because there is no place for cars to pull over. Emergency vehicles have trouble mounting the curb to get beyond stopped cars
- Feels that school buses and fire trucks need to be considered in the construction of roundabouts
- W. 2nd Street medians are a problem to get emergency vehicles beyond stopped cars especially during rush hour.
- Identified sight distance problems at Winslow/Highland/Allendale. A three-way stop was suggested.
- Suggested that right turns on red should be prohibited on Allen/Patterson
- Identified Burger Road & SR 45 in Van Buren Township as a dangerous area that may be due to poor sight distance to the east
- Identified large amounts of congestion on Friday and Saturday nights on W. 3rd Streets
- One-way streets are not problematic for emergency responders as long as there are plenty of cross streets available.

Travel Surveys (2013)

Voluntary on-line and on-board travel surveys were conducted in the spring of 2013 (March to May). The on-line surveys allowed opportunity for the pubic to provide their household travel information based on a typical week. Similarly on-board travel surveys allowed transit riders to provide their household travel information based on a typical week (with the assistance of the Corradino Group consultant staff and mobile computers). This was the first time this type of survey and data collection was done for the BMCMPO to update the MTP.

The data collected was combined with the 2009 National Household Travel Survey-Indiana (an add-on conducted by FHWA and financed by INDOT). This travel survey information was used twofold. First, to develop a new household model and trip generation methodology based on statistical analysis of the combined household surveys. Second, to create a new destination choice and mode choice models for each trip purpose based on the same household survey.

A total of 273 responses were provided with 173 providing complete travel surveys. Staff assisted residents living in Crestmont public housing to help reach lower-income populations for the survey, as households with higher education and income levels had higher participation rates. Data weighting was used to obtain unbiased results. Methods and methodology is detailed in technical documentation provided by the Corradino Group.

Public Workshops (2013 -2017)

Several public workshops were held in Bloomington and Ellettsville to both inform the public about the MTP process and provide an opportunity to guide its update through public participation. All workshops were structured with an informational session with a question and answer period, followed by breakout workstations. The workstations allowed attendees to select and participate through group discussions/ presentations, map exercises, and/or active forms of participation. Workshops also provided general comment forms and the ability to submit general comments on-line.

Press releases were issued for all workshops, BMCMPO members were notified, and the workshop locations were open and accessible to the general public. Development of the plan and public participation was strategic two fold. First, to generally inform the public about the process, ways to participate, and the fundamental rationale of a Metropolitan Transportation Plan (MTP). Second, to build upon previous outreach efforts by engaging the community at milestones of plan development. These milestones centered around first, early in the process with initial needs and issues, then at a mid-point in the process with more technical aspects of the MTP, and finally late in the process for plan adoption. The workshops worked well to draw out public opinion and feedback. A summary of feedback from these milestones is summarized below.

Early Feedback

Participants were asked to discuss how they would describe current transportation conditions in the community.

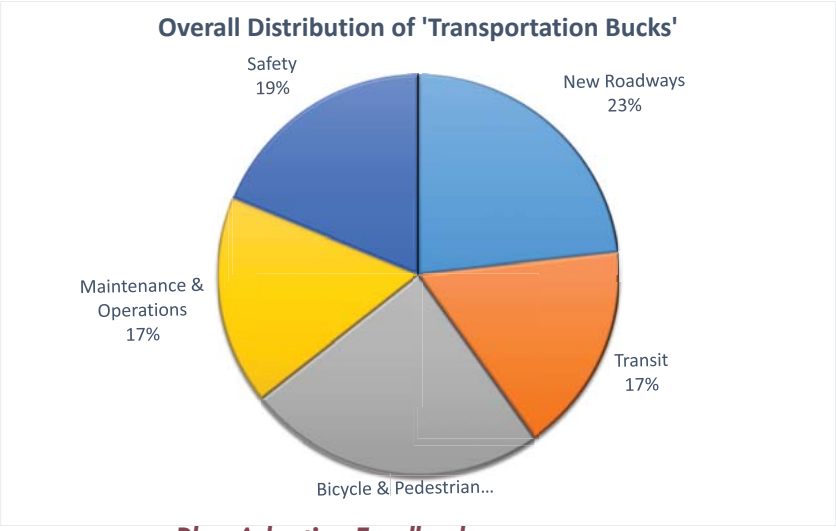
- Majority of traffic is high-speed, through traffic
- Distracted drivers/close calls are a problem
- There is a lack of pedestrian crossings across State Route 46
- Concerned that the one-way pairs on SR 46 have created "two islands" out of Ellettsville
- Poor disability access; utility poles block the sidewalks
- High traffic volumes
- At Temperance/Main Streets (one-way pair), traffic moves quickly
- Concerned that as Ellettsville grows, there may be more transportation problems
- Specifically said that there are many accidents at the Arlington/ SR 46 intersection
- Concerned about crime when walking or biking to Ellettsville
- East-West auto connection needed
- Need more convenient, cost-effective public transportation
- North-South travel difficult (except 37)
- Bus service too limited (neighborhoods)
- No pool/bus parking areas
- Buses too big and routes too long
- Easier to be a pedestrian in Bloomington now
- Scooter/motorcycle parker problems
- Need more bike racks

Participants were asked to discuss how the community, transportation system should look like in the future.

- Construct a bypass south of Ellettsville for SR 46 to reduce congestion
- Concerned that I-69 will result in a wider SR 46 to account for higher traffic volumes
- Want to separate through traffic from local traffic
- Want better management of drainage that is impacted by both transportation and land use density.
- The County plan will inhibit growth and thus more need for public transportation focus on the urbanization of Bloomington. In an urbanized area there will be less use of cars
- More recreational transportation especially East-West
- Needs of aging population
- Major East-West corridor
- Highly developed bus service
- Patterson Park car/bike/pedestrian traffic problems for Prospect Hill
- Smaller buses, shuttle/trolley around core neighborhoods
- More bicycle routes
- Extend transit routes to the counties
- Express bus routes
- Neighborhood centers with parks, pharmacy, stores, medical, etc.
- Shut down downtown to car traffic
- East-West connectivity

Mid-point Feedback

Participants were asked how to distribute transportation spending. The pie chart illustrates the overall results on allocations of transportation spending.



Plan Adoption Feedback

- Language should be included within the vision that specifically identifies vulnerable populations such as elderly, young children, and the poor.
- Add information on the funding allocation process
- Explain or detail a set of criteria which are required for a project to be prioritized.

MPO Committees (2010 - 2017)

The Policy, Technical, and Citizen Advisory Committees received on-going status reports as well as opportunity to guide development of the MTP through its development and adoption process. All Committee meetings are open to the public and respective packet information was included for all committee meetings. The involvement of the MPO Committees help provide guidance to staff and kept members informed throughout the multi-year process to develop and adopt the MTP.

Final Public Open House (2017)

The final draft of the MTP was available for public review prior to adoption by the committees of the BMCMPO. An Open House was held to provide an opportunity to learn about key aspects to the plan, to provide final comments on the plan, and to learn about the adoption process.

Interagency Consultation & Coordination (2012 -2017)

BMCMPO staff consulted and coordinated with state and federal transportation agencies to ensure minimum requirements were attained as well as to respond to any additional feedback received. This consultation and coordination helped ensure the MTP had the appropriate technical reviews before a final MTP was adopted.

Technical Assistance

Technical assistance for the 2040 Metropolitan Transportation Plan was provided by The Corradino Group. General details of their data collection, methodologies, and model development are provided in Appendix C. The Corradino Group helped the MPO achieve the following objectives:

Data Collection

The Corradino Group collected household travel behavior via an online survey to supplement the travel data already available as well as the National Household Travel Survey (NHTS). The online survey collected information such as household size, income, auto ownership, mode, and usual weekly household destinations. An on-board transit survey was also used for Bloomington Transit and Indiana University Bus Systems. The survey was designed to collect rider information such as demographics, household income, automobile availability, origins, and destinations.

Socioeconomic Forecasts

Develop a range of county-wide socioeconomic forecasts for the year 2040. These forecasts are necessary to allocate household and employment values to the Traffic Analysis Zones (TAZ) used to model travel demands. Three forecasts or growth styles were used as for comparison: "Low"; "Mid-Range"; and "High Growth". These socioeconomic forecasts are based on recent development trends as well as reasonable expectations for future growth within Monroe County.

Land Use Forecasts

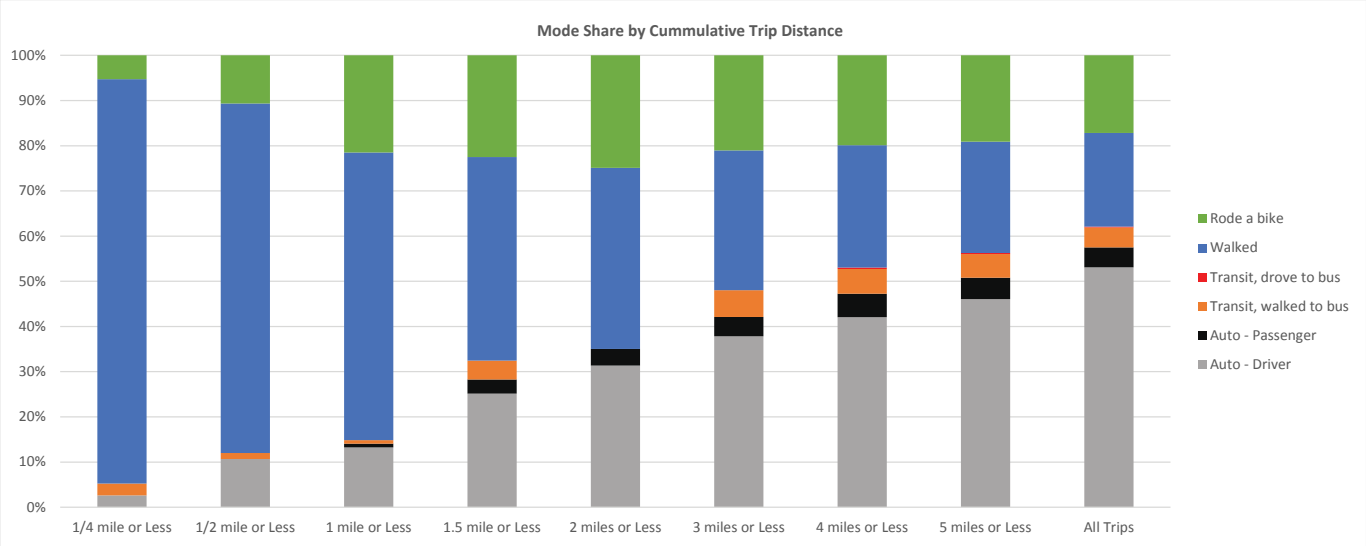
Develop a range of county-wide land use forecasts for the year 2040. These land use development patterns are closely tied to zoning and subsequently transportation needs. Three land use forecasts were used for comparison: "Standard"; "Compact"; and "Low Density". These land use forecasts are based on existing land use controls or possible changes to guide new development. Together with the socioeconomic forecasts, a total of nine different forecast modeling options were created. These ranged from low growth and compact development to high growth and low density development. Once a preferred socioeconomic and land use forecast scenario is selected, future travel demands could be modeled to help the community better understand future needs as well as evaluate future scenarios.

Travel Demand Model

Develop a transportation travel demand computer model that accounts for existing travel behaviors of Monroe County residents and visitors on the existing transportation network as well as under future scenarios. Develop a range of performance measures, so the model is a useful tool to compare current and future conditions out to the year 2040. Federal legislation requires that all MPOs establish performance measures on the use, condition, and impact of the transportation system. In addition to these requirements, BMCMPO performance measures are also based on the Guiding Principles, outlined in Chapter 2. Performance measures are a means to evaluate desired results and progress over time. Chapter 5 provides more details on the performance measures used for the MTP.

Below is a summary on the categories and attributes used for each performance measure.

BMCMPO Travel Survey Results



Travel Demand:

- Person trips per day
- Daily vehicle trips
- Daily vehicle miles
- Daily vehicle hours
- Daily transit boarding's
- Mode shares

Safety:

- Predicted number of accidents
- Fatal, Injury, Property

Travel Efficiency:

- Vehicle hours of delay
- Accessibility by mode
- Number of jobs within X minutes
- Shopping within X minutes
- Transit person hours
- Weighted average transit walk distance
- Weighted average transit headway
- Five Urban Design Variables

Economic:

- Infrastructure costs
- Monetized System User benefits (time, cost, etc.)
- Potential jobs impacts
- Prosperity index

Environmental:

- Greenhouse gas emission tonnage
- GHG per trip
- GHG per capita

Ultimately, the travel demand model allows a range of projects together with policies and even conditions be compared to one another to aid in the decision making process for choosing a preferred course of action. Technical documentation by Corradino is available for more in-depth details on the TDM.

D Appendix

Travel Demand Model

Overview

This appendix is a general summary to provide an overview on the general technical aspects to the BMCMPO travel demand model (TDM). The following provides an overview of the model, the network attributes, traffic analysis zones, trip generation, destination and mode choice, and traffic assignments and validation. More detailed technical documentation issued by The Corradino Group is available upon request.

Model Overview

The BMCMPO maintains a TDM covering Monroe County utilizing TransCAD software. The BMCMPO model serves as an analytical resource for the Bloomington-Monroe County area.

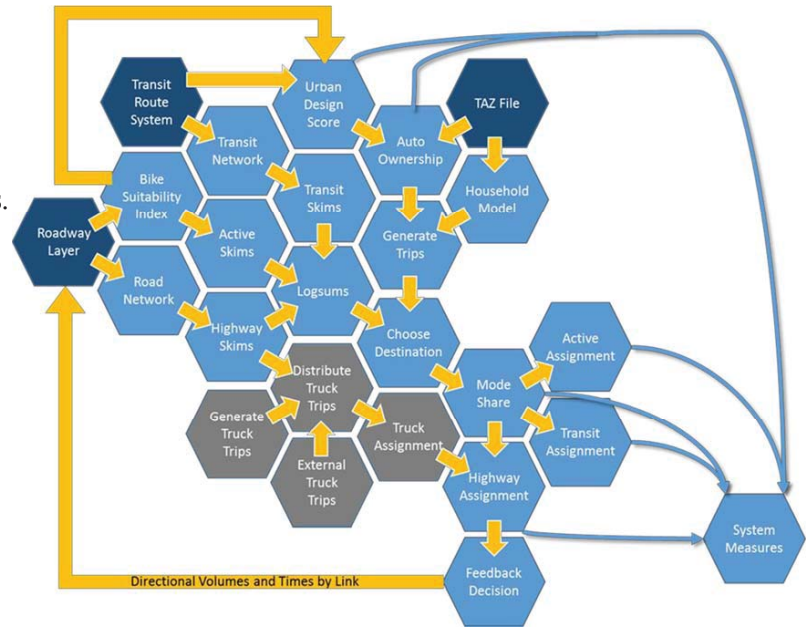
The BMCMPO model is designed primarily for use in transportation planning efforts at a regional scale and is a useful tool for the development of the long-range BMCMPO 2040 Metropolitan Transportation Plan (MTP).

The model is designed and calibrated for macro-level regional planning activities, more detailed studies would be necessary for specific project-level analyses. The model does incorporate local data, along with good professional judgment, as part of the validation process. Basic model components use mostly a conventional trip-based travel demand model. It also uses aggregate land use/socioeconomic data and road/transit network data to estimate facility-specific roadway traffic volumes and transit demand.

Conventional TDMs use a four step process. Each step of the TDM simulates the traveler's decision-making on one aspect of trip making: trip generation predicts whether to make a trip, trip distribution finds where to go, mode split figures out which transportation mode to use, and traffic assignment estimates which route to take for the trip. This conventional approach follows four sequential steps:

- Trip Generation - this initial step translates household and employment data into person trips using trip generation rates established during model calibration.
- Destination Choice - the second step estimates how many trips travel from one transportation analysis zones (TAZ) to any other zone. The distribution is based on the number of trips generated in each of the two zones, and on factors that relate the likelihood of travel between any two zones to the travel time between the two zones.
- Mode Choice – the third step estimates the proportions of the total person trips which use transit and ride-sharing modes as opposed to single occupant vehicles for travel between each pair of zones.
- Trip Assignment - the final step assigns trips from one zone to another to specific travel routes between the zones. The assignments to routes do consider effects, such as traffic congestion.

The TDM uses a feedback loop to pass congested speeds back through the modeling steps so that trip distribution and mode choice components produce results that are consistent with modeled congestion for a given scenario. This generalized process is shown in the feedback illustration below.



Development of the TDM requires various data and information to run each of the four steps of the TDM. Much of this data and information are attributes assigned to each TAZ. Statistical analysis, network attributes, and other parameters are used to establish a Base Year (2013) condition used to compare future conditions or scenarios using the same four-step process, but with projected data values. The general aspects of Transportation Analysis Zones, Trip Generation, Destination and Mode Choice, and Traffic Assignment and Validation are provided below to illustrate relationships of data, attributes, and model parameters used for the TDM.

Transportation Analysis Zones (TAZ)

Originally based on 2010 Census Block geography, a total of 591 (including 34 external stations) TAZs were developed. Each TAZ contains socioeconomic, population, household characteristics, employment and school enrollment data for key attributes. Significantly more TAZs than the previous TDM allowed a more refined level of detail analysis for key spatial attributes. This includes group quarters associated with Indiana University which typically have not been accounted for within TAZ development in the past.

Population and household data from the 2010 Census were also aggregated into each TAZ. This process resulted in total 137,976 population and 68,624 households in Monroe County. Household and economic data from the Census were also used for TAZ attributes. This approach is used to represent key household characteristics, which typically affect the number of trips made by household members (e.g. average household size, median household income, average number of workers per household, average number of vehicles per household).

School enrollment and employment are other key attributes aggregated into each TAZ. For school enrollment, a total of 14,660 K-12 and 50,948 university enrollments (41,997 for Indiana University and 8,951 for Ivy Tech) for Monroe County were assigned. For employment, a total of 79,738 employees for Monroe County were also assigned by North American Industry Classification System (NAICS-based) employment types. This resulted in 8,376 Retail, 10,066, Industry, 3,140 Office, and 58,156 Service employment type assignments.

Another attribute of TAZs used was to classify them by area types (rural, suburban and urban). This information is required for speed and capacity estimation of network links. The area types were determined by combined criteria of population and employment density for each TAZ and followed the following guidelines:

TAZ Classification

Area Type	Population Density (Persons/mile2)		Employment Density (Jobs/mile2)
Rural	Less than 1,500	AND	Less than 400
Suburban	400 to 1,000	OR	1,500 to 2,000
Urban	1,000 or greater	OR	2,000 or greater

Trip Generation

The initial step of the TDM is trip generation. Attributes assigned to each TAZ are used to translate this information into person trips using trip generation rates, household worker stratification curves, and household market segmentation (automobile ownership). Approximately 75% of the households have two people and two or less workers. Household stratification is used because the workers and size of the household strongly influence the trip generation (e.g. home-based work, home-based other, home-based shop, home-based school).

Likewise the market segmentation also strongly influences trip generation when factoring in the number of autos available to adult household members. The auto ownership variable is key to the trip generation process. The inclusion of the auto ownership model will allow the regional travel model to be sensitive to different types of urban development and/or non-auto infrastructure (transit and non-motorized). Categorizing household automobile ownership into Zero Auto, Autos Less than Workers, Autos Greater than Workers was used for the market segmentation of the trip generation process.

Truck trips is another aspect that the TDM incorporates into the trip generation step. Generally truck trips are not based upon household information, but are related to the employment aspect and trips generated by commerce.

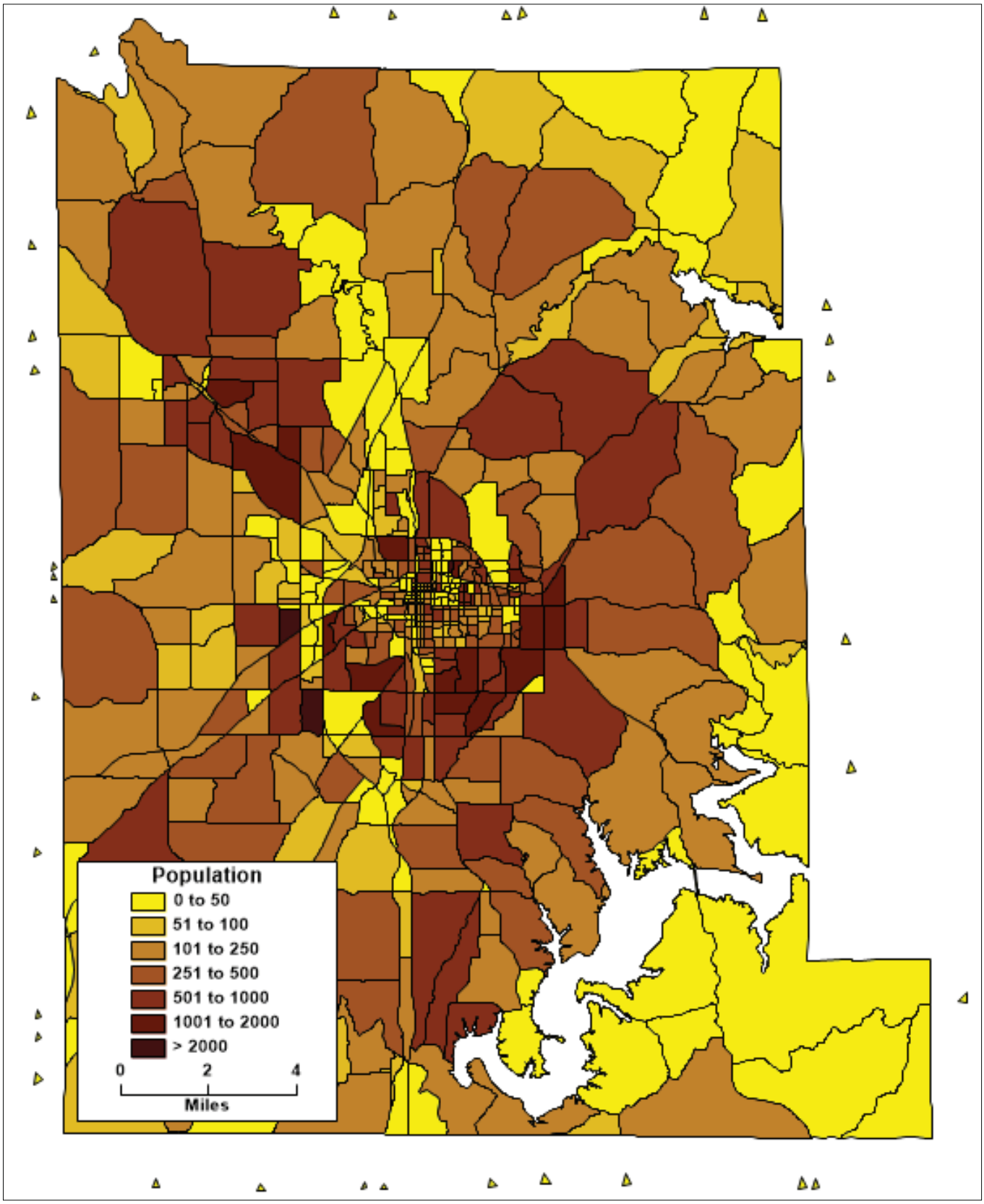


Illustration : Monroe County TAZ and Respective Population Values

Destination and Mode Choice

The next step of the TDM first estimates how many trips travel from one TAZ to another TAZ. The distribution is based on the number of trips generated in each of the two zones, and use factors such as the likelihood of travel between any two zones to the travel time between the respective two zones. This includes time of day factors, peak travel, and other attributes to estimate trips. Another aspect that the TDM uses is a congested travel time feedback loop. This is helpful when assessing consistency with air quality and travel speeds as they are interrelated.

Next the TDM estimates the proportions of the total person trips by mode type between each pair of zones. This Mode Choice step uses a regression or logit model to assign the probability of using a particular travel mode based upon the utility of that mode in relation to the sum of the utility for all modes. The utility measure is specific to each travel mode, while the coefficients for travel time and cost are generally held constant for all modes for a given trip purpose and population. This regression assumes an improvement in one mode will divert trips proportionately from all other modes. For example, a transit improvement that attracts an additional five percent of all trips would reduce trips on all other modes by five percent. It also has the ability to recognize the potential for something other than equal competition among modes. In this instance, a reasonable assumption for a premium express transit service would attract more diversion from the parallel local bus service than from the auto modes. Finally it also relates the mode choice to the type of trip generation (e.g. home-based work, home-based other, home-based shop, home-based school).

It is important to note that this Mode Choice step now offers functionality that was not previously factored with previous BMCMPO TDMs. In the past, modes other than automobile were not modeled by the TDM and were simply assumed being accounted for indirectly since data attributes were almost solely associated with automobile travel.

Another unique aspect of the BMCMPO TDM is including urban design attributes. There are strong correlations between land uses and transportation needs. A "5D Score" was developed to better relate the land development types and their impact on travel behavior (e.g. low density tends to favor high VMT and high density tends to favor low VMT on a per capita basis). The 5D Scores used Density, Destination, Design, Diversity, and Distance to Transit as part of the Mode-Choice step.

Traffic Assignment and Validation

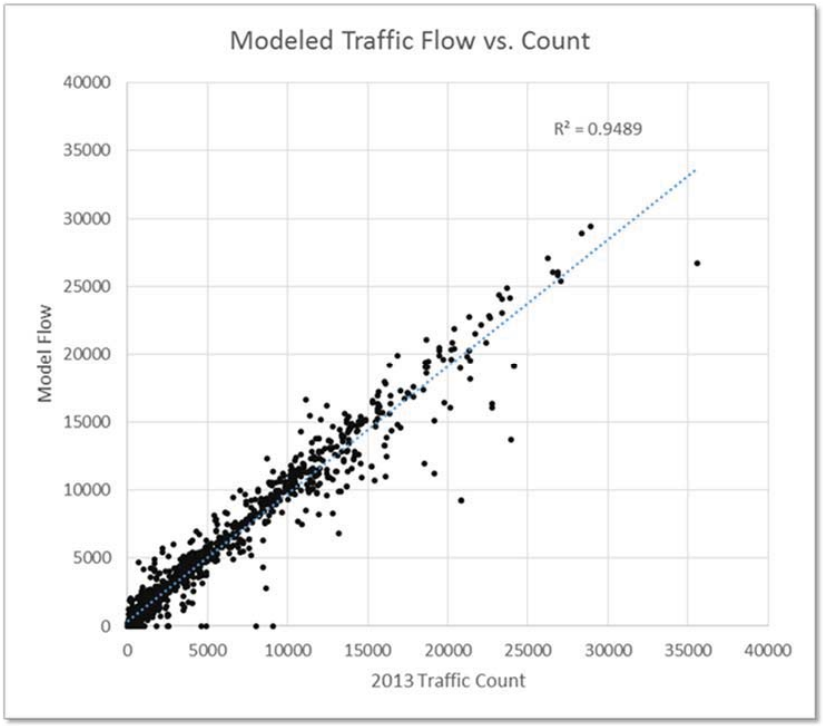
Accurately representing the transportation network of Monroe County is a fundamental part for the successful validation of the BMCMPO TDM. The City of Bloomington and Monroe County provided roadway traffic counts and transit ridership data, and a variety of GIS files of roadways, transit routes, bike routes, trails/paths, traffic signals and parcels data. All these data were used for developing a model network which accurately represents the transportation infrastructure conditions in Base Year 2013. Technical analysis considered aspects of future networks, highway speeds, capacity estimation, delays, external stations, growth rates, truck traffic, transit network, and other network attributes.

The trip assignment step is the last step of the conventional four-step model process. In general, trips from the various trip generation tables are assigned to the network according to mathematical algorithms that ensure that all zone to zone trips use paths that minimize the total travel time of all trips on the network. This step is also the last step in the feedback loop that returns updated highway travel times to the trip distribution step which generates revised trip tables based on these updated travel times. This loop ensures that consistent, stable highway travel times are established before the final set of highway and transit trips are assigned to the network. Trip assignment used the following steps for traffic assignment: Highway Assignment (equilibrium assignment for peak periods, off peak period, by single occupancy vehicle, high occupancy vehicle, trucks, bikes, and pedestrians), Congested Travel Speeds (standard Bureau of Public Roads curves), and Count Data (local, INDOT).

TDM validation is measured against the Base Year (2013) observed data for the region. Calibration of the TDM takes place at each step in the model process and involves initial estimation and then refinement of the various parameters and coefficients of the model components by comparing model results to observed conditions. This is done until calibration refinements have resulted in satisfactory results. Once validated, the model can be used to predict future travel patterns with a high degree of confidence.

The Root Mean Squared Error (RMSE) method is used to validate for different volume, facility and area types. In regard to RMSE, The model is generally within the desirable range of error for high-volume roads and overall, but above desirable targets for low-volume roads, which are more difficult to replicate, given the inherently smaller margins of error afforded.

The 2013 Base Year model is performing well with a validation against counts to show an overall 26.2% RMSE and 1.5% count VMT error. The system-wide modeled 2013 Base Year VMT estimate is consistent with the 2005 HPMS estimate (within -5%). The figure below shows the estimated traffic flow vs. the actual traffic counts as part of the validation.



E Appendix

Environmental Justice

Federal Statutes

Title VI of the Civil Rights Act of 1964 requires that no person in the United States shall on the grounds of race, color, national origin, gender, age, or disability be excluded from participation in, or be denied the benefits of, or be subjected to discrimination under any provision or activity of federal aid recipients, sub-recipients or contractors. Title VI established a standard of conduct for all Federal activities that prohibits discrimination. By the 1990s, concerns over the high and adverse environmental impacts of private or government actions that were disproportionately high and adverse to human health, or environmental effects, on minority populations and low-income populations, resulted in Executive Order 12898.

Executive Order 12898, issued on February 11, 1994, titled Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and the President's Memorandum on Environmental Justice, directed every federal agency to make environmental justice part of its mission by identifying and addressing the effects of all programs, policies and activities on "minority populations and low-income populations".

Now the totality of significant individual or cumulative human health, or environmental adverse effects must be addressed. Furthermore, disproportionately high incidents borne by predominantly minority and/or low-income populations (appreciably more severe or greater in magnitude than the adverse effects borne by non-minority and/or non low-income populations), must also be addressed. Thus instituting the term Environmental Justice (EJ) ensures equal protection under the country's laws, including the following:

- National Environmental Policy Act of 1969 (NEPA)
- Title VI of the Civil Rights Act of 1964
- Section 504 of the Rehabilitation Act of 1973
- Age Discrimination Act of 1975
- 23 United States Code 324
- Title II of the American with Disabilities Act of 1990
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970

Environmental justice applies to transportation in many ways. EJ must be integrated into every transportation decision from the beginning concepts through post-construction operations and maintenance (policy decisions, systems planning, project development and NEPA review, preliminary design, final design, right of way, construction, operations and maintenance). All policies, programs, and other activities that are undertaken, funded, or approved by FHWA, FTA, or other US DOT components must comply with EJ requirements. In regards to the Metropolitan Transportation Plan, generally the underlying principle of Title VI is that minority and low-income residents should:

- participate in the planning process;
- benefit from planned transportation improvements; and
- not bear an unfair burden of the environmental impacts.

The Plan estimates growth patterns and future transportation needs which helps to address the benefits and burdens that future transportation projects might have on disadvantaged populations. Plan development provides growth projections to evaluate, opportunities for all populations to provide input (Public Participation Plan), assess the effects of future decisions on neighborhoods, the environment, and the economy, and help ensure that the benefits and impacts of future transportation systems are equally distributed.

Demographic and socioeconomic data from the American Community Survey (ACS), for each of the 16 Census Tracts of Monroe County, was obtained. The data was analyzed by percent of minority populations and percent below poverty status by tract. The percentage of both non-white and below poverty status populations by Census Tract is summarized in Table XX. Individual tracts are identified by two EJ characteristics:

Methodology & Results

- High minority tracts - 50 percent or more of the residents in the tract were "minority" populations; and
- Low income tracts - 50 percent or more of the individuals within the tract were classified as living in poverty status.

Census Tracts with 50 percent or more of either of the two EJ characteristics are locations of importance for transportation planning purposes. The EJ Census Tracts (EJ Tracts) with high incidents of poverty and minority populations for Monroe County are:

- **Census Tract 1** covering the Bloomington Central Business District and immediate surrounding areas;
- **Census Tract 2.01** covering the northern portion of the Indiana University campus;
- **Census Tract 2.02** covering the southern portion of the Indiana University campus;
- **Census Tract 6.02** covering the northwestern portion of the City of Bloomington; and
- **Census Tract 16** covering the area north of downtown and immediately northwest of the Indiana University campus.

The Census Tracts, with the EJ Tracts labeled in red, are mapped for reference on page 81, Figure E-1. It is important to reference the Tracts that meet the conditions of EJ with Figure E-1 and any proposed transportation pro-jects within the MTP or future projects. Figure E-1 provides a useful means to quickly assess the spatial relationship between possible projects and EJ compliance for the MTP. Currently, no residential displacements are anticipated for any project within an EJ Tract.

EJ Tracts identified cover most of the Indiana University campus and/or have high concentrations of off-campus housing desired by student populations. The high percentage below poverty classification for these tracts is very likely a reflection of the large number of students residing within these Tracts. Furthermore, Tract 2.02 has a high minority proportion and this may also be influenced by large number of students living on campus, particularly international students. By comparison, the Bloomington Housing Authority manages a large low-income housing complex within Tract 6.01 as do several other agencies within this tract. Tract 6.01 is close to meeting the EJ characteristics, but offers some context when comparing it to the EJ Tracts that have high student populations. Projects that are within EJ Tracts, a higher level of analysis during the Red Flag Analysis will be necessary when project funding is being considered for a Transportation Improvement Plan (TIP). This in turn may require the need to address specific EJ concerns as a project moves forward with implementation.

Another consideration for EJ is transit service. Again, Figure E-1 provides a useful means to quickly assessing the spatial relationship between Transit services and EJ compliance. Bloomington Transit, Indiana University (IU) Campus Bus, and Rural Transit all provide transit services within and in close proximity to Indiana University and the Downtown area (Tracts 1.0, 2.01, 2.02, 6.02, and 16). Together Bloomington Transit, IU Campus Bus, and Rural Transit provide a range of transit services to all EJ Tracts within Monroe County. Future transit investments supported by the MTP will continue to enhance mobility and service for populations within EJ Tracts.

The multi-modal transportation improvements contained in the 2040 MTP will benefit areas with a concentration of low-income households through improved mobility and accessibility without having a "disproportionately high" or "adverse" effect. In fact, no households will be displaced in implementing transportation improvements in these low-income or high minority areas. Finally, the 2040 MTP makes multi-modal transportation investments within,

Conclusion

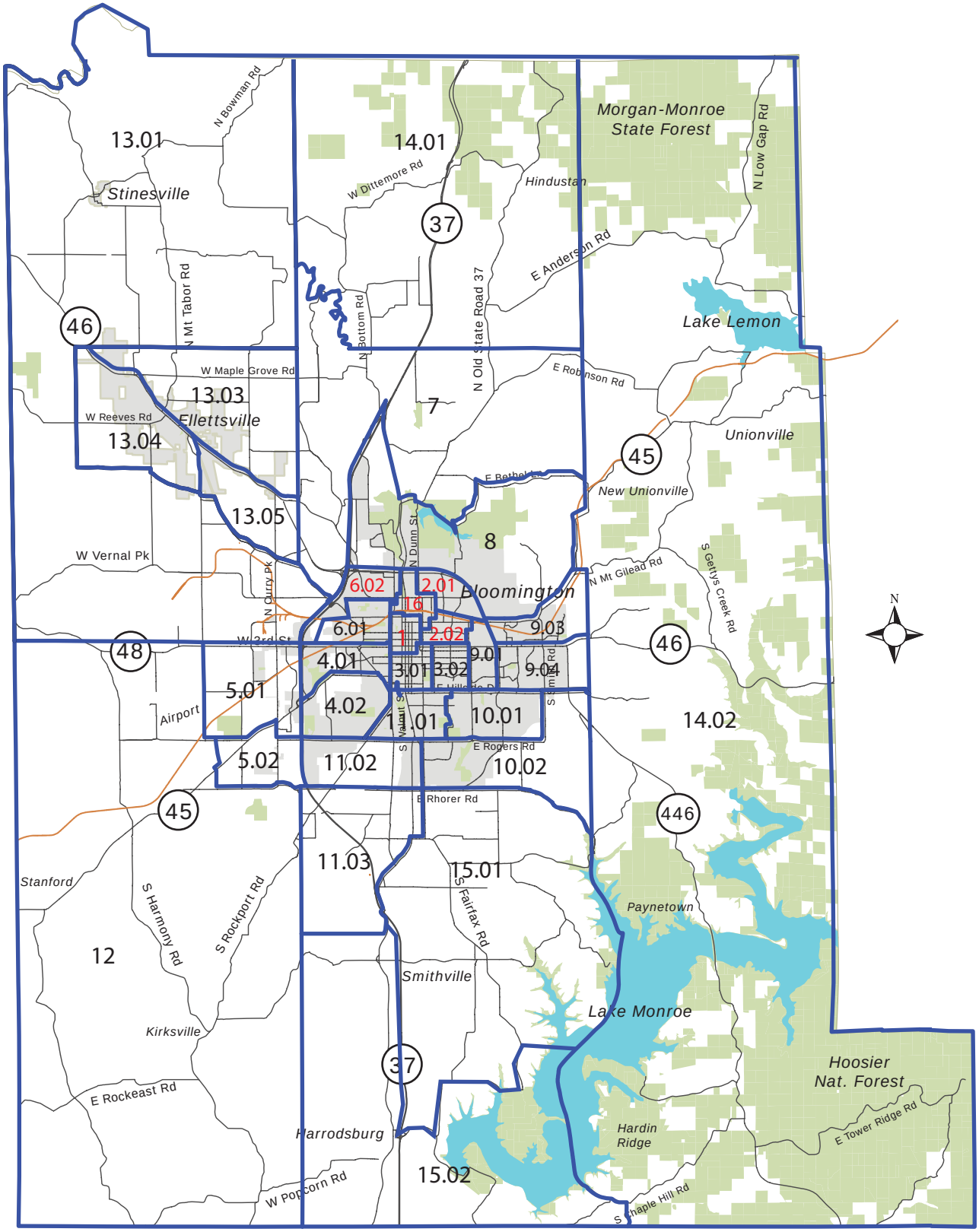
and to, low-income areas ensuring that low-income groups receive a proportionate share of benefits, without enduring adverse impacts. Thus, the Year 2040 MTP is in compliance with Title VI, relative to Environmental Justice.

The Table on this page details the Census Tract and respective population and poverty results regarding Title VI requirements for the BMCMPO area. Highlighted cells are locations of importance for Title VI transportation planning purposes.

Census Tract	Population	White	Non-White	% Minority	% Below Poverty
1.00	5286	4656	630	11.9%	72.7
2.01	564	124	440	78.0%	65.6
2.02	60	56	4	6.7%	81.7
3.01	4542	3710	832	18.3%	41.7
3.02	2926	2716	210	7.2%	35.4
4.01	4358	3534	824	18.9%	31.1
4.02	4605	3599	1006	21.8%	24.7
5.01	4238	3683	555	13.1%	21.2
5.02	3438	2944	494	14.4%	12.3
6.01	4347	3051	1296	29.8%	47.9
6.02	3137	2350	787	25.1%	59.1
7.00	2666	2434	232	8.7%	8.9
8.00	5924	5085	839	14.2%	18.3
9.01	2930	2170	760	25.9%	43.1
9.03	5063	3966	1097	21.7%	31.5
9.04	5469	3293	2176	39.8%	43
10.01	5064	4072	992	19.6%	6.2
10.02	5601	4553	1048	18.7%	12.2
11.01	5241	4369	872	16.6%	27.1
11.02	4490	3655	835	18.6%	17.1
11.03	3130	2734	396	12.7%	9.9
12.00	6043	5840	203	3.4%	4.7
13.01	5825	5655	170	2.9%	10.4
13.03	5894	5669	225	3.8%	3.4
13.04	3985	3526	459	11.5%	8.5
13.05	2132	2069	63	3.0%	4.7
14.01	2230	2161	69	3.1%	9.1
14.02	5249	4956	293	5.6%	11.7
15.01	5452	5327	125	2.3%	5
15.02	2842	2745	97	3.4%	10.7
16.00	4971	4355	616	12.4%	76.9

Source: U.S. Census Bureau / ACS 2015 5 Year Estimate

Figure E-1: Monroe County EJ Tracts



F Appendix

Air Quality

Overview

The Clean Air Act of 1971 required the development of a State Implementation Program (SIP) for achieving National Ambient Air Quality Standards (NAAQS) in non-attainment areas. The relationship between transportation planning and air quality planning was formalized with the Clean Air Act Amendments of 1990, which establish a direct relationship between projects in the metropolitan Transportation Improvement Program and air quality compliance.

Under current Federal requirements, an air quality conformity determination is required for major transportation investments in designated air quality "non-attainment" and "maintenance" areas. The composite of major transportation investments contained in an urbanized area long-range transportation plan must therefore demonstrate air quality improvement or, at minimum, no degradation in air quality relative to the "Existing Plus Committed" transportation network.

Compliance

Monroe County and Bloomington have not been subjected to Federal air quality requirements because Monroe County and the City of Bloomington currently meet Federal air quality standards, and the region is in "attainment" for each of the criteria pollutants.

Although a conformity determination is not needed for the Bloomington urbanized area, the projects programmed in the Cost Feasible Plan for the 2040 Metropolitan Transportation Plan will result in an improvement to air quality. The analysis completed for the 2040 MTP initially showed that traffic congestion would increase for the "no-build" (Existing Plus Committed) transportation network over the next two decades years because of increased:

- System-wide volume-to-capacity ratios;
- Road miles operating below Level-of-Service "C" or "D";
- Vehicle-miles of travel on facilities operating on below Level-of-Service "C" or "D";
- Congested vehicle-hours of travel; and
- Total vehicle-miles of travel.

Since congestion and air quality are correlated to vehicle speeds, total vehicles, and vehicle-miles of travel, air quality would degrade over the Year 2040 forecast period if no further major transportation investments are made in the Bloomington urbanized area. In other words, an increase in mobile source generated carbon monoxide and ozone (hydrocarbons and nitrous oxides) will occur under a "no-build" Transportation Plan alternative.

Conversely, the recommended set of projects in the 2040 MTP Plan focus on alternative transportation and public transportation while adding modest roadway capacity will result in air quality improvements over the no-build condition through the achievement of reductions in:

- System-wide volume-to-capacity ratio;
- Congested roadways;
- Vehicle-miles of travel on congested roadways; and
- Congested vehicle-hours of travel.

Forecasted growth in population, employment, and income will bring about increased transportation demands within the BMCMPO area during the forecast period extending to Year 2040. The recommendations of the 2040 Metropolitan Transportation Plan will, however, contribute to overall air quality improvement through a systematic application of transportation capacity preservation, minimal capacity expansion projects, and continued system growth of the bicycle/pedestrian and public transit systems.

G Appendix

Projects

Projects

The following Projects index provides a central reference point for the description of recommended BMCMPO 2040 Metropolitan Transportation Plan multi-modal projects.

This projects index is not all-inclusive nor does it necessarily represent a formal investment commitment by governmental entities or governmental entity partners pending further study, priority establishment, funding availability, and formal programming within the framework of the BMCMPO transportation improvement programming process.

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Project Cost Estimation

Estimating project costs is a critical step for project selection, project programming and project scheduling. The 2040 Metropolitan Transportation Plan used a multi-step process to calculate individual infrastructure project costs.

1. BMCMPO staff analyzed project construction costs as documented in past BMCMPO Transportation Improvement Programs and developed average construction costs by associated project type. These costs were then recalculated based on project length and assigned a derived dollar per mile cost.
2. Individual project types included added travel lanes, pavement replacement, road rehabilitation, road reconstruction, new road construction, converting a rural design roadway sections to urban cross sections, signal installation/replacements, sidepath/trail construction and many other similar projects.
3. The length of each project was measured through the use of GIS software.
4. Costs were calculated for each project by multiplying the cost per project type (Step 1) by the project length (Step 2).
5. Project costs were then recalculated to reflect the year of construction. Year of construction costs were established by determining a cost estimate in the base year (2018) and applying a constant dollar annual inflation rate of 2.0% for the final project cost.

Project Index

Monroe County Projects

Fullerton Pike - Phase III

Start:	S. Rockport Road
End:	S. Rogers Road
Length:	1.3 miles
Description:	New road construction from Rockport Road to Wickens Street and road construction from Wickens Street to Rogers Road; construction of new three-lane road connection with new bridge over tributary to Clear Creek and Clear Creek Trail.
Bicycle/Pedestrian:	Multi-use path on one side of the road with sidewalk on the other side of the road, and on-street bicycle lanes.

City of Bloomington Projects

10th Street/14th Street

Start:	Dunn Street
End:	State Road 45/46 Bypass
Length:	2.9 miles
Description:	Road reconstruction to two lanes and creation of one-way pair.
Bicycle/Pedestrian:	On-street bike lanes with sidewalks on both sides of road.

17th Street

Start:	Vernal Pike
End:	State Road 45/46 Bypass
Length:	3.0 miles
Description:	Construction of new two lane road connection between Crescent Road and Vernal Pike (crossing State Road 37); 8 intersection modernizations/improvements between State Road 37 and State Road 45/46 Bypass.
Bicycle/Pedestrian:	(a) On-street bike lanes with sidewalks on both sides of road, or (b) Sidepath on one side of road with sidewalk on other side of road; Provide exclusive bicycle and pedestrian crossing of State Road 37.

Adams Street

Start:	Countryside Lane
End:	Allen Street
Length:	1.8 miles
Description:	Construction of new two lane road connection (to be implemented by future development).
Bicycle/Pedestrian:	Sidepath on one side of road with sidewalk on other side of road.

Moores Pike

Start:	College Mall Road
End:	State Road 446
Length:	1.4 miles
Description:	Road widening to three lanes.
Bicycle/Pedestrian:	(a) On-street bike lanes with sidewalks on both sides of road, or (b) Sidepath on one side of road with sidewalk on other side of road.

Sudbury Drive

Start:	Weimer Road
End:	Rogers Street
Length:	1.4 miles

Description:	Construction of new two lane road connection (to be implemented by future development).
Bicycle/Pedestrian:	Sidepath on one side of road with sidewalk on other side of road.

Weimer Road

Start:	Tapp/Wapehani Road
End:	Bloomfield Road
Length:	0.7 miles
Description:	Reconstruction for two lanes.
Bicycle/Pedestrian:	Use old Weimer Rd alignment to extend Clear Creek Trail.

Jackson Creek Trail

Start:	Moores Pike
End:	Clear Creek Trailhead
Length:	12.1 miles
Description:	Multi-use bicycle and pedestrian trail.
Bicycle/Pedestrian:	Multi-use bicycle and pedestrian trail.

H Appendix

Glossary

Terms

3C Planning means Comprehensive, Cooperative and Continuous transportation planning process.

Alternative Transportation Funds means the City of Bloomington's established funding exclusively for pedestrian and bicycle infrastructure maintenance, preservation, and facility expansions more than a decade ago. Funds are allocated through annual municipal budget approvals by the Common Council.

Analysis Area means any geographic area such as a zone or group of zones combined for the purpose of making an analysis.

Apportionment means any method for dividing federal funds by an established formula. An apportionment operates like a line of credit to sub-federal governments.

Authorization means the level of funding designated by Congress for specific legislation.

Average Daily Traffic (ADT) means the average number of vehicles passing a specified point during a 24 hour period.

Bike Lane means a portion of the road that has been designated and designed for the exclusive use of bicycles with distinct signage and pavement markings.

Bloomington Transit (BT) is a municipal corporation that provides public transportation within the City of Bloomington limits.

Bottleneck means the point of minimum capacity along a highway segment.

Build Condition, Option, Alternative or Alternate means a transportation plan, program or alternative involving a major capital investment.

Capacity means the maximum rate of flow at which persons or vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic and control conditions, usually expressed in vehicles per hour or persons per hour.

Capacity Expansion Projects means major transportation investments that expand the capacity of any highway or transit system to accommodate additional vehicles. Highway expansion projects involve projects that add through travel lanes including major roadway widening, new roadways, new freeway interchanges, and substantial realignments of existing roadways.

Capacity Preservation Projects means transportation investments to preserve the capacity of the existing highway or transit system. Such projects include bridge rehabilitation and replacement, pavement rehabilitation and reconstruction, and low capital cost investments such as traffic signal improvements or safety improvements (e.g. guardrails and minor horizontal/vertical curve realignments). Typical transit projects involve bus and equipment replacement, transit shelters, and garage facility maintenance.

Carpool means any vehicle (usually a car) or arrangement in which two or more occupants, including the driver, share use or cost in traveling between fixed points on a regular basis (also referred to as ridesharing).

Census Tract means small areas with generally stable boundaries, defined within counties and statistically equivalent entities, usually in metropolitan areas and other highly populated counties. They are established by the U.S. Census Bureau to be relatively homogeneous with respect to population characteristics, economic status, and living conditions.

Central Business District (CBD) means an area of a city that contains the greatest concentration of commercial activity. The traditional downtown retail, trade and commercial area of a city or an area of very high land valuation, traffic flow, and concentration of retail business offices, theaters, hotels and services.

Citizens Advisory Committee (CAC) is a committee, organized under the MPO, that is comprised of citizens representing a broad spectrum of the community. The committee is tasked with providing recommendations to the Policy and Technical Advisory Committee on transportation-related topics that affect the MPO.

Committed Improvement means transportation investments for which funds have been programmed. This includes projects that are under construction, but not yet open for operation. In the most stringent sense, committed improvements involve projects for which funds have been programmed through the construction phase. In the least stringent sense, committed projects may involve proposed projects for which design has been completed and any environmental clearances have been received such that the project may be scheduled for bid letting.

Comprehensive Planning means a planning process that requires inclusion of land use, transportation, water and sewage, education, health and other elements.

Cross-Town Routes means a non-radial bus or rail service which does not enter the Central Business District.

Cumulative Bridge Funds provide revenues for the cost of construction, maintenance, and repair of bridges, approaches, and grade separations. Cumulative bridge fund receipts are derived from a tax levied on each one hundred dollars ($100) assessed valuation of all taxable personal and real property within the county or municipality.

Cumulative Capital Development Funds may be used for major roadway capital investments or other purposes prescribed by the Indiana General Assembly.

Daily Vehicle Miles Traveled (DVMT) means the total number of miles driven per day in a specified area by all vehicle types.

Deadhead Miles means the miles a transit vehicle travels without passengers or cargo on board, often to and from a garage or from one route to another.

Discrimination means any intentional or unintentional act, or any failure to act, which has the effect of excluding or denying a person from participation in benefits, or has otherwise subjected a person to unequal treatment under any program or activity because of race, color or national origin.

Divided Highway means a multi-lane facility with a positive barrier median, or a median that is 4 feet or wider.

FAST Act means the Fixing America's Surface Transportation Act enacted on December 4, 2015, funding surface transportation programs. It authorizes a $305 billion investment over fiscal years 2016 through 2020 with provisions for streamlining, performance-based measurements and multi-modal transportation.

Federal Fiscal Year (FFY) means a twelve month period for which records are kept. The Federal Fiscal Year is from October 1st to September 30th.

Federal Highway Administration (FHWA) is part of the U.S. Department of Transportation and is responsible for administering federal-aid transportation funds and programs.

Federal Transit Administration (FTA) is part of the U.S. Department of Transportation and is responsible for administering federal-aid public transportation funds and programs.

Geographic Information System (GIS) means spatial data, presented in an electronic map format, which geographically represents the geometry of the highways, an electronic map) and its geographically referenced component attributes data that are integrated through GIS technology to perform analysis.

Grant means an agreement between the federal government and a state or local government, whereby the federal government provides funds or aid-in-kind to carry out specified programs.

Highway means any road, street, parkway, or freeway/expressway that includes right-of-way, bridges, railroad/highway crossings, tunnels, drainage structures, signs, guardrails, and protective structures in connection with highways.

Indiana Department of Transportation (INDOT) is the agency that administers and funds transportation needs within the State of Indiana.

Indiana Statewide Transportation Improvement Program (INSTIP) is Indiana's multi-year program of transportation projects that is comprised of the Transportation Improvement Programs from all of the State's MPOs.

Land Use means the purpose for which land or a structure on the land is being used.

Level Of Service (LOS) means a qualitative measure describing operational conditions within a traffic flow stream, generally described in terms of such factors as speed and travel time, freedom to maneuver,

traffic interruptions, comfort, convenience and safety. Typically, a scoring system of A through F is used to describe the level of service. For highways, the LOS definitions found in the *Highway Capacity Manual* (Transportation Research Board Special Report 209) are used.

Local Road and Street means the account used exclusively for engineering, land acquisition, construction, resurfacing, restoration, and rehabilitation of highway facilities. Local Road and Street account (LRS) funds, including accelerated allocations, are available for capital investment; however, a portion of the funds must be set aside for preservation projects such as resurfacing, intersection/signalization, and safety improvements.

Local Share is the non-federal matching funds provided by a local entity fro federal matching funds.

Long Range Transportation Plan (LRTP or Plan) means the official multi-modal transportation plan adopted by the MPO for the metropolitan area in accordance with Federal metropolitan transportation planning guidelines. As a minimum, the transportation plan must have a twenty year horizon and must be updated every five years (every three years in air quality non-attainment areas).

Maintenance Area means any geographic region of the United States designated as non-attainment pursuant to the Clean Air Act Amendments of 1990 (Section 102e, United States Code 7410 et seq.) and subsequently re-designated to attainment status subject to the requirement to develop a maintenance plan under Section 175 of the Clear Air Act as amended.

Major (metropolitan) Transportation Investment means a high-type highway or transit improvement of substantial cost that is expected to have a significant effect on capacity, traffic flow, level of service, or mode share at the transportation corridor or sub-area scale.

Mass Transportation/Mass Transit means the provision of general or special transportation service, either publicly or privately, to the public on a regular and continuing basis in an urban area. This does not include a school bus, charter or sightseeing service.

Management System means a systematic process, designed to assist decision-makers in selecting cost effective strategies/actions to improve efficiency and safety of, and protect the investment in the nation's infrastructure. Typical management systems include the pavement management system, bridge management system, transit management system, congestion management system, safety management system, and intermodal management system.

MAP-21 means Moving Ahead for Progress in the 21st Century Act signed into law in July 2012. MAP-21 consolidated federal funding programs by two-thirds, streamlined environmental reviews, altered bicycle and pedestrian funding, granted development of a national fright policy, and allowed for greater use of innovative financing.

Metropolitan Planning Organization (MPO) means the forum for cooperative transportation decision-making for the metropolitan planning area. The MPO is designated by the Governor of each state and is composed of the chief-elected officials of the metropolitan planning area.

Metropolitan Planning Area (MPA) is the transportation planning area designed by the MPO. As a minimum, the MPA must cover the Urbanized Area (UZA) and the contiguous areas likely to become urbanized within the twenty year forecast period covered by the metropolitan transportation plan.

Metropolitan Transportation Plan means the official inter-modal transportation plan developed and adopted through the metropolitan transportation planning process for the metropolitan area. This is also referred to as the long range transportation plan.

MVHA means the Motor Vehicle Highway Account which derives receipts from motor vehicle registration fees, licenses, driver's and chauffeur's license fees, gasoline taxes, auto transfer fees, certificate of title fees, weight taxes or excise taxes and all other special taxes, duties or excises of all kinds on motor vehicles, trailers, motor vehicle fuel, or motor vehicle owners or operators.

Multi-Use Trail or Path means a hard surface, off-road path for use by bike, foot and other non-motorized traffic typically not within the road right-of-way.

National Highway System (NHS) means a federal transportation program, authorized in 1995, that includes the Interstate Highway System and other roads that are important to national defense, commerce, and mobility. The NHS in Indiana includes 2,897 miles of roadways and was developed by the U.S. Department of Transportation, in cooperation with INDOT and the State's MPOs.

No Build Condition, Option, Alternative or Alternate means a transportation plan, program or alternative involving no major capital investment. This is sometimes referred to as the "do-nothing" option. The No Build condition typically includes the existing transportation system plus committed or already programmed improvements to the transportation system.

Non-Attainment Area means a geographic region of the U.S. that the Environmental Protection Agency has designated as a non-attainment area for transportation related pollutants for which a National Ambient Air Quality Standard (NAAQS) exists.

Operational Improvement means a capital investment for the installation of traffic surveillance and control equipment, computerized signal systems, motorist information systems, integrated traffic control systems, incident management programs, and transportation demand management facilities, strategies or programs.

Operating Expense means the total of all operating costs incurred during the reporting period.

Operating Subsidy means the revenue received through federal, state, and local cash grants or reimbursements to fulfill operating expense obligations not covered by fares or other revenues generated by the transit system.

Peak Direction means the direction of higher demand during a peak commuting period.

Peak Hour means that one-hour period during which the maximum amount of travel occurs. Generally, there is a morning peak and an afternoon peak and traffic assignments may be made for each period, if desired.

Policy Committee is a committee of the MPO which reviews and approves transportation policy. It is composed of local elected and appointed officials from area municipalities, Indiana University and state and federal transportation agencies.

Preliminary Engineering (PE) means the first phase of a transportation improvement project, defines scope and project design.

Primary Arterial means a class of street serving major movement of traffic, typically carrying over 20,000 vehicles per day.

Primary Collectors means roadways that typically carry between 3,000 to 10,000 vehicles per day.

Radial Routes means transit service patterns, in which most routes converge into and diverge from a central transfer point or hub, like spokes of a wheel. If the routes are timed to arrive and depart at the same time, it is called a pulse system.

Revenue means all operating funds associated with the provision of transit service.

SAFETEA-LU stands for the Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users. This is the five-year federal transportation program authorizing the annual funding for federal transportation programs and replaces TEA-21.

Secondary Arterial means a street typically carrying between 10,000 to 20,000 vehicles per day.

Secondary Collector means roadways in Bloomington that typically carry less than 3,000 vehicles per day.

Sidepath means a hard surface path physically separated from the road with a grass or tree plot within a road right of way for the use of bicyclists, pedestrians and other non-motorized users.

Sidewalk means a hard-surface path within the street right-of-way that is designated for the exclusive use of pedestrian traffic.

Signed Bike Routes means a street that is safe for use by both vehicles and bicycles without a designated bike facility. These routes are identified with appropriate signage.

Statewide Transportation Plan means the official statewide, multi-modal transportation plan that is developed through the statewide transportation planning process.

Thoroughfare Plan means the official plan for the designation and preservation of major public road rights-of-way in accordance with the Indiana Code (IC 36-7-4-506).

Technical Advisory Committee (TAC) is a committee of the MPO which provides technical advice on transportation projects and programs. It consists of MPO agencies planners, engineers and transit managers.

TIF (Tax Increment Financing Funds refers to taxes payable on assessed value in excess of taxes attributable to the assessed value constituting the base; the "base" being the assessed value of the property in the Area that existed prior to the designation of the area as a designated redevelopment allocation area.

Transportation Demand Management (TDM) means strategies or actions taken to reduce or shift the peak-hour of travel demand or to shift the mode of travel demand. Typical actions to shift or reduce the peak-hour of travel demand involve programs to shift work hours, limit the trip generation of new development, and congestion tools. Typical actions to shift the mode of travel include transit fare subsidy programs, control of parking fees, expansion of transit services, construction/designation of high occupancy vehicle lanes or preferential parking areas, and construction of pedestrian and bicycle facilities.

Transportation Enhancement Activities (TEA) means the provision of facilities for pedestrians and bicycles, acquisition of scenic easements and/or scenic or historic sites, scenic and historic highway programs, landscaping and other scenic beautification, historic transportation buildings, structures or facilities (including historic railroad facilities and canals), preservation of abandoned railway corridors (including conversion and use thereof for pedestrian or bicycle trails), control and removal of outdoor advertising, archaeological planning and research, and mitigation of water pollution due to highway runoff.

Transportation Equity Act for the 21st Century (TEA-21) means the former six-year federal ground transportation program covering highways, transit and transportation enhancement activities. It authorized the annual funding for federal transportation programs prior to SAFETEA-LU, which was approved in 2005.

Transportation Improvement Program (TIP) means the staged, multi-year, multi-modal program of transportation projects which is consistent with the metropolitan transportation plan.

Transportation System Management (TSM) means a variety of low-cost capital investments or programs to preserve roadway capacity including signal system improvements, intersection improvements (adding turn lanes), access control policies, and transportation demand management strategies.

Urbanized Area (UZA) means a statistical geographic area defined by the U.S. Census Bureau that consists of a central core and adjacent densely settled territory containing a population of at least 50,000 people.

Unified Planning Work Program (UPWP) means the document which describes urban transportation and transportation related activities to be undertaken in an area during a period of time. The UPWP is prepared by the Metropolitan Planning Organization (MPO).

Wheel Tax means the motor vehicle excise surtax and wheel tax are county option taxes on motor vehicles which provide revenue to counties, cities and towns for road construction, reconstruction, repair or maintenance of streets, roads and bridges.

Volume To Capacity (V/C) Ratio means the observed number of vehicles or persons passing a point on a lane, roadway, or travel-way, compared to the maximum rate of flow at that point.