TRANSPORTATION CONFORMITY ANALYSIS FOR THE $PM_{2.5}$ AIR QUALITY STANDARDS

EMPO METROPOLITAN TRANSPORTATION PLAN 2040
EMPO FY 2013-2016 TRANSPORTATION IMPROVEMENT PROGRAM
INDOT FY 2014-2017 INSTIP

Prepared by
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Resolution Approving Air Quality Conformity Determination

WHEREAS, the Evansville Metropolitan Planning Organization (EMPO) is the organization designated by the Governor as the Metropolitan Planning Organization responsible, together with the State, for carrying out the provisions of 23 U.S.C. 134 (Federal-Aid Highway planning requirements), and capable of meeting the requirements of 49 U.S.C. 1603(a) (Federal Transit planning requirements) in the Evansville Planning Area; and

WHEREAS, the Indiana Department of Transportation (INDOT) is the organization responsible for carrying out the provisions of 23 U.S.C. 134 (Federal-Aid Highway planning requirements), for the portions of the Evansville non-attainment area outside of the Evansville Planning Area; and

WHEREAS, the Evansville Metropolitan Planning Organization Policy Committee is the policy body of the Evansville Metropolitan Planning Organization; and

WHEREAS, the Metropolitan Transportation Plan 2040 and the 2013-2016 Transportation Improvement Program and the associated Air Quality Conformity Analysis has been developed through the consultation process, in consultation with the INDOT, Technical Committee and the Policy Committee and has undergone a minimum 30-day public review; and

WHEREAS, the Evansville Metropolitan Planning Organization finds Metropolitan Transportation Plan 2040 and the 2013-2016 Transportation Improvement Program to be in conformance with the SIP for the annual $PM_{2.5}$ standard for the Southwest Indiana attainment maintenance area and has complied with the Clean Air Act Amendments (CAAA) requirements as they pertain to the development and conformity of the Transportation Plan;

BE IT THEREFORE RESOLVED, that the INDOT and the Evansville Metropolitan Planning Organization Policy Committee, at its regular meeting of January 08, 2014 endorses the Air Quality Conformity Determination.

Mr. Jack Corn, Jr., Chairperson,
Evansville MPO Policy Committee

Attest:

Mr. Roy Nunnally
Director, Asset Management Division
INDOT

Mr. Seyed Shokouhzadeh
Executive Director Evansville MPO

January 08, 2014

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1.1 Conformity Finding

The Evansville Metropolitan Planning Organization (EMPO) and Indiana Department of Transportation (INDOT) find that the Metropolitan Transportation Plan 2040 (MTP 2040)(see attachment A for MTP projects list), the Transportation Improvement Program for federal fiscal years 2013 – 2016 (FY 2013- 2016 TIP), and the projects in the $PM_{2.5}$ maintenance area outside of the Metropolitan Planning Area (MPA) (see attachment B for projects list) conform with annual fine particulate matter ($PM_{2.5}$) standards specified by the United States Environmental Protection Agency. Conformity was determined by running the AQPP program (see attachment C) on the EMPO road networks.

This report makes the determination that the MTP 2040, the FY 2013 - 2016 TIP, and the projects in the $PM_{2.5}$ maintenance area outside the MPA satisfy all the applicable criteria and procedures in the conformity regulations.

The Transportation Conformity Analysis for the $PM_{2.5}$ National Ambient Air Quality Standards documentation is subject to a public comment period running from December 6, 2013 to January 5, 2014. Upon close of the public comment period the EMPO policy committee will recognize, consider and respond to all comments received.

1.2 Overview of the Conformity Process

On December 9, 1997, the U.S. EPA approved IDEM's request to re-designate Vanderburgh County from a marginal one-hour ozone non-attainment area to a maintenance area.

On April 15, 2004, U.S. EPA designated Vanderburgh and Warrick Counties as a Basic non-attainment area for the new 8-hour ozone standard. Federal regulations also required a Conformity Determination for the Transportation Plan and the TIP be made within 12-months of the designation. On June 15, 2005, the U.S. EPA revoked the 1-hour ozone standard for Vanderburgh County.

On January 30, 2006, the U.S. EPA approved IDEM's request to re-designate Vanderburgh County from a Basic 8-hour ozone non-attainment area to a maintenance area. Indiana's petition included a long-term maintenance plan that was implemented to ensure that the area continues to meet the 8-hour standard for ground-level ozone in the future. Indiana also committed to maintain all emission control measures necessary to ensure continued compliance with the standard.

On May 21, 2012, USEPA formally designated Vanderburgh and Warrick Counties in attainment of the 2008 8-hour Ozone Standard. In the same Federal Register, USEPA revoked the 1997 8-hour Ozone Standard for transportation conformity purposes, effective July 20, 2012. As such, it is no longer required that the EMPO Transportation Plan and TIP demonstrate conformity to the 1997 8-hour Ozone Maintenance SIP.

Based on air quality monitoring data gathered between 2006 and 2009, Southwest Indiana (Evansville area) was re-designated to a maintenance area for the annual $PM_{2.5}$

National Ambient Air Quality (NAAQS) by the USEPA on September 27, 2011 (FR Vol. 76, No. 187). The southwest Indiana $PM_{2.5}$ maintenance area includes the counties of Vanderburgh and Warrick in the MPO boundary area. The attainment maintenance area also includes a donut area adjacent to the MPO boundary comprised of Dubois County, the township of Montgomery in Gibson County, Washington Township in Pike County and Ohio Township in Spencer County. Figure 1 shows the maintenance area designated by USEPA for $PM_{2.5}$.

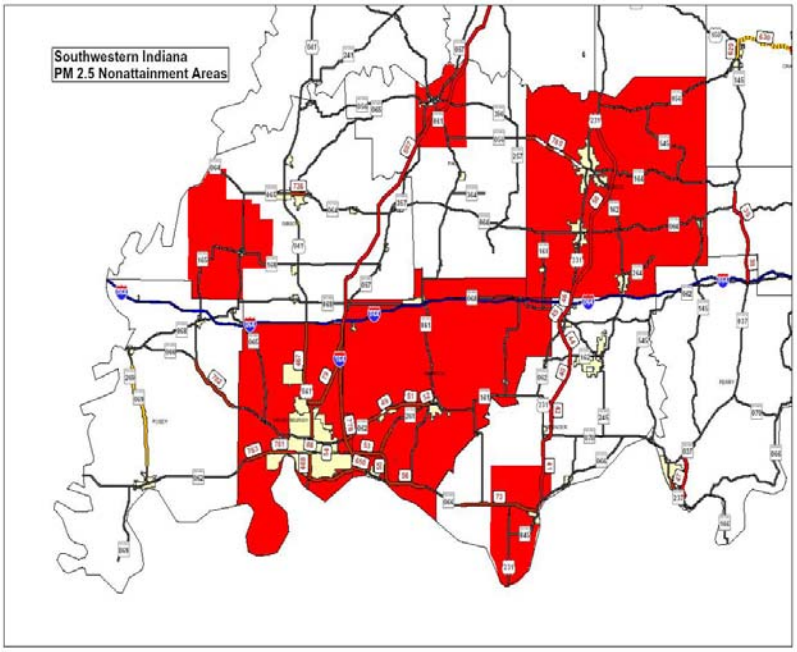

Figure 1: Southwest Indiana Maintenance Area for $PM_{2.5}$

The transportation conformity provisions of the 1990 Clean Air Act (CAA 90) require that the EMPO, as the Metropolitan Planning Organization (MPO) for the southwestern Indiana, make a determination that the region's MTP, TIP and projects conform to applicable State Implementation Plan (SIP) and that emissions, taken as a whole from the plan, program and projects will not negatively impact the region's ability to meet the NAAQS deadlines. This conformity demonstration also includes all non-exempt projects in the FY 2014 – 2017 in the $PM_{2.5}$ donut area outside of the EMPO Planning Area. Conformity to a SIP means that the region's MTP and TIP will not cause any new violations of the NAAQS, will not cause any worsening of existing violations and will not delay efforts to attain the NAAQS in a timely manner. This demonstration is conducted by comparing estimated motor vehicle emissions resulting from implementation of the MTP 2040 and the FY 2013 – 2016 TIP for specific analysis years to the motor vehicle emissions budget contained in the applicable SIP. The $PM_{2.5}$ demonstration is conducted by estimating motor vehicle emissions resulting from implementation of the 2040 MTP, the FY 2013 – 2016 TIP, and FY 2014-2017 INSTIP in the $PM_{2.5}$ maintenance area for specific analysis years are less than 2010 baseline year motor vehicle emissions.

The purpose of this report is to document the process and findings developed by the EMPO and the INDOT as part of the transportation conformity analysis of the EMPO MTP 2040, the EMPO FY 2013 – 2016 TIP, and the INDOT FY 2014-2017 INSTIP (non-exempt projects in $PM_{2.5}$ non-attainment area outside of EMPO MPA).

1.3 Summary of $PM_{2.5}$ Conformity Process

The entire $PM_{2.5}$ maintenance area, including the donut area, must demonstrate conformity for the federal agencies to accept the determination. This results from the fact that there is one $PM_{2.5}$ maintenance area, and there must be one conformity demonstration that includes all non-exempt projects in the MPA and $PM_{2.5}$ donut area.

The State Implementation Plan (SIP) was developed by the Indiana Department of Environmental Management (IDEM). The SIP gives the mobile source emissions budgets for southwest Indiana counties for PM2.5. The estimated mobile source emissions for various analysis years after running the AQPP program are compared with the mobile source emissions budgets from the SIP. If the estimated emissions are less than the mobile source emission budgets then the MTP 2040 and the FY 2013- 2016 TIP are said to conform with the SIP and National Ambient Air Quality Standards.

Pursuant to final rules published May 6, 2005 (40 CFR 93.102(b)(2)(iv) and (v) and 93.119(f)(9) and (10)), $PM_{2.5}$ maintenance areas are required to perform a regional emissions analysis for NO_x as a $PM_{2.5}$ precursor unless the head of the state air agency and the EPA Regional Administrator make a finding that NO_x is not a significant contributor to the $PM_{2.5}$ air quality problem in a given area. Such a finding has not been made for southwest Indiana (Evansville Area), so this conformity analysis includes NO_x as well as direct $PM_{2.5}$ emissions.

Regional emissions analyses under the annual $PM_{2.5}$ standard are not required for VOC, SOx or ammonia before an adequate or approved SIP budget for such precursors is established, unless the head of the state air agency or EPA Regional Administrator makes a finding that on-road emissions of any of these precursors is a significant contributor. Since such a finding of significance has not been made for the southwest Indiana non-maintenance area, these precursors have not been analyzed for this conformity determination.

2.0 Consultation

Interagency consultation is required under the transportation conformity rule, as described in 40 CFR 51.402. The principal forum for the discussion of technical issues relating to conformity procedures is the interagency consultation process. A formal interagency process is required in each non-attainment and maintenance area to establish procedures for consultation between the MPO, FHWA, FTA, U.S. EPA and state and local transportation planning and air quality agencies. A Transportation Air Quality

Conformity Protocol executed in 2010 establishes the interagency consultation process for SIP development and conformity determinations between EMPO, INDOT, IDEM, U.S. EPA, FHWA and FTA.

2.1 Summary of Formal Consultation Meetings

During the preparation of the update to the EMPO MTP 2040, the EMPO FY 2013 – 2016 TIP, and the INDOT FY 2014-2017 INSTIP and the development of the conformity determination analysis, the consulting agencies communicated on a regular basis. For the conformity analysis, the procedures used and all of the major assumptions were subject to discussion, review, and consensus approval by the consulting agencies.

- A consultation call was held on July 25, 2013. The list below shows the items discussed and agreed to by the participating agencies.
    - After discussions, the participating agencies agreed on the following analysis years for the 2040 Plan:
        - ✓ 2010 – base year
        - ✓ 2015 – near-term year
        - ✓ 2022 – budget year
        - ✓ 2035 – interim year
        - ✓ 2040 – horizon year of the transportation plan
    - The participating agencies agreed that the MPO is not required to show conformity for the Ozone standards.
    - $PM_{2.5}$ components to be analyzed: The participating agencies agreed on analyzing $PM_{2.5}$ direct and NO_x the same components as the last interim test.

- Further consultation calls were held on October 22 and November 13, 2013. The list below shows the items discussed and agreed to by the participating agencies.
    - $PM_{2.5}$ inventory approach: The participating agencies agreed on the same approach (Inventory was calculated based on the emissions rates calculated for average weekday using MOVES 2010a program) that was used for the replacement budgets.
    - MOVES input variables: The participating agencies suggested EMPO can use the same variables as they did for the replacement budgets.
    - Annual emission: The participating agencies agreed EMPO could use equivalent weekdays (340) to convert daily emissions to annual emissions.

- Determining conformity: The participating agencies agreed on the Build year emissions ≤ SIP budgets condition to determine conformity for years 2015 and 2022.
- Determining conformity: The participating agencies agreed on the Build year emissions ≤ SIP budget for 2022 condition to determine conformity for years 2035 and 2040.
- I-69 KY: Participating agencies suggested the EMPO run the conformity analysis with and without the I-69 Bridge for years 2035 and 2040 so that if the funding is approved then the conformity will have been already determined. EMPO agreed and will include the new I-69 Bridge in the 2035 and 2040 networks to allow for both options for future analysis.

PUBLIC NOTICE

RE: Particulate matter that is 2.5 micrometers or smaller in size ($PM_{2.5}$) Conformity Determination for the EMPO Metropolitan Transportation Plan 2040 (MTP 2040), the FY 2013-2016 Transportation Improvement Program (TIP), and the INDOT FY 2014 – 2017 INSTIP (projects in the $PM_{2.5}$ donut area).

Maintenance area for $PM_{2.5}$ includes Vanderburgh County, Warrick County (MPO Planning Area), Montgomery Township in Gibson County, Dubois County, Washington Township in Pike County and Ohio Township in Spencer County (donut area).

The Evansville Metropolitan Planning Organization (EMPO), the Metropolitan Planning Organization for the Evansville-Henderson urbanized area, and the Indiana Department of Transportation (INDOT) have completed a draft $PM_{2.5}$ Conformity Determination for the EMPO MTP 2040, the FY 2013 – 2016 TIP and the INDOT FY 2014 – 2017 INSTIP. The EMPO MTP 2040 and FY 2013 – 2016 TIP include transportation projects for the City of Evansville, the City of Henderson, the Town of Newburgh, Vanderburgh, Warrick and Henderson Counties. The INDOT FY 2014 – 2017 INSTIP include transportation projects for the $PM_{2.5}$ donut area. The draft conformity determination demonstrates conformance of the EMPO MTP 2040, the FY 2013 – 2016 TIP for Vanderburgh and Warrick Counties and the INDOT FY 2014 – 2017 INSTIP for the donut area.

A copy of the draft Conformity Determination for the EMPO MTP 2040, EMPO FY 2013 - 2016 TIP, and INDOT FY 2014 - 2017 INSTIP will be available for review at the EMPO Office, from December 6th 2013 to January 5th 2014. The draft may also be viewed through the EMPO web page, at http://www.evansvillempo.com. A Public Meeting on the draft Conformity Determination will be held at 4:00 p.m. on December 5, 2013 in Room 301 and an Open House will be held between 5:00 p.m. and 7:00 p.m. on Thursday December 12th 2013 in room 318 in the Civic Center Complex, 1 NW MLK Jr. Blvd, Evansville, IN.

A 30-day public comment period will be in effect from December 6th 2013 until January 5th 2014. Comments may be sent by mail to the address listed below, by email to comments@evansvillempo.com , or by fax to 812-436-7834.

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3.0 Travel Demand Model for Air Quality Conformity

The air quality conformity analysis was generated using the EMPO regional TransCAD model for Vanderburgh & Warrick Counties and Montgomery Township in Gibson County, and the INDOT Statewide Travel Demand Model was utilized to model the balance of the donut area. The existing EMPO model was developed with the latest demographic data available and was calibrated for the year 2010. The travel model achieved a percent root mean square error of 30 percent in replicating the actual 2010 traffic counts. All forecasts have utilized the best available planning assumptions concerning development and socio-economic forecasts to the year 2040.

A more detailed discussion on the development of the EMPO regional model is provided in the Technical Memorandum: Travel Model Documentation, prepared by BLA in October 2012.

3.1 Model Networks

Traffic modeling for air quality conformity analysis used five separate networks for 2010, 2015, 2022, 2035, and 2040, each with a specific trip table and traffic assignment for the associated analysis years. The milestone years were:

- 2010 - for baseline year test
- 2015 - near-term year
- 2022 - budget year
- 2035 - interim year
- 2040 - horizon year of the transportation plan

These milestone years meet the requirements of Section 93.106(a)(1) of the conformity rule. Each model network represents transportation improvement projects that are included in the proposed transportation plan to be open to traffic by January 1 of the various milestone years. All non-exempt transportation projects have been considered in the analysis.

Attachment A contains a complete listing of the specific transportation improvement projects included in each of the model networks for the milestone years. All non-exempt projects planned or programmed in the EMPO Metropolitan Transportation Plan 2040, the EMPO FY 2013-2016 TIP, and the INDOT FY 2014-2017 INSTIP were included in the conformity analysis.

3.2 Conformity approach for $PM_{2.5}$

The annual PM2.5 NAAQS for which the southwest Indiana region must demonstrate conformity is based on annual measurements, so the emissions estimates must be annual values. The AQPP program used calculates emissions estimates through the application of emissions rates developed in MOVES to the outputs of travel demand model. The emissions estimated by the AQPP program are for an average day.

The methodology employed in the AQPP is fairly straightforward. The AQPP takes travel demand model data as an input along with the emissions rates developed in MOVES. The travel demand model vehicle-miles-traveled are then disaggregated into a fine level of detail and factored by the emissions rates to produce emissions estimates. **Figure 2** shows a flowchart of the post-processor's function.

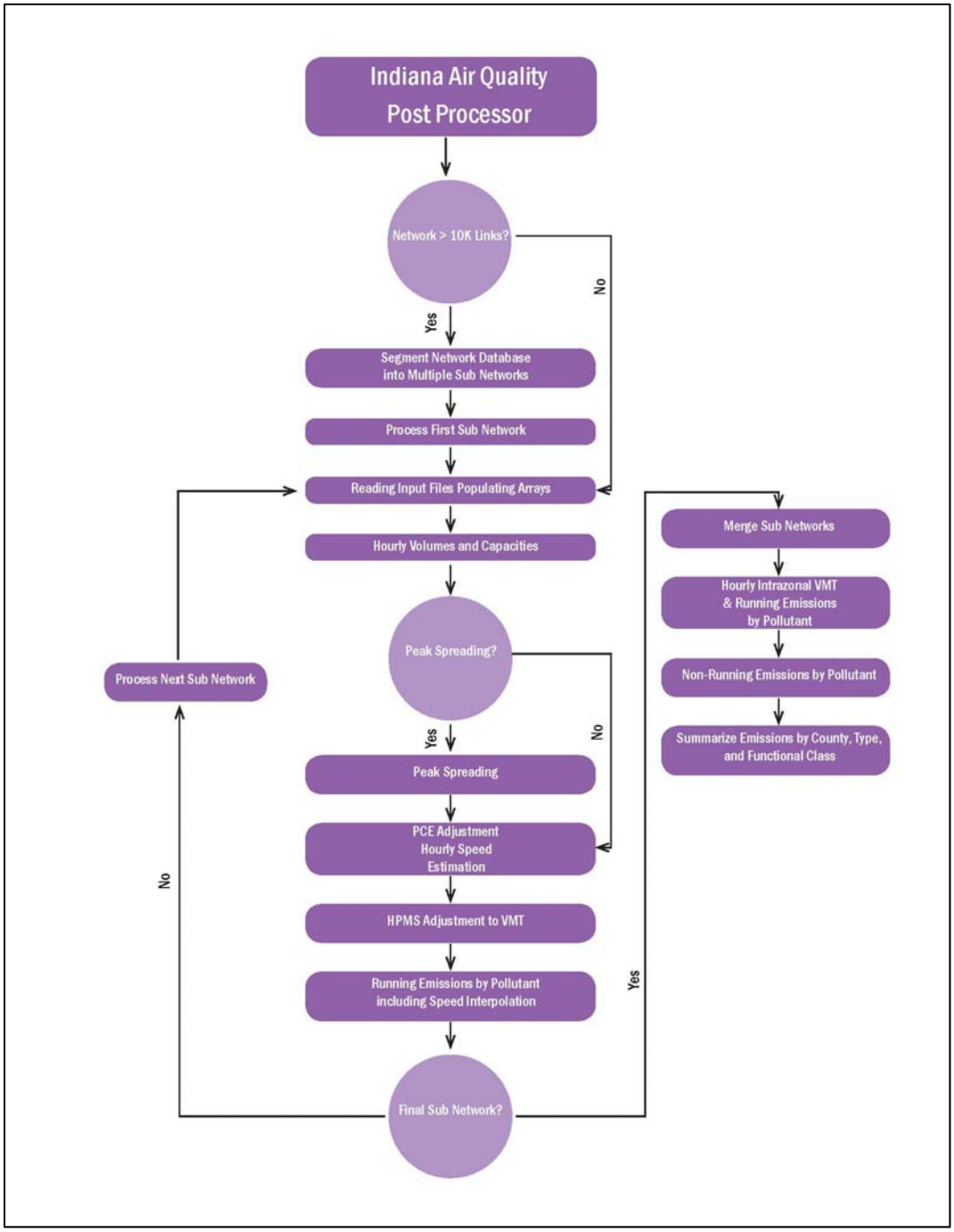

Figure 2: AQPP Flow Chart

To convert daily emission to annual emission, "The equivalent Weekdays per Year" (340) was used to compute annual $PM_{2.5}$ emissions. The Equivalent Weekdays per year is used to adjust for the fact that the travel demand model estimates weekday volumes and weekend days do not typically contribute as much VMT as weekdays. The value of 340 represents an assumption that weekend days contribute approximately three-quarters as much VMT as a weekday, which is consistent with the limited available data from other regions of the country. If state or local data is collected, or becomes available, it will be used to adjust this value.

Since the emissions inventories are computed by multiplying disaggregate emission rates by the corresponding VMT, total annual VMT is not a natural byproduct of the conformity analysis.

4.0 Conformity Determination for $PM_{2.5}$

The State Implementation Plan (SIP) was developed by the Indiana Department of Environmental Management (IDEM). The SIP gives the mobile source emissions budgets for southwest Indiana counties for PM2.5. The estimated mobile source emissions for various analysis years after running the AQPP program are compared with the mobile source emissions budgets from the SIP.

The southwest Indiana region is a maintenance area for the annual $PM_{2.5}$ standard, so the emissions inventory must reflect annual emissions totals. To accomplish this, BLA in collaboration with CDM Smith developed a micro-computer program to interface with and post process the output of the EMPO TransCAD model. A detailed discussion of the program is provided in the Technical Memorandum: INDOT AQPP. A detailed discussion of the MOVES2010a input data parameters is also attached.

All input and output files from the AQPP model processes are provided online at www.evansvillempo.com.

4.1 Results of Conformity Determination for $PM_{2.5}$

The emission results from the conformity analyses for all of the maintenance area for the years 2010, 2015, 2022, 2035 and 2040 in Table 4 shows that the direct $PM_{2.5}$ and NO_x emissions from motor vehicles are lower than the emissions budgets for years 2015, 2022, and are lower than 2022 budget for years 2035 and 2040 so conformity for the annual $PM_{2.5}$ standard is demonstrated.

EMPO Running						
Year	Vanderburgh County		Warrick County		Montgomery Township Gibson County	
	Direct $PM_{2.5}$ (Tons / Yr)	Nox (Tons / Yr)	Direct $PM_{2.5}$ (Tons / Yr)	Nox (Tons / Yr)	Direct $PM_{2.5}$ (Tons / Yr)	Nox (Tons / Yr)
2010	154.77	3,668.76	74.33	1,844.86	5.73	142.18
2015	91.72	1,947.15	40.65	931.00	3.38	76.57
2022	45.68	899.05	17.74	423.93	1.40	34.15
2035	39.02	644.75	14.16	304.58	1.08	24.77
2035+	40.02	660.48	14.34	307.79	1.08	24.77
2040	38.73	646.34	14.21	305.39	1.15	26.76
2040+	39.80	664.97	14.38	308.46	1.16	26.80

Table 1: Mobile Source Emissions Conformity Test for EMPO Modeling Area

Year	EMPO Non-Running	
	Direct $PM_{2.5}$ (Tons / Yr)	Nox (Tons / Yr)
2010	18.75	1,363.85
2015	12.37	1,089.21
2022	8.34	869.97
2035	7.61	833.35
2035+	7.61	833.35
2040	7.78	871.34
2040+	7.78	871.34

Table 2: Total Non-Running Mobile Source Emissions Conformity Test for EMPO Modeling Area

Donut Running						
Year	Dubois County		Washington Township Pike County		Ohio Township Spencer County	
	Direct $PM_{2.5}$ (Tons / Yr)	Nox (Tons / Yr)	Direct $PM_{2.5}$ (Tons / Yr)	Nox (Tons / Yr)	Direct $PM_{2.5}$ (Tons / Yr)	Nox (Tons / Yr)
2010	25.97	703.72	5.06	136.73	7.09	181.57
2015	15.23	370.59	6.93	188.60	4.25	100.03
2022	7.60	171.12	2.45	74.08	1.95	45.23
2035	6.50	118.69	1.91	56.04	1.59	31.61
2035+	6.49	118.42	2.01	59.77	1.36	26.96
2040	6.63	122.04	2.00	59.43	1.64	32.80
2040+	6.72	121.93	2.11	63.73	1.39	27.51

Table 3: Total Running Mobile Source Emissions Conformity Test for Donut Area from INDOT

Year	Donut Non-Running	
	Direct $PM_{2.5}$ (Tons / Yr)	Nox (Tons / Yr)
2010	5.31	365.60
2015	3.47	291.90
2022	2.32	235.04
2035	2.04	235.27
2035+	2.04	235.27
2040	2.07	254.47
2040+	2.07	254.47

Table 4: Total Non-Running Mobile Source Emissions Conformity Test for Donut Area from INDOT

Southwest Indiana Attainment Maintenance Area				
Year	Direct $PM_{2.5}$ *(Tons / Yr)*	SIP Budget (Tons / yr)	Nox (Tons / Yr)	SIP Budget (Tons / yr)
2010	297.01		8407.27	
2015	178.01	199.93	4995.04	5642.95
2022	87.48	100.45	2752.59	3173.08
2035	73.91		2249.06	
2035+	74.95		2266.81	
2040	74.21		2318.57	
2040+	75.41		2339.21	

Table 5: Mobile Source Emissions Conformity Test for PM2.5 Maintenance Area.

+: With I–69 South (KY) and the New Ohio Bridge added to the 2035 and 2040 Networks

5.0 Conclusion

The conformity analysis conducted by the EMPO and INDOT concludes that the EMPO Metropolitan Transportation Plan 2040, the FY 2013-2016 TIP and the INDOT FY 2014 – 2017 INSTIP (projects in the $PM_{2.5}$ donut area) meet all the applicable requirements for the conformity with the annual $PM_{2.5}$ standards. The Metropolitan Transportation Plan 2040 and the FY 2013 - 2016 TIP are recommended for approval by USDOT.

This conformity analysis for $PM_{2.5}$ air quality standards was subject to a public comment period running from December 06, 2013 through January 5, 2014. This report and the accompanying Attachments make the determination that the region's transportation plan and program satisfy all applicable criteria and procedures in the conformity regulations and comply with all applicable implementation plan conformity requirements.