

KYOVA Interstate Planning Commission  
720 Fourth Avenue  
Huntington, WV 25701

Ohio Department of Transportation

Re: Ironton Signals CMAQ application

Dear :

Enclosed for a CMAQ eligibility determination is an emissions analysis for the Ironton Signal Optimization Project; Phase I Downtown Signal Upgrade. There will be a total of 6 signals in downtown Ironton, Ohio undergoing improvements. This is located in the KYOVA and Huntington/ Ashland Non-Attainment/Maintenance Area. This project is in the current KYOVA FY 2030 Long Range Plan and FY 2008-2011 TIP. It is scheduled for FY 2010.

Signal system coordination is one of the most effective ways to decrease delay and increase air quality within a transportation corridor. This project will reduce emissions by improving average travel speed and reducing delays at signalized intersections.

Please review the emissions analysis and let me know if you have any questions.

Respectfully,

Saleem A. Salameh, P.E., M.ASCE  
Technical Study Director/Transportation Engineer  
KYOVA Interstate Planning Commission

## **PROJECT INFORMATION**

### **Ironton Signal Optimization Project; Phase I Downtown Signal Upgrade**

**Location:** There will be a total of 6 signals in downtown Ironton, Ohio undergoing improvements. This is located in the KYOVA and Huntington/ Ashland Non-Attainment/Maintenance Area. This project is in the current KYOVA FY 2030 Long Range Plan and FY 2008-2011 TIP. It is scheduled for FY 2010.

#### **Itemized Project Cost:**

Preliminary Engineering \$ \_\_\_\_\_

Right of Way \$ \_\_\_\_\_

Construction \$ \_\_\_\_\_

Total Project Cost: \$ \_\_\_\_\_

Amount of CMAQ money requested: \$ \_\_\_\_\_

Amount of Local Match Funding: \$ \_\_\_\_\_

Source(s) of Local Match Funding: City of Ironton's general funds.

#### **Detailed Project Description and Justification**

The City of Ironton has 20 signalized intersections within the City limits. Signal equipment was replaced at some of the intersections in 1986. A study, completed by Tetra Tech, Inc. in March 2009, provided a comprehensive evaluation of the signal system and identified four areas that need improvement. They are:

1. Signal Communication
2. Aging Infrastructure
3. Maintenance
4. Optimized Timings

The purpose of the signalization upgrade is to develop signal communications in order to operate the transportation system in Ironton more efficiently. Intersections currently operate independently, resulting in inefficiencies, which can in turn result in increased delay, driver irritation, and increased emissions. Also, the inventory of existing signal equipment revealed that none of intersections meet Americans with Disabilities Act (ADA) compliance. The problems are that there is only one timing plan; no multiple timing plans for AM, Midday, PM peak; no pushbutton actuation for pedestrians, no actuation for vehicles, no pre-emption, and there is timing loss over time.

After evaluating the study results, it was decided by the City of Ironton and the KYOVA Interstate Planning Commission that replacing the aging infrastructure at 6 intersections was the highest priority and needed to be addressed first. The timing patterns currently used were implemented in the 1980's. Additionally, a new central system, and software, is recommended to update the signals with the most recent technology. The existing detection has failed and needs repaired or replaced. The dated controllers would also be

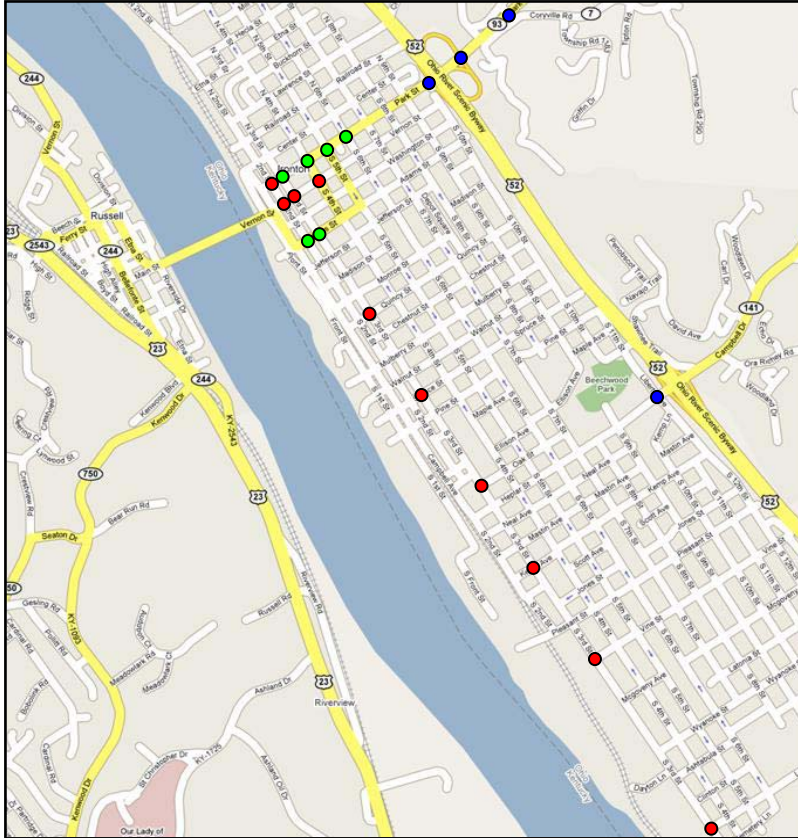
replaced. The signal poles at the 6 signalized intersections are showing signs of deterioration, such as rust, or other damage. Improvements planned for this project would also include replacing the poles, cabinets, signal field equipment, bulbs (new LED bulbs), lights, and ADA ramps.

A public meeting was held on March 5th, 2009 inviting public input for the overall traffic problems and recommendation of upgrading the signals in the City. No negative comments were received on upgrading the signals. Coordination between officials within the City of Ironton, KYOVA, and ODOT has been ongoing. CMAQ funding is an important financial option to aid in the safety and well being of the residents of the City of Ironton. Signal system coordination is one of the most effective ways to decrease delay and increase air quality within a transportation corridor. This project will reduce emissions by improving average travel speed and reducing delays at signalized intersections.

### **Arterial Analysis**

Arterial analyses were performed to determine the effectiveness of the entire signalized network system to accommodate existing and future traffic demand. The analyses were performed with the same Synchro/Simtraffic model used to determine the individual intersection Levels of Service. The coordination analysis was conducted with the initial intent of at least improving the traffic flow and reducing delay at the intersections. For this study cycle lengths ranging from 60 to 150 seconds, in 5-second increments, were selected for analysis. The coordination analysis was completed for the AM, Midday, and PM peaks. The signal timing plans are recommended to operate about the same time of day as the existing patterns are operating. The time of day and recommended pattern are:

- AM Peak 6:00 am to 10:00 am
- Midday Peak 10:00 am to 2:00 pm
- PM Peak 2:00 pm to 7:00 pm
- Off Peak 7:00 pm to 6:00 am



Red and Blue – Existing Signals not upgraded in Phase I  
 Green – Signals to be upgraded in Phase I

Locations to upgrade signal, poles, controllers, lights, and ramps:

- Park Ave. (SR93) & 6<sup>th</sup> St.
- Park Ave. (SR93) & 5<sup>th</sup> St.
- Park Ave. (SR93) & 4<sup>th</sup> St.
- Park Ave. (SR93) & 3<sup>rd</sup> St.
- 2<sup>nd</sup> St. & Adams St.
- 3<sup>rd</sup> St. & Adams St.

## EMISSIONS INFORMATION

Emission reduction methodology was derived from the Synchro software program. Reduction results from AM, Midday, and PM peak hours were taken for the intersections and added together to calculate the average NO<sub>x</sub>, VOC and CO emission reductions for sixteen intersections. The optimization is based on upgrading six intersections and free flow at ten other intersections. This project will coordinate signals and upgrade equipment on Park Ave and Adams St., and provide for a centrally controlled signal system. This project will reduce emissions by improving average travel speed and reducing delays at signalized intersections.

**Table 1 :Emissions Analyses**

		HC		CO		NOx	
Existing							
	AM peak	0.357 kg		11.475 kg		1.442 kg	
	Midday peak	0.689 kg		20.407 kg		2.712 kg	
	PM peak	0.763 kg		22.605 kg		3.029 kg	
2030 No-Build							
	AM peak	0.514 kg		15.254 kg		2.012 kg	
	Midday peak	0.861 kg		24.662 kg		3.369 kg	
	PM peak	0.961 kg		27.618 kg		3.755 kg	
Optimization			Difference from 2030 No-Build		Difference from 2030 No-Build		Difference from 2030 No-Build
	AM peak	0.436 kg	.078 kg	12.947 kg	2.307 kg	1.688 kg	0.324 kg
	Midday peak	0.705 kg	0.156 kg	20.985 kg	3.677 kg	2.791 kg	0.578 kg
	PM peak	0.778 kg	0.183 kg	23.600 kg	4.018 kg	3.111 kg	0.644 kg

NOTE: a positive number indicates an improvement in emissions

The total emissions reduction for the entire project is shown below:

		Emissions Reductions		
		HC	CO	Nox
AM Peak		0.078	2.307	0.324
Midday		0.156	3.677	0.578
PM Peak		0.183	4.018	0.644
Total	kg/day	0.4170	10.0020	1.5460
	lbs/day	0.9174	22.0044	3.4012
	ton/day	0.0005	0.0110	0.0017
	ton/yr	0.1147	2.7506	0.4252

## **Appendix 1 : Synchro/SimTraffic Emissions Analyses**