



TRANSPORTATION TECHNICAL COORDINATING COMMITTEE
1:00 p.m., Wednesday, June 10, 2015
KIPDA Burke Room
11520 Commonwealth Drive
Louisville, Kentucky 40299

Kentucky
Member
Counties

AGENDA

Bullitt

Henry

Jefferson

Oldham

Shelby

Spencer

Trimble

Indiana
Member
Counties

Clark

Floyd

1. *Call to Order, Welcome, Introductions*
2. *May 13, 2015 Meeting Minutes* – Review and approval (see enclosed). **Action is requested.**
3. *Public Comment Period*
4. *Transportation Policy Committee Report* – Staff will report on the May TPC meeting.
5. *Kentucky Congestion Mitigation Air Quality (CMAQ) Funding Priorities* – Staff will present proposed priorities for CMAQ funds in Kentucky (see enclosed). **Action is requested.**
6. *Connecting Kentuckiana: High Crash Intersection Assessment* – Staff will provide information concerning the draft report. **Action is requested.**
7. *Other Business*
8. *Adjourn*

Equal
Opportunity
Employer

Auxiliary aids/services are available when requested 3 business days in advance.

Auxiliary aids/services are available when requested three (3) business days in advance.

11520 Commonwealth Drive
Louisville, KY 40299
502-266-6084
Fax: 502-266-5047
KY TDD 1-800-648-6056
www.kipda.org

See
<http://www.nidetarc.org/tripplan/>
for TARC service



MEETING MINUTES
TRANSPORTATION TECHNICAL COORDINATING COMMITTEE (TTCC)
1:00 p.m., Tuesday, May 13, 2015
KIPDA Burke Room
11520 Commonwealth Drive
Louisville, Kentucky 40299

Call to Order

Chair Matt Meunier called the meeting to order at 1:03 p.m. After introductions were made, it was determined that there was a quorum present.

Review and Approval of Minutes

Emily Liu (for Jeffrey Brown), Louisville Metro Planning & Design Services, made a motion to approve the minutes of the April 8 TTCC meeting. Dirk Gowin, Louisville Metro Public Works, seconded the motion and it carried with a unanimous vote.

Public Comment Period

There were no public comments.

Transportation Policy Committee (TPC) Report

Larry Chaney, KIPDA staff, reported on the April TPC meeting.

Kentucky STP-Urban (SLO) Funding Priorities

Mary Lou Hauber, KIPDA staff, presented revised priorities for dedicated STP funds in Kentucky. **Jim Urban, Oldham County Planning Commission, made a motion to recommend approval of the revised priorities to the TPC. Jeffrey Brown, Louisville Metro Planning & Design Services, seconded the motion and it carried with a unanimous vote.**

KYTC Project Prioritization

Larry Chaney, KIPDA staff, explained prioritization procedures for projects to be considered for inclusion in the next Six-Year Highway Plan. There was discussion. Action was not taken, but a working group was formed to review the prioritization procedures. The working group will consist of Dirk Gowin (Louisville Metro Public Works), Matt Meunier (City of Jeffersontown), Jim Urban (Oldham County Planning Commission), and a to-be-announced Bullitt County representative.

Other Business

There was no other business.

Adjournment

The meeting was adjourned at 1:31 p.m.

Larry Chaney
Recording Secretary

Members Present:

Roanne Hammond
Matt Meunier
Jessica Miller
Thomas Witt
Larry Chaney
Michelle King
Jeffrey Brown
Dirk Gowin
*Greg Heitzman
Jim Urban
Brittany Montgomery
*John Watkins

Bullitt County
City of Jeffersontown
Indiana Department of Transportation – Seymour District
Kentucky Transportation Cabinet
KIPDA
Louisville Metro Air Pollution Control District
Louisville Metro Planning & Design Services
Louisville Metro Public Works & Assets
Louisville/Jefferson County Metro Sewer District
Oldham County Planning Commission
Town of Clarksville
Southern Indiana Transportation Advisory Group

Members Absent:

*Eric Evans
*Freida Howe
David Flowe
Mike Moore
Jeff Gahan
Brian Dixon
Tom Galligan
*Brad Meixell
Michael Tackett
*Michelle Allen
*Greg Rawlings
*Abigail Rivera
Don Lopp
*Lauren Hardwick
Shawn Seals
Larry Buckel
Emmanuel Nsonwu
Joe Forgacs
Tom Hall
Larry McFall
Patti Clare
Skip Miller
*Eric Pruitt
*Deana Epperly Karem
David Voegel
*Wendy Chesser-Dant
Scott Stewart
*Steve Coston
*Dick Joslin
*Jill Saegesser
Robert Lively
J. Barry Barker
*Stephen Cotton

AARP – Kentucky
Bullitt County Chamber of Commerce
City of Charlestown
City of Jeffersonville
City of New Albany
Clark County
Clark County Air Board
Clark County Fire Chiefs Association
Clark County Planning Commission
Federal Highway Administration – Indiana
Federal Highway Administration – Kentucky
Federal Transit Administration – Region 4
Floyd County
Greater Louisville Inc.
Indiana Department of Environmental Management
Indiana Department of Transportation – Public Transportation
Indiana Department of Transportation – Urban & MPO Section
Kentucky Division for Air Quality
Kentucky Transportation Cabinet – District 5
Louisville & Jefferson County Riverport Authority
Louisville Metro Economic Growth & Innovation
Louisville Regional Airport Authority
Louisville Water Company
Oldham Chamber & Economic Development
Oldham County
One Southern Indiana
Ports of Indiana – Jeffersonville
Procarent
Regional Mobility Council
River Hills Economic Development District
TARC Accessibility Advisory Council
Transit Authority of River City
University of Louisville

Others Present:

Brian Meade
George Miller
Lara Kurtz
Beth Jones
Judi Hickerson
David Burton
Ashley Davidson
Amanda Deatherage
Mary Lou Hauber
Andy Rush
Craig Butler
Jim Mims
Milana Boz
John Swintovsky
Emily Liu
Rickie Boller

Aecom
BIA
Burgess & Niple
Kentucky Transportation Cabinet
Kentucky Transportation Cabinet – District 5
KIPDA
KIPDA
KIPDA
KIPDA
KIPDA
Louisville Metro Air Pollution Control District
Louisville Metro Codes & Regulations
Louisville Metro Parks
Louisville Metro Parks
Louisville Metro Planning & Design Services
TRIMARC

* Denotes Advisory Members



MEMORANDUM

TO: Transportation Technical Coordinating Committee

Kentucky
Member
Counties

FROM: Mary C. Hauber

DATE: June 3, 2015

Bullitt

SUBJECT: Review and Prioritization of Kentucky CMAQ Applications

Henry

Jefferson

Oldham

Shelby

Spencer

Trimble

The Kentucky Transportation Cabinet has requested applications for the use of FY 2015 Congestion Mitigation and Air Quality (CMAQ) funding. These are federal funds to be used for projects or programs that assist in achieving better air quality. The Kentucky Transportation Cabinet receives approximately \$13,000,000 in CMAQ funding each year to use in non-attainment and maintenance areas throughout the state for projects that will reduce emissions and improve air quality. Since project selection is at the state’s discretion, there is no guarantee how much of that the Louisville area will receive.

Indiana
Member
Counties

Thirteen project applications were submitted to KIPDA and the Office of Local Programs by sponsoring agencies. A working group meeting was held on May 21 to review the projects and suggest priorities for the applications. MAP-21 directs MPOs and states to give priority to diesel retrofits and to consider the cost/benefit of each project when determining priorities. The working group reviewed the applications and used those criteria, as well as the following, as a guide in prioritizing the applications: emissions reductions benefits, the benefit to the community, and how the projects affect the area regionally. In addition, KIPDA staff ranked the projects based on a CMAQ Priority Assessment that included the following criteria to be used as a guide:

Clark

Floyd

- Is project included in the Metropolitan Transportation Plan and is it a regional priority in the MTP?
- Is project located within ¼ mile of an MTP Bicycle & Pedestrian Priority Corridor?
- Does project meet recommendations for Investment Area?
- Does the project serve to maintain the existing system?
- Is project a Title VI/Environmental Justice Area mitigation project?
- Is project included in the TIP?
- Is project a mandated TCM or on the list of CAAA list of TCMs?
- Is project a diesel retrofit?

Equal
Opportunity
Employer

11520 Commonwealth Drive
Louisville, KY 40299
502-266-6084
Fax: 502-266-5047
KY TDD 1-800-648-6056
www.kipda.org



Additionally, a cost benefit analysis factor was applied for each project and project sponsor project delivery history was reviewed.

Attached is a list of proposed priorities for FY 2015 Kentucky CMAQ funds. The TTCC is requested to recommend a list of priorities to the Transportation Policy Committee. A TPC approved list of priorities will be forwarded to the KYTC Office of Local Programs, and considered when they select projects for funding.

Action is requested.



FY 2015 CMAQ-KY Projects

Louisville Urbanized Area

DRAFT Project Priorities

Priority	Project	Description	Sponsoring Agency	Eligible CMAQ Category	2015		Emissions Reduction				Previously received CMAQ funds?
					Phase	Federal Funds Requested	VOC (kg/day)	CO (kg/day)	NOx (kg/day)	PM 2.5 (kg/day)	
1	Kentuckiana Air Education (KAIRE)	The KAIRE program promotes clean, healthy air by educating the public on the negative health effects of air pollution and encouraging "air-friendly" behavior such as proper vehicle maintenance, ride-sharing, idling reduction, use of mass transit, and walking/bicycling. Objectives include: Educate the public about the health effects of poor air quality; Raise awareness of Ozone Season and encourage community action during episodic poor air quality conditions; Encourage changed behavior that will help local air quality; Reduce emissions and health risks through efforts to eliminate vehicle idling; and Involve new organizations, schools, businesses, and individuals in encouraging air-friendly behavior.	APCD	Public Education and Outreach Activities	Program	\$ 600,000	25.0000	218.0000	64.0000	5.0000	Yes, previous to 2010
2	TARC Riverport Circulator	Implementation of a circulator to expand public transportation service in the Riverport employment center and connect homes to jobs in the Southwest Metro area. This service will address a major need in the transit service sector to improve mobility between areas with expanding population and employment growth in the southwestern portion of Jefferson County. The new circulator route will increase the current number of trips to Riverport from 3 morning and 5 evening weekday trips on Rt. 19 to approx. 15 morning and 15 evening weekday trips, and add connections to arterial Routes 19 & 63, crosstown Route 29, express Route 50X, and high-frequency Route 18 Dixie-Preston Hwy.	TARC	Transit Improvements	Operating	\$ 2,568,000	3.8700	46.1500	3.7700	0.0100	New
3	I-64 Intelligent Transportation Systems (ITS)	Installation of an over the road Dynamic Message Sign (DMS) on I-64 EB with termini MP 16.000 and MP 16.225 (between Hurstbourne Pkwy and Blankenbaker Pkwy), and a verification camera (CCTV) on a 50' pole including associated electrical and other appurtenances as an addition to the Louisville TRIMARC system. Data from advanced monitoring and alerting systems is analyzed by TRIMARC software to pinpoint potential problems. Operators use cameras for verification and ensure that appropriate assets are dispatched quickly to mitigate the incident. The information is disseminated to the public by using the Dynamic Message Signs.	KYTC - District 5	Congestion Reduction and Traffic Flow Improvements	PE, Utilities, Construction	\$ 616,000	3.2440	31.9000	6.9750	0.4760	New

FY 2015 CMAQ-KY Projects

Louisville Urbanized Area

DRAFT Project Priorities

Priority	Project	Description	Sponsoring Agency	Eligible CMAQ Category	2015		Emissions Reduction				Previously received CMAQ funds?
					Phase	Federal Funds Requested	VOC (kg/day)	CO (kg/day)	NOx (kg/day)	PM 2.5 (kg/day)	
4	Watterson Trail Corridor Phase 2	Construct a separated multi-use trail parallel to Watterson Trail for 0.83 miles between Stonybrook Dr. and Mulberry Row Way. Project will provide alternatives to the automobile in creating an option to reduce emissions from vehicles by establishing a safe route to bike or walk to places of employment, shopping, or services by the general public.	Jeffersontown	Bicycle and Pedestrian Facilities and Programs	Construction	\$ 1,320,000	0.0997	1.3046	0.1714	0.0034	New
5	Louisville Loop Northwestern Parkway Shared Use Path	Construct a shared-use path system along Northwestern Parkway from 39th St. to existing sidewalk at 326 Northwestern Pkwy near Shawnee Golf Clubhouse. Project will include an accessible 10 foot shared use path, restriping pavement at street crossings, connections to existing transit stops, Louisville Loop wayfinding signage and MUTCD regulatory signage, and other bicycle and pedestrian facilities and amenities.	Louisville Metro Parks	Bicycle and Pedestrian Facilities and Programs	PE, Utilities, Construction	\$ 1,225,842	0.0523	1.1064	0.1352	0.0053	New
6	CNG Powered Trucks	Purchase 5 new Class-8 CNG powered trucks to replace existing diesel powered trucks.	Louisville Metro Office of Sustainability - Public-Private Partnership with M&M Cartage	Alternative Fuels and Vehicles	Capital	\$ 375,000	2.8400	-4.0200	10.6600	0.3300	New
7	KY 53 Improvements	Improvements at Crystal Drive and KY 53, and at the I-71 SB off-ramp will decrease congestion and increase safety. Crystal Dr. at KY 53 is the highest crash rate location in Oldham County and gets highly congested, backing up traffic to the I-71 SB off-ramp. The project includes reconfiguring the off-ramp to allow 2 right turn lanes and 1 left turn lane, and adding left turn lanes to KY 53 at Crystal Dr. These improvements will allow better traffic flow and reduce the delay time at both the I-71 and Crystal Dr. intersections.	KYTC - District 5	Congestion Reduction and Traffic Flow Improvements	PE, ROW, Utilities, Construction	\$ 2,502,214	0.0413	0.4694	0.1032	0.0210	New
8	S. Madison Ave. Sidewalks	Provide sidewalk connectivity along S. Madison Ave. for approximately 0.35 miles from downtown Main St. to the end of S. Madison Ave. at Herrick Ln. Project includes 5' sidewalk to be constructed with ADA improvements for handicap ramps and tactile warnings at major intersections of Main Street and near the end of Frank Ave.	Middletown	Bicycle and Pedestrian Facilities and Programs	ROW and Construction	\$ 272,477	0.0808	1.5828	0.3280	0.0083	New

FY 2015 CMAQ-KY Projects

Louisville Urbanized Area

DRAFT Project Priorities

Priority	Project	Description	Sponsoring Agency	Eligible CMAQ Category	2015		Emissions Reduction				Previously received CMAQ funds?
					Phase	Federal Funds Requested	VOC (kg/day)	CO (kg/day)	NOx (kg/day)	PM 2.5 (kg/day)	
9	Kratz Lane Sidewalks	Provide sidewalk connectivity north to south for approximately 0.35 miles along Kratz Lane between Shelbyville Rd. and Old Shelbyville Rd./Main St. Project includes 5' sidewalk to be constructed with ADA improvements for handicap ramps and tactile warnings at major intersections of Shelbyville Rd., Old Shelbyville Rd./Main Street and Donahue Ave.	Middletown	Bicycle and Pedestrian Facilities and Programs	ROW and Construction	\$ 234,382	0.0474	0.9285	0.1924	0.0048	New
10	UPS - CNG Vehicle and Infrastructure Development Project	UPS operates one of the largest private alternative fuel fleets in its industry. This project is to purchase 63 CNG Class 8 tractors that will be domiciled in Louisville, and the purchase of 100 CNG delivery package cars to provide service in and around Louisville including Bullitt and Oldham counties. The request is for the cost differential for the CNG vehicles and UPS will provide a 50% match. In addition, a request is made to build a CNG refueling station at its facility at 8100 Air Commerce Drive, Louisville, and will provide a 50% match. CMAQ funds requested: \$2,556,880 for vehicles; \$3,473,070 for refueling station.	Louisville Metro and UPS	Alternative Fuels and Vehicles	Capital and Construction	\$ 6,029,950	6.9900	144.0300	29.4800	0.0400	New
11	Bliss Ave.	Provide sidewalk connectivity along Bliss Ave. for approximately 0.18 miles between Shelbyville Rd. and Wetherby Ave. Project includes 6' sidewalk to be constructed with ADA improvements for handicap ramps and tactile warnings at major intersections of Shelbyville Rd., Pepper Way, and Wetherby Ave.	Middletown	Bicycle and Pedestrian Facilities and Programs	ROW and Construction	\$ 131,066	0.0006	0.0110	0.0024	0.0001	New
12	Wetherby Ave.	Provide sidewalk connectivity along Wetherby Ave. for approximately 0.55 miles between N. Madison Avenue and Evergreen Road. Project includes 5' sidewalk to be constructed with ADA improvements for handicap ramps and tactile warnings at major intersections of N. Madison Ave., Evergreen Rd., Bliss Ave., and Linney Ave.	Middletown	Bicycle and Pedestrian Facilities and Programs	ROW and Construction	\$ 322,555	0.0011	0.0184	0.0040	0.0002	New
13	U of L Pedestrian Promenade: Belknap Campus to Research Park	Construction of a pedestrian promenade from Eastern Parkway through the Speed School campus, over the Norfolk-Southern Railroad, to the south end of the Engineering and Science Research Park. The promenade offers alternative options for pedestrians to enter and exit the Research Park without moving their cars, and will reduce congestion, increase walkability, and reduce the risk of pedestrians attempting to perform at-grade railroad crossings.	University of Louisville	Bicycle & Pedestrian Facilities & Programs; TCM	PE, ROW, Utilities, Construction	\$ 7,200,000	0.1600	3.1600	0.7400	0.0300	New

Total \$ 23,397,486



MEMORANDUM

Kentucky
Member
Counties

TO: Transportation Technical Coordinating Committee

Bullitt

FROM: Andy Rush

Henry

DATE: June 2, 2015

Jefferson

SUBJECT: Connecting Kentuckiana: High Crash Intersection Assessment

Oldham

Shelby

Spencer

Trimble

In October 2014 and in April 2015, the TTCC was presented with information regarding the safety component of the ongoing Connecting Kentuckiana MTP Update. Much of the focus to this point has been on the identification of high crash intersections within the 5-county KIPDA Region.

Indiana
Member
Counties

The attached report thoroughly describes the process that KIPDA staff developed to analyze the raw crash data in order to generate a list of high crash intersections in the region. The description in this report matches the information that was presented to the TTCC at recent meetings.

Clark

Floyd

The high crash intersection assessment is one of six parts of the ultimate crash analysis that KIPDA staff anticipate completing in advance of the MTP Update. The other five components include the identification of: 1) High crash roadway segments, 2) High crash interstate segments, 3) High crash ramps/ramp intersections, 4) Locations of crashes involving pedestrians, and 5) Locations of crashes involving bicyclists. KIPDA staff plan to present the results of these analyses to the TTCC at upcoming meetings.

Action is requested.

Equal
Opportunity
Employer



Connecting Kentuckiana: High Crash Intersection Assessment

DRAFTOverview

The Kentuckiana Regional Planning and Development Agency (KIPDA), in developing the Connecting Kentuckiana, Metropolitan Transportation Plan, undertook the process of identifying high crash intersection locations and assessing the severity of the crashes which occur in them. Intersections were analyzed based upon the frequency of crashes which occur at a given intersection, the rate of crashes relative to the volume of traffic entering the intersection, and the severity of the crashes which occurred in the intersection.

The analysis of intersections resulted in high crash intersection lists. The lists are intended to serve as starting points for further study and as a key consideration when prioritizing the programming of funding sources. High crash lists have been developed for the portions of the states of Indiana and Kentucky which are within the KIPDA Metropolitan Planning Area (MPA), and for each of the five counties comprising the KIPDA MPO (Clark and Floyd counties in Indiana; Bullitt, Oldham, and Jefferson counties in Kentucky).

The High Crash Intersection Assessment is considered a companion resource to the Safety Review associated with the TAD Reviews completed as part of the Connecting Kentuckiana Issues Report. The TAD Reviews introduce issues related to frequency of crashes on roadways, including intersections (high frequency crash locations were identified based upon the number of crashes which occurred within 0.10 mile of each other) and the High Crash Intersection Assessment contributes analysis based upon the frequency of crashes which occur in or near intersections and includes analysis based on both the crash rate and severity of crashes.

The lists of high crash intersections do not necessarily indicate that one intersection is more dangerous than another. In some cases, the frequency of crashes that occur within a given intersection may be a reflection of the volume of traffic travelling through it for which there is no reasonable project-based improvement to correct it. Unfortunately, there are situations where the severity of crashes in terms of injuries and fatalities is less a matter for studied improvement and more a reality of individual driver behavior or circumstance for which little can be addressed within a given intersection. It is understood that reducing the number of injuries and fatalities in a given intersection is often a product of reducing the number of crashes as a whole.

The intent of the High Crash Intersection Assessment was to put all of the high crash intersections in the KIPDA MPA on a level playing field where a thorough review and comparison could be completed. Through an analysis which normalizes the relationship between the frequency of crashes and the volume of traffic, accounts for crash related injuries and fatalities, and focuses attention to where the greatest numbers of crashes occur, a process was developed where safety issues are identified and related improvements prioritized.

Analysis

The Analysis process focused on quantifying crash information so that one crash location can be compared to another. The comparison provides a better understanding of which intersections pose the greatest risk of crashes and where funding resources may be directed in order to improve safety. Research was conducted of metropolitan planning organizations, Federal Highway Administration planning resources, and other literature in order to identify the most reasonable approach for assessing the severity of crashes at intersections in the KIPDA MPA. Following the review, it was determined that an approach which combined crash frequency with crash rate and severity of crashes would be an appropriate and informative means for determining which intersections are of the greatest concern. It is important to point out that the combination of factors used to complete this analysis is an indicator that transportation-related safety can be measured in many different ways and that there is no single factor nor set of factors which fully reflect the concept of safety. This analysis serves as a starting point from which further examination, study, and collaboration can be conducted in order to improve transportation safety.

Crash Data

Crash information is recorded by state and local police agencies and collected in statewide databases annually. In Kentucky, the Kentucky State Police maintain the statewide crash database and make it available at www.crashinformationky.org. The Indiana statewide database, known as the Automated Reporting Information Exchange System (ARIES) is available to public agencies and requires a password or protected account. In order to remain consistent with the data used in completing the Connecting Kentuckiana Issues Report, crash data spanning three years (2009-2011) and included the five KIPDA MPO counties was utilized. A review of the data was necessary in order to correct any obvious errors related to the assignment of the latitude and longitude of some crash locations.

Included in the crash data was information about the latitude/longitude of each crash location, if applicable, the address or cross street nearest the crash, brief information describing factors which may have contributed to the crash, and if the crash resulted in injuries or fatalities. The crash data was used to create a Geographic Information Systems (GIS) layer in order to better understand the spatial relationships between the crashes.

Crash location data in each state was fairly consistent. Each state used latitudes and longitudes from or near the site of the reported crash, as well as street address information when possible. Both states also consistently reported when a crash resulted in a fatality. The difference in the crash data from Indiana and Kentucky was in the reporting of crashes which resulted in an injury. Indiana reported significantly more injuries per crash than Kentucky. Because of the difference in the number of injuries per crash reported, and the similar travel conditions in each state, the only reasonable explanation to the reporting differences in the number of crashes resulting in injury is the manner and process used to identify and report injuries.

High Crash Frequency

By narrowing the analysis to intersections with the highest frequency of crashes, the probability of improving transportation user safety is increased. Over 1,300 intersections in the five county KIPDA MPA were reviewed in order to identify the intersections with the highest frequency of crashes. The following factors were utilized when identifying which intersections to consider in the analysis. The intersection:

- was on a functionally classified road
- had at least three legs
- had traffic counts available for the segments of roadway that comprised an intersection

Crashes which occurred on interstates or interstate ramps were excluded from the analysis because of their unique travel behavior.

Using GIS, a 250-foot buffer surrounded the center of each intersection. The buffer, using the spatial join function, assigned the crashes within the buffer to the nearest intersection. By using the spatial join tool, double counting crashes when two or more intersection buffers overlapped was mitigated. The number of crashes assigned to each intersection was the basis for determining the intersections with the highest frequency of crashes.

The frequency of crashes that occurred at each intersection was completed using the criteria listed above. The top 100 intersections in Kentucky with the highest frequency of crashes and top 50 intersections in Indiana with the highest frequency of crashes underwent further analysis (incorporating Crash Rate and Severity Index). Each intersection was ranked based on the cumulative score of all three factors.

Crash Rate

The crash rate is a means for understanding the ratio of the number of crashes to the number of vehicles entering an intersection; the higher the crash-to-volume ratio, the greater concern. The crash rate was calculated using a formula which considered both the number of crashes which occurred from 2009-2011, and the Average Daily Traffic entering the intersection. The following formula was used to assess the number of crashes per million vehicles that entered the intersection:

- $\text{Crash Rate} = (N/3) / (365\text{ADT} / 1,000,000)$
 - N= Total number of crashes at the given location over three years
 - ADT = Average Daily Traffic entering the intersection

Severity Index

The Severity Index establishes a means for comparing the severity of crashes occurring in one intersection to another. While reducing all crashes is important, identifying where the more severe crashes occur assists with the identification of intersections of greater concern. The Severity Index introduces to the analysis a layer of information which contributes to ranking high crash intersections. The Severity Index assigns a numeric value to crashes which result in an injury or fatality and crashes

with no injuries or fatalities. How to weight the severity of crashes has, for many years, been a topic of debate, study and discussion around many conference tables.

KIPDA researched the weights assigned to crashes from other MPOs and state departments of transportation. While weights assigned to crashes resulting in an injury were reasonably consistent, the weights assigned to crashes resulting in at least one fatality spanned a wide range. The Mid-Ohio Regional Planning Commission (MORPC) utilizes a safety analysis tool similar to the High Crash Intersection Assessment developed by KIPDA. MORPC assigns a weight factor of 1 to crashes which result in no injuries or fatalities, 3 to crashes which resulted in an injury, and 12 to crashes which resulted in a fatality.

For the crashes that either had no injuries or fatalities or that resulted in an injury, KIPDA elected to apply the same weight factors used by MORPC. Given the variety of weights assigned to crashes resulting in a fatality, it was decided further investigation was needed. The process for determining a weight for crashes incorporated the wide range found in earlier research. KIPDA conducted the High Crash Intersection Assessment three times, each time assigning a different value to crashes resulting in a fatality. The range included a weight of 5, 12, and 30.

It was determined that the three weights reviewed had little impact on an intersection's Severity Index or affected the High Crash Intersection Assessment rankings. This is in part due to two factors: 1) fatalities account for one-third of the formula used to determine an intersection's Severity Index (the other two-thirds are crashes which result in an injury, and crashes which do not result in an injury or a fatality); and 2) the percentage of crashes which result in a fatality is low when compared to the rest of the crashes (in the KIPDA MPA, crashes resulting in a fatality accounted for 0.26% of all crashes in the three year period of 2009 through 2011). Because the weight factor of 12 had already been established in a process similar to the KIPDA's, and the range of weight assigned to fatalities had relatively little impact on an intersection's Severity Index, it was decided to use a weight between the two extremes of the KIPDA research; or 12.

The formula used to determine an intersection's Severity Index is:

- Severity Index = $(12Ftl + 3Inj + 1PDO) / N$
 - Ftl = A crash resulting in at least one fatality at the given intersection
 - Inj = A crash resulting in at least one injury at the given intersection
 - PDO = A crash resulting in property damage only or did not result in any injuries or fatalities at the given intersection
 - N = The Total number of crashes (Fatal + Injury + No Injuries or Fatalities) at the given intersection

(Please Note: Each crash's severity was determined by the worst condition involved in that crash. For example, if a crash resulted in two fatalities and two injuries, it was considered in this analysis as a crash with a fatality. Crashes were not reflective of the number of fatalities or injuries that occurred, but whether or not the crash resulted in an injury or a fatality. In cases where both an injury and a fatality occurred in a single crash, than the crash was considered to have resulted in at least one fatality.)

Ranking High Crash Intersections

In order to facilitate a ranking of the high crash intersections each intersection was scored and ranked using the calculations for crash frequency, crash rate, and severity. Each of the three factors used in the analysis was ranked independently of the other. The independent rankings for each intersection were tallied and provided an overall score for a given intersection. An intersection with a lower combined score was ranked higher on the list. In the event that two or more intersections receive the same overall score, the crash rate score was used as a tie-breaker.

Example:

Intersection	Criteria Rankings			Intersection Score
	Crash Frequency	Crash Rate	Severity Index	
Road A @ Road B	6	3	2	11
Road X @ Road Y	9	4	5	18

Rankings by Jurisdiction

Lists were developed for the KIPDA MPA for Indiana and Kentucky as well as each of the five counties in the KIPDA MPO region. The jurisdictional lists were developed for two reasons: 1) State and federal funding opportunities which may be utilized to address safety issues are available by state. 2) As indicated earlier, the process of reporting injuries within each state varied significantly. A single, regional rank which encompassed both states would have incorrectly overemphasized Indiana high crash locations due to the disparity in how injuries were reported. The lists by county assist local jurisdictions in identifying high crash locations within their county which may not have been realized when compared to the remaining high crash intersections in their respective state. Local jurisdictions may have local funding mechanisms in place which they may utilize to address high crash intersection concerns.

Jurisdiction	High Crash Intersections Analyzed	High Crash Intersections Ranked
Indiana	50	20
Kentucky	100	40
Clark, Co. IN	10	5
Floyd Co. IN	10	5
Bullitt Co. KY	10	5
Jefferson Co. KY	10	5
Oldham Co. KY	10	5