

# Creating a Transportation Database Using a Linear Referencing System(LRS)

## Project Overview and Methodology

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# TMACOG is.....



- 1 **Toledo Metropolitan Area Council of Governments**
- 1 **Northwest Ohio's MPO (Metropolitan Planning Organization)**
- 1 **TMACOG Transportation Department is charged with planning transportation in Lucas and Wood Counties and southern Monroe County in Michigan.**
- 1 **Transportation Staff –10. Only 2 people working on GIS, apart from other responsibilities.**

# We are here....



# Why Transportation Database?



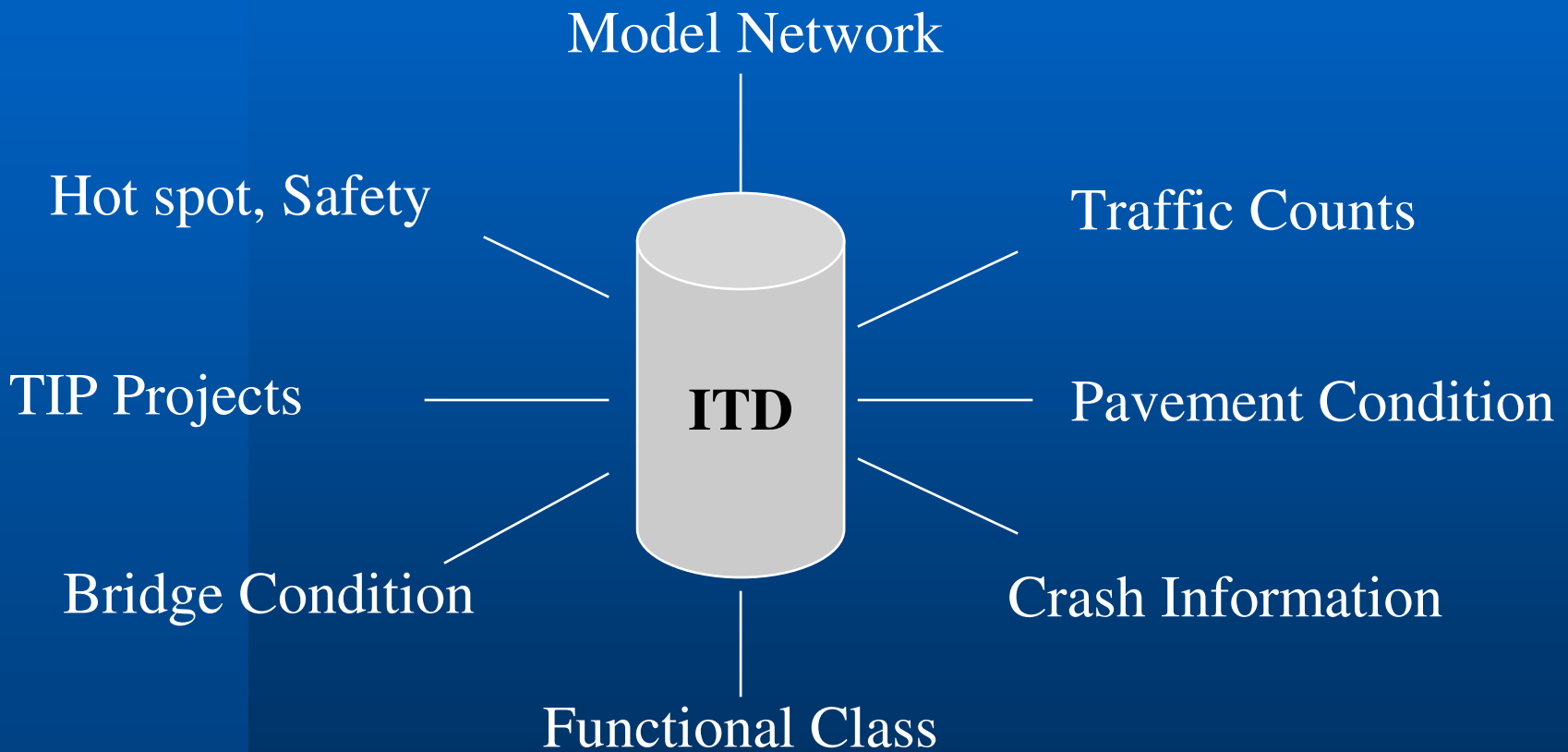
- 1 Numerous sources of data into the same platform
- 1 Ability to analyze this information.
- 1 Ability to easily integrate data provided by Ohio Department of Transportation (ODOT) and Michigan Department of Transportation (MDOT)

# Integrated Transportation Database (ITD) Related Projects



- **Traffic Flow Map**
- **Analyze Transportation Improvement Program (TIP) projects with crash data, volume, pavement condition ratings, etc.**
- **Long Range Plan**
- **Travel Demand Model**
- **..... And various other maps**

# Database Structure



# Linear Referencing



- **Linear referencing acts as a framework to support different kinds of related data**
- **Accessibility to ODOT and MDOT data**
- **Dynamic Segmentation capability to overlay and analyze**

# TMACOG Network Vs State Network



## 1 TMACOG Network

- Stick Network
- Divided highways 2 links for each direction

## 1 ODOT Network

- Divided highways has one route
- State network is up to date
- Local Network is obsolete
- Has route mileage information
- Point Shapefile with mileage (Control Points)



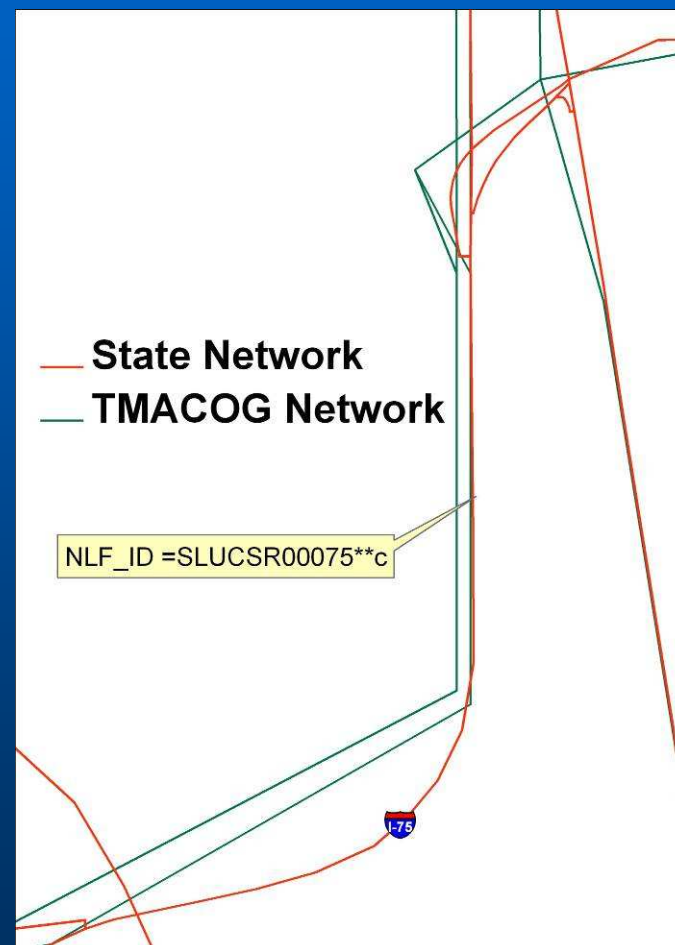
# Conflation



## 1 Equivalency

- To be able to plot TMACOG links on ODOT network, We need

**Route ID  
From Log  
To Log**





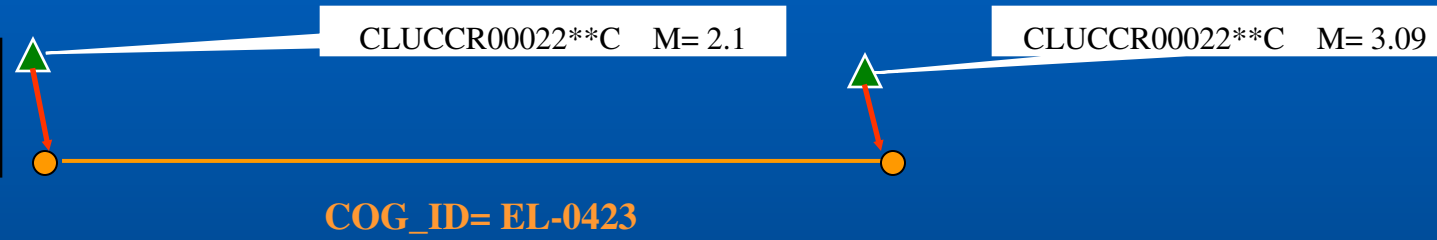
# Conflation Methods

- 1 Spatial join
- 1 Attribute transfer mapping (for ramps)
- 1 Locate features along the routes (for Michigan)
- 1 Manual conflation

# Spatial Join



ODOT Control points



Attributes of Equivalency Events

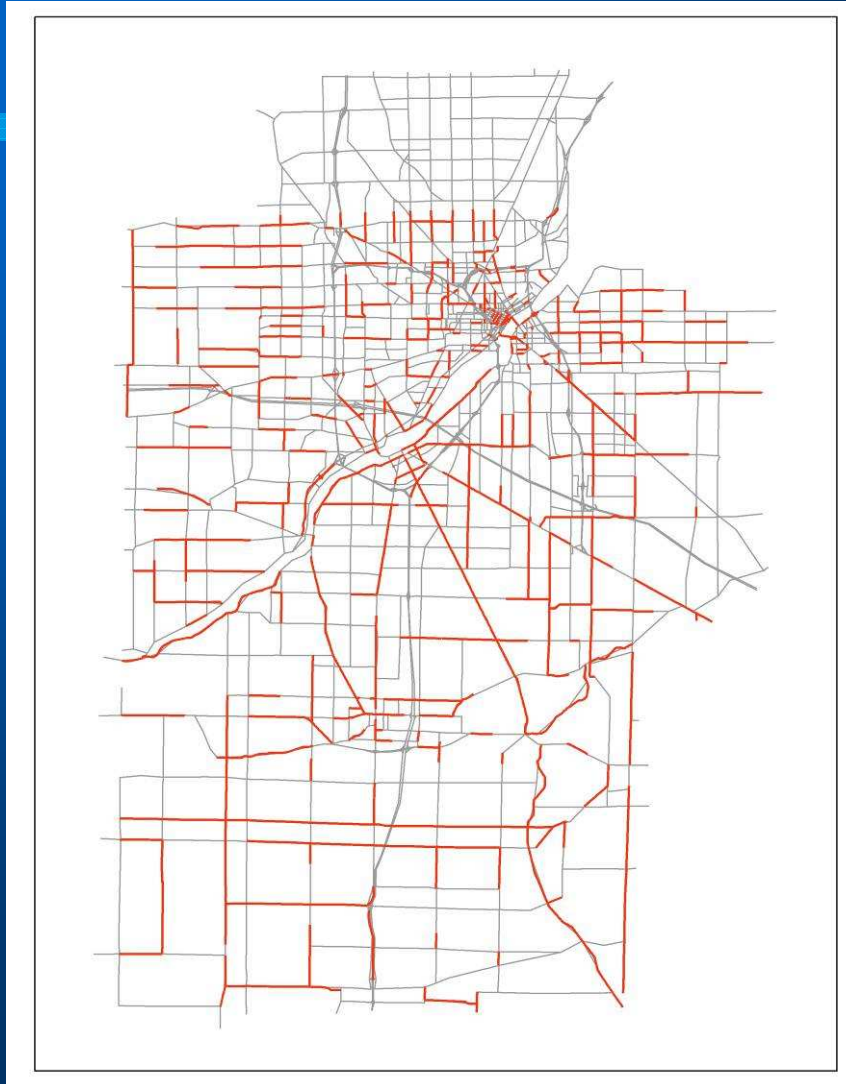
OBJECTID*	NLF_ID	COG_ID	FROM_MEA	TO_MEA
846	CLUCCR00022**C	EL-0423	2.1	3.09
2205	CLUCCR00022**C	EL-0423	3.09	3.50

Record: 0 Show: All Selected Records (0 out of 3386 Selected)

# Result of Spatial Join (Ohio)



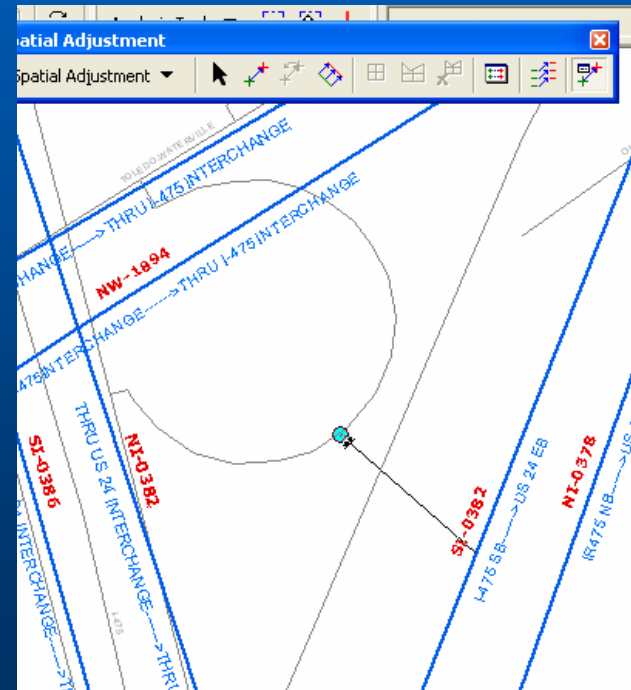
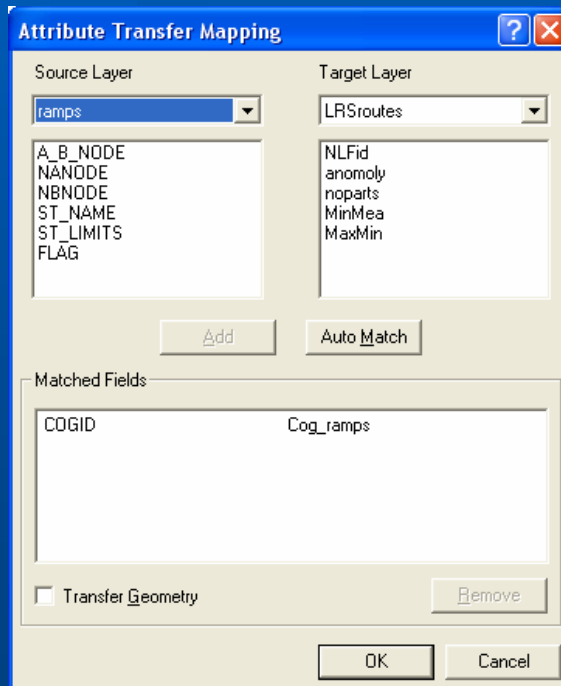
25% join



# Attribute Transfer Tool



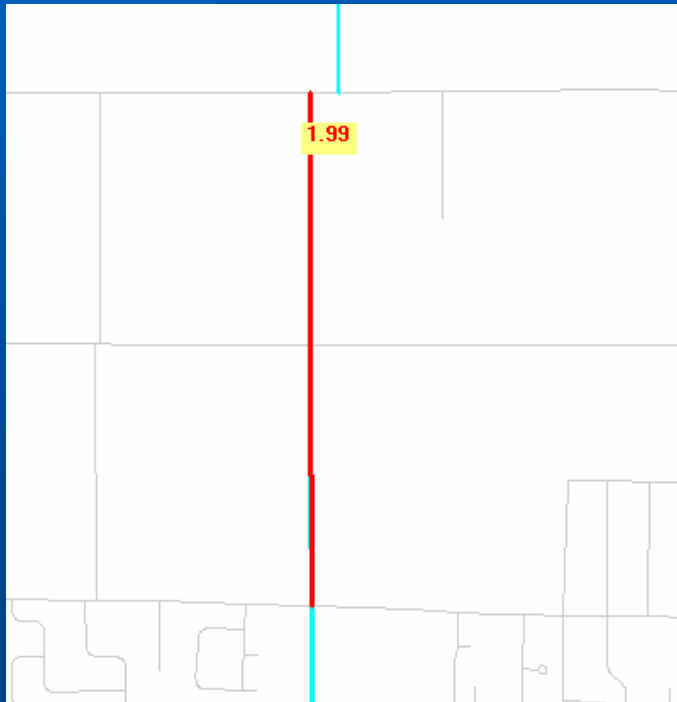
- 1 There is one to one relationship between TMACOG network ramp and ODOT ramps
- 1 Attribute transfer mapping



# Manual Conflation



## Using Digitize Events Tool



Field	Value
NLF_ID	CCR00071*
COG_ID	
FROM_MEA	0.98
TO_MEA	1.99
VERIFY	
OFFSET	
TABLE_1	
Duplicates	
Type	
Bound	

[http://edndoc.esri.com/arcobjects/9.0/default.asp?URL=/arcobjects/9.0/Samples/Linear\\_Referencing/Editing/Digitize\\_Events/DigitizeEvents.htm](http://edndoc.esri.com/arcobjects/9.0/default.asp?URL=/arcobjects/9.0/Samples/Linear_Referencing/Editing/Digitize_Events/DigitizeEvents.htm)

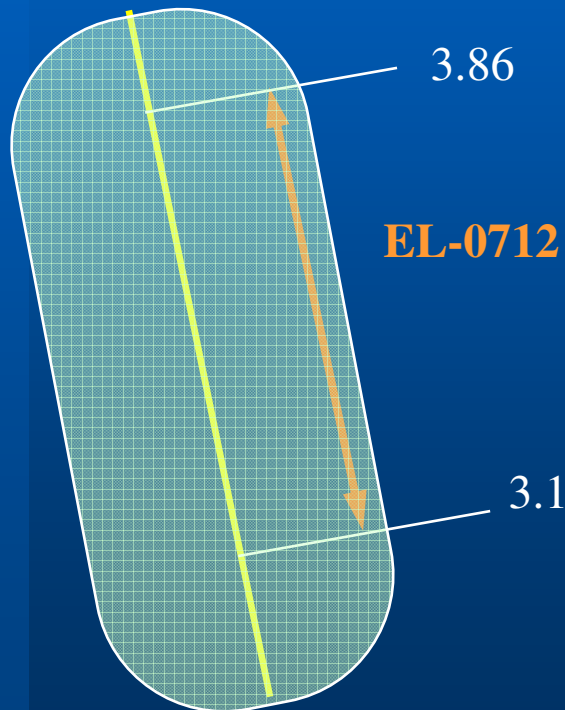
# Locate route events



## Example One

CLUCCR00008\*\*C

Buffer of 100 feet



OBJECTID*	NLF_ID	COG_ID	FROM_MEA	TO_MEA	
1225	CLUCCR00008**C	EL-0712	3.1	3.86	1
1226	CLUCCR00008**C	EL-0712	4.28	4.28	

Record: 1 Show: All Selected Records (0 out of \*2000 Selected)

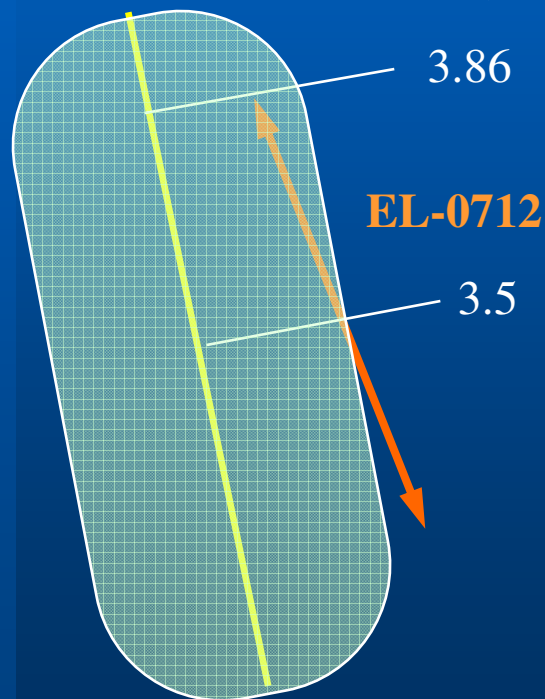
# Locate route events



## Example Two

CLUCCR0008\*\*C

Buffer of 100 feet



OBJECTID*	NLF_ID	COG_ID	FROM_MEA	TO_MEA	
1225	CLUCCR00008**C	EL-0712	3.5	3.86	1
1226	CLUCCR00008**C	EQ_0144	4.28	4.36	

Record: 1 Show: All Selected Records (0 out of \*2000 Selecte



# Result of Locate Route Events



(Michigan)



# ITD Products

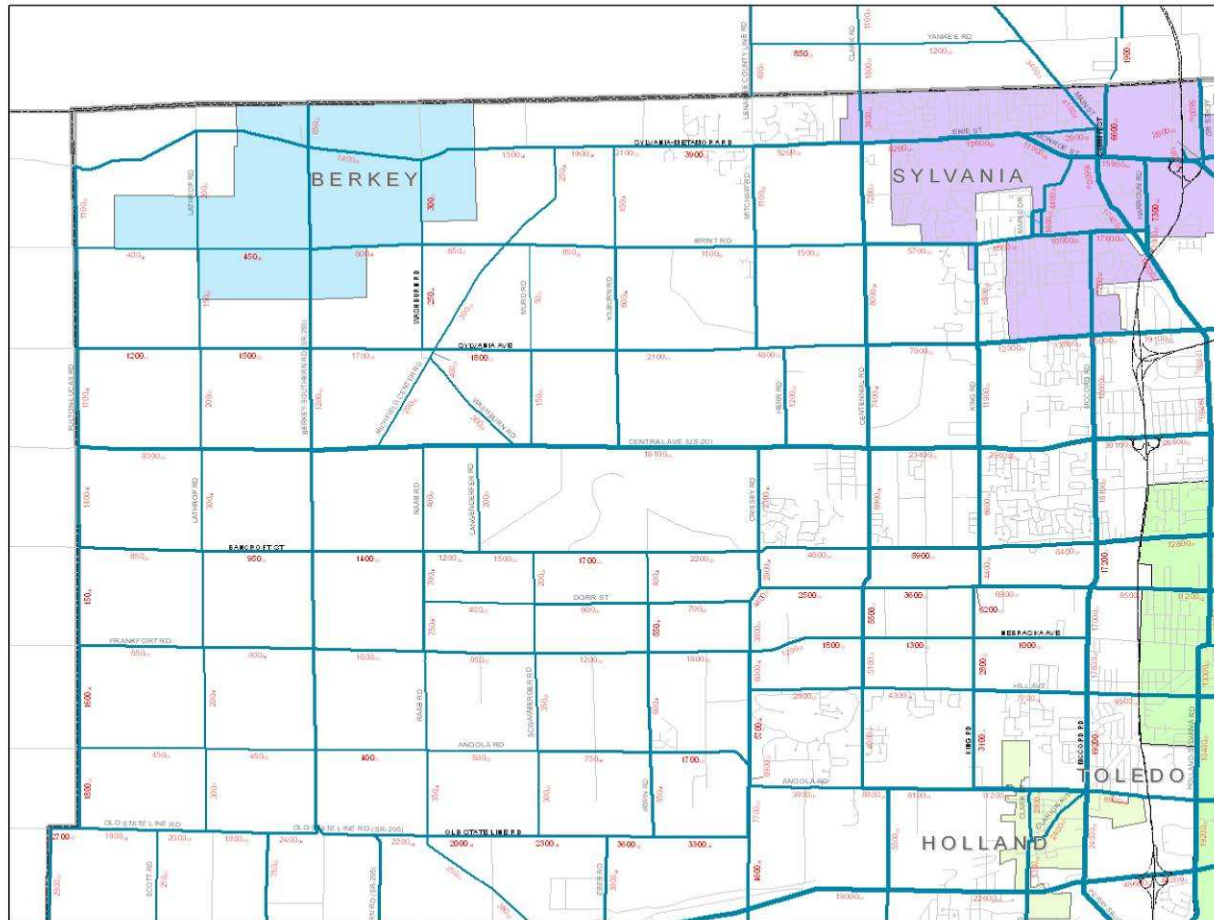


- **Traffic Flow Map**
  - Traffic counts from ODOT
- **TIP Maps**
- **Long Range Plan**
  - Pavement Condition
  - Crash Locations
  - Bridge Condition
- **Travel Demand Model**
- **..... And various other maps**

# Traffic Flowmap



Map 03



Traffic Flowmap  
2005



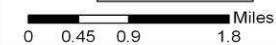
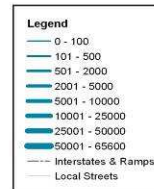
Toledo Metropolitan Area Council of Governments

Traffic counts are taken every year on roads and highways in all of Lucas and Wood counties and western portions of Ottawa and Sandusky counties in Ohio, and in southern Monroe County, Michigan. The counts estimate 24-hour volumes and are adjusted for season and for road category. The Toledo Metropolitan Area Council of Governments (TMACOG) coordinates the traffic counting program in the Toledo metropolitan area. TMACOG creates maps and maintains a database for the entire region.

While more than 1500 counts are taken every year, not every road is measured annually. The subscript to the Annual Average Daily Traffic (AADT) number indicates the year the measurement was taken. Example: 8100<sub>05</sub>, AADT count is 8100 cars and trucks daily. Count was taken in 2002.

To view an electronic version of this map, or to view the most up to date and detailed count information at individual locations, visit the transportation department of the TMACOG website at [http://www.tmacog.org/tran\\_body.htm](http://www.tmacog.org/tran_body.htm).

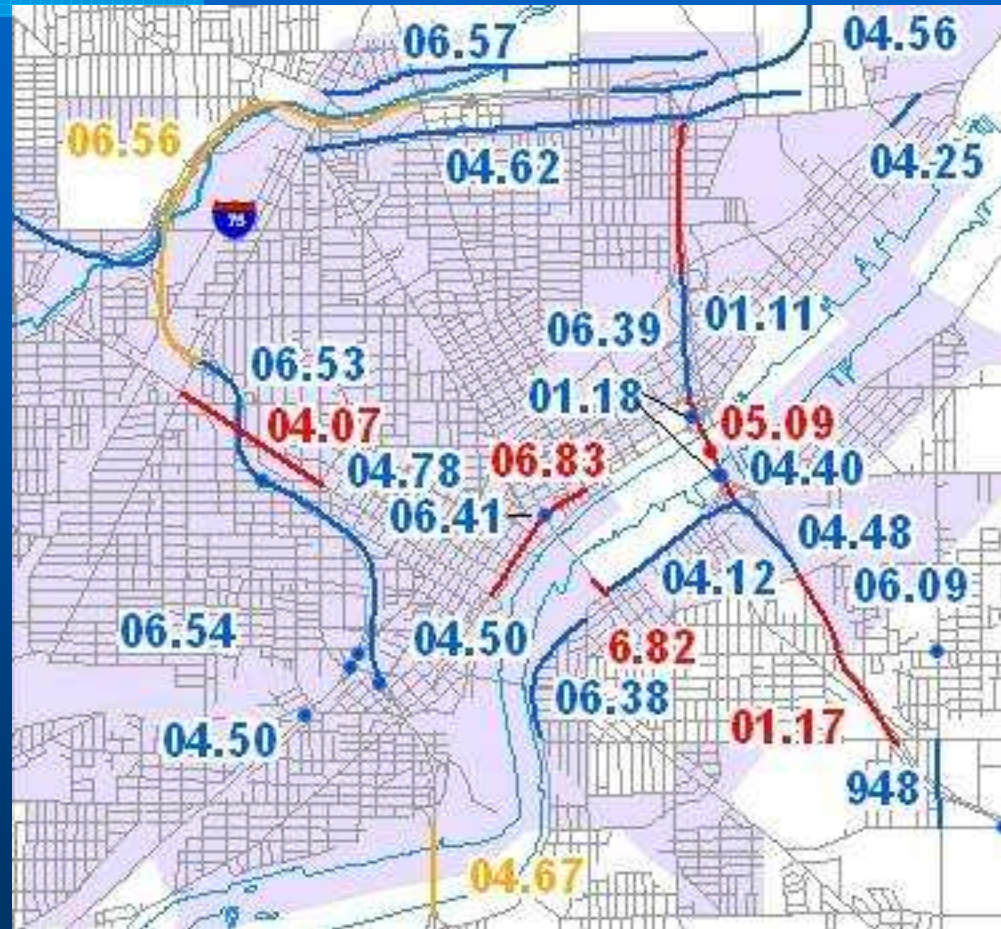
Interstates are shown on maps 18 - 24.



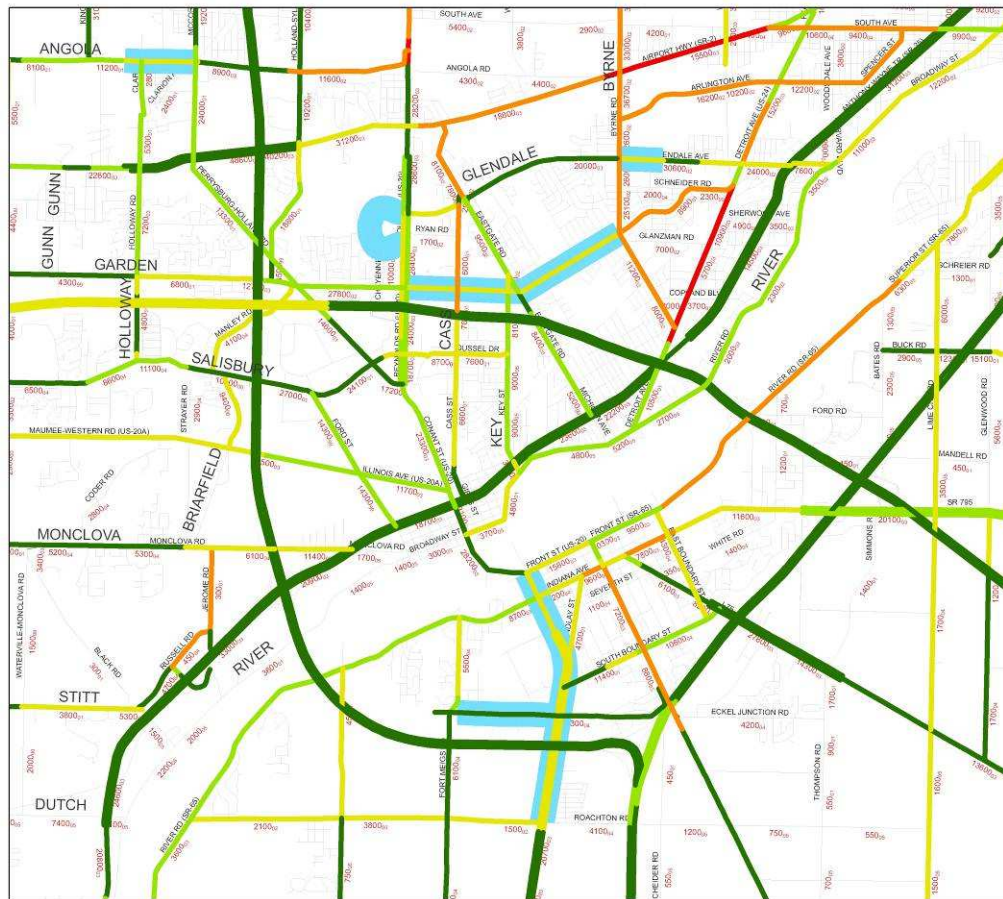
# TIP Map



Current TIP map  
developed using  
ODOT LRS



# TIP Project Analysis



**Pavement Condition  
Federal Aid Eligible Roads  
2004**



# Future Projects



- 1 **County Centerline**
- 1 **Maintenance**
  - **Crash Locations**
  - **Updated Traffic Counts**
  - **Bridge Conditions**
  - **Pavement Conditions**



# Thank You

## Questions????