Local Traffic Management

Tools for local agencies
Overview:

• How to assess impacts of new road opening
• How to assess impacts of a large, special event
• How to manage traffic signal systems
Elkhart County
How to assess impacts of new road opening

CR17 Extension:

4-lane divided roadway replacing 2-lane standard county road
CR17 Traffic Study
Before and After 4-Lane Extension
CR17 Traffic Study
Before and After 4-Lane Extension

Questions:
• What are traffic impacts of improved access after construction of new section
  • More traffic?
  • Route changes?

Manufacturing and Commercial areas
CR17 Traffic Study
Before and After 4-Lane Extension

Completed with:
• Tube counters
• Radar counter
• Bluetooth data collectors
Bluetooth Matching

- **Bluetooth**: a wireless protocol utilizing short-range communications technology facilitating data transmission over short distances from fixed and/or mobile devices.

- **MAC Address**: a 48 bit (>28 trillion) unique address assigned to a device by its manufacturer.

- Matches are anonymous, like license plate matching.
CR17 Traffic Study
Before and After 4-Lane Extension
CR17 Traffic Study
Before and After 4-Lane Extension

ADT at select locations

Before and After Opening of New Section (2011 vs 2012)
CR17 Traffic Study
Before and After 4-Lane Extension

ADT at select locations

Before and After Opening of New Section (2011 vs 2012)

Even with new road open, just back to 2006 levels at main crossing
CR17 Traffic Study
Before and After 4-Lane Extension

Bluetooth
Origin-Destination Study

Before New Section
Complete (2011)

Route Splits of Vehicles
Passing Thru Point ‘E’ and SR119 (‘G’), CR38 (‘H’) & CR40 (‘I’)

2011
CR17 Traffic Study
Before and After 4-Lane Extension

Bluetooth
Origin-Destination Study

Route Splits of Vehicles
Passing Thru Point ‘D’ and
SR119 (‘G’), CR38 (‘H’) &
CR40 (‘I’)
CR17 Traffic Study
Before and After 4-Lane Extension

Bluetooth
Origin-Destination Study

Route Splits of Vehicles
Passing Thru Point ‘D’ and SR119 (‘G’)

2012
CR17 Traffic Study
Before and After 4-Lane Extension

Bluetooth
Origin-Destination Study

Route Splits of Vehicles
Passing Thru Point ‘D’ and CR38 (‘H’)
CR17 Traffic Study
Before and After 4-Lane Extension

Bluetooth
Origin-Destination Study

Route Splits of Vehicles Passing Thru Point ‘D’ and CR40 (‘I’)

2012

52.6%

15.8%

31.6%
How to assess impacts of large, special event

Elkhart County 4-H Fair:

Are visitors to event being well served by transportation infrastructure?
How are they getting to/from the fair?
Can improvements be made?

Average Daily Attendance = 27,200
Total for week = 245,000
Fairs have a historic place in traffic engineering –

Dr. Greenshields measured cars going to the Ohio State Fair in 1933 with a camera system to develop first traffic flow theory.
Vehicle Counts

Travel Time
Origin/Destination

Time Lapse Camera

Data Collection

Device Deployment
Data Collection

Device Deployment

Bluetooth Case

Road Tubes
Data Collection

Device Deployment
Findings

Fair Traffic Directional Splits

4% at CR 17 and CR 18

44%

65%

6%

10%

5%

5%

30%
Findings

Traffic to/from West

Signed Route to/from Fair

Origin/Destination
Traffic to/from South

Findings

Traffic to/from south evenly uses east and west approaches

Origin/Destination
Findings

Traffic Counts

Peak Inbound Hour (7-21) (vehicles per hour)

Peak inbound hour is typically 4:45 – 5:45 PM, earlier on weekends
Peak Outbound Hour (7-21) (vehicles per hour)

Findings

Traffic Counts

Peak outbound hour is typically 9:00 – 10:00 PM, later on weekends
Findings

Traffic Flow

CR 34 - US 33 TO LOGAN ST.

Traffic Flow

Travel Time

Travel Time
Traffic Flow

CR 34 - US 33 TO LOGAN ST.

Traffic backups shown as reduction in flow and increase in travel time

Travel Time
Findings

Outbound flow also restricted at peak release time
Findings

Average of 6 cars parked per minute (approx. 360 cars per hour) per parking crew

Peak daily inbound flow is approx. 700 cars per hour
Findings

Video

Time Lapse
Potential Impact of New Link to CR36 Using 7/21 Peak Hours as Example

Based on origin/destination study: new link traffic estimated to gain all CR31 traffic, as well as half of southbound traffic now using CR34 to US33. Numbers are just to give idea of relative potential, actual usage will depend on many factors including visitor knowledge of route and signage.

Potential to reduce traffic on CR34 by ~10%
Suggestions

**Link to CR36**

Link to CR36 has potential to reduce traffic on CR34 toward Goshen by ~ 10%

- Good signage and dissemination of information to public about the new route will help it to succeed

**Signed Alternate Route to Fair using CR38**

- Only 6% of people going to/from fair from the west use signed route along CR38.

![Map showing traffic distribution and route options](image)
CR34 (Monroe Street)

CR34 will still see bulk of traffic, dealing with traffic issues there will remain important

- CR34 is not at ‘theoretical’ capacity
- Conflicting traffic movements and backups from parking lots reduce this capacity
  - Left turn’s into parking lots
  - Right turn’s waiting to enter fair grounds backing onto CR34 during peaks
- Blackport Road
- Slow vehicles and pedestrians
CR34 (Monroe Street)

- No place to pass slow vehicles
- Traffic turning left into parking lots can’t be passed
- Occasional right turn traffic into parking lots spills back to road

Right turn lane to Gate 5, may need more lanes like this at Gates 1 and 2
CR34 (Monroe Street) Selective Areas of Widening

Suggestions

1. **Blister to allow passing of left turn traffic at Gate 1**

2. **Right turn lane at Gate 2**

3. **Position permit checkers at distance from CR34 to keep queues from backing up to CR34**

Future option: Re-align Gate 1 with Blackport

CR34 Improvements
CR34 (Monroe Street) Selective Areas of Widening

Blister to allow passing of left turn traffic at Gate 5
CR34 (Monroe Street) Add 10’ (min) Shoulders Along Fairgrounds

Shoulders provide:
- space to pass turning and slow vehicles
- room for emergency vehicles to bypass traffic
- effective right-turn lanes near gates

CR34 Improvements
Traffic Signal Performance Measures

Originally developed for use by INDOT
Adapted to local agencies through an LTAP project

Primarily 7 basic measures to help ensure signals are operating well—engineering level analysis tools

- Coordination
- Cycle timings
- Volumes
- Split Failures
- Etc...
Performance Measure Evolution

2003

2006

2008

2010

2011

Central System

Procurement Specification

Exceptional (6)
Highly Favorable (5)
Favorable (4)
Random (3)
Unfavorable (2)
Poor (1)
How Current PM Systems work:

Replace second cabinet/hardwired logging system

With a smart controller
Performance Measures
Elkhart County, IN
Even Useful on a Small System

- 15 miles of fiber optic along CR17
- 14 county signals on fiber network
- 4 INDOT signals on fiber network
- 1 microwave link
- 4 signals on broadband radio
- 7 signals with no data connection
- 1 Centracs system
- 10 FLIR thermal sensors
- 3 full time linux bluetooth stations
- 5 PTZ cameras
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C=75

C=90

Plan Change At 0500

Plan Change At 1300

Plan Change At 2000
Cycle Length
Cycle Lengths Mismatched

- Cycle Length
  - 60
  - 75
Performance Measures

Next Step:
Adapt Performance Measures, now mostly Engineering Analysis Tools, to **Maintenance** functions.

Possibilities include:
- Detection Failures
- Changes in traffic patterns
  - arrival on green
  - change in volumes on an approach
- Loss of communication
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