Facilitating Special Event Congestion Management in Small Communities

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Overview

• The problem
• Strategies
• Results
• Conclusions
Bozeman

- Community of 35,000+ (and growing)
- Home to Montana State University
  - 12,000+ students
- Hosts a number of special events throughout the year
  - University athletic events, concerts, etc.
  - Festivals, parades, etc.
- Limited capacity for infrastructure expansion
The Problem

- Traffic congestion is increasing nationwide
- Recurring and special events* congestion will continue to be a problem
- An overlooked issue in small communities
  - Resources are limited (financial, personnel, equipment)
  - Absence of alternative routes
  - Limited existing infrastructure
- A proactive, rather than a reactive approach is required

* Special events include football games, concerts, etc. For the purpose of this presentation, special events are Montana State University home football games. Note that the problem extends to special events other than just football games.
The Problem...
The Problem

- Football attendance is growing, as are impacts
- Quantified in fall of 2006
  - Travel times, intersection operations
- Results indicated that greatest impacts occurred post game
  - Extensive delay on two primary egress routes
  - Poor LOS at intersections (signalized and AWSC) in vicinity of campus
  - Distance from campus minimized impacts
The solution...

- Investigate and employ traffic management strategies
- Facilitate interagency cooperation
  - Partners:
    - Western Transportation Institute at Montana State University
    - MSU Police
    - MSU Athletics
    - Montana Department of Transportation
    - City of Bozeman
    - Bozeman Police Department
    - Gallatin County
- Develop and test field strategies that small communities may employ in managing special events
- Direct traffic to routes best equipped to handle it
- Educate the motorist
- Act as a training mechanism for agencies to handle future issues related to game traffic
The Strategies

- Road closures
- Traffic control personnel
- Traveler information/operations:
  - Dynamic Message Signs (DMS)
  - Highway Advisory Radio (HAR)
  - CCTV - Real-time monitoring
Road Closures

• Lincoln St - day long closure
• Kagy Blvd – day long closure
• 11th Ave - post game closure
• Grant St – post game closure
Traffic control

• Signal Changes – 19\textsuperscript{th} and College, 19\textsuperscript{th} And Kagy

• Sign change – 11\textsuperscript{th} & Grant
  – East/West stop signs covered and intersection converted to 2-way stop intersection – continuous North/South flow traffic

• Traffic direction - Police
  – 11\textsuperscript{th} and College
  – 11\textsuperscript{th} and Kagy
  – 19\textsuperscript{th} Avenue and Garfield Street
  – Parking Lots
Traveler Info and Operations

- Dynamic Message Signs (DMS)
  - 19th Avenue northbound before Garfield (Main Street traffic use Garfield <=)
  - 19th Avenue southbound before Lincoln (Lincoln Closed)
- HAR
  - Provide message on preferred routes to travel and prohibited turn movements
- CCTV
  - Monitor critical intersections and relay strategy modifications to field personnel in real time
    - Deployed at:
      - 19th and Kagy
      - 19th and College
      - 11th and College
      - 11th and Kagy
      - 11th and Grant
Traveler Information

Traffic Advisory
Tune to AM 1700

LINCOLN CLOSED

USE GARFIELD

Football traffic to be routed, watched

A NEW GAME PLAN

New traffic plan for MSU football games takes effect Saturday

THE BIG SKY
Real Time Monitoring
Results: Interagency Partnership

• Interagency cooperation has greatly improved
  – Relationships established
  – Consensus developed on strategies and approaches employed
• Greater stakeholder understanding of counterparts’ event roles and activities
• Equipment and labor resources leveraged to maximize benefits
Results: Traveler Information

- Survey of game attendees indicated two-thirds of respondents were aware of strategies
  - Predominant sources: newspaper, radio
  - HAR, DMS, TV and internet also indicated as sources of information
Results: Traffic Signal Timings

- Produced mixed results
  - Led to modest improvements
  - Prevented addt’l deterioration
  - Impacted minor approaches

- Increased throughput - example 19th And Kagy
  - 2006 – 4:00-5:00 – 1317 vehicles passed thru int
  - Approx 50 additional vehicles thru every 15 min with decreased travel times
Results: Manual Traffic Control

- Simulation employed to analyze officer’s control strategy
- South approach benefited greatly from manual control
- Delay and poor LOS on remaining approaches deemed acceptable

<table>
<thead>
<tr>
<th>Outputs</th>
<th>AWSC</th>
<th>Manual Control</th>
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<tbody>
<tr>
<td>Cycle Length (sec)</td>
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<td>Total Split (sec)</td>
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<tr>
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<tr>
<td>West</td>
<td>23 / C</td>
<td>59 / E</td>
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<tr>
<td>East</td>
<td>26 / D</td>
<td>68 / E</td>
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<tr>
<td>South</td>
<td>164 / F</td>
<td>53 / D</td>
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<tr>
<td>North</td>
<td>14 / B</td>
<td>28 / C</td>
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<tr>
<td>Intersection</td>
<td>80 / F</td>
<td>55 / E</td>
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Results: Road Closures

- Travel time used as metric to measure effectiveness of closures
- Traffic shifts expected to improve flows, reduce travel times
- Morning: minor improvements, no significant deterioration
- Afternoon: significant improvement on 11th corridor, steady state on 19th corridor

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<th>Time</th>
<th>19th Avenue</th>
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<td></td>
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Results: Real Time Monitoring

- Monitoring and improved communications with field officers maximized effectiveness of manual control and
- Helped monitor pedestrian safety
- Extremely effective in tracking
  - Corridor congestion
  - Pre/postgame traffic patterns
  - Potential incidents
  - Improving coordination efforts
General Observations

• Transportation still an afterthought with special events
• Demand is still exceeding roadway supply
• Signals remain a problem, particularly north of 19th and College intersection
  – Signal synchronization needs to occur
• Queuing from 19th and Kagy back to stadium area
  – Function of intersection geometry – can only put so many vehicles around a corner at low speed per minute
  – Traffic from empty lot and office complex has major impact on congestion on Kagy
Conclusions...

• Improvements seen
  – Pre, post-game travel times have improved
    • Where they have not, no major increases noted
  – Road closures have worked out well
  – Manual traffic direction has been beneficial
  – Interagency partnership has improved
    • Everyone is now on the same page

• Challenges exist
  – Funding for continued operations
  – Driver acceptance
  – Signal timing and synchronization
    • Address impacts occurring beyond vicinity of campus
Acknowledgements

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• City of Bozeman Police
Questions?