DUBUQUE

STREETS PROJECT

BY

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US 20 is one of the most congested corridors in Dubuque Metro area with 39,000 vehicles per day with 212 accidents with one fatality in 2017.


Impact of East-West Corridor Improvements on US 20.
ISSUES IN THE METRO AREA
TRAFFIC ISSUES IN DUBUQUE METRO AREA

US 20, Pennsylvania Avenue and Asbury Road are three major corridors that connect the west end of the metro area to downtown. US 20 is the shortest but most congested route with 39,000 AADT. Asbury Road and Pennsylvania Avenue are parallel routes to US 20 with 14,000 AADT.
TRAFFIC ISSUES IN THE DUBUQUE METRO AREA

US 20

US 20 is the most problematic and has a significant amount of congestion. Emergency pre-emption/pedestrian crossings and coordination changes frequently disrupt the flow along US 20. One of the main goals of the project is to design a solution that can reduce congestion on US 20 and distribute the traffic more evenly across the other roads in the network.

PENNSYLVANIA AVE

ASBURY RD
TRAFFIC ISSUES IN DUBUQUE METRO AREA
LEVEL OF SERVICE

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<tr>
<th>Traffic Volume</th>
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EXISTING OPERATION ISSUES

• Drivers are sometimes very slow to pull off from the standing queue at signalized intersections. Therefore, headways between vehicles are longer resulting in lower saturation flow rates. This can impact efficiency of the green times.

• Drivers tend to be very aware of the necessary lane changes well ahead of the merging/diverging times and this sometimes creates an issue because uneven utilization of the lanes on some of the roads.

• There is a lot of truck traffic throughout the network which can contribute to traffic issues due to the amount of uphill in the project area. Very often signals that are timed to provide good coordination for truck traffic may not be ideal for light vehicles (they get to the next signal too soon in some cases).
TRAFFIC ISSUES IN DUBUQUE METRO AREA

TRAFFIC STUCK AT AN INCIDENT
CITY’S INVESTMENT
EXISTING SIGNAL AND ITS ASSETS

1. DETECTION
2. VIDEO SURVEILLANCE
3. PERFORMANCE MEASURES SYSTEM
4. COMMUNICATION INFRASTRUCTURE
MAJOR INVESTMENTS

COMMAND CENTER

City surveillance system with coverage of major streets and signalized intersections with 30 days of video storage.
MAJOR INVESTMENTS

FIBER

The City invested heavily into good communications throughout the city in the early 2000’s. This included placement of a multiple duct fiber conduit system under roadway, sidewalk and utility projects.

Originally this communication improvement was installed to connect the traffic signals and city buildings together.

Over the last 3 years this has grown substantially and has turned into the communications backbone for the entire city (both private and public).
REQUIREMENTS FOR THE SYSTEM
OPERATIONAL NEEDS

1. DATA COLLECTION
2. PERFORMANCE MEASUREMENT SYSTEM
3. TRAFFIC MODELING
4. DECISION SUPPORT SYSTEM
5. TRAFFIC SIGNAL SYSTEM
6. COMMUNICATION SYSTEM
7. ATIS
8. OPERATIONS AND MAINTENANCE
PERFORMANCE MEASURES

IMPROVE MOBILITY
• Average travel time per trip for the corridor and each network
• Average delay per trip (for the corridor and each network)
• Number of rerouting events
• Number of automatic retiming due to STREETS system.

REDUCE CONGESTION
• Intersection LOS
• Freeway LOS
• Arterial LOS
• Volume/Capacity Ratios

IMPROVE SAFETY
• Incident rate
  • Number of Secondary Accidents
• Accident rate
  • Injury
  • Fatality

INFORMATION TO TRAVELERS
• # of events disseminated (i.e., travel time information)
  • Per O/D pair
  • Construction
  • Incidents
  • Special Event
• System Availability
  • Device up-time
• 511 Usage
  • Number of subscribers
STREET

CONCEPT, PROCESS & BUDGET
The goal of the Smart Traffic Routing with Efficient and Effective Traffic Signals (STREETS) project is to develop a smart, next-generation, traffic management and control system. This system will use traffic control strategies to enable dynamic traffic routing to maximize the use of existing roadway capacities in the Dubuque metro area.
STREETS MANAGEMENT & CONTROL SYSTEM

COMPONENTS

STREETS will dynamically react to congestion detected or predicted by the Micro-simulation model, and proactively change signal timing based on predicted traffic flow data while disseminating congestion and alternate route information for motorists.
PROJECT PARTNERS

ROLES

- The City of Dubuque and Dubuque MPO will play a lead role in developing and maintaining the project.
- Iowa DOT will provide technical support and guidance to the City and the MPO.
- FHWA will be one of the funding agencies and the office of research will provide some support.
- EMS, MDST groups, Transit, County and School Districts will be helping in developing the project.
- Ultimately the major user is traveling Public.
**LOGICAL PROCESS**

1. **Monitor Traffic**
   - Traffic Status Change?
     - No: Do Nothing
     - Yes: Traffic Status Change

2. **Traffic Status Change?**
   - Yes: Run Demand Model
     - Field Data: Traffic Data, Signal Timing
   - No: Do Nothing

3. **Run Demand Model**
   - Run Micro-Simulation and Generate MOE
     - Rerouting Improves Network?
       - No: Do Nothing
       - Yes: Feed Simulated Traffic Flow to DSS

4. **Feed Simulated Traffic Flow to DSS**
   - Generate Responsive Plan (Signal Timing)
     - Plan Approved based on Criteria?
       - No: Disseminate New Route to the Travelers
         - ATIS Information (DMS, 511, Apps)
       - Yes: Send Response Plan to ASCT
         - Run ASCT to Adaptively Modify Signal Timing

**Legend**
- Field Data
- Modeling
- Performance Measurement
- DSS
- ATMS/ASCT
- ATIS
The project is broken into two deployment stages.

**Stage 1** includes integration and deployment of the STREETS software, servers, camera analytics and traffic signal enhancements at 33 intersections. The estimated cost for Stage 1 is $3,366,250.

**Stage 2** would expand the system to add another 33 intersections. The estimated total cost of Stage I and Stage 2 $5,062,250.
PROJECT FUNDING

DUBUQUE MPO & CITY
- Surface Transportation Block Grant (STBG) funds
- Local funds

IOWA DEPARTMENT OF TRANSPORTATION
- Iowa Clean Air Attainment Program (ICAAP)
- Traffic Safety Improvement Program (TSIP)

FEDERAL HIGHWAY ADMINISTRATION
- Accelerated Innovation Deployment (AID)
PROJECT TIMELINE

SCOPE DEVELOPMENT
The City, MPO and IADOT staff met with FHWA research staff and developed concept statement and scope of the project. Developed RFP for Systems Engineering.

RFI & RFP PROCESS
Staff conducted Request for Information using the Systems Engineering document and received 11 proposals. Staff is using information from RFI and systems Engineering to develop an RFP.

PROJECT IMPLEMENTATION
The project will be tested and implemented in 2021 and 2022. Phase II will be implemented in 2023.

SYSTEMS ENGINEERING
Went through a selection process and hired Iteris to conduct systems engineering for the project.

PROJECT DEVELOPMENT
Staff will release the RFP in October of 2019. The project will be developed during 2020 and 2021.
STREETS project will be first of its kind to implement Dynamic Adaptive System for the full metro area
Thank You

Dubuque STREETS Project