

## ICM IMPLEMENTATION PLAN

### MEDIAN BARRIER GATES

10/25/19

Version 2.0



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## Introduction

### PROJECT OVERVIEW

The Median Barrier Gate (MBG) project focusses on providing emergency responders quick, safe, simple and secure access to incident scenes in locations across solid median barriers. The MBG is part of the Event Management strategy functional area identified within the Des Moines Metropolitan Area Integrated Corridor Management (ICM) Program. This pilot project will serve to highlight the benefits and challenges of providing quick and secure access to incident scenes rather than utilizing the existing practice of using interchange ramps for turnaround locations.

### Document Scope

This Implementation Plan documents the various options for selecting the gate type and location(s), as well as design and deployment of pilot MBG on the interstate system in the Des Moines metropolitan area. The installation of a pilot location will be used to identify the benefits and challenges of MBG to determine whether additional gates will be warranted.

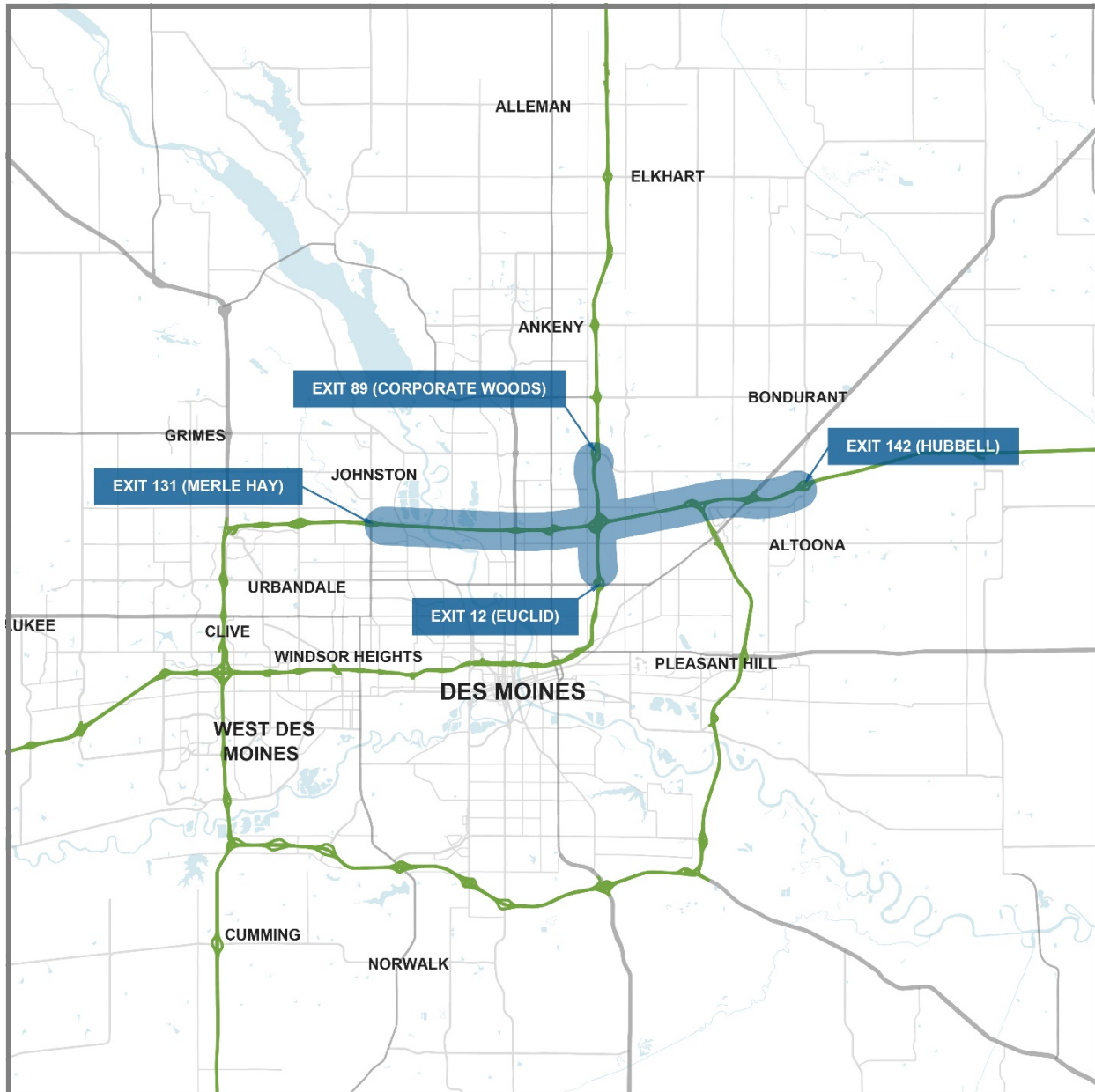
### PROCESS AND APPROACH

As part of the Event Management strategy, functional area identified within the Des Moines ICM Program, general background information, and guidance on event management can be found in the Program-Level Concept of Operations (June 24, 2019) document. Specific to this strategy, stakeholder outreach and coordination was completed to identify the criteria for selecting gate types and locations for installation. Table 1 shows a summary of the different types of gates available for installation. Additional detail is provided in the strategy Con Ops:

([https://iowadot.gov/desmoinesicm/pdf/IADOT\\_DSMICM\\_Median%20Barrier\\_Project%20Con%20Ops\\_w\\_Appendix\\_073119\\_FINAL\\_.pdf](https://iowadot.gov/desmoinesicm/pdf/IADOT_DSMICM_Median%20Barrier_Project%20Con%20Ops_w_Appendix_073119_FINAL_.pdf)).

The management and oversight structure for the ICM Program has not been formalized as of the writing of this document. As such, the criteria for selection of gate locations for this Implementation Plan were identified by the ICM Steering Committee (a group of active stakeholders identified with Iowa DOT as part of project engagement). The base criteria for ramp identification was: concrete median barrier without existing crossovers or breaks, long distances (greater than 3 miles) between interchanges, or close proximity to system interchanges (e.g., northeast mix-master). Frequency of incidents was not selected as a primary determining factor when selecting gate locations since many high-incident locations (e.g., western I-235) have frequent entrance ramps in close proximity to potential incident locations. Figure 1 shows the extents for potential pilot median gate installations.

Figure 1 – Median Barrier Gate Project Area



Iowa DOT procurement staff will need to be engaged to determine the appropriate method for selection of the gates to be installed. The four types of barrier gates that were researched for this program are:

- A. Swinging (fully removable)
- B. Sliding
- C. Raising
- D. Lowering

A summary of each of these gate types is included in the appendix. The four gate types described herein have strengths and weaknesses that should be considered when determining which gate should be installed. It was determined that the Type A – Swinging and the Type D – Lowering gates did not meet the stakeholder’s needs and are not considered viable options. A qualifications based, low-bid environment may be the best method for procurement of gate hardware, but alternative selection methods (e.g., sole source) should be investigated.

Once a selection method has been determined, procurement documents will need to be developed. This effort could include functional requirements, sole source justification, and/or bidding and letting documents. After a gate type is selected and a contract is awarded the process of determining the specific locations for installation can be finalized. Based upon the method of opening (e.g., swing, slide) the optimal location for installation may be impacted. Field investigation, including the potential identification of electrical service (if powered gates are selected) will be required. Specifications, typical details, and site-specific drawings and plans will be developed. Coordination with gate manufacturers may be necessary to streamline this process. If the procurement of gate hardware does not include installation, additional lettings and design documents may be required for the installation of gates.

After installation, methods of measuring the utilization of gates and the impacts to event response and clearance times should be employed. Sources of data may include the Iowa DOT’s Traffic Management Center and emergency dispatch centers. Responders to incidents may also be surveyed to determine strengths, weaknesses, and potential improvements to the gate system.

## TIMEFRAME

The timeframe for this Implementation Plan will require adequate time for determination of procurement type, development of design and letting documentation, and procurement and installation. In total, it is anticipated the procurement and design process will require up to 9 months with construction and installation completed within 6 months of award.


## AUDIENCE

This Implementation Plan is written to provide guidance to Iowa DOT District 1 staff for the process and required next steps for the installation of MBG. Project stakeholders (e.g., law enforcement, fire) may also benefit from understanding the process and timeline, as well as providing input during the selection and design phases of the project.

For the specific pilot project, this Implementation Plan is written for a narrow audience – those jurisdictions who oversee and manage incident response and maintenance in the area surrounding the Northeast Mixmaster.

For the broader intent of this document – to provide guidance to future infrastructure enhancement projects and the overall process – the audience includes all jurisdictions within the Des Moines Metropolitan Area ICM Program and the future Technical Committee which will oversee the process

## Median Barrier Gates

Description	<p>Median barrier gates are breaks in the solid concrete or cable median barrier that are secured when not in use to prevent unauthorized access. Median barrier gates are intended to be easy to operate without the use of specialized tools or equipment, and located in areas where access is difficult and incidents are likely to occur. The two types of barrier gates are:</p> <ul style="list-style-type: none"> <li>• Type B – Sliding</li> <li>• Type C - Raising</li> </ul>	
Lead Agency	<ul style="list-style-type: none"> <li>• Iowa DOT</li> </ul>	
Location	<ul style="list-style-type: none"> <li>• I-80 from exit 110 to exit 143</li> <li>• I-35 from exit 68 to exit 94</li> <li>• I-235</li> </ul> <p>See Figure 1</p> <p>Pilot – Northeast Mixmaster</p>	
Technology & Infrastructure Elements	<ul style="list-style-type: none"> <li>• Type B - Manual or Powered</li> <li>• Type C - Electric Only</li> </ul>	
Operational Responsibilities	<p>The operation on median barrier gates would be the responsibility of the following agencies as documented in the strategy Concept of Operations:</p> <ul style="list-style-type: none"> <li>• Law enforcement</li> <li>• Fire / EMS</li> <li>• DOT Maintenance</li> </ul> <p>Con Ops available - <a href="https://iowadot.gov/desmoinesicm/pdf/IADOT_DSMICM_Median%20Barrier_Project%20Con%20Ops_w_Appendix_073119_FINAL_.pdf">https://iowadot.gov/desmoinesicm/pdf/IADOT_DSMICM_Median%20Barrier_Project%20Con%20Ops_w_Appendix_073119_FINAL_.pdf</a></p>	
Funding Needs	<ul style="list-style-type: none"> <li>• <b>State Transportation Funding for installation – Up to \$450,000 budget requested FY22.</b></li> <li>• <b>Outside services budget – Up to \$75,000 budget requested for FY21</b></li> <li>• <b>District 1 Maintenance and Operations budget – Up to \$10,000 per year FY22 and beyond</b></li> </ul>	

ROM Cost Estimate Rough order magnitude	Planning & Design	Implementation (Equipment + Installation)	O&M (annual)	Total (10 Year Cost)
	\$55,000 - \$70,000 for initial gate (Subsequent gates developed at \$45,000 to \$60,000 )	Type B - \$200,000 (manual) to \$280,000 (powered) + \$30,000 electrical service  Type C - \$350,000 to \$375,000 + \$30,000 electrical service	\$5,000-\$10,000	TBD
Funding Opportunities	<ul style="list-style-type: none"> <li>N/A</li> </ul>			
Project Dependencies	<ul style="list-style-type: none"> <li>Type C requires FHWA approval</li> </ul>			
Required Agreements	<ul style="list-style-type: none"> <li>None</li> </ul>			
Other/Notes	<p>Type B - Does not encroach into traffic space. Deployments have been primarily powered option. Opens quicker than swing gate. Winter conditions have led to inoperability and repairs in other areas. Is not used during the winter.</p> <p>Type C - Does not encroach on mainline or shoulder. Work similar to railroad crossing gate, opens quicker than swing or slide gate (&gt; 1 minute). No FHWA approval yet but approved for use in Asia and Europe. No current US deployments.</p>			

## APPENDIX A – GATE TYPES

### GATE TYPE A SWINGING (FULLY REMOVABLE)

#### Product Names

- Vulcan <https://trinityhighway.com/product/vulcan-gate/>
- Armorguard <http://www.barriersystemsinc.com/armorguard-gate>
- BarrierGuard <https://thomasbarriers.com/steel-barriers/barrierguard/barrierguard-800-gate/>

#### U.S. Installation Locations (Partial List)

- Iowa (Council Bluffs)
- Michigan
- Wisconsin

#### Positives

- Lowest cost
- Manual or powered option

#### Negatives

- Not used by other DOTs during the winter
- Manual models take 2-5 minutes for one person to open
- Opened gate blocks shoulder and may impact travel lanes

#### Contacts

- Trinity Highway- Blake Bazzart
- Armorguard (Lindsay)- Lyn English
- Barrierguard- US Reflector or Thomas Barriers





## GATE TYPE B- SLIDING

### Product Name

- BarrierGate <https://trinityhighway.com/product/barriergate/>

### U.S. Installation Locations (Partial List)

- Michigan
- North Dakota
- Georgia

### Positives

- Does not impact shoulder or travel lanes
- Mid-level cost when compared to other gate types
- Manual or powered option

### Negatives

- Snow and ice build-up caused damage to motor, no longer use during the winter.
- Concern with longevity, corrosion after 1-2 years.

### Contacts

- Trinity Highway- Blake Bazzart
- Michigan DOT- Carlos Torres



## GATE TYPE C- RAISING

### Product Name

- CADO <https://emergencybarrier.com/products/9-meter-hydraulic-operated-cado-guide-rail/>

### U.S. Installation Locations

- None

### Positives

- Does not impact shoulder or travel lanes when open
- Fast open and close (> 1 minute)
- Can open from within vehicle
- Vertical path does not have the same snow and ice issues as swing and slide gates

### Negatives

- Most expensive gate type
- No manual option, requires electrical installation
- Not crash tested in U.S. (manufacturer indicated they will do this), crash tested in Asia/Europe
- No U.S. installations to compare

### Contact

- Traffic Tech- Jim Morris



## GATE TYPE D- LOWERING

### Product Name

- Cumberland Median Responder Gate (MRG) <https://www.cumberlandbarrier.com/median-responder-gate-mrg/>

### U.S. Installation Locations

- None- New company, no commercial installations anywhere

### Positives

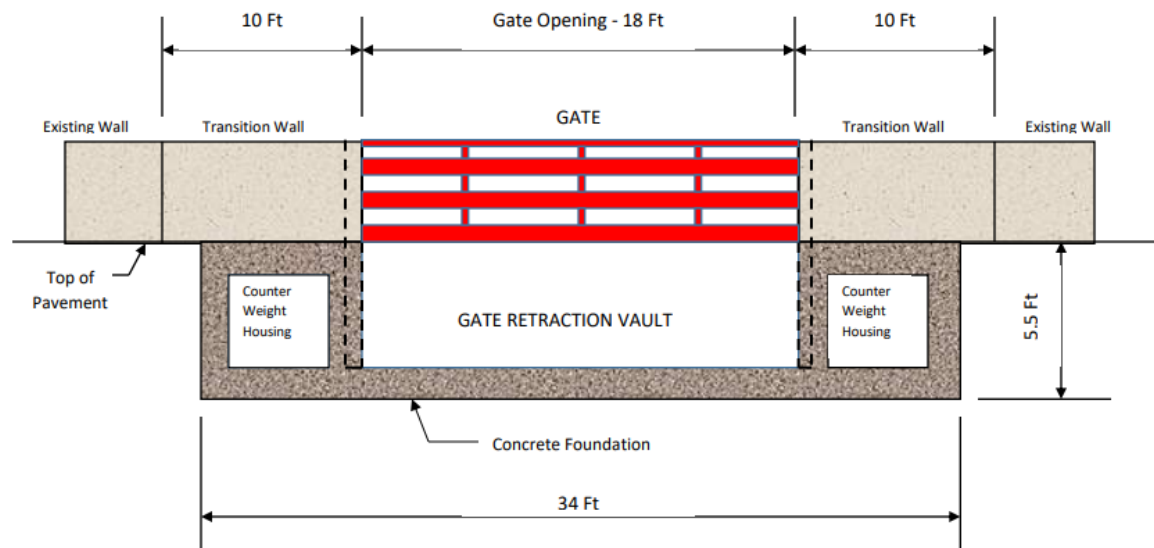
- Can be powered with solar
- Does not impact shoulder or travel lanes when open
- Innovative design

### Negatives

- Extensive construction required
- Unproven technology
- Gate retraction vault requires drainage
- Gate retraction vault presents many maintenance issues

### Contact

- Cumberland- Gary Miracle



RESPONDER GATE – ELEVATION VIEW