Alternative Intersections & GDOT’s ICE Policy

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GDOT Office of Traffic Operations

Overview

❖ Alternative Intersections
  • Types
  • Benefits & Applicability
  • Examples
❖ GDOT’s ICE Policy
  • Policy & Process
  • Tools
Intersection Control Types

- Minor Stop / Two-Way Stop Control
- All-Way Stop Control
- Signalized Intersection
  - Roundabout
  - RCUT
  - MUT
  - RIRO
  - Jug Handle
  - Quadrant Roadway
  - Continuous Green T
  - Displaced Left Turn (DLT, CFI)
  - Innovative Interchanges (SPUI, DDI, roundabouts)

Roundabouts

- Circulatory roadway
  - Slow Speed
  - Entry Deflection
- Central island
  - Truck Apron
  - Landscaping
- Splitter islands
  - Pedestrian refuge
- Yield on approaches
- Mini, Single-Lane or Multi-Lane
Roundabouts

Circulatory roadway

NOTE
A roundabout is NOT A
• Rotary
• Traffic Circle

Yield on approaches
Mini, Single-Lane or Multi-Lane

SR 18 at SR 87, Monroe County, GA
Benefits

- Can improve safety
  - Vehicle
  - Pedestrian/Bicyclists
- Can improve operations
  - Higher capacity, less delay
- Can reduce footprint

<table>
<thead>
<tr>
<th>Traffic Control Prior to RBT</th>
<th>% Reduction in Injury Crashes</th>
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<tbody>
<tr>
<td>Signalized</td>
<td>78</td>
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<tr>
<td>All-Way Stop</td>
<td>46</td>
</tr>
<tr>
<td>Two-Way Stop</td>
<td>82</td>
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NCHRP 572, Exhibit 5-15

- Chance of pedestrian death if hit by a motor vehicle

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Chance of Death</th>
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<tbody>
<tr>
<td>20</td>
<td>5%</td>
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<tr>
<td>30</td>
<td>40%</td>
</tr>
<tr>
<td>40</td>
<td>80%</td>
</tr>
<tr>
<td>50</td>
<td>100%</td>
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</table>

NCHRP 572, Table 28

Benefits

- Can improve safety
  - Vehicle
  - Pedestrian/Bicyclists
- Can improve operations
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- Can reduce footprint

32 Total
8 Merging
8 Diverging
20 Crossing

8 Total
4 Merging
4 Diverging
0 Crossing
Status in GA

- 50+ On state routes/built with GDOT $$
  - 35+ single lane/compact
  - 5+ multi-lane/hybrid
  - 10+ mini
- 20+ under construction
- 65+ in design
- 165+ On local roads
- 250+ Other circular intersections

Right-in Right-out (RIRO) with Downstream U-Turns

- No left turns or through movements from side street
- Make right turn then U-turn instead
- No left turns into side street, also use U-turn

Benefits
- Improved safety
- Reduces queueing on side street
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**Benefits**
- Improved safety
- Reduces queueing on side street

Reduced Conflict U-Turn (RCUT)

- Prevents left turns and through movements from side street
- Make right turn and use U-turn instead
- Allows left turns into side street
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[Diagram showing Reduced Conflict U-Turn (RCUT)]

[Image of Reduced Conflict U-Turn (RCUT)]

FHWA: https://safety.fhwa.dot.gov/intersection/innovative/uturn/
Benefits

- Improved safety over TWSC
- Reduces queueing on side street
- Often easy retrofit - cheaper
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Status in GA

- 35+ Existing
- 15+ Design/under construction
- 25+ Under consideration
  - 1 signalized

Total: 70+

Median U-Turn (MUT)

- No left turns, only throughs and right turns
- Make right then use U-turn
- U-turns signalized/unsignalized
Median U-Turn (MUT)

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- Make right then use U-turn
- U-turns signalized/unsignalized

[Diagram of Median U-Turn (MUT)]

FHWA: https://safety.fhwa.dot.gov/intersection/innovative/uturn/
Benefits

- Improved safety over traffic signal & AWSC
- Reduced signal phases
- Good alternative with existing wide medians
- Easily used in corridor with other alt. intersections
  - Roundabouts
  - RCUTs
  - RIRO
High-T/Continuous Green-T

- “Top” through movement separated from other, operates continuously
- Channelized left turn from side street

**Benefits & Applicability**

- Good alternative when high through volumes in one particular direction
- Relatively easy conversion with existing wide median
**Quadrant Roadway**

- No direct left turns at main intersection
- All left turns rerouted to connector, quadrant roadway
- Both junctions of connector road typically signalized
- All signals coordinated

**Benefits & Applicability**

- Good where there are heavy through volumes
- Reduces delay at severely congested intersections
- Simple two phase signal at main intersection
- More appropriate as a spot treatment
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Continuous Flow Intersection (CFI)

- Left turning traffic crosses opposing lanes in advance of main intersection at a signalized cross-over intersection
  - Displaced Left Turn (DLT)
- Left turns at same time as through movements
- Can have varying # of displaced left turns
Benefits

- Reduced # signal phases
- Good alternative on high volume roadways
- Improved safety over conventional traffic signal

Exhibit 4-2. Conflict point diagram for conventional intersection
Exhibit 4-3. Conflict diagram for CFI on one street
Exhibit 4-4. Conflict diagram for CFI on all streets

Status in GA

- 1 Existing
- 1 Design/under construction
- 4 Under consideration

Total: 6
**Diverging Diamond Interchange (DDI)**

- Vehicles shifted to left side of road
- Allows free flow lefts on to freeway
- Allows partial free flow lefts off of freeway

[Diagram of Diverging Diamond Interchange](Gwinnet County website)

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Images:

1. [Image of Diverging Diamond Interchange](Gwinnet County website)
Benefits

- Especially good where left turning volume high
- Reduce # signal phases
- Improved safety over conventional interchange
- Viable alternative to bridge widening for capacity increase
Status in GA

- 6 Existing
- 2 Design/under construction
- 10+ Under consideration

Total: 17+
Single-Point Urban Interchange (SPUI)

- One signalized intersection
- Left turns onto freeway can be simultaneous
Benefits

• Simpler sequence phasing for signal
• Increased capacity
• Easier to coordinate with upstream/downstream signals
• Requires less right-of way than conventional diamond interchange, DDI or roundabout interchange
GDOT Mission Statement

Deliver a transportation system focused on **innovation, safety, sustainability** and mobility

**Why ICE??**

Integrate safety into our decision making process for intersection control on **ALL** projects
Why ICE??

Integrate safety into our decision making process for intersection control on **ALL** projects

75% of all crashes in GA are intersection related

Fatalities on Georgia Roads

Purpose of ICE

The purpose of ICE is to provide:

- Traceability
- Transparency
- Consistency
- Accountability
Intersection Control Policy
Before ICE

- **GDOT Design Policy Manual**
  - Ch. 7 Design Policy Manual: At Grade Intersections
  - Ch. 8 Design Policy Manual: Roundabouts

- **MUTCD**

ICE Policy Timeline

- **June 2013**: GDOT approached FHWA about ICE
- **September 2015**: Meeting with Chief Engineer
- **June 2016**: Attended Peer Exchange in Matteson Illinois
- **June 2017**: Chief Engineer Signs Memo Announcing ICE Policy
- **January 2015**: ICE Peer Exchange Webinar
- **December 2015**: Formed Working Group and Advisory Group
- **May 2017**: Meeting with Commissioner and Chief Engineer
- **July 2017**: Ice Policy effective date
Ice Policies in the United States

Policy & Process

ICE is a policy and a process

Establishes the general applicability and future effect; sets forth a course of action, plan or procedure.

Describes the framework and methodologies by which a Policy can be successfully implemented.
Intersection Control Evaluation

THE POLICY

Location and format

http://www.dot.ga.gov/

Scroll to bottom of the page
Requirements & Waiver

<table>
<thead>
<tr>
<th>Not Required</th>
<th>Required</th>
<th>Waiver</th>
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<tbody>
<tr>
<td>No changes to intersection footprint or control</td>
<td>Project is on State route/NHS and/or uses State or Federal money</td>
<td>ICE <em>may</em> be waived based on appropriate evidence and a written request</td>
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</tbody>
</table>

Not Required

A project that will not do any widening, where there is no change to intersection geometry or control. Examples include:

– Resurfacing
– Signal timing and maintenance.
– Signal Permit revision w/ no changes to physical footprint of intersection
– Sidewalk/streetscape improvements
– bridge replacement (with no realignment or relocation of intersection)
Not Required: Driveway Permits

For driveway permits, where the driveway is not a new leg to an already existing intersection, that satisfy either of the following criteria:

1. The driveway is along a divided, multilane roadway where the access will be limited to a closed median (no median opening) with only right-in/right-out access
2. The driveway is along an undivided roadway and the development will not be required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer)

Waiver Eligible

In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request.

- Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s)
- The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably;
- The intersection is along an undivided, two-lane roadway that will not be widened and:
  - Low risk in terms of exposure (less than 1,000 vehicles entering per day).
  - Latest 5 years of crash history is not indicative of a crash problem
  - No undesirable geometric features
  - Proposed changes will not adversely affect safety
Approvals

**Level 1:** Chief Engineer (or Designee)
- Projects going through Plan Development Process
- New or revised signal permits
- New median openings

**Level 2:** District Engineer with notification to Chief Engineer
Projects that are not level 1 where:
- Leg is added to intersection
- Intersection control will be changed

**Level 3:** District Engineer
- QR, Driveway Permits, Maintenance Work that does not qualify as level 2

Implementation

- ICE is required for all projects that do not have concept approval by [July 1, 2017](July_1_2017)
- If ICE would delay the concept report submittal for any projects that have schedules set by July 1, 2017, ICE may be completed during the preliminary design phase
- Submittals during preliminary design must occur no later than 1/3 of the way through the time allotted for preliminary design
THE PROCESS

Intersection Control Evaluation

Stage 1
Screening

Screening effort to eliminate non-competitive options and identify alternatives for further consideration

Stage 2
Alternative Selection

Detailed evaluation of the alternatives identified in Stage 1 in order to support the selection of the preferred alternative that will be advanced to detailed design

ICE

ICE – The Process
Stage 1 - Screening

Unsignalized
- Minor Stop
- All-Way Stop
- Mini Roundabout
- Single Lane Roundabout
- Multilane Roundabout
- RCUT
- RIRO w/Downstream U-Turn
- High-T (unsignalized)
- Offset-T Intersections
- Diamond Interchange (Stop)
- Diamond Interchange (RAB)
- Turn Lane Improvements
- Other

Stage 1 - Screening

Signalized
- Signal
- Median U-Turn
- RCUT
- Displaced Left Turn (CFI)
- Continuous Green-T
- Jughandle
- Diamond Interchange (signal)
- Quadrant Roadway
- Diverging Diamond
- Single Point Interchange
- Turn Lane Improvements
- Other
Stage 1 - Screening

1. Does alternative address the project need in a balanced manner and in scale with the project?
2. Does alternative improve safety performance in terms of reducing severe crashes?
3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?
4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?
5. Does alternative appear feasible given the site characteristics, constrains and location context?
6. Does alternative appear feasible with respect to other project factors?
7. Overall feasible alternative?
ICE Documentation

Stage 1
- Completed Stage 1: Screening Decision Record
- Single intersection projects may proceed seamlessly to Stage 2
- For corridor projects a Concurrence Memo should be generated and signed (use Multi-File Summary tool)
- Required for Concept Report

Stage 2 - Alternative Selection

Shortlist of Alternatives from Stage 1

- Total Project Cost
- Traffic Operations
- Safety Analysis
- Environmental Impacts
- Stakeholder Posture

Preferred Alternative
ICE Documentation

**Stage 1**
- Completed Stage 1: Screening Decision Record
- Single intersection projects may proceed seamlessly to Stage 2
- For corridor projects a Concurrence Memo should be generated and signed (use Multi-File Summary tool)
- Required for Concept Report

**Stage 2**
- Completed Stage 2: Alternative Selection Decision Record with supporting documentation
- Included in Project Concept Report or as a stand-alone document
- Completed waiver form if the ICE recommended alternative is not selected as the preferred alternative
- Required in Concept for stand alone intersection projects.
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Office</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris Raymond, P.E.</td>
<td>State Traffic Operations Manager</td>
<td>GDOT Office of Traffic Operations</td>
<td>404-635-2809</td>
<td><a href="mailto:cdraymond@dot.ga.gov">cdraymond@dot.ga.gov</a></td>
</tr>
<tr>
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<td>Alternative Intersections Supervisor (RAID Team Supervisor)</td>
<td>GDOT Office of Traffic Operations</td>
<td>404-635-2967</td>
<td><a href="mailto:dtrevorrow@dot.ga.gov">dtrevorrow@dot.ga.gov</a></td>
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