Innovative Intersection Solutions

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**Innovative Intersection Solutions**

- Innovative intersection overview
- Case studies
  - Continuous flow intersection
  - Modern roundabouts
  - “Florida T” intersection
  - Diverging diamond interchange
- Evaluation process
INTERSECTIONS: WHERE ROADS MEET

Connection Points
- Pedestrian activity
- Business activity
- Connectivity

Conflict Points
- Reduced capacity
- Safety concerns
- Access issues
INNOVATIVE INTERSECTION OVERVIEW

• Questions
  ✓ What movement is most dangerous at an intersection?
  ✓ What movement is most stressful for drivers?
  ✓ What movement has greatest impact on pedestrians?
  ✓ What movement requires most additional space at an intersection?
  ✓ What movement impacts progression of traffic the most?
Innovative Intersection Overview

• Questions
  ✓ How many innovative intersection concepts can you find?
INNOVATIVE INTERSECTION OVERVIEW

Why consider innovative intersections?

- Increase capacity
- Increase safety
- Context sensitive
- Reduce left turn conflicts
- Reduce delay
- Reduce impacts
- Reduce cost
- Reduce construction time
- Sustainabilty

“Do More with Less Resources”
**INCREASE CAPACITY**

**Conventional 4-lane roadway**

650 v/l/h x 4 lanes = 2600 v/h  
C=150 PM Peak

**CFI 4-lane roadway**

850 v/l/h x 4 lanes = 3400 v/h  
C=120 PM Peak
**Reduce Delay**

**CFI vs. Conventional Intersections**

- Reduction in average delay
  - ✓ 4-Legged CFI = 48% to 85%
  - ✓ 2-Legged CFI = 58% to 71%
  - ✓ T-Intersection = 19% to 90%

- Up to 95% reduction in number of stops

- Up to 88% reduction in queue lengths
**Increase Safety**

- 32 conflict points versus 8 conflict points
- Reduces crashes
  - ✔ Overall by 39 percent
  - ✔ Injury by 75 percent
  - ✔ Fatalities by > 90 percent
- Increases efficient traffic flow up to 50 percent
Reduce Left Turn Conflicts

- Left turns
  - Involved in many serious crashes
  - Cause conflicts with pedestrians
  - Reduce green time for through vehicles
  - Queues can impede through vehicles
  - Require significant right of way for storage
INNOVATIVE INTERSECTION OPTIONS

• Full grade separated interchanges
  ✓ SPUI
  ✓ Diverging diamond interchange
  ✓ Roundabout interchange

• Grade separated intersection
  ✓ Left turn flyover
  ✓ Echelon

• Major at-grade improvements
  ✓ Continuous flow intersection
  ✓ Roundabouts
  ✓ Florida T
  ✓ Quadrant roadway
  ✓ Access management
  ✓ Median U-Turns

• Minor at-grade improvements
  ✓ Turn lanes
  ✓ Signal timing optimization
  ✓ ITS “smart” intersections
Case Studies

- US 78/ SR 124 continuous flow intersection
- Modern roundabouts
- Union Hill Road “Florida T” intersection
- Bessemer Road diverging diamond interchange
CONTINUOUS FLOW INTERSECTIONS
Citizen Opposition
15 – 20 Years Ago

“...The only reason that road is being built is to move traffic to a commercial zone. It looked that way back when it was first proposed and it still looks the same way.”

Doug Geganto
Task Force Chairman

Citizens march to oppose loop

Angry residents target road plan
Snellville connector foes plan march

Snellville east-west connector put on hold pending ARC study

AJC
9/28/93

Gresham Smith and Partners
State DOT is waiting for city officials to recuperate from their near terminal case of denial and give up their monument-building dream in favor of a more reasonable and financially feasible solution.
• Significant traffic problem
• Unsafe intersection for all modes
• Did not want grade separation
• Previous Efforts
  – Snellville bypass in early 1990’s
  – Traffic circle in early 2000’s
VIABLE ALTERNATIVES

3-Legged CFI

Flyover

Potential Impacts

Norton Road

2-Legged CFI

Turn Lanes

Add CFI to northbound leg of US 78.
Add CFI to southbound leg of US 78.
Add CFI to eastbound leg of US 78.
ALTERNATIVES ANALYSIS SIMULATION
<table>
<thead>
<tr>
<th>Alternative</th>
<th>Improvement Type</th>
<th>CAC</th>
<th>Weighted Criteria</th>
<th>Staff Work Group</th>
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<td>B</td>
<td>Left Turn Flyover</td>
<td>7</td>
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$60 Million less than Grade Separation

CAC Preferred Alternative
Phase 1 CFI

Phase 2 EB bypass
Yes, we need to improve traffic someway.

Yes, I support the proposed project.

I believe it will cut down on accidents and keep traffic moving.

I support the project, very much needed!

I support, looks like a good plan.

Great solution, the only design that will solve the problem.

Great design idea!

Should be a great improvement in traffic flow.
Modern Roundabouts
MODERN ROUNDABOUTS

- Eliminate left turns
- Slow all vehicles down
- Yield on entry
- Douglas & Cobb Counties & Roswell
- Unique Columbiana Roundabout
- I-75/Carbondale Road Roundabout Interchange
ROUNDABOUT IN ROSWELL, GA
ROUNDABOUT IN ROSELLE, GA
ROUNDABOUT IN COLUMBIANA, AL
Roundabout in Columbiana, AL
I-75/CARBONDALE ROAD ROUNDABOUT INTERCHANGE
Florida “T” Intersection
Union Hill Road at Mullinax Road

• Thru traffic issue
  ✓ Need to widen main route
  ✓ High directional volumes
  ✓ Required realigning mainline

• Closely spaced intersections
• Issues with ROW
• Need to reduce delay & stops
Union Hill Road “Florida T”

- Tied closely spaced intersections together
- Reduced impact to adjacent properties
- Accommodate high directional volumes
- Reduces stops and delay
- NOT pedestrian friendly
Union Hill Road “Florida T”
DIVERGING DIAMOND INTERCHANGE
Bessemer Road Interchange
BESSEMER ROAD DIVERGING DIAMOND INTERCHANGE

- TDOT Request – Study Dual Roundabout as an alternative
- DDI selected as Preferred Alternative
  - High Level of Service
  - Lower Cost
  - Increase Safety
  - Shorter Construction Schedule
**Bessemer Road Diverging Diamond Interchange**

- Need to improve existing diamond interchange
- Left/through vehicles cross over before interchange
- Can be constructed in existing right of way
- No new bridge structures required
- Increased capacity
- Accommodate heavy left turns
Bessemer Road Diverging Diamond Interchange
BESSEMER ROAD DIVERGING DIAMOND INTERCHANGE
Bessemer Road Diverging Diamond Interchange
EVALUATION PROCESS

• Identify candidate locations
  ✓ Citizen, public official and staff input
  ✓ Prepare a needs assessment
• Identify range of potential solutions
• Evaluate range of potential solutions
  ✓ Environmental and historic property impacts
  ✓ Right of way constraints
  ✓ Geometric constraints
  ✓ System constraints
  ✓ Cost of right of way and construction
  ✓ Stakeholder input
• Receive public input
SUMMARY

• Thanks for joining us today

• We have a lot of tools in our tool box

• People seem to be willing to think outside the box
  ✓ Save Cost
  ✓ Be more sustainable
  ✓ Less impact

• As pro’s we need to be creative
QUESTIONS?