

# 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



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# INTERSECTIONS: WHERE ROADS MEET

## Connection Points

- ✓ Pedestrian activity
- ✓ Business activity
- ✓ Connectivity

## Conflict Points

- ✓ Reduced capacity
- ✓ Safety concerns
- ✓ Access issues



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# 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?



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# INNOVATIVE INTERSECTION OVERVIEW

- Questions
  - ✓ How many innovative intersection concepts can you find?



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# 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
- ✓ Sustainability

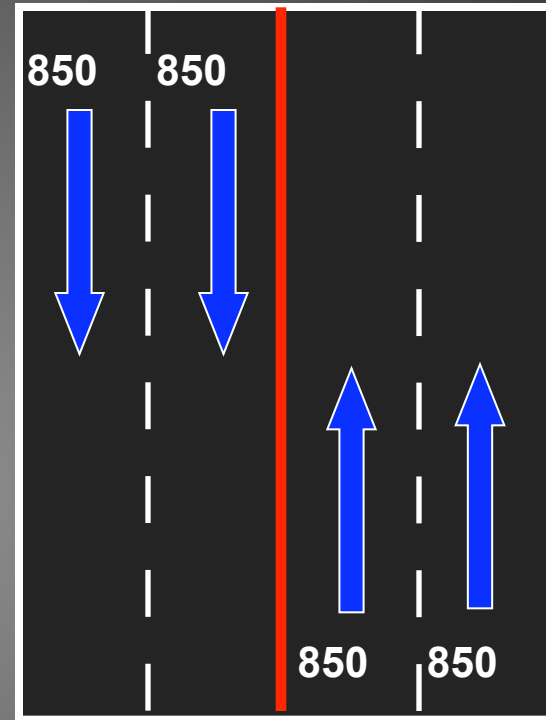
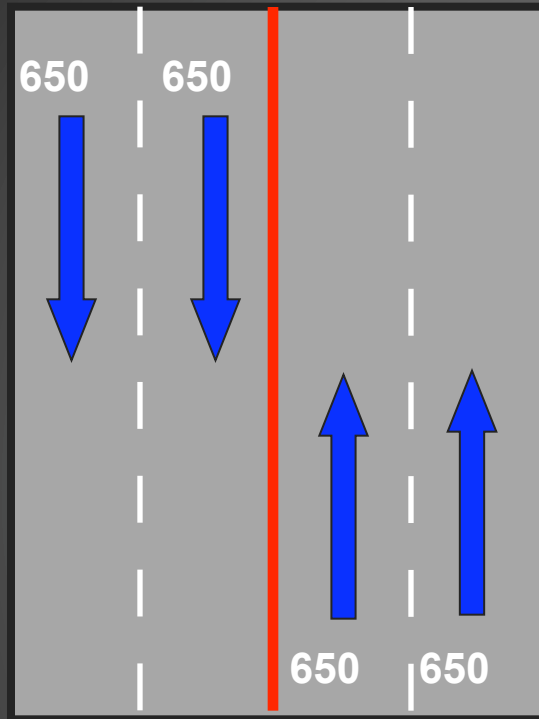


*“Do More with Less Resources”*



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# INCREASE CAPACITY



Conventional 4-lane roadway  
 $650 \text{ v/l/h} \times 4 \text{ lanes} = 2600 \text{ v/h}$   
 $C=150 \text{ PM Peak}$

CFI 4-lane roadway  
 $850 \text{ v/l/h} \times 4 \text{ lanes} = 3400 \text{ v/h}$   
 $C=120 \text{ PM Peak}$



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# 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

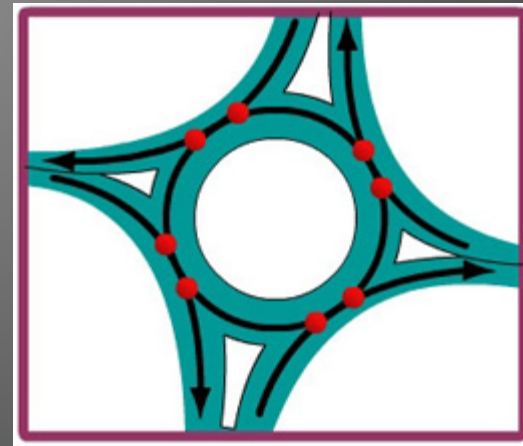
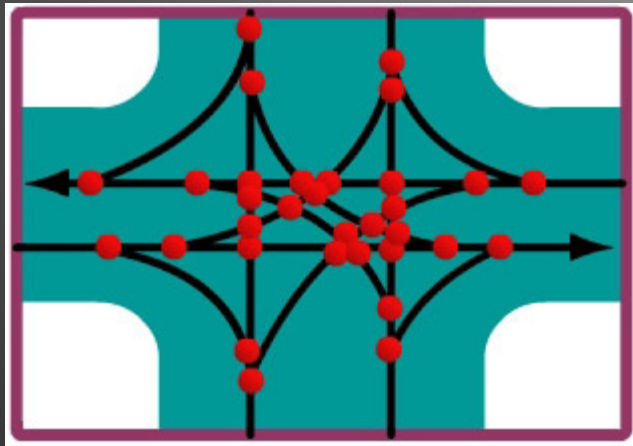


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# INCREASE SAFETY

- 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



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# 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



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# 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



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# CASE STUDIES

- US 78/ SR 124 continuous flow intersection
- Modern roundabouts
- Union Hill Road “Florida T” intersection
- Bessemer Road diverging diamond interchange



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# CONTINUOUS FLOW INTERSECTIONS



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# US 78 at SR 124 Gwinnett County, Georgia



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# 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**

*ARC*  
*9/28/93*  
**Snellville east-west connector put on hold pending ARC study**

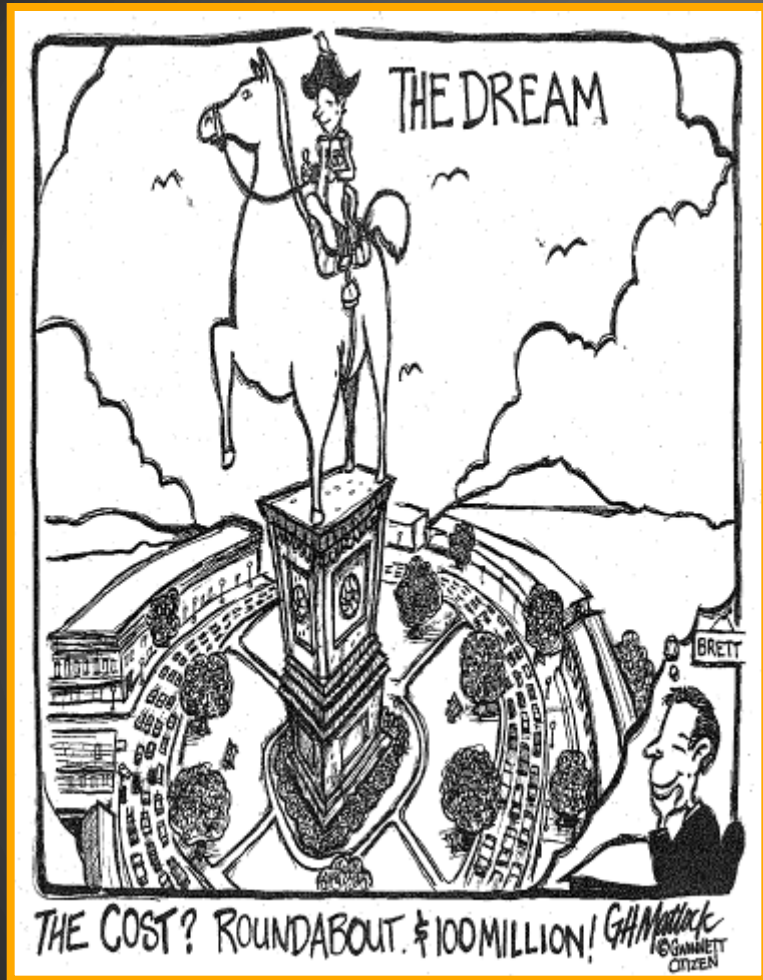
**Angry residents target road plan**  
Snellville connector foes plan march



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# CITIZEN OPPOSITION

7 – 10 YEARS AGO



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.



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## KEY ISSUES

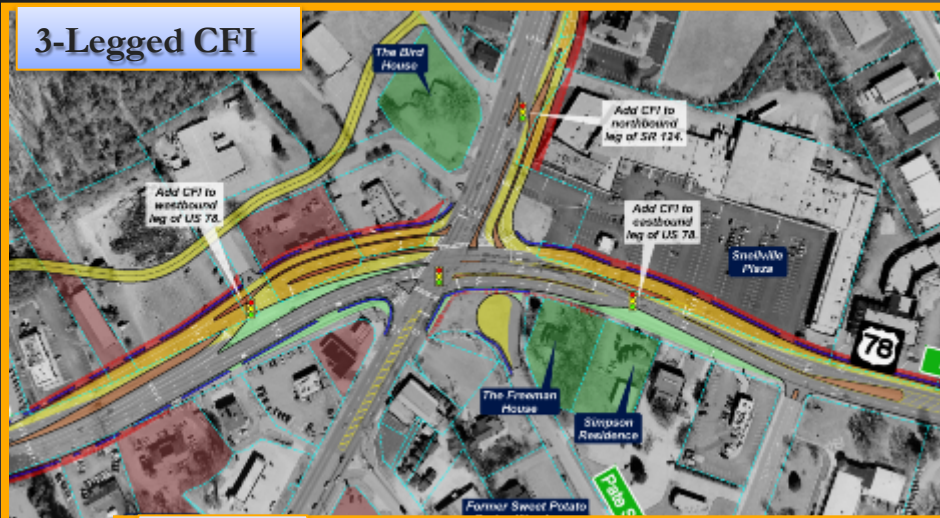
- Significant traffic problem
- Unsafe intersection for all modes
- Did not want grade separation
- Previous Efforts
  - Snellville bypass in early 1990's
  - Traffic circle in early 2000's



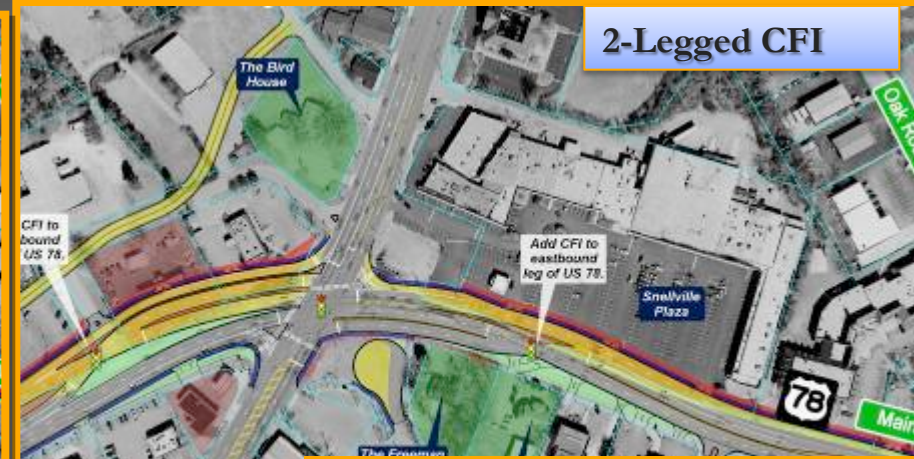
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# VIABLE ALTERNATIVES

### 3-Legged CFI



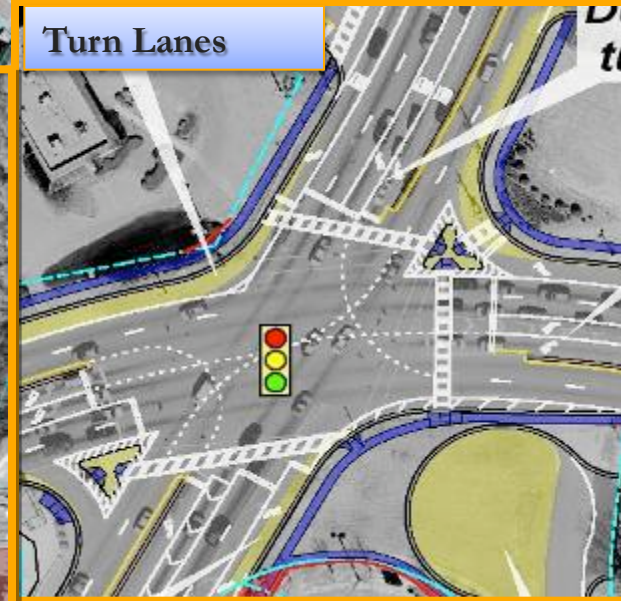
### 2-Legged CFI



### Flyover



### Turn Lanes



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# ALTERNATIVES ANALYSIS SIMULATION



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**\$60 Million  
less than  
Grade  
Separation**

**CAC Preferred  
Alternative**

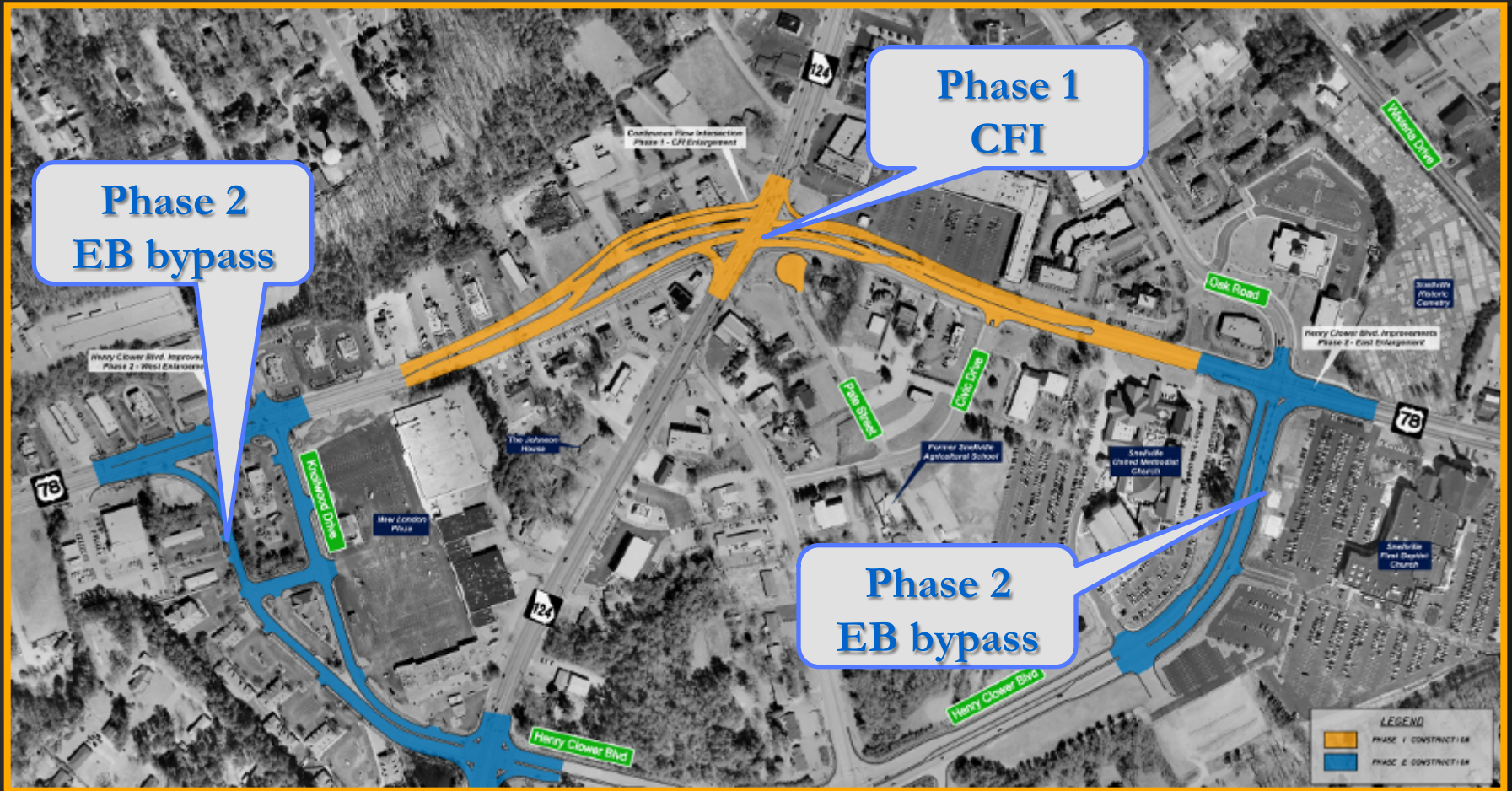
## Rankings - Quantitative Evaluation

Alternative	Improvement Type	Ranking		
		CAC	Weighted Criteria	Staff Work Group
D2	2-legged CFI w/ EB Bypass	1	1	1
D1	2-legged CFI	2	2	2
C	EB Bypass w/ Turn Lanes	3	4	4
E2	3-legged CFI w/ EB Bypass	4	5	3
E1	3-legged CFI	5	6	5
A	Turn Lane Improvements	6	3	6
B	Left Turn Flyover	7	7	7



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# PREFERRED ALTERNATIVE



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# CITIZEN SUPPORT

## TODAY

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!



Great solution, the only design that will solve the problem

Yes, we need to improve traffic somehow

Great design idea!

I support, looks like a good plan.

Should be a great improvement in traffic flow.



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# MODERN ROUNDABOUTS



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# MODERN ROUNDABOUTS

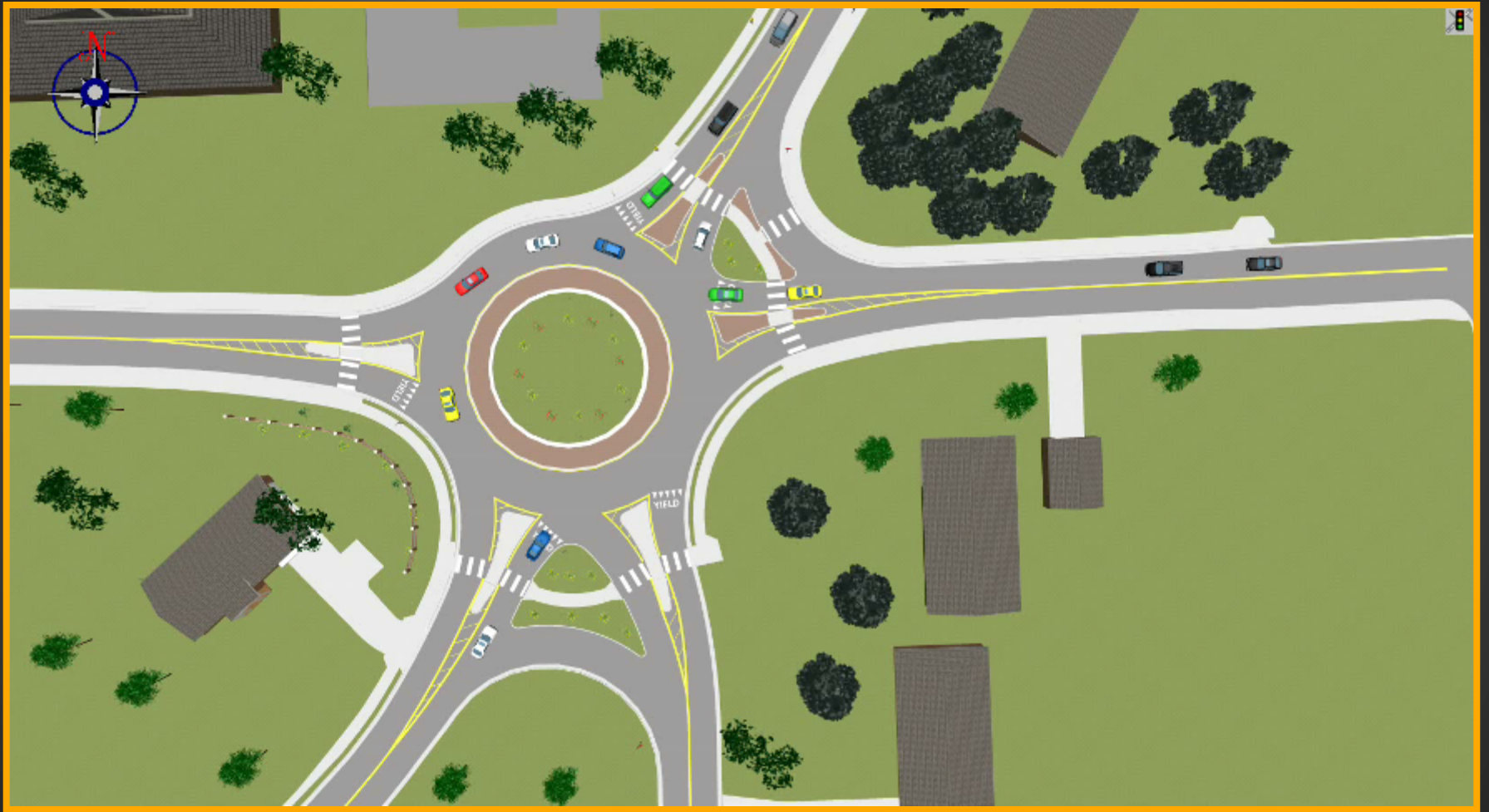
- Eliminate left turns
- Slow all vehicles down
- Yield on entry
- Douglas & Cobb Counties & Roswell
- Unique Columbiana Roundabout
- I-75/Carbondale Road Roundabout Interchange



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# ROUNDBABOUT IN ROSWELL, GA



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# ROUNDBABOUT IN ROSWELL, GA



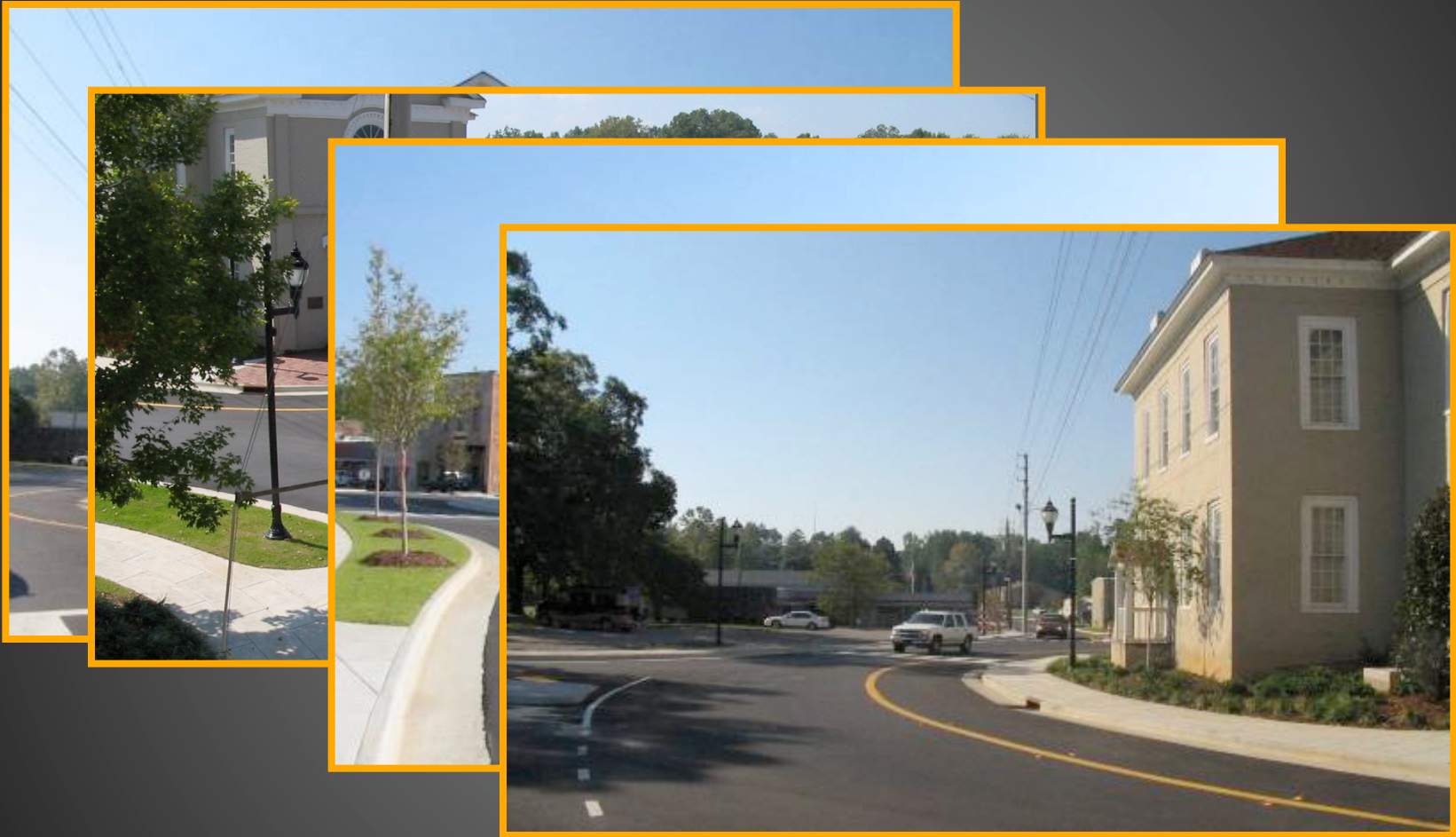
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# ROUNDAABOUT IN COLUMBIANA, AL



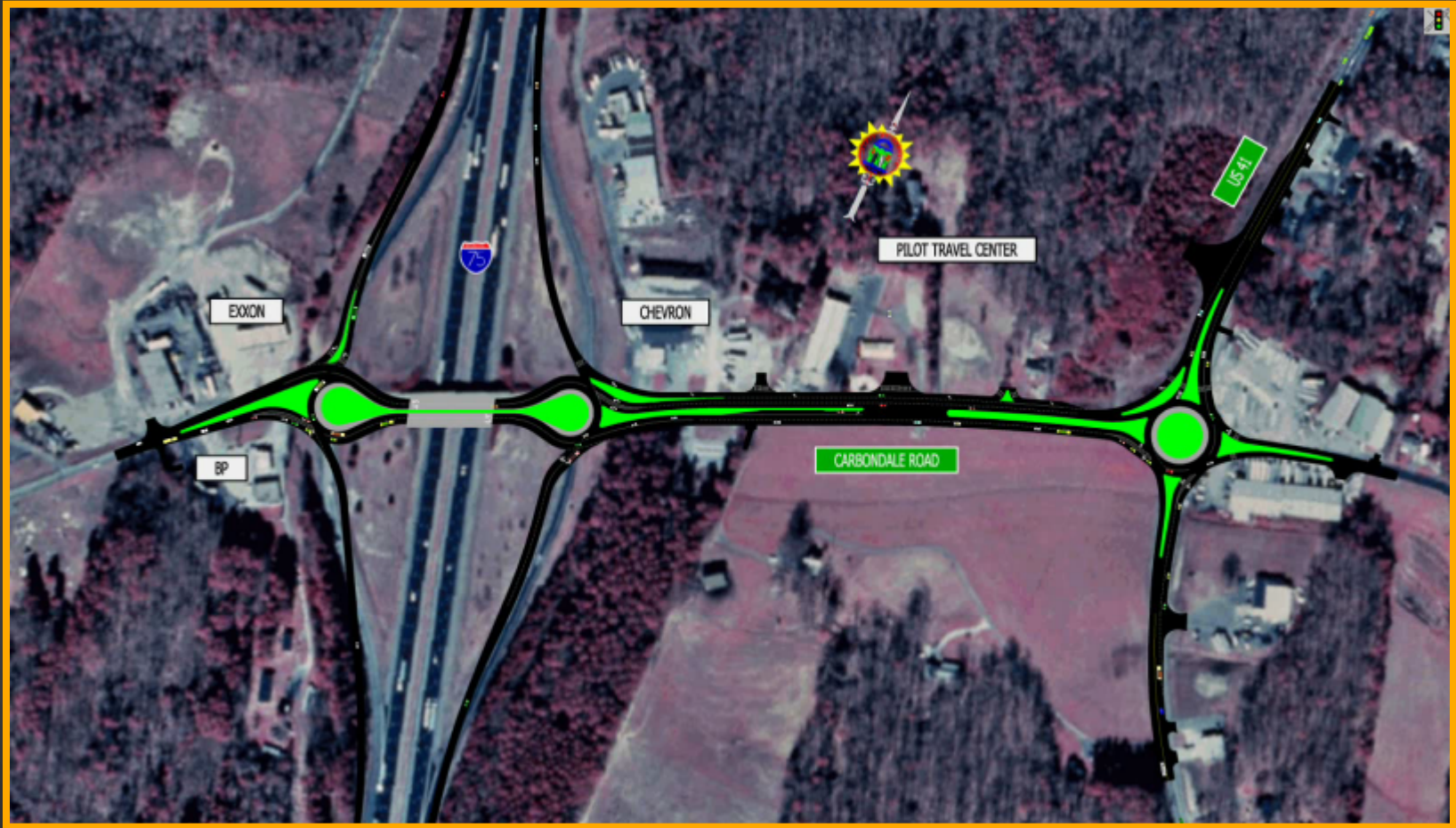
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# ROUNDBABOUT IN COLUMBIANA, AL



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# I-75/CARBONDALE ROAD ROUNDABOUT INTERCHANGE



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# FLORIDA “T” INTERSECTION



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# 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



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# 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



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# UNION HILL ROAD “FLORIDA T”



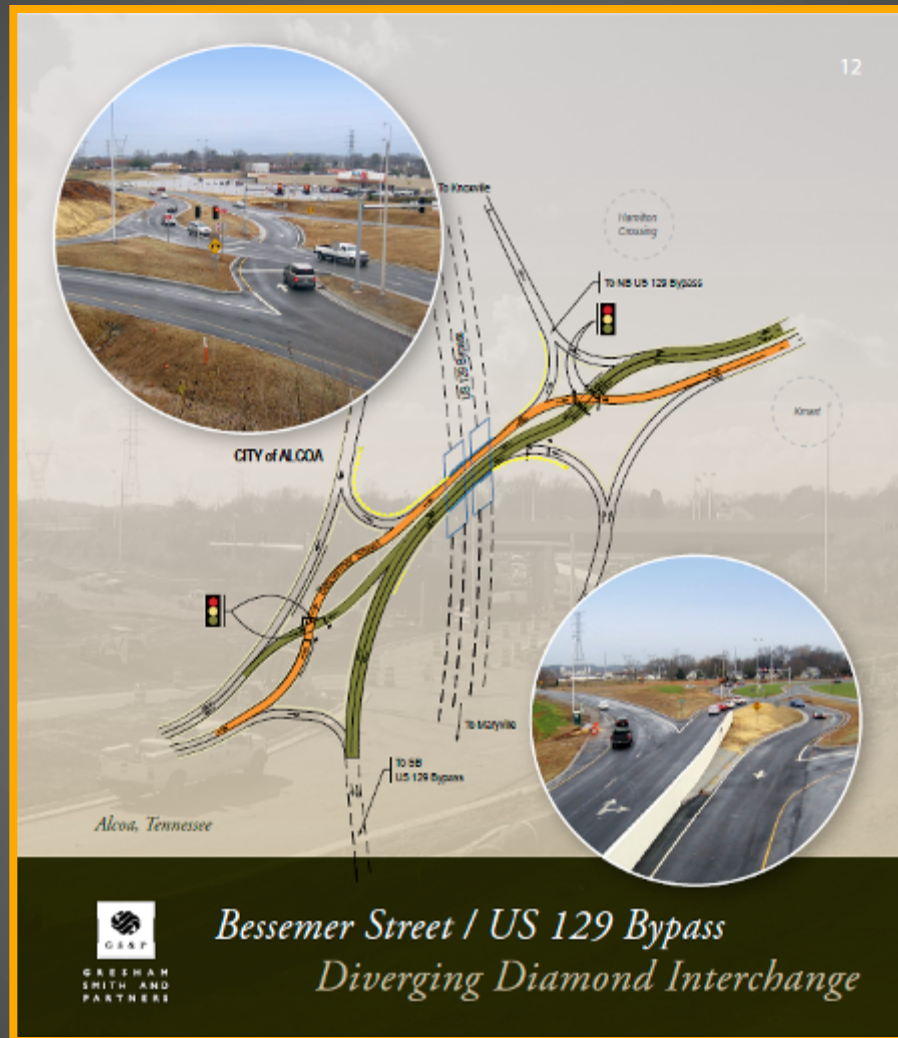
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# DIVERGING DIAMOND INTERCHANGE



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# BESSEMER ROAD INTERCHANGE



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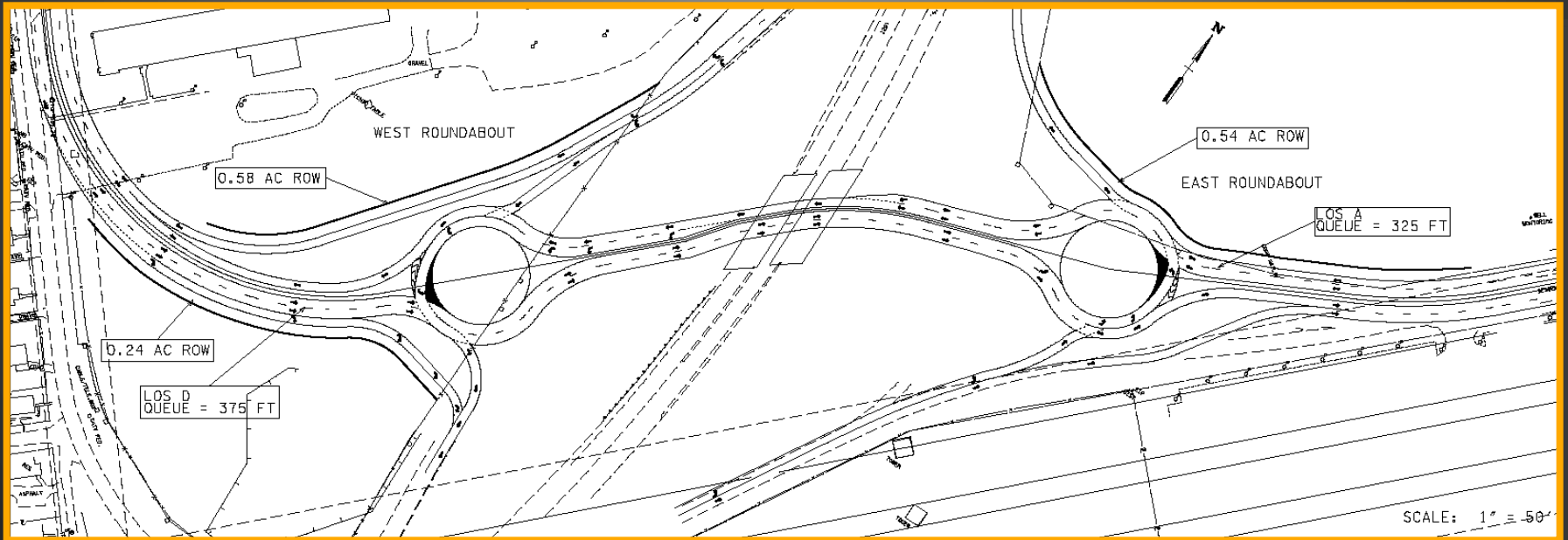
# BESSEMER ROAD INTERCHANGE



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# 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



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# 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



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# BESSEMER ROAD DIVERGING DIAMOND INTERCHANGE



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# BESSEMER ROAD DIVERGING DIAMOND INTERCHANGE



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# BESSEMER ROAD DIVERGING DIAMOND INTERCHANGE



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# 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



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# 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



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# QUESTIONS?



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