



ROUTE 460 CORRIDOR IMPROVEMENTS

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Salem District Engineer

October 22, 2024

Route 460 Corridor Studies – I-581 to Route 220 Alternate

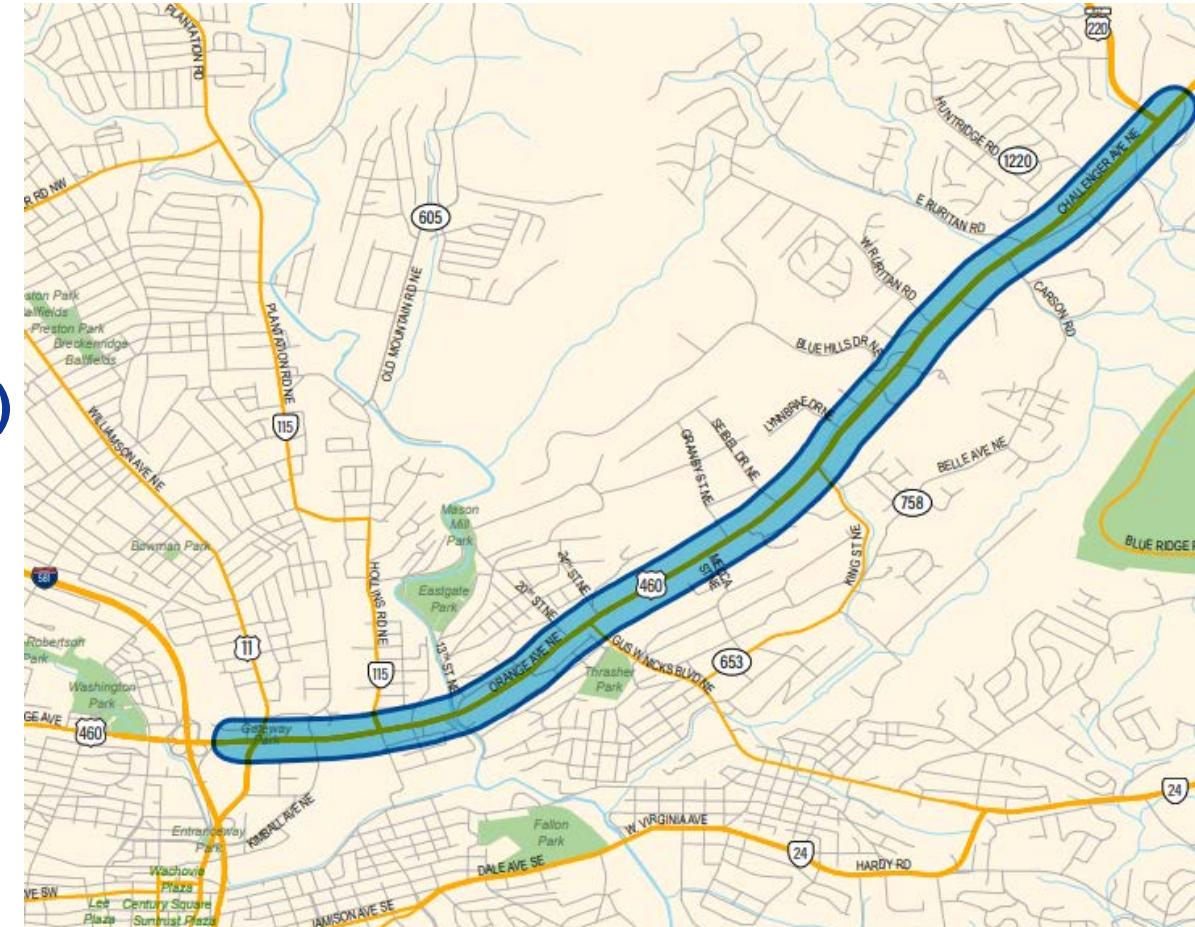
Route 460 Operational Improvement Study (2019-2021)

- Williamson Road (Route 11) to Route 220 Alternate (Cloverdale Road)
- Approximately 4.8 miles
- 36 intersections/median crossovers

Interstate 581 / Orange Avenue Study (2021-2022)

- Interchange ramps and Orange Avenue to Williamson Road
- Operational and safety

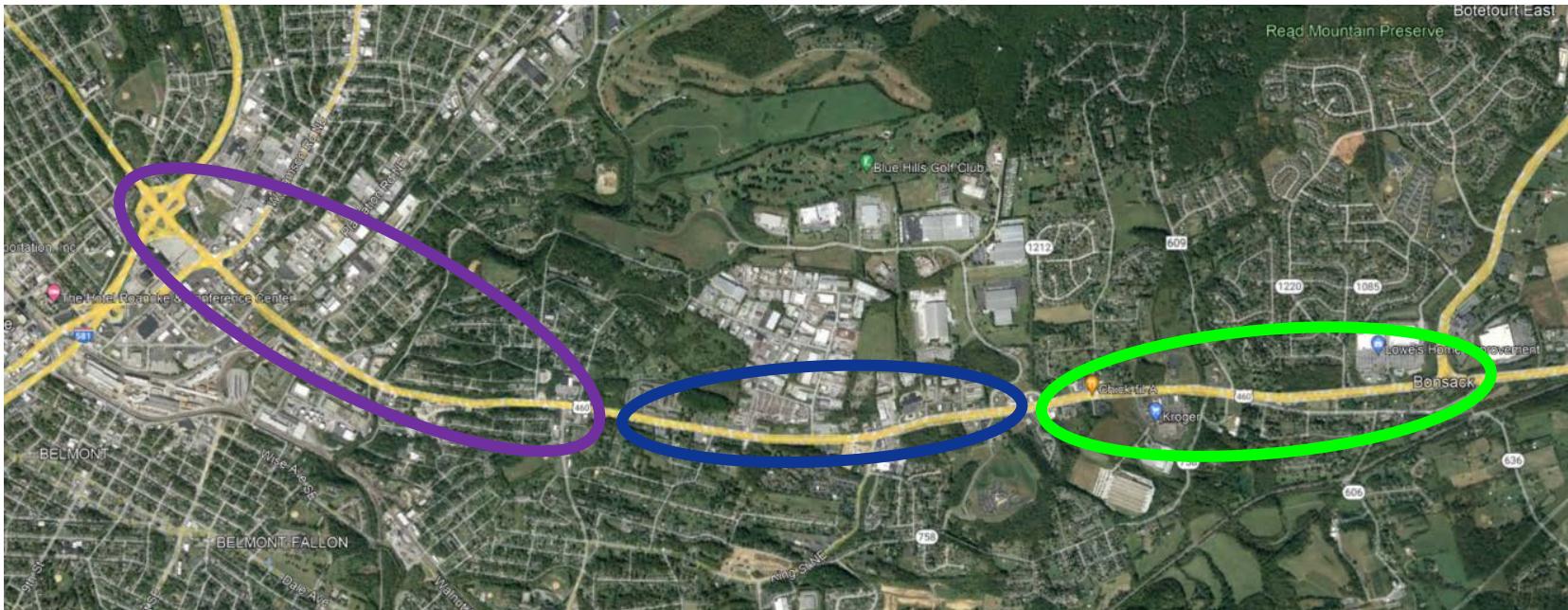
11 projects funded from these studies



Route 460 Improvements – I-581 to Avery Row

Project Delivery:

- Interstate 581 to Gus W. Nicks Boulevard (City of Roanoke)
- Hickory Woods Drive to Blue Hills Village Drive (City of Roanoke)
- West Ruritan Road to Avery Row (Roanoke County)



Route 460 Intersection Improvements – Roanoke County

General Scope

- Crossover and Intersection Improvements from West Ruritan Road to Avery Row
- 1 Thru-cut at West Ruritan Road
- 6 Restricted Crossing U-Turn (RCUT) Intersections
- 1 Displaced Left Turn (DLT) Intersection at Route 220 Alternate

Current Status

- Preliminary Design Underway

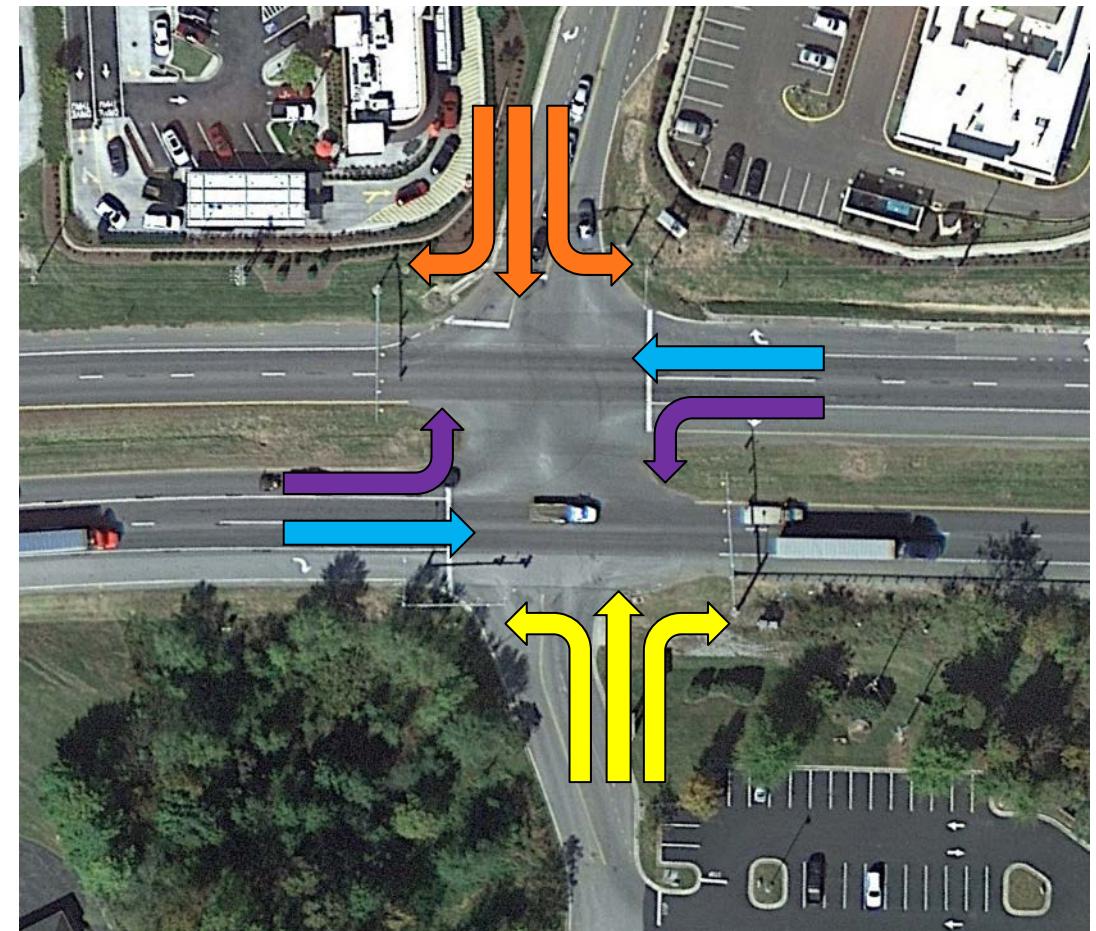
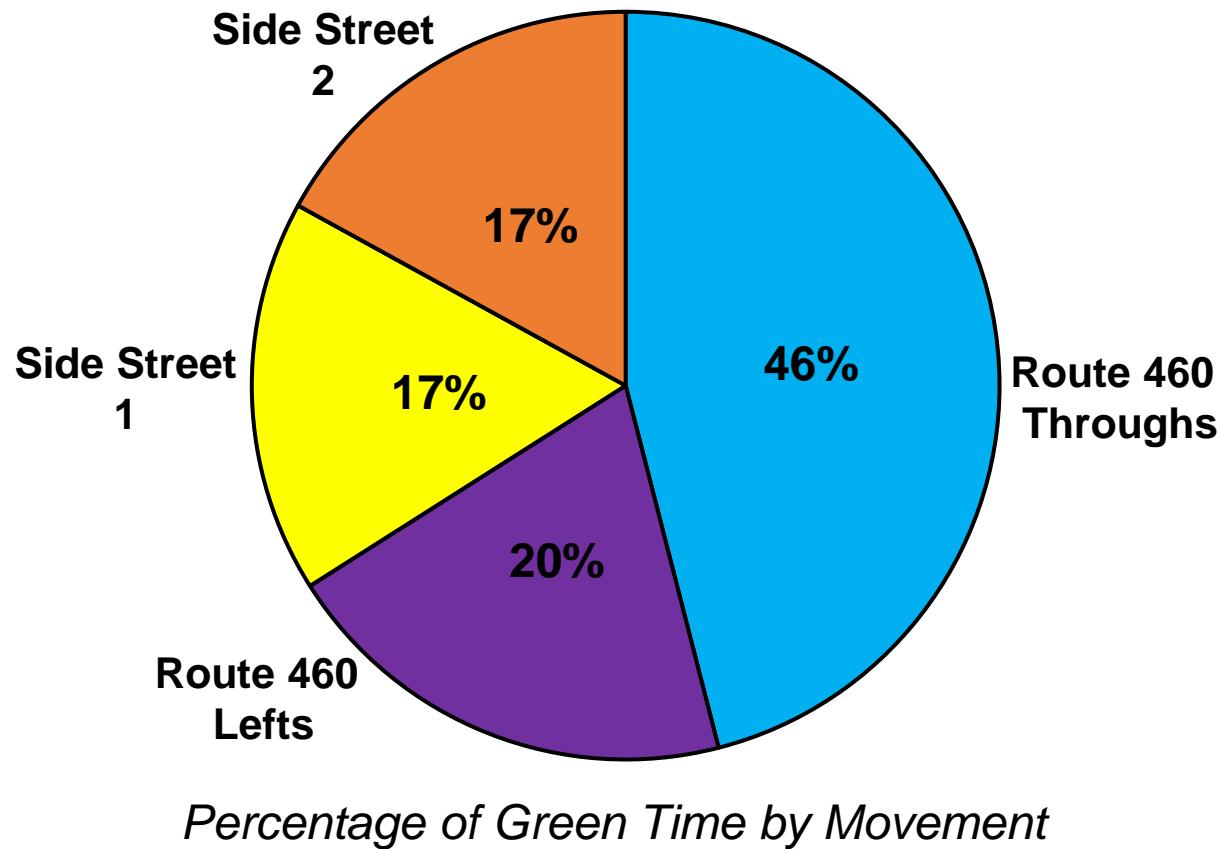
Project Schedule

- Public Hearing Held August 2024
- Construction Expected Summer 2026



Route 460 & West Ruritan Road – Existing Configuration

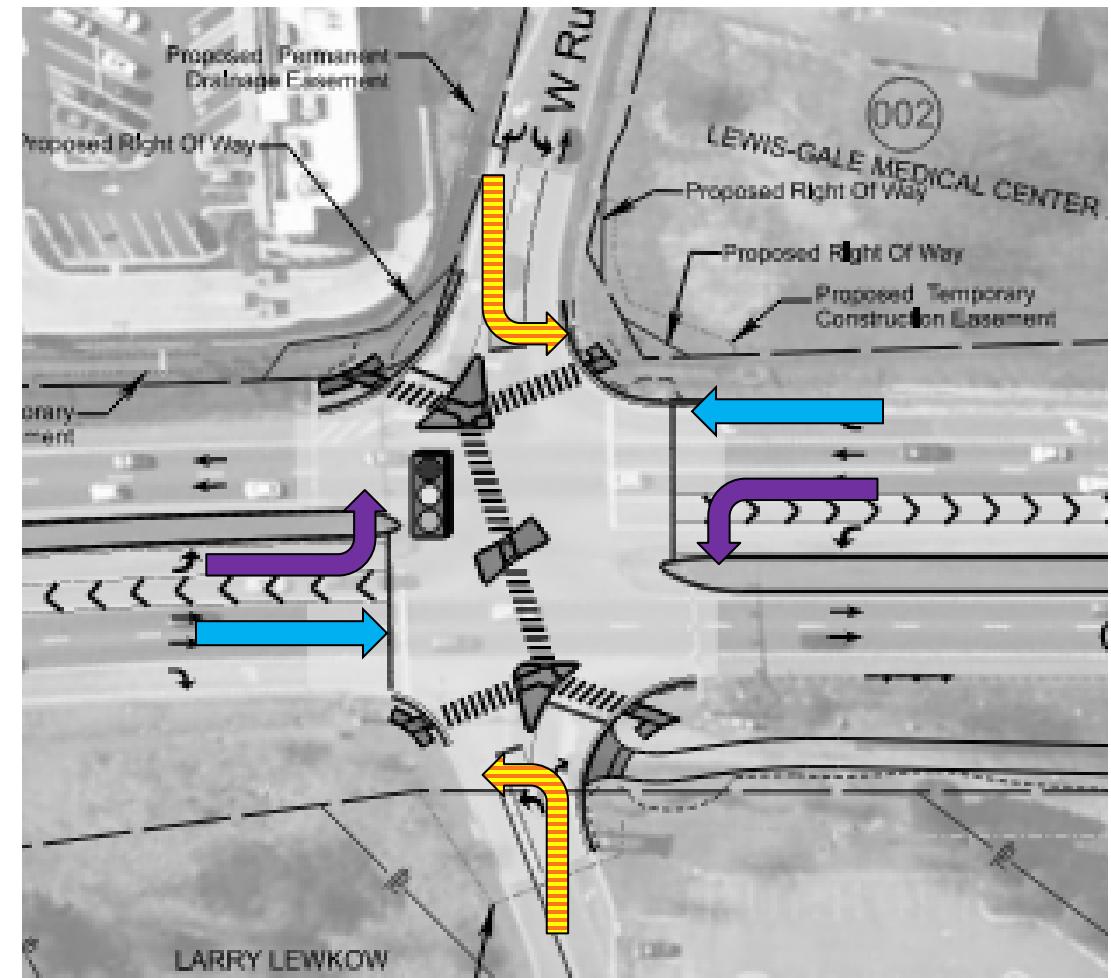
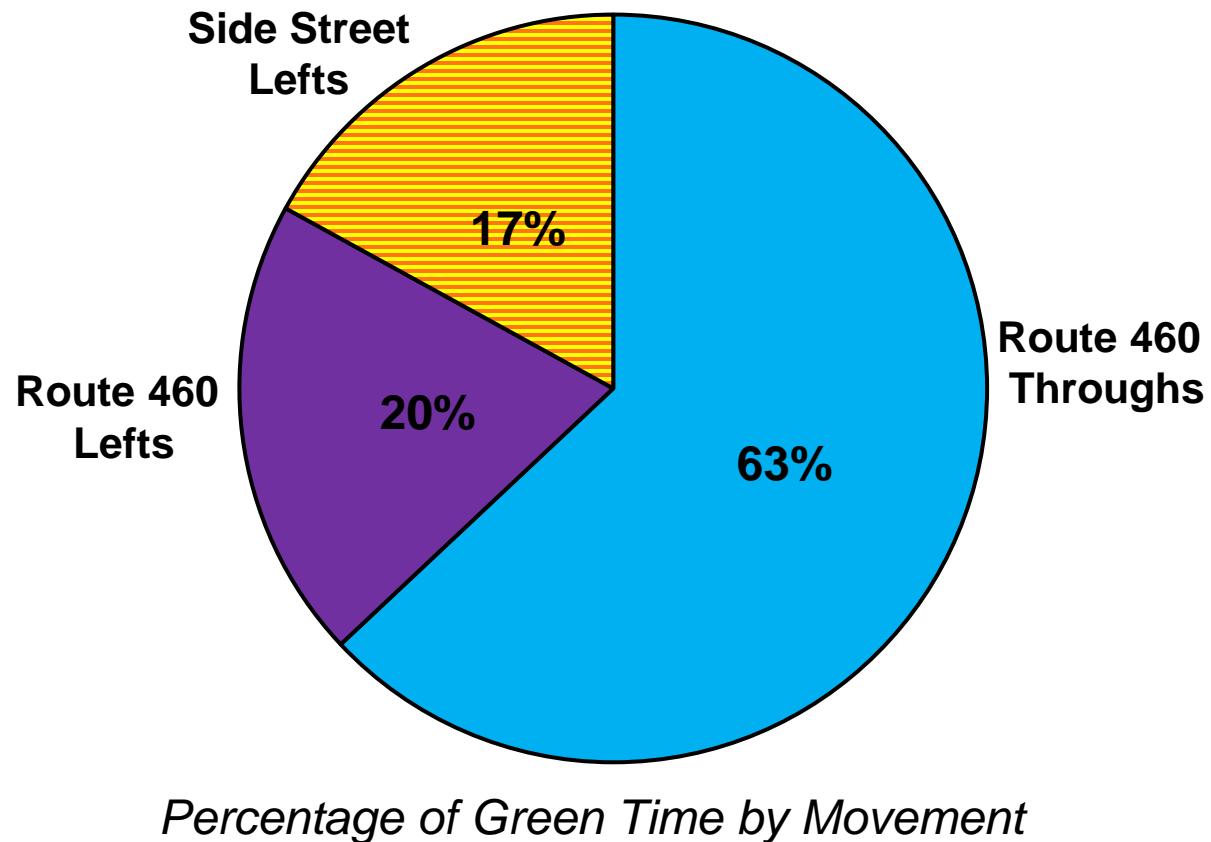
Existing: 4-Phase Operation



Route 460 & West Ruritan Road

Route 460 & West Ruritan Road – Thru-Cut Configuration

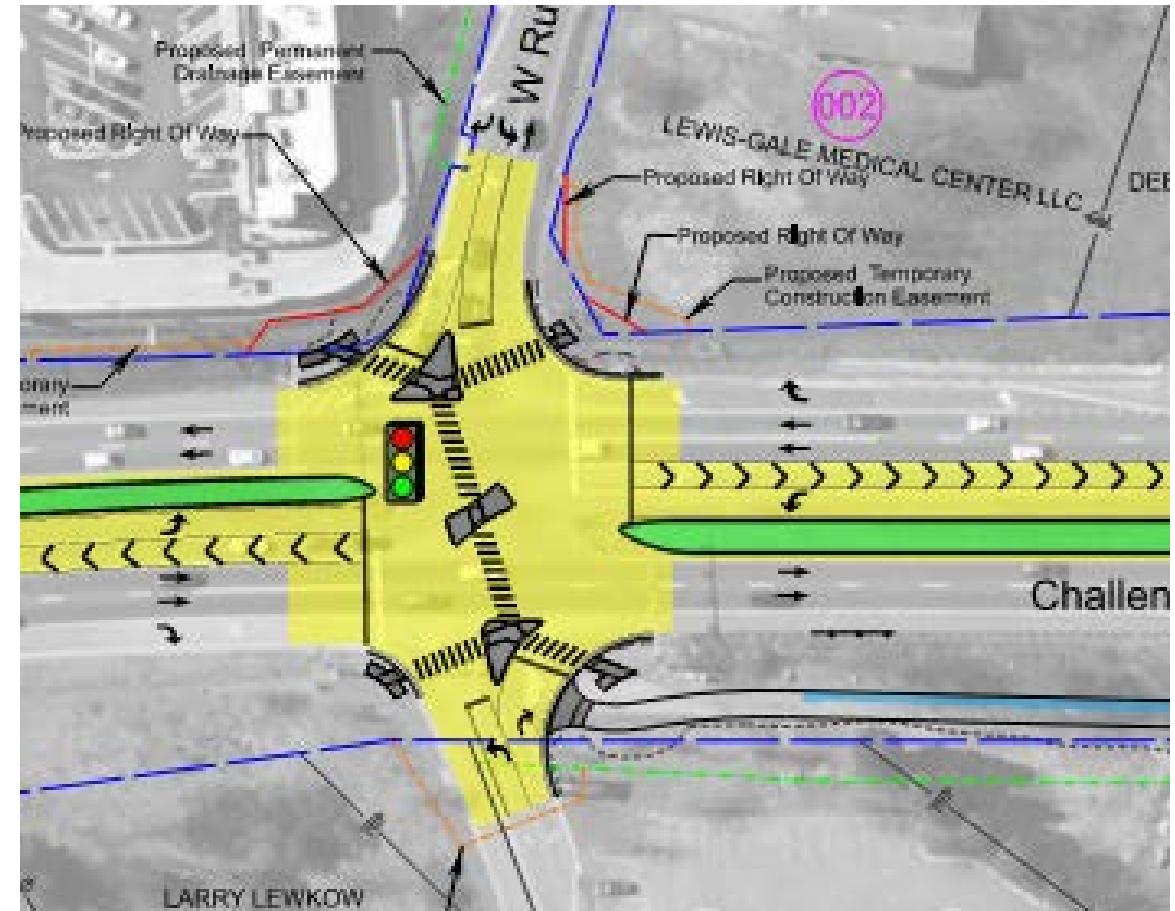
Thru-Cut: 3-Phase Operation



Route 460 & West Ruritan Road

What is a Thru-Cut?

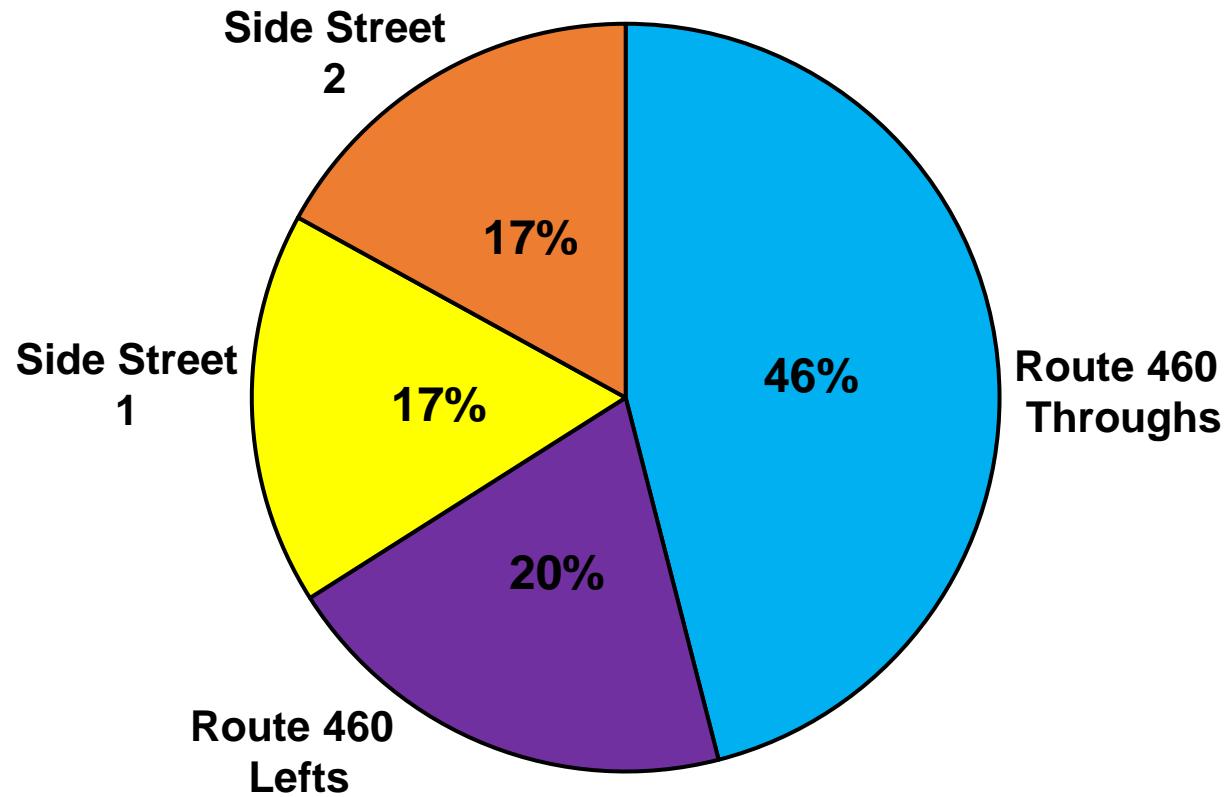
- **Retains all movements except the side-street through movement (less than 0.1% of peak traffic)**
- **Allows both side-street left-turn movements to serve concurrently, thereby reducing a phase at the intersection**
- **Side-street through traffic turns right and uses nearby turn lane to make a U-turn and then turn right at the main intersection.**



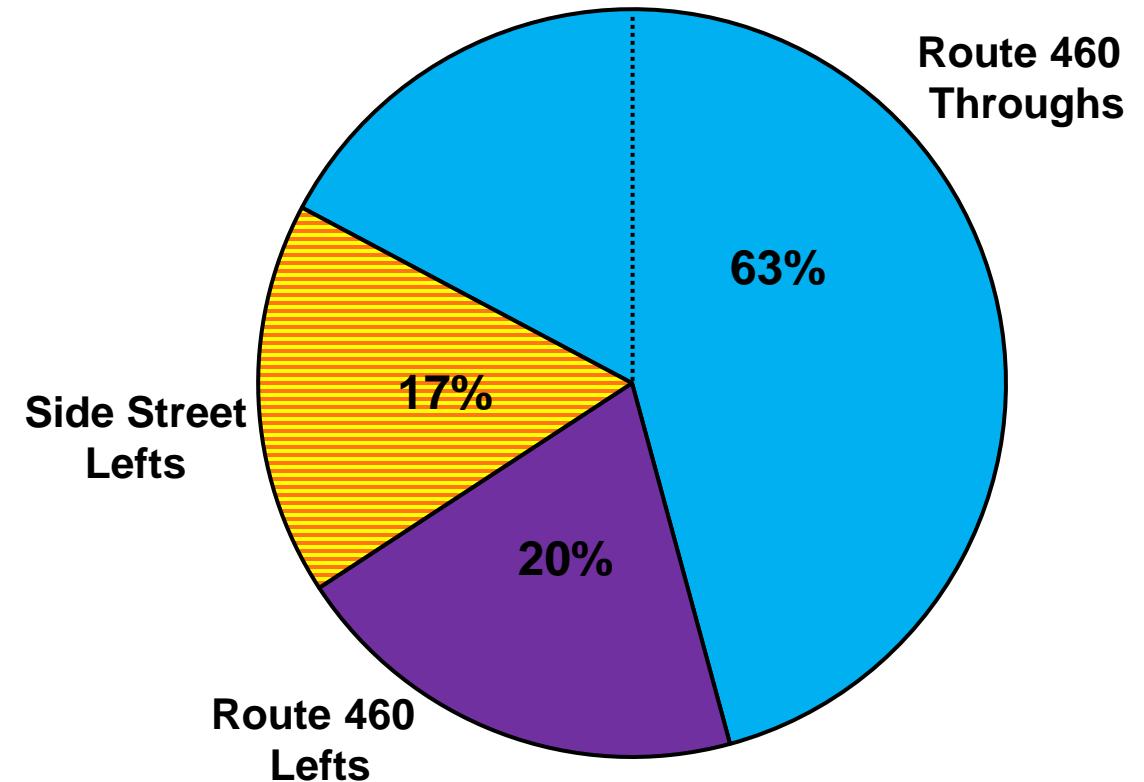
Route 460 & West Ruritan Road

Effect of Phase Reduction

Without Thru-Cut



With Thru-Cut



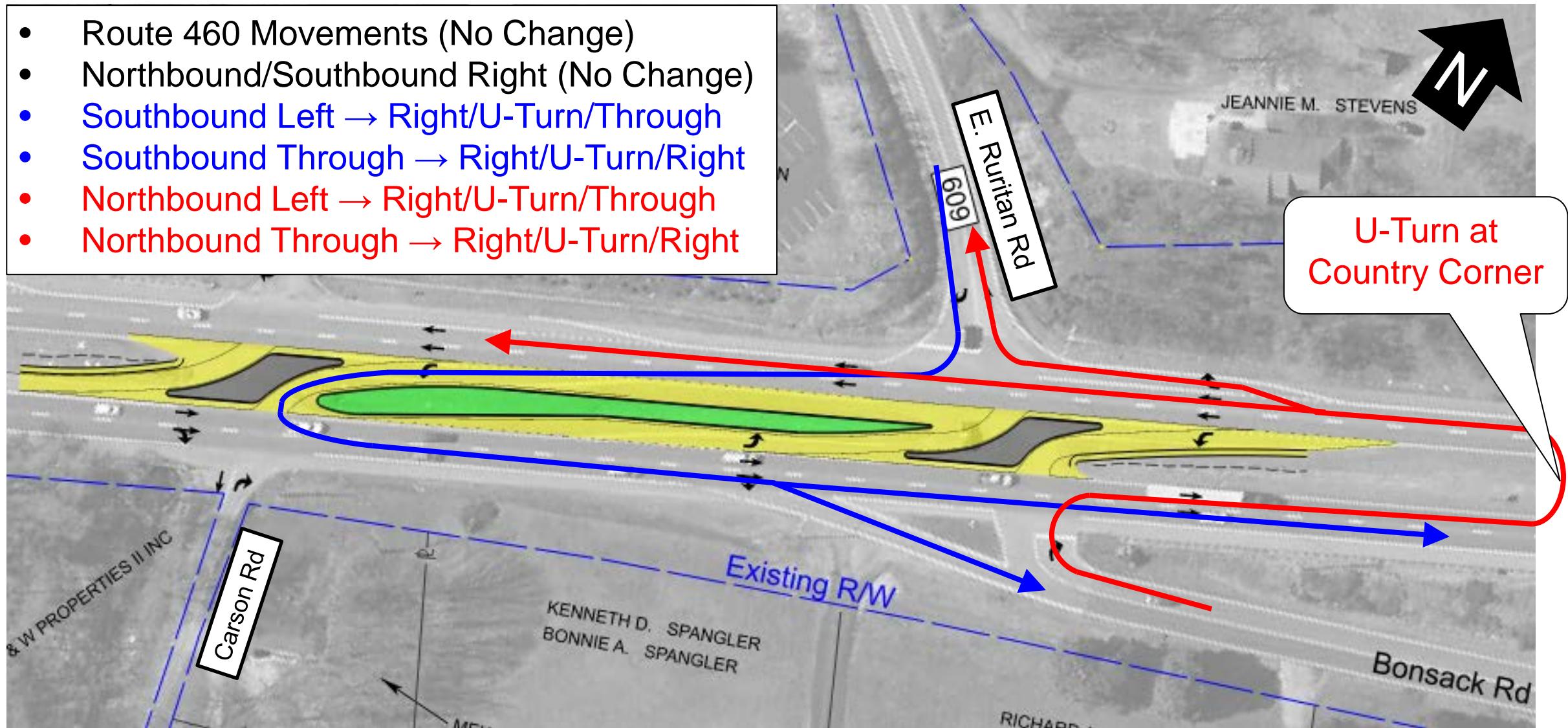
- Increased green time equates to 15-20% capacity increase.

Route 460 & East Ruritan Road/Bonsack Road – Existing



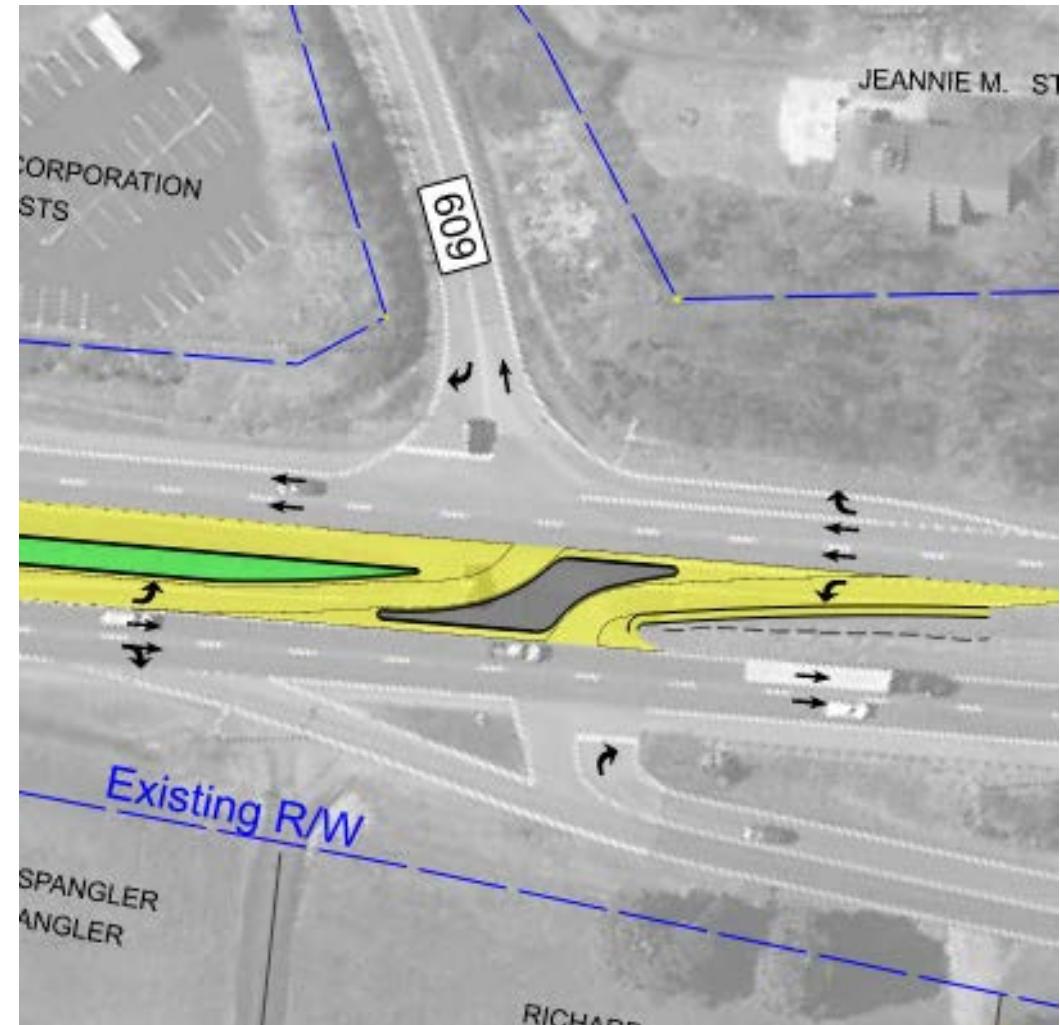
Route 460 & East Ruritan Road/Bonsack Road – RCUT

- Route 460 Movements (No Change)
- Northbound/Southbound Right (No Change)
- Southbound Left → Right/U-Turn/Through
- Southbound Through → Right/U-Turn/Right
- Northbound Left → Right/U-Turn/Through
- Northbound Through → Right/U-Turn/Right



What is a Restricted Crossing U-Turn (RCUT)?

- Redirects side-street left-turn and through traffic to turn right and use a nearby median crossover to make a U-turn and then turn right at the main intersection or proceed straight
- U-turn locations with turn lanes are provided in the median.
- Main intersection and U-turn intersection can be signalized or unsignalized



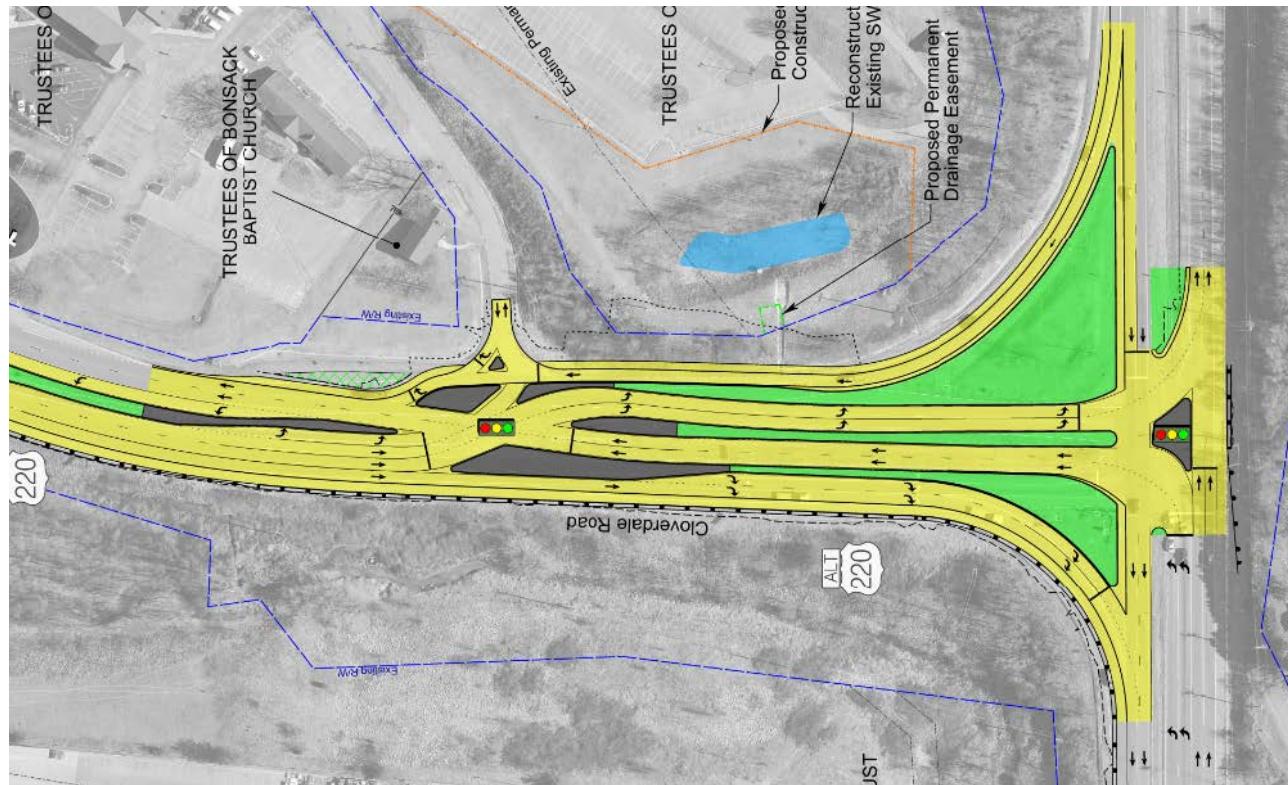
Route 460 & East Ruritan Road

Benefits of Thru-Cuts and RCUTs

- **Improved Safety** - Reduces the number of points where vehicles cross paths
- **Increased Efficiency** - Reduces traffic signal phases by redirecting the side street through movements or left turns, which reduces delay and increases capacity
- **Cost-effective** - Is more cost-effective than adding lanes to increase capacity

What is a Displaced Left-Turn (DLT)?

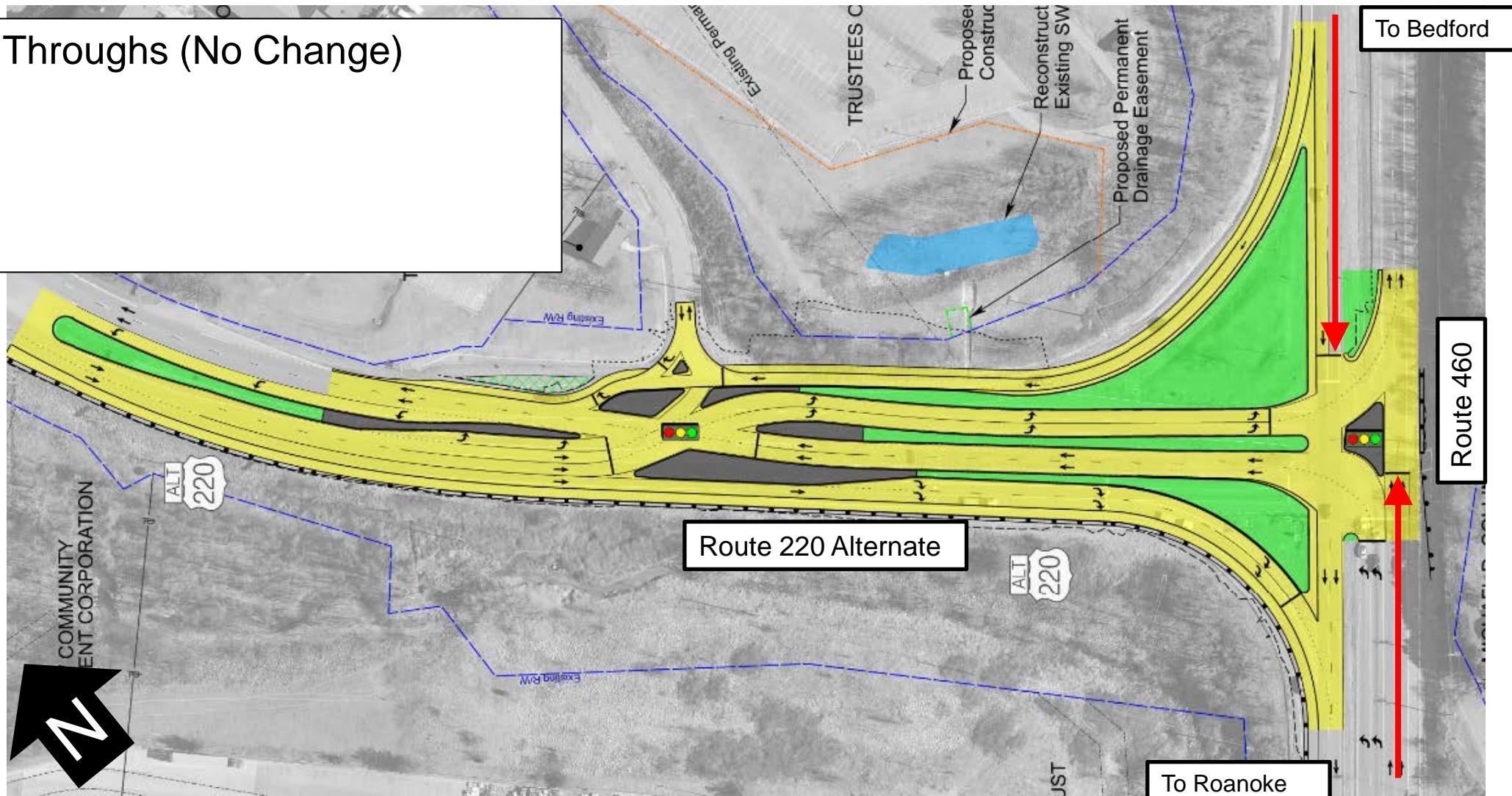
- **Left-turning vehicles at the primary intersection cross to the other side of the road similar to a Diverging Diamond Interchange (e.g., Valley View Blvd interchange).**
- **Reduces signal phases because left-turns occur simultaneously**



Route 460 & Route 220 Alternate

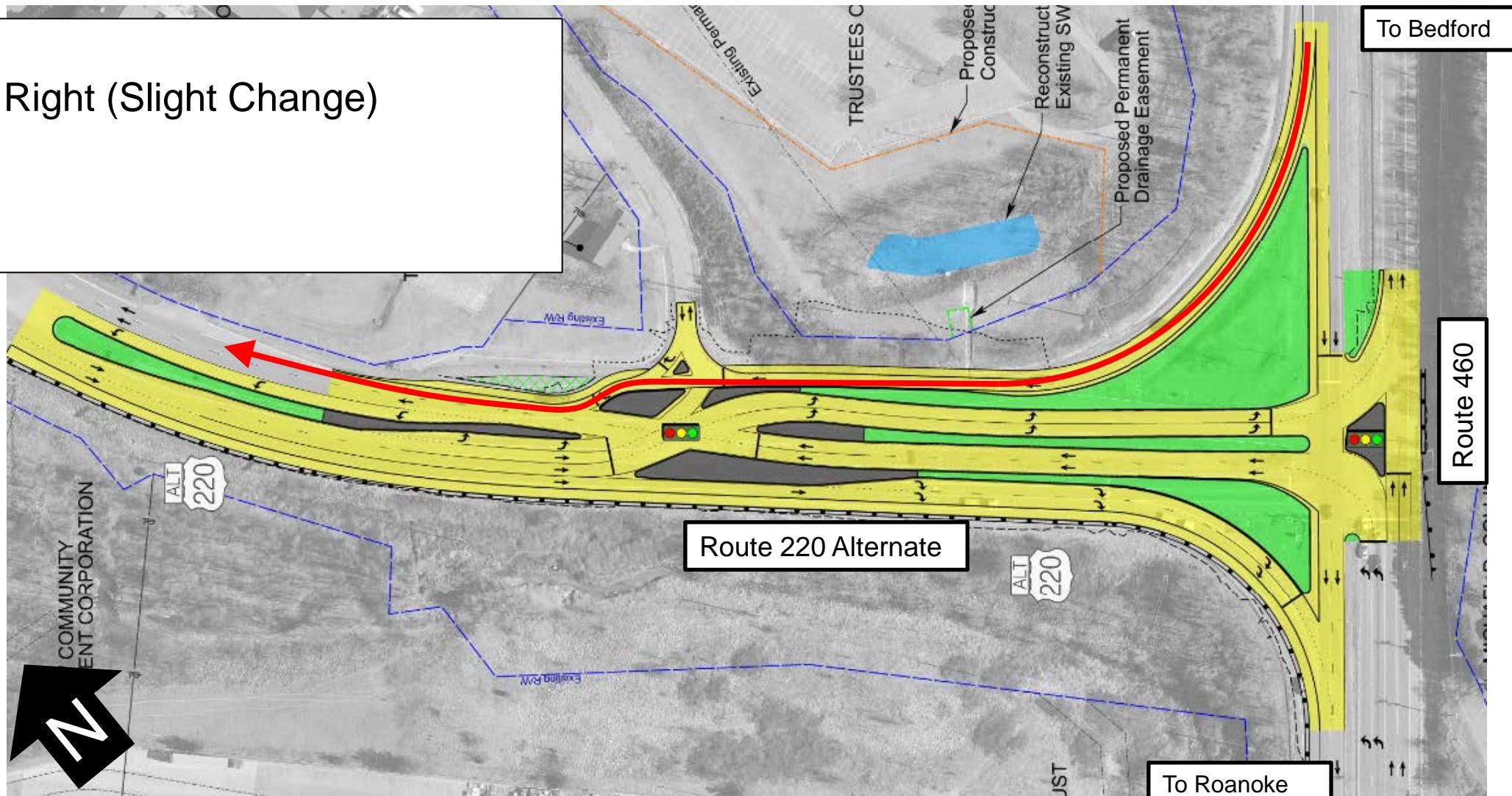
Route 460 & Route 220 Alternate – Displaced Left Turn

- Route 460 Throughs (No Change)



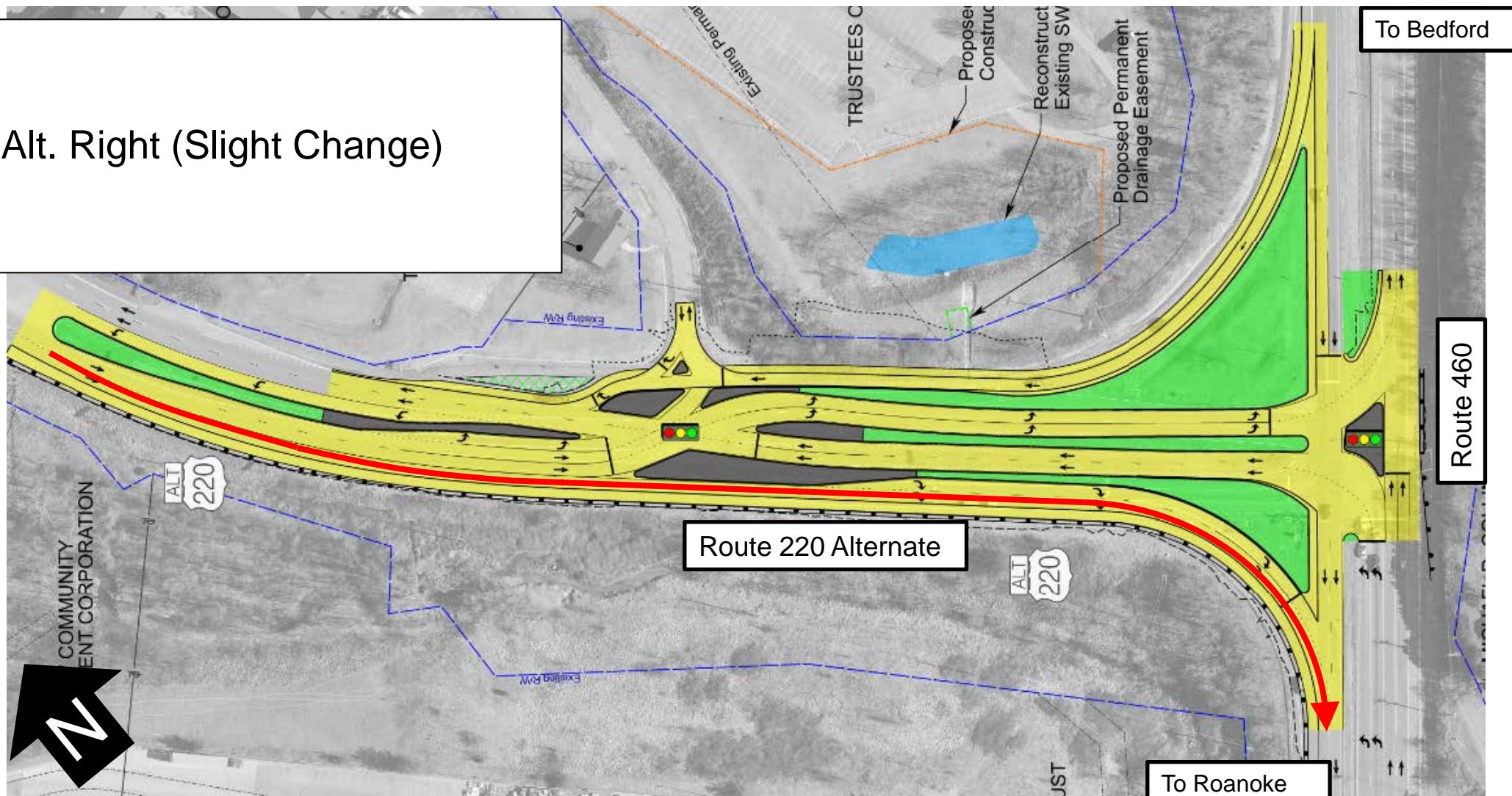
Route 460 & Route 220 Alternate – Displaced Left Turn

- Route 460 Right (Slight Change)



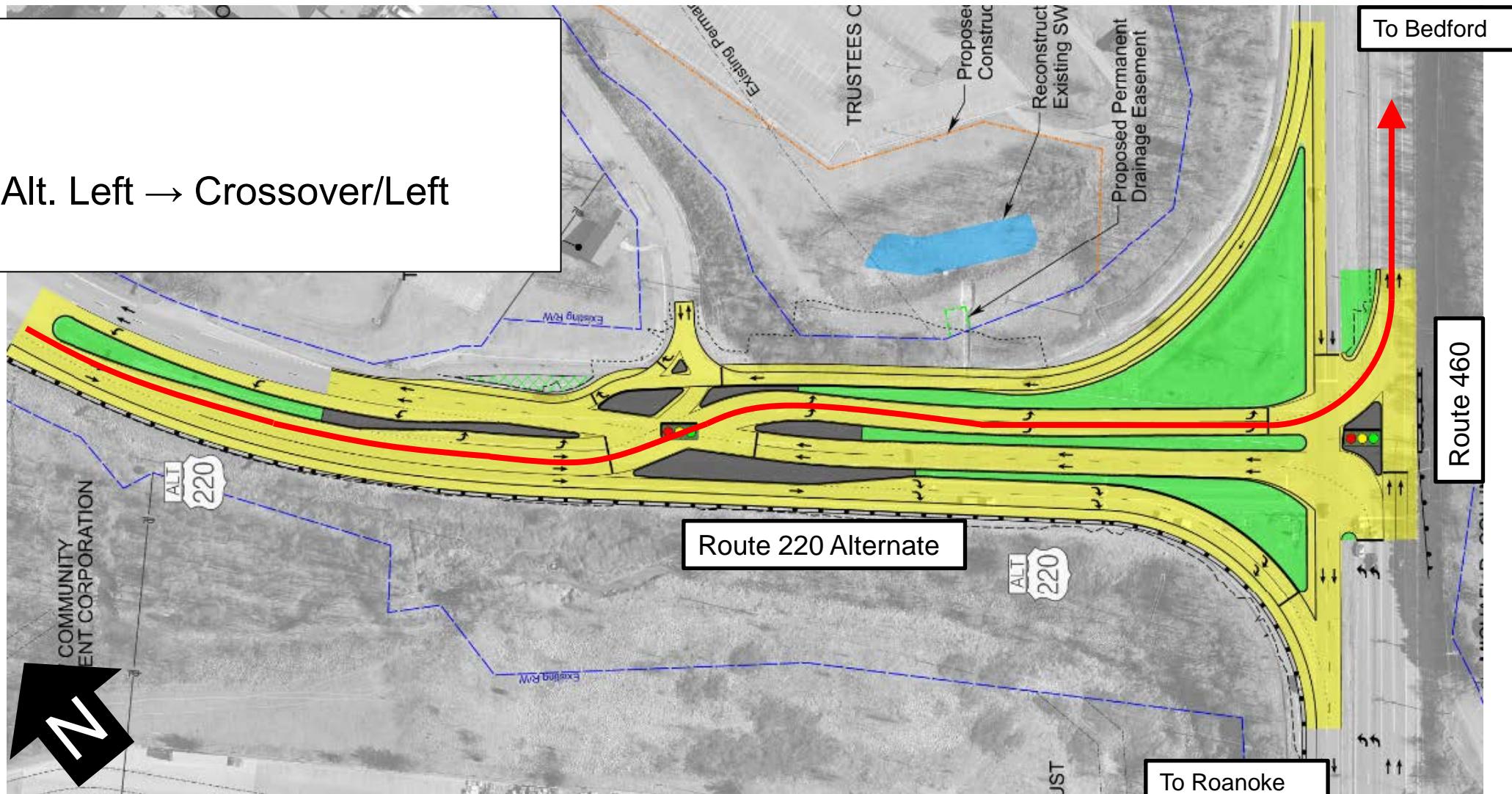
Route 460 & Route 220 Alternate – Displaced Left Turn

- Route 220 Alt. Right (Slight Change)



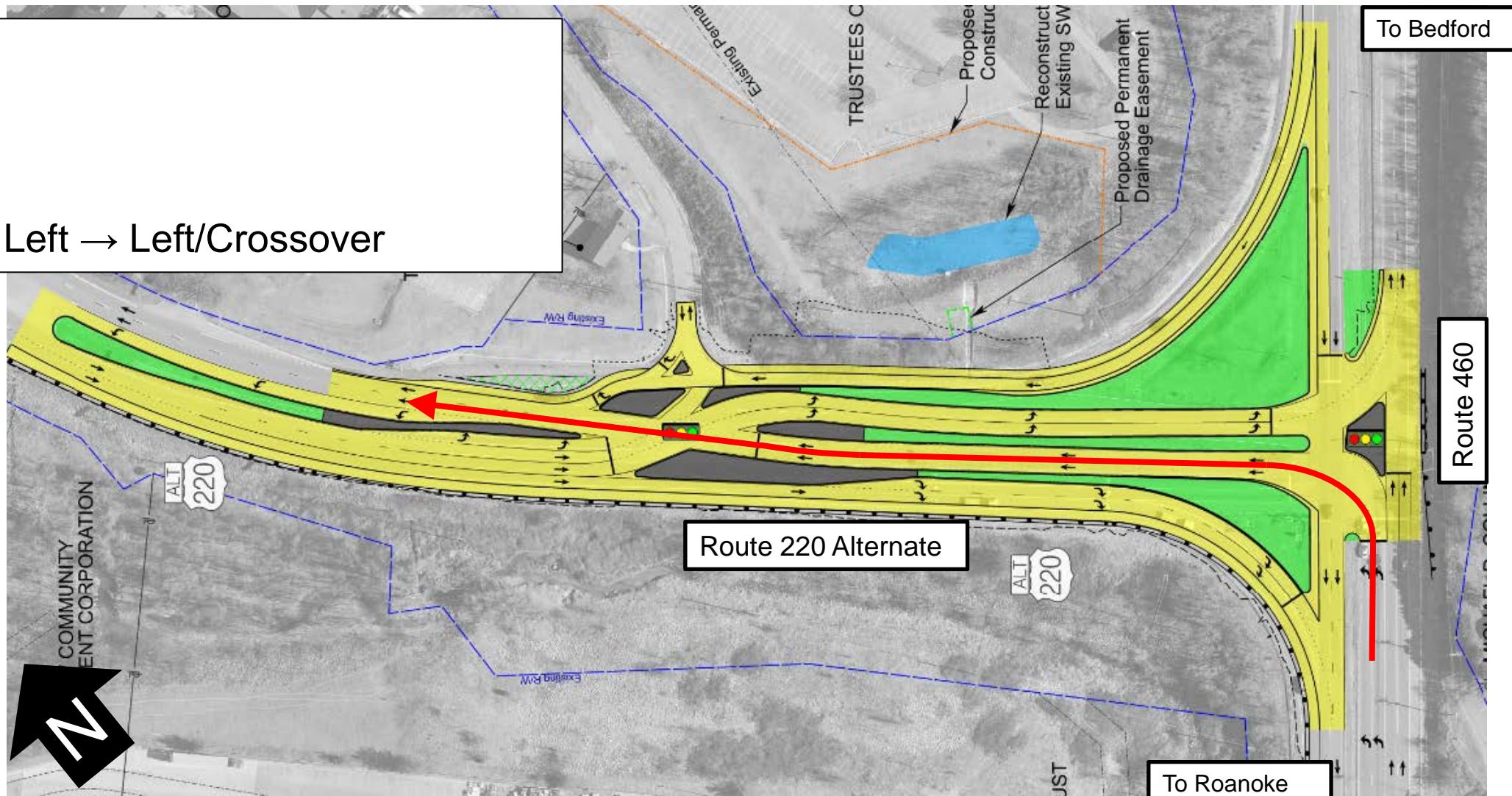
Route 460 & Route 220 Alternate – Displaced Left Turn

- Route 220 Alt. Left → Crossover/Left



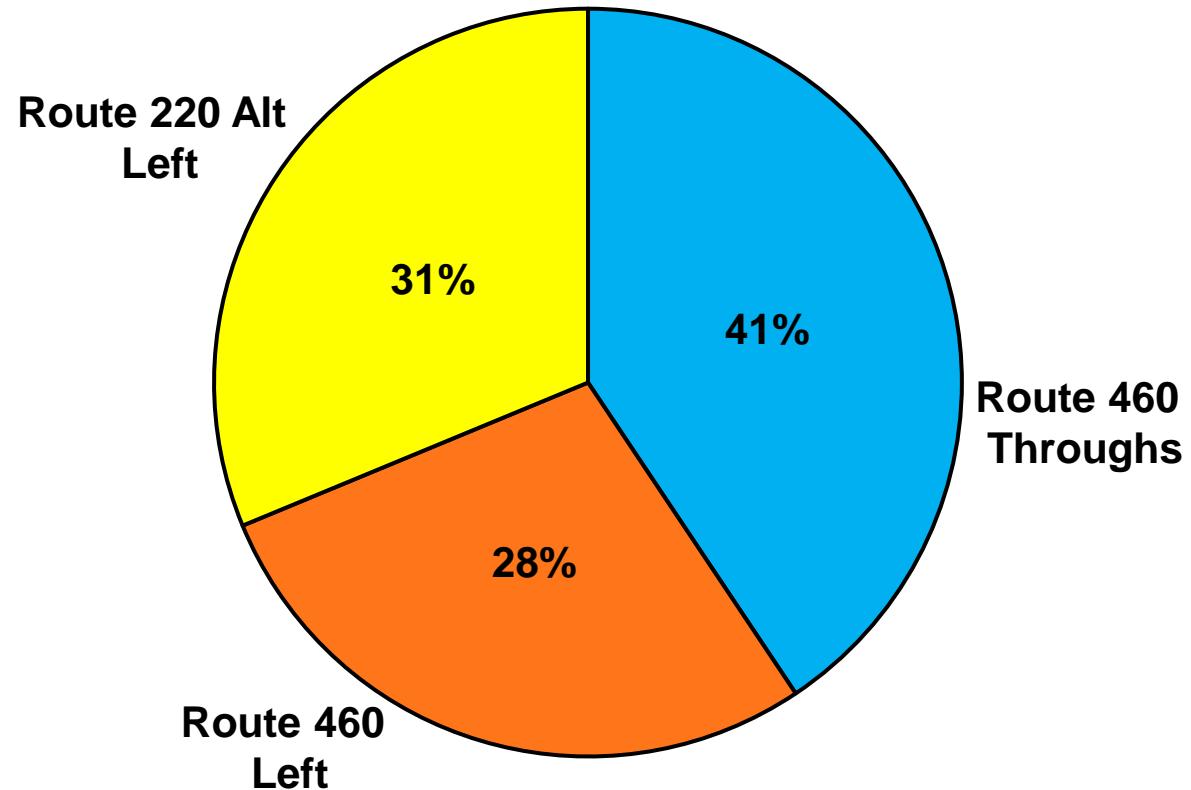
Route 460 & Route 220 Alternate – Displaced Left Turn

- Route 460 Left → Left/Crossover

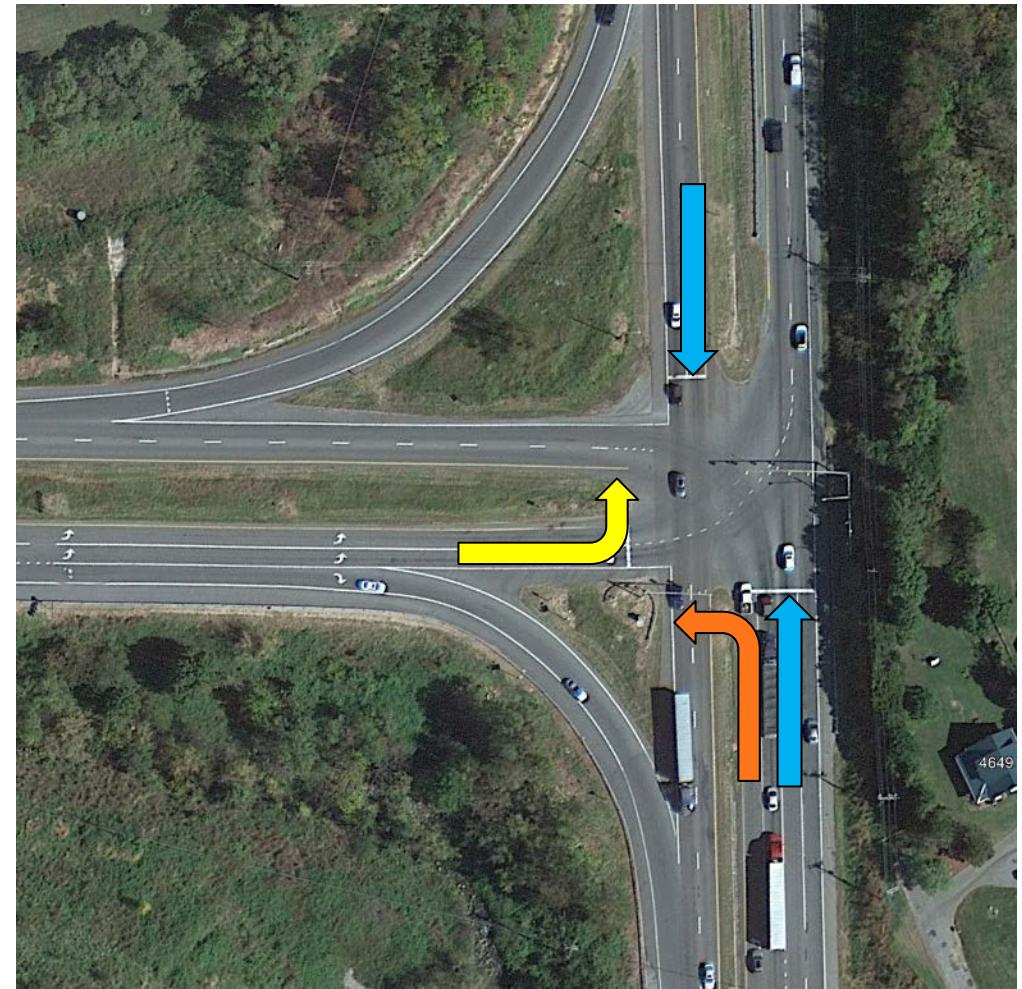


Route 460 & Route 220 Alternate – Existing Configuration

Existing: 3-Phase Operation



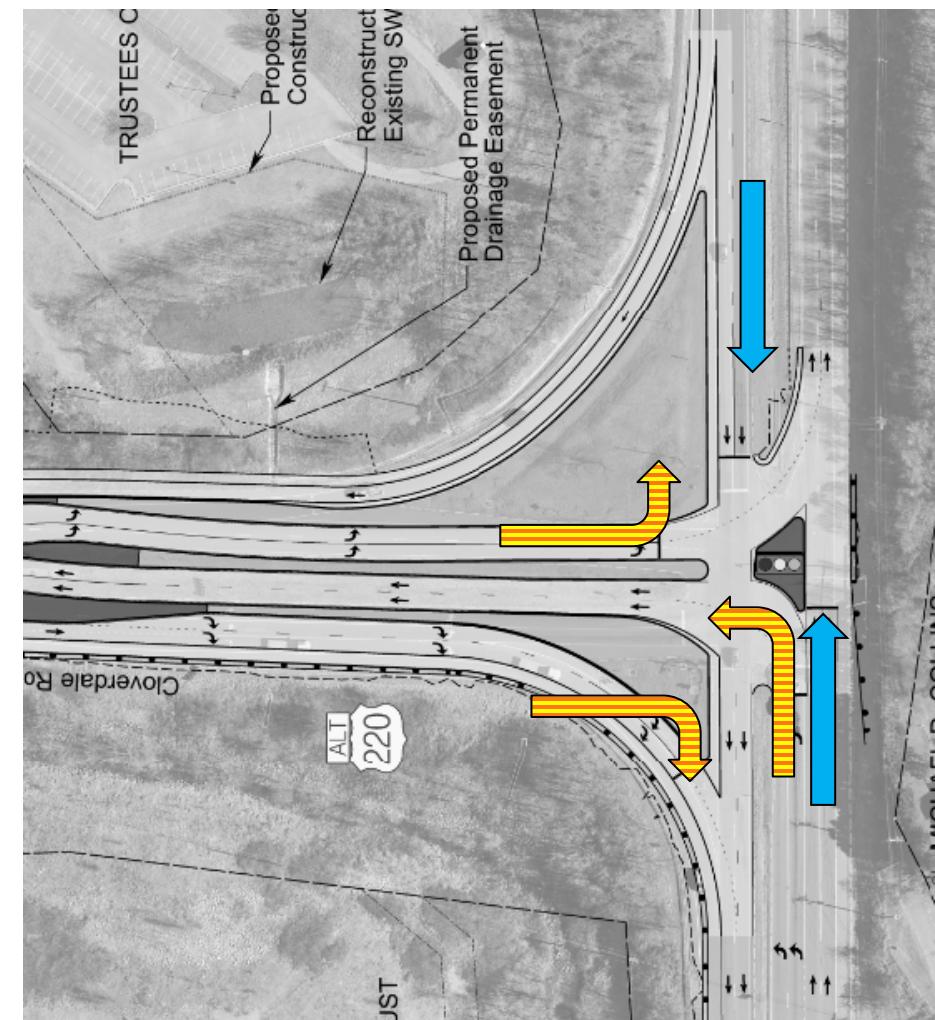
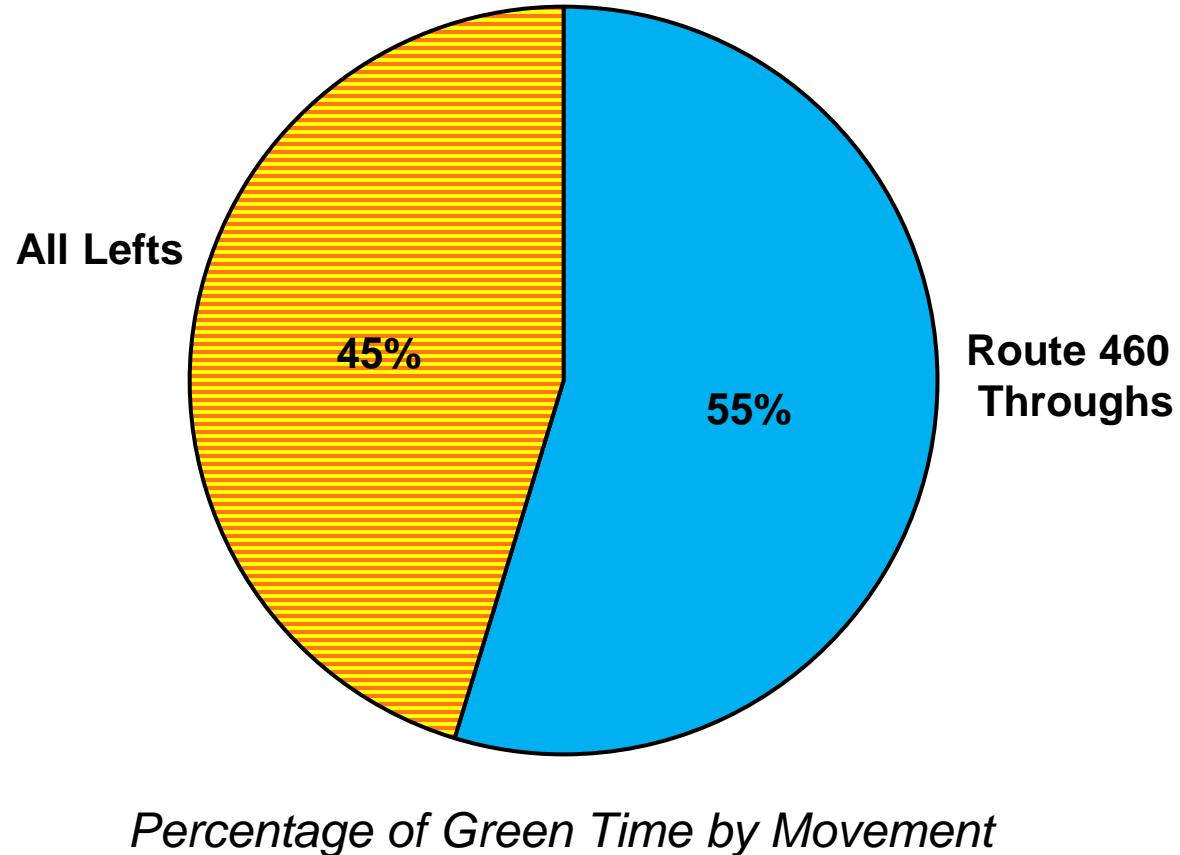
Percentage of Green Time by Movement



Route 460 & Route 220 Alternate

Route 460 & Route 220 Alternate – DLT Configuration

DLT: 2-Phase Operation



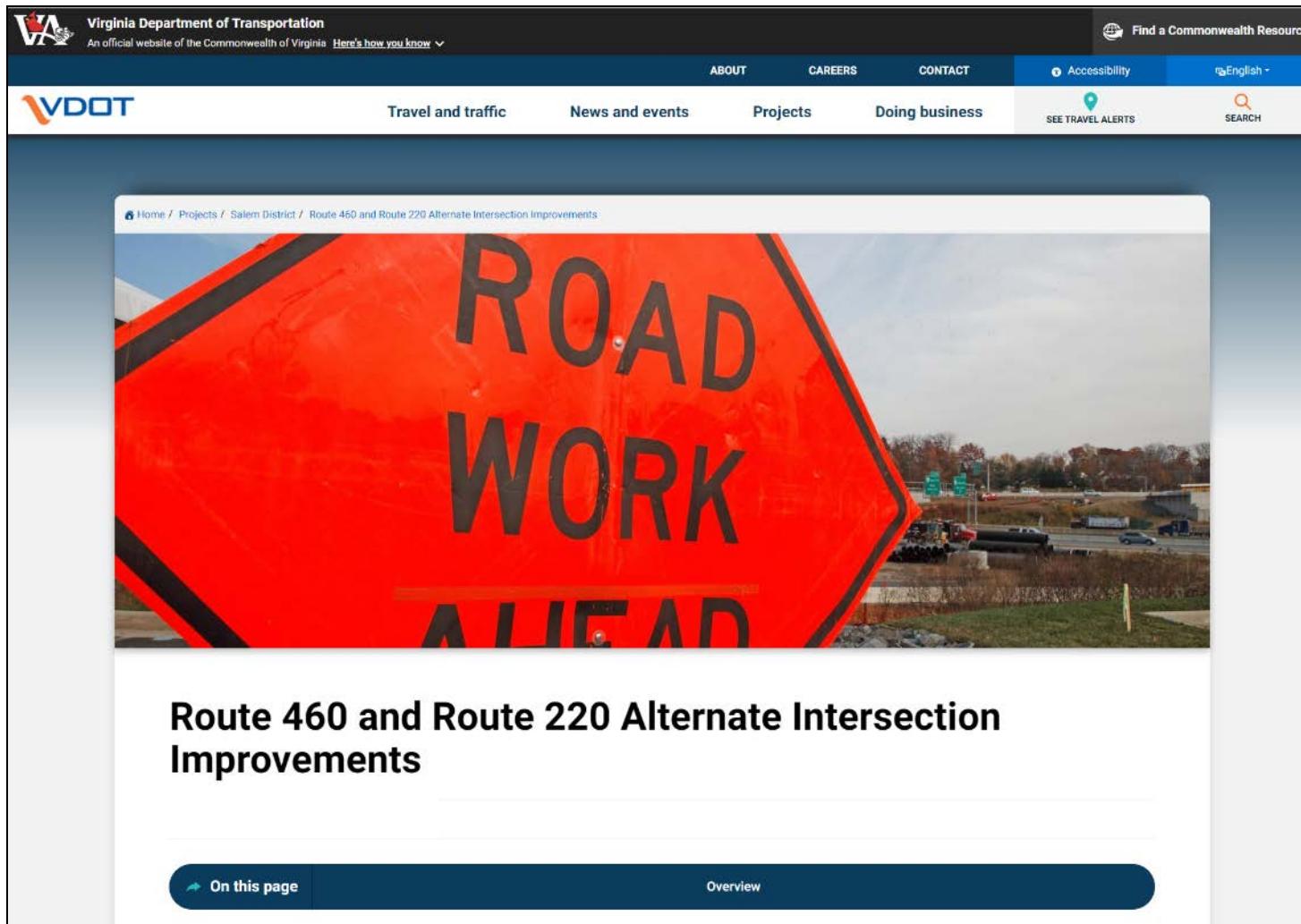
Route 460 & Route 220 Alternate

Benefits – DLT at Route 220 Alternate



- **Capacity increase for future growth with the DLT**
 - Increase for westbound Route 460 is 36%
 - Increase for left-turns from Route 220 Alternate toward Lynchburg is 30%
- **This intersection is one of the highest crash locations in Salem District**
 - Right-turn from Route 220 Alternate to westbound Route 460 has a high frequency of crashes
 - Converting from yield to signal control will reduce both rear-end and sideswipe crashes for vehicles turning right from Route 220 Alternate

Route 460 & Route 220 Alternate – Displaced Left Turn



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ROAD WORK AHEAD

Route 460 and Route 220 Alternate Intersection Improvements

On this page Overview



Video of simulated driving through DLT on VDOT project website

Route 460 Intersection Improvements – Roanoke County

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Project Schedule

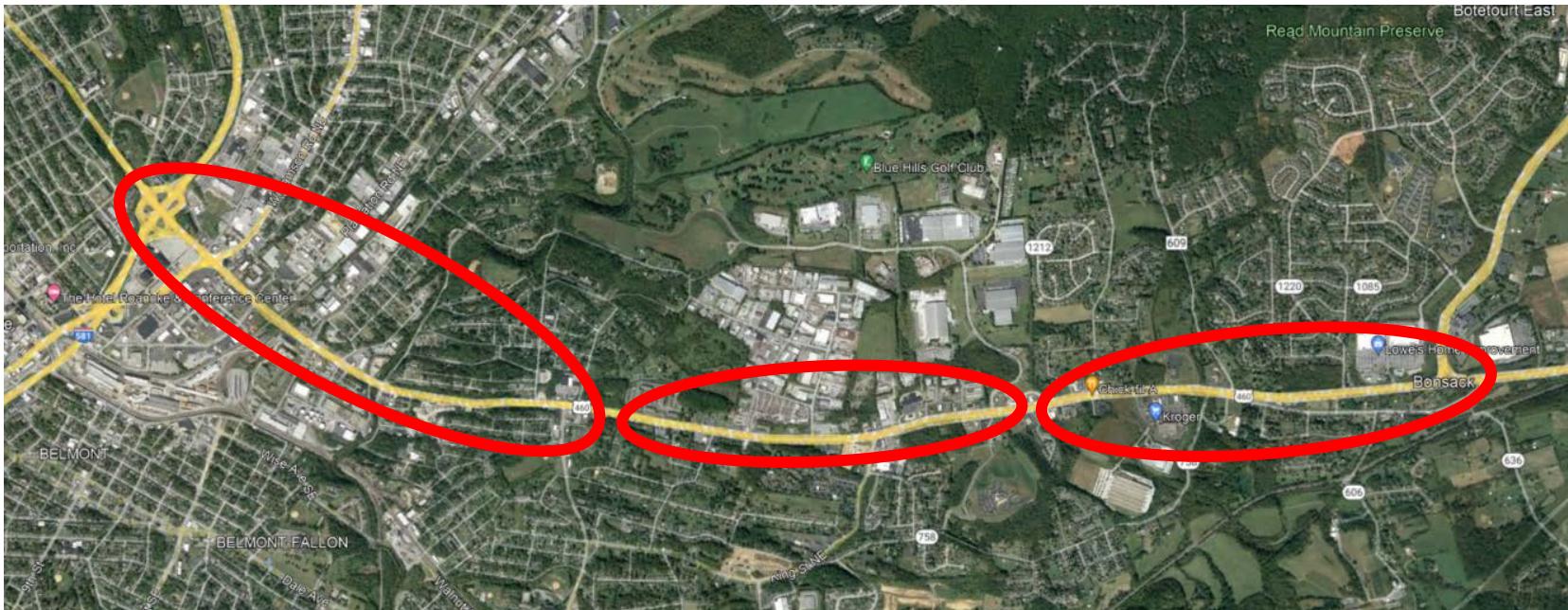
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Route 460 Improvements – I-581 to Avery Row

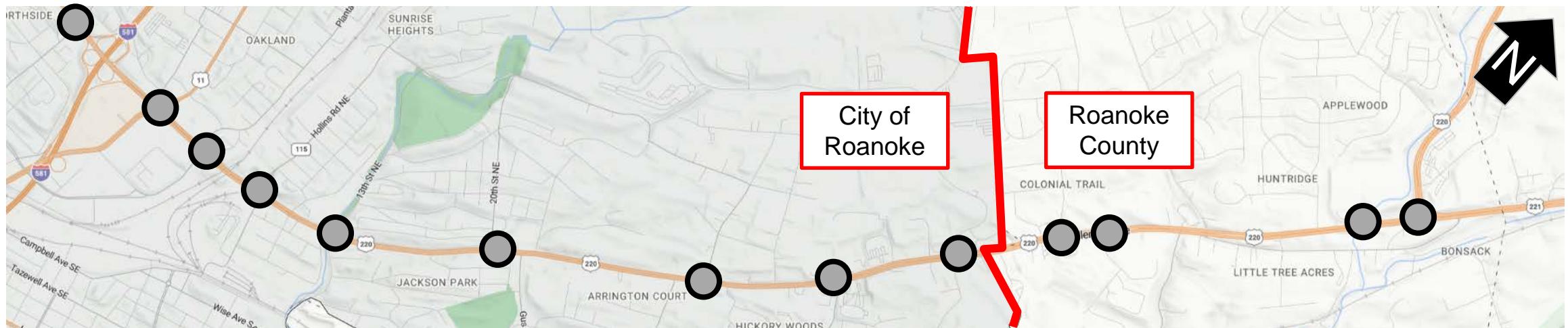
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Route 460 Corridor Signalized Intersections

Westbound to Downtown (AM Peak worst)



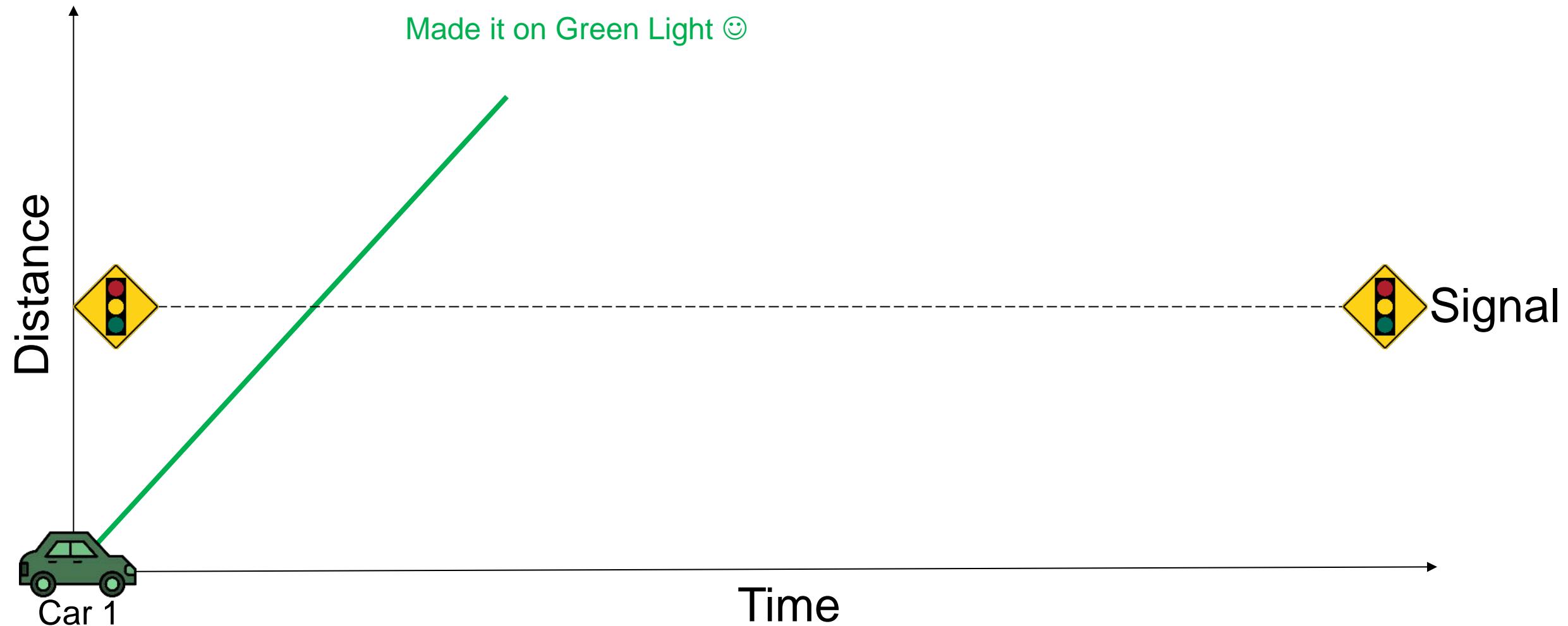
City of
Roanoke

Roanoke
County

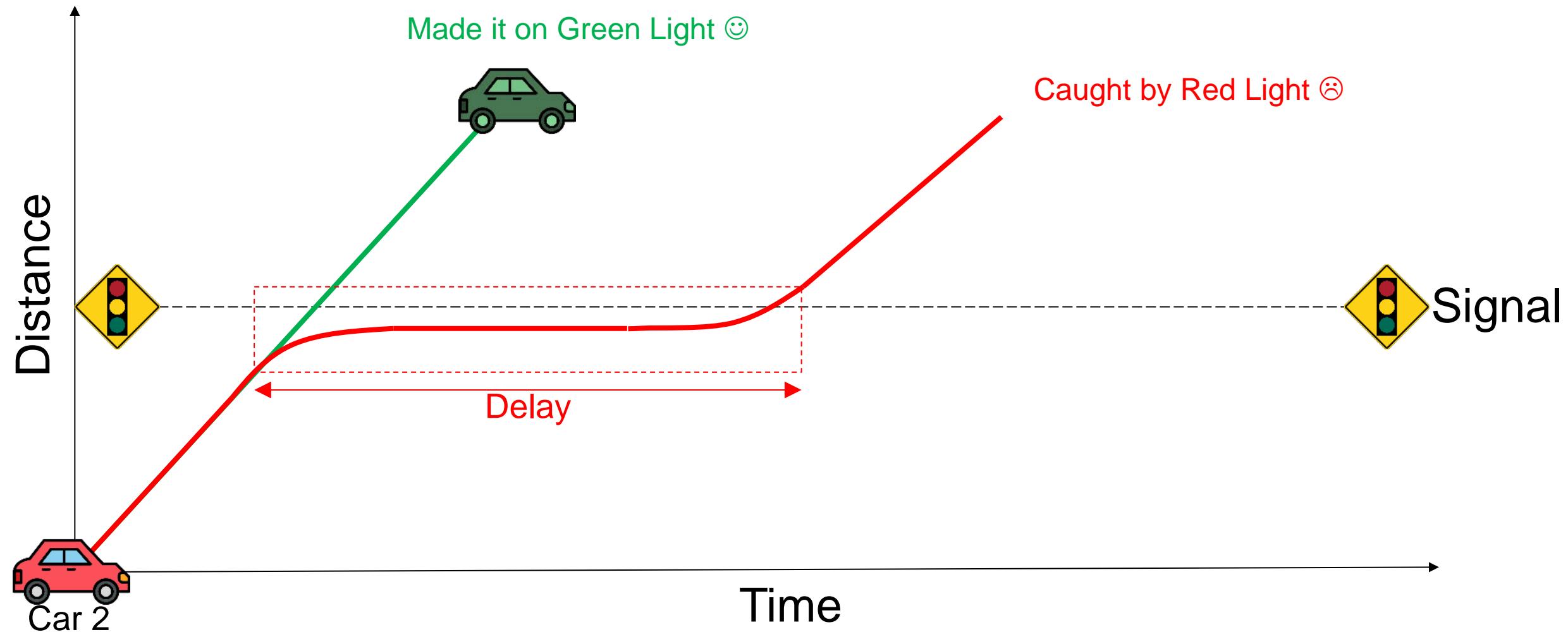
Eastbound from Downtown (PM Peak worst)



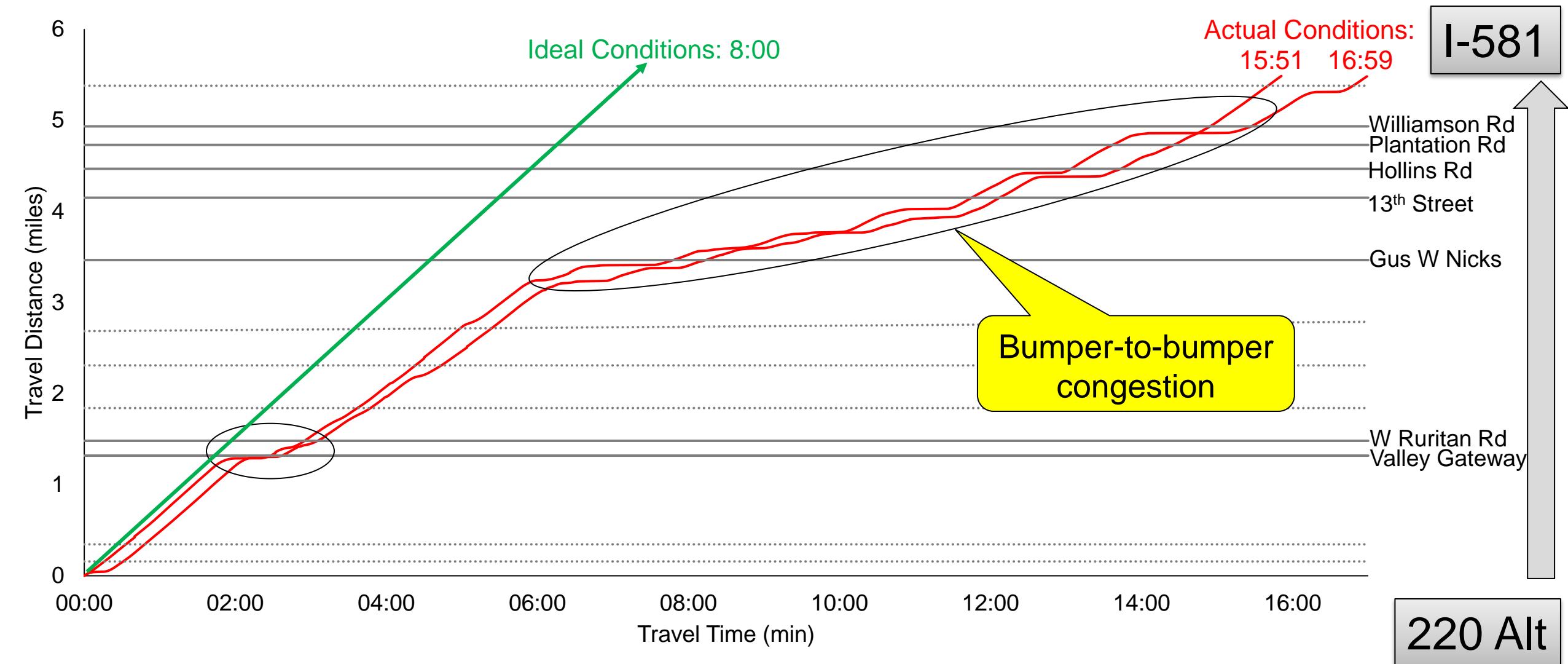
Corridor Travel Time Illustration



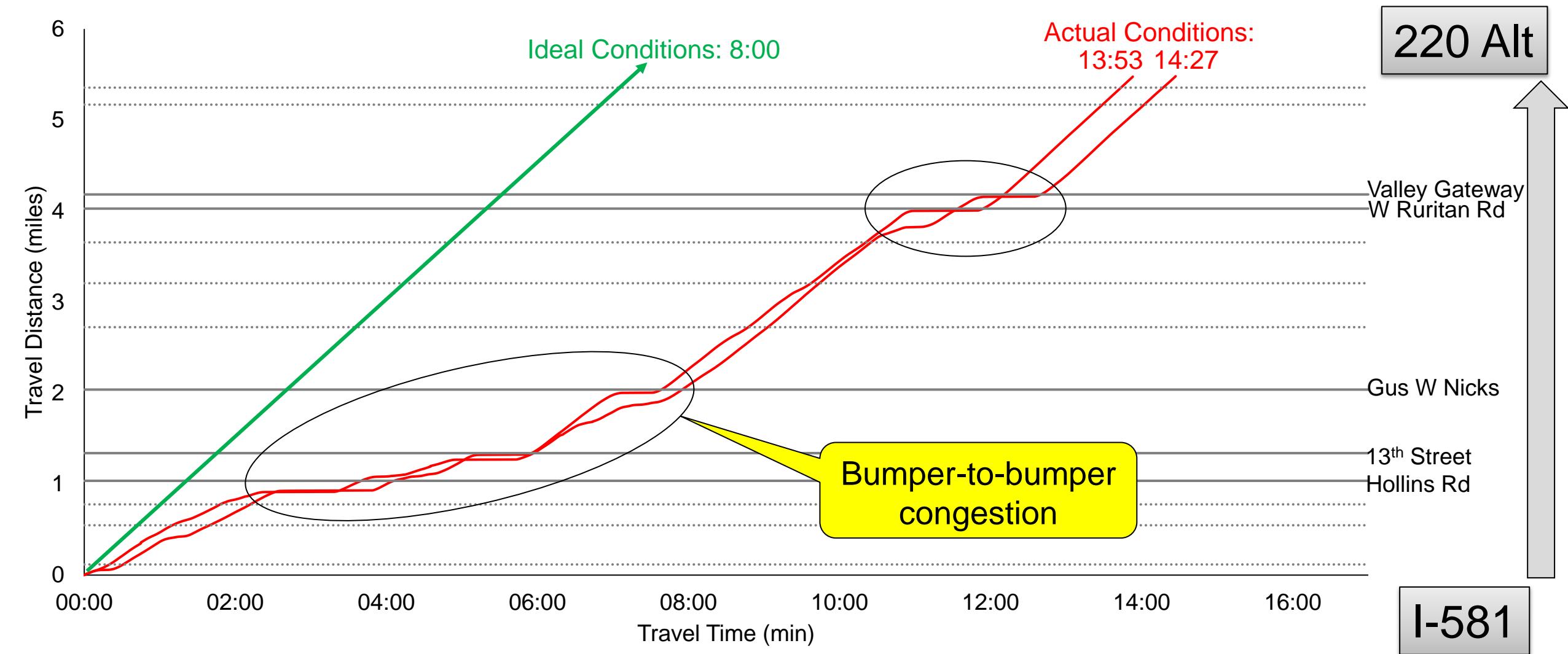
Corridor Travel Time Illustration



Westbound AM Peak – Travel Times in September 2024



Eastbound PM Peak – Travel Times in September 2024



2019 vs. 2024 Corridor Travel Times (minutes:seconds)

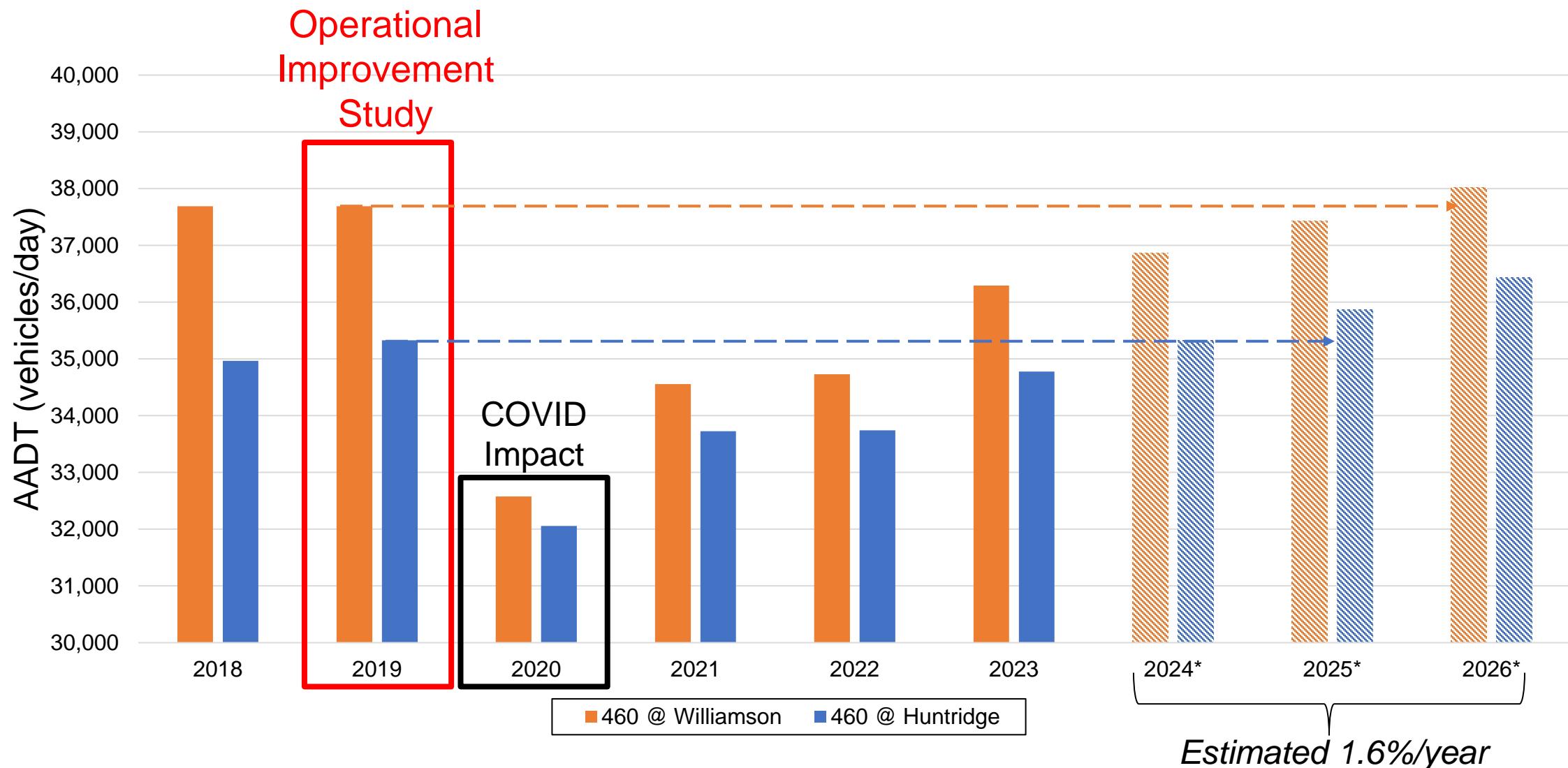
- **Performing better now than in 2019**
 - 2019 from STARS Operational Study
 - 2024 from September 2024 data collection

Peak Period	Direction	2019	2024
AM Peak	Westbound (To Downtown)	21:02	15:34
PM Peak	Eastbound (From Downtown)	23:35	14:10

2019 → 2024 Key Changes in Conditions

- **Post-COVID traffic volume decrease**
 - Short reprieve from peak hour congestion
- **Sheetz relocation from Williamson Road to King Street**
 - Shifted problem areas
- **Corridor Signal Retiming**
 - Coordination between City signals and VDOT signals

Traffic Volume Trends – Average Daily Traffic Volume



Rethinking Traffic Volume Scenarios (Travel Time)

Operational
Improvement
Study 2019

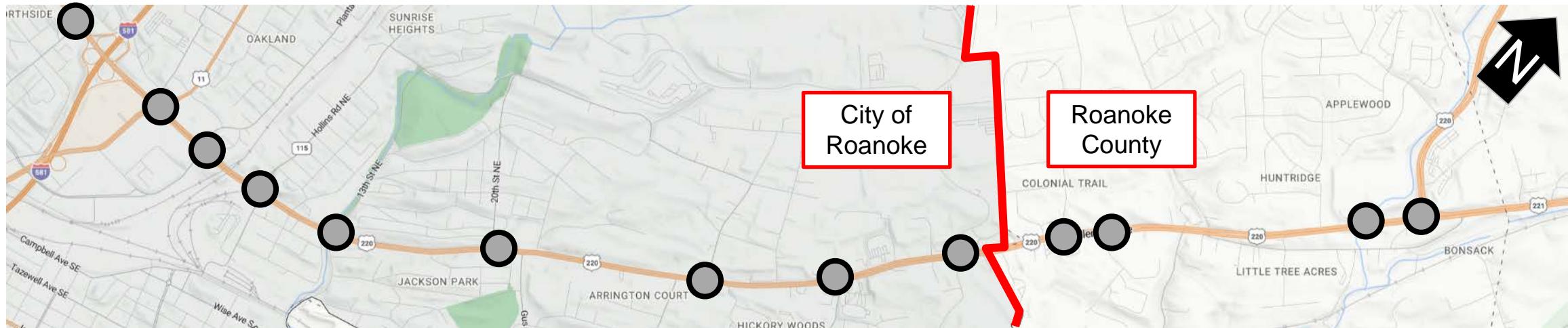
Peak Period	Direction	2019 Existing	2019 w/ Improvements	2040 Do Nothing	2040 w/ Improvements
AM Peak	Westbound	21:02	15:06	31:13	21:39
PM Peak	Eastbound	23:35	16:04	30:27	19:59



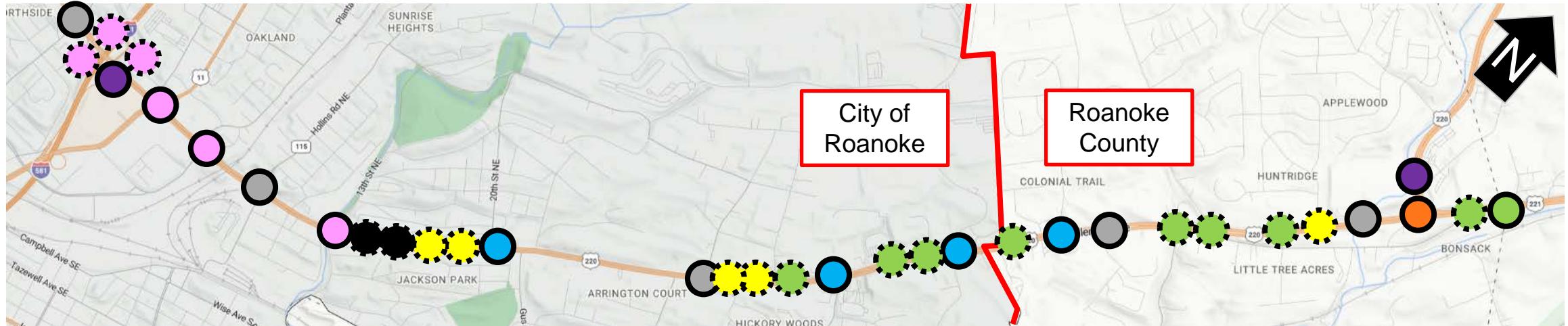
Peak Period	Direction	2026 Do Nothing	2026 w/ Improvements	2047 Do Nothing	2047 w/ Improvements
AM Peak	Westbound	21:02	15:06	31:13	21:39
PM Peak	Eastbound	23:35	16:04	30:27	19:59

10-min Travel Time
Improvement

Route 460 Corridor Signalized Intersections



Route 460 Corridor Planned Improvements



Type of Control

- Signalized Intersection
- Unsignalized Intersection

Type of Improvement

- Thru-Cut
- Channelized Left
- RCUT
- Displaced Left
- New Signal
- Other Improvement
- Median Closure
- No Change

Summary

- **Improvements at each intersection have a cumulative effect on the overall travel time along Route 460.**
 - Approximate 10-minute reduction in future commute times
- **Improvements will increase intersection safety.**
 - Reduced angle, rear-end, and sideswipe collisions
 - Additional pedestrian accommodations
- **Preserves capacity for future growth and opportunities**

