



# ROUTE 460 CORRIDOR IMPROVEMENTS

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Salem District Engineer

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

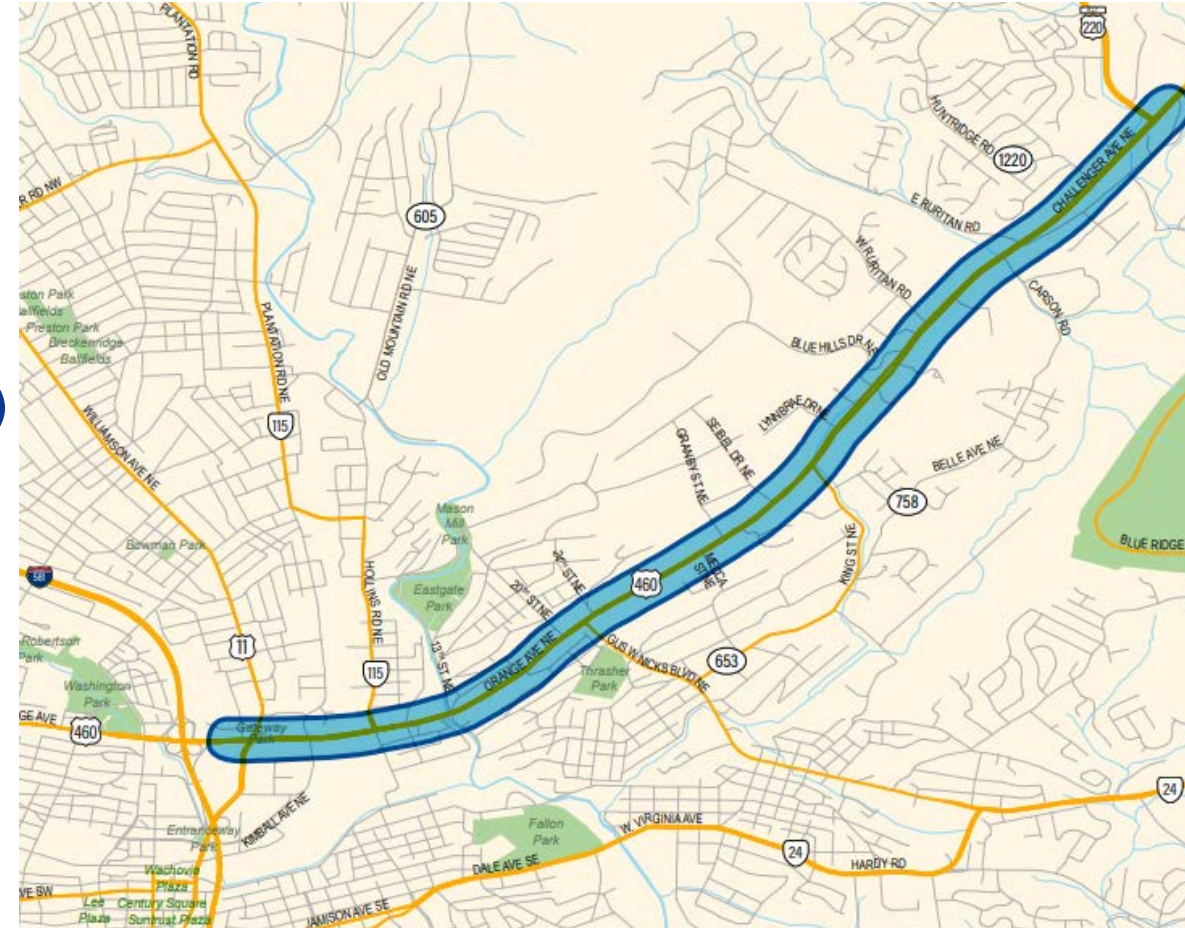
## Route 460 Operational Improvement Study (2019-2021)

- 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

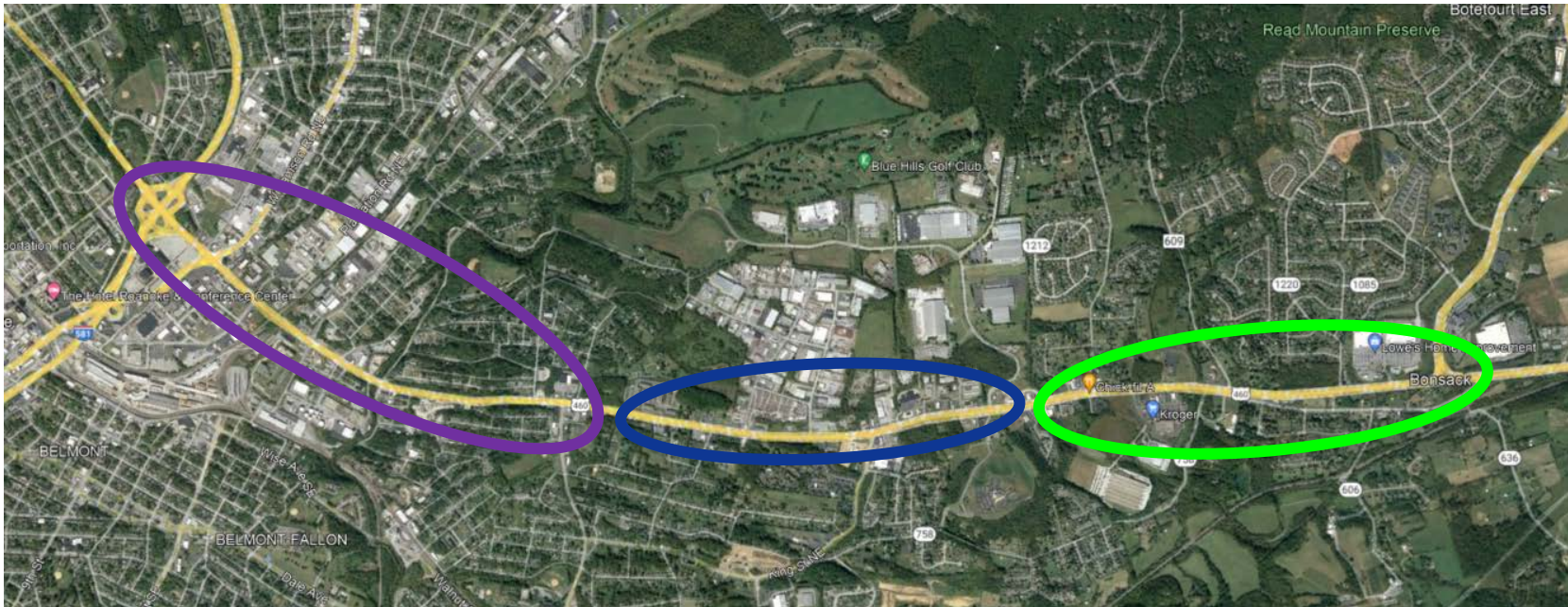
**11 projects funded from these studies**



# 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

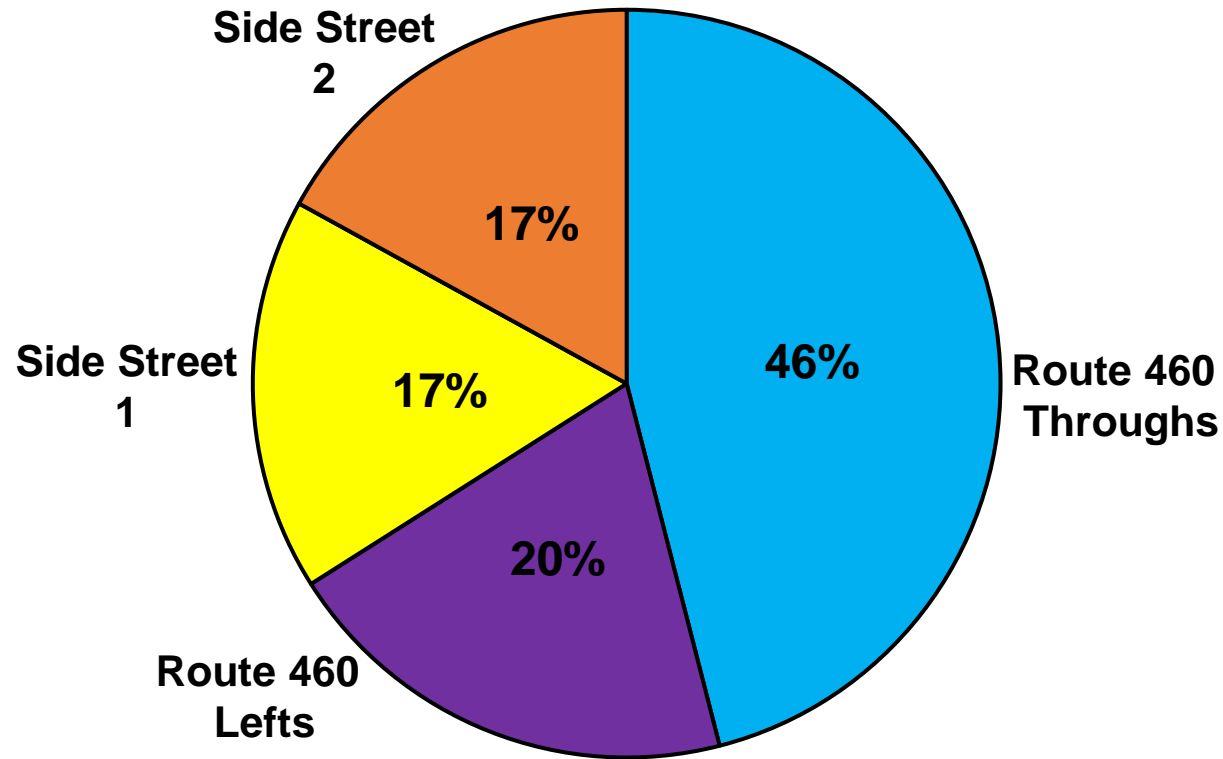
## Project Schedule

- Public Hearing Held August 2024
- Construction Expected Summer 2026

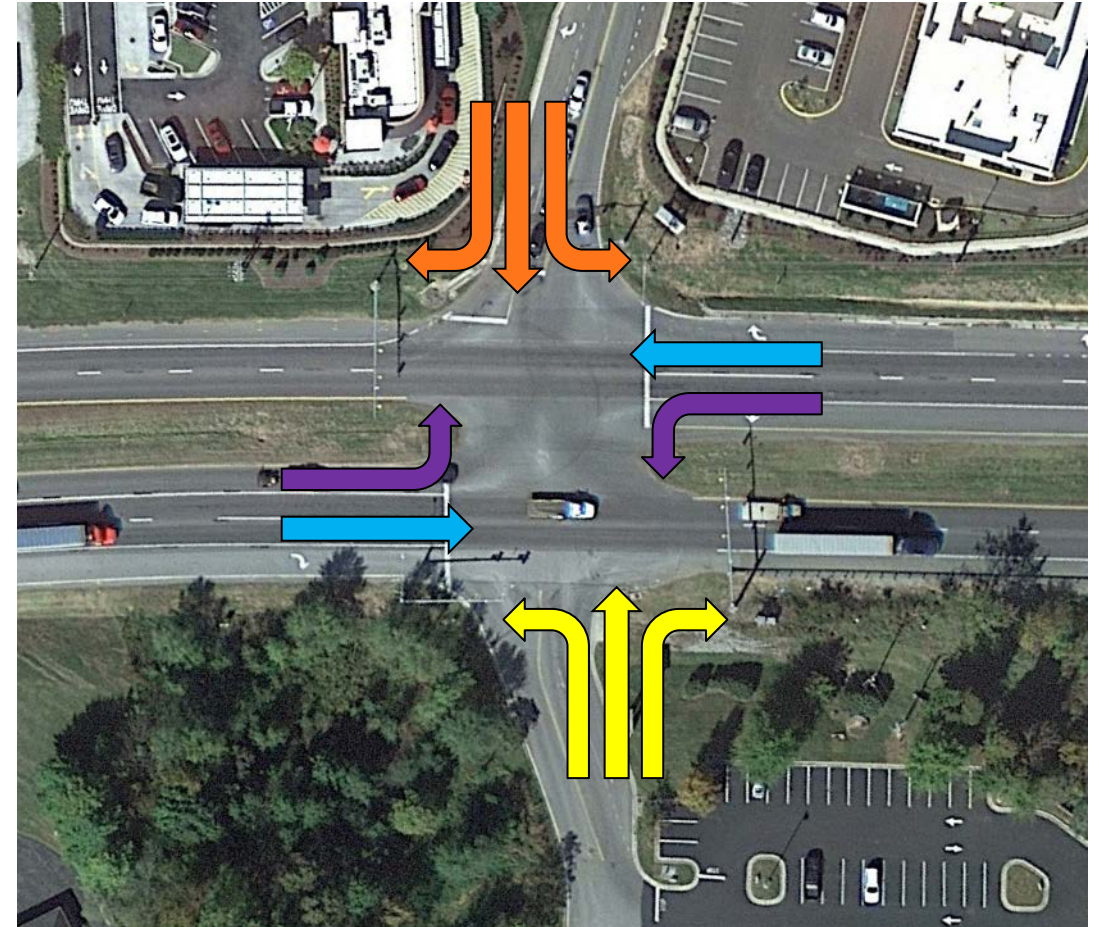


# Route 460 & West Ruritan Road – Existing Configuration

## Existing: 4-Phase Operation



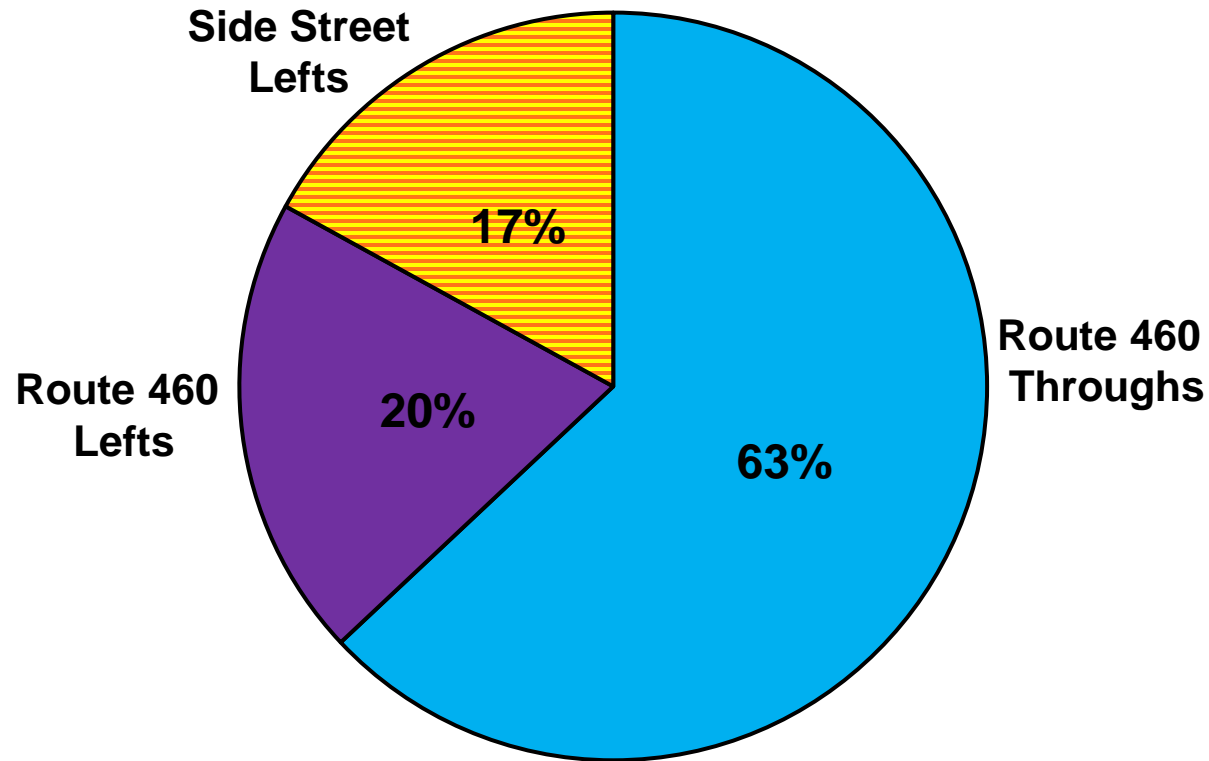
*Percentage of Green Time by Movement*



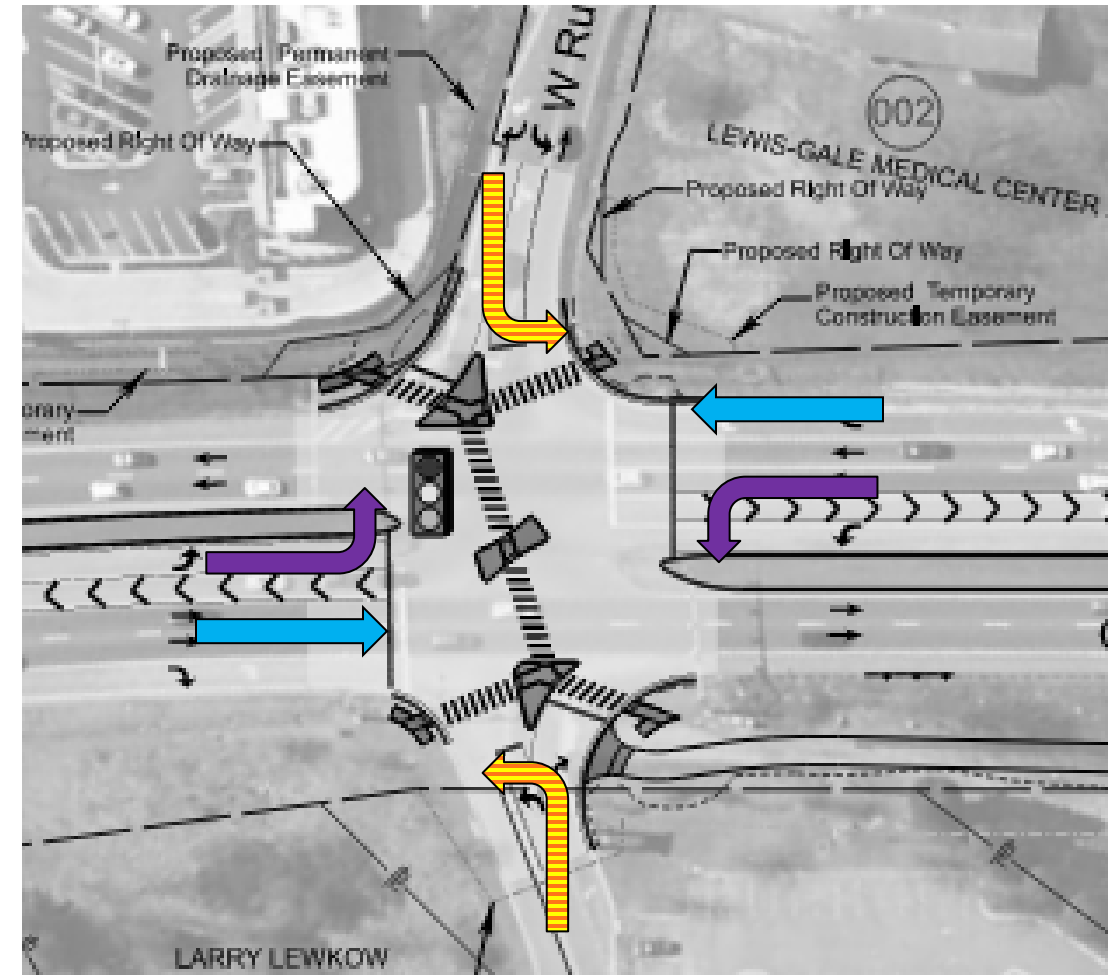
Route 460 & West Ruritan Road

# Route 460 & West Ruritan Road – Thru-Cut Configuration

## Thru-Cut: 3-Phase Operation



*Percentage of Green Time by Movement*

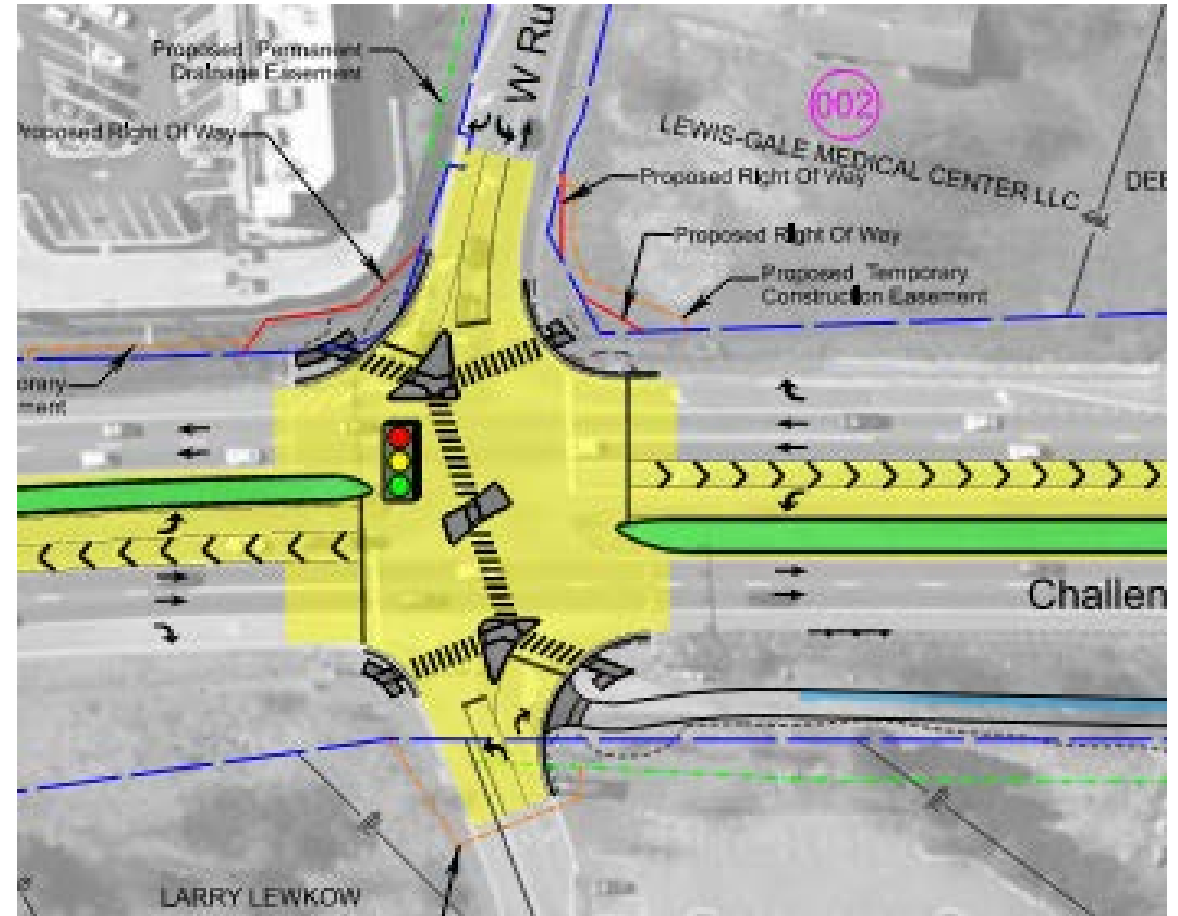


Route 460 & West Ruritan Road



# What is a Thru-Cut?

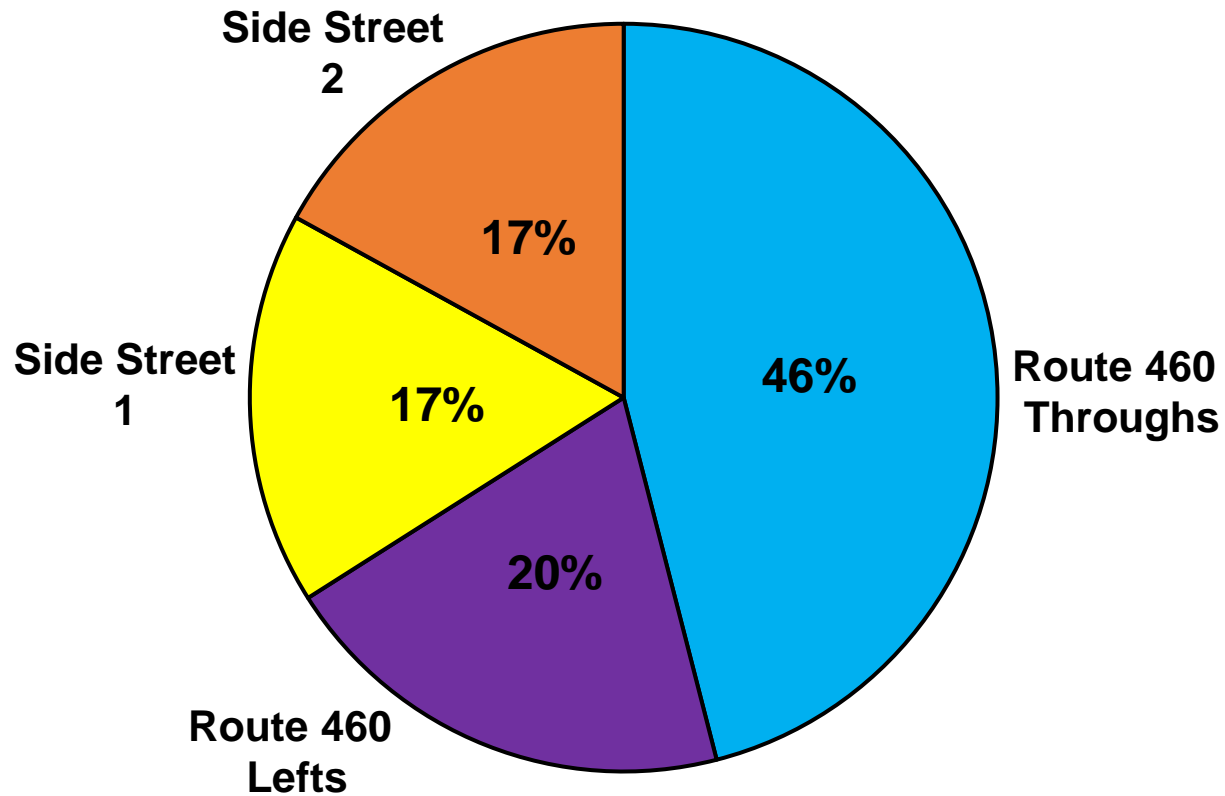
- Retains all movements except the side-street through movement (less than 0.1% of peak traffic)
- Allows both side-street left-turn movements to serve concurrently, thereby reducing a phase at the intersection
- Side-street through traffic turns right and uses nearby turn lane to make a U-turn and then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



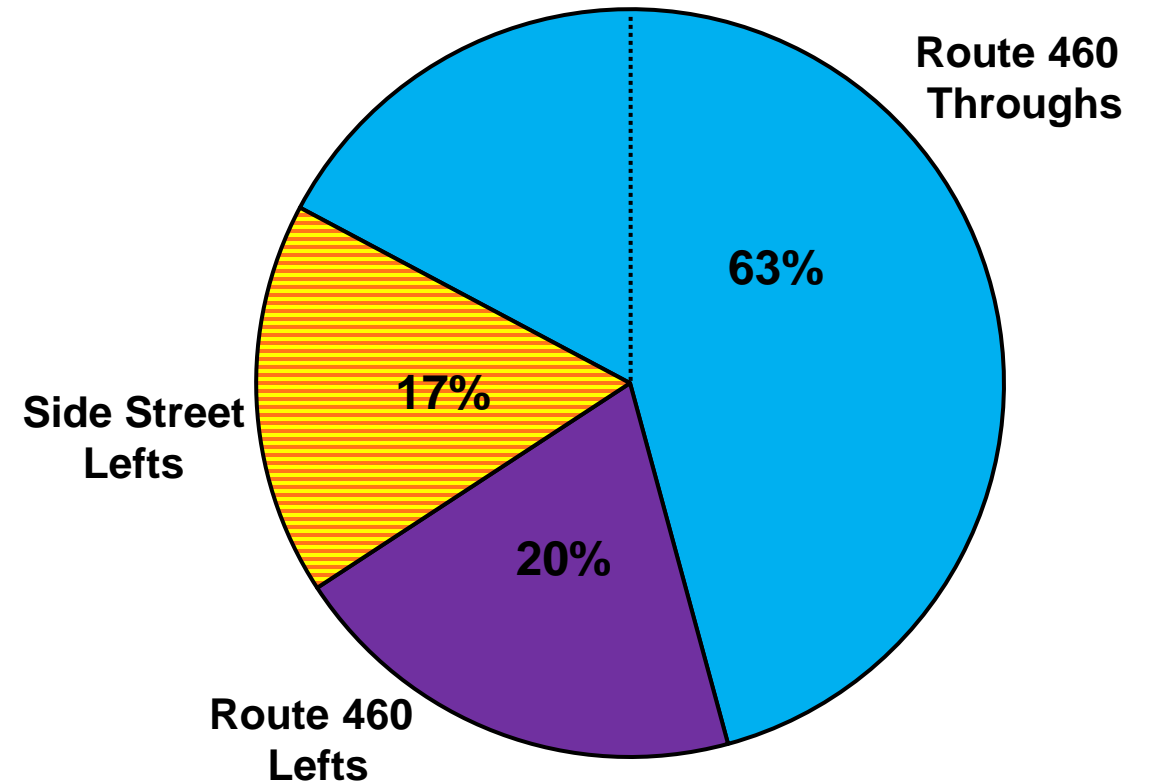
Route 460 & West Ruritan Road

# Effect of Phase Reduction

## Without Thru-Cut



## With Thru-Cut



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



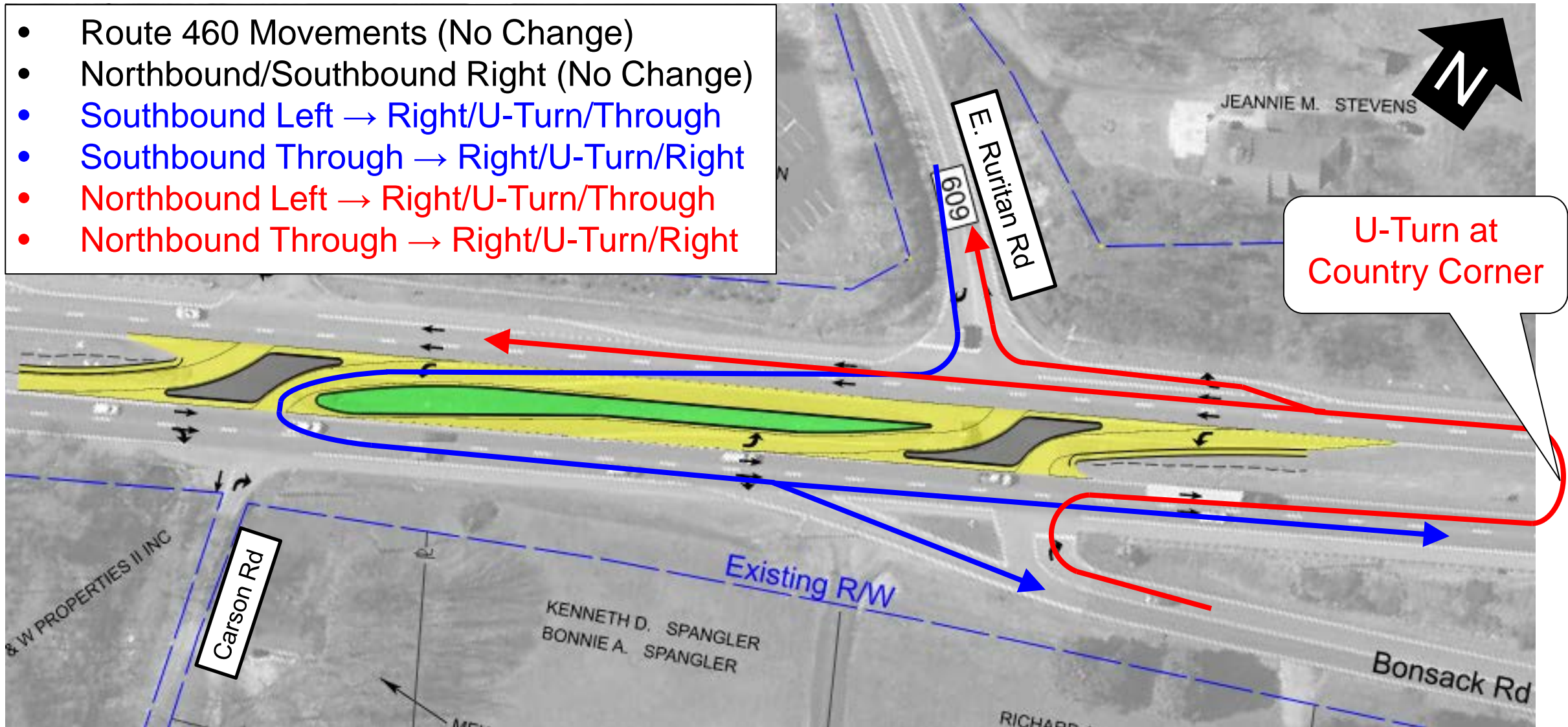
# Route 460 & East Ruritan Road/Bonsack Road – Existing





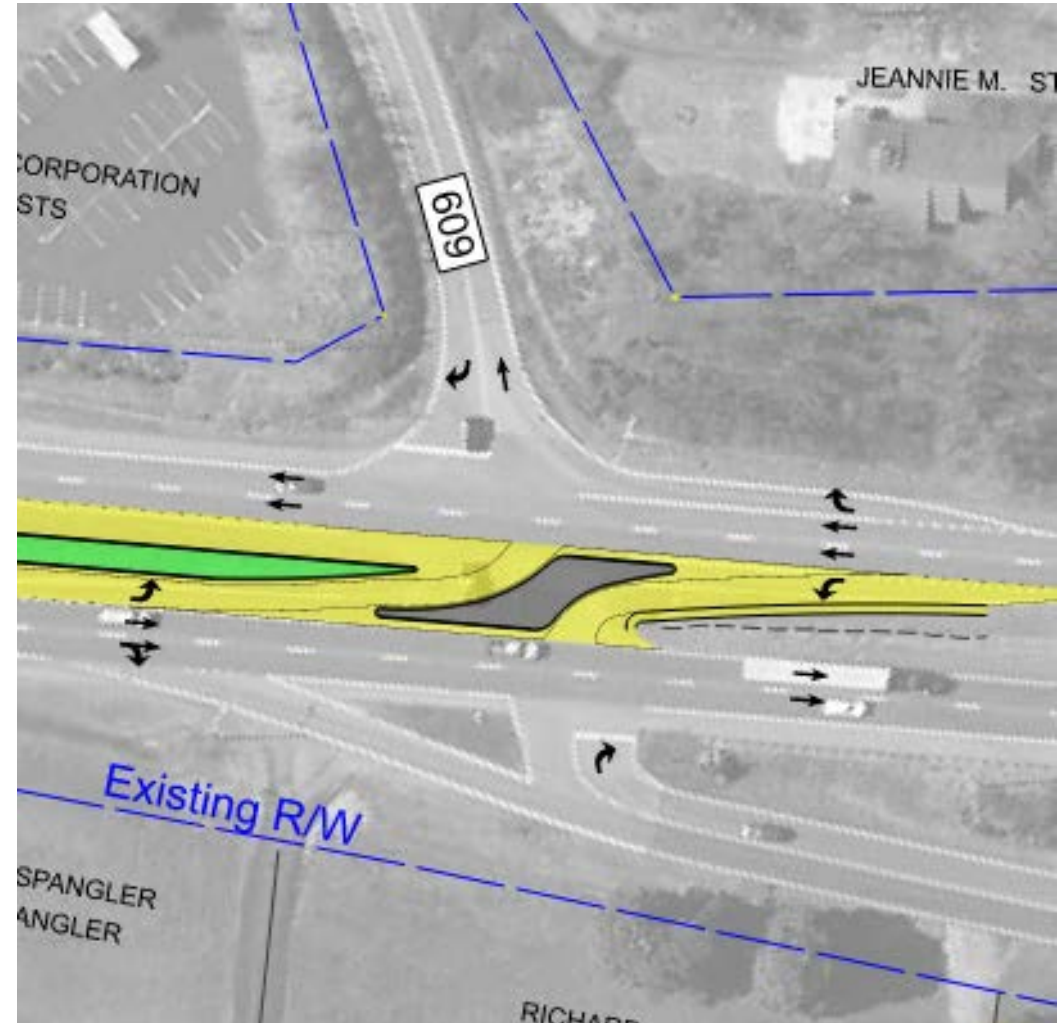
# Route 460 & East Ruritan Road/Bonsack Road – RCUT

- 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 signaled or unsignaled



Route 460 & East Ruritan Road

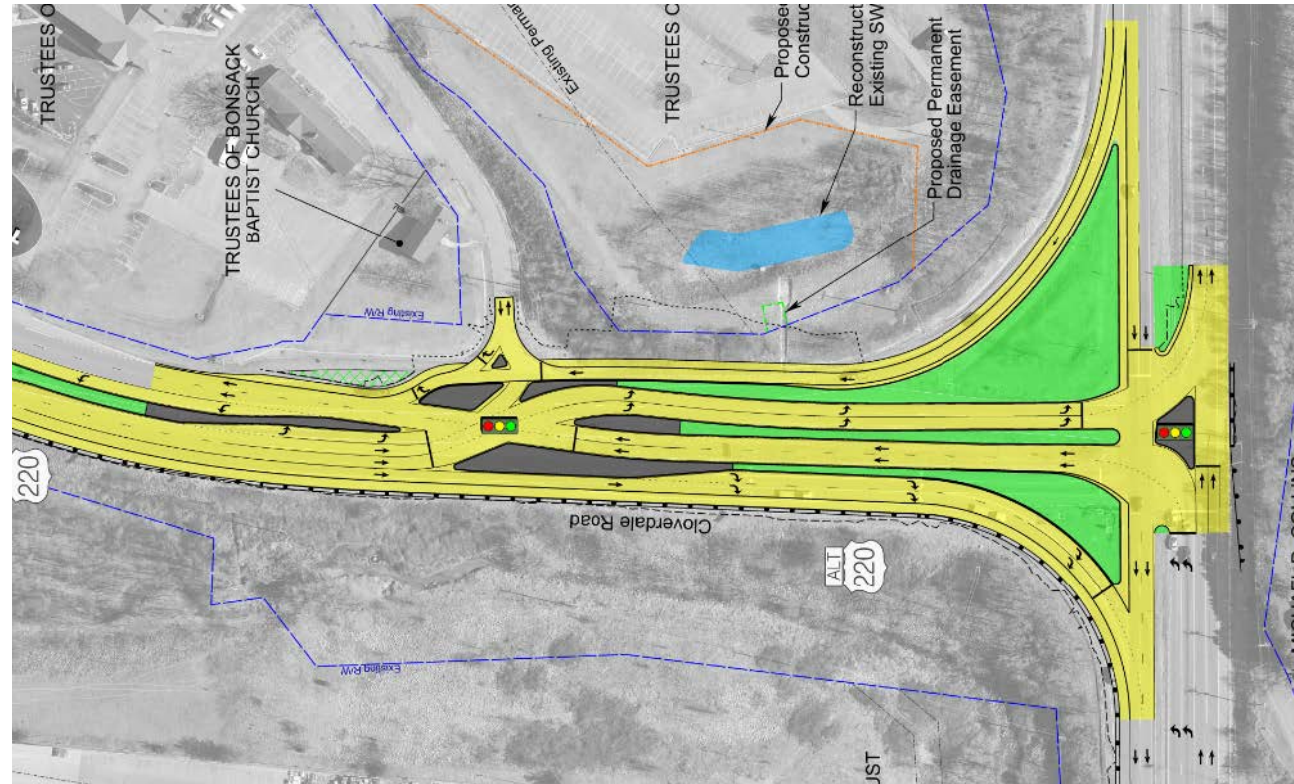


# Benefits of Thru-Cuts and RCUTs

- **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)?

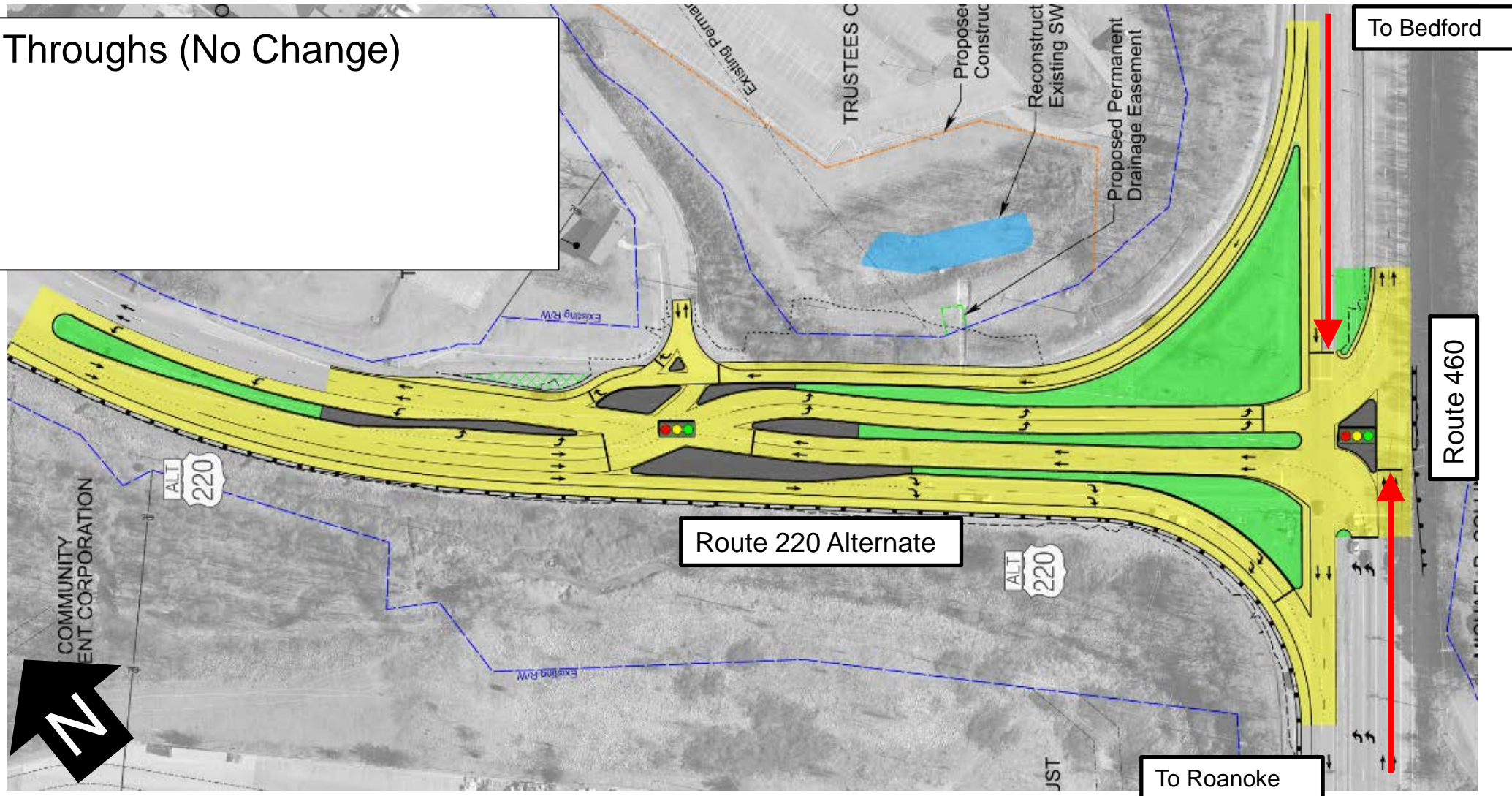
- Left-turning vehicles at the primary intersection cross to the other side of the road similar to a Diverging Diamond Interchange (e.g., Valley View Blvd interchange).
- Reduces signal phases because left-turns occur simultaneously



Route 460 & Route 220 Alternate

# Route 460 & Route 220 Alternate – Displaced Left Turn

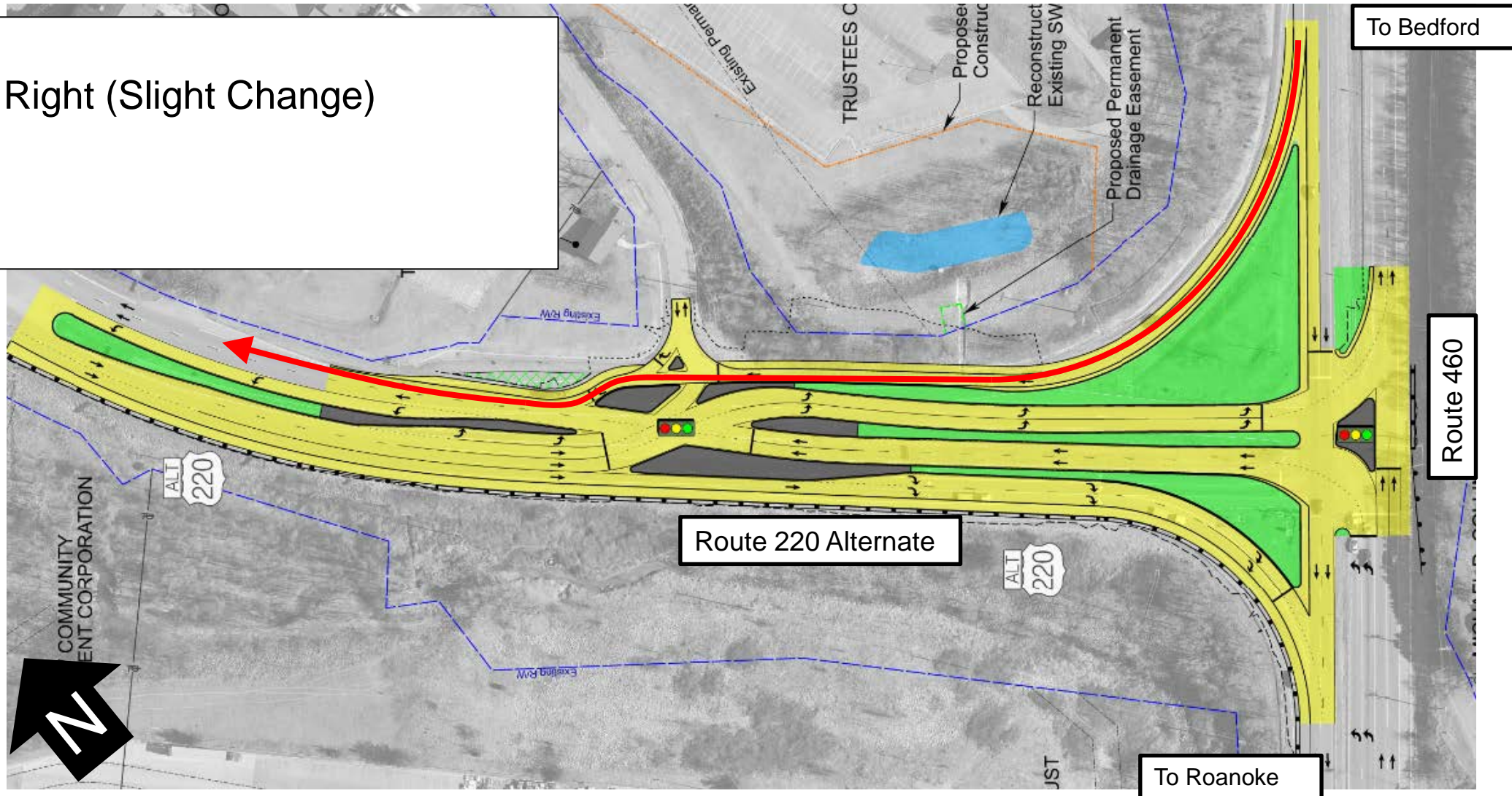
- Route 460 Throughs (No Change)





# Route 460 & Route 220 Alternate – Displaced Left Turn

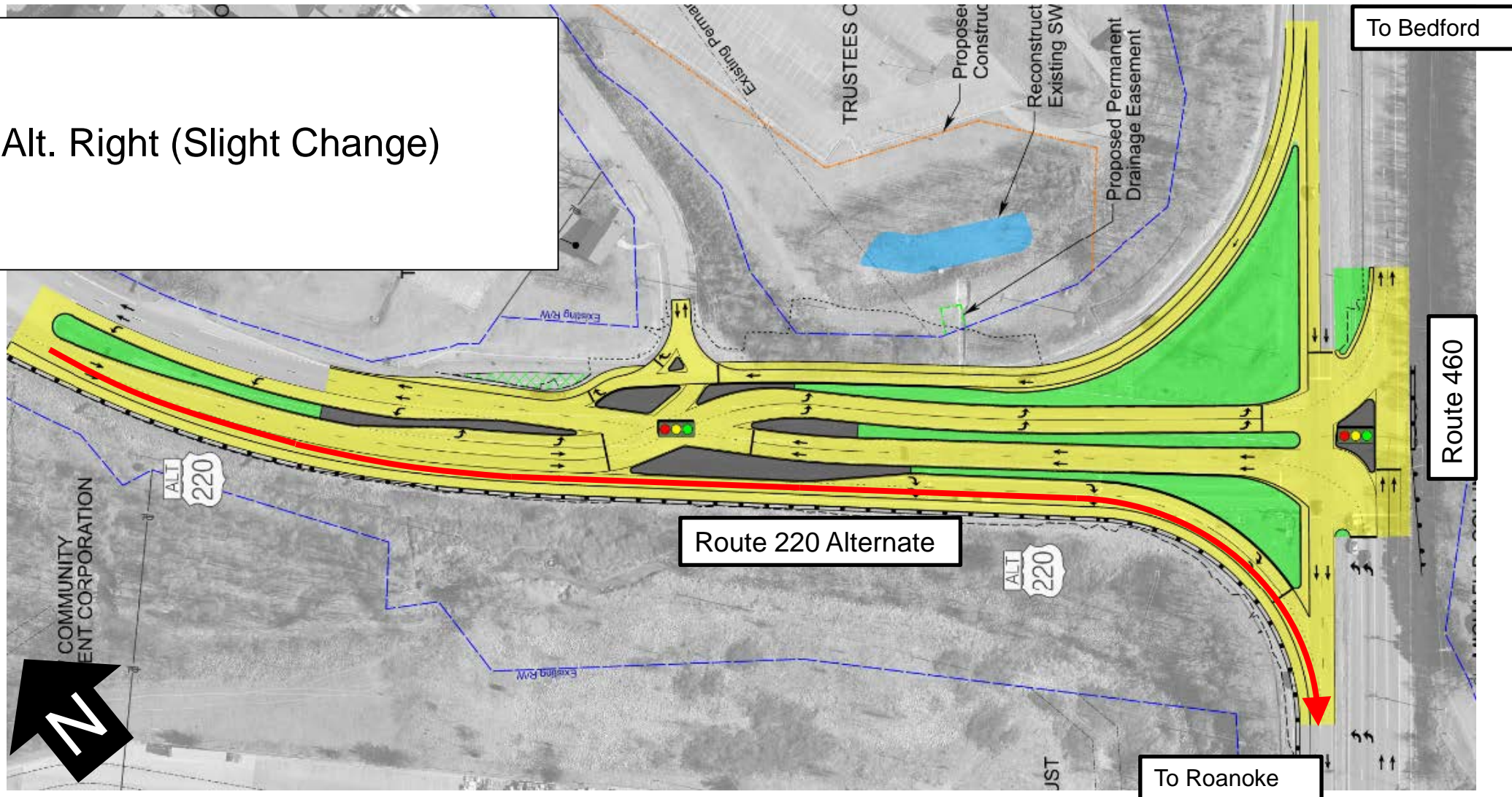
- Route 460 Right (Slight Change)





# Route 460 & Route 220 Alternate – Displaced Left Turn

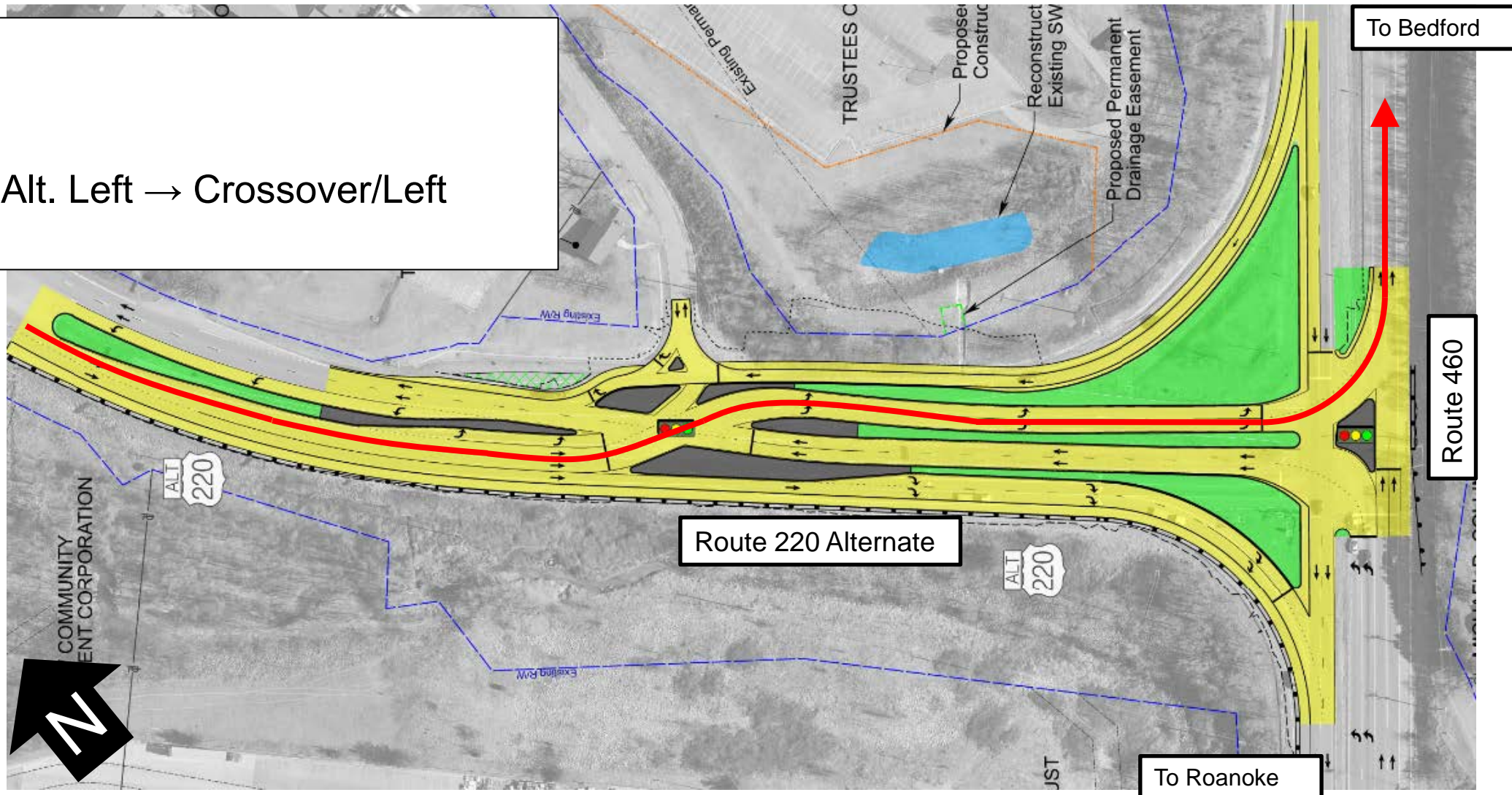
- Route 220 Alt. Right (Slight Change)





# Route 460 & Route 220 Alternate – Displaced Left Turn

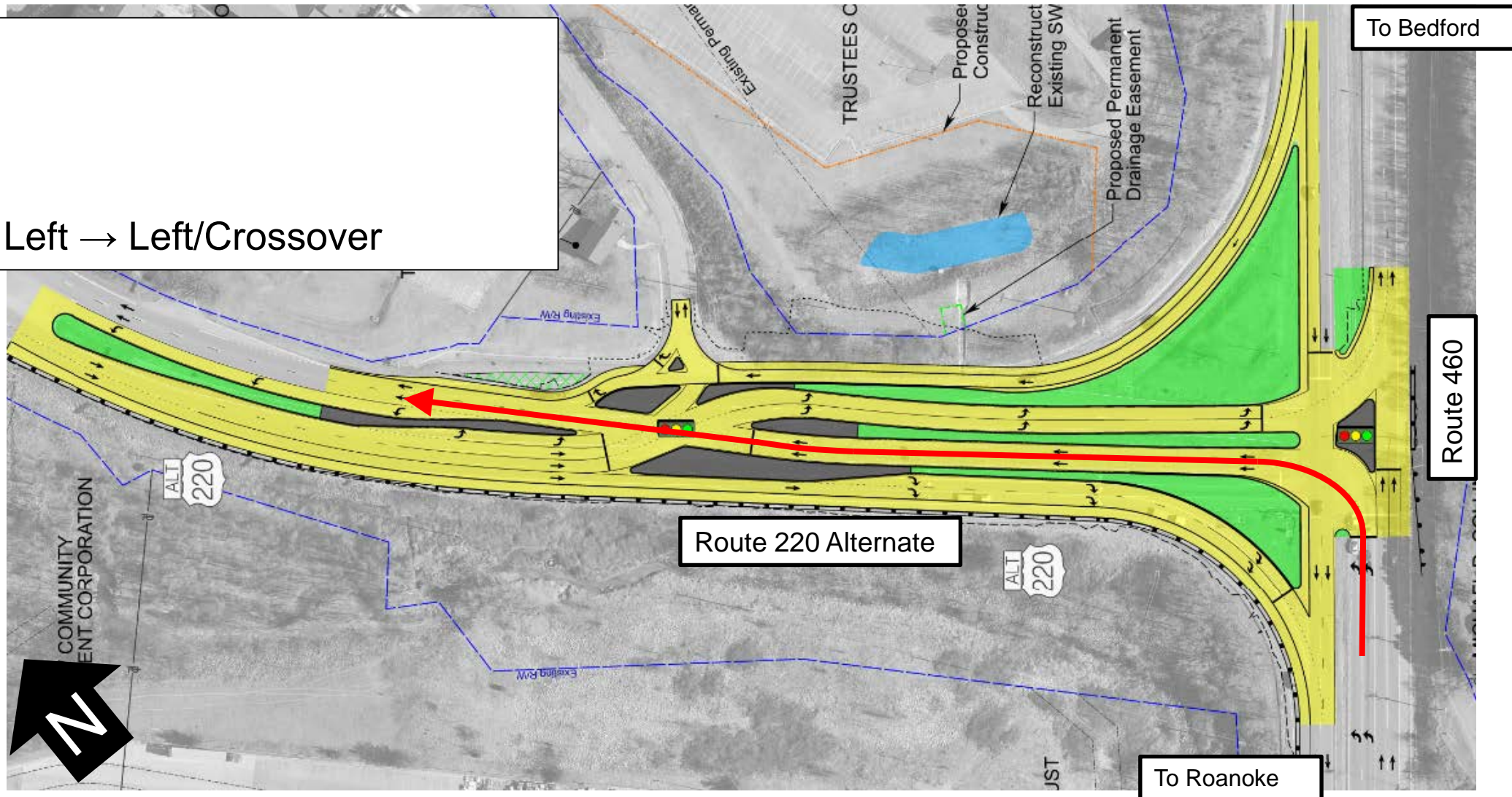
- Route 220 Alt. Left → Crossover/Left





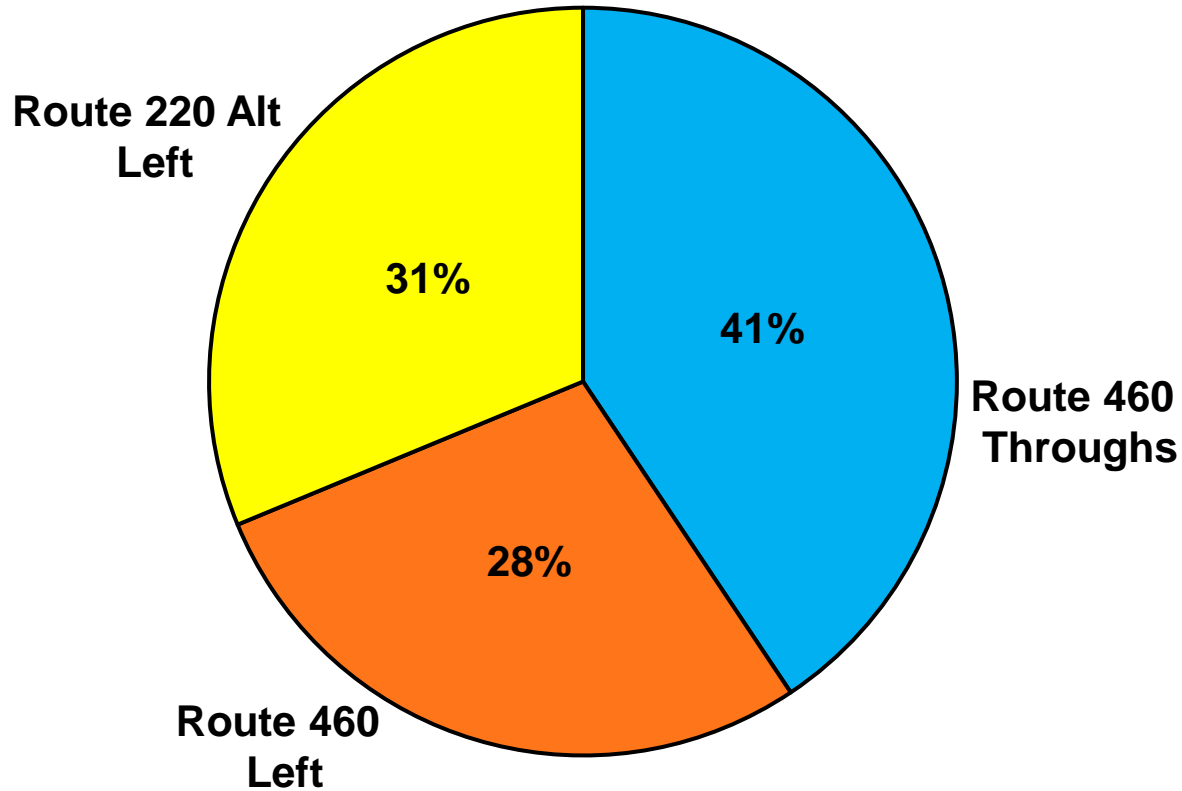
# Route 460 & Route 220 Alternate – Displaced Left Turn

- Route 460 Left → Left/Crossover

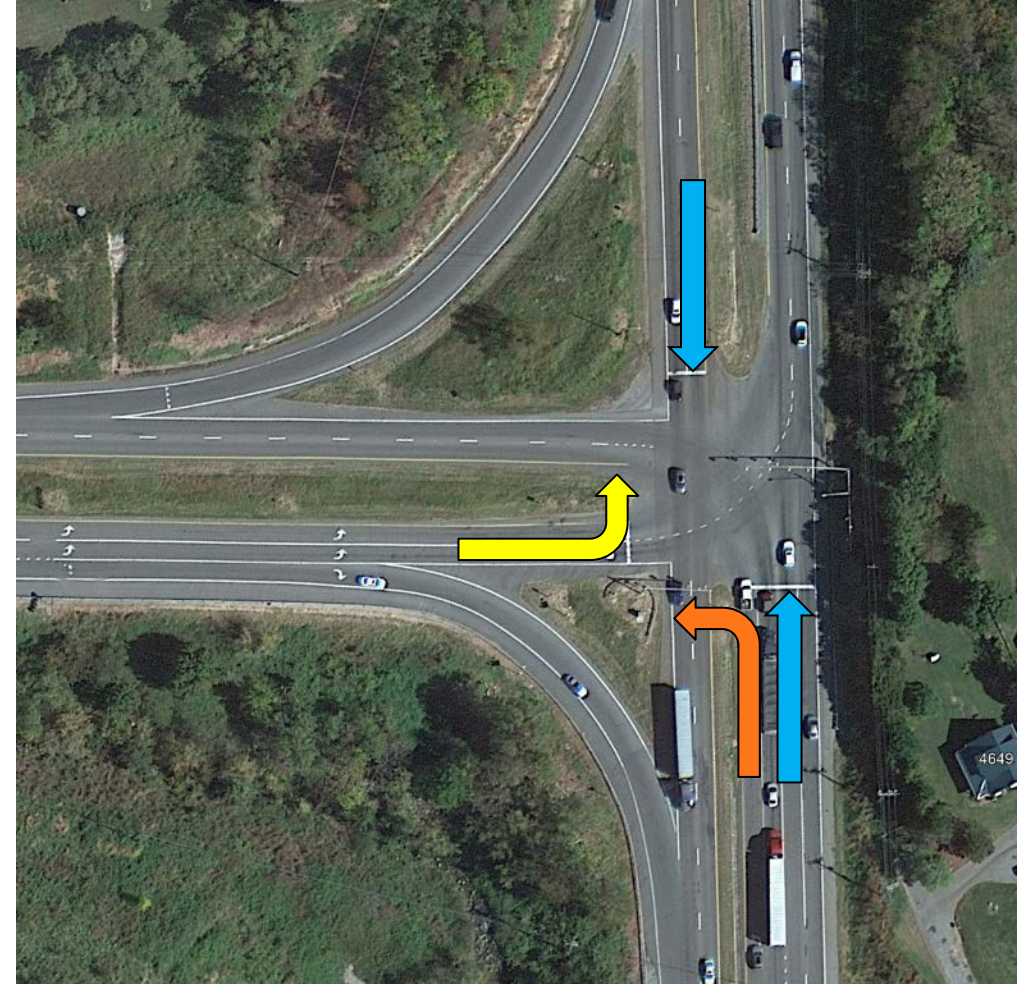


# Route 460 & Route 220 Alternate – Existing Configuration

## Existing: 3-Phase Operation



*Percentage of Green Time by Movement*

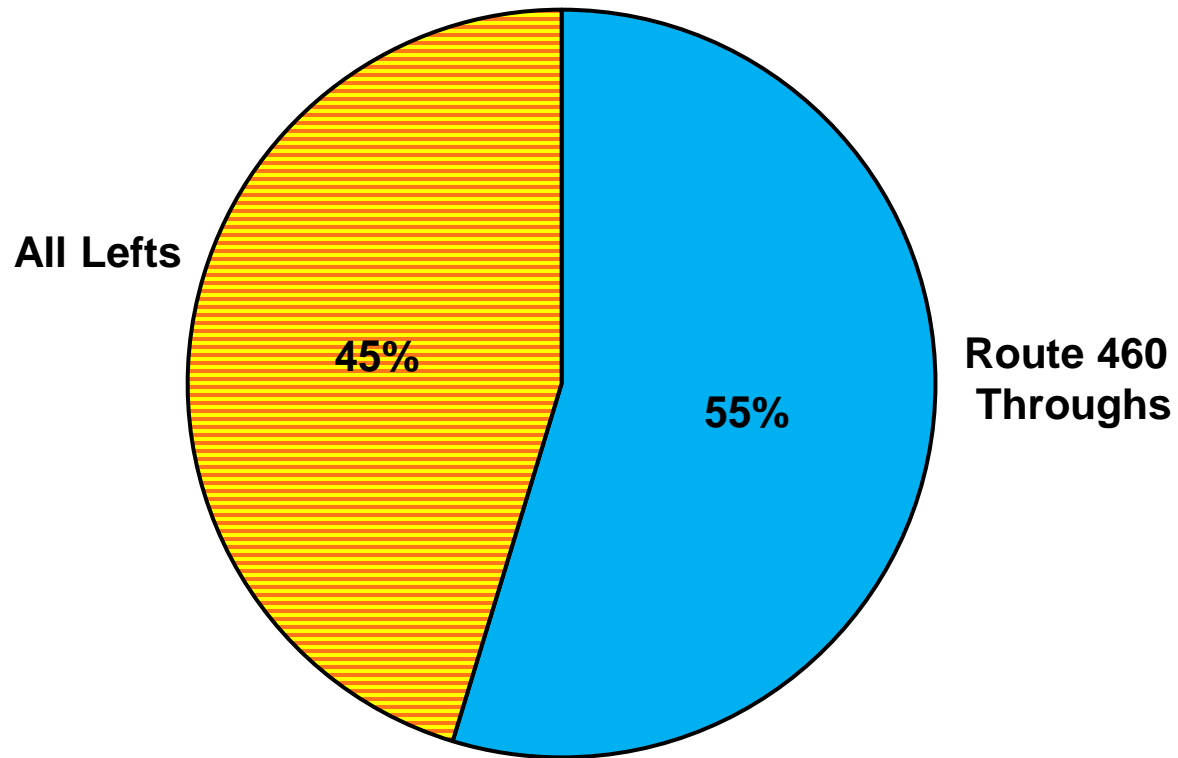


Route 460 & Route 220 Alternate

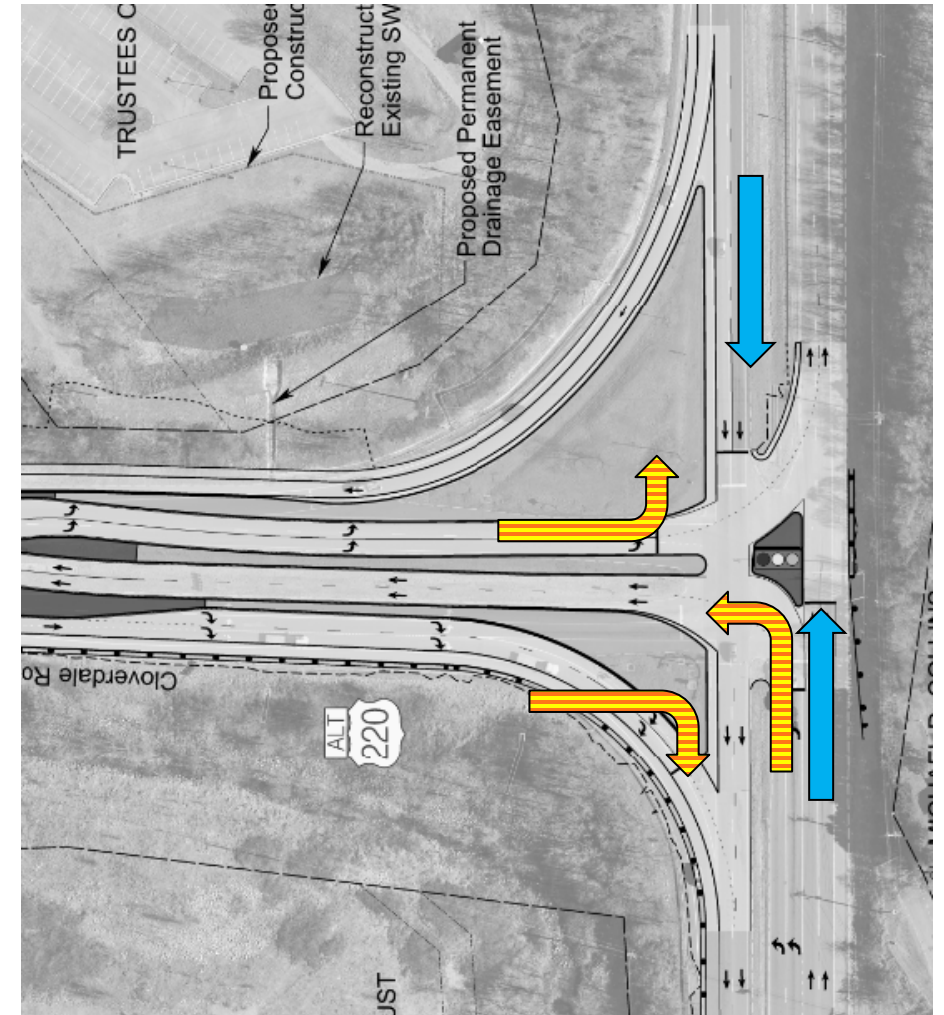


# Route 460 & Route 220 Alternate – DLT Configuration

## DLT: 2-Phase Operation



*Percentage of Green Time by Movement*



Route 460 & Route 220 Alternate

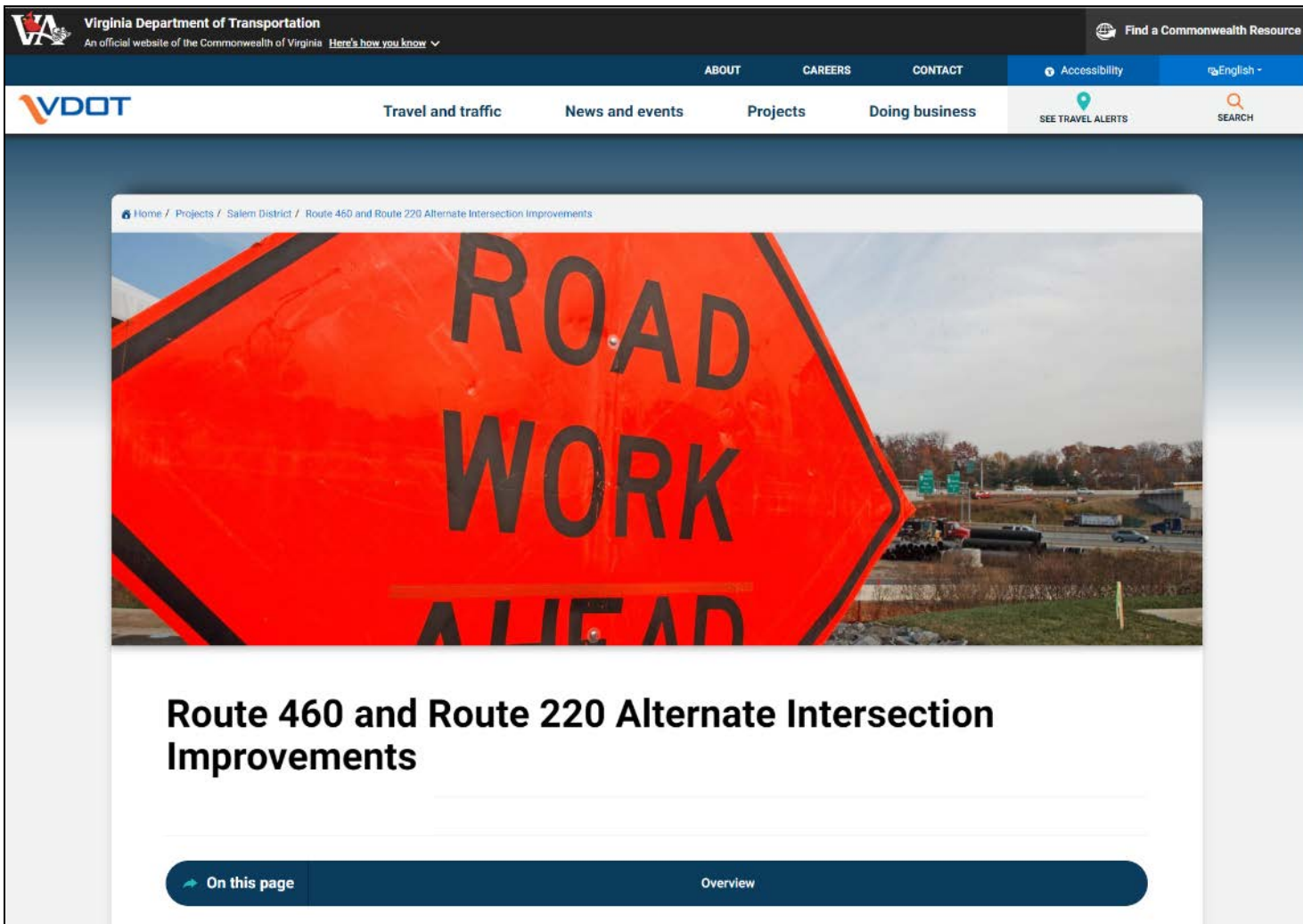


# Benefits – DLT at Route 220 Alternate



- **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



*Video of simulated driving through DLT on VDOT project website*



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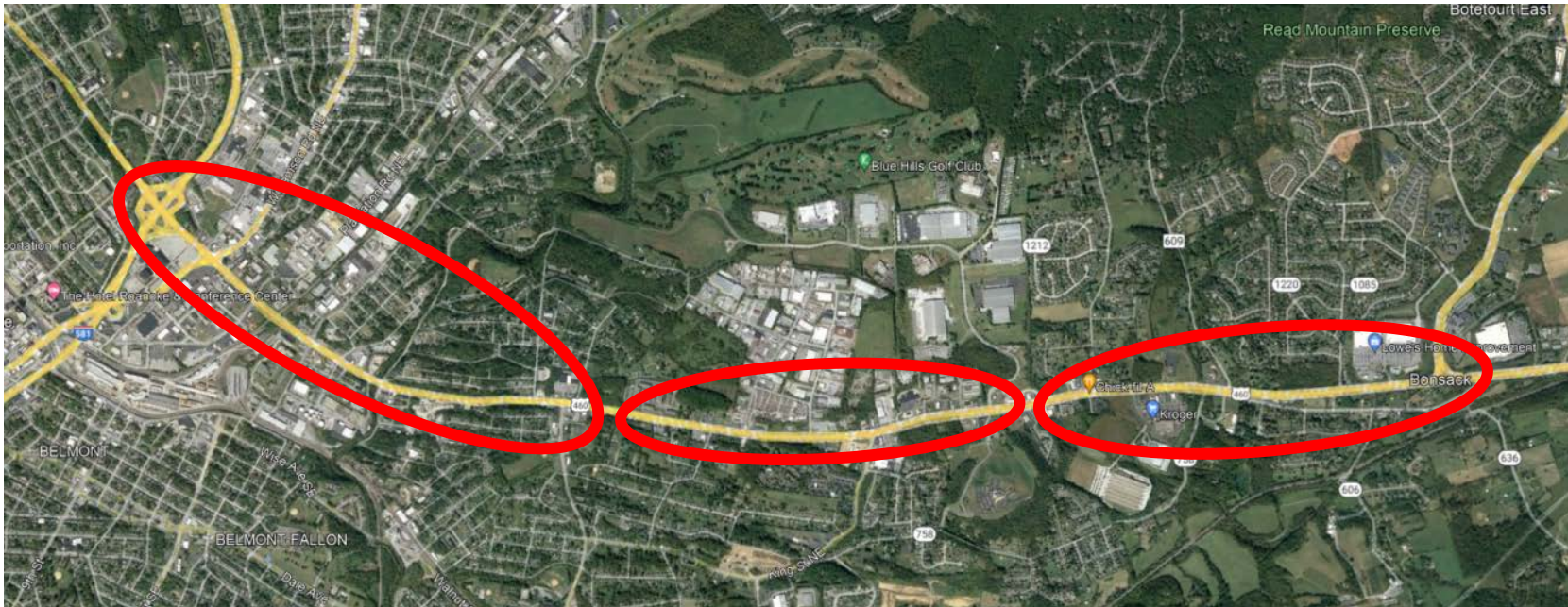




# Route 460 Improvements – I-581 to Avery Row

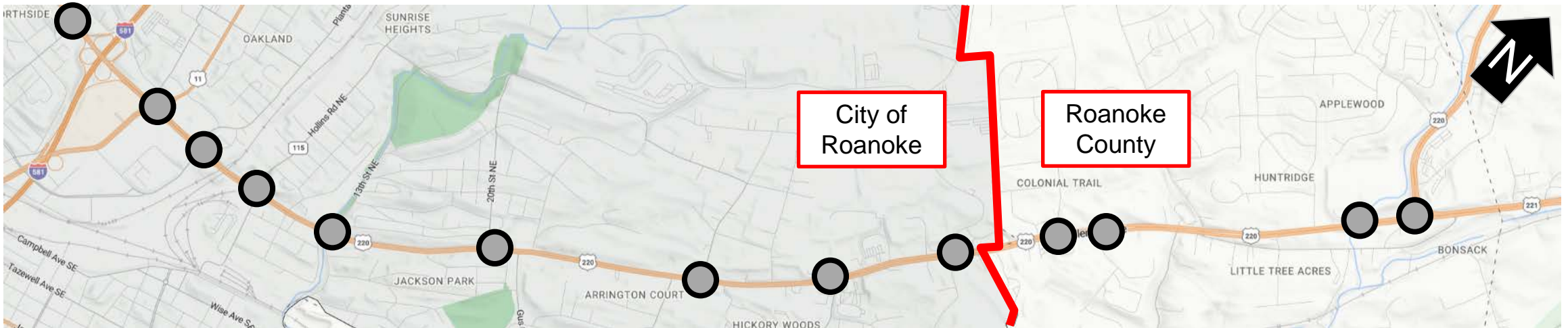
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# Route 460 Corridor Signalized Intersections

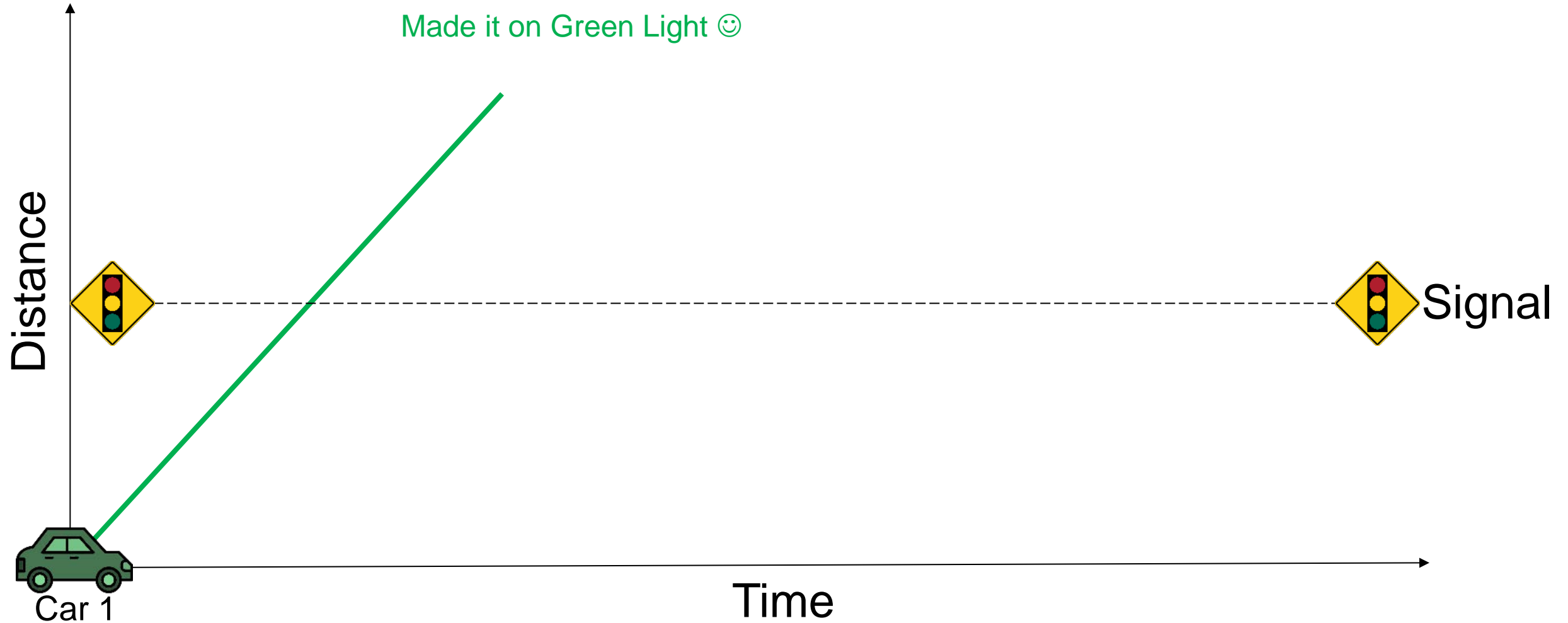
Westbound to Downtown (AM Peak worst)



Eastbound from Downtown (PM Peak worst)

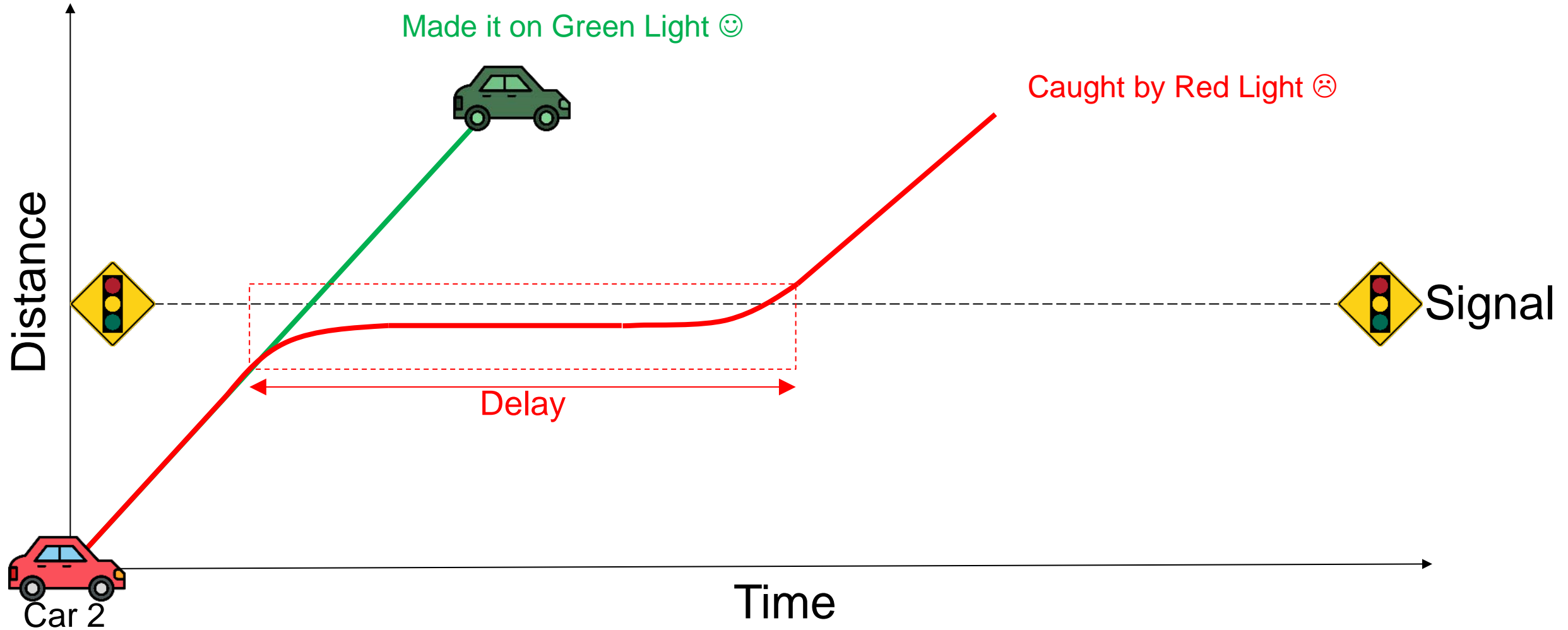


# Corridor Travel Time Illustration

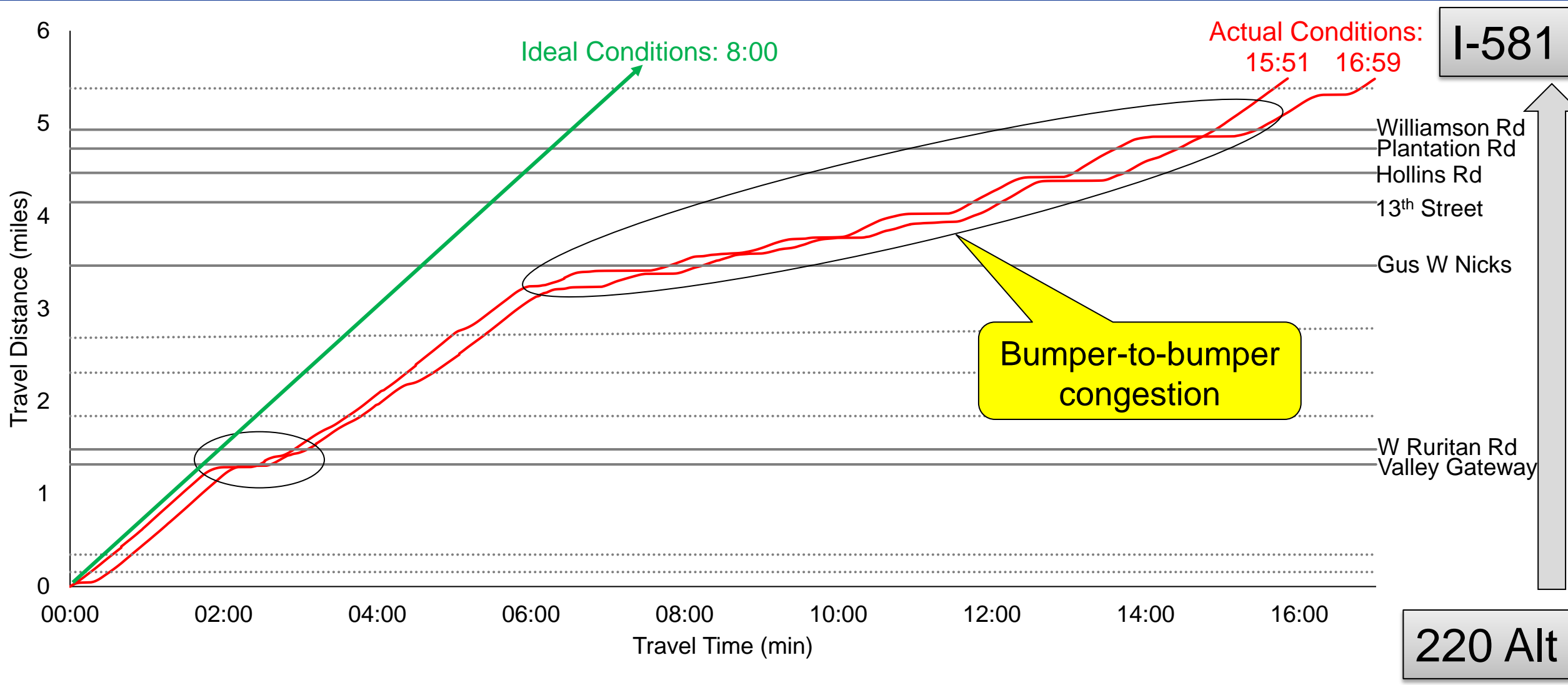




# Corridor Travel Time Illustration

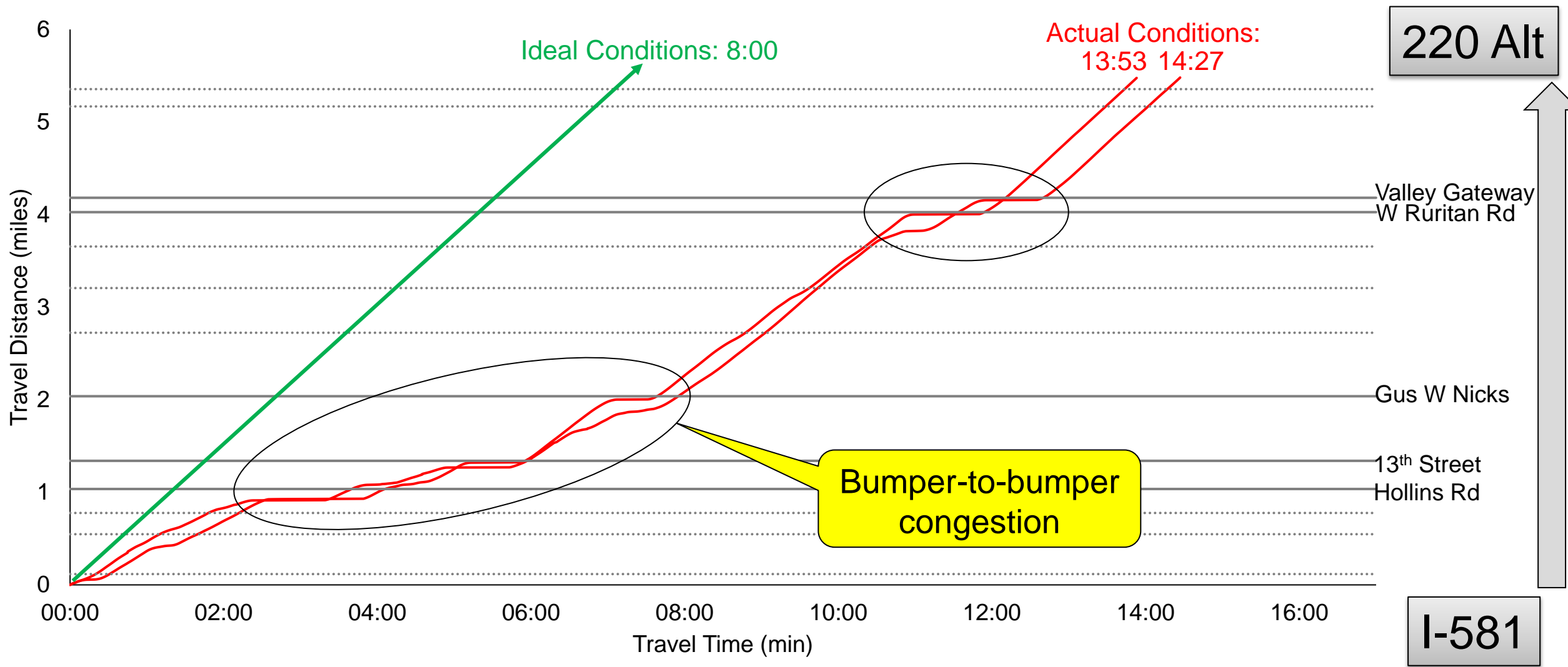


# Westbound AM Peak – Travel Times in September 2024





# 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

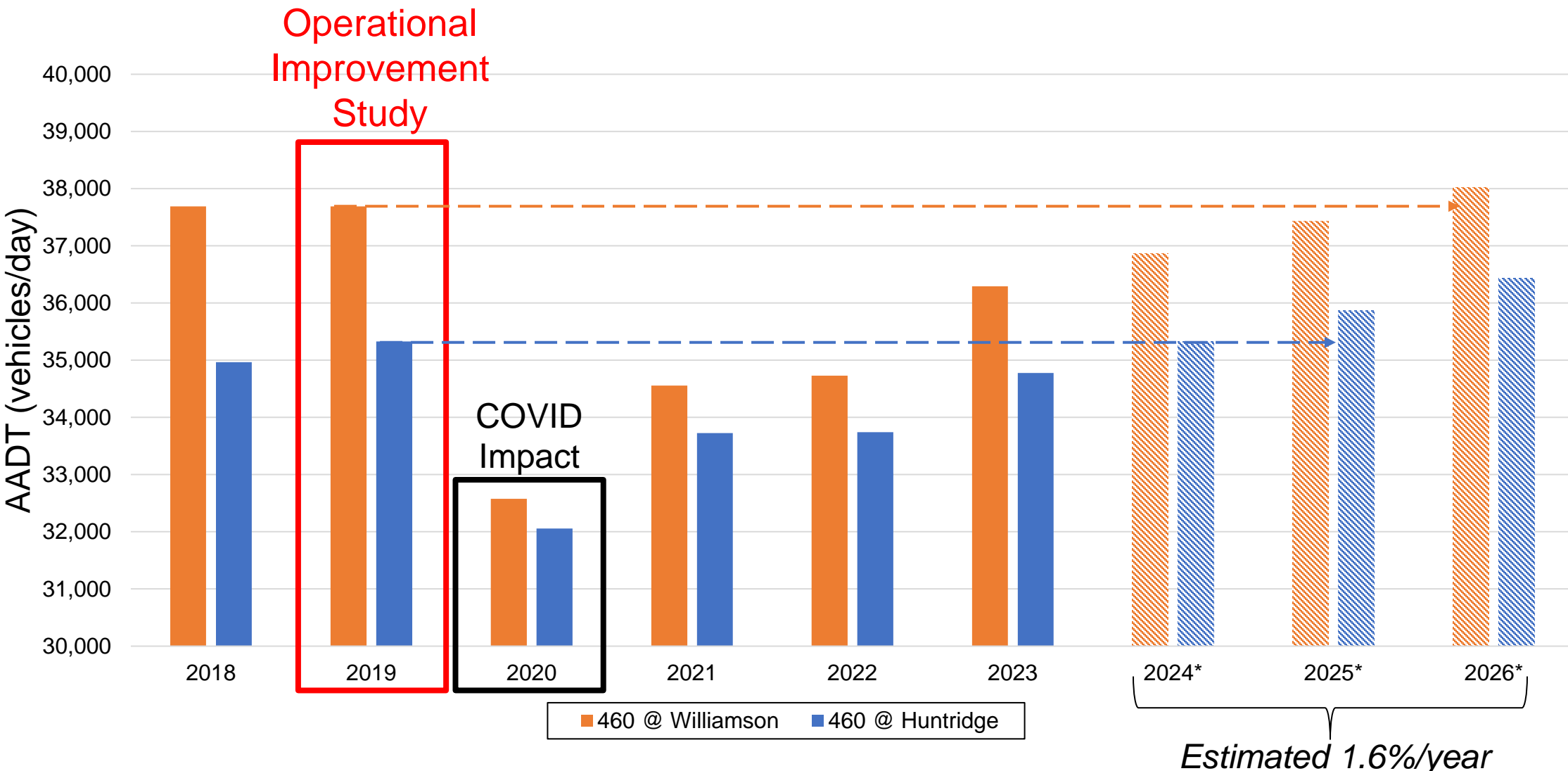
Peak Period	Direction	2019	2024
AM Peak	Westbound (To Downtown)	21:02	15:34
PM Peak	Eastbound (From Downtown)	23:35	14:10



# 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

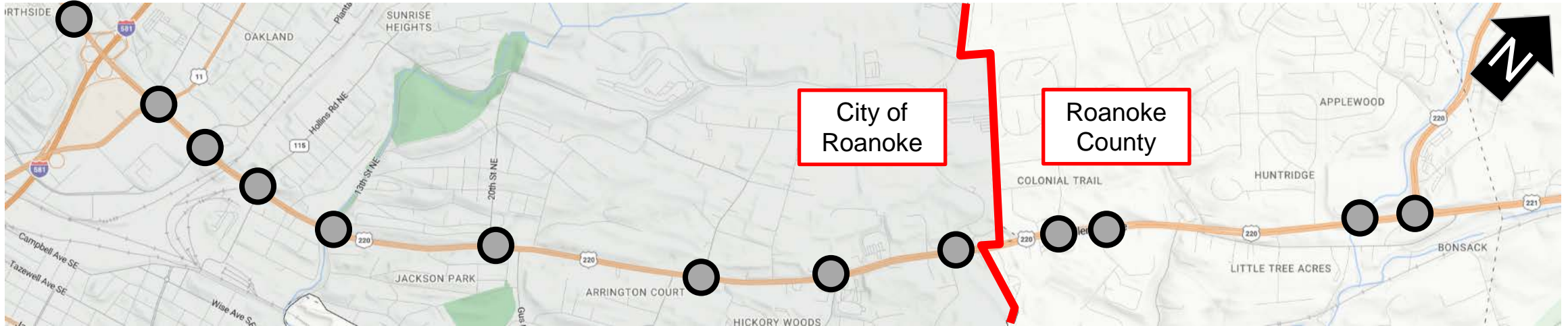
Peak Period	Direction	2019 Existing	2019 w/ Improvements	2040 Do Nothing	2040 w/ Improvements
AM Peak	Westbound	21:02	15:06	31:13	21:39
PM Peak	Eastbound	23:35	16:04	30:27	19:59

+ 7 years

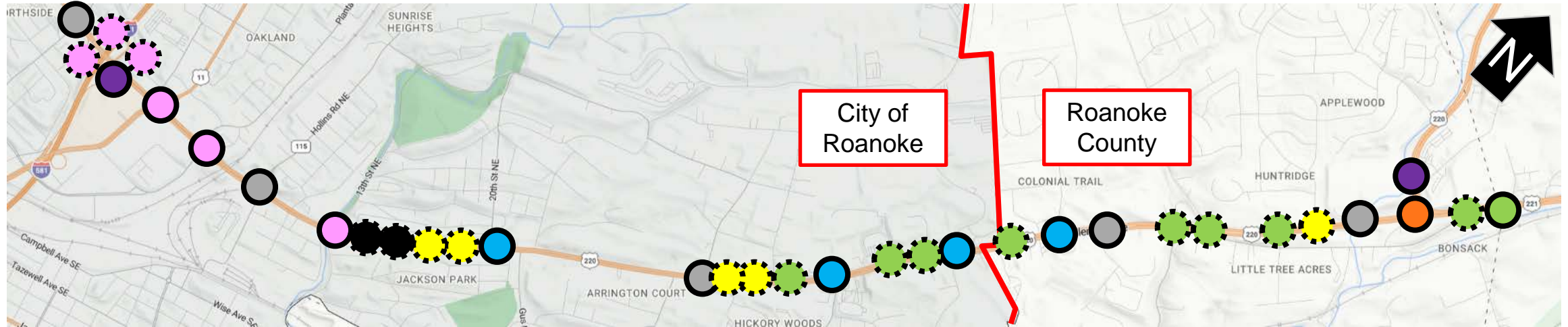
Peak Period	Direction	2026 Do Nothing	2026 w/ Improvements	2047 Do Nothing	2047 w/ Improvements
AM Peak	Westbound	21:02	15:06	31:13	21:39
PM Peak	Eastbound	23:35	16:04	30:27	19:59

*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**

