Redesign of US Route 1 Corridor at Bakers Basin Road

Design Team:

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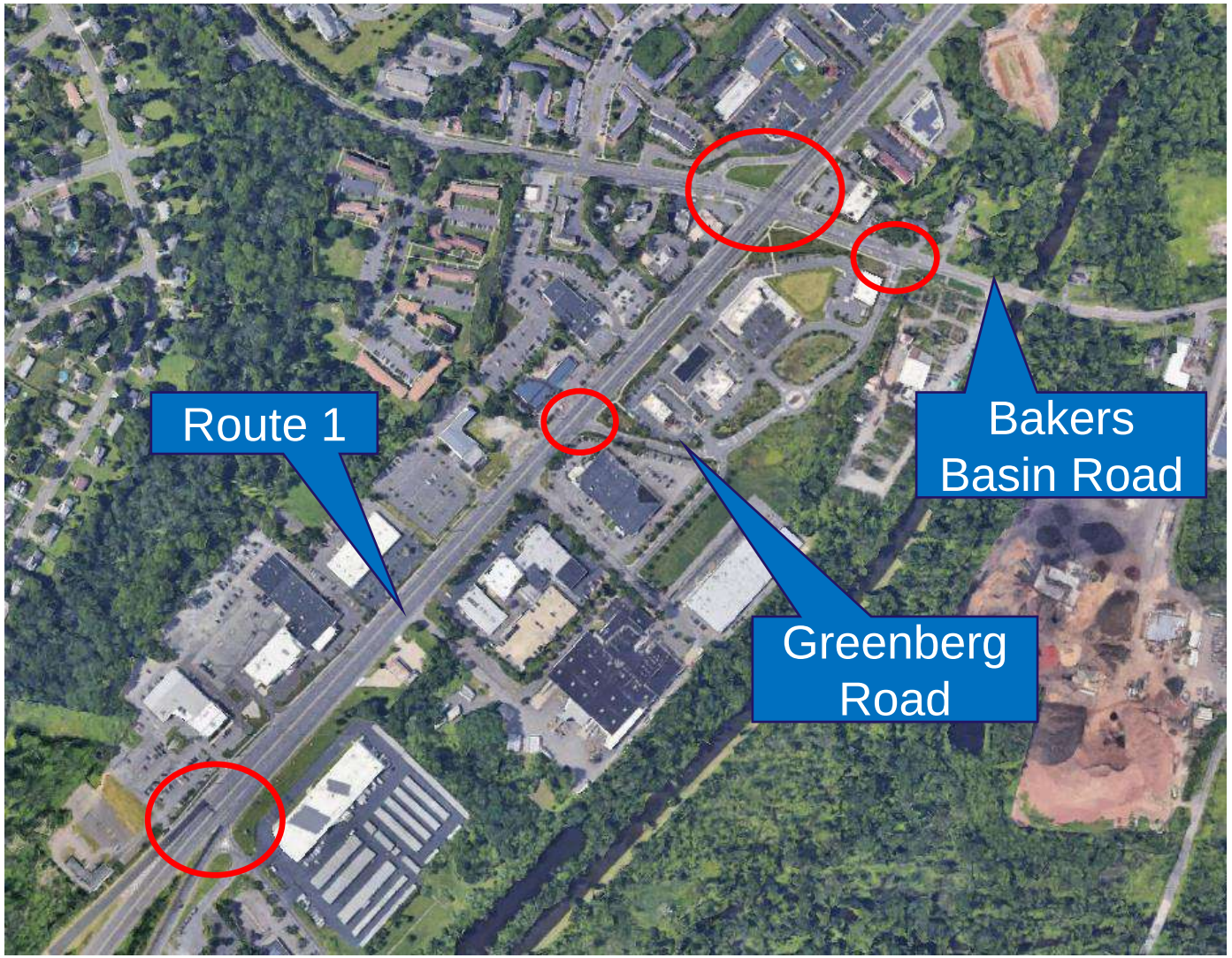
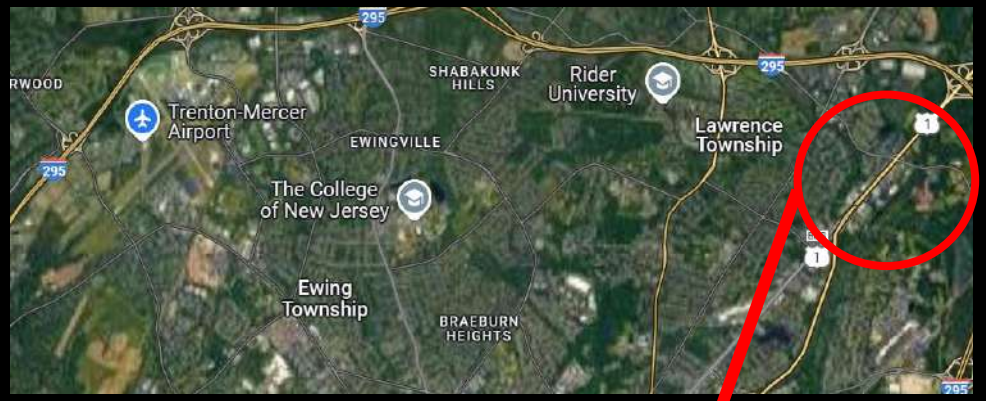
Advisor:

Dr. Thomas Brennan



Problem Statement and Background

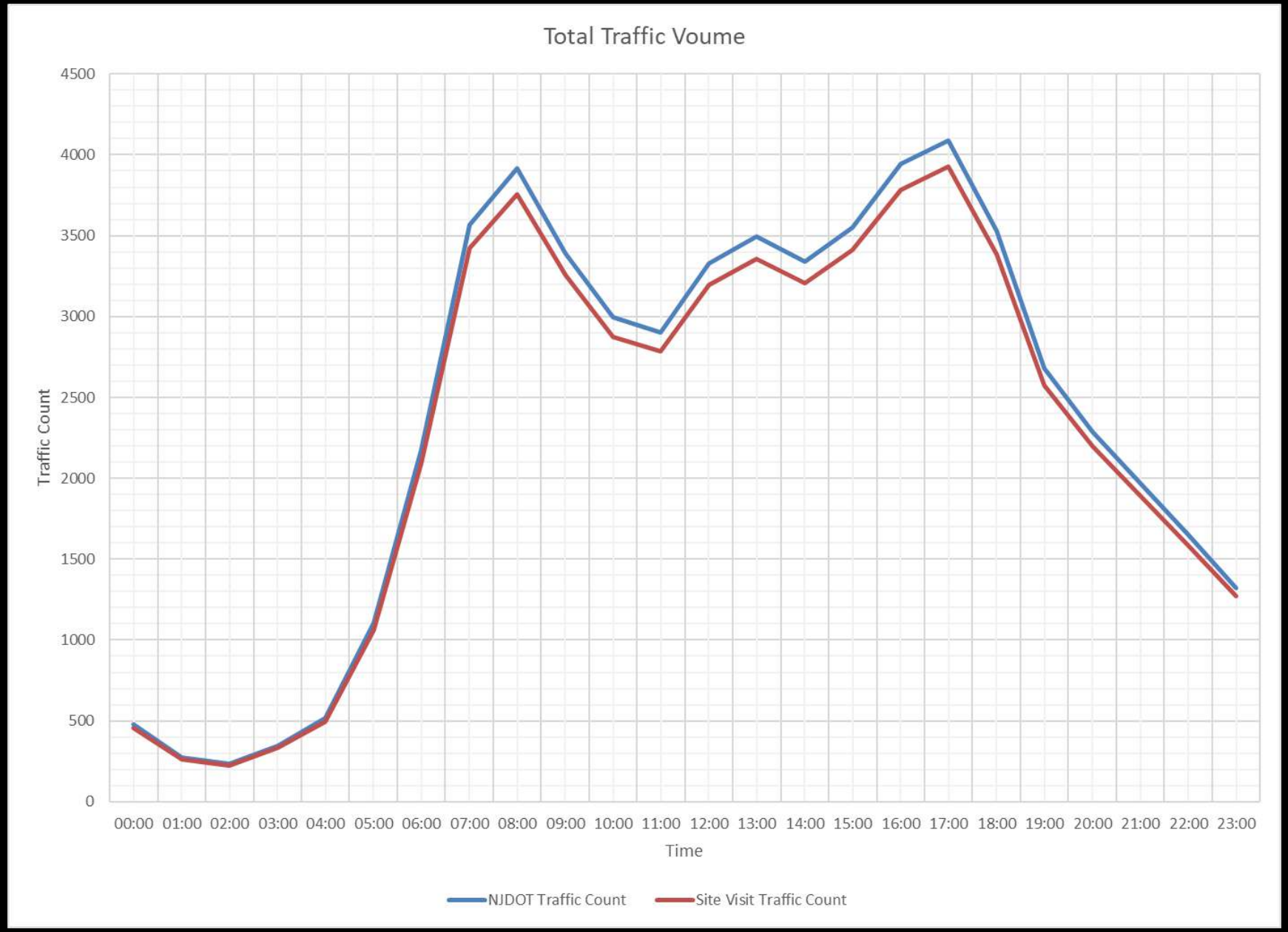
- US Route 1 Corridor at Bakers Basin Road, Lawrenceville NJ
- High Traffic Volume and Speed
- Pedestrian Safety Concerns
- History of Accidents
- Community Impact



Design Constraints

- Existing roadway geometry and right of way
- Traffic Flow and Capacity
- Pedestrian and Bicycle Accommodations
- Safety Regulations and Design Standards
  - American Association of State Highway and Transportation Officials (AASHTO)
  - Federal Highway Administration (FHWA)

Traffic Count Data



VISSIM Model of Existing Conditions

Count: 10	No	Name	Link	Volume(0-MAX)	VehComp(0-MAX)
1	1	Straight	1: Route 1 North	1500.0	1: Default
2	2	Right	2: Route 1 North	300.0	1: Default
3	3	Left	9: Bakers Basin West	100.0	1: Default
4	4	Straight	8: Bakers Basin West	150.0	1: Default
5	5	Right	16: Bakers Basin West	150.0	1: Default
6	6	Straight	3: Route 1 South	1300.0	1: Default
7	7	Right	7: Route 1 South	300.0	1: Default
8	8	Left	6: Bakers Basin East	200.0	1: Default
9	9	Straight	4: Bakers Basin East	100.0	1: Default
10	10	Right	5: Bakers Basin East	100.0	1: Default

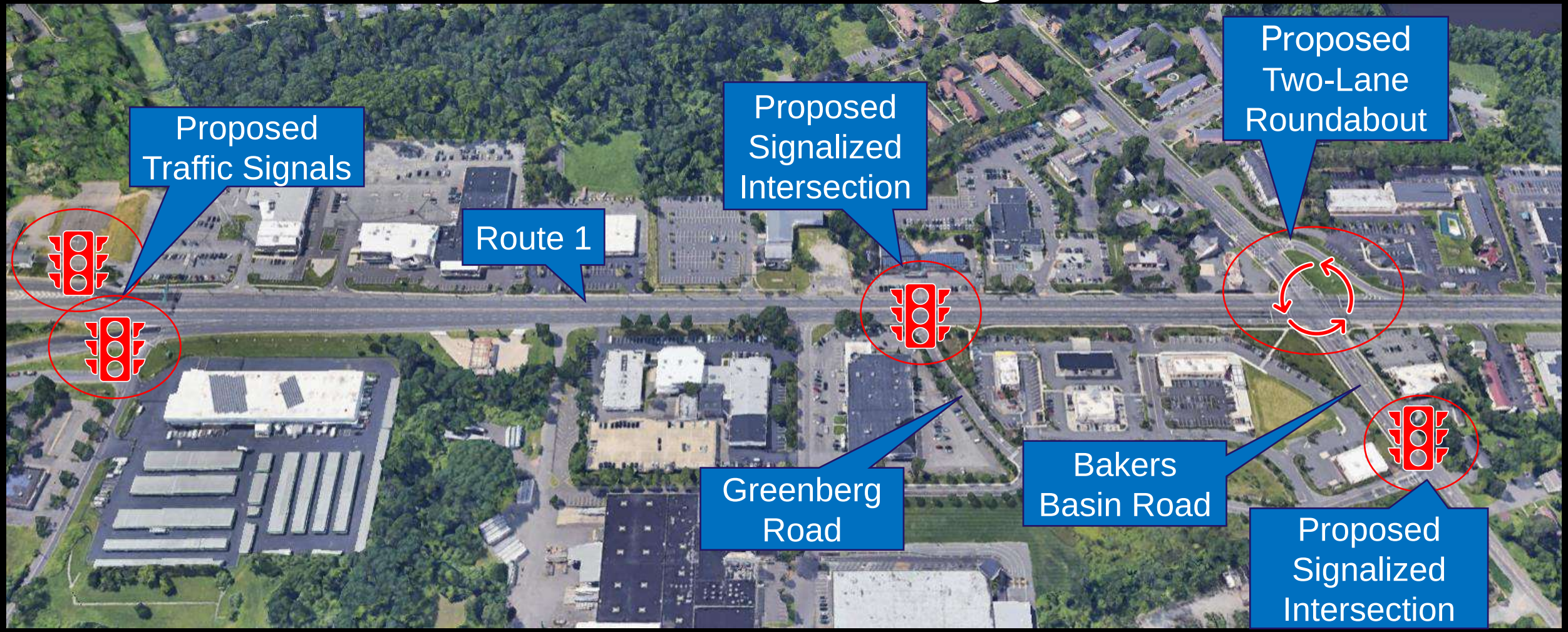
Realistic Constraints

- Economic: Budget limitations
- Political: State / County / Township Regulations
- Ethical: Safety vs. Convenience
- Health/Safety: Reducing Accident Rates
- Social: Reconnect Neighborhoods

Applicable Standards

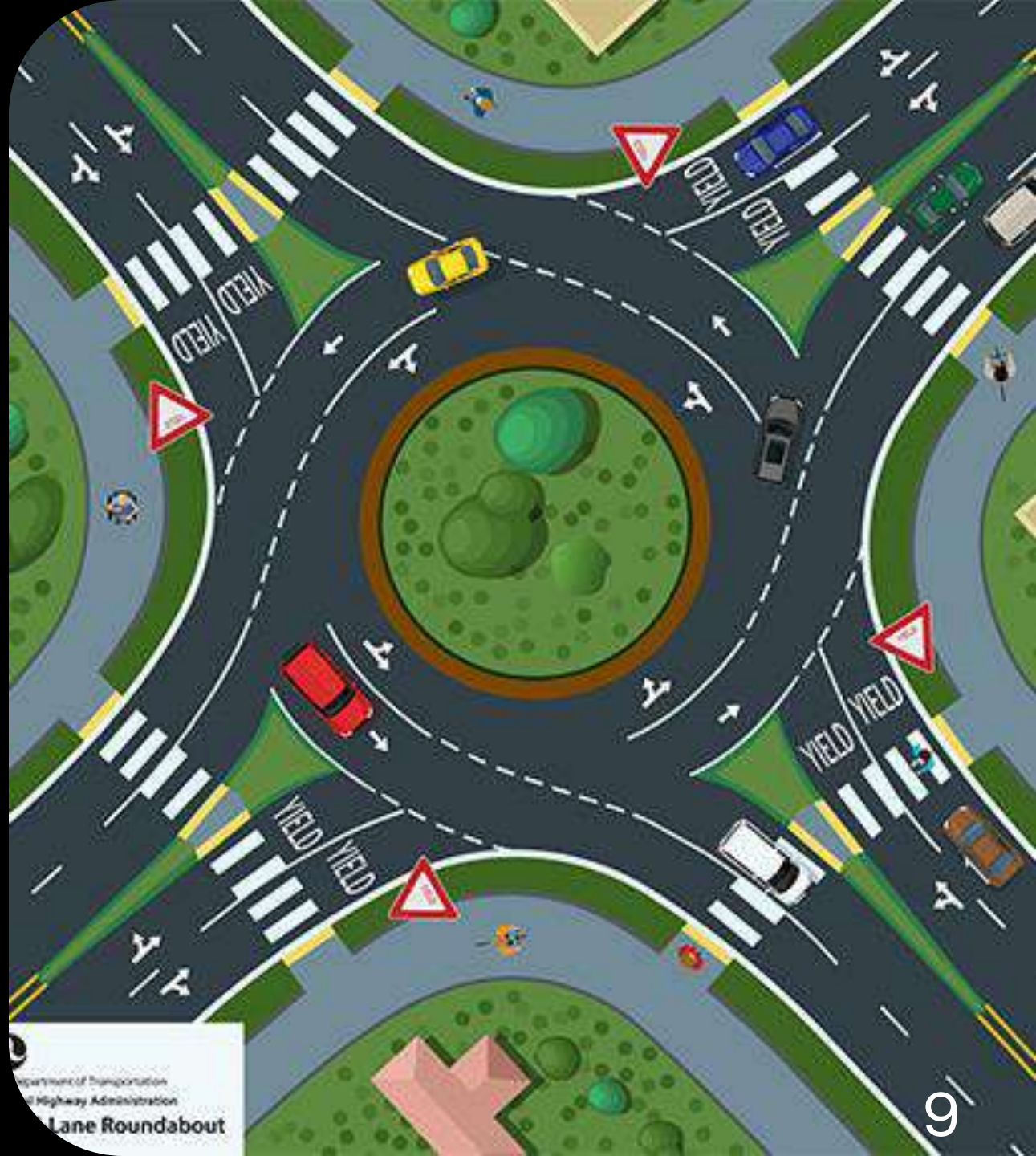
- ADA Standards for Accessible Design
- Lawrence Township Zoning Ordinances
- ITE Trip Generation Manual, 11th Edition
- Manual on Uniform Traffic Control Devices (MUTCD)
- NJDOT Roadway Design Manual

Alternative Design 1



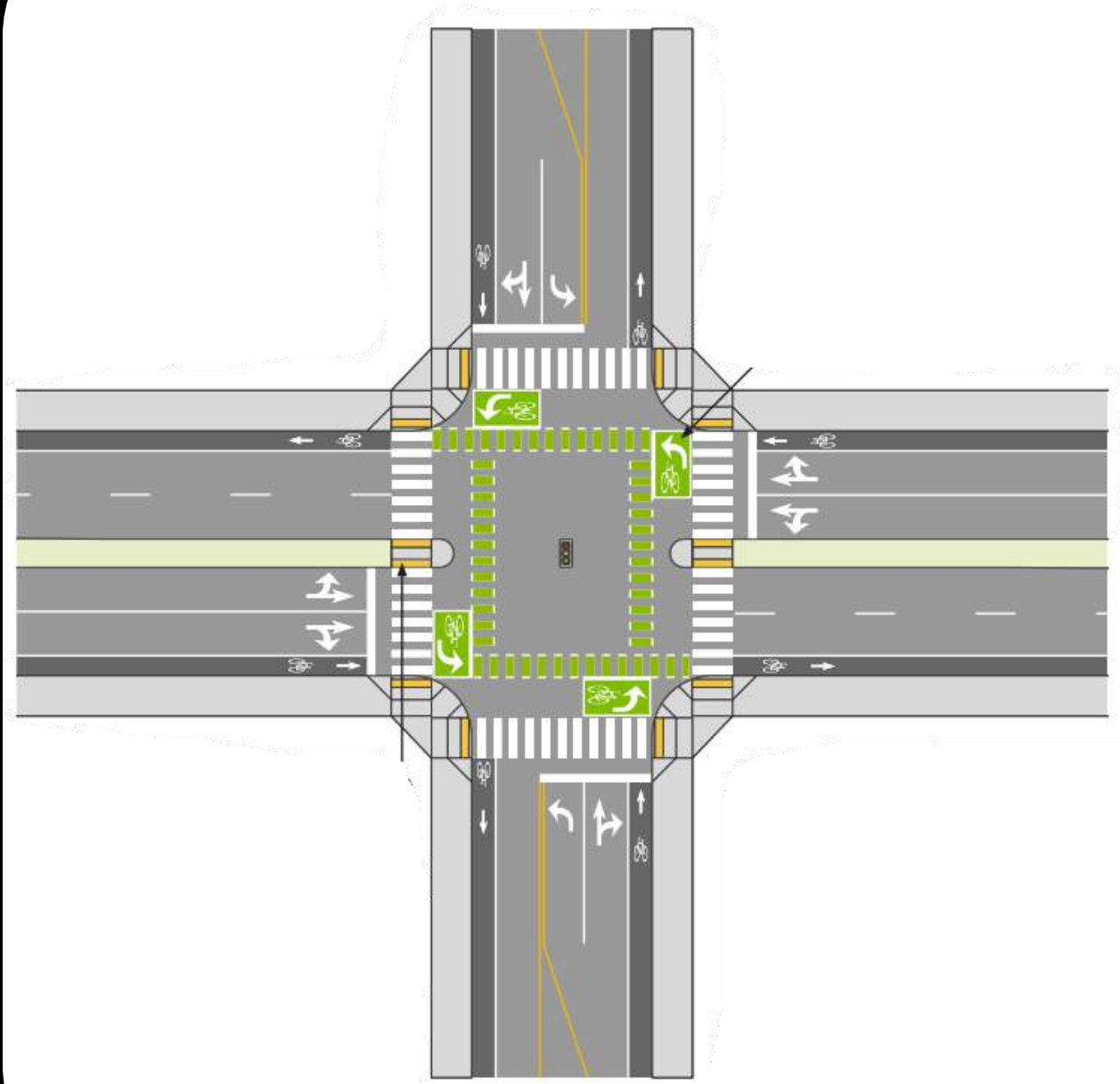
Alternative Design 1

- Example two-lane roundabout at main intersection
- Constant flow (enhancing vehicle circulation)
- Safe speed (35 mph)
- Include crosswalks, bike lanes, and sidewalks

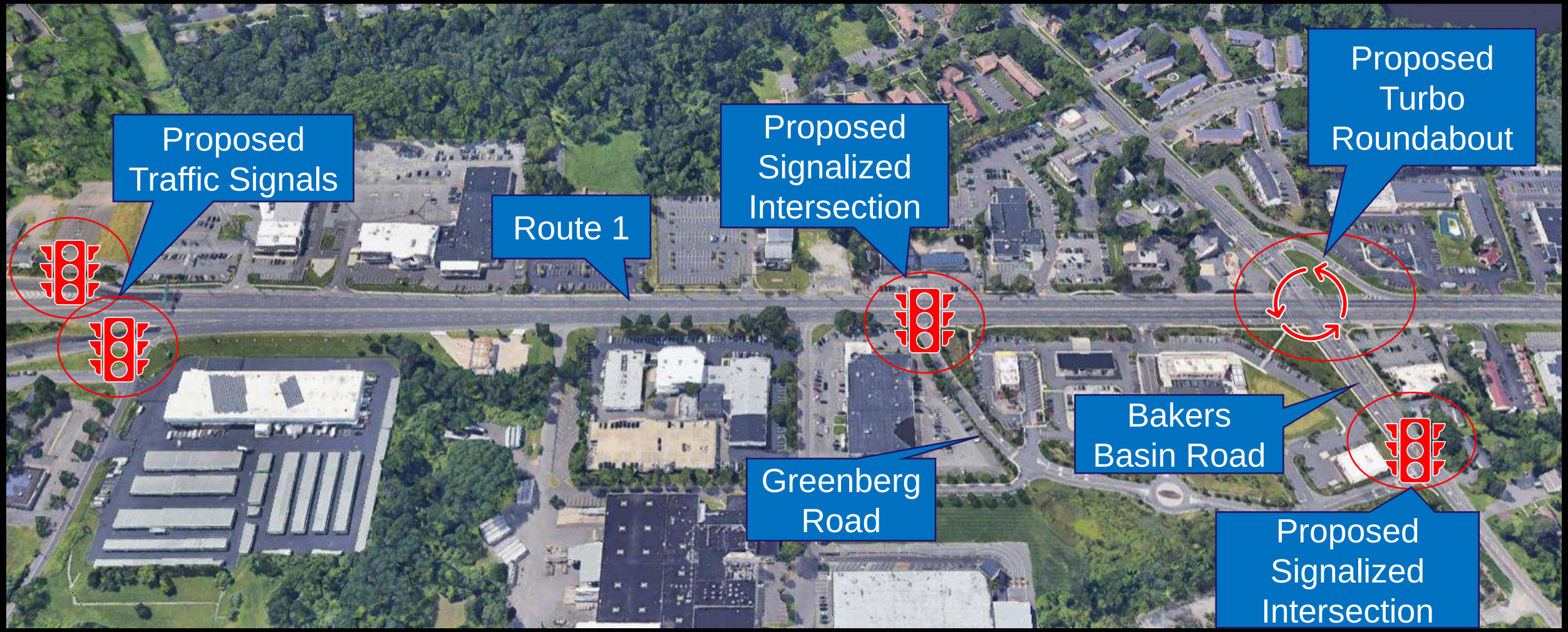


Alternative Design 1

- Add signalized intersections at the Chick-fil-A entrances and exits
- Slow down traffic
- Remove median
- Prioritize pedestrians and cyclists

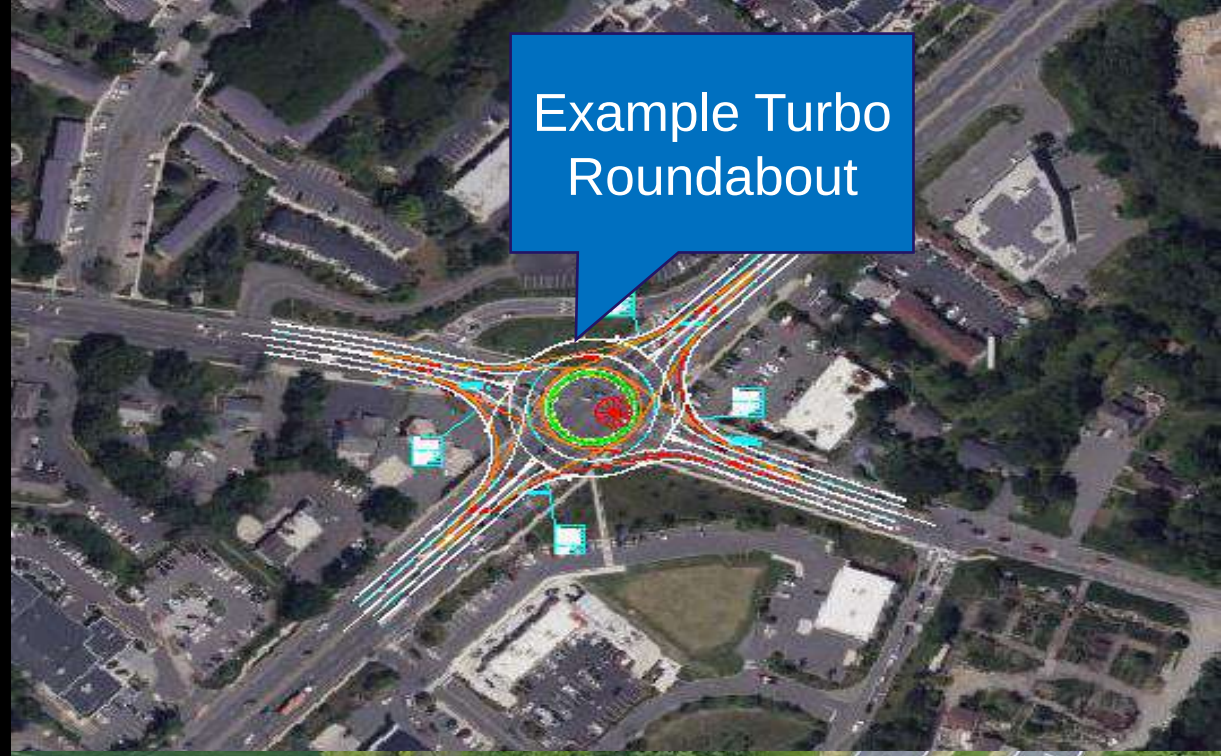


Alternative Design 2

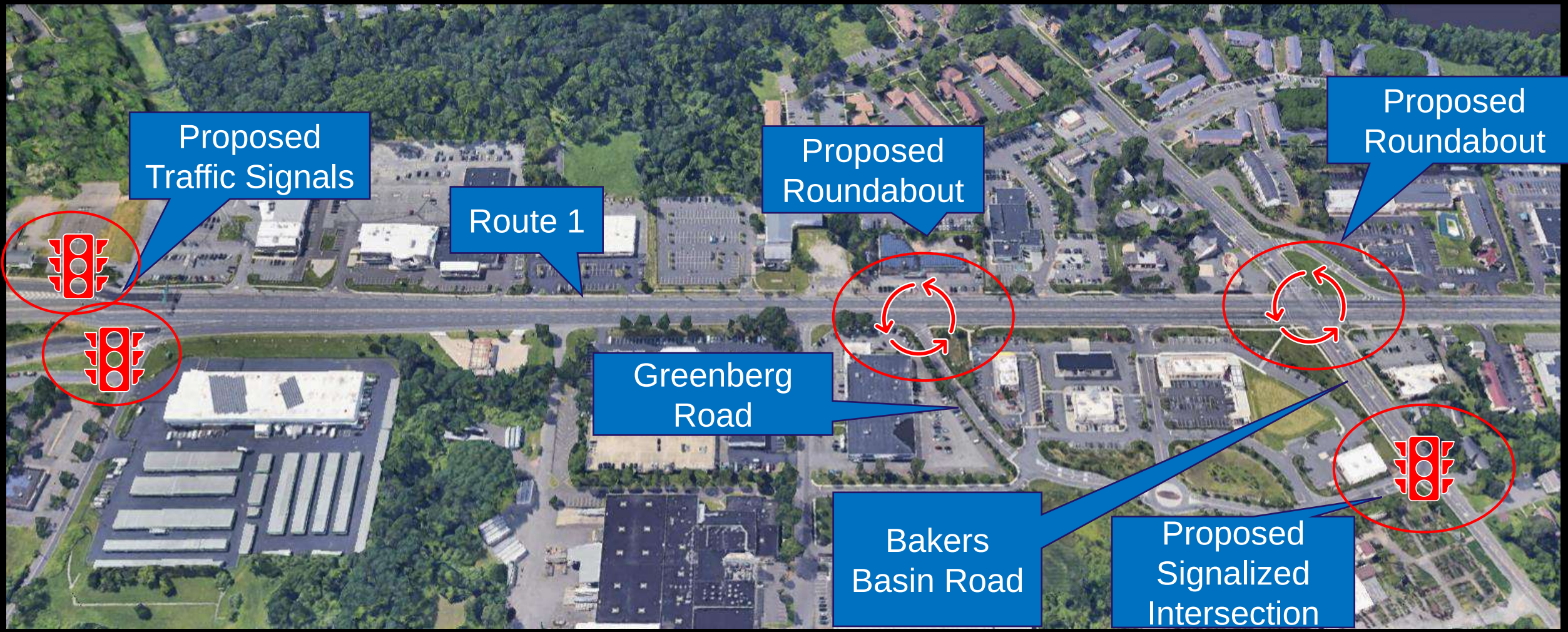


Alternative Design 2

- Improve safety and lower speed limit
- Design Turbo Roundabout for Route 1-Bakers Basin Road intersection
- Implement signals at remaining intersections

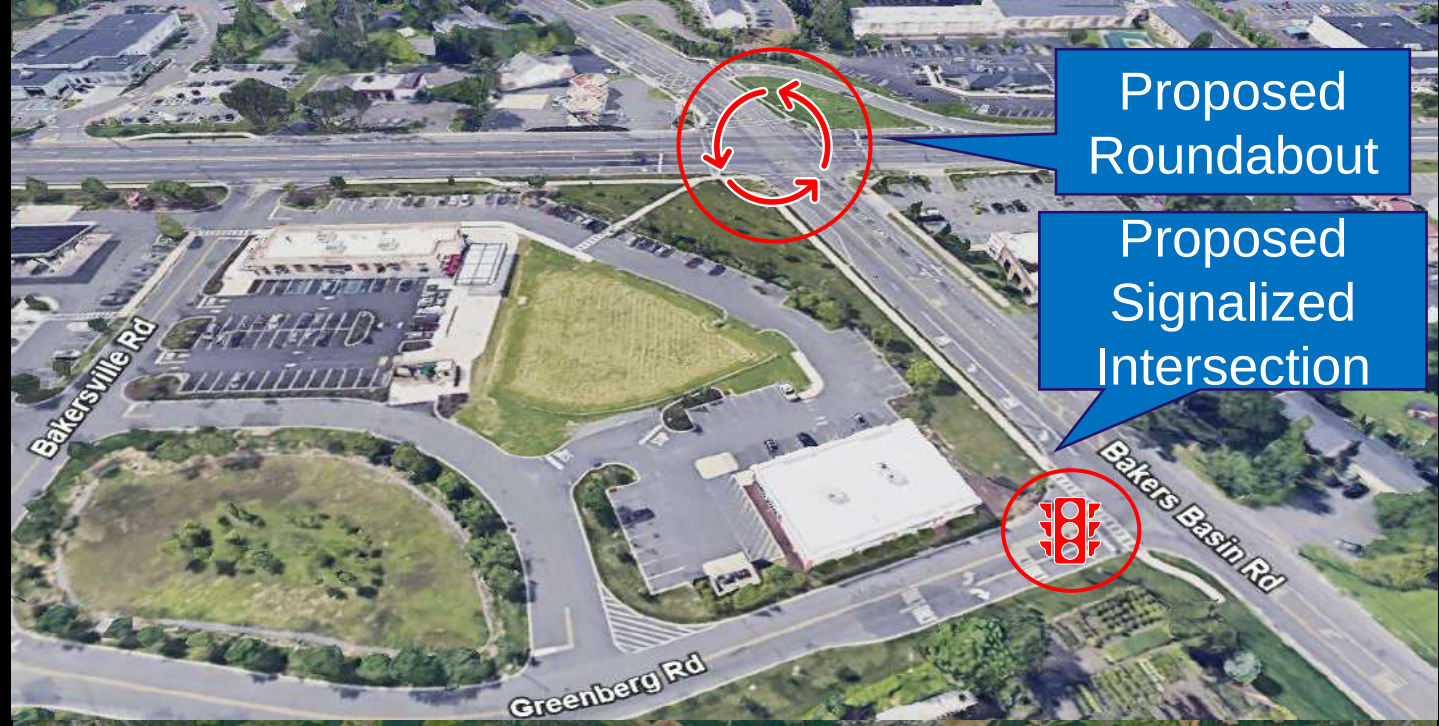


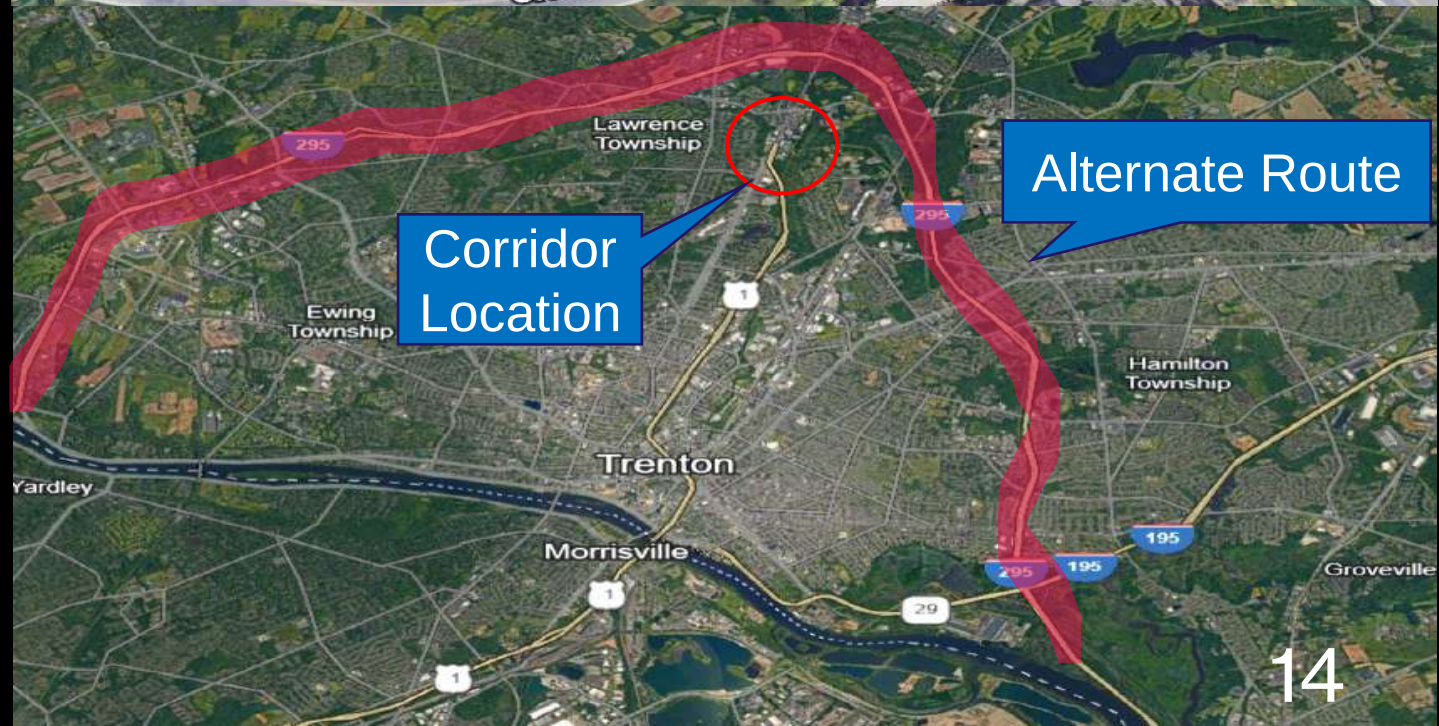
Alternative Design 3



Alternative Design 3

- Slow traffic, enhance safety, promote pedestrians
- Roundabout, 55mph to 35mph
- Chick-fil-A Signalized intersection to alleviate congestion
- Use I-295 to reduce local traffic





Alternative Design 3

Route 1 Branching Interchange into traffic signals

- Manages on/off ramp merging traffic
- Smooth traffic flow and safety
- Greenberg roundabout connects housing to businesses
- Bike lanes and Pedestrian walkways
- Remove Existing Median
- Improves safety and flow

Design Selection Matrix

Criteria	Weight	Alternative 1	Alternative 2	Alternative 3
Safety	5	1	2	3
Pedestrian Accessibility	4	3	1	2
Improved Traffic Flow	3	1	2	3
Constructability	2	3	1	2
Cost	1	3	1	2
Total Score		29	23	38

Budget Breakdown

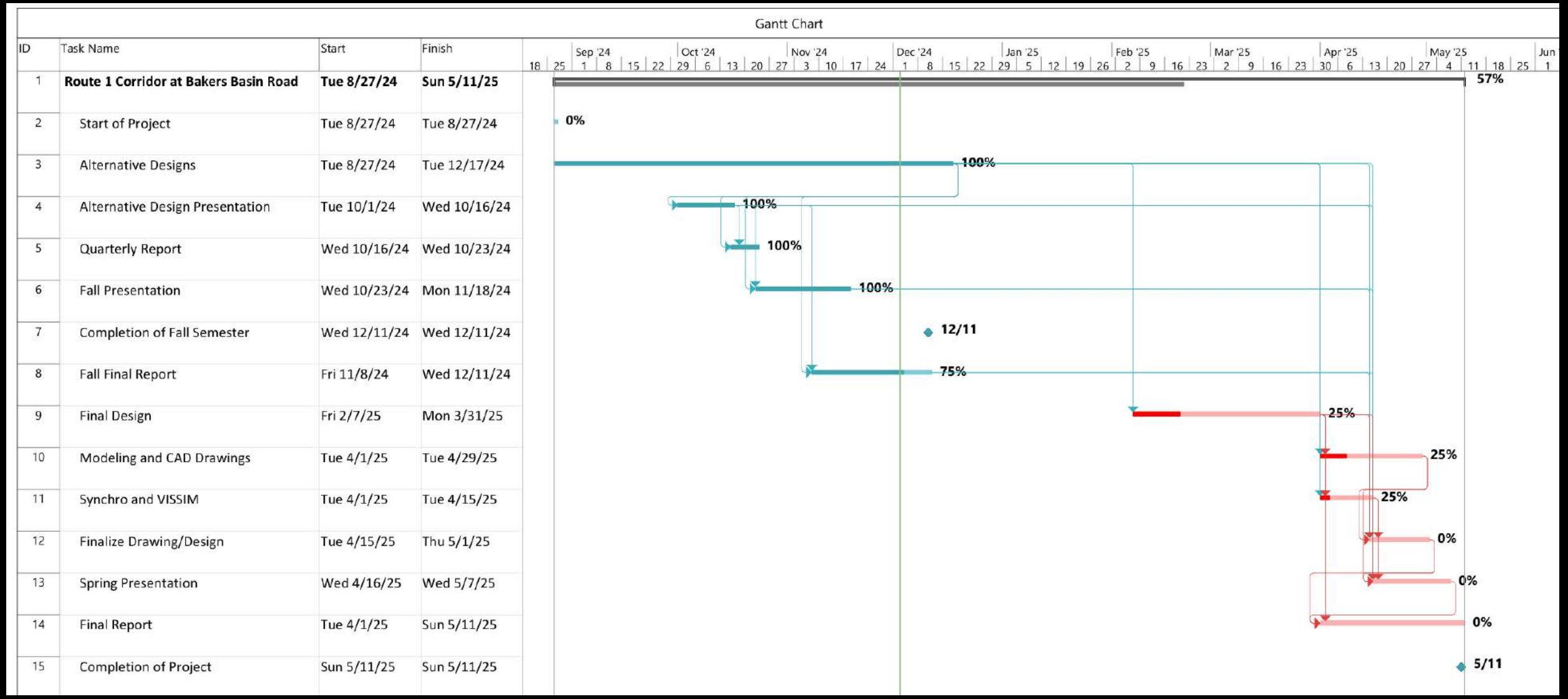
Task	Dr. Thomas Brennan	Patrick Frawley	Nicholas Rocco	Jayson Schmidt	Ryan Rosenthal
	Engineering Director	Project Engineer	Design Engineer	Design Engineer	Design Engineer
Fall 2024 Hours					
Site Visit	0	1	1	1	1
Research	1	9	8	8	8
Proposal Presentation	1	5	5	5	5
Traffic Analysis	0	4	5	5	6
Constraint Analysis	0	3	1	1	1
Alternative Design	1	1	2	2	2
Constraints and Alternatives Design Presentation	1	9	9	9	9
Design Selection	0	1	1	1	1
Quarterly Report	0	5	5	5	5
Estimate of Engineering Cost and Schedule	0	1	2	1	1
Engineering Services Proposal	2	8	8	8	8
Engineering Services Proposal Presentation	2	10	10	10	10
Spring 2025 Estimated Hours					
Intersection Designs	4	10	10	10	10
Corridor Design	3	10	10	10	10
Final Presentation	2	12	12	12	12
Final Report	2	8	8	8	8
Totals					
Hours	19	97	97	96	97
Hourly Rate	$95.00	$38.00	$34.00	$34.00	$34.00
Total Individual Cost	$1,805.00	$3,686.00	$3,298.00	$3,264.00	$3,298.00
Total cost	$15,351.00				
Overhead (150%)	$23,026.50				
Fixed Fee (10%)	$2,302.65				
Final Cost	$40,680.15				

Project Budget

Fall Total Cost	
Total Cost	$8,706.00
Overhead (150%)	$13,059.0
Fixed Fee (10%)	$1,305.90
Cost	$23,071
Final Cost	$23,000

Spring Total Cost	
Total Cost	$6,645.00
Overhead (150%)	$9,967.50
Fixed Fee (10%)	$996.75
Cost	$17,609
Final Cost	$18,000

Project Schedule



Questions?