Princeton University Campus Connection and Road Safety Enhancements: Engineering Services Proposal

Jake Kozlosky, Matthew Harbison, Sean Kane (Team Leader), and Victor Lopez

Advisors: Dr. Thomas Brennan and Amir Rizavi

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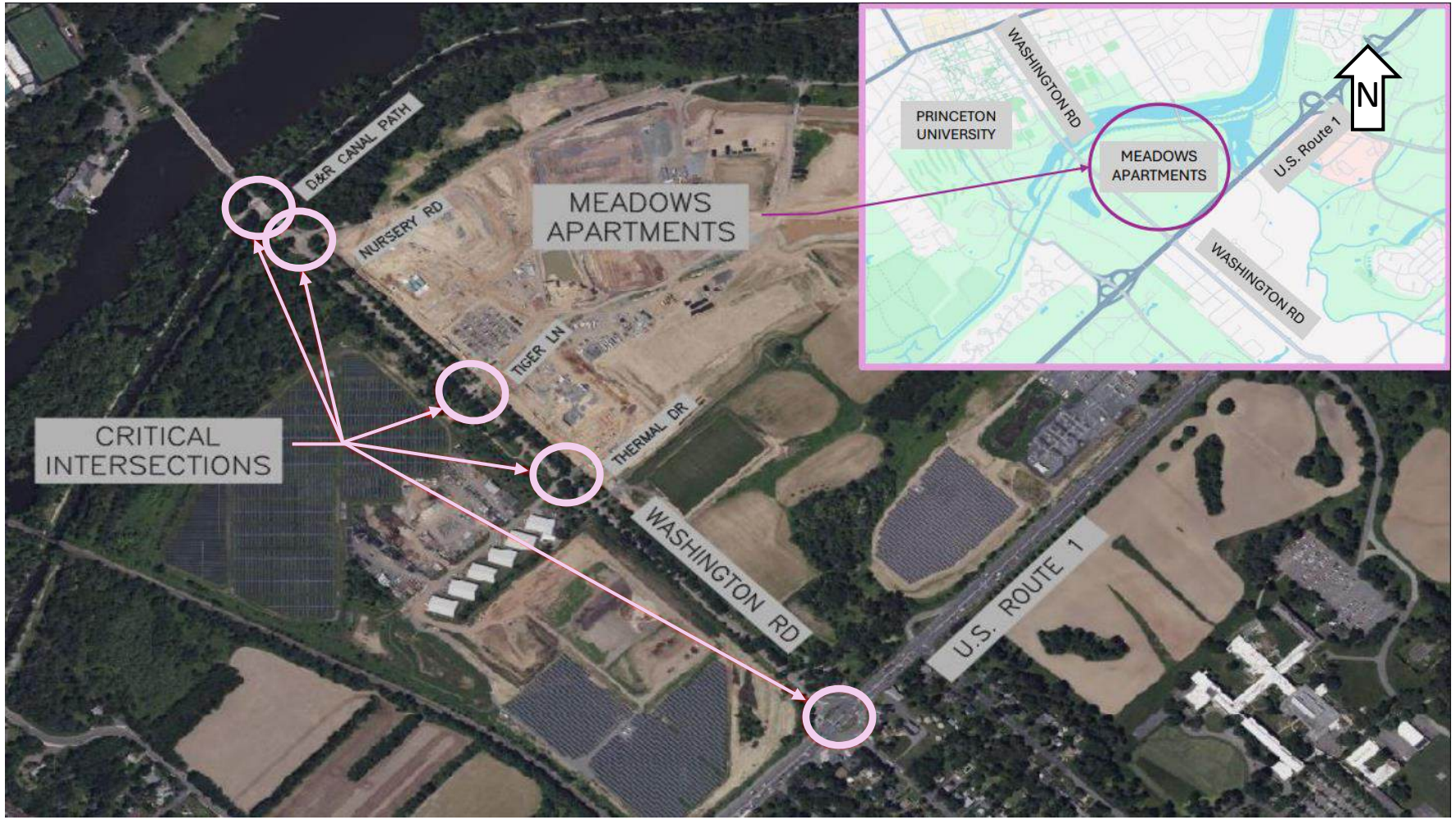
Site Overview



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Problem Statement and Background

- Washington Road Corridor at Route 1, Princeton NJ
- Pedestrian Safety Concerns
- Connectivity
- High Speed Rates & Increase in Traffic
- History of Accidents

U.S. Route 1

Campus Meadows Drive

Thermal Drive

Nursey Road

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Modern Engineering Tools

- AutoCAD/Civil3D
  - Roadway Design
- Synchro Studio 12
  - Traffic Volume Analysis
- PTV Vissim
  - Traffic Volume Analysis

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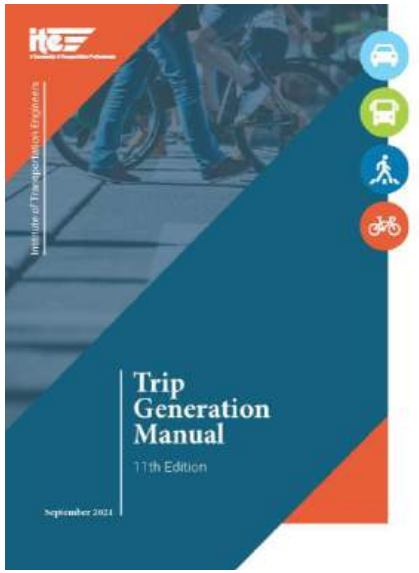
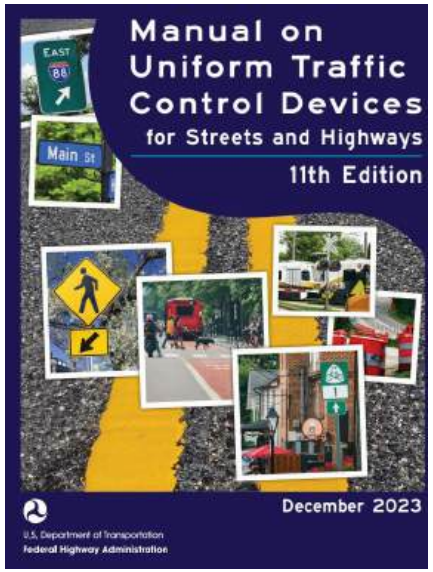
Applicable Standards

- AASHTO Guide for the Development of Bicycle Facilities
- Envision
- ITE Trip Generation Manual
- NJDOT Roadway Design Manual
- Manual on Uniform Traffic Control Devices
- Public Right-of-Way Accessibility Guidelines
- West Windsor Design Standards





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Design Constraints

- Multimodal Design
- Traffic Flow and Capacity
- Limited Right-of-Way
- Under the Ordinance of West Windsor

Conceptual Alternative

Potential Alternative

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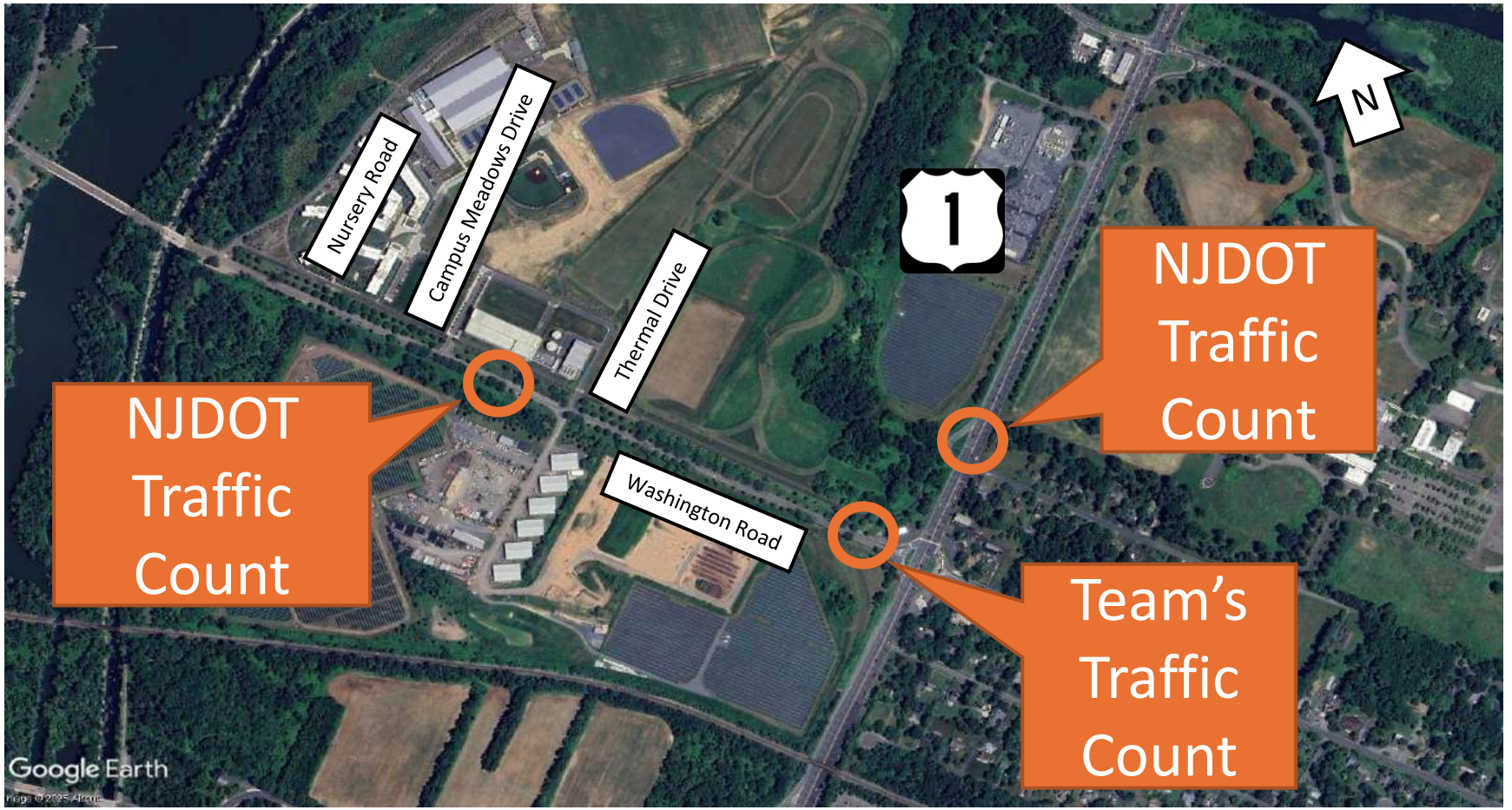
Traffic Counts



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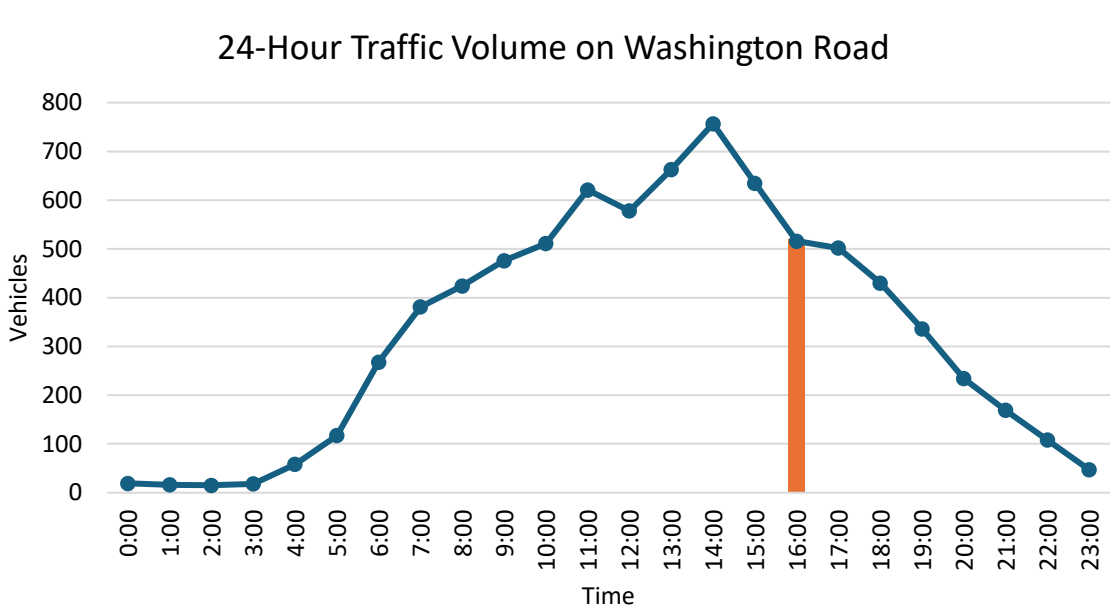
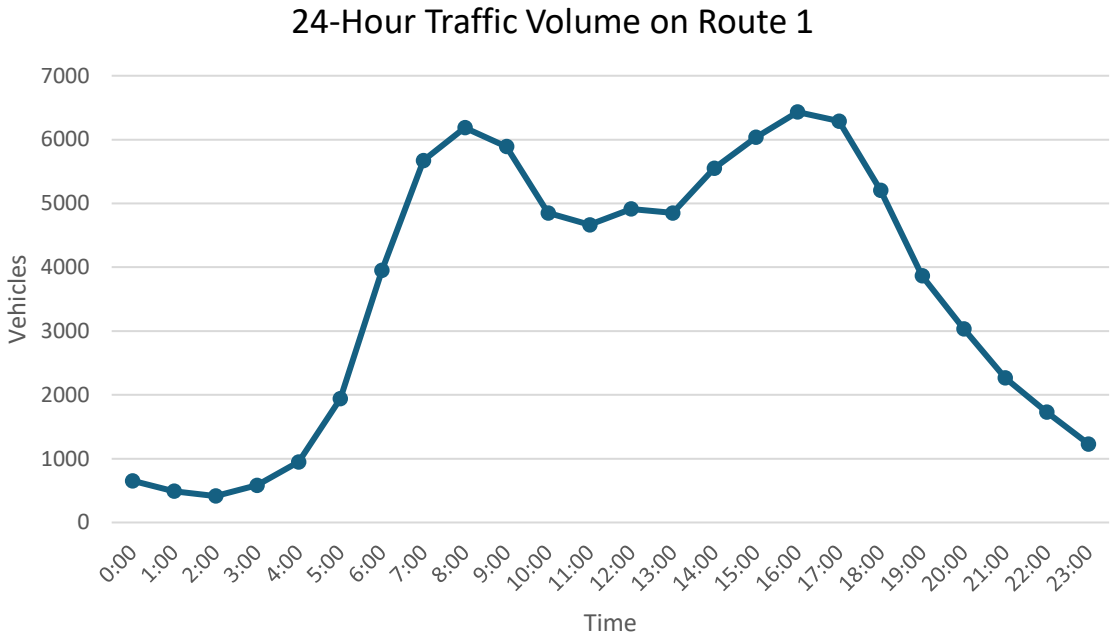
Traffic Counts





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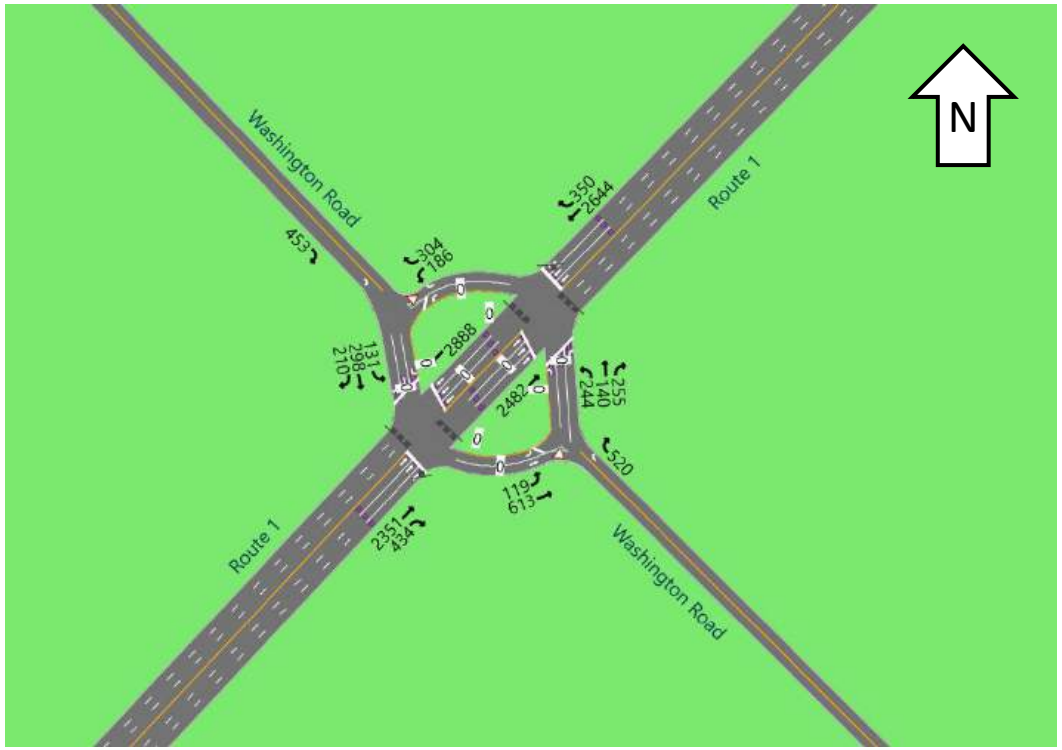
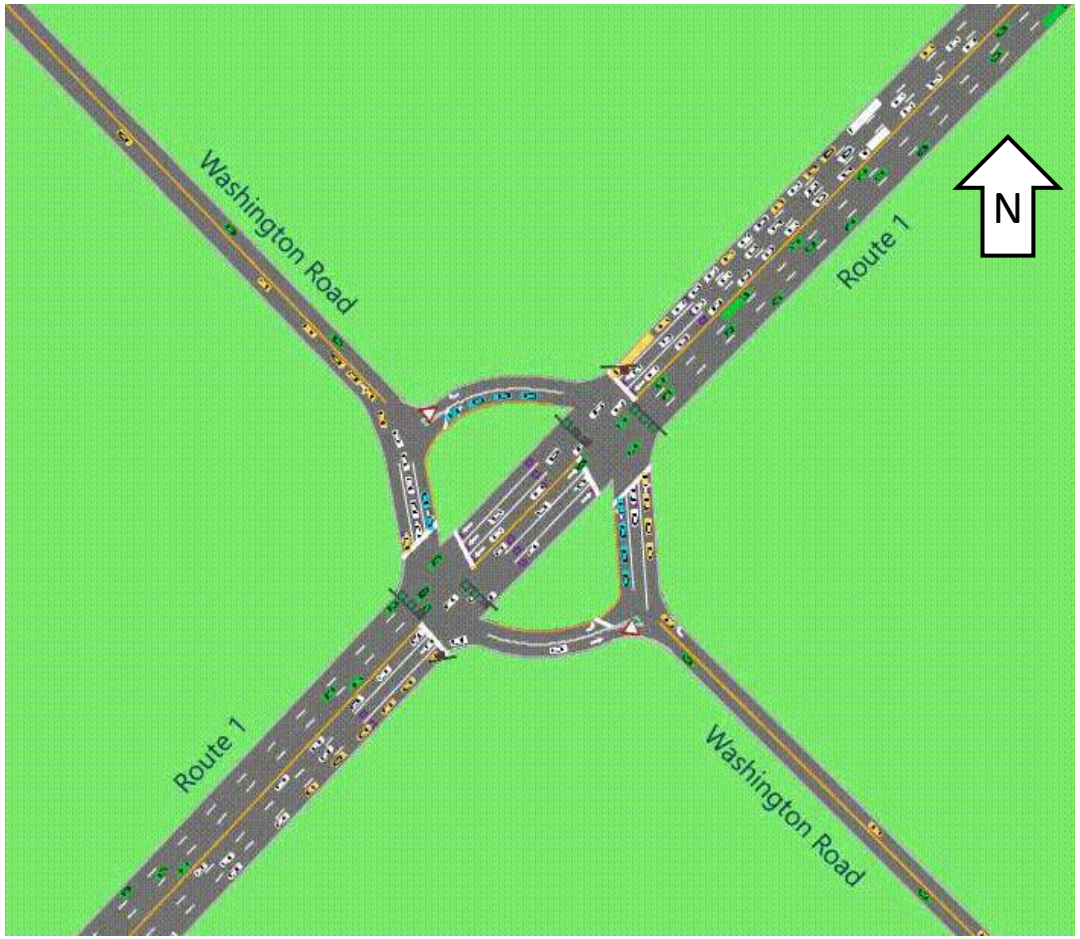
Transportation Analysis





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Realistic Constraints

- **Economic**: Princeton University operations, commuter access, regional commerce
- **Political**: State/County/Township Regulations
- **Social**: Nearby residential neighborhoods
- **Ethical**: Equal access for pedestrian/cyclist, ADA compliance
- **Health/Safety**: High crash risk, High speeds
- **Environmental**: Tree Relocation, Wetlands
- **Physical**: Existing Roadway and Geometry

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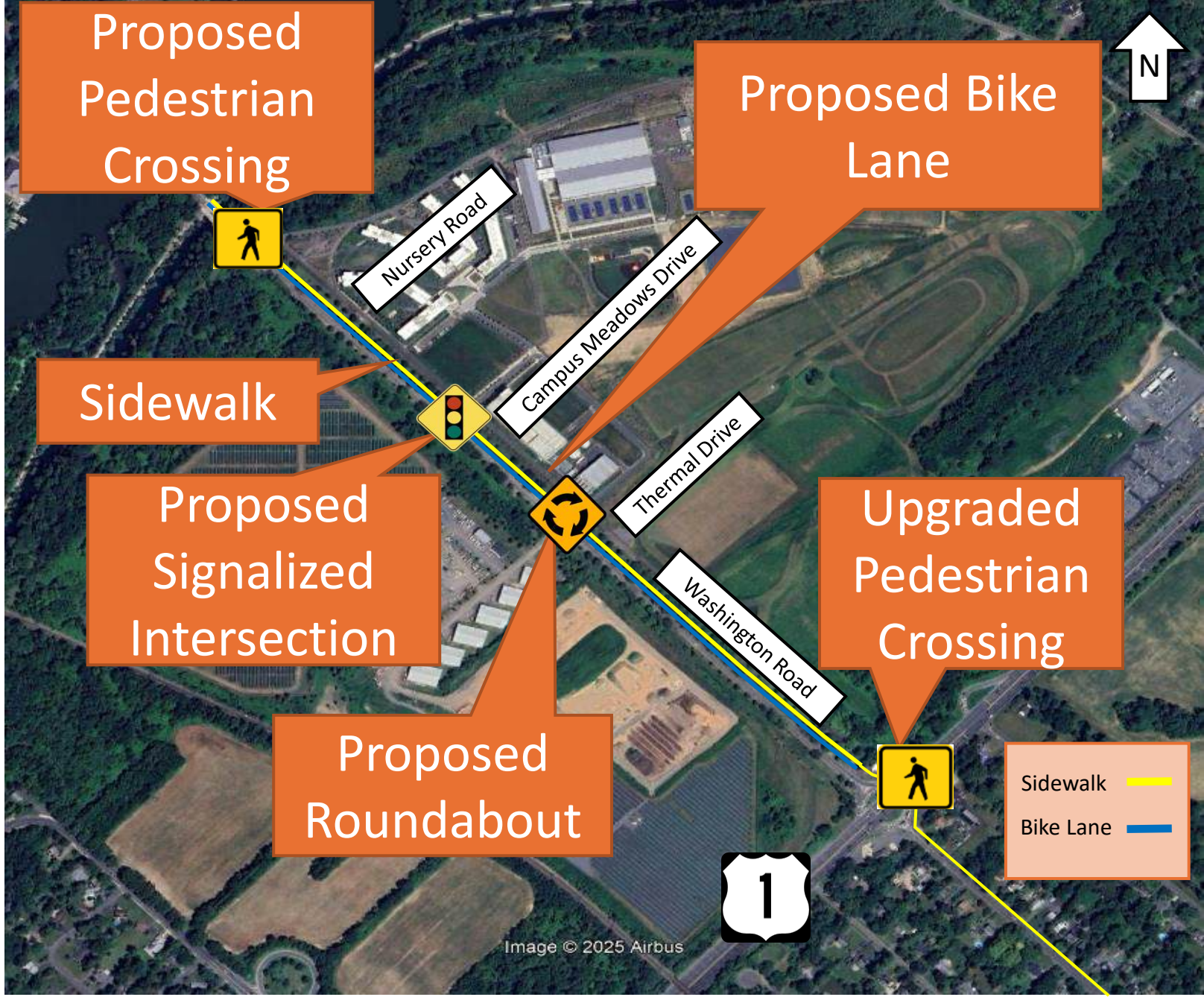
Alternative Design 1



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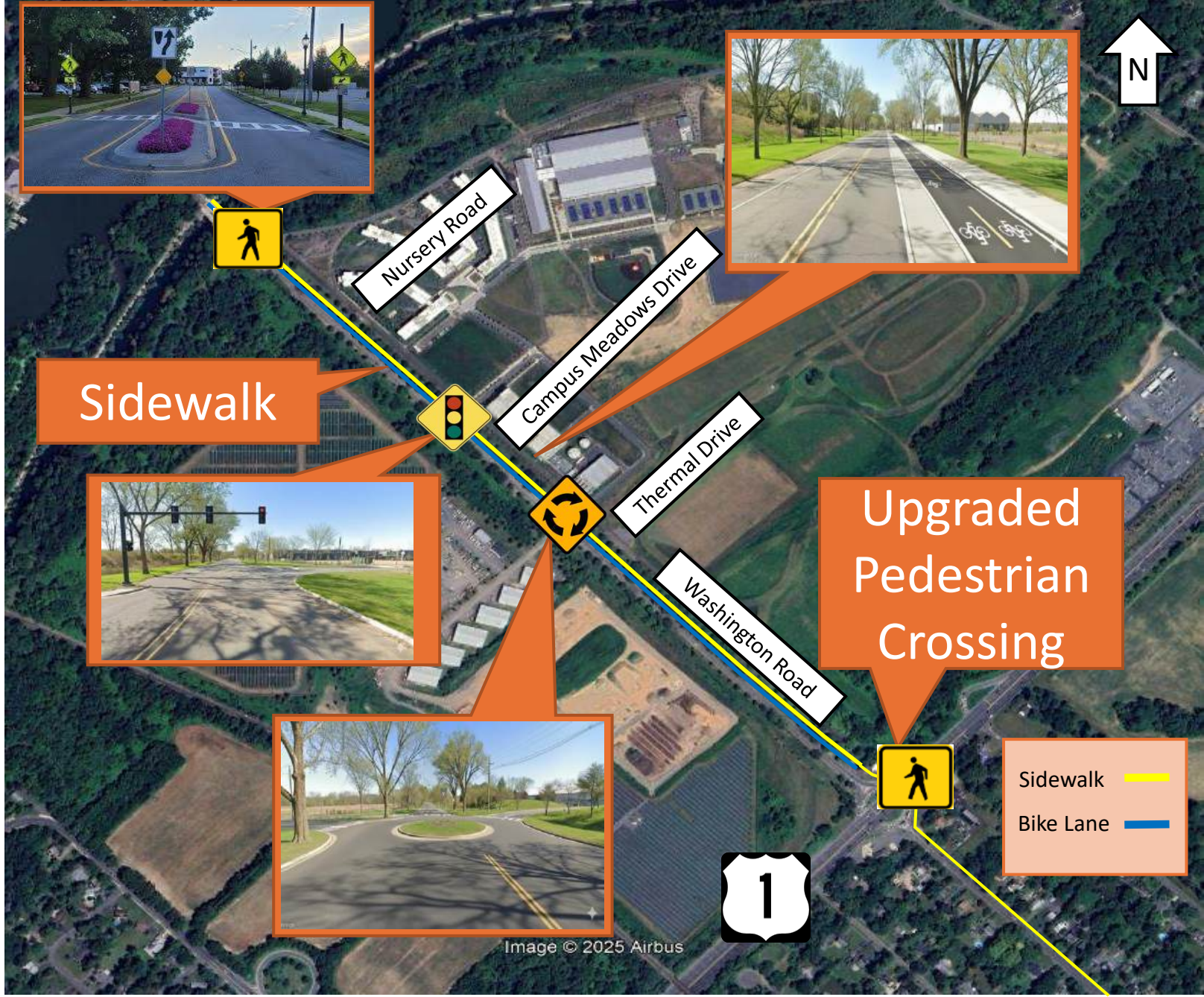
Alternative Design 1



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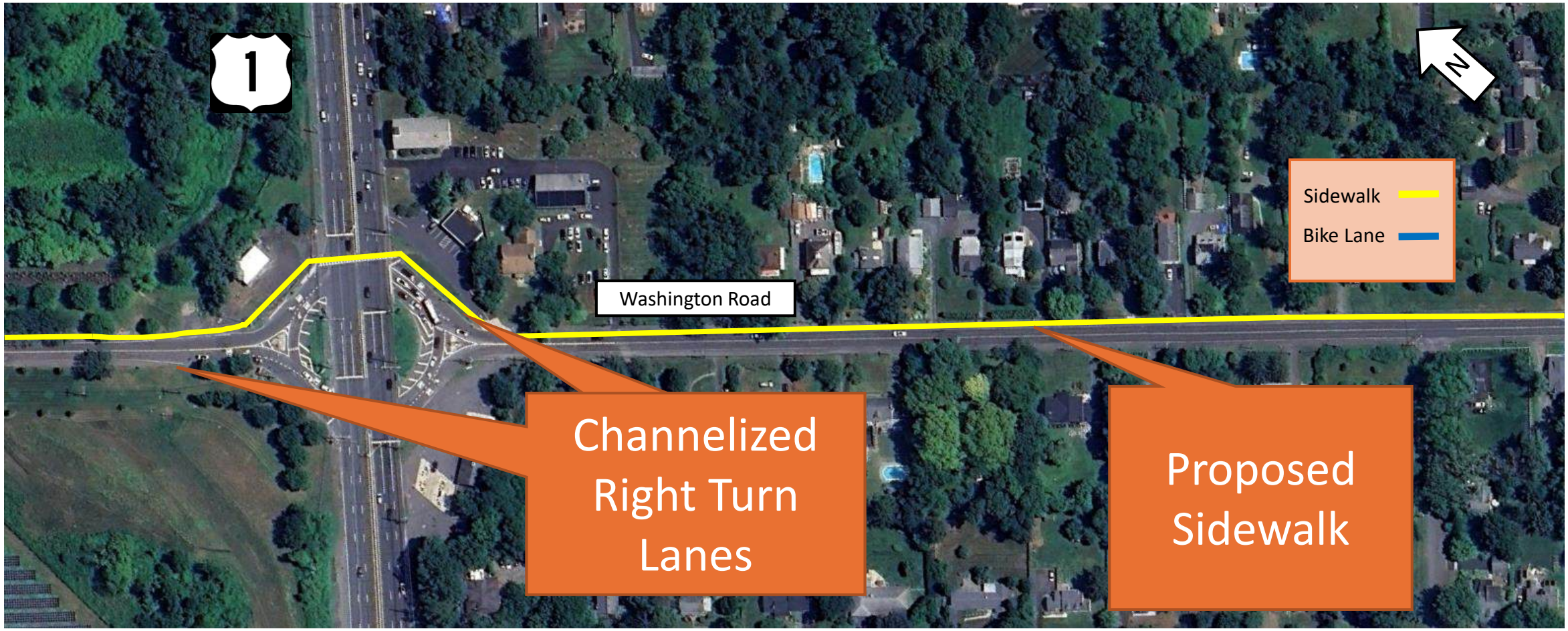

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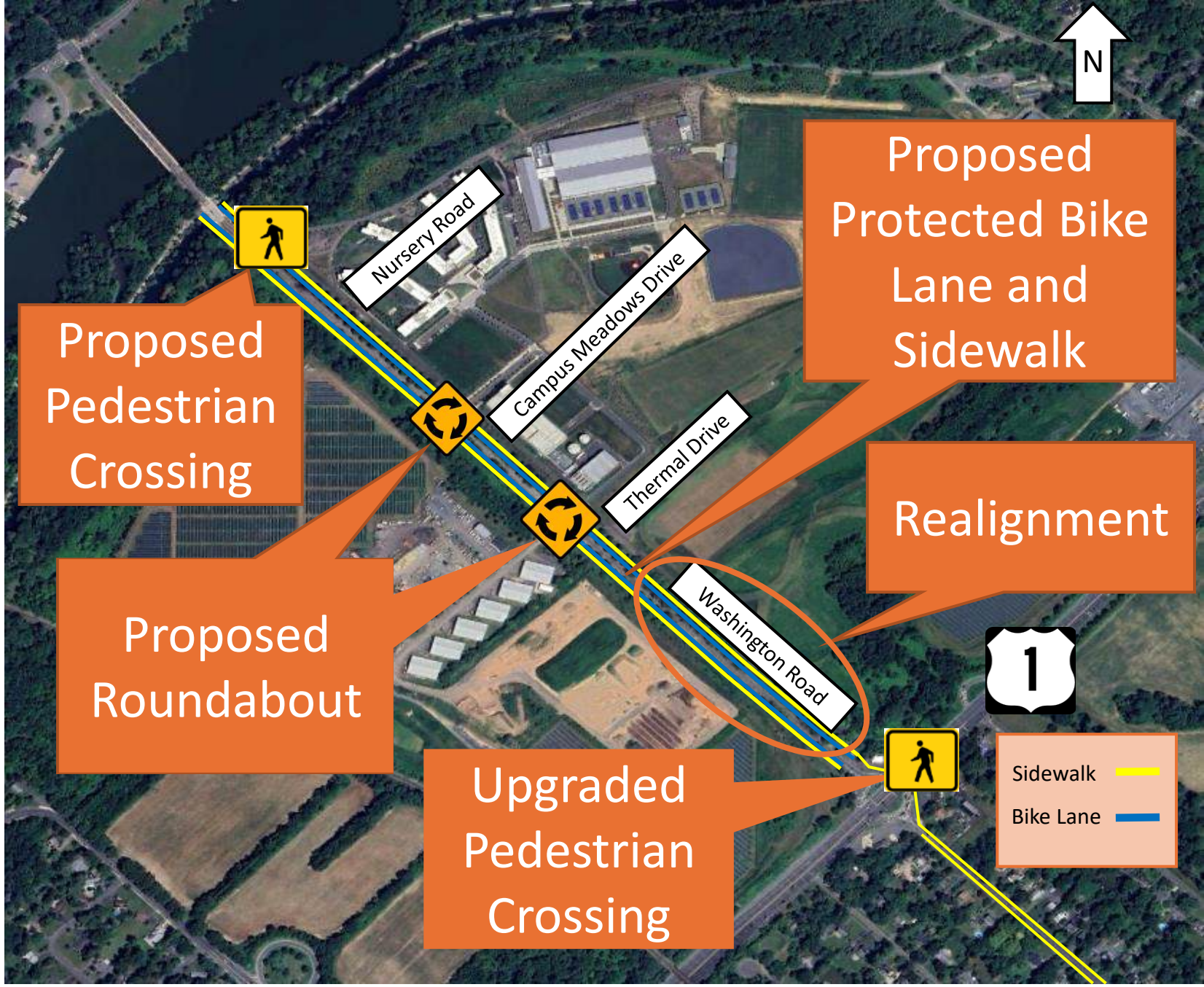
Alternative Design 2



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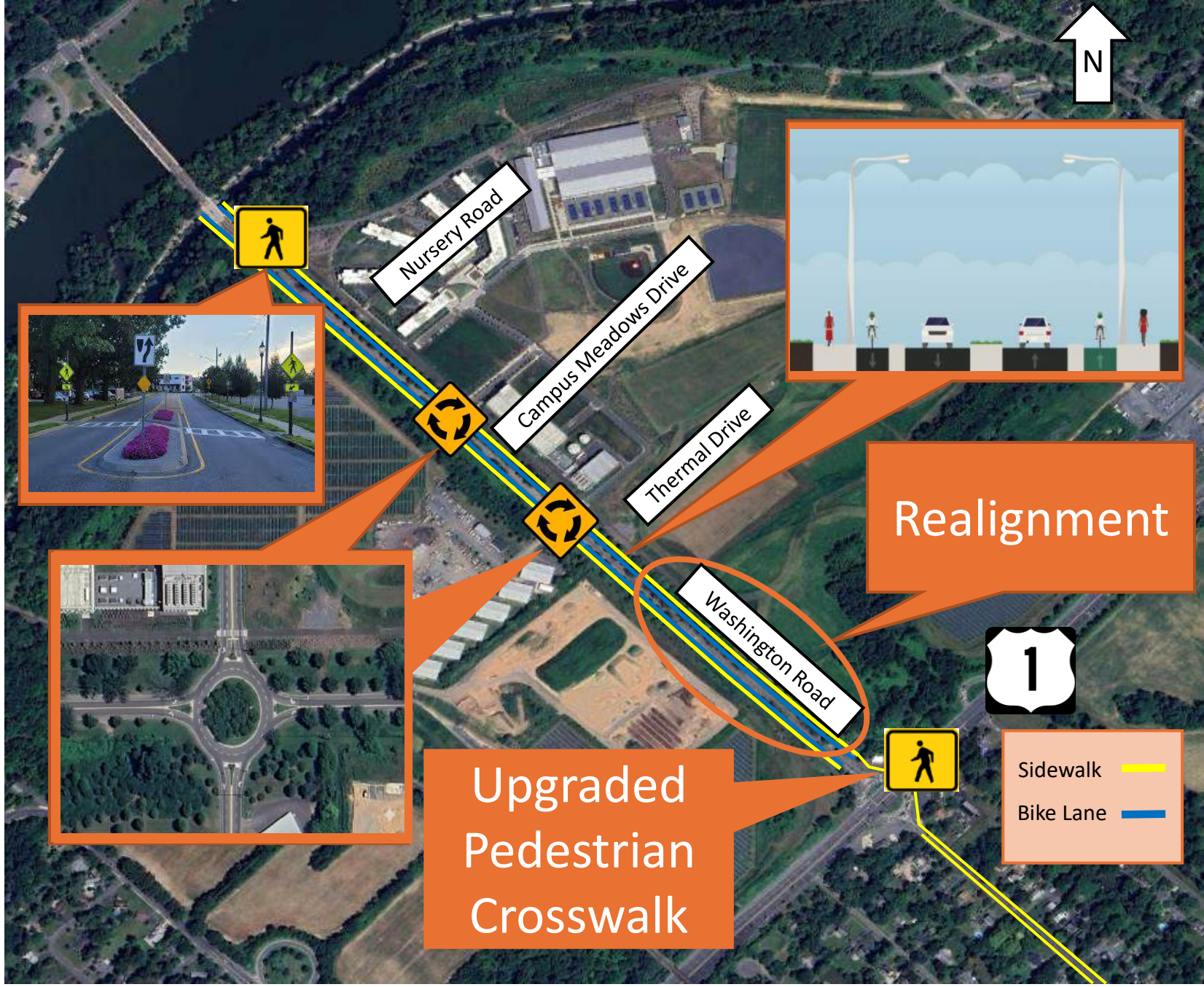

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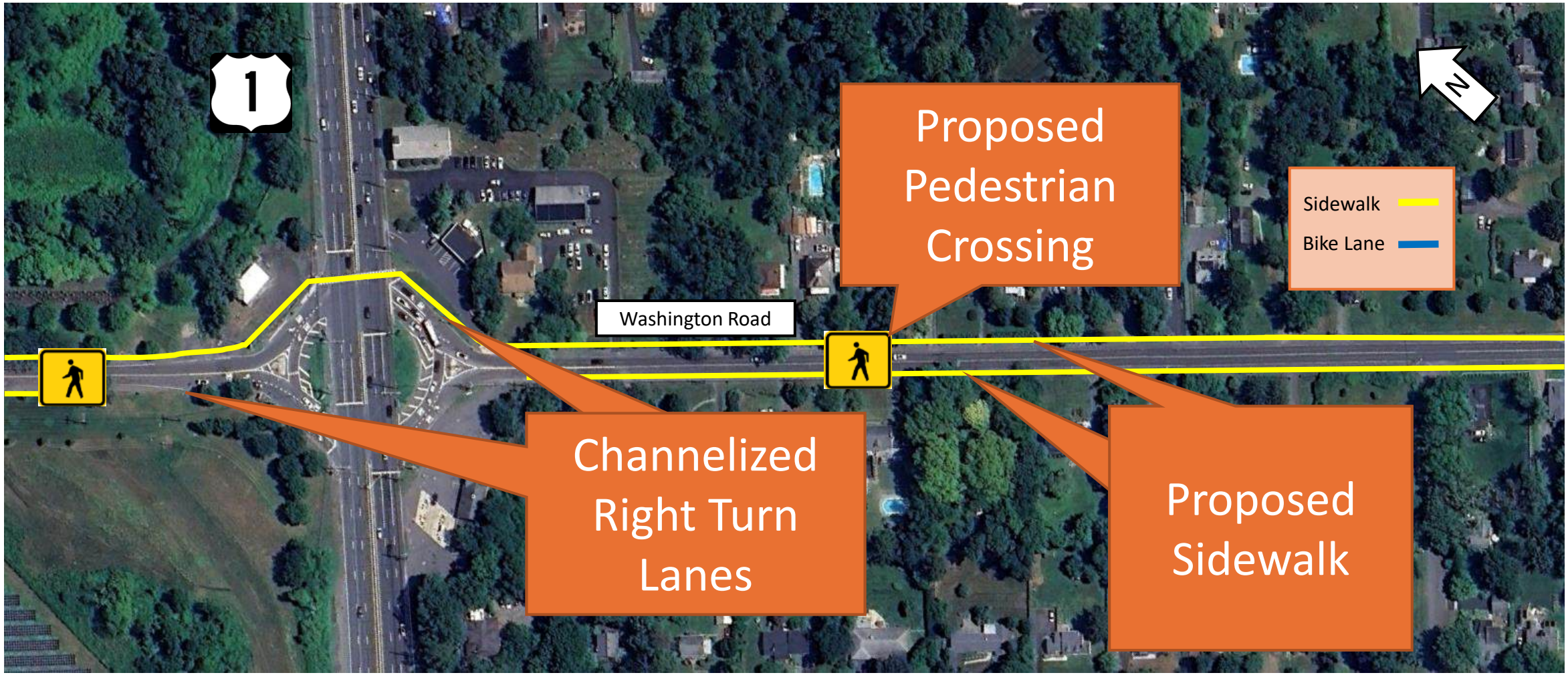

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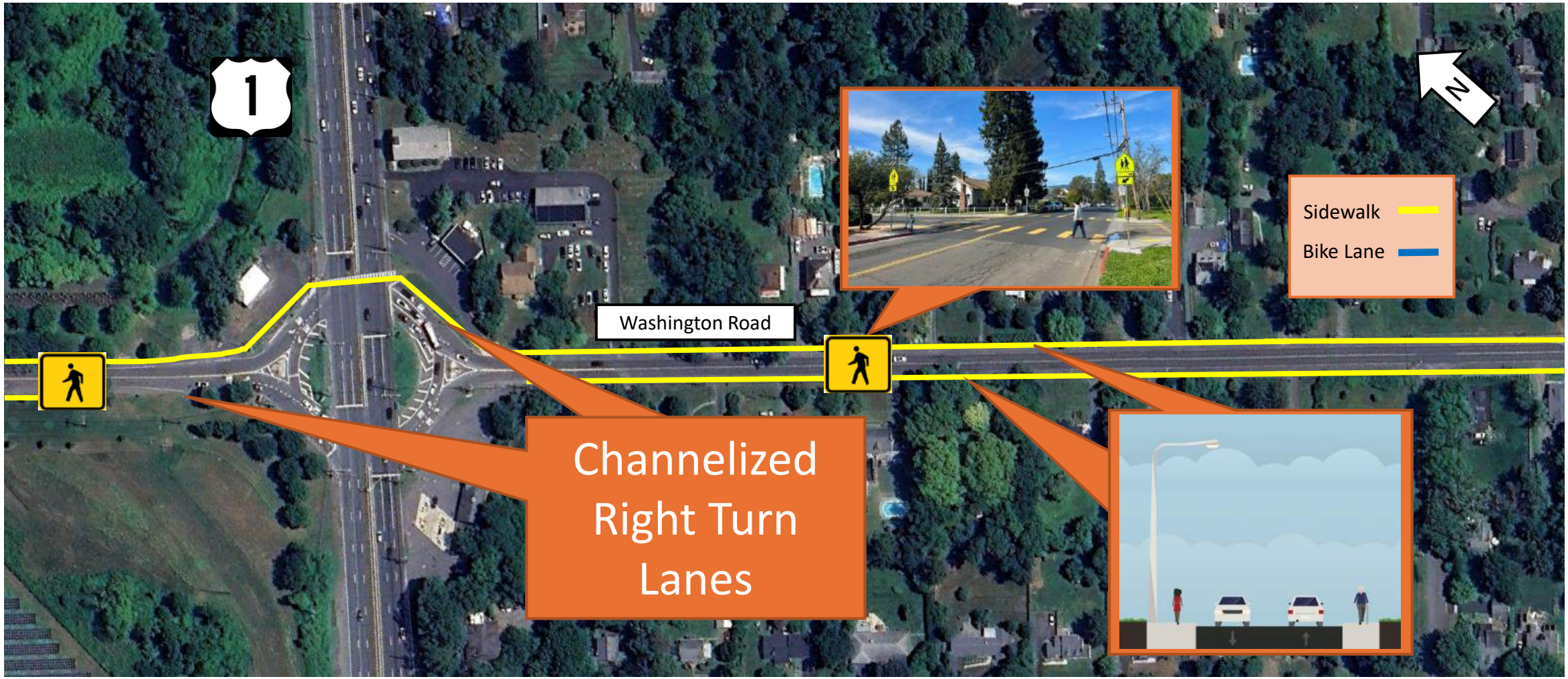

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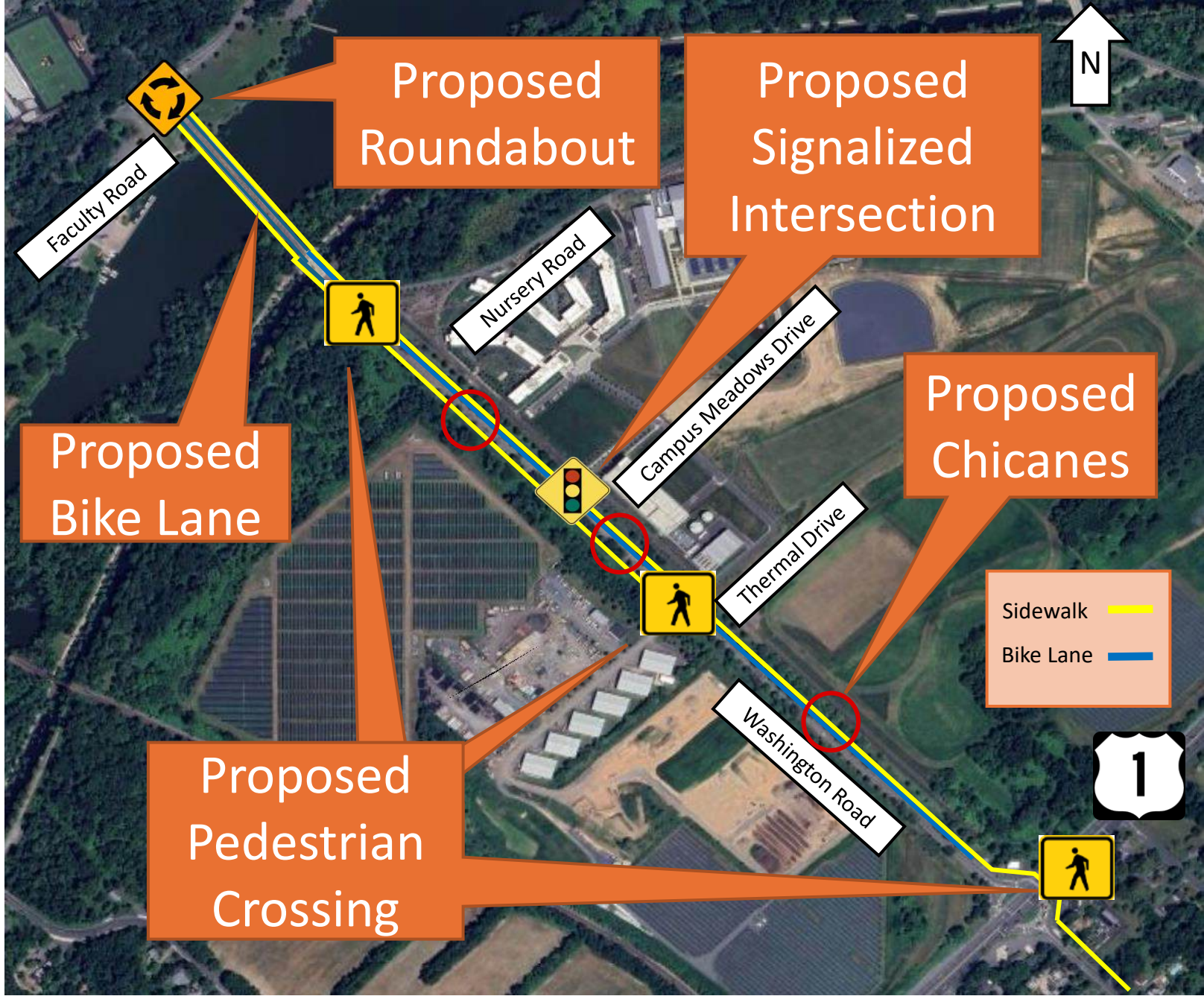
Alternative Design 3



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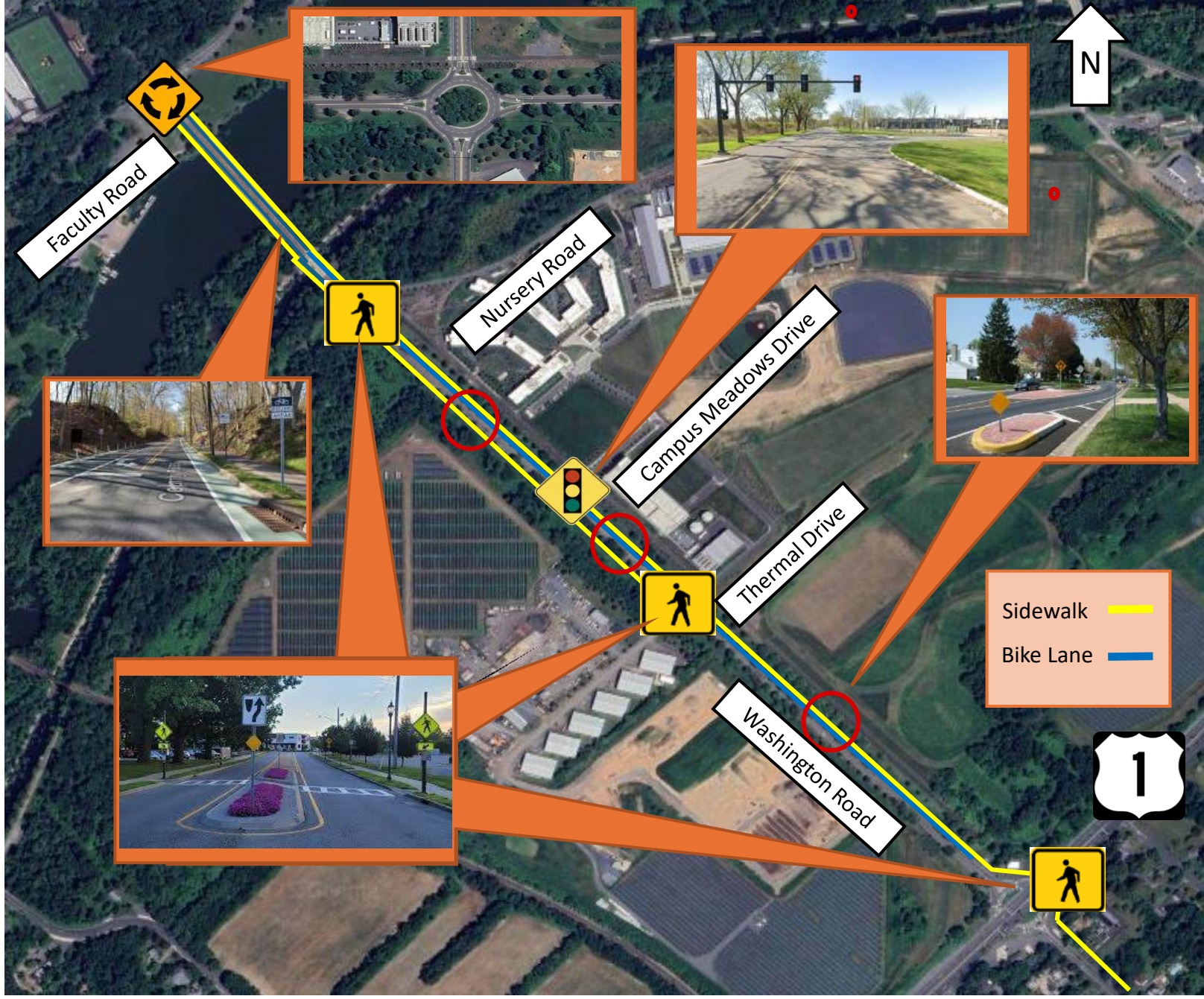

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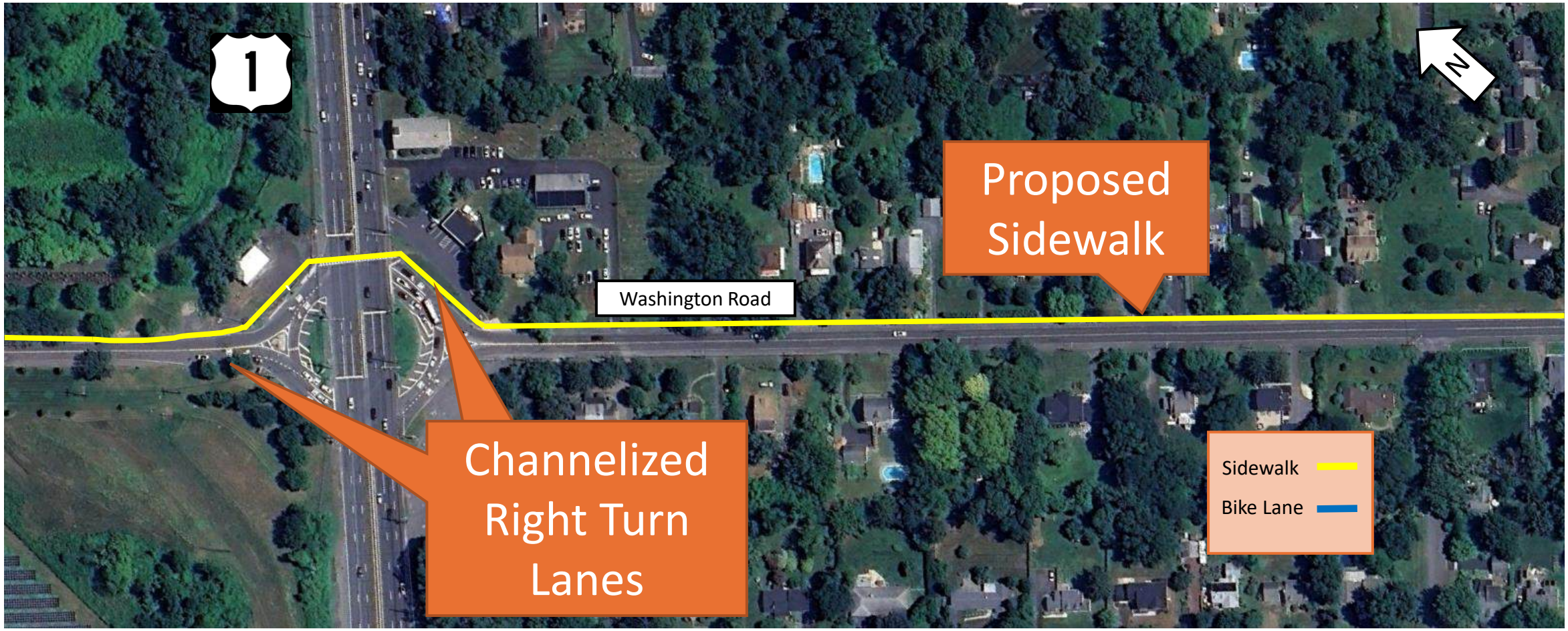

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Design Selection Matrix

Criteria	Weight	Alternative Design 1		Alternative Design 2		Alternative Design 3	
Safety	**9**	1	**9**	2	**18**	3	**27**
Cost	**8**	3	**24**	1	**8**	2	**16**
Longevity	**7**	1	**7**	3	**21**	2	**14**
Operation & Maintenance	**6**	1	**6**	3	**18**	2	**12**
Construction Time	**5**	3	**15**	1	**5**	2	**10**
Pedestrian Accessibility	**4**	1	**4**	3	**12**	2	**8**
Physical Constraints	**3**	3	**9**	1	**3**	2	**6**
Changes to Public Traffic Patterns	**2**	1	**2**	2	**4**	3	**6**
Aesthetic	**1**	1	**1**	2	**2**	3	**3**
Total Score		15	**77**	18	**91**	21	**102**

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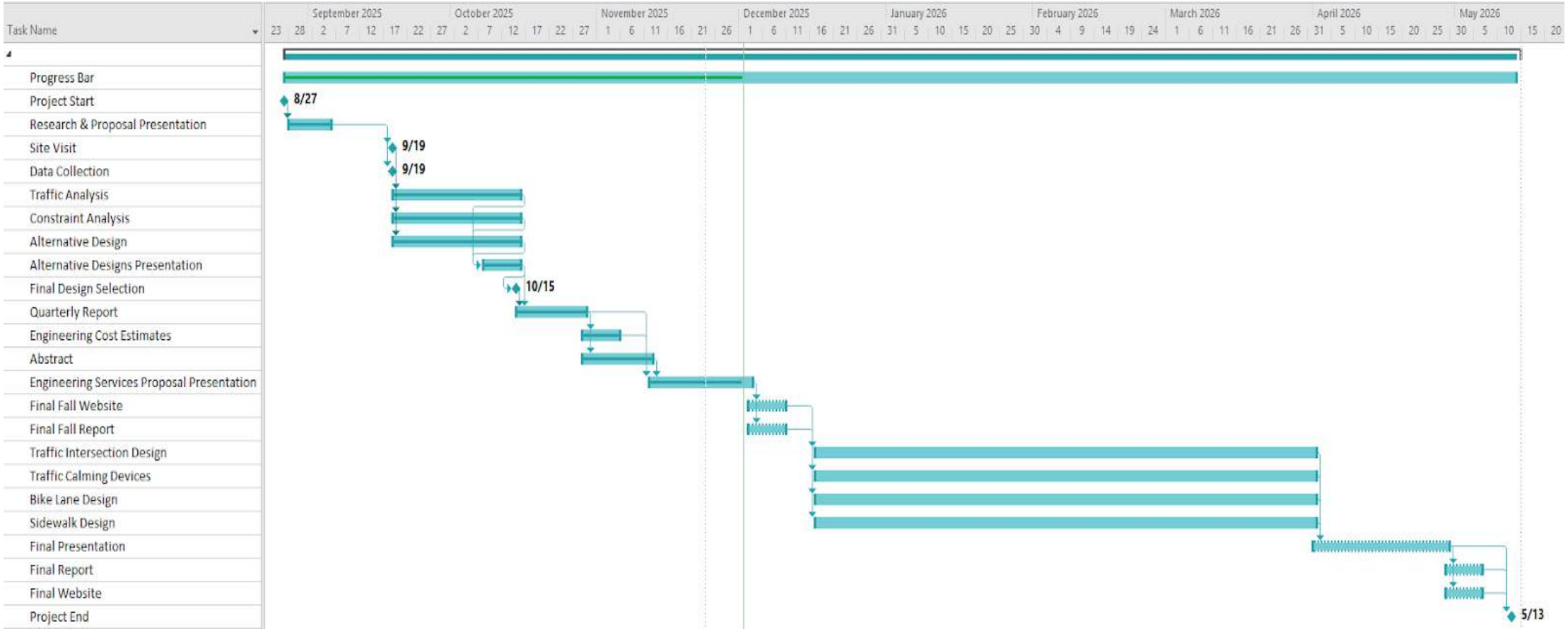
Schedule



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Engineering Cost – Fall Semester

TASK	Dr. Thomas Brennen	Sean Kane	Jake Kozlosky	Matthew Harbison	Victor Lopez
	Faculty Advisor	Project Engineer/ Team Leader	Design Engineer	Design Engineer	Design Engineer
	Eng. V	Eng. II	Eng. I	Eng. I	Eng. I
HOURLY RATE	$95.00	$38.00	$36.00	$36.00	$36.00
Fall Cost					
Research	2	5	5	5	5
Site Visit	0	2	2	2	2
Proposal Presentation	1	4	2	2	2
Alternative Design Research	1	4	4	4	4
Traffic Analysis	1	1	1	1	3
CAD	0	1	1	1	3
Alternative Design Presentation	2	5	8	8	8
Quarterly Report	1	8	8	8	8
Estimate of Engineering Cost and Schedule	1	2	1	1	1
Engineering Services Proposal Presentation	2	8	8	8	8
Engineering Services Proposal	1	8	8	8	8
TOTAL HOURS	12	48	48	48	52

Fall Total Cost		$ 8,292.00
Overhead	150%	$ 12,438.00
Fixed Fee	10%	$ 2,073.00
Direct Cost		$100.00
Total		$ 23,000.00

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Engineering Cost – Spring Semester

TASK	Dr. Thomas Brennen	Sean Kane	Jake Kozlosky	Matthew Harbison	Victor Lopez
	Faculty Advisor	Project Engineer/ Team Leader	Design Engineer	Design Engineer	Design Engineer
	Eng. V	Eng. II	Eng. I	Eng. I	Eng. I
HOURLY RATE	$95.00	$38.00	$36.00	$36.00	$36.00
Spring Cost					
Traffic Intersection Design	5	8	8	8	8
Traffic Calming Devices	3	4	4	4	4
Bike Lane Design	1	4	4	4	0
Sidewalk Design	1	2	2	2	2
Traffic Analysis	2	2	2	2	4
Final Report	1	10	10	10	10
Final Presentation	1	6	6	6	6
TOTAL HOURS	14	36	36	36	34

Spring Total Cost		$ 6,514.00
Overhead	150%	$ 9,771.00
Fixed Fee	10%	$ 1,628.50
Direct Cost		
Total		$ 18,000.00

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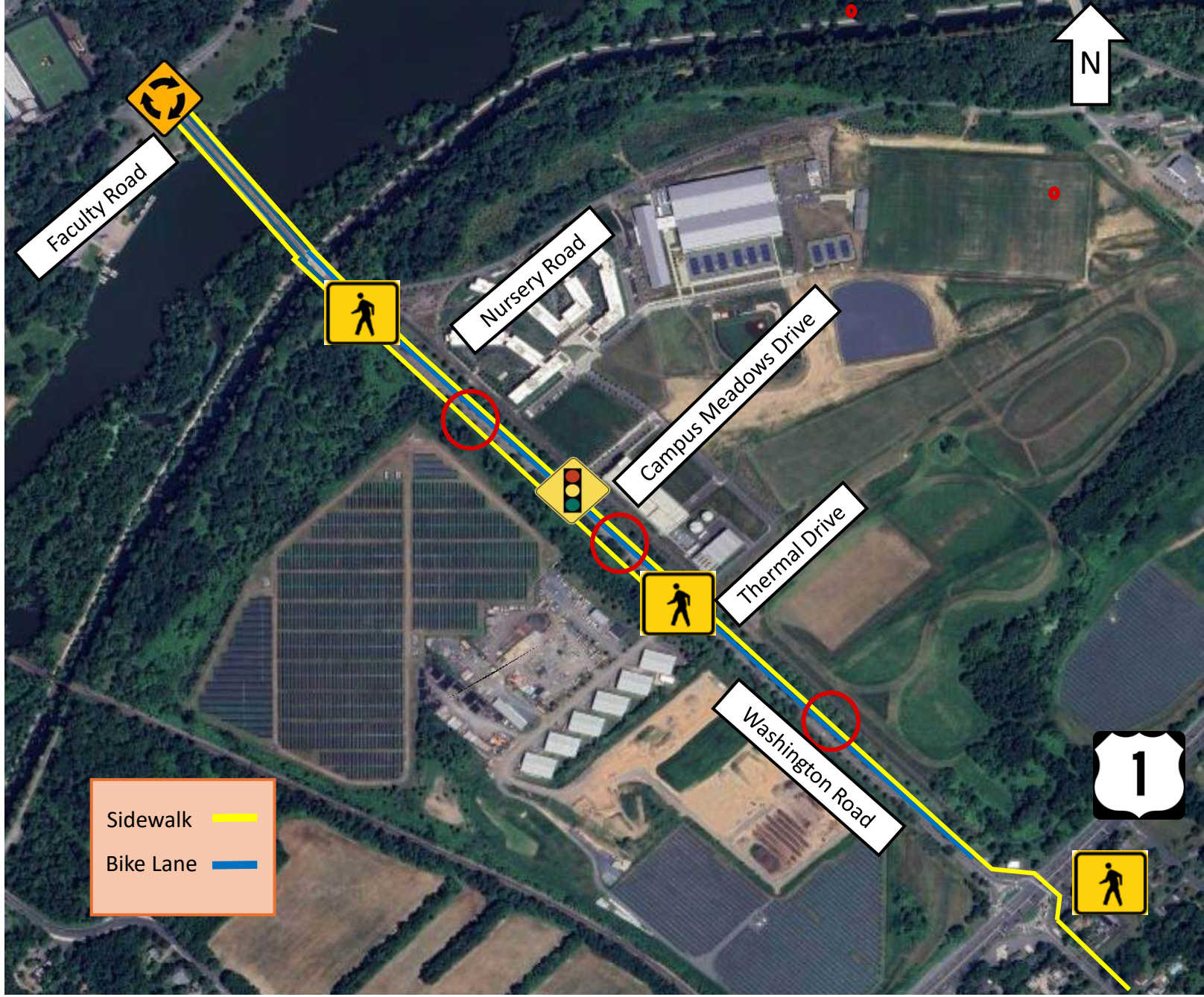
Conclusion

Alternative 3

- Complete Street
- Traffic Calming Devices
- Connectivity
- Safety



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Questions?

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