

State Route 29 & County Route 579 Intersection Redesign

Nicholas Chiovoni¹, Rachel Dultz¹, Mark Esposito¹, and Ryan Maffia¹; Advisor: Thomas Brennan Jr. PE, PhD¹
Department of Civil Engineering, The College of New Jersey, Ewing, NJ

Abstract

The State Route 29 & County Route 579 Intersection Redesign is a three-intersection redesign project located in Trenton, New Jersey near the Delaware River. The three intersections chosen did not have a well-functioning flow of traffic, did not clearly indicate where drivers should be traveling, and were overall not the best solutions for their locations. The project focus was to redesign the intersections to optimize their traffic flow and improve their safety while following corresponding NJDOT and AASHTO specifications.

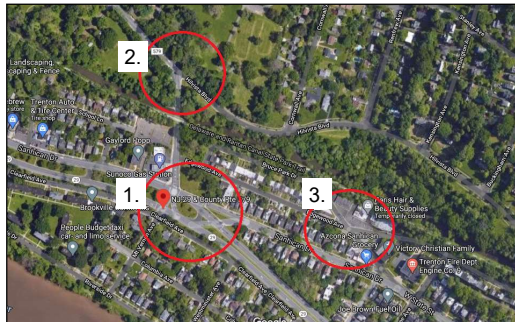


Figure 1: Project Site

Design/Methods

Main Goals

- Improve traffic flow
- Increase neighborhood connection
- Limit conflict points

Area 1

- Realign State Route 29 South
- One cohesive intersection
- Green space for public use and separation from highway

Area 2

- Roundabout with three entrances/exits
- Additional sidewalks and crosswalks
- Slow drivers upon Route 29 intersection

Area 3

- One-way traffic on Bruce Park Drive and Edgewood Avenue
- Re-size of intersection & added green space for public use
- Emergency vehicle turning lane



Figure 2: Proposed Area 1



Figure 3: Proposed Area 2



Figure 4: Proposed Area 3

Results

The State Route 29 and Sullivan Way intersection was simplified to a conventional four-way intersection and the entrance onto Sanhican Drive from State Route 29 was eliminated to provide for safer more efficient travel. The Sullivan Way and Hilvista Boulevard intersection was reconfigured to a small roundabout to reduce conflict points and aid in reducing travel speed. The Edgewood Ave, Bruce Park Drive and West State Street intersection was reconfigured to include 2 one-way streets and the impervious area was reduced to create a better navigable intersection.

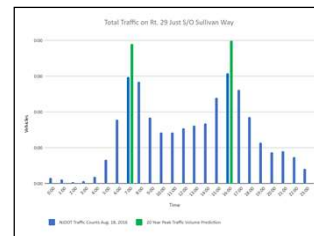


Figure 5: Peak Traffic 2019 vs Prediction

Table 1: Peak Traffic 2041 Prediction

2041 Traffic Count Prediction		
Road	AM Peak	PM Peak
Rt. 29	3900	4000
Sullivan Way	1600	1500
W. State Street	600	600



Figure 6: Proposed Area 1 Synchro Analysis



Figure 7: Proposed Area 2 Synchro Analysis

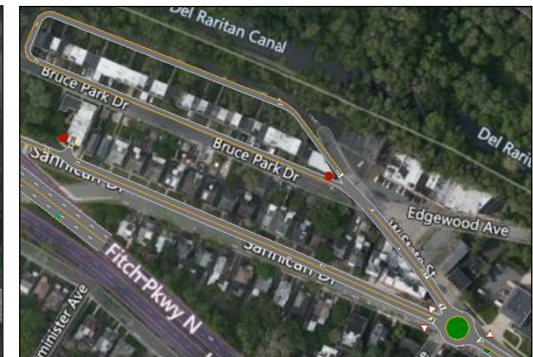


Figure 8: Proposed Area 3 Synchro Analysis

Synchro

Synchro analysis was done for each intersection for both existing and proposed conditions. In order to properly evaluate the proposed design traffic flow and signaling, both traffic counts from the project team and data from the NJDOT was used for the analysis.

Conclusion

- Safer travel for drivers, cyclists, & pedestrians
- Smoother traffic flow for more efficient travel time
- Less conflict points for lower accident risk

Future Directions

- Public green space for parks, walkways, bike paths, etc. will draw positive attention
- New neighborhood connection through pedestrian accessible travel
- Economic benefit and increased population in Trenton, NJ

Acknowledgements

The design team would like to thank our advisor, Dr. Thomas Brennan Jr. PE, PhD for assistance throughout the project. The support of the TCNJ Civil Engineering department and the TCNJ School of Engineering made this redesign project possible.

References

1. AASHTO Standards. (2001).
2. Autodesk AutoCAD Civil3D. (2020).
3. City of Trenton Code. (2019).
4. Google Maps. (2020).
5. Google.com. (2020).
6. ITS Standards. (2020).
7. Microsoft. (2016).
8. "Movavi Screen Recorder 21" (2020).
9. New Jersey DOT TMS Stations. (2020).
10. Roadway Design Manual. (2015).
11. Manual on Uniform Traffic Control Devices for Streets and Highways. (2020).