



SUBMISSION FORM

All submission forms must include the following information. Separate submission forms must be turned in for each eligible program. **Deadline: July 1, 2022.** Please include this submission form with the electronic entry. If you do not receive an email confirming receipt of your entry within 3 days of submission, please contact [Gage Harter](#).

PROGRAM INFORMATION

County: _____

Program Title: _____

Program Category: _____

CONTACT INFORMATION

Name: _____

Title: _____

Department: _____

Telephone: _____ Website: _____

Email: _____

SIGNATURE OF COUNTY ADMINISTRATOR OR DEPUTY/ASSISTANT COUNTY ADMINISTRATOR

Name: _____

Title: _____

Signature: _____



Loudoun County, Virginia
Department of Transportation and Capital Infrastructure

2022 Virginia Association of Counties Achievement Awards
Intersection Improvement Program

I. Executive Summary

In April 2018, Loudoun County's Board of Supervisors unanimously approved the adoption of the Intersection Improvement Program in the capital improvement program to ensure adequate resources and a programmatic method are established to efficiently implement safety improvement projects at state-maintained intersections, including enhanced intersection traffic control, such as signalization, or other innovative solutions such as a roundabout. The Intersection Improvement Program periodically reviews all signalized, unsignalized and roundabout intersections along roadways with functional classifications of arterial or collector in the *Countywide Transportation Plan*. Each intersection is ranked from one to five, with "Ranking 1" indicating a low priority intersection and a "Ranking 5" indicating a high priority intersection that needs improvements. Advanced analyses are then completed for Ranking 5 intersections and viable improvements are identified to be programmed for design and implementation with capital funds through the Intersection Improvement Program. This intersection improvement 'pipeline' also enables procedures to be established that streamline the project development process and advance the procurement of long lead-time traffic signal poles and mast arms; thereby mitigating untimely ad-hoc intersection improvement project delays resulting from slowdowns associated with funding source identification, traffic signal development process, and procurement of long lead-time materials.



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I. State the problem, challenge or situation faced by the locality

In the last three decades, the population of Loudoun County nearly quadrupled. Today, the County has over 400,000 people. Road improvements attracted more and more people to live in the County, expand business opportunities and visit the County's historical and scenic landmarks. This growth has added more vehicle miles traveled on the County's roadway system causing isolated congestion and, in some cases, safety concerns. When new residential and commercial developments are constructed and occupied, new trips are added to the County's roadway system. Additionally, Loudoun County and the Virginia Department of Transportation (VDOT) are adding new and missing roadway segments to the system. As these roadway improvements occur, the new and existing traffic are rerouted to the newly built roadways, which creates operational and safety challenges at intersections. Historically, transportation improvement projects in the County were generally advanced by VDOT through its annual fiscal deliberation processes or by private developers constructing segments of roadways, including intersection improvements via proffer agreements.

In 2012, the County reorganized two Departments (Office of Transportation Services and Capital Construction and Solid Waste Management) to form the Department of Transportation and Capital Infrastructure (DTCI). Thus, increasing the County's responsibility to advance multi-modal transportation projects including intersection improvements. Since 2012, the County's intersection improvement projects have been implemented on an ad-hoc basis typically reacting to specific safety concerns or incidents where District Supervisors formally direct DTCI via board



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member initiatives to begin a process of addressing the concern or deficiency. In some instances, funding for these safety initiatives was not identified in advance. As a result, project schedules for implementation of safety improvements were affected until available project funds were identified, resulting in delayed response times to the identified operations and safety concerns. In some instances, delays due to ad-hoc analysis and proposed design improvements resulted in a greater amount of time needed to get VDOT's concurrence, which affected project schedules for implementation. Also, the time needed to acquire materials such as traffic signal poles and mast arms resulted in an expansion of project schedule from weeks to months.

II. How the program fulfilled the awards criteria - innovation, partnering or collaboration and a model for other localities

In March 2017, DTCl recommended to the County's Board of Supervisors a more proactive approach to ensure that adequate resources and a programmatic method were established to efficiently implement intersection improvement projects. The approach includes the following:

- 1) Establishment of a formal intersection improvement program;
- 2) Maintenance of a robust database of existing intersections throughout the County;
- 3) Adoption of standardized signal pole, mast arm and foundation designs;
- 4) Formation of on-call contracts for the provision of intersection improvement analysis, design and construction; and



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- 5) Adequate funding levels through the Capital Improvement Program (CIP) to address the needs.

Initial development of a robust database of existing intersections throughout the County included existing intersections along roadways with functional classifications of arterial and collector status as identified in the 2010 *Countywide Transportation Plan (2010 CTP)*, which included a median break (for 4-lane roadways) or turn lanes (for 2-lane roadways). In this study, DTCl reviewed the unsignalized intersections only (totaling 544 intersections); signalized and roundabout intersections (totaling 180 intersections) were excluded in this initial study. Data for each intersection, including traffic volumes and vehicle and pedestrian crashes, was gathered to populate the database. In addition, geospatial information was collected to allow for all gathered information to be implemented into a Geographic Information System layer that can be queried using existing Loudoun County mapping software.

Upon establishment of the database, each unsignalized intersection was analyzed and ranked from one to five. The purpose of the scoring system was to determine those intersections with the highest likelihood of requiring safety improvements over the next several years. A ranking of one indicated a low priority intersection, and a ranking of five indicated a high priority intersection and candidate for enhanced intersection traffic control, such as signalization or other innovative solutions such as a roundabout. Table 1 provides the criteria utilized in scoring each intersection.



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Table 1. Characteristics of Intersection(s) by Lowest to Highest Priority Ranking

Rank	Description
1	<ul style="list-style-type: none"> • Minor street serves a small development without potential expansion • Location is close to adjacent signalized intersection(s) • Location is rural in nature
2	<ul style="list-style-type: none"> • No immediate, significant traffic growth is projected in near future • Transportation projects nearby will divert traffic away from this location • Location is close to adjacent signalized intersection(s) • Minor street development is built out
3	<ul style="list-style-type: none"> • Some potential for traffic growth in near future • May be impacted by adjacent transportation project
4	<ul style="list-style-type: none"> • Some potential for traffic growth in near future • May be impacted by adjacent transportation project in the next 6 years • Moderate to high number of crashes • Serves a significant pedestrian crossing for a major pedestrian generator (schools, Metrorail stations, shopping centers, W&OD Trail, etc.) • Key intersection of significant roadways • High volume of traffic volumes
5	<ul style="list-style-type: none"> • High number of crashes • High volume of traffic volumes • Will be directly impacted by adjacent transportation project • Key intersection of significant roadways

Of the 544 unsignalized intersections along the CTP roadways, the number of intersections assigned to each ranking are shown on Table 2. DTCl identified forty-three intersections that were rated as “Ranking 5” and fifty-one intersections that were rated as “Ranking 4”. DTCl also reviewed the number of committed intersections, which are defined as those intersections that are currently either in the planning or study, design, or construction phase as of January 1, 2017. There were



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twenty-one committed intersections, and they were excluded from further study. Therefore, the number of intersections subject to the proposed Intersection Improvement Program was 523 intersections.

Table 2. Number of Significant Intersections by Rank

Ranking	Number of Intersections	Number of Committed Intersections ¹	Number of Intersections Subject to Intersection Improvement Program
5	43	14	29
4	51	6	45
3	74	1	73
2	118	0	118
1	258	0	258
0 ²	180	180	0
Total	724	21	523

¹ Committed intersections are defined as those intersections already in either the planning, design or construction phase for signalization or installation of a roundabout to mitigate congestion or safety issues. These intersections are excluded from this Study.

² Existing signalized and roundabout intersections are excluded in the Intersection Improvement Program and designated as a ranking of 0.

In March 2017, DTCI formally presented the *Loudoun County Roadway Intersection Improvement Program Report (2017 IIP Study)* to the County’s Board of Supervisors, and recommended a standard operating procedure be established to continually update the roadway intersection database on a regular schedule and be collaborated between DTCI, Department of Planning and Zoning, the County’s Office of Mapping, Loudoun County Sheriff’s Office, and VDOT. It was recognized that this study only included unsignalized intersections along 2010 *Countywide*



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Transportation Plan roadways with the functional classifications of arterial and collector. For a comprehensive review, DTCl recommended expanding the study to analyze the safety and operations of signalized intersections, those with high crashes, along the non-CTP roadways.

In April 2018, the County's Board of Supervisors unanimously approved the adoption of the Intersection Improvement Program where capital funds were appropriated for the design and construction of improvements. To reduce delays associated with obtaining VDOT approval, on-call consultant contracts were established for intersection analysis and design activities. Using these on-call contracts, advanced analyses were completed for the Ranking 5 locations and the County's signal justification documents were standardized. As added benefit, in some cases the advanced analyses have been used to trigger developer signal proffers and have enabled the County to pursue state grant opportunities.

To reduce traffic signal pole and mast arm acquisition delays, DTCl modified the signal development process to move away from a traditional signal design and construction processes where the signal contractor supplies the signal poles and mast arms to a modified process where:

- (1) Traffic signal poles and mast arms are based on VDOT standardized poles and mast arms, and not custom designed;
- (2) Soil testing for foundation design is performed concurrent with signal design;
- (3) Standardized foundation designs are used with the standardized poles and mast arms; and
- (4) A contract with VDOT pre-approved signal pole and mast arm vendors is established so these signal components can be procured prior to their need in the field.



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Recognizing benefits for addressing signalized intersections in a similar programmatic manner, in January 2019, the County's Board of Supervisors unanimously approved to fund the second round of the countywide prioritization review of the Intersection Improvement Program. Unlike the initial review in 2017, this analysis included signalized intersections along the newly adopted 2019 *Countywide Transportation Plan (2019 CTP)* roadways. The analysis was also expanded to include unsignalized intersections along non-CTP roadways of significance, which is defined as roadways connecting two existing CTP roadways or providing public access to Loudoun County Public Schools or other public facilities.

In June 2020, DTCl presented the report titled *Loudoun County Expansion of Roadway Intersection Improvement Program (2020 IIP Study)* to the County's Board of Supervisors, which summarized the results of round two analysis. This report provided updates to the 2017 rankings of all previously included unsignalized intersections as identified in the 2010 CTP, and expanded the review to include signalized intersections, roundabouts, unsignalized intersections along the new 2019 CTP designated roadways and unsignalized intersections along 2019 non-CTP roadways of significance. In brief, DTCl conducted advanced safety studies to six Ranking 5 locations identified in the 2020 IIP Study and recommended viable improvements for each to be programmed for design and construction phases in the Intersection Improvement Program portion of the Fiscal Year 2023 Capital Improvement Program.

Understanding the vast growth in Loudoun County resulting to rapid change to traffic patterns, there is a need for periodic reassessment of the intersection rankings to proactively address



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burgeoning intersection operational and safety challenges. In Spring of 2022, DTCl commenced round three analysis and is scheduled to present the study findings to the County's Board of Supervisors in September 2022.

III. Tell how the program was carried out, including financing and staffing, and the program's results

The program was initially launched in 2017 by engaging an on-call task order consultant to study and produce the initial intersection database and final report, including intersections rankings and prioritization. DTCl engaged the same consultant to conduct the second update and expand the program in 2020. The 2020 update added signalized intersections and roundabouts to the intersection rankings, and unsignalized intersections were expanded to include new roadways or newly designated roadways within the 2019 CTP.

In 2020, DTCl engaged a Portfolio and Program Management Consultant (PPMC) and established a Program Management Office (PMO) to assist the County with strategy, programming, and planning for the County's capital improvement projects. In 2021, the PMO assumed a role in managing the Intersection Improvement Program, moving forward. The PMO is currently working on a third update to the intersection study. The PMO is working in coordination with DTCl planning, design, and construction teams to look for opportunities to streamline the overall process from initial intersection screening to implementation.

In addition, the program uses three task order contracts: Advanced intersection analyses are completed using a contract established in October 2021, intersection improvement design services



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are completed using a contract established in July 2020, and VDOT approved traffic signal poles and mast arms are obtained using a contract established in September 2021 for the purchase, storage, and delivery of those elements.

To date, ten intersections advanced to the design phase in FYs 2021 and 2022. Another eleven intersections will commence design phase in FY 2023. In the same timeframe, between seven and ten newly prioritized intersections are expected to be recommended for advanced safety studies.

IV. Brief overview of the program that could be used for press releases, brochures, etc.

Loudoun County's Intersection Improvement Program addresses safety and capacity challenges at state-maintained roadway intersections countywide. A database of existing unsignalized, signalized, and roundabout locations identified in the *Countywide Transportation Plan (CTP)* and non-CTP roads of significance is maintained to assist staff in prioritizing intersections that could benefit from physical modifications or upgrades. The Intersection Improvement Program process follows a regular cyclical schedule for addressing safety and operational problems at remaining intersections. The process includes quantitative and qualitative analysis of candidate intersections resulting in a prioritization that considers the frequency of accidents and traffic volumes. Highest ranking intersections are analyzed using a developed methodology and in coordination with various County departments and agencies, including Virginia Department of Transportation. Recommended conceptual improvements are developed for each studied intersections and, with approval from the County's Board of Supervisors, advance to design and construction phases



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through a streamlined process that minimizes typical delays associated with a traditional signal design and construction process. Loudoun County's Intersection Improvement Program is a proactive and data-driven approach to address safety and operational problems at major state-maintained roadway intersections that will result in a safer countywide transportation network for County residents and visitors.