

**BOARD OF SUPERVISORS  
TRANSPORTATION AND LAND USE COMMITTEE  
INFORMATION ITEM**

**SUBJECT** Intersection Improvement Program Overview

**ELECTION DISTRICT:** Countywide

**CRITICAL ACTION DATE:** At the pleasure of the Committee

**STAFF CONTACTS:** John Thomas, Transportation and Capital Infrastructure  
Joe Kroboth, III, Director, Transportation and Capital Infrastructure

**PURPOSE:** To provide an overview to the Transportation and Land Use Committee (TLUC) of the Intersection Improvement Program included in the Capital Improvement Program (CIP) and outline the next steps involved in advancing the program.

**BACKGROUND:** The Department of Transportation and Capital Infrastructure (DTCI) historically acted in a responsive mode with regards to reported safety deficiencies and/or operational problems at roadway intersections. Generally, after a significant vehicular crash occurred or District Supervisors' Offices received numerous complaints, a safety study would be initiated by the Board of Supervisors (Board) to address the problem. To enhance responsiveness in addressing safety and operational problems at intersections, DTCI proposed a data-driven plan to systematically identify problematic intersections in advance of incidents or complaints. This plan involved conducting an inventory of non-signalized, signalized, and roundabout intersections along roadways listed in the Countywide Transportation Plan (CTP) and non-CTP roadways of significance<sup>1</sup>. The plan evaluated intersections based on traffic volumes and crash history. From this data, the intersections are ranked on a scale from one (1) through five (5) where a ranking of five represents the most critical intersections requiring improvements and a ranking of one indicates the lowest priority intersections.

**2017 Intersection Improvement Program Study:** In February 2017, DTCI completed the Intersection Improvement Program Study (2017 Study, linked on page 2) with the intent of providing baseline information from which a systematic program mitigation plan could be established. The 2017 Study only evaluated unsignalized intersections. In total, 43 out of 544 unsignalized intersections were ranked as "Ranking 5." Of these, 14 were identified as

<sup>1</sup> Non-CTP roadways of significance are defined as roadways connecting two existing CTP roadways or providing public access to Loudoun County Public Schools or other public facilities.

“committed” intersections, which are defined as those intersections that are either in the planning/study, design, or construction phase for signalization or installation of a roundabout. The remaining 29 intersections were subject to the Intersection Improvement Program (Table 1).

**Table 1 – Ranking 5 Intersections in  
 2017 Intersection Improvement Program Study**

Status	No. of Priority 5 Intersections
Total Number of “Ranking 5” Intersections	43
Committed Intersections	14
<b>Intersections Subject to Intersection Improvement Program</b>	<b>29</b>

At the March 23, 2017, Board Business Meeting<sup>2</sup>, DTCI presented an Information Item summarizing the results of the Study. At this meeting, the Board directed staff (8-0-1: Randall absent) to forward the proposed Program to the FGOEDC for review and recommendation.

At the November 14, 2017, Finance, Government Operations and Economic Development Committee (FGOEDC) meeting<sup>3</sup>, DTCI presented the 2017 Study as part of a series of service level papers for discussion as part of the FY 2019 budget development process. The report contains tables indicating the categorization of unsignalized intersections on CTP roads, by election district. The FGOEDC expressed support for establishing the systematic program as part of the FY 2019 CIP budget development that would mitigate safety problems starting with the “Ranking 5” intersections, which are locations with the highest level of improvement needs. The program was added to the FY 2019 – FY 2024 CIP with funding intended to ramp up over the six-year period. The total six-year budget for this program in the FY 2022 Proposed CIP totals \$77.3 million (excludes staffing charges), with a ramp up period beginning in FY 2019 through FY 2021 with construction funding available beginning in FY 2022. The program is funded with local tax funding and general obligation bonds.

Typically, installation of a traffic signal requires three to four years to be completed. Given DTCI’s on-going efforts with VDOT to refine the development process for traffic signal projects, DTCI proposed a three-year development timeframe with the assumption that the design phase for a traffic signal would be completed in year one, land acquisition and utility relocation activities would be completed in year two and the construction phase would be completed in year three. Roundabouts are estimated to require five years to complete: two years for design, one year for land acquisition and utility relocation activities, and two years to complete construction. Therefore, from an implementation standpoint, the program was to “ramp up” over a three-year period for traffic signals and a five-year period for roundabouts to fund the installation of five traffic signals and one roundabout per year.

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<sup>2</sup> March 23, 2017 Business Meeting [Item I-1, Proposed Countywide Roadway Intersection Improvement Program](#)

<sup>3</sup> November 14, 2017 FGOEDC Meeting [Item 7, FY 19 Budget Development – Intersection Improvement Program](#)

The application of CIP funds to proposed intersection improvement projects is to be determined by iteratively updating the categorization and ranking of roadway intersections countywide (in which “Ranking 5” intersections are identified), identifying and obtaining VDOT concurrence for recommended improvements, and formally presenting this information for Board consideration.

At the April 18, 2019 Board Business Meeting<sup>4</sup>, the status of the 29 intersections was presented and staff was directed by the Board (9-0) to submit the results of the traffic signal warrant analysis and signal justification report for 18 “Ranking 5” intersections to VDOT for review, comment, and approval. The remaining 11 intersections were already under design, construction, or had been addressed through proffers or independent CIP projects. Staff was also directed (9-0) to meet with the respective District Supervisors where the intersections are located to review the findings of the analysis and recommended improvements, and to initiate a public outreach program, as appropriate, to gain feedback from the public.

At the November 7, 2019 Board Business Meeting<sup>5</sup> the Board (8-0-1, Letourneau absent) acted to fund the design of improvements at the intersections of Waxpool Road (Route 2119)/Shellhorn Road (Route 643) and Waxpool Road (Route 2119)/Ashburn Road (Route 641)/Ryan Corner Place and to forward the implementation costs of the Waxpool Road from Faulkner Parkway (Route 640) to Demott Drive (Route 2070) Corridor Study recommended improvements to the FY 2021 budget deliberation. These intersections were identified as ranked 11 and 12 among the analysis of the 18 intersections previously identified in the April 2019 Board Business Meeting. The proposed FY2022 CIP provides funding for these intersections through the Intersection Improvement Program. In January 2021, the Board approved the Waxpool Crossing zoning map (ZMAP-2019-0020) that includes the construction of a two-lane roundabout at the intersection of Waxpool Road and Faulkner Parkway.

At the July 21, 2020 Board Business Meeting the status of the 29 “Ranking 5” intersections, summarized in Table 2, was presented to the Board. Of the 29 “Ranking 5” intersections, improvements at 12 intersections have funding or have been addressed. This includes four of the intersections that were presented at the April 18, 2019 Board Business Meeting that have advanced to design as a result of a Board Member Initiative (BMI) or through proffers. Finally, improvements at the intersection of Harry Byrd Highway (Route 7) and Cedar Drive (Route 822) will be determined through an ongoing Route 7 corridor study.

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<sup>4</sup> April 18, 2019 Business Meeting [Item 8g, FGOEDC Reports: Results of Traffic Signal Warrant Analysis for the Intersection Improvement Program](#)

<sup>5</sup> November 7, 2019 Business Meeting [Item 6, Response to Board Member Initiative: Traffic Analysis and Safety Study of Waxpool Road between Faulkner Parkway and Demott Drive](#)

**Table 2 – Status of 29 Ranking 5 Intersections in  
 2017 Intersection Improvement Program Study**

Status as of June 2020	No. of “Ranking 5” Intersections
Improvements are funded or have been addressed <sup>1</sup>	12
Improvements have VDOT concurrence but still require funding <sup>2</sup>	16
Improvements being identified through ongoing study	1
<b>Total</b>	<b>29</b>

<sup>1</sup> Intersections improvements are either in design, under construction, or are currently completed through proffers or County CIP projects.

<sup>2</sup> Including Waxpool Road/Shellhorn Road and Waxpool Road/Ashburn Road intersections.

At the July 21, 2020 Board Business Meeting<sup>6</sup> staff was directed (9-0) to forward intersection improvements for 10 of the 16 intersections, as identified as the first 10 intersections below in Table 3, to Fiscal Year 2022 CIP process for deliberations and programming through the already established Intersection Improvement Program.

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<sup>6</sup> July 21, 2020 Business Meeting [Item 7, Intersection Improvement Program Update](#)

**Table 3 – Intersection Improvement Program (Prioritized Projects List)**

Prioritized Project (Project ID) <sup>7</sup> Description	Intersection ID	Election District	Beginning FY	Ending FY	Project Total (\$ in 1000s)
<b>Sterling Blvd. (Route 846) and Glenn Drive (C02408)</b> Provides for traffic signal installation at the intersection with lane configuration changes on the northbound approach with a dedicated left turn lane and a shared thru/right lane.	2017-2	Broad Run, Sterling	FY 2022	FY 2028	\$2,725
<b>Claiborne Parkway (Route 901) and Marshfield Dr. (C02406)</b> Provides for the conversion of the intersection to a right-in, right-out, left-in configuration and the addition of a U-turn lane on the northbound approach of the Claiborne Pkwy/Wayside Court intersection.	2017-4	Ashburn	FY 2022	FY 2025	\$1,773
<b>Tall Cedars Parkway (Rt. 2200) (C02305)</b> Provides for the conversion of the intersection at Tall Cedars Parkway and Nations Street to a right-in, right-out, left-in configuration.	2017-5	Dulles	FY 2022	FY 2025	\$357
<b>Ashburn Road (Route 641) (C02409)</b> Provides for the installation of a traffic signal at the intersection of Ashburn Road and Faulkner Parkway. Additionally, provides for the creation of dedicated right and left turn lanes in the east and westbound directions.	2017-3	Ashburn	FY 2022	FY 2026	\$6,760
<b>Old Ox Road (Route 606) and Douglas Court (C02410)</b> Provides for the conversion of the intersection to a right-in, right-out, left-in configuration.	2017-9	Broad Run	FY 2022	FY 2025	\$1,021
<b>Old Ox Road (Route 606) and Dulles Summit Ct. (C02411)</b> Provides for various minor improvements at the intersection including: repositioning the stop bar, extending the median nose, modifying the curb ramps, and installing additional warning signs. The project will also include new curb and gutter, and mill and overlay of all legs of the intersection.	2017-10	Broad Run, Dulles	FY 2022	FY 2025	\$542
<b>Ryan Road (Route 772) and Cotton Grass Way (C02412)</b> Provides for improvements to pavement markings in order to update the northbound approach lane configurations to a shared left/through lane and a dedicated right turn lane and therefore align the northbound lanes with the matching receiver lanes.	2017-19	Blue Ridge, Dulles	FY 2022	FY 2024	\$94
<b>Sugarland Road (Route 604)</b> Provides for an installation of the mini roundabout at the intersection of Sugarland Road & Church Road/Frederick Drive. Additional, related work will be required to reconfigure existing approach lanes and to provide ADA upgrades to pedestrian ramps.	2017-20	Sterling	FY 2023	FY 2027	\$3,473
<b>Claiborne Parkway (Route 901) and Dulles Greenway</b> Provides for the installation of a traffic signal at the intersection while retaining existing lane configurations.	2017-8	Ashburn	FY 2023	FY 2027	\$1,381
<b>Sterling Blvd. (Route 846) and West Laurel Ave.</b> Provides for the installation of a traffic signal at the intersection, while preserving the existing lane configurations, and upgrades to the existing curb and gutter system.	2017-15	Sterling	FY 2023	FY 2027	\$2,092
<b>Waxpool Road (Route 2119) and Shellhorn Road (Route 643) (C02290)<sup>8</sup></b> Provides for interim safety improvements at the Waxpool Road and Shellhorn Road intersection to include tree trimming and vegetation removal, as well as the installation of advanced intersection warning signs.	2017-21	Broad Run	FY 2021	FY 2023	\$2
<b>Waxpool Road (Route 2119) and Ashburn Road (Route 641) (C02426)<sup>8</sup></b> Provides for interim and long-term safety improvements at the intersection of Ashburn Road/Waxpool Road/Ryan Corner Place. Interim improvements include the installation of All Ways Stop (AWS) signage and minor pavement marking updates. Long-term improvements would include the installation of a traffic signal at the intersection.	2017-12	Broad Run	FY 2021	FY 2026	\$1,762
<b>Total Cost</b>					<b>\$21,983<sup>9</sup></b>

<sup>7</sup> Project IDs have been provided for those prioritized projects receiving funding in FY 2022 or that have previously received funding.

<sup>8</sup> This project is part of the Waxpool Road Corridor Study as presented to the Board at the Nov.7, 2019 Business Meeting as part of *Item 6 BMI: Traffic Analysis and Safety Study of Waxpool Road between Faulkner Parkway and Demott Drive*.

<sup>9</sup> The current prioritized project list total does not match the six-year total for the program because the current list of projects reflects the initial iteration of projects prioritized for funding in FY 2022 and 2023. Remaining capacity in the six-year period will be absorbed by additional projects once those have been identified and prioritized by the Board in subsequent fiscal years.

Since the July 21, 2020 Board Business Meeting, staff has been working with VDOT to implement Phase 1 improvements for the Harry Byrd Highway (Route 7)/Clayton Hall Road (Route 760) intersection under their Systemic Unsignalized Intersection Project which implements safety treatments such as signage and pavement marking improvements. Design plans are being finalized and construction for the project is tentatively scheduled to begin mid-2021.

On December 15, 2020<sup>10</sup>, during the Uses of FY 2020 General Fund Balance, the Board directed (8-0-1, Kershner-absent) staff to add no more than \$300,000 for the cost of interim improvements at Waxpool Road/Ashburn Road/Ryan corner place and Waxpool Road/Shellhorn Road as identified in the November 7, 2019, Board Business Meeting item and to decrease the intersection improvement program by the same amount. The Board also allocated \$3.7 million of FY2020 Fund Balance for the Intersection Improvement Program. Fund balance will be utilized to advance prioritized projects.

**2020 Intersection Improvement Program Study:** When DTCI presented the 2017 Study at the March 23, 2017 Board Business Meeting, the Board also directed staff to expand the study to include existing signalized intersections. At the January 17, 2019 Board Business Meeting, funds were appropriated to update the countywide prioritization analysis, which included expanding the study to include identifying signalized intersections requiring improvements.

At the June 16, 2020 Board Business Meeting<sup>11</sup>, DTCI presented an information item summarizing the results of the expansion study to the Countywide Roadway Intersection Improvement Program (2020 Study). This Item provided updates to the 2017 rankings of all previously included unsignalized intersections and expanded the database of intersections to include signalized intersections, roundabouts, and unsignalized intersections along the new 2019 CTP designated roadways and unsignalized intersections along non-CTP roadways of significance. Like the 2017 Study, each intersection was ranked from one through five using criteria customized for each intersection type, where a ranking of five represents the most critical intersection requiring improvements and a ranking of one indicates the lowest priority intersection. Based on updates to the 2017 unsignalized intersection rankings and the additional ranking of signalized intersections countywide, seven additional intersections were classified as “Ranking 5.”

DTCI staff is currently developing the scope of work and cost estimates for the analysis and evaluation of these seven intersections. The analysis of these seven intersections will include the evaluation based on 13 criteria related to safety, traffic signal warrant results, pedestrian and bicycle impacts, traffic impacts and roadway impacts as described in the staff report that was presented at the April 18, 2019 Board Business Meeting. This analysis will help determine the recommended improvements and the recommended re-order of implementation to achieve the

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<sup>10</sup> December 15, 2020 [Item 12f, Finance/Government Operations and Economic Development Committee Report: Use of FY 2020 General Fund Balance](#)

<sup>11</sup> June 16, 2020 Business Meeting [Item I-2, Expansion to the Countywide Roadway Intersection Improvement Program](#)

greatest improvement in safety and traffic operations. These intersections are identified in Table 4.

**Table 4 –Ranking 5 Intersections in  
 2020 Intersection Improvement Program Study**

<b>Intersection ID</b>	<b>Location</b>	<b>Election District</b>	<b>Current Intersection Control</b>
2020-1	Church Road (Route 625) and Lincoln Avenue (Route 1496)/Belfort Street (Route 1481)	Sterling	Unsignalized
2020-2	Loudoun County Parkway (Route 606) and Edgewater Street (Route 2237)	Dulles	Unsignalized
2020-3	Pacific Boulevard (Route 1036) and Business Court (Route 1037)/Indian Creek Drive (Route 1038)	Broad Run	Unsignalized
2020-4	Sterling Boulevard (Route 846) and Williamsburg Road (Route 1437)/Chase Heritage Circle	Sterling	Unsignalized
2020-5	Ashburn Village Boulevard (Route 2020) and Shellhorn Road (Route 643)	Broad Run	Signalized
2020-6	Gloucester Parkway (Route 2150) and Loudoun County Parkway (Route 607)	Broad Run	Signalized
2020-7	Sterling Boulevard (Route 846) and Shaw Road (Route 636)	Broad Run/Sterling	Signalized

As part of the results of the expansion study, it was suggested to prepare corridor safety analyses for roadways having sequences of multiple high-ranking intersections. A corridor analysis will provide a well-coordinated approach to improve the intersections as a system and address potential safety and operational issues at each intersection that may be impacting the function of upstream and downstream intersections.

**ISSUES:** Staff has identified the following four issues:

Countywide Prioritization Analysis Update Timing: At the June 16, 2020 Board Business Meeting staff recommended to continue the efforts of re-review and re-order the ranking of the unsignalized, signalized and roundabout intersections countywide every three years. To ensure a set of projects have been defined and recommendations are accepted by VDOT prior to FY 2025 budget deliberations, an update should be initiated in July 2021.

Potential Improvements to the Ranking Methodology: Currently, the two primary factors used for the ranking of unsignalized, signalized, and roundabouts intersections from one (1) through five (5) are: the number of crashes and traffic volume. Staff recommends the addition of other analyses into the methodology. These analyses will help to consider other factors that can provide a more equitable approach to the current analysis. These analyses include the evaluation of:

- Crash rates - Crash rates describe the number of crashes in a given period of time as compared to the traffic volume (or exposure) to crashes. Crash rates are calculated by dividing the total number of crashes at a given intersection over a specified time period (typically three to five years) by a measure of exposure.
- Average crash severity - The number of injury and fatal crashes is compared to the total number of crashes.
- Pedestrian and bicycle safety - This factor would consider the presence of pedestrian and bicycle facilities and crashes to account for non-motorized needs in project prioritization.

*Project Schedules:* The Intersection Improvement Program were developed assuming a three-year development timeframe with the assumption that the design phase for a traffic signal would be completed in year one, land acquisition and utility relocation activities would be completed in year two and the construction phase would be completed in year three. However, each priority “Ranking 5” intersection has varying degrees of complexity and presents unique circumstances that will need to be vetted with VDOT and impacted stakeholders. Project schedules as well as the order in which improvements are proposed to be implemented may vary to accommodate these uncertainties.

*Unanticipated or Rapidly Emerging Intersection Safety Locations:* In addition to the systematic process for addressing intersection improvements in the Intersection Improvement Program, staff continues to recommend, and the Board has approved funding in the “Traffic Signal Contingency” account within the capital fund. These funds are primarily used to address unanticipated or emerging intersection safety and signalization projects that the Board chooses to implement outside of the Intersection Improvement program. The above issues will be addressed in future updates to the Intersection Improvement Program ranking and report.

**FISCAL IMPACT:** There is no fiscal impact associated with this item at this time. The Intersection Improvement Program is an existing project in the CIP, and the appropriations schedule guides the workplan of this program.