

# Village of Waterford Traffic Calming and Byway Assessment

Village of Waterford  
Catoctin Election District,  
Loudoun County

Draft Report  
December 16, 2020



Prepared for:  
Loudoun County  
Department of Transportation  
and Capital Infrastructure



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## Executive summary

A Loudoun County Board of Supervisors Business Meeting was held on January 21, 2020. At this meeting, the Catoctin District Supervisor moved that the Board of Supervisors direct staff in the Department of Transportation and Capital Infrastructure (DTCI) to initiate the process to install pole mounted speed display (PMSD) signs at the three (3) entry points to the Village of Waterford as interim traffic calming measures. At this meeting, the Catoctin District Supervisor further moved that the Board of Supervisors direct DTCI staff to review the viability of other traffic calming measures such as splitter islands, chicanes, and chokers at the three entry points to the Village of Waterford as well as the feasibility of a bypass. The Copy Test of this directive is available in Appendix A.

Three potential traffic calming treatments were investigated for each of the roadways leading into the Village of Waterford as directed by the Board of Supervisors: chicanes, chokers, and splitter islands. Five locations for potential treatments were identified that would minimize impacts to residential Right-of-Way (ROW) and impacts to the environmental and historical constraints. The feasible traffic calming treatments for each location are listed below:

- Loyalty Road Location A, approximately 200 feet south of Browns Lane
  - Feasible traffic calming treatments: Splitter Island
- Loyalty Road Location B, approximately 150 feet west of Old Waterford Road
  - Feasible traffic calming treatments: Chicane and Splitter Island
- Clarkes Gap Road, approximately 400 feet north of Hamilton Station Road
  - Feasible traffic calming treatments: Chokers
- Old Wheatland Road, approximately 300 feet east of Milltown Road
  - Feasible traffic calming treatments: Splitter Island
- The intersection of Old Wheatland Road and Clover Hill Road
  - Feasible traffic calming treatments: Splitter Island

Conceptual sketches were developed for the feasible traffic calming treatments at each location and an evaluation of the concepts was conducted by comparing each of the concepts against one another for criteria that included cost, impacts to environmental constraints, impacts to residential ROW, aesthetics, maintenance requirements, anticipated reductions in vehicle speeds, and anticipated reductions in traffic volumes. The results of the evaluation concluded that there is little difference between the traffic calming treatments for the criteria used. None of the concepts are expected to reduce traffic volumes, however FHWA data from 2014 suggests that chicanes may reduce vehicle operating speeds by approximately three (3) to nine (9) MPH and chokers may reduce vehicle operating speeds by approximately one (1) to four (4) MPH. FHWA data also shows that splitter islands commonly reduce vehicles speeds by approximately two (2) to three (3) MPH, however, data from ITE suggests that there is no significant impact of vehicles speeds beyond the island.

In addition to the mid-term traffic calming evaluation, four areas were reviewed for a potential byway around the Village of Waterford as directed by the Loudoun County Board of Supervisors:

West of the Village of Waterford

- Area 1: West of the Village of Waterford, outside of the National Register Historic District
- Area 2: West of the Village of Waterford, inside of the National Register Historic District

East of the Village of Waterford

- Area 3: East of the Village of Waterford, outside of the National Register Historic District
- Area 4: East of the Village of Waterford, inside of the National Register Historic District

Each of these areas include residential dwellings, conservation easements, wetlands, and other environmental constraints that would need to be avoided. A No-Build scenario (without a potential byway) would have the least amount of impacts to environmental constraints, however it would also not offer any travel time savings as vehicles would still be traveling through the Village. Area 2 and Area 4, the potential byway areas inside of the National Historic District have the lowest costs and the least impacts to environmental constraints in the area. The potential byway areas outside of the National Historic District, Area 1 and Area 3, would offer more travel time savings versus traveling through the Village as it was assumed that vehicles would travel at higher speeds along a potential byway than along the roadways within and leading to the Village of Waterford. The potential byway areas within the National Historic District would still offer some travel time savings, however the shorter length of a potential byway in these areas would mean that vehicles would need to travel on the lower speed facilities of the existing roadway network for a greater distance prior to using the potential byway around the Village. For the potential byway areas outside of the National Historic District, there are understandably more acres of environmental constraints, as these locations would require the potential byway to span a greater distance and would require more right-of-way. However, within Area 3 on the east side of the Village, outside of the National Historic District, the areas and locations of the environmental constraints, particularly the Conservation Easements, would be difficult to avoid without impacts.

It is important to note that additional studies are needed to determine any potential byway alignment on new location or along existing roadways. At the time this report was written, a potential byway around the Village of Waterford was not included in the Loudoun Countywide Transportation Plan or the Loudoun County Comprehensive Plan. Identified funding sources and amendments to these documents would be needed for a potential byway project to move forward in the Project Development Process.

## Section I: Mid-Term Traffic Calming Concept Development & Evaluation

### Introduction

#### Background Information

A Loudoun County Board of Supervisors Business Meeting was held on January 21, 2020. At this meeting, the Catoctin District Supervisor moved that the Board of Supervisors direct staff in the Department of Transportation and Capital Infrastructure (DTCI) to initiate the process to install pole mounted speed display (PMSD) signs at the three (3) entry points to the Village of Waterford as interim traffic calming measures. At this meeting, the Catoctin District Supervisor further moved that the Board of Supervisors direct DTCI staff to review the viability of other traffic calming measures such as splitter islands, chicanes, and chokers at the three entry points to the Village of Waterford as well as the feasibility of a byway. The Copy Teste of this directive is available in Appendix A.

Several studies have been conducted, prior to the January 2020 directive from the Board of Supervisors, to determine potential treatments to reduce cut-through traffic and speeding within the Village of Waterford. Below is a summary of the timeline of events leading up to the January 2020 Board of Supervisors directive:

- In July 2015, Waterford Citizens' Association (WCA) approached the Catoctin District Supervisor with concerns regarding excessive vehicular speeding and volume traversing the Village of Waterford.
- At the June 23, 2016 Board of Supervisors Business Meeting, the Board approved the expenditure for the cut-through traffic study.
- In May 2018, the *Final Technical Report: Village of Waterford Cut-Through Traffic Study* was completed by a County's task order consultant. Following the completion of the report, DTCI held a stakeholder meeting to discuss the results of the study and the alternative remedial measures that were presented in the final report, short-, medium-, and long-term solutions on May 30, 2018. This meeting was attended by representatives from WCA, the District Supervisor's Office, the Virginia Department of Transportation (VDOT), and the consulting team. At this meeting, WCA requested additional time to allow them to inform and vet the study findings with other residents of the Village of Waterford.
- On April 4, 2019, WCA sent the *Waterford Traffic Reduction Counterproposal* to representatives of the County and VDOT via electronic mail.
- On July 2019, DTCI held a follow-up stakeholder discussion with WCA and VDOT to further discuss the WCA's *Waterford Traffic Reduction Counterproposal*. At this discussion, given that approximately 2.5 years had transpired since the traffic data was collected (November 2016) for the May 2018 *Village of Waterford Cut-Through Traffic Study*, it was determined by

stakeholders that up-to-date traffic data would be needed to better assess the current speed and volume conditions in Waterford and to address these traffic concerns via the County's Traffic Calming Program. At this meeting, staff and WCA discussed the process and criteria as currently identified under the County's *Residential Traffic Management (RTM) Guide*.

- On October 10, 2019, DTCL collected traffic and speed data at seven locations in and around the Village of Waterford. The locations on Clarkes Gap Road, Loyalty Road, and First Street met the criteria for the installation of traffic calming measures included in the County's *RTM Guide*, as well as the criteria for the installation of PMSD signs in the *VDOT Traffic Engineering Division Memorandum, TE-374.1*.
- On October 25, 2019, DTCL met with VDOT to discuss the proposed installation of three PMSD signs at the Village entry points on Clarkes Gap Road, Loyalty Road, and First Street, and received VDOT's concurrence.
- On October 30, 2019, DTCL held a stakeholder meeting with WCA and VDOT to discuss the speed study results. At this meeting, WCA expressed support of the PMSD sign installations as an interim condition.
- On January 21, 2020, the Board of Supervisors approved the process to install the PMSD signs at the three (3) entry points to the Village of Waterford as interim traffic calming measures and directed DTCL staff to review the viability of other traffic calming measures such as splitter islands, chicanes, and chokers at the three entry points to the Village of Waterford as well as the feasibility of a byway. The PMSD signs were installed in May 2020.



## Stakeholder Meetings

For the January 21, 2020 Board of Supervisors directives, several stakeholder meetings were conducted to discuss the potential locations of the splitter islands, chicanes, and chokers, which are the mid-term traffic calming options, as well as the environmental constraints associated with the long-term byway assessment. Stakeholders for this study include VDOT, WCA, Loudoun County Fire and Rescue, Loudoun County Sheriff's Office (LCSO), and the Catoctin District Supervisor. Table 1 presents the various meetings conducted for this study along with the dates and purposes of the meetings. Meeting Minutes are provided in Appendix B for each of the stakeholder meetings.

**Table 1: Stakeholder Meetings**

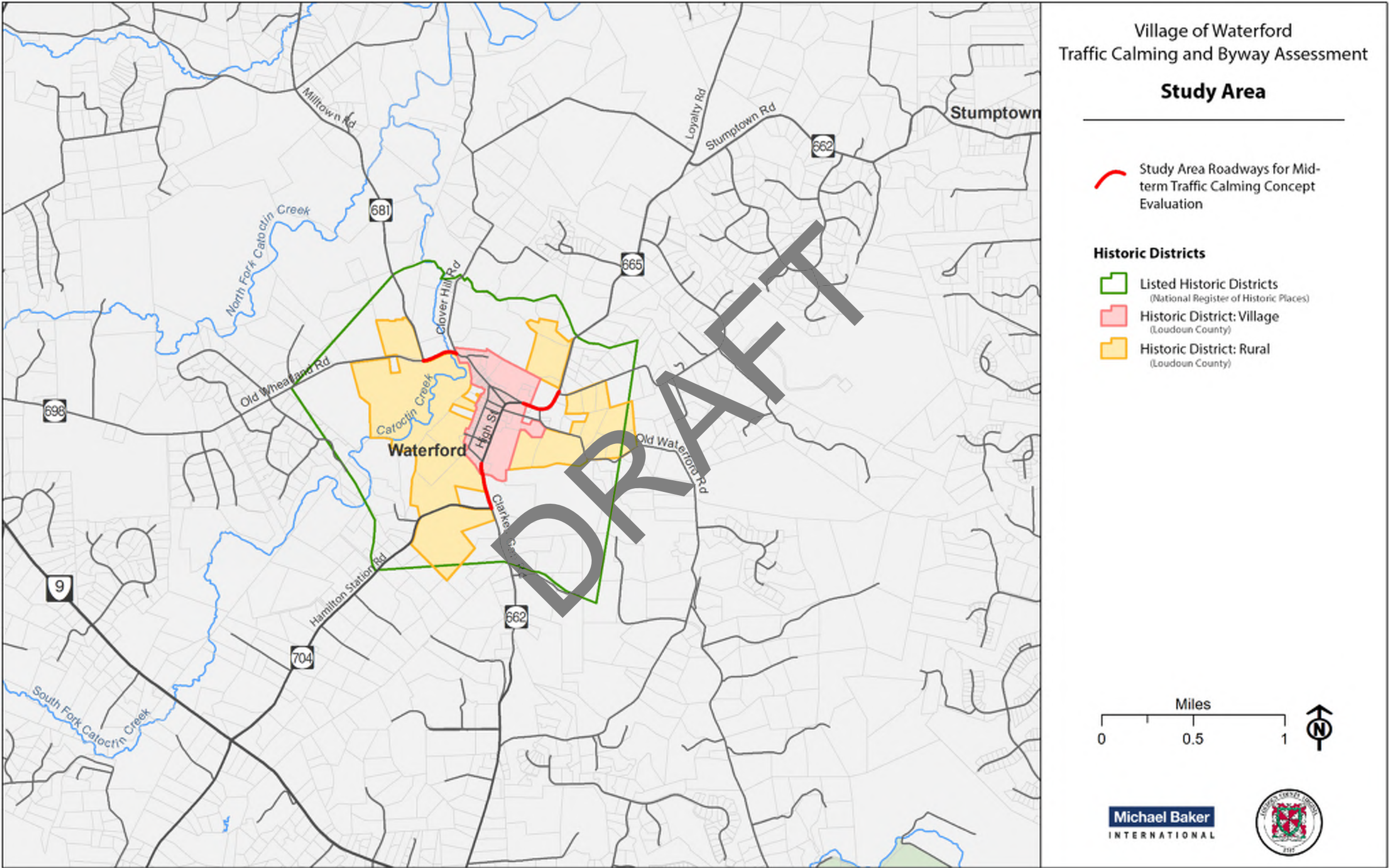
Meeting	Date	Location	Meeting Purpose
Stakeholder Kick-off Meeting	May 7, 2020	Virtual	Study Scope and Schedule
DTCI/VDOT Review Meeting	July 15, 2020	Virtual	Review of preliminary mid-term concepts and environmental constraints for the long-term byway assessment
Stakeholder Review Meeting	August 6, 2020	Virtual	Review of preliminary mid-term concepts, long-term byway assessment, and potential implementation timelines

## Study Area

The Village of Waterford is located in northern Loudoun County, in the Catoctin Election District, approximately five (5) miles north of the Town of Leesburg and approximately eight (8) miles south of the Maryland state line. The study area for the long-term byway assessment is presented in Figure 1 along with the roadways evaluated for the mid-term traffic calming treatments which include the three roadways leading into the Village of Waterford: Clarkes Gap Road, Loyalty Road, and First Street.

It is important to note that First Street becomes Old Wheatland Road (Route 698) west of the intersection with Clover Hill Road (Route 662) and that the segment of Old Wheatland Road from First Street to Milltown Road (Route 681) was included as a study roadway for the mid-term traffic calming evaluation. Features for the study roadways are summarized in the Existing Conditions section of this report and were verified during the field visit.

Figure 1: Study Area for Mid-term Traffic Calming Evaluation and Long-term Byway Assessment



## Data Collection and Existing Conditions

The data collection task for this study included a field visit, gathering information on traffic volumes and speeds, obtaining crash data and information on environmental constraints, and an origin/destination review. This data assisted in the determination of locations meeting the VDOT criteria included in the *VDOT Traffic Calming Guide for Neighborhood Streets* and the *Loudoun County DTCI Residential Traffic Management (RTM) Guide*:

- The roadway must be in the VDOT Secondary Roadway System.
- The roadway must be a neighborhood street. Neighborhood streets are within a neighborhood setting where the residences and businesses face the street rather than reverse-frontage (where houses along a street do not face or generally have access to the street).
- The roadway must have a posted speed limit of 25 mph or less.
- The roadway has an 85<sup>th</sup> percentile speeds greater than ten (10) MPH in excess of the posted speed limit.

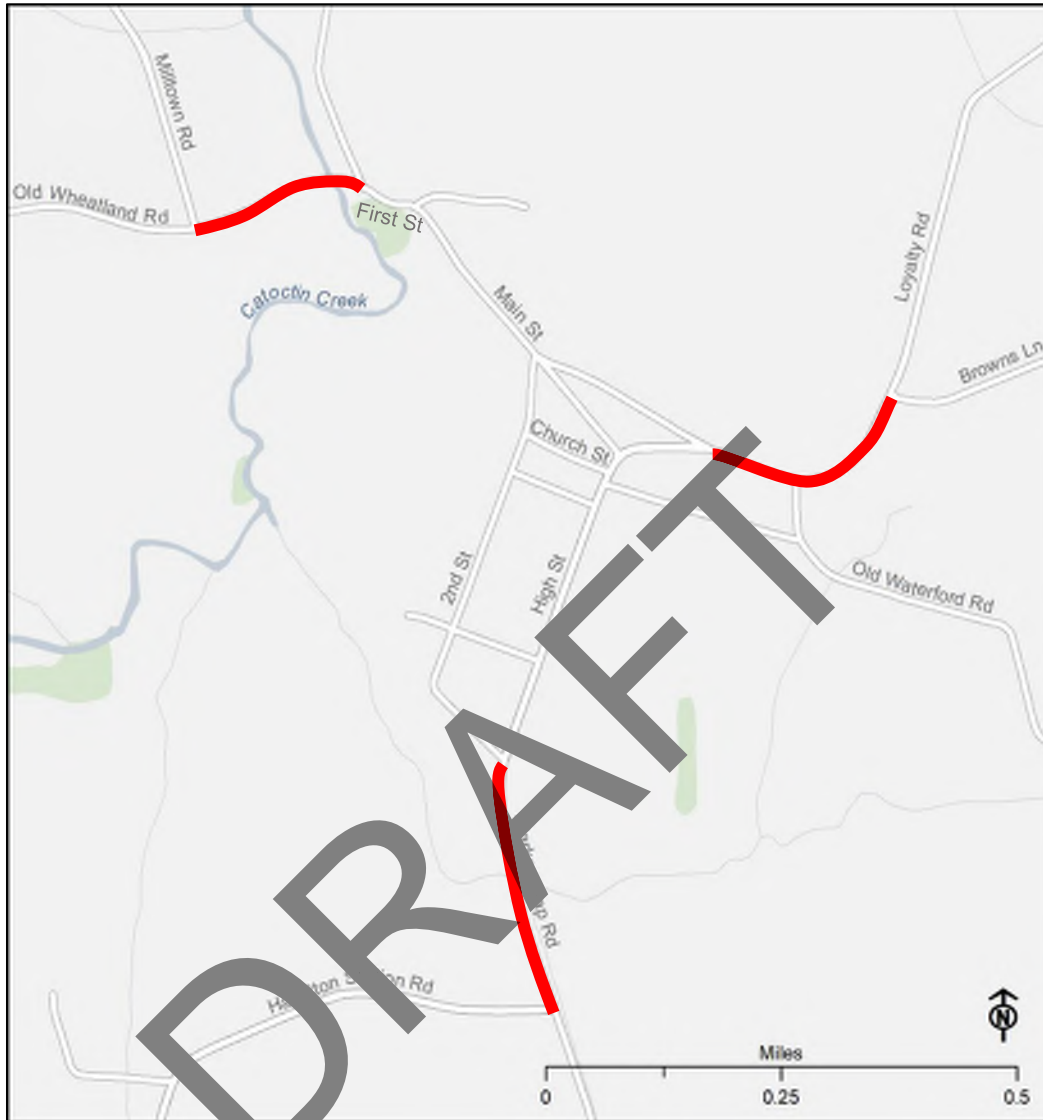
### Field Visit

Information collected during the field visit included:

- Existing lane configurations
- Existing sight distance locations
- Apparent geometric, private property or utility challenges
- Historical landmarks and bodies of environmental significance
- Possible causes of reportable crash history
- Overhead utility locations

Figure 2 presents the study area roadways investigated during the field visit. A summary of observations noted during the field visit, as well as the roadway features for each facility is discussed following the figure.

**Figure 2: Study Area Roadways for Mid-Term Traffic Calming Concept Evaluation**





**Loyalty Road (Route 665)**

Loyalty Road is a two-lane roadway (one lane in each direction) functionally classified as a Minor Collector Roadway by VDOT, running north-south from the Village of Waterford to Taylorstown, Virginia. Loyalty Road was designated as a Virginia Byway in 1988. The posted speed limit along the segment investigated for traffic calming measures is 20 MPH. The width of each lane ranges from ten (10) to twelve (12) feet. The two-way average daily traffic (ADT) along Loyalty Road just north of the Village of Waterford is 3,129 based on data collected by DTCL in October 2019.

It was noted during the field visit that there are overhead utilities along Loyalty Road and sight distance limitations due to the horizontal curve between Browns Lane (Route 666) and Old Waterford Road (Route 698). Along Loyalty Road, just south of Browns Lane and just west of Old Waterford Road, there are posted signs stating: SPEEDING – ADDITIONAL \$200 FINE.

**Figure 3: Field Visit Photo - Facing Southbound on Loyalty Road, just North of Browns Lane**





**First Street (Route 662) and Old Wheatland Road (Route 698)**

The roadway segments of First Street and Old Wheatland Road, between Bond Street and Milltown Road, run east-west and consist of two lanes (one lane in each direction). These segments are classified as Minor Collector Roadways by VDOT. Motorists using these roadway segments can also access Milltown Road which is a north-south roadway leading to the Town of Lovettsville, approximately six (6) miles north of the Village of Waterford. The posted speed limit along the segments investigated for traffic calming measures is 20 MPH. The width of each lane varies between ten (10) and eleven (11) feet and the two-way ADT along these segments is 4,440 based on data collected by DTCl in October 2019.

It was noted during the field visit that there is a wide pavement area at the intersection of Old Wheatland Road and Clover Hill Road and there are overhead utilities along First Street and Old Wheatland Road. There is a posted sign further east of First Street Road, along Main Street, stating: SPEEDING – ADDITIONAL \$200 FINE. There are two similar signs along 2<sup>nd</sup> Street.

**Figure 4: Field Visit Photo - Facing Southbound on First Street at the Intersection with Clover Hill Road**



### **Clarkes Gap Road (Route 662)**

Clarks Gap Road is a two-lane roadway (one lane in each direction) functionally classified as a Major Collector Roadway by VDOT, running north-south from the Village of Waterford to Paeonian Springs. Clarkes Gap Road was designated as a Virginia Byway in 1988. The posted speed limit is 20 MPH along the segment investigated for traffic calming measures. The speed limit further south on this facility is 45 MPH, transitioning to 30 MPH before the speed limit lowers to 20 MPH approaching the Village. The width of each lane is approximately ten (10) feet and the two-way ADT along Clarkes Gap Road just south of the Village of Waterford is 7,919 based on data collected by DTCl in October 2019.

During the field visit, it was noted that there are overhead utilities along Clarkes Gap Road and steep drainage ditches on both sides of the roadway. There are two posted signs further north of Clarkes Gap Road, along High Street, stating: SPEEDING – ADDITIONAL \$200 FINE.

**Figure 5: Field Visit Photo - Facing Northbound on Clarkes Gap Road, approaching the Village of Waterford**

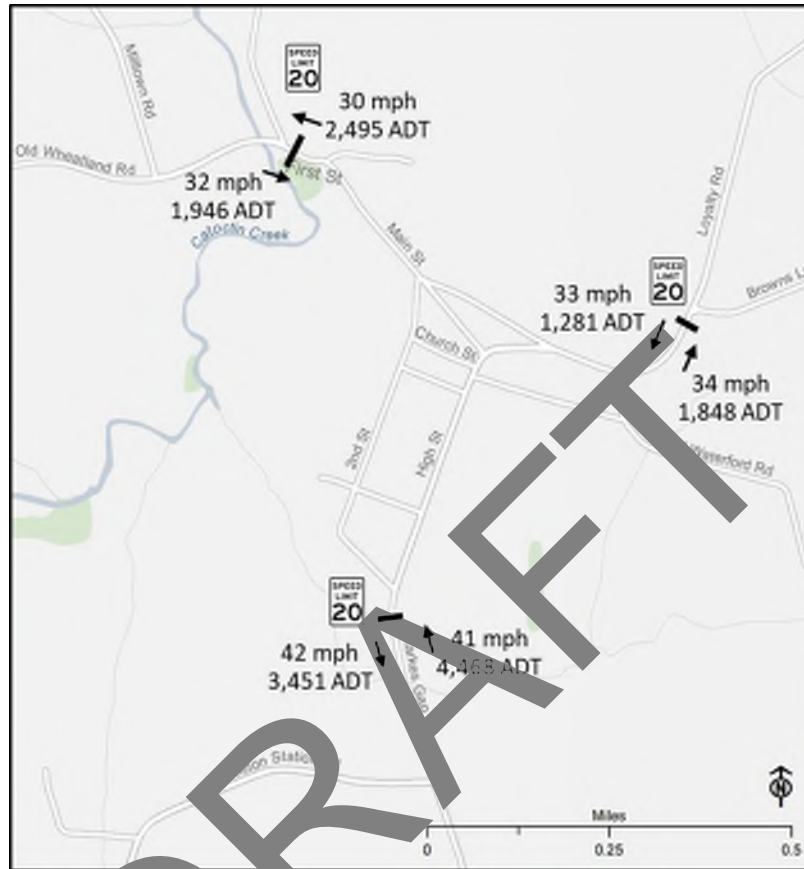


### **Traffic Volumes and Speed Data**

Existing traffic volumes and speed data were collected by Loudoun County DTCl over a two-day period in October 2019. Figure 6 presents the ADT and 85<sup>th</sup> percentile speeds at the entry points to the Village along First Street, Loyalty Road, and Clarkes Gap Road. The Loudoun County *RTM Guide* states that roadways with 85<sup>th</sup> percentile speeds greater than ten (10) miles per hour (MPH) above the posted speed limit are deemed to have speeding problems and qualify for both non-physical and physical traffic calming measures. The 85<sup>th</sup> percentile speed is defined as, “the speed at or below which 85 percent of all vehicles are observed to travel under free-flowing conditions past a monitored point.” As shown in the figure, traffic volumes on Clarkes Gap Road are approximately double the traffic volumes at the other locations and vehicle speeds greatly exceed the posted speed limits at each location. It is important to note that Clarkes Gap Road has a posted speed limit of 45 MPH on a

tangent (straight) segment before transitioning to 30 MPH and then 20 MPH as you approach the Village, which may be a factor for the higher speeds.

**Figure 6: 2019 Average Daily Traffic (ADT) and 85th Percentile Vehicle Speeds**



\*Traffic data collected in October 2019 by DTCl

### Crash Data

Crash history within the Village of Waterford area was obtained from the public VDOT crash database for the time frame of February 2015 to February 2020 (a five-year time frame). The data shows that the predominant crash types include “fixed object – off road”, which are typical for roadways with less pavement width as this makes it difficult for motorists to avoid obstructions or recover from drifting, and “angle crashes”, which primarily occur at intersection locations with below-standard roadway geometry and sight-distance. Crash severity was also investigated; most of the crashes within the last five years of data have a severity of “property damage only”, which typically occur on low-speed roadways or in stop-and-go conditions. There were two crashes on Clarkes Gap Road and one crash at the intersection of Milltown Road with Old Wheatland Road that included “visible injuries” and two crashes that included “severe injuries”; one on Old Waterford Road that resulted from a vehicle colliding with a “fixed object off-road”, and another at the intersection of Old Waterford Road and Loyalty Road that was a result of an “angle crash”. Figure 7 shows the locations of the crash types and Figure 8 shows the severity of the crashes. The full crash history is available in Appendix C.

Figure 7: Village of Waterford Crash Data – Crash Types (Feb. 2015-Feb. 2020)

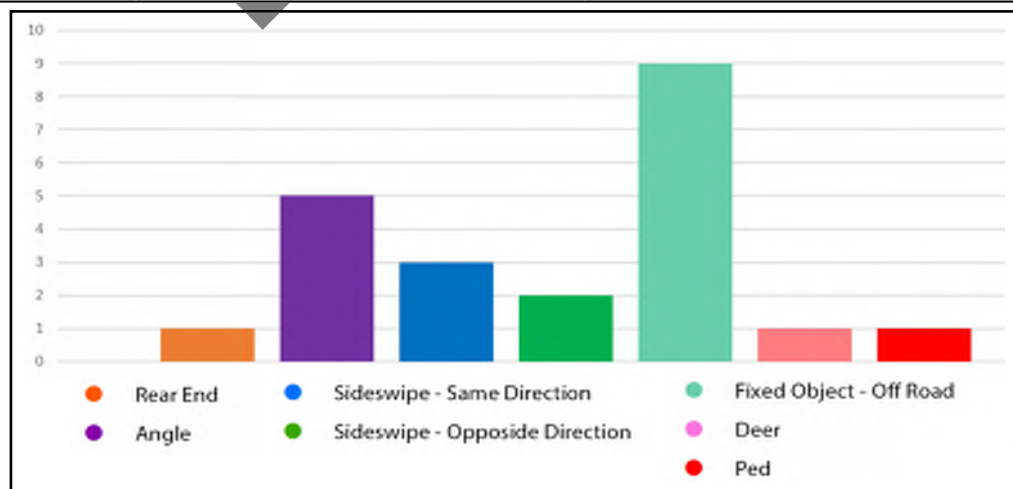
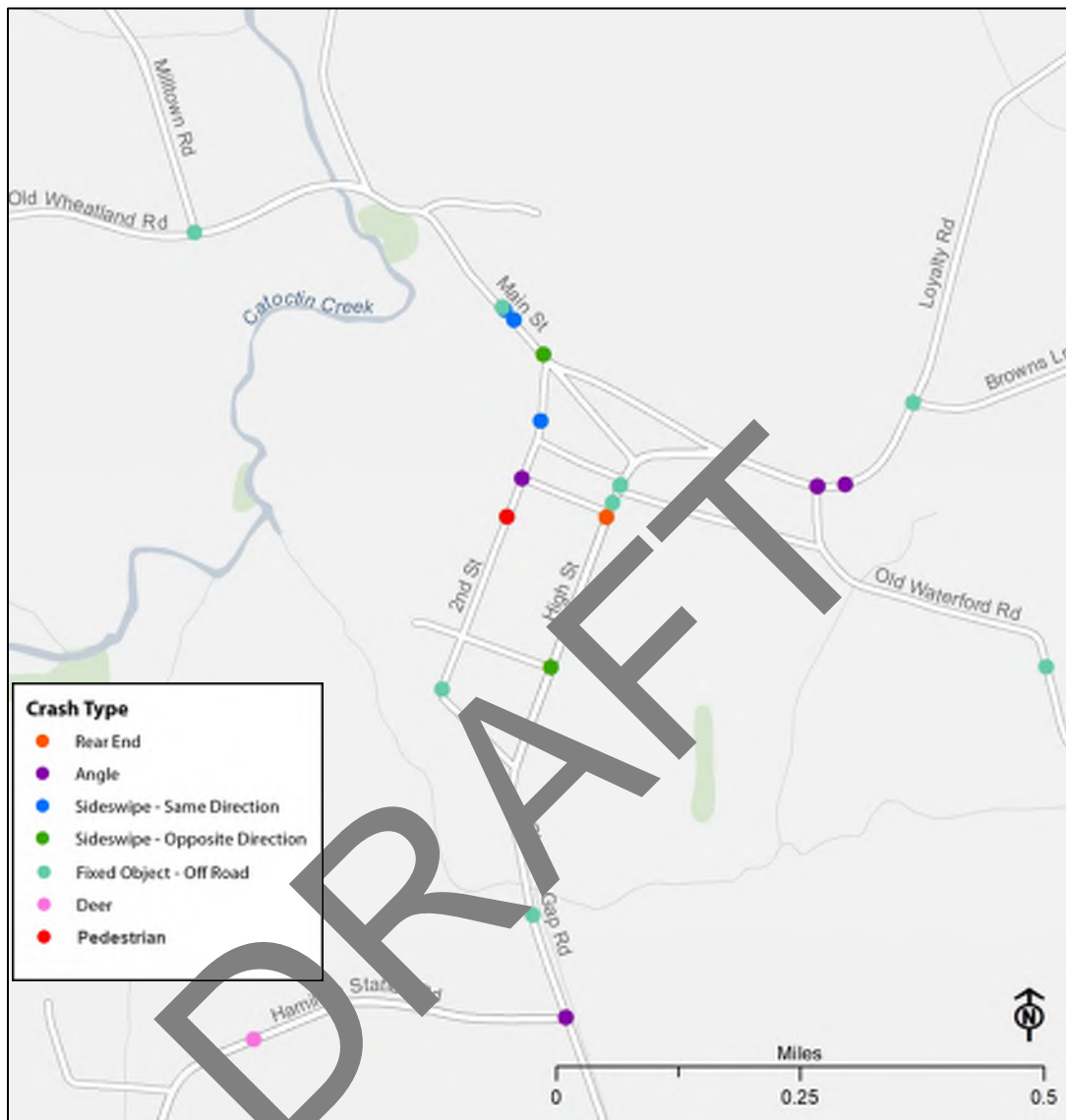
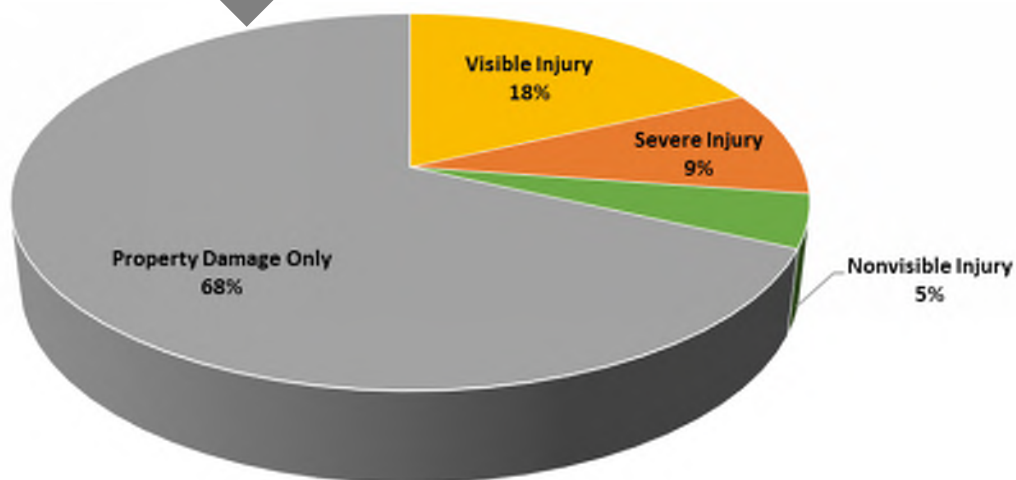
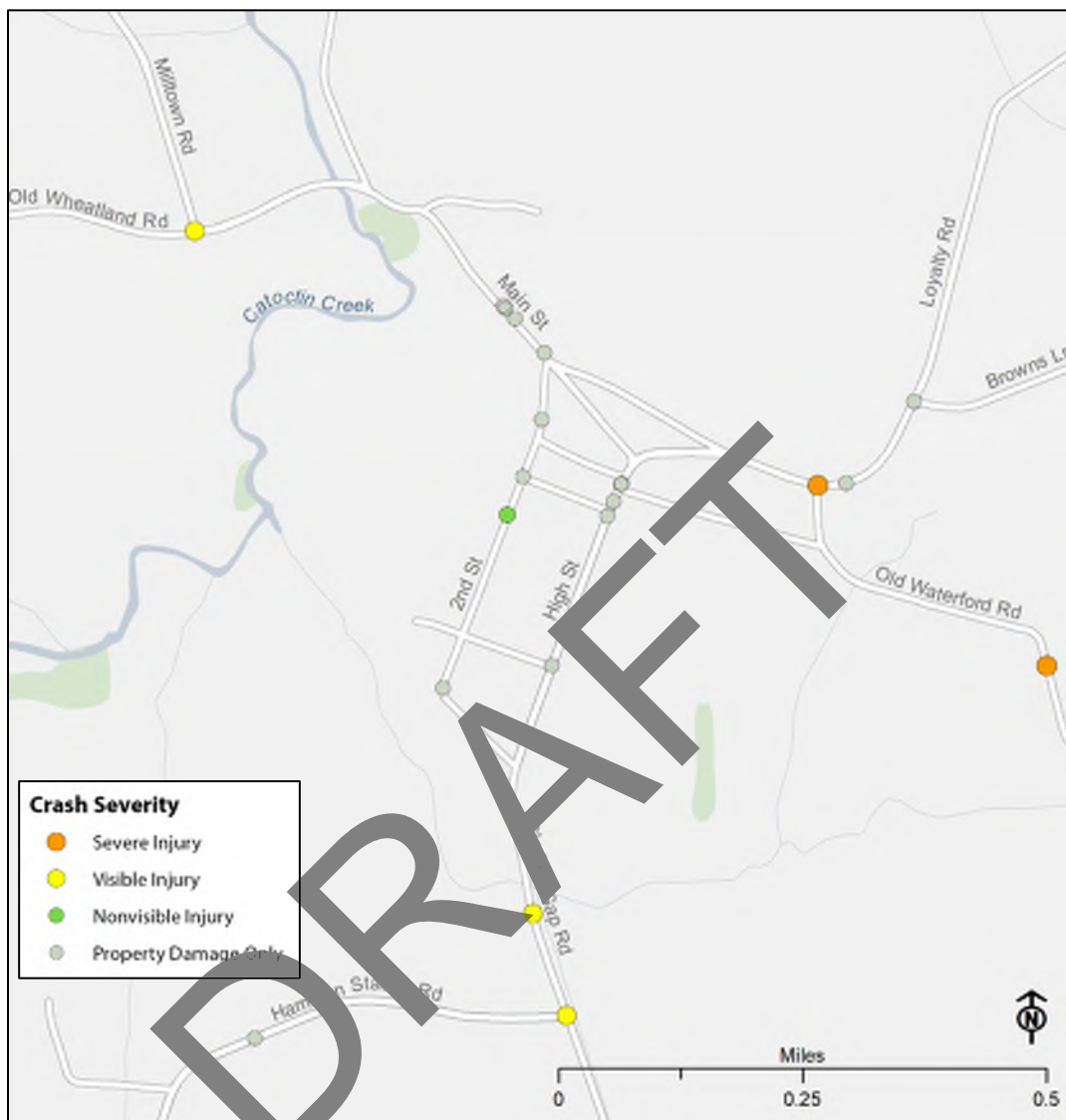




Figure 8: Village of Waterford Crash Data – Crash Severity (Feb. 2015-Feb. 2020)





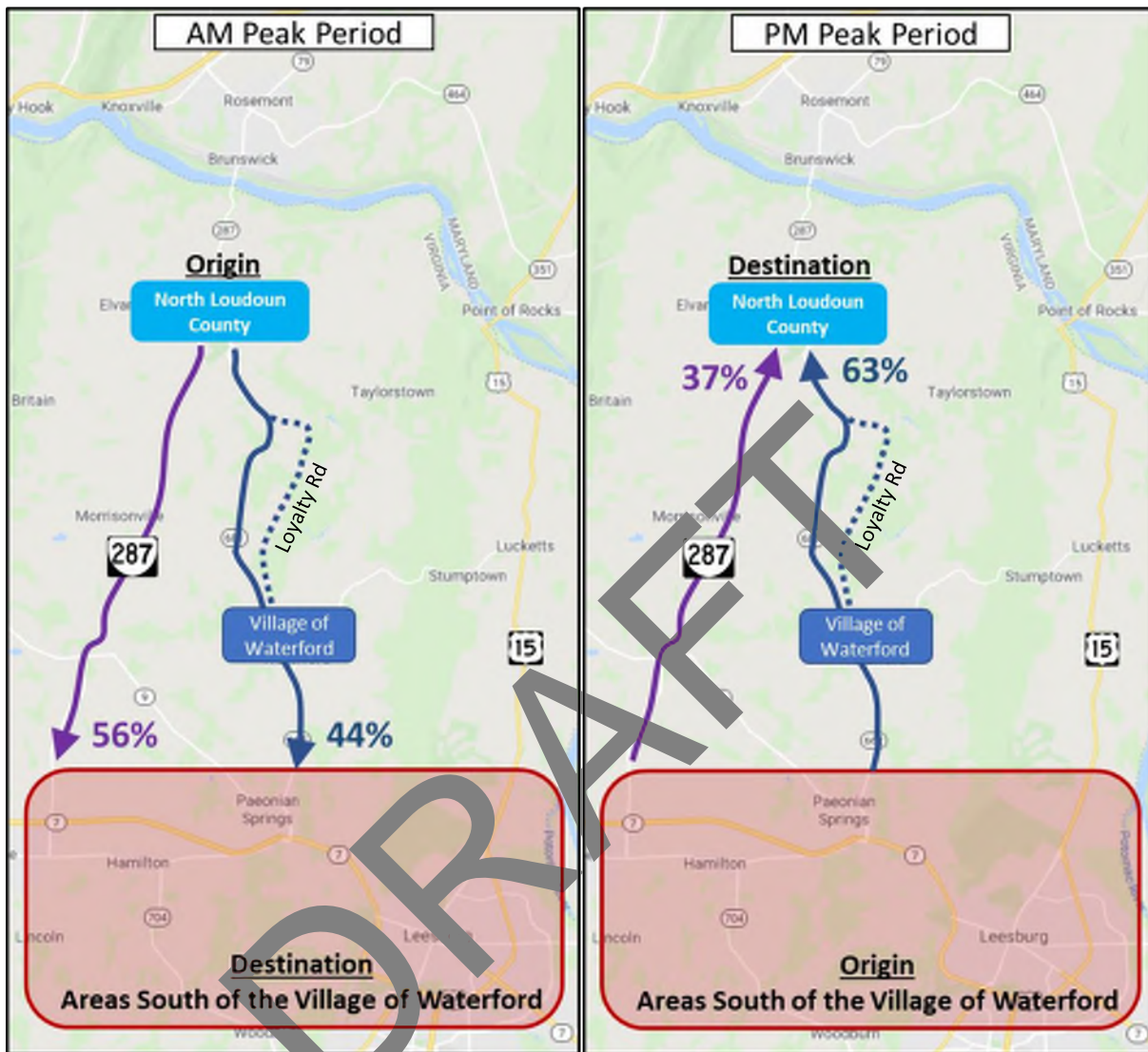
### Origin and Destination Review

An origin and destination (O-D) review was conducted using the “big data” source, Streetlight Data. Streetlight uses anonymous Global Positioning System (GPS) and cell phone data that can assist in determining traffic origins and destinations, including the source of cut-through traffic in the Village of Waterford. Data from Streetlight is used at the planning level due to sample sizes in the ten percent to twenty percent range. A formal O-D analysis includes determining surveillance sites (location points) where vehicles are entering and exiting the “primary use area”. License plate data of vehicles traversing through these location points are further examined and matching license plates between location points during the same peak period and direction of travel indicate the vehicle used the primary use area as cut-through route. Because of limitations due to the COVID-19 pandemic, a formal O-D analysis was not included in the scope of this study.

For this study, the O-D review was conducted using Streetlight data for the AM and PM peak periods (5-9 AM and 3-7 PM) during weekdays (Monday-Friday) for all of 2019 (pre-COVID-19) to determine the following:

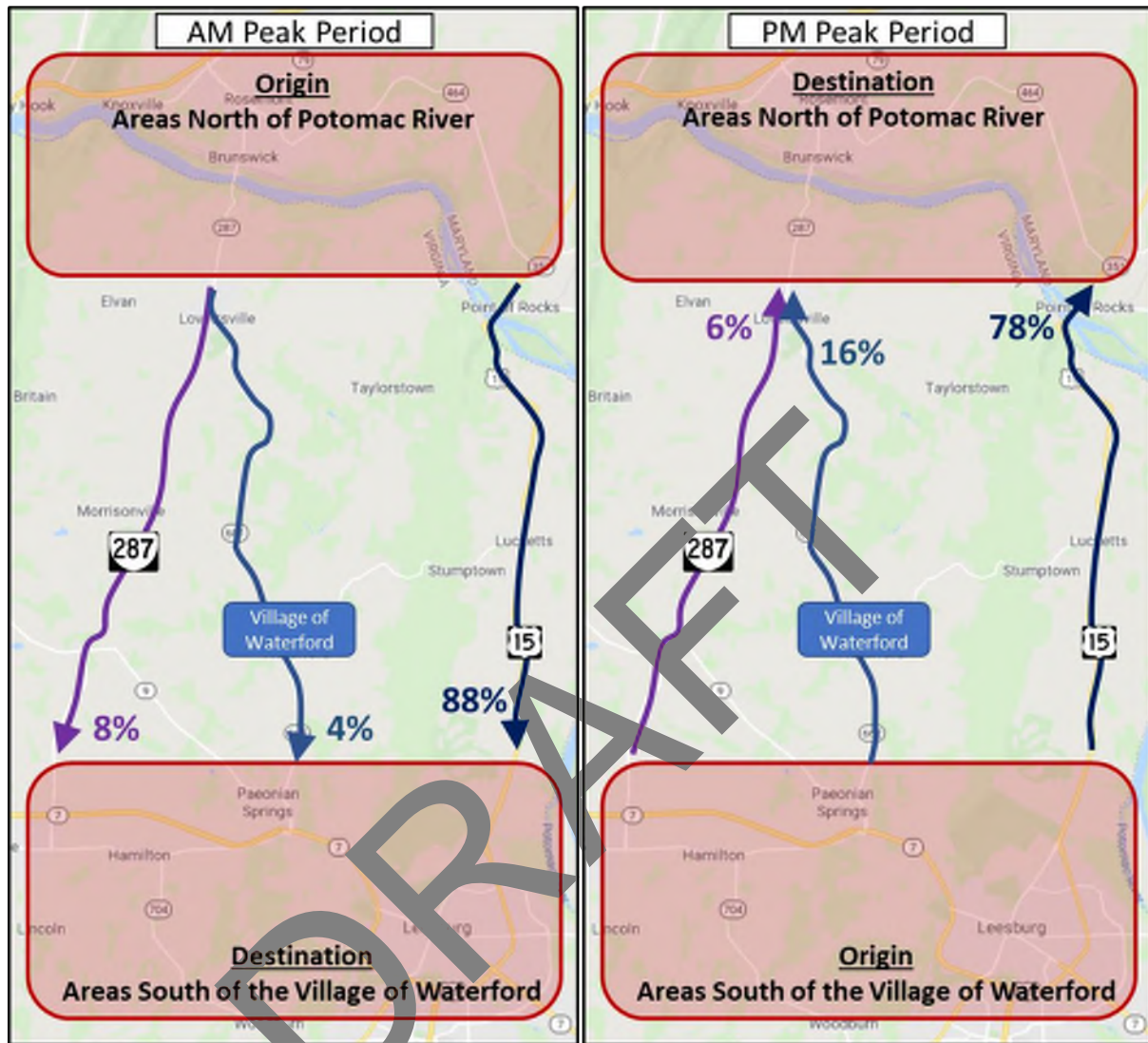
- Route choices for vehicles originating in north Loudoun County and destined to points south of the Village during the AM Peak Period (Figure 9)
- Route choices for vehicles originating from points south of the Village and destined to north Loudoun County during the PM peak hour (Figure 9)
- Route choices for vehicles traveling from areas north of the Potomac River to points south of the Village during the AM Peak period (Figure 10)
- Route choices for vehicles traveling from points south of the Village to areas north of the of the Potomac River during the PM Peak period (Figure 10)

**Figure 9: North Loudoun County Origin and Destination Route Choice (2019)**



The O-D review results for vehicles originating or destined to north Loudoun County, depicted in Figure 9, show that 44 percent of AM peak period traffic originating from North Loudoun County travel through the Village of Waterford during their commute. The data also shows that 63 percent of vehicles travel through the Village during the PM peak period in the northbound commuting direction. Figure 10 shows the route choices for a larger travel shed, showing the route choices for longer commutes originating or destined to areas north of the Potomac River.

**Figure 10: Origin and Destination Route Choices (2019)**



As displayed in Figure 10, the O-D review for the larger travel shed show that only 4 percent of the total traffic travels through the Village of Waterford during the AM peak period. The data also shows that 16 percent of traffic travels through the Village in the northbound direction during the PM peak period commute. Due to the operating hours of businesses and other commercial developments, the larger percentages during the PM peak period are expected, as there are typically more vehicles on primary roadways during the PM peak compared to the AM peak, making the route choice through the Village of Waterford more attractive compared to other roadways.

## Environmental Constraints

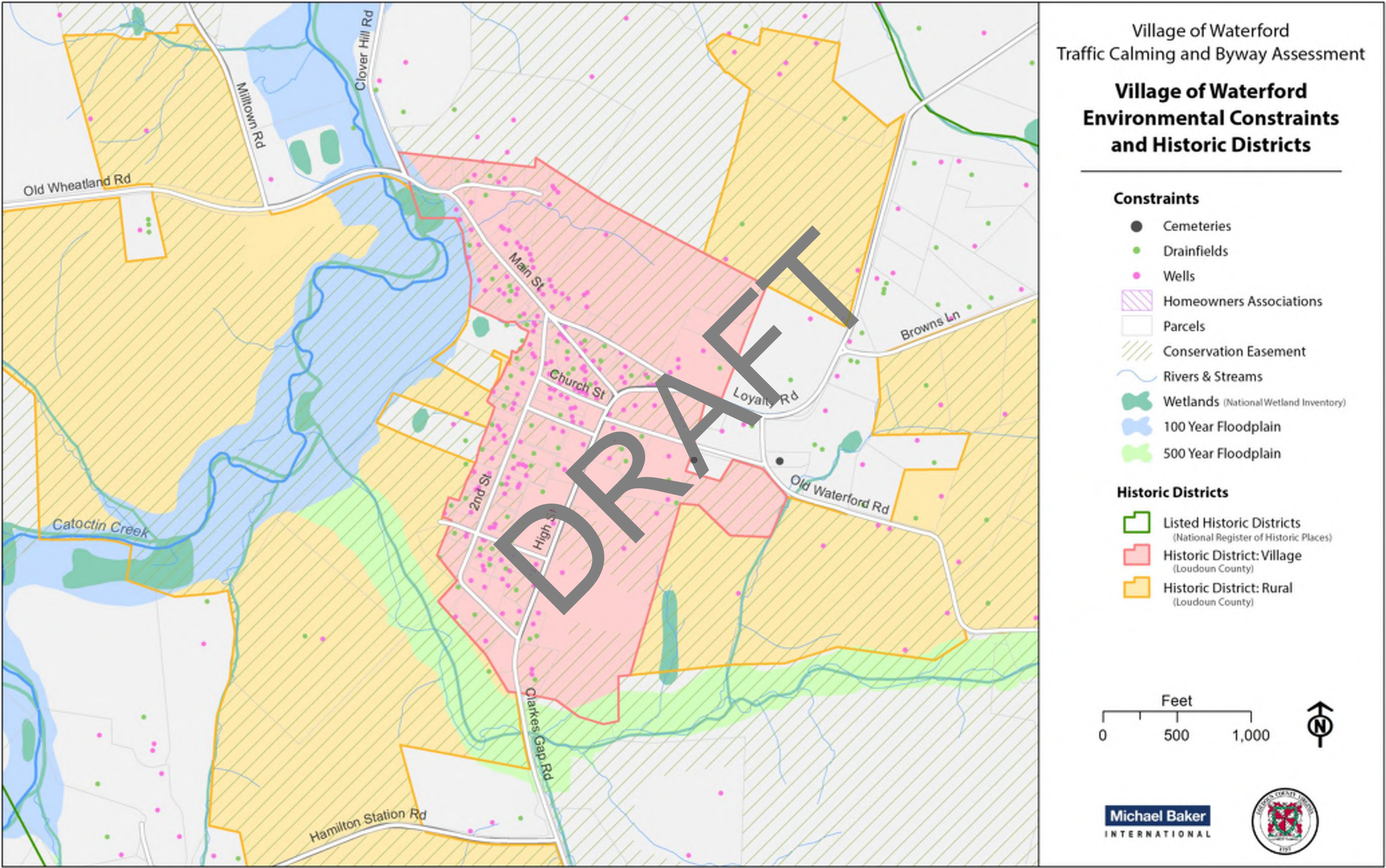
Environmental and historical constraints were investigated as part of the data collection effort, both within the Village of Waterford limits to assist in the development of mid-term traffic calming concepts, and for a larger area outside of the Village limits for use in the byway assessment. The environmental and historical constraints within the Village limits are depicted in Figure 11 and the constraints for the larger study area are shown in the Long-term Byway Assessment section of the Report. The constraints shown in the figures include the following existing features:

- Cemeteries
- Drainfields
- Wells
- Homeowners Associations (HOA)
- Parcel boundaries
- Conservation Easements
- Rivers and Streams
- Wetlands
- 100 year Floodplain
- 500 year Floodplain
- Nationally registered Historic Districts
- Loudoun County designated Historic Districts (both Rural and Village)

As shown in the figures, the Village of Waterford and surrounding area have a significant number of constraints. Although all of the above constraints were considered during the development of the mid-term traffic calming concepts, the primary constraints of concern were the parcel boundaries and conservation easements. Impacts to these constraints during the development of mid-term traffic calming concepts, as well as a discussion on the influences of these constraints on the byway assessment are included in the corresponding sections of this report.



Figure 11: Environmental and Historical Constraints within the Village of Waterford Area



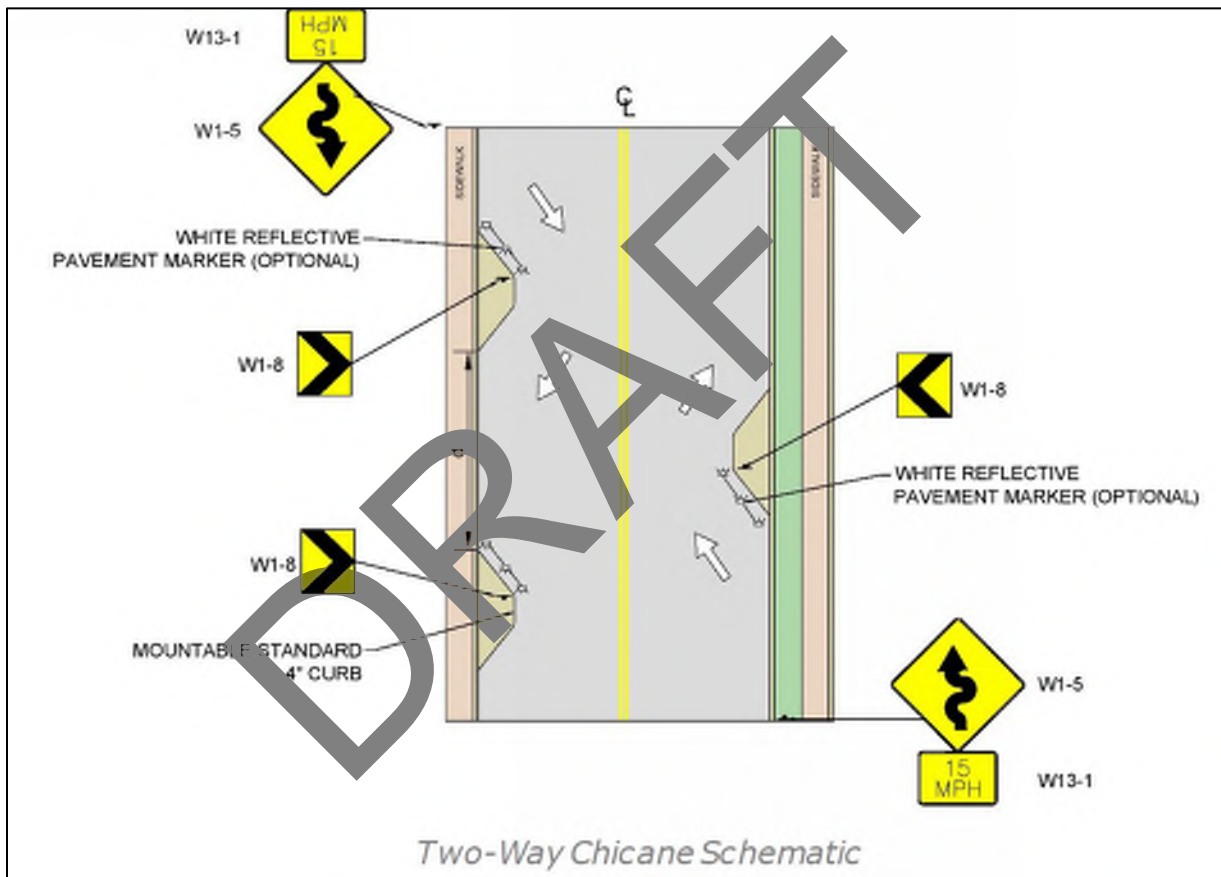


## Mid-Term Concept Development and Evaluation

### Mid-Term Concept Development

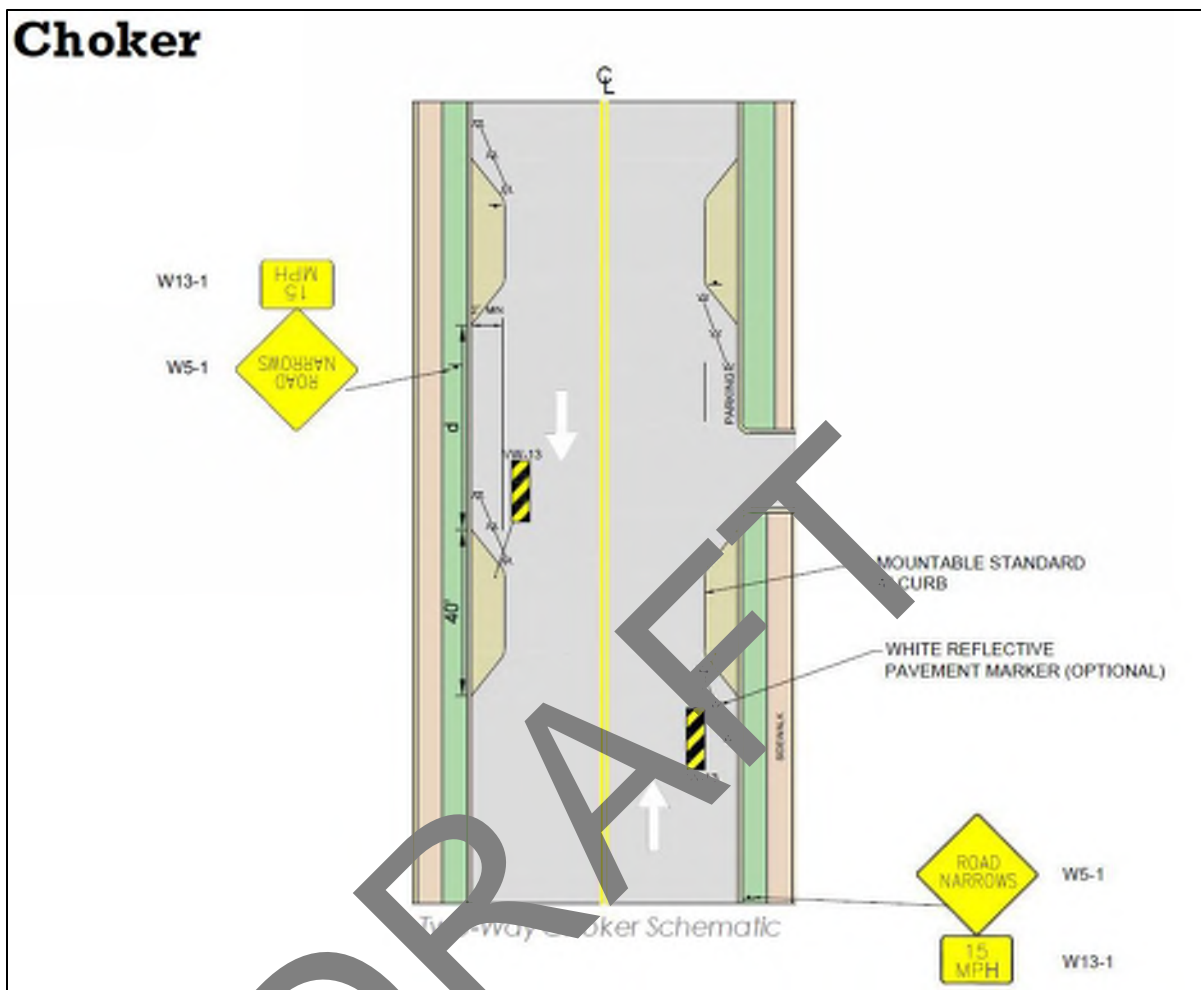
Three potential traffic calming treatments were investigated for the roadways leading into the Village of Waterford: chicanes, chokers, and splitter islands. Descriptions of each of these treatments as well as the schematic of each treatment shown in the Loudoun County DTCI Residential Traffic Management (RTM) Guide are below.

**Chicane:** A series of alternating curves or lane shifts that force a motorist to steer back and forth instead of traveling a straight path.



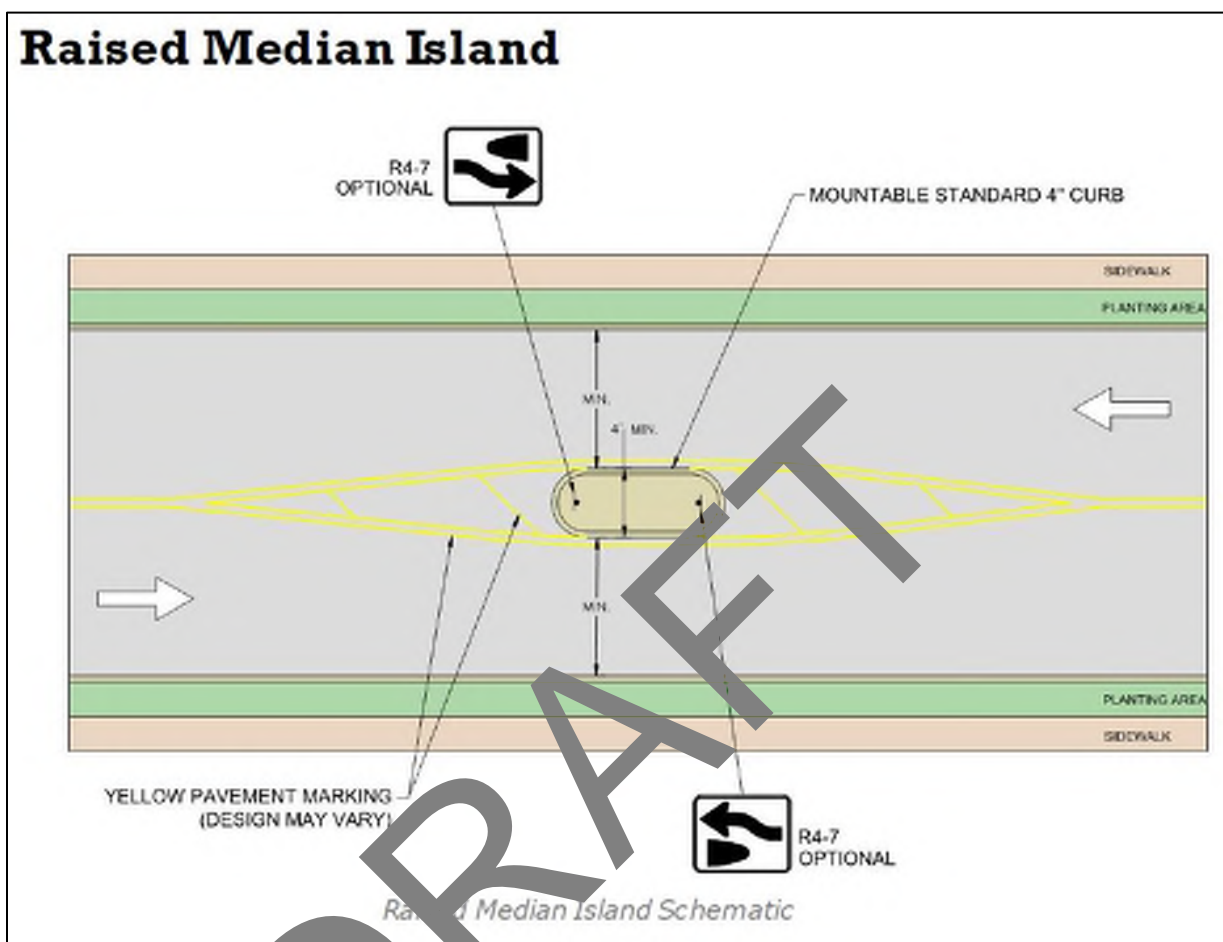
Source: Loudoun County DTCI Residential Traffic Management Guide

**Chokers:** Narrowing of a roadway through the use of curb extensions or roadside islands.



Source: Loudoun County DTCI Residential Traffic Management Guide

**Splitter Islands:** A raised island located along the street centerline that narrows the travel lanes at that location. Also referred to as Raised Median Islands.



Source: Loudoun County DTCI Residential Traffic Management Guide

The development of traffic calming treatments included consideration of the historical value of the study area, as such, the first step in the mid-term concept development was to identify potential locations that had the least impacts to residential properties, environmental constraints, and historical constraints.

Five (5) locations were identified which are listed below along with the methodology used to determine the feasibility of each traffic calming treatment. Table 2 summarizes the feasibility of each traffic calming treatment at each location.

**Loyalty Road (Location A), approximately 200 feet south of Browns Lane**

The potential installation of a traffic calming treatment at this location can be accomplished by shifting impacts to the west side of the roadway without impacting the residential properties on the east side of Loyalty Road. No locations along Loyalty Road north of Brown's Lane were feasible due to sight distance limitations from vertical curves along the roadway.

**Loyalty Road (Location A), approximately 200 feet south of Browns Lane**



**Chicanes** - It was determined there was not sufficient space between Brown's Lane and the horizontal curve to install the chicanes while also not impacting residential access or emergency vehicle access to properties in the area. Additionally, the installation of chicanes would require widening Loyalty Rd. and impacting residential properties on the east side of the road.

**Chokers** - The proximity of the parcel boundary on the east side of the roadway does not allow for the installation of chokers without significant impacts to the property and its access.

**Splitter Island** - Widening the roadway to the west to install a splitter island is feasible without significant impacts to properties on the east side of the roadway.

It is proposed to use the GS-7 (Urban Collector) from the VDOT Road Design Manual-Appendix A for this location. This standard includes 11-foot lanes and curb and gutter. Although Loyalty Road is not a truck restricted route, Clarkes Gap Road and Main Street are restricted to trucks. Reducing the design lane width by one foot to maintain the existing 10-foot lanes (per note 13 of the GS-7 standard) should be explored further with VDOT.

**Loyalty Road (Location B), approximately 150 feet west of Old Waterford Road**

The potential installation of a traffic calming treatment at this location can be accomplished by shifting impacts to the north side of the roadway without impacting the residential properties on the south side of Loyalty Road.

**Loyalty Road (Location B), approximately 150 feet west of Old Waterford Road**



Chicanes - Widening the roadway to the north to install chicanes is feasible without significant impacts to properties on the south side of the roadway. The elements for the chicane can be placed such as not to impact property access.

Chokers - The proximity of the parcel boundaries on the south side of the roadway do not allow for the installation of chokers without significant impacts to the properties and their accesses.



Splitter Island - Widening the roadway to the north to install a splitter island is feasible without significant impacts to properties on the south side of the roadway. The splitter island can be placed as to not adversely impact access to the properties on the south side of the road.

It is proposed to use the GS-7 (Urban Collector) from the VDOT Road Design Manual-Appendix A for this location. This standard includes 11-foot lanes and curb and gutter. Although Loyalty Road is not a truck restricted route, Clarkes Gap Road and Main Street are restricted to trucks. Reducing the design lane width by one foot to maintain the existing 10-foot lanes (per note 13 of the GS-7 standard) should be explored further with VDOT. A design waiver may be needed should adequate shoulder width not be available for the chicane concept.

**Clarkes Gap Road, approximately 400 feet north of Hamilton Station Road**

This location on Clarkes Gap Road is constrained by the creek on the east side of the road and conservation easements on the east and west side of the roadway; however, the distance from the existing edge of pavement to the parcel boundary on the west side of the roadway allows for possible construction of a mid-term option with minimal impacts to the ROW. Additionally, the parcel directly to the west of the proposed location does not include a conservation easement.

**Clarkes Gap Road, approximately 400 feet north of Hamilton Station Road**



Chicanes - Due to the horizontal curve requirements of roadway with a posted speed limit of 30 MPH in the section leading up to the Village, widening the roadway for the installation of chicanes would result in additional impacts to the conservation easements on the west side of the roadway or impacts to the wetland area and conservation easements on the east side of the roadway.

Chokers - The installation of chokers is feasible due to the available ROW on the west side of the roadway. It is anticipated the choker concept could be implemented without impacting nearby conservation easements or widening to the east and impacting the adjacent stream. Generally, traffic calming measures are implemented on roadways with speed limits of 25 mph or less. Utilizing the choker concept on a section with a posted 30 mph speed limit is the most feasible as it induces a shift in the roadway alignment with physical elements on the outside of the roadway rather than placing fixed objects within the potential travel path like a splitter island or chicane.

Splitter Island - Installation of a splitter island near the village limits would impact the residential properties. Further south along Clarkes Gap Road, installation of a splitter island would impact the stream on the east side of the roadway. Additionally, the operating speeds further south along Clarkes Gap Road are close to 45 MPH and the engineering team determined installing a fixed object in the middle of the road was not a safe option for those speeds.

The speed limit along Clarkes Gap Road decreases from 45 MPH to 30 MPH just south of this location. Locations closer to the Village limits were not feasible due to the proximity of the creek, conservation easements, and potential impacts to property boundaries and access. The GS-3 standards from the VDOT Road Design Manual-Appendix A show a minimum design speed of 40 MPH for roadways with an ADT over 2,000 along with a minimum lane width of 11 feet; however, designing to the 40 MPH standards would have little to no effect on speeding. It is anticipated that if a traffic calming treatment is installed along this roadway design waivers would be needed to construct the traffic calming treatments under the GS-3 design standards for a design speed of 35 MPH and travel lanes less than eleven (11 feet) wide.

**Old Wheatland Road, approximately 300 feet east of Milltown Road**

The potential installation of a traffic calming treatment at this location can be accomplished by shifting impacts to the north side of the roadway without impacting the conservation easement on the south side of Old Wheatland Road.

**Old Wheatland Road, approximately 300 feet east of Milltown Road**



Chicanes – The roadway widening required for the chicane concept would impact the conservation easement to the south and the property to the north.

Chokers - The roadway widening required for the choker concept would impact the conservation easement to the south and the property to the north.

Splitter Island - Widening the roadway to install a splitter island is feasible without significant impacts to conservation easements on the south side of the roadway.

The GS-3 standards from the VDOT Road Design Manual-Appendix A show a minimum design speed of 40 MPH for roadways with an ADT over 2,000 along with a minimum lane width of 11 feet, however, designing to the 40 MPH standards would have little to no effect on speeding. It is anticipated that if a traffic calming treatment is installed along this roadway design waivers would be needed to construct the traffic calming treatments under the GS-3 design standards for a speed of 25 MPH and travel lane widths less than eleven (11) feet.

### **The intersection of Old Wheatland Road and Clover Hill Road**

The existing paved area of this intersection along with the gravel area in the northwest quadrant of the intersection is sufficient to provide a traffic calming treatment at this location with minimal impacts to ROW. Additionally, no impacts are anticipated to conservation easements or wetlands.

**The intersection of Old Wheatland Road and Clover Hill Road**



Chicanes – Chicanes are not permitted to be constructed within an intersection.

Chokers – Chokers are not permitted to be constructed within an intersection.

Splitter Island – The existing paved area of this intersection along with the gravel area in the northwest quadrant of the intersection allows for the installation of splitter islands on the Old Wheatland Road approaches with minimal impacts to ROW. The addition of a right-turn lane on southbound Clover Hill Road will also provide better operations and safety at the intersection.

It is proposed to use the GS-7 (Urban Collector) from the VDOT Road Design Manual-Appendix A for this location. This standard includes 11-foot lanes and curb and gutter. Although Old Wheatland Road is not a truck restricted route, Clarkes Gap Road and Main Street are restricted to trucks. Reducing the design lane width by one foot to maintain the existing 10-foot lanes (per note 13 of the GS-7 standard) should be explored further with VDOT.



The VDOT Road Design Manual, VDOT Traffic Calming Guide for Neighborhood Streets, Loudoun County DTCI Residential Traffic Management (RTM) Guide, and setback requirements provided by Loudoun County Fire and Rescue were used in the development of the mid-term traffic calming concepts. Design standards for roadway construction are primarily based on VDOT roadway classification and the design speed of the roadway. Loyalty Road and the second Old Wheatland Road locations are classified as a collector roadway and the proposed locations are in a more “built-out” area. Therefore, the GS-7 design standards were used for the development of traffic calming treatments at the locations on Loyalty Road. These standards include 11-foot lanes, minimum radii of 115 feet, and CG-6 specifications for curb and gutter. The minimum design speed under the GS-7 standards is 25 miles per hour (MPH). The utilization of this criteria allowed the engineering team to limit the footprint of the example concepts.

The first Old Wheatland Road location and Clarkes Gap Road are classified as collector roadways with average daily traffic volumes (ADT) over 2,000 in a rural area which fall under the GS-3 design standard in the VDOT Road Design Manual. The GS-3 standards show a minimum design speed of 40 MPH for roadways with an ADT over 2,000, however, designing to the 40 MPH standards would have little to no effect on speeding. It is anticipated that if traffic calming treatments are installed along these roadways, design waivers would be needed to construct the traffic calming treatments under the GS-3 design standards for a design speed of 35 MPH for Clarkes Gap Road and 25 MPH for Old Wheatland Road. Design waivers would be needed to use lane widths below the minimum of 11 feet in the Road Design Manual for GS-3 for roadways over 2,000 ADT.

Discussions were held with Loudoun County Fire and Rescue and the study team was provided required setbacks necessary for their emergency vehicles. The example concepts were located and designed to adhere to a required 50-foot setback of physical obstructions from all structures. This space will allow for emergency vehicles to set-up and access properties and structures in the event of an emergency event such as a fire.

A summary of the feasibility of each traffic calming measure at each location is presented in Table 2. Figure 12 summarizes the potential traffic calming treatments at each location. Figure 13 through Figure 20 show the example concepts of each potential traffic calming treatment. Preliminary feedback from VDOT on the example concepts included:

- The actual footprint of each installation can vary from the concepts shown. This can only be determined at the design stage with considerable engineering data, which may impact additional right-of-way, utilities, or other roadside features significantly more than depicted.
- Chokers and chicanes are not recommended as seen in the concepts as there is no other curbing along the roadway to prepare drivers for the obstruction.

**Table 2: Feasibility of Mid-term Traffic Calming Treatments**

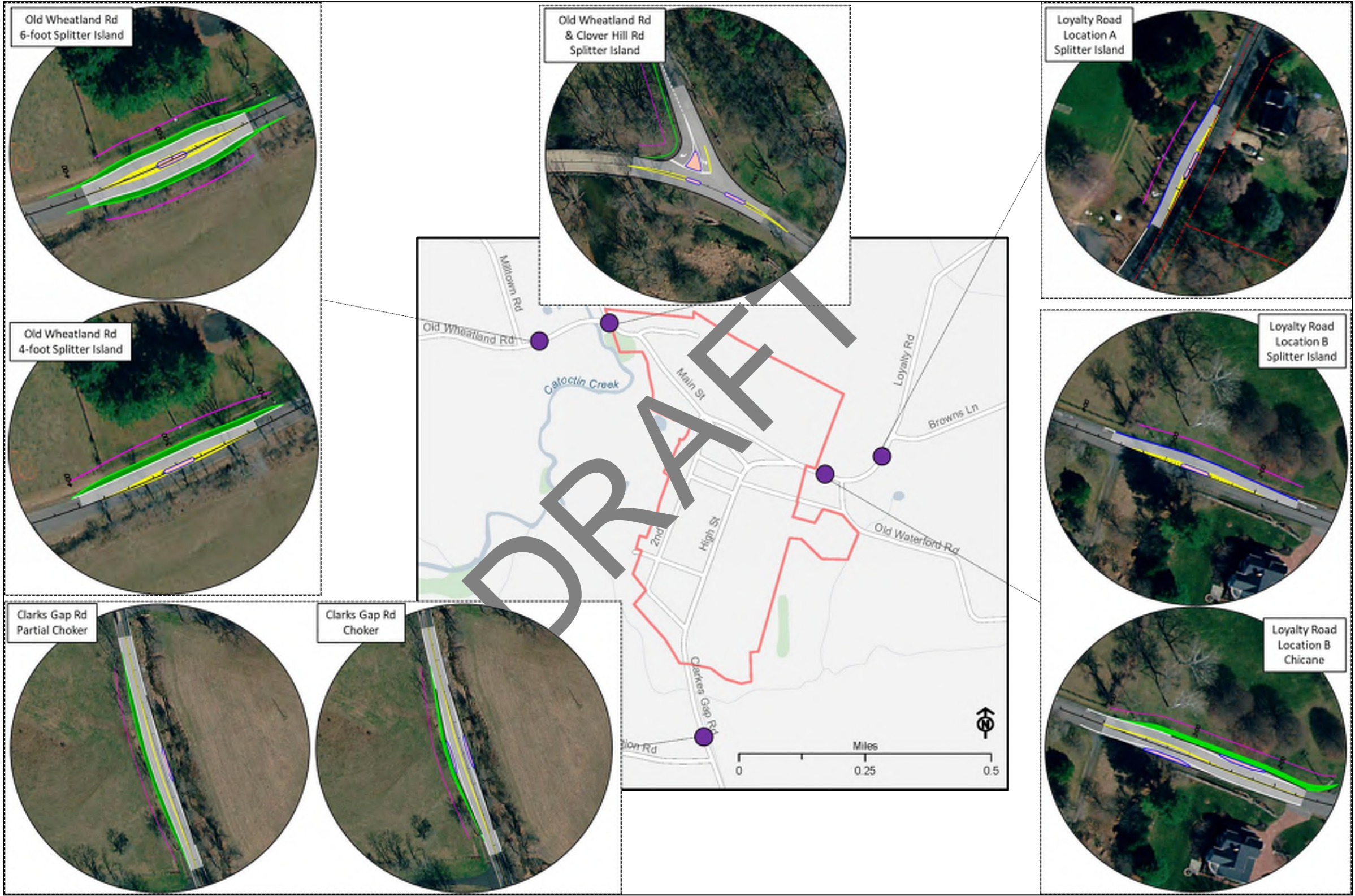
Location	VDOT Functional Classification	Design Standard	Feasible Traffic Calming Treatment		
			Chicane	Chokers	Splitter Island
Loyalty Road, Location A	Collector Roadway	GS-7	X	X	✓
Loyalty Road, Location B	Collector Roadway	GS-7	✓	X	✓
Clarks Gap Road	Collector Roadway	GS-3	X	✓	X
Old Wheatland Road	Collector Roadway	GS-3	X	X	✓
Intersection of Old Wheatland Road and Clover Hill Road	Collector Roadway	GS-7	X	X	✓

✓ Traffic calming treatment is feasible

X Traffic calming treatment is NOT feasible



Figure 12: Summary of Potential Traffic Calming Measures



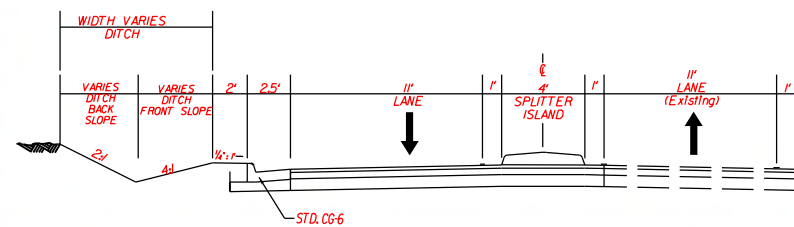


# Conceptual

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or Right of Way

Note: Right of way and/or easements to be determined as design is advanced. All alignments and recommendations are conceptual in nature and are not funded for final design, right of way and / or construction.

## TYPICAL SECTION



Radius = 250'

Radius = 250'

## Design Criteria

Design Standard - GS-7 (Urban Collector)

Design Speed - 25 MPH

Lane Widths - 11 LF

Splitter Island Width - 4 LF

Curb & Gutter - CG-6

## Figure 13: Loyalty Road Location A Splitter Island

Project Location



Village of Waterford, VA

Legend

Proposed New Pavement

Proposed Concrete Island

Approximate Property Lines  
Obtained from Loudoun County GIS

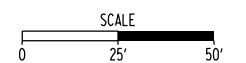
Proposed Curb and Gutter

Proposed 15' Grading Buffer

Conservation Easement

Wetland Area

Scale



Date

10/23/2020

## Village of Waterford Traffic Calming & Byway Assessment



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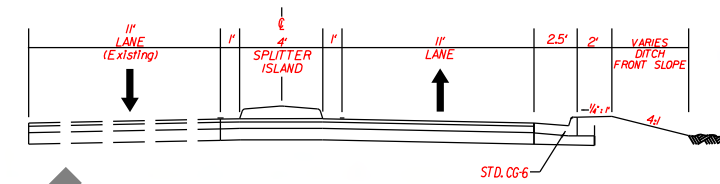
PIN: 303277303000  
3.19 Ac

PIN: 303184199000  
10.60 Ac

PIN: 303178764000  
0.62 Ac

PIN: 303180549000  
2.94 Ac

## TYPICAL SECTION



## Figure 14: Loyalty Road Location B Splitter Island

### Project Location

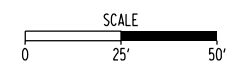


Village of Waterford, VA

### Legend

- Proposed New Pavement
- Proposed Concrete Island
- Approximate Property Lines  
Obtained from Loudoun County GIS
- Proposed Curb & Gutter
- Proposed 15' Grading Buffer
- Conservation Easement
- Wetland Area

### Scale



### Date

10/23/2020

## Village of Waterford Traffic Calming & Byway Assessment



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### Design Criteria

Design Standard - GS-7 (Urban Collector)

Design Speed - 25 MPH

Lane Widths - 11 LF

Splitter Island Width - 4 LF

Curb & Gutter - CG-6



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PIN: 303277303000  
3.19 Ac

PIN: 303184199000  
10.60 Ac

PIN: 303178764000  
0.62 Ac

PIN: 303180549000  
2.94 Ac

## Figure 15: Loyalty Road Location B Chicane

Project Location



Village of Waterford, VA

Legend

- Proposed New Pavement
- Proposed Concrete Island
- Proposed Drainage Ditch & Grass Shoulder
- Approximate Property Lines  
Obtained from Loudoun County GIS
- Proposed 10' Grading Buffer
- Proposed Edge of Pavement
- Conservation Easement
- Wetland Area

Scale



Date

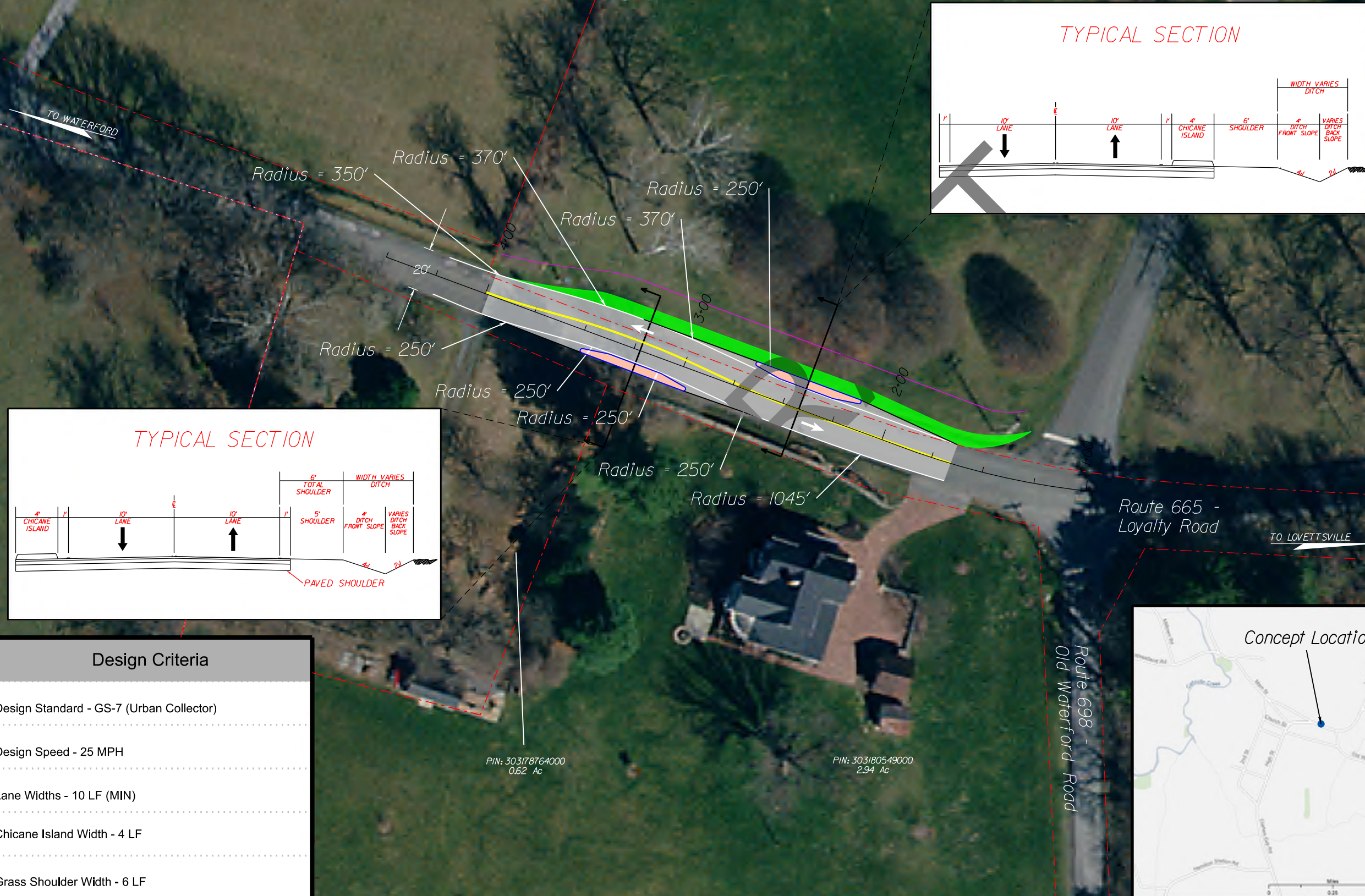
10/23/2020

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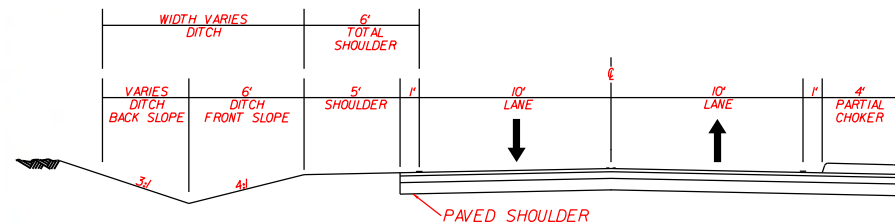
# Conceptual

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## Typical Section



## Design Criteria

Design Standard - GS-3 (Rural Collector)

Design Speed - 35 MPH

Lane Widths - 10 LF

Partial Choker Width - 4 LF

Grass Shoulder Width - 6 LF

## Figure 16: Clarkes Gap Road Partial Choker

### Project Location

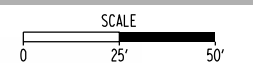


Village of Waterford, VA

### Legend

- Proposed New Pavement
- Proposed Concrete Island
- Proposed Grass Shoulder
- Approximate Property Limits Obtained from Loudoun County GIS
- Proposed 15' Grading Buffer
- Proposed Edge of Pavement
- Conservation Easement
- Wetland Area

### Scale



### Date

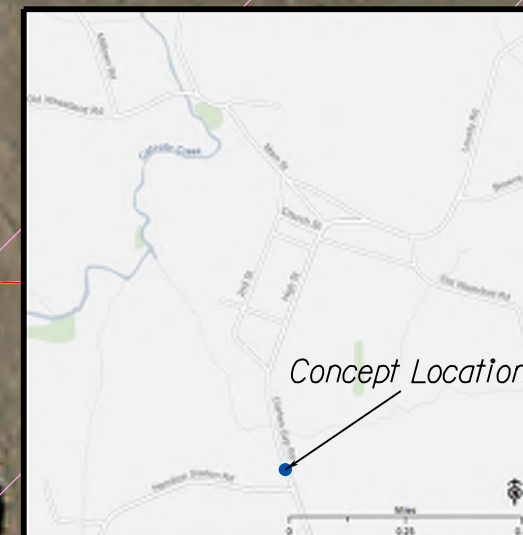
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## Figure17: Clarkes Gap Road Choker

### Project Location

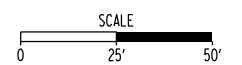


Village of Waterford, VA

### Legend

- Proposed New Pavement
- Proposed Concrete Island
- Proposed Grass Shoulder
- Approximate Property Limits Obtained from Loudoun County GIS
- Proposed 15' Grading Buffer
- Proposed Edge of Pavement
- Conservation Easement
- Wetland Area

### Scale



### Date

10/23/2020

## Village of Waterford Traffic Calming & Byway Assessment



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### Design Criteria

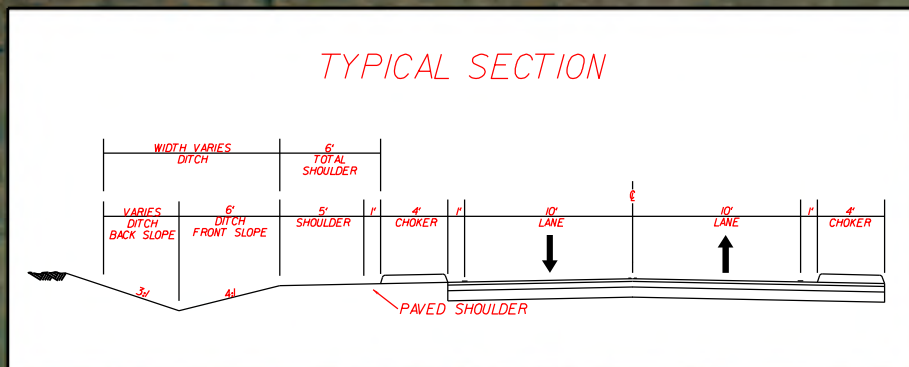
Design Standard - GS-3 (Rural Collector)

Design Speed - 25 MPH

Lane Widths - 10 LF

Choker Island Width - 4 LF

Grass Shoulder Width - 6 LF





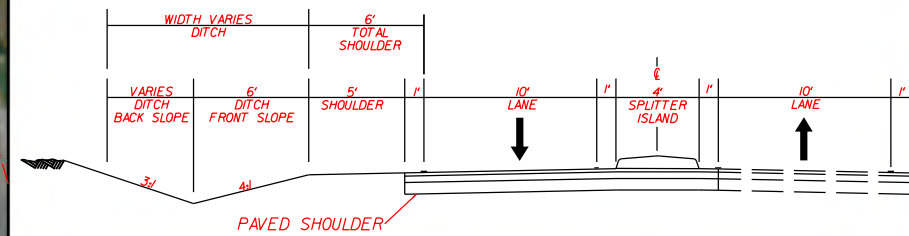
# Conceptual

## Not for Construction or Right of Way

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PIN: 303352541000  
8.43 Ac

### TYPICAL SECTION



Radius = 215'

Radius = 215'

Route 681 - Milltown Road

Route 698 -  
Old Wheatland Road

### Design Criteria

Design Standard - GS-3 (Rural Collector)

Design Speed - 25 MPH

Lane Widths - 10 LF

Splitter Island Width - 4 LF

Grass Shoulder Width - 6 LF

PIN: 341103295000  
144.0 Ac

## Figure 18: Old Wheatland Road 4' Splitter Island

### Project Location



Village of Waterford, VA

### Legend

- Proposed New Pavement
- Proposed Concrete Island
- Proposed Grass Shoulder
- Approximate Property Lines  
Obtained from Loudoun County GIS
- Proposed 15' Grading Buffer
- Conservation  
Easement
- Wetland Area

### Scale

SCALE  
0 25' 50'

### Date

10/23/2020

## Village of Waterford Traffic Calming & Byway Assessment



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Concept Location



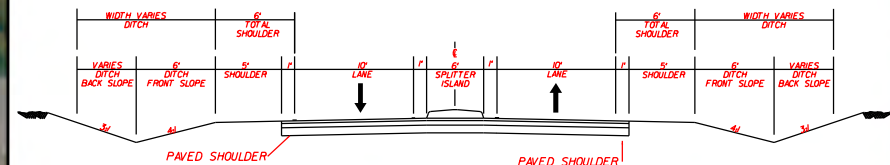
# Conceptual

Not for Construction  
or Right of Way

Note: Right of way and/or easements to be determined as design is advanced. All alignments and recommendations are conceptual in nature and are not funded for final design, right of way and / or construction.

PIN: 303352541000  
8.43 Ac

## TYPICAL SECTION



Route 681 - Milltown Road

Route 698 -  
Old Wheatland Road

TO ROUTE 9

Major Floodplain

TO WATERFORD

PIN: 341103295000  
144.0 Ac

## Design Criteria

Design Standard - GS-3 (Rural Collector)

Design Speed - 25 MPH

Lane Widths - 10 LF

Splitter Island Width - 6 LF

Grass Shoulder Width - 6 LF

## Figure 19: Old Wheatland Road 6' Splitter Island

### Project Location

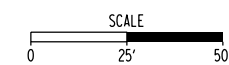


Village of Waterford, VA

### Legend

- Proposed New Pavement
- Proposed Concrete Island
- Proposed Grass Shoulder
- Approximate Property Lines  
Obtained from Loudoun County GIS
- Proposed 15' Grading Buffer
- Conservation  
Easement
- Wetland Area

### Scale



### Date

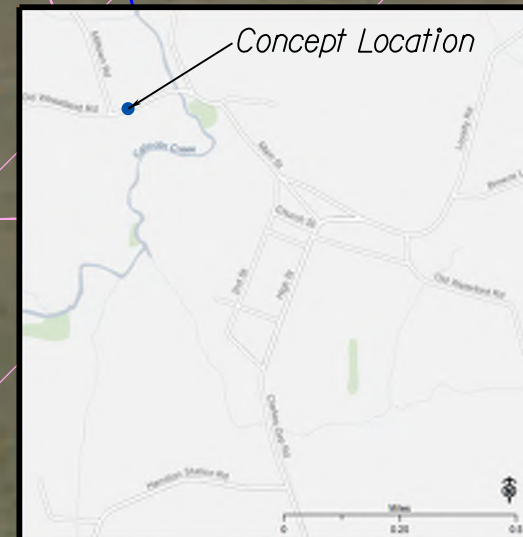
10/23/2020

## Village of Waterford Traffic Calming & Byway Assessment



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# Conceptual

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## Figure 20: Old Wheatland Road & Clover Hill Road Splitter Island

Project Location

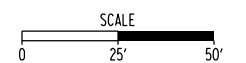


Village of Waterford, VA

Legend

- Proposed New Pavement
- Proposed Concrete Island
- Approximate Property Lines  
Obtained from Loudoun County GIS
- Proposed Edge of Pavement
- 15' Grading Buffer
- Conservation Easement
- Wetland Area

Scale



Date

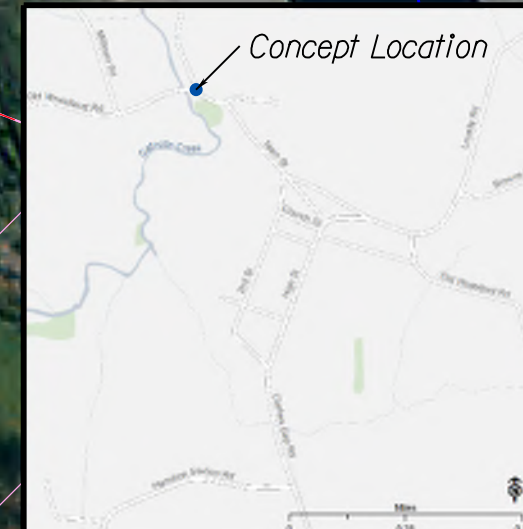
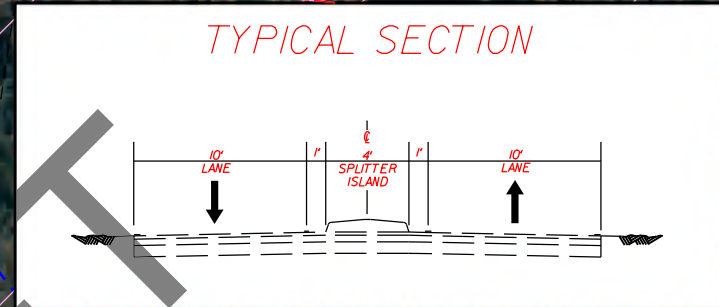
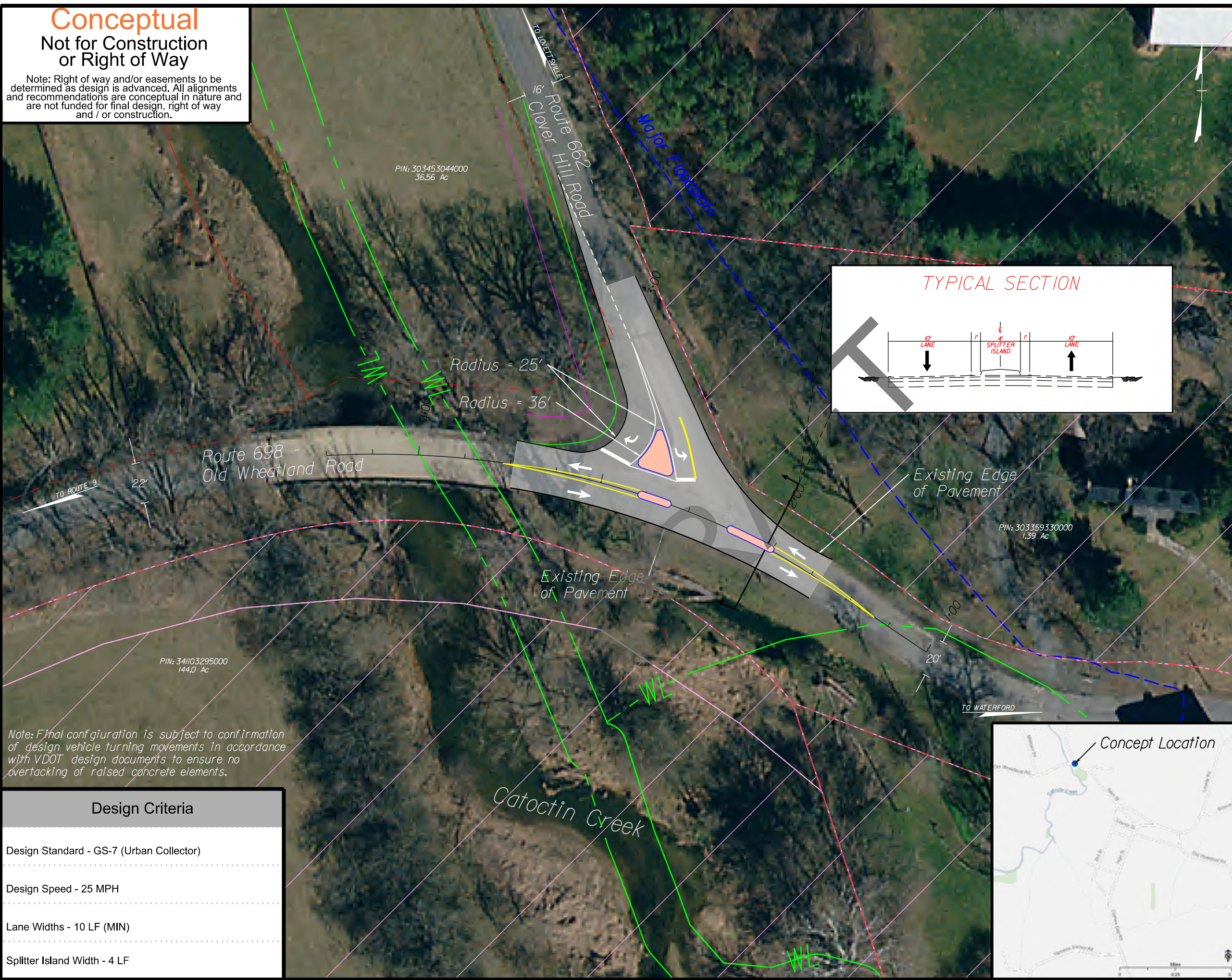
10/23/2020

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### Potential Construction Materials

Premium construction materials were investigated for the potential traffic calming concepts to maintain the existing aesthetics of the village. The investigation involved researching construction materials used for similar traffic calming treatments throughout Loudoun County. Figure 21 includes pictures of splitter islands installed along Route 50 in Aldie, Virginia and the premium materials used in the construction. It is important to note that VDOT Instructional and Informational Memorandum IIM-LD-218.4 states that VDOT will not be responsible for repair or replacement of damaged paver units or other non-standard pavement materials within the right of way on VDOT maintained roadways. Additionally, the use of premium construction materials comes with increased construction and maintenance costs.

**Figure 21: Pictures of Splitter Islands Constructed on Route 50 with Premium Materials**



### Effectiveness of Potential Mid-Term Traffic Calming Concepts

Information was obtained from The Federal Highway Administration (FHWA) and the Institute of Transportation Engineers (ITE) to determine the effectiveness of each of the traffic calming concepts to reduce vehicles speeds and reduce traffic volumes. Website links are provided following the discussion.



**Chicane:** Information from FHWA states that chicanes can slow traffic by encouraging a motorist to moderate vehicle speed through a series of horizontal deflections. The amount of speed reduction (or the final speed) depends on the length of the alignment shift, as well as the volume and distribution of traffic. FHWA data from 2014 suggests that vehicle operating speeds may be reduced by approximately three (3) to nine (9) MPH. FHWA data also suggests that there is little traffic diversion if only a single installation occurs.

**Chokers:** Information from FHWA states that chokers can slow traffic by funneling through narrower street opening than is provided in upstream cross-section and that traffic speeds likely to decrease slightly. FHWA data from 2014 suggests that vehicle operating speeds may be reduced by approximately one (1) to four (4) MPH. FHWA data also states that chokers have little effect on traffic volume diversion.

**Splitter Islands:** Information from FHWA states that traffic speeds are likely to decrease slightly (typically between one (1) and five (5) MPH, with reductions of two to three MPH being the most common) after a splitter island (also referred to as Median Islands) is installed, however data from ITE states that there is no significant impact of vehicles speeds beyond the island. FHWA data also states that splitter islands have little effect on traffic volume diversion.

- Link to FHWA Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed:  
[https://safety.fhwa.dot.gov/speedmgt/ref\\_mats/eng\\_count/2014/eng\\_ctm\\_spd\\_14.pdf](https://safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/2014/eng_ctm_spd_14.pdf)
- Link to FHWA Traffic Calming ePrimer website:  
[https://safety.fhwa.dot.gov/speedmgt/traffic\\_calm.cfm](https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm)
- Link to ITE Traffic Calming Measures website: <https://www.ite.org/technical-resources/traffic-calming/traffic-calming-measures/>

## Cost Estimates

A range of cost estimates were developed for the potential mid-term traffic calming measures and are presented in Table 3. The cost estimates assume that only one of the mid-term traffic calming concepts is installed or constructed at any given time. In a scenario where multiple concepts are implemented, it is expected that the costs would decrease slightly due to efficiencies in preliminary engineering, project management costs and construction engineering and inspection.

**Table 3: Cost Estimates for Potential Mid-Term Traffic Calming Concepts**

Location	Traffic Calming Treatment	Cost Estimate Range*
Loyalty Road, Location A	Splitter Island	\$650,000 - \$850,000
Loyalty Road, Location B	Splitter Island	\$550,000 - \$725,000
Loyalty Road, Location B	Chicane	\$525,000 - \$700,000
Clarks Gap Road	Partial Choker	\$525,000 - \$700,000
Clarks Gap Road	Choker	\$575,000 - \$750,000
Old Wheatland Road	Four-foot Splitter Island	\$550,000 - \$725,000
Old Wheatland Road	Six-foot Splitter Island	\$550,000 - \$750,000
Intersection of Old Wheatland Road and Clover Hill Road	Splitter Island	\$575,000 - \$775,000

\*Costs are in 2020 dollars and include design and construction costs

## Evaluation of Potential Mid-term Traffic Calming Concepts

The potential mid-term traffic calming concepts were evaluated against each other using criteria for cost, impacts to environmental constraints, impacts to residential right-of-way, aesthetics, maintenance requirements, anticipated vehicle speed reductions, and anticipated reduction in traffic volumes. The evaluation is presented in Table 4.

As shown in Table 4, there is little difference between the mid-term concepts for the evaluation criteria. The splitter island on Loyalty Road (Location A) and the splitter islands at the intersection of Old Wheatland Road and Clover Hill Road have the highest costs, albeit by a small amount. The grading buffer of the choker and partial choker concepts on Clarks Gap Road impede slightly into the conservation easement on the west side of the roadway. However, the grading buffer was assumed

to be 15 feet for all concepts and the entire 15 feet may not be needed if a design survey and the final design of an improvement determines that the required grades can be met with less than 15 feet. None of the concepts are expected to impact the adjacent residential properties. The aesthetics for all of the concepts is also similar as all of the concepts introduce a new element along the roadway. There is little difference in the maintenance requirements for each of the concepts; the evaluation assumes that concepts with more physical obstructions (concrete structures) will require more maintenance, however the pavement striping required for the splitter islands at the intersection of Old Wheatland Road and Clover Hill Road will need to be maintained in addition to the splitter islands and channelizing median. Perhaps most importantly, the anticipated speed reduction for each of the concepts is similar; data from FHWA and ITE indicate that each of the treatments reduce vehicle speeds slightly, but the reduced speeds are confined to the immediate area of the traffic calming treatment. Data from FHWA and ITE also indicate that none of the concepts will reduce traffic volumes.

**Table 4: Evaluation Matrix of Potential Mid-Term Traffic Calming Concepts**

Location	Traffic Calming Treatment	Evaluation Criteria						
		Cost	Impacts to Environmental Constraints	Impacts to Residential Right-of-Way	Aesthetics	Maintenance Requirements	Anticipated Vehicle Speed Reduction	Anticipated Reduction in Traffic Volumes
Loyalty Road, Location A	Splitter Island							
Loyalty Road, Location B	Splitter Island							
Loyalty Road, Location B	Chicane							
Clarks Gap Road	Partial Choker							
Clarks Gap Road	Choker							
Old Wheatland Road	Four-foot Splitter Island							
Old Wheatland Road	Six-foot Splitter Island							
Intersection of Old Wheatland Rd & Clover Hill Rd	Splitter Island							

- Concept compares favorably vs other concepts
- Concept does not compare favorably vs other concepts
- Concept does not offer any benefit

## Summary – Mid-term Concept Development and Evaluation

Three potential traffic calming treatments were investigated for each of the roadways leading into the Village of Waterford as directed by the Board of Supervisors: chicanes, chokers, and splitter islands. Five locations for potential treatments were identified that would minimize impacts to residential Right-of-Way (ROW) and impacts to the environmental and historical constraints. Once the locations were identified, each of the five locations was evaluated to determine the feasibility of installing chicanes, chokers, and splitter islands based on VDOT geometric standards, impacts to residential ROW, Loudoun County Fire and Rescue requirements, and impacts to environmental and historical constraints. The feasible traffic calming treatments for each location are listed below:

- Loyalty Road Location A, approximately 200 feet south of Browns Lane
  - Feasible traffic calming treatments: Splitter Island
- Loyalty Road Location B, approximately 150 feet west of Old Waterford Road
  - Feasible traffic calming treatments: Chicane and Splitter Island
- Clarkes Gap Road, approximately 400 feet north of Hamilton Station Road
  - Feasible traffic calming treatments: Chokers
- Old Wheatland Road, approximately 300 feet east of Milltown Road
  - Feasible traffic calming treatments: Splitter Island
- The intersection of Old Wheatland Road and Clover Hill Road
  - Feasible traffic calming treatments: Splitter Island

Conceptual sketches were developed for the feasible traffic calming treatments at each location and an evaluation of the concepts was conducted by comparing each of the concepts against one another for criteria that included cost, impacts to environmental constraints, impacts to residential ROW, aesthetics, maintenance requirements, anticipated reductions in vehicle speeds, and anticipated reductions in traffic volumes. The results of the evaluation concluded that there is little difference between the traffic calming treatments for the criteria used. None of the concepts are expected to reduce traffic volumes, however FHWA data from 2014 suggests that chicanes may reduce vehicle operating speeds by approximately three (3) to nine (9) MPH and chokers may reduce vehicle operating speeds by approximately one (1) to four (4) MPH. FHWA data also shows that splitter islands commonly reduce vehicles speeds by approximately two (2) to three (3) MPH, however, data from ITE suggests that there is no significant impact of vehicles speeds beyond the island.

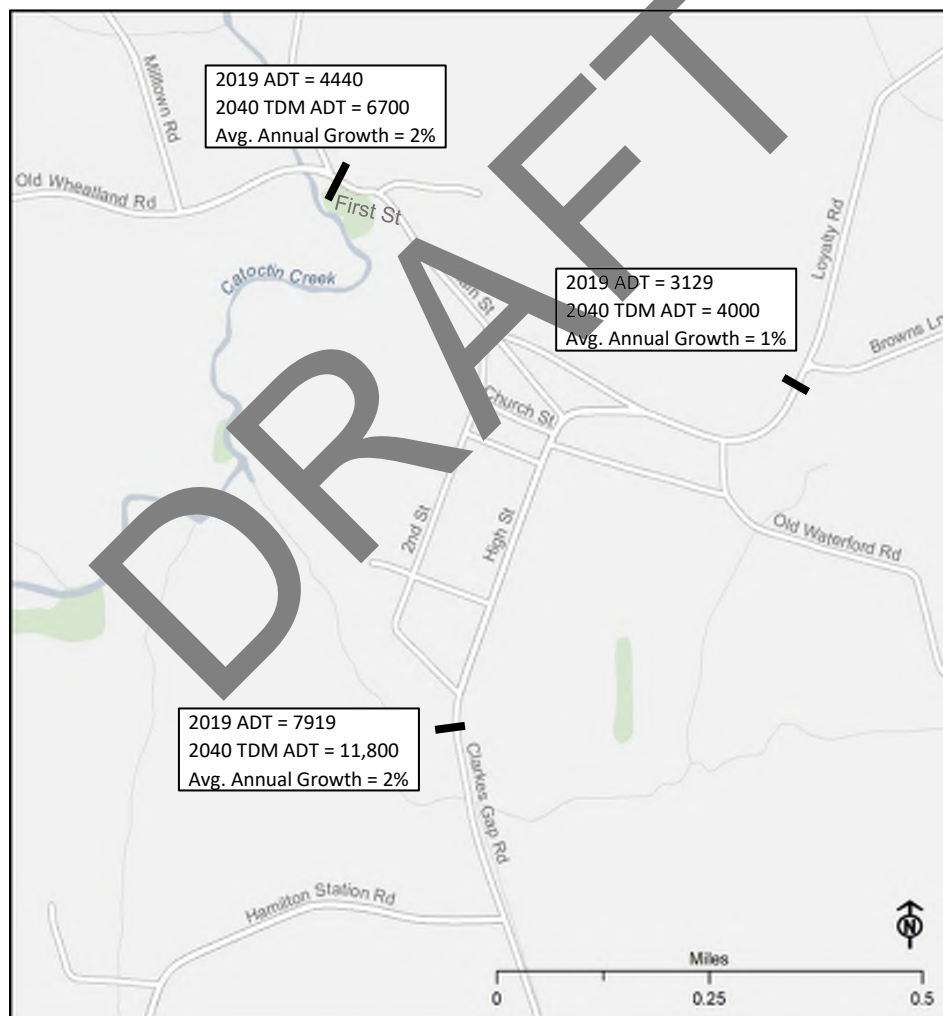


## Future Conditions

### Future Traffic Volumes

Future daily traffic volumes for the year 2040 were obtained from the Loudoun County Regional Travel Demand Model Demand Model (TDM). Regional travel demand models are tools used in transportation planning to predict future travel patterns using calculated values for households, employment, and other socioeconomic data, as well as the future roadway network for the region. The 2040 average daily traffic volumes from the Loudoun County Regional Travel Demand Model are presented in Figure 22, along with the average daily traffic volumes collected by Loudoun County DTCI in October 2019.

**Figure 22: 2019 and 2040 Average Daily Traffic (ADT) Volumes**



\*2019 ADT data collected by DTCI in October 2019, 2040 ADT data from Loudoun County TDM

As shown in Figure 22, traffic volumes are expected to increase by one percent to two percent per year (non-compounded) along the roadways leading into the Village of Waterford. The ADT volume along First Street is expected to increase from 4,440 in 2019 to 6,700 in the year 2040, an average annual growth rate of two percent. The ADT volume on Loyalty Road is expected to increase from 3,129 in 2019 to 4,000 in the year 2040, an average annual growth rate of one percent. The ADT volume on Clarkes Gap Road is expected to increase from 7,919 in 2019 to 11,800 in 2040, an average annual increase of two percent. These increases in traffic volumes are in-line with traffic volume growth throughout Loudoun County for similar areas.

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## Section II: Long-Term Byway Assessment

### Long-term Concept Feasibility Review

A Loudoun County Board of Supervisors Business Meeting was held on January 21, 2020. At this meeting, the Catoctin District Supervisor moved that the Board of Supervisors direct DTCL staff to review the feasibility of a byway around the Village of Waterford. Prior to this directive, several meetings were held between WCA, the Catoctin District Supervisor, VDOT, and DTCL beginning in 2015. There were also two studies conducted prior to the January 2020 Board of Supervisors Business Meeting. The *Final Technical Report: Village of Waterford Cut-Through Traffic Study* was completed in May 2018, and in October 2019, Loudoun County DTCL collected traffic and speed data at seven locations in and around the Village of Waterford. Additional details of this directive along with a timeline of events is discussed in the Introduction section of this report.

### Environmental Constraints

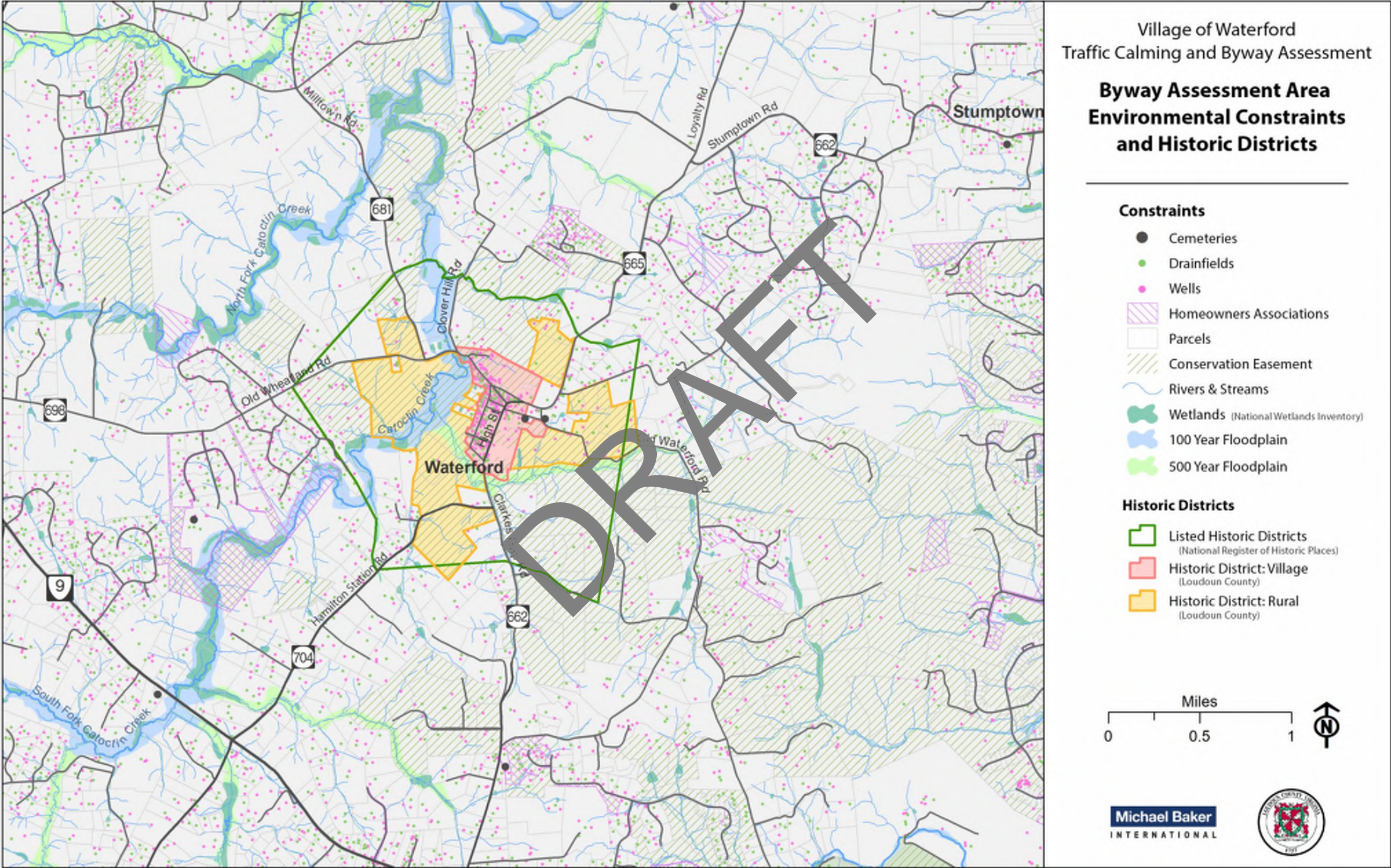
Environmental and historical constraints were investigated as part of the data collection effort. These constraints for the Long-term Byway Assessment area are depicted in Figure 23. The constraints shown in the figures include the following existing features:

- Cemeteries
- Drainfields
- Wells
- Homeowners Associations (HOA)
- Parcel boundaries
- Conservation Easements
- Rivers and Streams
- Wetlands
- 100 year Floodplain
- 500 year Floodplain
- Nationally registered Historic Districts
- Loudoun County designated Historic Districts (both Rural and Village)

As shown in Figure 23, the Village of Waterford and surrounding area have a significant number of constraints. Although all of the above constraints were considered during the long-term byway feasibility review, the primary constraints of concern were the cemeteries, conservation easements, and wetlands. These items represent the more challenging constraints to mitigate for determining the feasibility of a potential byway due to costs and requirements for environmental permitting.



Figure 23: Study Area Environmental and Historical Constraints





### Locations for Long-term Byway Feasibility Review

A Virginia Byway is defined as a road, designated as such by the Commonwealth Transportation Board (CTB), having relatively high aesthetic or cultural value, leading to or within areas of historical, natural or recreational significance. Loyalty Road and Clarkes Gap Road were designated as Virginia Byways in 1988. Milltown Road was designated as a Virginia Byway in 1999.

As stated in the Loudoun *Countywide Transportation Plan*, one method used by the County to help facilitate the public awareness of scenic roads and their associated landscapes is through state-designated “Virginia Byways,” as authorized by the 1966 Scenic Highway and Virginia Byways Act.

Because Milltown Road, Loyalty Road, and Clarkes Gap Road are all designated Virginia Byways, a new roadway connecting any of these roadways could also be designated as a Virginia Byway. A potential future byway (all new roadway) around the Village of Waterford would consist of a two-lane roadway with graded shoulders and possibly a shared-use path on one or both sides of the roadway. Four potential areas were reviewed as part of the Village of Waterford long-term byway assessment:

#### West of the Village of Waterford

- Area 1: West of the Village of Waterford, outside of the National Register Historic District
- Area 2: West of the Village of Waterford, inside of the National Register Historic District

#### East of the Village of Waterford

- Area 3: East of the Village of Waterford, outside of the National Register Historic District
- Area 4: East of the Village of Waterford, inside of the National Register Historic District

#### **Area 1: West of Village of Waterford, Outside of National Register Historic District**

A potential future byway (new roadway) was reviewed on the west side of the Village of Waterford, outside of the National Register Historic District (shown in Figure 23). This new byway would have a length of approximately five miles. The northern connecting point of a byway to the existing roadway network could potentially be along Milltown Road (Route 681), north of North Fork Catoctin Creek. The southern connecting point of a byway to the existing roadway network could potentially be along Clarkes Gap Road (Route 662), north of the intersection with Charles Town Pike (Route 9). Both of these connecting points could be at-grade intersections. This route would also include two at-grade intersections with Old Wheatland Road (Route 698) and Hamilton Station Road (Route 704). Potential traffic control options for the at-grade intersections include, but are not limited to, traffic signals, roundabouts, and stop signs. It is anticipated that two bridge structures would be required, over North Fork Catoctin Creek and over South Fork Catoctin Creek, while other water crossings could potentially be accomplished with culverts, depending on the results of detailed environmental and hydraulic studies.

There are several residential communities west of the Historic Village District which would need to be avoided along with their corresponding wells and drain fields, as well as approximately 430 acres of

conservation easements and approximately 115 acres classified as homeowners' associations. Environmental data obtained from the Loudoun County database includes one cemetery located between Old Wheatland Road and Hamilton Station Road, approximately 0.8 miles east of Charles Town Pike; a potential byway alignment through a cemetery would require the relocation of the deceased. The terrain west of the Village varies from level to rolling and most of the wetlands and floodplains are confined to the areas directly adjacent to the North and South Forks of Catoctin Creek.

Planning level cost projections were developed using the Virginia Department of Transportation (VDOT) planning level cost estimating tool for a five-mile byway on the west side of the Village of Waterford, outside of the National Register Historic District. The estimate assumes a two-lane rural roadway and two bridges over the North and South Forks of Catoctin Creek. The estimated construction cost for a five-mile byway ranges from \$29 million to \$36 million. These costs are in 2020 dollars and do not include costs for design, the mitigation of environmental constraints, right-of-way acquisition, or overhead and underground utility relocations.

## **Area 2: West of Village of Waterford, Inside of National Register Historic District**

A potential future byway (new roadway) was reviewed on the west side of the Village of Waterford, inside of the National Register Historic District. This new byway would have a length of approximately 1.5 miles. The northern connecting point of the byway to the existing roadway network would potentially be along Milltown Road, north of the intersection with Old Wheatland Road. The southern connecting point of the byway to the existing roadway network would potentially be along Clarkes Gap Road (Route 662), north of the intersection with Hamilton Station Road (Route 704). This route would also include an at-grade intersection with Hamilton Station Road. Potential traffic control options for the at-grade intersections include, but are not limited to, traffic signals, roundabouts, and stop signs. It is anticipated that one bridge structure would be required over Catoctin Creek while other water crossings could potentially be accomplished with culverts, depending on results of detailed environmental and hydraulic studies.

There are several residential dwellings and one residential community west of the Village of Waterford, within the National Register Historic District, which would need to be avoided along with their corresponding wells and drain fields, as well as approximately 380 acres of conservation easements. There are no cemeteries located within this area based on environmental data obtained from the Loudoun County database. The terrain in this area varies from level to rolling, and most of the wetlands and floodplains are confined to the areas directly adjacent to Catoctin Creek. However, there is a 500-year floodplain that follows the stream that crosses Clarkes Gap Road just north of the intersection with Hamilton Station Road.

Planning level cost projections were developed using the VDOT Planning Level cost estimating tool for a 1.5-mile byway on the west side of the Village of Waterford, inside the National Register Historic District. The estimate assumes a two-lane rural roadway and one bridge over Catoctin Creek. The estimated construction cost for a 1.5-mile byway ranges from \$9 million to \$11 million. These costs are

in 2020 dollars and do not include costs for design, the mitigation of environmental constraints, right-of-way acquisition, or overhead and underground utility relocations.

### **Area 3: East of Village of Waterford, Outside of National Register Historic District**

A potential future byway (new roadway) was reviewed on the east side of the Village of Waterford, outside of the National Register Historic District. This new byway would have a length of approximately 5.5 miles. The northern connecting point of a byway to the existing roadway network could potentially be along Loyalty Road (Route 665), north of the intersection with Stumptown Road (Route 662). The southern connecting point of a byway to the existing roadway network could potentially be along Clarkes Gap Road (Route 662), north of the intersection with Charles Town Pike. This route would also include three at-grade intersections with Hurley Lane (Route 703), Old Waterford Road (Route 698), and Stumptown Road. Potential traffic control options for the at-grade intersections include, but are not limited to, traffic signals, roundabouts, and stop signs. It is anticipated that bridge structures would be not be required and any water crossings could potentially be accomplished with culverts, depending on the results of detailed environmental and hydraulic studies.

There are several residential communities east of the Historic Village District which would need to be avoided along with their corresponding wells and drain fields, as well as approximately 1200 acres of conservation easements and approximately 88 acres classified as homeowners' associations. There are no cemeteries within the study limits east of the National Register Historic District. The terrain east of the Village, outside of the National Register Historic District, varies from level to rolling transitioning to mountainous approaching the eastern limits of the study area. There is a minimal number of floodplains in the area, all confined to the areas adjacent to Ball's Run Creek.

Planning level cost projections were developed using the VDOT planning level cost estimating tool for a 5.5-mile byway on the east side of the Village of Waterford, outside of the National Register Historic District. The estimate assumes a two-lane rural roadway and no bridge structures. The estimated construction cost for a 5.5-mile byway ranges from \$31 million to \$38 million. These costs are in 2020 dollars and do not include costs for design, the mitigation of environmental constraints, right-of-way acquisition, or overhead and underground utility relocations.

### **Area 4: East of Village of Waterford, Inside of National Register Historic District**

A potential future byway (new roadway) was reviewed on the east side of the Village of Waterford, inside of the National Register Historic District. This new byway would have a length of approximately 1.1 miles. The northern connecting point of the byway to the existing roadway network would potentially be along Loyalty Road, north of the intersection with Browns Lane. The southern connecting point of the byway to the existing roadway network could potentially be along Clarkes Gap Road, north of the intersection with Hamilton Station Road. This route would also include two at-grade intersections with Browns Lane and Old Waterford Road. Potential traffic control options for the at-grade intersections include, but are not limited to, traffic signals, roundabouts, and stop signs. It is anticipated

that bridge structures would not be required, and any water crossings could potentially be accomplished with culverts, depending on the results of detailed environmental and hydraulic studies.

There are several residential dwellings east of the Village of Waterford, within the National Register Historic District, which would need to be avoided along with their corresponding wells and drain fields, as well as approximately 380 acres of conservation easements. Based on environmental data obtained from the Loudoun County database, there are two cemeteries east of the Village along Fairfax Street, within the National Register Historic District. The terrain east of the Village varies from level to rolling and there is a minimal number of floodplains in the area, all confined to the areas adjacent to Ball's Run Creek.

Planning level cost projections were developed using the VDOT Planning Level cost estimating tool for a 1.1-mile byway on the east side of the Village of Waterford, inside the National Register Historic District. The estimate assumes a two-lane rural roadway and no bridge structures. The estimated construction cost for a 1.1-mile byway ranges from \$6 million to \$8 million. These costs are in 2020 dollars and do not include costs for design, the mitigation of environmental constraints, right-of-way acquisition, or overhead and underground utility relocations.

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## Evaluation of Potential Long-term Byway Locations

The previously discussed potential long-term byway locations were evaluated against each other and a No-build scenario (The No-build scenario does not include a potential byway). The evaluation is presented in Table 5. The ranges of data for each criterion result are shown directly below the evaluation table.

**Table 5: Long-term Byway Location Evaluation**

Potential Area	Evaluation Criteria									Estimated Cost
	Length of Potential Byway	Potential Number of Bridge Structures	Environmental Constraints in the Area of Potential Byway						Potential Travel Time Savings vs Traveling through the Village	
			Cemeteries	Drainfields	Wells	Homeowners Associations (Acres)	Conservation Easements (Acres)	Wetlands (Acres)		
No-Build	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	\$0
Area 1: West of Village, Outside National Historic District	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	\$29M - \$36M
Area 2: West of Village, Inside National Historic District	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	\$9M - \$11M
Area 3: East of Village, Outside National Historic District	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	\$31M - \$38M
Area 4: East of Village, Inside National Historic District	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	\$6M - \$8M

Note: Estimated costs are in 2020 dollars and were developed using the VDOT planning level cost estimating tool. Estimated costs include per-mile costs for a rural, two-lane roadway and estimates for bridge areas.

Range of Data for Criteria									Evaluation Result
Length of Potential Byway (miles)	Number of Bridge Structures	Cemeteries	Drainfields	Wells	Homeowners Associations (Acres)	Conservation Easements (Acres)	Wetlands (Acres)	Potential Travel Time Savings vs Traveling through the Village	
0	0	0	0 - 25	0 - 25	0 - 25	0 - 250	0 - 25	More Time Savings	Low impacts
1 - 2	1	1	26 - 100	26 - 100	26 - 200	251 - 750	26 - 100	Some Time Savings	Moderate impacts
> 2	2	2	> 100	> 100	> 200	> 750	> 100	No Time Savings	High impacts

As shown in Table 5, the No-Build scenario (without a potential byway) would have the least amount of impacts to environmental constraints, however it would also not offer any travel time savings as vehicles would still be traveling through the Village. Area 2 and Area 4, the potential byway areas inside of the National Historic District, have the lowest costs and the least impacts to environmental constraints. The potential byway areas outside of the National Historic District, Area 1 and Area 3, would offer more travel time savings versus traveling through the Village as it was assumed that vehicles would travel at higher speeds along a potential byway than along the roadways within and leading to the Village of Waterford. The potential byway areas within the National Historic District would still offer some travel time savings, however the shorter length of a potential byway in these areas would mean that vehicles would need to travel on the lower speed facilities of the existing roadway network for a greater distance

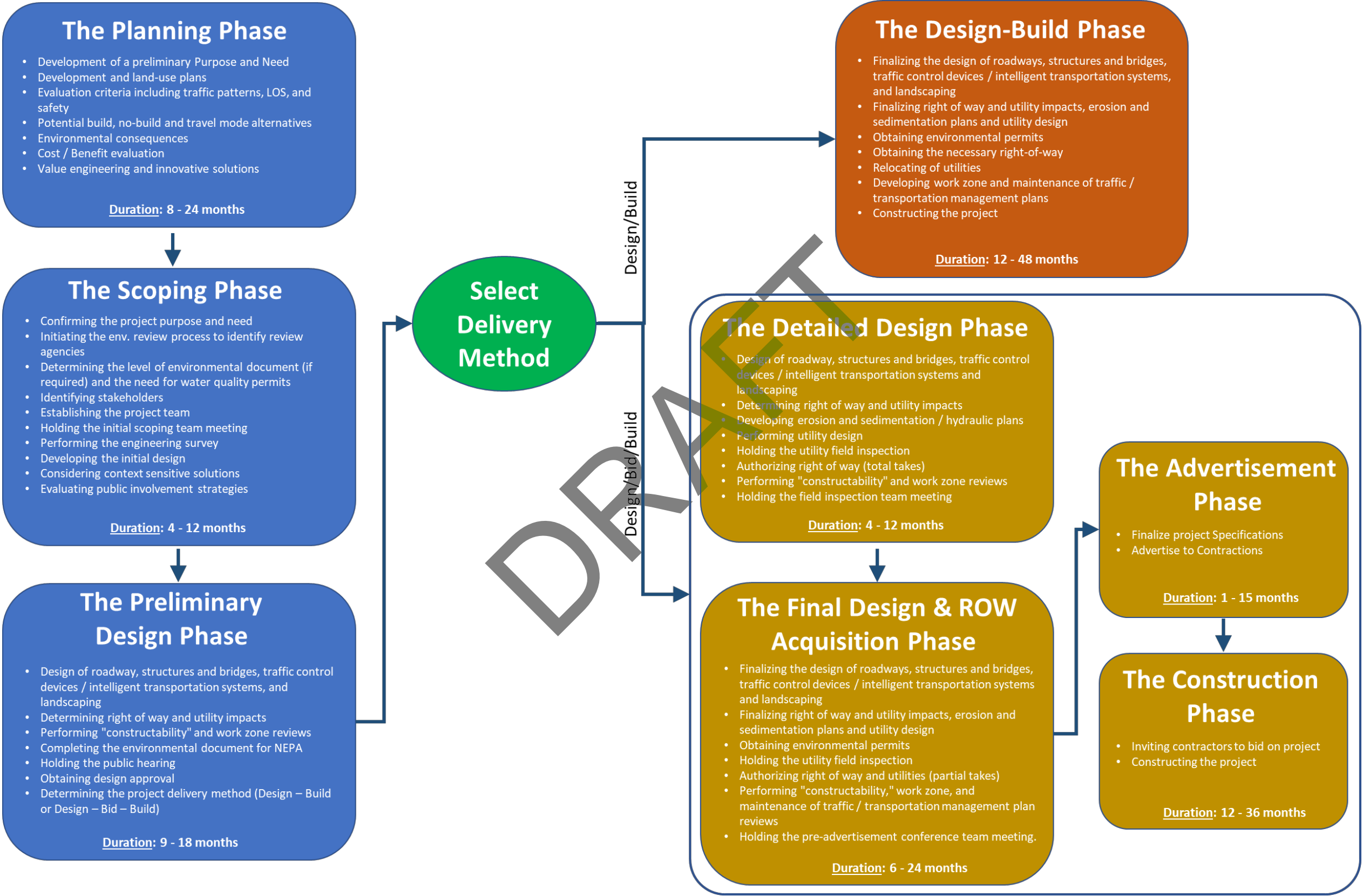
prior to using the potential byway around the Village. For the potential byway areas outside of the National Historic District, there are more environmental constraints, as these locations would require the potential byway to span a greater distance and would require more right-of-way. However, within Area 3 on the east side of the Village, outside of the National Historic District, the areas and locations of the environmental constraints, particularly the Conservation Easements, would be difficult to avoid without impacts.

### Typical Project Development Process

The typical project workflow process, also called the Project Development Process, for a new roadway in the Commonwealth of Virginia is summarized in the following section. Many of these tasks can take place concurrently and it is important to remember that every project has unique circumstances and that each project's requirements, risks, and complexities tailor the project development process and timeline to the individual project. The Project Development Process can also differ depending on the agency that is administering the project; although many new roadway projects are administered by VDOT, municipalities can also administer projects however, VDOT guidelines must still be followed if state or federal funding is used. The typical Project Development Process can take up to 14 years depending on the delivery method and complexity of the project. A graphic that summarizes the typical Project Development Process is presented in Figure 24 and a detailed description of each phase is included in Appendix D.

It is important to note that this Village of Waterford Byway Assessment document is in the beginning stages of the Planning Phase and if the process moves forward, funding sources will be needed and additional studies will be required to identify the ultimate alignment of a potential byway.

Figure 24: Typical Project Development Process





## Planned Transportation Projects

The Loudoun County Fiscal Year 2021 – FY 2026 Adopted Capital Improvement Program includes six projects that would potentially decrease congestion and travel times along primary where motorists would choose to traverse through these roadways and avoid the Village of Waterford routes. At the time this report is being developed, these projects are expected to be completed in approximately 5 to 15 years. The locations of the projects are presented in Figure 25.

### Route 9 / Route 287 Roundabout

Project elements include the construction of a two-lane roundabout and approaches on Route 9 (Charles Town Pike) and Route 287 (Berlin Turnpike). This improvement will potentially reroute traffic away from the Village of Waterford by improving operations and reducing vehicle delay at this intersection.

### Route 7 Improvements, Phase 1: Route 7 and Route 287 Interchange

Project elements include lengthened and widened ramps, channelized turn lanes, expanded turn land and through lanes along Route 287 between Eastgate Drive and the westbound Route 7 exit / entrance ramps, expanded pedestrian access, and traffic signal modifications. These interchange improvements will potentially reroute traffic away from the Village of Waterford by improving vehicular operations through the interchange.

### Route 7 Improvements, Phase 4: Route 9 to Hamilton Station Road (Route 704)

Project elements include the construction of an additional travel lane on eastbound and westbound Route 7 between Route 9 and Hamilton Station Road. The construction of additional travel lanes along this roadway will potentially reroute traffic away from the Village of Waterford by improving roadway operations and decreasing vehicular travel times along this roadway segment.

### Route 7 Improvements, Phase 5: Hamilton Station Road to Route 287

Project elements include the construction of an additional travel lane on eastbound and westbound Route 7 between Hamilton Station Road and Route 287. The construction of additional travel lanes along this roadway will potentially reroute traffic away from the Village of Waterford by improving roadway operations and decreasing vehicular travel times along this roadway segment.

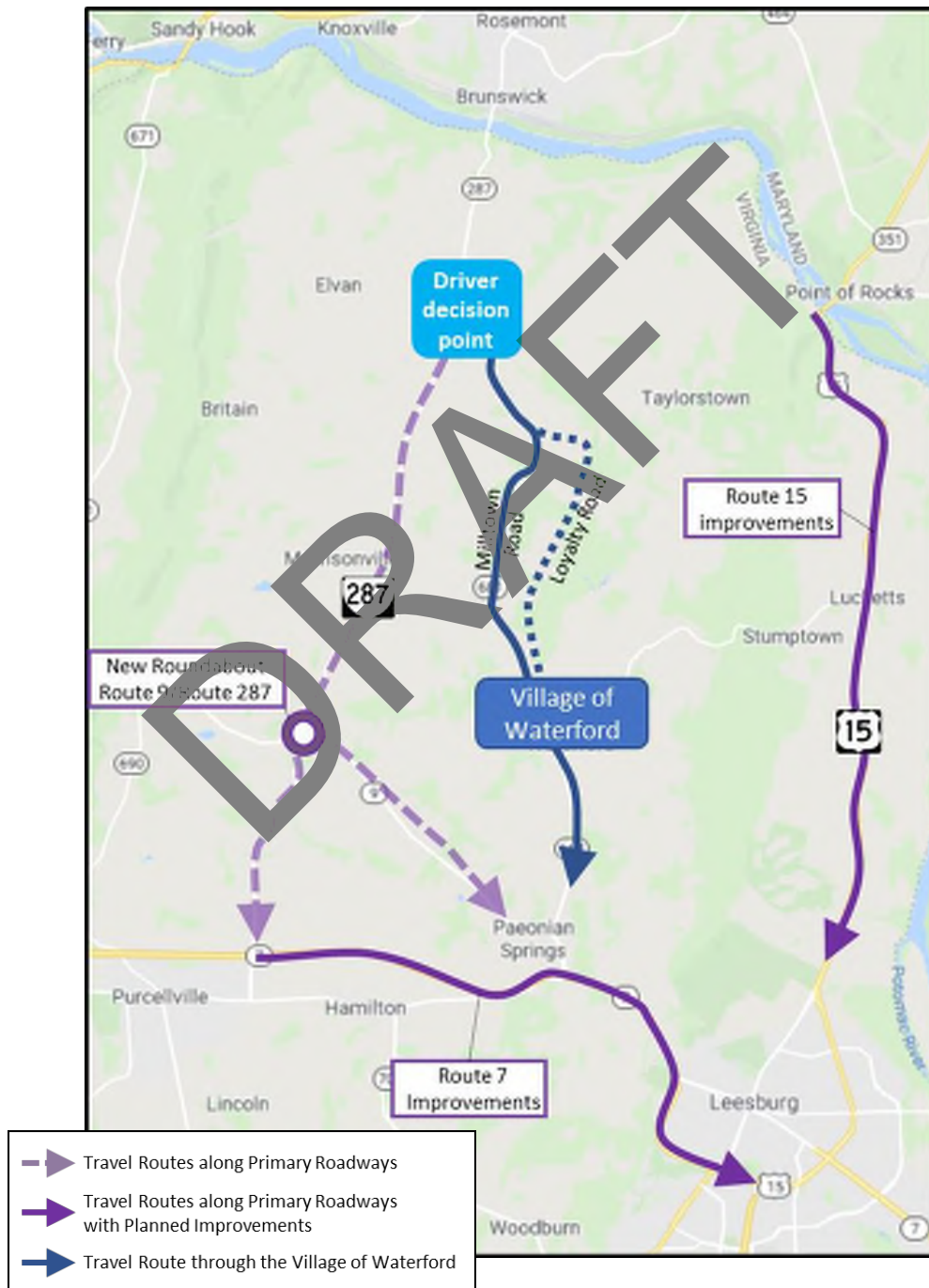
### Route 15 Improvements, Montresor Road to Point of Rocks Bridge

Project elements include widening to four lanes with median from Montresor Road to Stumptown Road/Lucketts Road, improved two lane roadway with median and shoulders from Stumptown Road/Lucketts Road to Saint Claire Lane, improved two lane roadway with shoulders from Saint Claire Lane to the Point of Rocks bridge, bypass around the Village of Lucketts, and several intersection improvements. These improvements will potentially reroute traffic away from the Village of Waterford by improving roadway operations and decreasing vehicular travel times along this roadway segment.

### Route 15 Improvements from Battlefield Parkway to Montresor Road

Project elements include widening Route 15 from two to four lanes from Battlefield Parkway in the Town of Leesburg to Montresor Road (Route 661) and several intersection improvements. These improvements will potentially reroute traffic away from the Village of Waterford by improving roadway operations and decreasing vehicular travel times along this roadway segment.

**Figure 25: Planned Future Projects to Reduce Vehicle Travel Through the Village of Waterford**



## Summary – Long-term Concept Feasibility Review

Four areas were reviewed for a potential byway around the Village of Waterford as directed by the Loudoun County Board of Supervisors:

### West of the Village of Waterford

- Area 1: West of the Village of Waterford, outside of the National Register Historic District
- Area 2: West of the Village of Waterford, inside of the National Register Historic District

### East of the Village of Waterford

- Area 3: East of the Village of Waterford, outside of the National Register Historic District
- Area 4: East of the Village of Waterford, inside of the National Register Historic District

Each of these areas include residential dwellings, conservation easements, wetlands, and other environmental constraints that would need to be avoided. A No-Build scenario (without a potential byway) would have the least amount of impacts to environmental constraints, however it would also not offer any travel time savings as vehicles would still be traveling through the Village. Area 2 and Area 4, the potential byway areas inside of the National Historic District have the lowest costs and the least impacts to environmental constraints in the area. The potential byway areas outside of the National Historic District, Area 1 and Area 3, would offer more travel time savings versus traveling through the Village as it was assumed that vehicles would travel at higher speeds along a potential byway than along the roadways within and leading to the Village of Waterford. The potential byway areas within the National Historic District would still offer some travel time savings, however the shorter length of a potential byway in these areas would mean that vehicles would need to travel on the lower speed facilities of the existing roadway network for a greater distance prior to using the potential byway around the Village. For the potential byway areas outside of the National Historic District, there are understandably more acres of environmental constraints, as these locations would require the potential byway to span a greater distance and would require more right-of-way. However, within Area 3 on the east side of the Village, outside of the National Historic District, the areas and locations of the environmental constraints, particularly the Conservation Easements, would be difficult to avoid without impacts.

It is important to note that additional studies are needed to determine any potential byway alignment on new location or along existing roadways. At the time this report was written, a potential byway around the Village of Waterford was not included in the Loudoun Countywide Transportation Plan or the Loudoun County Comprehensive Plan. Identified funding sources and amendments to these documents would be needed for a potential byway project to move forward in the Project Development Process.



## Appendices

Appendix A: Copy Teste of Loudoun County Board of Supervisors Business Meeting (January 21, 2020)

Appendix B: Stakeholder Meeting Minutes

Appendix C: Crash Data

Appendix D: Typical Project Development Process

## **Appendix A**

Copy Teste of Loudoun County Board of Supervisors Business Meeting (January 21, 2020)

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Loudoun County, Virginia

www.loudoun.gov

Office of the County Administrator

1 Harrison Street, S.E., 5th Floor, P.O. Box 7000, Leesburg, VA 20177-7000

Telephone (703) 777-0200 • Fax (703) 777-0325

At a business meeting of the Board of Supervisors of Loudoun County, Virginia, held in the County Government Center, Board of Supervisors' Meeting Room, 1 Harrison St., S.E., Leesburg, Virginia, on Tuesday, January 21, 2020 at 5:00 p.m.

IN RE: Proposed Traffic Calming Measures in the Village of Waterford (Catoctin)

Supervisor Kershner moved that the Board of Supervisors direct staff in the Department of Transportation and Capital Infrastructure to initiate the process to install three pole mounted speed display signs at locations designated in the January 21, 2020 Board Business Meeting Action Item, as an interim traffic calming measure in the Village of Waterford, and assign the responsibility for perpetual maintenance of the signs to the Department of General Services.

Supervisor Kershner further moved that the Board of Supervisors amend the FY 2020 Capital Improvement Program by authorizing the transfer of \$100,000 from the Traffic Calming Contingency account in the Capital Fund to the Traffic Calming Signs Project in the Capital Projects Fund for the installation of pole mounted speed display signs in the Village of Waterford in the Catoctin Election District.

Supervisor Kershner further moved that the Board of Supervisors direct staff in the Department of Transportation and Capital Infrastructure to review the viability of other traffic calming measures such as a bypass, chicanes and chokers at the three entry points of the Village of Waterford in the Catoctin Election District as described herein, and report back at a future business meeting.

Seconded by Chairman Randall.

Supervisor Kershner accepted Chairman Randall's Friendly Amendment to add "and traffic reducing" to the third paragraph of the motion following the words "traffic calming."

Voting on the Amended Motion: Supervisors Briskman, Buffington, Glass, Kershner, Letourneau, Randall, Saines, Turner, and Umstadd – Yes; None – No.

COPY TESTE:

  
DEPUTY CLERK TO THE LOUDOUN COUNTY  
BOARD OF SUPERVISORS

## **Appendix B**

Stakeholder Meeting Minutes

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Loudoun County, Virginia

h.gov

Department of Transportation and Capital Infrastructure

10000, MSC# 64, 101 Blue Seal Drive, Suite 102, Leesburg, VA 20177

(703) 737-8624

**PROJECT:** Village of Waterford Traffic Calming and Byway Assessment

**DATE:** May 7<sup>th</sup>, 2020

**TIME:** 10:00 AM – 11:30 AM

**LOCATION:** WebEx Conference Call

**PARTICIPANTS:**

Greg Ahlemann, Loudoun County Sheriff's Office  
Marie Caraballo, Loudoun County DTCI  
Stacey Cary, Loudoun County Catoctin District Aide  
Anthony Donald, Michael Baker International  
Thomas Folse, VDOT Traffic Engineering  
Zach Harris, Michael Baker International  
Meredith Imwalle, Waterford Citizens Association  
Caleb Kershner, Loudoun County Catoctin District Supervisor  
Heidi Mitter, VDOT Planning Division  
Miguel Pinto, Loudoun County DTCI  
Maria Sinner, VDOT  
John Thomas, Loudoun County DTCI  
Eloisa Thring, Loudoun County DTCI  
James Zeller, Loudoun County DTCI

**MEETING MINUTES: (updated on 5/28/2020)**

**Purpose**

The purpose of the conference call was to conduct a stakeholder kick-off meeting for the Village of Waterford Traffic Calming and Byway Assessment.

The meeting began by introductions of meeting participants. Then it was followed by a PowerPoint presentation by Loudoun County's DTCI Project Manager (Miguel Pinto) and Michael Baker's International (Zach Harris). The presentation included project background, detail explanation of the scope of work and proposed schedule of the study. A copy of this presentation was distributed to all parties prior to the meeting via email.

After the presentation, question and answer session proceeded and those remarks are highlighted below.

## Questions/Answers:

**Q1: *Wondering about the timeline. Looks like the current situation won't allow for in-person counts. Will you be looking at historic studies and data to supplement the Streetlight data?*** – VDOT (H. Mitter)

**A:** Yes, Baker has received the 2016 traffic data collected by JMT used for a previous study and will be reviewing that data. - Michael Baker (Z. Harris)

Updated on 5/28/2020

**Q2: *Village of Waterford residents are interested in seeing Old Wheatland Road (Route 698) included in the study as a possible byway.*** – Waterford Citizens Association (M. Imwalle clarified Q2 during a conference call on 5/27/2020)

**A:** This is a byway feasibility study with a phased approach. During this phase we will be gathering all the information from the area and identifying all the constraints to determine several byway options. Once we complete the study we will be able to determine if the use of existing roadways such as Old Wheatland Road as byways is possible during this phase or the next phase. - DTCI

**Q3: *How do we get the word out to the wider community in Waterford? There are probably others that need to be looped in.*** – Catocin District Office (S. Carey)

**A:** We've been using online tools to brief the Village residents and we'll schedule another meeting to provide the information to the community and foundation. - Waterford Citizens Association (M. Imwalle)

**Q4: *Will the study address identifying other secondary roads that may need to be improved? Potentially, with a bypass in place, if the demand increases other facilities may be impacted.*** – Loudoun County DTCI (J. Zeller)

**A:** The Board direction is to review byway options. Review of impacted secondary roads is not included in the scope. – Loudoun County DTCI (E. Thring)

**Q5: *The blue dotted lines on slide 13? Are these lines the proposed alignment of the by-way?*** - Catocin District Office (S. Carey)

**A:** No. They are representative to show the review of potential byway locations will include the east and west sides of the Village. - Michael Baker (Z. Harris)

**Q6: *For the Origin/Destination (O-D) analysis, can we get information on specific paths?*** – Loudoun County DTCI (J. Thomas)

**A:** M. Baker showed a graphic of the O-D analysis. The total number of vehicles traveling between the two areas will be reviewed. Then, assess the various traffic patterns traversing the three primary routes between the north and south O-D areas (Route 287, Route 15, and Village cut-through). – Michael Baker (Z. Harris)

**A:** We want to look at the percent of motorists driving to the village as their selected destination and determine the number of drivers that are cutting through. – Loudoun County DTCI (E. Thring)

**A:** Yes, that's the goal. We'll be using Streetlight data for the analysis. This uses anonymized GPS information from apps in your phone, car, etc. - Michael Baker (Z. Harris)

**A:** We have provided the October 2019 traffic data to Baker, which are data collected within the Village. Baker will be reviewing an area larger than the Village and it needs to be supplemented with Streetlight data. – Loudoun County DTCI (M. Pinto)

**Q7: *The PMSD signs will be installed on May 18th?*** – Loudoun County DTCI (E. Thring)

**A:** It's planned to be the week of the 18<sup>th</sup>, but I will provide an update if the contractor has an opportunity to install them before. Also, these PMSD signs have the ability to monitor speeds and we can continuously review the speeds at these three (3) entry points. – Loudoun County DTCI (M. Pinto)

**Q8: *In order to keep membership and citizens informed, when is the next time we'll be update?*** - Waterford Citizens Association (M. Imwalle)

**A:** We are targeting the end of August / early September following the development of the draft report. The study team will provide an update of the study findings and recommendations to the group who participated in this stakeholder meeting, and discuss the next steps. – Loudoun County DTCI (E. Thring)

Additional Comments:

- I wanted to clarify; Streetlight data is not dependent on certain apps. It's based on cell phone data from anything you're doing and not just navigation applications. – VDOT (H. Mitter)
- I want to add a couple comments on the schedule; with this schedule it's tentative as of today but because of COVID-19 everything ahead of us is unpredictable. This study could be extended a couple weeks to adjust to the current situation. – Loudoun County DTCI (E. Thring)
- DTCI is working on the continuity with respect to public meetings and we're refining the tools to keep projects on schedule and meet outreach needs for this project and others. We are considering various virtual public involvement platforms. It may be WebEx or other platforms. – Loudoun County DTCI (J. Thomas)





Loudoun County, Virginia

[www.loudoun.gov](http://www.loudoun.gov)

Department of Transportation and Capital Infrastructure

P.O. Box 7500, MSC# 64, 101 Blue Seal Drive, Suite 102, Leesburg, VA 20177

Telephone (703) 737-8624

**PROJECT:** Village of Waterford Traffic Calming and Byway Assessment

**DATE / TIME:** July 15, 2020 / 10:30 AM – 12:30 PM

**LOCATION:** Go To Meeting Conference Call

**PARTICIPANTS:**

Marie Caraballo, Loudoun County DTCI  
Anthony Donald, Michael Baker International  
Thomas Folse, VDOT Traffic Engineering  
Zach Harris, Michael Baker International  
Faruk Hesengan, Michael Baker International  
Heidi Mitter, VDOT Planning Division  
Miguel Pinto, Loudoun County DTCI  
John Thomas, Loudoun County DTCI  
Eloisa Thring, Loudoun County DTCI  
Ray Wright, Michael Baker International  
James Zeller, Loudoun County DTCI

**MEETING MINUTES:**

The purpose of this meeting was to review the mid-term traffic calming options and the long-term byway assessment with VDOT. Attendees were introduced. Background information of the study and the study scope were presented, which included investigating the potential installation of splitter islands, chokers, and chicanes at the entry points of the Village of Waterford and the feasibility of a byway. Pole mounted speed display signs were installed in spring 2020 as temporary measures to mitigate speeding. Design standards and components for each of the mid-term options, including potential byway alignments, were presented and discussed.

**Next Steps:**

- **Mid-Term Review:** Michael Baker will re-review options to further minimize impact to private properties and encourage motorists to slow down as they enter and exit the Village. This review also includes the application of resurfacing, restoration and rehabilitation (RRR) design standards, and various material options for the proposed concepts. Conceptual drawings will be revised to reflect this review and group comments/discussion.
- **Long-Term Review:** Michael Baker will revise graphics depicting various potential byway alignments recognizing it is feasible and develop a typical project development process to include elements of the next steps. The group recognized that a comprehensive final alignment study with analyses to support new roadway configuration, including environmental impact studies, will be required should this long-term concept advanced to the next step. A comprehensive plan amendment to the *Countywide Transportation Plan* may also be required.



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Telephone (703) 737-8624

**PROJECT: Village of Waterford Traffic Calming and Byway Assessment**

**DATE / TIME: August 6, 2020 / 3:00 PM – 4:30 PM**

**LOCATION: Go To Meeting Conference Call**

**PARTICIPANTS:**

Greg Ahlemann, Loudoun County Sheriff's Office  
Johnathan Bales, Catocin District Supervisor's Office  
Marie Caraballo, Loudoun County DTCI  
Stacy Carey, Catocin District Supervisor's Office  
Anthony Donald, Michael Baker International  
Thomas Folse, VDOT Traffic Engineering  
Zach Harris, Michael Baker International  
Meredith Imwalle, Waterford Civic Association  
Heidi Mitter, VDOT Planning Division  
Miguel Pinto, Loudoun County DTCI  
John Thomas, Loudoun County DTCI  
Eloisa Thring, Loudoun County DTCI

**MEETING MINUTES**

The purpose of this stakeholder meeting was to review the mid-term traffic calming options and the long-term byway feasibility assessment, and solicit feedback from the group. Attendees were introduced. Background information of the study and the study scope were presented, which included investigating the potential installation of splitter islands, chokers, and chicanes at the entry points of the Village of Waterford. Pole mounted speed display signs were installed in Spring of 2020 as temporary measures to mitigate speeding. Design standards and components for each of the mid-term options, including the identification of constraints for possible byway locations, were presented and discussed.

• **Mid-Term Review:**

The study team presented the existing signage system to mitigate speeding (All-Way Stop and Additional \$200 Fine signs), including the speed limit reduction from 25 MPH to 20 MPH as well as eight (8) traffic calming concepts for each of the entry points to the Village of Waterford: three along Loyalty Road, two along Clarkes Gap Road, and three along Old Wheatland Road. The study team also presented the constraints for each concept, the design standards, potential construction materials and project timeline for the construction of mid-term options.

- **Long-Term Review:**

A map illustrating various constraints such as cemeteries, drain fields, wells, residential communities/properties, floodplains, conservation easements, rivers, streams, etc. in the Village of Waterford and its surrounding area was presented and discussed. As part of this discussion, the potential VDOT roadway classification standards for a byway was presented to the group. The potential implementation timeline for construction of a byway was presented and discussed. The project timeline includes additional roadway alignment studies, right-of-way acquisition, utility relocation, roadway design, National Environmental Policy Act (NEPA) process, construction, etc. and it will take about 16 years to be completed. NEPA requires agencies (state and local) to assess the environmental effects of their proposed actions prior to making decisions.

In the Fiscal Year 2021 Capital Improvement Program, the following projects were presented and discussed. These projects are slated to be improved within the next five years. When completed, it is anticipated that congestion along these routes will be reduced, travel times for commuters will be decreased and cut-through traffic in the Village of Waterford will ultimately be lessened.

- Berlin Turnpike (Route 287) and Charles Town Pike (Route 9) roundabout
- Harry Byrd Highway (Route 7) and James Monroe Highway (Route 15) widening between Battlefield Parkway and Montresor Road (Route 661)

**Next Steps:**

- Michael Baker will submit the Draft Report for VDOT review
- DTCI will schedule a public meeting to share study findings. Meeting date will be coordinated with Supervisor Kershner's office and Waterford Citizens Association.



## Appendix C

Crash Data

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Crash Year	Crash Date and Time	Crash Severity	Persons Injured	Pedestrians Killed	Pedestrians Injured	Vehicle Count	Collision Type	Route or Street	Crash Type	Severity Name
2015	11/4/2015 0:00	B	1	0	0	2	2	OLD WATERFORD RD	Angle	Visible Injury
2015	10/9/2015 0:00	A	3	0	0	2	2	LOYALTY ROAD	Angle	Severe Injury
2015	9/14/2015 0:00	O	0	0	0	1	9	LOYALTY ROAD, (RT.665)	Fixed Object - Off Road	Property Damage Only
2016	7/5/2016 0:00	O	0	0	0	1	9	HIGH ST	Fixed Object - Off Road	Property Damage Only
2016	2/22/2016 0:00	O	0	0	0	2	5	HIGH ST	Sideswipe - Opposite Direction	Property Damage Only
2016	4/24/2016 0:00	O	0	0	0	2	2	LOYALTY ROAD (RT. 665)	Angle	Property Damage Only
2016	10/29/2016 0:00	B	1	0	0	2	2	ROUTE 681 (MILLTOWN ROAD)	Angle	Visible Injury
2017	8/26/2017 0:00	O	0	0	0	2	1	HIGH ST	Rear End	Property Damage Only
2017	5/7/2017 0:00	B	1	0	0	1	9	CLARKES GAP ROAD	Fixed Object - Off Road	Visible Injury
2018	11/16/2018 0:00	O	0	0	0	1	16	MILLTOWN ROAD	Other	Property Damage Only
2018	4/30/2018 0:00	O	0	0	0	2	4	MAIN ST	Sideswipe - Same Direction	Property Damage Only
2018	5/25/2018 0:00	B	1	0	0	1	9	OLD WHEATLAND ROAD	Fixed Object - Off Road	Visible Injury
2018	11/23/2018 0:00	O	0	0	0	1	9	OLD WATERFORD ROAD	Fixed Object - Off Road	Property Damage Only
2018	5/22/2018 0:00	O	0	0	0	2	5	40175 MAIN ST	Sideswipe - Opposite Direction	Property Damage Only
2018	7/1/2018 0:00	A	2	0	0	1	9	OLD WATERFORD ROAD (RT. 698)	Fixed Object - Off Road	Severe Injury
2018	11/18/2018 0:00	O	0	0	0	1	10	HAMILTON STATION RD (RT 704)	Deer	Property Damage Only
2018	3/10/2018 0:00	O	0	0	0	1	9	LOYALTY ROAD (RT.665)	Fixed Object - Off Road	Property Damage Only
2018	7/14/2018 0:00	O	0	0	0	2	4	MAIN ST	Sideswipe - Same Direction	Property Damage Only
2018	1/16/2018 0:00	O	0	0	0	1	9	SECOND ST	Fixed Object - Off Road	Property Damage Only
2018	6/22/2018 0:00	O	0	0	0	2	2	2ND STREET	Angle	Property Damage Only
2019	11/24/2019 0:00	O	0	0	0	1	9	MAIN ST	Fixed Object - Off Road	Property Damage Only
2019	11/24/2019 0:00	O	0	0	0	1	9	HIGH STREET	Fixed Object - Off Road	Property Damage Only
2019	10/6/2019 0:00	C	1	0	1	1	12	BOND ST	Ped	Nonvisible Injury
2019	10/2/2019 0:00	O	0	0	0	2	4	MAIN ST	Sideswipe - Same Direction	Property Damage Only
2019	2/12/2019 0:00	B	1	0	0	2	2	CLARKES GAP RD	Angle	Visible Injury
2020	2/28/2020 0:00	O	0	0	0	1	9	LOYALTY ROAD	Fixed Object - Off Road	Property Damage Only

## **Appendix D**

Typical Project Development Process

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## Typical Project Development Process

The typical project workflow process, also called the Project Development Process, for a new roadway in the Commonwealth of Virginia is summarized in the following section. Many of these tasks can take place concurrently and it is important to remember that every project has unique circumstances and that each project's requirements, risks, and complexities tailor the project development process and timeline to the individual project. The Project Development Process can also differ depending on the agency that is administering the project; although many new roadway projects are administered by VDOT, municipalities can also administer projects however, VDOT guidelines must still be followed if state or federal funding is used. The typical Project Development Process can take up to 14 years depending on the delivery method and complexity of the project.

It is important to note that this Village of Waterford Byway Assessment document is in the beginning stages of the Planning Phase and if the project moves forward, funding sources will be needed and additional studies will be required to identify the ultimate alignment of a potential byway.

### **The Planning Phase**

**The Planning Phase** may last from 8-24 months. The Village of Waterford Byway Assessment document is part of the planning phase as this document studies the feasibility of a new byway facility based on the traffic patterns and safety needs while also developing planning level cost estimates.

The Planning Phase is often initiated based on requests for road improvements from local governments. In the case of roads maintained by the Commonwealth, VDOT planners work with federal and other state agencies, localities, regional planning organizations and residents to develop short- and long-range plans for improving the highway system. How long the planning and programming process takes depends on factors relating to the significance and complexity of a recommended transportation improvement; factors include the functional role of a roadway proposal (with respect to regional travel, mobility and / or access), costs and availability of funding revenue, environmental and / or economic impact, and the support of the affected agencies, regional planning organizations, jurisdictions and the public. Participating regional planning organizations include urbanized area Metropolitan Planning Organizations and Planning District Commissions, as well as Virginia's non-urbanized area Planning District Commissions.

Factors that planners consider in making recommendations regard strategic and performance goals and related concerns, including aspects such as:

- Development of a preliminary Purpose and Need
- Development and land-use plans
- Evaluation criteria including traffic patterns, level of service (LOS), and safety needs
- Potential build, no-build and travel mode alternatives

- Environmental consequences
- Cost / Benefit evaluation
- Value engineering and innovative solutions

Every four years, the Commonwealth Transportation Board (CTB) develops a statewide transportation plan called VTrans. VTrans is Virginia's multimodal transportation plan that lays out the overarching Vision and Goals for transportation in the Commonwealth, identifies transportation investment priorities, and provides direction on implementation strategies and programs to the CTB and to transportation agencies such as Virginia Department of Transportation (VDOT) and Virginia Department of Rail and Public Transportation (DRPT), as well as regional Metropolitan Planning Organizations (MPOs). The CTB uses the plan to guide critical investment decisions such as the Six Year Improvement Program (SYIP), including the SMART SCALE funding program.

The SMART SCALE funding program is the primary source of funding for roadway projects in Virginia and is a method of evaluating and scoring planned projects based on an objective, outcome-based process that is transparent to the public and allows decision makers to be held accountable to taxpayers. The SMART SCALE process includes six major steps:

1. Localities submit basic information about a transportation project
2. The Office of Intermodal Planning and Investment (OIPI), along with VDOT and/or the Department of Rail and Public Transportation (DRPT) conduct a pre-screening of all submitted projects to determine the eligibility for SMART SCALE funding based on the project meeting a VTRANS need.
3. The localities submit SMART SCALE applications for those projects that were deemed eligible in the previous step.
4. The applications are evaluated and scored by OIPI, VDOT, and DRPT based on five major categories: Safety, Congestion Mitigation, Accessibility to jobs and multimodal choices, environmental quality, and economic development.
5. The CTB prioritizes projects for funding following a public comment and review period.
6. Projects receiving funding are entered into the SYIP.

More information on the SMART SCALE program can be found at <http://vasmartscale.org/default.asp>

For a locally administered project (LAP), a pre-scoping phase is part of the overall planning phase. During the pre-scoping phase, the local government administering the project must identify the funding source and ensure the proposed project is included in the appropriate planning documents. For the Village of Waterford Byway, the Loudoun Countywide Transportation Plan would need an amendment to include the project. The pre-scoping phase also includes VDOT authorization for Loudoun County to administer the project.

### **The Scoping Phase**

**The Scoping Phase** may last between 4-12 months.

The scoping phase establishes the project team and sets the groundwork for the Preliminary Design Phase. The primary components of the scoping phase are refining the project goals and objectives by establishing the purpose and need of a project and determining the location, transportation mode and / or the typical section of a roadway. The items needed to meet scoping phase requirements include:

- Confirming the project purpose and need
- Initiating the environmental review process to identify reviewing agencies
- Determining the level of environmental document (if required) and the need for water quality permits
- Identifying stakeholders
- Establishing the project team
- Holding the initial scoping team meeting
- Performing the engineering survey
- Developing the initial design
- Considering context sensitive solutions
- Evaluating public involvement strategies

For a locally administered project, the scoping phase also includes conducting the necessary traffic studies, performing the geotechnical and soils investigations, establishing an initial project schedule, and procurement of consultant services for preliminary engineering, Right-of-Way procurement, and construction management.

### **The Preliminary Design Phase**

**The Preliminary Design Phase** may range from 9 – 18 months.

The Preliminary Design Phase of the overall project workflow determines preliminary design impacts and includes a majority of the public involvement. Once the preliminary design is prepared, it is reviewed by all stakeholders, such as affected property owners and local governments. On occasions when the planning phase results in more than one possible alternative, information meetings and / or public hearings are conducted to involve citizens before making a final decision on the location of the roadway; at these meetings, the required Right-of-Way and other design components are presented and discussed with the public.



The components of the Preliminary Design Phase are listed below:

- Design of roadway, structures and bridges (30 percent design plans)
- Traffic control devices / intelligent transportation systems and landscaping
- Determining right of way and utility impacts
- Performing "constructability" and work zone reviews
- Completing the environmental document for the National Environmental Policy Act (NEPA).
- Holding the public hearing team meeting and public hearing
- Obtaining design approval
- Determining the project delivery method (Design – Build or Design – Bid – Build)

### **The Design – Build Phase**

**The Design – Build Phase** may last between 12 – 48 months.

The Design – Build project delivery method (also called Alternative Project Delivery) is the preferred project delivery method for new roadway construction (compared to the Design – Bid – Build method described later). This method shortens the overall project timeline by combining the latter phases of the Design-Bid-Build process into one phase.

The first part of the Design-Build process selects competing contractor teams based on past qualifications. Each of the competing teams develops a set of design plans (based on the 30 percent plans from the Preliminary Design Phase as well as other criteria set forth by the agency administering the project) as well as final bid costs for their design.

Once the winning contractor team is selected, they are responsible for completing the final design for all project components as well as constructing the roadway within the allotted time frame set forth by the agency administering the project. This includes:

- Finalizing the design of roadways, structures and bridges, traffic control devices / intelligent transportation systems, and landscaping
- Finalizing right of way and utility impacts, erosion and sedimentation plans and utility design
- Obtaining environmental permits
- Obtaining the necessary right-of-way
- Relocating utilities
- Developing work zone and maintenance of traffic / transportation management plans
- Constructing the project

Because the contracting team assumes most of the risk in the Design – Build process, many of the above components are conducted simultaneously to reduce the time frame of design and construction. During construction however, the administering agency constantly reviews the design plans, inspects for quality as well as conformity to project requirements and environmental protection. Traffic flow is also managed through the project, keeping affected property owners informed and ensuring that work zone safety guidelines are met. The new roadway is opened to traffic only after a satisfactory final inspection.

### Typical Project Development Process for Design-Bid-Build Projects

For a project that is delivered through the Design – Bid – Build method, the first three phases discussed previously remain relatively the same. However, after the Preliminary Design Phase, the following steps are conducted:

#### **The Detailed Design Phase**

**The Detailed Design Phase** may last between 4-12 months. (Cost Range: \$500,000 - \$2M)

The Detailed Design Phase expands on the work done in the Preliminary Design Phase by refining the design plans with more detailed engineering and ensuring the project's constructability. Once the design is approved, VDOT's right of way and utilities office issues a "Notice to Proceed," authorizing its agents to begin negotiations with landowners. The items included in the Detailed Design Phase are listed below:

- Design of roadway, structures and bridges, traffic control devices / intelligent transportation systems and landscaping
- Determining right of way and utility impacts
- Developing erosion and sedimentation / hydraulic plans
- Performing utility design
- Holding the utility field inspection
- Authorizing right of way (total takes)
- Performing "constructability" and work zone reviews
- Holding the field inspection team meeting

### **The Final Design and Right of Way Acquisition Phase**

**The Final Design and Right of Way Acquisition Phase** may range from 6 -24 months.

The Final Design Phase includes finalizing the design conducted in previous phases and prepares the project for advertisement and construction. Utility companies are also contacted about relocating water, sewer, gas, electric and phone lines, and all necessary permits and authorizations are obtained before work begins. The components of the Final Design Phase include:

- Finalizing the design of roadways, structures and bridges, traffic control devices / intelligent transportation systems and landscaping
- Finalizing right of way and utility impacts, erosion and sedimentation plans and utility design
- Obtaining environmental permits
- Holding the utility field inspection
- Authorizing right of way and utilities (partial takes)
- Performing "constructability," work zone, and maintenance of traffic / transportation management plan reviews
- Holding the pre-advertisement conference team meeting.

### **The Advertisement Phase**

**The Advertisement Phase** may last from 1-5 months.

The Advertisement Phase includes finalizing the project specifications and cost estimates for the project to be advertised to contractors, as well as completing the biddability review, securing environmental and right of way certifications, and verifying funding and obtaining environmental permits. For a locally administered project, authorization for advertisement must be received by VDOT.

### **The Construction Phase**

**The Construction Phase** may range from 12 to over 36 months.

The Construction phase includes the invitation to contractors to bid on the project and the awarding of the contract to the lowest qualified bidder; the cost and time of construction are also taken into account during the bidding process.

During construction, the administering agency constantly inspects for quality as well as conformity to project requirements and environmental protection. Traffic flow is also managed through the project, keeping affected property owners informed and ensuring that work zone safety guidelines are met. The new roadway is opened to traffic only after a satisfactory final inspection.