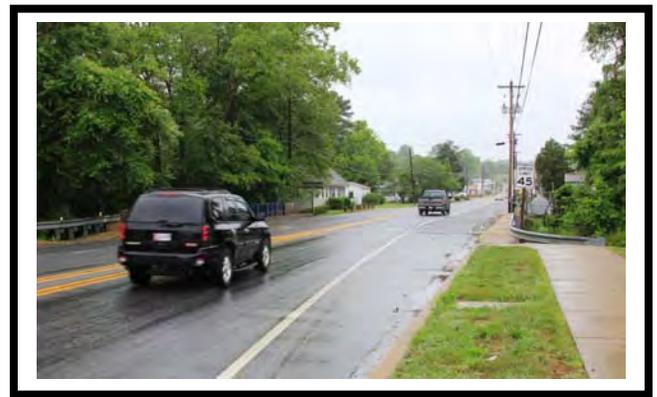
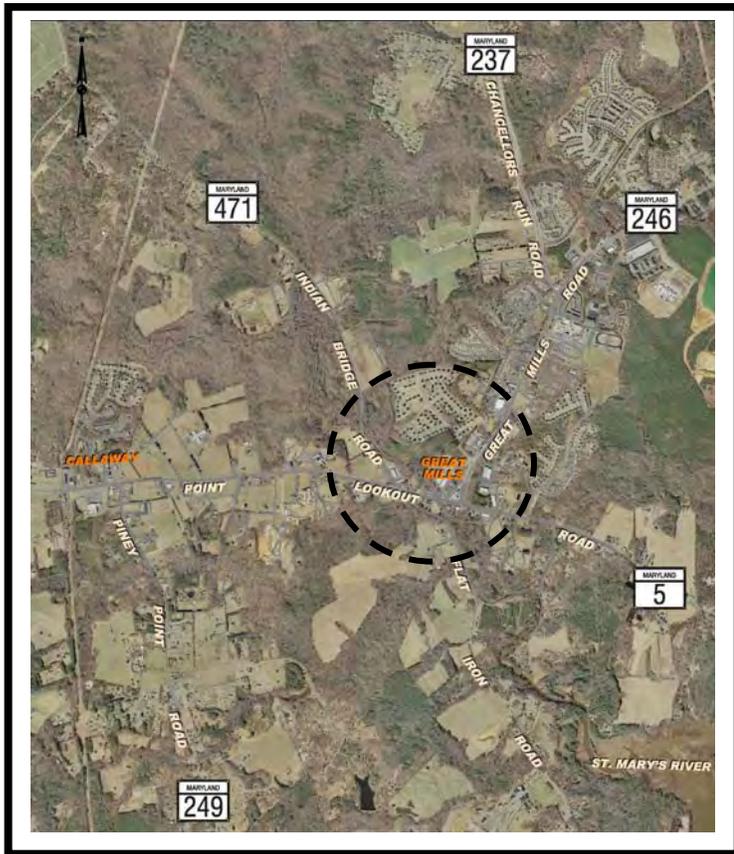




# MD 5 Great Mills Improvement Project

## Purpose & Need Statement



April 2016

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## 1. INTRODUCTION

### 1.1. Project Location

The MD 5 Great Mills Improvement Project involves the study of MD 5 (Point Lookout Road) from MD 471 (Indian Bridge Road) to MD 246 (Great Mills Road) within the community of Great Mills in St. Mary's County (*Figure 1*). The study area consists of an approximately 3,500 foot east-west section of MD 5, including the intersections of MD 471 and MD 246.

Within the study area, MD 5 is a two-lane Urban Other Principal Arterial (OPA), with either a wide shoulder open section or closed section with sidewalk, and uncontrolled access to the local businesses. The posted speed limit is 40 miles per hour (mph). Between the two intersections, MD 5 crosses the St. Mary's River on a bridge, SHA structure #1800600, which was originally built in the 1900s, and widened in the 1950s. The bridge has a width of approximately 48 feet and is currently in fair condition. It is considered "structurally sufficient" (Sufficiency rating of 6 out of 9 for superstructure, substructure and deck) and has some serviceable life remaining. Replacement or reconstruction of the bridge is anticipated within the next 20 years.

MD 5 includes single left turn lanes at the 4-way signalized intersection with MD 471. This intersection with MD 471 is at a 30 degree skew angle. This skew impacts traffic operations and creates sight line concerns. This section of MD 5 between MD 471 and MD 246 provides the most convenient roadway connection for the residents of Drayden, Piney Point, Tall Timbers, Valley Lane, and Callway to reach northern and eastern destinations including Great Mills High School, Lexington Park, NAS, and St. Mary's City.

MD 471 is a two-lane urban collector with a posted speed limit of 40 mph. The north leg of MD 471 leads to MD 4 (St. Andrews Church Road), past the St. Mary's River State Park, and the south leg leads to a mostly residential area along the Potomac River. MD 246 intersects with MD 5 to the north only, at a 3-way signalized intersection, about 1,400 feet east of MD 471. Eastbound MD 5 has a double left turn lane to northbound MD 246 and southbound MD 246 has double right-turn lanes to westbound MD 5. This intersection also includes a spur (MD 5A) between MD 246 and MD 5, which services a small commercial area and accesses MD 5 at a right-in/right-out access point about 350 feet west of the traffic signal. MD 246 is a four-lane urban principal arterial with a posted speed limit of 40 mph and leads to Lexington Park and the Patuxent River Naval Air Station (NAS), which are major trip destinations in the area.

St. Mary's Transit System (STS) operates the Route 3 buses along MD 5 and MD 246 between Leonardtown and Lexington Park via Great Mills, Monday through Friday, 6 am to 6 pm, in one-hour intervals. However, the transit riders currently have no amenities such as bus shelters, benches, or sidewalk connectivity within the study area.

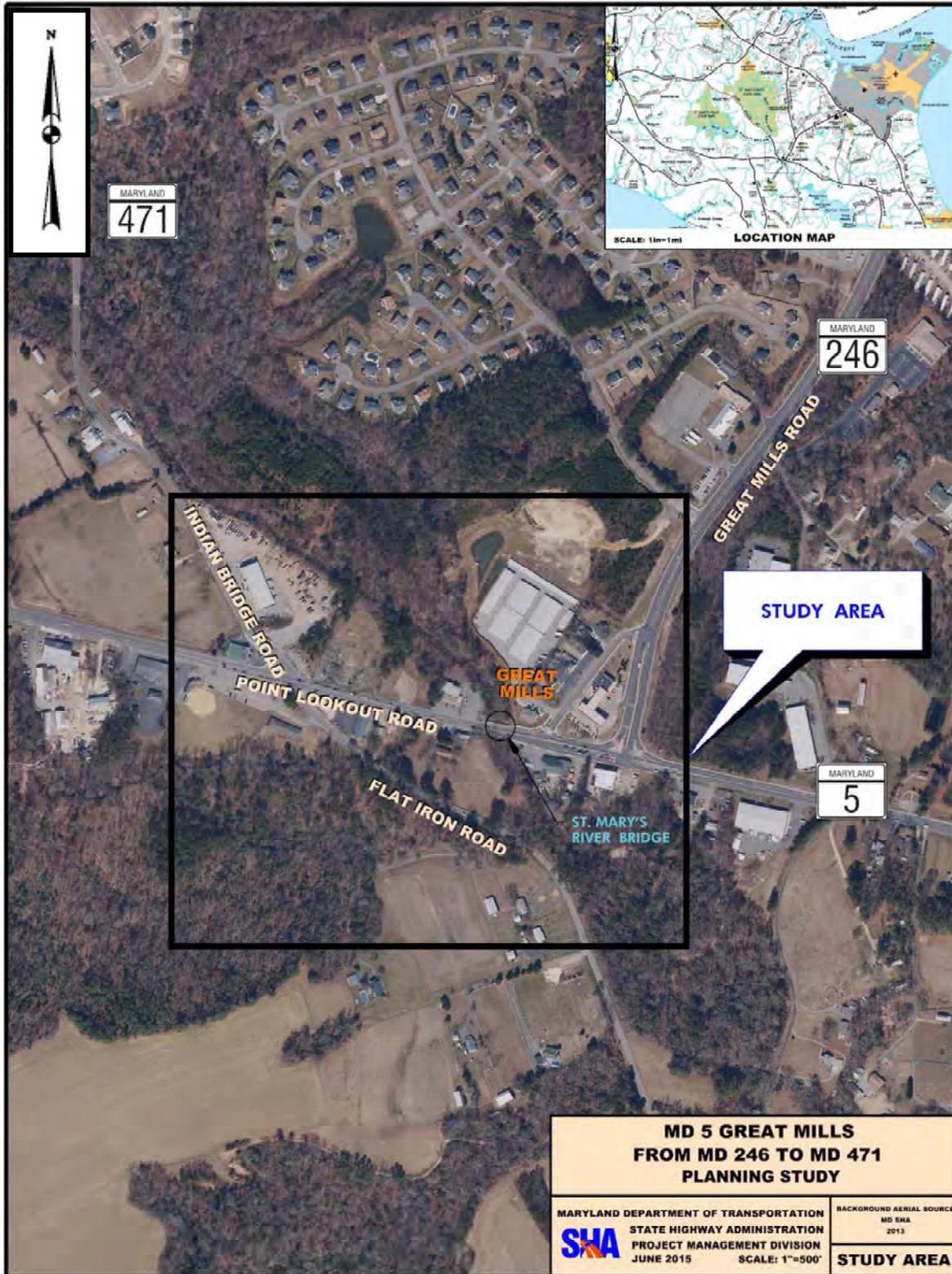


Figure 1 - Location Map

St. Mary's Transit System (STS) operates the Route 3 buses along MD 5 and MD 246. There are no convenient nearby Park and Ride lots for ride-sharers. The NAS operates one weekday round-trip shuttle bus from the base to Reagan National Airport and Bethesda Naval Hospital. There are no other shuttle services currently planned or in operation for use of the employees of the NAS.

## **1.2 Project Background and History**

St. Mary's County has experienced rapid population growth since the early 2000s and future growth and development is anticipated to continue at a relatively steady pace. The county has the fastest growing workforce in the state, mostly attributed to growth at the Patuxent River NAS and to population moving from the Washington, DC area. This growth has resulted in increased traffic volumes in the MD 5 Great Mills area. The increase in traffic volumes creates congestion, delays for commuters, and safety concerns due to multiple access points along MD 5 and the intersection movements at MD 246. An additional concern within Great Mills is flooding that occurs on MD 5 near the bridge crossing at the St. Mary's River.

SHA completed the MD 5 Great Mills Feasibility Study (January 2015) to identify transportation improvements to the section of MD 5 in Great Mills from MD 471 to MD 246. The feasibility study compiled data from existing sources and documented new information (e.g., traffic data) to effectively provide a roadmap for future phases of a SHA project planning study. The primary goal of the concepts developed in the feasibility study was to explore options to improve traffic operations, and secondly to alleviate roadway capacity and design deficiencies. Subsequent to the development of the January 2015 Feasibility Study, the project moved into the NEPA/planning phase and project planning activities commenced.

## **2. PURPOSE OF THE PROJECT**

The purpose of the MD 5 Great Mills Improvement Project is to develop a transportation solution along MD 5, between MD 246 and MD 471 that improves existing traffic operations, design deficiencies, and safety.

## **3. NEED FOR THE PROJECT**

The need for this project is based on the following:

- *Failing Levels of Service at Intersections* – The intersections of MD 5 / MD 471 and MD 5 / MD 246 experience failing Levels of Service (LOS) in both the existing year and the future design year of 2040.
- *Long Queues During Peak Hours* – There are multi-mile long traffic queues at these intersections during peak hours.

- *High Crash Rates* – The study area overall crash rate is significantly higher than the statewide average for similar roadways. Specifically, the rear end, left turn, and sideswipe collisions within the study area are significantly higher.
- *Geometric Deficiencies* – The intersection of MD 5 / MD 471 has a skew angle of 30 degrees creating an undesirable geometric configuration. The skew angle configuration impacts traffic operations and creates safety concerns.
- *Roadway Flooding* – The majority of the study area is within the 100-year floodplain. The approach roads to the bridge flood multiple times every year causing safety concerns for motorists, cyclists, and pedestrians.
- *Disconnected Sidewalks/Bicycle Lanes* – Most of this section of MD 5, through the residential and commercial district of Great Mills, does not have continuous accommodations for pedestrians and cyclists.

#### 4. TRAFFIC ANALYSIS AND CRASH DATA

##### 4.1. Existing Traffic Conditions

The existing traffic patterns indicate that most traffic travels eastbound on MD 5 to northbound MD 246 in the morning peak-hours and westbound on MD 5 from southbound MD 246 in the evening peak-hours. These patterns reflect commuter traffic traveling from residential areas in the southern portions of Great Mills and residential areas west of Great Mills, north to downtown Lexington Park, commercial areas along the northern portion of the MD 246 / MD 235 corridor, and the Patuxent River NAS.

Traffic counts were compiled by SHA for two consecutive 24-hour periods, and average daily traffic (ADT) volumes and traffic delays were calculated for both intersections within the study area (*Table 1*). In addition, peak period observations (7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM) were performed in the study corridor to examine existing traffic operations, in particular vehicular queues. See Figure 2 for existing and future traffic Level of Service.

*Table 1 – Existing (2013) Intersection Capacity Analysis*

Intersection	Traffic Volume (vehicles/day)	Average Delay (seconds)		Overall Level of Service	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
MD 471/MD 5	19,475	58.8	45.8	E	D
MD 246/MD 5	18,600	43.7	37.6	D	D

Source: SHA 24-Hour Traffic Counts, 2013



Figure 2 – Existing Conditions Map

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### ***MD 471/MD 5 Intersection***

The existing traffic volume through the MD 471 intersection is 19,475 vehicles per day (vpd), and the average intersection delay is 58.8 seconds in the morning peak-hours and 45.8 seconds in the afternoon peak-hours. Overall traffic operation for this intersection is Level of Service (LOS) E in the morning peak-hours and LOS D in the evening peak-hours.

Particularly, the traffic operations through MD 471 and Flat Iron Road are LOS F for both morning and evening peak-hours for both northbound and southbound directions. Peak hour observations indicate that during the AM peak the eastbound MD 5 queues at the intersection extend up to approximately 10,000 feet. The observed travel time from the end of the queue to the MD 471 intersection was approximately 12.5 minutes. These queues dissipated by the end of the AM peak period.

### ***MD 246/MD 5 Intersection***

The existing traffic volume through the MD 246 intersection is 18,600 vpd, and the average intersection delay is 43.7 seconds in the morning peak-hours and 37.6 seconds in the afternoon peak-hours. The overall traffic operation for this intersection is LOS D in both the morning and evening peak-hours. Each leg of the intersection is LOS D other than the through traffic on MD 5; where westbound and eastbound through traffic is LOS C in the morning peak-hours and evening peak-hours, respectively. Peak hour observations indicate that during the PM peak, the southbound queues along MD 246 are extensive, particularly for the right turns to westbound MD 5. In addition, the westbound MD 5 PM peak queues are extensive at this intersection, particular for westbound through traffic. Consistent cycle failures were observed for this movement. The bridge over St. Mary's River acts as a bottleneck along westbound MD 5, since traffic on two through lanes merge into one lane approaching the bridge.

## **4.2. Future Traffic Demand Forecasts**

Traffic volumes are projected to increase by approximately 30% by the year of 2040. This projection is based on the calibrated regional travel forecast model developed by SHA, which accounts for projected development, employment, and population growth. Therefore traffic operations would worsen at the MD 471 intersection, while the overall traffic operation remains the same at the MD 246 intersection.

For the MD 471 intersection, the overall traffic operation would be LOS F during both morning and evening peak-hours under the current roadway conditions. Traffic operations at MD 471 and Flat Iron Road would remain LOS F, except for northbound traffic morning peak-hours. Traffic operations at MD 5 would worsen to LOS F for both eastbound and westbound traffic in the morning peak-hours and evening peak-hours, respectively.

For the MD 246 intersection, the overall traffic operation would remain LOS D for both morning and evening peak-hours under the current roadway conditions. Traffic operations on MD 246 would remain at the same level, while traffic operations would worsen to LOS E in peak-hours traffic directions, though not enough to worsen the overall traffic operation at the intersection.

### **4.3. Crash History Analysis**

Crash data within the study area was collected by SHA during the period of 2010 to 2012 and again for the period of 2012 to 2014. The crash rate is typically expressed in terms of crashes per 100 million vehicle-miles. For the purpose of this planning study, the crash rates for the roadway section are used to compare the data within the study area and statewide data for state maintained highways.

The overall crash rate from 2012 to 2014 within the study area is 315.0, which is significantly higher than the statewide crash rate of 169.8. Moreover, most of the collision types have a significantly higher crash rate in comparison to statewide crash rates. Rear-end, sideswipe, and left-turn collisions, in particular, occurred frequently with a crash rate of 173.8, 21.7, and 32.6 respectively, compared to 55.3, 11.4, and 13.3 statewide rates. These crash rates have not significantly changed since the 2010 through 2012 data.

In terms of collision types, almost half (42%) that occurred during the 2010 to 2012 period resulted from rear-end collisions, and about 21% resulted from sideswipe collisions. The data collected for the 2012 to 2014 period indicates that rear-end collisions make up 55%, followed by 12% for sideswipe collisions and 10% for left turn collisions. According to the crash data for the study area, the contributing factor for most of the rear end collisions was following too closely. The numerous access points along MD 5 are a main factor for the high crash rates of sideswipe and left turn collisions. The total crash rates and the rates for rear-end, left-turn, and sideswipe collisions are significantly higher than statewide rates for state maintained highways with similar functional classifications. In addition, during the 2012 to 2014 period, truck-related (21.7) and wet surface (34%) crash rates were significantly higher than statewide rates (10.5 and 21% respectively).

No significant crash data on pedestrian or bicycle related collisions were recorded within the study area for either data period.

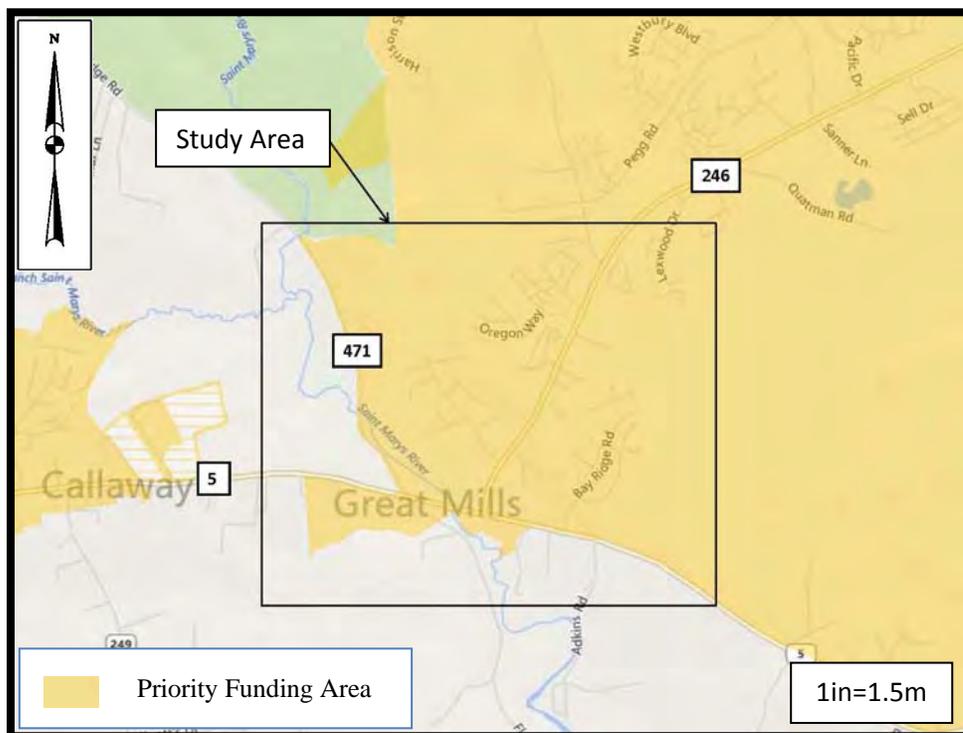
## 5. PRELIMINARY ENVIRONMENTAL REVIEW

### *Socio-Economic Environment*

Land use within the vicinity of the MD 5 Great Mills Project Planning Study is predominately commercial and residential with wooded areas interspersed. Residential dwellings are mostly located along MD 5, west of the St. Mary's River crossing.

Institutional and public land uses in the study area include the Old Holy Face Church, the Great Mills Post Office, and the Little Flower School. Smaller areas of other land uses are spread throughout the study area.

MD 5, within the study area, is located within a Priority Funding Area (PFA); however, the PFA border is along MD 471 north of MD 5 (**Figure 3**). Any proposed work west of MD 471 is not within the PFA and would be subject to Smart Growth Consistency Coordination with the Maryland Department of Planning.



**Figure 3 – Priority Funding Area (PFA) Boundary**  
Source: Maryland Department of Planning (MDP) PFA Mapping Tool

The study area is also within the Lexington Park Development District (the District boundary is similar to the PFA boundary). The 2010 *St. Mary's County Comprehensive Plan* envisions the Lexington Park Development District as the principal growth area for the County. In

2015, the County updated the Lexington Park Development District Master Plan to shape and direct growth in the next 30 years. To facilitate the planning efforts, the District Master Plan designates subareas and creates focus areas within these subareas.

The Plan has designated that most of the MD 5 Great Mills study area is within the Great Mills Road Corridor (MD 246) focus area. The District Master Plan identifies the Great Mills Road Corridor, along with the Downtown focus area, as providing the gateway to the Patuxent River NAS. In addition, the Plan identified the corridor as one of the focus areas having significant existing development that would benefit from infill development, redevelopment, and design and infrastructure enhancements.

Several community facilities and services are located in and adjacent to the study area, including:

- Great Mills Post Office
- Great Mills Canoe and Kayak Launch
- The Little Flower School
- Old Holy Face Church
- Great Mills High School
- James W. Henderson Park
- Great Mills Swimming Pool.
- St. Mary's River State Park

The MD 5 Great Mills project area falls within three census tracts, two of which have an Environmental Justice population. These two census tracts have a percentage of minority population that exceeds the state and county average levels. One of the census tracts includes a substantially higher percentage of the population living at the poverty level than the state and county percentages. The percentage of the population whose education is below grade 12 is substantially higher than the state and county percentages.

There are multiple historic standing structures that are within or adjacent to the study area. These historic standing structures are identified as:

- Great Mills Elementary School (SM-486) – unevaluated
- Physic Hill (SM-495) – unevaluated; demolished c. 2005
- Holy Face Church (SM-746) – unevaluated
- St. Mary's Youth Memorial Park (SM-744) – unevaluated; at this location since 1984
- Holy Face Convent (SM-891) – Not Eligible, 11/1992; demolished
- SHA Bridge 1800600 (SM-510) – Not Eligible, 7/2000

The study area includes several twentieth-century residences and commercial buildings along MD 5 and MD 246 that may need additional evaluation for National Register of Historic Places (NRHP) eligibility. Additionally, the historic district, Cecil's Mill, is located one quarter mile north of MD 5 along MD 471. Cecil's Mill Historic District is listed in the

NRHP (NR-456). The MD 5 crossing is at the former head of the St. Mary's River estuary and the surrounding terraces have high prehistoric potential. Additional archaeological surveys would be required as the project progresses.

Section 4(f) of the Department of Transportation Act of 1966 governs the use of land from publicly owned parks, recreation areas, wildlife and waterflow refuges, and public or private historic sites for federally funded transportation projects. Within the study area, the following sites are potential Section 4(f) resources: Great Mills Canoe and Kayak Launch; James W. Henderson Park; Cecil's Mill Historic District; and the unevaluated historic structures.

### ***Natural Environment***

Several soil mapping units are located in the study area and include wet alluvial land, silt loams, and sand loams. Some units are classified as Prime Farmland Soils and Soils of Statewide Importance. Further coordination with the Natural Resource Conservation Service (NRCS) and Farmland Policy Protection Act (FPPA) may be required at later stages in design. The entire study area is in the Atlantic Coastal Plain Province physiographic region. The geology for the study area includes both the St. Mary's Formation and the Lowland Deposits.

A portion of the study area is within a broad area identified by the Maryland Department of Natural Resources (DNR) as a Sensitive Species Project Review Area (SSPRA). The federally listed threatened Northern Long-eared Bat (*Myotis septentrionalis*) habitat includes nearly all of Maryland west of the Chesapeake Bay. Additional surveys may be required if more than one acre of forest is impacted. Records for the state-listed threatened Flier (*Centrarchus macropterus*) and the state-listed endangered Eastern Narrow-mouthed Toad (*Gastrophryne carolinensis*) are documented in the study area.

The study area is located within the Lower Potomac River watershed, with tributaries draining to the St. Mary's River. Streams within the study area are classified as Use I. Johns Creek within the study area is a Tier II designated high quality watershed. National Wetland Inventory (NWI) and DNR mapping identifies wetlands located along MD 5, east of MD 246, as well as wetlands within the vicinity of MD 471, both north and south of MD 5. Field delineations were completed in October 2015.

The majority of the study area is located within the St. Mary's River and Johns Creek 100-year floodplain. SHA records indicate that MD 5 needs to be closed for traffic one to two times per year due to roadway flooding during tropical storms or hurricane events. The water levels on MD 5 can be in the range of 2" to 16" during these events. The areas that have been closed due to flooding include MD 5 from MD 246 to the western edge of the study area, and north along MD 264 and MD 471 approximately one third of a mile.

This is corroborated by the preliminary hydraulic analysis that was completed during the feasibility study. The analysis indicates that the bridge would be overtopped by flood water in a five-year storm event, and a two-year storm would raise the water elevation to reach the bottom of the bridge structure. A more detailed hydraulic analysis would be completed as part of this planning effort.

The sea level in the vicinity is projected to rise five to ten feet in the study area by the year 2050. Sea level rise will be considered in the development of alternatives that reduce the impact of flooding.

Forest Interior Dwelling Species (FIDS) habitat is present on the north and south side of MD 5 within the study area. Field studies and site reconnaissance would be required as the study progresses to determine forest composition, species type, etc. that are present within the study area. The study area falls within a Green Infrastructure corridor on the north side of MD 5, but not within a Green Infrastructure hub.

#### ***Other Environmental Considerations***

There is potential hazardous waste sites within the study area that include a gas station and a large industrial facility located along MD 471, just north of the MD 5 intersection. An Initial Site Assessment (ISA) would be required as the project progresses.

The study area is not located in a designated nonattainment area and there are no known air quality concerns within the study area. Similarly, there are no known noise concerns within the study area. A noise analysis would be completed once detailed alternatives are developed.

## **6. MULTI-MODAL CONSIDERATIONS**

In St. Mary's County, public transportation is operated by the county's Department of Public Works and Transportation, the St. Mary's Transit System (STS). The public transportation routes are also served by complementary Americans with Disabilities Act (ADA) service. .

Great Mills High School is adjacent to MD 246 and less than a mile north of MD 5. Given the location of the high school within the large school district it is likely that multiple school buses use the MD 5/MD 246 intersection, often during the peak hours.

Currently, there are limited sidewalks provided for pedestrians in the study area. Sidewalks are provided on the east side of the St. Mary's River bridge around the MD 246 intersection, while almost no sidewalk is provided on the west side of the bridge, with the exception of small sections at driveway entrances to some businesses.

## **7. CONCLUSIONS**

The MD 5 Great Mills study area has intersections with failing LOS (intersections MD 5/MD 471 and MD 5/MD 246) with multi-mile long traffic queues during peak hours, roadway sections with crash rates that are significantly higher than the statewide average, and an intersection (intersection MD 5/MD 471) with an undesirable geometric configuration.

Additionally, the roadway floods near the bridge over the St. Mary's River multiple times a year and the sidewalks and bicycle lanes in the study area are disconnected. A project planning study is necessary to assess and prepare for transportation improvements within the study area that improves existing traffic operations, design deficiencies, and safety.