



MD 5 Great Mills Improvement Project

*Adding Capacity, Improving
Safety in Rural Maryland*

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

Table of Contents

1. Project Description - 1

2. Project Location - 11

3. Grant Funds, Sources and Uses of Project All Funds - 14

4. Selection Criteria - 15

5. Environmental Risk Review - 26

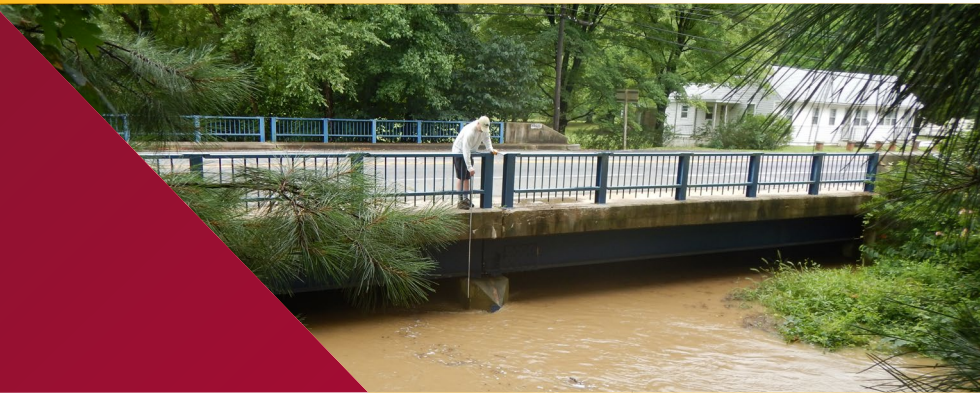
6. Benefit–Cost Analysis - 29



MD 5 Great Mills Improvement Project

Adding Capacity, Improving Safety in Rural Maryland

1. Project Description



I. Project Description

The MD 5 Great Mills Improvement Project (the Project) will mitigate congestion and climate change, increase access for underserved rural communities, address safety concerns, improve connectivity to nearby military installations, and provide access to job centers and local and regional schools. The Project provides critical multi-modal safety and traffic solutions at a key intersection in St. Mary's County, a rural county in Maryland's western shore peninsula. This area is undergoing major residential, workforce, and commercial growth and is within the Census-designated Lexington Park-California-Chesapeake Ranch Estates, MD, Urbanized Area (2010 population: 58,875).

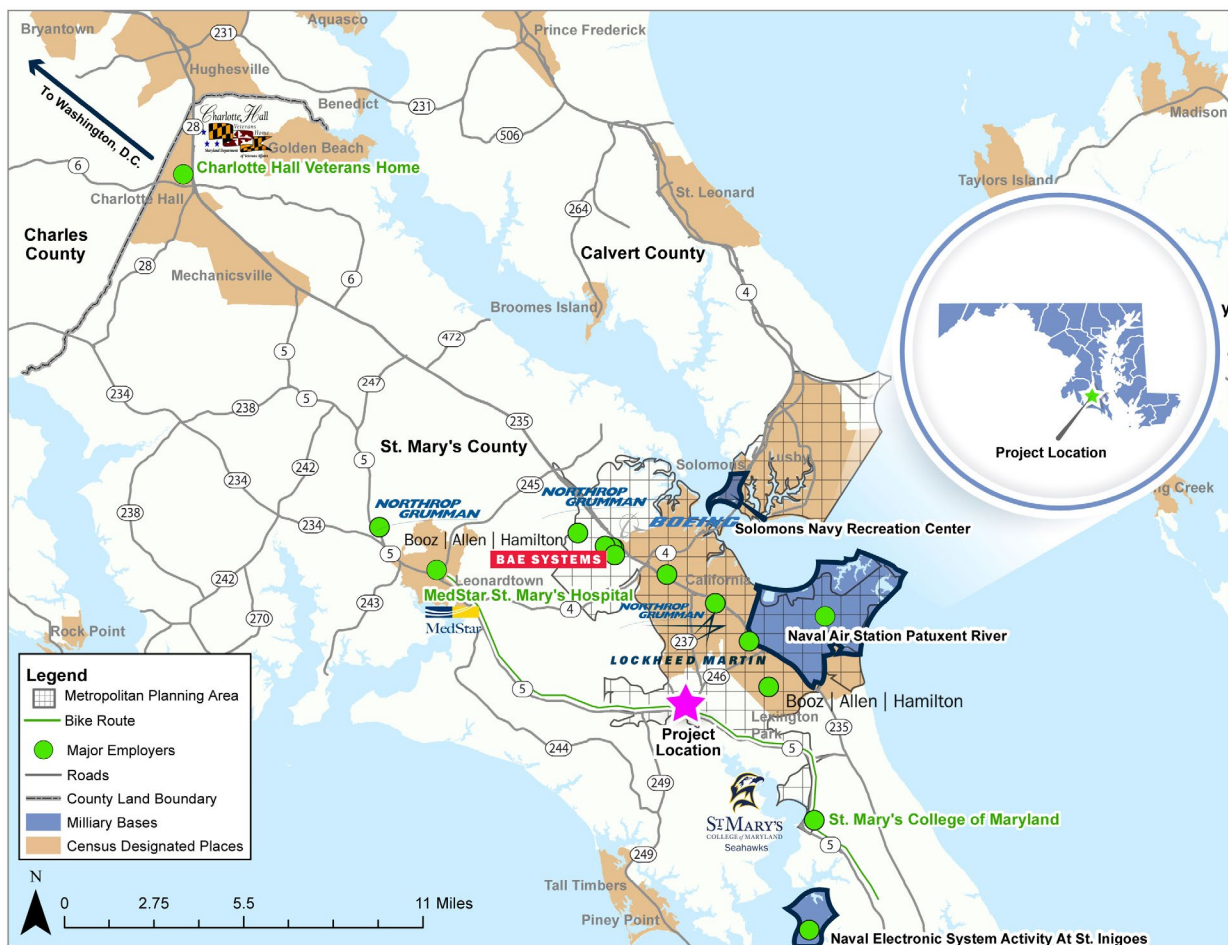


Figure 1. Project Location and Surrounding Area



The Project will address existing safety, congestion, access, and connectivity issues present in the Project Area by improving road geometry, replacing an aging bridge that consistently floods, and enhancing bicycle and pedestrian access. The proposed improvements will facilitate continued economic growth in the region by ensuring safe and efficient connectivity to key military and private sector employment centers while helping mitigate current or future climate change challenges faced in this county, whose total area comprises 53 percent water versus 47 percent land. The Project Area encompasses Maryland Route 5 (MD 5), or Point Lookout Road, between MD 246 (Great Mills Road) and MD 471 (Indian Bridge Road) in Great Mills, St. Mary's County (the County). The Maryland Department of Transportation State Highway Administration (MDOT SHA), in partnership with St. Mary's County, Maryland, requests **\$13.4 million** in RAISE grant funds, representing 60 percent of total project costs. These funds will complete the funding package for a \$22 million project that confronts existing challenges in our State highway system and prepares for increasing development, job opportunities, and traffic volume.

Home to the first Maryland colony established in 1634, St. Mary's County maintains a unique and historic culture of Chesapeake Bay tidewater farmers and watermen who traditionally populated this rural area, along with a sizeable community of Amish and Mennonite farmers.



Figure 2. Watermen harvesting oysters (credit: Dave Harp/Bay Journal Media)

Over the past five decades, the County has undergone a major transformation, with population doubling since 1970. In the past 10 years, the County has grown over 7 percent – one of the highest rates in Maryland and above the national average of 5.96 percent. The Urbanized Area, which contains the Project, includes some areas that have a higher population density than the State average. The Urbanized Area also has a growing a minority population as shown in Figure 3, including a larger Hispanic/Latino population than either Calvert or St. Mary's County. This growth is due in part to growing military installations, which are the major economic drivers for the region, and associated defense contractor businesses. The population of long-distance commuters who travel from St. Mary's County to Washington, D.C., is also rising.

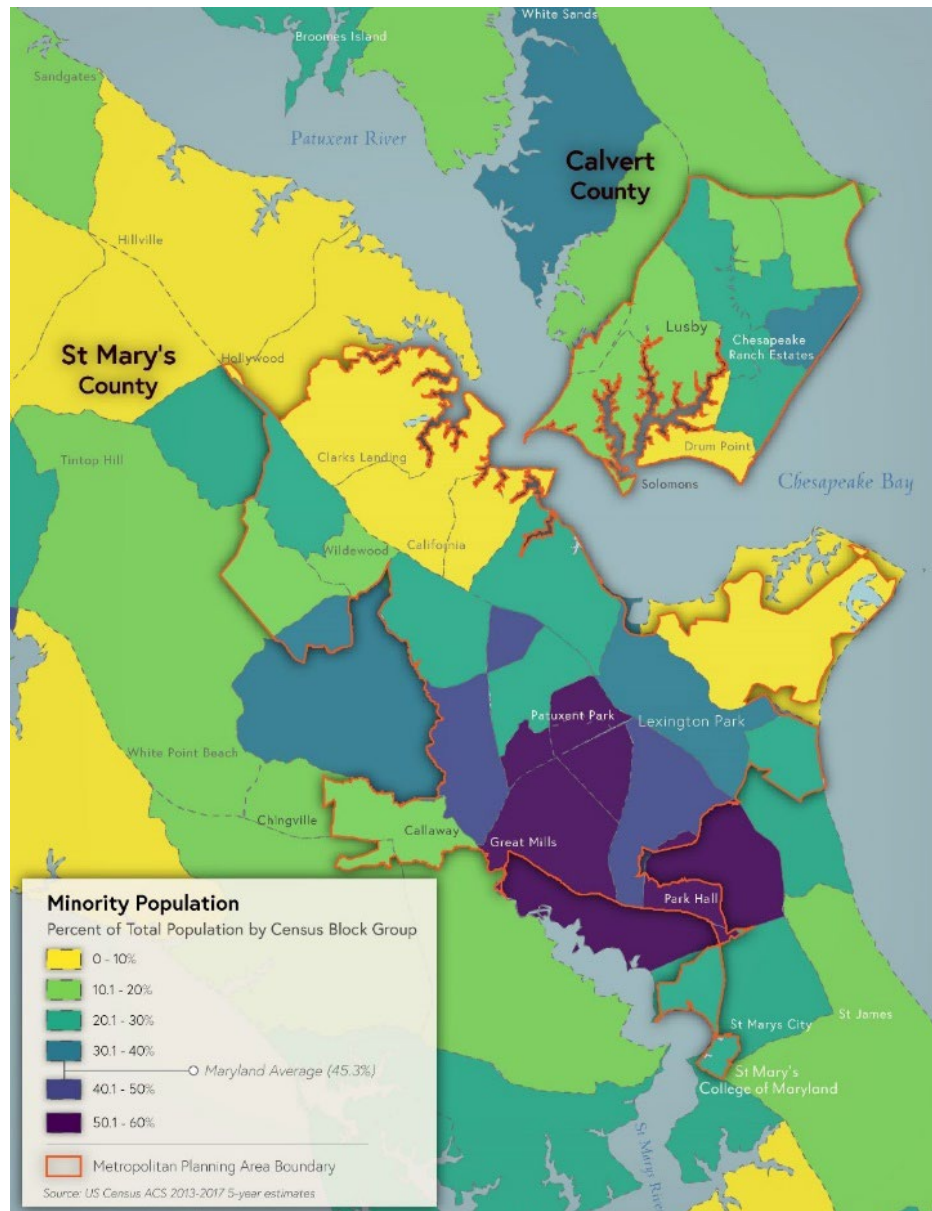


Figure 3. Minority population density in the Project area

St. Mary's County has the fastest-growing workforce in the State of Maryland. An April 2019 Forbes article stated that, "California-Lexington Park in Maryland [the Urbanized Area in which the Project is located] emerged as the city with the highest share of high-tech jobs in its local economy in the country." The high concentration of science, technology, engineering, and math (STEM) jobs in this region is driven by the presence of several critical military installations in Southern Maryland. The Naval Air Station Patuxent River Main Site (NAS PAX) in Lexington Park is three miles east of the Project Area. The Webster Outlying Landing Field (WOLF) at St. Inigoes, which houses a Coast Guard Station and an Army National Guard UAS program, is located 11 miles to the south of the Project. These military installations employ over 21,500 active-duty personnel, civilians, and contractors, many of whom rely on MD 5 for access to destinations around the County; Washington, D.C.; Virginia; and Maryland.



While this growth has brought expanding opportunities for residents, it has also strained the transportation infrastructure. Overall, traffic operations are approaching failing conditions, with substantial peak-period delays. Further, this growth is expected to continue, as more defense, aerospace and other technologically driven industries are spawning new commercial, office, and residential developments near the community of Great Mills. These new developments are expected to generate a **27-percent increase in traffic by 2040**.

In addition to meeting the transportation needs of a growing and increasingly diverse population, the Project will address substantial safety concerns at and near the Project location. The MD 5 road was not designed to support the higher traffic volumes and speeds it experiences now, adversely impacting traffic operations and creating safety concerns, particularly for already at-risk travelers. Today, **the crash rate in the Project Area is higher than the statewide average** for similar types of roadways and the continued growth will exacerbate these issues for motorists, bicyclists, and pedestrians and their access to jobs, schools, and other critical services, as well as for the transit bus that comes through this area providing access to jobs, school and essential services for those more dependent on transit. Addressing safety concerns in the Project area will improve missing connections to existing transit, employment and educational opportunities and will therefore enhance mobility and accessibility for pedestrians, bicyclists, and transit users. The Project will also **address flooding issues that require motorists to make a 14-mile detour** when the roadway is impassable.

This rural traffic mitigation and safety project is designed to support and stimulate economic growth in this growing area. With a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant in place, these improvements will support this growing rural community while preserving residents' quality of life and connections to this nationally significant historic place.

The Project comprises five coordinated, complementary infrastructure investments that work together to address increasing challenges that are impacting the Project Area's safety, state of good repair, economic competitiveness, environmental sustainability, and quality of life. Built together, the impact of the five components detailed below is greater than the sum of the individual parts; built alone, each will not deliver the benefits to the same extent as when built together along the same time frame. Further, by leveraging these management and operations improvements together, the Project minimizes the overall duration of construction and provides a lower overall cost and impact to the community. Components are detailed below and depicted in Figure 4.

1. Widen and resurface MD 5 (Point Lookout Road) from two lanes to an undivided four-lane closed section roadway to improve the roadway and the adjacent intersection performance
2. Replace an existing bridge over the St. Mary's River at the same grade with a more resilient bridge
3. Add shoulders to accommodate five-foot bicycle lanes in order to improve safety
4. Add a new five-foot wide sidewalk along both sides of MD 5, while providing Americans with Disabilities Act (ADA)-compliant ramps and installing pedestrian crossing signals
5. Implement drainage improvements, new stormwater management facilities, erosion control, landscaping and stream restoration



Figure 4: Great Mills Project Elements

Project History and Any Previously Completed Components

Since last year's Better Utilizing Investments to Leverage Development (BUILD) application was submitted to U.S. DOT, MDOT SHA has strengthened the Project in several ways:

- Advanced design on the roadway improvements and bridge replacement
- Refined the costs estimate
- Acquired right-of-way for the Project

The Project complements an earlier phase of work completed in 2019 that closed outbound traffic at Great Mills Road just east of the St. Mary's River Bridge to prevent drivers from trying to "queue jump" the backed-up traffic on MD 5 at the MD 246 intersection.

Based on the St. Mary's County's [2021 transportation priority letter](#), the Project is the second highest priority of a total of 16 transportation improvement projects. Due to the Project's regional importance, MDOT requested that the MD 5 Great Mills project be a Congressional Member-designated project for federal transportation authorization or appropriations legislation. Despite this very high priority rating and the community's need for the congestion and safety improvements, funding availability continues to prevent its completion, as County and State resources are limited. Without this RAISE grant, it will take MDOT and St. Mary's County several years to fill the remaining funding gap. During this time, the growing population and increasing access needs for the military installations, and associated industries, will only exacerbate the current congestion and safety problems.



Relationship to Other Improvements

The Metropolitan Commission (METCOM), which provides public water and sewer utility services in St. Mary's County, replaced and relocated the sewer pumping station from directly adjacent to the St. Mary's River bridge within the Project Area to a new location at 20254 Point Lookout Road, Great Mills (Figure 5). The new location of the sewer pumping station is within the Project limits on the same parcel but relocated out of the St. Mary's River floodway. The relocation of the pump provides the onsite space needed to reconstruct the 108-year old bridge that currently experiences significant flooding. Replacing this bridge over the St. Mary's River is part of the Project.



Figure 5 - Great Mills wastewater pumping station (old location)

The East Run Medical Center sits just 0.8 miles north of the Project location. The new development provides a community-based outpatient clinic that serves veterans as well as expanded residential development around the East Run Medical Center. Improving traffic conditions and multimodal connectivity will provide better access to this important essential medical service.

Another related improvement that will help improve the functionality of the MD 5 Great Mills Improvement Project is the traffic camera that has been installed at the MD 5/Great Mills Road (MD 246) intersection in a collaboration between St. Mary's County Government and MDOT SHA to monitor traffic operations and facilitate more efficient response to incidents and crashes.

Project Need

This Project addresses several transportation challenges that are impacting this rural community's ability to fully realize the benefits of expanding job opportunities and economic growth without diminishing mobility and quality of life. The County has acknowledged the pressing need to fund this Project by including it in the 2021 Transportation Priority Letter as one of its top funding priorities and in the Calvert-St. Mary's Metropolitan Planning Organization's (C-SMMPO) Long Range Transportation Plan ([Moving Forward 2045](#)). The Great Mills Project will address existing safety concerns, congestion, access, and connectivity issues by improving roadway geometry and infrastructure, traffic patterns, multimodal access, and safety that directly impact this critical – and growing – workforce in St. Mary's County. Table 1 presents key safety and traffic statistics for the Project Area.

Table 1. Key Statistics in the Project Area

Safety			Traffic	
Crashes (2009-2019)	Crashes Resulting in Fatalities or Injuries	Pedestrians	Annual Hours Delay	No-Build LOS on MD 5
187	68 (9 serious injuries, 0 fatalities)	2 (non-fatal, in 2010 and 2018)	23,096	F (MD 471) D (MD 246)



Transportation Challenges the Project Will Address

The Project will address five key transportation challenges impacting residents’ quality of life and access to opportunities, detailed below.

CHALLENGE 1: Failing Levels of Service at Intersections and Substantial Peak-Period Congestion

The intersections of MD 5/MD 471 and MD 5/MD 246 are currently reaching or exceeding capacity, with Level of Service (LOS) E and D in the AM and PM peak. The MD 5/MD 471 intersection is projected to reach a failing level of service by 2040, which severely limits mobility through this growing rural area where there are multi-mile-long traffic queues at these intersections during peak hours. Additionally, failing LOS in general correlates to increased air pollution and emissions due to projected queue lengths and idling. Key performance measures for the MD 5/MD 471 and Flat Iron Road intersection, including LOS are presented in Table 2; key statistics for the MD 5/MD 246 intersection are in Table 3.

Table 2. Key Statistics for MD 5/MD 471 (Flat Iron Road) Intersection

Daily Traffic Volume	Ave. Delay-AM Peak	LOS- AM Peak	Ave. Delay-PM Peak	LOS-PM Peak	Projected 2040 LOS
19,475 vehicles	73.2 seconds	E	40.5 seconds	D	F

Table 3. Key statistics for MD 5/MD 246 (Great Mills Road) Intersection

Daily Traffic Volume	Ave. Delay-AM Peak	LOS- AM Peak	Ave. Delay-PM Peak	LOS-PM Peak	Projected 2040 LOS
18,600 vehicles	44.3 seconds	D	37.9 seconds	D	D



Figure 6. - Southbound traffic on MD-246 queuing to approach Westbound MD 5

Peak hour observations at the MD 5/MD 246 intersection 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, particularly westbound through-traffic (Figure 6). 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 merges into one lane approaching the bridge.

Traffic volumes are projected to increase by 27 percent by 2040. This projection is based on the calibrated regional travel forecast model developed by MDOT SHA and the Metropolitan Washington Council of Governments (MWCOCG). The model accounts for projected development, employment, and population growth. If capacity is not improved in the study area, traffic operations



will worsen at the MD 471/Flat Iron Road intersection; overall delay will double in the AM peak hours and triple in the PM. The delay at this intersection will impact the MD 246/Great Mills Road intersection because these two intersections function as a system. The proposed intersection improvements will have significant impacts on the LOS of the network as well as the ability to access local and regional jobs and schools. Without the Project improvements, the MD 471 eastbound approach will fail during both AM and PM peaks; the westbound approach will fail during the PM peak. Traffic operations on the MD 246 approaches will maintain similar conditions. The intersection's northbound approach will degrade from LOS D to LOS E, and the southbound will worsen from LOS C to LOS D.

A major benefit from this Project is increasing throughput capacity on MD 5 between the two intersections, which **will significantly reduce travel time by an estimated 8.5 minutes and provide additional capacity for the traffic queues.** Since the two signals are so close to each other, currently the queues from one intersection spill back into the other. The coordinated investments presented in this Project will significantly reduce travel time and elevate the LOS in the Project Area to LOS C in the morning and evening at MD 471 and MD 246, meeting MDOT SHA's goals as stated in the Purpose and Need Statement. The bridge replacement and associated roadway widening will add capacity that will, in turn, reduce recurring congestion. The reduction in recurring congestion will also improve access for transit and school buses in and around the Project Area.

CHALLENGE 2: High Crash Rates

The constriction of daily commuter traffic down to two lanes on MD 5 and Great Mills Road leads to frequent crashes resulting from inattention, abrupt stops, and impatient driving. The overall crash rate in the Project Area is approximately 40 percent higher than the statewide average for similar roadways. Specifically, rear-end, left turn, and sideswipe collisions within the Project Area are significantly higher than the state rate. Table 4 presents key crash rate statistics within a half-mile of the Project segment around the intersections of MD 5 with MD 246 and MD 471.

Table 4. Crashes in the Project Area and Projected Reduction

Total Crashes (2009-2019)	Crashes Resulting in Injuries (2009-2019)	Injuries from Crashes (2009-2019)	Projected Crash Reduction with Project
187	68	93	10%

The roadway expansion and geometry changes on MD 5, in addition to the improved facilities for bicycles and pedestrians, is projected to result in a 21 percent reduction in rear end collisions and a 15 percent reduction in left turn crashes. **This results in an overall Project crash reduction of approximately 10 percent**, or 2.5 incidents per year.



Figure 7 - Flooding at St. Mary's River Bridge

CHALLENGE 3: Roadway Flooding

The majority of the Project Area is within the 100-year floodplain, according to current FEMA flood maps. Flood models developed by NOAA and the First Street Foundation show that the region is expected to experience an increased probability of significant flooding from 1 percent to 5 percent by 2040. ^{1,2} MDOT SHA records indicate that MD 5 and the approach roads are closed to traffic from one to three times a year due to significant roadway flooding. There are no alternative routes that do

¹ "Surging Seas Risk Finder - St. Mary's County, MD", Climate Central: https://riskfinder.climatecentral.org/county/st-marys-county.md.us?comparisonType=post-al-code&forecastType=NOAA2017_int_p50&level=4&unit=ft

² "FloodFactor - Great Mills Rd, MD", First Street Foundation: <https://floodfactor.com/property/20213-point-lookout-road-st.-mary's-county-maryland/242291098/fsid>



not add large travel distances and time: the fastest alternate route adds 14 miles and at least 20 minutes to reach the other side of the bridge on MD 5. The water levels on MD 5 can be in the range of two inches to sixteen inches during these events. The areas that have been closed due to flooding include MD 5 from MD 246 to the western edge of the Project Area, and north along MD 246 and MD 471 approximately one-third of a mile.

The Project will replace the St. Mary's River Bridge, a 108-year old bridge built in 1913 and widened in 1955, to accommodate a 5-year design storm without overtopping the bridge or touching the bridge superstructure.



Figure 8. Pedestrians on St. Mary's Bridge with-in Project Limits

CHALLENGE 4: Disconnected Sidewalks/Bicycle Lanes

This section of MD 5 through the residential and commercial district of Great Mills does not have continuous accommodations for pedestrians and cyclists. There are limited sidewalks and what exists is inconsistent and lacks the connectivity needed to support existing residential areas, businesses, and potential redevelopment. These incomplete pedestrian and bicycle connections exacerbate the community's lack of robust transportation options. Additionally, the St. Mary's River bridge has a raised sidewalk area on each side of the bridge, but neither direction provides adequate Americans with Disabilities Act (ADA) accommodation, which limits access to people with disabilities as well as caregivers with children. Further, disconnected and inadequate sidewalks disproportionately impact people with disabilities and those who cannot afford to own a vehicle, hindering their ability to access destinations in the Project Area.

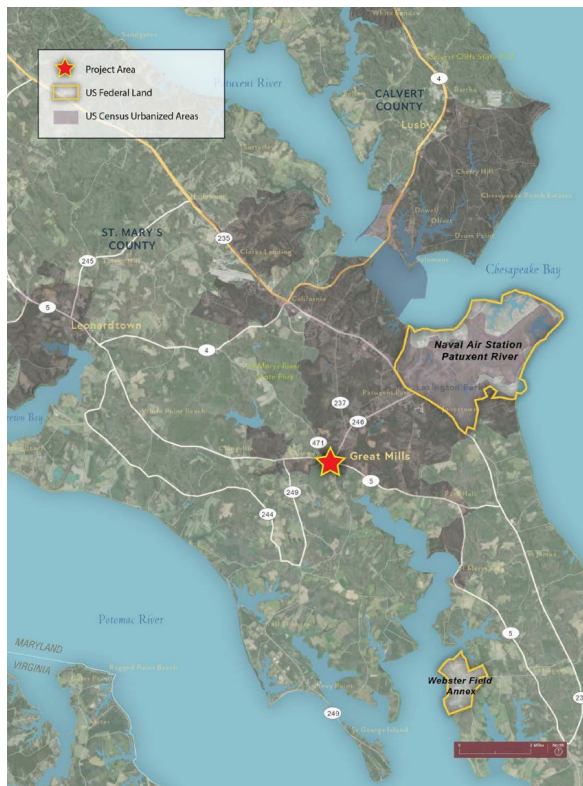


Figure 9. Military Installations Connecting to the Project

The St. Mary's Transit System (STS) operates along MD 5 and MD 246 (the Route 3-Great Mills Route), which has seen increasing ridership. However, accessing bus stops is challenging due to the incomplete sidewalk infrastructure discussed above, especially for anyone with mobility needs. There are no shuttle services currently planned or in operation for use by the employees of NAS PAX. The lack of pedestrian and bicycle facilities further constrains transportation choices and access to jobs, schools and essential needs. This is particularly burdensome to those who may not have access to a personal vehicle, are unable to drive, or who have mobility challenges.

The Project specifically invests in infrastructure to support pedestrian and bicyclist connectivity, access, and safety. RAISE funds will fund of new five-foot bicycle lanes and new five-foot wide sidewalks along both sides of MD 5. These pedestrian improvements will allow residents that rely on bus service easier and safer access to



the bus. Further, ADA ramp improvements and new pedestrian crossing signals and push buttons facilitate safe access for all users, including people with disabilities.

CHALLENGE 5: Increasing Rural Community Access to Employment Opportunities

This Project directly benefits the rural community in and around Great Mills. New commercial and residential developments planned near and within the Great Mills Project Area are expected to generate higher traffic volumes and congestion, especially during peak travel periods. High traffic volumes resulting from existing development already contribute to operational failure. The additional traffic generated by future development will worsen congestion along the corridor. The intersections of MD 5/MD 471 and MD 5/MD 246 are projected to experience failing Levels of Service (LOS) in the design year of 2040. These traffic conditions are frequently what those who choose to live in rural areas seek to avoid. While the growth offers opportunities for these residents, it also serves as a growing detriment to quality of life in this rural community.

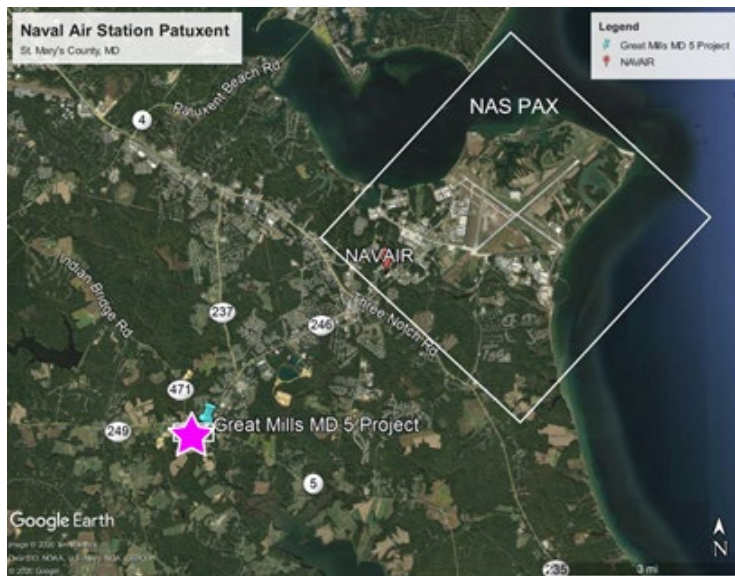


Figure 10. The Project in Relation to Naval Air Station Patuxent (NAS PAX)

The Project is an important link to nearby military facilities and will be even more important as the area's population continues to swell. The economic driver of St. Mary's County and lower Calvert County, Maryland is NAS PAX, which supports \$2.4 billion in wages on an annual basis and \$7.5 billion in output to the Maryland state economy.

The NAS PAX installation includes approximately 935 buildings and 5 runways. Since its commissioning on April 1, 1943, NAS PAX has evolved into the Center of Excellence for Naval Aviation. Approximately 80 percent of St. Mary's County's revenue is due to its direct and indirect

economic relationship to NAS PAX. The County's economic development plan, adopted in 2017, highlights the importance of NAS PAX to the County and showcases a commitment to preserving and protecting the mission of NAS PAX in the plan. Figure 10 shows the relationship between the Project Limits and the military installations; in short, access to NAS PAX is primarily via MD 235, MD5/MD 246, or MD 4/MD 235. Consequently, the Project Area contains crucial connections for rural workers, installation revenue, and product delivery. The impact of the military installations is discussed in greater detail in Section 2. Project Location.



2. Project Location



II. Project Location

The Project is entirely within St. Mary's County, Maryland, and part of the State's 5th Congressional District, within the Lexington Park-California-Chesapeake Ranch Estates Urbanized Area (UZA), which is considered rural for the purposes of the RAISE grant but not defined as an Area of Persisting Poverty. The Lexington Park-California-Chesapeake Ranch Estates UZA had a 2010 Decennial Census population of 58,875. Geospatial coordinates for the Project are 38.24 latitude, -76.50 longitude.

As Figure 11 shows, the Project will improve the following intersections along MD 5 (Point Lookout Road):

- MD 471 (Indian Bridge Road/Flat Iron Road)
- MD 246 (Great Mills Road)

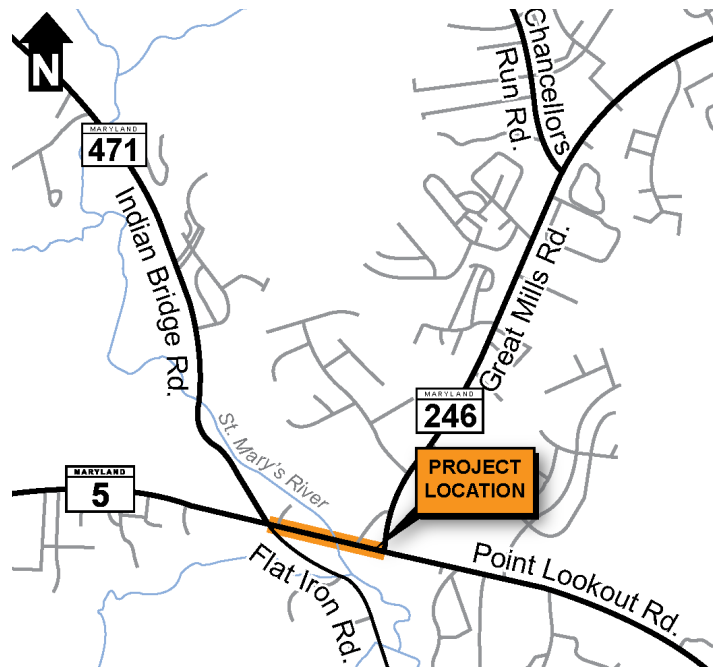


Figure 11. Roadways in the Project Location

The MD 5 Great Mills Improvement Project begins to the west on MD 5 at its intersection with Flat Iron Road and Indian Bridge Road and ends to the east at the intersection of MD 5 and Great Mills Road, approximately one-third of a mile in distance.

Today, the Great Mills Project Area comprises 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, MDOT SHA structure No. 1800500, which was originally built in 1913, and widened in 1955. The bridge has a width of approximately 48 feet and is currently in fair condition. The bridge replacement in this Project is driven by the roadway typical section needs, as well as the need to reduce flooding on this 108-year-old bridge.

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 Lee, and Callaway to reach northern and eastern destinations including Great Mills High School, Lexington Park, and NAS PAX.



The Great Mills Project has two routes that feed MD 5: MD 471 and MD 246. 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. MD 246 is a four-lane Urban Principal Arterial with a posted speed limit of 40 mph and leads to Lexington Park and the NAS PAX, which are major trip destinations in the area.

Currently, there are limited sidewalks provided for pedestrians in the Project 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, except for small sections of driveway entrances to some of the businesses.

Public transportation is operated by the St. Mary's County Department of Public Works and Transportation, the St. Mary's Transit System (STS). STS operates the Route 3 buses along MD 5 and MD 246 between Leonardtown and Lexington Park via Great Mills during the weekday peak periods. The public transportation routes are also served by ADA paratransit services. With Great Mills High School along MD 246 less than a mile from MD 5, multiple school buses use the MD 5/MD 246 intersection during the peak periods as well.

Military Installations In the Project Area

In 1943, NAS PAX opened in St. Mary's County, just northeast of the proposed improvements in the Project. While the County had historically been rooted in agriculture and seafood industries since its founding, the installation brought advanced science, research, development, and military personnel, and culture into the area.

In the 1990s, Base Realignment and Closure (BRAC) throughout the nation led to growth in and around this installation, and NAS PAX became home to the Naval Air Systems Command (NAVAIR) and the Naval Air Warfare Center Aircraft Division (NAWCAD), as well as 50 other tenants. NAVAIR is responsible for the research, design, and acquisition of naval aviation resources serving the Navy and Marine Corps. NAWCAD is the test, evaluation, development and research entity serving NAVAIR and is the installation's and St. Mary's County's largest employer. As the installation's importance and its workforce grew, private industries also expanded or located in the County service its activities. What had been a two-lane road down to NAS PAX from Charles County and the Washington, D.C., area, transformed into the eight-lane road MD 235 is today.

Webster Outlying Landing Field (WOLF) is an extension of NAS PAX. At WOLF, NAWCAD employees conduct all combat identification, including identification of friend or foe, C5I (Command, Control, Communication, Computers, Collaboration and Information) systems, and all Navy air traffic control operations. Subject matter experts in lead systems integration, these employees conduct critical rapid engineering projects for all branches of the Department of Defense and perform over \$1 billion worth of work every year. WOLF is also home to the Unmanned Aircraft Systems Test Directorate, which does research, development, testing, and evaluation for all the Navy and Marine Corps unmanned aircraft systems.

Table 5: NAS PAX Personnel Totals (1985-2019)

	1985	1995	2005	2011	2019
Contractor	4,004	5,400	9,400	10,053	9,503
Military	3,308	2,600	3,000	2,829	2,416
Civilian	3,893	4,300	7,800	9,541	9,623
Total	11,205	12,300	20,200	22,423	21,542



Today, over 21,000 people work at NAS PAX, approximately 1,500 people work at WOLF, and 300,000 people come into the region to visit the installation annually. Table 5 illustrates the growth of NAS PAX between 1985 and 2019. Eighty percent of St. Mary's County's economy is derived from the flow of dollars from NAS PAX into salaries of the civilian and industry workforce. The Great Mills Project improvements directly impact the commute times and safety for the workforce concentrated at NAS PAX and WOLF, thereby impacting the economic competitiveness of the County.



Figure 12. NAS PAX Queue at Gate 2

The Great Mills Project's proximity to the installation and its high-tech offerings make the Project especially important to the local workforce. NAS PAX supports full spectrum acquisition management, research and development capabilities, air and ground test evaluation, aircraft logistics, and maintenance management. This synergy of missions supports land-based and maritime aircraft engineering, testing and engineering (T&E), integration, and life-cycle support for ship/shore electronics. Combined, these capabilities are unique within the Department of Defense and ensure NAS PAX's status as an aviation leader. The facilities and infrastructure on the installation are also used by foreign governments, academic

institutions, and private industry for similar projects. **NAS PAX is the only installation on which these crucial activities occur.** As a result, the County is a hub for STEM and high technology jobs that rivals Silicon Valley in California and Seattle/Bellevue, Washington.

Much of the workforce lives north of the Project Area, meaning thousands of people are driving through the Project Area every morning and every afternoon. The time spent in traffic is consistently referenced as an impediment to an exceptional quality of life. As in any region, the ability to get people quickly – and safely – to and from their destinations is imperative.

The Great Mills Project feeds NAS PAX's Gate 2, which is located across MD 235 (Three Notch Road) from Great Mills Road. Over 10,000 vehicles a day pass through this gate alone. Much of the traffic volume travels through the Great Mills Project limits, causing failing levels of service and significant queues during both the morning and afternoon commute. Furthermore, most of the 1,500 employees at WOLF traverse Route MD 5 to St. Inigoes. A military construction (MILCON) project for upgrades to Gate 2 at NAS PAX has been a priority for several years. With these improvements, Gate 2 will become the Main Gate with 24-hour access and that increases the likelihood that traffic volumes will increase within the Great Mills Project limits. Figure 12 shows the queue at Gate 2 located at NAS PAX.

Consequently, the Project will accommodate the increased flow of traffic and reduce queuing onto the public roadways. The Project's ability to process greater traffic volumes will improve the relationship between NAS PAX and the community, as well as provide members of the public a less congested route to work and retail establishments outside the gates.



3. Grant Funds, Sources & Uses of All Project Funds



III. Grant Funds, Sources And Uses Of All Project Funding

Spending by Project component is shown in Table 6. A detailed cost estimate for each component is available in the appendices. These cost estimates are based on Preliminary Engineering and include reasonable contingency factors appropriate to the scope of each component.

This application from MDOT SHA and St. Mary's County requests \$13.4 million in RAISE funds for the Project with a total cost of \$22.3 million. Non-federal funds from the State account for 40 percent of project costs. RAISE funding accounts for the remaining 60 percent of the Great Mills Project. These cost estimates have been adjusted to reflect the 65 percent design milestone. Table 6 presents the funding sources and uses.

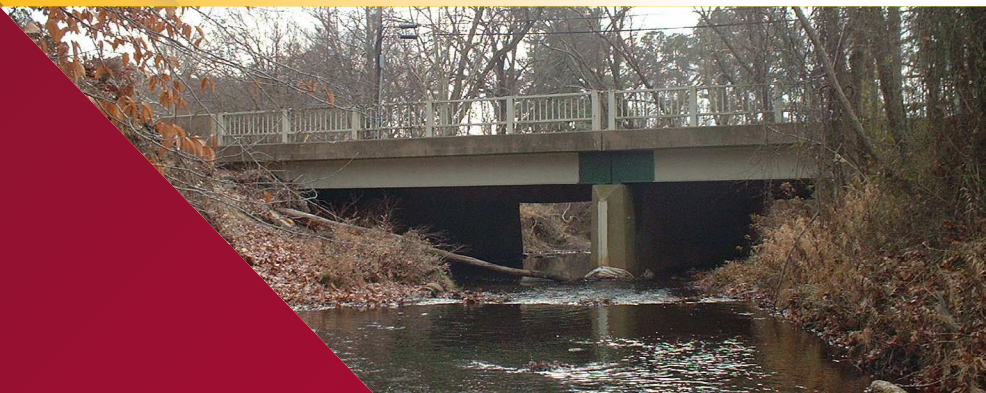
Table 6 - Project Budget Summary by Use and Source

Project Budget Summary by Use and Source	State Funded	Federally Funded (RAISE)	Total Cost
Design and Engineering		\$ 1,554,000	\$ 1,554,000
Right of Way Acquisition		\$ 4,356,153	\$ 4,356,153
Utilities	\$ 2,600,000	\$ 1,000,000	\$ 3,600,000
Construction Costs			
Bridge	\$ 1,286,304	\$ 1,924,046	\$ 3,210,350
Maintenance of traffic	\$ 680,000	\$ 1,320,000	\$ 2,000,000
Drainage	\$ 500,000	\$ 900,000	\$ 1,400,000
Landscape	\$ 626,806	\$ -	\$ 626,806
Traffic Design/Signage/Marking	\$ 400,000	\$ 300,000	\$ 700,000
Roadway	\$ 898,188	\$ 1,347,282	\$ 2,245,470
Overhead (15% of construction costs)	\$ 658,695	\$ 868,699	\$ 1,527,394
PROJECT TOTAL	\$ 8,925,063	\$ 13,385,090	\$ 22,310,153
Percent Federal/Non-Federal Match	40%	60%	

This Project supports American industry through the compliance of domestic preference laws. Iron and Steel materials purchased for the construction of this Project will comply with 23 CFR Part 635.



4. Selection Criteria



IV. Selection Criteria Safety

The Project will improve safety on MD 5 by reducing the number, rate, and severity of transportation-related crashes, and improve capacity of an evacuation route.

The Project Area is one of the most dangerous roadway segments in St. Mary's County. From 2009 to 2019, 187 crashes occurred within a half-mile of the Project segment around the intersections of MD 5 with MD 246 and MD 471, including 77 serious injuries. **The crash rate in the Project Area is 40 percent higher than the statewide average**

for similar roadways. The overall crash rate from 2017 to 2019 within the Project Area is 316.8 crashes per 100 million vehicle miles (mvm) traveled, compared to the statewide crash rate of 116.8 per 100 mvm traveled. Rear-end, sideswipe and left-turn collisions were the most frequent types of crashes. Table 7 shows the crash rate by type in the Great Mills Project Area compared to the State crash rate for similar routes. Figure 13 shows several concentrations of crashes in the Project Area.



Figure 13. Crashes on MD 5

Table 7: Crash Rate by Type, 2017 to 2019

Crash Type	Project Area Crash Rate	State Crash Rate
Rear-end	126.7	53.8
Sideswipe	25.3	10.5
Left-turn collision	25.3	13.0

Long traffic queues at intersections, poor visibility at the MD 5/ MD 471 intersection, and a high density of roadway access points to adjacent businesses contribute to the high crash rate within the Project Area. MD 5 includes single left-turn lanes at the four-way signalized intersection with MD 471, which present queue-jumping issues at the intersection.



The Project addresses the factors that contribute to the route's high crash rate and aligns with the 2021-2025 Maryland Strategic Highway Safety Plan which includes Maryland's Vision Zero signed October of 2019 that set a goal of zero motor vehicle related fatalities or serious injuries by 2030. The expansion of the roadway to include an additional outside travel lane in addition to the improved facilities for bicycles and pedestrians, are projected to reduce crashes by an average of about 10 percent, or approximately 2.5 incidents annually. **The prevention of these crash incidents is calculated to be \$1.4 million in discounted 2019 dollars.**



Figure 14. MD 5 between MD 471 and MD 246 lacks continuous sidewalks

Cyclist and Pedestrian Safety

As detailed in Project Need, the Project Area currently does not have continuous sidewalks; existing sidewalks are interrupted by many curb-cuts leading into business parking lots and residential driveways, creating opportunity for conflict between pedestrians and vehicles (Figure 14). The Project Area also does not currently have bicycle lanes, causing cyclists to ride in narrow shoulder space or within the roadway lanes. The current conditions present critical safety concerns for pedestrians and cyclist traveling on the roadway. Over the last 10 years the total number of crashes involving pedestrians and cyclists has doubled. This Project will result in a significant reduction in those type of crashes upon completion.

The Project will improve pedestrian safety by adding a five-foot wide continuous sidewalk along both sides of MD 5, building ADA ramps at all pedestrian crossings, and installing pedestrian crossing signals with countdown timers at all crosswalks. The Project will improve cyclist safety by adding five-foot wide bicycle lanes in both directions. These improvements will eliminate gaps in pedestrian and cycling infrastructure and ensure that neither pedestrians nor cyclists need to travel in vehicular travel lanes with high-volume traffic.

Emergency Evacuation

MD 5 is one of only two evacuation routes off the St. Mary's County peninsula and the only evacuation route that leads away from the National Capital Region (NCR). MD 5 would facilitate an evacuation across the Potomac River via the Harry W. Nice Memorial/Thomas "Mac" Middleton Bridge (Nice Bridge) into Virginia. In a national emergency scenario, the Project Area in Great Mills would be a critical bottleneck for the estimated 21,000 people who would need access to the MD 5 evacuation route. Expanding the capacity of this road would reduce evacuation time and allow travelers to more quickly travel to safety.



Environmental Sustainability

The Project Area is located within the St. Mary's River and Johns Creek 100-year floodplain, which experiences flooding multiple times a year (Figure 15). MD 5 is consistently impacted during flood events, seeing up to 16 inches of water on the roadway during major storms. The St. Mary's Bridge is particularly vulnerable to high rainfall events. The bridge approaches in each direction currently flood one to three times per year, requiring MDOT SHA to close the bridge to traffic, which leads to increased travel time, congestion and idling. By 2040, the annual probability of significant flooding is anticipated to increase from 1 percent to 5 percent, which will significantly increase the average number of road closures due to flooding in the Project area. A preliminary hydraulic analysis indicated that a five-year storm event would bring the water level of the St. Mary's River over the height of the bridge deck and a two-year storm would elevate water levels to the substructure of the bridge. The impacts of flooding on the bridge and MD 5 roadway disrupts traffic flow, creates unsafe conditions for commuters and creates water quality concerns associated with stormwater runoff.

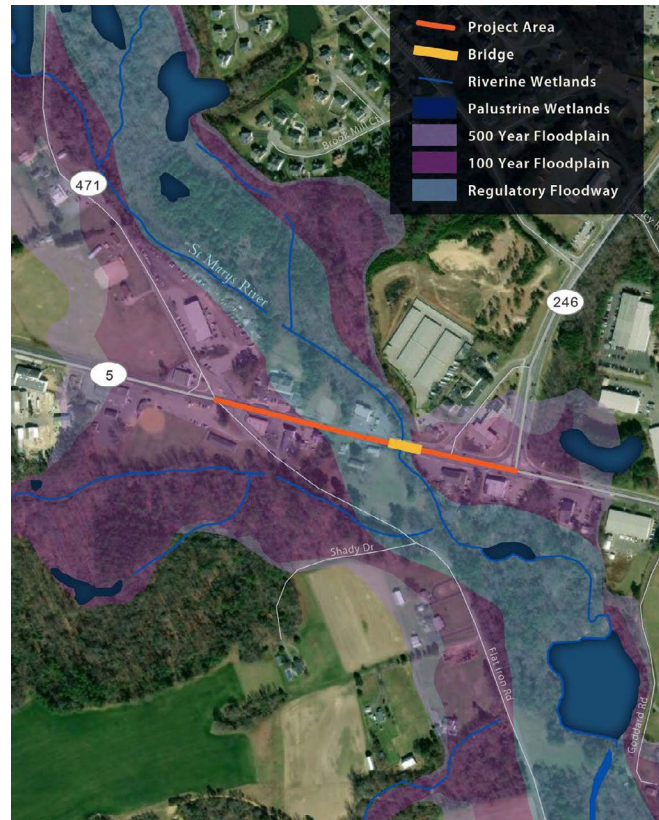


Figure 15. Watersheds within Projects Limits

The areas that are most acutely affected by flooding and that experience yearly flood-related closures include:

- St. Mary's River Bridge
- Bridge approaches
- MD 5 from MD 246 to the western edge of the Project area
- A 1/3-mile stretch north along MD 246 and MD 471

The Project addresses these flooding concerns and improves stormwater management on MD 5 within the Project limits and at the St. Mary's River Bridge to reduce flooding in the roadway. The Project scope includes drainage improvements, installation of new stormwater management facilities, and landscaping to retain rainwater runoff from MD 5. The Project's bridge improvements would redesign the bridge approaches to manage stormwater runoff and mitigate flooding.

Related Improvements that Enhance Environmental Sustainability

METCOM underwent a project to relocate, replace and upgrade an existing wastewater pump station, which is within the footprint of the proposed bridge. The new facility was relocated out of the St. Mary's River floodway, thus reducing the risk of sewage entering the waterway, and out of possible future MDOT SHA construction. The Project was completed in the June of 2020.

Other Project Benefits for the Environment

The St. Mary's River embankments adjacent to the project site experience considerable erosion, diminishing water quality by introducing sediment and pollutants to the waterway. The Project will include the construction of stream riffles upstream of the bridge to minimize erosion caused by high stream velocities.



Improvements to stormwater management infrastructure on MD 5 will also reduce the amount of runoff into wetlands adjacent to the Project site. National Wetland Inventory (NWI) and DNR mapping identifies wetlands located along MD 5, east of MD 246, and north and south of MD 471, within the vicinity of MD 471. The Project will create a closed-section roadway in which curbs and gutters are installed to contain and control the flow of stormwater to a suitable outfall, limiting the amount of stormwater entering wetlands and waterways from the road.

The St. Mary's River embankments adjacent to the MD 5 crossing have experienced considerable erosion. In particular, the banks on the left upstream side of the crossing have eroded back to the point of being 15-foot near-vertical banks with minimal vegetation stabilizing the bank. Additionally, the bridge abutments are set perpendicular to MD 5 traffic flow (Figure 16), resulting in approximately 58 degrees of skew to the river's flow direction. This skew has resulted in increased scour along the left cell of the bridge and increased deposition in the right cell. Continued erosion of the banks and scour at the crossing results in excessive sediment entering the St. Mary's River. Sediment is one of the three watershed limits established by the U.S. Environmental Protection Agency under the Chesapeake Bay's Total Maximum Daily Load (TMDL), a "pollution diet" for the Bay and its feeder rivers, streams, and creeks that is required under the Clean Water Act. Excessive sediment has the potential to smother sea grasses and bottom dwellers that are vital to the health of the tidal estuaries and the Bay's ecosystem. Additionally, further erosion and scour can result in potential failure of the bridge abutments, potentially leading to significant traffic impacts along an already strained corridor.

The Project proposes to skew the bridge abutments, so they are no longer perpendicular to MD 5 traffic and perform minor realignment of the stream channel near the crossing to improve the hydraulic conveyance of the crossing. This realignment will reduce shear stresses at the crossing, minimizing the potential for future erosion of the stream banks, directly improving downstream water quality, and preventing any potential failure of the crossing as a result of the erosion. Additionally, the reduced shear stresses will also improve conditions for vegetative establishment along the riverbanks and floodplain helping stabilize the banks against continued erosion. Furthermore, the Project proposes to stabilize stream riffles upstream of the bridge to help minimize the potential for further erosion as a result of high stream velocities.

Reducing Congestion-Related Emissions and Dependence on Oil

The widening of MD 5 to an undivided four-lane closed section roadway will alleviate congestion and reduce congestion-related emissions associated with idling traffic. As residential and commercial developments continue to grow near the Project Area, the Project improvements will increase roadway and intersection capacity for growing traffic volume and reduce congestion, especially during peak travel periods.

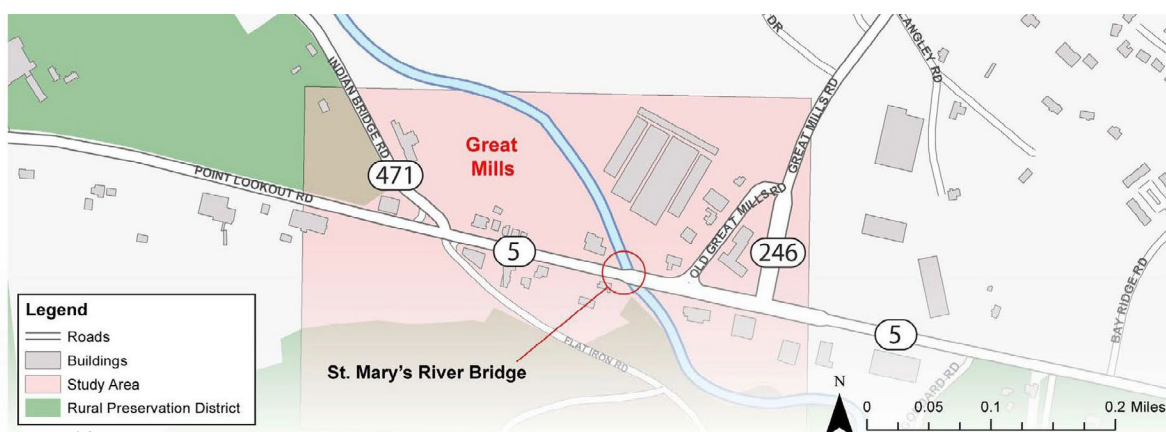


Figure 16. Location map for the St. Mary's River Bridge



The Project introduces pedestrian and cycling infrastructure to MD 5 within the Project limits, offering non-motorized transportation alternatives to reduce dependence on vehicular travel and to better and more equitably enable the community to access jobs, schools and essential services. Filling gaps in pedestrian and cycling infrastructure connectivity on MD 5 will provide residents of nearby residential areas the opportunity to travel by foot or bicycle to commercial centers and community services. These multimodal transportation options will provide additional opportunities for alternative travel that will reduce environmental impacts.

This Project also aligns with the Federal Highway Administration's (FHWA) and MDOT's alternative fuel corridors initiative. The purpose of these corridors is to support the deployment of low and zero emissions vehicles and reduce transportation related emissions. MD 5 is currently designated as "Corridor-Ready." MD 5 is an Electric Vehicle (EV) Ready Corridor because it meets the threshold of required EV charging facilities in the corridor. Within six miles of the Project Area, there are currently four EV charging stations – two on NAS PAX, one in Lexington Park, and one at St. Mary's College. Currently, there are over 32,180 plug-in electric and plug-in hybrid EVs registered in Maryland and over 2,615 publicly available charging outlets and 995 stations in Maryland. The EV Corridor Ready designation assists Maryland as the State continues working towards establishing a reliable and accessible EV charging network to minimize our climate and air quality impacts and provide opportunities for enhanced transportation options.

Climate Change and Resiliency

This Project supports St. Mary's County's efforts to comply with Maryland's Greenhouse Gas Emissions Reduction Act Plan ([GGRA](#)) by reducing congestion which will in turn could also decrease the number of vehicles idling along the corridor. This plan is a commitment to protect Maryland's citizens, the environment, and the State's economic from the effects of climate change. It will enable the State to reach its ambitious goals by 2030. In addition to the reduction in congestion, the Project will be used as an opportunity to incorporate the use of climate friendly design practices and materials. These material substitutions will include using Warm Mix Asphalt instead of Hot Mix Asphalt and the use of Reclaimed/Recycled Concrete instead of GAB as a subbase material.

Quality of Life

Expanding Access for Communities in St. Mary's County

While the Great Mills Project provides critical connections between military installations and growing businesses in the area, the corridor also connects important community landmarks, ranging from housing to public services to recreation areas. Safe and uncongested travel through the Project area is critical for equitable access to jobs, schools and essential services, like groceries and medical services. This was, and will continue to be, critically important during times of a national health crisis. Vulnerable populations, such as the economically disadvantaged, older adults, and people with disabilities or mobility challenges need to have opportunities to access these critical amenities. According to the C-SMMPO March 2020 Long Range Transportation Plan, "Moving Forward 2045," the Lexington Park-California-Chesapeake Ranch UZA has a poverty rate of 8.6%. Additionally, the UZA community has a much larger percentage of households who are technically above the poverty rate (\$24,600 for a family of four), but below Maryland's median household income of \$78,916; more single head-of-household families; and a higher percentage of renters.

Residential dwellings are mostly located along MD 5, west of the St. Mary's River crossing. The Project will improve access to institutional and public land uses in the Project Area, including the Great Mills Post Office, Great Mills High School, Chesapeake Public Charter School, Fairlead Academy, and the Little Flower School. The Project will also enhance access to recreational



facilities in the Project Area, such as Great Mills Canoe and Kayak Launch, James W. Henderson Park, Great Mills Swimming Pool, and St. Mary's River State Park.

The COVID-19 pandemic has severely affected all areas of transit and reduced travel demand across the nation. While the full breadth of the COVID-19 pandemic's effects has yet to be fully realized, including impacts to state and local revenue and funding sources, MDOT SHA remains committed to advancing this Project as a key element of its overarching commitment towards reducing the agency's impacts on the environment and providing additional service and amenity improvements to rural areas.

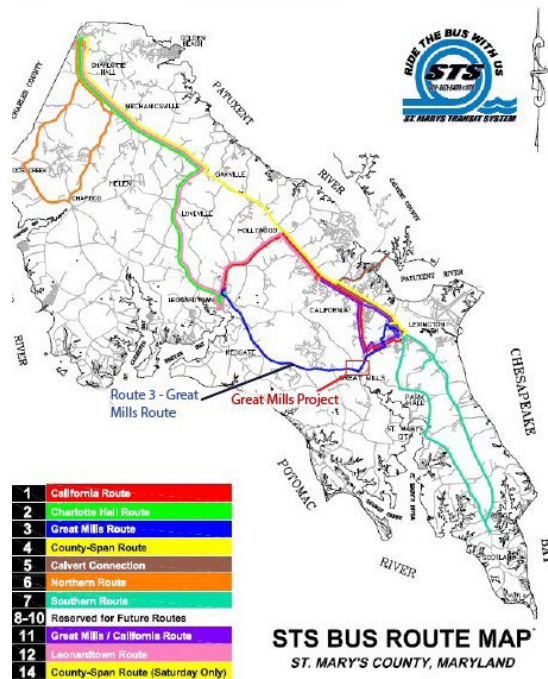


Figure 17. St. Mary's County Transit bus route map

A small, fixed route and demand-response bus transit agency with a total of 19 vehicles and 380,000 unlinked passenger trips per year (Figure 17). STS operates its Great Mills Route (Route 3) bus service Monday through Friday along MD 5 from 6:00 a.m. to 7:00 p.m. Two bus stops are located within the Project Area at the MD 5/MD 246 intersection on the east and west side of MD 5, respectively, at the Sheetz Gas and Convenience Store. Notably, while this route is the only bus line that travels through the Project area, passengers can transfer from this route to seven of the other nine routes, making it a critical connection for destinations throughout the County. Further, while bus ridership on the other STS routes has declined, matching national trends, ridership on Route 3 has been increasing. Additionally, ADA and Statewide Special Transportation Assistance Program (SSTAP) paratransit service will continue to provide medical trips such as dialysis, chemotherapy, hospitals, clinics, mental health facilities, as well as trips to pharmacies and grocery stores.

A fully developed, multi-modal transportation system has the potential to induce growth, helping implement St. Mary's County's land use plans in the Project Area and beyond. It will shape development in the Lexington Park Development District and determine the area's character and quality of life. The result will be a coordinated, integrated, and safe transportation system which supports community revitalization, economic development, and environmental stewardship.

The Project Area is also within the Lexington Park Development District. The 2010 St. Mary's County Comprehensive Plan envisions the Lexington Park Development District as the principal growth area for the County. The County updated the Lexington Park Development District Master Plan in 2015 to shape and direct growth in the next 30 years.

Increasing Transportation Choices for Individuals

The County has been steadily building and expanding road, pedestrian, and bicycle networks to meet the demand of the population. The Project will add bike lanes to improve the National Park Service-designated Southern Maryland Potomac Heritage Trail on-road bicycling route that runs on MD 5 from the county seat of Leonardtown south to Point Lookout. The addition of bicycle lanes at this congested and hazardous section of the corridor will improve safety for bicyclists and motorists. The addition of continuous sidewalks on both sides of MD 5 will provide pedestrian connections for residents between local businesses and transit stops. ADA-compliant sidewalks will improve access for people who use mobility devices such as wheelchairs or who travel with young children in strollers.

In addition to sidewalks, the Project will improve the safety and convenience of using public transportation. St. Mary's Transit System (STS) is a



The Lexington Park Development District Master Plan focuses on the development district becoming the County's mixed-use center. NAS PAX is the anchor on the MD 235 side of the district and MD 5 is at the other end. The improvement in the Great Mills Project is essential for allowing connectivity for all types of transportation: transit, bicycle, pedestrian, car, and carpool.

The Plan has designated that most of the MD 5 Great Mills Project Area is within the Great Mills Road Corridor (MD 246) focus area. The District Master Plan identifies the corridor as one of the focus areas having significant existing development that would benefit from infill development, redevelopment, design, and infrastructure enhancements.

Creating Job Opportunities for Disadvantaged Businesses

MDOT encourages the growth of disadvantaged and/or minority owned and operated businesses that seek to avail themselves of business opportunities in Maryland. In developing goals for disadvantaged business enterprise (DBE) participation, MDOT consults with minority, women's, and general contractor groups, community organizations, and other organizations concerning the availability of disadvantaged businesses. For fiscal years 2019-2021, the MDOT SHA overall DBE goal was 26.04 percent. However, each project's DBE goal is set on an individual basis. The MDOT SHA Procurement Review Group (PRG) will review the proposed procurement solicitation for the MD 5 Great Mills construction project and will establish an appropriate recommendation for a DBE Goal for the Project before the Project solicitation is published.

Economic Competitiveness

Rapid Growth in Population and Tech Industry



Figure 18. Major employers in St. Mary's County

St. Mary's County is home to NAS PAX, WOLF, over 200 high-tech firms, Maryland's first Federal Aviation Administration (FAA) unmanned aircraft system test site, and a workforce that has grown by 19 percent over the past decade. In a study conducted by 24/7 Wall St. that reviewed U.S. cities' labor forces to determine the cities with the most high-tech jobs, California-Lexington Park, MD was found to be the city with the highest share of tech-jobs in the County with nearly a quarter (24.8 percent) of the area's entire workforce employed in a STEM field (Figure 18).

The County's rapid growth in the technology industry has also contributed to its large population influx. Since 2010, St. Mary's County has experienced population growth at a rate of 7.15 percent – fifth highest in the State of Maryland and well above the U.S. national average of 5.96 percent. In addition, by 2040, the Maryland Department of Planning has predicted that St. Mary's County will see an increase in population by nearly 40 percent (Figure 19), the largest increase of any county within the State.

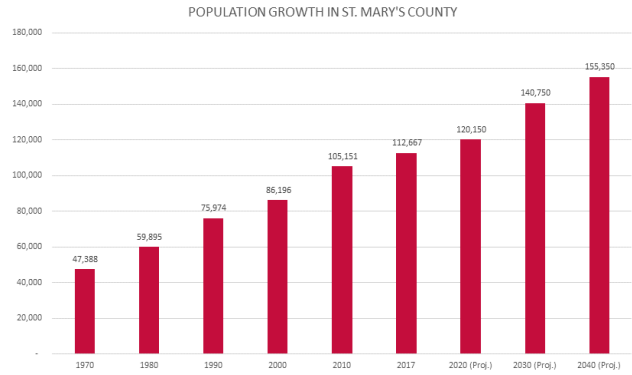


Figure 19. Historic and projected population growth in St. Mary's County

was selected to host the headquarters of the Naval Air Systems Command (NAVAIR) and Naval Air Warfare Center Aircraft Division (NAWCAD). This had a profound effect on the California-Lexington Park metropolitan area, which today has the second-highest employment cluster strength (0.80) in the State of Maryland, just behind Montgomery County. Currently, the three military installations employ approximately 21,500 people, including civilian employees, contractors, and active-duty personnel. Restaurants and retail services have also boomed in the area to accompany this growth.

The improvements to MD 5 will also greatly benefit residents of Great Mills, Lexington Park, and Piney Point by providing access to training programs such as the Harry Lundeberg School of Seamanship in Piney Point, which trains licensed merchant mariners. Another training program these improvements will provide additional access to is the College of Southern Maryland (CSM) Leonardtown Campus, with its CSM Flight Academy, a partnership with the Naval Aviation Warfare Center to develop aviation workforce leadership.

Access to these employment and educational centers is critical to job retention and growth. Figure 19 shows the number of residents commuting into St. Mary's County, out of St. Mary's County and within the county (2017 Longitudinal Employer Household Dynamics (LEHD) Survey commuting data). In a study that looked at the impact of commuting, survey results showed that over a quarter (26 percent) of the survey respondents had gotten to the point of looking for another job due to their commute. In addition, a recent study in Maryland reveals that traffic congestion is a top priority for the workforce in greater Washington, D.C. region; potential employees and employers look to St. Mary's County, and the Project Area as a "best of both worlds" alternative to locating in the greater Washington, D.C., region, with lower housing costs, a less stressful lifestyle, and shorter commutes. Due to a lack of modal options on St. Mary's roadways, the MD 5 Great Mills Improvement Project will ensure prospective employers and employees can achieve the quality of life, high tech job opportunities, and ease of access to life's opportunities that they have come to expect in the Project Area.

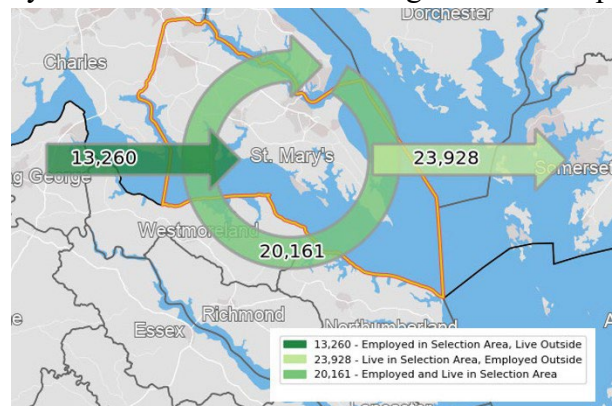


Figure 20. Longitudinal Employer Household Dynamics (LEHD) Survey Commuting Data, 2017

Currently, nearly 20 percent of the St. Mary's population lives within 2 miles of the proposed Project site. These numbers will continue to rise: Estimates suggest that over 6,000 new jobs will



enter Southern Maryland (St. Mary's, Charles and Calvert Counties) by 2024. This will make it difficult for residents to access essential destinations such as jobs, schools, and activity centers along MD 5. Based on 2015 inflow/outflow job count data, the California-Lexington Park metropolitan area currently sees an influx of 13,060 employees that live outside the area, an outflow of 23,864 employees that live within the area, and a constant workforce of 20,387 that lives and works in the California-Lexington Park metropolitan area. Figure 20 presents commuting data for the County.

Economic Development Investments Impacted by the Project

Given NAS PAX's role in the economy of the region, the County is working to integrate with the installation's high technology specialization. The County, as a result, has made economic development investments in light manufacturing. The production facility is for the manufacturing of finished products or parts, primarily from previously prepared materials with a focus on unmanned aerial vehicles and aircraft prototypes, training systems, and aircraft modifications kits and parts.

Additionally, engineering, design development and integration of communication and intelligence systems at WOLF is expected to increase. There are no more available facilities or space on the installation to support its expansion. At the same time, other private contractors are looking for space along the Great Mills Corridor for their expansion in light manufacturing. The County views the Great Mills Corridor as ideally situated to meet the demand for light manufacturing and the Project will assist in this expansion. Addressing the existing housing shortage is critical to the County's ability to connect residents to employment opportunities. With a limited housing stock, homeownership is less affordable and therefore unattainable to many without higher incomes. In fact, housing prices have increased as the demand for housing has increased from 2019 to 2021.

There are also two new housing developments that are close to the Great Mills Project. The approval and planning process for 60 townhouses, known as Bay Ridge Estates, is underway at 45671 Pleasant Mill Drive, Great Mills. The Planned Unit Development (PUD) at the north end of MD 471, Wildewood, covers approximately 400 acres and is envisioned to contain 40 acres of commercial development and 1,600 housing units. Both developments require access to the Great Mills corridor and the intersection within the project limits will be a critical throughput.

The Project also facilitates development at the County's airport, located 9 miles north of the Project area in California, MD. Several key economic initiatives are underway at the St. Mary's County Airport, including construction of new airport West Apron and new airport electrical vault; relocation of Airport Road in preparation for taxiway relocation; continued construction of airport office buildings; creation of an Innovation District Master Plan; and Transformation of the Southern Maryland Higher Education Center to the University of Maryland at Southern Maryland. The airport is an economic engine and center of academic excellence in the County, as well as a source of recreation for the general aviation community.

State of Good Repair



Figure 21. High water levels at bridge after storm

Current Condition

Bridge No. 1800500 is rated in fair condition based on National Bridge Inventory (NBI) ratings of 6-deck, 5-superstructure, and 5-substructure. The majority of the National Bridge Elements (NBE) that quantify the overall condition of the individual components of the bridge are in Condition States 1 and 2. Overall, the bridge is currently considered to be in a state of good repair (SGR). MDOT SHA Office of Structures defines a structure as being in an SGR when its overall structural



condition does not have any impact to its functionality or long-term service life. Structures in an SGR have no load restrictions resulting from a deteriorated structural component; mobility is not affected as vehicles, bicyclists, and pedestrians can safely travel across a structure without restriction.

Life-Cycle Costs

A structure in an SGR can have localized defects and deficiencies, but these types of deficiencies and defects can be addressed by routine maintenance, minor rehabilitation, and preservation activities. Based on the available pavement performance data, the existing pavement on MD 5 is in fair functional condition and good structural condition. Current minor rehabilitation work includes a \$75,000 project to perform steel repairs and install additional grout bags for scour protection. Another minor rehabilitation effort includes bridge painting; the bridge was last painted in 2012. The life span of a typical paint coating system is 20 years so in the next 10 to 15 years the bridge will need to be painted again at a cost of approximately \$500,000 in 2020 dollars. The bridge deck is currently in satisfactory condition, but over the next 10 to 20 years, deck patching and a new overlay will likely be required to extend the service life of the deck. For a structure of this size, this work is estimated to cost approximately \$200,000. To maintain the bridge in a state of good repair, approximately \$1 million will need to be invested over next 10 to 20 years in preservation and minor rehabilitation work.

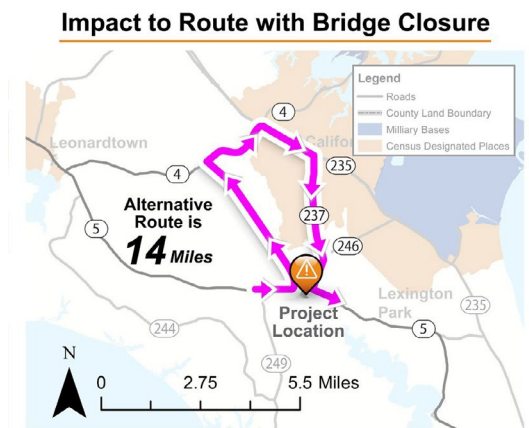


Figure 22. Fourteen-mile detour route with bridge closure

Bridge Replacement

Currently, the bridge (Figure 22) does not convey the two-year flood level without overtopping. With the existing conditions, the probable frequency of road closure at the bridge due to flooding is more than 50 percent in a given year. For the proposed replacement bridge, this probability is reduced to between 20 and less-than-50 percent in any given year. When the bridge is closed due to flooding, motorists must take a much longer route to get around the bridge closure, adding 14 miles to the total distance traveled which is at least 20 additional travel minutes.

The Project will replace this bridge to address these flooding issues that render it impassible in heavy rainfall events. Replacing the bridge will reduce the need to perform minor rehabilitation to maintain the bridge in an overall SGR. While minor rehabilitation work will continue to be performed as needed in an attempt to maintain the current bridge, these efforts will not sufficiently address flooding and its associated challenges and therefore the bridge replacement is needed.

Partnership

MDOT SHA has several strong partnerships in this Project. Local, state, regional, and federal government partners are supporting the Project through planning and permitting coordination. Elected officials also provide full support for the Project, bolstered by their constituents' support. Letters of support from these partners are included in the appendices.

- **St. Mary's County** lists the Project as its top transportation priority in its Priority Funding Letter to the Department of Transportation.
- **St. Mary's Metropolitan Commission (METCOM)** has relocated a wastewater pump station currently located in the Project Area to facilitate the St. Mary's River Bridge replacement.
- **Calvert-St. Mary's Metropolitan Planning Organization (C-SMMPO)** highlights the Great Mills Project in the C-SMMPO Long-Range Plan and continues to support this Project.



- **Maryland Department of the Environment (MDE)** will issue the State's wetland/waterway/floodplain authorization in close coordination with the federal government (specifically, the U.S. Army Corps of Engineers) to ensure regulated nontidal wetlands, nontidal wetland buffers and waterways, including the 100-year floodplain, located in the Project Area are protected from loss and degradation.
- **U.S. Army Corps of Engineers (USACE)** will authorize the proposed work occurring in waters of the United States, including wetlands, to ensure the Project does not cause more than minimal adverse environmental effects, individually and cumulatively, under Section 404 of the Clean Water Act and/or Section 10 under the Rivers and Harbors Act. Federal authorization of the Project will be closely coordinated with MDE, as well as additional federal and state agencies, including the U.S. Fish and Wildlife Service (USFWS) and Maryland Department of Natural Resources (MD DNR).
- **Maryland Department of Natural Resources (MD DNR)** will serve as a commenting resource agency throughout the state and federal wetland and waterway permit reviews. MD DNR will provide information on important fisheries resources and state and federally listed rare, threatened and endangered plant or animal species. They will recommend instream work restrictions, stringent erosion and sediment controls methods and other Best Management Practices (BMPs) to protect the Project Area's aquatic resources.
- **U.S. Fish and Wildlife Service (USFWS)** will serve as a commenting resource agency during the federal wetland and waterway permit review to ensure compliance with Section 7 of the Endangered Species Act. USFWS will provide information on the presence of species which are federally listed or proposed for listing as endangered or threatened within the vicinity of the Project Area.

Innovation

Advanced Utility Relocation

MDOT SHA and the design team have been working closely with utility owners within the Project limits. The coordination started early in the design phase to clarify relocation requirements, right-of-way needs, design/construction time frame and potential procurement issues for each impacted utility. This partnering allows MDOT SHA to secure the ROW and easement needed for relocated utility lines and structures, and also to come up with a realistic project schedule that accounts for all the utility efforts to happen before roadway improvement and stream stabilization can occur. Innovative methods were also discussed and incorporated to expedite design, permitting and construction of the Project. These methods include, but are not limited to, coordinating between MDOT SHA Office of Structures and Verizon to attach communication conduits to the proposed bridge structure, incorporating METCOM sewer relocation at the beginning of the Project to better coordinate design and avoid potential conflicts, submitting integrated permit application to MDE for Waters of the United States (WUS) disturbance to reduce permit time needed for individual utility owners, and installing pole-mounted switches to minimize service interruptions during construction.

EV Corridor Ready Designation

As previously detailed, MD 5 is designated as "EV Corridor-Ready," and the Project will help advance this important initiative to reduce dependence on oil and greenhouse gas emissions.

Maryland's Unmanned and Autonomous Systems

With Maryland serving as one of the leaders in the growing unmanned and Autonomous vehicle community a unique opportunity presents itself for innovation within St. Mary's County as well as the State overall. According to May 2019 U.S. Bureau of Labor Statistics, California-Lexington Park, MD has the highest concentration of aerospace engineers. These efforts continue to support the innovation goals of St. Mary's County, supports local innovation and technology companies located within the county, and expands upon important partnerships such as those with the nearby military installations.



5. Environmental Risk Review



V. Environmental Risk Review

Project Schedule And Milestones

This Project is ready to advance, with Preliminary Engineering and right-of-way acquisition funded in the FY 2021-FY 2024 C-SMMPO [TIP](#). If a RAISE grant is awarded, the construction funding will be amended into the C-SMMPO TIP.

The MDOT SHA will have all necessary pre-construction activities completed by June 2024. All necessary activities will be complete to allow RAISE grant funds to be obligated sufficiently in advance of the statutory deadline of September 30, 2024, and any unexpected delays will not put the funds at risk of expiring before they are obligated. Further, all real property and right-of-way acquisition necessary for project improvements and utility relocations will be completed by December 2022 in accordance with 49 CFR part 24, 23 CFR part 710, and other applicable legal requirements. Finally, the Project can begin construction quickly upon obligation of grant funds and funds will be spent expeditiously once construction starts, with all funds expended by September 30, 2027. The Project schedule is presented below.

The Project will be advertised, and construction services procured under a traditional design-bid-build process. This will allow the Project to be constructed for the lowest possible cost. The MD 5 Great Mills Project received Categorical Exclusion approval in December 2020, the milestone dates for the Project schedule are presented in the table below:

Table 8: Project Timeline

Project Activity	Timeline
<i>Right of Way Acquisition</i>	December 2022
<i>Design Completion, Plans, Specifications & Estimates (PS&E)</i>	June 2024
<i>Advertisement</i>	September 2024
<i>Bid Opening</i>	October 2024
<i>Notice to Proceed</i>	January 2025
<i>Substantial Completion</i>	January 2027

Approvals and Permits

State and Local Planning Approvals

The Project has garnered broad public support from the community and businesses alike. It has been programmed into the C-SMMPO long-range plan in five funding phases. Currently funded phases (Preliminary Engineering (PE) and Right-of-Way (ROW)) are in the FY 2021 – FY 2024 C-SMMPO Transportation Improvement Program (TIP). If a RAISE grant is awarded, the construction funding will be amended into the C-SMMPO TIP.



Required Approvals and Permits/NEPA Status

MDOT 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 MDOT 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.

A Public Notice published in August 2015 announced the initiation the MD 5 Great Mills Improvement Project. The Project moved into the NEPA/planning phase and project planning activities commenced. A Purpose and Need Study was finished in March 2016.

A community survey was mailed out in the Summer of 2015 to citizens within the Project study area. MDOT SHA received over 300 responses. Traffic congestion was cited as the greatest need (53 percent of respondents identified it as one of multiple issues) with the addition of travel lanes being a preferred improvement (65 percent of respondents identified it as one of multiple improvement types). An alternatives Public Workshop for the Project was held on March 15, 2016, with approximately 50 attendees. The purpose of the Workshop was to familiarize the public with the Project, review the planning process and solicit comments on the proposed alternatives. In 2016, the Project coordinated with the Smart Growth Working Group. The Project was found to comply with the Priority Funding Areas law and no additional coordination was required.

In 2017, MDOT SHA coordinated with Maryland Historical Trust to determine a finding of “No Adverse Effect” made on nearby architectural resources (Cecil’s Mill Historic District, Holy Face Catholic Church and Little Flower School). FHWA concurred with de minimis finding for minor impacts to church property in August 2017. In 2018, a Phase 1 archeological survey was completed. No sites were identified. Phase II would be required if the Project expanded into Cecil’s Mill Historic District.

MDOT SHA received approval for a Categorical Exclusion in December 2020 ([linked here](#)) for minor impacts to park and recreational resources. The Project has now reached the end of the Preliminary Engineering phase with 65 percent design being completed.

Financial and Technical Capacity

MDOT is responsible for building, operating, and maintaining a safe and seamless transportation network that links Maryland with the rest of the country and the world. MDOT directs and oversees the planning, construction, and operation of Maryland’s highways, transit, maritime, rail, and aviation facilities, as well as the Maryland Motor Vehicle Administration. The Transportation Business Units (TBUs) are funded by a common funding source: Maryland’s Transportation Trust Fund.

The Transportation Trust Fund is separate from the State’s general funds and its revenues are dedicated to improving and operating Maryland’s transportation network. The five TBUs and the Maryland Transportation Authority all work together to assist each other in the development of a seamless transportation system designed to fuel Maryland’s economy and enhance its citizens’ quality of life.

The Maryland Department of Transportation has developed a \$15.177 billion 6-year program. The MDOT FY 2021 to FY 2026 6-year CTP dedicates over \$7.204 billion to MDOT SHA’s capital program, with approximately \$5.035 billion committed to safety, congestion relief, and community enhancements. Despite this significant investment, the transportation needs around the



State continue to outpace available resources. The RAISE funding request would allow MDOT SHA to accelerate this Project and continue momentum from planning to design and construction.

Risk and Mitigation Strategies

The following table presents the primary risks for the MD 5 Great Mills Improvement Project, the potential impacts these risks may present, and mitigation strategies for each.

Table 9: Project Mitigation Strategies

RISK	IMPACT	MITIGATION STRATEGY
A Joint Permit Application will be required from MDE and USACE due to bridge replacement associated impacts to St. Mary's River.	<ul style="list-style-type: none">• Application will require agency review and 30-day state public notice; additional time may be needed to address comments on stream stabilization work associated with the new bridge.• Wetland mitigation will be required.	<ul style="list-style-type: none">• Project schedule accounts for review time.• Advanced mitigation credit is available at an existing mitigation site in the watershed.
Proposed project occurs in a FEMA floodplain designated as Zone AE, with floodway. A CLOMR may be required if the proposed bridge would result in an increased Base Flood Elevation (BFE) of more than zero foot.	<ul style="list-style-type: none">• Project schedule could be impacted since coordination with FEMA to obtain CLOMR takes about a year.	<ul style="list-style-type: none">• Modeling shows that the Project will improve hydraulic efficiency of the bridge; consequently, it is anticipated that there will not be a CLOMR required. Instead a LOMR will be required following construction to update FEMA maps based. The FEMA coordination task is not anticipated to affect the Project schedule.
Three to four business displacements are anticipated.	<ul style="list-style-type: none">• Start of construction date could be impacted since ROW needs to be cleared before construction can start. Anticipate approximately 18 months to clear ROW.	<ul style="list-style-type: none">• Design schedule is accelerated, which allows team to begin getting ROW plats earlier in the process.
Utility impacts are anticipated. Existing county sewer line is in conflict with the proposed bridge and will require relocation.	<ul style="list-style-type: none">• Construction schedule could be delayed.	<ul style="list-style-type: none">• Design schedule is accelerated, which allows team to begin coordination with utility companies earlier in the process.• County sewer pumping station has been relocated.



6. Benefit-Cost Analysis



VI. Benefit-Cost Analysis

A benefit-cost analysis (BCA) was conducted for the MD 5 Great Mills Improvement Project for submission to the U.S. Department of Transportation (U.S. DOT) as a requirement of a discretionary grant application for the RAISE 2021 program. The analysis was conducted in accordance with the benefit-cost methodology as outlined by U.S. DOT in the 2021 Benefit-Cost Analysis Guidance for Discretionary Grant Programs. The period of analysis corresponds to 26 years, which includes 6 years of design and construction and 20 years of benefits after operations begin in 2028. The capital cost for the Project is expected to be \$25.7 million in undiscounted 2021 dollars. At a 7 percent real discount rate, these costs are \$17.1 million in 2019 dollars. Net operations and maintenance costs are projected to average \$55,400 per year in undiscounted 2019 dollars in the “Build” and “No Build” scenarios. Over the entire 20-year operations period, these costs effectively result in a net zero change in operations and maintenance costs. Finally, net reductions in rehabilitation and replacement costs are expected to total approximately \$620,300 in undiscounted 2019 dollars and \$275,400 in 7 percent discounted 2019 dollars over this same period.

The Project is expected to generate \$23.6 million in discounted 2019 dollars in benefits using a 7 percent discount rate. The roadway and bridge improvements on MD 5 will reduce the number of crash incidents within the Project segment and reduce road congestion due to under-capacity. This leads to an overall project Net Present Value of \$6.5 million and a **Benefit Cost Ratio (BCR) of 1.38**. As such, the Project is expected to generate economic benefits that outweigh its costs. The overall project benefit matrix can be seen in Table 10.

Travel time savings and the reduction in crashes produce the greatest quantified benefits, illustrating the Project’s focus on facilitating economic competitiveness and improving safety for road users and pedestrians. The travel time savings includes in-vehicle travel time savings for drivers and passengers of autos. A reduction in travel time translates into more time available for work, leisure, or other activities. The reduction in crashes due to lane expansion and roadway improvements will mean fewer incidents of property damage and injuries for vehicle users and pedestrians. Additionally, the more efficient utilization of road capacity during peak hour and avoided roadway flooding is expected to reduce vehicle-miles traveled related to detouring traffic throughout the region.



Table 10: Project Impacts and Benefits Summary, Monetary Values in Millions of 2019 Dollars

BCA Metric	Monetized Value (undiscounted \$2019)	Monetized Value (discounted \$2019)
Total Benefits	\$81.2	\$23.6
Travel Time Savings	\$55.3	\$15.6
Vehicle Operating Cost Savings	\$10.4	\$3.1
Reduced Vehicle and Pedestrian Crashes	\$4.7	\$1.4
Reduced Emissions	\$2.9	\$1.6
Health and Recreation Improvements	\$1.1	\$0.3
Reduced Agency O&M Costs	\$0.9	\$0.5
Residual Value	\$5.5	\$0.8
Total Costs	\$24.5	\$17.1
Net Present Value (NPV)	\$56.7	\$6.5
Benefit Cost Ratio (BCR)	3.31	1.38
Internal Rate of Return (IRR)	10%	

