National Culvert Removal, Replacement, and Restoration Program (Culvert AOP Program) – Fiscal Year 2023

Application and Project Narrative For:

Culvert Replacement – Runway 10 Approach Road Over Stony Run

Hanover, Maryland

Submitted By:
Maryland Aviation Administration

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

Table of Contents

FY 2023 National Culvert Removal, Replacement, and Restoration Grant Program (Culvert AOP Program) Application

I. Basic Project Information

1	Application Name	Culvert Replacement – Runway 10 Approach Road Over Stony Run
Eligibility Criteria		
2	Project Description: Provide a concise description of the project(s) based on the directions in provided in D.2.a.I See narrative below for full project description.	Funding from the Culvert AOP Program is being requested to replace a culvert over Stony Run, traversed by Runway 10 Approach Road at the Baltimore/Washington International Thurgood Marshall Airport (BWI) in Anne Arundel County, MD. The project will replace the current structure with a pre-cast concrete bottomless design that will improve fish passage. The existing structure over Stony Run is a twin 60" corrugated metal pipe (CMP) culvert beneath a gravel roadway. The two pipes have deteriorated along with active erosion of the headwall, requiring routine maintenance to clear debris impediments from the upstream extent and to allow traffic to access critical navaids. The culvert replacement will improve aquatic connectivity by opening approximately 14.3 miles of upstream habitat along Stony Run, located in the Deep Run-Patapsco River HUC-12 (020600031102) watershed. The project also aims to decrease flooding events and associated effects, such as sedimentation, pollution, and blocking necessary airport traffic.
3	Which anadromous species does your project propose to benefit by meaningfully improving or restoring fish passage?	Direct benefits are expected for alewife (*Alosa pseudoharengus*) blueback herring (*Alosa aestivalis*). Benefits are also expected for sea lamprey (*Petromyzon marinus*) and American eel (*Anguilla rostrata*), as well as indirect benefits for striped bass (*Morone saxatilis*), white perch (*Morone americana*), and yellow perch (*Perca flavescens*).
4	Briefly describe how the proposed project benefits the anadromous species in item 4 above?	Full description of proposed project benefits provided in the project narrative below. Primary benefits to river herring include providing access to historic spawning areas through increased aquatic connectivity.
5	Culvert AOP Program Request amount	Exact Amount in year-of-expenditure dollars: $_1,345,440.00__
6	Total Cost of all Proposed Projects	Estimate in year-of-expenditure dollars: $_1,681,800.00_____

7	Who is the Application Sponsor?	X State ☐ Unit of local government ☐ Indian Tribe
8	If Application Sponsor is a State or a unit of local government, indicate the percentage, type, and source of non-Federal match	20% match from State of Maryland Transportation Trust Fund
9	Eligible Facility Type.	X Culvert ☐ Weir
Additional Project Information		
10	State(s) and/or Tribal land in which the project is located	Anne Arundel County, Maryland
11	Identify the Lead Applicant	Dan Favarulo Deputy Chief, Business Development and Management Maryland Aviation Administration P.O. Box 8766 BWI Airport, MD 21240 dfavarulo2@bwiairport.com 410-859-7439
12	**Location Information**	
A	Location of eligible facility and project area	Baltimore/Washington International Thurgood Marshall Airport (BWI), Hanover, Anne Arundel County, Maryland
B	Provide name and description of the waterway and watershed.	Stony Run is one of several tributaries of the Patapsco River, whose mainstem flows 40 miles from Marriottsville, Maryland to the harbor of Baltimore, Maryland. Stony Run is in the Northern Coastal Plain (MLRA 149) with a drainage area of 5.5 miles at the project location (USGS StreamStats, 2023). Stony Run belongs to the Deep-Run Patapsco River (HUC-12 020600031102) watershed and the larger Gunpowder-Patapsco River (HUC-8 02060003) watershed. The Deep Run-Patapsco River watershed includes other tributaries than the watercourse the project crosses, spanning approximately 27, 666 acres (The Nature Conservancy, 2024). Land use adjacent to the project crossing includes forest, commercial, and industrial. The wetlands of Stony Run are primarily palustrine deciduous forested wetlands that are seasonally or temporarily flooded. These Nontidal Wetlands of Special State Concern are considered the 'best examples of Maryland's nontidal wetland habitats' and are

		afforded special protections. These wetlands are deemed to hold important ecological and educational value.
C	Provide geographic coordinates for the project	39.1752109, -76.6966515
D	Is any part of the proposed project area(s) located on a federally recognized Indian Tribe land?	☐ Yes X No
	Other Public and Private Parties	
13	Please provide organizational names of sub-recipients that will receive funds and other key partners.	The Maryland Department of Transportation (MDOT) State Highway Administration (SHA) is a partner in the administration of funds from the Federal Highway Administration (FHWA).

II. Grant Funds, Sources and Uses of all Project Funding

1	Culvert AOP Program Request Amount	Exact Amount in year-of-expenditure dollars: $ 1,345,440.00
2	Estimated Total of Other Federal funding (excluding Culvert AOP Program Request)	Estimate in year-of-expenditure dollars: $ 0.00
3	Estimated Other Federal funding (excluding Culvert AOP Program) further detail	*Program:* *N/A* *Amount: $* *$0.00*
4	Estimated non- Federal funding	*Source:* State of Maryland Transportation Trust Fund *Amount: $* 336,360.00
5	Future Eligible Project Cost (Sum of Culvert AOP Program request, Other Federal funds, and non-Federal funds, above.)	Estimate in year-of-expenditure dollars: $ 1,681,800
6	Previously incurred project costs	Estimate in year-of-expenditure dollars: $ $35,000
7	Total Project Cost (Sum of 'previous incurred' and 'future eligible')	Estimate in year-of-expenditure dollars: $ 1,716,800
8	Include a detailed statement of work or attach separately	**X** This is attached separately. The file is named: Included in the project narrative below
9	Include a detailed budget or attach separately	**X** A detailed budget is attached separately. The file is named: Included in the project narrative below

10	If more than one culvert or weir, will project bundling be used to deliver the project?	☐ Yes ☐ No N/A

III. Statutorily Required Project Selection Priorities

Project Selection Priorities—Please check which of the project selection priorities listed below, and at Section E of the NOFO, apply to the project(s) in your application.		
1	Which of the following selection priorities does your project meet?	**X** Anadromous fish listed as endangered or threatened under the Endangered Species Act. Although not likely present in Stony Run, the project may provide indirect benefits to Atlantic sturgeon and shortnose sturgeon. Full description of these benefits are in the project narrative below. **X** Anadromous fish identified by NMFS or USFWS that could reasonably become listed as a federally endangered species or a threatened species. River herring have been reviewed twice for listing under the ESA since 2013 and may be reviewed more by 2036. Due to lasting threats such as inadequate regulations and climate change, these species may be listed under the ESA in the future. More detail on river herring and the other species that may become listed are in the project narrative below. X Anadromous fish identified by NMFS or USFWS as prey for endangered species, threatened species, or protected species. X Anadromous fish identified by NMFS or USFWS as climate resilient stock. X Project that opens up more than 200 meters of upstream habitat for anadromous fish before the end of the natural habitat.
2	Briefly describe how your project meets the selection priorities checked above.	Full description of benefits to anadromous fish are provided in the project narrative below.

IV. Project Selection Criteria

1	**Criterion #1: Conservation Benefits to Anadromous Fish**
	The proposed project meets the Conservation Benefits to Anadromous Fish criterion by removing barriers to fish passage and improving connectivity to fish habitat, which is vital to the sustainability of anadromous fish species. See project narrative below for full description of how this project contributes to this criterion.
2	**Criterion #2: Regional and Watershed Context**
	The proposed project meets the Regional and Watershed Context criterion by supporting the goals set forth by the Chesapeake Bay Program's Fish Passage Workgroup and aligning with federal and state initiatives to replace or remove outdated structures which act as barriers to fish passage. See project narrative below for full description of how this project contributes to this criterion.

3	**Criterion #3: Ecosystem Benefits**
	The proposed project contributes to the Ecosystem Benefits criterion by supporting biodiversity of fish species in the watershed through improved fish passage; providing improved sediment and woody debris transport through use of a bottomless culvert design; and enhancing ecosystem resilience through design which will withstand and reduce impacts linked to extreme weather events. See project narrative below for full description of how this project contributes to this criterion.
4	**Criterion #4: Project Design, Monitoring and Evaluation**
	The proposed project aligns with Project Design, Monitoring and Evaluation criterion through use of appropriate design standards meant to provide significant benefits to fish passage and culvert resiliency; and will include post-construction evaluation through five-years of monitoring. See project narrative for full description of how this project contributes to this criterion.
5	**Criterion #5: Climate Change, Sustainability, and Resilience**
	This project contributes to the Climate Change, Sustainability, and Resilience criterion by sizing the culvert to allow for increased capacity; using more resilient materials; and utilizing available climate tools to inform design. See project narrative for full description of how this project contributes to this criterion.
6	**Criterion #6: Equity and Barriers of Opportunity**
	This project contributes to the Equity and Barriers of Opportunity criterion as BWI is committed to enhancing opportunities and ensuring fair access for minorities and women, both business partners and employees. BWI is well recognized and awarded in the industry as a leader that values diversity, equity, and inclusion, along with providing opportunity and fair access to employees and business partners. See project narrative for further description of how the project contributes to this criterion.

V. Project Readiness and Environmental Risk

Technical Feasibility		
1	Describe the technical feasibility of the project as described in Section D.2.b.v	To enhance fish passage and the resilience of both the structure and the associated access road, a bottomless concrete culvert will be proposed. The bottomless culvert design supports natural streambed continuity. Three different options for bottomless culverts will be analyzed to determine the best solution. The design criteria for the project will be developed based on multiple regulatory and technical standards to ensure effective fish and aquatic organism passage. See project narrative for further description of technical feasibility, including development of design criteria, basis of the budget, risks, and contingencies.
Project Schedule		
2	Include a detailed project schedule	**X** This is attached separately. The file is named: Included in the project narrative below
3	Design Status	Planned or Actual Start of Preliminary Design Date: 4/1/2025 Planned or Actual Completion of Preliminary Design Date: 7/22/2025

		Planned or Actual Start of Final Design Date: _10/28/2025_ Planned or Actual Completion of Final Design Date: _12/23/2025
4	Anticipated Construction Start Date	Date: _9/29/2026__
5	Anticipated Project Completion Date	Date: _1/29/2027 (construction); 1/29/2032 (monitoring)_
Required Approvals		
6	NEPA Status – Indicate if the determination will likely be the result of a Categorical Exclusion (CE), Environmental Assessment (EA), or Environmental Impact Statement (EIS)	Planned or Actual Start of NEPA Date: _4/1/2025_ Planned or Actual Completion of NEPA Date: _9/1/2025_ Final NEPA Determination or current status of NEPA process: Likely a Categorical Exclusion.
7	Will all necessary environmental approvals and permits meet the project delivery timeline specified in the project schedule?	X Yes Details included in project narrative below. ☐ No
8	Are there any prepared environmental studies or documents describing known project impacts and possible mitigation for those impacts?	☐ Yes X No No mitigation anticipated
Assessment of Project Risks and Mitigation Strategies		
9	Indicate potential project risks and strategies undertaken or that might be taken to mitigate those risks.	During the timeline of this project, it is expected that there will be risks to the environment, construction, schedule, and budget. Appropriate mitigation measures will be taken to reduce these risks and impacts. See narrative below for full explanation of these risks and mitigation strategies.
10	Is right-of-way acquisition necessary?	☐ Yes X No ☐ Not Applicable
11	Right-of-way acquisition considerations	N/A
	Lead Applicant Evaluation	
12	Describe the Lead Applicant's experience with	MAA has significant experience implementing Federally funded transportation planning and

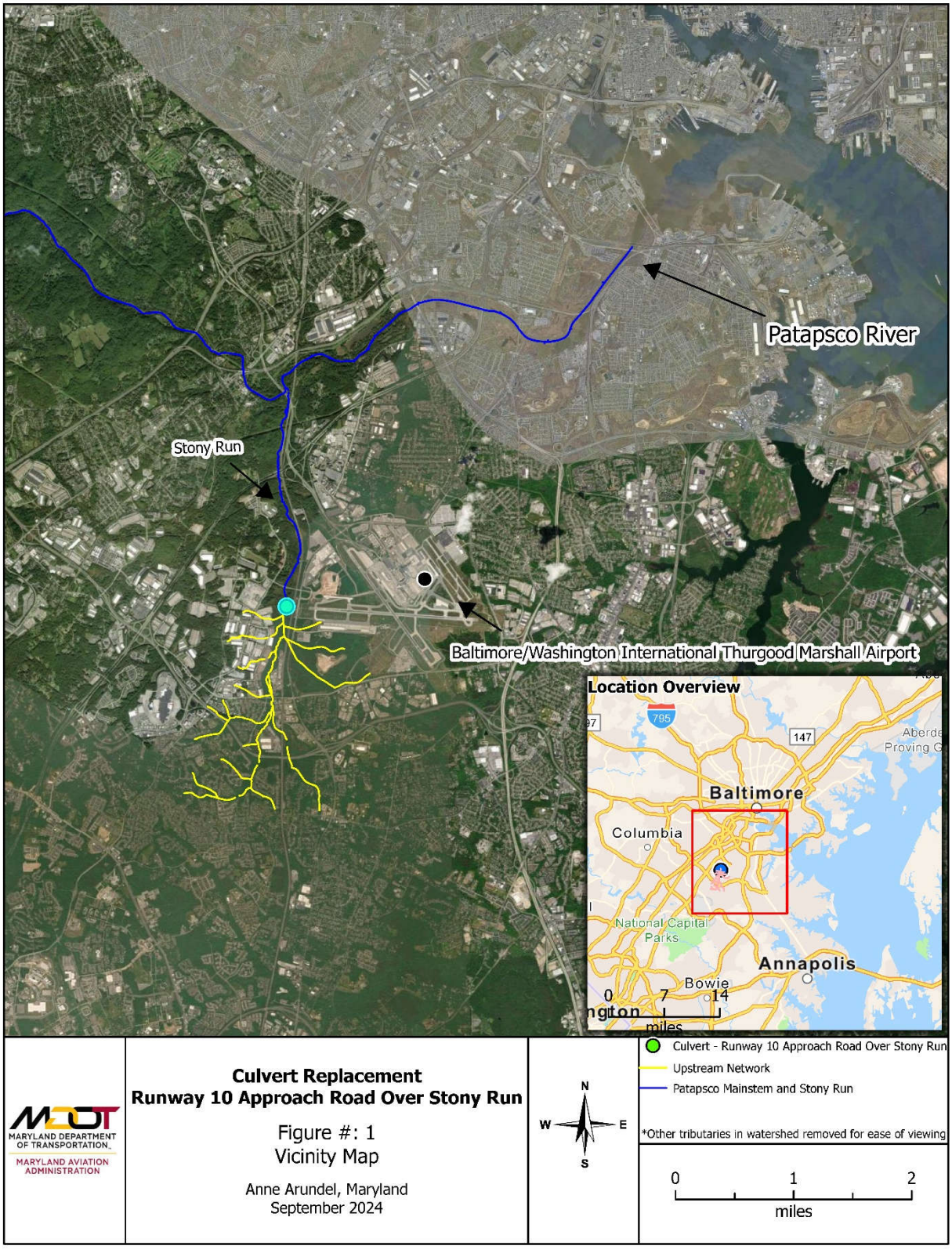
	receipt and expenditure of DOT grant funds or other Federal funding sources as described in Section D.2.b.V.	construction projects. Grants are managed by the Office of Capital Programs who reports directly to the Chief Financial Officer for MAA within the Division of Business Development and Management. The Office of Capital Programs coordinates with the Office of Finance for payment and with the Division of Planning and Engineering for project and contract management. The FAA follows the Federal grant procedures and MAA is familiar with the standard documentation and paperwork required for the grant process from award to closeout. MAA is currently managing 13 grants valued at over $132M. Additional details are included the project narrative below.

I. Basic Project Information – Project Description, Location, and Parties

The Maryland Aviation Administration (MAA), through the Maryland Department of Transportation (MDOT), is requesting $1,345,440 in federal funds through the Culvert Aquatic Organism Passage (AOP) Program under the National Culvert, Replacement and Restoration Grant Program. The project seeks to replace the existing culvert over Stony Run traversed by Runway 10 Approach Road at the Baltimore/Washington International Thurgood Marshall Airport (BWI) in Anne Arundel County, MD. The MAA operates BWI and Martin State Airports, carrying both domestic and international cargo and passengers. BWI is a key transportation hub that serves over 27 million passengers annually. This project has a significant transportation nexus in that replacement is needed for the failing culvert to maintain safe and resilient access along the Runway 10 Approach Road, which supports crucial airport navigation equipment, including the precision of instrument approach (ILS) and approach lighting systems.

The project is located in the Northern Coastal Plain Major Land Resource Area (MLRA) 149A, approximately 2 miles upstream from the confluence of Stony Run with the Patapsco River, a major tributary of the Chesapeake Bay (**Figure 1**). The Chesapeake Bay is the largest estuary in the United States and provides habitat for many species of anadromous fish, two of which are listed as endangered under the Endangered Species Act. The project will replace the current structure with a pre-cast concrete bottomless design that will improve fish passage and lengthen the service lifespan. The existing structure over Stony Run is a twin 60" corrugated metal pipe (CMP) culvert, which is prone to corrosion and abrasion, leading to a shorter lifespan compared to the proposed concrete design. The culvert has reached the end of its serviceable life, and the two pipes have deteriorated, along with active erosion of the headwall. Additionally, soils in this area are historically corrosive, which can cause CMPs to fail. This culvert has failed and is subject to prolonged clogging by sediment and debris, hindering adequate fish passage in its current state. The culvert requires routine maintenance to clear debris impediments from the upstream extent and to allow traffic to access critical navaids. The replacement of this structure will improve aquatic habitat connectivity and provide access to 14.3 miles of upstream habitat along in Stony Run. The replacement of this structure will also aid in the reduction of flooding events which can contribute to increased sedimentation, an increase in pollutants, as well as disruption to crucial airport operations.

Figure 1: Vicinity Map of Culvert Replacement – Runway 10 Approach Road Over Stony Run



The Gunpowder-Patapsco HUC-8 watershed (02060003), and specifically the Patapsco River, has been targeted by multiple watershed-wide improvement goals specifically related to fish passage. Most of the aquatic fragmentation within the Patapsco River watershed stems from the construction of major dams around the early 20th century. Many federal, state, local, and larger non-governmental entities are addressing the harm caused by these outdated structures, such as the National Oceanic and Atmospheric Administration (NOAA), the Maryland Department of Natural Resources (MDNR), and American Rivers. The Chesapeake Bay Program's Fish Passage Workgroup has been committed to removing aquatic barriers to provide access to historic, upstream habitats for migratory fish species, including opening up over 30,000 stream miles since 1989 in the Chesapeake Bay watershed, with the goal of an additional 132 miles every two years. Significant investments have also been made in providing aquatic connectivity along the Patapsco River mainstem, through the removal of several major dams. Historically, five major dams occurred over the 40-mile Patapsco River mainstem: Daniels, Union, Simkins, Bloede, and Liberty dams. Of these five, three have been removed and one more is slated for removal. Most recently, in 2019, Bloede Dam was removed, which was the downstream-most dam along the Patapsco River. The removal of Bloede Dam prompted the watershed restoration goal of opening over 65 miles of spawning habitat for river herring and shad and approximately 183 miles of habitat for American eel, through the removal of Daniels Dam, which is already gaining funding through American Rivers.

The culvert replacement at the Runway 10 Approach Road over Stony Run aims to improve fish passage, primarily to alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), two species of anadromous fish collectively referred to as river herring The project would also provide fish passage for American eel *(Anguilla rostrata)* and sea lamprey *(Petromyzon marinus)*, two additional diadromous species, by providing access to 14.3 miles of upstream network. Additional indirect benefits are expected, which are detailed below.

II. Grant Funds, Sources, and Uses of all Project Funding

The total budget for this project is $1,681,800. MAA is requesting $1,345,440 in federal funds through the Culvert AOP Program, which accounts for 80-percent of the total project budget. Requested funds are for a single project, the culvert replacement at Runway 10 Approach Road over Stony Run. The 20-percent match by MAA, totaling $336,360, will be funded through the State of Maryland Transportation Trust Fund. A detailed budget is shown in **Table 1**, showing the dollar and percentage breakdown of requested funds and state-committed funds for each project component. Additional information is also provided in SF424C, which is included with this application submission.

Table 1: Detailed Budget with Dollar and Percentage Breakdown of Requested Amount and Funds Covered by Maryland Transportation Trust Fund

Budget Item	Amount Requested through Culvert AOP Program		Amount Covered by State of Maryland Transportation Trust Fund		Total
	Dollars	Percentage	Dollars	Percentage	
NEPA	$32,000	80	$8,000	20	$40,000
Permitting	$12,000	80	$3,000	20	$15,000
Design	$293,360	80	$73,340	20	$366,700

Construction	$814,800	80	$203,700	20	$1,018,500
Construction Inspection	$81,520	80	$20,380	20	$101,900
Post-Construction Monitoring	$76,000	80	$19,000	20	$95,000
Escalation (3%)	$35,760	80	$8,940	20	$44,700
Total	**$1,345,440**	**80**	**$336,360**	**20**	**$1,681,800**

This budget includes a built-in 30-percent design contingency to account for unforeseen complications with design. It also includes an overall 3-percent escalation to factor in escalation in labor costs and materials. Any major, unanticipated cost increases not covered by this budget would either be covered by State of Maryland Transportation Trust Funds or would result in submitting an additional application for Culvert AOP funding in a future fiscal year to cover additional project phases.

III. Statutorily Required Project Selection Priorities Under NOFO Section E

There are ten species of anadromous or semi-anadromous fish in Maryland, which require unhindered migration to spawning habitat to maintain productivity: shortnose sturgeon (*Acipenser brevirostrum*), Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus*), blueback herring (*Alosa aestivalis*), hickory shad (*Alosa mediocris*), American shad (*Alosa sapidissima*), alewife (*Alosa psuedoharengus*), white perch (*Morone americana*), yellow perch (*Perca flavescens*), striped bass (*Morone saxatilis*), and sea lamprey (*Petromyzon marinus*). In addition, one species of catadromous fish, the American eel (*Anguilla rostrata*), occurs in Maryland. Due to their small size and distribution within smaller bodies of water, river herring, white perch, yellow perch, sea lamprey, and American eel are more likely to encounter culverts during their migration to spawning habitat. The presence of culverts may become a concern for these smaller species as culverts have the potential to impede fish passage, disconnecting individuals from necessary spawning and foraging habitat. Culverts can become obstacles to passage for migrating fish due to man-made or natural debris, unsuitable water velocities over distance, elevated slopes, unsuitable depths across various flows and seasons, as well as reduced channel width. Aside from these physical barriers, culverts may pose as a behavioral barrier by removing natural substrate and associate shelter and resting habitat. Culverts can also provide inadequate lighting for fish, evoking a retreating response away from the culvert, which has been documented in the seasonal activities of river herring (Keep et al. 2021). In Maryland, alewife spawn in the Chesapeake from the end of February through April, while blueback herring spawn from the end of March to the middle of May.

1a. Anadromous fish listed as endangered or threatened

Of the anadromous species known to occur in Maryland, only the Atlantic sturgeon and shortnose sturgeon are protected under the Endangered Species Act. The Chesapeake Bay is one of the five distinct population segments (DPS) of Atlantic sturgeon, with records of Atlantic sturgeon in the Susquehanna, Potomac, and around the Patapsco Rivers. Studies following released yearling Atlantic sturgeon indicate that the Chesapeake Bay can serve as nursery habitat for Atlantic sturgeon (Secor er al. 2000). The Chesapeake Bay is also one of 19 DPS for the shortnose sturgeon, with records occurring in the Upper Bay, near the Chesapeake and Delaware Canal, and the

Potomac River. Due to specific habitat requirements of these two species, it is not expected that they will occur within the Stony Run watercourse, reducing direct benefits of this project to their populations. However, this project may indirectly benefit these endangered species by improving sediment and pollutant retention and mitigating flooding impacts, both of which can be detrimental to downstream habitat (Trout 2004).

1b. Anadromous fish that could reasonably become Federally listed under the ESA

Of the ten anadromous species present in Maryland, the shortnose sturgeon and the Atlantic sturgeon are the only species listed as endangered. Of the remaining anadromous fish species, American shad, hickory shad, yellow perch, striped bass, and river herring have all experienced population declines that warrant conservation efforts. MDNR has also designated American shad, hickory shad, striped bass, and yellow perch as "fish species in need of conservation." This designation allows MDNR to execute legislation to protect these species deemed at risk of further decline. Stocks of anadromous fish in Maryland have declined due to pressures of overfishing, stream blockages and degradation of spawning and nursery habitat, and deteriorating water quality. Due to these declines, harvest moratoriums, other restrictions, and stocking efforts have been employed in Maryland and in cooperation with neighboring states.

There are three major stocks of striped bass in the United States that are managed, one of which is the Chesapeake Bay stock, which comprises approximately 90 percent of the coastal population of striped bass. However, in the Chesapeake Bay, due to poor water quality and overfishing pressures, a moratorium on striped bass harvest was enacted in 1985. Due to its status as an important game and food fish, striped bass were intensely harvested and are now subject to conservation efforts. Historically a more important game and food fish, the American shad was protected in 1980 by a harvest moratorium due to overfishing and dam and culvert construction blocking crucial nursery and spawning habitat. In the following year, hickory shad were also protected by a harvest moratorium for the same reasons. Both species occur in the Patapsco River, and in recent years have undergone restocking efforts as a means of conservation. As recruitment of these species is density-dependent, many stocking efforts are required to increase the proportion of wild spawning individuals returning to the Patapsco River. In 2021, MDNR determined that natural recruitment was low in the Patapsco River, releasing 250,000 larvae and 90,000 juvenile American shad in 2022. From 1997 to 2014, MDNR has stocked the Patapsco River with 4,912,200 hickory shad larvae.

Due to the construction of dams and other blockages, as well as overfishing and pollution, river herring populations have declined considerably. In 2005, NMFS designated river herring as a species of concern. As of 2009, river herring landings were less than one percent of landings from 1950 through 1970. Such decline prompted the issuance of a moratorium on the commercial and recreational river herring fisheries of Maryland and Virginia in 2012. In 2013, NOAA National Marine Fisheries Service (NMFS) determined that listing river herring under the ESA was not necessary. However, there were limitations of the data that would prompt NMFS to agree to review the status of river herring within five years of this determination. The decision to not list river herring was challenged by a lawsuit, resulting in a second determination occurring in 2019, yielding the same "not warranted" determination.

NOAA NMFS describes the lasting threats to river herring as habitat degradation due to dams, declining water quality, incidental take, lacking regulations, and susceptibility to climate change.

NOAA NMFS determined that the foreseeable future of river herring to be three-generations or from 2030 to 2036. Within this timeframe, these threats may result in further decline of river herring abundance, and potentially revisiting this determination in the future. Through the course of this second determination, NOAA NFMS identified four DPS for Alewife and three DPS for blueback herring. Within the scope of this project, there is a DPS occurring for both alewife and blueback herring in the Mid-Atlantic. This DPS scored as low risk of extinction for both alewife and blueback herring based on the evaluation of demographic information and threats to extinction. Across the range of both alewife and blueback herring, both species were also scored as low extinction risks, prompting the "not warranted" determination. Despite the NOAA NMFS acknowledgement that river herring abundance is low, they cite that management efforts have reduced mortality for both alewife and blueback herring and that there is still genetic continuity offshore, which may aid in reducing extinction risk. River herring stocks will be monitored through 2036, or three generations, to ensure that management efforts are effective as threats such as climate change, overfishing, and habitat degradation combine with a complex life history to pose a higher extinction risk.

1c. Anadromous fish identified as prey for endangered, threatened, or protected species

In addition to direct benefits to migratory species using Stony Run (i.e., river herring, American eel, and sea lamprey), river herring are also an important forage species for other anadromous and semi-anadromous species found in Maryland, including striped bass, white perch, and yellow perch. Direct benefits to river herring species would indirectly benefit additional migratory species through trophic interactions. Due to low recruitment, landings and indicators of overfishing, the Atlantic striped bass stock is managed under Amendment 6 of the Atlantic Striped Bass Interstate Fishery Management Plan. MDNR has also created a Maryland Tidewater Yellow Perch Fishery Management Plan that manages yellow perch stocks using an ecosystem-wide approach to identify impacts to the yellow perch fishery. Striped bass and yellow perch are also listed in Maryland as "fish species in need of conservation" by MDNR, so any benefit to the forage of these species may aid in the conservation goals of the state. River herring are also an important food source for other federally managed species found in the Chesapeake Bay and along the Atlantic Coast, including but not limited to black sea bass, bluefish, clearnose skate, red hake, scup, summer flounder, and windowpane flounder (Buckel 1998; Steimle 1999; Gartland et al. 2006; Szczepanski Jr 2013; Traver and O'Brien 2014). These species are all managed by the Mid-Atlantic Fishery Management Council under the Magnuson Stevens Act.

Populations of predatory waterbirds declined drastically during the 20th century due to pesticides bioaccumulating in forage and causing nesting failures, such as thin eggshells. In 2007 Bald Eagles (*Haliaeetus leucocephalus*) were no longer listed under the ESA and in 2010 were no longer state-listed in Maryland. They are now protected by the Bald and Golden Eagle Protection Act and nest in the Chesapeake Bay during the same time as migrations of shad and river herring move into the tidal-freshwater areas of the Bay. Spawning fish and their carcasses are an important food source for nesting eagles due to the high nutrient content of the gametes. Osprey *(Pandion haliaetus*), protected under the Migratory Bird Treaty Act (MBTA), also forage on river herring during the nesting season; however, they will shift to other available species once the spawning run concludes. Other species protected by the MBTA that forage on river herring and shad include the great blue heron *(Ardea herodias)* and double-crested cormorant *(Phalacrocorax auritus).* Direct benefits to river herring populations would result in indirect benefits to these and other predators.

1d. Anadromous fish identified as climate resilient stock

In the 2019 review and decision to not list river herring under the ESA, NOAA NMFS describes susceptibility to climate change as a lasting threat to river herring (NMFS 2019). Throughout the range of these species there are documented impacts of climate change, such as sea level rise, increased precipitation, and increased flooding events. Increased flooding events are particularly disastrous for early life stages of river herring and their spawning habitat. NOAA NMFS ranked the threat of natural climate change as medium to the Mid-Atlantic DPS of Alewife and low to the DPS of blueback herring. NOAA NMFS scored the threat of anthropogenic climate change as medium to the Mid-Atlantic DPS of alewife and noted that this DPS would likely be the first to experience the impacts of extreme temperatures in spawning and nursery habitat. The Mid-Atlantic DPS for blueback herring also received an anthropogenic climate change threat score of medium, due to large populations of blueback herring concentrated in this area. These determinations of relative vulnerability to climate change suggest that both river herring species are at least moderately resilient to climate change. By replacing the proposed culvert with a larger bottomless design, the project may alleviate some of the pressures of climate vulnerability by increasing resilience through increased aquatic connectivity and access to historic spawning habitats.

2. Project that opens up more than 200 meters of upstream habitat

The replacement of this culvert will greatly benefit fish passage, providing aquatic connectivity and access to 14.3 miles of upstream habitat based on the Chesapeake Fish Passage Prioritization Tool. The entire upstream network is mapped as current habitat for blueback herring and alewife on the Chesapeake Fish Passage Prioritization Tool.

IV. Project Selection Criteria

Criterion #1: Conservation Benefits to Anadromous Fish

The proposed project meets the Conservation Benefits to Anadromous Fish criterion by removing barriers to fish passage and improving connectivity to fish habitat, which is vital to the sustainability of anadromous fish species. Migratory fish populations, including river herring, have declined in Maryland and the Chesapeake Bay watershed due to several factors, including habitat degradation, migration barriers, fishing pressure, and commercial fishing bycatch. While some populations of river herring (e.g., New England stocks) have slowly increased in recent years, river herring in the Chesapeake Bay remain at historic lows compared to numbers observed in the mid-20th century. Following the determination by NOAA NMFS that river herring be considered a Species of Concern, the State of Maryland enacted a moratorium on river herring harvest in 2011 and the Chesapeake Bay Program Fish Passage Workgroup has been committed to removing aquatic barriers to provide access to historic, upstream habitats for migratory fish species. The Chesapeake Bay Program's Fish Passage Outcome, per their 2015-2025 Management Strategy, is to "*Continually increase access to habitat to support sustainable migratory fish populations in the Chesapeake Bay watershed's freshwater rivers and streams. By 2025, restore historical fish migration routes by opening an additional 132 miles every two years to fish passage. Restoration success will be indicated by the consistent presence of alewife, blueback herring, American shad, hickory shad, American eel and brook trout, to be monitored in accordance with available agency resources and collaboratively developed methods.*"

Several diadromous or semi-diadromous species are known to use the mainstem of the Patapsco River, including river herring, American shad, hickory shad, sea lamprey, and American eel. River

herring have been documented near the confluence of Stony Run, and American eel and sea lamprey were documented along Stony Run in 2020, just downstream of the project area, by the Anne Arundel County Bureau of Watershed Protection and Restoration. MDNR's fish passage coordinator, Jim Thompson, stated that Stony Run historically supported river herring spawning runs and they have been documented recently near the mouth of Stony Run. MDNR supports the removal of hydraulic barriers that occur in historic migratory fish ranges and supports efforts to restore aquatic connectivity along Stony Run which will bolster past and future work being done in the Patapsco River watershed. Jim Thompson has provided a letter of support for this project, which is included as an attachment to this application. This culvert project would improve aquatic connectivity along Stony Run by providing access to 14.3 miles of upstream habitat historically used by river herring, American eel, and sea lamprey.

In addition to direct benefits to migratory species using Stony Run (i.e., river herring, American eel, and sea lamprey), river herring are also important forage species for anadromous and semi-anadromous species, including striped bass, white perch, and yellow perch. Therefore, the direct benefits to river herring species would indirectly benefit additional migratory species through trophic interactions. River herring are also an important food source for other federally managed species found in the Chesapeake Bay and along the Atlantic Coast, including but not limited to black sea bass, bluefish, clearnose skate, red hake, scup, summer flounder, and windowpane flounder (Buckel 1998; Steimle 1999; Gartland et al. 2006; Szczepanski Jr 2013; Traver and O'Brien 2014). These species are all managed by the Mid-Atlantic Fishery Management Council under the Magnuson Stevens Act.

Criterion #2: Regional and Watershed Context

The proposed project meets the Regional and Watershed Context criterion by supporting the goals set forth by the Chesapeake Bay Program's Fish Passage Workgroup and aligning with federal and state initiatives to replace or remove outdated structures which act as barriers to fish passage. The Chesapeake Bay watershed spans over 64,000 square miles with more than 140,000 miles of documented rivers and streams. More than 5,000 dams and 165,000 road-stream crossings occur along these waterways, all of which pose threats to anadromous fish passage. Through the removal of fish blockages, the Chesapeake Bay Program's Fish Passage Workgroup has successfully re-opened over 30,000 miles of fish habitat in the Chesapeake Bay since 1989, but fish passage remains a major conservation goal in Maryland and the Chesapeake Bay.

Within the Chesapeake Bay watershed, the Patapsco River flows for approximately 40 miles, from Marriottsville, Maryland, where the North and South Branches meet, to the Baltimore Harbor, where it empties into the Chesapeake Bay. Historically, five major dams occurred over the 40-mile span: Daniels, Union, Simkins, Bloede, and Liberty dams. Of these five, three have been removed and one more is slated for removal. Most recently, in 2019, Bloede Dam was removed, which was the downstream-most dam along the Patapsco River. The removal of Bloede Dam prompted the watershed restoration goal of opening over 65 miles of spawning habitat for river herring and shad and approximately 183 miles of habitat for American eel, through the removal of Daniels Dam, which is already gaining funding through American Rivers. The culvert replacement at the Runway 10 Approach Road over Stony Run would open an additional 14.3 miles of upstream network along a major downstream tributary to the Patapsco River, contributing to the watershed-wide restoration efforts. The American Rivers is also working with multiple groups in the

Chesapeake Bay region to work towards a goal of removing 4,500 fish blockages in the Mid-Atlantic region by the year 2050.

Most of the aquatic fragmentation within the Patapsco River watershed stems from the construction of major dams around the early 20th century. Many federal, state, and larger non-governmental entities are addressing the harm caused by these outdated structures, such as NOAA, MDNR, and American Rivers; however, dams are not the only blockages present along the Patapsco River and its tributaries. Within Anne Arundel County, Maryland, there are approximately 3,493 documented stream crossings, and only roughly half (1,835) have been surveyed (National Aquatic Barrier Inventory & Prioritization Tool 2024). Within the Deep Run-Patapsco River HUC-12 watershed, stream crossings per square kilometer range from 0 to approximately 3.29, with approximately 0.80 stream crossings per square kilometer in the vicinity of the proposed culvert replacement at Runway 10 Approach Road over Stony Run (MDHWA 2022). Combined with the successful dam removals along the Patapsco River, the removal of smaller barriers at road-stream crossings will allow access anadromous fish access to historic spawning and nursery habitat along major tributaries, such as Stony Run. MDNR's fish passage coordinator, Jim Thompson, stated that the removal of barriers that occur in historic migratory fish ranges to restore aquatic connectivity, such as the culvert replacement at Runway 10 Approach Road over Stony Run, will help to bolster past and future work being done in the Patapsco River watershed and greater Chesapeake Bay region.

Criterion #3: Ecosystem Benefits

The proposed project contributes to the Ecosystem Benefits criterion by supporting biodiversity of fish species in the watershed through improved fish passage; providing improved sediment and woody debris transport through use of a bottomless culvert design; and enhancing ecosystem resilience through design which will withstand and reduce impacts linked to extreme weather events.

The North Atlantic Aquatic Connectivity Collaborative (NAACC) has prioritized HUC-12 watersheds for field surveys related to diadromous fish passage and road-stream crossings, covering Maine through West Virginia. In Maryland, the NAACC has rated the Deep Run-Patapsco River HUC-12 watershed as Tier 7 out of twenty for priority, with Tier 1 being the highest priority. The culvert at Runway 10 Approach Road over Stony Run was also identified as having moderate restoration potential for fish passage, based on the NAACC HUC-12 prioritized watersheds metadata.

The Anne Arundel County Bureau of Watershed Protection and Restoration sampled the fish community in 2020 approximately 0.25 miles downstream of the proposed crossing replacement. The summer electrofishing survey detected 19 different species, including green sunfish, white sucker, bluegill, largemouth bass, redbreast sunfish, fallfish, tessellated darter, yellow bullhead, blacknose dace, eastern mudminnow, eastern mosquitofish, sea lamprey, least brook lamprey, redfin pickerel, American eel, swallowtail shiner, creek chub, northern hogsucker, and longnose dace. The greater Gunpowder-Patapsco HUC-8 watershed is home to 52 resident fish species and one rare mussel species according to the Chesapeake Fish Passage Prioritization Tool. In addition to providing fish passage for migratory species, the proposed culvert replacement would improve aquatic connectivity for resident fish species and other aquatic biota, including mussels, crayfish, and herpetofauna. Fragmentation of aquatic biota populations may decrease their resilience to

climate change and other large-scale detrimental impacts, due to genetic bottlenecking. Mitigating these impacts is critical for species such as river herring that have been reviewed for listing under the ESA twice since 2013 and may be reviewed again by 2036. Stream blockages may also prevent resident fish species from accessing forage, shelter, spawning habitat, and thermal refugia.

As detailed under other criterion, river herring are an important prey species for numerous aquatic and terrestrial species, including important sportfish species (e.g., striped bass), federally managed fish species (e.g., bluefish), and bald eagles and other avian piscivores, such as great blue heron and double-crested cormorant. By providing access to historic upstream spawning habitats for river herring, this project has the potential to bolster local and regional river herring populations, proving benefits to numerous predator species through trophic interactions.

By replacing a twin CMP with a single bottomless culvert, sediment and debris transport will increase. By increasing the ability of the stream to move sediment, the stream substrate may be better suited for the needs of the aquatic organisms within Stony Run as well as reducing the likelihood of sediment buildup blocking the culvert and eroding the adjacent streambanks. Changing to a single bottomless culvert will also allow for larger pieces of woody debris to pass through the structure, reducing impacts of flooding events, fish passage barriers, and damage to the culvert. The structure will be engineered to remain stable under worst-case flood conditions, accounting for overtopping flow and the 100-year flow event. These measures are in place to minimize the risk of culvert failure. The design will focus on resilience, ensuring that the structure performs satisfactorily throughout its service life while mitigating potential flood-related damage. This improved stability and resilience will also provide stability for the wetlands of special state concern that are located both upstream and downstream of the existing culvert.

Criterion #4: Project Design, Monitoring and Evaluation

The proposed project aligns with Project Design, Monitoring and Evaluation criterion through use of appropriate design standards meant to provide significant benefits to fish passage and culvert resiliency; and will include post-construction evaluation and five-year monitoring plan.

The current structure conveying Stony Run under Runway 10 Approach Road is a twin CMP that has reached the end of its serviceable life and shows signs of deterioration and erosion of the headwall. The existing structure is prone to flooding events, which cause sediment accumulation and debris blockages, preventing fish passage. Flooding events also accelerate the erosion of the roadway and the stream banks, increasing sedimentation and pollutants in the stream channel which may contribute to the deterioration of the downstream watershed.

The goals of the culvert replacement include improving the anadromous fish passage in Stony Run by removing the blockage and improving passage, increasing aquatic habitat connectivity in the Patapsco River watershed, increasing the stability of the floodplain and stream channel, reducing impacts to wetlands of special state concern, and reducing the impacts of storm and flood events. Project goals related to the long-term success of the culvert include increasing the resilience of the culvert and access roadway, reducing maintenance needs and providing long-term cost savings, and reducing soil erosion around the bridge and road by having adequate conveyance.

The design criteria for the project will be based on multiple regulatory and technical standards to ensure effective fish and aquatic organism passage. The proposed design will ensure that the peak

discharges for the 10-year and 100-year events are not increased downstream and that the 100-year water surface elevation is not increased upstream more than 0.10 feet on property not owned by MAA. The proposed design will comply with State Highway Administration (SHA) Office of Structures (OOS) manual for Hydrology and Hydraulics (H&H) Design, Chapter 13; Federal Highway Administration (FHWA) 23 CFR 650A; Hydraulic Engineering Circular-26 (HEC-26): "Design of Fish Passage for Bridges and Culverts"; Section 26.17.04.06 of the Code of Maryland Regulations (COMAR); and Natural Resources Conservation Service (NRCS) conservation practice standard for aquatic organism passage (Code 396) ensuring that the minimum requirements for fish and other aquatic organism passage for nontidal are met. These standards ensure that the design supports habitat connectivity, allowing safe passage for aquatic organisms while maintaining structural and environmental integrity.

The design will be developed in compliance with SHA Office of Structures (OOS) Manual regulations and requirements, ensuring both safety and durability. The structure will be engineered to remain stable under worst-case flood conditions, accounting for overtopping flow and 100-year flood events. These design measures are in place to minimize the risk of culvert failure. The design focuses on resilience, ensuring that the structure performs satisfactorily throughout its service life while mitigating potential flood-related damages. The design team has committed to using a bottomless culvert made of concrete. Concrete was chosen as the material for the proposed culvert as concrete will require less maintenance and is more durable under heavy loads and harsh conditions. This choice for design allows for this structure replacement to be cost-effective and a long-term solution for the needs of the airport, while still providing improved fish and aquatic organism passage.

The project design is being completed by a competent licensed Maryland Engineering Firm with experience in culvert design. The project designer was recently responsible for designing the replacement of two twin CMPs with bottomless arch culverts for BWI Long Term A Lot. Construction will be monitored by a third-party construction management and inspection firm to ensure all work is completed per the approved plans. There will be post-construction monitoring of the culvert and Stony Run to confirm the successful construction and identify any issues requiring corrective actions.

In addition to monitoring structure stability following the culvert replacement, MAA will coordinate with resource agencies (MDNR, USFWS, and NOAA Fisheries) to develop a technically sound monitoring approach for fish passage at the replaced culvert. MAA is committed to visual assessments, physical monitoring, and biological monitoring for five years following construction. Performance standards to assess the success of fish passage options must be broad-based. While external factors (e.g., biological, physiochemical, etc.) not controlled by fish passage design may affect fish movement within a stream reach, certain critical physical parameters required for successful fish passage can be controlled. These parameters include water depth and water velocity. In addition, sediment deposition or scour at the structure, presence of debris jams, and other, general conditions of the structure can be readily assessed. For this reason, the primary performance measure for the goal of fish passage will be meeting the fish passage design parameters established for the project, including annual monitoring of water depth and velocity during the spring migration period for river herring. Physical monitoring will occur annually for five years following construction. Visual assessments and eDNA sampling will also occur along

the project area reach during spring migration periods for river herring to monitor use and passage by river herring. While specifics on eDNA monitoring will be coordinated with resource agencies for approval, MAA anticipates collecting eDNA samples for river herring at five locations along Stony Run (upstream and downstream of the project area). Samples will be collected weekly during the typical spring spawning run period for river herring (i.e., March and April). Visual assessments will also occur at the time of eDNA sampling to document the presence of river herring. Previous studies have shown that river herring can return and utilize upstream habitats within two years of large blockage removals and eDNA confirmation can occur over a one to five year window (Huang et al. 2023); therefore, monitoring is expected to occur annually for five years.

Criterion #5: Climate Change, Sustainability, and Resilience

The design will account for climate change, sustainability, and resilience in several ways. The design will ensure that the peak discharges for the 10-year and 100-year events are not increased downstream and that the 100-year water surface elevation is not increased upstream more than 0.10 feet on property not owned by MAA. The replacement structure will be concrete instead of corrugated metal, which is expected to improve stability and sustainability due to a prolonged service life compared to the deteriorating CMPs currently in place. By replacing the twin CMP with a larger, bottomless design, the project will also increase the hydraulic capacity and the new culvert will reduce the risk of flooding and potential damage. The larger, single structure will be capable of passing larger debris associated with the anticipated increase in storm frequency and intensity due to climate change. In addition to these measures, the design team will also account for climate change by using the MDOT SHA Climate Change Vulnerability Viewer (CCVV), which showcases data related to climate change and the potential to impact Maryland's transportation infrastructure. Data included in the CCVV tool includes nuisance flooding areas, comprehensive flood modeling, roadway inundation, hurricane models, and other related data.

Criterion #6: Equity and Barriers of Opportunity

Historically, several tribes of indigenous people, including the Piscataway and Susquehannock, inhabited the shores of the Patapsco River and utilized the Chesapeake Bay and its tributaries to acquire food and other resources. Aquatic species, including migrating shad, striped bass, river herring, American eel, and sea lamprey were important food sources for indigenous tribes in the Chesapeake Bay region. Individuals from these tribes would build V-shaped weirs out of wood or stone to capture migrating American eel and sea lamprey. The mass migration of these species through the Chesapeake provided a sustainable food source for these tribes. Presently, the Native American population in the surrounding area has dwindled due to a variety of reasons; however, there are multiple institutions with the mission to preserve tribal history in the area, such as the Baltimore American Indian Center. The culvert replacement project will expand access for river herring, American eel, and sea lamprey to historic spawning grounds by removing barriers to fish migration pathways, which will result in both direct and indirect benefits to the natural resources of this area that are connected to this tribal history.

The project is consistent with the goals of Executive Order 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*. MAA promotes the utilization of D/S/M/WBEs and removes barriers to participation through strong labor standards, including above average compensation via the Secure Maryland Wage Act. MAA is committed to

enhancing opportunities and ensuring fair access for minorities and women, both employees and business partners.

MAA is an established leader in the airport industry with sustained commitment to the values of diversity, equity, and inclusion (DEI) through employment and contracting opportunities. BWI was recognized with the ACI-NA Large Hub Inclusion Champion Award (2020) which celebrates innovative steps taken by airports to foster diverse businesses, workforce diversity, and advocacy. MAA's Executive Director Ricky Smith was the first recipient of the ACI-NA Leon C. Watkins "Guardian Award" (2020) for Excellence in Business Diversity. The award recognized Mr. Smith as a leader that promotes opportunities for minority- and women-owned businesses while also advancing equal opportunities for all in the airport industry.

V. Project Readiness and Environmental Risk

Environmental Review and Permitting Risk

Environmental review and permitting risk information is provided below in the context of project readiness, per guidance in the NOFO.

Detailed Statement of Work

The existing twin corrugated metal pipe (CMP) culverts at the Runway 10 Approach Road over Stony Run are failing and clogged with sediment and debris, inhibiting fish passage. MAA will initiate the NEPA and permitting process upon notification of awarded funds. MAA anticipates a NEPA determination of Categorical Exclusion (CE) for this project and NEPA, permitting, and design will advance concurrently, to the extent possible. For design, up to three (3) proposed options will be analyzed for replacement of the existing culvert and both options will be concrete, bottomless designs. The design efforts will include researching records and site inspection; site investigations and topographic survey; base plan development; geotechnical investigations including borings; and design. Civil engineering design and hydrologic and hydraulic (H&H) analysis of Stony Run to determine the impacts of replacing the existing culverts and evaluate the three design alternatives. Peak discharges will be developed using SCS TR-55/TR-20 methodology and the existing conditions discharges will be calibrated based on the results of Fixed Region regression equations computed using GIS-Hydro in accordance with the Maryland Hydrology Pan. As required by MDE Nontidal Wetland & Waterway Division (NTWWD), the existing conditions model will be utilized to develop ultimate conditions discharges which will take into consideration land use zoning in the watershed. The H&H analysis and recommended culvert replacement options will consider impacts to peak discharges resulting from culvert upgrades. The existing conditions HEC-RAS hydraulic model available from MDE through the Digital Flood Insurance Rate Map (DFIRM) outreach program will be used as the base conditions model for the analysis. The results of the H&H analysis will be summarized in an H&H report suitable for submission to MDE. The H&H analysis and recommended culvert replacement options will consider impacts to peak discharges resulting from culvert upgrades. The design will need to ensure that the peak discharges for the 10-year and 100-year events are not increased downstream and that the 100-year water surface elevation is not increased upstream in excess of 0.10 feet on property not owned by MAA. The design will ensure compliance with the Hydraulic Engineering Circular 26 (HEC-26): "Design of Fish Passage for Bridges and Culverts"; design or retrofit of a

stream crossing to meet fish passage requirements. The design will also comply with Section 26.17.04.06 of the Code of Maryland Regulations (COMAR) and Natural Resources Conservation Service (NRCS), conservation practice standard, aquatic organism passage, Code 396 ensuring that the minimum requirements for fish and other aquatic organism passage are met in nontidal waters. Stormwater Management (SWM), Erosion and Sediment Control (ESC), Nontidal Wetland/Stream Impacts, MAA AZP and Form FAA 7460-1, and Airfield Safety and Phasing Plans will be prepared. Following construction of the project, a technically sound monitoring approach will be developed with input from resource agencies. MAA expects to monitor fish passage at the new culvert annually for five years through physical monitoring of final design criteria (e.g., depth and flow), visual inspections, and eDNA sampling.

Technical Feasibility

To enhance fish passage and the resilience of both the structure and the associated access road, a bottomless concrete culvert will be proposed. The bottomless culvert design supports natural streambed continuity. Three different options for bottomless culverts will be analyzed to determine the best solution. The design criteria for the project will be developed based on multiple regulatory and technical standards to ensure effective fish and aquatic organism passage. The design will comply with the Hydraulic Engineering Circular 26 (HEC-26), which provides guidelines for the design or retrofit of stream crossings to meet fish passage requirements for both bridges and culverts. In addition, the design will adhere to Section 26.17.04.06 of the Code of Maryland Regulations (COMAR), which governs environmental and water resource protection. The project will also follow the Natural Resources Conservation Service (NRCS) conservation practice standard for aquatic organism passage (Code 396), ensuring that the minimum requirements for the passage of fish and other aquatic species are met in nontidal waters. These standards will ensure that the design supports safe passage for aquatic organisms while maintaining structural and environmental integrity. The design team for this project recently completed two similar culvert replacements at BWI for Long Term Lot A, which involved replacing two deteriorating twin CMPs with concrete bottomless arch culverts.

Project Schedule

An overall project schedule is provided below in **Table 2**. Because this project will occur on MAA-owned property, there is no anticipated right-of-way acquisition. Schedule-related risk mitigation measures are discussed below in the *Assessment of Project Risks and Mitigation Strategies* section.

Table 2: Culvert Replacement – Runway 10 Approach Road over Stony Anticipated Project Schedule

Project Milestone	Duration	Start Date	End Date
NEPA	5 months	4/1/2025	9/1/2025
Anticipated Permit Approval from MDE Stormwater and Sediment Plan Review Division	4 months	6/1/2025	10/1/2025
Anticipated Permit Approval for MDNR Authorization for Work in the Stony Run Forest Conservation Easement	2 months	8/1/2025	10/1/2025

Anticipated Permit Approval for MDE Wetlands and Waterways Protection Division, MDE Waterway Construction Division, and US Army Corps of Engineers Joint Permit Application	2 months	8/1/2025	10/1/2025
30% Project Design Submittal	16 weeks	4/1/2025	7/22/2025
60% Project Design Submittal	30 weeks	7/22/2025	10/28/2025
100% Project Design Submittal	38 weeks	10/28/2025	12/23/2025
Procurement/Advertisement	40 weeks	12/23/2025	9/29/2026
Construction	4 months	9/29/2026	1/29/2027
Post-Construction Monitoring and Reporting	5 years	1/29/2027	1/29/2032

Required Approvals

MAA and its on-call consultant teams are well versed in environmental planning and permitting. NEPA and permitting for this project have not been initiated as this project is still in the early stages of design and funds are being requested for NEPA, permitting, and design through the Culvert AOP Program. Due to the size and minimal impacts expected from the culvert replacement project, a Categorical Exclusion (CE) is anticipated for the NEPA determination.

Due to the minimal impacts associated with this project, MAA does not expect any issues with project permitting. A culvert replacement and up and downstream tie-ins/stabilization would likely be a temporary waters impact. For the waterway construction impacts, a Joint Permit Application (JPA) would be prepared and submitted to MDE Regulatory Services Section for distribution to the DNR, USFWS and USACE. Trilogy letters would be sent to DNR and MHT to confirm there are no state RTE species or cultural resources issues located within the project area. An iPaC (Information for Planning and Consultation) certification should be completed to confirm no federal RTE species are located within the project area. The USACE would most likely approve the project via a Nationwide permit (NW) and MDE Authorized to Proceed (ATP), since there are no wetland impacts anticipated. Mitigation would not be anticipated since all impacts are temporary.

Since there is no anticipated new impervious surface, a SWM waiver can be obtained from MDE or authorized agent. Erosion and Sediment Control plans will need to be prepared and approved by the MDE Plan Review Division or authorized agent. Plan submissions include Concept Design (30%), Site Development (65%) and Final (100%), as detailed in the project schedule above. Since forest impacts are expected to be below 20,000 square-feet, the project would be exempt from the Forest Conservation Act.

Assessment of Project Risks and Mitigation Strategies

It is not anticipated that the culvert replacement will result in impacts requiring mitigation. The diversion of the stream is a risk to the construction of the culvert; however, clearwater diversion will be sized per MDE requirements to allow for the safe passage of stream flow through the site during construction. During removal of the existing structure and the construction of the proposed

structure, there is a risk of environmental impacts and disturbance of aquatic life. To mitigate this risk, the project will implement best management practices (BMPs), such as silt fences, erosion controls, and time of year restrictions to avoid disturbing spawning fish species. Construction will also be scheduled during low-flow periods to minimize disruption. There is the risk of potential flooding during construction. To mitigate this risk there will be detailed hydraulic modeling to ensure the design accommodates both low and high flow conditions, appropriately sized clearwater diversion, scheduled construction during low-flow periods to minimize disruption, and a developed Flood Mitigation Plan for construction.

The cost estimate for this project was based on the previous Long Term Lot A culvert repair project, as well as a separate project which included more erosion repair than Long Term Lot A. The designer teams' original scope for the culvert replacement at Runway 10 Approach Road over Stony Run was to develop 30-percent documents to develop a construction cost, but that phase was halted. Since preliminary design for this project has not been completed, developing an exact cost is not possible; therefore, the cost estimate was derived from the Long Term A Culvert Replacement construction cost. This project budget includes a built-in 30-percent design contingency to account for unforeseen complications with design, as well as an overall 3-percent escalation to factor in escalation in labor costs and materials.

MAA has also factored in several time and schedule risk mitigation procedures. Rain delays and procurement delays have been accounted for in the proposed project schedule. There is also ample time allotted between anticipated permit approval and the 100-percent design completion date. This will allow for flexibility related to delays in NEPA, permitting, or design. MAA also plans to implement regular project team meetings throughout the entire project, including weekly team meetings during construction.

Technical Qualifications

MAA has a thorough understanding and successful track record of complying with Federal contract and procurement requirements as applicable, including but not limited to: Title VI/Civil Rights requirements, Buy America provisions, Americans with Disabilities Act, Uniform Relocation Assistance and Real Property Acquisition Act, Davis Bacon Act, Federal Motor Vehicle Safety Standards, and/or the Federal Motor Carrier Safety Regulations. As a multi-modal and aviation facility, MAA stakeholders and tenants include other Federal agencies (Department of Homeland Security and Customs and Border Protection). Construction contracts, including terminal development programs, have successfully complied with and will continue to comply with Buy America provisions. MAA complies with all FAA federal contracting requirements for applicable architectural/engineering services, including the contracts that will support this project. MAA commits to complying with all applicable Federal contract and procurement requirements in undertaking the proposed project.

Lead Applicant Experience

The designer has extensive experience with fish passage and AOP in relation to both infrastructure and ecosystem restoration projects. For example, slope, flow velocity, and minimum depth parameters for a low flow channel are often integrated into culvert design as a requirement from MDE to ensure passage following the installation, replacement, or retrofit of culverts on perennial

systems. Examples of this include work for drainage and culvert design for MDTA on the I-95 Express Toll Lanes as well as for virtually countless culvert replacements for the designer's municipal clients.

AOP is a standard requirement for the designer's ecosystem restoration projects. The designer has designed and constructed over 25,000 linear feet of restored stream channel as part of the Eccleston Restoration project as well as the Patuxent Mitigation Bank, all in Use III trout waters. Each of these post construction systems has demonstrated trout mobility and spawning as verified through monitoring, indicating successful passage and overall successful habitat restoration, and was scrutinized by MDE, USACE, and MDNR for suitable passage design. The designer has suitable modeling capability, including 2-Dimensional modeling, to analyze culverts and low flow channels and compare to known reference materials for the species present in a system, to ensure that low flow depth, slope and velocity is met to allow passage. This includes seasonal analysis of high, low, and average seasonal stream discharges to determine passage characteristics of existing and proposed crossings.

MAA is currently managing 13 grants valued at over $132 million. MAA is an annual recipient of FAA Airport Improvement Program (AIP) grants, which support planning and development of public-use airports, along with AIP discretionary grants to support planning and construction. MAA has programmed over $250 million through FY 2029 in anticipated AIP Federal funding to construct critical airfield and terminal improvement projects at BWI Marshall and Martin State Airports. BWI was also recently awarded over 102 million dollars in federal including through the Infrastructure Investment and Jobs Act, Coronavirus Aid, Relief, and Economic Security Act (H.R. 748, Public Law 116-136), and sustainability grants.

MAA has successfully delivered projects that have culminated in necessary and beneficial Airport development. MAA professional planning and engineering staff consistently engage qualified consultants to conduct planning, environmental and design work in compliance with FAA, State and local requirements. Projects undertaken for MAA are developed with careful consideration regarding scope and schedule. Regular meetings with consultants and key stakeholders ensure work is tracking with the budget and schedule and potential out-of-scope items are identified and addressed early.