NASA Langley Research Center
Municipal Separate Storm Sewer System (MS4)
Annual Report

Covering the period of July 1, 2022 – June 30, 2023

Submitted to the Virginia Department of Environmental Quality (DEQ) in compliance with Permit No. VAR040092

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General information:

a. NASA Langley Research Center, VAR040092.

b. The reporting period for this annual report is July 1, 2022 through June 30, 2023.

c. The signed Certification Statement can be found on the last page of this annual report.

d. Each annual reporting item as specified in a Minimum Control Measure (MCM) in Part I E can be found on pages 5 – 20.

e. A Program evaluation can be found on pages 3 – 4.

Part I D 2 e - Evaluation of MS4 Program Implementation

The Program Plan has guided NASA Langley Research Center (LaRC) in effectively implementing the requirements of the permit. The MS4 Annual Report assesses the effectiveness of the MS4 Program through internal review conducted by LaRC's Environmental Management Office (EMO) and incorporates any public feedback. The program was evaluated for improvements and strengths, during which it was confirmed there is no need for significant alterations to the Program Plan. A summarized review of each MCM is below:

MCM 1 – Three high priorities were selected to reflect the most pressing stormwater-related concerns at LaRC, and the public contact information was updated. This Plan Year (PY) LaRC increased the educational outreach campaign for MCM 1 by leveraging multiple tools, the public website, informative articles and flyers, targeted e-mails, and training sessions. This concerted effort proved successful in reaching various relevant groups across the Center, teaching them methods to combat stormwater pollution and enhance the water quality of local waterways. Evaluations through the EMO internal review process and public feedback attested to the strengths of this multifaceted initiative and modifications were deemed unnecessary.

MCM 2 – LaRC actively seeks input through the interactive platform *Inside Langley*, which is accessible to all Center employees, and the environmental webpage, which is accessible to the public. Reinforcement of public engagement and feedback has led to the continual improvement of the Program Plan. Encouraging reporting illicit discharges in accordance with permit requirements remains an ongoing endeavor, with trainings, public website resources, and outreach articles and flyers disseminated on a quarterly basis. Personnel can contact EMO staff or visit the public website for information on LaRC's IDDE Program.

The EMO promotes an array of internal events and advertises external events to educate the public and uphold the Center's commitment to inclusivity and community engagement. This MCM was evaluated for effectiveness through public participation interaction and recorded attendance and was deemed effective. No major program plan changes are needed.

MCM 3 – Illicit discharges are strictly prohibited at LaRC and are addressed by the comprehensive IDDE Handbook, Langley Procedural Requirements (LPR) 8500.1, and the Annual Standards and Specifications for Stormwater Management and Erosion and Sediment Control (AS&S). Regular trainings are available to personnel, serving to inform staff and address concerns. Additionally, LaRC operates within a VPDES industrial permit, with a framework designed to minimize and prevent pollutant discharges. After an internal evaluation of the IDDE component of the program by EMO, this measure was found to be effective with no need for major modification. Minor changes were made to IDDE inspection checklists.

MCM 4 – This facet of the program is executed through LaRC's DEQ-approved AS&S, LaRC's Environmental Construction Specifications Section 01 35 40.00 99, and LaRC Seeding Specifications Section 32 92 19.00 99. These documents detail LaRC's stormwater construction program and associated requirements, which comply with all regulatory requirements including Part I E 4 a 3 of the MS4 permit.

The AS&S undergoes an annual evaluation by DEQ, ensuring alignment with current regulatory standards. A comprehensive evaluation of this program's effectiveness was conducted through the EMO internal review process; it was determined the program needs no significant updates other than those required for current program contact and certification information.

MCM 5 – This component of the program is implemented through LaRC's approved AS&S. Projects adhere to LaRC's Environmental Construction Specifications Section 01 35 40.00 99 and NASA Environmental Design Standards. EMO plays a crucial role in the project review and execution process by providing feedback during the design and construction phases to ensure compliance with all requirements.

Additionally, LaRC has developed a Green Infrastructure Maintenance Handbook to ensure long-term operation and maintenance of stormwater management (SWM) facilities. This handbook serves as a comprehensive guide to the upkeep of these structures. As part of the continuous improvement process, document updates are made as necessary. Additionally, EMO strengthened language in the contract for the Grounds Maintenance Contractor who performs maintenance on many of the SWM facilities.

After thorough review through the EMO internal process, the program was deemed effective and no changes required to the Program Plan's current structure and guidelines.

MCM 6 – LaRC employs multiple operational and maintenance best management practices (BMPs) to prevent and mitigate pollutant discharges during Center operations. These control measures and pollution prevention practices are outlined in procedural documents, including the Environmental and Energy Program Manual (LPR 8500.1), LaRC's AS&S, and LaRC's IDDE Handbook. The Center also maintains a robust training regimen for workers engaged in maintenance and construction duties.

LaRC curtails environmental impacts from projects by requiring Langley Form 461 (LF461), the "Environmental Project Planning Form," which reviews and comments on plans prior to start. In tandem, the Center has a Stormwater Pollution Prevention Plan (SWPPP) for the Grounds Maintenance Yard which monitors the regular functions and activities that may cause runoff or other discharges. Any necessary document updates are promptly executed.

This MCM was examined during the EMO internal review and deemed effective. LaRC ensures compliance by onsite personnel and maintenance contractors with standard operating procedures and updates to the Program Plan.

Chesapeake Bay TMDL Special Conditions – LaRC submitted its Chesapeake Bay Phase Two Action Plan to the DEQ on October 31, 2019 and received approval from the DEQ on July 14, 2021. LaRC is implementing the action plan and the program has been found to be effective. The action plan is maintained and implemented by EMO, and a copy is available upon request. Additionally, LaRC has drafted its Chesapeake Bay Phase Three Action Plan for submittal to the DEQ with the MS4 Registration Statement.

Back River TMDL Special Conditions – LaRC was allocated a waste load reduction for the Back River TMDL. To meet conditions of Part II of the General Permit, LaRC developed and implemented the Back River Action plan, which was submitted to the DEQ on May 5, 2021. Approval was received on January 1, 2022. The action plan is maintained and implemented by EMO, and a copy is available upon request.

NOTE: Future amendments to the Program Plan may occur based on regulatory updates to the next MS4 permit cycle.

Minimum Control Measure One – Public Education and Outreach
Annual Reporting Requirements – Part I E 1 g

The table below lists the high-priority stormwater issues addressed and the communication strategies used:

Strategy	Metrics and Evaluation	High Priority Issues Addressed
Speaking Engagements: These training sessions target personnel who frequently interact with chemicals, hazardous materials, oils, and other processes with risks to water quality. Therefore, LaRC also includes topics on stormwater pollution prevention, detecting/reporting illicit discharges, and spill response during these trainings because of the target audience. A more detailed list of training events conducted in accordance with Part I E 6 m can be found under the MCM 6 section	Annual Facility Environmental Coordinator Training, held on 08/04/2022, 08/08/2022, 08/17/2022, 08/24/2022, 08/31/2022, and 06/30/2023; Annual Waste Management and Spill Response Training, held on 07/21/2022, 08/10/2022, 06/05/2023, and 06/07/2023.	1. Environmental Impacts of LaRC Processes 2. LaRC's Illicit Discharge Detection and Elimination (IDDE) Program and Reporting Resources 3. Chesapeake Bay and Back River TMDL Education
Media Material - Educational Article: ***Processes that May Impact Water Quality at LaRC*** The article encompasses many of the mechanical and chemical processes and the range of pollutants that have potential for discharge from LaRC, as well as the ramifications on water quality. It accentuates the Environmental Review process and its role in facility operations by providing examples of discharge processes that require review and relevant regulations.	Published 09/16/2022 on the public environmental website and advertised on *Inside Langley*. The *Inside Langley* advertisements received 95 views and the environmental website received 21,811 hits*.	1. Environmental Impacts of LaRC Processes 2. LaRC's Illicit Discharge Detection and Elimination (IDDE) Program and Reporting Resources
Media Material - Educational Article: ***NASA Langley Stormwater Connections & Illicit Discharge Detection and Elimination (IDDE)*** This article explains indoor and outdoor connections at LaRC's facility, highlighting distinctions between wastewater and stormwater systems, while also offering guidance on what to do if an illicit discharge is detected.	Published on 12/19/2022 to the public environmental website and advertised via *Inside Langley.* The article advertisement received a total of 196 views and the webpage received 12,655 hits*.	1. Environmental Impacts of LaRC Processes 2. LaRC's Illicit Discharge Detection and Elimination (IDDE) Program and Reporting Resources
Media Material - Educational Article: ***Chesapeake Bay and Back River Waterways***	Published on 3/20/2023 to the public environmental website and advertised on *Inside Langley*. The *Inside Langley* advertisements received 42	1. Environmental Impacts of LaRC Processes

The article informs readers of various regulations on the Chesapeake Bay and the Back River waterways, the concept of TMDLs, and the methods used to gauge and uphold water quality standards. It also includes NASA Langley's utilization of BMPs in accordance with Virginia's TMDL objectives for the Chesapeake Bay and the Back River. The article highlights Langley's innovative green infrastructure, ongoing ecological endeavors, and the Grounds Maintenance contract, all of which contribute to mitigating pollution. It also identifies practical measures for individuals to adopt at work and home to combat water pollution.	view and our environmental website received 12448 hits*.	2. LaRC's Illicit Discharge Detection and Elimination (IDDE) Program and Reporting Resources 3. Chesapeake Bay and Back River TMDL Education
Signage: LaRC maintains signage to enhance visibility of SWM facilities at LaRC to both visitors and employees, including visual "underground" explanations of how each manufactured BMP is designed to address stormwater quality and quantity. These signs offer an opportunity for EMO to teach passersby about the importance of the SWM facilities in mitigating pollution.	Signage was evaluated during EMO internal inspections in May 2023 and found to be in adequate condition.	1. Environmental Impacts of LaRC Processes 2. LaRC's Illicit Discharge Detection and Elimination (IDDE) Program and Reporting Resources 3. Chesapeake Bay and Back River TMDL Education
Media Material - Educational Article: ***Reducing Urban Wildlife Pollutants: Back River TMDL*** This article describes NASA Langley's Back River bacterial TMDL, including possible causes for fecal coliform levels in the waterway and the measures taken by NASA Langley to limit said introductions. The article also provides actions for staff to limit personal stormwater contributions at the home and workplace.	Published 06/21/2023 on the public environmental website and advertised on *Inside Langley*. The *Inside Langley* advertisements received 63 views and the environmental website received 2309 hits*.	1. Environmental Impacts of LaRC Processes 2. LaRC's Illicit Discharge Detection and Elimination (IDDE) Program and Reporting Resources

NASA believes the "hits" count is inflated due to spam website interactions. The number of advertisement views was used to evaluate effectiveness for the MS4 Annual Report.

Minimum Control Measure Two – Public Education and Participation
Annual Reporting Requirements – Part I E 2 f

(1) LaRC requests public input on the MS4 program via the *Inside Langley* announcement system (accessible to all employees). Additionally, public input is encouraged at any time through the environmental public webpage (which is also routinely promoted). The following is a summary of public input received on the MS4 program:

Public Input Received	Response and Implementation
LaRC did not receive any public comment during this reporting period. An advertisement for public comment was published on 3/2/2023 through *Inside Langley* email notifications, and again in LaRC's third quarterly stormwater article.	LaRC has garnered informal commendations and feedback throughout the permit year from both internal and external sources regarding the MS4 program. EMO remains steadfast in its commitment to advancing its water quality program through accessible means such as informative handouts, posters, emails, signage, and blog posts. The public webpage will remain diligently monitored to ensure the latest information is readily accessible, with constant updates and additional content provided to enhance environmental practices at LaRC and at home.

(2) The LaRC MS4 program and stormwater website: https://environmental.larc.nasa.gov/water/ms4/.

(3,4,5) Public involvement activities implemented during the reporting year are described below. Each subsection lists the metric defined for each and an evaluation of the activity benefits. Participation in events for all Center personnel was encouraged through promotion, sponsorship, and/or involvement.

Category of Public Involvement Opportunity: Educational Events

1) NASA Langley's Earth Day/Arbor Day Expo 2023

Activity Description: LaRC hosted an Earth/Arbor Day Expo on the center on 04/19/2023. The expo featured 12 interactive exhibits from several Langley programs and local environmental groups, such as askHRgreen, Resilient Hampton, Virginia DEQ, and the Mariner's Museum. The event was held adjacent to the cafeteria in B2102 and was open to all personnel.

Metric and Evaluation of Water Quality Benefits: EMO staff coordinated this event, including advertisement through the *Inside Langley* announcement page, the public environmental blog, and center-wide emails. Due to its location adjacent to the cafeteria, hundreds of employees were able to interact with exhibitors on recycling, stormwater pollution prevention, water quality, community involvement opportunities and resiliency, native plants, and more. The *Inside Langley* announcements for LaRC's Earth Day/Arbor Day activities received a total of more than 300 "views" from 03/28/2023 to 05/01/2023. The event was well received and deemed effective for public involvement to improve water quality and support local initiatives.

Category of Public Involvement Opportunity: Disposal or Collection Events

1) Household Chemical Collections and Computer Recycling

Activity Description: LaRC actively promotes local household chemical collection events that occur throughout the year and serve communities that surround LaRC. By advocating for these collection events, LaRC limits potential waste seepage into local landfills, waterways, and groundwater, effectively mitigating environmental hazards. Several of these collection events were promoted through the *Inside Langley* announcement page.

Metric and Evaluation of Water Quality Benefits: These advertisements ran consistently throughout the year, collectively amassing over 100 views. During LaRC's annual Waste Management Spill Response training, attendees were polled about participation in an advertised collection event. Seventeen attendees responded that they participated in at least one collection event. NASA deems these events to be effective and important for preventing hazardous materials from entering the environment.

2) NASA Langley Plastic Bag Recycling

Activity Description: LaRC sustained its ongoing collaboration with the York/Poquoson Master Gardeners to recycle plastic bags and film packaging. LaRC collected plastic bag material from Center personnel for eight weeks during the permit cycle (four weeks each in observance of Energy Awareness Month in October 2022 and Earth Day/Arbor Day in April 2023). All material collected was donated to the York/Poquoson Master Gardeners to make composite benches for parks, schools, or learning gardens. The collaboration between LaRC and the York/Poquoson Master Gardeners exemplifies a commitment to community involvement, outreach, and sustainability.

Metric and Evaluation of Water Quality Benefits: The event was coordinated by EMO staff, and announcements were posted on the *Inside Langley* events calendar and public environmental blog throughout the months of October 2022 and April 2023. LaRC collected 99 pounds of plastic and film packaging in October 2022, and 25 pounds in April 2023, bringing the total amount of recycled single-use plastic material up to 1,747 pounds since 2016.

Category of Public Involvement Opportunity: Restoration

1) Annual Clean the Bay Day

Activity Description: Clean the Bay Day, orchestrated by the Chesapeake Bay Foundation, was held over five days from 05/29/2023 to 06/05/2023. This extensive event engaged volunteers to remove debris from Virginia's shoreline and used a flexible schedule to increase active engagement from volunteers. The event also showed participants the pressing challenges facing the Chesapeake Bay watershed and the importance of keeping local waterways clean. LaRC joined forces with neighboring MS4 permittee, Joint Base Langley Eustis-Langley (JBLE-L), contributing to a local shoreline restoration event.

Metric and Evaluation of Water Quality Benefits: LaRC promoted the partnership with the JBLE-L event via *Inside Langley* announcements. The advertisements received numerous views and NASA contributed two volunteers to the event. The multi-day clean-up event removed approximately 30 pounds of debris along 18 miles of shoreline. The most common items removed were pieces of lumber, numerous plastic bottles, and plastic bags.

2) Additional JBLE-L Volunteer Opportunities

Activity Description: LaRC partnered with JBLE-L for multiple volunteer opportunities throughout the reporting period. Events included Turn the Tide on Trash and Langley Clean-up. LaRC advertised these volunteer opportunities on the *Inside Langley* announcement page, public environmental blog, and center-wide emails.

Metric and Evaluation of Water Quality Benefits: The events were promoted by EMO staff and advertised on the *Inside Langley* announcement page, the public environmental blog, and center-wide emails. The advertisements received numerous views and NASA contributed four volunteers to the events. The events combined to remove hundreds of pounds of litter, including over twenty pounds of trash from along the shores and waterways of the JBLE-L facility. NASA views these events as valuable opportunities to partner with a neighboring MS4 and share positive impacts for removing litter from our local waterways.

Minimum Control Measure Three – Illicit Discharge Detection and Elimination
Annual Reporting Requirements – Part I E 3 e

(1) **Confirmation Statement:** LaRC's MS4 map and information table have been updated to reflect any changes to the MS4 occurring on or before 06/30/2023. LaRC will continue to maintain a robust GIS-based MS4 map that includes a storm sewer map and information table.

(2) NASA LaRC has 16 MS4 outfalls. All 16 outfalls were inspected quarterly, totaling 64 inspections during the reporting period. Additionally, visual outfall inspections often occur weekly for several outfalls in the core industrial area. Screening reports are stored physically and electronically with the EMO.

(3) A total of six (6) illicit discharges were reported and investigated:

Illicit Discharge Investigation #1: North 40 Concrete Wash Water

(a) Concrete washout container leakage in the North 40 area of the property.

(b,c) During a weekly inspection conducted by LaRC, effluent was observed seeping from a 20-yard concrete washout dumpster (07/07/2022). The inspection revealed a lapse in the containment structure.

(d-f) The leak was immediately remedied and all material deposited on the ground was removed in accordance with LaRC's spill response requirements. To prevent future leaks, the contractor positioned a 300-gallon receptacle adjacent to the concrete washout dumpster on 7/14/2022. Residual water from the upper section of the washout container was extracted into the tote. Once the tote reached three-quarters of its capacity, the contractor arranged for transfer offsite. The concrete wash water was then conveyed to Vulcan Materials for appropriate disposal. The inspection process concluded and was officially closed on 7/14/2022. There was no discharge to a storm drain or ditch.

Illicit Discharge Investigation #2: Puddle with Observable Contamination at Flight Dynamics Research Facility (FDRF)

(a) Puddle with soot sheen discovered on construction site referred to as FDRF.

(b,c) On 10/06/2022, a LaRC construction inspector noticed a large puddle that exhibited a sheen-like surface, a possible sign of oil contamination. Subsequent examination showed that oil was not the causative agent. The contractor on-site affirmed the residue atop the puddle emanated from a pile driving apparatus. The soot was promptly cleaned and removed from the premises.

(d-f) The incident was duly reported to the contractor and LaRC's spill response team. After investigation, it was ascertained that oil was not the source of the contamination. Comprehensive cleanup protocols were followed to effectively remove the soot from the site; the inspection was formally concluded on 10/07/2022. There was no discharge to a storm drain or ditch.

Illicit Discharge Investigation #3: Hampton Steam Plant Non-Stormwater Discharge

(a) The City of Hampton/NASA Steam Plant, operated by the City of Hampton, sits outside the NASA fence line but the stormwater system connects to a NASA stormwater ditch that eventually discharges to Outfall 005. A non-stormwater discharge from the plant was observed coming onto NASA's property.

(b,c) On 03/08/2023, NASA stormwater personnel discovered a stagnant, waxy unknown substance in NASA's stormwater ditch. Upon sampling and further investigations, a notification was made to the DEQ on 4/3/2023 and an absorbent boom was placed across the ditch as a precaution to prevent discharge to the outfall about one mile downstream.

(d-f) Investigation occurred from 03/08/2023 through 05/25/2023. In response to this situation, the City of Hampton and the DEQ were involved. It was discovered that the steam plant discharged

water softener backwash to the stormwater system, which then flowed through numerous catch basins and low points in the system. Trash, lime, and ash from other processes in the steam plant had accumulated in these basins and were being flushed out with the water softener backwash. The City of Hampton undertook a comprehensive cleaning of all catch basins and areas of reduced elevation using a vacuum truck. As part of the remedial plan, the water softener backwash was rerouted towards sanitary systems, after which the inspection was formally concluded on 05/30/2023. NASA is awaiting final confirmation of the replumb so the discharge can be removed from the NASA VPDES permit.

Illicit Discharge Investigation #4: Dewatering Bag at 22kv

(a) An electrical manhole was filled with groundwater during a routine maintenance inspection. To fix the issue, the manhole was dewatered per protocol through a dewatering bag placed on top of permeable pavers; however, the dewatering bag was left unattended for an extended period allowing for the development of algae.

(b,c) On the date of 05/23/2023, an inspector from LaRC discovered that during the dewatering process, the dewatering bag had been mistakenly left unattended for a period of time, allowing algae to grow. The bag was correctly placed on permeable pavers near a drain that channels water towards a bioretention basin, meaning the algae growth was not discharged to an outfall.

(d-f) Promptly recognizing the situation at hand, remedial action was initiated. The dewatering bag was removed on 05/25/2023 and the investigation was subsequently closed on 05/30/2023.

Illicit Discharge Investigation #5: B1189 Parking Lot Oil Stain

(a) Oil staining leading to a storm drain was found in an asphalt parking area near B1189. The most likely cause of this stain was a privately owned vehicle.

(b,c) On the date of 05/30/2023, an inspection conducted by a LaRC inspector led to the discovery of an oil stain in the B1189 Parking Lot. Remedial measures were taken including using absorbent pads in the affected area. In the interest of preventing another spill, monitoring was increased.

(d-f) After a thorough assessment and completion of response actions, the inspection was officially concluded on 05/30/2023.

Illicit Discharge Investigation #6: Dewatering Bag at B1268

(a) A dewatering bag was found by a LaRC inspector to be leaking, releasing sediment and like matter into a nearby inlet.

(b,c) A dewatering bag at B1268 was found on 06/28/2023 after an indeterminate duration of unattendance. Upon observation, it was apparent the dewatering bag had deteriorated to an unsatisfactory degree, permitting the escape of sediment particles onto the pavement and into an adjacent inlet. The bag was hidden among tall grass and did not receive required maintenance prior to discovery by the LaRC inspector.

(d-f) In response to this situation, a new dewatering bag was installed and supplemented by appropriate protective measures (IP) to the nearby inlet. The remedial actions satisfactorily resolved the matter and the associated report was closed on 07/22/2023. The water was determined to be condensate from a heat exchanger and the dewatering bag was used per LaRC protocol.

Minimum Control Measure Four – Construction Site Stormwater Runoff Control
Annual Reporting Requirements – Part I E 4 d

(1) NASA LaRC implements a construction site stormwater runoff program in accordance with Part I E 4 a (3).

(a) **Confirmation Statement:** Land disturbing projects that occurred during the reporting period have been conducted in accordance with the current Department approved standards and specifications for erosion and sediment control and stormwater management.

(b) Not applicable.

(2) The total number of NASA LaRC (MS4 staff) inspections conducted was 48 for the reporting year.

(3) Per approved LaRC Annual Standards and Specifications, the contractor may remedy minor deficiencies that have no environmental impacts without formal enforcement action, if this is done in a timely manner and not a recurring issue. Two (2) issues required formal enforcement actions, through a signed *Corrective Action Notice* form.

Project and No. of Enforcement Actions	Type of Enforcement	Issues Driving the Enforcement
VAR10Q866: 2 Enforcement Actions	Formal written Corrective Action Notice (CAN) submitted to the contractor and project team. Required corrective action to be completed within 72 hours. Issues were corrected and closed out on time.	1) On 12/16/2022 unfiltered sediment-laden water was observed leaving the site and discharging to Stormwater Outfall 008. The project was observed using improper dewatering techniques against the protected vegetated filter strip and rinsing muddy tarps in the construction entrance. Corrective action included immediately ceasing dewatering and rinsing processes, retraining employees on proper techniques, and inspecting E&S controls for necessary maintenance to remove excess sediment. 2) On 12/23/2022 sediment-laden water was observed leaving the site and discharging to Stormwater Outfall 008. A muddy section of bare soil overflowed past the construction entrance and down the street to an unprotected inlet. The project had a dirt berm protecting this area that failed. Corrective action included proper construction of a gravel berm and applying stabilization where appropriate.

Minimum Control Measure Five – Post Construction Stormwater Management
Annual Reporting Requirements – Part I E 5 i

(1) Not applicable. LaRC does not implement a Virginia SWM Program in accordance with Part I E 5 a (1) and (2). LaRC's SWM program fits Part I E 5 a (3).

(2) Thirty-two (32) formal inspections were conducted, once for each of the 32 stormwater management facilities operated at LaRC. EMO and the support contractor also conduct frequent SWM facility inspections during construction as part of the Construction General Permit (CGP) inspection process.

(3) Much of the maintenance completed on the SWM facilities was routine (sweeping, weeding, mulch applications, litter removal, etc.). There was no significant maintenance to SWM facilities performed.

(4) **Confirmation Statement:** LaRC had three projects under the General VPDES Permit for Discharges of Stormwater from Construction Activities during the permit year. All projects obtained proper coverage through the DEQ. Below is a summary of LaRC's projects:
- VAR10P840 (B1194 and B1200 Demolition): Received Notice of Termination on 10/31/2022
- VAR10Q866 (B2105 Construction): Ongoing; Received coverage on 03/22/2022
- VAR10S002 (B1256 COLTS Demolition): Ongoing; Received coverage on 10/25/2022

(5) **Confirmation Statement**: LaRC electronically reported BMPs using the DEQ BMP Warehouse on 09/28/2022. The approved submission was labeled as 20220928.

Minimum Control Measure Six – Pollution Prevention/Good Housekeeping
Annual Reporting Requirements – Part I E 6 q

(1) LaRC has not developed any new or significantly modified any existing operational procedures during the reporting period. Some visual tools were developed for GIS maps for the Grounds Maintenance Landscaper to define stormwater BMP boundaries. Existing written procedures are in accordance with Part I E 6 a and are summarized in the MS4 Program Plan.

(2) No new SWPPPs were developed during the reporting period. One existing SWPPP continued to be implemented.

(3) Modifications to the SWPPP were necessitated with the objective of enhancing its efficacy. This entailed revising the site map to incorporate flow arrows, strategically positioned to elucidate the directional course of stormwater movement towards the closest outfalls.

(4) No new turf and landscape nutrient management plans were developed during the reporting period. LaRC has no applicable lands where nutrients are applied to a contiguous area of more than one (1) acre.

(5) The following table is a summary of completed training during the reporting year:

Minimum Control Measure Six – Pollution Prevention/Good Housekeeping **Annual Reporting Requirements – Part I E 6 q**		
Training	**Selected Audience**	**Training Requirement/ Objective**
Annual FEC Training – Trainings were held on 08/04/2022, 08/08/2022, 08/17/2022, 08/24/2022, 8/31/2022, and 06/28/2023 with 9, 12, 10, 9, 7, and 3 attendees, respectively. A total of 50 FECs were trained. FECs are asked to monitor their facilities for illicit discharge concerns in their assigned facilities and are the primary "eyes and ears" for the EMO. The FEC training course covers stormwater pollution prevention and the importance of LaRC's IDDE program. It also discusses how to make proper reports to the EMO.	Facility Environmental Coordinators (FECs)	Part I E 6 m (1) Part I E 6 m (3)
Annual Waste Management and Spill Response Training – Trainings were held on 07/21/2022, 08/10/2022, 06/05/2023, and 06/07/2023 with 219, 114, 215, and 161 attendees, respectively. This annual training is mandatory for all Center employees (including FECs) that use, handle, or request disposal of hazardous materials, oils, or hazardous waste. A total of 709 Center employees were trained. Stormwater pollution prevention is covered in the training, along with appropriate spill response to prevent materials from reaching storm drains.	All Personnel who handle waste on Center FECs	Part I E 6 m (1) Part I E 6 m (3) Part I E 6 m (7)
Grounds Management Training –Training was conducted on 06/10/2023 and had a total of 12 attendees. The training is focused on several stormwater best management practices specific to the daily workload of grounds personnel, including the management of grass clippings, removing debris from catch basins, street sweeping, and minor spill cleanup. Attendees were also given information on what illicit discharges might look like at LaRC, and how to report issues or concerns of water pollution to the EMO. LaRC has very limited recreational facilities. There are a few ball/soccer fields and tennis court areas, but no nutrients are applied. However, LaRC reviews good housekeeping and pollution prevention practices around Center, including these facilities, during Grounds Management Training. The Grounds Maintenance contract is responsible for the minor amounts of pesticides and herbicides applied on Center. The program is primarily need-based and done via spot treatments (e.g., an individual requests a wasp nest be sprayed). LaRC has required, through specific contract language, that the Grounds Maintenance contract operator carry all required applicator licenses. This contract language ensures this requirement is met, or the operator is not allowed to work at LaRC. Grounds Management Training is offered biannually. In the off years, targeted training is provided to the primary Center contractor for maintenance and operations.	Grounds Maintenance Contractor (Performs street sweeping, apply pesticides and herbicides, and work around maintenance, public works, and recreational facilities)	Part I E 6 m (2) Part I E 6 m (3) Part I E 6 m (4)

Minimum Control Measure Six – Pollution Prevention/Good Housekeeping **Annual Reporting Requirements – Part I E 6 q**		
Training	**Selected Audience**	**Training Requirement/ Objective**
Emergency responders receive comprehensive training in spill release management as a part of broader emergency response preparedness requirements. This training encompasses personnel from the NASA LaRC Fire Department and the City of Hampton, as well as the proficient on-site HAZMAT Response contractor. All personnel maintain required certifications for emergency response.	Emergency Responders, including NASA LaRC Fire Dept and HAZMAT responders	Part I E 6 m (7)
Mrs. Ande Remington serves as LaRC's Water Program Manager. Mrs. Remington oversees all ESC and SWM Plan reviews and inspection programs. • Dual Combined Administrator, Certification #DCA0291 (Expires 10/29/2025) Mr. Sarat Calamur supports LaRC's Water Program by participating in plan reviews and overseeing the inspection programs. • Dual Combined Administrator, Certification #DCA0487 (Expires 09/22/2026) Mr. James Griczin provides contract support to LaRC's Water Program Manager. Support includes site inspections and conducting multi-media field inspections of construction sites and maintenance tasks. • Dual Combined Inspector #DIN1872 (Expires 07/31/2026) • Provisional Plan Reviewer for SWM (Expires 08/31/2024) Ms. Kattie Iwanski provides additional contract support to LaRC's Water Program Manager and conducts field inspections of construction sites and maintenance tasks. • SWM Inspector #SWIN2756 (Expires 07/31/2026) • Provisional Inspector for ESC (Expires 04/05/2024) Ms. Susan Dillman provides additional contract support to LaRC's Water Program Manager and conducts field inspections of construction sites and maintenance tasks. • Provisional Inspector for SWM (Expires 6/28/2024)	EMO	Part I E 6 m (5)

Minimum Control Measure Six – Pollution Prevention/Good Housekeeping **Annual Reporting Requirements – Part I E 6 q**		
Training	**Selected Audience**	**Training Requirement/ Objective**
Water Use and Discharge Reporting Procedures Quick Reference – LaRC's onsite maintenance contractor developed a comprehensive guide that informed Center Maintenance, Operations, and Engineering (CMOE) employees of methods for detection of illicit discharges, steps to follow if an illicit discharge was discovered, and all appropriate contact information for IDDE. The guide included specific information on various procedures and water uses, such as draining mechanical systems or pressure washing. In March 2023, this reference guide was discussed and distributed in various maintenance shops for convenience and availability.	Jacobs (Primary Center Contractor) Personnel	Part I E 6 m (1) Part I E 6 m (3)

Part II TMDL Summaries – Chesapeake Bay

TMDL Special Conditions – Chesapeake Bay TMDL
Annual Reporting Requirements – Part II A 13

a. All BMPs implemented during the reporting period were reported to the DEQ BMP Warehouse in accordance with Part I E 5 g. Submission ID was 20220928.

b. LaRC did not acquire credits to meet required reductions.

c. The tasks scheduled for PY5 were annual street sweeping, catch basin cleaning, land use change (reforestation), and land conversion via demolition of facilities. Due to funding impacts, the schedule of buildings planned for demolition was altered and reforestation did not occur. Instead, land use changes of Turf to Mixed Open occurred in areas where lawn maintenance was not necessary. Also in PY5, the demolition of the B1256 complex began and demolition of B1194/B1200 was completed.

The table below summarizes the cumulative reductions achieved after Permit Cycle 2. NASA LaRC achieved significantly more than the required 40% reductions during the first two cycles.

Sub source	Pollutant	Total Required Reduction (lbs)	Load Reductions Required by End of Permit Cycle 1 (5%) (lbs/yr)	Load Reductions Achieved by End of Permit Cycle 1 (lbs/yr)	Load Reductions Required by End of Permit Cycle 2 (40%) (lbs/yr)	Cumulative Cycle Load Reductions Achieved by End of Permit Cycle 2 (lbs/yr)	Cumulative Progress, Cycles 1 & 2 (%)
Regulated Urban Impervious	TN	143.2	7.16	96.1	57.3	152.2	**76%**
Regulated Urban Pervious		115.1	5.76	26.6	46.0	52.0	
Regulated Urban Impervious	TP	52.6	2.63	9.7	21.0	19.3	**66%**
Regulated Urban Pervious		9.3	0.46	4.5	3.7	8.9	
Regulated Urban Impervious	TSS	19880.2	994.01	7816.4	7952.1	11646.8	**73%**
Regulated Urban Pervious		1597.0	79.85	762.6	638.8	1382.1	

d. The following is a list of control measures expected to be implemented during PY1 of the new permit:

- One facility currently undergoing demolition (B1256) will complete work and convert to a green space. This will equate to a land-use change of 1.31 acres of impervious surface to a grass condition.

- Demolition will begin for two facilities (B1202 and B1299, pending funding). This will equate to a land-use change of 3.92 acres of impervious surface to a grass condition.
- LaRC will evaluate acreage in the North 40 that are not suitable for reforestation but are good candidates for conversion to Mixed Open space.
- LaRC will continue the street sweeping program and annual mass load credit approach.
- LaRC will continue to implement a catch basin cleaning program.
- LaRC will continue to implement ESC controls on land disturbing activities.

Part II TMDL Summaries – Local TMDL

Local TMDL Special Conditions – Back River TMDL
Annual Reporting Requirements – Part II B 9

The following is a summary of planned and completed actions during the reporting year and permit cycle, per LaRC's Back River TMDL Action Plan:

Actions for Permit Cycle: Nov 1, 2018 through Oct 31, 2023

Action		Schedule/Frequency	Implementation Status
Finalize/publish LaRC's Back River TMDL Action Plan to the public website; advertise via LaRC's employee notification system		May 2021	Completed May 25, 2021
Complete the public website update to include information on the Back River TMDL		June 2021	Completed May 25, 2021; maintained throughout permit year
Publish an educational article to the public website; advertise to LaRC personnel via *Inside Langley* employee notification system		At least one article annually	LaRC published the following educational articles to the public website and advertised to LaRC personnel via the *Inside Langley* employee notification system: 1) *Back River and Chesapeake Bay Waterways* published 03/20/2023, received 42 "views" 2) *Reducing Urban Wildlife Pollutants in the Back River* published 06/21/2023, received 63 "views"
Complete training on stormwater and water quality, with added emphasis on pollutants and urban wildlife	LaRC FEC training	At least two in-person classes annually; virtual training available anytime.	LaRC Annual FEC training held six "in-person" classes training a total of 50 FECs. Additionally, several FEC's completed the training via a recorded on-demand training option.
	IDDE-Specific SWM Training for the Center's maintenance contractor personnel and any interested LaRC personnel	Annually	LaRC developed a comprehensive reference guide to inform employees how to detect illicit discharges, what steps to follow if an illicit discharge was discovered, and all appropriate contact information for IDDE. This was reference guide was distributed in March 2023 and posted in various shop locations.
	LaRC Waste Management and Spill Response Training	At least three "in person" classes annually; virtual training available anytime	LaRC Annual Waste Management and Spill Response training held four "in person" classes training a total of 709 employees. Additional LaRC personnel completed the training via a recorded on-demand training option.
	Grounds Maintenance Contractor SWM BMP Training	Biennially	The most recent training was held on 03/27/2023 with 12 attendees. The next class is planned for 2025.
	Maintenance-Specific SWM Training for personnel performing roadway and recreational area maintenance	Biennially	A targeted training session was held on 05/02/2022 with 47 attendees. The next class is planned for 2024.

Signed Certification Statement

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

KRISTEN POULTNEY Digitally signed by KRISTEN POULTNEY Date: 2023.09.22 09:10:34 -04'00' 9/22/2023

Kristen Poultney, Environmental Office Head Date

VAR040092 NASA Langley Research Center
Permit Number MS4 Name