



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

Covering the period of July 1, 2018 – June 30, 2019



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

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Annual Reporting Requirements
Part I D 2

The annual report shall include the following general information:

- a. The permittee, system name, and permit number;
- b. The reporting period for which the annual report is being submitted;
- c. A signed certification as per Part III K;
- d. Each annual reporting item as specified in an MCM in Part I E; and
- e. An evaluation of the MS4 program implementation, including a review of each MCM, to determine the MS4 program's effectiveness and whether or not changes to the MS4 program plan are necessary.

General information:

- a. NASA Langley Research Center, VAR040092
- b. The reporting period for this annual report is July 1, 2018 through June 30, 2019
- c. The signed Certification Statement can be found on the last page of this annual report
- d. Each annual reporting item as specified in an MCM in Part I E can be found on pages 5-24
- 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 LaRC in effectively implementing the requirements of the permit. MS4 program effectiveness was evaluated through SPEEB internal review process taking into account public input. Opportunities for improvement were evaluated and the program's implementation was determined to be effective, thus no major changes were necessary. A review of each MCM is included below:

MCM 1 – The three high priorities have been selected based on the most pressing stormwater-related issues at LaRC. LaRC continued to advertise educational outreach on the public website, through distribution of articles, flyers and targeted e-mails, and through numerous training sessions. LaRC has successfully reached a diverse audience with information on how to reduce stormwater pollution, and other ways of helping protect and improve the water quality of local waterways. This component of the program was evaluated for effectiveness through SPEEB internal review process and public input. It was found to be very effective and no changes are necessary.

MCM 2 – LaRC solicits public input via the employee @LaRC announcement system in order to improve the Program Plan. Additionally, public input is encouraged at any time through our public environmental webpage. Reporting of illicit discharges is encouraged continuously during trainings, in our public website, and through outreach articles and flyers that are distributed quarterly. Personnel can report by calling or emailing SPEEB staff, and more information on LaRC's IDDE program can be accessed in our public website. Additionally, LaRC's public involvement opportunities include a variety of events that are coordinated by the environmental team, and external events that are advertised through @LaRC announcements. This component of the program was evaluated for effectiveness through SPEEB internal review process and public input. A potential opportunity for improvement includes evaluating improved mechanisms/forms for increased public reporting/input, and evaluating improved methods for tracking complaints and participation in events. The Program Plan will be updated should these improvements occur.

MCM 3 – Illicit discharges are prohibited at LaRC and it is addressed primarily through LaRC's IDDE Handbook, the Langley Procedural Requirements (LPR) 8500.1, LaRC's approved Annual Standards and Specifications, and annual trainings offered to personnel. Under a VPDES permit, LaRC also implements a DEQ approved Operations and Maintenance (O&M) manual to minimize or prevent pollutant discharges. This component of the program was evaluated for effectiveness through SPEEB internal review process. This program was found to be effective and no Program Plan changes are needed.

MCM 4 – This component of the program is implemented primarily through LaRC's DEQ approved Annual Standards and Specifications for SWM and ESC, and LaRC's Environmental Construction Specifications Section 01 35 40.00 41. LaRC's Annual Standards and Specifications for ESC and SWM have been developed to provide detailed information on LaRC's stormwater construction program, and ensure compliance with all regulatory requirements as well as Part I E 4 a 3 of the permit. A new staff member, Alexandra Salcedo-Bauza, was included as contract support. This component of the program was evaluated for effectiveness through SPEEB internal review process. This program was found to be effective and the program has been approved by DEQ. No Program Plan are needed.

MCM 5 – This component of the program is implemented primarily through LaRC's approved Annual Standards and Specifications. Projects are also expected to comply with LaRC's Environmental Specifications Section 01 35 40.00 41, NASA Environmental Design Standards, and feedback through the design review process. In addition, LaRC's Green Infrastructure Maintenance Handbook has been developed to ensure adequate long-term operation and maintenance of SWM facilities. This component of the program was evaluated for effectiveness through SPEEB internal review process. This program was found to be effective and no Program Plan changes are needed.

MCM 6 – LaRC uses a variety of operational and maintenance BMPs to ensure that Center operations are accomplished in a way that minimizes or prevents pollutant discharges. Appropriate control measures and pollution prevention practices are implemented primarily through language in procedural documents, including the Environmental and Energy Program Manual (LPR 8500.1), LaRC’s Annual Standards and Specifications, and LaRC’s IDDE Handbook. The Center also utilizes a robust training plan that includes targeted training for contractors completing maintenance and construction tasks. LaRC also enforces the use of the Langley Form 461 (LF461), the “Environmental Project Planning Form”, that allows SPEEB to review projects, and provide feedback or requirements to reduce negative environmental impacts. LaRC has met the requirement to develop and implement a SWPPP for the high-priority facility, Grounds Maintenance Yard, and continues to monitor and inspect the facility. This component of the program was evaluated for effectiveness through SPEEB internal review process. The program was found to be effective. An opportunity for improvement includes evaluating potential improvements in written procedures. The Program Plan will be updated should these improvements occur.

TMDL Special Conditions– LaRC submitted its Chesapeake Bay Phase Two Action Plan draft to DEQ with the registration statement for the new General Permit. A final updated plan will be submitted to the DEQ within the required 12 months. The program has been found to be effective and LaRC is ahead of project load reductions needed. Additionally, LaRC has been allocated a waste load reduction for the Back River TMDL. NASA LaRC will develop and initiate implementation of an action plan to meet conditions of the Part II of the draft General Permit, no later than 30 months after the permit effective date. The action plan will be maintained and implemented by SPEEB, and a copy will be available upon request once complete.

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

- (1) A list of the high-priority stormwater issues the permittee addressed in the public education and outreach program; and
- (2) A list of strategies used to communicate each high-priority stormwater issues.

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

(1) High-Priority Stormwater Issues Addressed	(2) Strategies Used to Communicate
<p>Water Quality and Winter Precipitation: Best Management Practices (BMPs)</p>	<p>Media materials- an educational article, <i>Deicing Best Management Practices and Green Alternatives</i>, was published on 12/20/18 to the public environmental website, and advertised via @LaRC. The article discussed how deicers work, the different types available on the market, and BMPs to mitigate environmental impacts. The article showcased greener alternatives and strategies to reduce deicer usage on Center and at home.</p> <p>An educational Reference Folder is sent annually to FECs to provide relevant information and policy reminders for maintaining environmental compliance. The reference folder was sent on 8/1/18 and covered various environmental media programs including educational flyers on LaRC’s IDDE program, pollution prevention practices, and proper hazardous waste disposal.</p>
<p>Litter Prevention: Illicit Discharge Detection and Elimination (IDDE)</p>	<p>Media materials- an educational article, <i>Help Stop the Journey of Our Trash</i>, was published on 3/19/19 to the public environmental website, and advertised via @LaRC. The article discussed how trash can reach local waterways through the storm drain system, its negative impact on water quality and wildlife, and how “garbage patches” are formed by ocean currents. The article highlighted the ubiquity of cigarette butts in litter across the world and techniques to mitigate.</p> <p>An educational Reference Folder is sent annually to FECs to provide relevant information and policy reminders for maintaining environmental compliance. The reference folder was sent on 8/1/18 and covered various environmental media programs including educational flyers on LaRC’s IDDE program, pollution prevention practices, and proper hazardous disposal.</p> <p>Speaking engagements- a detailed list of training events conducted in accordance with Part I E 6 m can be found under MCM 6 section. The following training sessions covered topics on stormwater pollution prevention, detecting and reporting illicit discharges, and spill response: <i>Recognizing and Reporting Stormwater Pollution</i>,</p>

(1) High-Priority Stormwater Issues Addressed	(2) Strategies Used to Communicate
	<p>held on 6/5/19; <i>Environmental Refreshers: Erosion, Stormwater, and Waste</i>, held on 6/10/19 and 6/27/19; Annual FEC trainings, held on 6/8/19, 7/12/18, and 7/19/19; Annual Waste Management and Spill Response Training, held on 7/12/18, 8/9/18, 6/4/19, and 6/5/19; and Grounds Management Training, held on 6/4/19.</p>
<p>Chesapeake Bay and Back River TMDL Education</p>	<p>Media materials: an educational article, <i>Fall Lawn Care Tips</i>, was as published on 8/29/18 to the public environmental website, and advertised via @LaRC. The article provided guidance on reducing the pollutants (e.g. phosphorus, sediment, bacteria, and toxins) from entering the Chesapeake Bay. Tips included taking a soil test, applying fertilizer properly, selecting the recommended grass seed, and returning grass clippings to the lawn area.</p> <p>An educational article, <i>The Chesapeake Bay Pollution Diet</i>, was published on 2/8/19 to the public environmental website, and advertised via @LaRC. The article explained how the Chesapeake Bay TMDL will help restore water quality, outlined the pollutants of concern and their negative environmental impacts, and provided information on BMPs implemented at LaRC to intercept, treat, and reduce stormwater runoff.</p> <p>An educational article, <i>The Back River Bacteria Diet</i>, was published on 3/18/19 to the public environmental website, and advertised via @LaRC. The article discussed the sources and types of bacteria that are used as water quality indicators of fecal contamination, and BMPs implemented by LaRC and Hampton Roads to reduce bacteria loads such as green infrastructure, investing in city improvements, public education such as “no discharge” facilities in marinas, and pet waste disposal stations.</p> <p>Speaking engagements- a detailed list of training events conducted in accordance with Part I E 6 m can be found under MCM 6 section. The following training sessions covered topics on LaRC’s TMDLs, pollutants of concern, and stormwater pollution prevention: <i>Recognizing and Reporting Stormwater Pollution</i>, held on 6/5/19; <i>Environmental Refreshers: Erosion, Stormwater, and Waste</i>, held on 6/10/19 and 6/27/19; and Grounds Management Training, held on 6/4/19.</p>

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

- (1) A summary of any public input on the MS4 program received (including stormwater complaints) and how the permittee responded;
- (2) A webpage address to the permittee's MS4 program and stormwater website;
- (3) A description of the public involvement activities implemented by the permittee;
- (4) A report of the metric as defined for each activity and an evaluation as to whether or not the activity is beneficial to improving water quality; and
- (5) The name of other MS4 permittees with whom the permittee collaborated in the public involvement opportunities.

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

Public Input Received	Response and Implementation
Contractor on-site requested a safety minute on stormwater pollution and IDDE.	The safety minute on the requested topic was held on 10/16/18.
Contractor on-site requested a training session on stormwater pollution prevention for project managers.	The training session on the requested topic was held on 6/27/19.
Received request for guidance on proper disposal of chemical and household products, as well as local disposal/collection events.	A household chemical collection event was advertised on 7/9/19 and will count towards the next reporting year. LaRC has participated in promoting hazardous waste collection events in the past, and will continue to support these events by promoting through @LaRC announcements.

- (2) The LaRC MS4 program and stormwater website: <https://environmental.larc.nasa.gov/water/ms4/>.
- (3,4) 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. All events were promoted on Center through promotion, sponsorship and/or involvement.

Category of Public Involvement Opportunity – Educational Events

1) Chesapeake Bay Foundation (CBF) Brock Environmental Center Tour

Activity Description: NASA Langley provided an opportunity for personnel to attend a tour of the Chesapeake Bay Foundation’s Brock Environmental Center on 10/9/18. The Brock Environmental Center

is designed to meet the strictest environmental standards in accordance with the Living Building Challenge. The Brock Environmental Center demonstrates environmentalist concepts and provides education on the environment.

Metric and Evaluation of Water Quality Benefits: This tour was coordinated by SPEEB staff, and announcements were posted on the @LaRC page, public environmental blog, and center-wide emails. The @LaRC announcements received 89 visitors from 9/25/18 through 10/5/18. The Center is an innovative example of environmentally sensitive and smart building—among the first in the nation to embrace energy and water independence—and advances CBF’s efforts to defend the Chesapeake Bay. Twelve (12) LaRC employees participated in this tour where they had the opportunity to learn about stormwater management concepts and their benefits for improving water quality.

2) NASA Langley’s Earth Day/Arbor Day Expo

Activity Description: SPEEB hosted the annual Earth Day and Arbor Day Expo on 4/23/19 in the Integrated Engineering Services Building (IESB). The event was held adjacent to the cafeteria in B2102 and was open to all personnel. The expo featured ten (10) environmental interactive exhibits from several Langley programs and local environmental groups, including citizen science for water quality monitoring, CBF, and AskHRgreen.

Metric and Evaluation of Water Quality Benefits: The expo event was coordinated by SPEEB staff, and announcements were posted on the @LaRC page, public environmental blog, and center-wide emails. The @LaRC announcements received 1,066 visitors from 4/2/19 to 4/25/19. The event was well attended and generated enthusiastic feedback. The event was hosted adjacent to the cafeteria, so hundreds of employees were able to network and interact with exhibitors that featured information on recycling, stormwater pollution prevention, water quality, community involvement opportunities, native plants, pollinators, and more.

3) Tree Steward Event – Master Naturalist Speaker

Activity Description: NASA Langley hosted environmental speakers in recognition of Earth Day 2019. On 4/18/19, Daina Henry, the President of the Peninsula Master Naturalists, presented *24 Ways to Kill a Tree*, an educational presentation focused on the importance, benefits, and proper care of trees.

Metric and Evaluation of Water Quality Benefits: The event was coordinated by SPEEB staff, and announcements were posted on the @LaRC page, public environmental blog, and center-wide emails. The @LaRC announcements received 787 visitors from 4/2/19 through 4/18/19. Twenty (20) LaRC personnel attended the presentation which concluded with a giveaway of a dozen young, native trees. During the presentation, attendees learned how to avoid 24 common ways of unintentionally killing trees, valuable tips on how to correctly care for them, and the many ecological benefits of trees such as improving water quality and minimizing flood risk.

4) Oyster Restoration Event – CBF Speaker

Activity Description: NASA Langley hosted environmental speakers in recognition of Earth Day 2019. On 4/25/19, Heather Lockwood, the Virginia Oyster Restoration Specialist for CBF, presented educational information on oyster restoration programs in Virginia and how to be part of CBF’s mission to “Save the Bay”.

Metric and Evaluation of Water Quality Benefits: The event was coordinated by SPEEB staff, and announcements were posted on the @LaRC page, public environmental blog, and center-wide emails. The

@LaRC announcements received 1,056 visitors from 4/2/19 through 4/25/19. Twenty (20) LaRC employees attended the presentation with a dozen signing up for involvement in oyster restoration activities. Attendees learned about the ecological importance of oyster reefs, received tips on oyster gardening, and learned how the Back River oyster reef will help restore the oyster population in the Bay while helping improve water quality.

Category of Public Involvement Opportunity – Disposal or Collection Events

1) NASA Langley Plastic Bag Recycling

Activity Description: NASA Langley continued its partnership with the York/Poquoson Master Gardeners to recycle plastic bags and film packaging. LaRC collected plastic bag material from Center personnel for 4 weeks in observance of Energy Action Month in October 2018, and for 4 weeks in observance of Earth Day and Arbor Day in April 2019. All plastic material collected on Center is donated to the York/Poquoson Master Gardeners and can be used to make composite benches that are placed at community parks, schools, or learning gardens.

Metric and Evaluation of Water Quality Benefits: The event was coordinated by SPEEB staff, and announcements were posted on the @LaRC page, public environmental blog, and center-wide emails during the months of October (2018) and April (2019). The @LaRC announcements received 338 and 305 visitors, respectively. Collection details and results were posted on the public environmental blog. The recycling efforts were effective and strong employee participation resulted in the diversion of 423 pounds of plastic bags and films.

2) Curbside Recycling

Activity Description: The Virginia Peninsulas Public Service Authority (VPPSA) curbside residential recycling program provides collection of household recyclable materials. LaRC has received positive feedback on these events in the past and looks to continue supporting and promoting curbside recycling and hazardous waste collection events in the Hampton Roads community.

Metric and Evaluation of Water Quality Benefits: LaRC participated in this event through promotion of a VPPSA flyer via @LaRC announcements. The flyer providing guidelines for curbside recycling during the holiday season. The @LaRC announcements received 354 visitors from 11/27/18 through 12/19/18. By advertising VPPSA recycling guidance, LaRC helps create public awareness on correct recycling practices. Curbside recycling helps divert waste from landfills, and prevents dumping -and potentially toxic leachate- into creeks and local waterways.

Category of Public Involvement Opportunity – Restoration

1) Elizabeth River Project Annual RIVERFest

Activity Description: The Elizabeth River Project (ERP) hosted its annual RIVERFest environmental festival on 10/6/18. This outdoor festival hosted by the non-profit ERP to create excitement, understanding, and community involvement in the restoration of the environmental health of the Elizabeth River.

Metric and Evaluation of Water Quality Benefits: LaRC participated through promotion of this event via @LaRC announcements. The @LaRC announcements received 150 visitors from 9/12/18 through 10/5/18. By advertising the RIVERFest event, LaRC helps create public awareness on environmental restoration activities and promotes community participation. The festival features free kayak paddle tours, a native plant walk, education on water quality, and more pollution prevention topics applicable to Hampton Roads. Volunteers help advance the restoration and the environmental health of the the Elizabeth River.

2) Hampton Roads 10th Go Green Expo

Activity Description: The Newport News, Hampton, and York County/Poquoson Master Gardeners hosted the 10th Annual Go Green Expo on 9/8/18. The Go Green Expo is Hampton Roads' premier horticultural, sustainability, indoor event.

Metric and Evaluation of Water Quality Benefits: LaRC participated through promotion of this event via @LaRC announcements. The @LaRC announcements received 101 visitors from 9/4/18 through 9/7/18. The event featured speakers, workshops for rain barrels and sustainable gardening, and a farmers market. Participants are able to learn about eco-friendly products and pollution prevention practices that can be incorporated into daily activities to help improve water quality. By advertising the Go Green Expo event, LaRC helps create public awareness on local environmental activities, and promotes community participation.

3) Building 2101 Green Roof Restoration

Activity Description: On 4/25/19, over 1,200 ft² of the LaRC Administrative Building (B2101) green roof was weeded and planted with 864 “coral carpet” sedum plugs by volunteers. The green roof has completed five phases of weeding and planting since September 2016, with a total of 12,664 sedum plugs installed on the roof area. To aid plant establishment, the LaRC grounds maintenance contract continues periodic inspection, fertilization, weeding, and summertime irrigation.

Metric and Evaluation of Water Quality Benefits: The event was coordinated by LaRC staff, and announcements were posted on the @LaRC page, public environmental blog, and center-wide emails. The @LaRC announcements received 180 visitors from 4/2/19 through 4/18/19. Twenty (20) LaRC employees and community volunteers participated on the restoration event. Green roofs provide numerous benefits such as runoff reduction and improving water quality by removal of pollutants.

4) Annual Clean the Bay Day

Activity Description: Since the event began in 1989, Clean the Bay Day has engaged thousands of volunteers who have removed more than 7.1 million pounds of debris from Virginia's shoreline. Clean the Bay Day performs as a gateway program through which children and adults alike embrace environmental stewardship of their waterways.

Metric and Evaluation of Water Quality Benefits: LaRC participated through promotion of this event via @LaRC announcements. The @LaRC announcements received 179 visitors from 5/21/19 through 5/28/19. By advertising the Clean the Bay Day event, LaRC helps create public awareness on local environmental activities, and promotes community participation. Clean the Bay Day is an annual stream and shoreline cleanup program where citizen volunteers remove litter and debris from Virginia creeks, streams, rivers, and the Chesapeake Bay.

Category of Public Involvement Opportunity – Pollution Prevention

1) Rain Barrel Workshops

Activity Description: The city of Hampton and Newport News hosted several rain barrel workshops during the reporting year. Workshop attendees learn about the problems associated with stormwater runoff, ways to conserve water in their homes, and watershed friendly landscaping techniques. LaRC received positive

feedback on these events in the past and looks to continue supporting and promoting these workshops in the Hampton Roads community.

Metric and Evaluation of Water Quality Benefits: LaRC promoted this event via posting to the @LaRC site. Announcements were posted in August (2018) and May (2019) for multiple upcoming events and received a total of 375 visitors. By advertising rain barrel workshops, LaRC encourages the use of residential stormwater BMPs. Rain barrels are a great to alleviate some of Hampton Roads stormwater issues by conserving water, supplying non-chlorinated water for gardening, and keeping excess water out of the stormwater system.

2) Gardening with Native Plants Workshops

Activity Description: The city of Hampton and Newport News hosted several gardening workshops featuring native plants. Native plants are essential for a healthy watershed as they are adapted to local climate and soils. NASA Langley participated in educating the public through promotion of local gardening workshops via @LaRC announcements.

Metric and Evaluation of Water Quality Benefits: The following local workshops were advertised via @LaRC announcements: *Attracting Native Bees* received 181 visitors from 2/11/19 through 2/15/19; *Seed Swap and Basic Seed Starting* received 140 visitors from 2/11/19 through 2/15/19; *CNU's Annual Gardening Symposium* received 125 visitors from 3/18/19 through 3/22/19; and *Spring Native Plant Sale* received 296 visitors from 3/25/19 through 3/29/19. By advertising native plants workshops, LaRC encourages the use native species, helps create awareness on local pollinators and promotes sustainable gardening practices. Native plants reduce the need for fertilizing (a pollutant of concern for the Chesapeake Bay), require less watering, and provide natural habitat for wildlife.

(5) No other MS4 permittees were officially collaborated with on public involvement opportunities. However, NASA LaRC routinely promoted local stormwater-related events in the Hampton Roads area.

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

- (1) A confirmation statement that the MS4 map and information table have been updated to reflect any changes to the MS4 occurring on or before June 30 of the reporting year;
- (2) The total number of outfalls screened during the reporting period as part of the dry weather screening program; and
- (3) A list of illicit discharges to the MS4 including spills reaching the MS4 with information as follows:
 - (a) The source of illicit discharge;
 - (b) The dates that the discharge was observed, reported, or both;
 - (c) Whether the discharge was discovered by the permittee during dry weather screening, reported by the public, or other method (describe);
 - (d) How the investigation was resolved;
 - (e) A description of any follow-up activities; and
 - (f) The date the investigation was closed.

- (1) **Confirmation Statement:** LaRC's MS4 map and information table have been updated to reflect any changes to the MS4 occurring on or before 6/30/19. 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 NASA Environmental.
- (3) A total of four (4) illicit discharges were reported and investigated:

Illicit Discharge Investigation #1: Murky Water at Outfall 003

- (a) Illicit discharge of sediment-laden water due to improper dewatering into a drop inlet at Measurement Systems Laboratory (MSL) construction site (B2104);
- (b,c) Observed on 9/5/18 during a construction site ESC/SWM inspection;
- (d-f) Inspector asked the subcontractors to relocate the bag away from the inlet and to clean/remove sediment from the area. MSL Project Manager (PM) was notified and a Corrective Action Notice (CAN) was issued due to the illicit discharge. Follow-up inspections were done at the site to enforce compliance with ESC and P2 practices. The investigation was closed on 9/6/18.

Illicit Discharge Investigation #2: Murky Water at Outfall 003

- (a) Illicit discharge of sediment-laden water due to ineffective inlet protection (IP) at MSL construction site (B2104);
- (b,c) Observed on 2/22/19 during a construction site ESC/SWM inspection;
- (d-f) The PM of MSL was contacted immediately and a CAN was issued due to the illicit discharge. Subcontractors were asked to replace IPs, to dewater using sediment filtering bags placed away from inlets, and to review erosion and sediment control (ESC) and pollution prevention (P2) practices. Follow-up inspections were done at the site to verify IPs were adequate, and to enforce compliance with BMPs. The investigation was closed on 2/25/19.

Illicit Discharge Investigation #3: Litter at Outfall 003

(a) Improper trash disposal at MSL construction site (B2104);
(b,c) Observed on 4/10/19 during a construction site ESC/SWM inspection;
(d-f) The PM of MSL was informed immediately of issues observed during the inspection and a CAN was issued due to illicit discharge. The subcontractors were asked to collect all trash at the construction site, dispose of them properly, and to review P2 plan. The trash and debris observed in the outfall's oily water separator (OWS) was removed by the Center's maintenance contractor (Jacobs) on 4/11/19. Follow-up inspections were done at the site to enforce compliance with BMPs. The investigation was closed on 4/15/19 following the compliance of other items noted in the CAN.

Illicit Discharge Investigation #4: Geothermal water

(a) Geothermal well leak bubbling up to the surface of B1212 parking lot (reported to DEQ PREP);
(b,c) Observed and reported by LaRC personnel on 4/24/19;
(d-f) Dye testing was conducted and identified the source of the leak as a conveyance line within the well field vault. Facility personnel shut off the valve to the pipe, abandoned that zone of the geothermal well field, and resumed running the facility as normal. Repairs to the system are not currently needed at this time as the capacity of the system is sufficient for its operation. The water leak is now isolated and the system is no longer consuming excess make-up water. The investigation was closed on 5/24/19.

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

- (1) If the permittee implements a construction site stormwater runoff program in accordance with Part I E 4 a (3):
 - (a) A confirmation statement that 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
 - (b) If one or more of the land disturbing projects were not conducted with the department approved standards and specifications, an explanation as to why the projects did not conform to the approved standards and specifications.
- (2) Total number of inspections conducted; and
- (3) The total number and type of enforcement actions implemented and the type of enforcement actions.

- (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 71 for the reporting year.
- (3) Per approved NASA Annual Standards and Specifications, the contractor may remedy minor deficiencies that have no environmental impacts without formal enforcement action, as long as this is done in a timely manner and not a recurring issue. Four (4) issues required formal enforcement action, through a signed *Corrective Action Notice* form.

Project	No. of Enforcement Actions	Type of Enforcement	Issues Driving the Enforcement
VAR10J220	4	Formal written Corrective Action Notice (CAN) submitted to the contractor and project team.	9/5/18 – Illicit discharge of muddy water from improper dewatering activities. 12/10/18 – SWPPP incompliance due to missing inspections. 2/22/19 – Illicit discharge of muddy water from ineffective inlet protection. 4/10/19 – Illicit discharge from improper dewatering and trash disposal, and SWPPP incompliance due to missing inspections, and SWPPP updates.

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

- (1) Implementation of a Virginia Stormwater Management Program in accordance with Part I E 5 a (1) and (2); (a) & (b)
- (2) Total number of inspections conducted on stormwater management facilities owned or operated by the permittee;
- (3) A description of the significant maintenance, repair, or retrofit activities performed on the stormwater management facilities owned or operated by the permittee to ensure it continues to perform as designed. This does not include routine activities such as grass mowing or trash collection;
- (4) A confirmation statement that the permittee submitted stormwater management facility information through the Virginia Construction Stormwater General Permit database for those land disturbing activities for which the permittee was required to obtain coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities in accordance with Part I E 5 f or a statement that the permittee did not complete any projects requiring coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities; and
- (5) A confirmation statement that the permittee electronically reported BMPs using the DEQ BMP Warehouse in accordance with Part I E 5 g and the date on which the information was submitted.

(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) Nineteen (19) formal inspections were conducted, once for each of the 19 stormwater management facilities operated at NASA LaRC. SPEEB and the support contractor also conduct SWM facility inspections during construction as part of the ESC inspection process.

(3) The majority of the maintenance done on the SWM facilities was routine. The following significant maintenance was performed:

Green Roof Restoration at Administrative Building (B2101) – LaRC's green roof located on B2101 underwent major maintenance and restoration on 4/25/19. Weeding took place on an area over 1,200 ft², and 864 "coral carpet" sedum plugs were planted on LaRC's B2101 green roof. The green roof has completed five phases of weeding and planting since September 2016, with a total of 12,664 sedum plugs installed over the roof area. To aid plant establishment, the LaRC grounds maintenance contract continues periodic inspection, weeding, and summertime irrigation.

(4) **Confirmation Statement:** NASA Langley ensured that operators under the General VPDES Permit for Discharges of Stormwater from Construction Activities on NASA federal property and under NASA's approved AS&S program submitted stormwater management facility information to the state database during Notice of Termination to Richmond, VA. This only included one site during the permit year – VAR10G999.

(5) **Confirmation Statement:** NASA Langley electronically reported BMPs using the DEQ BMP Warehouse on 8/23/19. The approved submission was labeled as 20190823.

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

- (1) A summary of any operational procedures developed or modified in accordance with Part I E 6 a during the reporting period;
- (2) A summary of any new SWPPPs developed in accordance Part I E 6 c during the reporting period;
- (3) A summary of any SWPPPs modified in accordance with Part I E 6 f or the rationale of any high priority facilities delisted in accordance with Part I E 6 h during the reporting period;
- (4) A summary of any new turf and landscape nutrient management plans developed that includes:
 - (a) Location and the total acreage of each land area; and
 - (b) The date of the approved nutrient management plan
- (5) A list of the training events conducted in accordance with Part I E 6 m, including the following information:
 - (a) The date of the training event;
 - (b) The number of employees who attended the training event; and
 - (c) The objective of the training event.

- (1) LaRC has not developed any new or modified any existing operational procedures during the reporting period. 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) No SWPPP modifications were needed or implemented. The one high priority facility for was not delisted during the reporting period.
- (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 is a summary of completed training during the reporting year:

Training Requirement/ Objective	Selected Audience	Summary
<p>(1) Field personnel receive training in the recognition and reporting of illicit discharges no less than once per 24 months</p>	<p>Facility Environmental Coordinators (FECs)</p>	<p>Annual FEC Training – Training was held on 7/12/18, 7/19/18, and 6/18/19 with 9, 7, and 15 attendees, respectively. A total of 31 FECs were trained. FECs are asked to monitor their facilities for illicit discharge concerns and are the primary “eyes and ears” for the SPEEB. The FEC training course goes into detail about stormwater pollution prevention and the importance of LaRC’s IDDE program. It also discusses how to make proper reports to LaRC Environmental.</p> <p>Annual Waste Management and Spill Response Training – Training was held on 7/12/18, 8/9/18, 6/4/19, and 6/5/19 with 155, 87, 200, and 162 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 604 Center employees were trained. Stormwater pollution prevention is covered in the training, along with spill response to prevent materials from reaching storm drains.</p>
	<p>Standard Practice and Environmental Engineering Branch (SPEEB) employees, Jacobs (primary Center contractor) Personnel, and any interested LaRC personnel</p>	<p>Illicit Discharge/Stormwater Management Training – A special training session, titled <i>Recognizing and Reporting Stormwater Pollution</i>, was held on 6/5/19 with 3 attendees. This training educated personnel on stormwater runoff pollution, impacts on water quality, and possible sources of pollution in the workplace. The training also provided tips on how to recognize illicit discharges, and resources available at NASA Langley to report an illicit discharge.</p>
	<p>Personnel who handle waste on Center.</p>	<p>Annual Waste Management and Spill Response Training – Training was held on 7/12/18, 8/9/18, 6/4/19, and 6/5/19 with 155, 87, 200, and 162 attendees, respectively. This annual training is mandatory for all Center employees use, handle, or request disposal of hazardous materials, oils, or hazardous waste. A total of 604 Center employees were trained. Stormwater pollution prevention is covered in the training, along with spill response to prevent materials from reaching storm drains.</p>

Training Requirement/ Objective	Selected Audience	Summary
<p>(2) Employees performing road, street, and parking lot maintenance receive training in pollution prevention and good housekeeping associated with those activities no less than once per 24 months</p>	<p>Grounds Maintenance Contractor</p>	<p>Grounds Management Training – This training is delivered biannually. The most recent training was held on 6/4/19 and had a total of 11 attendees. The training is focused on several stormwater best management practices specific to their daily workload, including the management of grass clippings, removing debris from catch basins, and 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 Environmental Office. The next training will take place during PY2.</p>
	<p>Jacobs (primary Center contractor) Personnel, and any interested LaRC personnel</p>	<p>Maintenance Stormwater Management Training – A special training session, titled <i>Recognizing and Reporting Stormwater Pollution</i>, was held on 6/5/19 with 3 attendees. This training educated personnel on stormwater runoff pollution, impacts on water quality, and possible sources of pollution in the workplace. The training also provided tips on how to recognize illicit discharges, and resources available at NASA Langley to report an illicit discharge.</p>
<p>(3) Employees working in and around maintenance, public works, or recreational facilities receive training in good housekeeping and pollution prevention practices associated with those facilities no less than once per 24 months</p>	<p>FECs</p>	<p>Annual FEC Training – Certain FECs are employed to manage “public works-type” facilities on Center. LaRC reviews good housekeeping and pollution prevention practices around Center, including these facilities, during annual FEC training. Training was held on 7/12/18, 7/19/18, and 6/18/19 with 9, 7, and 15 attendees, respectively. A total of 31 FECs were trained. The FEC training course goes into detail about stormwater pollution prevention and the importance of good housekeeping principles in and around facilities.</p>
	<p>Jacobs (primary Center contractor) Personnel</p>	<p>Maintenance Stormwater Management Training – A special training session, titled <i>Environmental Refreshers: Erosion, Stormwater, and Waste</i>, was held on 6/10/19 and 6/27/19 with 10 and 40 attendees, respectively. This training was targeted towards Jacobs PMs and CMs at NASA Langley. The training focused how to prevent, recognize, and report illicit discharges at construction sites and facility maintenance projects. Topics covered included proper procedures for day-to-day tasks, outside storage of</p>

Training Requirement/ Objective	Selected Audience	Summary
		chemicals, secondary containment, good housekeeping, and getting proper environmental review of a project before work begins.
	Grounds Maintenance Contractor	Grounds Management Training – This training is delivered biannually. The most recent training was held on 6/4/19 and had a total of 11 attendees. The training is focused on several stormwater best management practices specific to their daily workload, including the management of grass clippings, removing debris from catch basins, and 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 Environmental Office. The next training will take place during PY2.
(4) Employees and contractors hired by the permittee who apply pesticides and herbicides are trained or certified in accordance with the Virginia Pesticide Control Act.	Grounds Maintenance Contractor	LaRC has very limited recreational facilities due to its small size. 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., someone calls in a wasp nest to be sprayed). NASA has required, through specific contract language, that the Grounds Maintenance contract operator carry all necessary state licenses. This contract language ensures that this requirement is met or the operator can't work at NASA LaRC.
(5) Employees and contractors serving as plan reviewers, inspectors, program administrators, and construction site operators obtain the appropriate certifications as required under the Virginia Erosion and Sediment Control Law and its attendant	Standard Practice and Environmental Engineering Branch (SPEEB)	<p>Mr. Peter Van Dyke serves as LaRC's Water Program Manager. Mr. Van Dyke is in charge of all ESC and SWM Plan reviews and inspection programs. Mr. Van Dyke has ESC and SWM Combined Administrator certifications.</p> <p>Dual Combined Administrator #DCA0184 (Expires 4/17/2021)</p> <p>Mrs. Alexandra Salcedo-Bauzá provides contract support to LaRC's Water Program Manager. Support</p>

Training Requirement/ Objective	Selected Audience	Summary
<p>regulations; and (6) Employees and contractors implementing the stormwater program obtain the appropriate certifications as required under the Virginia Stormwater Management Act and its attendant regulations;</p>		<p>includes plan reviews and site inspections. Mrs. Salcedo-Bauzá is a dual combined inspector, and is provisionally certified as a Dual Plan Reviewer and Program Administrator.</p> <p>Dual Inspector #DIN1117 (Expires 3/22/2022)</p> <p>Ms. Jazmin Argarin also provides contract support to LaRC’s Water Program Manager and conducts multi-media field inspections of construction sites and maintenance tasks. Ms. Argarin is a dual combined inspector for ESC and SWM.</p> <p>Dual Combined Inspector #DIN0965 (Expires 8/11/2021)</p>
<p>(7) Employees whose duties include emergency response have been trained in spill response. Training of emergency responders such as firefighters and law-enforcement officers on the handling of spill releases as part of a larger emergency response training shall satisfy this training requirement and be documented in the training plan.</p>	<p>All applicable Center Personnel</p>	<p>Annual Waste Management and Spill Response Training – Training was held on 7/12/18, 8/9/18, 6/4/19, and 6/5/19 with 155, 87, 200, and 162 attendees, respectively. This annual training is mandatory for all Center employees use, handle, or request disposal of hazardous materials, oils, or hazardous waste. A total of 604 Center employees were trained. Stormwater pollution prevention is covered in the training, along with spill response to prevent materials from reaching storm drains.</p>
	<p>Emergency responders such as firefighters and law-enforcement officers</p>	<p>Emergency responders receive training on the handling of spill releases as part of a larger emergency response training.</p>

Part II TMDL Summaries	
TMDL Special Conditions – Chesapeake Bay TMDL Annual Reporting Requirements – Part II A 13	
a.	A list of BMPs implemented during the reporting period but not reported to the DEQ BMP Warehouse in accordance with Part I E 5 g and the estimated reduction of pollutants of concern achieved by each and reported in pounds per year;
b.	If the permittee acquired credits during the reporting period to meet all or a portion of the required reductions in Part II A 3, A 4, or A 5, a statement that credits were acquired;
c.	The progress, using the final design efficiency of the BMPs, toward meeting the required cumulative reductions for total nitrogen, total phosphorus, and total suspended solids; and
d.	A list of BMPs that are planned to be implemented during the next reporting period.

- 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 20190823.
- b. Not applicable. NASA LaRC did not acquire credits to meet required reductions.
- c. The following table outlines the progress toward meeting the required cumulative reductions for total nitrogen, total phosphorus, and total suspended solids:

Cumulative Progress Report end of PY1:

Sub source	Pollutant	Load Reduction Required by 2023 (end of permit)	Total Load Reduction Achieved To Date	Remaining Load Reductions Planned Permit Cycle	Cumulative Load Reductions Planned/Achieved through 6/30/2023
Regulated Urban Impervious	TN	57.28	237.32	200.67	437.99
Regulated Urban Pervious		46.04	31.48	18.12	49.6
Regulated Urban Impervious	TP	21.03	80.57	73.17	153.74
Regulated Urban Pervious		3.71	3.08	1.72	4.8
Regulated Urban Impervious	TSS	7952.08	25112.95	22400.50	47513.45
Regulated Urban Pervious		638.79	526.56	301.16	827.72

- d. The following is a list of control measures expected to be implemented during PY2:
- One facility complex is proposed to be demolished and will equate to a land-use change removing 0.61 acres of impervious surface and converted to a grass condition.
 - LaRC will continue the street sweeping program, annual mass load credit approach, during PY2.
 - LaRC will continue to implement a catch basin cleaning program.
 - LaRC will continue to implement ESC controls on land disturbing activities.

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
Kristen Poultney, Environmental Branch Head

9/30/19
Date

VAR040092 NASA Langley Research Center
Permit Number MS4 Name